

Original Unedited Cherokee Chat Archives
2001 – 2004
Cherokee Pilots' Association

Radio Speaker

December 26, 2004, 4142

Quam makes a series of aircraft grade flame resistant higher quality speakers. The original part number of the Piper speaker (I don't know the manufacturer) was 6FU3211 (circular) as listed in the parts manual. I deconstruct that to mean 6 inch, Flame resistant, 3.2 ohms. Don't know what the U and the 11 mean.

Quam has a part number 6C5FR, which is probably equivalent. Quam shows it as a 6&1/2 inch diameter, 3.2 ohm 10 Watt speaker, 2 inches deep. Aircraft Spruce carries it for \$21. I'll look at my speaker in the next couple of days to verify that (just in case!) and for future reference.

The Radio Shack idea is a good one, but for myself, I would prefer a better quality speaker (as long as it fits!!)

Older Autopilot Repair

December 26, 2004 7071

For the older autopilots, Autopilots Central is "the" place to go for help and repairs. Our 1960's vintage units are very repairable and in fact they are not as antequy as you think. In fact, except for a very few components, namily capacitors , they are very much in the vein of current designs. They have printed circuit boards and other modern type parts on the board, in fact "the very best" components that were available the time. Why the avionics shops turn their nose up at them is beyond my understanding as the electronics in them is of the most basic of design. An electronics apprentice should easily be able to deduce the physics of the unit. Talk to Bob Ferguson. He is the man to go to for help. He has a couple of very capable bench techs that help with the work.

Tracy O'Brien Lighted Wing Tips

December 26, 2004 6119

I installed the lighted wing tips on my '68 Cherokee a few months ago. I was mostly interested in the lights. The lights work great and I could see a noticeable improvement in climb and cruise performance. I was impressed with quality of the tips and parts. The shipment came with every little thing I needed as they advertised. I had my gas tanks out at the time I installed the tips. This made it easy to run the requires wires through the wing. I am very happy with the lighted wing tips would do it again without a doubt.

Tapered Bore in Aircraft Cylinders

December 26, 2004 4827

The OH shop is correct, and most other shops are merely parts changers.

Tapered bores have disappeared from the auto industry, and just about every internal combustion engine maker, since the 1920s.

The theory was that the head portion is hotter than the lower extremities of the cylinder, and that as the engine heat rose, it was supposed to end up with a straight bore. In theory, as AC piston

engines are, it's supposed to work, in practice it is the reason for myriads of problems these dinosaurs are faced with.

.002" to .003" are actually built in, in addition to the "normal", .010 to .012 piston clearances. These engines are automatically built to burn oil and expire prematurely, have high fuel consumption, and are generally unreliable in comparison to lawnmower engines.

Locomotive engines, with gigantic pistons, operate on less clearance than a Lycoming or a Continental.

There are some Lycomings that are normally assembled new with straight bores, but most have tapered bores.

It is a very poor design feature, unacceptable by the entire internal combustion engine world, except aviation, where the least reliable engines are found

Oil Droplets from Breather In Winter Weather

December 25, 2004 7231

This is not uncommon during the winter flying. The hot gasses venting through the breather tube condense moisture droplets due to condensation (water-oil emulsion). I wouldn't worry about it. Just try to make your flights in the winter at least one hour in duration.

Headliner Installation

December 25, 2004 7884

I redid my interior back in 97 and found the headliner to be the toughest part. I liken it to wallpapering the ceiling of a round room. The problem is the damn thing won't stop falling on you. If you know anybody with some expertise, perhaps an auto interior shop or somebody who has done this I would not hesitate to pay them good money to do the work. If you're determined to do it yourself, and maybe you have a better natural knack than I do, here are a few suggestions. Use the old liner as a pattern for the new one. Start in the middle and work your way to the outside, meticulously stretching out each wrinkle for a nice tight finish. Be very careful putting the metal ceiling trim back up because once you've punched a hole in the liner and run a screw in, you won't be able to go back and stretch that part of the headliner tighter to take a wrinkle out elsewhere. It took the two of us a full day to get the liner up. There were times we just had to walk away. It did come out looking great, but it almost ruined our relationship. If you're as clueless about this stuff as I am, hire somebody to do it.

Concorde Battery

December 26, 2004 0013

Most of us have gone with the Concorde RG-35AXC and are very pleased with it. I've had mine for almost six years now and it still spins the prop. My Cherokee was like all the others, having to 'bump' it over the stroke and forget cranking on a cold day (even in August); but the first crank on that Concorde was, WOW - what a difference.

I have a '69 140B, that I've owned since '83 and have replaced the battery about every three years. I've added copper cables and a light-weight starter, but none made as much of a difference as that Concorde did.

The Concorde costs a bit more, but is usually shipped FREE with no hazardous charge, AND is well worth it. I'll not buy any other.

M20 vs Walker Air-Oil Separator

December 24, 2004 7231

I have install several of the M-20 oil separators and prefer it over the others. I think it is the best for the buck

Insurance Premium Doubles Over Last Year

December 26, 2004 1828

I work for one of the larger aviation insurance companies (there aren't too many left!), and can confirm that what you're seeing may be correct accross the board. I am a claims handler, and in the last year or two have seen and heard of many PA-32 losses involving multiple fatalities and total losses of aircraft and property damage, resulting in costly claims. Many of these involved classic VFR into IMC events, and I think that therefore underwriters are looking for increased premium or higher qualifications for PA-32 pilots to compensate. While we are all unique pilots and may have different skill sets and none of these types of claims were any of our faults, the increase in premium is likely due to a large number of PA-32 losses across the board in the past year. Just trying to offer an explanation that the increase in premium cost likely is not indicative of your abilities or those of the airplane, but rather that it likely reflects a need to recuperate from larger losses involving said aircraft. I don't know if changing your underwriter (the company that your broker/agent gets your coverage with) will help, but it never hurts to try, and you certainly can get a competitive quote or two to see

Fuel Pressure Drops Drastically During Climb

December 24, 2004, 7231

It has been my experience that this problem will go away if you bleed the air out of the pressure line. To this is simple. With master switch on, turn boost pump on. Loosen the "B" nut on the fuel line where it connects to the back of the fuel gage (besure to to have a wrench on the fuel gage fitting. When the fuel starts to drip/flow at the fuel gage, tightn the nut and I feel your problems will be solved. I have done this many times and it works. Suggest you remove the right seat and have a towel on top of you to saok up the fuel that drips as you bleed the line.

Control Surface Repair

December 23, 2004 8770

Williams Airmotive, Kendalville IN. here is their web site. <http://www.williamsairmotive.com> ...and...

December 24, 2004 7231

Associated Aero at the Wiley Post Airport specializes in reskinning control surfaces. They are in Oklahoma City. Ask for Dale at 405-789-5474

FAA Aircraft Records Site

December 23, 2004 6088

Here is the real link to the FAA records search site.

<http://162.58.35.241/e.gov/ND/AirRecordsND.asp>

Insulation Materials

December 21, 2004 5713

Thermal and acoustic insulation for aircraft is a real challenge. It is pretty easy to get good thermal properties at reasonable weights however the acoustic performance is another story. Generally more mass is better for acoustics, at least in preventing transmission. Thus I'm sure any new foam materials you put into the aircraft will be better than the fiberglass acoustical but it will be more heavy. On a per weight basis you will find it very difficult to beat fiberglass. Which is why they use it.

For our small aircraft a few extra pounds of insulation will not make a lot of difference to the performance but should at least be considered. In a Boeing 747 or Airbus A380 an extra gram or two per square meter of material is not acceptable.

Experiment and have fun with different materials, its all a balance of weight and performance. As mentioned by others. Don't forget the issue of contamination from moisture. Water can get into this area either from leaks in the aircraft or more probably from moisture in the air condensing on the skin when the aircraft is being flown. If you stick your insulation to the wall you are running the risk of trapping moisture in this area unless you are very careful. Again the major OEM's actually have spacers to keep the insulation of the skin. They have a much larger moisture problem then we do in our aircraft. They are looking at 100's of lbs of water condensing, freezing and thawing on the skin and metal structures each flight. All this runs around the insulation and out the belly of the aircraft.

Installing an Avionics Master Switch

December 22, 2004 7231

In almost every case the avionics is connected to one half of the buss bar. All you need to do is determine what circuit breakers are going to the avionics. At that point, you cut through the copper buss bar and connect a wire on each side of the cut buss bar and connect the wires to a SPST toggle switch. Mount the switch in your panel and placard it AVIONICS MASTER. This rework really need to be inspected by your mechanic and a log entry made as to what was done and signed by your mechanic.

Intermittent Electrical Problems in Entire Electrical System

December 22, 2004, 7231

90 percent of the time the problem can be isolated to corrosion on the terminals. I have found the biggest culprit to be the ground wire that runs from the engine to the left rudder pedal bearing block. This is where the airframe ground ends. It begins with the battery ground where it attaches to the frame near the battery box. Secondly, check to see if you still have aluminum primary cables. The internal resistance in the aluminum cables can be so high it can cause the system to drop off line at the most inopportune times. If you have aluminum cables, I would highly recommend getting them replaced. If not, disconnect each cable and clean the ends and mounting lugs.

Kit for Compliance With SB 1006

You can contact www.Airward.com (which is a flight training and A&P/IA operation) and also sells kits for SB1006.

...and...

December 22, 2004 7422

When I ordered the Airward Kit last Feb. it included:

2 fuel lines; 4 rubber vent line tubing; 8 SS hose clamps/for vent lines; 2 fuel sender gaskets and bolts; 1- 3oz. Dinitrol AV8; 140 Cadmium Plated tank screws (2 sizes); SB1006 Bulletin with Instructions; 1- 2oz. aerokroil penetrating oil. All items neatly packaged and labeled. You also have a choice of structural SS tank screws for a few dollars more.

Local Purchase of AV-8

December 22, 2004 8494

I have 2 liters of AV8 that I bought from a local chemical company. You can order it from Piper but they have to ship it and you are charged a hazardous material charge that makes it quite expensive for what you get. I am in the Los Angeles basin at Chino airport which is near Ontario, CA. You only need about a half pint to treat the fuel bays of a Cherokee.

Overhead Trim Handle Not Working

December 21, 2004 0013

There is an adjustment (of sort) with a spring that could have gotten worn. You'll have to remove the handle and the panel that the speaker and light is on (watch the wiring) to take a look. The handle is attached the same way that most car window handles are with a 'C' clip. The other way would be to tighten the actual cables.

Paperwork for Installing TSO's Vertical-Card Compass

December 21, 2004 5983

According to my IA, since the PAI-700 is TSO C7c, you need to:

1. Update equipment list
2. Update weight & balance
3. Update/install compass steering card
4. A&P sign-off in airframe logbook

His position is that this is a TSO equivalent to original TC equipment, just as if you were replacing the AI or other TSO panel instrument.

New, Longer Lasting Gates Belt, Requires 337

December 20, 2004 7231

As many of you know me from Aircraft door seals and those who don't I would like to pass along a little information. Along with being an Aeronautical Engineer, A&P IA, I also have been involved with restoring and refurbishing Cherokees for over 40 years and am always happy to share my experience with the Cherokee's with members of the Cherokee Pilots Association, and especially friends I have met through the Chat or our Annual Fly-in.

For years I have heard complaints (including from myself) about the alternator belts (Gates Green Stripe) and the problems with having to purchase the same belt from Piper (to be legal) that you can buy from the auto parts suppliers.

I contacted Gates Rubber and had the opportunity to visit with the project engineer about the difference between the belt that Piper sells and the Green stripe of the same part number that you

can buy for less than \$15.00. As you can imagine he wouldn't discuss the situation between the two but passed along some great information. It seems that Gates has been developing a new belt that will last ten times as long as the belt in question and meets exactly the same specs as the belt called out for the Cherokees. I ask if he would send me the engineering data on the new belt and he was happy to as long as I agreed to keep it confidential which I assured him I would. Upon receiving the data and one of the new belts, I must admit as an engineer I was impressed. So much I submitted a 337 to the FAA for approval for installing it on my 180. I just received a call from the FAA stating that my 337 for the new belt has been approved for installation of the new belt on my plane. The only stipulation that the FAA Aircraft Certification Office made was that each installation will need a field approval. What this means is you can now have a new and superior alternator belt for your plane at a fraction of the cost of the original. The only stipulation being you will need to have your mechanic submit a 337 for field approval to install the new belt using my 337 as substantiation. As a Christmas gift, I will be happy to provide anyone who wishes, a copy of the FAA Field approval(337) for installation of the new belt. All I need is for you to send a self addressed stamped envelope to Aircraft door seals, 7100 NW 63rd Street, Hangar 1002, Bethany, OK 73008

Estimating Electrical Load From Radios and Instruments

December 19, 2004 5822

This web site has always been helpful for me in determining the load for various instruments
<http://aircraftexpense.com/eloadindex.htm>

Concorde Gas Recombinant (RG) Sealed Battery STC

December 18, 2004 3566

I just bought one and installed it no problem. Concorde furnishes the STC after you call them with a/c serial number, etc.

Pre-Heating Cabin in Winter - Foot Warmers

December 18, 2004, 0709

Just a follow up to a discussion a few lines back regarding the best way to heat a cabin in the winter....I think I found it. I discovered this from a local pilot when I was in his hanger. They are sold as heated mats for office workers with cold feet. They are a 20"x 14" rubber mat that has heating elements encased in rubber. Plug into 110V, consume 90W and put out 310 btu/hr and heat to about 130 Deg surface temp. The mat is waterproof and has nothing exposed for spark. I purchased 2 of them (one for the pilot and one for the co-pilot side) for the floor. I plugged them in along with my engine heater the night before flying (for about 10 hours). The hanger temp was around 15 deg. The next morning the cabin had heated to about 40-50 deg, the instruments came right up to speed. The best thing is that the floor remained only warm to the touch and I can sleep better the night before flying not having to worry about a ceramic heater shorting out.

These are great....if interested, I bought mine for \$50 from:

http://www.safehomeproducts.com/SHP/ES/cozy_heat_products.asp#CozyFootWarmers

Alternate Door Lock

December 16, 2004 7231
68.12.177.41

I was quite surprised when I arrived at the office to check for messages. I had a dozen or more requesting additional information regarding the alternate door lock.

The lock is available at LOWE'S home supply as well as from the supplier Belwith International. They have offices in Grandville, MI, City of Industry, CA, and Tampa, FL. The lock is brand name "First Watch". The part number is 1358 and is a direct replacement for the locks on the Piper entry door and Baggage door. It comes with two locking arms, and if they don't exactly fit the way you want, you can also install the piper locking arm. It fits it also.

The locking mechanism is superior to the original lock on the Cherokee's and as a bonus, most packages are coded with the key number so you can have one for each door with a matching key. The best part is at LOWE'S, they are less than \$4.00. They can be found in the hardware dept in the door locks and cabinet lock area. I have installed these in more than a dozen Cherokee's and they work great.

Setting Up Pre Purchase Inspection

December 15, 2004 3255

The proper way to handle this is to have a purchase agreement before the inspection with a significant deposit by the buyer - this is a pre-purchase inspection, not a fishing expedition. The agreement stipulates a purchase price and who pays for what on the inspection. It also specifies that if items are found that the seller does not want to pay for or will not accept an adjusted price for, the deal is off and the airplane returned to the seller in original condition. This is the way I bought my Arrow from a Canadian seller 500 miles away. I wanted my mechanic to look at the airplane, not his.

Fuel Flow Indicator

December 13, 2004 3282

JPI FS450, Order from any number of suppliers, American Avionics, www.americanavionics.com has it in their flyer at \$573. You may be able to find it less if you do some shopping. I estimate 4-6 hours to install, plus cost of one additional fuel

Paint Blisters on Fiberglass Fuel Tip Tanks

December 14, 2004 1055

The blisters are fairly common on fiberglass tanks as they get older. The solution is to re-glass the tank according to local Cherokee expert, IA and 135 operator that flies Sixes. I got a quote from him a couple years ago and I think it was like \$700 or \$800 per tank. I didn't have mine done and they are getting worse.

Use of External Antenna For Handheld

December 13, 2004, 4142

There are three choices (other than just using the little rubber antenna on the handheld):

1. External antenna. This is the easiest and most redundant: just plug your handheld in and you're good to go.

2. Switch box. The Icom one (Chief Aircraft part number IC ANTSE, see picture below) is about \$70 plus installation. The Commant one is very expensive.

3. Manual cable switching of antenna from panel-mount to handheld.

The switch box is not too bad an idea, but both it and the manual cable swap are slightly more complicated, and don't have the redundancy of the separate antenna. (I have a separate antenna). 'Course, they're a little cheaper.

You can't use a splitter like you can with VOR receivers. They throw away half the transmit power, and enough transmit power could leak through to the other receiver to fry it.

Oil Dye to Locate Engine Leaks

December 12, 2004, 4827

JC Whitney carries a whole kit. If there a Caterpillar agency near you, they carry the dye, but you'll need a "black" light. Just remember, clean the engine, fly for about 30 min to an hour and check it asap. If you wait too long, it will spray all over and it will be difficult to locate. Look for the highest concentration.

Sticking Primer

December 12, 2004, 0785

Fuel should be all the lubrication necessary for your primer. However nitrile "O" rings should not break down in fuel, perhaps you have rubber "Buna" "O" rings used for hydraulic applications (brakes-struts). If your "O" rings have become sticky goo be sure to clean primer lines and nozzels when you rebuild it.

RMD Lighted Wing Tips

December 13, 2004, 0045

I replaced the Madras tips on my 180D and I didnt notice any performance differences other than better x-wind handling.

I went with the RMD tips and it took me and my mechanic working together about 8 or 10 hours to install - we also installed the split switch. It is a tough job running wires down the wings through the grommets and you need to measure 12 times and drill once when installing the actual tips.

They are worth the time and money if in looks only...

Instrument Panel - Post Light Bulbs

December 12, 2004 6816

I found them at NAPA auto stores. You have to remove the rubber cap on your old bulb and put it on the new bulb.

Mechanic Lost Log Books

December 12, 2004 4827

There is an alternative to your problem, if the logs are indeed lost forever, a complete inspections, of all ADs for your particular bird will be required. A list of STCs, or other repairs requiring 337s, will be on record wiht big brother. Equipment list (if lost too) can be had from Piper. It will be costly, but properly documented, and certified are just as good, and should have little bearing on the value of the plane. A complete inspection will require cost, and since the birdbrain lost your logs, he should be made to pay for it.

This will mean, for example, if your plane requires an oil pump AD, and no documentation to be found, the engine will have to be inspected for such.

As for those that insist that logs are to be filled in your presence, then be prepared to spend enough time to go over your logs. The worst I've had was 6 hrs. As for those that "stickies" means so much to you, find a shop that will add a sticky first, before you get your inspection. Even the prettiest sticky will no assure a good inspection. Kinda reminds me of a radio shop that swapped radios for me. The paperwork was impecable, but when I did my preflight inspection, my wheel locked forward, and could not fly. A year later I lost both radios, since, same shop used incorrect connectors, and sheared wires off. So much for pretty stickies.

...and...

December 11, 2004 6985

I couple years back I was looking at a Saratoga in Florida that I really liked but it had missing logs. My finance company would not finance the purchase of that plane so I moved on and found another a few weeks later. As a relatively new owner (only my second plane) I had no idea at the time the huge hit the missing logs take on both price and finance-ability.

Yoke Universal Joint Source

December 10, 2004 7748

Finally got my yoke U-Joint. here's some info that might be useful:

Apex Manufacturing (as recommended by the Cherokee Archives) manufactures the joint all right, but no longer sell u-joints through their company. They recommended M & M Hardware, Inc. in Miami, (305) 925-2600, www.mmaero.com.

M & M had it and shipped it same day. It was \$129.00 plus shipping. Expensive, but beats the \$404.00 Piper wants for the part. My part number is 12-PF-744, that is for the early Piper with the 3/4 diameter on the yoke end and a different diameter on the other end. Mine is a 1962 160. The part is undrilled.

Another thought is to have a good machine shop re-manufacture the joint. I had this done for my main landing gear scissors links for \$160 total for the four links (Piper wants about \$1000.00 each for the new links)

Y-Type Shoulder Harness Installation

December 10, 2004 1376

I was able to get the advantages of "Y" type shoulder harness and new belts through WagAero's site.

The attachment point is fabricated metal bracket which must be riveted into the overhead structure above and to the rear of the seat backs. It requires the removal of the headliner, drilling of a few existing rivets and addition of a few more to tie the brackets into the existing overhead supports. It makes a clean installation, and in my '63, did not interfere with the overhead roof vent.

Wag Aero sends along the necessary paperwork to be filed with the FAA (STC if I remember correctly) The new lap belts include the metal to metal tang type of hardware and each shoulder harness is individually adjustable with a pull tab.

Be advised that with the harness snugged up, you will not be able to easily reach the fuel selector valve by your left knee, and it will be a stretch to reach the floor mounted flap handle. I find that if I loosen the shoulder straps a bit that I can reach all required controls. They can re-tightened in a heartbeat with a tug on each if need be.

Paint Touch Up

December 11, 2004 1376

The airbrush idea is OK, with the caveat that overthinning the paint as is needed in most airbrushes defeats the purpose of touch-up... you want a paint film thickness that matches the original, right?

I have a couple of airbrushes I use for painting models, and have found that they do not do a particularly good job of spraying automotive/aircraft types of paint due to the larger grind of the pigments used in those paints, as compared to the ultrafine grind of model paints.

I suggest instead that you get a "Touch Up" spray gun designed for the automotive type paints we use. I got one from Harbor Freight a couple of years ago for less than the cost of an airbrush. It has worked very well for touch-up.

The main suggestion I have is: Practice! Just like landing a plane, the more you do it the better it gets... practice, practice, etc... Use an old fender or hood off a car to get the settings of the gun down and practice your technique. It will be time well spent in a quality touch up or repaint effort...

Bubbles in Fiberglass - Thermal Insulation Protection

December 9, 2004, 4827

The stuff is made by Thermo-Tec. Most speed shops carry it. Use the glue on type. They have their own hi temp adhesive. The self stick stuff will not last long. It's a little rough to fit into bends, and you may have to glue it in section. I had to do this with mine.

Fuel Gauge Stuck on ■Full■

December 9, 2004 4827

The sending unit is nothing more than a variable resistor, rheostat. Once grounded, it will show full potential. This is how you test a fuel gauge, simply ground the wire (disconnected from the

sender) and it will show full. Somewhere, you either have the sender or the wire going to it grounded.

I would not remove the gauges, since they are part of the aircraft, however, another device can be added as a "back up". I know I'm going to get a lot of heat for this, but I don't really see the value of the 450. If you are going to add a JPI of any sort, an analyzer is a better investment. OK, I'll add this one too, LASAR is better than all of them.

Use of Dye to Find Oil Leaks

December 8, 2004 4827

Clean the engine thoroughly first. You can use brake cleaner for a final drying (don't use the ecological crap, just the straight cheap stuff). Put the dye in the oil per recommendation, and fly it for about an hour or so. Check it very soon after. If you wait too long, or fly it too long, the leaked oil will spread and it will be hard to detect the origin.

A "black" light (ultra violet) is used to detect it. Kinda reminds one of the 60s.

This has been my experience with the stuff. Also waiting too long, it will slowly disintegrate, and just goes away.

Plan on adding the stuff and checking very soon after.

Plywood to Replace Rear Seat Platform - Cherokee 140

December 8, 2004 9135

I am a cabinet maker in my spare time. There are lots of grades of plywood. I would not even consider the junk you get at your local Home Depot etc. It is poor quality, lots of voids, and too flexible. Any decent hardwood plywood is much better. Shop grades of ash or birch are much better quality. Much of the shop grade is the same core as the higher grades, just flaws in the finish face. A1-A2 looks nice, but is too expensive for what you want. The best stuff for what you are doing is called Baltic birch. It is imported from Finland. It is metric, and comes in 5'x5' sheets. Any good hardwood supplier should have it. It has no voids, and many more plies than US plywoods. It is available in many thicknesses. Some suppliers will sell partial sheets. I use it for drawer sides in cabinets, and the stuff is great. It looks a lot like aircraft grade plywood, just lots cheaper.

Rams Horn Yokes

December 8, 2004 1087

I just purchased a used set from Wentworth for 375.00 and they also included 2ptt and new Piper emblems. These needed new powdercoating which I had done for 70.00. You just need to let the people at Wentworth know whether you have the large shaft or the small shaft.

Carburetor Ice

December 6, 2004 6036

If you apply carb heat and get a smooth loss of RPM in flight, no problem. If you apply heat and get a roughness or vibration with the RPM drop, you are indeed melting accumulated ice..leave the heat full on, and adjust the mixture as necessary.

Resurfacing Exhaust Ports Without Removing Cylinder

December 6, 2004 4337

I had a couple cyls ground down about a year ago. It was an easy task for the A&P. There is a device which is bolted to the cyl so that the grinder is absolutely level to the cyl, can be moved about to get the surface flat. The only catch is if there is enough metal left after the erosion to grind it down and still be serviceable.

Reusable Oil Filter

December 6, 2004 8433

A company called ADC (www.aviationdevelopment.com) manufactures an oil filter system that uses a cleanable element. The system has an STC and PMA. Aircraft Spruce is a reseller. In addition to the cleanable element, the sytem is also available with an optional chip detector. A friend of mine, who is a United check pilot, purchased a Beech Baron. The previous owner installed the ADC system with chip detection. Ric was on his way to Alaska with his two sons, both aviation students at UND. They had just started over water when the chip detection light came on. BTW, the both engines were running strong. They turned around a flew back to home base, W52, Battle Ground, WA. The problem turned out to be a broken piston ring. Just think what a tradegy the outcome could have been, had they been way over water with no indication of a problem until the engine headed south.

Door Has Gap at Top Corner During Flight

December 5, 2004 2411

I too had a pretty bad gap. Installed new seal from Dick, new pins and then adjusted the latches. The gap is gone. Is your door "tweaked"? Has it swung in the wind and maybe bent or twisted something? 3/8" is alot of gap.

If you open the door, grab it at the rear lower end and lift it does it wiggle or wobble around? My old pins wore a groove in the part that accepts the hinge pins, the part that screws into the fuselage. It allowed alot of wobble. All good now. Dick has all the parts and for a good price.

<http://www.aircraftdoorseals.com/>

Replacing Landing Light Wire

December 5, 2004 9608

Use 12 gauge wire (Teflon insulated if possible, shielded cable is not necessary) and a splice (I use a hook type connector), with a short length of clear Tygon tubing to slip over the connector which I then tie-wrap in place. I then tie-wrap the cable to the engine mount, so that it doesn't rattle around in the engine compartment and burn on the exhaust headers, and is instantly accessible when you want to remove the bottom cowl.

Muffler and Exhaust System Components

December 4, 2004 5929

We have been purchasing our mufflers & exhaust systems from the Parts Exchange in Fort Mill SC. They specialize in exhaust systems.

800 478-2257

800 528-0390

Replacement Valve Cover Gasket

December 4, 2004 3614

My findings using the silicone rubber gaskets are:

Clean both the rocker cover and cyl sealing surfaces COMPLETELY. Then instl gasket totally dry and CAREFULLY and EVENLY torque to spec. In this case 50 inch pounds is appropriate. DO NOT overtorque as this will probably cause a leak. Suggest check condition of screw lock washer and possibly replace.

...and...

December 3, 2004 0178

I've had good success with REAL gaskets silicone rocker gaskets. Spruce sells them, p/n RG-75906 for about \$7 each. Don't overtighten the cover screws!

Arrow Gear Power Pack Continually Burns Out

December 3, 2004 4827

It's rare that these motors burn out, especially as many as you had. Mine was changed after 30 years, my buddies repairedr after the same time Mine replaced due to age, fear, and needed one ASAP.

They fail for the following reasons, running low on oil, stuck pressure valve, and poorly adjusted switches. Those packs have a long life expectancy, but need to be serviced like the rest of the plane as well as having the entire system in working order. You may also be a victim of a gear motor running while in flight for hours at a time, due to internal leaks in the system, or improperly set set switches. You have more problems than meets the eye. I've never heard of one Piper retract having as many packs as you have had to replace. Find someone that really knows the system.

Cabin Heater Hot in Front, Cold in Rear Seat

December 2, 2004 8747

If your Archer is like my '76 140, the control levers by your feet control a flapper valve inside the heat duct. If they are pushed full forward, they block the flow to the rear.

Engine Diesels after Shutdown

December 1, 2004 4827

Dieseling occurs when the combustion chamber is loaded with build ups, and glowing. Assuming your primer is not leaking, then the fuel shut off at the carburetor is not closing completely,

Dieseling occurs when even the above condition is present, and with presences of fuel.

Assuming that both primers and fuel shut off are working, at the end of the leaning /shut down process, some fuel is still unburned, but since all the builds up are glowing, it will "diesel" as long as fuel, no matter how residual, is present.

Ignition timing should also be inspected. If combustion chamber is fairly clean, retarded timing will make the engine hotter than normal especially when long periods of slow running are performed. There will not be enough "residual" fuel to cool surfaces down, and remain hot.

Hot Starts - Technique - Fuel Injection

December 1, 2004 6663

So here's the magic in my IO360-C1C, '71 Arrow, no Lasar or other fancy gear or starters: Power and mixture closed (aft). Run the electric fuel pump for 15 seconds or so. (Theory is this handles

vapour in the lines from the hot engine.) Shut it off. Start Cranking. Slowly advance the throttle 1/2 inch. Stand by on the mixture - you won't be watching blades for long. Move it up smartly a second or so after it begins firing.

I used to sweat the hot starts and a couple of times ran my battery badly down. This one works every time.

Wing Flies Low - Rigging OK

November 30, 2004 7884

All kinds of stuff can cause this. If your rigging is good, make sure you're trimmed good. Hold the wings level with the yoke and turn the rudder trim until the TC shows the planes not turning. Hopefully the ball will be generally centered and when you let go your plane won't go into a steep turn. I often find a turn or two of the rudder trim to make it fly straight isn't uncommon. The fuel and people and junk in your plane isn't always perfectly balanced. Rigged perfectly I had a little bit of a heavy left wing. I always burn fuel initially out of the left tank and I had the right flap lowered about an 1/8th of an inch and it flies beautifully. I think my main problem is old warped wingtips. I can actually look at them and tell they're not perfect which isn't unusual for a 30+ year old plane.

Pitot Heat Mast only gets Warm

November 30, 2004 1927

Yes, the pitot heat mast has 2 resistor elements. In addition to seeing one go bad, I have seen both increase resistance. A good check is turn on the landing light and look at the load meter. The pitot heat draws more current than the landing light. The difference can be seen on the meter. You should not operate the pitot heat on the ground longer than it takes to verify the operation. These things require lots of airflow to keep the elements from over heating and going bad.

Oil Cooler Replacement Hose (AD 95-26-13)

November 30, 2004 5763

Precision Hose Technology (PHT), they advertise in the POM magazine (800-331-5946, Tulsa OK). Their class "D" hoses are covered in braided stainless steel and I believe they also include new "fire sleeve" over the stainless. The class "D" hose is more expensive but I don't think it has a recommended replacement life.

Carrying a Fire Extinguisher

November 30, 2004 4531

I would recommend a Halon 2-1/2 pound unit be carried as a minimum. Don't carry the dry chem type. (Halon, a member of the refrigerant family, is one of the gases that is to be phased out due to the Ozone layer depletion problems, under the Montreal Protocol.) It is therefore getting more and more expensive. It is also the most effective clean agent fire suppression gases utilized to date, and the best extinguishing agents to be carried in aircraft. The beauty of Halon is that it is a gas, and can get into areas where the dry chem units can't.

I would get an extinguisher with a pressure gauge. I have mounted my extinguisher under the right seat. I know how to quickly get at it, and it is out of the way, because there is such little

room in the Cherokee. But if you ever need it it is there for those small fires, or even avionics shorts or failures.

Installation of Air-Oil Separator

November 30, 2004 5822

I installed a Walker air-oil separator last spring along with my wet vacuum pump...easy installation...the kit they provide is superb; all the parts including clamps etc...two hours is a good guess

btw, I had an M-20 separator before adding the wet pump and Walker separator. Based on my experience so far, the M20 did a much better job keeping oil off the belly of the plane

Strobe to Replace Rotating Beacon

November 29, 2004 7884

Delighted with my whelen hrcf. took about 20mins for me to install and my a+p did the sign-off and filed the stc. I guess I've had it now about 6 or 7yrs and over 1000hrs. Never changed a bulb or had any trouble whatsoever. Best 300bucks I ever spent. tc

The current model is HRCFA. The A suffix denotes the newer style lense. You'll need to specify whether you want red or red/white split. You don't want the all white one for the top of the tail. Yes, you use the existing wires. The Spruce part number is 11-16214 (red) or 11-16216 (Red/White). I don't think you'll need the mounting adapter or ring.

<http://www.aircraftspruce.com/catalog/elpages/whelenselfcont.php>

Autocontrol IIIB Autopilot Enters Sudden Turn in Flight

November 29, 2004 1440

Tim before you try to have it repaired I would have your A & P clean the connections from the control unit, DG and AI then try it again. I had a similar problem found out it was a bad connection.

Weight & Balance for Removal of Rear Seat

November 29, 2004 4884

Weight and balance is one page in a 3 ring binder that is AFM in my plane. I made 2 W&B sheets, one with back seats, one without. Both signed by A&P (important). Insert appropriate sheet and keep other until you switch. Technically you also need to re-do W&B after removing wheel pants, like we do here in the winter after it snows, so I have ones for that situation too.

Quartz Landing Light

November 27, 2004 4023

I use the Quartz Q4509 in my Arrow. I get in excess of 100 hours between replacements and use the landing light quite often.

It's a direct replacement for the standard GE4509 and costs \$24.50 at Chief Aircraft supplies.

www.chiefaircraft.com/cgi-bin/air/hazel.cgi?action=serve&item=/Aircraft/LightingSystem/PartsInstallation.html

Swinging Vertical Card Compass

November 27 0544

Some thoughts about the new PAI 700 vertical card compass installed in my PA 28-151.

I recently noticed that my whiskey compass wasn't reflecting reality. In hindsight, probably the result of a glareshield mount and a lot of avionics work since the install 28 years ago. I decided, based on CPA forum posts, to go with the vertical card compass. Spruce had a good price, as usual, and the unit arrived in three days, also as usual.

I bought the Piper windshield pillar mount and my avionics tech moved the mount about six inches up the pillar from the panel. That was the first place he found minimal magnetic interference. Although not initially impressed with the location, I find the compass is comfortable to read there (despite older eyes and bifocals) and I think it's a good choice, borne out by an easy and good quality swing.

The swing takes a lot of care and some time. For me about 1 1/2 hours. I have seen people swing the compass from inside the plane by moving it under power. I don't see how you can align the plane precisely on the compass rose that way, though the engine vibration is somewhat of a plus however. If the engine is not running, be sure to gently tap the compass face to make sure it has settled in properly on the new heading. The tapping always causes a change of a degree or two.

I moved the plane by hand, a bit of work since there were 16 settings and I needed to jockey each one several times. I sighted from the tail skid to the nose wheel, about 20 feet back from the plane, to ensure as close to perfect compass rose alignment as possible each setting. You do a lot of climbing in and out of the cockpit with all of the adjustments and settings.

Also, be sure not to leave anything on the glareshield--headsets, key rings, etc. and make sure your steel wrist watch is not on your setting hand. I also disconnected the tow bar each time before the readings but that may have been overkill. The compass comes with a brass key for the settings.

In the end, the card shows only minor deviations (1 to 2 degrees) on the cardinal headings and several of the intermediate headings are dead on. The instrument itself appears to be very good quality. Flight and taxi readings bear out the settings. GPS track is another crosscheck but wind angle must be factored in.

Time will tell over the long run, but I am very pleased with the compass thus far and feel it is a solid investment in safety. Another interesting point is that the compass now automatically falls naturally into my instrument scan and I intuitively read it at a glance like the other instruments. It also settles more quickly than a conventional compass.

Because I look at the compass more frequently, I now notice precession of the DG almost immediately. Before, the whiskey compass only got looked at when I consciously willed myself to do so and then I had to focus carefully on it to understand exactly what it was reading, due to the limited view of the card and the backwards reading (lets see now, do I add or subtract those three degrees?)

The PAI-700 came with good instructions for both the install and the swing. I have heard that this compass is not as happy in all planes but that PA 28s seem to be agreeable. One factor is the magnetic environment of the Cherokee and the other, ample vibration...

Oil Temperature Reading Low

November 26, 2004 7682

Have your mechanic test your sender with a hot water bath. If they gauge is reading differently than the water bath, have the mechanic verify the sender is the correct part number for the gauge. If the sender and gauge are reading correctly and oil temperatures are low, consider a strip of duct tape over the cooler exchanger. I tape mine over completely in the Alaska winters. I fabricated a plate, but found tape to be handier to use and remove on those warmer days.

Ineffective Cabin Heater

November 23, 2004 8175

Check the condition of the flapper valve in the heat valve box located at the bottom of the firewall on the engine side, also check the cable. The flapper can get quite dirty and corroded. I took mine apart, bead blasted it, painted it with Hi-Temp engine paint, reassembled it and adjusted the cable. The difference is like night and day. In my case, the flapper had some corrosion that was preventing it from opening all the way so that the exhaust port never fully closed. Also, while it is off, check the heat tunnels to make sure that they are not obstructed, and finally make sure the heat vents leading to the cabin from the tunnel have not been covered over.

Overhaul of Constantc Speed Propeller

November 23, 2004 8955

Some advice on selecting an overhaul shop: be sure you know ALL of the costs involved, and what they are contingent on, before committing to a shop.

The worst case might be if your blades and hub were red tagged and you bought a propeller elsewhere: will you have to pay an inspection fee? Is pick and delivery really free then? Assume the worst, get prices from several sources, know the applicable charges, and get references before giving you propeller to a shop.

It is also better for the shop to know that you will be inspecting the parts in the event of any unexpected problems.

You should probably have the governor overhauled at the same time too. You said that it has been many years for this propeller: you might be shocked at the sludge you will scoop out of the hollow crankshaft and propeller hub, particularly if you are burning avgas...

Michel Indicator

November 23, 1055

Check out the Michel MC-60. It's a digital indicator and only \$600.00 NEW from Eastern Avionics. I have one for my VOR/GS and it works great. I don't have the GPS yet but one reason I installed the indicator is that it's switchable for GPS and VOR/GS.

Installation of Carburetor Temperature Gauge Probe

November 22, 2004 7062

A friend just had a JPI installed on his Archer (0360-A4M) this weekend with a Carb prob. It did have a factory hole, with a screw in plug. Just unscrewed the plug and screwed in the Probe. I know he has a Marvel-Schebler carb, but not sure what number it is. On his carb, the plug was right behind the muffler, on the front of the carb.

Custom N Numbers

November 22, 2004 6809

You'll need to complete FAA Form 8050-64, Assignment of Special Registration Number, and send it to FAA Aircraft Registration Branch, AFS-750, Mike Monroney Aeronautical Center, P.O. Box 25504, Oklahoma City, OK 73125-0504. There is a fee associated with reserving an "N", but I don't know how much. Check the FAA Aircraft Registration web site to find out if the number you want is available.

Addition of Wing-Tip Strobes

November 22, 2004 4977

The typical wingtip set-up consists of the following Whelen items:

- 1- HDACF strobe power supply
- 1- A650PG14 wing tip, position light (green)
- 1- A650PR14 wing tip, position light (red)
- 1- HD60 installation package

This will provide you with a very bright strobe system. Concerning installtion I would guess, strictly a guess, that you are looking at 5-10 hours of install time. If you can assist, this should reduce your costs.

The biggest pain is stringing the new strobe cables from the power supply (located in the aft) through the wing, to the strobes. Thats the most time consuming!

Small Amount of Oil on Back of Constant-Speed Propeller

November 22, 2004 7505

Not at risk for sudden failure but the prop seal is in need of repair. Not too costly in avation terms but needs to be done by prop shop. May want to go directly to a prop shop and save the cost of your A&P pulling the prop and sending to the shop.

Alternator Conversion (For Generator Equipped Plane)

November 21, 2004 4827

To perform such a conversion, requires a modification of your present installation. There two options. One is to buy all the required part, and contact your local FSDO and make an appointment for a DER to counsel you on the procedure for such a modification. You have to do some leg work, and allot much time for the process. You'll have to supply documentation regarding the installation and modifications required. There will be some financial consideration in addition to purchasing all the necessary materials. Number two, buy an STCed kit which available, and include all the correct parts, install it (with an A&P). He'll fill out the 337 and have an IA approved it and file it for you.

It ain't hard.

Converting to Rams Horn Yokes - Paperwork

November 21, 2004 : 4935

AD69-22-02 which pertains to cracks in the bowtie type control wheel refers you to Piper SL 527D. Under this service letter it gives you the authorization to switch to the newer ram horn yoke to eliminate the above AD.

Have you IA or AP sign off the change by complying with the service letter and changing the yoke to the later one listed in the SL527D, inturn have him sign off the AD as no longer applicable. Be sure they are the P/N' listed.

Oscillating Fuel Pressure Gauge

November 20, 2004 : 2645

Your problem is probably fuel in the upper portion of the line going to the fuel gauge. I would suggest the you break the line at the coupling which is located on the right side of the engine. If a half ounce or so of fuel drains from the upper portion of the line, your problem will likely be corrected. The air in the line actually serves to dampen the oscillations caused by the fuel pump.

Windshield and Bird Strikes

November 20, 2004 8433

IMHO the best reason to install 1/4" windshield is bird strike protection. Because section modulus varies with the square of the section height, or in this case, the windshield thickness, a 1/4" windshield is 4x stronger than 1/8". I will probably start an argument among those who value appearance over function, but bird strike protection is also the best reason to stick with a two piece windshield.

Ming, you will have to bevel the edges of the windshield to use 1/4". For the length of time the windshield will be in your plane, the extra effort is worth it.

I measured interior noise levels with a dB meter before and after upgrading. There was about a 1 - 1.5 dB noise reduction. In other words: not very much. The cheapest and lightest noise reduction system continues to be a comfortable ANR headset.

Rechroming Struts

November 19, 2004 0785

Stripping and re-plating is the easy task, then you need a centerless grinder to accurately size the shaft with a 10 microinch finish. Plating process doe's not deposit evenly as you might expect, thus the need to plate oversize and finish grind for size and finish.

Send it to the folks that are equipped with necessary skills and proper paperwork.

Instrument Panel Light Rheostat

November 19, 2004 8175

The rheostats shouldn't just 'short out'. Perhaps you've gotten aluminum shavings from previous panel work falling on them or something. The rheostat is a wirewound one. It has a length of resistive wire wound axially on a cylindrical core. A wiper arm provides a contact that moves along the wire. The other contact is at the end of the wire. By moving the arm, you change the

resistance between the terminals. The failure mode on these is an open circuit either from corrosion on the wiper or from an overload causing the wire to heat up and break. You can check with an ohmmeter to see if the rheostat resistance still varies over the full travel or not. Early Pipers only had the rheostat, a high power one at that. Later models added transistors to permit a heavier load without using a huge rheostat to handle the power. If yours is one with transistors, then the transistors are more likely the problem.

Troubleshooting Fuel Gauge

November 18, 2004 7231

It is quite simple to check to see if it is the gage or the sending unit. It is easier with passenger seat removed. To test the gage you will need someone to observe or have a large mirror to look back at as you lay on your back under the panel. Take a test lead (electrical wire with alligator clips on each end). Clip one end to a good ground and touch the terminal on the gage going to the tank in question. To know which terminal, it is the one that doesn't have a jumper wire going to the other gage terminal. When you ground the gage it will go to full if the gage is working properly. More than likely, you will find it will be the sending unit and you will need to pull the tank for access. There is a single wire attached to the sending unit. It could be loose from the sending unit, but that is rare. Send the sending unit to Airparts of Lock Haven for Overhaul. Normally a little over \$100 for the overhaul. Be sure to order a new gasket with the overhaul.

Alternator Noise in Radio

November 18, 2004 2411

If it speeds up and slows down with the engine speed it is most likely the failure of the alternator, a diode most likely. With a properly functioning alternator you should get NO perceptible AC induced into your electrical system. The cheesy little filter (useless as tits on a bull) is not intended to filter out the massive AC or chopped up DC as it really is that comes from your alternator.

You need to pull the alternator, have the brushes checked/replaced, and have the output checked by a good shop that can do a load test.

The only other problem may be a bad ground but that I believe is not the problem. Adding all those worthless filters is not the answer. If they were required in the first place when the aircraft was produced they would have been installed at the factory.

How do I know this? Call it trial by fire so to speak. When I first bought my Cherokee I went through hell with a dirty alternator. I finally pulled it and tossed it for a good, new unit. No problems since!

Use of Old Oil

November 17, 2004: 7062

When I bought my 180 the previous owner gave me 2 unopened cases of Aeroshell 15-50. Below is the question I asked to Shell and their answer.

Question;

I have two cases of Aeroshell 15-50 that have a different colored label then the current 15-50 bottles. I believe these are older cases of oil. Can you tell me how old they are and if they are safe to use? I would like to use it only if it is completely safe to do so.

Case1 says - WR03259

Case2 says - WR01259

Thank you, Dale

Answer from Shell oil;

■Shelf life on AeroShell piston oils is 4 years from date of manufacture. The cases you have are dated January 25th and March 25th of 1999 (MMDDY format for the date stamp after the letters WR)

I would recommend you not use the product. The biggest issue you face with out of date product is that the additives tend to "drop out" due to gravity, and once that happens you cannot properly re-mix them, even with vigorous shaking. •

Engine Runs After Mixture Cut-Off

November 17, 2004 2411

You lean the engine to starvation to shut it down. I assume you are able to set idle to minimum, that is about 600RPM? If so then the throttle position is good one would suspect. You could have a mixture control problem, the cable is not properly adjusted to pull the mixture all the way back at the carb. You could have a leaking primer. That could be dumping enough fuel in to the carb to keep it running.

Simple Green for Cleaning

November 16, 2004 : 1590

Conventional Simple Green is not suitable for use on aluminium aircraft. Aviation Consumer did a test a few years ago and demonstrated that it corrodes aluminium when it gets into skin joints etc.

Simple Green has another formulation on the market now which they claim is intended for aircraft and meets Boeing's spec for cleaners. It's called Extreme Simple Green, and you can see their blurb for it at <http://www.simplegreen.com>

Haven't seen any independent reports on its effectiveness or tests of its behavior vs. aircraft structure.

Very Dim Overhead Light- Early Model

November 16, 2004 7062

I had a 140 with the 3 position switch. With the switch on the "Low" setting, it would barley light up anything and I would certainly not fly at night with it. However with the switch on "high" I found it very good to fly at night with and did so many many times.

Fast forward... A couple months ago I sold my 140 and bought a 180. I went out to the hanger one night to see how well the overhead light was going to work in the 180 before doing any night flying. Even on high it was terrible. I could not make out anything on the panel.

I noticed the bulb seemed bright, but it was not "centered" in the little overhead red window. I removed the plastic panel up there to get to the light and just "bent" the light bracket a little bit so the bulb was centered in the window. Tried it again, and WOW I could not believe the difference. Lights up the panel well. Mine was actually up to high in the window and the top edge of the window was shading most of the light.

Torque: Engine Suction Screen Crush Washer

November 16, 2004 7231

The recommended torque as provided by Lycoming is to hand tighten until snug, then tighten 180 degrees further and safety wire. Don't forget the asbestos side if the crush washer goes against the engine and not the nut.

Spark Plug Performance

November 15, 2004 4827

Your spark plugs have several enemies, fixed ignition timing, magnetos, leaded gas, massive electrodes, the pilot.

Fixed ignition timing is self explanatory. Ignition when controled will burn fuel completely rather than leaving a good bit unburned to "load up" spark plugs, and combustion chambers. The magneto, now nearly 110 years old has not changes in technology. Being sensitive to engine speed, and very shot spark duration, the variation in voltage heat will make it difficuly to keep spark intensity to allow complete burn.

Leaded gas, with a combination of the fixed timing, and short duration, and varying intensity, allows the stuff to accumulate, and corrode the electrodes. Resistance caused by build ups will weaken spark, and cause even more build ups. Unleaded gas will eliminate that part of the equation.

Massive electrodes are old technology. The object was for the plug to whitstand heat.

Technology has solved this problem many years ago. Massive electrodes only found in aircraft engines, which have earned a reputation of being short lived.

The pilot, is the last link. Improper leaning techniques, long warm ups, lead to more build up, and eventually shorten plug life, and increase wear.

One last item, the old wives tales. We hear "I just pull the plugs clean then and reset them, and they run fine" Run, the engine will, but if any one is naive to thing that one is receiving maximum performance, economy, or proper engine operation, out of a worn out spark plug, think again. Poor plug performance due to a "poor life (overextended)" will and does diminish performance, increase fuel consumption, and can even cause a disaster for the engine.

Replacing Engine Baffle Material

November 14, 2004 3614

By all means remove all the old stuff and get a quality baffle seal sheet and cut out your own.

Use the old for a template and guide. Now the way I attach the new material. Drill holes for a no. 6 screw -- .171 dia will do -- using as may staple holes as practical. Arrange holes in an even manner. Now punch holes in material to mate with baffles. Finish attachment using CRES screws. washers and self locking nuts. Use high temp locking nuts such as AN363 type. Also, put baffle material on inside of baffle so that air press will help seal it.

Changing Engines - Approved on Type Certificate

November 12, 2004, 8494

Hi, my plane had the A3A replaced with an A4A. Only a log book entry was made. If your planes TCD has both listed it is a log book entry only. Same thing go's with any part that is listed in the equipment list, it only requires a log book entry.

Interior Door Handle

November 12, 2004 7071

The 67 and earlier models used Studebaker door and window crank handles.
For 68 and 69 Cherokees most all came with a door handle from a 67 Ford Falcon. It may be possible that the Studebaker handle will be found on some early 68 Cherokees.

Replacing Trim Jack Screw

November 12, 2004 0999

Remove the upper/lower tail cones. Remove the bolt connecting the stabilator to the bottom of the screw-you'll have to support the stabilator with something to keep it out of the way. Remove the cotter pin at the top of the screw. Count the threads top or bottom (or measure it). unscrew it and put the new one in. The threads frequently don't match up well with the old barrel, making the trim too tight to work, and necessitating a new barrel also.

Really a very simple and intuitive process.

The barrel is another story. I would leave that to the A/P. He will have to sign off what you do anyway.

Brake Toe-Cylinder O-Rings

November 12, 2004 2161

My parts book lists only one Gar-Kenyon master Cyl..

The "O" rings are:

MS28775-113

MS28775-012

MS28775-110

Stall Warning Switch - Defeated by Insect

November 12, 2004 : 0663

I just couldn't see shucking out three Ben Franklin's for something that could be fixed. I went to the hangar today and sat down with the little switch and decided to see how easy it was to get into. The back part of the switch is not fastened like the sides. It was easily opened up from the back. The first thing I saw was an insect cacoon. Then a quick bath in WD-40 and an air hose treatment, IT WORKS GREAT!

Electric Trim Very Sloppy

November 11, 2004 5091

It is extreemely important to clean and lube all the pulleys and especially the jack screw in the tail. Spray the lube on the jack screw and you will probably find all your problems go away.

November 11, 2004 0279

Another issue is A&Ps that aren't familiar with Piper Electric Trim sometimes lube the clutch. Hasn't happened to me, but the prior owner had it happen to him and he had a devil of a time getting it cleaned up.

Differences in Types of SCAT Tubing

November 10, 2004 : 4142

As found on the Aircraft Spruce site, CAT, SCAT, CEET, and SCEET are all varieties of rubber-impregnated fiberglass tubing reinforced by a steel wire. They are manufactured by HBD/Thermoid.

CAT is neoprene impregnated, temperature range -65 to 300 F, color grey/black
SCAT is silicone impregnated, giving a wider temperature range of -80 to 450 F, color red
CEET and SCEET are double-walled versions that have slightly higher temperature ranges, 350 and 500 F respectively. SCAT is the most commonly used type in our planes.

Damage to Ailerons

November 10, 2004 : 4827

A word of caution about ailerons. If it has any sort of damage crinkles, etc., have it repaired properly. I have seen ailerons with patches, which is illegal as well as dangerous. An aileron flutter is nothing to fool with, and in most cases, is deadly

Preheating

November 9, 2004 5704

I have a Tanis pad on the oil sump that I use anytime the temperature gets below freezing. Depending on temperature usually an hour or two is sufficient. The aircraft is hangared. Also consider warming up the cabin a bit for the benefit of your instruments. I use a small ceramic cube type plug in heater with an internal fan and a low power setting for that purpose. I place it on the floor beneath the panel for about 20 minutes or so. Seems to work great!

Meaning of ■Yellow Tag■

November 8, 2004 3013

This means that the item was tested according to the manufactures specifications and is approved for return to service in an aircraft. You will also see Form 8130 which is the new "yellow tag". Normally when you buy used items, your A&P will usually want to have a yellow tag with it.

Cylinder Running Hot After Overhaul

November 5, 2004 4827

Max EGT is around 1500, and Max CHT is just under 500. Neither temps are advisable to operate, but are the accepted max.

It doesn't have to necessarily be an intake leak, but it's just one of the culprits.

The lifter bleed down clearance is more important. Clearances are .028 to .080. .050 for 320s and .060 for 360s, each with $\pm .010$.

Clearances can be altered by changing pushrods with other cylinders, or replacement. Each engine has a choice of four push lengths. Also exchanging rocker arms (EX for EX, INT for INT)

Too tight will overheat and include high CHTs, as will too loose, though too loose the engine will not develop full power, so less likely to have high CHTs, still can happen.

EGTs and CHTs for 4 stroke engine tend to remain relatively comparable, but always deal with EGT first and foremost, since it deals with mixture directly, and reacts much faster.

On the average, and depending on installation and condition EGTs max. for normal operation around 1400, and CHTs around 300 to 375. Remember it's based on installation, and condition of gauges. No matter, it's important that you establish peak and ROP numbers.

Airspeed Indicator Fails to Return to Zero on Ground

November 5, 2004 6519

Could be that your pitot tube is plugged. Mine got blocked when I was on a trip one time. I tried probing it out and even sucking the debris out with my mouth to no avail. (Yes, I was willing to eat bug guts to get home.)

When I got back home, my mechanic took the pitot head off and blew it out from above with compressed air. It has worked flawlessly since.

Cost of Annual Inspection

November 7, 2004 9840

I spent seven hours yesterday, 6 Nov, with the A&P I use for my annual on my 1972 PA28-235. The only thing out of the ordinary he has to do is replace the alternator belt (3-1/2 years old and starting to show some cracks).

Cost of Annual Inspection \$350.00

Extra time to pull prop 100.00

Belt 19.00

TOTAL 469.00

Learning experience PRICELESS

So, the COST of my annual was \$350.00. I elected to spend another \$119.00 for preventive maintenance. That is my decision and just because it occurred at the same time as the annual INSPECTION does not mean my annual was \$469.00.

I had the front strut resealed in September for about \$100. I could have waited until Saturday and had the guy do it then. I would not have considered that money a part of the annual INSPECTION, but routine maintenance.

My annual INSPECTION always runs 350.00. Additional work is extra.

Spark Plugs Would Not Mate to Wiring Harness

November 4, 2004 9952

That's because you tried to connect 3/4" diameter lead connectors to 5/8" plugs. The "E" and "H" denote the difference.

Wing Stabilator Tip Installation Nuts

They are like Tinnerman nuts except you can use machine screws with them. They are used in mounting the wing and stabalator tips.

November 8, 2004 3282

I used "Monadnock" nuts from Spruce. Page 86 in 03-04 catalog. Available in 6-32, 8-32, and 10-32 sizes, part no.s 04-00151, 04-00152, 04-00153. I think the 8-32 is what you need.

Fuel Cap Wear

November 2, 2004 4444

If you haven't looked at your caps lately, check the surface, in the cap, which rubs/engages with the fuel tank. Because of the tightening pressure the cap wears grooves into the tangs on the caps.. New caps cost in the range of \$250. I'm wondering if anyone has found a good fix. We're trying silver solder in the grooves but are not sure the silver solder is hard enough. The cap tangs are stainless steel.

We're a little concerned that if we try to weld the grooves that we may warp the cap.. We have 3 birds which makes for 6 caps and we put fuel in them a lot!!

November 2, 2004 6130

My AP unscrewed the steel part, welded in new material, then used a grinder to restore to original dimensions - worked great.

...and...

November 2, 2004 4142

First, when you take off and put on the cap, push down on it to take the pressure off. A dab of grease such as DC-4 or EZ Turn (replacement for Fuelube) might help. I haven't tried the grease, but I might, since one of my caps is showing wear, and I found water in the tank last week.

Second, caps are available for much less from salvage yards (eg. Wentworth). Buy a couple and you can find the one with the best holder tab condition.

Recommends K&N Air Filter

November 1, 2004 2411

As for performance, you cant measure 3% or 10% for that matter. It will let your engine breath easier though. As for the ease of maintenance and the fact you dont have to buy another filter it is a good deal. You wont find the filter media being sucked into your carb either with a K&N. I own one and recomend it highly.

Purchasing Side windows

November 2, 2004 6236

I have been very happy with the L.P. Aero Plastics, Inc. windows in my '67 140. I used 1/4" smoked grey all around. However, I would probably go with 3/16" on the sides if I had it to do over. (www.glapinc.com)

Battery Testing, Battery Life

October 27, 2004, 4827

Average life of a lead acid battery is 3 years. Anything more is a gift, and/or luck. No matter, when you see a volt meter, quality or not, climb to 15, it's an indication that "all ain't right in river city"

Chances or a gauge or regulator failing is unlikely, but from what you described.

The first place I would check is the battery. You can do a load test, or the fool proof method method, run the battery down some, disconnect it from the system, and put on a chargere (min. 10 amps). Hook up a volt meter accross the battery, and watch it within 20 to 30 mins will tell the story, If it goes above 14.2 begin to suspect it. Should you see 15, the battery is ready for Valhalla. Voltage regulators rarely go bad as well as gauges. The alternator will fail before they will, and the battery always first, and it'a always the last to be checked.

The battery can take out the charging system, before any other components in the system can take it out.

Removing yokes for Powder Coating

October 27, 2004 0033

I had the same problem when I had mine powder coated- wheels are attached to the shaft with a pin - nearly impossible to remove. Not the least of my worries was how to reattach the yokes to the shaft when the powder coat was done. I lucked out and the guy who did my coating was able to mask the shaft and coat the yokes with them attached. Removing the shaft from the tree behind the panel was much easier. Check with your powder coat shop. If they'll do this it'll save you a lot of grief.

Replacing Interior Seat/Shoulder Belts

October 27, 2004 : 0709

I replaced mine (1984 Archer II) by removing my existing lap belts and shoulder harness and sending them to www.aircraftbelts.com. They replace all the webbing with your choice of color and mail them back promptly with your original hardware.

I believe that the cost for both pilot and co-pilot lap and shoulder was less than \$200. They also replace the insert where the shoulder tab attaches to the lap belt. The belts are FAA PMA'd. Very easy to remove and install yourself. Just use a socket wrench and a screw driver.

Inoperative EGT Gauge

October 26, 2004 1345

I also have a 1973 Challenger. It has a Alcor 2 1/4 inch CHT/EGT guage. The EGT side does not work. I've ordered a probe for it as our mechanic has determined the probe is bad. The probe is Alcor Part Number ALC86255 and is listed at \$71.50 in Chief Aircraft. If you do have a Alcor guage, call their toll free number 1-800-354-7233 and ask to speak to their tech people. They can help you to decided which probe/wires you need. Also visit them at www.alcorinc.com.

Satellite Radio Installation

October 24, 2004 0461

For starters, you need to equip with a stereo intercom, which may be part of a newer model stereo audio panel (e.g. Garmin or PS Engineering) or may be a stand-alone stereo intercom. If you don't already have one, you'll also need to get an input jack installed on your panel to feed

the external audio source into the intercom. You'll also need a patch cord that connects the headphone output jack on your audio source to the audio input jack on your panel. That done, the \$125 XM or Sirius satellite radio receiver that you buy at any ol electronics store will plug into your cigarette lighter adapter for power, and the output line will plug into your audio input jack, thus running into your intercom. The antenna can go on top of the glareshield, and will secure there with a little spot of velcro.

My PS Engineering 3000 intercom shuts the music off when a radio call comes-in, but some of the fancier stereo audio panels will let the music play in the background and will overlay the com traffic on top, each at whatever volume level you set at the radio source.

If you want a slicker installation, without wires strung over your cockpit, an avionics shop can wire it all to a single point (E.G. the co-pilot yoke) where they can mount the bracket so that you just connect the radio to the storage bracket when you get on board.

Cabin Stretch - PA-28

October 22, 2004 4142

These are the various models and the years they got stretched. The wings on the Arrow and 180 were lengthened as well.

180/Challenger SN 7305001 (1973 model year)

235/Charger SN 7310001 (1973 model year)

R-200/Arrow II SN 7235001 (1972 model year)

The Arrow 180, and the Cherokee 150/160 had been dropped by then, so they never got stretched.

Loose Stabilator Bolts

October 20, 2004 9336

A few weeks ago I posted a message about a loose Stab. bearing in my 1982 Archer. Well we finally got around to checking the fittings.

What we found was the right stab. bolt and nut were torqued tight, but the bolt still rotated when the head was turned. The nut had bottomed-out on the bolt threads and did not allow the bolt to tighten against the casting. We added another washer under the nut and everything tightened up OK. Since that bolt has such a short thread (about 3/8"), you have to get the right combination of washers while still maintaining the proper number of exposed threads past the nut after everything is tight. There is very little room for error.

Hopefully that has cured the problem.

My A&P did admit that it was his fault for not double checking to see if the bolt turned after tightening.

Valve Lifter Bleed Down

October 20, 2004 4827

I wrote an article on POM about bleed down. In a nut shell, the hydraulic lifter provided constant contact of the follower in relation to the camshaft. In the process it takes up for expansion due to heat. The more accurately we can follow the contour of the camshaft, the more accurate will breathing and exhaust will be. End result will be most performance, economy and engine life.

The key for all this is the hydraulic lifter located inside the cam follower or tappet. At a precise timing, it fills with oil to constantly makes up the variation caused by expansion. When is closing, the lifter has to "unload" in order to allow final closing of the valve. The process again starts, fill the lifter, complete the cycle and unload.

Depending of the design of the lifter (ours are perhaps the most archaic dating back to the mid 30s), time has to be allotted to unsure filling and emptying (unloading). In the case of most Lycomings, this time is allotted by a given figure, referred as bleed down clearance. Lycs, use .028 to .080. There is a down side. Too much and factor in valve train "quivers", the lifter will not fully load, not enough, and the lifter will not allow final closing. Both condition will lead to some sort of valve failure, guide wear, and even cracking of the cylinder head. Too much will induce heavy build ups, which can lead to detonation. On the positive side, once done, check intervals can go 500+ hours.

Just because the tolerance has a bandwidth of .052, it is not wise to have this situation. The closer they are to each other the better the performance. Recording tolerances, will also aid in determining camshaft condition. Acceptable numbers for 320s is .050, and 360s, .060. variations of + .010-.005, are also acceptable. For 320s, a max on .060 min. .045, for 360s, .070 max, .055 min.

There are a myriads of other factors, but the above is much of what is to be expected.

Carburetor Heat Shroud

October 20, 2004 8175

You might try aerospace welding in minnesota. They 'repair' your heat shield, which really means they fabricate an exact duplicate using new sheet metal except some small part of your existing one. Price is around \$200-250. The piece you get back is as good as new but at a fraction of the price. (www.awi-ami.com)

Use New, Not Rebuilt Cylinders

October 19, 2004 9763

The plane I own I've had for 24 years. In that time the engine has been overhauled twice. On both occasions the cylinders were rebuilt as per the shops suggestion. Well they never were right. Chrome you know. Always burned gobs of oil and had fouling and compression problems. WELL...about three months ago I took off from a field and as I climbed to about 1000 feet the plane sounded as if it had turned into a screaming Harley. Upon immediately landing I discovered one of the exhaust pipes had blown off a cylinder by pulling the studs from a cylinder. THAT DID IT...I decided to do what I originally wanted to do when the engine was last overhauled. I bought NEW Superior cylinder assemblies. At a little over \$800 each (complete...nothing else to buy except no blow exhaust gaskets), I set about replacing the old cylinders. What an amazing difference! The engine is smooth, the cruise and climb are way up and the oil consumption is nil. For all of you who are thinking about cylinder overhaul versus replacement, you now know what to do. The cost of a complete rebuilt assembly is so close to the cost of a new cylinder assembly that they're really isn't any reason to rebuild the old jugs. Use 'em for boat anchors.

Replacing Cylinders

October 19, 2004 4827

Often times, owners are not aware of the insignificant difference in price between "fixing" and buying new. But this is only part of the equations. Assembly as well as operation play as important as a part in the life on the engine.

As to chrome cylinders, they are cylinders passed their useful life, but we can get a few more hours by simply adding chrome to a too far worn barrel, and so it goes.

Operation is another culprit. When we hear "don't lean until higher than 3000' or 5000'", this is absurd nonsense, and putting the engine at risk, good or poor O. But it's being done all the time. Some lean by fuel flow alone. Fuel flow at sea level and 3000' are a horse of a different color. When I did my commercial work, I was told to do just that. I balked stating that it was no good for the engine to run so rich> I was voted down. Its engine rarely reached 800hrs.

A few months ago, a friend was reinstalling a third set of barrels on their club 172. I asked if the bleed down clearance was ever checked or the exhaust system inspected carefully. The argument was that it was done the first time. I argued that the second and third time, valves were refaced and seat replaced. Long story short, only one out of 8 valves were in tolerance, all the rest were as much as .040 wider, which explained its problems. Its muffler had no baffles whatsoever. It has since been said, by everyone using it, that the AC has never run so strong.

After all is said and done, and even with the best of care, there is still no guarantee that these dinosaurs won't commit suicide.

Flaps Stick Upon Retracting (On the Ground)

October 19, 2004 8747

My '76 140 used to occasionally have the same problem when the flaps were fully deployed. (wouldn't do it with 1 or 2 notches) It doesn't do it anymore. Only things changed were the applicable parts were lubricated at annual and the A&P found a bent pushrod on the right side which was replaced.

Fiberglass Tip Tanks - Paint bubbling

October 19, 2004 6286

Had a similar problem on one of my tips. Small area of bubble which would just keep coming through paint touch ups. I had the tip tank pulled and reglassed by a Corvette shop that my mechanic used. No more bubbles and it has been 2 years. My mechanic thought that it was actually fuel vapor that might have been coming through because there was no moisture. If it happens on the other tip, I'll know what to do. Not a cheap fix.

Air Filter

October 15, 2004 : 4827

There is only one. Use K&N airfilter (for ACs). Brackets have a reputation for losing foam particles, which your throttle body will not like. The K&N is pricey, but can be cleaned 25 times plus, will not fall apart, and very difficult to clog.

Repairing Leaky Floor Vents

October 15, 2004 0581

I used single membrane rubber roofing material, I cut it to size, glued it to one side of the plates, and riveted them together. It has not failed in three years, and I use my plane daily to commute to work. If you know someone in the trades, I am sure that you'll be able to scare up a piece, if not

let me know and I will send you some. Piper wanted big money for the replacements, if I remember correctly they wanted to sell me the whole vent.

...and...

October 14, 2004 6130

There are two screws that attach the "valve" to pivot post, the valve is two sheet metal pieces, original with some type of rubber material riveted together.

Remove the rivets, remove the rubber, you can replace with baffle material or felt, I chose to use a stiff felt. Trace the material using the aluminum pieces and about at least an extra quarter of an inch. Re-rivet the two pieces together again through the existing holes with the new material in the middle (marking the pieces before disassembly is probably a good idea - though it is hard to screw up).

Do final trimming as you test fit each piece back into place, remove a very small amount of material at a time and keep test fitting until you have enough friction to hold out the air, but allows the valve to be moved, the pivot post is pretty strong!

Landing Gear Will Not Retract

October 14, 2004 1300

Just an FYI for P28R drivers, I went out last Saturday morning for a short XCcountry. I selected gear up and nothing happened --- still 3 greens.

The problem was the gear up relay switch --- a \$25 part (484-373). It was the original so it lasted 34 years -- gear down relay looked a little newer.

The interesting part is that Saturday, it was completely dead --- the gear would not retract on jacks. I went out to replace it this afternoon. I took off, selected gear up and it worked, but once again would not work on jacks --- replaced the relay and it works like new.

For you engineers, I was curious so I took the old relay apart. The 34 year old contactors were in great shape and the solenoid worked --- I assume it must have been a coil problem?

...and...

October 15, 2004 5646

Might not have been the relay, there's a micro switch that is released when the bellows of the auto extend inflate due to ram air pressure.

Gear over-ride actually moves the lever from the bellows and releases this same switch.

In my airplane the switch was cruded up with congealed oil and causing the gear to not retract problems in cold temperatures, thinks flying east and overnight cold soaking in Fargo!

In your case not retracting on the stands I would think it might have been sticking and didn't have aircraft vibration to help it pop out. With this design it is always compressed while the gear is down so it can take a set.

It took a lot to find this as moving it into the shop and as the airplane warmed up it worked better!

Cleaned up around the area of the micro switch plunger and it went away permantly.

...and...

October 15, 2004 4827

If your auto extend is engaged operation, the gears will not retract on the stands. It has to be set in override position in order to operate on stands. As to the solenoids, be sure they are being energized. If they are not responding then they are suspect, If they are not energized when they should be, the problem is elsewhere.

Regardless, on stands, the auto retract should be overridden.

Quarter Inch Windshield

October 11, 2004 8175

As I understand it, all 1/4" windshields need to have the edges ground to a taper for them to fit at all. The gaps I am referring to are on the trim retainer pieces that screw on on top of the edges of the window across the bottom and up the center post. The ones along the bottom seem to fit OK, although the one on the right doesn't sit flat to the glass. The vertical one fits to the glass well, but doesn't meet up with the roof. Thinking back, I think there was a gap, maybe about half as much, with the stock thickness window.

...and...

October 11, 2004 1073

If your airplane originally had 1/8 inch windshields, the best method of installing 1/4 inch is to buy new trim strips from Piper. The windshield can usually be installed without grinding very much if any if you carefully bend the inside retainer. The new trim strips will make it look like a factory install.

Replacing O-Ring in Primer

October 11, 2004 0178

I've never seen a parts break-down on the Koehler primer. Someone suggested it was a -12 and that has worked fine. You must use the MS29513 (fuel resistant) O-rings and somewhere I remember reading to lubricate the O-ring with light oil but "fuel lube" or "e z turn" works better. The only difficult thing is getting to the nut behind the panel - I used a crows foot. Remember to check with your A&P beforehand so he can sign off your work.

Fuel Pressure Gauge Needle Flutter

October 11, 2004, 0689

Here is a fix from Fast Eddy that worked on my 180 Arrow.

Take off the top cowl and look on the right side for a line running from the pump up to and through the firewall. There should be a coupling on it. Disconnect at the coupling and allow

ALL the fuel to drain from both ends. Might only amount to a teaspoon or two but that's enough to cause your problem. Reconnect, run the boost pump for a minute or two and check for leaks. If OK, button up and the problem should have gone away.

Battery Box Drain

October 11, 2004 3614

The front tube is air in and aft tube is air and vapours out. Tubes are scarfed properly for this flow. The center tube is a drain and is to be capped at all times and removed to facilitate box cleaning. Clean with baking soda and water and flush thoroughly.

Now the important factor to me. Paint the box interior with black batt box paint. Avail at Wicks or Spruce. This is a special compounded black lacquer for the box. Follow up on this annually and you probably will never have a problem.

Fixing Leak at Fuel Selector Valve

October 9, 2004 9239

My A&P had me remove the handle for fuel tank selection. Then remove the large round selector plate with the right and left tank logo. There is a nut that holds the selector valve in the valve body. I removed this and slipped it off while holding pressure on the selector valve so it wouldn't pop out. (OH I started all this with the valve in the off position). When you slip the nut off there is a o-ring and a small washer behind the nut and they slide over the valve selector. I held pressure on the valve selector while my A&P went and replaced the o-ring. He packed the nut, o-ring and washer with some kind of grease or lube and then I reinstalled. End of gas leak. Oh and on some planes you have to pull off the side trim molding to get to the valve nut. Mine you didn't. Much cheaper than new valve.

Electric Fuel Pump

October 9, 2004 4657

I had to replace mine a couple of months ago. Someone on this board sent me this address:
Contact Pifers Airmotive, 1660 Airport Rd, Waterford, MI 48327

248-674-0909 or 800-878-0909

I gave it to my mechanic, don't know if he used it or another source, but the parts charge listed the fuel pump at \$79.00.

Apparently there are two different types of fuel pumps, I don't know how Piper determined which one each plane gets. If yours makes a pulsing or clicking sound it is an "interrupter" pump, and costs around \$100.00. This is what I had on the 140.

If yours made a whirring sound, it may be closer to a thousand bucks. I suspect those might be on the fuel injected airplanes.

Fluctuating Ammeter

October 8, 2004 4142

Strobes cause that. If that's not it (see what happens when you turn them off), is it worse with a heavy load (landing light on) or low load (everything off). Could be lots of things: weak battery (pulses with light load), bad connection or master switch (pulses with heavy load). Could be vibration on the regulator or overvoltage protector if they are the old mechanical type.

October 8, 2004: 4827

Remove the alternator and do a bench test. sticking commutators will do as you described. Check the easy stuff first, though.

Replacing Wing Root Seal

October 8, 2004 : 0544

The job is done, different in some ways from what I expected but similar in others.

A surprise was the challenge in getting the old seal off. It apparently was very old and came off in pieces. About an hour's work.

I didn't realize how stiff the bulb on the new seal would be. I tried a number of tools and techniques but in the end, WD 40, patience and a stiff putty knife worked best. Hardest parts were on the top of the wing near the trailing edge where the gap seemed to be very narrow. Work one side and then the other, slowly moving forward. The bottom of the wing was comparatively easy, but my mechanics creeper was a godsend. On the bottom, after the leading edge, I was able to peel the two sides back and simply slip it in.

Two tricky areas. One was the leading edge. You need to put tension on the seal to pull it tight and remove the puckers. But not too tight as the seal contracts a bit when it cools in the evening. Second is the spar trim point on the bottom of the wing. It sags a bit and I think it will be necessary to put a bit of adhesive aft of the spar to keep tension on as there is only a short piece of bulb left at that point.

Overall, about another hour's work on the install, though it seemed a lot longer!

Defrost for Night Landings

October 7, 2004 : 4657

I am reminded tonight, as I am each year about this time, of another item to add to your pre landing checklist at night: DEFROST-ON FULL.

Ever notice how after landing on a beautifully clear night you all of a sudden have a hard time seeing to exit the runway and find your parking space?

Even with a 7-10 degree temp/dewpoint spread, you may be bringing a cold soaked airplane and windshield into very moist air. Right at touchdown, just when you really want to see where you are going, the windshield starts to fog up.

It might be thin enough that you don't recognize it for what it is, just looks like an incredibly dirty windshield.

If this sounds familiar, consider selecting DEFROST a few minutes prior to starting down to prevent that from happening.

Replacing Seat Actuation Cylinder

October 7, 2004 1208

Assuming that the pa28 cylinders are the same or simialr to the PA32, I just replaced mine with a cylinder from Avfab - they advertise in the magazine - cost was about \$150 as I recall. I replaced the pilot vseat and did it alone - not easy but it can be done. One hint - don't expand the cylinder out until you have it secured in place. If you do it is difficult to get compressed back to where it needs to be. With two people would probably be very simple job. I was told A&P not required and simply made logbook entry.

Time to Replace Tires

October 7, 2004 4827

Rule of thumb in the entire tire industry is just before the grooves disappear. Somewhere between 10 to 20% remaining is also a general rule.

Tire wear's best friends are low tire pressure, alignment, and general abuse, in our case, faster than normal landings, or just plain bad ones. The real culprit, and the hardest to deal with is age. If the aircraft is tied down in the open air, the elements will help it age. In warm area, and even up north, on a hot summer day, tarmac can reach upwards of 140 deg. The C guys that remove wheel pants while the tires are exposed to sunlight will help aging process.

So there is really no "real formula", but a simple visual inspection. Remember also, that low air pressures also will invite even higher than normal heat rises while landing on a hot day. A good time to inspect for cracks is immediately after landing, and usually near the tire bead. BTW, from personal experience, I have owned and installed both expensive and cheap tires, oddly, there's not much difference in service life, however, tire pressure alone will do in both grades.

Tachometer has Slight Flutter

October 9, 2004 : 8494

I had that problem with another plane I had. As Ken says remove the cable but don't remove the housing from the panel. Place a rag on the end of housing in engine compartment. Take some solvent and use a bulb syringe to squirt solvent into the housing from the panel side. Make sure you have a rag in the cockpit to catch what weeps from the housing. When you think you have put enough in take an air hose and blow it out from the cockpit side. Then use LPS 2 lubricant on the housing and wipe some on the cable before you insert it back in. LPS 2 is better than WD40, it is a light oil. WD40's carrying agent evaporates. Always use LPS 2 on all controls and pulleys and Teflon lube on hinges. Hope this solves your problem. If it persists then its time to check the tach. I have the Horizon didital tach. The downside of the digital tachs is if you lose electrical power, you lose the tach.

Propeller Balance Recommended

October 5, 2004 : 6900

I had my prop balanced on 08/14/2004 as well. When I started it was at .4 IPS (Inches per second). Apparently there are 2 schools of thought as to what is "in balance". One states that it can be .2 the other states 1.5 IPS. Initially we kept adding weights and did not see any results. Then discovered the accelerometer was hitting the inside of the cowl when the engine was accelerated. Any way long story short - I got down to .008 IPS. World of difference, even

taxiing. I did not even know that the vibration existed until after the balance. I would recommend to any one. My cost was \$175.

Cleaning fuel and other stains

October 5, 2004 : 0856

A friend of mine told me about a product called "Black Streak" remover, available at Boat US stores. It is made to remove the black streaks which form on the white hulls of boats. I used it this past weekend to clean my 140. WOW!! No elbow grease involved! Just spray it on-wait 30 seconds, and wipe it off. It cleaned everything from bugs to streaks/discoloration, etc.

Better Gascolator Stops Leaks

October 4, 2004 0825

Had the same problem and finally got tired of messing around with my old gascolator. I replaced it with a much better solution that uses a machined aluminum gascolator housing that "bayonet" locks to an upper housing and is sealed with an o-ring. A little pricey, but it definitely works. Go to the following website for more info.

<http://www.stevesaircraft.com/>

One Piece Windshield

October 3, 2004 : 4077

Yes, I installed a one piece in my Dakota. Is it worth the money? No! It is costly, about \$950, and will take a good 10+ hours (probably 20) to install. It requires jacking up the engine from the top, cutting and drilling out the old support, replacing the support with one that goes on the inside, and installing the windshield. A hard job to be sure.

Would I do it again. Absolutely! It gives more vision, not much, but some, a support to grab onto, and makes the plane stand out on the ramp.

The only reservation I had was that the support is structural and I wondered if it was as good a design as the original. I asked K. Bergy about it at the fly in as we were looking at my plane. His response was that Kosola designed it and he was one of the original designers of the plane. It is as strong as or stronger than the original.

Not a speed mod by any means. But, in my experience, it will increase speed just as much as gap seals, wing root fairings, smaller strobes, and the like. I installed those also but nothing looks as nice as the one piece.

Repairing Leaky Magnetic Compass

October 3, 2004 5495

It's an easy job...as previously mentioned the kit is available from Spruce.

Here are a couple of suggestions:

Most of these have the light attached with a couple of screws to the front. You can remove the light this way when you remove the compass from the housing...I cut the wires 5 seconds before I realized this.

Also, to prevent an annoying air bubble in the compass on hot days, fill the compass up and then refrigerate it for a few hours and then top it up and cap it.

Superchargers and Aircraft Engines

October 1, 2004 : 4827

Turbocharging (exhaust driven supercharger) in GA engines has one purpose only and that is to maintain sea level pressure at higher altitudes. The turbo systems uses are pathetic in construction and technology to say the least, but work well with an otherwise pathetic engine. To increase pressures beyond sea level pressures, is a death knell for these dinosaurs, the example of which is the shorter TBO, and a great majority never see it.

Mechanically driven supercharging would increase complexity, and difficult to control to such a low level where the dinosaur would survive.

The engines of old. radials and the Vs were built to withstand the extra pressures of supercharging, although, they too, had limited life.

180 HP Engine Conversion

October 1, 2004, 0364

I completed the upgrade to the 180hp. factory new. avcon has the stc #SA793CE.Address-P.O. Box 654 Udall Kansas 67146.

Oil Screen Needs to be Cleaned

September 30, 2004 1517

The oil pressure screen is located on the accessory case between the two magnetos. It's in the housing with the oil temperature sensor. It's held on by four screws. You'll need a gasket (about \$0.99 from most places) and 4 new lock washers. You can take the wire off the sensor or just leave it on, just don't dangle the screen housing by the wire. The screen is inside the housing. When you take it off, it will make a mess. Stuff an oil rag underneath it to capture as much oil as you can.

There's also a suction screen, in the sump, under a large hex-head plug that faces the firewall. It's safety-wired on. You'll need to re-safety it and replace the washer underneath, AN-900-16.

The gascolator on the left side should also be cleaned periodically, again, safety wire and another inexpensive gasket. The lower cowl has to come off for that one

Wheel Corrosion Causes Failure

September 26, 9608

Friday evening, my wife and I flew up to Columbia, Ca. and had dinner. We departed Columbia after dark, and had a beautiful flight back to Oakland, where I made squeaker of a landing (had to impress the wife).

We fueled up, and taxied back to my tiedown area. As we turned off the taxiway to the ramp where I tie down, there was a big bang, and the right wing dropped. We were taxiing at about a brisk walking pace when this happened, so we were stopped in a few feet.

I shut off the engine, and we hopped out with a flashlight to see what happened. The right main tire and tube were flat, but I couldn't really see what had happened, as the wheel assembly was

obscured by the wheel pant (which was trashed). I thought we had blown a tube. We called Ground, and they sent an airport ops guy out. Between us we couldn't do anything but cone off the plane.

The next morning, my friends and I converged on the plane, jacked it up and removed the wheel pant. What I saw gave me the willies! The outer tire bead flange on the cast aluminum wheel hub had parted company with the rest of the hub, due to intergranular corrosion. We slapped a spare wheel on the plane and towed it to the tiedown.

My buddy who is an IA said that the corrosion had gradually gotten worse until it let go, but that it's a process that takes years. What is really frightening is all the places I've been since I bought the plane a year and a half ago (4 trips to Baja, and all over the West Coast). If that wheel had let go on a takeoff roll at Vr with full power, or on a landing at 60+ mph... I don't even want to think about it.

I checked my logbook, and it seems to be the original hub from 1965. We carefully cleaned and inspected both main wheel assemblies and the nose wheel when I put on new tires and tubes a couple of months ago. I found no cracks at all, and believe me, I was looking. Anyway, I'm ordering 2 new wheel and disc sets tomorrow, and I'll need to find a right main wheel pant. Anybody out there have one laying around to sell?

So hopefully this is a wake up call for others with old wheel hubs. Check them out carefully. and if there is any doubt, ditch them. We were so lucky to be taxiing slowly, right in front of my mechanic's hangar when it let go. It could have been catastrophic.

Fly-In Websites

September 25, 2004 : 0937

Two websites which show current fly-ins are www.flyins.com/ and www.fun-places-to-fly.com/.

Wing Skin Patch From Inside Wing (Fuel Tank Access)

September 22, 2004 : 0028

That is commonly called a flush patch. A&P's had to do one to get their license. Access will be the biggest deal. will need to be able to get backing plate and bucking bar on the inside. If they have to drill out rivets that hold the skin down to get in there, it could be expensive, and you might want to go with patch on the outside and pop rivets. Does not look as good, but is cheaper.

Maintenance & Parts Manuals

September 22, 2004 : 1517

Piper will send you to Avantext (www.avantext.com). Not cheap (\$199, \$299 for one year subscription), but it is up to date, official and you'll get the service manuals and service bulletins and Service letters too. Essco (www.esscoaircraft.com) has the paper ones, but they do not guarantee them to be up to date.

Windshield and Window Sealant

September 20, 2004 1276

I am a building contractor and while i swear by Polyseamseal, I will not use it in any exterior applications on a house or commercial structure. it is great for bathroom and kitchen applications. It also has a very good adhesive quality to it and i have used it in place of liquid nail where the adhesive would be visible. It also remains very pliable.

For tough abusive applications on my boat I use 3M 5200. It is silicone based adhesive/sealant. It is a little pricy, but it is fantastic and comes in clear, black and white. i was put on to this by manufactures of 40' sportfisherman. They use it to seal underwater hull penetrations. I have since also used it my plane and on buildings when i have a problem area I can't solve with regular silicone.

It really is great stuff. 3M has a few variations on it for specific applications and drying conditions and I have had very good success with all of them.

I think Home Depot stocks it, but if not look for a national boating store like west marine, Boat US, Boaters World or even Bass Pro Shops. I have found all of these stores anywhere there are lakes large enough to put power boats in.

Cleaning Oil Screen 0-540

September 18, 2004 7120

Also own a Cherokee 6-300. On the left side of the engine (from the pilot perspective), just below the exhaust manifold toward the back, you will see in the side that looks similar to a normal oil drain plug installed horizontally. It should be safety wired. Cut the wire, unscrew the plug, and pull out the screen that rests inside. Clean with solvent and reinstall. Be sure to re-safety wire, This is done after the oil has been drained and before refill. I change my oil every 25 hours and clean the screen every 50.

Overhauled Engine Runs Rough at Low Power

September 18, 2004, : 4827

You need to look at the carb closer. Start with the air screw and be sure that it's adjustment was done with the engine warmed up, and while running, not just truning it back 1 1/2 or two turns. If it requires more thant that, you may have some other problem.

Idling at 700 rpms is too slow for a newly OHed engine. 800 to 900 is more appropriate. Inspect your primer for leaks as well.

Connecting Apollo GX Series GPS to Autopilot

September 18, 2004 7071

If you have the Piper Autoflite with a tracker unit or a heading bug interface then all you need to do is install a selector switch inline to the tracker from the DG and GPS and simply select one or the other to follow. The sensitivity on the GPS internal CDI needs to be set to 1/4 mile per dot sensitivity. How to do this is in your owners manual.

Servicing Wheel Bearings

September 17, 2004 : 9608

An A&P is not required to maintain your bearings. Just jack the plane up, remove the retainer and dust seals, pull out the bearings, clean them, repack and reassemble.

To clean the bearings, I just use gas or acetone for the first stage, then pop them into the ultra-sonic for 10 minutes with Methyl Alcohol to get all the fine grit out.

I use Sta-lube High Temp Disc Brake grease, which has a mil-spec number. My A&P says any quality grease will do.

Main 40 amp Circuit Breaker - Older Models

September 17, 2004 4142

According to the Parts manual (Fig. 69-7) the Piper part number for the 40 Amp breaker is: 454665

This is a standard breaker, the Potter and Brumfield PB W23-40 (full number: W23-X1A1G-40). See picture below. This is available from Aircraft Spruce or Chief Aircraft among others.

Landing Gear Pump Cycles Every Few Seconds

September 16, 2004 4467

Internal hydraulic leak, probably either one of the gear actuators or the emergency gear extension valve (most likely). Each unit can be individually isolated at the manifolds under the back seat, the gear is then retracted (while on jacks). If the pump stops cycling, the unit that is isolated is the leaky one. Now you need a few 49 cent O-rings and about an hour to rebuild the unit.

Vertical Card Compass Installation

September 16, 2004 : 1073

PAI-700-14. Search the supply houses for the cheapest price. I bought mine from Aircraft Spruce.

Mounted mine on the center post using their Piper mount, PACMO-Piper, using 4 pop rivets (1/8) as in the original. If you are moving from the top of panel mount, you can locate the position of the bracket from other Cherokees with the center compass. The hole (1/4) for the light wires is drilled in the center of the post under the mounting bracket. The wires run down through the center post and under the panel. Leave them long enough to pull out of the hole if you need to remove it for any reason.

I would not go back to the wet compass. It does not remove all the compass errors, but it has more stability and easier to fly partial panel.

High Intensity Discharge landing Light

September 16, 2004 5983

HID nose lights for PA-28 have been available from LoPresti Speed Merchants for \$948.

http://speedmods.com/Boom_Beam/boom_beam_AML.htm

Replacement of ELTs With New Digital Models

September 17, 2004 : 7540

I researched this topic before I decided to go through the hassle of replacing mine. Our current ELTs (121.5/403 MHz) will no longer be monitored after 2009 by SARSAT, but services can still be obtained, by filing flight plans, family/friend reports of non-arrivals, or loss of contact by

ATC, during flight following or IFR operations. The new digital ELTs are very expensive at this time, and while their performance far exceeds our current ELTs, that doesn't make ours obsolete.

Winching Plane into hangar

September 15, 2004 : 0276

I was faced with the same problem when I moved into my hanger this summer. Someone on the chat suggested Harbor Freight for a winch. After checking with my mechanic about stresses, I ordered a 880 lb engine hoist (#44006 \$ 74.99)(www.harborfreight.com) and 100 ft of 16/4 awg service cord from McMaster-Carr (#7082K82 \$ 42.00)(www.mcmaster.com). My partner installed the winch on a vertical 2 X 10 at the rear of the hanger. I replaced the short cord between the hand control and winch with the 100 ft cord. The cable is not quite long enough but 10 foot of dock line and a hook solved that problem. It works like a champ and takes all the strain out of putting the PA140 to bed. We are careful to push the plane around more or less in line with the pull of the winch and keep a close eye on the tail feathers as she rolls back into the "T". By the way the setup looks very similar to ones offered by Spruce and Wag for around \$ 300. Go for it.

Master Switch Relay Resistor - Value

September 15, 2004, 2161

I replaced the resistor on my master relay with a 4 ohm 50watt resistor. You should be able to find one at Radio Shack.

Should be the same as my PA28-180

Corrosion Protection application

September 15, 2004, 3282

Some of the choices are Boeshield T-9, ACF-50 or Corrosion X. An A&P I have used likes LPS-3. I recently used ACF-50. All are available from Spruce.

32 oz is enough for one application. It can be fogged in using a siphon type engine cleaner tool. I made a siphon fogger using 40" stainless steel tubing because I wanted to be sure to reach the far corners, but I think the engine cleaner would have worked just as well.

Seat Foam

September 13, 2004 : 3282

Conforfoam is hard as a board when it is cold, but it warms up in a minute or two. I have used it as a cushion in my truck at temperatures near zero F. Most suggest using pink over blue over green, each 1" thick. Available for \$16 each at: www.wicksaircraft.com

Vortex Generators & Poor Takeoff Performance

September 8, 2004 1467

Concerning my problem of poor takeoff performance on my turbo-normalized Lance. I just completed installation of vortex generators and WOW, what a difference. The airplane now flies out of ground effect instead of mushing out, but the biggest difference is the increase in control even at speeds close to stall. Much easier to land and hold the nose off. Not cheap, \$1450 plus labor - approx. 9 hrs. but in my case well worth it.

Cabin Heater Box Repair

September 7, 2004 8175

I refurbished the one on my Six last year, but the corrosion on mine was not bad. In my case, I removed the heat box and the distribution manifold that the heat box attaches to, bead blasted all the peices, painted it with hi temp exhaust paint and put it all back together. IIRC, the flapper hinge is a bend in the flapper sheet metal wrapped around a pin. I don't recall there being an easy way to get the pin out of the box to remove the flapper (I didn't remove mine). The flapper itself is two peices of metal rivetted together. If the flapper is perforated, you might be best off looking at the salvage yards for a replacement heat box rather than trying to repair yours.

Nosegear Trunnion Crack Repair

September 7, 2004, 1659

Contact S & B Industries Inc.

801-261-4076 - We are a FAA CRS and have approved data for your NLG trunnion, part number 67054-03.

Electric Attitude Indicator Replacing Turn & Bank

September 6, 2004, 0461

I replaced my turn coordinator with a Mid-Continent electric AI. It has a slip/skid "ball" that fastens right on the front of the instrument w/ 2 screws. It also has an internal battery backup that keeps the instrument working for an hour or so in loss of electric power situations. Internal battery recharges itself. Cost was about \$3K installed. I cannot say enough good things about this new AI, and it is a safety must for those who fly lots of IFR.

Alternator Keeps Dropping Off Line

September 3, 2004 0444

I recently had the same type of problem but first replaced the battery(needed) and the alternator(not needed, I think) and the alternator kept going off line. I replaced the overvoltage relay, two wires and bolt it down, and voila, problem appears to be solved. It was very disturbing when the problem was occuring as I was not sure that it was not a more complex problem. Since the regulator had been replaced recently, I was convinced that an original relay was the most likely culprit.

Listing of FSS Telephone Numbers

September 2, 2004 8175

If you call the 1-800 wx brief calls get routed to the FSS nearest the area code of the phone you are calling from; so if you call from your cell phone, you'll get the FSS local to your home area. This can be a problem if you live in new england and have travelled to the midwest, for example.

HEre is a list of FSS phone numbers:

Albuquerque, NM (866) 449-5390

Altoona, PA (866) 708-9987

Anderson, SC (866) 225-2172

Anniston, AL (866) 609-8684

Bangor, ME (866) 295-3835

Boise, ID (866) 258-9068

Bridgeport CT (866) 293-5149
Buffalo, NY (866) 678-2759
Burlington, VT (866) 847-1846
Casper, WY (866) 227-7498
Cedar City, UT (866) 667-3858
Cleveland, OH (866) 780-8261
Columbia, MO (866) 223-4352
Columbus, NE (866) 288-3448
Conroe, TX (866) 689-5992
Dayton, OH (866) 505-6163
Denver, CO (866) 751-7021
Deridder, LA (866) 401-5659
Elkins, WV (866) 656-2661
Fairbanks, AK (866) 248-6516
Ft. Dodge, IA (866) 300-2858
Ft. Worth, TX (866) 272-7915
Gainseville, FL (866) 523-7229
Grand Forks, ND (866) 306-6931
Great Falls, MT (866) 527-7601
Green Bay, WI (866) 845-4888
Greenwood, MI (866) 245-6109
Hawthorn, CA (866) 879-8252
Honolulu, HI (866) 766-0820
Huron, SD (866) 732-1331
Islip, NY (866) 365-5019
Jackson, TN (866) 840-1051
Jonesboro, AR (866) 520-8890
Juneau, AK (866) 297-2236
Kankakee, IL (866) 450-6593
Kenai, AK (866) 864-1737
Lansing, MI (866) 879-4066
Leesburg, VA (866) 225-7410
Louisville, KY (866) 412-7968
Macon, GA (866) 276-0243
McAlester, OK (866) 269-0189
McMinnville, OR (866) 833-7631
Miami, FL (866) 347-0316
Millville, NJ (866) 225-7920
Nashville, TN (866) 890-1348
Oakland, CA (866) 469-7828
Prescott, AZ (866) 226-3763
Princeton, MN (866) 841-6469
Raleigh, NC (866) 663-3354
Rancho Murieta, CA (866) 272-7525
Reno, NV (866) 281-2737

Riverside, CA (866) 838-2250
San Angelo, TX (866) 300-3867
San Diego, CA (866) 682-2175
San Juan, PR (866) 822-8537
Seattle, WA (866) 384-7323
St. Louis, MO (866) 671-6176
St. Petersburg, FL (866) 295-3983
Terre Haute, IN (866) 224-9906
Wichita, KS (866) 672-5145
Williamsport, PA (866) 655-6434

Rebuilding Seats

August 31, 2004 6130

I will never not have confor foam in an airplane I own. If you only ever fly your airplane locally for a max of 2 hours at a time, stick with the cheap stuff, if you want comfort go with confor foam.

I redid all 4 seats in my Archer, each seat was weighed before and after with no change in weight. I attribute that to the foam that Piper used in my 84 Archer - is actually pretty dense and secondly the covering materials cloth and Ultraleather that I reinstalled weighed less than the pimp red velour covers that Piper used.

Things to consider:

I added a 1 inch lumbar support, the curve of the Piper seat back was probably fine, and I did not need the lumbar. The biggest problem was the loss of 1" of rear room - to put me where I was used to fly the plane from, my seat had to back up a notch.

I also used 3" of foam, and wished I had used 2", I am 6ft and with my Lightspeed headsets at the lowest seat position, I am perfect, but have no spare headroom - but I have the vertically adjustable seats - if anyone shorter than me drives my plane, they will love what I had done - my wife is 5'4" and for the first time has a great view out the co-pilot seat in the full up position. My slings were sagging, and so with tight slings, two inches would have been fine. If you don't have vertically adjusting seats, you should take your tight slung seats out to your plane and test fit what will work for you. I literally spent days sitting in my seats trying different foam combinations. I recommend pink and blue on the seat, and either pink or yellow 1" on the seat back, I would do yellow if doing again, the back can be softer because it is not weight bearing. Again, the best advice, buy some of everything and test out all combinations. I had a test seat from the back of the plane in my living room for over a month with different combinations - I watched all my football games in the seat.

I also added kidney and thigh supports, when you fold the seat forward, the kidney and thigh supports bump and the seats won't flop forward like Piper intended - not really a problem, more like car seats that are spring loaded to go back to their vertical position.

Lastly, just be careful of building out your seats too large, room in the cockpit is scarce, with tight slings you don't need as much cushion - unless you need the height, and if you build the backs too thick, you are taking away leg room from your passengers. I made my seats borderline too large.

Lots of fun, and you will never ever regret it

Noise Insulation

August 30, 2004 0013

PepBoys has a roll of insulation for about \$20. I doubled it with the foil facing out and the other facing in (yes, it is FAR A&B approved). I used it all around the cabin, even in the roof - we can talk without headphones.

On another note, those samples of seat foam that you can pick up at major airshows can be trimmed (about a half inch thick) to fit inside your headsets to increase comfort and noise reduction.

Down Gear Switch Defective: Arrow

August 28, 2004 0546

I posted a couple of weeks ago asking for advice on a main gear down light that was intermittently not working. After cycling a couple of times, I could get it working and it seemed to be getting crankier as time went on. Well, I finally got around to checking the microswitch and found it to have an intermittent high resistance value. A local aviation parts store had a replacement switch for \$120 list price. Even with a small discount it seemed pretty expensive for such a switch, so I went to Air Salvage of Dallas and found one for \$35. I Replaced the faulty switch with the salvage switch and everything is working fine.

Repairing Electric Fuel Pump

August 28, 2004 6259

I had my pump quit a few months ago. I disassembled it and thoroughly cleaned the cylinder and piston assembly. I then very lightly used the finest emery cloth to remove any deposits and foreign matter on both the cylinder and piston. It's important not to remove any metal from either, as the pumps ability to develop adequate pressure relies on a specified piston to cylinder clearance. After blowing it out with compressed air and a through rinsing in 100L fuel, I reassembled it, and it's been working great ever since. Be careful not to loose or damage the small check valves, and while you're at it, replace the end cover gasket if worn. It's unlikely the problem is anything other than contamination or wear of the cylinder/piston. Be sure to inspect it for wear. If you see obvious wear marks, then you should replace the unit.

Vertical Card Compass

August 30, 2004, 3255

The vertical card compass is easier to interpret quickly because it doesn't read backward compared with the DG. Because it has an internal gearing mechanism, it has quite a powerful magnet and this can cause problems on setup unless done by somebody who has experience with these. If you mess up the installation, they are never accurate.

Elevator Trim Barrel Parts

August 27, 2004 0785

I purchased the trim barrel from Mc Farlane 58.00 www.mcfarlane-aviation.com
bushings from Piper Yes Piper 1.09 ea you need two
they should have the washers. also. The machined 1/2-13 screw is 4130 steel running against the
aluminum barrel. My jack screw was like new fit with the new barrel.

Shoulder Harness Retract Spring

August 27, 2004 5929

I purchased the spring from these people last year.
Safety LTD retract spring \$100.00 630-584-9359 or 800 866-4886

Turbo Aircraft - Plane Porpoises (altitude hold) at HighAltitudes - Century 2000 A/P

August 26, 2004 8396

I own a 82 Piper Turbo Arrow IV and has the Century 41 Autopilot in it. Regards to your porpoising, I have had the same problem with my plane as to porpoising, but after talking with Century Personell and sending in my autopilot to have them test it. Came back with an airworthiness tag attached. Anyway, I called them and told them what occurs, the technician there told me it was the Attitude Indicator on my plane. that the ring and brushes on the back part of it, which is used for Autopilot was probably worn. Ended up sending the AI out 5 yrs ago, rebuilt and came back and problem disappeared. Now I'm noticing it is starting to act up a little again. So hate to think about it, but since it is identical to 5 yrs ago. Would imagine will end up having to do the same thing again. You might want to look in the area of the AI. Not that the problem is there, but would definitely suspect a problem there as to when it is at the higher altitudes.. etc..

Help With Difficult Medical Problems

August 24, 2004 3255

I used Pilot Medical Solutions after bypass surgery. They advertise that they assemble medical records but in practice you may have to do that yourself using their instructions, since many medical organizations won't release directly to them.

Go to AOPA first with your condition to find out what to expect. Pilot Medical Solutions is expensive but they know what the FAA wants and hand-carry it in a package that gets approval in days instead of months. They also send an annual letter to my doctor telling him exactly what he needs to send them.

You can do all this yourself but it's sort of trial and error, and every time the FAA has to request something you left out, several months go down the tube. It comes down to time vs money.

Primer For Starting

August 24, 2004 4827

Every internal combustion engine has to have some "pre fueling" for starting. It can be an enrichner, choke or primer. The engine being cold, requires considerably more fuel for starting. Once started, and as the cylinder temperature rises, less fuel is required. AV engines have poor

excuses for carburetors, they are updraft types, and even abandoned by lawnmowers. FI, although an improvement is continuous flow, which makes for easier starting, but also easy to flood. Regardless, more fuel is a must for starting.

Even though aviation is riddled with the ridiculous notion that the lead in it lubricates, it is a fable. Lead is not a lubricant, nor does gasoline have any lubricity. Fuel, however, is also used for cooling purposes, which, if not used properly can harm the engine, just as well as help it.

Plane Turns to Right While Taxiing

August 23, 2004 7071

You need to check the toe-in on both main tires. You will probably find that the toe-in on the left is out and the scissor assembly is either improperly reassembled from previous maintenance or will need to be adjusted with shims placed between the two scissor links there at the center knuckle. The procedure is in the maintenance manual.

August 24, 2004 4868

Another thing to check is the condition of your brakes. If one side is dragging, it can cause the symptoms you describe. You may also want to check the condition of your wheel bearings to make sure your wheels are rolling smoothly.

Eyeball Vent Source

August 21, 2004 0580

I ordered two eyeball vents from Wicks Aircraft (www.wicksaircraft.com) and installed them into the front two positions of my 1972 6-300. Pretty simple installation. And, they WORK!! Great airflow.

I'm going to buy four more for the other seats, hopefully before too many people get wind of this great alternative and they sell out.

Simple installation (up front, at least..haven't done the back):

- 1.) remove front overhead console.
- 2.) remove existing vent assemblies (held in with just 2 screws each) from overhead console
- 3.) remove vents from their original plastic housing
- 4.) on the new vents, remove the black supply piece (backing). You'll only install the silver piece(front) into your plastic housing.
- 5.) on the plastic housing, dremmel out the hole and remove the two non-essential screw holes. This should be pretty easy because it's plastic. The rear ones are metal and will require more finesse.
- 6.) fit the new vent into the socket. Dremmel divets/indents into the sides of the new vent so your screws will fit into the two remaining holes on the plastic housing. Oh - you won't be able to use your old screws. You'll need longer ones.
- 7.) once you can fit two screws into their respective sockets and the vent is snug in the plastic housing, remove them and seal the entire fit with silicon so no air leaks.
- 8.) put new vent assembly back into place (old plastic housing, new vent component!)
- 9.) reattach hose and duct tape it for good measure.

Downloading Listing of Ads

August 19, 2004, 1073

First go to this FAA website:

http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/MainFrame?OpenFrameSet

Click on 'Current ADs' 'By Make'

Click on the 'P' near the top of the right section.

Click on the arrow in front of 'Piper Aircraft...'

Click on the arrow in front of 'PA-28-150'

The list of AD's will be displayed. You will have to read each AD to see if it applies to your airplane.

Also check 'PA-28 Series (all)' to see if any apply to your airplane.

For the engine, click on the 'L' at the top and go to 'Lycoming Engines'

Scroll down to the 'More Data' at the bottom and then go to your model engine.

You can look up the AD's for your propeller and any accessories you have in your airplane in a similar manner.

Additional info that you should have is the Type Certificate Data Sheet for your airplane. It can be found at:

http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgMakeModel.nsf/MainFrame?OpenFrameSet

You use the same method as with the ADs. 'Current Models' 'By Make'. After you locate your model, click on the TCDS number next to your model (2A13) and then on the pdf file 2A13.pdf.

I have a binder with each AD for my airplane and the TCDS. Don't overlook the Notes at the end of the TCDS file. Lots of useful info.

Finite Lifetime of Carburetors

August 20, 2004 2411

Many may not know that our carbs do have a finite lifespan and that they do need to be overhauled. I have a O-360-A4A and at about 4200 hours the engine began to run rough. No amount of leaning or fiddling with the mixture or throttle would help. I continued to fly. During my BFR it happened. The carb failed. When the throttle was applied to full the engine ran so rough that I thought it was going to tear off the mounts. I landed safely at a local airport.

I had the carb removed and sent to a shop in NorCal. The guy there told me that the carbs we use need to be overhauled at 4000hrs if flown regularly, sooner if flown less often. There are seals in the throttle shaft that fail due to age among other items, and carb failures occur as a result.

Typically superhyper overrich problems. Such was mine...a super hyper overrich event.

The carb was rebuilt, cost minimal, and the engine has run perfectly since. Some food for thought. The carb is probably the single most important thing on your engine. You only have one, and when it gets tired it just rolls over and dies.

Fuel Tank Screw Removal

August 18, 2004 0354

This is my first time doing the annual on my friends 1974 Arrow II. A thorough review of the log book shows no evidence of SB 1006 compliance. I looked at the hoses with a borescope and they appear to be original. No log book entry on ever changing the hoses either. Yikes! So the tanks are coming off. I reviewed the archives on all of the posts for tank screw removal and SB 1006 so I prepared for lots of fun. I stocked up on left hand drill bits and bought new Blue Point screw extractors. They are cad screws and if they've never been out oh man.

I started thinking that I never saw mention of the use of a screw buster in any of the posts. Can it be that no one has ever used one of these in this application? So I thought I would give it a try. I was able to break loose all of the screws in 30 minutes. None rounded out. Some were tough but they broke loose eventually.

The tool can be ordered from Aircraft Tool Company (www.aircraft-tool.com, 800-248-0638, product AT-540, \$19.95). This is NOT like one of those hand impact tools that you hammer on. Those impart WAY too much load onto the structure.

You also need 3/8 drive apex bit holder, some #2 apex bits and a rivet gun (preferably 4X or less). The rivet gun must have excellent trigger control. You only need to pull the trigger until the hammer taps lightly. You CANNOT just wank it on the whole way or you will probably mess something up. Like any tool, used properly it works great but if not handled right.... uh oh!

It may seem strange that the gun is tapping down on the screw while you are trying to pull it out. But what the gun is actually doing is breaking the corrosive bond between the fastener and the nutplate. While tapping gently you apply slight pressure (1 to 2 lbs. ?) with you hand on the wrench. When the bond breaks the screw will turn and you are done. Put your Dewalt on it and it will come right out.

If you are not familiar with using rivet guns then get someone to help you. Too much trigger and a slip off and you will be repairing skin. Again, used properly it is magic.

Some of the other benefits are:

1. You don't have to spend time picking the paint/wax buildup out of the screw head. The light tapping of the gun will push the bit into the fastener.
2. In most cases you won't have to use penetrating oils.
3. You won't have to use lapping compound as the bit is pushed into the fastener tightly.
4. You can probably do the entire job with one bit.

Projects that have evidence of heavy corrosion may benefit from a dose of penetrating oil but I wonder how much will actually get down in there.

Radio Noise Follows Engine RPM

August 19, 2004 4142

If it's a whine that follows the RPM, it's alternator whine. If it's a scratchy, poppy kind of noise, more likely the magnetos, but that's more likely to affect the radios only.

So assuming it's alternator whine, it's either the alternator itself, a filter or the battery. If your battery's old, try checking or replacing it. If not, there is a capacitor type filter on the alternator that's going bad. Or, it might be alternator brushes or a diode going bad.

My guess: battery first, alternator second.

Rivets For Replacement of Aileron Hinge

August 18, 2004 3614

Been substituting Cherrymax for solids for years but, no longer legal. Cherrymax blind rivets are slightly stronger than solids but must now have a 8110-3 and 337 approval for their useage. Aileron hinges can be squeeze set easily and I would insist on them. You do not need a 337 to replace these hinges as no alteration or repair configuration is involved. It is a direct part replacement. Suggest squeeze them yourself and let the A/P inspect.

Governor Leaks - Constant Speed Propeller

August 17, 2004 4827

The prop governor has an internal leak and can be repaired with a modification. Call Mid-Fla prop service 407-894-2412.

...and...

August 17, 2004 8955

Is the leak from the governor itself, or between the governor and the crankcase? If it is not the governor, then this might be helpful.

As I understand it, there are two different gasket types that are used for this: one is of a rubber like material and has a fine metal screen embedded into it to catch any chunks of unattached engine parts or carbon bits that are trying to get into the prop governor; and the other gasket type does not have the screen and is of the more common composite gasket material.

I was told by two engine rebuilders and one parts supplier that the screened gaskets tend to not be too reliable. It seems that the wires that form the screen extend through the gasket to the outer edges and are not always bonded properly to the gasket body, so oil can seep past the wires. I understand that is possible to keep replacing the screened gaskets until you find one that does not leak. Changing the screened gasket twice did not cure my persistent leak, but the leak has not reappeared since the plain gasket was installed.

Obviously, your application needs to be checked before using the plain gasket, but I would certainly suspect the screened gasket if that is what is already installed, regardless of how new it is.

Master Switch Ruins Battery

August 17, 2004 1165

My Concord battery died a few months ago. When I opened it up..no battery fluid. So I figured the electrolyte may have been "boiled" away due to higher than normal voltage.

Using a digital voltmeter in the cigarette lighter socket, my suspicions were confirmed when I saw fluctuations from 14.2 all way up to 15.2 with the engine running.

I have the Zephtronics voltage regulator, which is non-adjustable.

I also have a new alternator, copper cables, battery box mod, and clean connections all the way from my battery to the alternator.

I recalled reading somewhere that a similar problem was traced to a master power switch.

The theory was that resistance had built up in the toggle switch over the years, causing higher voltage output back to the battery.

So I ordered a new toggle switch from Spruce (\$6 bucks I think) and replaced my 40 year-old master switch today.

The result is a rock-solid voltage reading of between 14.0 and 14.1.

Hope this helps someone else...much cheaper than buying batteries and replacing perfectly good alternators.

Fluctuating Ammeter - Another Solution

August 16, 2004 0279

Since I bought my plane last year it has had a dancing ammeter. I bought a Monroy ATD-300 a few months ago and it started telling me I had high voltage quite a bit of the time (rather than telling me about traffic). Connected a digital voltmeter via my cigar lighter and took it up for a spin - found it registering between 14.8 and 14.9 volts. Checked battery - good electrolyte. A&P and I did some book research and found that the Voltage Regulator is non-adjustable, so ordered a new one.

About two weeks ago, before getting the new voltage regulator, ammeter decided dancing wasn't good enough and started jumping on a trampoline.

Now, with new regulator in hand, climbed up under instrument panel to evaluate how to go about replacing it and found the one bolt holding it onto the aluminum mounting plate was about 1/4 turn loose. The bolt serves as the ground connection for the field circuit. Tightened it up and put new voltage regulator back in box. Ammeter now steady as a rock, voltage at 13.9 volts, and Monroy now tells me about traffic

Replacement Overhead Vents

August 16, 2004 0169

Don't waste your money on the twenty dollar plastic vents..if that will satisfy your needs, just take the vents out ..the plastic will not close..I had to put a rag in my air intake last winter to keep the cold air off me because the plastic would not close off..they are junk and sold to desperate vent shoppers.

The solution is WICKS AIR VENTS, they now sell reconditioned air vents changed out from the big airlines. These vents are as old as 30 years, but they close up so tight they can hold 30 lbs air pressure, and open wide with as good air flo.

These are round air vents, a little larger mounting hole than the Piper. The forward vents can be reamed out easily because they are just embedded in plastic.

The back vents are in aluminum and need a rhiem tool or a good burr grinder. Wicks sells the vents in the small hose or the large hole size.

The STC for the vents is a toss up, they have been approved for aircraft when new, some say they are like a fan belt, if its FAA approved, it can go on any aircraft, others just say they are not sure,...I'm not sure either, but I have six on my Cherokee, and I love them, they are much better then the original Piper vents.

See August 2004 AOPA magazine, page 148, (wicksaircraft.com) the good metal ones are about \$25.00 ea.

Spark Plug Washers

August 15, 2004 6259

I did a little research in my "Light Plane Maintenance" library, and found that the rounded side should be towards the spark plug, as during torque crush the rounded side will conform to the underside of the spark plug. The underside of the spark plug has a 2 degree angle to provide a controlled crush of the gasket. The side towards the plug will actually become concaved as it conforms to the 2 deg angle of the plug. Setting the rounded side of the gasket towards the plug renders the gasket more conducive to reshaping to mate with the plug. Reuse of gaskets isn't recommend, as it isn't likely the gasket's concaved surface will exactly mate with the plug again due to relative rotation of the gasket/plug. A reused gasket won't crush like a new one because the copper has become hardened. If you anneal (apply heat with a torch until the gasket is red hot) the gasket can be reused. Annealing provides stress-relief of the copper, rendering it "soft" again, and thereby adaptable to a new crush. I've gotten where I just always put new ones on. I bought a large box of them

Lubration for Use in Fuel Systems

August 13, 2004 4142

Apparently Fuelube has been discontinued, but fortunately there is a substitute called "EZ turn", which is available from Spruce and Wick's . It is resistant to petroleum and is supposed to be equivalent to Fuelube.

Stiff Ailerons

August 12, 2004 7231

If it were to guess what the problem was I would say the problem is the center sprocket on the control column. This seldom gets lubricated and I have found many that were totally dry and when this occurs the ailerons become very stiff. To correct this, the turn barrel on chain on the control column needs to be backed off and the sprocket removed, the shaft polished and lubricated with grease. This should also be done to the control wheel sprocket shafts while you are at it. You will know immediately when you loosen the chain. If you can't turn the sprockets with ease you found the culprit.

Leaking Exhaust Gasket

August 12, 2004 8747

I just struggled through this on my O-320. Had leaks at two gaskets. I also was using no-blow gaskets that were just put on. To stop the leaks I did the following: (with A&P oversight) After dropping the exhaust, cleaned the mating faces with scotchbrite. I used brown.

Inspected the surfaces. If they are eroded, I'm told there is a tool that can spot face the cylinder without removing it. (I didn't have to) The exhaust flanges could be warped too.

I discovered exposed helicoil thread sticking down from both exhaust studs on one cylinder. Pair of needle nosed pliers got rid of that problem.

We tried a copper/asbestos gasket instead of the no-blow. They are more malleable but not as durable. We replaced all 4 since my A&P said its best to have the same type of exhaust gasket on the common pipes so you don't have any possible offset where the pipes meet at the slip joint.

I used a torque wrench to tighten down the nuts the value the A&P directed. (80 in-lb? 100 in-lb? Don't recall) Don't forget to use new lockwashers.

Replacing Upper Door Latch Cam

August 8, 2004, 9952

The part is under \$20. (Try Linda Lou, PO box 18255, Memphis, TN 38181, 901-365-6611). You're really going to enjoy replacing the cam. Remove the outer door latch lever by taking out the screw. Note if you have a rubber gasket or O-ring between the lever and the door skin. Remove the machine screws and sheet metal screws that hold the assembly to the bottom of the door. It will come out as a complete unit. The wise thing to do is to either take a couple of digital pictures or make a sketch of where the bushings/spacers and other parts go in the latch assembly sandwich before you take that assembly apart. Also, note how the spring is positioned on the cam. Once you have removed the three screws and nuts that hold the assembly together, it's too late to work from memory. Pop in the new cam, put all the goodies back the way they came out and reverse the removal procedure. You should be able to do it with a phillips screw driver and two small wrenches. Some needle-nose pliers can help with getting that spring properly set. Best of luck and be patient.

Rigging Where Plane Wants to Turn

August 8, 2004 : 4827

It's best to move the flap to make it go straight and level (as opposed to changing rudder rigging). The rubber trim should be set straight per instructions, and be sure that you have equal travel L & R. Your engine is offset for the purpose of S&L flight. Heavy wing (pulling Lor R) is adjusted with the flap.

If it pulls left Lower the left flap, right lower right flap. Lower in small increments, and try it after each adjustments, at all four cardinal points. At no time raise the flaps any higher than when leveled.

Interior Lights not Coming On as Rheostat Switch is Turned On

August 7, 2004, 6088

The click you hear/feel is actually a toggle switch that the wheel switch turns on and off. It is adjustable. Try looking at that before you spend buukuu (sp) \$\$\$

Heated Pitot Tube Installation Kit

August 9, 2004 : 0028

Here is what I got from Airparts of Lock haven:

Hi john.....the first time install kit for your airplane is part number 757-140. This kit contains everything you need to make a legal intallation on the heated pitot system. It contains a new heated pitot, switch, hardware, blueprints and piper paperwork. Cost is: \$443.00.

Charging System Drops Off Line

August 5, 2004 0298

It sounds like the same trouble I had - changed out the old vibrating point system. for the new Zeftronic. It works great. It even has a simple trouble-shooting light. I found it rather simple to install once I removed the seats and just laid down on the floor.

Spark Plug Replacement - 0-320

August 4, 2004 : 8747

Either REM40E or REM37BY will work. The REM37BY's are recommended when encountering lead fouling.

Replacing Rear Door Window on PA-32

August 4, 2004 8175

I'm replacing all my glass in September. My rear door still has the original glass in it, which is to say it is molded into the door. Piper has a (very expensive) kit for replacing the glass that contains a new piece of glass, a frame, 16 screws with anchors, and a router bit. The shop that will be doing it says the router bit breaks after the first few inches and so they use their own router bit instead. I don't need the piper glass because I am planning to put in solar grey windows. The only things I need are the frame and the screws with anchors. I suspect the screws and anchors can be found in any shop (?), so it comes down to the frame. Has anyone replaced their rear door window on their PA32? IF so, do the screw anchors look like something I can easily obtain outside of the kit? Also, does anyone know the part number of the frame by itself and whether I can get it from a salvage yard or not?

August 4, 2004 : 2533

I bought the kit two years ago for my six it is a joke .All you need is the fiber glass ring and anchors; Lowes has the same anchors for 20 cents each .My kit cost \$666.00 now \$1384 you can buy just the ring for around \$800.00 from piper .

Low Vacuum Warning Light

August 3, 2004 1165

Chief Aircraft (800-447-3408) sells the Precise Flight warning light kit by itself. I put one in my Cherokee and it works great.

Renovating Armrests

August 3, 2004 1382

When I had my int redone in March, the guy was supposed to have the armrests rechromed. Then he found his place couldnt do it. So he covered the chrome part w/thin leather, very tightly. Looks great. He also built up the pad w/the green conforfoam, got rid of the ashtrays, and covered the pad independently of the base. Comfortable now.

Window Glass

August 2, 2004 5910

Was very happy with quality and service from Great Lakes Aero in Flint Michigan (888-826-2712)

Nose Strut ■Blows Out• While Plane Sitting

August 2, 2004, 3614

Suggest temp not problem. Suspect perhaps wrong seal instl. Only the special quad seal should be used. Comes in a complete kit for less than \$15.00. Also, on nose gear, seal can be nicked very easily during instl. This will lead to the failure you are reporting. Suggest get a mech very fam with Cherokee struts.

Control Surface Rod End Bearings

August 2, 2004, 3614

The rudder brg is a KP3A. This brg is used something like nine places on your bird. Flaps, stab etc. The rod ends have Heim part no markings on their barrels. All this avail at Wicks, Spruce or ECAS.

Fuel Pressure Gauge Vibrates

August 3, 2004 1359

Had a similar problem on my 180 Arrow. Turned out to be a small amount of fuel in the line from the engine mounted fuel pump to the fuel pressure gauge.

Take off the top cowl and look on the right side for a line running from the pump up to and through the firewall. There should be a coupling on it.

Disconnect at the coupling and allow ALL the fuel to drain from both ends. Might only amount to a teaspoon or two but thats enough to cause your problem. Reconnect, run the boost pump for a minute or two and check for leaks. If OK, button up and the problem should have gone away.

Sticking Control Cable Pulley

July 31, 2004 : 0247

The most common cause of a sticking pulley is the grease in the bearings and within the bearing race or cup has broken down allowing moisture to cause rust on the roller balls. The only thing you can do is replace the bearings. In our case the bearing is a part of the pulley so order new pullies as needed. Trying to lubricate these bearings is useless, especially if the roller balls are corroded. If you are lucky the part number might be on the side of the pulley. Most pullies cost less than \$20.00 a peice for the Phenolic type from Aircraft Spruce or Wicks.

Electric Fuel Pump Rebuilding Service

July 30, 2004: 5983

Contact Pifers Airmotive, 1660 Airport Rd, Waterford, MI 48327

248-674-0909 or 800-878-0909

Aircraft Valuation

July 30, 2004 5441

The one that I find is the most accurate is NAAA aircraft evaluation on Trade-A-Plane. You do have to subscribe, but it is not expensive. You can add all the different equipment in the plane and seems to be close to what planes are selling for.

Rebuilt Wing and Control Surfaces

July 27, 2004, 4827

Try Williams Airmotive 206-347-0807, www.williamsairmotive.com

New Compass Not Properly Adjusted

July 28, 2004 7942

Avionics West has an article on Magnetic Compasses that describes the woes they have had installing Vertical Card compasses (primarily on Cessna aircraft)

<http://www.avionicswest.com/awiarticles.htm>

The gist of the article is that you should never install with a steel screwdriver. It seems that this is often overlooked by installers who then swear that they will never install one again.

Engine Stumble Around 1500 RPM

July 27, 2004 5200

I had an engine stumble in my '69 140; it happened between 1300-1500. According to Lycoming, the idle circuit for the carb stops somewhere between 1200 and 1600 RPM. If you get a stumble after that when advancing the throttle, your mixture is too rich. This sure sounds like your problem, especially if leaning helps. You can incrementally adjust the mixture screw. You will know if it's too lean as it will want to keep running when you shut it down.

Slow Starter & Bad Ground

July 26, 2004 : 5200

I purchased my '69 -140 in 1999. I've always had problems starting on the first crank. I read Andy Jones post on battery cable conversion. He seemed to have the same problem. The engine would crank up to the first compression stroke then stall until the starter was released and allowed the blade to fall back. Mine was just like this but would always start on the second crank. The funny thing is I have copper cables all the way to the starter. I had taken the leads off the battery several times and cleaned, took the leads off the solenoids and starter and cleaned, nothing worked. I had the battery checked under a load and it was good. I finally decided to check the ground connection point at the spar. As I loosened it I could hear rust in the hole. I finally found the washer on the backside of the bolt was too small and had worked its way through the hole leaving the bolt loose. I removed the old bolt. Cleaned the ground points and reinstalled a new bolt and washers. When I tried to crank the engine, it started on the first crank. It had never done that before. I'm sure I've had this problem since I bought the plane. I tried several more times and it worked every time. I'm sure going to be glad every time I fly now I won't have this cranking problem anymore. What a relief..... after a 50 cent bolt.

Oil Change Procedure

July 26, 2004 : peter

I change oil every 25 hours, so after 1000 hours...

I'm an expert! Because, I have done it wrong every-way possible.

Steps to follow:

1) Always change the oil after your LAST Flight. Means; you know you are due to change the oil, so bring from home, or always keep the following items at the hangar.

News Paper, Zip Lock Baggies 1 quart Freezer size, safety wire and Tie-Pliers. Case of your favorite oil and filter. I change filter every 50 hours, so I simply dump out the 3/4 quart of oil from the filter.

After shutdown, using a 3/8" clear tube drain oil over night. Or drain oil and go to lunch on a Saturday.

Oil Filter removal:

2)

Using News Paper, make a line with several pages just under the bottom of the filter. Pushing the paper up tight to the engine. Then form a "Pocket" in the newspaper, so if any oil escapes it will gather in the pocket.

3)

Slightly loosen the filter so you can turn it by hand, but not so much oil begins to run out. Punch a hole in the top of the filter using a large Phillips screwdriver and hammer. Just Aft of midway on the filter from the engine.

4) Slide "Zip-Lock" baggy over the filter completely and push firmly up to the engine. Now, rotate the filter so the hole is pointing down, but not so lose that the oil begins to run from the seal between the filter and engine.

If you follow the above steps correctly, all oil drains into the baggy and NOT one drop will run out when the filter is completely unscrewed.

I drain the sump first, and then do the filter next. As the filter oil is draining into the baggy, I begin to pour new oil into the fill hole. By the time all 8 quarts are added, the filter oil is all done draining. New filter is installed. (Remember to put some lube on the filter seal)...

Hand tighten filter, NEVER use a wrench.

Start engine, check for leaks...wire-tie, and re-cycle.

Ammeter Intermittently Indicates Zero Charge - All New System Components

July 25, 2004: 3282

OK, they have replaced everything in the system, now they need to find the problem.

There is most likely a loose or corroded connection somewhere in the system. Someone needs to go through the system, from battery to solenoid to switch to alternator to ammeter to ground etc

etc. Even if the connection looks good, clean the connectors and put it back together. Be particularly careful and thorough around the voltage regulator and o-v relay. Also spray contact cleaner into the master/alternator switch.

...and...

July 25, 2004 3566

You need to determine if the alternator is going off, or just the ammeter. And if it is just the ammeter, is current actually flowing thru its shunt but not the meter movement itself. You can do this by hooking a cheap voltmeter to the cig lighter and flying. If it holds a steady 13.5-14 V even with zero amps, it would appear your alternator/ voltage regulator is fine and you need to check the ammeter and its connection to the shunt.

If the voltage drops down to 12 V when the ammeter goes to zero then you really do have a problem in the charging system or maybe the master switch.

Struts Rebuilt With Wrong O-Rings

July 25, 2004 4863

I had a similar problem several years ago, although mine seemed to go hand in hand with the onset of cold wx. Well, anyway--- mine had been rebuilt sometime before I got the plane, and was fine till it started leaking and went flat. We discovered that it had been rebuilt using the round "O" rings, we even rebuilt it first time using the same thing, and it got leaky and went flat again in a short time. We finally found that it was supposed to be using the "o" rings that are square (a cross-sectional view, you know).

Recommends: Painted-On Wing Walk

July 25, 2004 0247

When I got my plane painted I thought about getting the adhesive stick on wing walk tape. The painter said he could do a better and neater job with paint and sand. He was right! The painted wing walk looks 100 percent better than any tape on I've seen. I watched as they did it. They cleaned, taped, hit the area with medium sand paper, wiped dust off, sprayed on two light even coats of black paint, they dusted with the sand as they threw it at a 45 degree angle over the second coat of paint while it was still wet, allowed the paint and sand dry, repeated with paint and sand,(a little thicker this time), finish with final coat of paint. Came out great! I would recommend you practice on a scrap of metal or well sanded piece of plywood first.

Starter Bendix Difficult to Engage

July 24, 2004 0247

The bendix is required to be lubricated at each 100 hr or during the annual. It doesn't hurt to lubricate it a little more often. I hit my starters bindex with some LPS 1 every three or four months. I do have intake plugs, but I do this because my plane in in the elements under a hail shed and not in a inclosed hangar. Just keep it lubricated and you shouldn't have to many more problems with it.

Fuel Pressure Reading Zero on Climb

July 23, 2004: 3282

Before you spend any more money on parts, clean the filters. Clean the screen and filter element in the gascolator, and if you have a carb. check the inlet filter

Cherokee Six Fuel Selector AD

July 24, 2004: 8175

AD 77-12-1 It is a 50 hour recurrent inspection. If your mechanic has never heard of it (and if he's doing your annual, it is his responsibility to check it as well as yours to make sure it gets done), I'd suggest finding a new mechanic.

The AD requires 50 hour inspections by setting the selector to off, draining the bowl, waiting 3 minutes, then opening the drain for one minute measuring the amount of fuel that comes out. If more than 1/2 tablespoon, it needs to be corrected..it indicates one or more of the valve ports is not closing all the way.

Wing Not Solid at Wing Walk

July 18, 2004 : 0620

The two underpanels with dimples are the reason your wing is buckling when you walk on it. The dimples crack at the ends over the years. Just about every PA-28 hits this point around 5-6 K hours TTAF.

The panels are \$ 350 each from Piper. We upgrading the wing skin from .032 to .040 at the same time. With labor, Ken's estimate of \$ 1,500 to \$ 2K is about right.

Absolutely not a required repair. Sure feels better, though

Wet Vacuum Pump

July 17, 2004 5822

Several months ago, Airwolf was having a pre-certification sale (just get your name on the list once it was certified)...if you got your name on the list, it was going to be \$1599...then the air separator for \$499. I think they told me that after it was certified, it would be \$2100. I expect they will feature it at Osh. I think they are charging the high price for the paperwork/STC. I bought a PESCO pump (orginal wet pump), the airwolf filter and got a field approval for the installation...total less than \$1000

Items Installed Without Proper logbook Notations

July 15, 2004, 1073

Inspect the installations and correct any discrepancies. Then complete a 337. If you have approved data, the IA can return to service. If no approved data, you will have to get a field approval. In the logbook I write 'found (item) installed by person or persons unknown' and then say how it is installed. Do a supplemental equipment list and revised weight and balance and your done. A little time but not difficult.

Carburetor Heat Shroud

July 9, 2004 8770

Contact "Aircraft Exhaust Systems Inc." Phone number 1-800-227-5951. I shipped my carb heat shroud to them and they completely overhauled it. The only thing they reused were a couple of end pieces. Cost was \$95.00 for the top section and \$170.00 for the lower section, plus core deposits. You get back basicly a brand new unit. Total cost with shipping & core deposts was \$375.00

Low Vacuum Light

July 9, 2004 2697

Precise Flight, the folks who make the backup system that runs off the engine vacuum, now sells the light kit as a separate item.

you can buy it direct from Precise Flight and I think when I got mine, it was about \$10.00 cheaper direct. <http://www.preciseflight.com/instrumentsource.html>

Polished Spinner

July 7, 2004 0247

Strip the spinner with paint stripper, use a micro-mesh kit from Wick's, Sporty's or Aircraft Spruce, finish off with Wicked Lighting Shine from time to time to keep a very healthy shine.

Electric Trim - Motor Turns, But Not Drum

July 8, 2004 4444

You can replace the clutch facings.. There are a couple of adjustments. Also, make sure that jack screw is clean and lubricated correctly!! Too much lube and it collects dirt.

Fuel Pressure Gauge Reads Zero During Climb

July 6, 2004, 7231

With the master and boost pump on, loosen the fitting slightly behind the pressure gage until you have a small stream of fuel flowing and re-tighten the fitting. I think you will find the problem will go away. I have run into this in the past and this was what I did to correct the situation.

Brake Pedals Go to Floor

July 5, 2004 0013

It doesn't take much of a crack in an O-ring for air to get into the system. Sounds like that is what you have. I rebuilt the entire brake system at last annual after dealing with a problem left brake for over a year, replacing all hoses (in/out), rebuilding each cylinder and then bleeding the system - works like new. If both pedals are going to the floor, the main (hand brake) cylinder may be the culprit. It is hard to get to and remove, but fairly simple to rebuild after it's out. New ones are \$200 (more from Piper of course), parts to rebuild are under \$5. You have more room in the Six to get to the stuff, but you still have to 'get down' to it. Bleeding was a bear, until I got someone to pressure bleed it from the outside.

Paintless Hail Dent Removal

July 6, 2004 9129

I had great success with paintless dent removal. My 140 had hundreds of small hail dents when I bought it. Now it has none!!! This process is not a simple quick fix. But it is much easier and more cost efficient than reskinning the entire plane.

In case you've never seen it done, these guys use blunt end instruments to rub out the dent from the back side of the metal. So our first step was to have my A&P remove the wingtips, tanks, bulkhead and tailcone. Then, the PDR guy spent about 20 hours working on my plane at a rate of \$50 per hour.

The total cost of labor was about \$1,500 and I have an airplane that is virutally hail free!!!

The control surfaces are the most difficult place to access. My paintless dent repair person accessed the back side of the skin through the tiny hole on the side of the ailerons. Tedious work but worth the effort.

Only one caveat...if your hail damage is deep, paintless dent repair won't work. If it is shallow, go for it.

New Autopilot Choices

July 4, 2004 2697

Your choice of modern autopilots are the Century or STEC series.

Many owners, if they have added one, have gone to the STEC, since it's completely electric. So if you have a vacuum failure, you can just continue on your way.

It will connect fine to most GPS units (get the GPSS option), and also most nav receivers.

Sloppy Fitting Cherokee Doors

July 4, 2004 7231

Since we introduced the new doorseal the question keeps arising about the way the door fits or in some cases doesn't fit so well. I have yet to see a Cherokee that is a few years old that the door doesn't need new clevis pins and eyebolts. This is very easy to check on your plane by just lifting up on the rear of the door. If you have any movement up and down on the door, you can pretty much conclude the clevis pins and eyebolts are worn.

The eyebolts are very easy to change out as are the clevis pins and cost is minimal.

Now for the commercial: Do to many members requesting the clevis pins and Eyebolts I have decided to stock them. The clevis pin set is \$5.80 which includes two pins, the proper washers (6, two cotter pins and the installation drawing. The eyebolts are \$21.50 for a set of two which includes the installation instructions. Shipping costs are included for either set. Until we get the parts on the website, and if you find you need the hardware, you will need to call in the order at 405-755-2151.

Recommends Wet Vacuum Pump

July 4, 2004 : 7231

I flew a Tri-Pacer for 16 years with a wet pump and never had a vacuum pump failure. When I was flying twins, I have had several dry pump failures and at least two in a single. The main problem with the older wet pumps was it did leave the belly oily. The new state of the art oil separators seem to have corrected the oil problem. If you don't have a backup stand-by vacuum system I would highly recommend the new wet vacuum pumps. Over the long haul it will pay for itself compared to the dry pumps. I would hate to think about being IFR and lose a pump. The wet pump or stand-by vacuum system would look awfully cheap about that time.

Challenger/Archer Differences

July 1, 2004 1616

In 1973 Piper changed the Cherokee 180 by stretching the fuselage 8 inches and increasing the wingspan 2 feet to 32 feet, while retaining the Hershey bar wing. This model was named the Challenger. In 1974 Piper renamed it the Archer I and squared off the windows, otherwise the

Archer I and Challenger are the same. In 1976 Piper replaced the hershey bar wing with a 35 foot tapered wing and renamed it the Archer II.

Throttle Refuses to Advance - Springs Back

June 30, 2004 6088

It sounds like you have an unraveling throttle cable. Just replace it. I got mine from McFarlane in Kansas. Nice folks. Another thing to check while you are installing the new cable is the rod end that attaches the cable to the carb shaft to ensure it is free, and it is at a 90 degree angle to the carb shaft. Sometimes they bind and cause a sticky feel.

Checking For Corrosion

June 29, 2004 : 8175

Corrosion needs to be an ongoing inspection. Make sure you have the extra inspection access panels afforded by service bulletins (I don't have the numbers handy, one I think was in the 700's and one in the 900's. The earlier one adds inspection panels to the bottom of the wing on the inboard rib box to gain access to the rear spar (also to the main spar, but the purported reason is the rear spar). The later one is for inspection of the rear spar attach fittings and has you add inspection ports in the baggage compartment in a PA28 as I recall. In the Six, that one is just an inspection as the rear attach fittings are under the center seat box.

SB1006 addresses spar corrosion, which would be the one most likely to ground the airplane. There is also an SB for stabilator attach fitting corrosion, and one for balance weight tube corrosion for both the stabilator and the aileron counterweights.

So far, these are all relatively easy to inspect, and the inspections are described in the pertinent SBs. Check also around the step, especially on the inside. The step doubler is steel and it is touching aluminum. A little bit of water sets up dissimilar metals corrosion which can lead to needing a peice of the belly skin replaced (I found out the hard way). The other area of concern is the hat section structural rails on the bottom of the fuselage. Look at the seam between them and the skin very carefully. If you see any bulging due to exfoliation, you probably should have the rails pulled off and cleaned up before it gets worse. The insides of the rails and skin under them was not originally painted. If some moisture gets in, combined with the exhaust gasses, you can get corrosion. Mine had popped 3 or 4 of the hat section rivet heads.

Fuel Pressure Drops During Climb

June 30, 2004 0013

Several years ago, on climb out - I too noticed the fuel pressure go to ZERO, although the engine ran fine. I held my breath and started a turn to the airport, then the pressure slowly came back to normal. It happened again on the next flight, so it demanded finding out what was wrong. I had my local FBO take a look, finding that the screen in the electric fuel pump was about 90% blocked by years of stopping trash in the fuel from going further. The screen was .50, the labor was \$125. No problem since and yes, the screen gets checked at annual.

Trim Tab Hinge Pin replacement

June 29, 2004 1927

You can buy the hinge rod from Aircraft Spruce. If I remember correctly, the diameter is 0.090, 3/32 (0.09375) rod is too large. I replaced mine during my paint job.

Aircraft Logbooks are Valuable

June 28, 2004 0663

I am finding out the hard way that incomplete logs are worth a mint. The way I looked at it, the logs that came with the plane (1974 140) started in 1986 due to the fact the plane was repossessed from the original owner and he refused to give them up didn't really matter because all the AD's had been complied with and the engine had been through a major overhaul. Everything checks out fine. I have the plane on TAP for sale and stated the fact that the logs were incomplete and a guy just called me and asked the very question "Are the logs complete? When I told him what happened to them, he acted like I was hiding something and then he rudely hung up. Any suggestions on how to go back and try to collect data or am I just SOL? It looks like that omission will cost me about 6k!!

Cherokee Six - 260 vs 300

June 28, 2004 0580

There are a few discussions on this board going on in the past week or two about this very topic. A fully loaded 300 has a much better climb performance than a fully loaded 260.

A 300 is fuel injected. A 260 is carbureted.

A 300 has a TAS of about 140kts at 6000-7000 DA.

A 260 has about 5-8 kts lower given the same conditions.

A 300 has better resale value than a 260.

Split Nose Bowl STC for 140

June 27, 2004 8424

Got the STC from Aviation Devel Corp, 1305 NW 200th St, Seattle, WA 98177 (206) 546-3011, \$175. Really like it, the only problem was one of the screws on left, pilot, side had to be ralligned it was hitting the edge of fly wheel.

Fuel Gauge Reads Low In Cruise Climb

June 28, 2004 2790

I had the same intermittent problem on an Archer and it eventually happened on the ground also. I capped off the fuel lines at the tee to the gauge and the pressure was normal. I changed the electric pump (original 1978) and the problem went away. Inside the electric pump a spring was missing from one of the check valves causing it not to seat properly at times causing the low pressure (pressure wnet back to normal when pump turned on). If you find that to be your problem be sure to check the carburator screen for that spring.

...and...

June 27, 2004 7231

I have seen this many times and in most cases it is caused by air in the line at the gage. With the master and boost pump on, loosen the fitting on the fuel line until you have a fuel dripping under pressure from the fitting, Retighten the fitting to leak check. I think you will find this will solve the problem in most cases.

Installation of Heated Pitot

June 27, 2004 4142

For the earlier planes you do need a 337. For later planes, where the heated pitot was an option and Piper had a retrofit kit, a logbook entry should be enough. In those cases, the only work required is to hook up a breaker, switch and heated mast to the already installed wiring.

Material For Side Windows

June 26, 2004 3282

Here is some more info from a quick web search:

Lexan is a trademark of GE plastics.

Plexiglas is a trademark of the Atoglas division of Atofina Chemicals. (Thanks to Larry Daniel of Atofina for the correction)

Lucite is a trademark of E.I.DuPont DeNemours & Co.

Acrylite is a trademark of American Cynamid Co.

Perspex is a trademark of ICI Group.

Lexan is polycarbonate.

Plexiglas, Lucite, Acrylite, Perspex and acrylic are polyacrylate.

Polycarbonate is harder than polyacrylate, and if someone wants to go dig up the physical properties listings, there's probably a wealth of other differences.

Lexan is much more shatter resistant than Acrylic. Acrylic is more scratch resistant than Lexan.

Another thought: if you do this, sand the cut edges to a smooth finish. Otherwise the rough finish at the edge will give rise to cracks.

Pitting In Hollow Crankshafts

June 25, 2004 9503

I found some pitting in my 1962 160 during annual this year. I was preparing for the worse, and took the plane to a engine facility in Kennett MO. that has a very good reputation in this area for engine O/H's. I flew the plane up on Friday afternoon after work, and picked it up Saturday afternoon. They performed the florescent dye test as required and the bill was only \$135. They told me that my pitting was fairly common, but they have rarely found cracks while testing these cranks.

FAA's Listing of AD's on Line

June 24, 2004 3435

The FAA has a searchable database of airworthiness directives on its web site at:
http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/MainFrame?OpenFram

eSet. (or you can try going to faa.gov and selecting "Airworthiness Directives" on the quick find menu at the upper right, but this didn't work in my browser.)

You can use the search function to look for ADs containing text like "pa-28" and "o-540" (or whatever engine you have). Be aware that an AD can be issued not only for your engine or airframe, but for any thing that is attached to your aircraft - for instance, there's a new AD on some models of Narco AT-150 transponders. So you have to do a lot of searching to be confident that you've found everything. Then you get to read through the ADs and check them against your maintenance logs to figure out if they really apply to your aircraft (e.g. exactly which parts does your engine's oil pump use?). This process is educational but tedious. Finally there are several cases where one AD supersedes another one, and a few cases where an AD has been withdrawn, though the FAA tries to note these on their web site.

The various fee-based services do a lot of this work for you, though there's something to be gained from reading all of the ADs yourself. For instance, I found (and replaced) a missing placard on my aircraft that was required by an AD. The AD was signed off in the logbooks but the placard was no longer there. Or someday a mechanic might tell you that your plane is subject to a particular AD. Instead of just believing what the mechanic says, you'll be in a position to discuss it.

...and...

June 24, 2004 3614

I use ADLOG. They do it all for you and keep you current for a very good price. This is then your record and you don't have to pay an IA several hours checking your bird at annual. Also, their entire format for record keeping is excellent and it is yours.

Changing Color of Paint Stripe

June 23, 2004 8433

The most important thing with painting is preparation. It literally is 90% of the work. Pulling the trigger on the paint gun is the easy part. By practicing on scrap metal you can get the hang of it. Most pilots have reasonably decent eye-hand coordination or they wouldn't walk away from their landings. Use 3M "fine line" masking tape to tape off the edges. Protect all of the other surfaces USE KRAFT PAPER NOT NEWSPAPER. Tape all the paper edges down because the air pressure from the gun will tend to lift them. I have had good luck using an air brush for touch up work. Depending on the area of your stripe you could try that. It would be slower, but put less volume of paint in the air. There are also pint touch up cups for conventional spray guns and HVLP systems for guys with the big bucks. Some local EAA Chapters have acquired HVLP systems which they loan out to members.

Stainless Steel Fuel Tank Screws

June 22, 2004 8175

You can get a kit of the screws from Skycraft which advertises in the magazine. He's the same guy that does the tank rebuilds and sells the skycraft wingtip landing lights that go into the wing metal. They are not regular stainless screws, these are structural. They are also not as shiney, so you'll probably want to paint them.

Removing Inside Door handle

June 24, 2004 4440

The handle is attached by a U-shaped spring clip, that is the 'wire' you see. If you can tell which way the U is facing, only two choices, (either toward the handle, or away from it) run an oil cloth around the base of the handle and it should snag the clip ends and remove it. There's also an automotive tool which is awkward. the handle will now come off, and chances are the clip will remain in the cloth.

Tip Tank Draining into Main Tank and Overflowing

June 22, 2004, 8175

Your selector valve is leaking, which means you won't pass the test in the fuel selector A/D. How long ago did you last accomplish the task in the AD? How well did it pass then? Have you had trouble with it passing the AD tasks before? If not, then it is probably just a bit of dirt lodged in the valve seat.

The valve has a ball bearing pushed against a seat for each tank. The selector has an arm that pushes the bearing off the seat for the selected tank. If one ball is not seating fully, then gas will push past that bearing when the selector is set to another tank. Hopefully it is just a bit of dirt stuck in the valve seat, which you may be able to dislodge by moving the selector back and forth either while the engine is running or while someone holds the sump drain open so that you have a positive fuel flow through the valve body. If that doesn't work, you can try taking the fuel filter bowl off, cleaning the filter and manually cleaning the valve balls the best you can. Otherwise, you'll need to have the valve rebuilt or replaced. A new replacement is very expensive (about \$4,000). I think the valve assembly in the '65 (mine is a '65) is not rebuildable because no one makes the valve seats. When mine goes, I plan to get a used valve out of a later model Six from one of the salvage yards, and send it out to be rebuilt before installing it in my plane.

The fuel selector AD requires you to set the valve selector to off, drain the sump and wait 3 minutes, then drain the sump again. If there is more than a teaspoon of fuel in the sump, one or more of the valve balls are leaking and the valve needs to be rebuilt or replaced before further flight. The AD does allow retesting multiple times, so if you can get it to pass at all you are good to go. The problem you are having is precisely the reason for the AD. The AD is recurrent and should be done every 50 flight hours.

Rigging Aircraft

June 22, 2004, 6685

I made the tool and found an A&P that will take responsibility for me doing the rigging adjustments. What I found in adjusting my rigging was that it is time consuming in that you really need to fly the airplane in between each adjustments to make sure you are converging on hands off stability. Paying an A&P to hang around for this will break the bank. The manual is good. And with 5 minutes of instruction from an A&P you can be doing your own adjustments.

New Style FAA License Available

June 21, 2004 : 0028

The FAA has just come out with a new style pilot certificate. They are plastic and you can request a new pilot certificate (\$2.00) at:
<https://amsrvs.registry.faa.gov/amsrvs/Logon.asp>

I have requested both my Private Pilot and A&P. You can provide a picture via Driver License or passport. The web site says it takes about two weeks.

Wing Landing Lights Burning Out Rapidly

June 21, 2004 8175

Is there a loose connection causing them to blink on and off a bunch? Turning lights on stresses the filament as it warms up. Pulselight avoids that stress by not turning the light completely out. If you have an intermittent connection however, the lights could be turning on and off a bunch. The other possibility is that your charging system voltage has gotten too high, which could be a symptom of a failing battery or a corroded connection in the field circuit.

Using Cell Phones in the Air

June 21, 2004 5646

Same old arguments, keeps popping up, we all know we are not supposed to do it, but somehow in the heat of the moment think we are entitled.

I don't know if you have noticed but if you forget to turn off the cell phone you will find your battery mostly dead when you land as it has spent a lot of time trying to stay in touch.

While it is true that a similar effect can be achieved by being on the top of mountain the phone is fairly much stationary and they tune the cell phone network to handle the local geography.

In our airplanes we are constantly moving and generally faster than 70mph. So the cell sites tend to get confused as they keep switching you around, either they drop your connection as they switch you to a new tower or maybe someone on the ground totally unrelated to you. Since dropped calls are their biggest complaint more and more attention is being paid to it. A good way to recover the cost of the diagnostic equipment is catch one person a day per major city and fine the heck out of them.

In short you are doing the electronic equivalent of buzzing the city.

It's going to be easier and easier for them to detect airborne use as they upgrade their cell phone sites for beam steering (to better reuse the spectrum), I think their lawyers are lobbying for dropping any connection that is moving faster than 80mph.

So if you want to chat in the airplane buy a sat phone, it doesn't care if you are on the ground or six miles up and sure as heck will get better coverage!

Radio Station License - Overseas Operation

June 17, 2004 0573

Let's put it this way...The Mexican gov't COULD impound your airplane for broadcasting illegally if you don't have one. You really should get one (\$100 which is good for as long as you own your airplane), and a Restricted Operators License (\$50 which is good for life) and then you are always covered. You can apply for both right on line at the FCC website.

(wireless.fcc.gov/aviation/fctsht4.html)

Keep the Radio Station license in the aircraft and your Restricted Operators License with your pilots license.

If you are travelling abroad for a "self-fly safari" and you don't have your Restricted Operators License with you, you may be denied the foreign validation of your US License,

which means you won't be able to rent the plane (in say, Johannesburg....)to go on the "self-fly safari" that you paid a lot of money to do to.

Aftermarket Gascolator Replacement

June 15, 2004 0415

Try the SA3-00 from Stevesaircraft.com - they have an STC'd design that replaces the older units.

Look at <http://www.stevesaircraft.com/amllist.php> for the applicability list and at

<http://www.stevesaircraft.com/gascolator.htm>

for the pricing.

The designs are much more solid than the originals.

...and...

June 15, 2004 5983

Univair Aircraft Corporation, 2500 Himalaya Road, Aurora, CO 80011

888-433-5433 Phone Information 303 375-8882 " Fax 303-375-8888

www.univair.com

I got a replacement bail and cup -- they have all the parts and full assembly -- FAA/PMA.

150 u72302-003 piper gascolator nut \$7.68

150 u85012-032 piper gascolator gasket \$1.47

150 u87477-002 piper gascolator top \$66.45

151 u494-644 piper gascolator bail \$32.57

151 -496-003 piper gascolator \$9.30

151 u750-268 piper gascolator bail wire \$18.54

151 u750-273 piper gascolator bowl seat \$10.23

Parking Brake Not Latching

June 15, 2004 3614

Really only one way to fix it and that is to replace ratchet. The ratchet should last for a very long time if operated correctly. Pilots are very adept to literally shoving the control to off with little applied ratchet release. This is what kills it. When the ratchet is engaged for parking, simply keep your thumb off the release and pull aft on the HANDLE ONLY !! A spring will do the release and with no damage to mechanism.

Windshield Replacement

June 14, 2004 9840

I used the standard thickness for the replacements I did a year ago on my 1972 235F. I don't think there is that much sound reduction with the thicker pieces and if you are using headsets, its no big deal any way. Also, you will undoubtedly have to bevel the edges for the thicker windshield to fit in the channels and that can be a mess and look bad.

Some trimming will be necessary. Be extremely careful when you do this. We used a portable belt sander for the final trimming.

Finally, do NOT use caulk of any nature to fill the channels and install the windshield. This is an improper installation. A previous owner had done this on my plane and it was a mess getting it all out. It literally took me over 4 hours to remove all the old caulk.

The approved method is to use the foam tape at the edge of the windshield. Some caulk is used along the center post, but sparingly. The Piper Repair Manual explains all this. The foam tape is available from LP Plastics, whom I am assuming is providing the windshield.

Also, with the windshields out it is a great time to replace the material on the top of the panel. YO\ou can't do it any other time. Airtex makes a great flat black vinyl replacement that I used and am extremely pleased with.

As for tinting, there is little noticeable depreciation of viewing at night with the grey tint and a great deal of improvement in heat reduction during the day (how much do you fly at night anyway??). I wouldn't do it without the tint. You'll like it so much you'll want to do the side windows (which you can do yourself without a sign-off) to make them match if they are not tinted already.

Patching Wing Skin Crack

June 14, 2004 6259

It's most important to understand what stress was placed on the material to cause it to crack in the first place, and to rectify that first. Then, you can repair the crack using detailed methods described in AC43.13-1B/2A (September 1998). I think you may be using the older version of AC43.13. This newer version is almost twice as thick as the previous. See figure 4-16 on page 4-32. It covers it pretty well.

Sluggish Starter

June 14, 2004 0013

I've seen this problem with something as simple as the starter cable's are not making good contact. I suggest that you start with the battery and check all the connections, even removing them, checking for corrosion and reinstalling, all the way to the starter. If not improved, you just might have a bad starter.

Towbar For Laminar Flow Nosewheel Pants

June 14, 2004 4587

I have the LFS Nosegear speedmod as well and simply took my tow bar to a local welder and he fashioned 2 new extended tines (3 . inches longer) with the same bend at the end, cut the old, short tines off and welded the new ones on. Cost me \$20.

Vacuum Pump Options

June 13, 2004 6271

I'm in the process of completing a major overhaul on my Arrow, and I previously had an Edo-Aire (now Sigma-Tek) pump. This was an older pump that I bought used when my Airborne pooped out while bringing the airplane home for the first time. Despite it having sat in a

boneyard for who-knows-how-long, that "used" pump gave me trouble-free service for nearly ten years and about 300 hours (I never flew IFR, except for some training). The Sigma-Teks are constructed using aluminum, rather than carbon vanes, and thus are supposed to be a bit more reliable. They can be purchased from Aircraft Spruce for \$396, and I was strongly considering its purchase.

However, I went with the Rapco 215CC. This was mainly for economic reasons--the Rapco pump was \$262, nearly \$150 cheaper than the Sigma-Tek, and cheaper than an overhauled Airborne (when you figure in the core charge--I had no core because the Edo-Aire/Sigma Tek pumps are not rebuildable). The Rapco is a new pump, it has an "inspection hole" to check for wear, the vanes (which are made of carbon) are beveled in one direction to help prevent damage from small debris ingested, and I understand that the vanes are also a bit thicker than the Airborne. I've not heard anything negative about the Rapcos.

The Tempest dry air pump also has an "inspection hole" and is of new construction, but they are more expensive than the Rapco (\$399 in Spruce's catalog, PLUS a \$100 core charge).

I've heard great things about Garwin and Pesco pumps, and from what I understand, as long as the vacuum pump drive has oil holes in it to supply oil to the pump, it can be used. I don't know what kind of paperwork you'd need, though. The downside is cost--they are more expensive (but you'd probably recoup the cost in extended life), moreover, you'd probably want to install an air-oil separator, which is more money.

Uneven Strut Extension After Landing

June 11, 2004 0785

One tip that works for me is to release the pressure remove the schrader valve connect 3/16 dia vinyl tubing over the valve the other end submerged in 5606 then move the strut assy up and down until all the air has been expelled, replace the schrader valve and using Nitrogen (requires approx 600 psi) inflate to proper height. I have noticed that 5606 fluid left on the strut will become like glue after sitting for extended periods, causing the o ring to roll and release pressure and fluid in some cases. I keep my struts wiped down and have no problems, however 3 weeks without being flown will have uneven strut extension after landing. Like a lot of things in life regular exercise has benefits.

Stabilator Trim Barrel Replacement

June 9, 2004, 0785

I purchased the trim barrel from Mc Farlane the bushings from piper (1.09 ea) can you believe? The machining on the barrel is first class, I would not set up a lathe and milling machine to produce a 58.00 part. my aircraft has 3350 TT the lower bushing was worn .030 the upper bushing .015, elongated from cable tension (electric trim). Interesting wrestling match wrapping the cable as specified by the shop manual. I used Lubriplate 105 for grease hopefully it will last another 35yrs with regular lubing.

...and...

June 9, 2004 6088

I had to remove my stabilator for my last 100 hour and replace the bearings on both sides. To do this, I had to remove the barrel. I secured the windings with a wire tie around both trim cables. I got it as close to the barrel as I could and really tight. Worked like a charm.

Compound to Prevent Frozen Slip Joints on Exhaust

June 10, 2004 : Thomas

Power Flow recommends that you use Loctite Silver Grade Anti-Sieze (rated for temps up to 1,600 degrees Farenheit). We are currently using that particular Anti-Sieze for most of our installations. However, any high temp Anti-Sieze should produce similar results.

High Charging Voltage (14.8 to 15 volts)

June 9, 2004 4827

High battery voltage usually means the battery is dying. I would have a load test performed (out of the plane)I would do it ASAP. Procrastinating, will attack the alternator, boil the battery, and cause a lot of greif. The VR if mechanical will suffer also.

Imron Paint & Safety

June 9, 2004 6088

Imron is a two part epoxy type paint, so I doubt it is available in spray cans. It also emits cyanide gas as it cures, so you need really good breathing apparatus to spray it. We found this out when I worked in an auto body shop and a car owner insisted on Imron. We did it, but in the morning his car was covered with spiders that succumbed to the gas. We had to grind them out and start over. It's not for us lay folks to mess with.

Patching Tip Fuel Tanks

June 9, 2004, : 4827

Polyester will indeed tolerate gasoline, but there are different types of polyesters, some for lay ups and some for finish work. The lay up stuff is just that. It never really gets hard, and always feel sticky, the fininshing type forms a hard surface and feels normally dry. The lay up type if not finished, will indeed leak if used to make a fuel tank. A friend built one of plyster nearly 25 yrs ago, and is still sound, save for the fuel bung, which he sinced patched.

I would repair the tip tanks from the outside, but with West Epoxy, with 403 or 404 added to it. They're a a little difficult to sand, but very strong. For finihing, used 407 or 410 with the epoxy, it is very easy to sand. Use the slow setting hardener.

If I were making a boat tank, by using plywood, or any type of fuel tank from glass it would be epoxy. Polyester has poor penetrating qualities, and does not do well in making tanks by covering plywood, especially marine plywood, but if it is entirely polyester, then it would work.

Still, I would always use epoxy.

Modification of Dick Russ Door Seal

June 8, 2004, 5087

I have installed the new door seal and new hinge pins on my Arrow. After reading of the positives it looked like the answer, and it appears to be just that, a tight door seal. The one area of negatives appears to be the bottom where it can be damaged by heavy feet. I decided to modify it in this way:

I left the old door seal along the bottom from the door stop attach point to just above the rounded lower rear corner of the door. At the two points where the old and new seals meet I marked them and cut the new seal at a 60 degree angle with the new seal at full thickness right

up to the old seal. After letting the door sit for 12 hours it is sealed tight! No leakage at each point where the old and new meet. Now the lower frame of the door is as it was and the areas of leakage are sealed tight. I should note that I have not had problems on the bottom area where I have left the old seal in and there is no way for water to enter there as the door lap sheds water away.

If others try this, let me know how it works.

P.S. I feel that if you have already installed the new seal you could still make this modification to the lower area. Another good thing, now when the door is open it looks great with the new painted areas on the door.

Cylinder Crack Near Exhaust

June 8, 2004 4827

Lycoming does allow a crack, properly placed, to fly with safety, but the assumption is that it will be fixed in quick order. Bottom line, no crack is safe.

\$2400 for a cylinder repair is more than steep, but if it entails a complete annual, and done properly, then it's not at all unfair. Be sure that he checks the exhaust system carefully. Cold compression is best in all cases. If you were reading in the 70s, it simply means that the cylinder rings, valves are in good condition. An crack in the exhaust manifold would not be revealed being that it is external. Your experience is more proof that good compression is not necessarily an indication that all is OK.

Forms for Registering Aircraft

June 7, 2004: 1073

AC Form 8050-1. Aircraft Registration Information. Available from your local FSDO or usually any aircraft dealer.

You will also need to include AC Form 8050-2. Aircraft Bill Of Sale Information. You should receive this at time of sale from seller. You need original forms, not copies. Complete forms and mail with \$5.00 to FAA. Address is on the forms.

Electric Attitude Indicator as Backup

June 12, 2004 1073

I installed a RC Allen electric AI about 2 years ago. That's about the price I paid (\$1,800). Be sure to order the connector. Great backup. I had an empty inst hole where the ADF indicator usually goes. I moved the T&B over and put the AI in the T&B position. I did not want to add an inclinometer to the instrument panel. It gives you a backup of both the vacuum system and the vac AI.

...and...

June 13, 2004 0461

This year I decided to replace my turn coord. with an electric AI. I looked at the R.C. Allen electric AI, but opted instead for the Mid-Continent because it has an internal self-contained rechargeable battery backup. Slip-skid ball is mounted right on the front of the unit. It is quite a bit more expensive than the RC Allen (about \$4,000 installed), but works great. I think that an electric AI is a "must have" for those who fly hard IFR regularly.

No Logbook Entry for Paint and Interior

June 4, 2004 7231

The airplane must have the proper paperwork for the interior. If was performed by a Certified Repair Station for interiors they will have the needed documentation. The same applies for the Paint facility. I would be on the phone to the seller. It is his responsibility to produce the airworthy documents. If he won't produce them then the next call should be to your attorney. Until you have these in your position the plane is by regulation unairworthy and under these conditions you also have no insurance. You can figure on \$10,000 to \$12,000 to have it redone.

Trim Jackscrew is Worn

June 3, 2004 5526

Eventually it will have to be rebuilt. I just did it, and can say that the job wasn't that difficult. You'll need a new trim barrel, and 2 new bearings, and possibly the shaft or "screw". Get the barrel and screw from these guys: <http://www.mcfarlane-aviation.com/>

I bought the aluminum barrel from Piper for \$230, only to find out that McFarlane has it for around \$70. The screw costs about the same, but because it's steel I opted not to replace it. The brass bearings (2) and cotter pin can be purchased from Spruce.

Once you have the tailcone off you'll see how it all comes apart. I worked with my mechanic and had the new parts ready. After cleaning it all up, we were able to clamp the cable, unwind and rewind it onto the new barrel, and install the screw in about 1.5 hrs. When done, there should be no play in the jackscrew. Be careful with the winding, it must be very precise, and by the book. We did not have to adjust the cable tension.

Cylinder Head Temperatures Seem High on Overhauled Engine

June 3, 2004 4827

CHTs on 4 cycle engines are nearly always in line with EGT, so EGT is what you should be concentrating on. Let's forget the 75%, and fly the AC at some known altitude and do some leanming as explained in all the textbooks. In SL flight, lean until it runs rough, and enrichen until it smoothen. Use 2500 rpms. Note the EGTs. Do this several times to acquire an average. At this point you will have reached an EGT which represents near stoichiometric condition. The engine performs best at this indicated temperature (EGT), and regardless of throttle settings. In climb you should add 100 to 200 degrees depending on load. With a fixed pitch prop, and even C/S climb should always be performed in a rich condition. Once leveled off aim for those numbers regardless of what ever power percentages are, or altitude.

EGTs responds quickly, CHTs lag, and in some cases lag enough to allow detonation. Those ideal numbers will also generate the most economical fuel consumption, as well as power. DO not run LOP at any time.

If you're not doing it, use 15/50, and be sure timing is on the money, as well as baffling, exhaust pipes.

I doubt the factory altered jetting. Think about it, lean or rich, you still change jetting manually with your mixture control, Establish EGT numbers first, then you should have a better picture of CHT. Lyc allows up to 500 deg.

Lance Nosegear problem

June 3, 2004 0586

I have a '78 T-Lance II. It's relatively low time, in good shape, and seemingly well maintained. It went to the shop for its first annual March 9. The AI found a major problem on the nose gear. And importantly, he did NOT find it on the first pass. Only after the upper and lower cowl was off and the plane was on jacks did the problem become apparent.

The bracket connecting the nose gear hydraulic actuator to the airframe, which was normally held by 8 or so rivets, was being held by a single rivet. The remainder had sheared off. With the nose gear down and locked, the bracket is in normal position and rivets are not visible; only when the nose gear is moving is the swiveling of the bracket noticeable. The second problem in detecting this, was that access to the bracket was via the front baggage. To get to it, you have to lift the carpet so the metal shavings from rivets not initially noticeable. Also, the bracket is attached to the underside of a sheet of galvanized metal, so again the fact that rivets were missing and the attachment loose was not immediately visible.

Now the follow-up... The repair of this took 33 hours of labor, several hundred \$\$ in parts, including replacing the galvanized sheet which had to be fabricated by Piper. The fabrication took several weeks, and that after a couple of weeks to strip the assembly and decide what needed to be done.

Poor Engine Performance With Climb Propeller

June 2, 2004 827

Check compression after it sits over night, and cold. If sound, it should be with 2 or 3# from warm. Lifter bleed down clearances can be off kilter, and muffler can have cracked or broken baffling internally. If you have a paper or Bracket air filter, they may be clogged. The Bracket if more than 1 year old can be troublesome.

If the engine cannot red line in straight and level flight, and you say the tach is alright, then you have an engine problem. With 56 in prop, it should be able to overrev easily in level flight, if the engine, and it's components are in order.

Assuming your engine and associated components are healthy, your steam gauges accurate (within 50rpm), most 140s have 58 inches, and will climb much better than the lower 56. You can legally repitch to 59 (which is just about the limit) without the encumbrance of paper work. The key is a healthy engine, and as much pitch as it will tolerate, within the legal limits

Rudder Pedals Hard to Push

June 1, 2004, The torque tubes your rudder pedals are attached to have small .062 dia holes for lubricating, hard to see without good light. If you raise the nose wheel up, you can work the pedals to distribute the oil WD-40 works with the plastic spout. You will think the rudder pedals are no longer connected

June 1, 2004 0785

There is also a lubrication hole on the aft side of the nose strut housing for the lower bearing just above the upper linkage about 3/16 dia. If you raise the front and rest on the lower skid plates (Low saw horse) you can check your shimmy dampener also and inspect linkages for play. I lubed mine 20 yrs ago still working well minimum rudder pressure for nose steering and coordinated turns in flight.

Paint for Back of Propeller

May 31, 2004, 7231

I have made it a practice to not use primer on the prop due to the possibility of applying too much on one blade and setting up an unbalanced condition. I have found over the years the best can spray that seems to last from year to year is Krylon stove top black. It used to be just Krylon High Temp Flat Black. It seems to bond exceptionally well and cover well. I always just go over the old paint with scotchbrite.

Cabin Door is Hard to Latch

May 29, 2004, 7231

The clevis pins can contribute to the problem because it allows the door to drop down out of alignment. .015 wear in the clevis pin(s) can allow the door to drop down 3/8 of an inch. You can check this easily by lifting up on the aft edge of the door to check for play in the hinges. The clevis pins won't remove all the play but it will certainly help. Next to adjust the top latch is easy. Remove the two screws holding the plate on the upper part of the door frame and remove the plate. The receiver for the hook is a welded oval fitting that is welded to a 10-31 screw. when you turn the oval clockwise it will tighten the latch and counter clockwise will loosen the latch. If you find it won't turn, you can see a lock plate that just needs to be pushed down to allow the receiver to be adjusted. It is very easy to do.

Propeller Pitch

May 29, 2004, 0478

The 56" pitch is considered the "climb" prop for the 140. A 58" pitch is considered "standard", and a 60" pitch is the "cruise" prop.

If you repitch to a higher number, you will get more speed, but you will get a slower rate of climb as a trade off. Also, fuel consumption goes up slightly as a trade off for getting the higher cruise speed.

I studied all of this and came to the conclusion that the 58" standard prop is probably best all around in my opinion. You get close to advertised (POH) rate of climb, cruise speed, and economy. Others like the cruise prop because of the extra cruise speed. I think only flight schools like the climb prop because of added student safety around the pattern.

Wet Vacuum Pump

May 30, 2004: 5822

I am in the process of installing a PESCO wet vacuum pump on my 180. Local FSDO agreed to a field approval (I'll give you a copy of the paperwork when finished). I have been using the M20 for several years and it did a great job. However, I elected to remove the M20 and go with the Airwolf separator. I thought about the second M20 but felt the Airwolf was a cleaner installation since it will handle both the crankcase vent and wet pump vent in the same unit with only a single line back to the sump. The airwolf was only slightly more cost than the second M20.

Wet vacuum pumps were the first pumps installed on airplanes...the Lycoming engines are machined to accept them (same mounting as the dry pump except that a gasket blocks off the oil channel when the dry pump is installed). Unfortunately, even though the wet pumps were standard, Piper (and many others) did not list the wet pump specifically in the type certificate as a piece of equipment. According to the FAA someplace, if a piece of equipment is not listed on the airplane TC or subsequent STC, you can't put it on the plane without a field approval. Ironically, Lycoming lists the wet pump on their list. However, my FSDO says it has to be on the

airplane TC. The original wet pumps were manufactured by Garwin and Pesco and appear to be readily available on the internet thru several suppliers. They tend to run \$400-\$600 if you shop around. Apparently, Airwolf designed their own wet pumps as a look alike to the Pesco/Garwin and is in the process of acquiring STC's to fit all airplanes. In recent years, its been nearly impossible to get a field approval. Hence, if you want a wet pump, Airwolf has you by the short hairs and can command the high price (\$2000). I decided to pursue a field approval and put together an extensive package which I presented to the FSDO guy. He agreed to sign off on the field approval once I filled out all the paperwork.

Rearranging Old-Style NonStandard Instrument Panel Instruments

May 28, 2004 8175

My '65 Six had the shotgun layout. The original holes are close enough to a 3 over 3 that I was able to rearrange the instruments in the panel without going through the expense of putting in a new panel. An adapter plate was fabricated to adapt the altimeter to the big AN gyro hole (4"?), and the static system plumbing needed new hose to reach. The original panel had the static instruments stacked up on the left side of the panel...I think it was Airspeed over altimeter over vsi. I did it at the same time I replaced the old AN attitude with a modern sigmatek gyro, so the incremental cost of moving the instruments to different holes was minimal.

Interior - Side Panel Backing Material (Aluminum)

May 28, 2004 1073

On my Warrior interior redo the shop used .020 aluminum.

He likes to use .016 but it was out of stock from his normal supplier at the time. The .020 less than 2 pounds heavier than the cardboard. The .016 is lighter by a fraction.

A 4x12 sheet of .016 T3 is only \$81.60 at Aircraft Spruce, p/n 03-27710. Aluminum meets the fire test. No field approval was done on my airplane, just a logbook entry

Used Shoulder Harnesses in PA-32

May 28, 2004 8175

I put shoulder harnesses in my front two seats in my Six in 1997. I used salvaged seatbelts, but if I were to do it again I'd just use the Piper kit. The labor cost involved in disassembling, cleaning up and copying the braces from the salvage parts pretty much ate up any saving buy going used. It was about 20 hours labor to install them IIRC.

The installation involves putting a doubler inside the skin and first bulkhead that is riveted through to the outside. No STC required, it is covered by a service bulletin.

Installing Wing-tip Strobes on Wing-tip Fuel Tanks

May 26, 2004 8175

It is possible (I added them to my '65 Six-260 which has the tip tanks). It is even relatively easy if you have the tanks off for SB1006. Probably very difficult without taking the tanks off.

Alternator Requirement - Pitot Heat

May 26, 2004 0178

Is your alternator capable of handling the extra load? Fellow at my airport had pitot heat installed years ago and on a recent IFR flight, the alternator failed when he switched the heat on. Found

out he only has a 45 amp alternator and with everything running on an IFR flight, the load exceeds 45 amps.

Labor Required for Annual - 140

May 26, 2004 0178

First annual at a new shop or with a new mechanic, I'd say at least 15 hours IF everything on the checklist is actually done. Add another two to four hours for AD research the first time around and even more time if you want SB's researched (It all depends on your log books - are they complete? legible? - I just did an inspection on an airplane that was missing the first log, had to redo AD's from 1948 thru 1965 - no history, no choice). Second or subsequent annuals? OK, maybe 10 hours on a 140 if the shop / mechanic is familiar with the airplane (if the mechanic just replaced all three tires & tubes and repacked the bearings four hours ago, you may agree to just remove the brakes, jack the acft and check for side play, free rotation, noise, etc. and not have to remove each wheel, clean & inspect each bearing again, etc. - that alone could save a couple of hours time) Once a shop has researched the history, it's only an update since the last inspection - say an hour or so, but it depends on if / how many AD's apply. It really makes a big difference for a shop to work on a familiar airplane - enough reason to find a shop you like and stick with them. You will save money in the long run and have piece of mind.

Aileron Shows Slight Flutter in Flight

May 26, 2004 3614

Suggest DO NOT FLY acft until problem is accounted for and corrected. It could be wear, balance or adjustment.

Ammeter Oscillates

May 25, 2004 2411

I second the battery. The battery is like a big load on the charging system and helps to keep things stable. If the battery is weak then the charging system is doing alot more of the work. If the battery is older than 3 years you might want to consider changing it out to. Grounds...they are the bug of all electronics. Make sure they are secure and clean, that means no corrosion between the terminal and the chassis. Battery included.

Capacitors are to be installed at the alternator. I do not know of any being installed at the field wiring. Take a look at the 140 electrical schematic to be sure. The book...is the bible!

Window Sealant

May 26, 2004 8747

I followed Dick Russ's suggestion. Put tape 1/8" to 1/4" from the edge of the window and fill in the gap with Polyseamseal. Its adhesive caulk available from home improvement stores. Dick recommends white on the outside, I used clear. If the window is loose, I would remove it, clean up the old sealant and reinstall it using Polyseamseal. You don't want water leaking and creating a corrosion problem. Its going to take several hours to remove, clean and reinstall the side windows but at least it only costs your time and a few bucks for caulk.

Vacuum Gauge Replacement

May 25, 2004 7782

Couple of weeks ago I reported a bad vac. gauge that Piper wanted \$3200 to replace. I ordered a replacement under the same part number from Wentworth for \$55, had it tested and yellow tagged for \$39 and had it installed for \$65. The only discrepancy was that the gauge that came out had one port but the gauge that went in had 2 ports (intake and vent) even though both were Airborns and had the same Piper part number. Test flew last night and the new one seems to run fine.

Audio Whining from Strobes

May 25, 2004 8175

It is a fairly common problem. Usually it is due to currents through the ground (the airframe) in a ground path that is shared by the audio circuit. It can usually be eliminated by rewiring the radio and audio grounds to ground to a single point or copper buss bar. This can be a major undertaking, depending on the state of your wiring and what you have in the panel. A first step might be to make sure the intercom jacks are not grounded to the airframe (should have insulating washers behind each jack).

Spinner Repair

May 24, 2004 4827

Stop drilling is not a leagal repair, or a repair at all. It's a temporary fix untill the nest time. If it's stopped again, it leave one wide open to scrutany and possibly grounding, plus, it's dumb. Not all spinners are repairable, but there are firms that specialize in this type of repairs. The carbon fiber spinners advertised in POM are a bargain. They will discount to POM subscribers. I just bought one for a C., and got an extra \$20 off.

Adjustable Seat Cylinder Repair

May 24, 2004 : 1073

Try Aviation Fabricators. They make a replacement cyl for the smaller unit which is much cheaper than Piper. The unit is PMA'd so just a logbook enrtly. I put one in my Warrior and it works great. They also can rebuild the older large diameter units.

<http://aviationfabricators.com/home.shtml>

Defroster Cable - Source

May 24, 2004 5603

Aircraft Spruce 2003 Catalog

Pg 151 Bottom right side. "Bowden Cable" ;isted at \$1.15 a foot P/N 05-15500

Crank Reworking - Source

May 24, 2004, 7419

We sent our crank out to Aircraft Specialties in Tulsa, OK. They inspected, found some corrosion on the inside, cleaned, polished, and sealed the crank; yellow tagged it for our engine (O-320 E3D). All for around \$600.00. Apparently, if the hp is 150 or less the crank did not have to pass the Hollow Crank AD. They also offered us a new crank for \$3700.00. Very nice people to deal with.

<http://www.aircraft-specialties.com> 800-826-9252

Damaged Wing Attach Bolt

May 23, 2004 3614

Have had the occasion of installing wing fwd attach bolts. In four recent instances found this bolt -- AN4 -- to be heavily hammered. There was no damage to any other or adjacent associated structure. Bolt was torqued properly. This one could be a sleeper. Something will be elongated or wallowed out before long and probably no one looks at this bolt unless attaching or removing wing. I put in all new bolts after insp of all mating parts. Plan to look at this struct more carefully in the future.

Hammering of the grip portion on the AN4 bolt. Plating completely gone. Comes from the load path of the wing bushing thru the bolt. One acft had 6,000 hr and the other bird 2,800 hrs. One acft -- the first -- was 15 yrs old and the second thirty four.

Improved Door Lock

May 22, 2004 5441

I had a Medco lock placed on mine. It cost \$100 two years ago. They are not getting in from the door. It includes a metal piece that goes into the door jam. If they want something, they will find an easier plane to get into, like yours.

...and...

May 24, 2004 : 4868

When my plane was broken into (and my avionics stolen), the bastard just used a crowbar (or something) to pry the door open. A lock with a longer throw might stop some crooks, but it's probably more likely that you'll just end up with a more severely damaged airplane. Besides using a cabin cover, you might also cover your panel with a piece of black fabric. If the crook doesn't know what types of avionics are available in a particular plane, he'll probably go on to the next one. In my case, everyone that was broken into at my field (W00, Freeway airport in Maryland) had a KX-155.

Ammeter is Intermittent

May 19, 2004 4827

Check all connections. Make sure battery is good, do a load test. If more than 3 years old, it's most likely dying. The alternator should be tested externally, but can be done in the plane.

Voltage reg test is easy too. Excite the field, and watch the ammeter, if it pegs, the regulator is faulty. Do it quickly, it should peg instantly

Purchase of Cherokee With Experimental Certificate

May 20, 2004 4884

That category of experimental airworthiness certificate is used to demonstrate that a STC wanna-be mod complies with the regulations via FAA mandated flight tests, as part of the STC application process. It usually lasts no more than 1 year, then it expires, if no other action is taken. If the mod that made the aircraft experimental was not either approved (i.e. STC issued) or removed, and the original certificate reissued, then that aircraft may not have a valid airworthiness certificate. The log books -should- tell all.

There was a time when the FAA would allow essentially non time-limited experimental/R&D airworthiness certificates, but not any more. If this aircraft has one of those, then that plane will be essentially uninsurable, and you should stay far, far away unless you can find an A&P/IA to

re-establish compliance with the original type certificate. That process could be as simple as an annual, or as complex as a complete restoration. Tread very carefully.

Left and Right Hand Rudder Pedals Not In Agreement

May 18, 2004 7231

The sequence to align the pedals is not hard but it is involved. You need to disconnect the nose steering rods from the bellcrank on top of the nose strut. You then need to clamp a short piece of angle iron to the pedals which will keep them aligned during rigging. Apply pressure to the center of the angle iron and have someone at the rudder verify the rudder is properly aligned. If not, the rudder cable turn barrels need to be adjusted accordingly. Assuming the rudder is in alignment then all that is remaining is to adjust the rod end bearings until they are lined up with the nose gear bellcrank with the nose wheel straight. This is a job for an A&P mechanic but that is how you adjust the pedals and nose steering.

Soundproofing Material

May 19, 2004 7650

Go to supersoundproofing.org and check out their section on soundproofing small aircraft. I bought a 1/2 roll of the stuff and have been adding it as I go to reduce cockpit noise. Most effective was when I put 1/2" of it under the carpet on the floor. Haven't gotten around to doing the side panels and doors yet. It's the same thing that spruce carries, spruce may be cheaper for small quantities though.

Carburetor Ice

May 14, 2004 4657

I've noticed a few discussions on this board regarding the use of Carb heat in the Cherokees. A number of pilot report that they "never" need it. It is also "common knowledge" around the airports that Cherokees don't need it except in extreme emergencies due to the relationship of the carburetor to the oil sump.

There may be some climates where that is true, however I'd suggest that you keep a more suspicious lookout for carb ice.

I took off this morning, temp 11C dewpoint 8. There was visible moisture in the air (about 20 miles in light haze) Shortly after Leveling off at 2,000 feet and turning 2500 RPM in a 140 I noticed after a few minutes that the tach was down to 2400.

Instead of adding throttle I applied Carb heat for about 30 seconds. RPM dropped to 2300, and then when I shut the heat off it returned to 2500.

At no time did the engine run rough. There was no sign of "trouble"

This is actually quite common under these conditions. I'm at a small airport with virtually no ground delays, so this all took place within about 5 minutes of starting the plane, before it had time to warm up.

I suspect that if I had not applied heat, the engine would eventually have warmed up enough to melt the ice anyway. In other words, NO PROBLEM. I would never have suspected that I had encountered carb ice.

I guess that the point I'm trying to make is that we should consider carb heat to be a useful tool under normal circumstances, not just an emergency device.

If you find yourself needing to make throttle adjustments for no apparent reason, suspect carb ice as being at least equally as likely as the throttle slipping.

I don't have a carb ice detector, but I suspect that anyone who does will be able to tell us that carb ice is NOT all that uncommon.

Source For Updated Instrument Panel Installation

May 13, 2004 7231

Many of you have purchased the engineering packet from me to update the PA28 instrument to the new flat panel like the new Cherokee's. Many have made the upgrade using my drawings but there have also been many that didn't feel confident enough to tackle it themselves or for that matter their Mechanics. I have also been ask if I would like to install the new panels and my response has always been I really don't have the time. Due to the many e-mails I receive regarding the upgrade and where it can be done I have contacted a company here in Oklahoma City at the Wilet Post Airport that specializes in building new instrument panels. It is an FAA Certified Structures Shop and they have built many custom panels. The company is Associated Aero and the contact is Dale Bershea. I showed Dale the Engineering drawing and packet I provide and ask if he would like to install some new panels for the member of the CPA. He said he would look into it. Today Dale gave me a call and said he had the figures worked up for a complete new panel based on my design and to tell the members on the Chat that they would install a totally new panel like mine or similar depending on what the customer wants for \$3450 which includes the cost of my engineering packet. This would be a complete new flat panel in any color just like or similar to mine. If you are interested in upgrading your old panel, give Dale a call at 405-789-5474. Be sure to tell Dale that Dick Russ said to call. That price is one I worked out with him for members of the CPA and is only available to members.

Alternator Voltage Low at Low RPM

May 13, 2004 4827

Don't be too surprised if the battery is faulty. I was a firm believer in Gill until I had 3 in a row that didn't last more than 16 mts. 1st and second less than a year. Both the alt. and regulators tested externally, the 3rd time was the battery again, but not before I installed a new electronic regulator/OV. In the end it was the battery again. I switched to Concorde. Problems gone. Have the alt tested on the bench by an alt shop, even Discount auto parts can do it, just to be sure. If it checks out, remove the battery, discharge it (landing light for about an hour) and put it on a charger with a voltmeter hooked up to it. Be sure the acid level is normal before charging. If the voltmeter exceeds 14 volts, the battery is shot. If so bite the bullet and get a Concorde XC recombinant batt. Don't forget to check all the connections.

Alternator Drops Off Line

May 12, 2004, 4827

Here are a few simple tests:

Note charge rate after starting, if not pegged to full charge and begins to go back near normal, battery is suspect.

If charging rate remains in the same spot all the time, alternator is suspect.

Perform load test on battery to test condition, if weak, it'll drive the regulator nuts.

Check all connections and switches, loose belt, etc.

If the battery is more than 3 years old, do the load test first.

Electric Trim Switch Manufacturer

May 12, 2004 8175

The switch is made by Mason switch company (www.mason-electric.com.) I don't have the switch part number handy, but it is basically a custom part even though it is in the Mason catalog. In other words, they don't stock it; they make it to order. The single piece price was considerably higher than the per piece price for even a small quantity probably because of the set-up costs of the tooling.

Low Vacuum Annunciator is Erratic

May 12, 2004 8747

My guess would be the vacuum switch under the panel that activates the light. Looks the same as the oil pressure switch that activates the Hobbs. They are depicted in the parts manual.

Vacuum Gauge Options

May 11, 2004 : 7782

Earlier I posted about my vac. gauge failing and Piper's wanting \$3200 for replacement. I checked into the catalogues and they had nothing TSO'd that would fit. Thanks to your posts, I called Wentworth and they're sending a salvaged unit with the same part number for \$55 plus shipping no exchange. Then, I have been told I have to get it "certified" by the local avionics shop for installation to be legal. I also checked the overhaul option: Lockhaven wanted \$350 to overhaul but needed 3 weeks. Keystone quoted \$96 but did not disclose the waiting period. Thanks for all your help. I hope this helps someone in the future avoid "the rock and the hard spot" we sometimes have find ourselves.

Oil Fill Door Opens In Flight

May 10, 2004 8175

Your oil door hinge is worn, which lets the oil door vibrate, which in turn has worn a notch in the frame that the latch engages. You'll need to patch or replace the frame to make the door stay shut, and you should probably replace the hinge to prevent a recurrence. Mine did it a year or two ago, and I notice the repair is also starting to wear. I don't think my A&P replaced the hinge even though I asked him to. It may help to make a gasket for the door using RTV on the frame to prevent the door vibration. To make the gasket, put a bead of RTV on the frame, put plastic wrap on top of the frame and close the door until the RTV cures, then open the door and remove the plastic wrap.

Nosegear Shimmy Caused by Main Landing Gear

May 9, 2004 7231

The problem of nose wheel shimmy keeps popping up from time to time. I would like to share an experience that I hope will be helpful. When I restored my 180 two years ago I replaced every nut and bolt and bushing in the nose strut, balanced the tire and had an absolutely shimmy free airplane until recently. I suspected the shimmy may be caused by the shimmy damper and since I had an answer for that I serviced it and in my own mind the problem would be solved. The next flight out the shimmy was still there and maybe worse. I concluded it must be the nose tire

balance and since the tire was worn I would just by a new tire and while at it install the new leak proof tube. With that said and done when the new tire and tube arrived I installed the new tire and tube, balanced the tire, made sure it had the proper pressure and reinstalled it with the confidence that the problem will be gone. The next flight on landing I didn't notice a shimmy and concluded the problem as suspected was the old tire. Last week on landing, the shimmy was back and worse rather than better. I did notice one thing out of the corner of my eye. It appeared the left wheel pants was vibrating excessively. This past weekend I jacked the plane up and pulled the wheel pants and tires to inspect the gear. During the inspection I noticed a slight movement from side to side of the gear torque links, not much but a little. I pulled the cotter pins from the upper and lower nuts and found I could tighten them a couple of turns. When I did this there was no side movement of the gear. I did the same for the other gear and found the same condition which I also corrected. With the plane back together, I took it on a flight yesterday and found that there was no tendency for the plane to shimmy and what I thought was nose gear shimmy turned out to be caused by the main gear. I flew the plane again today and tried landing fast as well as slow and you couldn't get a shimmy if you wanted it.
...and...

May 10, 2004 0028

Had a problem with the left main gear shimmy. My shimmy would come and go. When I had my annual done, told them to really check the left main gear. They said, all was fine, the IA flew over to my airport to pick me up, and we fly back to his airport. On landing at his airport there was the shimmy. We check the torque links, and sure enough they had lots of play.

I order the shims called for in the parts manual, and when they came in, went to put them in, only to find no play. Flew the plane a few for hours and there was play again.... did not seem to matter weather it was hot or cold, the play came and went. I wrote Piper about it, only to have them give me the name of a Piper dealer. I was concern about putting stress on the hosing, since it is cast type. My guess is that all the cracked housing you here about on the cast type, are caused by not properly shimmed, and over-tightened bolts.

I finally installed two .002 shims in the top and bottom, when it was lose, and have not had any more problems.
...and...

May 10, 2004 4440

Replacemnt of the shimmy damper is #1. The new Cleveland type run about \$600 from Spruce. Considering that many are 40+ yrs old, they are well worth the money.

The Piper service manual states that side play on the main gear torque links should be .005-.007, using a feeler gauge. **They should not be tight!** some side play is essential, or they will snap, especially the dog-bone type. Maintain per the manual, and there's never any shimmy problem.

Engine Runs Rough in Mid-Flight

May 8, 2004 6215

I had a fouling problem until my FBO taught me how to lean for takeoff. No problems since. Also, make sure your fuel tank vents are clear.(this happened to a friend) Kept getting a rough

engine mid flight. Diagnoses said fouled plugs or sticky valves, but it was only on one tank and not the other.

...and...

May 8, 2004 0518

Change to REM37By and lean aggressively to eliminate lead fowling.

Replacing Side windows

May 8, 2004, 8747

I just replaced the right rear Window in my '76 140 with standard thickness, green tint. I purchased it from Great Lakes Aero Products for around \$35-\$40 after shipping. The window is flat so if you could find the material locally, you could make it yourself.

I wouldn't worry about 1/4" for the side windows. No reason to increase thickness for impact resistance on a side window and folks on the chat generally say it doesn't reduce the noise in the cabin.

To remove the old sealant, create a home made scraper from a scrap of 1/4" window cut to a comfortable size with a sharp bevel on one end. You can scrape away the old sealant and not worry about scratching the aluminum

Use Polyseamseal adhesive caulk to seal in the new window.

Adjusting Rear Door - PA-32

May 9, 2004 7231

Start by replacing the clevis pins and make sure the proper washers are installed, Next, with the door open and the top hook extended, grasp the hook with a pair of vicegrips near the point where the hook bends and carefully bend it down a little at a time until it clears the the channel and aligns with the receiver opening on the fuselage. Then when you have done that, make sure the lower rod is extending down enough to pick up the striker. With the door properly adjusted it will more than likely be ok if you follow the preceding steps.

Vacuum Gauge Price

May 5, 2004 7782

A few days ago I solicited the chat about a low vac. problem I was having and received several good tips. Today, they found out that it is the gauge and that Piper wants \$3500 I repeat \$3500 (not \$350 not 35.00) for a gauge--even that was too overwhelming for the Piper Dealer who suggested I find one elsewhere and they would install it.

Shoulder Harness/Inertial Reel Repair

May 5, 2004 5929

Give these people a call, they are one source for the parts.

Pacific Scientific

Monday thru Friday from 7:30 am - 4:30 pm EST

11700 NW 102 Road, Suite 6

Miami, FL 33178

Phone: 305-477-4711

Fax: 305-477-9799

24 Hour AOG Phone: 305-528-7558

Attention Giselle repair seat belts
SITA/SPEC 2000 Address: MIAPXSD
CAGE CODE: 1B1H6

Mac Radio Upgrade - Repair

May 4, 2004 0559

I recently bought one of these on e-bay with a didget burnt out. theres a guy in Florida that has all the parts to fix them.he fixed the didgets put a new face on it and yellow taged it.it works excellent,i'm still trying to learn about it . it does quite a bit,im trying to figure out the timer for fuel tank switching.Essco aircraft manuals has a users guide for seven bucks or so, and the guy that fixes them is Roy Dawson radio in Orange, FL. (386)760-7600 Roy is a super nice guy and speaks very highly about the mac.

Installing New Door Seal - Cleaning Old Adhesive

May 4, 2004 4860

I think you will find the general consensus it that ■Oops■is nothing short of amazing. You will also find that everyone has trouble removing the old adhesive, some of which has been there since day one. Expect it to be more of a pain than you can possibly imagine. Don't use paint remover or adhesive remover, other than Oops, because you will damage your paint!!!

Personally, I used Oops and a small wire wheel on a dremel. It took me about 4-5 hours to clean both the baggage door and the main door.

It's a pain getting the old stuff off, but necessary for a good seal. Make sure it's clean to the paint or aluminum.

Autopilot Repair

May 7, 2004 8060

Call "Terry" at Lowe Aviation, Macon, GA (478) 788-3491, <http://www.loweaviation.com>. He is a true expert and can tell you _exactly_ what's likely to be wrong. I had your exact problem and had been told that it was unrepairable. Tried replacing the DG with no luck. Then I talked to Terry, pulled the control unit from the panel and sent it to him, and two weeks and \$200 later I had a perfectly fine autopilot again. You will know as soon as you talk to him that Terry is a real expert on these units.

(Autopilots Central in Tulsa OK, (918) 834-6669, is another shop that I've heard can repair these units, but I don't have first hand experience with them.)

Replacing Cracked Engine Mount

May 3, 2004 2235

My `68 Arrow got a firewall forward, engine, hoses, baffles, and all the other goodies that add up. One thing I did not count on was cracks in the engine mount. My mechanic found two cracks that required repair.

It was his experience that sending the mount out for repair was nearly as costly as getting an overhauled mount, and was a lot less time.

We went with a remanufactured mount from Kosola and Associates in Albany Georgia. (229) 435-4119

I am very pleased with the mount and the quality of their work.

Installation of New (Dick Russ) Door Seal

May 4, 2004, 6895

I used a coated masking tape from the hardware store to protect the paint on the perimeter of the door on the outside. Oops with a nylon and light brass brushes where my removal tools after using the putty knife to help with the large pieces. Using an artist brush I repainted the area that had the trim with black Rustoleum which avoided any paint matching problems and at least with my interior blends nicely. Waiting on the paint to dry sufficiently was the biggest hassle since I do not have a locked hanger.

Replacement of Alternator Noise Filter Capacitor

May 2, 2004 6259

If your alternator is the Chrysler model #2642997 then it employs a 0.5uf axial capacitor (at the top of the shield in the photo). The alternator threaded output post is actually one end of the capacitor, the other end has a wire coming out of it that connects, via a screw, to the rear shield. While, they're not FAA/PMA parts, the caps are available at just about all automotive alternator rebuild shops. I'd recommend just checking the cap with a capacitance bridge. It should measure around 0.5uf. Be sure to wiggle the wire a bit to be sure the wire internal connection integrity is sound.

I just checked the Piper Parts Catalog and discovered they call out the capacitor as Part Number 756-759. It appears it is available, along with the mounting insulator, as kit Part Number 2421137. When I get parts from Piper, I use Intermountain Air, a Piper distributor. Their number is 1-800-433-9617. I believe they're located in Utah. Ask for Arnie, as he's their technical advisor.

Sometimes an additional external noise suppressing capacitor is mounted on the front alternator shield. Its lead is connected to the alternator's output post. This is in addition to the already existing capacitor I mentioned earlier. The part number for the external cap is 63897-06 from the Parts Catalog.

Water Drain Holes for Rear Spar Area

May 2, 2004 : 8747

Piper service bulletin 977 has instructions for drilling two drain holes in the belly around the rear spar. Its applicable to most Piper's including the PA-32's.

You can get a copy of the S.B. from Dave Wheeler's web site:

<http://www.northwestschoolofaviation.com/sb.htm>

Removing Switch Panel Cluster (including Master Switch)

April 30, 2004 0112

On my 1977 PA28-140, to remove the cluster, pull the radio above it, and the tray. Pull the plastic faceplate around the switches...

There are 3 or 4 screws on the top, and two or so on the face....

If an A/P has previously removed the cluster, he may or maynot have put two notches in the aluminum aligned with the master (most commonly replaced switch), and on mine, I was able to remove the plastic, the two screws for the Master, and from behind, pull it back, disco the wires, reco the new and re-install...about an hour total, with 6hrs worth of cussing and sweating during that hour...

Older King Radio Repair

April 30, 2004 7637

I noticed an ad in Trade-A-Plane for a guy that only works on kx170,kx175. I gave him a call told him my problem, sent the radio to him in CA, got it back in less than two weeks working perfectly!! If anyone needs work done to their kx170 or 175 you might want to check this guy out. <http://www.kx170b.com/>

Intercooler for Turbo Charged Engine

April 29, 2004 4077

I purchased the Airflow Systems intercooler for the following reasons:

1. the guy who designed it use to work for Turbo Plus and he will do all he can to help in the installation;
2. the unit is about 5 pounds lighter than the turbo plus;
3. Airflow Systems did the actual testing at different power settings so that you don't have to guess and calculate different percentages in you head;
4. I like the air intakes much more than the turbo plus scoops, they are barely noticeable; and
5. The unit is \$500 cheaper than turbo plus.

Installation was easy, I did the fiberglass cowl work and helped with the cooler installation. I would guess about 12 hours total, mostly because I wanted the cowl to be perfect. I think total time with the mechanic was 6 hours and that is what the install cost me.

The difference is very noticeable and that is the way the planes should come from the factory. I also have the merlyn wastegate and that too is worth the money. I can maintain 700 ft climb to 20000 feet and not overheat. I could not do that before the cooler and wastegate.

Break-In Procedures

April 30, 2004 3255

Follow the engine overhauler's instructions to the letter, as mentioned. Here's what I did for mine recently, and worked well.

1. First flight take off full power, fly at 75-85% for 30 minutes but try to orbit the airport. Stay low to maximize manifold pressure. Avoid long ground operations if possible and keep climb rate low to get maximum cooling. Maintain rich mixture, at least 150ROP. Land, shut down, cool completely, check for leaks or any signs of overheating. Check oil level precisely.
2. Second flight give it an hour but stay near airports if you can. Same

power settings.

3. Continue to fly same settings 1-2 hours per flight until oil consumption stabilizes, telling you the rings have seated. This took close to 50 hours with my Chrome cylinders - others are less.

General intent is to keep lots of pressure in the cylinder to force the rings against the cylinder wall.

Replacing Door Hinge Pins

April 28, 2004 0676

For those of you who haven't checked your door pins, please do so. Grab the door, lift and see how much up and down slack there is. If it's like mine, it's probably worn. I just bought a pin set from Dick Russ (www.aircraftdoorseals.com) and installed it. About 10 minutes work. Although the door seemed fairly tight (noise wise) when the door was closed, the pins were about one quarter worn, plus the lower washers were missing. The kit is cheap (\$5.80) complete with instructions as to shim locations.

Replacing O-Ring in Fuel Selector Valve

April 26, 2004 0825

Have your shop take a look at Piper Service Bulletin No. 355. It gives the complete details of how to lube the selector valve and replace the o-ring.

Radio Noise Pitch Increases With Engine RPM

April 26, 2004 2411

Sounds like you have an alternator on its death bed. The only other possibility is a ground loop that may be set up as a result of not grounding your panel equipment at a single source. Most likely not the case.

Invest in a new alternator or find a shop that you know does good work on rebuilding alternators. I went through 3 alternators including one that was rebuilt by an automotive shop (I didnt know it but the guy I bought the aircraft from had it done byt he guy) before I got a "good one". Dont fight it. Replace it!

PA-32 Rudder Will Not Self-Center

April 25, 2004 7120

There is an old service bulletin from Piper for add-on springs to the steering mechanism on the Six--have them on mine an experience no problems. If this is a new problem I would investigate the rudder rigging. Any flutter could be the result of cables not tensioned to specs.

Zefftronics Voltage Regulator

April 26, 2004,8175

Cheapest I found last year was styles aviation at 44N; <http://www.skygeek.com/alcon.html>

It took me all of 20 minutes to take out the old regulator and put this one in. I got the one that includes the overvoltage relay (my airplane did not originally have the OVR, they were not installed in '65 Sixes). It is located under the front baggage compartment floor in the Six, which I already had open. I'd recommend the combined OVR and regulator unit, in which case you'll need an additional 5-10 minutes to pull out the existing OVR if you have one. It may be a few

more minutes if it is the first time you take these out, or if they are harder to get to than the Six, but I can't imagine it taking more than about an hour to do.

Upper Door Latch Not Catching

April 23, 2004, 0087

I had this happen in November to me. An FBO charged 5 hours labor to "inspect, adjust and reinstall" - probably because I was an out of townner, but that's the way it always seems to work probably.

When the hook again wouldn't catch the loop while trying to close it, I replaced the two plates that the hook slides in. One side was \$10 the other \$110. There's absolutely no difference except the \$110 one has countersunk drill holes for the screw heads - oh and the extra \$100 price.

Anyway, more inspection and what I've found is that the loop in the fuselage was moving forward as the hook was drawn and rolling off the front edge. The little chrome cover plate was broken on one side and was allowing the loop to move where it wanted to. I adjusted the loop out a rotation or so because it was causing the hook to have to draw the door in too far and then resecured that cover plate very firmly so the loop couldn't slide to the front of the plane. Then I replaced the door pins with Dick Russ' \$5 kit had the door swinging true again. No more problems to date (I'm sure I just jinxed myself).

It was frustrating and I still double check that the hook is fully out and back when the door is open before I try to shut it - it had a tendency to stick in and closed even with the latch thrown. A little LPS has helped that though.

Addition of Third Window

April 24, 2004 : 5385

I'm in the "paint it on for looks" camp and I have a third window on my bird (doesn't do much).

The STC to add a real third window is Isham's and it goes for \$195. Here's the website : <http://gallery.bcentral.com/Gallery/ProductDetails.aspx?GID=4351283&PID=237077&page=1&sortOrder=0>

...and...

April 23, 2004: 5665

I just got done doing this and the results are great. I traced a template off of an Arrow third window on my field, cut out the template out of heavier paper, taped it in place to make sure everything lined up and looked ok, then I went to the graphics/sign shop in town and had the gal cut them out of vinyl to match the color of my planes base color. (very very dark blue, almost black)

They look really good and guess what? If they dont, you can always rip them off, unlike having them painted on.

Selecting Torque Wrench

April 23, 2004 3614

By all means I suggest a clicker type wrench. Don't waste your money on the beam types. You seldom can read them unless you are a contornionst. You set the clickers and click away. Be

certain sure to reset to zero when done. This helps retain calibration. Snap On is of course the best. I have OTC (Otomwa Tool Co) and Sears. Can't beat Sears on price and value. Not the best but, mighty fine. MAC also has a good one. Also suggest a case for the wrench and store it in it. Suggest don't pitch it around in tool box.

Alternator Keeps Tripping Off Line

April 22, 2004 0709

I fought this same problem several months ago and as a result, I have learned a little. If you must cycle the alternator side of the master (if it is a split switch) to reset the alternator then the overvoltage relay is tripping. The problem is that, as I learned, it could be a result of various problems. My mechanic and I spent a lot of time on the phone with Piper tech and this is what I would try first after checking the connections on the alternator to the field and battery as well as your airframe to engine ground:

1. Replace the master switch. It is a cheap and easy part to replace. The contacts in the master can and do become worn with time and result in high circuit resistance causing a voltage drop to the voltage regulator which increases voltage to the alternator field and so on until the overvoltage relay trips. This sounds like the likely source of your problems as it seems to happen randomly. The resistance increases as the contacts heat up and can cause varying trips.
2. The next thing to check (and this turned out to be my problem) even though it is relatively new is the alternator brushes. If the brushes wear unevenly or if the slip rings have developed a defect, it can cause the brushes to jump off of the slip rings. When this happens the voltage regulator send max voltage to the field and then when they reseal, it overloads the overvoltage relay and trips it. This is most evident when the electrical load is low (due to not being able to absorb the surge as well as when the plane is drawing a lot of current) and high rpm. This problem usually causes a consistent trip at a given load and rpm....not varying.
3. Lastly, I would replace the overvoltage relay and regulator. If your plane has separate units you can buy a combo (both in the same box from Lamar for around \$200). Prior to this you can try adjusting your voltage regulator to the proper 13.8 to 14.2 volts but I doubt that this is the problem because the overvoltage relay should not trip until about 17 volts.

Leaning With Single Probe EGT

April 23, 2004 5115

I have a single point EGT (150Hp Mogas) and tried to lean with it for the last four years. Just about worthless. Put in an engine analyzer or use the old tried-and-true method.

Oil Cooler Hose AD

April 22, 2004, 5983

The AD (ACE-96-01) states that for rear-mounted oil coolers replacement with "type C/D" hoses will satisfy the AD with terminating action. For front-mounted oil coolers, the AMOC eliminates 100-hr inspections for "type D" hoses, but still requires replacement at 8 yrs or 1000 hrs. ...and...

April 22, 2004 4142

Using Teflon hoses gets rid of the 100-hour inspections, but not the 8-year replacement requirement for the 140s. If the cooler were in the back, Teflon hoses would fix it for good.

Aircraft Flight Manuals

April 22, 2004 0087

Based on an earlier post, I contacted Mr. Helm in Publications at New Piper about the FM for my '67 PA28-140. As ya'll probably know, the FM is based on the serial number of the acft.

Mr. Helm looked mine up and found that my FM should have 23 revisions to date. The one I rec'd with the acft purchased just last year only had 11 revisions.

Based on that, I have to purchase a new FM for my serial number at \$30 and it will take several weeks to process the request and mail it. UPS shipping was \$10 more at my expense. They would have provided up to the last 3 revisions free of charge but since I needed more, I get to pay.

This post is just to share my experience with other new aircraft owners that may be like me and not know all the intricate details (and expenses) that start revealing themselves with aircraft ownership.

I guess the old adage is correct: "If you have to ask the cost, you can't afford it"

Cylinder Head Temperature - Desirable Range

April 20, 2004, 8175

Everything I've read says to keep them around 350 in cruise and no more than about 425 in climb. My JPI redlines (flashes) them at 450, but that is too hot. I typically see 360-380 on my six once I got the engine broken in. Before the breakin was complete I had a hard time keeping them below 410.

Owner Produced Parats

April 21, 2004 0527

It's my understanding that you can produce your own parts, installing them is another issue. An A&P can only "repair" so long as there is something left to repair, but maybe a "repair station" can produce a "one off" for a specific work order... Or something like that, I've included links below so you can make up your own mind... But keep reading for a way that your A&P can produce parts for you

Further, producing you own parts doesn't necessary mean you did all the work but rather you "designed" and supervised the work to ensure it met your quality. You do not have to have "certified" people produce the parts either. But, you cannot sell these parts to other people, that would require a PMA if "original spec" parts and/or STC if not a "duplicate" of the original part. There is no problem selling the aircraft as long as these parts are still airworthy either...

For example check out the excerpt from the article below:

Q4: If a mechanic manufactured parts for an owner, is he considered in violation of Section 21.303(b)(2)?

A4: The answer would be ■No• if it was found that the owner participated in controlling the design, manufacture, or quality of the part. The mechanic would be considered the producer and would not be in violation of Section 21.303(a). But, if the owner did not play a part in controlling

the design, manufacture, or quality of the part, the mechanic runs a good chance of being in violation of Section 21.303 (b)(2).

and then...

Q5: What kind of advice can you give on how a mechanic can avoid even the appearance of violating section 21.303(b)(2)?

A5: First, a mechanic should never make a logbook or maintenance entry saying that he made a part under his certificate number. This faux pas will send up a flare and get you undue attention from your local FAA inspector. The mechanic, however, can say on the work order that he helped manufacture an owner-produced part under 21.303 (b)(2). Second, the owner or operator should be encouraged to make a log book entry that is similar to Section 43.9 maintenance entry that states: The part is identified as an owner-produced part under Section 21.303 (b)(2). The part was manufactured in accordance with approved data. The owner/operator's participation in the manufacture of the part is identified such as quality control. The owner must declare that the part is airworthy and sign and date the entry

Replacing Rudder Pedal Rubber Pads

April 20, 2004 0415

I got some from Wentworth Aircraft very cheap (\$3 each or so) - they stick on with glue.

Cherokee 140 Rear Seat Room

April 19, 2004 0676

I can tell you this much, there's not a lot of room in the back. I'm 5'9" /155 # and it's tight squeeze for me (kneewise). Ok for young kids or smaller adults, etc. They were sold as 2 + 2. That is: two adults and two kids. I've had three adults in mine, but the guy in the back wasn't real comfortable for a two hour trip, has to kind of sit "side-saddle". Regarding the placement of the seats, I think my weight and balance has a chart that lists the location. If/when I get to the airport, I'll see if I can dig it out and get the information to you. If you don't have any extra holes drilled in the plywood, it's probably in the original location.

Trim Hard to Turn When Cold (at Altitude)

April 18, 2004 0468

Don't know how applicable a '78 T-Arrow is, but I think the mechanisms are similar w/most Cherokees.

I just got done with a similar problem. Cold temperatures plus air-loads made it very hard to move. My tech guy had it apart 3 time to no avail. Checked lube, cable rigging, tension, trim motor, clutches, blah, blah. Progressively got worse, until on a recent trip at 17,000 and -25C, I could hardly move it. Elec. trim was unable, also.

My situation:

The trim jack screw or trim barrel shaft in the tail-cone of the airplane is stationary, and around it revolves the trim jack screw barrel. Trim cable winds around the barrel and as it turns the barrel the whole apparatus moves the trim arm up or down. The barrel is made of softer material than the screw, and mine was worn out-of-round so that when a rotating moment was applied through cable tension, the barrel displaced against the trim rib support bracket, binding it and effectively locking it up. The movement was almost a 1/4"!

I located a serviceable trim barrel replacement (PN 63530-000) at KRN Aviation, Chandler, AZ, 800-366-6462. \$44.00, plus 4.5 hours of tech time to R & R, re-rig trim, etc. Works like new now.

Since this is in the tailcone, I suspect it may not have gotten adequate lubrication over the years, plus weather exposure. So, this'll get lots of attention in the future.

Note: The Piper service manual specifies rigging tension corrections for ambient temperature. I had to stick to my guns and convince my tech to follow the rigging procedure to the letter, as he was of the mind that the airframe shrinking was greater than the cable shrinkage due to temp. change, thus wanted to set tension much higher than book. This may also contribute to excessive wear, but I don't know for sure. Just overlook the wives tales and go by the book is my view. ...and...

April 18, 2004, 5929

We have a 180 that had similar conditions a few years ago. We added the tail cone and jack screw cleaning and lube to the annual inspection. This has eliminated the problem for us. We were using a high and low temperture grease for the lubrication until recently when we switched. I understand that Aero lube and lubriplate are what is reccomended.

Hollow Crankshaft and Corrosion

April 18, 2004 7231

I have inspected many of the crankshafts and have yet to find a bad one. This doesn't mean you won't as others have but until it is inspected you cannot tell. The inspection consists of removing the propeller and the plug that is pressed in the end of the crankshaft. The plug can be removed by drilling a small hole in the plug installing a screw and prying it out. The easy way is use a slide hammer (which costs less than \$10.00 and it will pop it out easily. The inspection consists of removing the sludge that has accumulated inside the very end of the crankshaft and cleaning the inner diameter using gas or thinner on a rag. When it is clean you then inspect the shaft for signs of corrosion and cracks along with measuring the inside diameter to verify it has not been previously machined to a larger diameter. If it checks good, you replace the STD plug and you are good for another 5 years or until the inside of the shaft is treated with corrosion protection which the factory says must be done during overhaul with the shaft removed.

Rosen Sun Visors

April 18, 2004 7884

I picked up some rosen visors at sun n fun. Very nice upgrade cosmetically and functionally. Took me about an hour to install by myself. Getting the wrench up inside the window frame is a bit awkward. Put some tape on your window to protect it from the wrench and bring a real short wrench! Anyway..the first flight, staring right into the sun, I flipped that sucker down and they worked as advertised. I like the way they're fully adjustable on 3 axis so you can just put the visor right where they suns hitting you. And they're on a slide mount so even if the suns at the 8 or 9 oclock position (I always seem to encounter right before sunset coming up the beach) you can put the visor right on the spot. Seems odd being able to see through a visor so clearly after 8yrs with those 30yr old badly scratched piper visors. I'm very happy with the product. If the sun always seems to be in your eyes, like it does me, I'd recommend them. Paid \$305 fyi.

Autopilot Adjustment (Autocontrol IIIB)

April 18, 2004 5257

As parts age their electrical value often changes. These changes can cause autopilots to become out of adjustment. Here is a post I saved that explains how to adjust a Century IIIB. I know it's not the same as yours, but may you can get some ideas that could help you.

Autopilot adjustments

I've learned there are many possible causes for autopilots to oscillate, ranging from bad attitude indicators to loose cabling, but I thought I would share my recent experience getting the oscillations out of my Piper Autocontrol IIIB - via adjustments only.

Problems:

- 1) The autopilot activated in heading or VOR track mode would cause the plane to continuously roll back and forth between ~8 degree banks. The overall direction was maintained, but the plane was oscillating.
- 2) The autopilot would overshoot when turning to a new heading (set by moving the heading bug while in heading track mode). There was over 10 degrees of overshoot, followed by the usual oscillations about the new heading.
- 3) During autopilot-controlled turns, the bank was excessive, reaching 28 to 30 degrees.

The Expert Advice:

When the experts at Autopilots Central heard the description of the problem, they suggested autopilot adjustments I should make before considering equipment external to the autopilot control head. In fact, they guessed (correctly) that after adjustments the oscillation would be gone.

The biggest indicator they picked up on was the amount of bank in turns. The bank angle during a autopilot heading controlled turn should be approximately 20 degrees, not the 28-30 degrees I was experiencing.

Making the Adjustments:

The adjustments required access to 4 potentiometers located on the front of the autopilot, behind the faceplate. Removal of the faceplate required two tools. One Allan wrench to first remove the roll knob, and a small screwdriver for the faceplate screws. The roll knob screw is on the bottom of the knob, and the two faceplate screws

are visible after the roll knob is off.

The potentiometers are quite small, arranged horizontally, and are found directly under the right rocker switch. These pots will not be visible if you are of normal height and are sitting up in the pilot seat. A small jeweler-type flat screwdriver is required to adjust these pots. The pots are 20 turns for full range.

From left to right, the potentiometers adjust the following functions: gain/threshold, left roll, heading bug centering, right roll.

I was advised to adjust the left roll, then the right roll, then the bug centering, then test the bank angles and repeat the process as necessary to get everything correct. Evidently there is interplay between the adjustments.

After some experimenting I found that counter clockwise turns on the roll pots reduced the amount of bank angle in the turns. I had to turn each of the pots about 8 full turns to reduce the bank angles to 20 degrees. I also used the turn coordinator to help achieve the correct standard rate.

The heading bug center adjustment took no adjustment in my case so I don't know what direction to turn that pot for left/right bug adjustment. I will pass along that I was told to ignore the TC ball when making this adjustment, and to just adjust the rudder trim to make sure the DG was stable before adjusting the heading bug.

So far, the adjustments had cut the oscillations down to about 3 degrees of bank right and left. However, the overshoot on autopilot controlled turns was still there and caused the oscillations to start out at about 8 degree banks, slowly reducing down to ~3 degrees.

Again, after some experimenting, I found that clockwise turns on the gain/threshold pot resulted in decreased oscillations. I would make a few turns on the pot, then test both straight flight and turns with the autopilot, adding more clockwise turns until the oscillations and overshoot were gone.

I have NO MORE autopilot induced oscillations !

Vacuum Pump Slow to Come Up to Proper Vacuum

April 18, 2004 7231

Chad it is possible your pump is wearing close to its limits which could effect the output but before I would go out and replace it I would check the instrument filter to see if it is dirty and need replacing which can produce the same effect that you describe. In addition, the garter filter on the

vacuum regulator should be replaced once a year. It can also cause regulation problems. It only costs a couple of dollars.

If the main filter hasn't been replaced in the last 5 years it due.

Backfiring - Fuel Injection Engine

April 20, 2004 5385

I suspect the magnetos. If you have Bendix mags, the most common cause of backfiring is the stripping of the plastic timing gear. It causes the plug to fire at the most inopportune moments. You're lucky you found this problem on the ground. I can tell you that it's quite disturbing when it happens in the air.

Conversion to Club Seating

April 18, 2004 6736

I did the conversion for a customer about 8 years ago using the Piper drawing as authorization. Aprox. cost then was 7,000.00 dollars. The major part of the cost is for the rear facing seats, which are stressed to face aft. If I remember correctly they were \$1500.00 each used and then had to be recovered to match the aircraft. Factor in today's dollar and if you can get someone to do it VERY EXPENSIVE.

Updating Non-Standard Instrument Panel

April 13, 2004, 8175

If you don't use the original holes, you'll need to get a field approval. On my '65 six, the avionics shop was able to move the instruments around in the existing holes to get a standard T panel. It was also a bunch cheaper than fabricating a new panel, as it only involved an hour or two of extra work beyond the work already being done to upgrade the gyros (I had it done at the same time I replaced the old AN gyros, and the biannual static system check)

Autopilot Repair

April 11, 2004, 3842

The airport is Macon, GA (MCN)

His name is Terry (Wilbourne?)@ Lowe Aviation (478-788-3491).

He is the Century/Piper Autopilot Guru.

He is very good and can fix it if its fixable.

He has lots of expertise and parts.

I have flown up there on two occasions for service, both times I was impressed.

I call ahead to make an appointment. I get there early, meet Terry (who is expecting me), while he fixes the autopilot, I borrow the crew car from the FBO and go to breakfast.

Aircraft Certification for IFR Flight

April 10, 2004 0323

All you need to do is have your static system checked, transponder certified, altimeter certified.

I had my plane done 2003 good for 2 years cost \$225.00 in Bartow Florida.

Cruise and Climb Propellers

April 8, 2004, 4657

First consider two questions:

- 1 What engine speed (RPM) do you get, straight & level at full throttle?
- 2 How adequate is your takeoff performance?

Now you can consider the trade-offs. The finer pitched prop will spin faster, much like a lower gear in your car. This will IMPROVE takeoff performance, but the downside is that it may exceed redline in cruise at full throttle. This means that you have to back off on the throttle and cannot take full advantage of your engine's cruise potential.

Remember that above about 8,000 feet, depending on temperature, full throttle is only 75% power, and it is perfectly acceptable to cruise at redline. If you have to back off, you cannot even get 75%.

Note, because the air gets thinner as you climb, the resistance to spinning the prop goes down at the same rate as the power drops due to lack of oxygen. The very convenient result is that full throttle in level flight will be the SAME RPM at any altitude. You don't have to climb to 8,000 feet to check this out.

Now, Your choices:

If you currently have to throttle back in order to avoid over revving in level flight, AND you are willing to give up a little takeoff performance (you primarily use only longer runways) you may want to consider pitching to the "cruise" prop in order to move a little faster.

On the other hand, if you are currently concerned about the tight squeeze getting out of any runway that you use frequently, you might consider moving toward the CLIMB prop. You will accelerate a bit faster and use a bit less runway. The top speed will also be slower because you cannot use full throttle.

You will hear some people boast that since they installed Power Flow, or overhauled their engine, they can now exceed red line (sometimes even while climbing!)

While this speaks well for the effect of the modification, UNLESS THEY NEED SUPERIOR CLIMB PERFORMANCE, they are actually throwing away any benefit they gained. They need to repitch their prop to put that extra power to work in cruise.

For most people, the best pitch is that which just comes up to redline in cruise. If you NEED better climb, give up a little top end and re- pitch towards climb.

Premature Failure of Cylinders

April 8, 2004 4827

It's important to know if the engine was overhauled or rebuilt. I've mentioned this several times in the past, so here goes again. The definition of refurbishing an engine, according to the book of beauracracy, is as follow: Overhaul, the engine is disassembled, cleaned inspected, repairs performed, and reassembled within limits. Rebuild is the same, except that it is assembled to new tolerances. If you had an OH and most likely you did, at 1300hrs you may be at or beyond limits, and certainly far from new tolerance. Example: piston clearance new for most Lycs. .010 to .012. Limit is .018 to .020. If the engine had , let's say .016 to .017, it would have been construed as serviceable and assembled as an over haul. You can do the numbers on how long the engine would last.

Recently I had an experience, and vowed here after never to install another overhauled or rebuilt cylinder. Reason: Not too much difference in price, in most cases it may have been welded more than once, and finally, they also assembled within limits and passed off as serviceable. Is it serviceable? Certainly, but do not expect a 2000hr TBO.

I assume that 50 less of peak, you mean rich of peak. If this is so, leaning was not your problem. I would suspect that loosing valve seats and cracking 4 cylinders, may have been just a result of poorly rebuilt cylinders, assuming that the engine parameters are within "tolerance", such lifter bleed down clearance, exhaust system in good condition, and all the rest of engine operations. 40 plugs are the hot side and can contribute to "hot heads", 38 are recommended for 320s.

I would also shy away from miracle platings on your next set of cylinders, unless you get some auto industry type warranty (I doubt you'd get it) Hardened barrels are the most reliable. I would also stick to the 15/50 due to the anti corrosives. The Phillips is a fine lubricant, and it would be my second choice. The Shell 15/50 seems to have an edge.

Conversion to Thick Alternator Belt (A/C Equipped Plane)

April 7, 2004: 7790

After 2 weeks of searching for parts, a lot of headaches and of course, a lot more \$\$\$ than anticipated, the thin belt A/C configuration to thick belt non A/C conversion is done. 1979 Archer II with IO-360-A4M engine. Kept shredding thin belts every 30-40 hours. Did everything possible to align the alternator and flywheel properly but no dice. Finally threw in the towel (and a lot of \$\$\$) and did the conversion.

For those of you contemplating, let me save you a bunch of time/\$\$\$\$\$. The flywheel you need is a LW 16046 (7.5" diameter pulley). You will need 2 brackets and a Gates Green Stripe 9335 belt. You will also need a Chrysler alternator.

Wentworth supplied the initial conversion parts (\$650.00 with trade) but the alternator was no good (broken ground) and the flywheel was the wrong one (9.5" diameter pulley). Brackets were OK though. Had to buy a new flywheel (\$\$\$\$\$) but the supply is non-existent even new so had to jump on it or be grounded another 2-??? weeks. Also went with a Yellow Tagged alternator and yes, the \$64.00 Piper belt.

Governor Overhaul Shop

April 4, 2004 6286

I had my Hartzell governor overhauled last September at the same time my prop was undergoing an overhaul by Hartzell. At first I sent both the prop and governor out to Hartzell. While Hartzell was low bidder on the prop (by far), they were high on their estimate for the governor. I ended up having the governor overhauled by Mike Jones at Pro-Prop Governor & Accessory Inc. in Hallstead, PA (www.pro-prop.com). Rapid turnaround and even with shipping and shop inspection costs from Hartzell, I came out way ahead.

Replace Tappet Followers With Camshaft

April 3, 2004 4827

Whenever replacing a camshaft new or reground, the tappet (followers) should be changed. The lifter ass'y itself, if within tolerance, is OK to reused. Cam and follower surfaces will mate to each other. Depending on how much wear is on the old follower, it will not be compatible with the new surface. An experienced eye and some testing may allow reuse of old tappets on a newly ground cam surface, but given the complexity of replacement, it generally is not wise to do so. Some times an old surface, be it cam or tappet working against a new or newly ground surface is equally as bad as a badly worn surface.

The tolerances given for bleed down clearances are for a purpose. What is important is that they all be equal so as not to allow any other variation alter the accuracy of valve actuation.

Due the the nature of the valve train, staying towards the upper end of the tolerance is most beneficial when taking, expansion, velocities, inertia, etc. into account. Still equality is also equily essential. Beyond the limits is unacceptable.

Clearances will vary slightly as the engine is used, but periodical inspection, even at 300 to 500 hr. intervals should not result in extreme changes. This is why it is important to "keep an eye" on valve bleed down clearances. It will reveal any impending or possible failures before they have an opportunity to manifest themselves.

Halogen Landing Lights and Wiring

April 3, 2004, 3986

The other day I removed the fiberglass cowling on my 140 to do some painting. Upon getting it home and disassembling the landing light/air cleaner assy I noticed that one of the wires coming from the landing light had the insulation melted from the conductor. I remembered that I had replaced the original 4509 style light with a Q4509 Halogen so I went to an aircraft catalog to do some research. I believe the original lamp to be 50 wt and the Q4509 is a 100 wt light. The wiring going to the light is a #18 wire and I think the problem is that it's not capable of carrying the 7-8 amps current that the new light draws. I'm going back to either the 4509 or an H4509, which lasts longer although I'm not sure if it's legal or not. If you've got the Q4509, I suggest you check the condition of the wiring when you get the chance. I know I'm glad to have stumbled across this problem on the ground.

Cowl Latch Pins Wear Because of Worn Nylon Grommets

April 3, 2004 8175

I go through a set of the nylon grommets every 100 hrs or so. New pins would most likely cut down the wear, but they are also not easy to replace because like you say, the old ones have to be ground out and new ones glassed in. My mechanic tells me the pins wore in the first place because the grommets were allowed to wear through without being replaced.

Compression Check with Engine Cold

April 4, 2004 4827

Regardless of type of piston engine, cold compression first is always best.

Warming up an engine will only cover up any minor leaks, after all, that is what we want to know. Minor leaks become major leaks, and expensive ones. Most Lycomings and Continentals will read above 70s if the cylinders are sound. As Tom stated move the prop to and fro, before making final reading.

In the rest of the piston engine world compression testing is performed by actual piston movement. Two or three turns the engine should reach maximum pressure as specified by the manufacturer, if it does not, oil is then added, which should bring the pressure up, proving there is a problem. Sounds familiar? Each time we do warm compression testing in our flyers, we are masking potential problems. Good compression cold is a sound engine.

Some Metal In Oil Filter

April 3, 2004 0478

Depending on the type metal (ie, source) and the particle size, I think there are two courses of action:

- 1) If the flakes are tiny and not likely from a critical area, then continued running and monitoring the every-25hrs-or-so oil analysis can be done safely. If the size or amount of metal does not increase with time significantly, you just keep on going. This can give you many more months of safe use while you save up for the eventual overhaul.
- 2) If the flakes are large and/or likely from critical components, then rebuild is eminent.

Many people have told me that oil analysis is only informative as a "trend" detector. One analysis report should not be used to make big decisions (unless of course there are "metal chunks" in it). As a minimum, I recommend running the engine with new oil and filter for a number of hours and then looking to see again what metal is shedded.

Installation of Crankshaft Seal

April 2, 2004 4827

The method of installing the seal is barbaric, but not hard. It helps to have a tool for stretching over the flange. Do it while the seal is warmed in hot water, and use some 3/i oil. Besure the compression spring is properly installed. Use Hy Tach for sealing onto the case.

Be aware that there is no oil pressure against the seal. Only age, or excessive crankcase pressure makes them leak. Usually the latter.

Fluctuating Fuel pressure Gauge

April 1, 2004 5087

Your gauge may be bad, OR, you have a small leak that allowed the air to leak out and now its liquid logged. No cushion to absorb the pulses from the engine driven fuel pump. I looked under the panel with a mirror and bright light for fuel stains, and found none. On my plane the copper line from the pump to gauge has a coupling on the right side and back of the engine. I parted that line, used a rag to absorb fuel. This let a column of air back into the line and now it works fine, for 18 mo. The main thing here is that if you have a bad gauge get it overhauled or replaced. in my case we cant explain where the air went that was in there originally, but so far all is fine.

Source of AD List Specific to Particular Plane

April 1, 2004, 5983

Consider using documentation from a company called adlog. Great record keeping system with all ADs specific to your aircraft and equipment. [Www.adlog.com](http://www.adlog.com)

Arrow Gear Drops Immediately unless Auto Extend is locked Out

April 1, 2004 4827

The diaphragm is attached to a micro switch which completes the circuit on the up lock valve. When the diaphragm releases the switch, it in turn releases the up lock valve and the gears are extended by means of springs. Under normal sequence when the gear switch is in the down position, hybraulic pressure move the gears down, but in the auto mode, the motor/pump is not actuated, but instead is by passed.

The problem is somewhere in the auto actuator. I would perform testing on jacks. Remember also the throttle has a position switch as well.

Spark Plug Heat Range

March 29, 2004 7231

The recommended plug for the 0-360-A series is the REM38E. Some like to use the RHM40E since it is a little hotter plug. The hotter plug will help fouling if the rings or guides are allowing oil to foul the plugs. The average for the 38E life should be around 500 hours. I have not ever used the 40E in any of our customers planes so I can't give you an equivalent hours. The Unison plug uses the same prefix as the Champion plug and I have heard that Chief has the best prices. ...and...

March 29, 2004 4827

The 38 is the recommended heat range for the 360 (most of them anyway). I'm always surprised when shops use a hotter heat range, especially with a newly OHed engines. Heat range of the plug is also a factor in maintaining proper combustion chamber temperatures. The hotter range will transfer more heat, but at the same time help raise combustion chamber temp., which is not a good thing. Sort of Catch 22. As plugs wear, it will be more difficult to maintain a proper spark, and the additional wear which also caused gap to increase will also raise heat range. Although the dinosaurs turn slowly, they are still air cooled, and poorly at that. So every little bit helps, plug range included. BTW, the hotter range will in addition to other problems it may cause, also wear faster.

PA-32 Wing Cracks

March 28, 2004 8175

The sixes have a penchant for cracks at the joints between the ribs and the stringer about 9" forward of the rear spar. The usual repair is stop drilling the cracks and applying a diamond shaped patch over that intersection. I'm told that the new skins have a doubler under the at that location. I have one such patch on my left wing.

...and...

March 28, 2004 3013

Had a '74 Archer and had cracks develop. Replaced the entire aft inboard wing on both sides, had a diamond re-enforcement installed under the and rebuilt the wing walk while we were at it. There was no spar damage. Cost over 6k. oh yeah.. about 2100TT when cracks noticed.

Now I have a '72 Six with 5000 Hours. It has about two or three diamond patches on each side.

Piper started putting diamond shaped doublers under the wing skins some time in the later '70 I am told.

Watch the panels in the aft wing skins next time you fly. They do not hold tons of the structural stress, however they are subjected to the low pressure and changes in pressure. You will see them wiggling like a sheet. This is the cause of the cracks. Not spar damage.

Heater Does Not Turn Fully Off

March 27, 2004 8175

The heater cable works a flapper valve in a box at the bottom of the firewall. You can get under the plane and look at that box with the heater off to see if the flapper is closing flush against the plenum. Mine was looking rather beat when I did my FWF last summer. I took the whole box and plenum off, bead blasted it, and painted it with engine paint, put it back together and lubricated the moving parts. You wouldn't believe the difference. Not only can I shut the heat all

the way off now, I can actually control it. It used to be the heat was either on or it was off, no in between.

Vernier Mixture and Throttle Controls

March 28, 2004 6236

McFarlane Aviation, Inc. (800-544-8594) has recently received PMA for Vernier Controls for Piper aircraft. However, as their reference chart shows, they do not have a mixture control for the very early models. Alcor (www.alcorinc.com) has the only STC for Vernier Mixture Controls for application on the earliest Cherokees.

So...depending on your model and serial number, you may be able to get all controls from McFarlane, or you may have to buy the mixture control from Alcor.

In a recent post someone indicated that they installed Vernier controls from Chief Aircraft (Select "Chief Aircraft", and then "Control Cables" once at the Chief website) and got a field approval.... you might check the back pages or the archives for more detail.

I have been researching this for my '67 140, but the cost seems a bit excessive (\$323 for the throttle, and \$155 for the mixture) for me at the moment. The sample control I saw from McFarlane is a very high quality unit. I have not seen an Alcor unit.

Adding Panel Lighting Dimmer to Older Plane

March 27, 2004, 7231

I would recommend a Omnite 50 OHM wirewound rheostat. I've installed many and it works well for the lighting requirements for the Cherokee. You will need to have your mechanic submit a 337 for a field approval with the wiring changes. I wouldn't think your mechanic would have difficulty getting it approved.

Adjusting Upper Door Latch

March 26, 2004 4868

The latch is adjusted by moving the "loop" (or whatever you want to call it) that the door hook grabs onto. It'll move in or out depending on how many times you turn it. To do this, you need to remove the small plate that covers it (a screw on either side of the "loop") and then turn it. If your latch is too tight, you'll want to turn it counter clockwise (just like unscrewing a screw). The amount you should adjust it will be trial and error, but it's pretty easy.

Flying Aircraft With Propeller Spinner Removed

March 26, 2004, 4884

Some models and serial #s can fly without spinner, and some cannot. You must consult the TCDS to determine if yours can be without. There is a Propeller spinner section. Read notes 11 and 14, as well as the data for your model.

Decal Source

March 26, 2004, 7071

You can get any decal you need for our Pipers at Moody Aerographics in Bellview , FL . They advertise in TAP

Engine Vibration at 2,000 RPM

March 22, 2004 2411

Check the engine mounts. Mine had no heritage in my log book. They had to be well over 1000 hrs on them. More likely 2000. I replaced them and then the world was good! Look at them closely and if they are sagging It is time to replace them. My shop got 4 hours to replace them plus parts. Money well spent.

You may have other problems. Have your engine/prop checked by a shop that does dynamic balancing of the prop. The picture will tell a good story. How old is your prop? Been filed alot? You may have a prop problem.

Source For Reskinning, Sheet Metal Work

March 21, 2004 7231

Call Pat McGill at Hayton Metal works. That is what they specialize in and do a great job. Pats number is 405-833-3282.

Aviation Fuel Prices on Web

March 21, 2004 1512

www.airnav.com is a good site to check fuel prices. Saved me \$1.30 a gallon (Eldorado,Ks. at \$2.00/gal vs Branson,Mo at \$3.30/gal last weekend.

Alternator Belt (narrow type) Will Not Stay On

March 21, 2004 4827

The alt. should first be parallel in alignment, and in line with the crank pulley. If the holes in the alt. brackets are worn, it will be impossible to maintain parallel alignment. Once addressed, and if your alternator has ears with a floating type bushing, the alt. can be spaced for and aft by adding thin AN washers to the inside of the forward ear. Once reasonable alignment is established, when tightening, the bushing will find its own location. Belt tension is also paramount. Too tight or too loose is not good. When tightening, you should be able to depress one side of the belt 1/8 to 1/4 inch at the center between pulley contacts. Be sure the pulleys are not worn. Not sure if those thin belts are available in toothed type, but if they are (maybe illegal), they take more abuse than straight type, much like the Green Streak belts.

Engine Rebuild Criteria- Lycoming- From Minor Prop Strike

March 21, 2004, 6685

Engine Rebuild Criteria. I looked on Lycoming web site and here is the criteria of a prop strike requiring an engine overhaul. I'll have to have a propeller specialist tell me if mine is merely a case of needing dress up and paint. Which i think it is.

A propeller strike is defined as follows: A. Any incident, whether or not the engine is operating, that requires repair to the propeller other than minor dressing of the blades. B. Any incident during engine operation in which the propeller impacts a solid object which causes a drop in RPM and also requires structural repair of the propeller (incidents requiring only paint touch up are not included). This is not restricted to propeller strikes against the ground, and although the propeller may continue to rotate, damage to the engine may result, possibly progressing to engine failure. C. A sudden RPM drop while impacting water, tall grass, or similar non-solid medium, where propeller structural damage is not normally incurred.

Source - Vent Window Gasket Material

March 21, 2004: 2984

Aero Plastics, Inc. also has the foam, "Piper Vent Gasket Tape". Phone # 724 744 4448. 1/4" X 1/8" X 10'. P/N SP-FT11610. Don't remember the cost, but 10' will do a lot of vents.

Aileron Free Play

March 21, 2004 4827

Rod end wear is repairable, and easily rectified, but all the clevises, spindles, pivots, micarta wheels, all have a tad of end play, so a small amount of "slack" is not objectionable. When rigging, the aileron should be set to take slack into account, in most cases, slightly lower than the guage.

Avoiding Battery Box Corrosion

March 20, 2004, 8955

Removing the wings to eliminate corrosion seems extreme, but there are some battery box related points that might be helpful: find out if you can legally install a newer plastic battery box if your old one is too corroded to use; consider using cables instead of the old style braided leads; and consider replacing the flooded cell battery with a gel type battery (Concorde RG series), which doesn't have any liquid acid in it to leak.

Side Panel Backing Material - Interior Renovation

March 19, 2004, 7231

I would not recommend ABS for the side panels. It's heavy and not approved for use in the interior (as I'm informed by the interior shop). I would recommend a 1/8" plastic honey comb material called "Cortex". It comes in 4'X 8' sheets and is available from plexiglas distribution outlets like Regal Plastics. The coretex sell for less than \$10.00 per sheet. I've used it for years, it's very light, very strong and cuts easy with a Stanley Knife and it meets the flame tests required by the FAA..

Replacing Hinge Pins on Stabilator

March 19, 2004, 4868

I replaced most of mine last year. A few were so snug, that I couldn't get them out. I think I ended up replacing 3 of them. I don't think they were available in an oversize. They weren't very expensive... I want to say maybe less than \$10 a piece. If your hinges are too worn, you'll probably have to rivet in some new hinges. I figure I'll do that in a couple of years. The new pins tightened them up for now.

Installing Airtex Carpet

March 18, 2004 0999

I have done a Warrior and my current Archer with Airtex carpet. the pieces are pretty easy to figure out by matching them up to the existing carpet. I used the glue that Airtex sells for the floor pieces, but Velcro'd under and below the rear seats and the baggage compartment. You'll probably need an awl to find the screw holes in the side panels, and now is a good time to go to the hardware store and buy some screws (get some oversize ones also) and some new finish

washers. The carpet needs very little trimming, so cut just a little at a time to get the fit you want. If you take your time, it will look very nice.

Strut Scissors Need Replacement?

March 19, 2004, 3614

There are two types of MLG scissor links. If they are elliptical in cross section then an AD applies and suggest replace them. If they are I in cross section you got the good ones. If they are cracked then suggest you see them. Cracking is just about the only cause for rejection. If the bushings are worn they are easily replaced. Never seen any with corr as a problem.

Replacing Fuses with Circuit Breakers

March 19, 2004, 7231

I replaced the fuse holders with circuit breakers on every Cherokee we refurbished. It's not a real difficult task only time consuming. I would recommend to save cost buying used circuit breakers from Preferred Air Parts (800-433-0814). I have never had a problem with the used ones and the last time I bought them they were \$7.00 each. The ones you want are the small Klixon. You will need to submit to your local FSDO a 337 describing the change. Some times they like to have a 337 showing the alteration has been previously approved and then the can approve based on prior approval.

Pre Buy Inspection is Valuable

March 18, 2004, 0573

No doubt about it! Do a prebuy. AND MAKE SURE ALL AD's ARE COMPLIED WITH! Then, if the condition of the plane is acceptable...roll it into a fresh annual. It will cost you a few bucks more on the front end, but well worth it! And you'll have a fresh Annual. I did this when I bought my PA32-260 back in December. (And I split the Annual portion with the seller!) I'm sure it saved me thousands of dollars. The pre-buy looked okay, with a few squaks...but as I rolled into the annual the entire exhaust need to be repaired (seller paid for the entire thing) and there was an impeller AD that wasn't complied with (seller paid for) AND the more detailed annual discovered that the left magneto was bad (seller replaced). He agreed to pay for these since he represented that the airplane was in "airworthy condition" when I made the deal (and stated this in the contract). My total share for the fresh Annual and prebuy was about \$1,500. The seller's "share" was well over \$5k when all was said and done. (That being said, as I flew it back from Texas to CA, the turn coordinator failed (about \$500 to replace) and the comm 2 became intermittent (about \$500 to upgrade comm 1 (modification upgrade)and fix comm 2.) Still feel I got a great deal...after all my bird is 37 years old!

High Oil Consumption - Puddles of Oil Beneath the Breather

March 18, 2004, 7782

I was using about a qt. every 5 hours and read that if the oil breather is not properly vented or if it slips downward through its rubber mounted bracket, that a little oil will be sucked out and what is dripping is the oil remaining in the breather after being sucked out during flight. I checked my breather and while it was vented and the vents were unobstructed, it had slipped downward and was protruding from the bottom of the fuselage into the slip stream a little. It was raised and the clamp re-tightened. My oil consumption decreased and no more little puddles of oil.

Side Window Replacement

March 17, 2004 9952

Bought mine from Great Lakes Aero. I prefer the solar grey tint. This is something that the owner can install, so you save some money. It's not difficult, but takes preparation and patience. You can do it in a day. The door and pilot window have a molded curvature that your local company might not be capable of duplicating.

...and...

March 17, 2004 0112

Personally, I removed all 4 windows and took them to a place here in town that does boats, aircraft and other windows. They cut them perfect, a bit thicker than 1/8" OEM, they are dark tinted and fit without trimming. They even machined a storm window on the pilot side and it fits perfect! 5 yrs ago it was \$85 out the door.

Overhead Eyeball Vents

March 17, 2004, 6671

Try wicks aircraft supply page 57. 1 800 221 9425 the aluminum ones are what I used . I need to do some small finishing work to get them to fit in to the housing but after the work is don they are excellent.

Electric Attitude Indicator as Backup

March 17, 2004: 4070

The most important safety device in my plane is an electric attitude indicator below my vacuum indicator. It is in my scan and if the 2 do not agree, I can immediately determine which is wrong. The thing that kills most single engine IFR pilots is the insidious loss of vacuum. Almost no one can survive the gradual turn of the AI in the soup. I also just installed a vacuum loss warning light. I am not bullet-proof, but at least I have a fighting chance.....

Incidentally, I opted for the electric AI rather than a vacuum backup since it is a completely separate system -- and the battery can last long enough to get me down.

Engine Fails to Turn Over - Starter Motor Runs

March 16, 2004, 7884

If you're hearing the starter motor "whiring" but not engaging, it sounds like the bendix in the starter is stuck. Its funny, it wasn't til I had this happen a few times, I became aware that the manufacturer recommends cleaning and tightening the starter components every 100hrs? Most of us just use em til they stop working and buy a new one. I started having my cleaned at each annual back in 98, and no problems since. You may get buy fine without a new starter.

Lycoming 0-540 AD: Crank Bolts

March 16, 2004, 8955

Lycoming Service Bulletin 554 concerns crank bolt replacement on nearly all 540 type engines? It became an AD last year (03), and was due to some bad batch(es) of bolts made in the mid(?) *90s that were zinc plated, rather than cadmium plated, Needless to say, this SB and subsequent AD, should have been complied with already, or the plane must be grounded until it is. In short, there should not be any suspect Lycoming bolts in any airworthy plane at this time.

The AD required all 540~~as~~s that had a Lycoming bolt (PN STD-2209) replaced since that time to have that bolt replaced again with a known good bolt. This bolt holds the accessory drive gear on the crank shaft and must be new when the gear is installed, so any engine overhaul or rebuild done by anyone was suspect.

The only acceptable Lycoming supplied bolts are contained in their kit 05K19987, all other Lycoming bolts are not to be used, regardless of provenance, source, manufacturing date, or FAA approved forms to the contrary. OTOH, you could use a Superior bolt (or have one already installed), and not have the problem at all. FWIW, Lycoming picked up the bill for most bolt replacements.

Loose Nut and Nosewheel Shimmy

March 15, 2004, 3868

I experienced some nose wheel shimmy on roll out the other day. On checking I found that the nut on the bolt that holds the belkcrank to the top of the nose strut had worked loose. Tightening this eliminated the shimmy.

I would recomend checking this nut on a regular basis as a friend at the field recently had a \$5000 repair for nose wheel shimmy as it cracked the engine mount.

Welding Aluminum

March 15, 2004, 3614

The alum used on your cowl is 2024-T3. This is not an acceptable grade of alum for welding. Suggest a sht metal doubler for repair. The alum grade for welding is 6061. It welds nicesly but not much or any on a Cherokee that I am aware of except the fuel pump shroud or some baffling.

Wet vs Sigma Tek Vacuum Pump

March 14, 2004, 3994

The reliabilty should obviously improve immensely with the wet pump but all things considered, I favor going with the SigmaTec and spending the "separator money" on a Precise Flight stand-by vac system.

Wrong Exhaust for 140

March 12, 2004, 8747

It most certainly is possible to have an incorrect exhaust system on a 140. I am resolving this issue right now while my plane is in annual. I have a '76 140 with the O-320-E3D. I had contact between the front crossover pipe and the bottom of the alternator housing. After verifying I had the correct alternator, my A&P called an exhaust vendor and was told there are two versions of the exhaust available.

The exhaust pipes that were on the plane came straight down from the cylinders then crossed over in front of the engine. The new pipes we just received are angled aft slightly as they come out of the cylinders and extend down a bit more.

Cost for the two pipes (have to replace #1 and #2 so the slip joints will line up) was \$300 including sending in the old pipes.

Wrench for Removing Vacuum Pump

March 11, 2004, 2161

I sacrificed a Craftsman 7/16" box end ignition wrench for the cause when I replaced my Vac. pump. The wrench is a 12 point and only an 1/8" thick, by cutting a notch out of the side wide enough to span the stud you will be able to remove it after the nut is tight. PS, make sure you install the inlet and exhaust pipes on the pump before you mount the pump, they won't spin on later. The voice of experience, but the pump go's on a lot faster the second time.

...and...

March 11, 2004, : 7231

Airparts of Lockhaven have a wrench designed for just that purpose. You might want to give th Vero Beach Branch a call.

PA-32 Rudder Does Not Center

March 9, 2004, 8175

Mine also don't necessarily return to center, especially for small deflections. I often have to kick out maybe an inch of rudder pedal travel to center the ball...it won't do it by itself. The parts manual calls out centering springs that go from the firewall to the top of the nose fork. If the nosewheel does not have a wheel pant, those springs are required. With a nose pant, they are not required (the fin on the wheel pant is supposed to provide the centering force). Mine has wheelpant and does not have the springs installed. To install them I'd have to replace the bolts at the nose fork with ones with the hole drilled for the spring. There are little L brackets on the firewall under the screws for the heatbox to connect the aft end of the springs to.

I suspect with the springs installed, the pedals might center better. If you don't have the nose pant, you won't get any centering force beyond the air pushing on the rudder without the springs.

Hardware for Use on Inspection Panels

March 8, 2004, 7231

I would recommend you use a NAS 395 floating "U" Type Tinnerman nut in all of your inspection panels. The part number is A1932-8Z-1. They cost .42 each and Aircraft Spruce has them. Use these and you will never vhave a problem with the screws again. If you do, just replace the tinnerman nut.

Digital Outside Air Temperature Gauge

March 10, 2004, 6259

I have the Davtron M655. I like it a lot. Since, it measures outside ambient temp and is also coupled to the Mode-C encoder it is able to accurately display Density-Altitude. It has several other benefits, such as, displays Pressure-Altitude allowing you to check the accuracy of your altimeter, displays buss voltage (which is where I usually keep it), and displays outside ambient temp in both Fahrenheit and Centigrade. I think it's one of the best tools for the price, and it doesn't take up much panel space.

March 8, 2004, 6985

I have an Electronics International digital OAT. It has a LED that lights up when the temps are in the icing zone. My only complaint is that it only displays the temperature in fahrenheit. All of the performance charts are in celcius.

Circuit Breaker Rating

March 9, 2004

There are many Engineering Societies that establish standards I.E.E. A.S.E. They have established the ■Rating• on Circuit Breakers. 5amp Breakers NEVER Pops at 5 amps. Aircraft C/b's are built with closer tolerance than general purpose C/b's. Aircraft circuit breakers are rated to break at 115% of the ■HOLD• value, which in this example will be 5.75 amps. After 5.75 amps say 7 amps the 5amp C/b will pop in about 60 to 90 seconds.

General Purpose C/b's will hold 145% of the rated value. I believe owners should know this information, which is why I post this time. I recommend aircraft C/b's that are ■Push/Pull• Military specs. Just a few dollars more.

Universal 4400 tail flight strobe

March 2, 2004, 7231

I have installed several as replacements for the beacon. It will need a field approval by the FAA but I have never had a problem with them for this installation. If you do install one you will need the red or half red lens. No clear on the tail. I think is the best strobe for the buck.

Applicability of SB977 (Rear Spar Inspection Plates) to a 140?

March 2, 2004, 8770

I have a 140 also and you can inspect both sides of the rear spar area by lifting up the rear floor for the forward view and through the rear compartment access in the hat rack for the aft side. If you check the bulletin, for aircraft not needing the access holes installed, all you have to do is drill two small holes (one on each side of the aircraft) to allow drainage of water in the area. The bulletin gives you the measurements of the hole size and the correct location of where to put the holes.

Recharging a Discharged Concord RG Battery

March 2, 2004, 8175

Did you try the conditioning charge described in the manual for the battery? Charging from a low battery situation is supposed to be done using a current limited charge until it reaches something like 14v, then switched to a voltage limited charge. For conditioning, IIRC, you deep cycle the battery but then charge it at a current limited rate. Mine failed the load test after the first year, but running a conditioning cycle on it fixed it right up and it has been good since. You need a special charger to do that. I'm using a regulated lab power supply that has both current and voltage limits. My A&P's charger is not appropriate for a flat RG battery, and frankly neither is the airplane's charging system.

Installing a Split Master Switch on Older Model

March 1, 2004, : 8175

Check your switch carefully. Mine was a double pole switch with a shared actuator. Changing to a split master was simply a matter of taking the wires off the old switch, removing it, putting the new switch in its place and putting the wires on the new one.

Wing Spar Corrosion Checking

March 1, 2004, 7006

The inspection hole kit (Piper p/n 765-106v) is to install access plates in the lower wing to facilitate inspection on the rear spar at the attach fittings as spelled out in SB 789a.

The requirement to remove the fuel tank is to inspect the main spar cap and adjacent area for corrosion as spelled out in SB 1006. This area is not visible from the inspection plates added in paragraph above.

A third corrosion inspection area is the rear spar attach fittings inside the fuselage which is what Buddy is talking about. It is spelled out in SB 977 and requires inspection holes be cut in the rear baggage floor (these can be field fabricated), insulation cut away and removed within 6 inches of the attach fittings, side windows sealed if there is evidence of water leaks, and drain holes drilled in the floor.

As these old airplanes continue to age, keeping corrosion at bay can be a never ending task.

Checking Oil Temperature Gauge

February 29, 2004, 7231

The best way to test the temp probe is to pull the probe from the engine and run a comparison test. You will need to have a jumper wire from the temp wire to the connector on the probe terminal. I recommend immersing the probe in a can of light weight engine oil (5W) and heat the oil on a hot plate. Use a candy thermometer as a reference. Be sure to ground the probe to the plane and as you are heating the oil, have a helper monitor the temp on the candy probe as you monitor the aircraft temp gage. Be sure to have the master switch on. The reason I mentioned a candy thermometer is I have a high dollar digital pyrometer and found the candy thermometer to be as accurate

Installing Windshield

February 28, 2004: 7231

Bill, I would take that foam tape and throw it as far away from your plane as you can. If I might make a suggestion which has worked for me on over a dozen windshield installations.

Remove all the adhesive, tape and anything else that is around the windshield channel and support structure. The windshield should be pre-fitted to insure it will actually fit. This is easily accomplished by fitting each windshield into position. This may require sanding the windshield edges until you have a good flush fit all around. When this is finished, remove the windshields from the fuselage. Using the Polyseamseal in a caulking gun, fill the upper channel (across the top of the fuselage) with the Polyseamseal. Run a heavy bead on the inside vertical retainer on the side of the fuselage. Next run a double bead of the sealer around the retainer that is riveted to the glareshield and then run a heavy bead up the center post. Install the windshield in place making sure to have it firmly pushed back on the top and side until the sealant is forced out around the edges. Next run a fillet bead around the exposed edges (glareshield) and up the center post. Finally apply additional polyseamseal on top of the lower edge approximately the width of the lower trim piece and install the lower trim. Repeat the above for the other side. With both windshields in place, fill the center section with the polyseamseal making sure to seal all the edges before installing the center close out strip. Clean up all the extra residue of sealant with a soft sponge and clean water. Don't allow the sealant to dry until you have removed all the extra sealant.

Gyro Instrument (AI) Not Working Well

March 1, 2004, 0028

Check the filter in the back of the gyro. My AI had been overhauled within 3 months of when I bought the plane, but the AI was flaky until it had been running for 10-15 minutes. I replaced it, and took the four screens off that hold the input fitting (screen filters under the plate). It was filled with dust... cleaned, test with vacuum... worked great.

Electronic Regulator Stops Fluctuations

February 28, 2004 6236

Last weekend I noticed the voltmeter in my 1967 140 fluctuating from 13.4 to 15.2. On the advice of several here, I checked the accuracy of the gauge, which was fine. Because of the fluctuations we assumed the voltage regulator. We replaced the old mechanical unit with a new electronic unit from Kelly Aerospace. It appears the problem has been solved. The voltmeter read 14.3 from startup, through a short test flight and to shut down today.

Once the old regulator was removed, we noticed a crack in one of the resistors on the bottom of the unit. I assume that was the offending part.

The maintenance manual calls for a acceptable voltage range of 13.6 to 14.4. It appears my installation is within the acceptable range, albeit on the high side.

Warrior Conversion to 160 HP

February 27, 2004, 3601

Have just done a Ly-co conversion, now my engine no longer is a 3ED but a 3DG. Ly-co does not have performance data related to 1975 warrior (tapered wings), rather performance data on STC sheet is related to 140 (herschel bar wings). RAM also sells a 160HP conversion STC (not applicable to E3D engine)

Have flown 20 hours on conversion and can attest to good/acceptable improvements both in rate of climb and speed with a prop repitch to 60. Unknown at the time of my decision was that one cannot run engine higher than 2500RPM because of noise (like if somebody is going to measure decibels at high altitude!). Cost of the engine with STC and many new parts (not offered by Penn Yan or Mattituck) \$14,500, plus install 12 hours. Engine done @ Pine Mountain Aviation, Danbury CT.

Count of PA-28's Registered

February 27, 2004, : 6130

This is per a run on the FAA database that is one to two years old. I would like to get my hands on the PA-28R-300 a 300hp Arrow, probably goes like a bat... N number is: 300BT an experimental registered to Piper in Lockhaven.

Model CountOfn#

PA-28 155

PA-28-140 5749

PA-28-150 175

PA-28-151 1189

PA-28-160 346

PA-28-161 1987

PA-28-180 4095

PA-28-181 2486
PA-28-201T 78
PA-28-235 1011
PA-28-236 516
PA-28R-180 689
PA-28R-200 1518
PA-28R-201 390
PA-28R-201T 492
PA-28R-300 1
PA-28RT-201 221
PA-28RT-201T 319
PA-28S-160 1
PA-28S-180 2February 27, 2004, 1:35 pm, in reply to "Size of the 140 fleet"
User logged in as: 0527
209.244.4.106

You can do your own search (<http://162.58.35.241/acdatabase/acmain.htm>), then click on the "make/model" link. You might try just entering pa28 as the model, this will include a break down of all types. There where some "weird" one-offs that you may or may not want to include in your number...

Correct Cadmium Plated Structural Fuel Tank Screws

February 26, 2004, 7231
(70) AN525-832-R9 & (60) AN525-832-R12

Applying for a Ferry Permit

February 26, 5603

Go to < <http://forms.faa.gov/report.asp> >and that should get you form 8130-6 which is Ferry permit application. Anyone can fill out the application, you as the owner especially. The form is very self explanatory and you can fill it out right on line and print it right on your computer. Make sure you print it out as a two sided form.

Now, what this form is going to ask the FAA is that you want to fly your plane to a maintenance facility for repairs. You list the reasons why it would be currently un-airworthy i.e. damaged or inop strobe light, AD 2002-XX-XX not accomplished, Annual inspection overdue. You or your mechanic presents this to FAA, you as owner have to sign the ferry permit application or give a letter to your mechanic authorizing him to act in your behalf, (I just love it when the lawyers put a 757 in my name). Your mechanic as an A&P will then have to inspect plane and make a statement in log book that airplane is "Safe for the intended flight".

On your Ferry permit application you would have put down your intended route of flight. You will receive back the ferry permit with the route of flight and restrictions to flight i.e. daytime VFR only.

The FAA is very helpful with this, just please do your homework by reading the application thoroughly, yes it does read like an IRS form. But if you read it and fill it out correctly you should have no problem. Biggest thing about FAA is too many people are jumping gun and going in without documents or walking in asking them to fill them out. Do your homework and present it,

it is not hard. If you make one or two mistakes on form they will address them right there. Just don't expect them to make out whole form for you.

Oh yes, bring log books with you

Replacing Bulb - Whelen Tail-mount Strobe

February 26, 2004, 8175

The flash tube is a plug-in replacement. Spruce sells them, although I don't know the number off hand. If all else fails, you can send the flash unit to Whelen for a refurbishment. Back in '97 I took mine off the bottom of the tail cone (where it had been damaged by a previous owner dragging the tail tiedown on the runway) and sent it to Whelen. They charged me \$55 to replace the case, the lense and the capacitor, plus update the power supply to the latest mods. It was a bargain...I ended up with an essentially new strobe. It is now mounted in the top of the fin in place of the rotating beacon that was there when I bought the plane.

Removing Fuel Tanks for Inspection

February 26, 8175

I did mine in '96/97. It was the first time the tanks had been removed on a 32 year old plane. Most of the screws were stuck. I used an ez-out to remove them. It took me about 8 hours to remove both tanks. While they were out, I vacuumed out the insides (there was a lot of accumulated dirt), cleaned up and chromated the filler necks, repaired the fiberglass tip tanks, and pulled strobe wires etc.

...and...

February 24, 2004, 5983

SB1006 recommends every 7 calendar years.

Main Gear Shimmy

February 25, 2004, 4337

A week or so ago, as I was taxiing back to the hangar another pilot told me my left main had a shimmy. I found the castle nut had a lot of play.

When it was removed and cleaned a couple years ago, it was tightened according to specs (finger tight then one more turn). It had about 2 turns to get it finger tight. Apparently, when it was done last, the bolt did not come up completely. As a precaution now, I will check it a week or so after any maintenance to be sure it is tight. No shims were needed.

Attitude Indicator - Long Time to Erect

February 24, 2004 0028

Check the filter in the back of the AI gyro itself. My AI was overhauled within 6 months of when I got the plane, but would take a long time to right itself. I bought a new one and when I was playing with the old one I found the screen in the back was plugged up. Cleaned the screen and it worked great... sold it on eBay for \$165.

High Charging Voltage (15 volts)

February 22, 2004, 0676

One of the first things I would do (after using another digital voltmeter to check the accuracy of your meter) is to check the condition of the battery before replacing the voltage regulator, etc. If

the battery is sulfated, it will tend to drive the system voltage up. Normal system voltage should be somewhere between 13.5 and 14.2 volts. Anything over 15 volts will tend to boil the battery. Depending on easy the engine starts, a battery can be in less than perfect condition and still get the engine going.

Adhesive For Engine Block Heater

February 21, 2004,: 2161

Chief aircraft a distributor for EZ Heat recommends hi-temp RTV (Permatex 77B)
EZ Heat website shows Ultra Blue.

Battery Relay Energizing Circuit - Auxillary Power Plug

February 23, 2004,: 4142

When you pull out the plug for auxiliary power starting and the battery resistance is high and voltage low, it would allow the master relay to be energized by the alternator. My best guess is that it is a 4.7 or 5 ohm resistor, 10 watts, such as an Ohmite 20J5R0. Or, you could try to get it from Piper, part number 62279-00. Check the diode, too: industry part noubner 1N3208, Piper number 456 728.

By the way, for context, the original resistor looks like an old "fusible" resistor. The most common place to see them is in old TVs that were so cheaply built that they didn't want to put both a current limiting resistor and a fuse. Hence fusible resistor. This kind of thinking is obsolete for higher power circuits, so fusible resistors are much harder to find above one or two watts.

Precise Flight Backup Vacuum

February 21, 2004, : 7884

Finally, got to play with the precise flight stdby vac system today. I knew my vac pump was on it's last legs. It couldn't manage 2inches at idle for about 6 months now. And that was the exact symptom when the last one failed. Anyway, the vac warning flag popped out on the ai, and the PF system light came on so I pulled the knob and viola, 3.5 inches of vac just as advertised. I tried some various alts and power settings and below 8000ft I found it very easy to keep the gyros spinning without going to an uncomfortable power setting. Of course, the higher you go the lower the required power setting. And I did determine that at full power, at any altitude, you wont be powering any gyros. So don't plan on going missed too many times, or using the system at significantly higher altitudes unless theres plenty of room to descend at low power settings. Overall, I am quite happy with how the system functioned.

Metal Piece Found in Oil Screen

February 20, 2004, 7884

when we found bits of metal in my screen, we cut open the filter and found a LOT of ground up metal dust. Check the filter. If its clean I wouldnt be too concerned. Best bet is to ask your mechanic. But do check the filter.

Improving Seat Comfort

February 19, 2004, : 3282

The most recommended cushion is Confor foam. Probably the best situation is to use 1" of pink over 1" of blue over 1" of green. These are available at Wicks (www.wicksaircraft.com)for \$16 each, plus \$17.33 for the spray adhesive to glue them together.

If they need recovering, go to Airtex or get a good auto upholstery shop to recover them using burn cert material. I had my Warrior done this way for less than \$1400 including seats, side panels, and carpet.

Inertial Real Shoulder Harnesses

February 19, 2004, : 5481

The people you are looking for are KOSOLA AND ASSOCIATES, INC.

5601 NEWTON RD. P.O.BOX 3529

ALBANY, GEORGIA

31706

222-435-4119

FAX 229-888-5766

800-4KOSOLA

www.kosola.com

Were about \$710.00 per side a while ago but I think they have gone up since then.

Circuit Breaker Panel Overlay

February 18, 2004,: 7071

If you are talking about the colored panel on the lower right on a 1968 or newer Cherokee then go to www.arrow4graphics.com for a new overlay panel

Square Overhead Vents

February 17, 2004, : 6816

I just went through this about two months ago. The vents you are looking for are no longer available from Piper, However I did locate some new vents at a company called Grimes Mfg. Co. (Rowlett, TX) They were the company who made them for Piper. The price was \$175.00 each. I also checked with Wentworth and the few they had were broken

More on Wet Vacuum Pump

February 17, 2004,: 5822

I talked to John at Airwolf and got the scoop on the wet pumps...I've always been impressed with the concept. They have not recieved their certification (yet) that was expected at the end of 2003 but they have their fingers crossed.

They are offering a special price for the wet pump prior to certs (they take the order but don't charge you until after the certs are issued)..not cheap ~\$1500 but eliminates a know failure point in the airplane. Installation sounds fairly simple..especially for those with an Walker air/oil separator.

Wet Vacuum Pump

February 16, 2004, : 6757

Try looking at the site

<http://www.airwolf.com/Products/WetVacuumPumps/WetVacuumPumps.asp> which gives a bit of a background and the difference between wet and dry vac pumps. This site is airwolf's which sells a wet vac pump.

Replacing Plastic Seat Backs

February 16, 2004, : 8433

Replace with .016 aluminum covered w/ aviation grade fabric such as airtex. Have local auto upholstery shop sew pockets on. Use 1/4" foam on back side of fabric, wrap around deburred aluminum edges and glue to front side. Use screws with beauty washers to attach. Looks good, much more durable and less cost than plastic.

Engine Refuses to Start

February 15, 2004, : 4519

I would not be quick to assume the mags are bad. Especially since your problem in starting is related to cold weather. I would look at items in this order;

1 - Are you getting sufficient Prime. As mentioned earlier, AC engines need a lot more fuel in cold weather to start. Pull your Primer lines at the cylinders and have someone exercise the primer and confirm good fuel flow to all primer lines. Then run some safety wire through the hole into the cylinder to confirm no blockage.

2 - Check all of your plugs. If they are old replace them.

3 - Check your Plug wires. My experience has been that these will fail before a mag. They may check OK when the engine is running but they may break down when cold and trying to start. Your mechanic can check them.

Keep in Mind. I am know mechanic, but this is what I learned from my experience. My bad starts where due to bad plug wires. Much cheaper to fix than overhaul mags.

Stripping & Repairing Fiberglass

February 14, 2004, 4827

It can be removed with conventional strippers, but be carefull not to let it set too long, it will dig into the gel coat. Repairs should be made with epoxy, such as West, and not polyester (which it is). If the paint remover is left too long, it will create craters, which can be filled and feathered with one of the West fillers. Done it a bunch of times, ans West is excellent.

Sheet Metal Repair - Sources

Try Williams Airmotive, 260-347-0807.

You might call or e-mail Mike or Pat at 405-755-3406 or thayton@cox.net. You wont find a better source for sheet metal repair. They are in oklahoma City.

Rams Horn Yokes - Sources

Dual Rotor Vacuum Pump

February 11, 2004, 6014

Actually, there is a shear coupling between the rotors and the driveshaft so that either the forward one or the rear one can fail and not affect the function of the other one. If one fails, the other will soon follow, I believe the mfg. uses 25 (it ranged from 20-50h) hrs. as the average time between failure of the forward and rear rotors. Each chamber is also isolated by a check valve to prevent contamination from the failed chamber to enter the other one.

It is only meant as a backup and after landing with a failed chamber, under the STC, only (up to) 25 hrs of VFR-only flying is allowed with only one chamber operating before rebuilding the unit.

Almost as good as the redundancy in the chambers, are the vacuum failure lights (one for each chamber) that comes with the kit - you know immediately when a pump fails - they also act as a "hey stupid, turn off the master switch" indicator! - as they are lit when the master switch is on and the engine is off (no vacuum being made). I have them mounted between the AI and the DG making them real hard to miss - if I could only get them to buzz at me, I really will never forget to shut off the switch

Source for Rechroming Struts

February 11, 2004, 1659

I use Aerospace Coatings in Alabama. They are a CRS and their work quality is excellent. All work is returned to service with a FAA Form 8130-3.

Aerospace Coatings number is 256-241-2750. Ask for Patrick McCarthy EX:133, or 256-310-2537. www.aerospacecoatings.com

Throttle Housing Insert

February 11, 0492

Just want to pass on a tip about keeping the throttle housing insert of a '74 140 like new. I just replaced mine and put an aluminum plate behind the insert to give it support where there was NONE. Last time THAT will have to be replaced!

Count Down Timer Recommendation

February 10, 2004, 5040

I just got the "triple tell timer from "HITEC". www.hitec.com. This thing is really great for cross country use. Has count down and you can set the alarm to go off, the flash [red] to go off or you can have the alarm go off, you can set all or or just one. The best thing I like about it, is the count down which can be reset by striking one key, instead of reentering the time. set it for 10 minutes and when it flashes, time is up you just hit start again. I use to track distance traveled. 10 min. is good for 20 miles

Concorde Battery - Too Large to Fit

February 10, 2004, : 8175

Talk to the tech support at CONcorde. They have a replacement cover. When I asked, they sent me one.

Removing Difficult Screws

February 9, 2004, 7296

Go to Sears and purchase the screw removal tool kit for \$19.95. This fits into a bettery drill and in reverse it cuts into the screw and out they come. Works great on rounded phillips stainless screws.

Air Conditioning Belt Twisted

February 9, 2004, 5600

I had the same thing. I twisted the alt. belt and when it was being replaced I watched the mechanic put tension on the belt, as he did I saw a flex in the bracket. It was cracked.

Check your brackets for cracks. The belt must have two things to work: proper alignment and to sit properly in the pulley groove. Sometimes a pulley is not cut right and the bottom of the belt (the non grooved belt type) will hit the bottom of pulley. This makes the belt ride on the bottom and it twists up easily. I have not had problems with the A/C belt here, but the alternator belt many times until I got the pulley cut right and the alignment precise.

Significance of Engine ■Total Time•

February 10, 2004: 8433

Here is a long but simplified (I hope) explanation. I am a mechanical engineer and practice in the area of failure analysis and accident reconstruction. Engine components are subject to a variety of stresses, both thermal and mechanical. As a result of these stresses the engine components experience what is known as fatigue cycling.

Every material has a maximum load it can withstand one time before it breaks, referred to as its "ultimate strength." Every material has a load it can withstand to just the point of bending, referred to as its "yield strength." Most metals can be cycled at their yield strength for a short number of cycles before ultimate failure occurs. An every day example is bending a paper clip back and forth until it breaks. For steel, if the loading is reduced to about 50% of the yield strength, based on laboratory fatigue cycle testing, the part is generally thought by engineers to have "infinite life." I am ignoring the effects of corrosion, notches, bad design shapes, etc.

Aluminum does not perform similarly! There is no design load low enough for an aluminum part to have "infinite fatigue life." The spars on Cherokees were determined to have a reasonable service life of 60,000 hrs. based on accepted aircraft design practices, for example. There are a number of aluminum components on aircraft engines, the most expensive being the case and the cylinder heads. Once the engine is placed in service, these parts begin accumulating fatigue cycles toward their eventual failure. Fatigue failure starts as small surface cracks and progresses to larger cracks and eventually to ultimate failure if undetected.

Based on years of experience, most overhaulers suggest that cylinders can be overhauled one time if they are first run cylinders with no cylinder head cracks. The cost difference between overhauled cylinders and new replacement cylinders is close enough that many are opting for new. If you can't reach TBO on overhauled cylinders, they will cost you more than using new ones that do reach TBO. On turbo engines with high thermal loads, new is probably better every time.

Seat Belt Source

February 8, 2004, 7540

I had my sholder belts replaced by Aircraft Belts, Inc. www.aircraftbelts.com

They also do the lap belts, although I did not have mine done. They sent me a catalog of products, replacement end fittings and actual samples of a wide range of colors available.

Converting Rear Bench Seat to Buckets

February 7, 2004, : 4935

I have done this mod in other piper aircraft. You need the same parts as in the one which is similar to that one which has those seats and platform. A IA will need to submit this to the FAA for a field approval.

Deciding On Necessity for Engine Overhaul

February 6, 2004, 6244

TBO is only a guess at best. Operating history makes a world of difference. It is no problem running an O235 or O320 to 3000+ hours if it is maintained and flown frequently (daily). On the flip side, a 1975 warrior with 1000 TT engine and airframe since new should be purchased with the idea that the engine needs to be overhauled soon.

Saying that, here is what made me finally overhaul the O320 in my Warrior at about 2700 TSMOH. By the way, the engine ran fine, produced good power, no metal in the screens and leakdowns were in the upper 70's. A lot of people would be happy with this engine.

1. Oil consumption started to increase from 1qt/8hrs normal to about 1qt / 5 hours.
2. Oil would turn black and smell burnt after about 10hrs after oil change. (Blowby)
3. During leakdown test if piston was moved off TDC and held most cylinders went from about 77/80 to about 65/80. (Cylinder getting worn out)
4. Crankshaft AD had to be checked each 100hrs due to internal pitting. (More labor)
5. Engine oil leaks were annoying and impossible to stop. Most annoying is one leak hit the alternator and kept contaminating it.
6. One cylinder port was eroded and it was hard to keep a gasket in it.

JB Weld for Small Plastic Repairs

February 1, 2004, 2075

The faceplate on my Narco CP-136 Audio Panel was broken off (and glued back together) before I bought the plane. The left side of the faceplate, where 2 retaining screws attach it to the metal chassis, had been glued at least once before I bought it, and my avionics shop had glued it back together for me twice.

All to no avail. In extreme cold, the glue would simply let go. There simply wasn't enough original plastic left for the epoxy glue to grip.

So, when I picked up my plane from its recent transponder installation, I was not surprised when the faceplate suddenly popped out on the left side during the climb-out. (Hey -- everything in the panel had actually WORKED as advertised for a good 2 minutes! :-) Vowing to somehow permanently fix the damned thing, I jumped on line when I got home...

Suffice it to say that the alternatives I found were not good. The cheapest solution I found was a used unit for \$175 on Ebay. Narco wanted \$200 (!) for just the faceplate. At that point, I knew it was worth taking some time and thinking this thing through -- so I pulled the audio panel out of my minus 10 degree hangar and took it home to warm up in my workshop.

After raising it almost 80 degrees to room temperature, I carefully removed the screws from the remnants of the original plastic. It was obvious that some meathead had yanked it out -- hard -- by the faceplate, in an attempt to remove it from the panel. They probably didn't realize that the installation allen screw on this unit was the kind that you could turn forever, until it literally backed the unit right out of the panel. (Some radios just have allen screws that lock or release the unit from the panel, which results in you having to then slide them out "manually" with a yank or two.)

After too many gluings, the plastic around the screws was just a mess. When I backed the screws out, the piece literally crumbled, leaving nothing left to glue. I now had a rectangular faceplate with NOTHING at one end to screw through. (For a visual image of this, imagine a shoe-box lid with one end cut off...)

Now what?

With nothing to lose, I wrapped the end of the faceplate with a piece of strapping tape -- the only thing I could think of that would be strong enough, yet removable. I then C-clamped the faceplate on end, so that the missing end was flat on my work-bench. I then started mixing up a batch of J-B Weld...

J-B Weld is a 2-part mixture, rather like a thick epoxy except that it applies like a "flowing" putty. It fills large voids, dries without expanding (or contracting) into a rock-hard texture, and can be drilled, cut and sanded. I carefully spooned my first batch into the void framed by the strapping tape and the sides of the faceplate, making sure it was in contact with the sides and back without over-flowing anywhere, and let it dry over night.

The next day the new part looked good (better than expected, as it had "gravity-smoothed" perfectly) and was well adhered to the sides -- my faceplate had an "end" again! Still, it was a bit thin, and I didn't want to take the chance of it breaking when I tried drilling it. So, another batch of goop was mixed up, and I carefully built up another layer, packing it in but again making sure not to over flow the edge of the tape...

Next morning it looked much more stout, but -- since the weather was absolute crap anyway -- I mixed up another batch and used it to reinforce the OTHER end, so it wouldn't break off someday, too. I also packed some into the corners of the piece (using a toothpick) to reinforce some stress points, and filled in a couple of cracked areas from behind while I was at it. This was tedious, as the pieces are small, and you have to be careful not to add material to spots that need to clear certain parts. (Like the light bulbs for the marker beacon lights...)

The following afternoon it was time for the big test -- could I actually drill this stuff without breaking the new "end" out completely? I first carefully removed the strapping tape, and was surprised when it came off of the new material rather easily. I then marked where the holes needed to go, chucked the piece on end into my drill press, and EVER so carefully lowered the spinning bit into the new plastic.

You can imagine how relieved I was to find that it cut through just fine. The new J-B Weld plastic was just as strong (maybe stronger?) than the original part, and I quickly finished drilling both holes.

It was a little spooky counter-sinking the holes for the screw heads, since it meant hitting the piece with a fairly large drill bit. Again, however, it held up to the drilling force just fine.

Upon reassembly, however, I discovered that my new end was JUST a tad thicker than the original -- I had reinforced it a bit much. This didn't allow the faceplate to mount on the audio panel chassis properly, so, using the spinning bit in my drill press like a router, I carefully hogged out tiny bits of the new material at a time, until it fit perfectly.

All that was left was the cosmetic touches. Using some flat black model paint (J-B weld dries to a light gray color), I painted the new material to match the original plastic. Since the repair is almost entirely on the side of the faceplate, it's nearly impossible to see the new piece, and -- after painting to match -- you can't see it at all.

I reinstalled the unit today, and it fits, looks, and works as good as new. J-B weld is amazing stuff, and I'm \$200 ahead because of it.

Piper Parts

February 1, 2004, 5929

If you need to get any parts from Piper give Sandy a call and tell her your a cherokee club member and you will get a discount on parts. See attached.

Rock Hill SC, PIPER DEALER Sky Tech South

803 366-5108 Parts Talk to Sandy McCray she 10% to 30% off parts for Club members.

Conversion - Warrior to 180 HP

February 1, 2004, 4935

I traded the 0-320-D3G for the 0-360-A4M core through a well known overhaul shop. Had them build the 0-360 to reman standards plus blueprint it. Costs 15,000. Had to buy the prop another 1,600 (Used O/H). And then the STC Walter Sikes \$1,150. (Advertised in POM) The conversion is easy, yet paperwork is to be desired really needs cleaned up, it was the worst stc package I ever paid so much money for, yet I guess this outweighs the ease of the conversion. You are able to pretty much do everything with what you have. The engine baffle has to be lengthened and minor exhaust welding. Oh yeah another expense is to buy a new airbox or salvage one like in the older archers or 180's. I figure if you get the engine and prop settled the rest is cake. You also move your battery to the back of the plane. So you may have to buy or modify your box. All in all I think the conversion was well worth it.

Toe Brakes not Necessary

February 1, 2004 7229

I have only the hand brake in my '67 180. When I first bought the plane, this was one of the first things I was going to replace. The cost, as I remember was in excess of \$3,000.00. Since there were a few other things on my list it became an issue of (as it always is) how to get the most bang for the dollar. I felt there were other things more immediate than toe brakes, especially if IFR flying is in your plan.

Upon landing, I reach down and raise the flaps to add weight to the wheels and this puts my hand in location to grab the hand brake to exit the runway.

Propeller Balancing

January 30, 2004, 3366

I just had it done at Stockton Calif about a week ago on my PA-28-151. Even though the prop was overhauled 250 hours ago, the balancing made an incredible difference. It cost \$225, and was well worth it.

Strobe Lights Intermittent

January 31, 2004 4977

I would check the input connector to the power supply (red & black wires) Put a voltmeter across them and watch the voltage. See if it's more then 14 volts and /or see if the voltage drops out. I do agree if the power supply is old it's worth sending into Whelen for a repair service. 50-60 bucks and it's like new. Call Whelen @ (860) 526-9504, ask for Aviation service and double check w/ the techs. They can also give you additional things to check.

Effect of Pitch on Propeller

January 30, 2004 0518

My prop was close to run out, so I found a yel tag from one of our members, (this is a 140) the orig was a -58, this one a -60, previos flew 120mph flat out at 2700rpm, now flys 132mph flat out at 2600rpm. Its out of rig, need full left R trim to center ball, plus heavy left wing. Plan to rig when I do sb 1006 very soon.

Airspeed Indicator Markings - Type Certificate

January 29, 2004, 0112

[http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgMakeModel.nsf/0/62576BF580F2D27586256B5700597808/\\$FILE/2a13.pdf](http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgMakeModel.nsf/0/62576BF580F2D27586256B5700597808/$FILE/2a13.pdf)

A long link, but is the type certificate for the PA28's, find your model/SN range and the limits are in that section...

Fuel Tank Vent Lines

January 29, 2004, 7231

The vent line on each tank is fabricated from 1/4 inch OD aluminum tubing. It is conneced to the fittings with a 1/4 inch ID rubber fuel hose approximately 3 inches long. There are two per tank. They are usually secured with small squeeze type hose clamps. I have found many that they have just used safety wire wrapped aroud the ends which cannot recommend. I like to use the

small worm gear hose clamps. The correct hose is a MIL-H-6000-4. you will need a foot for both tanks. Most shops will have the hose which should run around \$3.00/ft. It will be 1/4 ID X 5/8" OD. When piper built the planes I don't think they used anything but 1/4" ID fuel resistant line that you can buy at NAPA.

Checking for Wing Spar Corrosion

January 28, 2004, 7231

I wouldn't get in a Cherokee these days without verifying that the spars caps have not been subjected to the elements. The corrosion of the caps is called exfoliation and it can occur to any Cherokee but those most prone have been subjected to coastal regions. Regardless, you need to find out the condition and even if sound the area needs to be treated with Dynotrol AV8. Your life could depend on it. A perfect example: I flew up to Blackwell Oklahoma to look at a 1968 Cherokee 180 that was for sale. Conditions of the purchase was the had to pull the tanks for me to inspect the spars (at my cost). When they got the tanks back to where I could see the spar caps, they had delaminated and grown to 3/4 inch caused by exfoliation of the aluminum. Both wings were the same. The sale of course fell through and the plane was parted out for parts. The Owner said it terrified him that he had been flying in a plane that could have folded the wings. Your mechanic is absolutely correct in insisting that SB1006 be done. You shouldn't even think twice about it.

One Piece Windshield

January 29, 2004, 5600

I went with the one piece STC from Kosola sold by LP Aero. It looks good and improves visibility. There is a structural tube support that has to be installed due to the center post being removed. All the other windows I got solar grey tint and wish I got the one piece tinted as well.

Windshield Installation

January 28, 2004 7231

Roy, I have installed dozens of windshields in Cherokee's and would recommend the 3/16" from Great Lakes Aero. Theirs have always fit well with little trimming. Regarding the sealer I would not use anything but Polseamseal Adhesive caulk. You can purchase it at Lowes, Home Depot and Ace hardware. Use the clear for the installation. It cleans up easy with plain water. Use the white as a finish bead on the outside when finished.

Copies of STCs on Board Aircraft

January 26, 2004 7231

Many Supplemental Type Certificates to be legal will have a statement with the STC if it is required as part of the aircraft airworthiness documents to be attached to the aircraft Pilots Operating Hand Book or Aircraft Flight Manual. If the STC does not call this out then all you need is any changes to the wt and Balance and a log book entry stating the aircraft has the stc and the STC number recorded in the log book(s)

Engine Control Cables

January 26, 2004, 1519

McFarlanes are about the best priced approved cables. If the plane has quadrant type throttle etc then the cables are a lot cheaper. The ones with a knob attached run \$3 to 400 for throttle and prop, mixture cables are \$100 to \$200.

Parking Brake Cylinder Leak

January 26, 2004, 0013

You can rebuild this. The O-rings wear with time and cause the leak. I just rebuilt the master and the right toe cylinder, and replaced all of the brake hoses. The master is the worst to get to and you'll have to 'bleed' the system afterward to rid it of air.

Hat Rack Installed

January 26, 2004, 0559

I installed a Plane Plastics hat rack in a 140 this weekend. .what a nice product.i simply used my existing bulkhead as a template for trimming and holes, followed there directions and got a sweet install.very pleased with the looks and the additional space.about 10 inches behind the seats and a shelf to put things on.anyone thinking of doing this i highly recommend.

Painting Inside Wing Surfaces

January 25, 2004, 4827

Your choice, but if you clean it thouroughly, self etching zinc chromate primer available in cans is fine.

Recommends Propeller Balancing

January 25, 2004, 3366

My prop had about 250 hours since overhaul, and was in good shape. I don't know what the total time was, but believe that it was in the thousands of hours. The pre-balancing vibration was about normal for a light single engine plane. It took about 2 hours to do the balancing because the cowling has to be removed on my model PA-28-151. The plane is smoother than silk since the balancing. As an added bonus, you get an accurate tach reading to see how accurate your tach is. I think that the balancing was well worth the time and money.

No Chrome for Spinner

January 24, 2004 4977

Legally you can't chrome a spinner due to the embrittlement issue. However, many experimentals are running around w/ chromed spinners and that's ok. I also don't buy the issue of cracks. An interesting article was done by Aviation Consumer regarding the "chrome" issue. No issues with cracking or long-term damage were apparent. Unfortunately, the FAA is ticking by their guns...

Alternator Support Bracket - Piper SB-387

January 23, 2004, : 4467

Re: Piper kit to prevent alternator bracket bolts from shearing:

My plane has this kit installed and I still sheared a bolt. The kit may be defective! I determined that when using only the lock plate under the bracket bolt heads, the bolts were bottoming out in

the engine case when torquing, failing to correctly capture the bracket. I used washers (thicker than lock plate) to prevent this from happening.

Wingtip Strobe Bulb Not Working

January 22, 2004,: 1875

There are several things to do before replacing the wire. Generally nothing happens to the wire between the tip and power module. Take the bulb and move it to the other side. New bulbs have actually been known to be bad. If that's not the case check the connectors to be sure the wire is not broken there. That is probably where the trouble is. Check the ground connection which unfortunately might require removing the wing tip.

Sealant for Installing Windows or Windshield

January 22, 2004 7231

Do not use silicone on the window installation. We recommend a product called Polyseamseal. It is available in white and clear. We have used it for years on every Cherokee we replace windows. It provides a great seal and cleans up with water. You can purchase it at Lowes, Home Depot or Ace Hardware. Use the clear to install and the white on the outside as a finish fillet.

EGT Not Necessary to Set for Lean

January 22, 2004, 6088

What's amazing to me is that I have a digital tach and EGT. If I lean to peak EGT then + 50 degrees it will give me an RPM that is 10 RPM lower (on the rich side) than peak. So If I lean to the highest RPM and enrichen to 10 RPM less I get the same EGT.

Here is the amazing part. If I do this by ear, lean to just rough and enrichen 1/4 inch - viola! I get the same thing!!!

Control Wheels Not Straight in Straight and Level Flight

January 21, 2004, 7231

Re-rigging also includes keepin the control wheels straight. In my opinion this can also be a safety of flight problem. Whether or not you are instrument rated has no bearing on my reasoning which is as follows. If you were to be on instruments or inadvertantly found yourself in IFR conditions, with no outside references vertigo could be experienced by your control wheels being turned. At one point you might wonder if the gages are off or the wheels are off. For safety of flight they need to be aligned with the aircraft in level flight. To answer your question, Absolutely they can be rigged to to be straight. I've re-rigged many Cherokee's and it is a task but I never found one that couldn't be corrected. Some times it may take a dozen flights or so but in the end it's worth it. In addition all the flights don't have to be the same day, just stay with it until its right.

Adjusting Oil Pressure - Screw Adjustment Model

January 21, 2004, 7231

Loosen the jam nut and turn the adjustment screw CW to increase pressure and CCW to lower the pressure. Be sure you do the adjustment with the oil warm and don't forget to tighten the jam nut. During winter it is not uncommon to see the oil pressure at red line on takeoff and come down when the oil warms up. The ideal is in the center of the green arc at 2500 RPM. But before you start readjusting it would be advisable to check the gage for accuracy. This can be done by disconnecting the oil line at the flex hose and connecting a regulated source of air pressure similar to a regulated compression tester.

Concord RG Battery

January 21, 2004, 0013

I've said it for years - I was impressed with the first crank (WOW - what a difference) with the Concorde. When the rep at Sun 'N Fun told me he would buy the battery back and ship me what ever battery I wanted - if I didn't like the Concorde - I couldn't loose. I made it a point to let him know and told him in person the next year how pleased I was.

I've had my Concorde 35 for almost 6 years now. I took it out 3 years ago (as I've done with other makes) to take it home to charge it - showed full within 5 minutes. I went flying last Thursday - our temp was in the low 40's, the other make battery would have given up - the Concorde stayed until it cranked. I've also replaced with copper cables (from American) and a Magnaflight starter; but nothing made as much cranking difference as the Concorde did.

The Concorde RG35AXC is the same size as other makes, it's sealed - so no maintenance is needed. Yes it's a bit heavier; but the Cherokee is nose heavy anyway. The cost is a little higher too, but most suppliers ship it FREE - so it winds up costing about the same.

An A&P is not required to change it out - but is required to post a new weight and balance - which you should do.

The Concorde RG-35AXC weighs 32 lbs.

The Gill G-35S weighs 29 lbs.

The Concord has 718 CCA at 0 degrees.

The Gill has 350 CCA at 0 degrees.

BIG DIFFERENCE!

Replacing Vacuum Pump

January 21, 2004, 6259

I've read that you should replace at 400 hrs if you fly IFR. I think the warranty on most runs out at 400 hrs. The PA28-140 uses the Airborne 211CC model pump. Rapco is a rebuilder of those pumps now. They're available from Spruce for about \$189. If I'm wrong I'm sure others will pop in here. If you just fly VFR I wouldn't worry about it until it breaks or when you overhaul your engine. Probably the most common dry pump is the Airborne, although another is Sigma-Tek at higher cost. I've had both, and have had good luck with the Airborne.

...and...

The Airborne dry pump is a great device but it cannot tolerate any contamination. As long as it is almost surgically clean it is a go. The way to handle this is keep rubber lines in good condition and never, never use any sealer on threads. This includes teflon tape. The slightest piece will probably fail the vanes. And keep the filters -- all of them -- changed on a regular schedule. Change them even when they appear pristine. Keep it surgically clean and it will run for a long time. I had one run over 2500 hours. It also got annual filter changes. If you do elect to replace pump, there is a special wrench that is almost necessary to use.

Service and Parts Manuals on CD

January 20, 2004 7650

When I bought our Archer, the previous owner gave me a CD from Avantext, Inc. that contains the service manuals and parts manuals for PA28-181's. He had also printed the entire CD and put it in binders. He had picked the free copy up from some show/convention, AOPA maybe. Anyway, I didn't think much of it until we started the annual and I started looking through the manuals. Everything is there, part nos, procedures, etc. I looked at their website, the disc for Archers (No 14) is \$199 for a single copy. Probably not bad considering the quantity of information

Equipment has TSO, but no STC

January 19, 2004, 7231

TSO stands for made to meet a Technical Standard Order. This means that certain conditions in the manufacturing of the component or part have met a standard that is approved for the part and meets FAA requirements for the part in question. This does not mean it has been approved for installation in any particular aircraft. The manufacturer must have it certified for each application in an aircraft by obtaining a Supplemental Type Certificate or have it approved for installation in your aircraft by obtaining a FAA-PMA authorization to have it installed. I would suggest you contact the manufacturer to see if he has approval for the installation in your aircraft and can provide you with appropriate documentation. If not, it's not a legal component.

...and...

Make it legal. Contact the FSDO and see if you can get a 337 approval. If they don't want to work it on their approval get it approved by a DER and 8110-3. With the 8110-3 the FSDO can't reject it. This way the insurance company can't deny any claim because of the illegal installation.

Rigging Test Procedure

January 19, 2004, 0038

Simple steps to determine the rigging of your aircraft

Note: rigging adjustments must be made by an A&P.

FLAP RIGGING CHECK

1. Set flaps fully retracted.

2. Match the button (Spacer or bolt) up with the rear spar (back of the wing portion) and the short end pointing to the flap. The long end will be forward (I find it easiest to lay on a creeper and slide under the wing to hold the tool in place).
3. Verify that no portion of the tool is on rivet heads or screws.
4. Put a slight amount of upward pressure on the flap while holding the tool in place. You should see one of the following:
 A Proper Neutral Rig- Button touches rear spar and flap end of tool touches the flap with no spaces between either.
 A Flap Set to Low- Flap end of tool touches flap and there is a space between the rear spar and button. Have flap adjusted up to neutral.
 A Flap Set to High- Button touches the rear spar, flap end of tool does not touch the flap. Have flap adjusted down to neutral.
5. Repeat steps 2 through 4 on the other side.
6. Fly the airplane in level flight at cruise, noting proper loading and fuel. There may be a slightly heavy left wing with the pilot only, this is normal. If it is excessive adjust the left flap down . turn and repeat. If more that 2 turns of adjustment are needed then consult an A & P to look for other items. Set Ailerons before any adjustment from neutral are made to the flaps.

Aileron Rigging Check

This will give you a hint as to how far out of rig you are. There is a stop tool that should be manufactured to properly rig per the Manual.

Note: rigging adjustments must be made by an A&P.

2 PERSON METHOD WITH FLAPS RIGGED NEUTRAL

This accurately represents the position of the ailerons in flight and takes out any play in the cables.

1. Set bottom of aileron with the bottom of the flap visually
2. While one person holds 1 aileron in place using upward pressure the other person applies upward pressure on the second aileron.
3. Check the height of the Aileron with one held flush. One of the following should be seen:
 A Proper Neutral Rig- Both ailerons line up with the bottom of the flaps when upward pressure is applied.
 A Ailerons set to Low- With one aileron lined up with the flap and upward pressure applied to both, the opposite aileron is below the flap.
 A Aileron Set to high- With one aileron lined up with the flap and upward pressure applied to both the other aileron is above the flap.
4. Aileron should be flush. If not have A&P adjust ailerons per the Service Manual. The manual will show him how to determine which one to adjust. Cable play at different temperatures will change this slightly

Replacing Tank Screws

January 18, 2004 3282

No nut required. I would take em out one or two at a time and replace as you work your way around. This is assuming you don't also need to remove tanks to check for corrosion al la SB1006 or replace rubber hoses.

Also, put some anti-sieze thread lube on the screw threads. If old screw heads are rusty, use a dremel type tool to cut a slot, then use a large new screw driver. Worked for me on some very bad screws.

...and...

I replaced mine prior to paint a few months ago and the Dremel trick was eventually used on probably 40 percent of them ... FWIW , try your local model / hobby shop and look for a Robart Cut- Off WHeel and mandrel ... This is a reinforced unit about 2" diameter and cuts a great slot just the right size for a straight driver bit ... The Easy-out and Sears type screw removal bits didn't work so well in my appplication..

...and...

Be aware that there are two different lengths of screw used. The long ones go at the rear of the tank .

...and...

I just replaced all the non stainless screws on my tanks in probably the most painless way I've ever seen. My IA had a screwdriver bit attached to the end of a light duty impact hammer and by giving just a little burst while turning the handle that held the bit, they came out almost effortlessly. It was unbelievable. The impact hammer broke the rust free just enough to allow the screw to be easily removed. There was considerable rust on these screws also so I know it would have been a huge job trying it like others have suggested. There was never enough vibration to even begin to make the bit pop out of the screw while all the turning torque was supplied by me turning the bit handle.

Salvage Prop Advice

January 18, 2004 2161

With due respect to your A/P, the only thing he can do to that prop is file on it.

You need to have it inspected by a qualified prop shop. The prop shop is the only one that can scrap your prop.

You may even get some trade in value, or sell it your self if it no longer meets your 140 spec.

I sold my 180 fixed pitch to a Reno Air Racer for \$1500.00, he repitched the heck out of it and ran it on a modified Pitts

Adding New Foam to Seats

January 14, 2004, 5665

Airtex sells seat support material which can easily do 2 seats for \$20.00. They also have seat glue available for 7 or 8 bucks. I used the old material for a template. Worked out great.

Then like John, I ordered the the confor foam in 16 x 18 in squares from Wicks aircraft supply and glued the green, blue and pink together with #M super 77. This seems to be the most popular combination and it feels great.

Wicks had the cheapest price for confor foam at \$16.00 per 16 x 18 sheet.

Pre-Buy on Aircraft with GEAR-UPS

January 13, 2004, 4827

Your man should have a good idea if the job was done properly. Most likely a prop strike would be included meaning the engine had to be torn down. Be sure all related (few) gear ADs are conformed with, and that the auto gear retract is not disconnected.

Rebuilt Exhaust System

Two that I know of are Dawley and Aerospace Welding in Minneapolis. I've dealt with both with good results. I'm away from home, so I can't hunt down contact info. Aerospace has a website, Dawley probably does too, and they both have big presence in Trade-a-plane. You could hunt on Google too.

Vernatherm - Operation Explained

Actually, the oil path is parallel to the vernitherm and the oil cooler. The vernitherm is wide open at cold temps. However, so is the path through the oil cooler.

In summer operation, oil is flowing thru both paths until the temp hits the vernitherm limit (180F) at which time it CLOSES, forcing all oil thru the cooler.

So, for winter operation, you have to block the oil cooler, since oil is always flowing thru it.

The logic is that oil cooling is the responsibility of the air frame design. If oil temperature exceeds vernitherm open limit, then oil flow is shunted to air frame system for "maximum" cooling.

Ammeter Spike - Arrow - Caused by Gear Actuation

It's usually the hydraulic valve under the back seat that's connected to the autoextend and gear override. You can isolate out this valve by disconnecting and capping the lines at the manifold under the back seat and then observing the pump with gear up on jacks.

Upgrading Alternator

You could put a National Airparts Alternator in, it is a PMA'd replacement and is a higher current rating. You'll need a 337 for the weight and balance, but there isn't an issue with the alternator itself.

That said, you can't take advantage of the higher output capacity without also changing out the alternator output wiring, output circuit breaker, load meter and possibly the master contactor. For that, you will need a field approval :-(. I put a National Airparts Alternator in my Six at the

overhaul but didn't upgrade the wiring. Not sure I'd spend the extra money again though. It is a well built alternator, and is not loaded heavily like the Chrysler I had in before, so at least it shouldn't suffer from a constant heavy load. The time involved for replacing the wiring looked prohibitive, and I wasn't ready to do battle with the FSDO for an approval.

Using Soap to Check for Intake Leaks

I have been troubleshooting an engine vibration problem and today as one of the checks, I followed the suggestion of others about putting the blower side of a shop vac to the intake system and using soapy water.

Wow, It really works!!! I was quite impressed. I found an intake leak around the #3 intake pipe where it goes into the engine oil sump. It wasn't a big leak and I don't think it's the source of the vibration, however, I am happy to have found it for now I can correct it and feel confident about the intake system.

Of course I could leave well enough alone, Noooooo!!

I thought that was such a good idea that I would put to on the exhaust system and check for leaks..... You guessed it!!! After about five minutes the entire engine looked like someone had use a foam fire extinguisher on it, there were so many bubbles from the leaks it was scary.

That's when I decided to just go ahead and put the airplane down for an annual since it is due in another month anyway. That way I can get all the leaks fixed and hopefully solve the vibration issue.

Replacing Door Wind Lace

If you choose to do the welting by yourself you should know that the welting is not a door seal but a close-out for the upholstery around it. You can remove the three aluminum strips and save the screws. Remove the old welting and install the new with a little glue just to hold it in place. Then replace the metal strips. To adjust pull the welting in toward the interior of the airplane until the welting touches the door (when closed) . cut out the excess around the latch plates on the top and the side of the door. Dick's door seal should do the job of sealing the door and will if the door is adjusted. On the latch plates you can move them in or out to make the latching possible. When first closing the door it should be very tight but will be fine after a day or two.

Engine RPM Restriction - 180

The only way to eliminate the RPM restriction is to buy a McCauley BLACKMAC propeller (fixed pitch)

Engine Heater - Continually On

If you leave an engine heater (any engine heater) on all the time during the winter, you will form condensation in your engine. That condensation will cause rust and also will become corrosive due to normal, acidic combustion by-products present in the oil.

Lycoming has a bulletin specifically on this, and strongly states not to keep a winter heater on all the time. It's a good way to ruin your engine.

Replacing Ring Gear - 140

There are two different ring gears -- one for direct drive starter and another for geared drive. They differ in the number of mating teeth. Both are probably eligible for installation if you have a 140. Check your eqpt list. You could easily get the incorrect one -- and then the hassle to change it!! You probably don't need that. Suggest specify direct drive starter or geared as you may have. Also, you may want to brighten the timing and TDC marks before putting it on.

Ultra Leather for Interior

The last 6 planes we did including a Kingair 200 was done with Ultra Leather. We used to only use leather and found that the Ultraleather actually stood up better in time than the leather. I talked a customer into UltraLeather over Leather for the Seneca we were refurbishing for him. He had a RV business and took mechanics all over with tools and work cloths. They were always crawling in with dirty cloths. Three years later I bought the plane back and the ultra leather still looked new. I can tell you from experience if it had been leather, I probably would have had to redue the interior. I have Ultra leather in mine and at Shangri-La everyone that looked at the plane thought it was leather. That is just my thoughts on the interiors. Ultra Leather is softer and cleans easier.

Installation of Propeller - Arrow

Arrows can only have props installed one way. The early props hubs had one O/S hole for the O/S bushing of the prop flange, the later hubs had two, which would have it 180 deg. opposite, and make absolutely no difference.

The prop is not timed to the engine per say, but the flywheel is. The flywheel is clearly marked for location.

The locating holes also holds true for a three bladed prop, one O/S bush on the prop flange and one or two on the prop hub.

Fuel Quick Drains not Draining

If your tanks have not been overhauled in recent years, you could have some residue at the bottom of the tanks (old tank sealer etc..) the filter in the sump and fuel filter should keep this stuff out of your engine. However, I suggest buying at least one spare sump valve..then replace one with the new one and clean the old one. I usually run a paper clip thru it when open. Once clean, use this one to swap with the other one. Until you get your tanks cleaned, you may be doing this every couple of weeks. Once you do it a couple of times, you should be able to do without without losing more than a cup of gas.

Vertical Card Compass Pitfalls

I had one of these installed and I love it!

BUT....

The \$270 compass cost me \$850 to total!!!!

Had to buy the mount.
Had the A&P move it.
Had all kinds of errors.
Put a shield around the KI-214 (older king VOR/ILS indicator).

The A&P also adjusted a few things. Get some one that know what they are doing!

Panel Light Dimming

I have a '76 Cruiser. The panel lights went out. There are several transisters, that can be obtained from Piper at a tidy sum, or for a few bucks from electronic supply stores, they are the same, and fairly common. It was a bit of a pain to replace, and I ended up replacing the rheostats, after I kept blowing the transisters. For the last several years my panel and instrument lights work perfectly. I did bite the bullet and got the rheostats from a Piper parts house. The electronic supply house could not find the proper value and range unit. (One rheostat was coming apart and kept shorting out, and blowing the transisters almost immediately.)

Increasing Gross Weight from 1950 Pounds - Early 140 Models

From the Piper Type Certificate....

The Model PA-28-140, 2 PCLM (Normal Category Only), S/N 28-20001 through 28-20939 may be

converted:

(a) To a maximum weight of 2150 lb. by the installation of Piper Kit 756 962 and Sensenich propeller M74DM58.

(b) To the four place, 4 PCLM (See Item VIII), configuration in accordance with Piper Drawing 65599.

Stripping Paint from Fiberglass Cowling

I've done it on crappy GA glass. The first layer was a breeze. So I did another "load". It went down to the gell coat, and left it with "open wounds". Not all was lost since all sorts of tiny cracks became visible. I use West Epoxy with 407 filler which is easy to sand. A second pass with even easier 410 leaving a smooth finish and all of those tinycracks disappearing. Used poly primer and Imron final coat. It all started with blistered spots around the ex pipe. No longer visible with West. West Epoxy is available at West Marine and aircraft supply (no relation).

Fuel Gage Reads Full All the Time

It might be the sender, but if there is a short to ground along the line going to the sender it would also cause the gauge to read full. Make sure you that wire is not shorting to ground before springing for a new sender (\$200). Disconnect it from the sender (after turning off the master), tape the sender wire off so it doesn't short. Then turn the master on and check the gauge. If it still reads full, then you have a short in the line. If empty, then the sender is shorted. You and your A&P should be able to do this check without removing the tank.

Sticky Elevator Trim - Not Cured by Grease Change

Two annuals ago, I had to replace the entire jack-screw and associated hardware/cables. My trim before acted similar to yours. After the repair and currently, the trim is smooth and responsive. It is also connected to the S-Tec 30/alt.hold. If I recall, it was not cheap to repair. ~\$2000.

Motor Mounts - Early Models Different

Called Lord...They did not know why they would not work. I described the originals and they figured out another number. Then they found in OLD Piper Catalogs that listed instead of 2 different mounts, there were 3. It seems that S/N;s 28-228 thru 28-507 uses Lord # J-6230-1.

This number is NOT offered from WagAero where I purchased the first set. I bought the second set from API in Memphis, TN.

Strut Inflation system

I purchased a paintball cylinder and a stainless steel braided hose for it. I got the connector for the schrader valve on the strut from Spruce. The paintball cylinder comes with a regulator fixed at about 800 psi. The main wheel struts will need around 300-400 psi and the nose wheel about 100-150. I installed a valve between the hose and the schrader connector and use this valve to "puff" the 800 psi into the strut. This method duplicates the operation of a strut pump, and you do not need to try to charge with a certain pressure setting. Just puff and rock the wings until you get the proper strut extension.

This rig cost me about \$110 and can be refilled for about \$3. I have used this method since about 1985. Of course, then, in my former life, I had access to all kinds of cylinders, valves and gasses. You might check ebay for cylinders, may be able to get a better deal there, just get a regulator capable of at least 500 psi. The size of the cylinder is not critical, just get one that is easy to tote around. My cylinder is 47 cu in.

Carbon Dioxide Monitor

I have the latest aeromedix model -- it was about \$80 as I recall. It works well and the bateries last a long time (years). A much better choice than the old color patches I used to use. Gives a loud alarm and a listing of the levels experienced. Acurate down to PPM. Was surprised to see 8-15 ppm durring taxi --- but 0 ppm in flight.

Vacuum Pump Backup System Choices

As for backups there are several ways you can go:

- * Electric standby AI. Probably costs about \$2000 installed. You might still want a warning light or flag on your vacuum AI to let you know that the vacuum has failed so you can cover it up and start looking at the electric pump.

- * Precise flight standby vacuum system. Allows you to divert engine vacuum to keep the gyros spinning. You have to reduce power to get this to work, so you might not want this if you regularly fly over high terrain. Personally I wouldn't want to have to use this if I lost my vacuum pump in turbulent soup. However it's certainly better than nothing, and it's not as expensive as the other options.

<http://www.preciseflight.com>

- * Aero advantage dual-chamber vacuum pump. Has two pumps in a single housing with a shear coupling between them so that either pump can fail or jam without breaking the other one. Comes with indicator lights to let you know if either pump has failed. Cost is a bit more than a normal vacuum pump (esp. for first-time install) but not nearly so much as some of the other

options. Biggest drawback is probably that they've only recently been certified, so there's not much real-world experience with them yet.

<http://www.aeroadvantage.com/>

* An old-fashioned wet vacuum pump. They are more expensive than dry pumps (if purchased new) but old-timers tell me that they hardly ever failed, especially without some notice (reduced vacuum). they do spit out oil, so you need an air/oil separator. Most aircraft flying these days were certified with dry pumps so you'd need some paperwork to install a wet pump on one of those, but you can get rebuilt wet pumps for a few hundred bucks. Airwolf is working on an STC for a new wet pump to be used on newer aircraft, but it will be something like \$1500.

<http://airwolf.com>

* Electrically-driven backup vacuum pump. These are basically an extra dry vacuum pump driven by an electric motor, and a valve. Turn on the motor when you go into the soup and your gyros will keep spinning even if your engine-driven vacuum pump fails. But they're heavy, and expensive, and it's yet another pump you need to replace every 500 hours or so.

Main Gear Attach Bracket Repair

Remove your wheel pants.

I use a small floor jack to lift just the gear leg I'm working on. Place the jack under the bottom of the strut with a thin (1/8"-1/4") piece of wood between the jack and the strut to protect the strut. Lift the strut enough to free the tire, remove the cotter pin from the axle and remove the wheel/pant attach point. Loosen the threaded pipe and remove it from the axle. Remove the wheel and bearing from the axle. Place a block of wood under the axle and lower the strut until the axle rests on the block.

The bracket for my wheel pants has broken twice in 5 yrs.. Had it welded each time, its holding right now but they appear to be prone to cracking.

Cherokee Six - Club Seating Versus Standard

I have had 2 6's and both with forward facing seats. I wouldn't have club seating; but depends on preferences.

I usually fly with 2 or 4 persons. The 3rd and 4th are either way back there and out of voice reach or sitting with their heads behind ours. With 2 on board you can't recline seats with club seating.

Much handier to pile all the luggage, camping equip.,etc behind the 3rd and 4th seat with in line seating.

I have a couple of plywood platforms that I use to stick in the back after removing seats 5 and 6 and that gives me a good loading area.

If you usually fly with 6 people who know each other well and want to visit in the back, then club seating may be best bet.

Installing Electronic Tachometer

I have the Horizon Tach and love it too. It takes a short time to get used to it but once you do it is awesome. The factory requires you to send them the time on your old tach. I was told they will not sell you a tach with ZERO hours on it. You must submit your current tach time. They will also want to know your engine type as they set in REDLINE and GREEN arc setting. the Tach

has led's that conform to the color arcs on Mechanical tachs. The ability to look at the mag health individually is very good when you are working out a possible mag problem.

Alternator Drops Off Line- Can be Recycled with Master Switch

You appear to have changed out all of the electrical hardware but failed to explain the reason your breaker popped! Ray's explanation of the electrical system is a very good one. I had this problem once and it was directly traced to my OV/OL relay. Your problem seems to be one of an over load issue on the electrical system. The recycling of the master will bring back on the OV/OL relay.

I would try this:

1: Connect a good digital voltmeter to the master buss and go fly. Put it where you can see it.

2: Fly with someone who is also a pilot. You watch the ammeter closely they fly.

3: Run with all your electrical stuff on.

4: Watch for the "burp" in your electrical system. You may need to be patient. If you see the ammeter spike high and the voltage drop then the ammeter fall you just saw a short occur.(may..maybe not)

5: Let it all cool down...a couple of minutes, and recycle the master. The Volts should be ok (make sure that it is around 13.7 and not much higher. The OV relay drops out at 16Volts I think)

6: Turn off EVERYTHING except a radio. If you don't need your transponder leave it off. (Your Turn Coordinator is always on with your master) Wait...does it all "burp" again?

YES: You have some wiring problems assuming your voltage is always in the normal range. (Help me out guys, 12 to 14 volts?)

NO: Then start to switch on some electrical stuff maybe a couple at a time to make this go fast. If it "burps" again then you MAY have found the culprit.

Wiring...make darn sure all the HOT wiring is good. By hot I mean anything that has voltage + on it. The cables, your master relay...is it good? Try pulling the batt and load leads on it and then turn on the master switch and measure the resistance ACROSS the master solenoid. It should be darn near ZERO! If it isn't you got a potential LOAD on your electrical system

When you do all of this write it down and let us know what the numbers are. Volts amps etc.

Intermittent Radios - Dirty Connectors

Occasionally the edge card connector will develop film on the tips and cause erratic operation as you've described. Pull the panel and clean the female and male halves of the connector with denatured alcohol. Cleaning the female half can be accomplished by utilizing a long stem cotton swab.

Use caution and read the label on any other cleaner. Some cleaners will damage molded plastic.

Stabilator Fore and After Play

The Service Manual reads in 4-71 (b) No play allowed.

Make sure your hinge bolts are properly torqued to 80-90 in lbs.

It's not really a hard job to replace the bearings&bolts but it's rather tedious to get the correct washer/spacers back in to maintain the clearance between the stabilator and tail cone.

Fuel Cap Seals

I have been down this road replacing the seals on my 180 with the cheap ones I bought from ASP and Wage etc. They all fell apart and leaked in no time. I finally bought the Piper seals from Piper. Yes they were more expensive but they were made out of a nice thick rubber that after 2 1/2 years is still as good as the day I bought them. In this case...pay the Piper!

Wheel Strut Continually Bleeds Down

One of three things

No fluid

Bad seals

Crack in strut casting: service bulletin out for inspection at torque link attachment lugs

Rebuild versus factory overhaul

Rebuild!

No such thing as factory OH and factory reman. By definition, per regulations, an engine is overhauled or rebuilt. Reman is a no name, and not recognized by the FAA.

Overhaul is an engine that is stripped down inspected, any repairs necessary done and reassembled within limits. Rebuilt is the same except that the engine is reassembled to new tolerance.

I would suggest a rebuild, and with new stud assemblies. Although rebuilt stud assemblies are rebuilt to new tolerance, they are still old units that no one has any real history. Besides there is very little difference in price in rebuilt studs and new. Do not install chromed units if rebuilt.

New chrome studs are NA.

Also, do not pay to have a rebuilt engine Zero timed (which only the factory or its arm can do).

This is not advisable since, you would be getting new logs, without any the knowledge of the rebuilt engine's previous life, plus you will pay an additional \$2 to \$4K extra

Leaking Hand Brake Cylinder

If the hand master leaks, do not rebuild by replacing O rings. Replace the entire inner assembly. Look at the fittings carefully as well as hoses. When they get old the hoses leak due to their "kinked" position. Fittings crack from "overzealous" mechanics.

Nitrogen Bottle For Filling Struts

Dry nitrogen is what should be used in struts, and not air. Air has moisture in it, which is not eliminated by the compressor or strut pump, so it ends up in your strut where it can cause corrosion over time.

You can buy a 500 psi regulator and hose from just about any welding supply. They will sell or rent the nitrogen bottle. You will need a servicing fitting and a valve. These for around \$35.00.

You should be into the whole set up for less than \$100.

Tachometer Flaws Due to Cable

Many times especially in the winter months I read how the tachs squeel and jump around and the question many time centers around lubrication.

What is many times overlooked is the cable itself. Guys and gals, the cables do wear out and when they do they will cause the tach to jump around and to some sounds like the squeel is

coming from the tach head itself many times can be traced to a worn out cable. The way to check if your tach cable is worn out is to remove it from the engine by loosening the nut on the drive end on the accessory case and pulling the cable from the housing. Once you have the cable removed, clean it real good with solvent or thinner. Lay the cable on a bench or table and stretch it out straight. Hold the square end firmly on the table and with your other hand see if you can rotate the drive end of the cable ccw or cw. If you can twist it while holding the opposite end, the cable is worn out and should be replaced. Nearly ever town has a speedometer repair shop that makes tach cables. Like here in Okla. City, a new cable is \$16.00. Another tip on tach cables is if the needle is unsteady at idle (jumps around) its a sure bet the cable is worn out. I personally ran into this just today. My tach needle has always been jumping around at idle but this morning, it was occilating at cruise. I removed the cable and did the test I just described and sure enough, you could twist it back and forth. I went to the speedometer shop and they made a new tach cable for me. I lubed it with a molybdenum grease and reinstalled it. When I started the engine it was rock steady throughout the entire RPM range.

Front Main Seal Leak

There is no pressure of any sort that the seal has to contain, other than crankcase pressure, wich is handled by the vent system.

The spring that maintains shape for the seal is required. It may have been left out, or installed incorrectly , and may be floating in a cavity behind the seal's location. Due to the barbaric method of installation of the seal, and the loose tolerance, it is advisable to uses some sort of sealant, if for any reason to present it from moving. HY Tach sealant is just that as well as a mild adhesive. A light coat on the out perimeter of the seal (after the spring has been properly installed) will help keep it in place. Done it lots of times and no failures yet.

Cleaning Struts During Preflight

Piper specifies the dry release agent (AKA Teflon) for this purpose. It lubricates without attracting dirt. The manual calls for it, so that is what I use. I don't like the suggestion to use 5606 because the oil will attract dirt during flight. The dirt collects during flight so it's there when you compress the strut at landing. Using 5606 is better than not lubricating the strut piston, but I think using Teflon is best.

I wipe down the strut with a paper towel before flight. If it's really dirty I'll use fuel then re-lube with a teflon spray. I bought the spray from a local bike shop.(I cycle a lot so I also use it on components on my bike).

<http://www.performancebike.com/shop/Profile.cfm?SKU=113&Store=Bike>

Club Seating Not Desirable

Sell it and buy one with the club seating. Yes, it can be done, but it ain't cheap. Someone did have an STC out for it, but as I recall the guy that held the STC even recommended against it. I looked into it when I first bought mine, thinking I'd want club seating. Now with 4 kids and a 5th due within the month, I'm glad I have the straight seating. Memories of sitting in the 'way back' of my Dad's country squire station wagon should be reason enough to convince you you don't really want it. Kids that share kick space will use it, trust me on that. Also, if you are tall, you'll

find that you can't shove the pilot's seat back nearly as far with the club seating as you can with straight seating, and AFIAK, you can't install a 7th seat in the club configuration.

Grease for Wheel Bearings

I use Aero Shell #5, available at Spruce.

Wing Covers After New Paint Job

I would not want to use any covers for at least 90 days at temps this time of year in your area. The paint will be "off-gassing" its solvents during this period, and the weight of the covers, especially with the sealing effects of freezing rain or snow, may be problematic. I would beg, borrow, or steal a hangar for these three months.

Nose Strut Leaks Even After Rebuild

I found while rebuilding mine that if you install the piston tube plug and "O" ring (item 9/10), into the bottom of the tube and slide it up to line up the hole it will shear two nicks off the "O" ring. You must slide the plug from the top. The quad "O" ring will roll very easy also. Had mine on the bench for quite a while with a pressure gauge making sure it held pressure for several days before I reinstalled it on the airplane.

Oil Filter Inspection

I watched my mechanic inspect the filter just the other day. He used a cutter to cut both ends and then took a hacksaw to cut through the paper. He then popped out the accordion paper and then unfolded the paper to look for metal.

Fuel Gauge Fluctuating in Flight

I have a Turbo Arrow, which has the dual sender units in each tank. With My Mechanic, we looked at the wiring right by the outboard sender unit, since that was very easy to do through an inspection plate, and found that the wire where it is attached to the sender unit was very close to the vent line and touching the metal ring on it. In flight during vibration, it had a tendency to touch that, and that sent the fuel gauge to full reading. In readjusting the connector at the sender unit it took care of the problem on mine.

Autopilot Selection

Both Century and S-Tec autopilots are good units but if you lose a vacuum pump with the Century you have nothing to help. The S-Tec receives its attitude data from the S-Tec turn coordinator which is electric. Should you have a vacuum system failure the auto S-Tec could save your life. Like I said they are both good A/P's but how much is your safety and survival worth. In that situation nothing beats the S-Tec.

Dancing Ammeter Needle

A "dancing" alternator output gage is quite common with Cherokees. It certainly is possible that you may have a loose alternator brush holder (and therefore poor brush connection). Increased low frequency vibration, as exists at idle, will tend to shake a loose brush holder more than it will at cruise, thereby making the problem appear worse at idle. However, there are many things that can cause the same symptom.

Some are:

- bad regulator
- bad alternator switch, or alternator half of the main switch
- poor connection between alternator output and power buss
- poor connection between alternator field connection and regulator field connection
- poor ground connection at regulator
- poor power connection at regulator
- poor connection at alternator field or output circuit breakers
- poor connection between battery and power buss
- poor ground connection between battery and plane frame
- poor ground connection between engine and power buss

The best thing to do with this kind of problem is to visually inspect while wiggling each and every one of the foregoing connections for security. Also, go over each connection with a screw driver and make sure each is tight. Make sure soldered and crimped connections are also secure. Analysis of an operating charging system can be difficult because the entire system is operating in a closed loop. "Cause and effect" tend to get caught up with each other. If you can't find the problem via inspection and tightening screws, then you will have to either do a process of elimination (you've already eliminated the alternator, regulator would be next), or analyze the system by taking voltage measurements with the system running.

Landing Light Gasket - Source

Try Aircraft Supply 800-569-9397 Part # TA8301 \$1.49

Fiberglass Cowling Repair

I bought the West Systems repair kit at my local boat store. Included about 8 small one-time packs of epoxy resin and hardener, as well as mixing sticks, plastic mixing dishes, syringe, brushes, etc. I should have taken before/after pics of the front right edge of my cowling. You'd never know it was repaired.

I patched the outside surface one day, let it cure, then cut and sanded it down. Then I patched the same place INSIDE the cowling, waited another day and repeated the finishing process.

Get a small handsaw(with a 6-8" blade), as well as 80, 150 and 220 sandpaper to cut and smooth out the work.

Entry and Baggage Compartment Locks

I found the locks at Lowes and they had an assortment of lengths to choose from. I was also able to match the entry door and baggage door locks so I have the same key. The locks fit perfect and also seem to be good quality and unlike Pipers, no GM key will open the locks.

Installing Step - Early Model Aircraft

Step installation can be labor intensive. To install the step you have to remove the radio/battery shelf behind the bulkhead. The shelf is riveted in place and difficult to remove but like I said I have done it several times and it mainly just entails drilling out rivets. The step is supported by a

triangular bracket that has attaching nut plates for mounting the step and is also riveted in place. If I had a Cherokee without a step I would do it in a heartbeat.

Control Yoke Piper Emblems

I read where a member of the group purchased some new emblems for his control yokes from Piper and had to pay \$65.00. Guys the company that makes the emblems for Piper is Aircraft Engravers: wayne@engravers.net. The last time I purchased a set they were \$30.00. Haven't bought any in two years but if you need some you might get with Wayne. Hopefully he can save you some money.

Carburetor Heat Box Shroud

The numbers are: 63723-02 (bottom) and 63723-03 (top). The most common way to get them is from a repair place, like Aerospace Welders in Minneapolis. Piper's are really expensive

Converting A/C to Wide Belt Alternator

Removing ALL of the A/C components is not an easy process. I am posting to suggest you consider conversion to the wide belt system per Piper SL No. 1040. The kit (767-310) cost is \$2,089.51 (Almost 2yrs ago) I converted my PA-32 in early 02 and have been very satisfied. Check with your nearest Piper Dist. or Sun Avn <http://www.piperparts.com> ..but also...

I removed (under IA supervision) the air conditioning system from my PA-28-140 over a year ago -- and I live in Florida!! Despite all the alignment tricks, I could never get more than 40 hours out of a belt.

If you're willing to get your hands dirty, removal is not too difficult, if you're mechanically inclined. I took out everything but the blower, which is still nice to have.

I had to purchase a single belt ring gear and alternator. IA made an inspection plate out of the drop-down door, which is now removable. I have never looked back and grateful for the useful load gain!

As a foot note, I sold all the components for \$\$\$ which pretty much offset the cost of the removal.

Upgrading to 60 Amp Alternator

The 180 had a 60 amp Alternator as an option which is part of the type certificate. All your mechanic would need to do is find a 60A alternator, change out the load meter and submit a 337. He might want take a close look at your wiring size but to my knowledge, Piper used the same harness for both alternators. I made this change to my 180 and everything worked great. There is no change to the regulator

Removing Bugs - Gap Between Windshield and Glareshield

I cover the end of my vacuum hose with masking tape, then poke a small hole and insert a large diameter plastic drinking straw. The smaller things will be pulled through and the larger ones will be held on the end of the straw.

Compressed air may blow things all over the cockpit or force them into small cracks.

Streaks emanating from Inspection Plate Screws

I put clear plastic washers under screw head. solved problem. It is caused my two dissimilar metals rubbing and/or chaffing.(steel screw and aluminum). The paint is probably worn in this area.

Digital Replacement for Ammeter

If you have a 2 1/4" opening, the Aerospace Logic one looks good. Digital, Amp and Voltmeter, TSO'd and STC'd \$275. Just bought their 4 place EGT - seems well made - www.aerospacelogic.com.

Pitot Static Instruments - Rebuild or New

The instrument shops that get good ratings on this chat are Nutek and Berkshire:

Berkshire Instruments, Attn: Joe Scherben, 68611 E LA SALLE ROAD, MONTROSE, CO 81401 5943, Phone: (800)443 0083, Fax: (970)240 9643.

Nu-Tek Aircraft Instruments, 7169 SW Santa Fe Lake Rd., Augusta, KS 67010, 800 338 7146, Fax: (316)775 1194.

You might also ask around and see if any local instrument shops have good reputations. If you want new, Chief and Spruce have them. Just make sure that your mechanic will sign off on it.

Fuel Cap Gaskets

If you are sure it is the seals I might recomend you buy them from Piper. I bought the aftermarket (Aircraft Spruce etc.) sels twice. They didnt work. I finally bought the heavy rubber ones, OEM from Piper. No more water. Period. I was having to sump two or three times with the old seals form AS.

Unusual Vibration Problem

I feel compelled to warn you that the vibration you are feeling could be a stabilator problem. It could be caused by an ill-fitting door or by looseness in any one of several hinges or bearings.

It must be taken extremely seriously, as it can cause the tail to part company with the plane.

To check for this possibility, you can look out one of the rear windows. If you see the tail feathers shaking... slow down. You will probably also feel the vibration most in the control wheel. I have experienced this twice... each time it was caused by a poorly closed or fitted door!

Muffler Bulges in Center

Normal operations will not cause the exhaust to bulge. You need a great deal more heat to do that, as the stainless steel is good to around 1900 degrees, if memory serves me right. Normal EGTs will be well below that, as the mixture is being burned in the cylinder, not in the exhaust tubes.

So what you have is unburned fuel getting into the muffler and being ingnited by the heat from the other cylinders.

At some point, you had a situation where one cylinder was not firing, but was flowing fuel.

Don't just replace the muffler! Please look for the cause.

Hard Starting - Reversed P Leads

Roughly three weeks ago I could not get the engine to turn over no more than four maybe five times using the ignition switch start position. It would stop before starting. Very frustrating.

An A/P friend happened to stop by and my problem was witnessed by him. He suggested we try bypassing the switch and use the starter solenoid. This we did and the engine turned over several times without hesitation but would still not start. Next he disconnected the P leads from the mags (we now had a hot prop. the plane was tied down.)

I tried starting using the ignition switch and again it would only turn over four-five times quit. Using the solenoid with the P leads disconnected, it turned over and started. (My solenoid can be actuated without jumping leads.) I used mixture control to kill.

We went another step forward and using a multi-meter checked the P lead Mag connections to the ignition switch and to our surprise discovered they were backwards. I have been trying to start on the right mag with the left grounded out, not getting the impulse shot from the left Mag.

We switched the leads and a miracle was witnessed. The engine still has trouble turning over with the ignition switch but it starts within a couple of tries. I will pull the ignition switch and look at the starter contacts. Had to learn a new sequence for starting but all is well.

It is just out of annual last month and had no problems flying it home. I know the leads were not switched on the annual Mag check as I was there when it was done. SOOOO it is my guess that these leads have been reversed for upward of eight years when the engine was overhauled.

I would advise anyone having problems with starting their 140's to check proper connection of the P leads.

Aluminum Battery Cables

The aluminum cables have been a problem with the Cherokee's since day one. Corrosion began immediately with the aluminum cables which is made up of many strands of solid aluminum. Just by their nature each strand started corroding when the cable was new and the internal resistance goes up as well. If it were me, I wouldn't wait. I would replace them now especially with winter coming on. I highly recommend the cables from American Aviation Inc. 405-354-7136 or 405-232-2607

Cherokee 235 Tip Tanks Sagging

If the tanks were collapsing, I don't think they would hold fuel. Sagging in the wing tip aft of the fuel tank is not uncommon. That is a large area that has no internal support. Have your A&P open the access covers on each side and check the two 1/4" bolts that attach the tip to the wing for security. He should also inspect the fiberglass in the area around the bolt holes to make sure it's not delaminating. I also have a 64 235 that sags a little aft of the fuel tanks.

Location of Ammeter Shunt

If it is the same as the earlier sixes which have complied with the ammeter shunt AD, then it is about a 3 foot long piece of wire that looks pretty much like the alternator wire and is bundled in the wire harness near the ammeter.

Adjusting Oil Pressure By Adding Washers

Crush washer AN900-XX is just the seal for the oil pressure relief valve/spring housing. The actual adjustment is made by adding or removing flat washers from behind the spring. Normally the relief valve has 3 washers, but it could have less or more. To increase oil pressure you would add a washer a washer or two to achieve the pressure you want. I do agree with you in that I like the pressure in the center of the green arc. Before you start adding washers I would first check the accuracy of oil pressure gage which is easy using a regulated air pressure source and a gage.

The copper crush washer is an AN900-20 or MS35769-31 (both the same). The washers go behind the spring and they are AN960-4 or AN960-4L depending on the thickness you need. These are the only washers inside the housing. Washers drop in the housing, then the spring followed by the ball. That's it period.

Electrical System Operating at Higher Voltage - Relay Tripping Out

When the ammeter is showing full charge all the time, the battery is the first and easiest place to look. Most cars today have volt meters, and when they start showing above 14 and up, very good possibility the battery is on it's way out. Most bike's have neither volt or ammeter, but testing at the battery and showing high voltage, is a worn out battery. In some bikes, it would take out a rectifier. In airplanes, with few exceptions, most all have OV relays, but many also have an ammeter. When it shows max amperage, and never going down, that nearly always battery related. The OV will not let the voltage to exceed what ever it is rated for, but the ammeter says other wise, In all cases, the battery is a lot easier to inspect than removing an alternator, or a regulator.

It can be said that in general lead acid batteries have a normal useful life of 3 years, some a tad more, anything after that will begin to take. My own make it 3 but although, they start the engine, the ammeter begins staying at high charge rates. Rather than risking electrical failure, the battery is replaced.

Aircraft Rigging Tips

Rig the plane according to Piper instructions. If the control wheel was locked in center position, and rigged from that, then the plane, in S&L should fly straight.

Things to remember, the starting point is ailerons in neutral position. Neutral meaning in flight mode which will have a tendency to pull them up. This is due to inherent "play", which should first be minimized. Flaps are set next. All play minimized. In level flight, the surfaces should be evenly positioned. Assuming the AC is perfectly aligned, it should fly straight. That's nearly impossible. It may pull right or left. If it pulls right, the left flap should be adjusted, vice versa for left. At no time, should the flap be moved above the neutral position. It should be moved down ward only. Move no more than 1/8" at a time (from the root end), and fly each time to test.

Removing Fuel Tank Screws

I did a tank in my 180 last month.

First use a dental pick and clean the philips heads out real well, also score around the head of the screw to break the paint. Spray a good penetrating oil at the base of each screw the night before.

Buy 1/2 dozen good quality philips #2 bits, make sure they fit the screws tight.

Find a small can of lapping compound, I borrowed a can, don't recall brand but it looked and felt like grease with sand in it.

Dip the philips tip in the compound and TIGHTEN the screw first. Once it moves "righty tighty" Turn it to the "lefty loosey".

The lapping compound actually grips the screw.

Out of 70 screws I had to drill 3 and they were the first three I tried before using the lapping compound.

The screws for my 65' 180 were AN525-832R9 and AN525-832R12. I used Cad. screws, they were 7 & 8 cents each.

...and...

Several times the question comes up on removing the fuel tank screws and everyone has good ideas on removing them especially cleaning (the+ head of the screw) before trying to remove the screw. In most cases the battery powered screw driver has enough torque to break the screw loose, other times it slips and that is where the trouble begins. First of all never try to break the screw loose with a impact screw driver. You are taking too much of a chance on damaging the tank. I have found the easiest way to remove a bad screw is to cut a slot in the head using a Dremil Tool with the rotary disk and a good slot screw driver. Its easy to do and the dozens of tanks that that I have removed I have never had to drill out a screw. but I have had to cut a slot to remove them.

The next item I would like to mention is the nut plate strip. A couple of times I have read that if you have a bad nut plate or mess one up the strip is very expensive to replace. This is very true but you don't have to replace the strip. The threaded portion of the strip is made up of the same insert thats in floating nut plates. All you have to do is remove the floating nut in the plate and replace it with a new nut insert removed from a nut plate. You will need to pry open the aluminum strip slightly but it is easy. insert the new nut and squeeze it back with a pair of pliers-walla like new.

Adding Step to Plane - Early Model

Daniel, I have installed several of the steps and it does not require a STC. It does require a Form 337 which has to be submitted by your mechanic. I have always been able to find them in a salvage yard for around \$200. To install it is labor intensive. Its a good 8 manhour job. The floor under the battery has to come out to install the reinforcing plates. Removing the floor can be tough. In addition, you need to make sure your model has been called out in the parts manual by serial number. If it has no sweat. If not, you will need field approval which should be relatively easy but just more paper work. All in all I still think it~~a~~s a change worth the effort.

Good Compression But Excess Oil Consumption

Cold compression plus no hisses, the rings, and cylinders can be "construed" as healthy. Filling to eight qts will used 1 to 1 1/2 qt immediately. Poor plug wires, and magnetos in poor condition will cause some consumption, due to incomplete combustion (long explanation), and weak spark.

Retarded ignition timing helps, leaking primers and carb condition will help foul plugs from running to rich, even after leaning.

Continuous short hops, and long warm ups don't help. If using W100 switch to 15/50, Chrome cylinders are always suspect.

Refurbishing Carburetor Air Box

Suggest using engine baffle stock material for seal. Works great and outlasts original. Rubber grommets are standard grommets avail at Wicks or Spruce. Easy job to do. Be certain topeen screw thread protruding sections or safety as reqd.

Paint Bubbles on Cowling Because of Heat

I had the same problem. I purchased the material from thermostatic Industries Huntington California 800 345-4217 This is the factory and will sell it by the square foot.

Rudder Needs Full Trim in Cruise

- 1.Place the plane on jacks.
- 2.Center the rudder adjustment screw at mid position.
3. place a piece of angle 2" angle iron across the right and left rudder pedals (pilot or co-pilot)and clamp the bar to the pedals.
- 4.Look at the rudder and see if it is centered at the tail. If not adjust the rudder cables until the rudder is in alignment(check cable tension).
- 5.go to the nose wheel pant and see if it lines up with the centerline of the plane (ref: only)
6. raise the wheel pant on the nose gear and with a straight edge across the wheel fork(on each side)measure from the straight edge to a point on each main gear.The distance should be the same,If the distance is not the same, adjust the nose gear rods until it is.

Low Oil Temperature - Wrong Sender

It sounds like you have a mis-match between your gauge and sender. There were two different vendors for the sender/gauge combination. Stewart-Warner was the early vendor, and Rochester (sp?) was the later vendor.I think....

I was made aware of this situation recently when trying to troubleshoot my expired gauge. One of the combinations I tried was a Stewart-Warner gauge with a Rochester sender. The gauge consistently read about 30 degrees low. After I put my old SW sender back in, the readings were back to "normal".

The gentleman at Airparts of Lockhaven (PA location not FL) is a great resource. You can find the phone number in the Magazine.

Valve Lifter Bleed Down

Lifter bleed down clearance is easy to check with straight valve Lyc, and a little more tedious with angle head. Since most of us fly straight valve, there are two methods. The first one as the book recommends (and it's a very brief explanation)is to have the cylinder on TDC and simply remove the rocker arm, push rod and tube. Remove the lifter, and bleed all the oil out of it, and clean it while at it. Reassemble, and check the clearance with a feeler guage like any other rocker

arm. Lycomings require a minimum of .028 and max of .080. 320s like .050 +- .008. and 360s like .060 +- .008. The trick is to keep them all identical. If the engine is tired and ready for OH, let it fall within the min/max. If that is not the case, and there is also a performance issue, then keep them close. The .050/.060 is near the max scale. Remember that the lifter was designed in the mid 30s for a side valve, water cooled engine of low compression. We use OHV, expands all over the place, and poor cooling. Also there's the question of valve float, and large clearances uses on guides as well as rocker angularity. Keep it on the loose end and as evenly as possible. Four different lengths of push rods for each engine are available, and in increments of .017. To come closer, rocker arms can be swapped. Int for Int, Ex. for Ex. There are no two alike even when new. All that close AC inspection we read about. The exhaust have rotators, and they too vary just a tad. I have hand lapped them to keep it close.

The second method of bleed down is a simple homemade tool. Bolt it in, and use a wide blade screw driver to force the oil out of the lifter. measure and replace as above. Sounds barbaric, but then again you're working on a dinosaur, and no need to go through all the work.

Bleed down clearance has little direct effect on oil consumption unless you have a loose seat with it. Too much clearance doesn't help either, but the oil usage part would be little.

Still, I would say that the majority of AC engines never have it checked, and 500 hr interval checking is not a bad idea. A lot of cracked heads or valve burning we read about especially a cylinder that was replaced, can be attributed to just that.

Oil Use Stabilizes After Overhaul

It can vary. Mine quit burning heavily after 2 hours, but that is uncommon I am told. The average seems to be about 10 hrs, but it can take longer. You should be right about in the groove at 25 hrs. If it doesn't settle down in the next few hours suspect perhaps a glazed cylinder

Power Loss & Carburetor Ice

Contrary to what some publications have reported, any time there is vaporization going on, temperature will drop. A carburator is the perfect vehicle, regardless of how it's mounted. It's true that Lycomings are less prone due to the method of mounting, still conditions prevailing, it can and will ice up. That's cast in bronze.

There is also another issue, the air filter. It too can freeze up. Had it happen on an IO 360. This can happen if your flying in that stable most air, where the entire AC is literally covered with "dew". Yes, the air filter is damp too. On an ILS, I was advised the temp. dropped to 0C.

The engine began running rough as a cob. I'll forgo the details, when I finally realized the problem, alt. air fixed it, but not immediately. Keep in mind that FI engines ain't supposed to ice up, but the air filter is rarely mentioned. Must admit the K&N helped out, as the LASAR.

So check the filter as well. Old paper filter, can get moist enough to completely clog it with ice, foam filters as well. The K&N manages to breathe, but I wouldn't push my luck with it either.

Once the fouling takes place, it may take several minutes to clear out, but seem like hours.

Keep in mind carburetors do and can ice up regardless on location. A long time ago, I watched a V8 engine with a 4 barrel carb with a mound of ice around it. Icing has no rules, all it needs is the right conditions.

Reasons for Engine Analyzer

There are two main reasons for fitting an analyser. First it allows you to monitor the performance of your engine as you fly along. In order to lean correctly you need to know which cylinder reaches peak first...it is NOT always the same one...this will vary with power setting attitude and ambient etc. Despite what Piper say they do not know which cylinder will peak first.

It also allows you watch the temperatures of the cylinder heads during critical phases such as climb and decent...no single gauge will achieve this...in fact a single gauge is often worth less than nothing since it will often indicate the cylinder it is monitoring is OK whilst another is in serious distress. The analyser will also alert you early on to any abnormality such as a high or low temp on one cylinder resulting from a failure of some kind within.

The second reason is to provide long term trends which will indicate if your engine is sickening and will often give the much needed warning of a problem before it becomes catastrophic.

Anyone who has the money would do themselves a great favour if they purchased a fuel computer and some kind of four/six place egt and cht.

A vernier mixture control is addictive...once you have one you will wonder why you waited so long...incidentally Alcor make a nice quality cable which is PMA'd for Cherokee's.

Replacement With Electric Attitude Indicator

A few days ago I mentioned that the FAA (in FAR 91.205) doesn't allow you to replace the turn coordinator. Wrong! In Advisory Circular AC 91-75 (June 2003) they've changed their tune to allow replacement of TC by electric AI for small planes like ours operated part 91. It needs to have a power loss warning flag, and you still need a slip/skid indicator (inclinometer), though they are relatively cheap. Some of the expensive electric AIs have them built in, but not the more affordable RC Allen units.

Oil Suction Screen

Many times the question regarding oil changes comes up and one that gets overlooked from time to time is the OIL SUCTION SCREEN. Several times the screen has been discussed and its was discribed as a fitting on the lower right side of the accessory housing. I have also referred to it as being there. In reality, it is actually located in the engine sump on the lower Right side of the engine. It has a 3/4" hex head plug that has a copper crush gasket and is safety wired to the the case. The screen should be pulled each time you change oil to inspect the screen for contamination or metal. This screen picks up the larger particles in the oil as the oil is being drawn into the oil pickup tube by the oil pump. The gasket (crush washer) P/N is MS35769-21 or AN900-16 and is available from Wicks or Aircraft Spruce. The crush washer is installed with the asbestos side towards the engine. Turn (CW) the hex plug or flange until the sealing surfaces are in contact and then tighten 180 degrees further and safety wire.

Sudden Increase in Oil Consumption, Fouled Plugs

You should do a cold compression test, and after the engine sits overnight. With Lycomings, less than 60# there is reason to suspect worn rings, et al. Should it be in the 30 pounds; listen for hiss. Regardless, it really doesn;t matter a lot, since if cold test is below 50s, it doesn't make much sense to not remove the cylinders, at which time every component should be inspected, valves, guides, etc.

It makes little sense to operate a weakened engine, where further pushing the envelope can lead to more problems.

Nose Scissors Bushings and Bolts

Several chat members have requested the part numbers and I have always been happy to help. If you do not have access to this information you might like to write it down. 6ea. bushing P/N 452-7662ea bolt P/N AN5-31A1ea bolt P/N AN5-20A The bushings are cheap and available from KCAC 1-800-475-5222, bolts are common aircraft.

Installation of Discount Price Radios

A new avionic that is not on the original equipment list of the airplane would require a 337 and STC for the type since it was not original certified equipment. That's what my IA, FSDO and avionics shop have all told me.

Yes, Gulf Coast, Eastern, American and all the other big Avionics shops have good prices on the units, but you can usually count on the same amount for labor(or more!). I've found that my shop can usually match or beat the big retailer prices, though. With new Garmin panel mount equipment, it doesn't matter anyway. You have to buy the equipment from the dealer who's doing the actual installation, which means they need to be a Garmin certified shop.

The only exception to the above is the tray compatible, swappable type units. Such an installation is allowed under 14 CFR Part 43, Appendix A, section c number 31 (out of 32 of all those 'things' the non A&P owner can do to his/her airplane)

Air Conditioning Pros and Cons

I have a 73 Arrow that was purchased 17 years ago with factory installed A/C on board that was working OK at that time. I found that the cooling was marginal at best during initial ground operation but did improve when operated in flight at cruise power. However per the operating manual you should not use the A/C during takeoff or climb since it does reduce power available by 10-15%. So when you need it most during that first flight on a hot day you can't use it for the hottest part of the flight--takeoff and initial climb. Also the A/C performance during that first hot taxi out to the runway leaves a lot to be desired. This led me to have it pulled from my Arrow since I felt regaining useful load was more important than the marginal benefit of the A/C. Of course I live in Ohio where A/C is not nearly as big a deal as for someone who lives and flies primarily in the South or Southwest. After pulling the unit I only recovered about 35 pounds of useful load since much of the associated equipment does not lend itself to removal without major modification. Shortly thereafter I began to have recurring problems with twisting of the skinny alternator belt that is present with the A/C configuration. Following at least three prop pulls to replace the belt every 2-3 months, and following numerous pulley changes and alignments, we put everything back the way it was before. Nonetheless the alternator belt problems continued but on a somewhat less frequent basis--a prop pull every 6-8 months instead. After at least 8 prop pulls over 4-5 years I'd had enough and at major overhaul pulled the A/C and converted the engine back to a non A/C configuration complete with new alternator, ring gear and brackets. I've not had one problem since with the alternator belt or brackets for the past eight years. This whole adventure probably ended up costing me \$7000 and dozens of hours of downtime. Bottom line: if your A/C is installed and seems to be working then DON'T TOUCH IT! Leave well enough alone. If you begin to have problems where you seriously consider removing it for any reason, then go all the way with reconfiguring the installation back to non A/C with a new

alternator, ring gear and brackets. That eliminates the skinny alternator belt and gives you the extremely reliable wide belt configuration.

Severe Shimmy

There are several things that can contribute to that. First check the bellcrank on top of the nose gear strut to see if it loose. You might want to have someone inside to try to move the rudder pedals (slightly) while you observe to see if there is movement with the nose wheel not moving. It is my opinion more than likely its the bushing/bolts in the scissors that are worn causing the problem. The bushings are very cheap from Kansas City Aviation. Next I would check tire pressure and tire balance. I have seen low pressure do the same as well as out of balance tires. Contrary to popular belief, the last place I would suspect is the Shimmy dampener which can cause it but the other items are more prone to be the culprit.

Engine Oil Shows High Temperature

I think the first thing I would do (and I always do it) is a check of the oil temp system. Its very easy to do. Borrow a hot plate, your wifes candy thermometer, and a pot that will hold at least a quart of liquid. Remove the temp sending unit from the accessory section. The wire will not be long enough to reach the pot so make your self a couple of jumper leads with alligator clips. Add a quart or more liquid to the pot. Some say water but I like to use cheap oil. Connect a jumper lead to the wire removed from the sending unit and the other end to the temp probe electrical terminal. Connect one end of the other jumper lead to the brass nut on the temp probe and the other end to a good ground on the engine. Suspend the temp probe in the oil(I made an aluminum bracket with a hole for the probe but you could also suspend it in the oil with a coat hanger. Place the candy thermometer in the oil and turn on the hot plate. Turn on the master switch and have someone monitor the temp on the thermometer as you monitor the gage in the cockpit. Draw a picture of the instrument and plot the temperature as the oil heats up. This will give you a very accurate measurement of the oil temp. I have found many times that it was the probe and when replaced, the engines ran cool.

Also, don't laugh at the candy thermometer. I ran a test on my wifes with a calibrated digital tester and found the candy thermometer right on cal.

Loose Cowling Is Dangerous

Not only should you check the cowl fasteners, but if you have the fiberglass cowl, check the following at least annually:

- 1.) Nylon bushings in front peg brackets
- 2.) Hold down nuts in front peg brackets
- 3.) Condition of all 4 upper cowl fastener angle brackets (the front ones crack).

Squeal From Engine Right After Startup

I have run into this over the years and in every case it was the starter not disengaging immediately after engine start. Then as you bring up power slightly the starter ring gear throws the starter Bendix drive back and out of the meshing with the Ring gear. I have always been able to correct it by lubricating the starter shaft that the Bendix turns on. I do this with LP spray lube but a squirt of oil would probably do the same.

Rudder Will Not Trim in Flight - Cruise Requires Application of Rudder

First, the rudder jackscrew assembly was replaced (I had broken a spring), and it helped somewhat, but still wasn't perfect.

What proved to be the final fix was that the steering horn was cracked (it eventually broke, making it easier to find). It's the horizontal bar, about 6" long that is attached to the top of the front gear assembly. The two arms from the rudder pedals and the steering dampner are attached to this. Check carefully for cracks.

Replacement Oil Cooler Hoses - AD 95-26-13

If the oil cooler is in the front and you have teflon hoses, you need to replace at 8 years or 1000 hours, whichever is first. If the oil cooler is in the back, you only need one inspection and you are done.

...and...<http://www.avweb.com/news/news/183061-1.html>

Eliminating Alternator Whine from Noisy Radio

JC Whitnet car parts has a noise filter that sells for 19.95. Follow instructions and wire into noisy radio and whine is gone. On mine I wired it into intercom as that was where my problem was. Went through all the approved and usual fixes \$\$\$\$ and nothing worked.

Cleaning Oil Screen at Time of Oil Change

The sump screen is located on the right side of the engine (as seen from the pilots seat) on the lower portion of the accessory case on the rear of the engine. You will be able to identify it in that it is safety wired, It is about 1 1/2 dia. with a hex head for removing. It takes a copper crush washer part number MS35769-21 or AN900-16. I have not seen a torque callout for this although there probably is one. Since it's a crush washer, I have always just tightened it until the copper crushes. It's quite tight at that point and ready to safety wire with .032 safety wire.

Replacing ELT

There are several ELT's on the market that are all basically about the same size. However, be aware that the new regs require that when you replace your ELT that you have a remote switch on your instrument panel that you can activate the ELT remotely. Requires removing the side panels to run the wires and mounting the switch. A pain in the neck. I moved mine to the avionics tray behind the battery (PA28R-180).

ADLog Listing Of ADs

I recommend ADLog. They provide a binder with a separate sheet for each AD along with a summary sheet of the ADs for your airplane. As new ADs are issued, they send you the new pages, and I usually get them before I get the AD note from the feds. The ADs are color coded red for recurring and green for one time, and put into separate sections for those permanently complied with. Each sheet has a sign off section for the AD sign offs, so your A&P can review the ADs very quickly. There is a one time setup charge (can't remember how much it was) and a yearly subscription of less \$20. It pays for itself in time you don't pay the A&P to research your ADs each year. Probably one of the better investments I've made in my airplane. (Aerotech Publications, P O Box 1859, Southold, Long Island, NY 11971, www.adlog.com)

Replacing Instrument Panel (Structural)

The panel itself is structural. The overlay is purely cosmetic (per T. Rogers) and can be replaced as an interior item. I made mine out of .040 aluminum. Looks pretty good, but have decided to go with an Aero Enhancements overlay. If you were at Afton last summer they had a display that looked FANTASTIC.

If you are going to actually cut out the existing panel (that the instruments are actually mounted to) better get with your local FSDO 1st. It can't be "un-cut" and could leave you with an unairworthy airframe unless they sign off before taking the tin snips to it.

If you're replacing the overlay, no 337 required, just a logbook entry.

Plane Unable to Climb Above 3000 Feet

Is your static speed within tolerance?

At full climb, and even at level flight, does the engine reach red line, even after proper leaning?

Your oil consumption is above the maximum allowed by Lycoming, have you checked compression?

Is your air filter in good condition?

Is the throttle moving it's full travel?

Is your primer system sealing off properly?

If you have an EGT, are/is the reading normal (above 1350)

Two things to do.

Let the engine sit overnight, do not start it and do a cold compression test. Positively no warm up. If compression is below 60 you have a problem. Below 50 it's reason enough to suspect something more serious, given the oil consumption.

Also after doing a cold test, remove the bottom plug, bring the piston to TDC, and look for a small pool of oil. It can be seen with a flashlight. If present, it explains the oil consumption.

You might also check if valves are opening at the same rate. This is to check for a worn cam. If there is a variation of more than .040. you may have a worn cam. This would be an extreme case.

Alternator Drops Off Line Regularly

It sounds like for some reason the over-volt protection is tripping. It is basically the only thing in the system that will cause it to go off-line and stay that way until the field circuit power is cycled. Check to make sure there are good grounds at the regulator and at the overvoltage relay. I'd look especially carefully at the regulator's ground because if that opens it will put the full bus voltage on the alternator field. It will likely check OK without vibration, as it works for a while then quits. DO whatever you can to induce some movement while checking the continuity to ground to see if you can't get it to open.

The overvolt relay comes before the regulator if you have the stock two unit set-up, so if the regulator ground is intermittent, you'll get a healthy spike in voltage which will in turn trip the overvolt relay and take the alternator off line.

...and...

When I installed the replacement alternator I connected a ground wire from the alternator case to the engine. It hasn't dropped off once since I installed the ground wire, and it now has 20 hours running. I convinced myself that the alternator wasn't getting a good ground through the mounting hardware. For now it seem to be working very great.

Replacing Sun Visor

I bought a new side mount visor for my 1974 PA28-151 at

<http://www.planeparts.com>

Phone 310-318-1902

It was an exact match for the other side and cost \$72 with shipping.

Mimimizing Tire Wear

Tire wear facts. Pressure, alignment, condition of struts, landing techniques.

Pressure (lack of) will accelerate tire wear. Less pressure, more wear, and cord break down from excess heat and is accelerated. All tires are not truly concentric, and one side may wear more than another, due to manufacturing process.

Alignment causes wear, usually scalloping from toe out. It will also cause one side to wear more than another. On fixed gear Cherokees, toe in can be corrected. Camber is not moveable due to the construction. Camber will geberally cause wear on ine side. 99% of all

Cherokees as well as other brands have uncorrectable camber. Camber wear will be minmized with proper toe in and air pressure. Camber wear can also be caused by improperly loaded wheel bearings. Worn links components will also cause shimmy, usually if toed out. Shimmy from alignment or balance is a tire wear component.

Strut condition is another cause of tire wear. First sign of strut induced wear is the sticking strut. For the most part, sticking is a result of worn seals and wipers, improper fluid level, use or plain old air, incorrect travel distance, and lastly worn bushings. Note the bushings are last on the list. Landing technique, self explanatory.

As to shop's calling it to your attention, if you don't ask, they rarely look, despite that it is on the list of items to check.

Expensive tires wear just as fast as cheap tires.

Let no one tell you that tire A will wear longer than tire B. No two pilots drive alike, lads vary dractically. Constant airport hpiing VS long flights will take it's toll on rubber.

In out circle we use Air Trainers. We have them mounted on a Searey Amphib (1290 gross), a C182 (3300 gross) Piper Arrow (2500GW). All three use the same size, 600X6.

Changing Oil Without a Mess

Slide a piece of angle aluminum up under the filter and let about a foot hang out the side of the cowling. Loosen the filter and the oil drains down hill on the angle aluminum to the outside and use a drain bucket to catch it.

Works great on cowls like my 140, don't know if it will work on the 180 type fiberglass cowls or not?

Preheating Engine in Very Cold Weather

A word of caution. As temperatures drop, it takes a long time to heat the crank shaft and center bearings. A quick preheat warms your oil, helps vaporize the gas in the cylinders and appears to start your engine with little effort. The core of your motor may still be at sub-zero temperatures thus reducing the flow of oil to the bearings. I also found that a 40,000 btu heater will barely warm your hands at 50 below zero. Therefore at 20 below it will take quite a while to adiquately warm the core.

When Tires Need Replacement

Flat spots anywhere on the tire or whenever all of the grooves are gone would indicate the need for a tire change. If the sidewall's show severe cracking from sitting in one place to long you might want to look at replacing the tire. Some tires have a red band of cord built into the second or third cord, if you use this indicator and see red cord its time to change the tire. Check with the manufacturer of the tire to see if they use the red cord indicator in their tires, some don't. It's not to safe to be flying onto/off of wet runways with bald tires. Hydroplaning is a bad thing to experience at any speed. No tread on the tire in wet weather can be more hazardous than if flying in a dry climate. Just like driving your car. I fly in a relative of speaking dry climate so I run my tires to the first sight of cord. Good maintenance practice is to move the airplane to rotate the tires when the aircraft has been sitting for a week or more to avoid flat spots. The EA-AC 65-15A Airframe Mechanics Handbook is a good reference to tire wear and inspection criteria.

Selection of O-Rings by Application

"O rings" are very important and can cause a lot of greif. Your basic black "o ring" is used in areas with hydraluic and grease. Fuel can distroy a black "o ring" in no time at all. Blue "o rings" are for areas that are introduced to fuel. You cannot match these two with skydrol or it will eat them up. Skydrol is a whole different animal in itself. Reference the EA-AC 65-15A Mechanic's Airframe Handbook.

Belt Part Numbers - Lycoming Generator and Alternator

P/N #37B19774-341 is the Lycoming belt for a generator

P/N #37A19773-376 is the Lycoming belt for an alternator

I use the 37A19773-376 belt on 1973 PA-28-140 with Chrysler alternator model 2642997, 12V, 60AMP

Water Droplets Found on Dipstick

There are several reasons, or combinations that cause the condensation, and not necessarily in any order. Exceesive long warm ups. Low power setting and running rich. Straight weight oils are prone to cause formulation. Engine operating temperatures below minimums.

It's unusual, but not that rare to see it on the stick. Condensation is mostly found collecting in the valve covers where it can be seen, in the form of a yellowish brown soft peanut butter looking slime, but some is also inside the engine.

Things to do to minimize it, lean carefully, maintain operating temperature, avoid long warm ups, if you are straight weight oil switch to 15/50. The change will not be immediate. It's not necessarily serious, but in the long haul, it's not a good thing. It may be expensive, but I'd change oil at 25 hrs, at least untill it all disappears.

Nose Gear Extends Beyond Normal Range

I have found over the years that when a strut is acting as you indicate - strange as it may seem - it is low on fluid. The guy doing the last servicing just thought he got it full. Suggest thst with acft on jacks, and a container of 5606 hooked to the fill valve, cycle the gear numerous times. On

final cycle push gear up to approx one inch from top and disconnect fill line. You never get all the air out and this compensates for the residual amount. Works every time for me.

Installing Wing root Seal

I have installed many and its not easy. I have found the best tool to buy a non flexible putty knife. Cut the blade off to about one and a half inches from the handle. Round the blade edge so its very smooth and not sharp. Start at the flap and work forward using WD-40 raising the outboard edge and forcing the bulb into the tiny crack. When you get to the spar, trim off the bulb just enough to clear the spar and go back after it. When you get to the leading edge, do not pull the seal around just work it around. Normally the bottom is easier than the top.

Unusable Fuel

For the early planes, the 2.2 lbs is technically right. Sometime during the 1970s Piper changed it to 2 gallons, though someone else on the chat mentioned that there was no actual change in the fuel system.

It's actually a little academic. If you know you're down to your last two gallons, your attitude should be way past concerned, past worried, probably somewhere between scared and scared spitless. In any case, definitely not in the neighborhood of "Glad I've got another 10 pounds left to go!"

Small Push-to-Talk Switch

It is made by c&k. (C&K part number is 8631ZQD2) You can get it from mouser electronics (www.mouser.com).

stock # 611-8631-252 \$4.34

MOM-(N/O) SPST SLDR

ITT INDUSTRIES, CANNON (C&K) PUSHBUTTON SWITCHES

Mouser is nice to deal with, no minimum order.

Stall Warning Switch

www.mcfarlane-aviation.com makes a FAA/PMA approved switch CA450-742N for \$588 check their cross reference for the exact Piper number match.

Better than paying the Piper (\$1200)

Carburetor Heat Shroud can be Repaired

It sounds to me like you are referring to the 2-piece carb heat shroud. What ever you do don't discard the one you have it is nearly worth its weight in gold. New from piper is about \$800 for both pieces. If a welding shop can salvage any piece from the old shroud, they can build you a new serviceable shroud around that piece.

I recently had my shrouds repaired by a local man that is retired, and looks for a couple of projects occasionally. He took sympathy on me as I was stumbling around the airport rubbing my eyes and sucking my thumb contemplating the thought of spending \$800 in two measly pieces of aluminum.

Aerospace Welding, Minneapolis, MN did some exhaust work on my bird just before I bought it 2 years ago. The work looks very good. Unfortunately I cannot vouch for them from a business standpoint because I did not deal with them. Others here may have additional suggestions for approved welding shops.

Another place to inquire about buying shrouds would be Wag-Aero. I understand they might be cheaper than piper, but again that is second hand. 6236 Joe

Excessive Engine Drop on One Magneto

Clean spark plugs first. While at it check for small pool of oil with piston at TDC. If all's clear, reinstall and check. It is persist then check the mags, timing, etc.

Trim Cable too Loose

Cables rarely if ever wear or stretch. You might look for worn pulleys, or worn tracks.

...and...

In the tailcone you may want to check the jack screw barrel and bushings for wear. As they wear out the barrel moves forward causing the tension to become loose.

Repairing Leaky Fiberglass Tip Tanks

I sanded the paint down very carefully to the fiberglass and flaired out the paint so it was very smooth. I then reglassed it and covered with gelcoat. It leaked again so did it all over again with more gelcoat. It has held and the cost was less than 100 dollars.

Fine-Wire Plugs to Eliminate Fouling?

I use Unison UREM40E in my O-320, lean aggressively on the ground, 100LL and no lead fouling problems. Personally, unless you're really having trouble with an oil/lead fouling problem, stay with the massive. If you have an oil fouling problem, you should make sure you understand why, before resorting to a plug change solution.

Arrow Gear Won't Retract Even With Manual Override Engaged

If the override up doesn't allow the gear to come up (your gear warning light should be on when you move the lever to the "UP" position) it is in the microswitches. Could be the switch on the diaphragm under the back seat, or most likely the squat switch on the left main needs to be adjusted. You'll need to jack the left wing so that the oleo is fully extended and then adjust the switch. Do it right by unscrewing and adjusting; DONT BEND THE TAB.

Paint For Interior Plastic, Headliner

I used SEM paint on all interior plastic including IP (unfortunately did not use it on headliner while I had interior removed) It worked well and I purchased from a local auto parts store.

Keeping Oil From Belly

I attached a foot long hose to the breather tube. It looks ridiculous hanging down so far under the cowlings, but does the trick. I haven't had to clean the belly once this year.

Repairing Brake Fluid Can

It depends on where it is leaking from. Mine leaked at the small copper tube that was soldered to the bottom of the can at the firewall. It allowed brake fluid to seep behind the firewall blanket and get into the heating duct. Fire up the heater and you would die!

If you remove the can and clean the paint off you can solder the fitting back on carefully. If the leak is in the can you can fix the leak with solder as the can is tin and easily soldered. I used a small torch to heat the can and then pool the solder with the copper tube and washer together. Fix worked. Washed out the can, re-painted it and after 2 years all is still good!

Engine Runs Rough at Idle - Will Not Shut Off With Mixture Control

Assuming the carburetor is in good order, I would suspect the primer circuitry. Not all four cylinders have them, and if they leak, it would be running on three cylinders. Check for broken or loose primer lines as well.

The carburetor may also have a problem in the enriching lever, or a bowl that's loose. The fuel cut off is just that. It has a flex connector that looks like a piece of speedo/tach cable. They may loosen with age (rare, but happens). If the float bowl is loose, the shut off will simply not shut off. It would have just enough fuel to idle rough as well.

If the float bowl is loose, the rough running on approach can also be from the float chamber overflowing, and overflowing into another circuit in the carb.

Constant Spark Plug Fouling

Be sure you have the proper heat range for your engine. Lean according to the book. Auto Lites will fare better, and you'll need to find out what caused the fouling. Auto engines today will rarely exhibit the greyish color, since a computer is constantly monitoring conditions, but a greyish color for your dinosaur may be more than just common fouling.

Next time, after running, park it and the next day remove the lower plugs and look for a pool of oil with the piston at TDC. If there's a tiny drop it's not abnormal, if there's a pool, you have a problem.

...and...

Lean aggressively while taxiing and cruising. Even with that mine fouled after being cleaned at 30 hours. In my '67 140 (E2A) I have Champion REM40E plugs, which are cooler than the 37Es (I think). Many advise that you switch to Autolite 40Es or 37Es, or fine wire plugs. I have just 135 hours on my Champions and haven't bothered to switch yet.

Source for Rebuilding Electric Trim Servo

Try Muncie Aviation (www.muncieaviation.com). Ask for the avionics shop. They re-build them for around \$500.00 and guarantee their work. I checked with salvage yards and they want about the same amount for a salvage unit that comes with a 15-30 day warranty. You have no idea what you are getting and the unit will probably need adjusting anyway, which most A & P's can't do.

Top Overhaul Rather Than Full Overhaul at TBO

Had an old friend that's no longer with us. Henry Powell had the best analogy for installing new parts old worn out machinery. He used to say. "You can't make chocolate out of horseshit." Listening to "those people", is an excellent way of filling the pages of the NTSB.

Fuel turns Dark Blue When Aircraft Has Been Sitting

You have a small leak in your quick drain. The fuel evaporates but the dye does not. The leak is probably so small that the fuel is evaporating before it drips on your wheel. Have your AP replace the O rings and your problem will disappear.

Standby Vacuum System

[I recommend] the Safe-Flight standby vacuum system. It is a fail safe system that as long as the engine is running you are going to have vacuum to operate the instruments. It also has a system fail light that is right in front of the pilot if installed properly. The drawback to the system is you normally will need to reduce your power to around 2100 RPM, but a Cherokee will fly all day at that RPM and get you home safely.

As far as I'm concerned, life is too short to rely on a mechanical vacuum pump when such a fail safe system can be had for around \$500. Just a couple of weeks ago the wife and I were about an hour out of Denver when the vacuum fail light came on and sure enough, no vacuum. Pulled the cable to the standby system and continued on to Denver. Took about 15 minutes longer but we made it with no problem.

Engine Runs Rough, EGT Drops at Power Reduction

Do a cold compression test after the engine sat over night, and is cold. DO NOT WARM UP.

This is to determine if you have some small leak down with clear cylinders. If compression is in the 70s, it would eliminate any leaks. Pay careful attention to number one. If it's below 70, you have a problem of some sort.

Carburetor or FI, should not result in roughness when accelerating or decelerating, or leaning, unless you over lean, then it is normal.

That EGT is dropping off too far, based on what you describe is suspect of something.

Another culprit may be valve related. Hopefully, valves were lapped in and that lifter bleed down clearance is correct. Too tight, will have similar effect.

Gascolator Leak

Replace the gasket! Make sure the aluminum bowl is not "out of round" and align carefully. Tighten snugly, so it doesn't wiggle, but don't overdo it. In addition to safety wire on the nut, I run a piece of safety wire from the bail on the backside across the bowl and to the other bail, mid-way up, just to make sure the bail can't move around.

Removing Brush-On Wingwalk

I am removing the stuff as we speak. It is a nasty project. I used Jasco Paint and Varnish remover. It works well. Use it liberally and let it sit. Use a plastic scraper to remove the goo. Use caution though as it EATS the paint too! I am going to re-paint the wingwalk with the paint on stuff. I will have to extend the width by about 1/2" to cover the paint screwed up by the Jasco.

Battery Box Repair

I took my box out, sanded and repainted it (looks like new). I cut slots and used rubber grommets to protect the cables. Works great, cost about \$1. A&P said he is recommending that to others.

Hartzell C/S Propeller Overhaul

For those of you who gave me comments and suggestions on my prop and governor overhaul, I wanted to share the end results.

I went with Hartzell for the prop overhaul as they were low bidder (when I told them, they said they were trying to get more competitive for this work). The good news is the 2 blade prop on my '78 PA32-300 (which had been overhauled 3 previous times) made it through with the standard overhaul @ \$1,208. However, my prop had an AD on it that required replacement of the hub at time of overhaul. Hartzell was supplying the hub at half price through the end of this year (\$1,293.50), so I'm thankful that I decided to do this now. Replacement of the hub terminates the AD.

Hartzell was great to work with by phone and e-mail. Turn around time was within the 2 weeks of receipt of the prop. I would recommend them to anyone considering an overhaul.

Governor overhaul is being done by Pro-Prop in Hallstead, PA as they were substantially cheaper than Hartzell on this item.

Test For Shimmy Damper Operation

Sounds like maybe your shimmy dampener might be at fault. Jack up your plane getting the nose off the ground. Then, move the nose wheel all the way to one side and let go. If the nose wheel snaps back to center then the shimmy dampener is defective. Instead, it should come back somewhat slowly, maybe taking a second or two to get back to center. Another test to do is to move the nose wheel in one direction to the halfway point, then move it back and forth a little. You should feel some stiffness and no breaks in that stiffness. If you feel any breaks then the dampener has lost some of its fluid. I have a complete documented procedure on how to rebuild the dampener at "The Eagle's Nest". Click on "Maintenance". However, some are not rebuildable.

Contact at Michel Radio Co.

Also 800-444-1115, talk to Glenn Kennedy

Replacing Bow Tie Yoke With Archer Rams Horn

It will most likely be a pain. You have the small dia shafts and need to put a bushing into the yoke, using your existing shafts. The Archer and later Cherokees have a larger shaft... (1.18" vs. .75")

As far as 337, I, and most others say that a simple log book endorsement, citing the AD affecting the old bow tie yokes is sufficient.

The AD has been demonstrated to be 'authorizing document' to install rams horn yokes in a Cherokee certified w/bow tie yokes.....it is specifically called out in the AD.... AD 69-22-02 R2

Concorde Battery STC

The STC for the Concorde RG series batteries in Piper single engine airplanes. The number is: SA00954WI. I would assume that it comes with the battery and after installation a 337 is filed.

Corrosion Protection - Boeshield

I've been using Boeshield. As I understand it, it was developed by Boeing specifically as a corrosion preventative for aircraft. When you apply it, make sure you apply it till it seeps from the lap joints. It will drip out for a week or so then will harden into a waxy stuff. It is supposed to melt any old application when it is reapplied so that it can work into the lap joints. I think corrosion X may get in better, but it also doesn't last as long. The corrosion X will weep out of the joints until it is gone, at which time it is time to reapply it. It dries to a waxy coating and is available at boating stores.

Owner Assist annual

Did my first owner-assist annual last week. What a great experience (though I am still a little sore from some of the crazy contortions you have to get into--especially under the panel work)! I spent four full days in the shop working along side the mechanics--very organized, conscientious, careful, and helpful. I have a whole new level of respect for these guys. They also seemed to really enjoy teaching owners how to perform basic tasks, and if you were up to it, more complicated tasks as well. I imagine most of you on this board do owner-assist regularly, but if you've never done it I can only say DO IT--best learning experience you can get regarding YOUR airplane. This will be a regular thing for me from now on.

Who did the annual? Casey Aviation, Mansfield, MA.

Reattaching Cool Scoop - Two Sided Tape

I used high strength double-sided foam tape from radio shack. I cut pieces of foam tape to cover the entire mating surface of the scoop, and pressed it into place, and that was that. The scoop on my 140 has been reattached this way for over three years and shows no sign of coming loose. I did the same thing for the little knob that keeps the window open when it fell off, and it's held up fine too. (You do have to specifically get the high strength stuff - ordinary foam tape won't cut it)

Wing Spar Corrosion Repair

During my last annual everything was going normal, with only minor problems found, until they started on the right wing and noticed what appeared to be a little dust on the back of the spar. The dust turned out to be corrosion. When you are first told about it you get that sick feeling and ask yourself what went wrong? The plans has been hangered most of it's life and treated with ACF-50 on a regular basis. Also the spot was close to the right inboard inspection plate and in an area where we replaced a rivet last year, so its hard to believe we missed it at that time. After reality sets in you realize that regardless of what went wrong you still have to deal with it. Both of my IA'S felt it was salvageable, but would require an engineer to develop and bless the repair. Remembering from past postings I knew that one of our members. Tom Lansden also known as Tom @Lake St Louis was a DER with a specialty in aircraft structures. I contacted him and he agreed to consider the project. We emailed several images of the damage, after a few phone calls and more emailed images he was able to come up with a repair that restored the wings integrity and at a reasonable cost. Not cheap, as it required several man hours, but much better than replacing the wing.

As luck would have it our local FAA rep was out looking over a repair to a home built engine mount and when he noticed the engineering drawings for my plane his interest level went into high gear. After reviewing Toms work he then inspected the craftsmanship of the repair and

much to my relief he had only praise for everything. I thought one comment he made was encouraging. He said that he was new to the Wichita office and did not know Tom, but was extremely impressed by the quality of drawings and attention detail. At different times both of the guys working on the plane ask where did you find this guy Tom? They both said he was the best they have worked with. He wasn't dictatorial in his approach, was open to their input and would gladly work with them in changing or modifying things to make the job go smoother. His drawings were so clear and precise that there was no confusion or question about what was required.

In the past Tom has provided insightful answers and cogent advice to many on this site, so it is without hesitation that I recommend him to any one unfortunate enough to need this level of help.

I also feel fortunate that my plane is looked after by two A&P's both with IA's who prefer owner assisted annuals and do not take short cuts.

For those those living in the Kansas City, Wichita, or Topeka, Kansas area I also recommend Black Hawk Aircraft for your annuals and routine service. Dave Christy is the chief cook and bottle washer and can be reached at 785/484-2778 business or 785/224-7808 cell phone. He has a hanger and grass strip just north of Topeka. You may need to work on your short field landings as his strip is only 1600 feet long, but my 180 handles it just fine.

After reading about some of the horror stories and high rates it's almost embarrassing to look at my bills. Their hourly rate is less than half of what most are paying. For those interested in a little background. Dave is retired from the Kansas Bureau of Investigation where he flew and wrenched besides doing undercover work. Kevin Drewelow is full time with the Kansas Air National Guard and a quality assurance inspector on the big birds. He also has the uncanny knack of being able to get an inspection mirror into the most unbelievable places. There are times he wants to show me something and it takes several tries before I can get the correct angle.

B

Arrow Landing Gear Power Pack - Repairing Motor

I've had pump failures twice, both times new brushes along with usual commutator cleanup cured it.

Sticking Struts and Improper Filling

when reading the maintenance manual I found a section relating to filling the struts. They say that when a strut has been fully emptied as in a seal replacement, the strut must be extended to 10 inches whilst filling, this is to allow fluid to fill the "outer chamber". I had a problem with some sticking after a complete rebuild and decided to try this out. It involves releasing the torque links in order to get the extension, so great care is needed, but it fixed the problem! The reference is in the first section of the manual close to the checklist for the 100 hour inspection.

Fiberglass Tip Tanks Deteriorating

The fiberglass delaminates over time. Eventually you'll also see the tank start to weep a little, evidenced by blue stains. I'm not sure adding fiberglass to the outside isn't just a bandaid. I had heard that it really needs a coat on the inside to fix it, and in order to do that you need to cut open the tank. You might talk to one of the bigger paint shops such as Oxford, to see what they say. I'm sure they've dealt with it plenty of times.

...and...

I do fiberglass work and plan to overhaul my tanks soon; there is a special fiberglass resin that is just for fuel tanks. Keep in mind that fiberglass is porous and must be sealed with gelcoat or fuel and water can pass thru it. Try removing all paint, sand and spray with a good coat of gelcoat. Gelcoat can be sprayed just like paint.

Michelin Airstop Inner Tubes

Just thought I'd mention, I installed the Michelin Airstop tubes this past May and I just love them. I used to have to add air every 3 weeks. With these Airstops last time I put air in them was the last week of May. Flew it yesterday and tires still don't need any more air. I can't get over it. They are grrreeeaattt!

Source of Service Bulletins

I purchased all the SB and SL from Sun Aviation in Vero Beach (800-580-7631) The cost \$38.00 for 67 PA32.

High Charging System Voltage

Be sure the battery is fully charged and in good condition."

"Check the alternator and determine that it is operating properly" (I think this part may apply more if you have a low voltage situation rather than a high voltage)

"With the alternator turning at sufficient RPM to produce a half load condition or approx 25 amp output, the voltmeter should read between 13.6 and 14.3 volts. If the regulator regulates but is out of spec, the reg is out of calibration and must be replaced."

"The regulator should not be connected accross the battery since the regulator is designed to compensate for the resistance contained in the wiring harness" (might want to double check to see if the volt reg was installed properly)

"If the voltage is high or continues to rise:

- a. The regulator may not be grounded properly
- b. The regulator is shorted and must be replaced."

Additional things to look for are:

1. Poor or loose connections
2. Poor ground on the regulator housing
3. Shorted Alternator windings
4. A grounded output or input wire. (This will cause and instant failure)

There is some information about an overvoltage relay but it looks like this is set to operate after the voltage would exceed 16 volts.

There is also some indication that if the connection between the volt reg and the battery is not good (i.e. bad wire)the volt reg may have and excessive output to compensate.

Also the volt reg can be bench tested if done properly, if you wanted to take it to a mechanic.

Oil Cooler Rupture

I was flying from Calif central coast to SFF in Spokane a couple weeks ago zipping along in my Archer at 6500 ft with a 20kt tailwind when I noticed the oil pressure guage was in the bottom of the green. It normally runs toward the top of the green at 80# or so. I scan the engine instruments constantly so I know it had to have just lost pressure. The guage was wavering and the oil temp held steady so I thought (hoped) it might have been a defective guage. No oil visible around windshield/cowling area. I was coming up on SAC airport so I did a couple of 360's over the airport (1st stupid idea) to assess the situation. The oil pressure dropped just bordering into the top of the yellow and the temp moved up just slightly so I advised SAC I was having oil pressure problems and they cleared me right into the pattern which had no traffic.

I put it on the ground trying not to shock cool the brand new cylinders, and taxied to the to the ramp (2nd stupid idea) to take a look at things. I should have shut it down as soon as I cleared the active, but the pressure was still in the top of the yellow and the temp was only a little high. To my dismay, there was oil all over the nospant and dripping out of the cowling. The belly was covered with oil. I took the cowling off and it appeared to be heaviest in the area of the oil cooler. Executive Air Repair towed it to their ramp. We solvent washed it, put in 3 qts of oil to match THE 3 QUARTS THAT WERE LEFT IN THE SUMP, and started it. Oil poured out of the oil cooler seam on the outside of the cooler and below the bottom hose fitting that returns to the sump. This Harrison oil cooler P/N 8526250 had been overhauled 200 hours ago. The mechanic thought I had another 15 minutes or so before all the oil was gone.

The good news is I saved my engine and in another couple of hours I would have been passing Mt.Shasta enroute to LMT where there is nothing but mountains and big trees. The bad news is I had about 30 hours to clean the oil off the plane while I waited for Pacific Oil Cooler to ship a replacement Niagra oil cooler P/N 20062A, and think about how much all this was going to cost me.

Besides learning to exercise a little more urgency when my instruments are talking to me, I had a few other revelations I feel I should share with the group.

1. There apparently is a SB on these oil coolers regarding the very seam that burst on mine. The Harrison cooler is made of only .018 aluminum and it is imperative that a second wrench is used to back up the fitting when the return hose is connected or pressure will be exerted on the seam which will weaken it. I think this is probably what happened to mine after it was overhauled although the mechanic who installed says he always backs up the fittings. Pacific said that once the seam starts to go, it will open up fast.

2. The Niagra cooler is marginally better with .020 wall construction but still needs a second wrench and a lot of care not to put pressure on the seam when connecting the hose. The Stewart Warner cooler costs more but has .065 thick wall construction and is generally a superior cooler. (I wish Pacific Oil Cooler had told me all this before I installed the Niagra) They also used a

stand-off tie wrap to anchor the teflon hose instead of the adel clamp on the back of the engine. The Teflon hoses are stiffer and can transmit more vibration to the cooler.

3. These engines apparently will run on the 2 quarts Lycoming says they will. The amazing thing is that it still held 55-60# of oil pressure and was being cooled sufficiently by only 3 quarts of oil. I think things were going to degrade real quickly though.

4. I never thought about it until later but the oil annunciator light never did light up. It appears to me the only thing the light is set up to do is tell you that you are in need of a new engine.

Having put a few thousand hours on Cherokees without any oil cooler problems, then to have one fail shortly after overhaul, I think the coolers are probably pretty reliable if they are CAREFULLY installed and the fittings backed up with a 2nd wrench to avoid tweaking the outboard seam.

Rudder is Erratic

Check your steering bar, this causes similar problems when they have been towed and the stops exceeded. The bar cracks and is no longer working.

Another thing to check is the springs on the firewall to the steering bar, if you have a nose fairing they should be there.

Not likely but another thing to check is the bungee trim where it connects to the rudder bar, possible the pin is broken.

Nose gear Sticking in Fully Extended Position

The lower bushing has a scraper that often gets enough debris in time to make it stick. The oil level is also critical/ Too low will bind, too much will not allow it to move through the entire length. Air pressure determined by height also plays a part. Use nitrogen instead of air.

Piper Service Bulletin 1131

My Serial# is on the list and it looks like every PA-28 before the Warrior III (one Warrior III serial # is affected, see below) & Archer III is on the list. The Warrior & Archer IIIs had forged, rather than cast main strut cylinders and are exempt. By the way, if yours are cracked and need to be replaced, that will remove your plane from the list and if your main strut cylinders have been replaced with forged in the past, it is also exempt. The aircraft affected are:

Model Serial #

140 28-20001 thru 28-7725290

150/160 28-1 thru 28-4377 and 28-1760A

151 Warrior 28-7415001 thru 28-7715314

161 WarriorII 28-7716001 thru 2816109

161 WarriorIII 2816110

161 Cadet 2884001 thru 2841365

180 28-3 thru 28-7205318

180 Archer 28-E13, 28-7305001 thru 28-7505259

235 Pathfinder 28-10001 thru 28-7710089 & 28-E11

260 Six 32-1 thru 32-7800008

The gist of the SB is that aircraft with cast rather than forged main strut cylinders might have cracks in torque link attach lugs. The inspection procedure calls for removal of the strut fairing and removal of the paint around the attach lugs, inspect visually with a 10X power magnifying glass. If no visible crack, liquid penetrant per AC43.13-1B must be performed. If crack is found by either inspection method, the strut cylinder(s) must be replaced before flight with forged cylinders. If no cracks are found, it becomes a 100-hour repetitive inspection. For most, that might mean an additional inspection at each annual but for those like me, who fly more than 100 hours a year, maybe at periodic oil changes as well. The SB says "Piper considers compliance mandatory." In my mind, that means the FAA will probably issue an AD eventually, a la the oil hoses AD.

Modifying Wheel Pants for Easier Pressure Checking

I ground a slight radius at the outside bottom center of the wheel pant with a dremel tool so I could get easier access to the tire stem when it was at the six o'clock position. You can experiment with the size of the radius, increasing slightly with each grinding until you find the right size. Unless you know the radius is there, most people will not notice.

Clearing Pitot Static Tube

I've had to deal with this problem a few times. There is a certain kind of bug on my field that likes to build a cocoon inside the pitot/static system. Usually happens in the summer months. I've got the tennis ball, but occasionally forget to put it back on after flight.

Recently, I had the pleasure of fixing this myself on a ramp while on vacation. Field had no maint., but the fueler did have a 120 psi compressor. If bugs are the problem, they are usually contained inside the pitot blade. They don't generally venture upstream into the lines. I removed my blade, spent a few hours picking at bug goop with the business end of a large safety pin, then blew it out with a compressor. The last bit of goo didn't come out until we got the tank pressure up to its 120 psi maximum.

If you do this, make sure you clear the tiny static hole at the back.

Correct Fitting of Engine Baffle Seal

The correct method is on the high pressure side, or the inside toward the engine so that incoming pressure seals off and air from escaping the pressure side. It's in the books, EA-AC 65-12A. It's only one of three bibles, each 500 pages. A&P making such simple errors should be reprimanded. Fitting the baffling seal on the outside will leak air preventing proper cooling.

Repair Steering Horn to Stop Nosewheel Shimmy

Shimmy can be caused by the steering horn on top of the nose strut that the steering arms connect to. If so, I removed mine and had a machine shop drill the elongated holes out and insert replacement bushings which were then welded in place. Makes a nice repair.

Pros and Cons of Turbocharged Engines

If you have need to fly high, a turbo charger is an excellent way to do it. --BUT there dues to be paid. Most Factory Turbo engines are specifically designed to handle the higher heat, with oil squirts on the bottom of the pistons, and extra heat rejection devices, over boost protection, and other unseen features. All of this costs money to initially purchase and overhaul, in addition the TBO of most Turbo engines is about 25-30% shorter than the non turbo models. Then there is the higher fuel burn, and the fact that you have haul the turbo system around, even if you don't use it's capabilities. The up side, is that you can fly much higher, if needed, and there are some inherent 'bragging rights'. If logic prevails, and you don't need to go above 12,000', you don't need the expense of a turbo. Another caveat is the Continental TSIO 360 that powers the Turbo Arrow, has had a checkered maintenance history, but that may have been dealt with by now.

Why Cylinders Crack

Lots of reasons for cracks. Most of them come from improper use of the engine, and plain poor maintenance. Plain poor design from the 1930s, hocus pocus methods and practices in aviation, such as differential compression testing after the engine is warmed up. The use of fixed ignition timing, the notion of leaning past peak to save a few pennies on gas (that's the dumbest), running the engine too slow, increasing the drag of the airframe due to lack of flying speed, and operating beyond BMEP. Broken or faulty exhaust systems.

The worst culprit is the number of times a cylinder head are rebuilt and/or welded. Rebuilders, and unfortunately, the unscrupulous ones, will "patch" a cylinder and sell it off as recomditioned when it should have been scrapped.

ADLog AD Organizing System

I switched to AdLog two years ago, (any search engine under Adlog), and I have saved more than the cost of it in the first year alone. You tell them your exact info on your a/c and you receive by mail AD's only applicibale to you. I and my IA swear by it-he also tells me an AdLog maintained plane is more desireable to a prospective buyer than one that is not,cant verify that, but thats not why I use it, just sheer simplicity!!

GAMI Injectors and Lean of Peak Operation - Leaning

I just operated my 1974 Arrow II with a factory remanufactured IO-360 C1C lean of peak for the first time today. It has 60 hours TT. Today's run was from Miller Airpark (at the New Jersey shore) to Block Island via JFK.

It's equipped with Gami injectors, LASAR ignition system, JPI EDM-700 engine analyzer, and an EI digital tach.

I was amazed with the fuel flow and temperature readings.

Here are the numbers:

Altitude - 7500▲
OAT - 75 F
TAS - 135 Kts.
RPM - 2400

MP - 23 ■

GPH - 8.3 (From the analog gauge)

1 2 3 4

EGT 1321 1295 1336 1308

CHT 300 303 334 310

Prior to today, at 100 degrees rich of peak I was burning 10.5 GPH, my EGT▲s ranged from 1370 to 1410 degrees and the CHT▲s were from 340 to 380 degrees.

At the higher fuel burn I would show a TAS of 140 Kts.

So for an extra 2.2 gallons an hour I would gain 5 extra knots and run significantly higher temperatures.

On the return flight the numbers were as follows:

Altitude - 6500▲

OAT - 75 F

TAS - 130 Kts.

RPM - 2400

MP - 23●

GPH - 8.3

1 2 3 4

EGT 1333 1288 1351 1302

CHT 291 291 305 299

RPM Limitation - RAM 160 HP Conversion

The RAM conversion for the E3D has a 5 minute limit at 2650-2700 RPM. Conversions of the E2A engines, under different STCs, do not have this limit. I'm not really sure as to why this limit exists for E3D conversions...I think it's something to do with differences in the crank bearings between the E3D and E2A engines....but I could be wrong.

Acceptable Cylinder Head Temperature

Aluminum can sustain temperatures beyond 400F but the mechanical properties start to go to hell. By mechanical properties, I mean yield strength (stress at which the metal displaces and does not return to its original shape), ultimate strength (stress at which the material fails), and endurance limit (alternating stress level for which fatigue life is infinite). Not only do these properties degrade with temperature, but properties at lower temperatures will degrade if the material has been exposed for lengthy times to high temperatures; this is called aging. Aging for aluminum accelerates drastically beyond 350F; consequently, as a general rule it is desirable to keep cylinder temperatures under 350F. At 350F, degradation is negligible even when exposed to

that temperature for 10,000 hours. At 400F, degradation is 20-30% for exposure at 10,000 hours. This is why cylinders never make it to 10,000 hours. There is also the issue of where the temperature is measured (usually near the sparkplug), and I'm sure temperatures elsewhere are cooler. I do not know what stresses are in this area; however, it's no coincidence that cracks usually occur near the sparkplug.

High EGT Corrects itself

It's very likely that you had a fouled or intermittent plug on the cylinder where your EGT probe is located.

If you're only firing on one plug, the air/fuel charge in the cylinder burns more slowly, and is still burning when it's ejected into the exhaust. This causes the EGT probe to show a higher temp (usually between 50 and 100 degrees, depending on your probe location). The engine will still feel smooth since all cylinders are still firing. Next time you see that happen, test each mag. If you've got a fouling or intermittent plug, you'll run smooth on 1 mag and rough on the other.

Electric Fuel Pump Source

\$65 from Aircraft Spruce. You may want to peel the automotive sticker off but its the same fuel pump you have.

Battery Discharges With all Switches Off

If you checked the current draw with the master off, and you still had a small amount of current on your meter, your really only looking at two possibilities.

First: Did someone tie into the HOT side of the MASTER SOLENOID to run a clock? IF so did someone tie something else into it too?

Second: There is a diode, looks like a hat with a little mast on top of it that sits on the shelf with the master solenoid. That diode has an insulator made of a thin substance that can fail. Mine had a hole the size of a pencil tip and it allowed enough resistance to ground to cause a small current leakage. This drained my battery.

Rechroming Pitted Struts

Piper did not nickel plate the steel shaft prior to chrome plating - on the mains only. That is why we have so many pitting problems - and on the mains only.! Had mine rechromed twenty years ago and still perfect. Made certain shure they nickel plate first. Suggest check with your plater in this regard.

Overhaul vs Rebuilt Engine

Overhauled by as defined by regulations, means that the engine is dismantled, cleaned, inspected, repaired as required, and assembled within limits.

Rebuilt is the same except the last part, it is reassembled to new tolerences.

So if you had an overhaul, is is not unlikely to have a wide variation of oil pressure, if the engine is within limits, rather than new tolerance. Example: Typical 320, piston new tolerance, .010 to .012, maximum wear limit is .020, Therefore in an overhaul, if your piston clearance is .017, it is within limits and can be reassembled and approved. Not a bad deal, but it will cost just about as

much as a rebuild, and you'll be hard pressed to ever see 2000 Hrs. since the tolerances are near maximum limits. This goes for all of the engine's components.

Plane Pulls to Side During Flight - Outside Range of Rudder Trim

First is the trim screw working properly, and properly set? Second, if the trim screw is indeed working, then you are not rigged.

Inspect all the cables to be sure that there no bindings or wear or kinks.

Set with guage according to Piper manual. With the trim detached, see if it pulls. If for example it pulls to the right, this is trimmed out by lowereing the right flap. Lower in very small incriments and fly it every time after making adjustments. Fly all cardinal points. Once straight and level is achieved, and the trim screw is in good working order and properly set, with surfaces in neutral position should find the trim screw in the center.

Nose wheel Shimmy

Try to adjust or tighten your scissor gear. Typically tighten the bolts and lube the strut first. This fixed my 140 instantly, as it shimmied very badly under braking between 36 and 65. Don't forget to check tightness of the hardware on the scissors gear on the mains too. That one cured mine once upon a time.

Cleaning very dirty metal engine baffles

Use Easy Off oven cleaner. Be sure it's done off the engine, and be sure you wash it per instruction.

Wing Root Seal Installation

Wing root seal is a piece of cake to install. Use non petroleum base silicon spray or dish soap, push in with a wide blade screw driver like Larry said, be careful not to poke the blade thru the rubber.

Also you have to trim the back side where it goes over the wing spar.

Autopilot Will Not Track Navigation Signal

Concerning my autopilot tracking problem, I want to post an update. The problem centered around the autopilot's inability to properly track a VOR in nav mode. Well, after replacing three autopilot computers and three roll servos, (one computer tried to invert me) and with much help and brain storming with Allen@LWC and others, it seems like the problem has been confirmed as a "noise" issue. The avionics shop replaced the wires that go from the navs/CDIs with shielded wiring and the wandering autopilot "seems" to finally track a nav. I got a call from an Stec supervisory tech today and he was very helpful. He agrees that it sounds like a noise problem, although he still doesn't rule out the possibility of excess friction on the ailerons. I want to run his thought past the gurus on this forum to see what you think. His thought is that given that the alternator produces AC current that is transformed into DC current...that there may be some AC current bleed over that is causing noise. The alternator also may not be providing a constant voltage output and since the autopilot uses very small (.5) voltage inputs to initiate corrections, erratic voltage might not allow the autopilot to do its job. (I am just parroting back his comments and am still clueless.) He suggested that I test this by turning off the alternator and seeing if the autopilot returned to solid tracking and also having the shop put an oscilloscope on

it. ...and...Make sure the roll computer and navs in question are grounded at a common ground point, not at different places on the panel. Ground currents are the most frequent cause of noise gremlins, and they can be avoided by using a single grounding point.

Leaning below 3000 Feet

Greatest use of an EGT, and some careful management, and not only can it be done, but it keeps the engine at max efficiency, which equates to best fuel economy and max performance. Not a bad deal.

New vs Rebuilt Gyros

I've gone down that path both ways...I've had more problems with new units than with rebuilt units. The advantage of having your own unit rebuilt is that you know when it was done. There is a shelf life on the units after overhaul or new. If you can live with the down time, I'd have your own overhauled rather than get a replacement. At least you will know all the hoses will fit... I also recommend changing hoses and filter at the same time.

Electric Fuel Pump Source

I bought an approved 478360 pump from Pifers Airmotive, 1660 airport rd, Waterford, MI 48327. Ph 248 674 0909 or 800 878 0909. It cost me \$175 in Feb. of this year.

Valve Lifter Bleed Down

Hydraulic lifters have many advantages over solid types, although solid types, in some applications are superior. In the latest engine technology, hydraulics are now the norm. In days of yore, they were hardly expected to allow an engine to spin much faster than 4000 rpms. Today's hydraulics can reach well into 5 figures.

The advantages: it allows the cam follower to duplicate the exact lift and opening sequence of the given cam design. It eliminates the "hammering" of the lifter onto the valve stem, and it maintains the following of the cam during the periods of cylinder expansion, which would alter clearance, as well as cam timing.

The lifter is in constant contact with the cam. In the course of operation, when the valve is located at full closing, it is mandatory that the valve completes sealing. Since hydraulic pressure is still present, it must be unloaded. This is accomplished through a small orifice which allows oil to escape from the lifter, i.e. bleed down.

As the cam turns toward opening the valve, the lifter must be loaded with oil in order to take up the clearance left when was unloaded. As the lifter is raised, oil is trapped in the lifter in order to allow the cam to be followed accurately, and take up for any expansion. As the cam starts towards closing, the process is repeated.

Correct bleed down clearance is required in the type lifter used on Lycomings to maximize opening and closing of the valve. Not enough clearance will not complete filling, and will not allow full bleed down, too much will not allow the valve to reach maximum lift. The results will be a power loss, higher fuel consumption, higher CHTs, valve damage, seat damage and cracks.

Nor enough clearance will cause valve damage, valve sticking, overheating and cracked heads. Nearly identical damage as too much.

Bleed down is also hampered with use of W100 or W80 oil. As a result of the lack of flow properties, valve bleed down, during the first 2 to 5 seconds cannot successfully accomplished. This will lead to valve sticking, higher oil consumption, and eventual valve train and cylinder damage. Worse, is when clearances are less than minimum.

You've often read that everyone who switches to multigrade automatically experiences a decrease oil consumption. The promptness of valve bleed down is directly related to viscosity. The lower viscosity will aid in faster bleed down when the engine is cold.

The accuracy of valve bleed down clearance is also important since both lift and closing become equal for all cylinders, eliminating any variation between cylinder operation. All cylinders are alike. Makes the dinosaur smoother, more economical, and powerful.

Camshaft designs reached their peak in the mid 1920s. As years passed, engine makers were able to maximize the accuracy of valve timing through the use of better materials, most importantly, lubricants, and now the ability to match a particular timing event for whatever task it is to be used.

This is condensed in text of the workings of a hydraulic lifter, but I assure you, it is extremely important to the life of the engine, and unfortunately, most overlooked.

Two ways of checking it for the straight valve Lycs., per Lycoming shop manual, or by depressing the rocker arm. A home made tool is required.

The angle valve is more or much the same, but more complex since the push rod tube can't be removed. So the book method (angle head) must be done when the engine is rebuilt or cylinder removed. A home made tool can be used to depress the lifter to check clearance, and altering clearances is performed for both types engines in the same manner.

Hatrack Installation

I installed a hatrack about 2 years ago. Generally pleased with the Plane Plastics (was Kinzie) product. However, take a good look at the thickness of the shelf, particularly in both aft "corners" where the horizontal shelf meets the vertical bulkhead. I installed it myself with my A&Ps supervision. I found it easiest to remove the seats, side panels, and the hinged "floor" where the rear seats are mounted. Place the bulkhead, see what binds, remove it, trim it a bit. Tedious, but not difficult. Trim a SMALL amount at a time. You can always remove a bit more material, but it's hard to add a bit more...

Plane Plastics

P O Box 400

Alva, OK 73717

PH# 580-327-1565

Note: Be sure to get the version WITH a hatch for access to the tailcone. It costs \$10:00 more and is the SECOND hatrack in the catalogue.

Engine Ground Strap

the engine ground strap, according to the Piper Drawing it's referred to as the "engine ground return" located under accessory case attachment bolt below left magneto mounting boss. Order of hardware, terminal, flat washer, internal tooth star washer & bolt. The other end bolts to firewall, bolt, flat washer, terminal, firewall, flat washer, internal tooth washer & nut. CAUTION be sure all connections are clean.

Arrow Gear Unsafe Light Comes on In During Cruise

My 72 Arrow had the identical problem for years and driving me crazy. A different A&P replaced the pressure switch and problem is now history. It appears that the gear was not fully retracting into the wells ... also affected air speed.

...and...

After an hour or so in cruise, the red light would illum., until we could descend 100 feet pull off some power to slow down just above gear speeds, then on an accelerated 200 ft. climb [to further drop airspeed to gear speeds(135kts down/107kts retract)] drop the gear, wait a few seconds, and retract again. Red light off.

It turned out that the hyd.pump needed an overhaul. No more red "in transit" light in cruise now.

Install a Wet Vacuum Pump

If you have the time and a little extra money, spring for a Garwin or Pesco wet pump. You'll need to add an air/oil separator, but the dependability of a wet pump can't be beat.

I installed a Garwin wet pump about 13 years ago and it's still cranking away. I've heard of others having them go even longer. The cost of the pump runs about the same as a dry pump. The extra cost comes from having to install the air/oil separator. Those vary in price. My original separator was WWII surplus and cost nothing. I upgraded to a Walker Engineering unit that ran about \$195. Installation is pretty simple. I can't tell you the reason dry pumps became standard. My guess, knowing how businesses run, is that it was cheaper to install a pump without the separator and its tubing. Plus, I'm sure the dry pump manufacturers cut a great initial deal on pumps for aircraft makers, knowing full well that the pumps will break and need to be overhauled or replaced sooner than wet pumps. If you get a copy of Trade-A-Plane, I've seen ads for Garwin and Pesco pumps.

EGT Probes Need Replacing

Pulled my egt probe and looked it over when I pulled my exhaust. The egt had been showing cooler than normal. It was running in the 12's and sluggish to rise and fall. The change occurred over a long period of time so you "get used" to it changing.

I bought a new probe, installed it and then flew to Oregon Friday. A huge difference. Now I see a smooth rise, good peak at around 1400, and the egt is much more easily set.

The probes don't last forever...500hrs maybe? They are cheap at \$27.00. Replace them.

Struts Binding after Landing

I'm thinking the strut sticking may also be due to a lack of lubrication on the piston. One of the tips I picked up from the CPA was to wipe down the struts before each flight to prolong the life of the seals. I have been doing that with fuel on a paper towel. Maybe I've gotten them a little TOO clean.

Looking on page 1E17 of the Cherokee service manual, it calls for lubricating the strut every 100 hours with Fluorocarbon release agent dry lubricant MS-122. Fancy way to say Teflon. Putting that on the strut piston should help with them sticking. (can probably also use it on the yoke control shafts)

Spruce sells a product called Tri-Flo Teflon lubricant on page 318 for \$11.80. (don't think this qualifies as a dry lube but perhaps it will work?)

You can get dry Teflon lube at bicycle shops. Here is one on-line source:
<http://www.performancebike.com/shop/Profile.cfm?SKU=113&Store=Bike>

Here is another source:
<http://www.nashbar.com/profile.cfm?category=103&subcategory=1121&brand=&sku=2529&storetype=&storeid=>

Painting Propeller

If you want to paint, the good stuff doesn't work !!! Try the cheap stuff , I've always had good luck with Krylon or other of the shelf brands of spray paint. This is one case where cheap is better. I learned this in the military where we painted our prop tips red White and blue, the epoxy and good enamels came off after a couple of flights but the Krylon and other spray cans available at the BX lasted a reasonable amount of time before requiring touch-up.

Repairing Non-Working Air Conditioner

first, find a good refer tech and have him work with your AP if he is not able to actually do the work. your AP can make sure it is all done by the book. finding the leak is not that hard... if you know how to find them. If your really set on getting the AC running you will need to do several things.

1: find the leaks. usually nitrogen can be used to pressureize the system components. Find an AC guy to help you out. Do not try it yourself. You will be working with pressures that can hurt or kill you. It is not a job for someone who has no experience with refrigeration. Home AC, car AC, plane AC. the systems are basically the same. You will need special gauges and fittings.

2: fix the leaks. i am surprised to hear the post stating that the hoses are clamped with hose clamps as the operating pressures are such that hose clamps wont cut it.

3: as for charging, you will need to find someone with R12 to charge it for you. R12 is still available if you look really hard. as for conversion, you will need to find out if the metering valve can be changed, I would just go with R12.

Lastly, after re-connecting the system, prior to dumping in R12, you can pressurize the system and it should not lose a pound of pressure while you check it. Leave it overnight. Then evacuate and check again. Then charge.

Finding the parts and a shop to do the work may be your biggest problem. If you have an HVAC technician available to take a look prior to starting you might find out it is not worth the trouble. Then when it is all ready to go back together get your mechanic to put it all together for you and fly cool!

Reweighting Aircraft and Equipment List - Weight & Balance

After you get the airplane reweighed, you get a document that has three numbers: empty weight, CG, and moment. That's basically a single sheet. Every time you add or subtract something you make a new sheet that has the old weight, CG and moment, the change, and the new numbers.

The equipment list is separate, and should have just the optional equipment installed, plus weight, arm location, and moment for each item. That way, when the shop removes your antique BoatAnchor Navihomer 101 and puts in a new Garmin/UPSAT CNX 80, they will know how much to subtract to account for the old stuff before they add the numbers for the new.

The dirty secret is that Piper made it look like they weigh the plane empty, then added in the numbers for the installed options. In reality, they weigh the final product (that's the important number, anyway) then subtract all the options to get the "pre-option" number they have in the book.

To recap: the most important numbers are the current (preferably measured) values for the weight, CG, moment. And a list of all optional (removable) items with their weights and arms (and moments).

Arrow Gear Light Going Out and Pump Running After Landing

It's most likely adjustment of the microswitch; often times the actuator (small aluminum angle) gets all boogered up because mechanics bend it instead of loosening it and rotating it on its slotted hole (this is how you adjust the switch). Another more sinister possibility is that the downlock cam is out of adjustment; the clearance between the cam and peg that it fits into must be a certain value. The lock can be adjusted with an adjustment on the hydraulic shaft. Incidentally, it takes all 3 greens to turn off the pump; one microswitch alone will not do it.

Cherokee Six Vents

The air flow diagram in the POH shows this.

The only fresh air vents are in the ceiling and on the side panels by each person's foot. The ceiling fresh air is fed from the inlet on the tail of the plane. The side panel floor air is fed from the air inlets on the wings.

Most Cherokee 6 upper air vents are ruined, as the guts of the parts consist of weak rubber hosing that, over the years, shrinks and decays. My avionics tech, who had to remove my ceiling console, re-attached the hoses and patched where needed. All 6 ceiling air vents provide great air flow.

And

The ceiling vents in old sixes (the eyeball type) connect on the back with about 7/8" clear vinyl tubing that dries out, gets hard, cracks and won't stay on the back of the eyeballs. I replaced mine a few years ago, and while I was at it refurbished 5 out of 6 of my eyeballs. I wrote up an article on how to repair the eyeball valve using a bicycle tube and safety wire in the magazine a few years ago. Takes about 20 minutes/valve once you get the hang of it. That 6th valve...well, it is missing the rotating piece, and I have not been able to obtain a replacement.

Those ceiling vents provide a decent airflow in cruise. On the ground, they might as well be light bulbs.

Rejuvenating Master Electrical Contactor

If this is of any help, I was told by a mechanic a very long time ago that some of these master solenoids/relays/contactors/gizmos work by a large metal ring or washer making the contact between the two electrical points. Sometimes the points begin sticking to the ring/washer after years of use. Almost like being spot-welded. They used to take the solenoid (etc.) apart and flip the washer/ring over and it would work fine. I've never done this, never seen it done, not recommending it.

Overhauled or Remanufactured Engine?

Here's a few notes on remans and overhauls.

The FAA does not recognize the term remanufactured, although they use it when issuing an AD. There is only overhauled and rebuilt.

Overhauled: Dismantled, inspected, repaired, and reassembled within limits.

Rebuilt: Dismantled, inspected, repaired, and reassembled to new tolerances. In other words to rebuild an engine as if it were in the same state as new dementionally. Whether Lycoming does it or any reputable shop does it, it's the same. Some will say that the factory uses new parts, a rebuilder can do the same if the owner insists. Only a manufacturer can Zero time an engine, and there absolutely to advantage whatsoever, in fact it's detrimental.

Think of it this way. When zero timing an engine, all the logs pertaining to it prior to rebuilding, can be discarded, and start as if it was new. A prostective buyer may want to know what has happened during its life. I would, and most of us would if it were a rebuilt engine. If the engine was brand new, this would be another matter.

So before you get to far of course, those are the regulations regarding overhauled and rebuilt. There ain't no reman.

Brief Fuel Smell When Using Electric Fuel Pump

there is a short flex line just a bout 8 inches long on the left rear engine area. they crystalize with age and leak/break but seeps fuel when the pump is turned on. When the engine is on the fuel evaporates and blows out the bottom so you might not notice it as much unless your on the ground and thats when you'll smell some raw fuel. With the engine off, turn on the fuel pump and check just in front of the fuel strainer are for fuel. that should find it.

Replacing Rod Ends on Aileron Bellcrank

They are left hand threads on one end but only on newer model Cherokees. The older ones had regular threads on both ends and the one on the bell crank was pinned in place with a roll pin.

Heat Wrapping Exhaust

I have come across Cherokees with heat wrapped exhausts on at least one occasion, with no apparent ill effects.

However an experimental exhaust manufacturer who I respect very much (Sky Dynamics, Kevin) has told me that one of his customers wrapped a perfectly good exhaust and it was demolished within 50 hrs.

When you prevent the heat getting out, it will necessarily heat the tube more. If the tube is anywhere near its heat limit, it could go over the top.

Cherokee Six Rear Door

There is no simple solution. The fiberglass structure changes shape ("cold flows") over time. The only true fix involves cutting the box structure, shaping it to the door frame, then re-fiberglassing it. I have learned to live with it -- just put new rubber in the gap to minimize noise and the excitement of a passenger seeing the ground through the crack.

Tire Replacement Time

According to literature I have from Michelin, replace when you first see the bias plys. (cords) For wet weather operation, tires with 3 or less grooves, replace when the fastest wearing groove gets down to 2/32". For tires with 4 or more grooves 2/32" at the 2nd fastest wearing groove.

Some added info that might make you feel more comfortable using the tires until you see cords: Those first cords you see are tread reinforcing plies. There is more rubber below those (called an undertread) before you get to the carcass plies which are the main structure of the tire. You could throw the entire tread and the tire carcass would still maintain integrity/pressure.

Brake System Testing

Easy do testing for soft brakes. Assuming the brake pads are in good condition and the wheel bearings are properly pre loaded. Simply tap your hand brake (with your feet off the pedals) and observe the pedals, if they move in tune with the hand brake you have air in the system, and must be bled. Bled properly, moving the hand brake will not move the pedals (a very tiny bit. 1/16" or less is acceptable). Once bled properly, if it persists, then the masters, including the hand brake (if you use it a lot) is leaking internally. Brakes ought to be rock solid hard.

Self Etching Primer for Touch Up Painting

Self-etching primer can be found at major automotive suppliers like Auto Zone or Napa. It's not available at my local WalMart, but I've seen it at Lowes. Often it's a dark green color and can alter the finish coat match, especially if white. When I touched up the leading edges on my plane, I ordered self-etching primer in white from Eastwood (www.Eastwoodco.com) which worked well under the white finish coat.

NAPA 7220 in spray can. Self etching, and with zinc chromate. Pro auto paint shops also carry it. The NAPA stuff is gray and works great for nearly everything. Painting aluminum, steel, plastics, everything I've tried it on. It also comes with those great "fan pattern" spray nozzles. So, when you empty the can, save the nozzles for use with other compatible cans.

Sticking Primer

I had a gripey Primer, lubed it w/ Fuel Lube, and solved the problem. You A&P may have some fuel lube, it only takes a finger tip full.

Latch on Oil Filler Door

The latch is stainless and very seldom wears. The wear is inevitably on the striker plate. This consists of two pieces of aluminum rivited through the fiberglass of the cowling. If these are replaced the problem goes away. I solved the problem by inserting a sliver of brass between the two layers of aluminum and pressing them together to hold the brass in place. The latch positively locks the brass in and this has worked perfectly for several hundred hours. If the hinge is worn it must be replaced as any vibration will eat away anything one puts in as a striker plate. Regarding a seal to prevent any further flutter in the door, do as follows. Get a match of other suitable spacer which just prevents the door from fully latching. Carefully smear the door with a thin layer of vaseline where it contacts the cowling (all the way round) put a thin bead of silicone sealer around the seating edge on the cowling and carefully close the door with the match in place next to the latch such that the door is kept a tad open. leave for 24 hours...clean off the vaseline and presto you will have a snug fitting door with a custom seal.

Oil Quick Drain For Arrow

The Arrow drain valve is a weird one of a kind. An incorrest drain valve would ruin threads, and/or prevent gears from retracting.

Safe-Air has a replacement at a fraction of the cost of the Piper drain (about \$260).

734-522-8360

Alternator Power Source Relay Circuit

That diode/resistor circuit is used when you have a dead battery and start the plane using the external power plug. If you disconnect the external plug, the battery might not have enough voltage to keep the master contactor energized. If the contactor drops out, that circuit is supposed to allow the alternator to pull the voltage high enough to energize it again, and keep the battery in the circuit.

Personally, I've always thought the circuit is a little hokey. In the newer planes, (1977 on) the external plug is connected to the alternator side, and then it makes sense, because then you start the plane with the master off, and the battery is disconnected. If you turn the master on, that circuit is the only way to energize it. I don't know why Piper changed the circuit in 1977. Could it be they had been doing it wrong all those years??

Engine Oil Temperature High

Just went thru this with my plane. I have a Cherokee 140, and once around the pattern would see the oil temp at the top of the green arc.

Here are the steps:

- 1) Check the accuracy of the oil temperature gage.
- 2) Run the engine until 180 to 220
- 3) Shutdown and check oil cooler lines (both ends) and the oil cooler all sides.

- 4) A cold feed line (no oil to cooler) means that the valve is not working or the system is blocked.
- 5) Cold spot on the cooler means that you have AIR BUBBLE in the cooler.
- 6) If the system is working properly, the cooler will be just as hot as the oil sump on all sides.

Engine Oil Temperature Low

First and most importantly, is accurate measuring device. The system works as follows. On engine start, oil is circulated only through engine. When the oil reaches a specified temp. the vernathrem (what a dumb name for a thermostat), opens allowing oil to go through the cooler. It's sole purpose is to maintain the operating temperature of the oil (within designed limits, green zone). If it exceeds, it goes through the cooler. It does this, all the time after the oil is warmed up. Should the temperature drop, the vernathrem diverts oil directly back to the engine to get hotter. The by pass valve is for the cooler only, it simply divert oil back to the sump if the cooler clogs. Some earlier engines don't even have a vernathrem, just the cooler by pas valve.

You pointed out that you changed the vernathrem, and installed one from a 235 (O540). The 320s and 360s are alike, but different part numbers(320 75944 360 79544, they're close). The 540s run hotter, and would open sooner than the 4 cylinders, cooler numbers.

The entire vernathrem if not seating will be doing nothing, and letting the oil go through the cooler all the time. Be sure you have the correct oil filter housing base gasket. There are two types, and one of them can be installed backwards.

When you described the method you used to test the guage and the sender, when you heated the sender, was it operating the guage in the plane? Measuring resistance is an indication that the components work by themselves, but are they compatible with each other?

Maintenance Manuals on CD

Avantext inc. www.avantext.com ph 800 998 8857 has tech pubs (parts, service, ad's,service bulletins, etc.) for Piper. They are not cheap, but are the best source for information.

Coating Exhaust System, Motor Mounts

Be careful with exhaust coatings. They are not compatible with stainless. There is yet another problem, if the muffler or header has to be welded for any reason, the carbon build ups will be difficult to clean up and make welding difficult. Platings make it nearly impossible. As to powder coatings on other surfaces, they are great. They're tough as hell, but in the case of a motor mount, for example, cracks will be difficult to detect, airframes not withstanding.

Shoulder Harness Not Retracting

Check to see if the nylon cover over the retract spring is popping off. It has IIRC 3 legs that are pushed through the metal back plate. If one leg is popping out, the spring gets jammed. One of mine was doing it several years ago, although I don't recall now what exactly I did to fix it. I think I might have rotated the cover one leg. I am pretty sure I didn't use any adhesives, tapes or anything that wasn't already there. It might take a few times of taking it a part and putting it back together for it to stay the way it is supposed to.

Source for Aircraft Curtains

I am told to get them from an RV/Camper supply...which makes sense, RV's have many different sizes and shapes of windows....and due to automotive requirements, the burn certification actually exceeds the FAR requirements....

Check Muffler For Loose Baffles

take that muffler off and check it out!!

We had an exhaust pipe split and burn a hole in the carb heat muff during a 15 min flight. After we took off the old pipe and ordered a new one we decided to take off the muffler and check it. Had a loose chunk of steel rattling around in the muffler and a solid piece blocking about half of the opening to the tail pipe. Replacing the exhaust pipe without thoroughly checking the muffler would have caused the same exhaust problem all over again. To say nothing of maybe burning a valve, loss of some power and so on. Bad things could have happened.

Wing Walk

I put on the adhesive backed anti-skid about 8 years ago, --still looks great.. Bought it at a auto paint store. Do not buy the flimsey stuff that Wag Aero sells.

White Wing Root Seal

Everyone that I know that has used white, says that it fades...to yellow over time.

...and...

used the white and still looks good after a couple of years although it shows the dirt more. The work to install was a two day effort for me. Really takes a lot of patience, soapy water for lubricant, and a learned technique for "rolling it in" a fraction of an inch at a time. I used a short putty knife as a tool. It was a chore I wouldn't want to repeat.

...and...

I used the "Clear Glide" wire pulling compound. Both sides done in 45 min. Wire pulling compound available from Home Depot.

Ultra Leather vs Real Leather

Just redid my seats in cloth and ultra-leather, I used about 5 yards of ultraleather and 3 yards of cloth, my seats are high back and I had large pockets on each seat as well as the headrests.

Try Douglas Interior Products for a supplier, they were the very best price I found and very, very good to work with. www.dipi.com or you can email Ann Kilian directly ann@dipl.com for pricing and information, they will send you free samples!

I also did the confor foam - found the very best price at www.skandiaupholsterysupplies.com I bought it in sheets that I could cut into fours and use for each seat. The seats are so comfortable I used to sit on them in the living room and watch TV!

Intercom Installation - Ground Loops

If you do go with a panel mount, be absolutely sure the installer only grounds the mic/headset lines at only the source end, and not at the destination or both ends. This is the only way to prevent ground loops, which will produce background noise. You don't want that.

Lean of Peak - Bad Practice

The numbers are academic, and whether new or old, staying slightly ROP in cruise, and an increase during climb is good practice.

No engine has ever been able to produce performance by overleaning regardless of whatever it is. During the 70s in the early days of pollution controls and economy. Nearly all the auto manufacturers tried their hand, and everyone failed. Results were more pollution, worse fuel consumption, and more engine problems. This lean of peak is pure aviation nonsense, and a cause of a multitude of problems. If you recall when you were learning to fly, one of the reasons for fuel being ingested into an engine is for cooling, how are you going to cool it without required fuel?

Flight Manual - Older Planes

I have a 1969 Cherokee 140, but my pilots guide is for a 1973 also. You need to look thru you're weight and balance paperwork, you should find some 8x11 pages titled Airplane Flight Manual Model PA-28-140. This is the bible for you're plane. It gives you all the engine and air speed specs. My says FAA Approved 2/14/64 and revised 7-25-75. If you can't find it let me know, I can fax it to you (7 pages).

Skytec Starter Slipping

I purchased a Skytec starter for my TSIO 360 and had it installed when the engine was rebuilt. The starter slipped now and then and got progressively worse. 60 hours later the starter adapter died and I had it replaced (under warranty). Before reinstalling the starter I contacted Skytec and Signature Engines to make certain it would function correctly. Upon receiving assurances from both I reinstalled the starter.

25 hours into my new adapter the starter is doing the same thing and it is only a matter of time before the adapter dies again.

I contacted Gene at Skytec and told him what was happening and that it may be the starter causing the problem but I did not know. He informed me they have had reported problems, the the problems are few and far between, and that they have no idea what is causing it. He also told me they re-designed the starter because of the problems and it would be out the fourth quarter. But the last thing he said is "ship the starter back and we will send you a re-designed one when they are ready or refund your money." Since I have my old starter it sounds like a great idea. And my starter is a year old.

I am impressed with Skytec as a business and their customer service is fantastic. I only hope the starter works when I get it. But something tells me that even if it does not work, they will make things right.

Ampmeter Flicker, Headset Buzz

If you're hearing an increase in headset buzz, I'd bet your alternator is going out. I have the same symptoms every 2 or 3 years. All of a sudden the ammeter starts jumping around and I get an intermittent buzz in the headset. The problem seems to come and go depending on engine rpm and ambient temperature. In my case I've spent a lot of time diagnosing the problem, and have found that it is caused by a stator winding short to stator lamination. It turns out the plastic insulator sleeves they are now using to insulate stator windings as it is routed in and out of the stator laminations eventually melts somewhat and allows the windings to short to the laminations. Depending on vibration at different engine rpms and temperature of windings/laminations it will short or not. I removed my alternator and using a DVM found the point of winding/lamination short. I've brought this to the attention of Electrosystems, as they were the rebuilder. I asked why they aren't using the previous non-plastic insulators anymore. They didn't have any real answer and didn't seem interested in solving the problem. Next time it happens to me I'll be using an alternate method of repair.

Logbook Entry for Rams Horn Yoke (Using Piper Parts)

just did it...got into 'debate' with a couple IA's....called FAA....because AD is 'authorized data' and it is an OEM part as an alternate in the manual, no 337....it is neither a repair or modification to the TC.

Muffler Rebuilding

I sent my old mufflers and stacks (PA28-161) to Dawley, www.dawley.net or 262-763-3113 and told them to do whatever was necessary. They came back, with all the paperwork, either new (mufflers and one stack) or looking like new (3 stacks). Price as I recall was about \$550.

Removing Fuel Stain

I tried most every cleaner that I could find at the airport including most of those recommended on this post without any success. I had resigned to repainting the wheel pant so I thought I would try the last one in the mechanics shop. "MEK"?? anyway, I put it on the tip of a shop rag very sparingly and with a water bottle handy rubbed the stain...Presto, off it came...I immediately polished the area with simonize wax and can see no harm to the paint....I certainly don't recommend this stuff but it worked for me this time. I am having the valve changed out .Its still hard to believe that the dye in that fuel could leave such a stubborn stain.

Painting Fiberglass Parts

Important Safety Precaution:

- Always wear a respirator suitable for epoxy/urethane products.
- Ensure there is adequate ventilation

Preparation:

1. Using sanding block and 80 grit paper, sand until remaining paint has good bond to substrate with no peeling, bubbling, etc. If there is gelcoat with cracks, sand down far enough into gelcoat to sand out most of any cracking (not necessary to sand out all of crack, as significant removal of gelcoat might weaken structural strength of the piece, and primer will adequately fill and support finish coats). Any large gelcoat cracks left might expand later and propagate up into the primer and paint finish coats. So, large cracks should be sanded out.
2. Use filler on areas of damage, followed by sanding with sanding block and 80 grit paper.

Applying Primer Coat(s):

1. Wipe down surface with prep-sol on paper towel.
2. Wipe down surface with tack rag (unfold, then crumple rag, then use)
3. Use Mar-Hyde Ultimate 2K Urethane Primer Surfacer (high build, buff). Use Mar-Hyde Ultimate 2K Primer Surfacer Catalyst. Use Advantage 116 Slow-dry Urethane Reducer. Ratio: 4:1:1 (primer, catalyst, reducer)
4. Put piece of masking paper next to piece so it receives spray also. This is used to determine when the surface is ready for the next coat. Surface is ready for the next coat when touching surrounding paper yields sticky, but not stringy paint.
5. Using gravity-fed gun, at 35 - 40 psi, apply tac coat such that the surface is just lightly covered.
6. When touch test of paper indicates the surface is ready for the next coat, apply full wet coat of primer, then let flash for 5 - 10 minutes.
7. When touch test of paper indicates the surface is ready for the next coat, apply a second wet coat of primer.
8. If another coat is needed, first let flash for 5 ■ 10 minutes, then apply third wet coat of primer.
9. Note, runs and sags generally don't develop with primers, unless the application is very excessive. Also, some orange peel is common with primers. This will be sanded off later.
10. Watch pot time = 3 hrs.
11. Let primer dry overnight for better appearance and color holdout (this is a must for thicker builds, such as 6-8 mils, commonly produced with a gravity-fed gun).
12. Apply a ■guide coat■ of black. It helps to see where and how far you need to sand
13. Wet-cut primer coat with 600 grit (if you ■break through■ the primer in a lot of spots while sanding, you may need to re-prime and re-sand, but a few ■break through■ spots are ok. Use semi-flexible sanding block on flat and near-flat areas. Use shammy to wipe down piece periodically.
14. Note, there is no requirement on how soon the basecoat must be applied.

Applying Basecoat Color:

1. Wipe down surface with prep-sol on paper towel.
2. Wipe down surface with tack rag.
3. Use PPG Deltron 2000 DBC Basecoat. Use DT Reducer best suited for shop temperature. (See Basecoat specification sheet.) Ratio: 1:1 (basecoat, reducer)
4. Using gravity-fed gun , with a 1.3 ■ 1.5 mm tip size, at 35 - 40 psi, apply tac coat such that the surface is just lightly covered. It's important not to apply too much, as a run develops easily, more so than conventional paints.
5. When touch test of paper indicates the surface is ready for the next coat, apply full wet coat of paint, then let flash for 5 - 10 minutes.
6. Repeat the above for a total of 4 wet coats in addition to tac coat, or until hiding of primer and sanding scratches is achieved.
7. There is no pot life limit on this product.
8. Any masking tape should be removed after 20 ■ 40 min (at 70 deg). If it is left on the surface for a day or so, it will be almost impossible to remove.

9. Clearcoat can be applied after 15 min (at 70 deg), but must be applied no later than 24 hrs.

Applying Clearcoat:

1. Wipe down surface with prep-sol on paper towel.
2. If there is any masking tape glue left behind, then wait 24 hrs before applying clearcoat, then use a wax remover to remove the glue, being careful not to remove any paint.
3. Use PPG Concept DCU2021 urethane Clear. Use DT Reducer and DT Hardener best suited for shop temperature. (See Clearcoat specification sheet.)
Ratio: 4:1:1 (clearcoat, reducer, hardener)
4. Using gravity-fed gun , with a 1.3 ■ 1.5 mm tip size, at 35 ■ 40 psi, apply tac coat such that the surface is just lightly covered. It's important not to apply too much, as a run develops easily.
5. When touch test of paper indicates the surface is ready for the next coat, apply full wet coat of clearcoat, then let flash for 10 ■ 15 mins.
6. Apply 2 more full wet coats of clear for a total of 3 wet coats in addition to tac coat, letting flash for 10 ■ 15 mins.
7. The pot life is 4 hrs (at 70 deg).
8. Let dry for 24 hrs.

Color Sanding:

1. Wipe down surface with prep-sol on paper towel.
2. This step is also referred to as ■rubbing out• or sometimes ■color sanding•.
3. It is used to sand out imperfections, dirt, bugs, runs, and also to get rid of ■orange peel•.
4. First, remove all runs/sags by scraping with a razor blade. Scrape at a right angle to the run/sag. When properly removed it should feel like it's at the same level as the surrounding area.
5. Wet sand with pad and 1500 grit paper (lots of water and no elbow grease).
6. As you sand you will see the shine disappear from the high spots of the clearcoat. You can not see this while it is still wet with water, you need to dry it with a squeegee, then wait and you will see shiny low spots and dull high spots.
7. Keep sanding until the surface looks all the same (dull) when dry, being careful not to sand into the paint layer.
8. If it looks like you are going to sand into the paint layer, then you need to apply another coat of clear.
9. Wipe down surface with tack rag and prep-sol.
10. If a lot of the clear was removed in trying to ■even• the surface, then repeat the previous steps starting at ■Applying Clearcoat• step #6.
11. When the surface is ■even•, then lightly wet sand with pad and 2000 grit paper.

Polishing:

1. Wait for 24 hrs after applying the clearcoat, but not over a week
2. Wipe down surface with tack rag.
3. Use a foam pad on a polisher for all polishing and waxing
4. Polish with Fine Cut Cleaner (Meguiers #2)
5. Then polish with Glazing Compound (Meguiers #7)
6. Then polish with Swirl Remover (Meguiers #9)

7. After 2 weeks the clear can be waxed to remove all the final scuffs (Meguiar's Gold Class, in black bottle)

Congratulations you're done!

Notes:

1. Always use a water filter on the gun (Harbor Freight Tools has these)
2. Hold gun about 6 - 10 inches from piece. Overlap each pass about 50%. Spray should cover a fan of about 6 - 8 inches wide.
3. Adding an agent to flatten the gloss of the topcoat makes the finish coat less flexible, and therefore more likely to crack.
4. Catalyst or activator chemically causes the paint to become very hard and resistive to damage by chemicals, abrasion, and impact. Without it the paint can easily be removed.
5. When testing for desired color the entire system, as described above, should be used on a test piece.
6. For all cleanup use lacquer thinner.
7. With air pressure set as appropriate, first adjust pattern width to about 6 - 8 inches, then adjust material from nothing to just the right amount. Too high of material setting will cause runs and sags.
8. If painting directly on aluminum a conversion coating must first be applied, otherwise the primer won't properly bond to the metal. This is essentially a phosphoric acid etchant which reacts with the metal to convert into a phosphate film over the metal. The acid content of these materials is so low that a thorough flushing of the surface with water followed by air drying is sufficient to remove all traces of any unconverted acid. The extremely thin phosphate film left by this conversion provides a good bond for subsequent primers or topcoats.

I do recommend using an HVLP rather than suction-feed gun. It really does produce much less overspray and cuts down on paint waste. The materials used in this process are not inexpensive. A quart of PPG paint of this caliber runs anywhere from \$30 - \$40. The Clearcoat is just about as expensive. If at all possible, paint in a paint booth. I didn't and I've got a few nibs here and there. But, it didn't turn out too bad. If you can't use a booth, then by all means choose a time of year when dust and bugs are at a minimum. You have to be real careful of Clearcoat overspray. When atomized, it easily becomes a fog everywhere. And, if you get it on things you don't want it on, you will have a devil of a time getting it off.

S-Tec Autopilot Independent of Vacuum

I have an S-Tec 30 in my '73 180. The AP control is located in the Turn Coordinator, which is part of the autopilot, and will function in a vacuum failure because it's electric. The altitude hold will also work because it's independent of the vacuum system, as well. The heading bug and heading hold will be disabled in a vacuum failure because the heading bug is on the directional gyro which is vacuum-driven. Nevertheless, I selected the S-Tec in large part because its central control is electric and at the very least you keep the wings level and steer with it even if every vacuum instrument fails.

Fuel Gauge Problems - 235, tip tanks

Just had the same problem ... fuel sender was dead. If it is always empty, the problem is either an "open" in the circuit or the float fell off or it has a hole in it and has filled with gas. If you want

to try and get to the bottom of the problem without taking off the tank, check the back of the gauge and make sure there is no corrosion and that the wire is not broken and check under the back seats to make sure there is not a broken wire there. There are 2 wires that go into the right wing and 3 that go into the left wing (unless you have wing tip landing lights, then there are more wires). One wire goes to the red or green tip lights, the other goes to the fuel sender and the extra wire on the left wing goes to pitot heat. It is pretty obvious which wires go into the wings when you lift up the back seats. If you look at the gauge when you turn on the power and the needle jumps a little, then the sender is probably stuck down because the float fell off or there is a hole in the float. If it does not move when you switch on the power, there is an open someplace, and it might be at the fuel sender itself.

Also .. taking off the tanks is very easy as long as the screws are not rusted on. Taking out the fuel sender is also easy ... just a few screws. If you do it yourself and have a mechanic sign it off when you put them back on you can save hundreds of \$\$\$\$. I just did it myself.

Michel (TKM) Radio Repair

Joe is right, Send it back to TKM. They charge \$80 plus shipping unless they have to replace a module. Address is TKM, Inc., 14811 N. 73rd St, Scottsdale, Arizona 85260. Tel # is 480-991-5351. They won't send an acknowledgment-your radio will just show up about a week and a half later. They seem to be secretive about address and phone number. Doesn't show up in google search and is not listed in aircraft magazines I have searched. Comes back yellow-tagged and I have heard is guaranteed for two years.

Engine Hesitation Accelerating Through 1300 RPM

My O360-A4A has always had that symptom. I've flown several other PA28s with A4A and A4M engines that exhibit a slight rough spot around 1300 rpm. It has been explained to me that this range is where the carb is shifting from the idle circuit to the normal jet. Sounds plausible. The fact that I've experienced this in so many other similar planes leads me to believe it's true.

Mountain Flying

I flew my 140 from Washington, DC area to LA last summer and have flown to Grand Canyon (6600 ft), Sedona (4000+ ft), etc since. I go IFR so am generally above the passes. The 140 can cruise comfortably at 12000 ft, but I cannot so I use oxygen at 9000 ft and above. Get a pulse oxymeter, your blood O2 level will likely surprise you (forget what the "regs" say). Read the AOPA info on mountain flying, it's great. Stay well under gross weight, expect little climb, and don't fly when winds aloft are strong (25+) because you will have no ability to climb against a downdraft (so get ATC to let you ride the updraft if you are not 2000 ft at least above terrain.) It's fun, challenging, and amazing what that plane can do with care and good planning!

Source of Aeroshell Oil

if your local Sam's club doesn't have it or you don't have a local distributor near by, then www.stores.yahoo.com/oilstore/aerpsenoil.html at \$32.39/12 qt case plus shipping (for me to Iowa a little less than \$10) is the best deal.

Ground Running Engine With Cowling Off

Mechanics are bad to run an engine without the cowl on. The problem that emerges is that the cowling forms a 'plenum' into which air is packed by the prop, this packing forces the air down thru the cylinder fins and draws away the heat. Without the cowling top, there is no plenum effect and no pressure builds up, hence no downward air movement, and no cooling. This is a good way to toast your rings and Valves. 'specially on a new tight engine!! If you MUST run your engine for extended periods on the ground, you should put the cowling on.

Sealant Around Cables on Firewall

Be carefull with using silicone sealants. They corrosive, and will attack electrical connections. There is a non corrosive available from Dow Corning and GE and avialable at industrial supply houses. Also at NAPA they carry a silicone that is sold for sealing around engine that will not attack electrical connections. Some is labeled non coorosive and some states that it will not harm O2 sensors.

Removing Screws, Fuel Tank

I have had to remove Cherokee tanks for years and admit the screws can be a bear some times. If one or more is stubborn, I always cut a slot in the head with a Dremal tool and have never had one I couldn't get out. I know others were trying to help you but I would never use a impact screw driver/hammer on the wing. The damage could be very costly. When you get all the screws out, if the tank is stubborn, you might need to place a 2X4 on the edge of the tank above the spar and strike the board with a hammer to dislodge the tank. Its always worked for me.

Kolola Shoulder Harness

I installed the Kosola shoulder harness for the front seats of our '65 140 last month. It's fairly labor-intensive but the results are good. The installation is similar to Piper's factory setup, with a doubler and support structure riveted into place above the rear window, and the inertia reel mounted to the new structure. Parts kit was around \$700/seat including inertia reel, new lap belts, STC and drawings. They also sell a kit with adjustable strap and no inertia reel for a couple hundred \$ less.

High Ammeter Reading - Piper's Shunt

A shunt across an ammeter is normally a resistor from one post of the ammeter to the other that protects the ammeter from high power.

Piper issued the service bulletin and in their wisdom went the cheap route. What they call a shunt is a length of heavy wire on the input side of the ammeter. The main power wire comes to the back of the instrument panel on the left side. It has an eye crimped to it and a length of the same size wire is bolted to it via another crimped terminal. From that crimp a smaller wire goes off to the ammeter and another small wire leaves the ammeter at the other side.

The length of wire that is bolted to the input wire is Pipers idea of a shunt (resistance). I checked several Cherokees and Arrows and found several ways of doing it ranging from a straight wire to a coil and a curly wire like a 'phone cord.

I found that my problem was an out of calibration ammeter and once that was adjusted all is well.

I was helped in my search by George from Lock Haven Air Parts who is a wealth of knowledge and told me how Piper had gone the cheap route.

Electric Fuel Pump Troubleshooting

1. If pump is making noise (clicking) and no fuel, then start by removing the housing end and cleaning the fuel filter.

2. If no pump noise, with the pump switch on, measure the "hot" terminal on the fuel pump to the frame with a multimeter and see if you have a nominal 12 volts. If no voltage, there's a wiring/breaker/switch problem.

3. If no pump voltage, then with all switches off in the plane, try the following:

*** Make sure there's no fuel leaks around the pump ***

- a. Use an external 12 volt battery source
- b. Use 2 jumper wires, at least 4' long.
- c. Connect a jumper wire FIRST from the outside of the pump housing to the battery (-) terminal.
- d. Connect a second jumper wire to the HOT terminal of the pump.
- e. Now, touch the wire from (d) above to the battery (+) terminal and see if there's any pump action.
- f. If nothing, then pump is dead. If it works, there's a wiring/switch problem back to the panel.

You do not want to be introducing an arc (spark) near the fuel pump area. Make the final connection at the battery end, not at the fuel pump, when you apply power

Arrow - Things to Watch Out For

I've had a 67' Arrow for about 12 years. They are basically a fancy Cherokee, so all the same issues apply (oil pump impellor, etc.). The gear system is excellent; it can only fail down (and locked) because it is held up with hydraulic pressure (no up locks). Having said that, if your plane has over 4000 hours it may be time for a main gear rebuild (bearings and bushings and about \$2000). There's also an AD to inspect or replace the main gear side brace studs (95-20-07). Hydraulic components do wear and occasionally prevent the gear from retracting or cause the pump to cycle in flight. It is easy to isolate each component at the manifolds under the rear seat and identify the culprit when cycling on jacks. Many times, it is the emergency extension valve (a hydraulic valve that is actuated by the auto-extend system or the lever between the seats) which can be rebuilt with 2 O-rings; I've had to do this twice in 12 years. The reason the gear system gets a bad rap is because mechanics don't take the time to understand the system. I always fly with the auto-extend system active, only locking it when departing in high density altitude situations (like summer time at gross weight at AEG). It's never been a problem during approaches because I drop the gear at the FAF anyways. When practicing stalls, it's actually instructive to let the auto extend system do it's thing, because it could happen for real.

Weight and Balance - Forward CG

Check your weight and balance envelope. It may be an original, which appears to have been amended. Obtain a current AFM, serial number specific for the plane, and you almost certainly will find what I did; the envelope you're working with is antiquated and obsolete. The newer envelope is more generous. The plane was proven to have greater performance capabilities. The envelope is not plane specific, but model specific.

Field Approval for ACS Yokes

I thought I'd pass this along to you. My A&P at Redlands, CA (L12) has had many successes in getting field approvals for the ACS Yokes sold in the Aircraft Spruce Catalog. When I told him that others had had some problems in getting an approval for these yokes, he was quite surprised. I asked him if I could pass on his number for anyone interested and he was delighted. His name is Casper Terry and his office number is (909)974-3244 at Red Aero Aviation. Hope this helps someone, Rick Miller '76 Archer II N8411C

Removing Sealant from Plexiglass

Buy a can of "OOPS" from Wal-Mart, you will find it in the paint dept. Will remove almost anything and will not harm plexiglas. We have been using it in the shop for years. Even cleans grease from ultra-leather without staining leather.

Flat Oleo Struts and Wrong O-Rings

I bought a PA28-235 that had been a southern plane, brought it north where we have cold-cold winters. The first real cold snap made both mains go flat, and fluid all over the place. We tried to do conventional servicing first and all was well for about 10 minutes, then fluid all over again. We order the "O" ring kit from Wag aero, it had rings that were round (speaking of a cross-sectional view), and others that were square cross-sectional view again. We did all that work, removed "O" rings that were round cross-sectional, and as you described, all distorted and mis-shapen. We were real dumb! we put in new ones of the same shape, it lasted probably a couple of months, then crappola again. I called the local Piper dealer parts dept to see if they had new ones available (thinking we had gotten defective ones); he was very helpful, and said they had them in stock, his book said they were square (cross-section, again). I said no, I don't think so, the old ones were round---- then the light bulb went off over my head. Was it possible what we had taken out in the first place had been the wrong ones?? We put in the square ones, and absolutely NO problems for years.

Control Wheels Difficult to Turn

A friend complained of stiff controls. After a brief inspection I found the Double-sprocket shaft (that controls the ailerons with the chain on top of the t-bar) could hardly be turned with vice grips. After loosening the chains, I tried to remove the shaft to lubricate it and it was everything I could do to remove it. It was really frozen to the bushing due to lack of lubrication. Piper Service letter 396 covers this for s/n's 28-1 to 28-971. This was a later s/n. On your next annual or service I would recommend you pull this shaft to make sure it has plenty of lube on it. On the plane mentioned, we polished the shaft lubed it and the controls feel like it had power assist they are so free moving. Some time even the mechanic can overlook something like this.

Flaps Slow to Retract After Handle Brought Up

Mine did the same thing until after the paint shop removed the flaps for painting, then cleaned and lubed the turnbuckles at the flap attach point when they put the flaps back on. Now the spring will lift them from the third notch without help.

...and...

Check to be sure the push rod that connects the outboard flap bracket (on the outer end of the flap tube) to the flap is on the correct side of the bracket. I was helping a friend do his annual and I discovered there was some binding when working the flaps. Studied the system and

discovered the push rod was connected to that bracket incorrectly. Works great now. Have someone work the flaps while you look at that area and be sure there is no binding.

Exhaust Leaks at Joints at Muffler

Remove them and reassemble with fibre wheel bearing grease. It'll make a carbon seal. Do not use stove pipe cement.

Removing the exhaust system is part of an annual. You most likely have a crossover system, if so, check it carefully for broken internal baffles, and that the end cap in the internal baffle is intact. Use blo proof gaskets with anti sieze compound, and the fiber wheel bearing in the slip joints. It'll be messsy after you start it up, but cleaning after it cools donw will stay that way after words. Tighten all parts in sequence.

High Oil Temperature

Just for starters, I'd recommend you check the accuracy of your oil temp gauge.

- Remove the sensor from the engine.
- Fill a small metal bowl with vegetable oil.
- Install temporary extension wires to sensor (make sure the're not to light. 16 gauge would be okay).
- Place sensor in bowl, along with an accurate high-temp thermometer.
- Raise the temperature of the oil to about 180 deg as seen by that thermometer.
- Turn on plane Master.
- Compare the panel gauge reading with that on the thermometer.

If after running this test you conclude your gauge is accurate, then here are some things to look at:

- engine baffling
- mag to engine timing
- defective veratherme (sp?)
- exhaust system constriction (loose baffle in muffler)

You didn't mention what part of the country you fly in. Here in the Phoenix area it's not uncommon for a PA28-140 to run near the high end of green. Mine does sometime, but not as quickly as you mention.

Lubricant for Yokes

I use CRC Heavy Duty Silicone spray, available at Ace Hardware, AutoZone, etc. for around \$2.50. It contains NO PETROLEUM DISTILLATES!

Unfortunately, many "Silicone Sprays" contain petroleum distillates. I know GUNK brand and Triflow contain petroleum distallates.

I avoid using petroleum base products around rubber materials and bushings, such as on the yokes. The CRC brand is great for tool protection in Florida, without the oily mess.

Lack of Overvoltage Relay on Early Models

Unless the OVP was called out as an option on your plane (which I doubt) it would at least require a 337. I don't know how hard that would be to get. Another option is to find a non-Piper STCed replacement from Zeftronics or Electrodelta. They also have combination regulators/OVPs.

Most cars don't have them, but on the other hand they also have better regulators. Even Cessna uses four wire regulators, instead of the crappy three-wire ones Piper uses. Since the field control current AND the bus sense line use the same wiring path through the breaker, master switch, etc. IF the resistance in that path goes up, the regulator will take the bus voltage up to compensate. Bad.

Hose Thread Sealant

I use Tite Seal. Avail at Wicks or Spruce. Real good in oil and fuel applications. Doesn't get hard and works well in the connection.

Information for Brake Disk Replacement

Contact Parker Hannifin (Cleveland Wheel and Brake) 1-800-272-5464 and for free they will send you a CD that has everything needed to do the job. Torque specs thru anything else.

Oil Cooler Leak

After a short flight last week, I noticed a small oil spot on the floor. I immediately had my A & I check out the engine and he said it was a loose hose that he tightened and that I was good to go. My next flight was a 3 hour trip during which there was no oil pressure drop. But, after getting out, I notice a large oil spot on the ground, my front wheel pant was speckled with drips and my belly was "wet" with oil. The dip stick showed 3 quarts low. I had the mechanic at the destination airport check it and he found that the oil cooler was leaking in a "seam." The hole was getting progressively larger as the seam weakened with the heat expansion etc. etc. An overhauled oil cooler was ordered, overnighted and installed. No more leak. I felt very fortunate that the oil cooler did not rupture into a larger leak leading to a loss of pressure and a forced landing. I am now a believer in doing a test flight after mechanical work--even for what appears to be "simple" problems.

Checking Airframe on Inactive Cherokee

I'll give you a brief list of some things I feel is critical.

1. Pull the fuel tanks and inspect the spars for exfoliation of the spar caps.
 2. Replace the fuel flex hoses if they haven't been replaced in the past 8 years
 3. Install a new vacuum filter and regulator gator filter
 4. Check your brake hoses and see how old they are (still a 8 year item).
- Check the torque links. They must be inspected every 5 years for cracks (requires stripping).
5. Check your baffle seals. If they are limp, have them replaced Summer is just around the corner.
- Watch out for cracks in the tires if you haven't replaced them.
6. Make sure your door seal is good and windows well sealed.
 7. Be sure to check the forward and aft spar attachment for corrosion.

8. remove the main pivot bolt on the control column. These seldom get lubed and can cause stiff controls.

Other tahn that inspect it good and lube everything. Besure to check control cable tension per the book.

Also, besure to check the wiring behind the alternator for cracks

Turbo Arrow

I have a turbo arrow and I love it. However, if the only reason you are looking is for retract time, there are many less expensive options. The only real reason for going with the turbo is for Altitude. Some cost to consider that I have encountered.....Alternator bushing, \$521.00 Spinner and spinner back plate \$2000.00+ Factory Reman TSIO 360 F1 in excess of \$30,000.00 Nice bird though, just be prepared to let loose of some cash with it. Add Oxegen and go on up to the Flight Levels, it will get you into Boeing country.

Spark Plugs to Avoid Fouling

Same problem until I switched to REM37BY. They were design for fouling issues.

Installation of Gates Belt - Not Piper

first of all you can use the Gates belt and it is as legal as can be. As the owner of the aircraft you have the authority to have the belt installed if you own the aircraft. In addition, your mechanic has the authority to install the belt if you purchase the belt and and hand it to him to install. The authority is FAR 21.303, para (b),(2). That authority comes from FAA regulations and don't let anyone tell you otherwise. If they question it, tell them that that was straight from the FAA. The entry in the log book would be that Gates Belt P/N 9335 was stalled as provided by the owner in accordance with FAR 21-303.

Airframe Corrosion Protection

I've been using Boeshield for the past 4 years or so. It turns into a waxy substance instead of running off like corrosion X. My mechanic has commented several times that it didn't need to be redone at the annual because it was still on from the last year. I redo it anyway (it melts the old stuff off when you reapply it) to make sure it is in the seams. Boeshield T-9 is available at any boating supply and usually at Wal-Mart.

Flush Oil Cooler When Rebuilding Engine

The cooler should be cleaned to remove the varnish build up internally. Solvent flushing and or reverse flushing will not remove varnish build up.

I have used Pacific Oil Cooler in

So. El Monte California. Turn around time was good and the oil temp dropped.

The process they use is interesting.

<http://www.oilcoolers.com/>

Fuel Selector Valve Rebuild

I had the same problem. The shop rebuilt the fuel selector valve and there has been no smell since. The parts were listed on the shop order as

MS29513-011 Seal

MS29513-018 O-Ring

They apparently used one of each for a total of 95 cents for the parts and \$227 for 3.5 hours of labor. The tanks apparently had to be drained, which I guess accounted for a lot of the time.

High Time Engine - Good Compression

One misconception about high time engines is the assumption since that it may have good compression, so the engine must be healthy, but a look at an oil pressure guage, assuming everything is in order, will tell a different story. These are extreme scenarios, but they happen. Just did an annual on a Mooney recently. The owner claimed good compression on a 2400Hr O360. A cold compression test revealed, one collapsed lifter, and every valve above max bleed down clearance limits. It had a slow rising oil pressure guage. Checking the timing revealed that the prop had to be moves nearly 5 deg. or so, before the mags moved. This revealed much of the condition of this high time engine with good compression and slow oil pressure rise. The owner sold it immediately.

High Oil Temperature - Air in Oil Cooler

The first thing I asked them to do was flush the oil cooler, since the Piper Service Manual says it is suppost to be done every 500 hours, and I could not fine a log book entry that it had been done.

The problem was when the flushed it they never removed the cooler, so air got trapped in the cooler, because the inlet and outlet are at the bottom, air gets trapped and no way to get out.

I un-bolted the cooler, turned it 90 degrees, with diconnection the oil cooler lines, so the inlet was on the bottom and the outlet on the top. I then ran the engine until the temp stayed put around 190 degrees for 5 to 6 minutes. Shutdown checked the oil cooler was hot, and started doing the happy dance.

Engine Horsepower - 160 HP Upgrade

Before you get too carried away with spending your hard earned money to make the ultimate world beater 140, here are a few things to consider.

The airframe is only going to go so fast and it's just about at the limit. You can improve handling, looks and other asthetics, but the speed gain is negligeable, if any.

Most airframes are not rigged properly. This was noticed by the three judges at the Afton fly in. Rigging, the simplest and least expensive speed mod. It can be as much as 8 to 10 mph loss of published speed.

In nearly every case, a 10hp STC will be noticeable over a tired engine has been OHed, and you'll pay a price in the long run for a very slight increase over the worn engine. A well tuned and running engine of 150hp will climb very well, produce the AC's published top and cruise speed, and won't drain your pocketbook. The 10hp increase will hardly be noticeable.

If that will not convince you just look at the specs between a 140 and a 180,a 30 hp difference, an additional 40 cubic inches diaplacement. These are Hershey bar Cherokees top speed: 140, 142mph, 180, 148mph, cruise, 140, 135mph, 180, 142mph, climb, 140, 631 fpm, 180, 725fpm. AC EWs, 140 1274#, 180, 1386#.

Now for identical aircrafts, with a difference of 126 extra pounds, the 180 with 40 extra cubic inches displacement, will render, 94 extra FPM, 7mph in cruise, and 6 mph in top speed. Do you think the extra 10hp and all the other "extras" are going to make a dent in performance? Over a worn out engine maybe, but a well trimmed and top running engine, I think not.

On an other note, a 235 Dakota is basically a 140 with a large engine, from 320 to 540, nearly double in size, and horsepower. The top speed gain is 24 mph. Watch your money.

...and...

The RAM "upgrade" "STC applies only to the E3D. The website is confusing, but you change cylinders with taller pistons.

AMR&D "upgrade" STC applies only to the E2A.

They both have "additional" STCs to hang the upgraded E3D, E2A or standard 160 hp D3G or D2A on the 140. Don't confuse this STC with the engine upgrade.

Prop repitch is a totally nother breed of cat. You can do it with any of the upgrades or the powerflow, depending on what you want.

You are right, forget about the carb rejet, unless you have a peculiar carb.

Laminar Flow Speed Pants

I added Robin's speed pants to my long list of mods last week, still waiting for the Powerflow Exhaust due next month (eager too!). Anyway it just happened that I had to make a run right away from San Francisco to San Diego and back, so I got a good taste of the changes to my plane from the speed pants. I am not going to make any scientific claims. I didn't take accurate readings of temperature and weight and everything else. But i do know my plane, put about three hundred hours a year on her, so I know how she flies any pretty much all circumstances. My best guess is that I gained somewhere between four-to-five knots of speed for a given power setting. Not top end because I don't fly full throttle, I can already pass redline. I fly at 2500RPM on my O-320 and I was cruising my PA28-140 at an average (GPS) of 117, averaged between the downward and return legs. Not too bad! I also did two cross countries this weekend with consistent performance. So I would have to say that the speed pants have provided the sigle best imprvovement in speed of anything I have added so far. And the feel is quite different as well. The plane doesn't feel like it's 'dragging', but rather more like a retract. Not quite as clean as a retract - but getting there.

The pants were a pain to install and required a fair amount of custom work to fit them. Roughly ten hours for both sides, not including any finish work like painting. And the installation instructions are pretty sad, so you have to be patient and loose fit things and then go back and try to understand the intention. Clearly this is a new product that will be refined. But the gain is well worth the effort and cost! I do have to say though, the look reminds me of my kids walking around in my big shoes!

One Magneto Starts Misfiring in the Air

If you do have that happen in the air you can switch to the one good mag and it will get you back home. If not it could blow a cylinder off of the case.

No Fuel Pressure Indication on Gauge

The first place I would start is the gage. If you haven't already, turn the pump on and tap on the gage. I have found many times the gage is sluggish and that is all it takes. You didn't say anything about the pressure with the engine running. Does the gage indicate pressure with engine running? If it does, the next place to check is the internal screen and filter inside the electric pump. You gain access to these by rotating the cap on the bottom of the pump. First you remove the screen and next the filter which is up inside the housing. If they are clean, you may just have a bad pump.

Water Leaks

Nothing worse than hopping in the Cherokee on a 95 degree day and finding 2 inches of water on the floor! Man I hate that. Lots of sealant and the biggest bruises cover they make took care of my leaking problem

Painting Back of Propeller

Aircraft Spruce has propeller paint in pressure cans -- I think it is about \$6. I've used it for years. Started with regular flat black enamel but I like the prop paint better. Use light coats and be sure to mask off the near-by aircraft surfaces.

Be aware that you can put the blades out of balance (think vibration). Strip the prop of old paint then repaint. I use a light coat of zinc chromate very, light on the z.c., then the same amount of paint on each blade. That goes for the tips too. Keep things in balance.

Prop Guard Propeller Tape

I put PropGuard on my plane when they started construction at my airport and kicked up a heck of a lot of stones. It has paid for itself many times over, I am sure. So far it hasn't been nicked enough to require a patch. But it has been hit a bunch of times.

It cost about \$65 and an hour to install (another \$50) as I remember. Let's see -- prop overhaul \$2000, prop guard \$115. Hmm, seems like cheap insurance...

Interior Renovation

I too just completed a full interior restoration in my 74 Warrior - total cost, about \$3,500. I started by removing and painting all of the window fairings with SEM vinyl paint - they look new. I painted the headliner and plastic panel overlays with the same. I installed Airtex carpet. I then picked a really nice leather-like vinyl (\$65 / yard) - 2 colors, and sent it with a design sketch to Airtex for my side panels. They gave me 10% off for supplying my own material. My local upholstery shop reupholstered my brow with black leather, and seats with the same material I sent Airtex. He also painted the frames, re webbed and foamed, and we even narrowed the rear bench seat to allow for an easier installation.

The Airtex side panels are awesome - so too are my seats. The interior has a factory new look. I also painted my door edges and door jams, and installed new door seals. I stripped the chrome off of the armrests, painted them, and made new padding that covered the ashtray holes. I used plastic recessed headphone jacks for the rear seats, and lots of little detail stuff: refinishing the flap handle, radio faceplates, new vents from Plane Parts, etc..

Installing wingtip wiring with tanks still installed

If all else fails, try this: Slide a piece of 1" PVC through the lightning holes temporarily all the way to the wing route. Tape the end of the wires to a small plastic baggy. Stuff the baggy into the

pvc. Slip a vacuum cleaner hose over the end of the other pvc end, turn it on and WHOOSH, wires are fed through. Laugh but believe me it works. I ran over 500' of phone line through pvc that way (20' increments).

Leaning With EGT - Time to Stabilize Readings

Are you allowing enough "time" for reading to stabilize, as you approach peak? In my 140, straight and level at 2300, I find full rich to be about 1330F. Slowly leaning, it will reach a peak at about 1485F. As you approach 100F above the full rich setting, while leaning, be sure to allow about 30 seconds of settling time as you inch your way to peak.

By the way, the 1330F as a full rich condition is very dependent on location of probe as to distance from exhaust port and position of the probe (center wise) within the exhaust pipe. Your base number may be higher or lower. However, I'm guessing your peak number should be within 200F of the full rich base number.

Conversion - 260 to 300 HP

There is one that's held by a man in Wisconsin. I saw it on the FAA STC site and I called him. He said "too, too much work. Don't do it!" Not only does the engine & plumbing need changed, the cowl needs to be altered as well. I would think that turbo-normalizing is the way to go if you don't want to sell the plane and move on to a different model.

Third Window Decals

I went to a sign shop and obtained a roll of heavy duty black sign vinyl. I cut out a template out of poster board. I made several cuts until I found a pleasing design. I have a Cruiser with the rounded window edges. I even sanded the poster board edges so they were perfect. I then traced the design on the paper side of the vinyl. I purchased a sharp long cut expensive scissor, for my tool box, and one that my wife would really like, and carefully cut out each side. I cleaned the area on the fuselage with Prepsol, to remove any wax. After a thorough cleaning, I applied a wetted soapy solution to the area and applied the new window. The soap solution allows for some adjustments, so it was just right. I then carefully squeegeed the new 'window', until all the soap solution was removed. Looks great, just like a window from a distance, and cost less than \$15 in materials, and a couple hours of work. (And it can be easily removed later.) My plane is white with red and black trim, so it looks good. I have heard of other people utilizing a gray or bluish vinyl, also with a nice look.

Draining Fuel from Tanks

If you use the quick-drains, be sure to electrically connect your airframe to the fuel container. The flowing fuel can build up a static charge that will want to jump the gap between the plane and the container.

I knew a pilot that burned down his plane and hangar that way. He noticed a faint blue glow around the stream of gas, and a few seconds later the whole place was on fire.

K & N Air Filter

K&Ns from Challenger Aviation only, are approved for installation. They carry a PMA and no "paperwork" required, just enter the installation in your log. 100 cleanings at 100 hrs. is one hell of a deal. You will be paying for that magic approval and sticker. Well worth

Leaning With Single Probe EGT

Typically, these dinosaurs should be kept well under 1500 deg. Having said that, a lot depends on location of the temp probe, condition of your exhaust system, the gauge itself, and connections.

Engine condition is most important as well in a single probe installation.

The best way to determine your particular engine, is to simply follow the method, we were taught when we learned to fly. On level flight, at different alts., lean until rough, and enrichen until it smoothens out, and note what your temp is. Once established, you'll know what's hot or cold for your prop twirler.

Some EGTs don't even have markings, but only have a red line limit tell tale, which is the required limit of your engine, once you have established it.

Renovating Dull Paint

1. Try some "Soft Scrub" to remove the old chalky paint. then wax with a good quality cleaner wax, I like Maguire's or just good ole liquid Turtle Wax.

PS just keep clear of the windows when using "Soft Scrub"

2. I use the stuff from Sporty's and have been pleased; Carbon X to clean the dirt off and Polyglide for the shine.

3. At first I used carbonex and found it was also taking off paint even when I diluted it to a 10:1 solution. Great for the underside a couple times a year, but I don't use it more than that.

I use ReJex wax for the wax on the leading edges. It works great and bugs come off with plain water and a rag. The wash/wax spray that comes in a plastic bottle with a sprayer on it works great for the rest of the plane. It washes and waxes at the same time with a rag.

Noise from Rotating Beacon

I have the Grimes Rotating Beacon and the static and noise was terrible. I removed the lens, and examined the unit. The bulb had corrosion around the base so I used sandpaper and polished the brass on the bulb as well as the contacts in the base, then applied some electrical grease to the bulb. Re-checked the comm, and no noise! That's been 3 weeks ago.

Spray Painting New Inspection Panel

For small jobs like that, I use 'Self Etching primer'. There a zillion shades of white, I find that the 'gloss white' by Rustoleum is a near match to my factory 'Juneau White'. Both available in spray cans at Wal mart.

Switching Seats, left to right

I switched them side to side in my 72, and no one knows the difference. They fit right in. The only difference is now all the controls are on the wrong side, but I got used to it.

Eliminating Bugs on Leading Edges

Use Rejex wax. It was written up in AOPA as "an item that works as advertised." Since I have been using it, I can wipe off bugs with water and a rag.

Simplified Method - Hole Finding in wingtip Installation

I was reading Light Plane Maintenance magazine and saw a great way to find the holes without using a fancy tool. I'll try to explain without pictures.

- 1) After removing the tips, put several pieces of masking tape parallel to the wingtip. The intent is to make a drawing surface on your wing.
- 2) Use a pencil and draw a large "X" with its center at each screw hole. Make sure that you will be able to see the tips of the X when the wing tip goes back on.
- 3) Put the wingtip back on. It will cover most of each X, but you should still see part of each X if you drew the lines long enough.
- 4) Get someone or something to hold the wingtip in place. You can now use a pencil and straight edge to redraw the X's on the wingtip, using the visible portion of the X you drew before as a reference. The center of each X is where the screw hole is.

Replacing Arrow Automatic Gear Diaphragm

I had the diaphragm replaced on my '70 Arrow on 8/14/02 -- the second time in twenty+ years.

There was also a mud dobbers nest in the air speed sensor on the left side of the fuselage.

You might try kit number 761-138 (gear extension kit) which should include the diaphragm -- list is \$128 discounted to \$116.

KCAC (in Kansas City) has the kit in stock -- to verify, call the parts mgr -- P.D Ray at 800-475-5222 and see what he will ship it to you for.

Installation of Wet Vacuum Pump

My dry pump self-destructed 13 years ago and I replaced it with a Garwin wet pump and Walker air/oil separator. Installation was relatively easy and operation has been great...

Oil Level - Cherokee 140

I put in seven qts at oil change and keep the level at six. Any more oil than that goes to the belly. That eng has far more oil capacity than it needs for lub and cooling. All this extra oil -- six qts and above -- is there for a leak reserve. Got over 3,000 hr on my own 140 with this practice.

Starter Replacement

Two weeks ago while flying Young Eagles, I had loaded up another three kids, hit the starter and heard it spin, but not engage. After climbing out and inspecting, I noticed that all of the teeth on the Bendix were gone. That stopped my flying for the day. This starter was installed in '92, when I replaced my engine and I've been told that I got good service out of it, for time and the many starts on it. Some days, when flying kids - I may crank 10 to 20 times on a hot engine.

I began the search for what I thought was the right replacement. I asked around, posted here and called several on which starter they had and compared costs and challenges. The StarTec comes recommended by many, requires an STC, some mods to the baffling and a longer starter cable. The Magnaflite doesn't (and was as highly recommended), so in weighing my options - I went with it. I called the manufacturer in Fort Point, AL about the Magnaflite to find out which model was the one for me. I then called Spruce to place an order only to find out they were out and was on backorder. I called the manufacturer again to ask about the backorder situation and was told that one of their suppliers had decided to stop supplying one of the components and that they had found another and was in the process of testing it for quality. They stated that they would not sell again until they felt comfortable with it. They then offered a name and phone number of a local

FBO (Evergreen, AL) that had one in stock. I called and ordered the last one they had for a while, said it was the most popular model. Cost was \$350 plus a \$200 core deposit and shipping. First, thanks to Augusta Aviation for allowing me to use their maintenance hanger and the watchful eye of an assigned A&P to allow me to do this on my own and save money. They even had the plane in the hanger, waiting, when I arrived that morning.

What a pain! My legs still hurt from bending down much more than I am used to. Remove the spinner, front plate, prop, back plate, lower cowling, nose bowl and everything connected to them. The right baffling, the alternator belt, starter ring and the starter cable was the last items to remove. I laid everything out in order, marking each with an arrow for ease of remounting in the position that they came off. The four bolts on the starter are in such a place that moving them more than an eighth of a turn at a time was a challenge. I was surprised at how loose they were, requiring not much effort to start them turning. Off with the old starter, finding it much heavier than the new one. While it was out of the way, I cleaned up everything that needed it. I placed the new starter in the slot and attached it with the same (now clean) bolts, tightening as much as I could. The starter cable was long enough; I just had to reposition it since the connection on the new starter was on the rear, as the old one was on the side. Yes, I did replace the alternator belt with a new one while I was there. Reversing the process, torque the bolts, safety wire, adjust the alternator belt and adjust the cowling took less time than removing everything. Time from start to finish was about 5 hours with one bathroom break and one cold drink. The lineman pulled my Cherokee out of the hanger, while I put all my tools away and cleaned up a bit.

I performed my normal preflight, climbed in and hit the starter. I was expecting a real prop slinger. What I noticed first, was the sound - different - like a Cessna! It didn't really spin any faster than my old one, especially with the Concorde battery and copper cables. It cranked fine and off we taxied to fly - just because I hadn't been able to for two weeks (even though I may not have anyway). This starter is about 10 pounds lighter, a big difference on the nose. Did it fly any different? I did notice that I didn't need as much up trim as before, Cherokee's are inherently nose heavy.

Radio Faceplate Overlay

If you just want to change the appearance of your xponder (tan to black) you might consider a faceplate overlay. I did this and I'm very happy with the results. It involves painting the edge of your xponder with black acrylic paint, and then you press on overlay for a "new looking" xponder (I've also done my KX-170B- looks new). Go here for the overlay:

<http://www.engravers.net/aircraft/fp-list.htm>

Location of Oil Screen

Cleaning the oil screen is essential to continued safe and reliable operation of your eng. If it seems next to impossible to get to, you got the correct gizzmo. Be certain to clip the lockwire and not tear it out of the oil sump. I use mineral spirits to clean it. Get it from Home Depot. If you find metal shavings get a mech to look at it.

Looking at the engine from the rear, the oil screen will be on the right side of the crank case, at the bottom (low spot). It is about 3/4" or larger safety wired hex head, facing aft, near the oil drain plug.

Sealing Newly Installed Windshield

Prep is 90% of the job. Be sure to remove all of the old stuff. I didn't use the tape, did use GE outdoor silicone - no leaks. I placed the windshield in, then taped it to where the channel meets the plastic with about a quarter inch to spare. I then filled the channel with silicone, pushed the windshield in place, ran my finger along the fit to remove any excess and make a smooth seam, then allowed it to cure for a few hours, peeled off the masking tape leaving a clean silicone seal. A lot of work.

Never paint an Antenna

Never, never paint an ant if you want it to continue to function. Kills it!!! What you are looking at is the blade sheathing made of a plastic type matl. The ant is a wire inside the sheath. The sheath is to keep ice build up from breaking the ant. A single uncovered wire ant works much better as the sheath can kill some of the signal.

Anemic Climb and Prop Repitching

Before you start repitching, or buying any accessories, it would be prudent that you make sure that the engine is in good shape, your tach is accurate (+/-50), and that the prop is at standard pitch, per TCDS. Good compression is "not" an indication of a healthy engine.

My number two Piper, a 140 Cruiser, had all the maladies, and the previous had the prop repitched for climb. It had no top end at all, and it was annualed before I bought. Trust me, I know the game. After the first annual, I found a cracked exhaust system blocking the exhaust pipe, a cracked cylinder head, ignition timing in the sewer, lifter bleed down too tight and some too loose.

Once corrected, the prop definitely had to be repitched. Where as it barely reached red line before, after the engine was back in tune and could exceed 3000. I had the prop repitched 1" more than the allotted 58 to 59, which was legal. After all was said and done, the 140 climbed well over 800fpm (high density alt in FL at 105 F OAT), and reached it's published top speed of 142 MPH, 30mph more than when I had purchased it. It also had good compression when I bought it.

...and...

If it has been a while since the prop was o'hauled, spend the money and get it done. I am fortunate in that Sensenich is close enough that they pick up and deliver. The money we spent on the prop refurbishing was without a doubt the best money we spent on the plane last year. Performance difference was amazing. I fly a 1984 Warrior II, about 1000 hrs on engine.

Soft Spot on Wing Walk

MY A&P found the soft spot on the wing walk last August during the pre-purchase by sticking a mirror into the inspection plate, and he showed me the cracks around the raised sections. I had them replace it in January before the plane went in for painting. Unfortunately, there are two wing walk support pans, front and rear, and both mine had cracks so I replaced both to the tune of about \$1,600. The pans themselves aren't too expensive, but the labor!!! The drill out all the rivets - from experience, be sure your A&P drills the rivets with the door CLOSED, or you'll have curly aluminum motes flying around the cockpit for months after. It was a big job. I don't

think there's any way to avoid it on older aircraft, but I now look askance at any overweighters climbing on my wingwalk.

Purchasing Foreign Registered Aircraft

Five years ago I purchased a 77 Archer that was manufactured for export to Guatemala. I purchased the plane from a dealer in TN who took it on trade for a twin commander. I worked closely with AOPA and the dealer but the FAA must inspect the records and aircraft and issue a new airworthiness certificate. Once this is done you can then re-register it in the U.S. I would likely not have bought the plane if I were not dealing with a reputable U.S. Dealer. There was a considerable pre-purchase inspection & annual performed by a third party of my choosing. Also make sure there are no foreign liens against the aircraft.

Auto Fuel - 160 HP Engine Conversion

I talked to Petersen on the phone a couple of days ago. He says you can get his Autogas STC for a 140 with the 160 hp engine, but you have to install two new fuel pumps and it costs about \$1400 for the STC and the pumps. and you have to run high octane auto gas. the pumps are supposed to guard against vapor lock.

...and...

Changing the pistons does not increase the risk of vapor lock, but running with premium auto gas does. 87 octane is not as likely given the heat under the cowl, but the increased compression of the 160hp upgrade requires you to burn premium and thus increase the risk of vapor lock. After labor you can figure the STC for auto gas in a 160 is almost three grand

Unison vs Champion Spark Plugs

The Unison/AL are excellent, far and away superior to Champion. I used them when they were Auto Lites, and proved then that they ran more consistently, and lasted longer. Champions screw their electrode, while Auto Lites/Unison, as well as AC and Auburns, when they were in business, have a positive bonding method not prone to loosening. With Lasar, my Auto Lites(Unisons) are near 700hr, and no wear yet.

Vernier Mixture

You can get a vernier mixture control cable(STC/PMA) for your Cherokee is from the folks at Alcor look at WWW.ALCORINC.COM I have one in my 235

...and...

Check with McFarlane Aviation. They historically have made FAA-PMA approved parts for Cessnas, but it looks like they are producing parts for other makes now (including Piper).

The following link is to the Mixture Control page on their website. Scroll down to the lower table....

Joe

<http://www.mcfarlane-aviation.com/mixture.html>

Performance Charts - 160 HP conversion

All the info you need is contained in the STC documentation from RAM (also, since that documentation is now a permanent part of your Airplane Flight Manual, be sure it's in there, and in the airplane at all times). Mine is in my airplane, so I don't have it in front of me for reference. But as I recall, the RAM 160 STC contains no new performance charts and fuel consumption data. In effect, RAM says there will be no significant changes to these parameters.

As for power settings, RAM doesn't change your 2700 RPM redline, BUT, they do impose a 5 minute limitation on op's at 2650 or higher. In fact, the STC requires that a new yellow arc be applied to your Tach, between 2650 and 2700. Remember, this is an "operating limitation" (the "O" in AROW), so as I mentioned before, the RAM documentation must be kept in your airplane.

...and...

RAM doesn't provide any power charts. However, you can calculate your own. If you didn't repitch your prop, the power levels are the same at the same RPM numbers. So if it says 2600 RPM is 75 % at 8000, that actually means 75% of 150 HP (112.5 HP) , which is 70.3 % of 160. And so forth. Use linear extrapolation to get 75% of 160.

If you repitched to 60 inches, you could use the Warrior charts, or 160 charts. I just figure that the numbers don't change. That is, if 2600 RPM is 75 % of 150 HP with a 58 inch prop, then 2600 RPM is around 75 % of 160 HP with a 60 inch prop.

Approximate, but probably at least as accurate as my tach!

Installing Door Seal - Eliminating Gaps

Went with the 1/4 round hollow seal for the door. Fit was just fine although it was important to stretch the seal in places where the gap was a bit smaller. Used a few small blobs of modeling clay to check the clearances at different places to get an idea of where I had different amounts of clearances.

Glideslope Does not Work on .50 Mhz Frequencies

Sounds as if you once had an older Narco Mk-12 paired with either a Narco URG-2 or URG-3 glideslope receiver driving a Narco VOA-5 indicator. If so, when someone did the "slide in replacement" with the TKM MX-12, they forgot to connect the 50 hz wire to the glideslope pigtail, which is pin #5 on the 25 pin connector. Without this modification, you only have channeling for the older 20 channel, rather than the now standard 40 glideslope channels.

TKM sells a pigtail adaptor, or your avionics shop can do the connections. TKM will also fax you a copy of the wiring harness. You might also want to ask them to send you (no charge) a special inline filter they provide to buffer the "noise" within the MX-12 that sometimes screws up the UGR-3 receiver. US Avionics is the co-located retail outlet for TKM and is quite helpful. 800-444-1115.

Rotating Beacon Replacement

If you've got the original 3 3/4 inch RB mount, you can go with the Whelen HR, CFA series of self-contained strobes for an FAA approved direct replacement. I've got two of them on my 180C (red on the fin and white on the belly) and have been very happy with them. Look at www.whelen.com for details. Easy to install yourself, but you'll need a sign-off by qualified A&P.

Lasar Ignition Switches to Backup Mode

Check your temp. probe wire. If it's the two wire type, check for frayed outer insulation, or poor connection. The new type has a one piece probewire with an outer case. Check that the probe is inserted properly. Check that you have a proper sized fuse or breaker (15 amps), and check that voltage that supplies power to the computer is ample, and in running mode with the computer hooked to your lap top. If they don't have enough voltage, they become a magneto. Be sure that all ground connections are good, especially the ones on the mags themselves

Don't have the Radio Shack adapter wire # in front of me, but I'll have it Monday when I go to the airport.

The program for the computer is inside, the lap top is merely for illustration. If the unit or component is faulty when you start the engine it will show a fault. If not, do a mag check, and wait 20-25 seconds for the computer to return to operating mode. Again, if it does not, the fault will show up. If it works,, the adapter wire is long enough to reach the cockpit, at which time you'll have to fly it until the fault shows up.

I had an early two wire probe and pull and tug, it ate through the insulation (after some 500hrs.), and my light would come on periodically. Installed a new style probe, freeby from Unison. My unit has about 700 hrs.

Lose Cover - Auxiliary Power Unit

If you are taking about the external power plug cover, I took a little clear silicon sealer and put a drop in three locations (3, 6, & 9 o'clock) around the edge of the cover where it contacts the airframe. Let dry and the cover is secure, but it still allows you to be able to open it for use. Once you use it, clean off the old sealant, and reseal. Works great and less expensive.

Sluggish Manifold Pressure Gauge

I have exactly the same problem in a '73 PA32-260. Last time, my mechanic found fuel in the line or gauge (must be line since he can't open gauge). He said there was a small orifice where the line connects to the manifold to minimize fuel ingestion to the gauge system. I am very careful about leaning on the ground until ready for takeoff.

Inaccurate Oil Temperature - PA-32

Sometimes, the oil gauge in the sixes isn't entirely accurate -- it's simply a rule-of-thumb kind of accurate. The gauge in my six showed close to redline on warm summer days and it was a concern to me too. I checked all of the standard items and did all of the standard things while in flight to keep the oil temp down. About a month ago, I put the oil probe hookup on my JPI700 and found out that my oil temp didn't go above 192 degrees during climb while the factory oil temp gauge showed close to redline. During cruise it dropped to 182 and stayed within one degree the entire flight. The JPI sheds light on what's happening inside the engine MUCH better than the factory gauges. It's worth the money.

Disabling Arrow Automatic Gear Extension System

There was a Service Bulletin (SB-866A) put out by Piper to remove the auto gear system. This required a kit that included a switch that would sound the gear warning horn when the second knotch of flaps were extended. You can't just disable the system and be legal (or safe).

STCs and 337 Forms

The STC is approval to make an alteration to an airplane if it is eligible. It is a supplement to the acft design. It does not require a field approval as it is previously approved. It does require a 337 which says the bird has been altered and IS IN ACCORDANCE WITH THE STC. This is what the IA is signing for. A 337 is reqd for each STC. When no STC exists then prior approval and field approval is necessary.

Lycoming Crankshaft Inspection AD 92-02-08

I called and talked with the FAA Safety Inspector who "wrote" this little ditty.

He explained to me in plain english that if your Lycoming O-320 is the 160 hp version or you have the STC to upgrade your 150 hp to 160 hp, then you need to do either 1 of 3 options:

1. If no internal pitting, A&P/IA sign-off, you are OKAY.
2. If internal pitting is present, and can be removed and sealed, A&P/IA sign-off. you are OKAY.
3. If pitting is present, and can NOT be removed per specifications:
 - a. Replace the crankshaft @ \$3750.00
 - b. Keep crankshaft and \$\$\$\$ and have A&P/IA accomplish inspection every 100 hours for pitting per specifications.

If option 3 (b) is your choice, then there is NO time limit, just so long as the pitting doesn't go past specs called out in the AD.

Remember, this is the english version that I personally got from the FAA Safety Inspector that wrote this AD. This is NOT my opinion! This is his.

Fuel Tank & Misc. Decals, Fuel Tank Placard

When my '73-180 came out of the paint shop in February, I replaced all the exterior placards. Check www.arrow4graphics.com. Product #705 (\$6.65 for a set of 2) is the rectangular 100LL placard that says, 25 gallons, 18 gallons to tab. The 17 gal/18 gal to tabs confusion comes from the useable fuel - 25 gallons total, 24 useable tank capacity; 18 gallons total, 17 useable to neck indicator tab. I put the large round blue 100LL decals around the filler opening, and the rectangular 100LL capacity placards just outboard the filler caps. Arrow has a set that includes a lot of the exterior decals. Also, you might try www.aerographics.com, in Colorado, I found replacement PIPER decals from them.

Removing Rear Bench Seat

I've found that if I remove the window trim near the back seat first then the seat can be lifted up and forward to remove much easier.

Engine Control Cables - Source

Try the following URL:

<http://www.mcfarlane-aviation.com/>

They were recommended by another CPA member here earlier. I recently bought a throttle cable for my plane from them; the cost was approx \$75+ less than Piper wanted. They have mixture control cables too.

Temperature gage probe as ice detector

when flying winter IFR, I have really come to rely on the probe as the initial ice warning. It has proven to be the best early warning system of actual icing conditions and will show ice buildup easily and well before any other surfaces are visibly covered, giving early warning to get out. The actual temperature that it shows is not that critical to flight anyway.

Poor Braking action

You most likely have a problem with your brakes. Bad rotors, if pads were "burned in", as practiced in aviation, they're probably well "cooked". Stainless steel rotor though nice because they don't rust, also have poor stopping power (poor friction coefficient), and will overheat pads faster, as well as lacking in stopping power. Misaligned or binding calipers or incorrectly preloaded wheel bearings.

Survival after crash

Having been a flight medic on an Air Rescue helicopter for 21 years and having taught survival classes to government agencies and search and rescue teams for a little longer than that. I can tell you a few things.

- 1) stay with the aircraft. Most aircraft that were survivable crashes are found within 72 hrs.
- 2) As Chip said. Conserve body heat
- 3) Drink water. Conserve your sweat not your water. I carry a min of 8 qts of water in my aircraft. 11-14 in the summer. These are the sealed mylar water bags.
- 4) Carry a good first aid kit...and know how to use it. Take a class from the Red Cross.
- 4) carry survival tools Fixed blade stainless steel knife and a multipurpose knife i.e. Leatherman, Gerber etc.
- 5) Shelter material, 8x10 plastic tarp. Folds up small can be used for shade or sealing opening.
- 6) Other than water food is not really needed. Most people can go 72 hrs without any major problems. I carry sealed food bars. Shelf life is 5 years. Do not use power bars and such. Shelf life is very short.
- 7) If you have food make sure you have water. If you don't have water don't eat. Food requires water for digestion. If you don't have water when you eat you will end up dehydrated.

8) Fire building material / starters. I use a magisium bar. Does not mater if it gets wet...
Whatever you select, practice using it before you need it. Most people fail to start fires in a stress situation because they have not practiced mthe skill. It really is harder than it looks.

9) Keep a cool head and a Positive Mental Attitude.

10) Again, practice all of the skills for survival, building shelters, fires etc. On the Job Training is not the way to survive.

Alternator Off During Starting

Don't overload the system!"You might say, ■I can't overload it.. And I will say, ■You do it every time you start your airplane.. Yes, that's the sad truth and probably the main reason aircraft charging systems have such a high failure rate. Yet there is a very simple thing that you can do that does not require any modifications to your aircraft. The two simple steps are:

1) Leave the alternator switch OFF BEFORE starting the engine.

2) Turn the alternator switch ON AFTER the engine is running.

This same process occurs automatically when you start your car or boat or virtually any other machine with a charging system. This function is performed by the ignition switch in your car. Accessories will work with the ignition switch in the on position, but will cut out when the switch is advanced to the engine start position. The ignition switch is also cutting off power to the voltage regulator (which shuts down the alternator) while the engine is being started.

In an aircraft, the alternator is usually turned on at the same time the master switch is turned on. This applies full power to the alternator field, since the voltage regulator is sensing the battery voltage (which is less than 13.8 volts). You then start the engine using the ignition switch. During the start, power is available to the alternator through the voltage regulator.

As the engine is being started the alternator is turning fast enough to produce some power. At the same time, however, the starter is drawing 200 to 300 amps. Most alternators can only sustain 60 to 70 amps -- 200 to 300 amps is equivalent to a dead short on the output of the alternator. This is a substantially overloaded situation, and the part most likely to fail will be the diode rectifier

Removing Silicone from Around Windows

The cured silicone just has to be physically removed by tools, however, to all that might be curious, when silicone is still uncured, try WD40. You'll be amazed how easy it is to clean up any overrun and leave a professional look!

Lubrication for Gas Cap Gasket

Use Dow Corning DC-4 - on both sides. They will last forever. This is the same lub recommended for oil filter gaskets. It is also great for your weatherstripping/door seals. Will kepp them soft and pliable, enhancing fit and life immensely.

Low Compression - Staking Valve

I had the same problem with #3 two years ago. I staked the exhaust valve (actually staked intake also), and it brought the jug back up into the 70's. The "staking" process involves removing the rocker box cover, placing the cylinder just below TDC on the compression stroke, and using a small block of wood on the back of the rocker arm just over the valve, tapping with a rubber hammer. If you do this with a little air pressure in the cylinder (via normal compression check procedure) any dislodged material will be blown out. Don't use much pressure (maybe 10 - 20 lbs), as you don't want the prop turning while your busy with the valve. A hanger buddy of mine had the same thing happen to his Continental 6 banger. Again, staked it and up it came. It's probably an indication that more aggressive taxi leaning should be used. Lately, I haven't been leaning at all during taxi. However, my plugs are always clean.

Cold Engine Compression Test

The ability to hold compression is enhanced when the cylinder had been oiled, as done after a warm up. Due to the sloppy tolerance used in AC engines, the slightest amount of lubricant will seal off the nominal .012 (new) clearance (max is near .020). By all that is holy, the entire internal combustion world operates with tolerances ranging from .0005 to .003. Even high performing large bore race engines today rarely are set much over .005. The typical Lycoming new is nearly triple of that race engine, and nearly 30 times that of the closest modern engine. In addition, the bore of most Lycomings are tapered. This is considered unacceptable everywhere else, except Lyc. and Continentals.

I advocate cold after sitting over night, to allow any oil from final sealing of any the most microscopic crevices. A healthy Lycoming will render excellent readings, if indeed it is healthy. Mid to high 70s is excellent, and in most cases plus or minus 2#. You may be surprised to learn that this is fairly common.

A weak cylinder, be it valves, cracks, or rings will show low cold. If this is the case, I also advocate a warm up after cold. In many cases the warm up will increase compression, since the oil sprayed has filled all the little voids. Now one has a reason for suspecting a problem. Had one bypassed cold, one would never know, if that cylinder is truly healthy, would he.

There is also no mention in practices for doing a compression test warm, other than a 25% variation not being acceptable. The rest of the IC world considers 15% as unacceptable.

I recently helped with an owner assist annual with a high time O360 A1. The owner claimed that the cylinders were fine and had good compression. Being that I'm the advisor, we did it cold. 3 cylinders were 76 through 78, which is excellent, one was 40. Needless to say, he was panic stricken. I said now we'll warm it up. After warm up, the 3 good ones had "not" changed the bad one came up to the level of the good ones at 76.

Still panic stricken, Sam asked what caused that. I explained.

We did a boroscope check, and lifter bleed down check. The boroscope revealed nothing unusual, but bleed down check revealed all valve to be beyond maximum tolerance, and a collapsed lifter of the one that wouldn't come up cold.

Back within tolerance, Sam noted that it had never performed this well, but he also acknowledged that the engine was beyond TBO and an OH was in order. He's selling it.

BTW, for your info, Franklin aircraft engines, do not use choked cylinders, set up clearance is typically .003, and max limit is .006. A worn Franklin is less than half than a fresh Lycoming or Continental.

Certified Rotax 4 cycle aircraft engines are set up at .0015 with a max limit of .005. (The Rotax is water cooled)

Installing Concorde 35 AXC Battery

When you put in a battery that is 5 lbs. heavier than the one you remove, you are not "replacing" a battery, you are :INSTALLING" a new type of battery. The STC,337 form, weight & balance & equipment list paperwork must be done. Then, however, when it comes time to replace that battery, it then qualifies to be done as Preventive Maintenance, which the owner-operator can do with a log book entry

Replacing Seat Rails

I just researched this for my 140. The seat tracks are "Riveted" in place. In order to replace them you will have to drill out the old rivets, drill the new seat track to fit the existing holes and then rivet it in place. I understand it is not a fun job and takes a good deal time and work. I was told this is a job for a good A&P or shop.

In addition, you can only get "New ones" from Piper and for my 140 they are \$185.00 per track or \$370.00 per seat.

Left and Right Seats Reversible

in my 73 they are frequently reversed. By the way, I consulted a junk yard regarding the fully adjustable seats with headrest. They said they adjust higher and lower, but don't have the unlimited recline I really wanted and they want about \$900 and wont give me any trade in! I talked to my interior shop and they said they can put headrests (\$75) and install an adjustable lumbar support (\$250) for any of the seats I want. Not a bad alternative.

One Cylinder Running Hotter Than Others

60 degree variation is not bad at all, given the nature of these dinosaurs. You might have the injectors nozzles inspected, flowed, and sonic cleaned. Airflow Performance is great and very reasonable. Make sure spark plugs are in good condition and properly gapped. Check lifter bleed down clearances. Too much is bad, not enough worse with turbos. Check the exhaust system, too.

Checking Valve Clearance

First off you MUST bleed down lifters. I find the only reliable way is to remove and disassemble lifter assy. Easy to do on Lyc. Drain all oil from lifter by twisting and rem plunger. Suggest do one at a time as parts are mate fitted. Reinstl totally dry and insert push rod. Now you can check for clearance. Push rods are of a fixed length and one must have the corrcst one in place. A range of lengths are avail. This is a MUST and correct clearance achieved. Go no further until all eight valve train clearances are achieved. Push rods may not be changed in length. Suggest preoil before starting eng as lifters need oil to perform properly.

...and...

Bled down they should .028 to .080, ideal .050 to .060. You need longer pushrods, They're in the parts list.

Strut Servicing

How long has it been since new o'rings were installed on the struts ? If you have oil coming out the bottom of the struts you need new o'rings. Best left to a mechanic as the pilot or owner is not qualified to do it. You have to jack the plane up, remove the struts , install new o'rings and put in new oil and air or nitrogen. I don't know where you got the instructions to use a squirt can to fill. To do it properly you have to remove the valve stem from the outlet at top where you put air in. Put a 1/4 inch ID hose on the the top and dip the other in a can of hyd. fluid and exercise the strut up and down until you have no bubbles. Then compress the strut and leave a 3/4 inch gap before it bottoms out. If you loose the air the fluid will keep it from bottoming out metal to metal.

Rejuvenating Dull Paint

Wash the airplane with "Soft Scrub" you know the stuff you get at the super market. Just stay away from the windows. Use a soft nylon fleet washing brush. It might take a time or 2 of washing but it works! I did the on several airplanes when I was growing up working as a Line-boy at my home town airport. Its a hell of alot easier than using rubbing compound, and won't polish paint off the rivit heads The best part is "it's cheap" After waxing with a good quality wax like Turtle Wax or Maguire's They are also low cost and work great. I refuse to pay \$15 for a product when a \$3 does the same job.

...and...

Step 1 -Good electric high speed (500-3000rpm) buffer with 3m yellow wool polish pad & Race glaze leveling compound.

Step 2 - clean 3m yellow polish pad with 3m Finesse it-II polish (Finesse it-II will also restore plexiglass like you won't believe! and try it on bare aluminum).

Step 3 - Race glaze Polish sealant with clean yellow polish pad than second coat buy hand. Any local Auto Body supply should have this stuff.

3m wool pad part #05705

3m Finesse it II #05928

Race Glaze www.Raceglaze.com 888-722-3452

www.grainger.com milwaulkee buff model 5460-6 grainger stock #3w784

Rigging Flaps, Low Wing

Earlier I asked you guys about trimming the flaps on a Dakota. Thanks for the advice. I found one flap slightly low and raised it only 3/4 turn. Now it flies straight, level, and hands off. Just wanted to let you know it was very easy to adjust. The manual is right on. Only trick was to grind down the sides of my 7/16 wrench so it fit onto the lock nut easily. Also, don't over tighten the nuts. I was amazed how sensitive the flying characteristics are to the flap adjustment. I could feel a difference with as little as a quarter turn. As an older airplane someone in the past had lowered the flap for trim reasons and so now raising it was necessary to re-trim.

Loadmeter fluctuating during cruise, ammeter fluctuation

Could be several things. Would need more information to pin it down. Could be any of the following:

- metal from plates in battery sloshing around, momentarily shorting out battery. If this is the problem you probably will be experiencing difficult starting also.

- alternator stator windings shorting to stator. I have this problem about every 3 years. When it happens alternator output current jumps around like yours. I also get a high-pitch alternator whine on the radios. I've diagnosed the problem as a melting of the small stator insulators used to insulate the stator windings from the stator.

- another possibility is a defective regulator, but probably not, as they tend to be pretty reliable. I'd bet on the alternator. You can pull it and have it tested at just about any automotive parts house.

See if you are getting full output from your alternator by running the engine at 1800 rpm, then load down the alternator by turning on everything, then see if you are getting near your alternator's max output. Also, take note if the alternator whine gets louder and softer as the ammeter fluctuation occur. If it does, I think it's probably the alternator

Researching ADs on Aircraft, Engine and Accessories

Consider using ADLOG.

They will provide a listing of all your airframe, engine and accessory ADs, along with a great record keeping system for recurring ADs. It's about \$100, but very thorough.

Check out www.adlog.com

Installing Concorde Battery

You are INSTALLING a new type of battery under an STC. The first thing an Insurance Co. looks at in the event of a claim is the paperwork. If anything is found to be unairworthy, guess what happens then!! In this case, it's the weight change that is the issue, plus any possible change to the Battery venting system.

Wilco

(800) 767-7593 STC# SA0954WI

FAA-PMA Supplement

No. 43, 9/4/01

Strobes not STC'd for Plane

I had a '75 Warrior that came with Aeroflash strobes on it. At our first annual, my A&P found that the STC in the log book was for the Cherokee 140 -- NOT the 151.

We tried getting the local FAA boys to okay them for our plane -- after all, they had been on the plane for 24 years -- no dice.

We had to immediately remove the strobes, or the plane would have been grounded. I ended up spending nearly \$1000 on new Whelan comet-flash strobes. Needless to say, it was VERY frustrating experience.

Lower EGT Reading in One Cylinder

Switch probe wires and see if there is any difference. If the hot cylinder gets cold, and cold gets hot, it's the gauge. If there's no change it's your engine. With these pre historic excuses for engines we fly, it is not too unusual. If the gap is too wide, there is something wrong.

Slow Starter - Corroded Cables

After my FBO convinced me the starter was probably worn out - it was the old 18lb original - and that the starter solenoid-to-starter aluminum cable looked pretty bad, we replaced both - with a new MagnaFlite lightweight starter and a copper cable. It did seem to help some, but the problem definitely persisted. I finally decided to buy a new Concorde battery and when I changed it, guess what - the battery posts and cable connections were so corroded it's a wonder it worked at all. With some patient cleaning and adding dielectric grease, the thing turns over fast enough to taxi. My advice, check those battery cable connections before you spend any money.

Radio Face Plates from Wag Aero

I put the kits from Wag-Aero on both my radios.

You will have to use the same windows and frames that cover the frequency numbers. They are very fragile, so be careful with you take them off and put them back on. Also, you will want to paint the old radio frame. It's easy, just be sure you mask off the frequency windows good. I also painted the knobs. I used black semi-gloss. I had an FBO tell me yesterday the radio's look like new.

Aircraft Valuation

I found the one of most value was the quarterly publications published by VREF (unfortunately also the most expensive). The most valuable of the FREE services (although not free if you don't subscribe to TAP) was the one on the Trade a Plane web site. The service on AOPA consistently overvalued all of the airplanes that I searched for and compared to other services.

...and...

www.nadaguides.com

Application - AD-98-0208: Crankshaft Inspection

I just talked to the FAA writer of this confusing, poorly written AD. Here is the basics of what he said he means in the AD.

1. If you have a 150 HP O-320 engine, this AD does NOT apply to your engine.
2. IF you have a 160 HP O-320 engine, this AD DOES apply to your engine. This includes ANY STC that upgrades your engine to 160 HP.

Hope this helps eliminate any and all confusion. Remember that this is from the horse's mouth!

Replacing wing walk doubler

I've done it and there's no easy way. Removing the fuel tank is a given. When you start riveting it in take your time and plan ahead, with a few impossible moves to buck rivets you'll be surprised how few, if any Cherry-max rivets you'll have to use. As for the wing walk, I've painted it to match the aircraft then went to the hardware store and bought matching rubber strips for the bathtub and arranged them accordingly. Looks GGRRREEEATE!! and if they need replacing, piece of cake.

...and...

I had both the front and rear doubler pans replaced on my '73-180 a few months ago. When the A&P drilled out the rivet heads, he left the door open - BAD! I am still removing little aluminum

shavings from the carpet, and when I first flew it, even after vacuuming thoroughly with a Shop Vac, the little metal pieces were so thick in the air that I was afraid one would lodge in my eye. My advice - be sure to drill out the rivets with the door closed. What are you going to do about the wing walk when you're done - stick on or paint on. I had paint-on applied, and it seems to not want to cure completely so it scuffs easily.

Determining power setting by fuel burn

The specific fuel burn at ideal fuel/air mixture settings,(stochiometric, TT) should reflect Horsepower output. For 160 hp ('B' & 'D') series O-320s, the specific fuel burn per HP per hour is .47 pounds, for the low compression (A & E) O-320s it is .53#/HP/HR.

Improved 140 Fuel Selector Valve

The Piper supplied fuel valve cost me \$385.00 (November 02 price) plus approx. 1.5 - 2 hrs. install time.

Much improved valve, smoother action with definite detents at all positions. Unless your valve is free of internal scoring,etc., I highly recommend the new valve.

Location of Voltage Regulator - overvoltage relay

Try looking up under the panel above your left foot while sitting in the left seat. Either 1 or 2 small square boxes roughly 3 inches or so square. Mine were installed on a plate on the side panel.

Non Retractable Front Seat Shoulder Harness

I use the non-retractable ones in my Cherokee that I got from Aircraft Spruce. They attach to the frame over each seat, and have two straps that go on each side of your neck and attach to the lap portion.

The advantage is that you are IN the seat. When tight, there is very little movement, and I like that. Some people complain that the straps rub on their neck, and they don't like being that secure in the seat.

Cost is about \$235 each and expect about 4 hours labor. I've done both of the front seats, and I've been pleased.

High Copper on Oil Analysis Sample

Sometimes piston engines. I would say, based on the information you have given, that the request to resample in 25 hrs is normal. With only having 135 hrs since Overhaul this may be considered normal break-in wear. The resample will help to determine if the level of copper is increasing or starting to level out. Keep in mind that the 48.9 parts per million is only the amount of copper found suspended in the oil and it is used to determine the wear trend by comparing the wear level to the previous sample. These are only wear trends and is not an absolute level.

Typically the trend is done by using a baseline analysis established some time after overhaul, usually 25 to 50 hours, and each sample thereafter.

This copper could be coming from a number of things that are wearing as part of the normal wear-in period, for example if the connecting rods were re-bushed during the overhaul they will exhibit a wear level for a period of time. This wear indication can also depend on how often you change oil and if you change filter each time you change oil?

Alternator Whine

If you load down your electrical system (by turning on just about everything) is the alternator still putting out near the max rated current? If it is, then the diodes are okay, and the problem is likely either the alternator capacitor or a poor ground between your intercom and chassis. Another possibility is a weak battery, as when they get weak they develop greater internal resistance. A good battery will actually act as a large capacitor and filter lots of noise from the power buss. If your alternator doesn't put out near max rated current, then you probably have a bad alternator diode.

Replacement Eyeball Roof Vents

I purchased the black plastic air ball vents part # 13-02901 from Aircraft Spruce. They didn't come with the back metal connector for the rubber hose like the old ones had. They are basically a very close fit, but you have to do some modifications to the hole alignments with a Dremel tool. I used 3/4" # 6 machine screws / lock nuts with a spacer cut 5/16" from some old hollow tubing to keep the metal connector tight to the frame the vents are mounted in. Works great! I installed the roof assemblies back in the six yesterday afternoon. remember to work from front to back when installing the plastic panels. While I had the panels out, they got a much needed fresh coat of paint.

Ill Fitting Cherokee Six Baggage Door

Cherokee six rear doors and baggage doors just don't fit very well. About the best you can do is make sure the latches work and make sure the door is well sealed at the top (it may not be possible to completely seal it top and bottom) you'll keep things drier if the top is sealed.

Yoke Emblem Source

Try Aero Enhancements @ 1-888-821-2376 www.aeroenhancements.com

They had a display @ Sun-n-Fun & their replacements looked GREAT. They even had some w/ wood grain effect

Rebuild Source - Fuel Tank Sender

Send it to Air Parts of Lock Haven. I had the exact same problem with my right tank. I removed both tank, figuring the other would be near failure also, and sent them in. If you only need float replacement, I think they charge \$50 each. If you need a complete rebuild The charge was around \$160 each. Sorry, I don't have my receipt immediately available. Call them. They'll quote you on the phone. Look in the Piper Owners Magazine for their ad. The turn around was so fast that I couldn't believe the UPS guy was standing in my driveway.

Source for Dye Penetrant Powder

Dye penetrant developer? Made by TURCO or Magnaflux. Its the white powder that shows the defect. Spray can. You can purchase a kit. Cleaner, Penetrant and developer.

We purchase from Universal NDT in Upland CA

Overhead Air Vents

I have a '70 P28R and looked for a week or so for aluminum replacement overhead vents.

The manufacturer was WEMCO but the cost was ridiculous. Ended up going to a salvage yard (Whites) and pulled 4 out of a fairly new F33. They charged \$100 for the set and they are drop in replacements for the old plastic type that were difficult to turn and were chipping away bit by bit. I think many A36's also have the same vent.

Fuel gauge stuck just above empty

If I were going to guess and bet money, I would say you have a pin hole in your sending unit float. The best way to fix it is to pull the tank, remove the sending unit and send it to Lock Haven for overhaul. It will cost you around \$125 if my memory serves me right. When you pull the tank and remove the wire from the sender, if turn your masterswitch on, you can check the indicator by grounding the wire. It will go from full to empty as you check it. If you do this repair, be sure to check the vent lines and supply flex hose for age (8 years max). Be sure to order a new gasket.

Lazar Ignition System

In the AV world, magnetos are over 100yrs old, and the technology is unchanged. Your engine is abused everytime it idles. Getting back to points and fixed timing, Autos, motorcycles, industrial engines, and even garden equipment, had just about 1/2 the life of the same engines today, outfitted with some sort of electronic ignition. The last twenty years, electronic ignition, in nearly every major application, is of the managed type. Managed type further increases engine life, in addition to fuel economy, and performance.

As for our Jurassic aircraft engines, starting, hot and cold, idling, climbing, cruising are vastly improved. In addition to fuel economy, and spark plug life. Unison claims 10% improvement on fuel economy, it's more like 20. Spark plugs life, my own are in the 600hr range, and still no sign of wear. At this rate, I feel confident that I will see 1000hrs. There's nothing available in aviation that will render as many benefits, and keep on giving benefits, for the investment. My pay off was around 200+ hrs.

Lycoming Service Center For Engine Installation

Just got my Arrow II back from the Lycoming Service Center, Williamsport, PA on 3/28/03. They did a great job installing a remanufactured IO 360C1C.

I dealt directly with the operations supervisor (Rich Hoffman) and the facility manager (Steve Palmatier) throughout this project. They could not have been more helpful or accommodating.

Since I purchased the remanufacture through Airpower Inc., Mr. Hoffman recommended I arrange to pay Lycoming Service Center through Airpower Inc. By paying indirectly, no sales taxes were incurred.

While their forte is R&R of engines, they were very accommodating in my many extra requests. In addition to standard engine install, (engine, hoses, Lord mounts) the extra work included:

1. LASAR ignition system (Thanks TT)
2. JPI EDM-700 engine analyzer
3. Electronic International R-1 digital tachometer
4. GAMI fuel injector nozzles
5. Davtron digital clock

6. Reinstall Reiff ■Hot Strip• sump heater
7. Installing correct alternator and mounting hardware (Aircraft had A/C removed ■ converted back to Chrysler/Electrosystems alternator and single channel ring gear)
8. New oil quick drain
9. New vacuum pump

I supplied the EDN-700, EI tach, GAMI nozzles, and digital clock. Also the hose kit and Lord mounts (from Airpower Inc.)

The install was meticulous. The first time the cowling was removed, I was blown away.

The Lycoming Service Center is the best-kept secret for engine installs. I have no hesitation in recommending this facility for anyone requiring engine work or installations. Their phone number is (570) 327-7270

Frozen Nut on Exhaust Stud

Try CorrosionX or other solvent. Whatever you do, do NOT much too much torque on the nut. You do not want to break the stud. If necessary cut the nut off. Its easier to replace a nut than a broken stud.

Installing Tapered Pin in Yoke U-Joints

Yoke joints are usually bolted, but if you have tapered pins, here's how: The hole is drilled straight in the normal manner. Use next larger, smallest drill size of the small end of the tapered pin. Then you'll need a tapered reamer for that pin and carefully ream the hole. Be sure that you don't go to far. A tapered pin should barely exit at the opposite end. You should get a straight flute reamer.

To remove the old pin, if it was drilled through, punch it out from the small end.
BTW, It's easier to drill it to accept a bolt. It should be a close tolerance bolt.

Routing Strobe Wires in Wing

Installing piggy-back strobe lights on the wing tip nav lights on my 1976 Cherokee Cruiser.

I purchased 12 feet of 1/4 inch dia 6061 aluminin tubing from Wicks. This was inserted through the end wing rib (with the tips removed) and then through each succeding rib, using the same holes that the nav wire goes through.

Then pushed the 18 gauge wire through the tubing. Once wire was in cabin, I pulled the tubing back out and did the other wing.

I also had the fuel tanks removed for S/B 1006. This made the insertation of the tubing a lot easier.

Routed and wired the strobes to 5 amp C/B and switch. Strobes work great, and I am happy camper!

Alternator Troubleshooting

I recently attended an I/A renewal seminar in Louisville,KY. One of the presenters was Aerotech of Louisville. They talked about our charging systems in language even I could understand. At

the end of their presentation they told us they had the same info on their web site for all to see and use. Check it out at www.aerotechlou.com. Hope it helps!

Replacing Aluminum Battery Cables

I have installed many of the American Cable kits. I would recommend the 1 gage over the 2 gage even though the line loss of the 2 gage is less than the new aluminum cables that piper originally installed. As far as a problem installing, just have a can of silicon spray and spray each rubber grommet as you feed it through the side members. Remove all the sealant from the firewall seal and remove the hard rubber seal and clean it up. After you rerun all the cables through the seal, reinstall the retaining plates and on the engine side reseal with High Temp RTV sealant(Permatex Red) you can find this at Auto Zone or O'Reilly's Auto supply. You will need to have your mechanic submit a 337 and sign it off in your log book. Each cable is clearly marked as to where it goes and I have never had to ream or drill out anything to complete the installation.

Replacing Door Weather Strip

Replacing main door weather strip on PA28-180 (1973)

First I would like to thank everyone for their help on this project. I have now successfully replaced the weather strip on the main door. There is no longer water dripping on my wife and the noise level has dropped. I thought I would just write down what I did in case anyone missed previous discussions. I would also point out that I am far from an expert and these are just my experiences.

1 ■ Removed the door.

The first thing is to remove the device that stops the door from blowing wide open. This is achieved by removal of the single pivot screw that holds the stop to the airframe. I then pushed this into its fully retracted position and taped it to the underside of the door.

The door will now swing completely open. Which is a good position for the next procedure, which is removal of the hinge pins.

This was simply achieved by removing the cotter pins from the underside of the top and bottom hinge. These should always be replaced with new ones, as the metal is not designed for repeated flexing.

To actually take off the door it's best to have a second person to help. One holds the door in place while the other pushes up the pins. There might be washers in the hinge so make sure you note where they come from and collect them. Once the pins are removed the door can be removed.

Note: make sure you don't position the door so that the window or paint will get scratched, put it on clean cardboard or a blanket.

2 ■ Removal of old weather strip.

This turned out to be really easy. I just grabbed one end of it and pulled it and off it came (this might be why it leaked like a sieve. It was not well stuck on and there was a lot of old adhesive on the door.

3 ■ Cleaning up the old adhesive

This task proved more difficult than I thought it would. This was mostly do to the fact that I am in France and it's difficult to get many of the products people talk about in this group. However I do work for 3M and they recommended that I use Toluene as a solvent to remove the adhesive. I initially tried to removed it be mechanical means and this was very in effective. The solvent worked like a charm. I applied a liberal coat to the side and left it to soak for 10 min. I then scraped the adhesive with a plastic scraper and it just came right off. Rubbing the surface with a rag and some more Toluene finished the cleaning. I finished the preparation off with a last wipe over with Methanol.

Note: If you use solvents like Toluene I strongly recommend the use of an organic respirator (the dust masks will do nothing to protect you). I also recommend that you are very careful to not allow any solvent to run onto the plastic window as this could cause is to craze (polymer term for going opaque)

4 ■ Application of new weather strip

I used the piper weather strip from Aircraft Spruce. This was chosen mostly because of limited access to other sources. However it seems to be a really nice weather strip.

With a nice clean surface I then took the adhesive (Neoprene) and dissolved it further in Toluene to make a medium viscosity liquid. This was thin enough to be painted on with a brush. I found that straight from the tube the viscosity was so high that it just formed lumps and did not spread evenly on the surface. It takes a little longer to go tack free but leaves a really nice thin film. I then coated a three-foot section of the weather strip in the same way. I left this for 10 minuets to form a tack free surface. I then positioned the weather strip on the door starting on the underside and positioned the first 3 feet in place. I then coated then next three feet. While this was drying I spent the time pushing the first three feet onto the door to make sure there was good contact over the whole coated area. I repeated the process around the door until I came to the start point. Here I just positioned the two ends of the weather strip on top of each other and cut through them with a sharp knife. I then applied adhesive to the two ends and they spliced together perfectly to give a seamless strip around the door.

Notes: I did not stretch the weather strip during application. I also had to trim a little off the flat side, as the door edge was a little narrow in places.

5 ■ Replacement of the door

I left the door in my garage for 1 day to let the adhesive cure and dry before returning the door to the aircraft.

Replacement is the reverse of taking it off, simplicity itself.

It took a little more time to make adjustments to the door latches, which can be moved. However once that was done I have a door that shuts easily and does not leak. I am very pleased with the result and more to the point so is my wife.

Note: While the door was off I took the trim off and removed, cleaned, lubricated and replaced all the lock assemblies. This was also a benefit to smoother door operations.

Slipping Electric Trim

Inside that box is an electric motor which turns in the direction commanded by the trim switch. At the same time a solenoid is pulled in which applies pressure to the disc clutch on the top of the unit where you see the cable wrapping around. If you have a lot of slippage it could be one or a couple of different things such as the clutch may be oily, worn, or out of adjustment, the cabling going to the trim jackscrew in the tail may be binding, or perhaps the jackscrew in the tail is in need of service such as cleaning and lubricating. If you clean and lubricate all the moving parts properly you will probably find your problem goes away. If the problem is in the box you have a whole new ballgame since you need an experienced A&P to work there. I doubt that is the case anyhow, should just need the maintenance I described.

Yes, and the capstan has a cork-like material on that clutch that can wear out, causing slippage. It could be that simple - I just had mine replaced, along with the capstan itself, whose grooves had become worn so the cable didn't run through properly.

Compass Incorrect After Avionics Installation

Last year I changed out avionics and put in King KI-203 and KI-204 indicators, the KI-204 affected the compass. I had to install mu-metal shielding around the indicator head, which was just below the compass, to "contain" the flux field so it would not affect the compass. Works great and easy to do. Mu-metal shielding is very flexible and available AD-Vance Magnetics in Rochester, Indiana.

I'm very doubtful that anything in the airframe got magnetized -- the newer indicators, particularly rectilinear types have very strong magnets in the meter movement.

AD-Vance Magnetics
P.O. Box 69
625 Monroe Street
Rochester, IN 46975
www.advancemag.com
574-223-3158

Shielding: 6" x 15" x .004" AD-MU-80 High Permeability. It was \$60 on 04/10/2002.

Cigarette Lighter Fuse Location

My cigarette lighter uses an inline style that is clipped into a spring clip, which in turn is mounted on the bottom of the back side of the panel right above the passengers knee. You'll have to be like a monkey and lay on your back on the floor; use a small pillow placed on the passenger rudder pedals to lay your noggin on.

Rigging

Any A&P should be able to make the adjustments. The Piper shop manual is very accurate. A gauge will have to be made up, and described in the manual (I used a piece of clear 1/4 clear fir). A few tips, some A&Ps, sorry to say, are not up on the effects of rigging on Pipers as well as other planes, so do some home work. The final adjustment, correcting the pulling is achieved by moving the proper flap, depending on which it's pulling. The flaps should never be raised beyond the adjusted ailerons. They are always lowered. Final adjustments will require several test flights. Once completed, you will gain some performance.

Sealed Batteries - Problems

The life of a sealed battery is less of the vented celled. When you bought the sealed it may have not been charged up from sitting, and since never stayed topped. I have used both and prefer the vented, but Concorde makes a good sealed battery RG35-AXE which is extra cranking power. You might give that one a whirl. I have also sent sealed batteries back due to the date on them.

Sealing Fuel Tank Sending Units

Gaskets are to be installed clean & dry but that means a new gasket. Some guys are reporting better luck with no gasket and just using PRC (Tank Sealant).
...and...

Sealing wet wing tank access covers and fasteners. We use PR1750B then PR1499A, then PR1005L. This stuff is made by PRC-DeSoto in Glendale CA. A coating of the PR1005L would probably work brushed on the gasket and over the edges and screws.

This material is for sealing turbine fuel and aviation fuels. Not cheap though, on the order of \$42 dollars a pint.

Crawling into Tail Section of Plane

I have been in my Cherokee 180 tail section fairly regularly on 100 hr inspections to check stabilator and rigging. The obviously won't support your weight. The stiffeners are also very fragile and apt to bend if you say put your knee on them. The best is to get a sheet of ply wood or even a plank etc and lay it over several at a time and spread the load. I saw a stiffener which had been buckled, it wasn't pretty and very difficult/expensive to fix

Toe Brake Conversion - Salvage Parts

I also have a 63 150B and I Made a parts list from the drawing in the parts manual ,then calling all the salvage yards in my area for a quote. Piper does have a kit but it is big bucks. I paid about 500cnd for every thing I needed incl. a few extra parts. it is nice not to have to lean forward for the lever when you are already busy, a must do in my opinion.

Slipping Electric Trim

My electric trim kept getting slower and stiffer, until the trim motor wouldn't turn it anymore, and the hand trim wheel was very stiff. I checked it and found that the trim cable that wraps around the pulleys and capstan on the motor were frayed in several spots where it passes through the guides, and was binding when the frays caught between the pulley and the guide. The cable was replaced and now it all works fine. This sounds like a bit different problem than you

described, but maybe it's worth checking to see if there's a badly frayed cable, or if the cable has somehow slipped out of one of the guides and is bound up.

Muffler Baffle Cracks

Most of these PMAed mufflers are made to specification, but the reason for such short life is more important. One side of these mufflers are a slip joint, therefore alignment for these "engineering marvels" is important. The condition of the header pipes as well as the muffler clamps themselves all play a part. The heater box around must be in good condition. If it loose or cracked, it amplifies vibration and helps the cracks.

Incorrect fuel mixture can induce overheating of the baffling, making it susceptible to cracking. In the end, careful assembly, all components in good condition, and proper engine operation will lead to long life.

Wag Aeros exhaust division has a good reputation. I recently had a question on a C muffler without baffling, and a new one that came without them. They come with baffles, which I concur. In any case, they would be a good source for a replacement.

Polishing Interior Aluminum (Heater Ducts)

I routinely polish aluminum parts in the cabin with Nuvite. Use their F7 grade on the fleece side of sweat shirt material, then RUB, RUB, RUB! Then, remove all traces of F7. Then, use their S grade on another clean piece of the same material, again RUB, RUB, RUB! Then, remove all traces of S. Using another clean section of the same material, bring out the luster, RUB, RUB, RUB. Additional applications of S will bring out the shine even more. As you can see, the secret word is "RUB". I usually do the door floor trim also. Those who polish planes generally don't put anything on after polishing, as it will take away from the luster and will eventually either yellow or peel. To keep the shine you will need to repeat the procedure about every 6 - 12 mos.

Replacing Main Wheel Bearing Cones

The best way to do it is by shrinking them a few thousandths. You can accomplish it in a few ways.

1. Put them in the freezer for a few hours. Probably the easiest for you.
2. Use liquid nitrogen
3. CO2 fire extinguisher

If it doesn't shrink enough to drop in, then use a brass or plastic drift or a piece of wood to tap it the rest of the way.

...and...

I used a brass rod for years and you must be very careful. Not, in my opinion, the best way. Then I came across a bearing race setting tool manufactured by Lisle. KD also has one I believe. Has a series of special adaptors and one will fit your races nicely. They also provide a screw on section. When the wheel is properly supported, this tool will allow quick and easy race insertion. Most Parts Plus or Carquest, etc stores stock them. If I remember correctly cost is approx \$30.00. Money, in my opinion, well spent. Still use brass rod to remove old race.

...and...

The Cleveland Maint. Manual says to use a small pan, (Good idea to place a pie or cake rest in the pan and then place the wheel half on the pie rest) and fill the pan with water to cover the wheel half. Then, heat the water to near a boil, then remove the wheel half and carefully

support the wheel rim,(use 2 pieces of wood), and with the Lisle or KD Bearing Tool, push the bearing race out from the back side,(if it didn't fall out during the heating process).

Installation. Pack the bearing race in dry ice, and after about 10 minutes of chilling, use the KD tool and install the new race. (Be sure to use a soft clean cloth and remove any moisture from all sides of the race before installation).

Sounds like a big hassle, but if you don't like banging on an aluminum wheel with a brass rod you can always use the manufacturer's method.

Removing Side Panel - Routing Battery Cable

The side panel is in two parts. There should be a set of finishing screws with cup washers along the bottom edge of the larger front panel, as well as one set of screws common to both parts that goes from floor to top, about where the left rear passenger's shoulder is. The final set of screws for the rear (smaller) panel is along the rear edge. Remove all the screws, and the hardware for the seat belt, the vent cups, and the fuel selector cover. Then the panel should slide up. You have to coax it a bit by pulling it out, so it'll clear the seatbelt bracket and the fuel selector. The tops are secured with clips that you have to disengage the top plastic pieces of the side panel from.

Nose Down Trim Needed to Maintain Level Flight

Similar problem in my Cherokee was fixed when mechanic rigged trim per Piper instructions. Took 2 tries. The first time he adjusted it "the way he always had" and the flight test was unsatisfactory.

I insisted he read the instructions, we did it together, and it worked just fine on the 2nd flight test.

New Style Fuel Selector Collar for Older Planes

I called the local Piper dealer, and he sold me the kit for about \$140. Easy install. www.kcac.com, if you can't find anything closer.

Ground Cable - Engine to Airframe

I just changed the battery cables on our 1965 235- 0-540 and the hardest one to do was the one you are asking about. Ours went from the back of the engine on the pilot side to the clamp that holds the tube that the rudder pedals hang from. Only one bolt has to come off on mine. Yours may be grounded somewhere else. 1 gauge cables from American (in the CPA mag.) they fit perfect and no more worries about about hot starts at the self serv pump.

Rebuilding Artificial Horizon (Attitude Indicator)

I sent mine out last year about this time to Century Instruments in Wichita,Kansas. It was an Edo-aire autopilot gyro. They rebuilt it for \$255. Check with them beforehand as not all gyros are rebuildable (according to them) Their #is 316-683-7571.

160 HP Mod and Powerflow Exhaust

We have a 140 (1972) with the D2A engine (160 pistons) and the PowerFlow exhaust.

The prop was originally repitched before we had it with the advent of the D2A. Once the PowerFlow was fitted we needed to take it to 62 inches to stop it over revving.

It's a great plane now, cruises at 105 knots / 2275 rpm / 6.5 galls per hour. I haven't played much with top speed, maybe I'll try that this weekend and report back. I do get 1100 f/min climb and still have 500 ft/min at 10500 feet.

Hot Start Problem - Carburetor

If all else fails to correct your problem, remove clean (bead blast) and visually inspect each spark plug. Look for cracks in the ceramic that insulate the center electrode in the firing end of the plug. Not the end of the plug where the wiring harness connects.

Hot Start With Flames - Fuel Injection

You need to go over the starting procedures again. FIs, on hot starts should have little throttle (less than 1/4) mixture off, and pump on. The backfire/flame is an indication of several things, too much fuel at the wrong time, and/or ignition timing not set. Mixture should be enriched as soon as the engine starts. The pump should be on in order to contain vapor lock. It should all be outlined in your POH.

Autolite vs Champion Spark Plugs

The major difference with Champs and Auto Lites is the method of connecting the electrode. Champion uses a mechanical device with a spring, which changes with temps, and even weakens. It created unnecessary resistance over and above the existing resistor (if it's a resistor plug), and sometimes the springs may cause a gap increasing heat range, and/or weakening spark.

Auto Lites have a permanent, positive connection, and not affected by external changes normally related to spark plug operation. As a result they run more consistently, cleaner, and last longer. If at any time your Champion powered flyer, after being set up for cruise, ever gave a slight momentary skip (and they will), this is the result of that connection. As for quality, both plugs are comparable, except for the AL's plating, plus the AL costs less. Not a bad deal.

Pushrod Tube clips - Broken because of poor assembly

Those clips/washers only fail if they are distorted on assembly. There are some out there, that install the tubes without pushing them home before installing the retainer. They use the retainer to push the tubes in, and bend the retainers. They are hard, and when bent, the stress begins, and eventually breaks. Kinda stupid, but it does work well if done correctly.

Door Handle Removal - Some models

If it is like my 72 140, you pop out the black plastic with a thin screwdriver, thus giving access to the screw that holds the metal handle to the door. Pretty simple once you have done it.

Field Approval - Replacement of 180 Engine

Since the 180 was equipped with the A4A in later years, you should be able to get a field approval rather than requiring an STC. I'm not sure about the A4M. Although essentially the same engine, it was installed on the -181 model. This is one that will probably have to be worked out between your A&P and the local FSDO before you decide which route to take. The FSDO will be doing the approval and they can tell you what they'll require.

FSDOs are notorious for their lack of consistency. An easy approval at one FSDO might be rejected by another. The opinion that counts is the opinion of the one you'll be working with.

That said, I have seen early model 180s that were equipped with both A4A and A4M engines by field approval.

Replacing Oil Quick Drain

the quick drain was originally supplied to Piper by Lycoming as part of the engine package. The oil drain valve does not have o-ring but rather a seal made specifically for the valve and to my knowledge no one has a replacement seal. I have been advised by Piper you need to replace the entire valve which I was quoted well over a \$100. I have replaced many of them in the past and I always go with Saf-Air P/N P5000 which is available through many suppliers. I know Wicks has them for \$58.00. They are a great valve and they do use o-rings
...and...

Lycomings in our Cherokees use two basic types, one looks like an over size Curtis valve, in fact it is a Curtis valve with 1/2" pipe thread, and the snap up to open, whose name escapes me. There were a few, very few that had a snap down to open, like many Cessnas (the cause of my total engine failure many moons ago), and I believe these were made by Aeroquip. Aeroquip does make a safer, generic one, but cannot be used on Arrows, due to it lenghts and the drain hose attached to it.

The Arrow uses the snap up to open, and has an oddball thread size 1"X20 threads. This is the only one to use on the Arrow because of the retracting gear. Safe Air does have a drain plug for the Arrow, with the oddball thread, and short.

Contrary to popular opinion, Lycoming does not supply the drain plug, the AC maker does. I know this one from first hand experience. Lycoming will place the drain plug where ever the manufacturer requests. If you look at a crankcase closely, it may have as many as four blank bosses, depending on model. They can accomodate just about any one. Even the oil pick screen may be in more than one location. Most Cherokees are the same.

That snap up to open type is difficult to repair due to the type of oring it uses. It's square in section, and by design, with age, even if you're able to find an O ring, it will still seep.

The Safe Air is the best, least expensive drain plug. It has duel O rings, and available off the shelf. BTW, it's a family owned and operated operation.

Battery Box Replacement

I have a stc'ed battery box yet I haven't advertised it. The stc for yours will be completed next month. Go to www.rileyaircraft.com for details if you can wait it bets the hell out of all the other alternatives!

Worn Carburetor Heat Box

My mechanic told me today that the carb. heat box on my 0540E4B5 is worn where the butter-fly mechanism bolt goes through the box(hole wallowed out)causing my carb heat to not rotate fully closed in the off position. He thinks this may be causing my take-off RPM to be 50 to 100 revs slow. A new box from Piper is a 72 business day wait and over a \$1,000.

I personally just re-built my carb box on my 1977 -140....it had about 1/4" of space all around the 'valve' where the OEM felt had rotted away....and was loose...

Keep in mind the through bolt (actuating arm) is mounted through nylon bushings and rubber grommets....I would be surprised if it actually fretted/wore the sheetmetal...it it did, have it welded up and re'drilled to the correct dia.

I ordered a valve, grommets and bushings from Piper for \$67 and did the rebuild in about an hour in my hangar....

Feeding Strobe Wires Through Wing

I did mine with the help of my son. We took a 1/4" piece of Cold Roll Steel, 20 ft long.... laid a trouble light in the wing and fed it through the wing. The biggest trouble was getting it through the fuselage, The whole job of feeding the wire was about 45 mins (both sides)
...and...

I did it on a hershey bar 75 Arrow, not too much prob. You might need to use the nav light lead to pull perhaps 3 new wires. 1st to repl the nav light lead, 2nd for the strobe, 3rd as a back up of potential landing/recognition light.

Fine Wire Spark Plugs

Fine wire spark plugs are fabricated using high erosion resistant electrode materials such as iridium. Massive spark plugs use a much lesser erosion resistant material -- and are much less costly. Spark plugs loose their ability to fire when the sharp corners are eroded. Therefore, longevity of the plug is greatly increased. I also find that due to the fine wire geometry, that plug has a much less tendency to collect debris and foul out.

Replacing Engine Baffle Material

The baffle seals are very, very important. They help direct the cooling air flow over the engine in the prescribed scenario for proper cooling. Without them, cooling air flow would be "squirrley" and hot spots could occur. As these gents suggest, Wicks and Spruce are the best source for material and fasteners. The staples used by Piper are a quick and dirty fastening system and corroded by now. Pop rivets with large heads and using a washer on the back side works very well and when carefull spaced looks professional.
...and...

Silicone cowl seal from aircraft spruce and speciality. About \$25 for 9'of 1/8" x 3" for p/n 05-00755 red.
(choice of red/black/blue)

They also have pre-cut kits, but need to call for price. They also sell fasteners for this purpose.

Should Tank Screws be Painted?

I replaced all my screws last year after SB1006. Left them unpainted. Did the same for my 140 a few years back. Both planes have white wings. I think it looks fine with unpainted screws. Also eliminates the possibility of painting, having to remove, and then looking damaged.
...and...

I reccomend not painting the screws. These fasteners are structural and must on occasion be removed to access a lot of wing equirements -- such as spar SB, fuel lines, wire routing etc.

Really, the Cherokee fuel tank is a large access panel! When painting the screws you are shooting yourself in the foot when trying to remove them. The SST fastener kits we all talk about are excellent and I might add are of the same structural strength as what Piper used. Both fasteners are of 125,000 PSI strength. Suggest that if you do elect to use SST, be certain and use a small amount of anti-seize on each screw.

ELT Replacement

One night when I was bored I did a search for 408 MZ ELTs on the web. There are several available but they are still not cheap. What I recall was about \$1,000 to \$1,500 depending on what unit and where you purchased it. They have been used in marine applications for years. But if survival is important you are looking at between several days versus hours for rescue. The 408s are coded with your specific aircraft address information and beams a signal to the satellite which unlike standard elts is responded to immediately.

Replacing Bow Tie Yokes with Rams Horn

I don't recommend trying to remove the shaft from the yoke. I think there is a potential of destroying the yoke, or least making it unservicable. I to have the 3/4" shafts on my airplane. When Piper changed their design from 3/4 to 1 1/8 shaft they simply used a busing in the end of the shaft that attaches to the universal joint. You can purchase that busing from your Piper dealer. The part number for the busing is 68557-00. In my parts manual it can be found in figure 80, Control Wheel Installation. You will also need to purchase the block and busing stack-up where the shaft goes through the instrument panel. I don't have those part numbers readily available. Let me know and I'll be happy to look them up for you. I purchased all the parts necessary to conversion from 3/4 to 1 1/8 from Air Salvage of Dallas.

If you install the Ram Horn Yokes without modifying them, your A&P can simply make a log book entry stating that he complied with AD 69-15-01. That's assuming this AD applies to your airplane. The AD allows for the installation of Ram Horn Yokes to illuminate the recurring inspection of the Bowtie Yokes.

Painting Interior Plastic

I paint several pieces of my 161 with "SEM" paint. It is a flexible automotive paint for anything from interior trim to bumpers. Looks like new with a little prep work and has been holding up GREAT.

Painting Headliner

Use the Molecubond Paint. You can get it at KMart, WalMart, Pep Boys, etc. Did my headliner (which was very discolored but otherwise ok) last year and it looks like new. Took about 3 cans and a few hours. I did mine when the entire interior was removed and we could mask off everything. Just make sure to wear a good paint mask, NOT one of those particle masks.

M-20 Air-Oil Separator Installation

In the process of installing the Oil Separator...thought I would post here in case someone is ready to buy. Installation has not been as easy as it should have or could have been. I have '73 180 with 0-360 A4A engine. I ordered the 300A unit per the manufacturers recommendation for pipers. This unit is set up to be installed on the left side (pilot) of the engine. This was not spelled out in

the vendor literature. If you have the plug on the case to return the oil which is on the right side, do not order the 300A. Suggest ordering the unit advertised for bulkhead mounting. If you do not have the plug (manufacturer stated that only about 20% pipers have the plug), then it doesn't really matter. My plug was 3/8 NPT so I bought a fitting 3/8 NPT x 1/4 barb. The separator inlet and outlet are 3/4 od. The vent from my engine was 5/8. Therefore, had to purchase new 3/4 ID hose and a piece of 5/8 tygon tubing to bush up the 5/8 OD fitting on the engine to the 3/4 ID hose. I called the manufacturer to discuss these items..he told me that most pipers have 3/4 and 1 inch vents (???) also told me that the plugs on the case are usually 1/2 in....the installation looks ok but would have preferred the oil return facing forward (instead of toward the firewall..will report on the performance once I am out of annual.

Personal Oxygen Supply

I use oxygen a lot and got tired of being robbed each time I needed it filled with "aviation" oxygen. I paid from \$30 to \$50 for each refill and it was always a pain to get the tank to a FBO for refills as my home base does not have oxygen. My belief that oxygen is oxygen was confirmed by Aviation Consumer several months back. The article indicated Aerox and MH sold filler assemblies from about \$90 to \$275 and it sounded great but a little costly.

I stopped at my local rural gas dealer and purchased a 4' stainless braided hose with hand nuts, pressure gauge and valve for \$120. The setup is about the same as the MH \$275 unit and works great. I had one oxygen tank and will purchase one more to top off my airplane tank but it takes no time at all to fill the convenience alone is worth the price.

Anybody who uses oxygen or is thinking about it should consider getting their own fill station. I wish I had done it years ago.

AMR&D Propeller Re-Pitch

Had the prop mod and a re-pitch this fall. The prop was due for an overhaul anyway so I had AMR&D do all three. I re-pitched to 62 from 58 per Art's recommendation. I do have ART's 160hp upgrade (in a '67 140). I could easily exceed redline at full throttle in climb at 85MPH and also in cruise. Now with the mods done, full throttle climb at 85MPH is about 2550-2600RPM at 750+ FPM on a cool day, just me and fuel to the tabs. It will be interesting to see what happens this summer. Although I have not done a timed speed run, I would estimate that I've gained at least 5 but not more than 10 knots cruise at 2450RPM, 3500MSL. Is this due to the re-pitch, overhaul or the tip mod?, hard to tell. Although not a scientific certainty I do believe it did help. Art was good to work with, was prompt and did a good job quality wise except for the advertising sticker he puts on the prop, a better design would look nicer. Do get a different sound now, lower pitch and a bit lower in volume. Art's price to do the overhaul, mod and re-pitch was competitive with Sensenich to do just overhaul and re-pitch.

Fuel injector nozzles and EGT spread

I too have an Arrow (75). I inst the edm700 about 4 yrs ago. Couldnt be without it! My #3 was always 40-50 hotter than the rest. Then I started to experiment w/changing the injectors around, sorta like musical chairs.I was able to get the spread tighter, but 3 was still 40-50 hotter. Others were w/in 20 of each other. Then I experimented w/enlarging the injector a bit. I think a new injector has a hole size about .027. I opened one up to about .031. Geez, that cyl then ran about

100 less than the rest! Point being that the injector hole size has a HUGE impact on the egt. So I got a whole new set of injectors, played some musical injectors, got a .027 drill and pin vise, and kinda customized my injectors. Now, in cruise in the 11000-16000 neighborhood, I see a spread of no more than 10 and sometimes they have been within 3! of each other. I also got one of those vibrasonic parts cleaners, and I clean my injectors every 100 hrs or so. Those suckers come out looking so new! I am very careful not to mix them when reinstalling.

Jacking Aircraft

You definitely need two jacks. It would be very unsafe to jack up only one side. To get one wing high enough for the strut to fully extend and the wheel off the ground, you would have the aircraft in a very awkward position. The jack could easily slip off the jack point.

Alternator drops off line - reset with master switch

I had somewhat of the same thing going on. It was the over volt regulator not the regulator itself that was bad. Replaced it with the printed circuit type over volt and haven't had a problem with it in 1000 hours plus.

It is located on the pilots side up under the panel. It is bolted to the left side of the plane with two screws and is about the size of a bar of soap. Should have two wires attached to it. Has a metal cover on it. The voltage regulator is bolted to the side right above it.

Nosewheel Shimmy - Causes

Most probable culprit is the shimmy damper - replace the 'O' rings and re-service. Other things to consider: both main and nose wheel sissors bolts and bushings, all wheel bearing preloads. Warped brake disks, Wheel alignment, rudder control cable tension. and the nosewheel strut bearings. Pretty much in that order.

Replacing tailcone jackscrew bushings

Steve Norman replaced the bushings on mine. He said it was a 2-man job. One guy holds the cable from unwinding. The other guy pulls the pin and inserts two new bushings and puts it back together. I think it only took 30 minutes.

Frozen exhaust slip joints

Frozen slip joints are normal. While out make sure the muffler does not have broken baffling. Keep heating and squirt penetratin oil at it while hot (about when red color starts to disappear) be careful squirting the oil. I'd be more concerned about the studs. They will be a @#\$\$%^ to remove.

Airframe Loading Factors

The load limits are set by standardization from the FAA. Normal cat. is 3.8G pos and 1.52G neg and is restricted to normal maneuvers. For utility it is 4.4G pos and 1.76G neg for the spins and such. Two up front and no baggage. Acro planes and designed to 6G pos and 4G neg.

Priming rusty skin

Zinc Chromate will work fine if the rust is removed completely. A wire brush is satisfactory in most cases. Remove the rust to the parent material surfaces and be sure to wipe with MEK or Acetoneprior to application of the primer.

My preference is to use an epoxy primer.

Fitting new wingtips

Big help is to get a stool, etc. to support the wingtip while you work.

Run masking tip all around the wing just inside of the exiting tip. This will provide a depth gauge for where your news tips will fit.

I then removed old tips, drew a line straight out from the holes onto the tape to be sure of their location.

I made a hole finder/transfer using an old hacksaw blade. Cut in half. Install and 1/8" pop rivet thru one hole. Line up the holes from the ends so that the head of the rivet is sandwiched between the blades and the upset end is protruding out. Drill and rivit in two places at the broken ends. Use this tool to slip above and below the of the new tip. The protruding rivet will fall into the nutplate and the open hole will mark the location to drill.

BE SLOW AND CAREFUL!!!!

At the nose of the tip the tool will not fit. You must measure the distance in from the line on the tape to the hole center.

Rebuilding 235 Fuel Selector Valve

Piper also has a long lead time unfortunately even if you wanted to shell out the dollars. The only place I could find in the US to rebuild the valve in my 64 235 was B&S Aircraft. I had the same cross feed issue you describe, I understand it's rather common.

Mike James there was very helpful - apparently they can only rebuild the valve with a certain part number IH26-2. Mine wasn't, I had to buy that model used from Wentworth Aircraft, have them ship it to Mike and have it rebuilt. Then my mechanic had to get new fittings to make it install properly which were easy to get at a local Piper dealer. Of course you could just take the used one and put it in your plane....but who knows what you are getting.

Here's some information for you:

Mike James

B&S Aircraft

1414 S Mosely

Wichita, KS 67211 United States of America

Tel - 316-264-2397

Fax - (316) 264-7898

sales@bsaircraft.com

Paid US\$775 for rebuild a year ago

Wentworth Aircraft (they have a website)

+1 (800) 493-6896

Paid US\$500 for the used valve!

Paid about US\$35 for fittings

AN919-12D Reducer

AN894D8-6 Bushing

Spray paint touchup of headliner

We had the same problem last year when we re-did the interior in our warrior. I used Molecu Bond. Aircraft Spruce has it, but you can also get it cheaper and in more colors from WalMart, Pep Boys, K-Mart etc.

I cleaned the headliner with a mixture of windshield washer solvent and a little joy and then wiped it down again with a clean cotton rag and then with a 3M prep solvent. When I painted ours, the entire interior was out of the aircraft so I masked off everything with large plastic sheets and then climbed in wearing a Tyvek suit (you can get these really cheap from a marine supply store, everyone who is smart wears them when painting boat bottoms. They are disposable) and a good 3M canister paint mask. DO NOT use just a particle mask! I used the bright white and it took 4 cans over about a 3 hour period. The headliner still looks just like new and is now a year old. Would definitely do it again. If you are also re-doing your plastic pieces, Krylon Satin Almond is a great match, then spray Krylon Satin clear as a top coat. Feel free to email me if you have any other questions

Spark Plug Gap

Suggest always check and set plug gap. Plug gap can be found in maint manual and manuf listing. The magic number is .016 if I remember correctly. Gapping does not cause misfiring until about .022.

Fuel flow gauge

I have a JPI 450 Fuel Scan in my 180 and don't know what I ever did without it. Not only is it accurate within 8 oz., it tells me actually what I've leaned to, How much fuel I've burned, how much I'm using, how much fuel I have left, and time to empty at whatever cruise setting I'm at. I keep checking it and its been right on the money every time I fuel up. The best part is I understand they are on sale for under \$500. If you have any other questions, give me a call at 405-755-2151. This is the third I've installed and my customers swear by it.

Replacing/repairing electric trim

Just had the whole electric trim replaced in my 76 Archer. Yes, the whole rear bulkhead has to be moved forward to get at the trim. In doing that you have to loosen the top air duct louvers. Be careful not to crack them as that is what happed to me. Had to replace the whole upper louvers to the push pull air duct. Cost about \$300 from plane parts and a whole day to install it.

Alternator kicks off line as battery charges

It sounds like you might have spikes on the bus that are tripping the overvoltage. 14.7 volts is a little high, it may be too close to the edge. It is also more likely to occur if you have a weak battery.

Do you have access to an oscilloscope to check for spikes?

Another possibility is that regulator can't turn down the field current enough. This would happen if it were damaged or defective, but since you replaced the regulator, it's less likely.

The only other thing I can think of is if you have a bad connection in the electrics somewhere. The first thing to do if you have any electrical problem is to make sure all the connections are tight and corrosion free, both the field circuit that you've already looked at, and the main

alternator circuit. This includes the grounding between the alternator, the airframe, the battery and the regulator.

Requirements - Logbook entry

To answer your original question, five things are required in a sign off. Found in FAR 34. 1. The date. 2. What you did. 3. What tech data did you use? (ie Piper maintenance manual chapter and paragraph, or manufactures instructions if they come with the item your installing) 4. Signature. 5. Certificate number. (A&P,IA,Pilot,etc.)

This is the minimum required. Times, serial & lot numbers and date of manufacture of the items should also be included as previously stated. I got nailed many years ago for leaving out the tech data.

Repack Wheel Bearings after painting plane

As soon as you get your plane back from the paint shop, take it immediately to your mechanic and have the wheel bearings repacked.

No matter how good the preparation is on the paint, some stripper will get into the wheel bearings and will cause the grease to go bad. I learned the hard way--about \$1,500 worth of the hard way.

Service Bulletin 1006

Mike, the service bulletin deals with Spar inspection behind the fuel tanks due to exfoliation of the spar caps and corrosion in the surrounding structure. It also deals with corrosion of the forward and aft wing attach fittings. There have been cases that when the tanks were removed for inspection, the spar caps were found so corroded the wings had to be replaced or repaired with new spars. On the last 10 or so Cherokees that I have inspected, I found only one that the wings were unairworthy. If your plane has not had the inspection done, I would certainly suggest you have the tanks removed for inspection. In addition to the inspection, it also recommends that the fuel tank main fuel supply flex hose and vent lines be inspected for age and deterioration. The hoses should be replaced at least every 8 years. I have had to replace the hoses on every Cherokee I have worked on due to age hardening or split vent hoses. Unfortunately, many owners and shops just didn't replace them like they should. My personal opinion is there is a safety of flight item, but since it's a service bulletin, it is not a mandatory inspection. I would suggest you check your log book and if it hasn't been done I would look into having the inspection done.

LoPresti Cowl

The LoPresti "Holy Cowl" was used on the AOPA sweepstakes Arrow III in about 98 or 99. They reported extensively on it, and said it looks sexy but didn't notice any perf increase. For inst, paint, paperwork, and the cowl, look to drop 10K or even more. A new cowl from Piper will prob cost about the same, so if your existing is shot, hell yea, but if just for the perf increase, I would think you could spend the 10K elsewhere and get better gains. BTW, I have a 75 Arrow II, and have done just about all the mods poss except the cowl, Lasar, and the 1-piece windshield. And I will prob do the Lasar this spring or summer.

Windshield sealant - sealing windshield

The Factory recommends using the foam Tape around the edges and a Bear-Manning sealant or equiv. I found that M/D tub and Tile sealer "caulk" is the closest match I have found, works

great, water clean up must have replaced 6 or 7 windshield on leak/ no complaints. One of which is going on fifteen years. I have a friend that now uses GE silicone II also water clean up " says it s the bee knees and looks great! All I can say is don't go cheap or take short cuts. when you pull out the old plastic send the time to really cleanout the old channel, this make all the difference in the world.

Brake bleeding brakes

I've tried just about every method and have found the following works best for me, and it only requires 1 person.

- put clear plastic tubing on the bleed valves of each main brake wheel cylinder
- put other ends of these tubes in the brake fluid reservoir, draping the hose up over the top of the engine cowling so you will be able to see the tube content from pilot's seat
- make sure the reservoir is near full
- crack open both wheel cyl bleed valves
- climb in and begin pumping each toe brake while watching the content of the tubing for fluid.
- While pumping you will see fluid with air bubbles move toward the reservoir. Of course, when they reach the reservoir they will float to the top and into the surrounding air.
- periodically pump the hand brake also
- after a while jump out and add fluid to the reservoir
- jump back in and continue pumping toe brakes and hand brake until no more bubbles are seen in tubing.
- jump out and close both wheel cyl bleed valves.

Although I've used this method only on planes with just left-side brakes, I would expect it would work just as well with dual brakes.

This method works every time for me, resulting in a hard and at top toe brake. Be careful not to spill any of the fluid. It does a job on just about everything it touches. I have an all polished plane and I hate it when I spill

Lasar - Amber light stays on

More than likely the temp probe is the culprit, and usually from no so good install. What type of probe is it? Does it have two seperate wires ora single wire with an outer shield.

You can hook up a lap top to your computer. You'll need a long adapter cord (from Radio Shack), and leave it hooked up until the fault code appears. In most cases it's the temp probe. The temp probe is built with an adjustable attachment, be sure it will go in far enough. Check for worn or scraped insulation, and proper installation.

Low voltage will set off the lamp. Make sure your electrical system is charging. Mine went off due to low charging rate, turns out to have been a bad diode in the alternator.

160 hp engine conversion

One is the RAM STC, which requires a prop re-pitch, carb re-jet and new cylinders. This STC is \$295. You must also buy a second STC which allows the 160 hp engine to reside in the plane. This is also \$295.

The second option, also from RAM, involves purchasing only the second STC, but would involve swapping your current engine for one that was designed to output 160hp from the factory. Obviously this would only be done at the major overhaul (unless you are rich of course...)

...and...

I have the RAM STC on my 1971 140. I don't believe the prop re-pitch is mandatory, however, not repitching the prop could result in over-reving the engine if you're not careful. Amongst the mandatory requirements of this STC (for the E3D engine) is that you are limited to 5 minutes max continuous operations between 2650 and 2700 RPM (there is no change to the 2700 RPM readline). In fact, the STC also requires you to paint a new "yellow" arc on your Tach, between 2650 and 2700.

I understood the carb re-jet to be mandatory. Actually, the STC specifies allowable Carb model numbers that can be installed. Other models, presumably, cannot.

Spinning magneto by hand

It is not a good idea to spin the mag by hand as described.

The voltage developed by the magneto is somewhat determined by how much resistance it finds as it completes its circuit. The output voltage of the magneto is relatively low when the normal spark occurs across the small, lower resistance gap between the electrodes of the spark plugs, but the larger, higher resistance gaps that the spark has to jump when no spark plugs are connected requires the magneto to develop a far higher voltage before the arc occurs, and this voltage can exceed the dielectric strength of the internal insulation of the magnetos parts and can degrade or destroy them causing lowered output, misfires, or failure. It can also cause carbon tracking on the magneto block, which can lead to misfiring, particularly at higher altitudes.

Multi Grade Oil, multi weight oil

-- Aviation Consumer ran a series on A/C oil a few months ago. We have been using Shell's 15W50 forever with 0 problems. (Midwest KC Area)

"The superiority of the multi-weight rests on two basic foundations: The first, and most important, is the vastly improved temperature performance of the multi-weight over the single-weight. Easier starting, better low-temperature lubrication and higher thermal stability all favor the multi-weight. Second, the manufacturers appear to devote greater resources, in general, to the additive packages in their multi-weight oils. This is largely because the multi-weight oils can, and do, demand a price premium over the single-weight offerings. The improved additive packages primarily help with extreme pressure (boundary) lubrication, corrosion control and detergency."

Testing gas for Ethanol alcohol

I keep a small baby bottle handy (believe it is a 4 oz) which has oz markings on the side. Put in 1 oz water & 2 oz gas. Shake it up and look to see if water level has increased. No rise..No alcohol.

Oil Cooler, AD 95-26-13, alternate compliance

I have checked the FAA web site and found ACE-96-01 which provides an alternate method of compliance to the oil cooler AD. This was requested by Piper. If you have an oil cooler mounted in the rear of the engine of a PA 28/32 and have replaced your oil hoses with TSO-C53a Type C or D then the AD is terminated. I printed out the material to show to IA and will be interested in the action. If you want the material look under Special Airworthiness Bulletins at faa.gov and scroll down until you get to the right one.

Glazed Cylinders

Glazing is basically a condition where the cylinder walls, are entirely smooth, and the hone marks are no longer working. It looks as the name implies, glazed. The condition can be attributed a number of factors, such as poor rings, worn ring lands, loose pistons, worn oil scraper, running too rich, long warm ups, etc. Some of these "rebuilt" barrels, if not properly honed or too much piston clearance, or just a poor bore job can result in glazed cylinders. The worst harm it will do is raise oil consumption. If in the case of a combination of some of those reasons, it can cause broken rings, more oil consumption, and even a cracked piston.

These of course are extreme cases.

Nearly all, if the time, most engines will have glazed cylinders when reaching TBO. This is one reason to heed the manufacturers recommendation for TBO. BTW, the same engine can also have acceptable compression. This is why you should be skeptical when some says, "The engine's fine, it has good compression"

Sudden EGT rise, one cylinder

Best guess - One of of your plugs on cyl.#2 quit firing (bad plug, bad wire, etc...). With only 1 of the 2 plugs firing, EGT will rise on that cylinder.

If that is the problem, an in-flight mag check should be able to isolate the problem pretty quickly.

Replacing aluminum battery cables

I just finished installing the American cables. 1) the pre-installed terminals do not cause a problem, I just used safety wire to tie the new cable to the old and used the old to pull the new thru. Of course, I have the wall panel out anyway for restoration and guided the new cable thru each hole. 2) No 1 is very stiff, but not so that you can't form it as required. 3) can't speak to the Bogert as I have only installed the American, but can't imagine there is much difference except price. 4) On my a/c the ground wire connects to the engine on a case stud just behind the starter, and to the airframe on a brace under the panel just above the pilot's left knee. Paint is scraped off both places. If you are concerned about oxidation of the aluminum, use a product like "De-Ox" (or is it No-Ox ?) available at Home Depot electrical dept. to prevent oxidation of al. 5) don't know. I also just installed a AK-450 elt. Since it would not fit thru the access hole near the tail, I fabricated a L shaped bracket and mounted it as far back in the tail as I could reach from the access door in the baggage compartment (PA28-161). This puts it about 2 feet further forward than the old one, but is easy to reach. The bracket is cherry-max riveted to ribs. The ELT antenna mounts different than the old one but I used one of the existing holes and put screws in the other two that mounted the old antenna. All done with the blessing of A&P/IA

Replacing Fuel Valve O-Ring - Fuel Selector

Sounds like the o-ring to me too. It is either a 011 or 012, but go to a bearing and seal business and request a viton of each size. They'll hold up much better than the Buna-N ones you'll get at the hardware or plumbing shops.

Replacing Overhead Bulb - Early Style

You have the old style overhead light. I have a '66 140 with the same arrangement.

Unfortunately this style is a pain to replace. That's why Piper went to the newer style the other posters talk about. I have found the only way to get to it is by dropping down the overhead panel. If you try to do it the way you said in you post, you will probably crack the plastic panel, especially if its old. You have to remove all of the screws, pop off the trim crank using a auto window trim removal tool. There is a little horseshoe clip in the crank handle. Be careful not to loose it. Then if your light is like mine, it's fixture is taped into the overhead plastic housing with 2" wide black tape, which of course has to be removed and replaced. Then you can get to the light bulb.

Noise on ADF

Tom, the first thing I'd do is use a standard AM radio tuned to the lower frequencies to see if it was also getting static. If it does, then there is something in your plane that is creating enough RF noise to mask the ADF signal.

If you don't hear any unusual static on the AM radio, then the next place I would look would be the antenna cable. Coaxial cable will deteriorate after time.

Key falls out of ignition switch, magneto switch

I think you need a new ignition switch, especially if you have a Bendix switch. There are two things you are suppose to check for when you do the 100 recurring AD (AD-76-02-12) on the Bendix ignition switch. One is from an idle rpm, turn the switch off to insure the engine will shutdown by killing the mags with the switch. The second thing is with the ignition switch on, either with the engine running or not, the "key" will "not" pull out of the switch. "If either of these checks fail the switch must be replaced" The reason for the last check is to make sure that key doesn't fall out and the switch is accidently left in the on position and you have a hot mag condition. If someone were to move the prop the engine may start..... Not a good situation.

Vibration after Replacement of Cylinder

#3 cylinder is notorious on 320s for giving problems. If you have a crossover exhaust system, and it was not checked for broken baffling inside the muffler, this may be why you had to replace it. The end of this type muffler is blanked off, if not, #3 will over heat.

You didn't tell us why it was changed in the first place.

More often than not, valve lifter bleed down clearances are not checked by many a techs. What you describe can be attributed to not enough clearance. To little will not allow enough bleed time especially when cold, even worse if using 80 or 100 oil.

The mags were OHed 50hr previously, so check for bad wires.

Check the priming system. They can leak a tad, and run OK after warming up, but wreak havoc when cold.

From what you describe, my first inclination is to check the muffler if you have a crossover system, and the bleed down clearances. .028 to .080. Good around .040 to .050 for 320. Up to .060 OK too. + -.005. Both too much and not enough will have much the similar effect.

Heated Pitot - Early Model

I put a heated pitot on a 140 just over 3 years ago as part of a big modification--new type gyros, a new panel, voltmeter, intercom, etc., etc. I had to get a field approval for the whole package and a new weight & balance addendum. It sailed right through the local FSDO. Instructions for continued airworthiness are required on the 337. I am an A&P/IA so I did the paper work. Only a Piper heated pitot will work, obviously, and wiring will have to be strung through the wing on early models. I would recommend a toggle breaker rather than a switch plus fuse or breaker, my manual calls for a 20A circuit protector.

Leaky Cabin Door

I have spent about \$1000 on my silly door in the past year trying to fix the same problem on my 1962 160. Rebuilt the latches, new upper and lower hinges, three sets of rubber seals (including Piper hollow seals), etc., all for naught.

It is now perfect--closes with a satisfying thunk like a Mercedes, doesn't leak--air or water. The fix? Two things--the restraint arm that prevents it from opening too wide (at the bottom of the door) was binding the last inch or so of closure. Also, the door itself was about 1/16" too wide for the opening, and was binding. It was obvious upon close inspection. Don't know if it was a replacement door or it simply "grew" over the years. We took about 1/32" or so off both sides of the door with a Dremel tool, then touched up the paint. It now fits exactly and works great.

Check the fit of the door and binding of the door restraint arm at the bottom.

Control Cable Failure During Flight

I had a throttle failure a few years back. The nut that attached the cable to the carb apparently just vibrated off in flight. It was quite a surprise when I pulled back the lever and nothing happened. I was sure for a few seconds I had screwed something up. Using the mixture to slow the engine worked quite well. You can also switch to one mag and turn on the carb heat to further reduce power. I gave some thought to going to a nearby airport which has an 10,000 ft runway and deadsticking it but I had no idea if the power might at some point just go to idle all by itself. Honestly, it wasn't particularly difficult to get it down on our 3600ft runway, shoot, I made the first turnoff!

I have been practicing failed stabilator/yoke control for a some time. I can fly the entire pattern no yoke from liftoff to just short of touchdown. I am not going to run the risk of knocking off my nose wheel in the name of practice! Use rudder for turning of course and make small adjustments to trim and power for alt and attitude control. When adding flaps pull the bar up sloooowly. If you get to making big inputs you'll find yourself making high speed dives and climbs to near the point of a stall in 3-400ft increments. It does take practice and I was horrible at it for a while. The throttle is more useful for correcting slight altitude adjustments than trim. Changing the trim makes a corresponding change in airspeed which results in another change in altitude and

attitude and it can turn into a mess. Obviously on base and final you're going to have to use trim to get slowed down and get the nose up for touchdown which is something of a frenzy just cranking that wheel as fast as you can. I have found saving that last notch of flaps til seconds before touchdown helps avoid landing on the nose wheel. By the way, this stuff is a blast to practice and I think its good practice using those rudder pedals and learing more about the effects of trim and power.

Nitrogen Strut System

Acquired the following from Praxair:

Victor TPR250-500-580 dual gauge regulator \$123

Nitrogen 20 cu ft tank (charged) \$ 63

From Aircraft Tool 800-248-0638:

Schrader Coupler SK204C \$ 19

From a local hydraulics supply house

SS high pressure hose \$ 48

Total \$253

Aircraft value

you should think of a/c valuation services as follows: VREF is the seller's wholly grail, AEROPRICE is the buyer's wholly grail and Blue Book Price Digest is the lender's wholly grail. Unless you have lots of \$\$\$\$, you better concentrate on the Blue Book Price Digest because that's what your lender will use. The a/c valuation process is more of an art than a science and in the end, he who has (or lends) makes the rules.

Polished Spinner

We polished the spinner on our old '75 Warrior, and it came out beautifully. Just use chemical stripper to remove the paint, and buff the bare aluminum using "Mother's" aluminum polish, or "Simichrome" polish.

Sluggish electric trim - cold weather

Cold weather can do that. It usually means that the trim jackscrew in the tail needs cleaning and a new coat of lube. Piper calls for a special low-temp lube to keep the trim from getting sluggish in the cold. I don't have the mil-spec handy, but it is commonly known as Lubri-plate.

Century Autopilot Repair

Burt, the Century web site lists: Brazos Electronics at Laporte (713-470-6686) and Temple Electronics at Hobby (713-649-8175) as capable of "box troubleshooting". I had my Century I installed by Tejas Avionics in Georgetown, but they are listed for limited troubleshooting only.

Arrow Gear Droop

Any of the 3 gear actuators could have an internal leak or it could be the auto-extend valve under the rear seat. Each item can be individually removed from the system at the manifolds under the rear seat to identify the culprit. It's usually 2 little O-rings in the auto-extend valve.

...and...

The November issue of Light Plane Maintenance, had a Q&A on the arrow gear from a guy with a more severe problem then you are reporting. Their reply:

The first thing we'd recommend is yanking the power pack and having it benched checked per the manual. At the very least you want to rule out internal leakage in the power pack. A bench check is the only way to do this (short of out right-right replacement, of course).

Another possible cause is a bad O-ring in one of the gear actuators. Unfortunately this can be a tough one to troubleshoot since all three gear actuators are connected through the gear-up/gear-down manifold. Thus, a bad O-ring in one actuator lets all three wheels sag.

Probably the easiest way to attack this is to jack the airplane, then cap off two of the actuator lines at the manifold. This lets you play with one leg at a time.

Retract one leg at a time and the airplane sit like that for hour (or two or three). The leg that sags is the one with the bad O-ring. Do this test after you rule out the power pack as a possible source, otherwise an internal leak in the power pack will let the gear sag and you'll wind up replacing all your actuator O-rings and still not fix the problem.

AD Listing

http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgAD.nsf/MainFrame?OpenFrameSet

Oil Analysis

I had a 79 Skyhawk with o-320-h2ad engine at 1100 hrs. tt I did an oil change and had an oil analysis , results were increased iron from 13 ppm to 28 ppm The lab noted the change and said to check in 50 hrs. At 1150 hrs. the iron went to 37 ppm and the lab called and said to check #4 cylinder lifters which I did and found heavy wear on the surface . I replaced the lifters and at 1200 hrs. tt iron went down to 23 ppm at 1250 hrs tt iron down to 14 ppm and stayed in teens until engine replacement at 2535 hrs. tt . I think I would have had to overhaul at about 1500 hrs if I had not found the lifter problem. So oil analysis got about 1100 hrs more on the engine . I believe in getting all the information that I can . I do oil analysis every 50 hrs. on my Pa-32/260 looking for trends or changes .

Slamming to Close Door

It is a sensitive trade off. Loosen it too much and it will leak air. The best is to have a good seal and then adj to a "gentle" slam. Alignment of all parts is essential. Lubricate all parts sparingly. Pull on door arm rest to close door. Avoid using inside door handle for pull. Try doing this and it may help.

Cracks - Patches

This is very common with the sixes. The easy way and cheap way is to install a patch on top of the wing. Its airworthy bur ugly. I have seen as many as 4 one ach wing. The proper way to repair the cracks including removing the existing patches is a flush patch which is not really hard to do, it just costs more money. The last one I did was \$1000 for both wings.

Under each of the patches on the outside of the wing skin,if you were to remove the patch, you would find a crack in the aluminum skin. It should have been stop drilled at each end of the crack to prevent it from continuing on further. When this has been acomplished, a patch or doubler is then riveted on top of the covering the crack which should return the to its same (or greater) strength. A flush patch cuts out the crack in the with a hole slightly larger than the crack. A doubler is installed under the aluminum which is about 1 1/2 times the size of the hole and riveted in place with flush head rivets. An aluminum disc. is cut out of aluminum the same diameter as the hole (the same thickness as the wing skin) and riveted to the doubler previously installed. It will normally have a fine joint around the outer diameter which can be filled with body filler, sanded and painted. If done properly, the strength is the same or stronger than the original and in most cases when painted, you would never be able to see the patch.

Repairing Leaky Compass

You are performing an illegal maint function - that everbody does. In other words, keep it to yourself and above all do not put anything in log book. According to the FAA it requires an instrument shop to do this! Aint that a b####h! Now, to fix it. You have a ruptured diaphram and it is leaking. They last about ten yrs. Rem compass, disassemble and instl repair kit. DO NOT TOUCH ADJ SCREWS. Fill compass with fluid by immersing and get all bubbles out. Put it back in airplane. Now if your swing was OK to begin with it will be fine. If you have to adj use a special brass (non magnetic) screw driver. And Oh yeah - the compass is req'd to make acft legal. Be certain sure you have a compass card in place too. The whole job is very easy to do.

Airplane Tends to Turn in Flight

Without consideration for weather, you should be able to fly hand off, certainly without pulling to any side. Rigging is where its at. Pipers are rigged by altering the position of the flap. Well and good, but if the ailerons are not in rig, or some excessive play is present, the rigging operation is incorrect.

Water Drops inside Valve Cover

The moisture you see is a mixture of several things. Straight weight oils (W80 Or W100, et. al.) are prone, excessively long warm ups. A very short hops, where the engine doesn't reach operating temperature. Running too rich, too long. Using a colder than normal spark plug. Ignition timing retarded. This is yet another reason for using multi grades. If you are using it, and still have the same problem, any of the others mentioned or combination thereof, will do the same.

Rams Horn Yokes

Bert, New ones from Piper run about \$2500 for the pair. Used Piper normally run around \$500-600 each from salvage dealers. Avian has some I've heard for around \$800 each? Mooney wheels can normally be bought used for around \$100 to \$125. I have a packet for the installation of the Mooney which I sell for \$10.00 just to cover shipping and handling. The Mooney control

wheel is actually a little better than the Piper and for all practical purposes looks just like the piper. With the packet, your mechanic should be able get a field approval from the local FAA FSDO. Let me know if your interested. (Dick Russ)

Converting to Club Seating

I assisted with a early model Senaca several years ago. Got the drawing from Piper, removed and reinstalled the existing hardware per the drawing. the seats are unusable, purchased used rear facing seats, as the backs are made to withstand the additional forces, over \$3000.00 then. By the time we finished, had the seats reupolstried to match and touched the exterior paint (rivet heads) I would estimate the whole thing cost over \$6000.00. Probably more at todays prices.

Lubricating Aileron Hinges

Actually, you can use just about anything. Clean motor oil, LPS3, not 2, the silicone is ok, but be sure it's not the fast dry stuff. Don't worry about looking tacky or nasty. Just wipe the access. The LPS3 is also a rust inhibitor, and won't go away. Looks nasty, but it works well. A good time to use LPS 3 is right after washing. Keeps any water from doing its "work", but you'll have to clean it up.

Satellite Telephone

When I moved to Nevada from Colordo I felt that what a shame to make a good off airport landing in the desert and not survive because of the harst enviroment. And as you stated, the ELT and cell phone would probably be worthless. So I went out and bought a satellite phone from GMPCS. I went out in the desert where I could not get any cell reception and tried the satellite phone. It worked like a charm. Their web sight is www.gmpcs-us.com phone 888-664-6727. Ask to speak to Adam Eckstein. He had a booth at the AOPA convention in Palm Springs.

Photocopy of Aircraft Logbooks

That's a great idea. I've been doing the same ever since I bought my bird. From what I've heard/read you can reduce the asking price of your plane by as much as 25% if it doesn't come with complete log books. That's a big hit for only an hour's work to copy them.

I'm the one who had his logs burned and I have learned you can't stop with your logs. Also copy your AD list, your weight and balance sheets, airworthiness cert. In short - everything. Maintenance records too. In the event you ever have to replace your original paperwork, every scrap of material will help put some new buyer more at ease.

Now what I do is copy everything, but I also scan to computer and burn a couple of CDs which are stored in geographically different locations.

Stabilator Movement - Side to Side

If your stab is loose where I think it is, suggest fix it pronto. All it takes is some washers and a lot of fooling to get them into place.

Lubricating Aileron Hinges

Don't lube the aileron hinges if they have a teflon insert. Some do some don't. You can easily tell by inspecting the hinge, the teflon insert is noticeable.

Stabilator Free Play

Whatever play is there originates at the hinge. A tiny bit is not abnormal, but if you get, say more than an 1/8", you should have some one with experience look at it. If it's more I would not fly it.

ACF 50 Corrosion Treatment

It's great as long as you continue the treatments forever!!!!!! I am in the process of repairing a 140 that was involved in a run-up accident.(Jumped the chocks?) During initial inspection I found a lower inboard wing panel that was severely corroded along the ribs and any low areas. In all these areas I found dirt that had collected over the years. Upon removing the dirt I found the corrosion. A check of the log book shows AC-50 had been applied several times as it was designed but had not been applied in the previous 8 years. I believe that once the AC-50 evaporated? dried up? the dirt now glued? by the AC-50 acted like a wick to absorb moisture causing the corrosion. Several other A&P's that saw this agreed with me. Yes, I changed the panel. Moral of the story, once you start don't stop.

Yoke Universal Replacement - removing taper pin

I replaced mine a few months ago, actually swapped pilot and copilot u joints...less slack in copilot side. Anyway after working all afternoon trying to hammer that thing out and fabricating a tool similar to a motorcycle chain breaker which did not work, my A/P walked over and handed me an air chisel with a blunt attachment and it popped out in seconds. Where was he 6 hours ago! A word of caution, each u joint is custom fit. The copilot u on the pilot side was fine but the pilot u on the copilot side when tightened would lock the yoke...ie real stiff ailerons. Had to pull that one back off and trim the length on the sprocket side. Air chisel was THE trick.

IFR Chart subscription

I like IPILOT.COM You can set up a subscription and they will send you what ever charts when they are published, also they don't charge shipping and they cheaper then most FBOS. I think sectional charts run me about \$6.50 +-. They charge your credit card only when they ship.

Maximum exhaust gas temperature (EGT)

There isn't one. Unlike cylinder head temp., EGT is not read as an absolute value. In fact, most of the EGT gauges I've seen don't even have temp values on them. Usually just a bunch of hash marks at 25 degree increments.

The purpose of the EGT gauge is to tell you where exhaust temps peak. Depending on the position of the probe, the absolute value can vary a few hundred degrees, but it will always tell you where temps peak and drop off.

Interior Door Handles, Knobs

Look at the handle carefully for a part number. Some are Ford pick up truck (chrome lever) and some are Volkswagen, yes VW (small pull lever with plastic inner cover) Some of the round knobs are the same as the ash trays.

Oil Cooler Hoses, oil cooler flushing

Cooler flushing is not something that's done on an annual basis, but after so many hours (can't quote exactly at this time) but it's a long time. It should always be done after major engine work, or breakages, and always before installing a new, or rebuilt engine. If yours hasn't been done even before your hoses got stiff, it's a good idea to do it. The cooler should be removed.

According to AD, the hoses should be replaced after 8 years, no matter what. Although you don't have the hours, and not quite the 8yrs. You're awfully close, and if they don't pass the stiffness test, ya gotta replace them. Look in the yellow pages (Trade a Plane) for deals. I've purchased some sets from AV Cell, here in FL. The complete firewall forward kit was about \$300. Lycomings have lots of hoses.

Location of single cylinder head temperature probe

#3 is the usual recommendation for a single probe because it gets the least amount of ram air. But uneven fuel distribution on carbureted engines can make any cylinder the hottest. Get an engine monitor - it'll eliminate all guesswork. We have one on our Arrow, and it turns out that #1 is the hottest.

Widly Varying Compression Readings on Same Cylinder

To begin with, aviation uses the differential compression method, which is fine after a real compression test is performed, much like the rest of the internal combustion world.

Properly executed, a compression test should be performed after warm up, but after an engine has sat (like over night), not after an engine has been run.

After running will have cylinders full of oil. This condition will indicate a normal reading, never knowing the true condition of a given cylinder.

To do it properly, run the engine as you would normally, before shutting it down, run engine speed up to 1500 or 1800 and lean as you would normally. This will clean out the engine.

Don't do anything until the next day. Do not start or warm up the engine. Take the compression test as you would normally. If the readings are in tolerance, the engine will be fine even with the "warmed up" method. If the readings are out of kilter and more than 10 to 15%, then the test should be repeated after warm up. If the test after warm up is stabilized and there is an increase, you have a few gremlins present.

The time you had one compression test with low numbers, could possibly have been bad procedure, but it could also have been a loose piece of carbon build up, which most often occur when doing a compression test after warm up.

Good compression readings are not a panacea for determining the condition of any engine, be it Lycoming, Dodge, or Briggs and Stratton. It simply means that if something is to go awry, it'll simply happen later than sooner.

Doing it "properly", I've caught lots of valve problems, worn cylinder, bad rings, etc., even though the warm up method was good.

The differential compression test, in effect will only measure compression at TDC. Hot or cold, it's the same condition. The difference between hot and cold is that hot, the cylinder gets some help in sealing from oil present. Cold there is no help, and must rely entirely on the condition of the entire cylinder. This holds true for the valves as well.

In the normal method of compression of the entire engine world except for aviation, the running engine test is the most effective. The test is performed with a compression gauge in the cylinder, turn the engine cold, and with one or two revolutions of the engine, it should reach some published number. If turned more, the reading will climb, and becomes irrelevant, in much the same way when you're filling the cylinder, hot or cold, in differential manner.

The object is always is to get an idea of the engine's condition. The cold method is more revealing, backed by a warm reading if not in tolerance. If the reading is good cold, no need to go further. Doing it warm first, is masking problems.

In the real world, when the engine is running, the condition at BDC or half way up or down, can be, and often is with AC engines with tapered bores, can change drastically. Any air going into the cylinder is not done by an air hose, it has to be "sucked" in, and pushed out by the rest of the cylinder components. Using the our differential method, the cylinder wall can be scorched, yet still show good compression, especially after being masked with a small amount of oil. So if any one is happy doing the barbaric aviation method, so be it. I'll stick doing the accepted manner, cold, and follow up if the readings are not to standard.

Resetting Garmin 295 GPS

I've had a GPSMAP 295 for 2 years, and it has worked fine during this time, but mine failed after a fuel stop on a recent cross country.

Failure mode:

The GPS kept shutting off after acquiring enough satellites for a 2D or 3D position lock. I tried new batteries, operating without the cigarette adapter, and changing antennas, no luck.

A call to Garmin support solved the problem. This was a symptom of a corrupted almanac within the GPS. (The satellite almanac is transmitted by the GPS satellites and saved in the GPS memory). No explanation on what could cause the corruption, but a master reset of the unit will solve the problem.

To execute a master reset - hold down the 'route' and 'quit' buttons while strobing the power button. Then release the route and quit buttons. On next power up the master reset should be executed.

One thing to note: The master reset will delete all waypoints and routes stored in the GPS.

The GPS worked fine after the reset.

Constant Speed Propeller - 180

Here is the skinny on the W/B C/S verses fixed pitch.

The STC is #SA2213WE held by Pacific Propeller, Inc. Kent Wa.

It installs a Hartzell compact hub # HC-C2YK1-B/7666-0 propeller and a Woodward B210681 governor on a PA28-180.

The Sensenich M76EMMS/60 prop weighs 38.5lbs

the spinner and attachments weigh 2 lbs

The Hartzell C/S weights 58 lbs with spinner.

The governor weighs 3 lbs.

So you can see that your empty weight will increase by 21 lbs.

In my case the licensed empty weight will be approx. 1328 lbs which leaves me a 1072 lb useful load.

As for operation restrictions:

Tach, 2700 red line, 2250 rpm to 2700 rpm green arc. , 2000 rpm to 2250 rpm cautionary arc. , 0 to 2000 rpm green arc.

Avoid continuous operation between 2000 & 2250 rpm.

Serial number 28-671 through 28-1760A only, are limited to 27.7" Hg at sea level and 27.3 Hg at 1400 feet and 2700 rpm (176 HP)

The cost was approximately \$5,000. It wasn't worth it. I had the c/s prop on my 1965 180C, and can tell you the performance improvement was, at best, minimal. You will pay a lot for the ability to adjust the prop pitch, and the little bit of "cool" factor. But you will pay big bucks, loose payload, as well as move your cg against the forward limit with only the front seats filled. Remember, a forward cg is inefficient, and might cause some difficulties under less than ideal landing conditions.

160 HP Modification E3D engine

the O-320E3B was a difficult engine to perform the 160 HP conversion on, as mentioned here. It is not as easy as just replacing the pistons. It appears that the O-320E3B has a lighter case design, almost like the infamous 320H design. Personally, I have decided to keep my Cruiser, with the O-320E3B at 150 HP and accept the limitations, and be able to utilize the mogas STC. If additional HP is desired, and you wish to keep your airframe, you may opt to exchange the engine at overhaul to an approved O-320, 160 HP model.

I of course had to get the RAM STC for the -E3D, Lycon did the work. Lycon has an STC for the

-E2A, I asked why not the E3D, they said majority of 150hp engines are E2A, didn't want expense to apply for STC for limited # of E3D....

I then called Lycoming HQ and wanted to know why the E3D is so finicky for modifications.....seems, or so they tell me, that a few of the earlier E3D designs had 'narrow deck' engines, as opposed to 'wide deck' variations. I asked how I know the difference looking at the engine. The engineer/tech at Lycoming made it easy....

On a narrow deck model the cylinders are held onto the case with large Hex head bolts. On wide deck models, the cylinders are held on with nuts over studs mounted on the case itself.....

Look where your cylinders meet the case, if you see nuts over a stud, you are wide deck and can convert to 160hp...if you see round bolts with hex recessed (allen type), then you are narrow deck and limited to 150hp...

If your serial number ends in A, you have the wide deck E3D, and don't have to do anything to the case, otherwise the RAM STC requires everything else mentioned in the last post. Go to www.ramair.com and you'll find their STCs that give you what is required. Remember, it takes two STCs.

High Oil Consumption

make sure your current crankcase vent hose doesn't extend so far down so as to enter the belly slipstream. This will cause crankcase oil vapor to be siphoned and promote an increase in oil consumption. My hanger neighbor had this problem. He had just had his engine rebilt and couldn't get the thing to stop using oil even after breakin, so he figured he had glazed one or more of them and pulled them all and sent them back to the shop to honing. After putting them on and doing another breakin, he had the same problem. I mentioned about the vent hose which he had way out into the belly slipstream, and after he pulled it up into the engine compartment his oil consumption went to normal.

Oh, another possible cause of excessive oil consumption is a blown front crankshaft seal. This causes the crankcase to become abnormally pressurized, resulting in higher oil vapor flow out the vent hose.

Repairing Exhaust Stack

The exhaust stacks can be repaired, and must be done by a certified shop, and returned to service, and blah, blah, blah. it's surprising that no one caught it. Did you just buy it? Be sure that the internals of the muffler are sound, especially since this involves #3.

Your IA will have to sign it off, or someone in the same capacity. If a certified repair station can fix it, it will have a yellow tag, or related documentation, and your IA shouldn't have any problems with that.

Heat is the most promising method for removing stubborn slip joints, but it will take an acetelene torch to near red.

Aircraft Records CD ROM

Go to <https://diy.dot.gov>, then click the links for "Federal Aviation Administration"--"Aircraft Payments"--"Request for Copies of Aircraft Records." Not a bad deal at only \$6.25 (Site is <http://162.58.35.241/e.gov/ND/airrecordsND.asp>)

Inconsistent EGT Readings on One Cylinder

We'll assume that the installation is OK, although I would check it again. It's quite possible that there is a leak, but even a leak will have a consistant readings. I would suspect something along weakness in compresion form worn ring lands, not so much the rings themselves, i.e. ring flutter, another is valve stem play in the guides, possibly a valve seat loosening. Valve lifter bleed down clearances can also bring this on, usually if on the tight side.

I would try leaning for best performance at say 1000 ft. increments, level off for a bit, and record your readings. The object is to get consistency in readings. If they're still as they were, then find a good mech. to look down the cylinders with a boroscope, particularly around the valve seat areas, and the cylinders top and bottom sides.

Another simple test is to take a real compression test. Do it with a cold engine first, then warm it up in the normal fashion, and see if there is a change. If there is an increase of say 10 to 15%, you have a cylinder problem. Pay particular attention to the one with the weird reading. Cold means let it stand over night, and do the test. Overnight will drain all the oil from the cylinders.

Make sure that the induction from your carb is in good order, as well as your primer lines. Our aircooled dinosaurs react differently at altitudes, but at least not in the manner you're experiencing.

Don't overlook ignition timing, plug and plug wire condition.

I've had a similar problem with a C 182, with an O470. It had a bad valve job done some hours before. It was a burned valve, from the result of a poor valve job.

Ammeter Dance

First: Your electrical system is DC, Direct Current. That said, any allusions of a pulsations could be from the rectifier circuit of the alternator. The alternator is an AC device. Four diodes are used to rectify the AC into DC. The pulse could be from your voltage regulator not holding the field current to the alternator steady. You may have a weak battery and the load is being put more heavily on your alternator.

You say the lights dim slightly at low RPM's. I would suggest you connect a good Digital Volt Meter to the master switch buss and watch the voltage. It should not change much more than a few tenths of a volt. If the voltage fluctuates much it is possible that the Voltage Regulator is going to the afterlife! Your battery, is a sink for the small AC produced by the alternator. If the battery is also moving on the afterlife then it might be the cause of the problem.

Another source could very likely be the cables running from your master solenoid to the front of the aircraft. If they or your ground are not secure and free of corrosion then a resistance will be created that can cause the problems your seeing.

First: Check the battery with a voltmeter with no load, then check the cells with a hydrometer. It will give you an indication of the batteries condition. If it is 3 years old then it is possibly to old to do the job.

Second: The charging system should be checked with the dig volt meter. Rev up and down the engine, not much, from 600rpm to say 1800 rpm. See if the voltage holds steady around 13.6 volts. It should not move much at all.

Third: Check all of the battery connections, the cable to and from the master solenoid to the starter solenoid. Ensure the ground is good at the battery. Pull it from the airframe and clean it. Use a wire brush to ensure the cable is grounded.

Last... you said the alternator is new. Is it new as brand new or did you have it rebuilt? I had a rebuilt alternator that under a load did not work. That is probably the first place to look....

Preheat, cold weather starting Lycoming SI 1505

Nosewheel Shimmy

Things that should be checked: (easy things first!!) Shimmy damper, wheel bearing (all) preload (retaining nut tightness), main and nose wheel sissors bushings and bolts, and main wheel alignment (toe in), control cable tension, steering rod end bearings. Seems like a lot, but any one can be the problem, and may excite one or more of the others. In my case, it was the main gear alignment, MG sissors and the shimmy damper, in concert.

Don't forget about the steering horn that mounts to the top of the nose gear strut. The holes will wear and cause looseness in the steering linkage. A couple of ways to repair is to replace the horn, drill out and re-bush the holes, or weld holes closed and re-drill.

Check the bearings and repack. Check the "true" of the wheels and make sure they are straight. Check the air pressure. Check the tire. Had the same happen to me on landing and it was all of the above plus the shimmy dampner.

And....

The one rarely monitored and probably the biggest culprit. There are the mediocre bearings inside the strut mount. These bearings are used in an incorrect application, they are not designed for thrust loadings. But kept in good condition and properly set preload will last quite sometime, 35 years, if they've never been replaced is way out of the envelope.

They develop cavities from wear in time and often will force the strut to steer improperly, and start to shimmy. If all is in good order, and proper weight distribution to the nose gear, allowing correct caster angle, "you do not need a damper", but it's a rare case.

Just did some repairs on the nose strut on a Tri Pacer, which is identical to the Cherokee. Worse, it has even less caster angle than the Cherokee, Had to make a non standard repair, not for discussion, and it will not shimmy without a damper, but just the same it is part of the package, and ideal conditions will not always be there.

Don't get too nuts about the damper. My old Cruiser's damper was half worn, but once the entire strut and all related parts were serviced, the shimmy was gone. The price of the damper prompted me to dig even deeper.

Trickle Charge Battery

Motorcycle Consumer News tested a great variety of trickle and maintenance type battery chargers some time ago and the BatteryTender by Deltran got excellent ratings. These are "smart" chargers that supposedly can be left on all the time. I have one on my motorcycle and one on my plane and have yet to overcharge or boil out either battery even though they may be left on for days, weeks or even months on end.

Also, see: www.vdcelectronics.com/batteryminder.htm

Purchase of Canadian Plane

I bought an Arrow from a Canadian owner. Potential issues:

1. You do have to re-register the plane in the US. If the original data plate is still there and no mods have been done, all you need is an annual inspection + signoff of a local FAA DAR.
2. You have to get a release of registration from the Canadian govt. If the owner helps this can be done easily.
3. Title search isn't worth much since it is done at the provincial level only.
4. Handling escrow funds is tricky because of the exchange rate. I ended up getting an incorrect exchange rate quote from the owner's bank and sent \$2000 too much. Fortunately, the owner was honest enough to have the bank return the overcharge

Side Window Replacement

Dale, I just finished replacing all six side windows. Went to a local plastics company and they used my old 1/8 thick windows as templates to cut the new ones on a cnc mill, total cost for labor and material was \$104. You can buy a saber saw blade to cut plexyglass for a couple of bucks and do it yourself. You should be able to purchase enough 1/8" tinted plexiglass to do all six side windows for \$75 or less. I chose regular tinted plexyglass because (arguably) it won't scratch or craze as easily as lexan. Having a drill mill machine I was able to make the pilot vent window out of the same tint but with 1/4" thick material. They wanted \$70 to make the vent window because of the setup time necessary to cut the relief all the way around that window. I chose a tint shade from a selection they had. The job isn't that bad, the worst part is removing the old sealant from around the window casings. I didn't use the thin 1 1/4" wide foam tape wrapped around the edge of the windows. It prevented me from getting a good seal on the outside. I wound up getting self-adhesive 1/4" thick by 1/2" wide door and window foam tape from Home Depot and placed it all the way around each window on the inside only. I used Bostik 1100 urethane sealant, and a little polyseam clear sealant around each window on the outside only. When I re-installed the trim pieces that help form, and hold the window in place, I got a much better seal on the outside. Fortunately I didn't have to replace the windshield, it's in good shape.

Repeated Alternator Failure - Diodes

Make sure there is a good ground between the alternator and the regulator. Hook an OHM meter between the case of the alternator and the case of the regulator. There should be less than 1 ohm resistance. Run the engine and check for a voltage drop between the same two points (Switch to the Volts circuit on your meter). High resistance or a voltage "drop" makes the regulator see a lower than actual charging voltage and the regulator keeps turning up the output. There may be a braided ground strap missing or loose, corroded between the engine and the firewall (airframe).

...and...

Have installed the one piece Zeftronics overvoltage/regulator unit. Works great. Has a Lamar unit for a while. It was cheap and didn't last more than 18 months. Suggest that if you're buying an

overhauled unit from the same guy look elsewhere. I went through 2 overhauled alternators. Got tired of it. Bought a new one. Seems good for now.

No Drop in RPM During Mag Check, Magneto

The only time I had your problem, the P-lead ring terminal was broken at the magneto. It's sort of exposed, and can get bumped easily during oil change, for example. This can loosen or break them.

ACS Yokes

I recently installed ACS yokes on my Cherokee and they were approved by my local FSDO. I had a Structural DER make a report and a form 8110-3 as structural approval. The DER charged me \$100.00 for his research and time. Since he has done all the work he will do one for \$50.00 including a copy of the 337. My daytime phone is 909-260-2028 or E-mail me.

Vernier Mixture Control

try alcor they have a web site(alcorinc.com)I research this and they are the only ones with a STC on a universal mix control cable with vernier adj.the cost of the cable is around \$130.00 you will save yourself a lot of problems going this way.

Autopilot Malfunctioning

I sent it all, servo, and tc back to century. They pretty much rebuilt and replaced damn near everything. The servo was a piece of junk and one of the boards in the tc was bad. You should see the parts list, its huge and ran about \$1200 as I recall. Of course mine wasn't working at all. One thing I have noticed is the indent on the knob that I pull out to change the mode from navtracker to wingleveler is deceiving. If I don't pull the knob a little extra hard it doesn't switch to wing leveler mode and appears to be malfunctioning. It's not really in either mode and it just wanders around. I don't know if that could be the problem with yours or not. I was pretty pleased with the service century gave me although it did take about 3 weeks.

...and...

probably the best autopilot service you can get is "Autopilot Central" in Tulsa, Okla. their number is: 918-836-6418 or 918-835-2048.

Bondo to Repair Damage

Paint shops around the country have been using synthetic filler for years and it has been excepted as repair for minor dings such as hail damage. Anything larger I would not approve for return to service without a proper repair but then again its a judgement call. No bondo, etc. is approved on control surfaces even to fill hail.

Rebuilding Shimmy Dampner

I've found I can rebuild mine. Here's the procedure I put together to do it.
Shimmy Dampner Rebuild Procedure

Nose wheel shimmy dampener:
Piper part number: PS-50152-7
Cleveland Wheels & Brakes
Aircraft Wheels & Brake Division
Parker Hannifin Corp.
Akron, Ohio 44011
Cleveland Model NR: 15-10
Ser Nr: 200
Manufactured: 04/90

O-rings used for rebuild:
MS28775-112 (qty = 2), use Spruce #AN6227B-10
MS28775-008 (qty = 1), use Spruce #AN6227B-3
MS28775-210 (qty = 1), use Spruce #AN6227B-15

Piston nylon ring generally doesn't need replacing. Just replace the above O-rings.
Note: There is a small piston in the rod that has an O-ring that needs to be replaced. Piston can be removed with a 4x40 screw threaded down its middle. The MS28775-008 goes on this piston. Note also, that the dampener has a fill hole accessible by removing the small plug. Fill dampener with MIL-0-5606 hydraulic fluid through fill hole. Be sure to purge all air from the unit, including the center of the control rod, before closing it up. Only fluid should exist on both sides of the control disk throughout the cylinder. Cleveland no longer manufactures this dampener, and Piper no longer supports this dampener. If dampener must be replaced it will have to be replaced with a different type unit, at \$500 - \$700 cost. Get replacement O-rings from Spruce or O-ring dealer. But, be sure they conform to MS28775

Shoulder harnesses

A while back I put Piper retractable shoulder belts in my 1965 180C. I got the complete kit from Wentworth for about \$600. Doublers had to be installed in the roof behind the front seats for the retractor hardware. When finished it was exactly like original equipment for the later model Cherokees. The installation took about 8 hours. Paper work required about 3-4 hours of hassle for my AI. get the paper work for Inertia Safety Shoulder Belt Installation Kit # 764 981V and file the appropriate 337 -- you need to find an AI who knows what he is doing. The shoulder belts look great and work fine without restricting movement

...and...

I just received two retractable shoulder harness kits from Kosola for the front seats of my 180. They were \$710 each. I think the non-retractables were \$480 each. I was told the install time should be 4 to 6 hours per side.

Arrow Gear Loses Pressure

Your backup gear extender may be bleeding pressure off the system. The second most likely culprit is the pump. Check the pressure that it develops and cycles at when isolated from the rest

of the system. If that doesn't work you may need to disconnect other fittings under the rear seat and plug them to isolate parts of the system to troubleshoot the leak.

The gear in transit light is activated by limit switches. The gear may not be fully retracted to activate the switches. The hydraulic pump will continue to work until a pressure switch turns it off.

A problem such as this can be the o-ring in the over ride system this is common to cause this problem. It is rare your pump would be the cause of loss of pressure. This is a small valve under the back seat and is operated by the over ride. You'll see it a little two way valve. You can change the o-ring but it is likely you'll damage the new one on install it is a touchy close tolerance valve. other wise new 150.00 \$

Carpet Glue

I always glue carper down. Use upholstery glue from a spary can, available in most auto parts stores. 3M or Prematex are good brands. If the stuff has to be removed. Lectra Clean will remove it, NAPA carries that as well as the glue. When you're done with the spray can glue, blow some out with the can upside down before putting it away, to keep the nozzle from clogging. Before you glue the stuff down, be sure it's clean especially anything oily.

EGT Upper Limits

There is no upper limit to exhaust gas temperatures... nothing gets heated by them except the exhaust system itself.

High EGT's mean that the gases flowing out of your engine have been completely burned. If there were unburned components, such as raw fuel or oxygen, the temperatures would be lowered... but that is not what you would want!

I would venture to say that high EGT's also mean that your cylinders are being well scavenged... exactly what a Power Flow Systems exhaust is designed to do. If spent gases were left behind in the cylinders after the exhaust stroke, the EGT's would be lower and the cylinder head temps would be higher.

The fact that all your EGT's are pretty level is also great. The main function of the EGT gauge is to tell us that all cylinders are behaving alike.

Preparing for Long Cross Country Flight

1. Plan fuel stops with airnav.com. This will help you select the most economical fuel.
2. WAC charts are much more convenient for long XCs than sectional charts, but be careful as WACs do have less info on them than sectionals.
3. A moving map GPS is worth a thousand maps.
4. A working autopilot will allow you to arrive refreshed instead of tired.
5. Stay clear of special use airspaces: TFRs, Restricted areas, etc.
6. Use VFR flight following or file IFR.
7. Fly at higher altitudes 7-10k where there is less traffic.
8. Call the destination FBO and ask about fuel and hangar availability.

9. Call ahead to make sure your mode of transportation will be there. I.e. courtesy car, rental car, whatever.
10. Take a small cooler with drinks/snacks, but watch the fluid intake (you don't want a potty break every 100nm).
11. Don't make a long trip the first one after an annual or other major maintenance. Always take a local area shakedown flight first.
12. Listen to Flightwatch 122.0 and call for enroute/destination weather. File a PIREP if you have time.
13. Take a cell phone and bring extra cash/credit cards.
14. Take a camera, because you don't want to forget this experience...

TKM replacement for KX-170

There have been a lot of posts regarding these units, and there seems to be about a 50/50 split on there quality and usability. One thing most agree on is that the KX-170B is a great radio, although not digital. Perhaps keeping one of your KX-170B's and trying the Michel in the other tray would be a good option. I have read the following complaints about the Michel:

Won't work properly with other units due to wiring/grounding issues

Tend to be less reliable

Lacking in tone (sounds thin)

On the other hand, these units are modern looking and have the digital flip-flop that you and I want. When they work well, most customers seem very happy with them. And most important, you cannot beat the installation costs of \$ 0.00!

My plan is to find someone that has one, borrow it, and spend an afternoon thoroughly checking it out. This will happen as soon as I find an extra \$1500 to play with!

Carburetor ice detector

ARP Industries Inc. Huntington NY. Phone # 631-744-1893. arpind@aol.com. I had to replace my transducer 2 yrs. ago

Rebuild heater shroud

Our shroud was almost falling off and our mechanic advised that he could not sign it off at our next annual. My RV6A buddy and builder removed the shroud. We put about 8 doublers in that sucker. All the corners plus a few other spots - showed it to our mechanic, and he was happier than a pig in manure. We got a sign off with no problem. Motto - don't trash your shroud so quickly - there is a shop in Ft Lauderdale that will fix it. I spoke to him when we were at the AOPA convention. If you need it email me - think I still have the name. Might cost \$100 - but try to salvage it yourself!!

New vs Rebuilt turn coordinator

I was in the same boat as you, a few months ago. Although my original hadn't shot craps yet, it was unreliable for IFR work. I looked into having it rebuilt versus getting a new one. The price I got quoted was around \$400 IF they could rebuild it. They told me certain brands can not be rebuilt. The cost of a new one was \$465, with a one year warranty.

And...

I've used NU-TEK for overhauling my DG and my electric TC. Both times I've been very happy with the price and the service. Call them at 800-338-7146.

Hypoxia

From the responses, seems everyone has a different view/effect-and that is EXACTLY the nature of hypoxia (lack of O2 to the bodily cells).

I was fortunate enough to go through Military Hyperbaric Chamber (Altitude chamber) during training so they could actually show us what blabbering idiots we become at altitude.

Not only is it very education, but FUN and as long as you have a Class 3 Medical anyone can schedule a session at 15 military installations across the country for \$50.00.

After we took our O2 masks off at altitude, after about 30 seconds we couldn't even put the round peg in the round hole of the "Play-SKool" toy they use, let alone write your first name legibly.

Of course, prior to entering we all thought-"that won't happen to Me!!!"

It does and fast. We had one guy who was unable to comprehend the verbal command at the end to put the mask back on (already hanging by one strap) The instructor wanted to make a point and shouted over the intercom "YOU ARE GOING TO DIE IN 30 SECONDS_PUT ON YOUR MASK!@!" he was met with a goofy smile and the instructor had to reach over and affix the mask.

If at all possible I recommend to anyone who doubts the insidiousness of Hypoxia to make a reservation. It's Too Cool!

Administered by:

FAA Office of Aerospace Medicine

Civil Aerospace Medical Institute

www.cami.jccbi.gov/aam-400/asemphys.html

Low vacuum light comes on in descent

The switch is attached to the regulator, and the regulator that includes the switch is a special version that costs almost twice as much as the older ones: about \$1550 versus \$880. Yikes!

So it's possible that its air reference is inside the regulator air inlet basket, so that it has the same garter filter protection as the regulator. That means you would probably have to take it off the regulator to check it. Airborne lists the vacuum switch price at \$363. Wince.

Filling Struts

Struts should be filled first with hydraulic fluid (mil-h-5606) with the strut all the way bottomed out. Then nitrogen should be added to inflate the strut to the required extension (3.25" on the mains 3.5" for the nose if I recall correctly).

To do the fluid service, you can just remove the Schrader valve (make sure all pressure is off first) and fill the strut with fluid. However, I find it best to have the wheel jacked off the ground and to draw fluid into the strut by the following procedure (you will need a friend):

1. remove the valve core from the strut service valve.

2. attach a tube to the service valve with the other end in a bottle of hyd fluid (there should be about a quart in the bottle).
3. one person then raises and lowers the wheel sucking fluid into the strut from the bottle.
4. do this a couple of times, until there are no bubbles pushed into the bottle on the up stroke of the wheel.
5. hold the wheel in the up (strut bottomed) position while the other person removes the tube and replaces the valve core.
6. lower and remove the jack.

Now you have the correct amount of fluid in the strut.

To service the nitrogen it is best to have a nitrogen bottle with a regulator so you have good control of the air going in, but you can do it without the regulator. You need to have probably around 700 psi, maybe more if the fuel tank is full. I have heard of people using shop air with the strut extended, but I would not recommend it as it could lead to corrosion inside of the strut.

One thing I would ask... was there a puddle of hydraulic fluid around your struts when you found them collapsed? If not, the shop that "re-built" them did not put fluid in, it would have to come out before the air.

....

I just bought the fitting that screws on to the strut last week. I had a hell of a time finding one at a good price. I finally found one at www.aircraft-tool.com, I did a search on the word strut, there are several choices but the fitting I bought was only \$19.95, other places wanted \$50-\$60.00 for exactly the same thing! I got a 47 Cubic Inch 3000 P.S.I. Nitrogen Tank and 800 p.s.i. regulator at www.bulldogpaintball.com (\$75.00), and I got the high pressure hose and valve to release the 800 P.S.I. from the regulator to the strut at a local store tha specializes in paintball guns. The cost for the w whole setup was less than \$140 US Dollars. It's a real sweet setup! I am posting a picture of my setup. I have been able to refill my storage tank with nitrogen at most paintball stores for \$3.00.

Magneto Drop

When checking left mag (contains impulse coupling) to engine timing, we discovered we couldn't quite bring it in to 25 deg BTC (made sure impulse coupling was unloaded) before we ran out of adjustment on the mag's dog ear adjustment slots. So, thinking it was probably an internal timing problem, we decided to put in a new breaker, set the internal timing, then try the external timing again. The new breaker set went in just fine. Set E-gap at 10 deg (moving in the normal direction of rotation from 0 deg corresponding to magnet flux reversal point over coil) and checked point gap at high cam lobe (was well within .018 +/- .006). When attempting to time the left mag to the engine we observed the same problem where we ran out of mag dog ear slot adjustment. Having read about a trick to solve this, I pulled the mag's drive gear and rotated it 180 deg, which resulted in a 1/2 tooth shift in mag to engine timing relationship. This pretty much put 25 deg right in the center of the slot. We thought we were done, but found when we did a run-up, that the left mag had about 125 - 150 rpm drop. It's not a rough drop which would

suggest spark plugs or ignition wires, but instead, is a smooth drop, suggesting a mag problem. Even though we put in new plugs, we swapped all left mag plugs with right mag plugs, 125 - 150 rpm drop stayed with the left mag. We ran a ignition lead tester on all ignition leads, they look okay. We're kinda stumped. Put back in the original breaker set, same problem. We thought maybe there might be a high voltage breakdown in the mag's distributor, so examined and cleaned it (realize we need to apply distributor block coating, but not important for this test), but still had rpm drop. I'm about to bring over my left mag to try on his bird, as can't think of anything else it can be. By the way, mag seems to be producing a pretty good spark, as can spin drive quickly and observe nice blue spark from tower connection to mag housing on all 4 cylinders. I wondered if maybe there could be a problem with the breaker cam lobe where the other lobe opposite from where E-gap is traditionally performed might not have the same E-gap. Didn't get around to checking it, but I'll bet it's okay.

By the way, we put a new breaker in the right mag and performed same internal/external timing and it worked out just fine, with mag centered in slots. Only 25 - 50 rpm drop.

-- I have experienced this problem. Found that I had mag drive gear one tooth off when inserting mag to eng. Pull mag out just far enough to access gear and move one tooth and try it. Fixed it for me. Suggest you have everything internal adj to exact spec.

--Also include the armature bearings, plug wires, point gap (stay with the recommended number rather than the extreme numbers, since it will affect duration), check the condensor. If the points are pitted, the location of the pit give you an idea of the condition of the condensor.

Engine Runs With Mixture at Idle Cut Off

Check the primer first, if it is fully in and locked, make sure O-rings are good/new if they are original.

My problem was the carb float bowl was loose. Nothing you can see, but putting a flashlight behind it, you could see a teeny bit of light. the lock tabs on the bowl were intact, but after 'unlocking' the tabs, got about a half turn from each screw, which seated the bowl tight. VOILA...no more 'dielseling'

Air Oil Separator

We just installed an M20 air-oil separator on my '76 Archer II this week. I put in 8 quarts of AeroShell 15-50 and after three hours in the air that first day, not a drop from the hose. I'm sold!!

Removing dried silicone

was able to remove it with a product called Goof Off (and a lot of elbow grease). It's an excellent spot remover I found at Home Depot.

Split nose bowl STC

I installed a kit in 1993 on a 180. I purchased the kit and STC from Aviation Development Corporation in Seattle, WA. STC # is SA5694NM and covers 140, 150, 160 and 180 models. Fairly easy to install and has held up well. The company has a website, www.aviationdevelopment.com

Nosewheel Shimmy

The one item that we all seem to forget is nose wheel balance. In many cases I have been able to stop the shimmy on Cherokees by balancing the nose wheel when every thing else failed. Unfortunately, I have found very few 600-6 tires that didn't need balancing. Just food for thought. Before you spend a lot of money rebuilding parts, check your wheel balance.

Removing frost from wings and tail

First of all, I turn it so the tail is toward the sun and drop the flaps. Secondly, I brush off as much as I can with a soft brush. For the stubborn stuff, I'll sparingly use a warm mixture of half water and antifreeze, sprayed on and quickly wiped off with a clean, warm towel. (The warm part is important--I heat the mixture and towels at home before leaving for the airport) Can usually be ready to go within 30 minutes or less. Make sure to thoroughly clean out all hinges and around the push-rods on the control surfaces.

Complete Strut Rebuild

JT, Evans 1-800-421-1729 Rebuilds the struts, with new pistons. Best price yet.

Low Fuel Pressure - Cold Weather

When that same eng is instl on a high wing acft and fuel is gravity feed that is about what fuel press will be. Also, on a low wing acft, if one loses all fuel press (eng driven and elect) you can keep it running using primer. That is one reason why you "generally" find low wing acft have three primed cyls and high wing have one primed cyl.

Cowl Paint Bubbling from Exhaust Heat

You can purchase the aluminized heat shield from any hot rod shop for considerably less. It's goes by the brand name of Thermo Tec. They have a site. They also carry an extensive line of the stuff. Had the same problem with the Arrow. I used the self stick stuff. You'll have to cut it for shape.

Refinishing interior plastic

I used Oxi-Clean on the plastic, did a great job of restoring the ivory white color, didn't need paint! Needed some scrubbing with a stiff brush and a good hour or two soaking in a hot water solution of the Oxi-Clean. What I found most interesting is that the original paint was a shellac! Looked blistered and bubbled, cleaned up well with alcohol and provided a good base for the new paint. New screws and finish washers and looks great!

Removing adhesive from plexiglass

Mike, one of the best products we have ever used to remove adhesive on plexiglass is a product called "OOPS" you can find it at Walmart or ace hardware. I think it's the same as 3M's adhesive remover but half the cost. We have used it for years in the shop on every kind of material.

New Crankshaft: Source

Engine Components Inc.

9503 Middlex, San Antonio TX 78217. I have the 160HP conversion...Part number AEL32101.1

New Trim Tab Source

Associated Aero in Oklahoma City makes the trim tabs. All you need to do is send them your damaged one and they can provide you a new one. They are an FAA approved flight components repair station. Call Sam or Dale at 405-789-5474.

Breaking in New Cylinder

Run the hell out of it for an hour in the air and the rings should be seated. Actually twenty minutes should do. Suggest use whatever kind of oil you prefer. I use Aeroshell 20W50.

Replacing glare shield material

The only way to do it properly is to remove both windshields. Don't let this scare you because it really is quite easy. Actually no more than just removing the screws and pulling the windshields out. You will need the help of an A&P to sign the reinstallation off. When you pull up the vinyl you will find a thin layer of fiberglass insulation. You cannot remove the aluminum glare shield as it is structural and an integrated part of the panel. I've done this a dozen times or more. The newest and best cover material made specifically for glare shields can be purchased from Don Ogle Aircraft Interiors (405-787-2361)

Using Winterization Plate

I have a 151 also and we put the plate on below

50 degrees it fits in front of the oil cooler and there should be nut plates on your winterization plate you should see the open holes on the oil cooler side for the bolts to secure the plate.

For my take on winter flying here in Minnesota we preheat the cabin as well as the engine the controls are very hard to move below 20 degrees which we have here now. I have no problem going places this cool for lunch or what have you but I stay away from constant touch and go's due to the heating and cooling of the engine, they say that's not a good thing.

Arrow Propeller Overhaul

The propeller manufacturer recommends that the prop be overhauled every 1500 hours or 5 years whichever comes first. This is only mandatory if you are operating your aircraft as a part 135 charter. I'll assume you're operating as a part 91 general aviation which does not require it to ever be overhauled. Now comes the kicker. Should you have a problem with the prop like blow a seal or worse, say lose a blade or anything that could be attributed to the propeller that would cause you to say land off field and damage the plane or worse, the insurance company would probably come back at you or your survivors and say that you did not maintain the aircraft as recommended by the manufacturer (hours and time) and could deny any claim you might have. Insurance companies will always look for some reason to not pay a claim. Other than that it doesn't have to be overhauled as long as it's not leaking and functioning properly. Bear in mind, seals get old and grease gets stiff.

Chrome Cylinders

Chrome lined cylinders tend to be troublesome to break in, but are really quite good for engines which are stored outside, since they resist corrosion better than steel.

The big problem with any refurbished/o'hauled/etc cylinder is not the process so much as the age and condition of the cylinder and aluminum head. There is no requirement for tracking the age or history of cylinders. The aluminum heads begin to fatigue after ~4000hr, so you never know what you are getting when you purchase a reworked cylinder. You can end up with a great cylinder bore, but with cracked heads.

Engine Runs after Idle Cut-off

Check the primer first, if it is fully in and locked, make sure O-rings are good/new if they are original.

My problem was the carb float bowl was loose. Nothing you can see, but putting a flashlight behind it, you could see a teeny bit of light. the lock tabs on the bowl were intact, but after 'unlocking' the tabs, got about a half turn from each screw, which seated the bowl tight. VOILA...no more 'dielseling'.....

Hail Damage Repair

Minor hail damage can be repaired. I have a 1966 140 to prove it. Here's how we did it. We hired one of these guys that does "paintless dent removal". These guys use blunt instruments to rub the dent out from the back side of the metal. And it works! To do it, they must gain access to the back side of the aluminum. So, my A&P removed my tanks, wing tips and bulk head. The paintless dent removal guy put in 20 hours of labor at a rate of \$50 per hour. The total cost of the job, including my A&P's time was \$1,300. And I have an airplane with no hail damage!

Don't waste your time and energy with dry ice. This process really works.

Seat binds moving back and up

I find that every two or three years I have to take out the seats and clean and lube the rollers with LPS-2. It seems that lint and dirt tend to collect in the roller bearings and cause them to stick. After this treatment they work fine for another couple of years. Hope this works for you.

Two Blade vs three blade

I have had the 3 blade on for about 30 days and have not got enough time on it to convinced myself the advantages outweigh the cons.

Pro's

- Cost about a 1K or so less than the 2 blade
- Increased take off performance ~~ 5-10%
- Quieter -- ~~ 10%
- Looks -- somewhat subjective

Con's

- The CG will move forward apx 3/4"
- Decrease useful load by 13.9 lbs
- Lower cruise speed ~~ 2-3 knots
- Jury's out on several other issues I am now working out

Slipping Elevator Trim

First thing to check is lubrication of the jack screw, this is probably the most likely culprit. Second, check the cable to be sure it is NOT lubricated - it relies on friction to operate and if there is any lubrication on it you will get slippage. I don't know what would be the best thing to clean it with but I used a clean rag with a little paint thinner.

Lube the jack screw, not the cable barrel, tighten the trim cable at the turn buckle. Use a cable tension meter. 10lbs + or - 1 according to the Sevrice CD

Conversion to 60 amp alternator

The 60 amp alternator is exactly the same physical size and mounting as the 35 amp alternator you need. The part number is 365664. Thunderbird accessories at 405-789-1822 has overhauled ones in stock. Ask for Paul if interested. The wiring that you have can handle the 60 amp current as well as your load meter which I believe yours is 50 amp. You will need to change the main circuit breaker to 60 Amp. Unless you are really loaded down with avionics and electrical goodies, your system will probably never see more than the 40 amps load that you are required to not exceed under full load. The regulator does not have to be changed. Your mechanic should be able to get a field approval (337) for the installation.

I also have a 180C and did the conversion last fall. My mechanic essentially converted the system to one with all of the parts for a 60 amp system. I required heavier wiring, a shunt wire, a heavier breaker, a new voltage regulator, a new over voltage regulator, a new panel amp meter and a new 60 amp alternator. I purchased the shunt, and amp meter from Wentworth and the wire, voltage regulator, over voltage regulator, and alternator from various supply houses -- had a heck of a time finding a new alternator the supply houses were all out of them at the time. My mechanic then spent several months getting all of the paper work through. The system now works great!!!! I had had lots of trouble with the old 40 (35 amp) system.

Two Blade Black Mac Prop, 180

I got one a few years ago, I don't have a RPM restriction and I got about 5 extra knots. It was about \$500 more than the Sensenich, but I figure a \$100 a knot was a pretty good investment.

Constant Speed Prop, 180

The only STC I know of for C/S on a 180 is from Pacific Propeller, Inc. Seattle, Wash. STC # SA2213WE.

I'm in the process of doing it to my 65'180C.

I've located a prop thru Northwest Propeller in Puyallup, Wa. and now rounding up a governor and adapter.

Should be ready to go with my new O/H after the first of the year.

Halogen Landing Light Bulbs

I use H7604 or Q7604. They are available at your local FBO parts department or your NAPA store. I found my FBO was a couple of \$\$ less than NAPA.

Battery Self-discharging

be careful when charging a regular acid battery with the caps off or loose. Charging causes the acid to bubble and a fine mist escapes and lands on top of the battery. A connection may be made between the negative pole and the acid on top of the battery causing the battery to drain itself. It can even happen with the caps on.

Test for discharge by connecting the negative probe of a volt meter to the negative pole and touch around the caps on top of the battery with the positive probe. If you get a reading the battery is discharging.

Cleaning the top of the battery with baking soda and water will correct the problem.

Strut re-chroming source

J.T. Evans orlando FL. 407-438-1395

Oil from Breather Tube

Since, you've never had the "puddle" before, my guess is you have a temporary "ring alignment" in one of your cylinders causing increased blow-by and therefore increased crankcase back pressure. This would result in increased oil mist from your crankcase breather tube. I'll bet it will go away in a few flying hours. Temporary ring alignment is a common occurrence, as the rings are always rotating.

Misuse of Electric Trim

I have electric trim and if I try to use it without any pressure on the yoke it displays the symptoms you describe. For example after climbing, if I push the button forward to level off, it works only kinda. Or during level flight if I pull on the button, I get problems. However, this is NOT how you are suppose to use it. The use of trim is suppose to "relieve pressure", not pitch the airplane. You need to apply force to the yoke with your arm and then use trim to relieve the pressure. If you level off with forward pressure on the yoke and use electric trim to catch up and relieve the pressure it works fine. In fact ever Cherokee pilot I know has been trying to use electric trim without yoke pressure to climb, descend, level off. This is pilot error. Electric trim isn't meant to pitch the plane, although some do. Electric trim is meant to relieve the pressure you manually apply to climb, descend, leveloff and when you push or pull on the yoke FIRST then use the thumb button to move the trim wheel, it works fine.

Replacement for Electric Trim Switch

My switch on my Arrow went west also. Piper wanted over 300. (then). I went to a local electronics supply place with the old switch. This friendly little Korean fellow couldn't hardly speak, but he came up with the exact switches. They are 2 micro-switches that have to be solder-wired together. Cost @ \$10. for the pair. Has worked great for past 4 yrs or so.

Low Output - Heater

Here's a few things you may want to check to solve your heating problem. I go through this process every year, and keep flying - even when it is below zero F.

-Nathan

1. Oil change to 15W50.

2. Install oil cooler cover plate
3. Verify duct is attached to exhaust heat exchange collar.
4. Verify integrity of heating duct from exhaust collar to mixer box located at firewall.
5. Verify integrity of heat/defrost cable to valve in mixer box.
6. Verify integrity of ducting to defrost ports.
7. Buy CO detector and glue to panel (the cheap card type ones)
8. Fill front & rear fresh-air vents with nerf ball, and seal off with duct tape.
9. Seal off rear air vents with duct tape (these vents are located on the side of the rear passenger seats on my 180).
10. Heating duct on cabin floor between pilot/passenger seats - make sure vent openings aren't clogged, and make sure that vent levers are open (levers are located towards the front of cabin on the duct. - where the center console attaches to the heat duct).
11. Extra blankets laid across rear cabin. (helps insulation).
12. For some reason, the trim tab wheel (on the floor in my '71 180) leaks cold air, so I usually place my stocking cap over it while flying.

Removing Fuel Stains from Paint

The 3M material Lync was talking about is called Finesit-2. We have been using it in the shop for years and found it to be the only product that will remove fuel stains and even exhaust stains off of 421 gear doors. The best part is its non abrasive and is fantastic for cleaning plexiglass windows and windshields. We have also used it to remove small scratches not only in windows but paint as well. Its the only product that won't burn the plexiglass or the paint. Its available commercially at auto paint supply stores that deal in 3M products.

Fuel Injected 180 HP Arrow

Early Arrows were 180HP with fuel injection, and had a compression ratio of 8.5:1. Later Arrows were 200HP due to a higher compression ratio (8.7:1).

Oil from Front of Engine - Arrow

The front crank seal in nearly all Lycomings have little or no oil pressure behind them. For them to leak, requires excessive internal crankcase pressure or a genuinely faulty seal. The 180 Rs have controllable props, and often times the prop governor line just behind the flywheel, leaks and appears as if it's the front seal.

Those early engines were also prone to leaking from the case halves due to fretting. They also had an AD out int the early days requiring cases to be welded.

I'd look for excessive crankcase pressure first, and the oil line next. A word of caution, make sure that none of this oil reaches (and probably already has) the alternator. Enough oil on it will cause failure of the alt., and possible fire.

If the alt. is full of oil, remove it and have it carefully inspected.

Metal in Oil filter

When my engine started to go the first symptom was a half dozen or so metal shavings in the oil screen and a lot of metal "dust" in the filter. Some dark, some shiny, probably coming from the cam. When I dragged a magnet along the filter folds it reminded me of that "fuzzy wuzzy" game we played as a kid. The flat end of the magnet looked like a rounded cutip swab after going over

only 1 or 2 folds. As far as oil analysis goes it detected absolutely nothing. Just for fun we sent off a sample from the contaminated oil and guess what? "ALL VALUES APPEAR NORMAL". I have no idea what kind of time your engine has left in it but I'd keep cutting open those filters at each oil change!

Installing Door Seal

A good trick for installing the door seal... Use 3M trim adhesive (Commonly called Gorrilla Snot)

put some in a small container and cut it with some Tolual, maybe 2 parts gorrilla snot 1 part Tolual. It should be about the consistency of paint. Then just paint a thin coat carefully on to the door surface where the seal will go and also paint the seal surface that will glue to the door. Let these dry an hour or more. Now the trick part. Just paint on a little Tolual on the door or seal, small section at a time and set the seal in place. The seal will be down for good using this method but if you do need to move it just use a little Tolual. One reason this works so well is that the seal sticks immediately, this lets you stretch the seal as you go by the hinge section of the door, at least on the Cherokee you may need to stretch it a little here to "thin" it out on this part of the door so it won't have the hinges in a bind when the door closes. you also need to adjust the upper door latch when you get done. We got our seal from Airtex.

Low Cost Tires

I used to use recaps, but the Aero Trainers are new for the price of recaps. I learned to use recaps quite by accident. I was stuck at CRG, when one of my overpriced Good Years (five hours or so) blew. The shop on the field was good enough to get me flying, ASAP, but all he had was a recap. He was comfortable with it, (they had a good reputation), and so was I. Well low and behold, the recap was equally as good. From then on, I used Dessler's recaps.

One day I needed to replace them, I called Dessler and they were out. They mentioned the Aero Trainers at recap prices. I got 'em. Been using them ever since.

Fuel Injector Cleaning

Unless you have a sonic cleaner, you were lucky in cleaning them as long as you did. Those injectors are an aeromatic type. It works much like a kitchen faucet, to allow some atomization of the fuel stream. Send them to Airflow Performance, 864-576-4512. They sonic clean, and flow them to match.

Cleaning Oil from Carpet

CRC electric cleaner will remove it. It might affect the glue under it, but will clean the stain.

ACS Control Wheels

I have just recently tried to get Mooney yokes and I was quoted a price of \$500.00 if you can find them. Used piper if you can find them run \$500.00 each. I have just installed Rams horn yokes made by ACS Products and they are sold by Aircraft Spruce. The ones with switch acvities are \$136.50 each. They are STC'D for Navions and I hired a n FAA DER to do the structural report and a form 8130-10 which I submitted with a 337 and got approval. They look great and are a lot less costly. You can special order them from Spruce and the factory can bore them out to fit. You want a real snug fit. The DER Report and copy of the 337 will run \$50.00

plus shipping. You can call me at home in the evenings between 6 and 9 PM PST. I am located in So. California

Windshield Sealant

I have replaced over a dozen windshields in every model of PA-28. I would never recommend using RTV because it is hard to clean up, and makes removal extremely difficult. I have always used "poly-seal adhesive sealant for the wind shields as well as the side windows. During the installation it cleans up with plain water, provides a great seal and the windows won't leak. Its cheap and be purchased from Lowes, Home Depot or Ace Hardware. I recommend the clear. It goes on white and dries clear.

Cylinder color code

information regarding the colors on cylinders:

Engine gray or unpainted-Standard steel barrels

Orange stripe-chrome plated barrels

Blue stripe-Nitride hardened barrels

Green stripe-Steel barrel 0.010 oversize

Yellow stripe-Steel barrel 0.020 oversize

Note: yellow painted on the fins between the spark plug and the rocker box indicates long reach spark plugs. Gray or unpainted indicates short reach spark plugs

Door seal

At my last annual, I had the same thing corrected. The main reason for the gap at the top of my door was because of "play" and worn pins in the two door hinges. Solution:

Removed all parts of old hinges, replaced with new. Removed wrong door seal(Beechcraft part#), and years of silicone build-up used to correct for the discrepancy, installed new Piper door seal. Results were amazing.

M-20 Air-Oil Separator

it is not necessary to weld the oil return per their instructions. Nearly all Lycomings have an extra plug that can be fitted to accept the return line. Look for a plug on the right side behind the lower motormount, on the accessory case, about 5-6" below the right mag and 1 -2" fore of that.

Vacuum System Filters

There are two filters, the garter filter on the regulator and the instrument central filter that is (on my plane at least) located on the firewall near the DG. It is about 3 inches long and 3 inches in diameter. The Airborne part number is 1J7-1, and it has a replaceable cartridge, the D9-18-1. The cartridge is about \$27, and there is a PMA equivalent from Rapco RA D9-18-1 for \$16. Chief Aircraft has this stuff.

By the way, this is the primary filter to protect your instruments, the garter filter is to protect your vacuum pump and regulator from debris entering through the regulator relief port.

The Piper service manual says to replace *both* filters at 100 hour intervals, items 12 & 13 on Card 1F20. The Airborne data sheet specifies 100 hours or annually for garter filter and 500 hours or annually for central filter.

Sealed Battery -gel cell battery

I bought a Concorde 35AXC almost 5 years ago. Noticed a difference in cranking right away. Took it out after almost 4 years of service, took it home, put it on a charger and it showed like new in under 5 minutes. I'll never buy another type again. It's Concorde for me.

Nosewheel Shimmy

Reasons for shimmy:

1. Bad tire
2. Incorrect oil and/or "air" in strut.
3. Worn strut bushings
4. Per Tom, SL, cracked motor mount.
5. Worn strut bearings or incorrect pre load.
6. Worn seals and wiper
7. Bad or incorrectly loaded wheel bearings
8. Bad shimmy damper.
9. Bad scissors
10. Loose fork mount.

Air Filter Security

The front filter housing plate, which also contains the landing light, should be snug. There is a "eye" bolt from the engine side of the nose bowl that holds the filter plate in place. For me, I have to take the lower cowling off to get to it and then re-safety wire.

If the housing plate is wiggling around, I'd pull the lower cowling and inspect.

Also, if the filter plate is not tight, it's not making a good seal between the filter and nose bowl, defeating the purpose of the air filter.

External Power Plug

There is a relay (contactor) similar to the master contactor. In pre-1977 planes, it was energized by the external power source, through a diode and the master switch. The diode keeps your A/C battery from blowing up if the thing is connected with the plus/minus polarity backwards on the car battery.

The aux. power was connected to the battery, so startup was the same as usual, except plug in the power first.

From 1977 on, the external power is connected to the bus directly, so the master switch (and contactor) don't have to be on to start up with external power. As far as avionics, all avionics should be OFF for all starts anyway, including from auxiliary power or ship's battery.

If you want to check the system with a DVM, you can at least see if the diode and contactor solenoid (magnet coil) are hooked up, using the meter's diode test mode: it should show about .7 volts from the center pin to ground when the plus lead goes to the center pin. It should show high resistance if the minus lead is connected to the center pin.

Stabilator Trim Motor Location

My stabilator trim motor is located aft of the baggage compartment, opposite side from battery. Open the velcro panel at rear of baggage to the tail section; should be very close to the bulkhead separating baggage from tail cone.

Backup Artificial Horizon

Electric attitude indicators are expensive, which is why there aren't many installed on light GA planes.

RC Allen is probably the most common AI vendor. They have vacuum AIs for ~\$650-700, and electric AIs for ~\$1800.

They can be purchased from Aircraft Spruce:

<http://www.aircraftspruce.com>

There are several electric AIs around the \$1k price range, but aren't approved, and so would require field approval for installation.

...or...

Try www.controlvision.com

they have the gps system with the independent horizon, and its portable, IE goes on the yoke, one leg or where ever.

EI R-1 Electric Tach

I just had an EI R-1 installed yesterday and thought I'd share my experience...

The installation was straight forward and relatively easy. The only 'installation' related problem we had was the location. I wanted to place the tach in the same position as my original tach (just to the left of the throttle quadrant in my '73 Cruiser), but the R-1 was too deep. The hand break assembly was in the way. So, we ended up placing it in the top left corner (next to airspeed) moving my clock down lower since I don't use it much. It's not a perfect fit, the unit is slightly angled due to the back of the panel/glare shield but over all I'm happy with it up there. Another issue was with removing my tach cable. Apparently on the O320 (mine at least) the vacuum pump needs to be removed to pull the tach cable out. Oh joy. That's being saved for another time; for now the cable is still there spinning away.

Last night I made a 10 minute flight in the twilight hours back to my hanger. The R-1 looked great. During the run-up, the mag drop feature worked perfectly. With 10 RPM resolution it mostly stayed locked on a particular speed; it didn't fluctuate or flicker back and forth between numbers much. I found the numeric display easily readable and very clear with the backlight (which is always on). The LED's are hooked into my rheostat. They work a little strange through. They are dimmest when the overhead light is brightest, and visa versa. That causes a problem for me because I have glare shield lighting and despise the overhead red light, which I almost always

keep at full dim during night flights. Full dim overhead results in the R-1's LED's to be almost full bright. To me they were uncomfortably bright. So, I think I'll change the wiring so they go full dim whenever the NAV lights are turned on. For me that will be a better option. It was hard to tell on such a short flight, but I'm pretty sure my old tach was reading low before - probably low enough that I've routinely flown over redline before. Oh, speaking of redline, soon after I pushed the nose over climbing out of PHX the red LED on the R-1 popped on indicating 2700 RPM. That LED (the red one) does not ever dim and it did a great job of getting my attention really fast!

Trim Tab Hinges

I changed the trim tab hinges and that fixed the vibration that I had on my little 71' 140.

The play in the hinges was about .030

Nulite Installation

Because my panel is flat, I installed Nulights on the outside of the panel. I drilled a small hole near the wire connection. I placed a rubber grommet into the hole and used shrink-wrap on the wire next to the connection. This made a clean looking application. I ran all the wires to a power bus and ground bus, which I installed, on the back of the panel. I used an AN circuit breaker and an AN toggle switch purchased from Spruce. The biggest problem was the rheostat. Thanks to (I think Gene) a fellow member, I installed a FFA approved America King Light Dimmer purchase from Chief. I also moved all the other lights to this system. It works great!

Primer O-Rings

According to my notes from a previous post, there are 2 o-rings required, MS29513-012.

Carburetor Adjustment

The Marvel Schebler Carb is one of the simplest carbs ever built it's light rugged and very dependable. The idle mixture screw it's in for lean and out for rich. The basic set-up is 700 to 750 RPM and enrichen for a 10 to 50 rpm increase when placed in ICO. it needs to be rich at idle for proper acceleration from idle.

But, please check the manual for the proper methods and numbers

Zefftronics Voltage Regulator

I recently installed a Zefftronics regulator/alternator controller on my Cherokee. One box, 3 wires, very rugged. Has an LED that will indicate problems before they occur, especially at installation. Comes with a great checklist to use prior to installing the device to ensure your system is good.

One wire to the ship ground.

One wire to the alternator field wire

One wire to the master buss.

Great unit. After installation I used a Fluke DVM to watch the output to the battery. Very precise at any and all RPM's. I recomend it.

Touchy Turn and Bank

A TC does indeed have dampening fluid inside, in fact in 2 different locations, and each of these locations uses a different fluid viscosity. Some "cutrate" shops will ignore the viscosity requirements, using any fluid they please, and you end up with a flakey TC. A reputable shop should be able to fix it up!

235 - C/S vs Fixed Prop

My comment is a 235 fixed pitch vs. constant speed, I've flown both. The main difference I note is when you push the throttle in to get rolling. The CS will set you back in your seat some, the fixed pitch will not. Once my plane is off the ground (fixed pitch) it gains speed rapidly and I honestly cannot tell you of any difference. The fixed pitch ends up being 35 lbs lighter, and in cruise the book claims it is 2 mph faster than csp. Service ceiling is somewhat reduced though. When i bought my plane I knew a different prop was not far down the logbook, a new one cost me \$2800 plus tax. I think that may be less than repair/mntnc of a csp in some circumstances. I figure 13 gph on a flight plan and all works out well.

Generic Manual in Plane

A friend and I got together and reviewed some of his 74 140 cruiser paperwork. It did not take long into it that we found his equipment list was entirely bogus. Not a single line item was marked as on aircraft. In other words it was a blank equipment list. Further we found the POM was not serialized as required for his prticular bird. It was just a generic. And yes, the weight and balance is completely no good. We have to weigh aircraft after establishing equipment list. Costs \$150.00 for original equipment list and POM from Piper. Then add revisions! All kinds of avionics and updating. \$250.00 to weigh acft. Two weeks to get paperwork - min. Weigh acft?? What a hell of a hassle!! A ramp check would have ripped him apart. Especially if they caught him at Bum Luck, Nowhere. "Heads up"

Rebuilding Exhaust System

I've had my exhaust rebuilt a couple of times. Acorn Welding (1-888388-8803) has done the best job by far. Turn around was about 7-8 days. They may have an exchange for an Archer. I've told Dawley (1-800-338-5420) does good work. Acorn seems to rebuild them a little heavier. I used Wall Colmonoy (1-800-433-5074) twice & they did not hold up very good.

Upgrading 35 amp alternator to 60 amp

I went for the upgrade due to electrical load. Cost around \$1000 or so depending on the alt and brackets you need. Install takes about 3 or 4 hours. 337 is no problem as long as you use the correct parts. Your A&P should know what to get. It made me feel a lot better

Sheet metal repair

If anyone needs sheet metal work done in the Pacific NW I would like to recommend a shop. Its Smith Aircraft located at Toledo (TDO), Washington.

Mark has done several items for me in the past with excellent workmanship and a reasonable price.

Mark's number is 360-864-4049

Dimmer for Instrument Lights

Gene is right again. The installer generally approves these based on three things:

1. Visual inspection (eg. is it working properly? damaged?)
2. Judgement of suitability based on general knowledge (eg. does it need to tolerate exposure to water? high voltage? is it the right resistance and power rating?)
3. Instructions of the manufacturer, in this case any relevant NuLite installation instructions.

Theoretically, the mechanic could test the rheostat to make sure it meets the power and resistance specifications. However, since the application is not that critical, a visual inspection and general post-installation check-out should be enough to satisfy the regs. The only real concern is that it will stand up to the current put through it without over heating.

Incidentally, avionics installers are more accustomed to these electrical issues. If your mechanic can't be convinced, you might ask an avionics guy how to convince him.

Alternator Belt - 180

If you go to your local NAPA ask for a "AX31" cost =\$6.79 + tax.

Alternator belt is one of the easiest and automatic things that they look for on a ramp check in Albuquerque - No FAA markings - no fly!!!

I would rather pay the extra \$20 and not have to pull the prop twice!!!

New Shoulder Harness Kit

Kosola (<http://www.kosola.com/>) has a new STCed kit. Email the address on their website for more info.

Carbon Monoxide Detector

Consider looking at Senco Model ONE. Check out www.aeromedix.com

Yoke Universal Joint Supplier

The part is made here in Dayton, Ohio by Cooper Power Tools(Apex). 937-222-7871 P/N UJ-357 They get about 70 bucks for it. Still twice what it's worth.

...and...

After paying that kind of \$\$ one would expect it would present no installation problems. But, I found they had drilled the hole that mates up with the control-wheel hole a little off, as when the u-joint bottoms out on the t-bar sprocket the hole didn't line up with the corresponding hole in the control-wheel. So, had to take some material off the end that bottoms out on that sprocket bushing. What a pain! Other than that, it went in okay. About that tapered bolt...I believe only ser numbers 28-21846 to 28-21930 used the tapered bolt. My ser num fell into the 28-20002 - 28-21845 range, which did not. If you have the tapered type, you will have to press out that bolt. I wouldn't hammer on it!

Worn Trim Barrel and Bearings

Just completed my annual on my '68 180 and found the same problem. I usually do a lot of the work on my Cherokee with the blessing of my IA but this is something I decided to take to the shop to be done. The parts are not expensive and the shop has told me 2 hours is typical. They quoted me about \$400.00 including parts. You need to be very careful because the barrel can be replaced without unwinding the cable. However, if you slip it turns into an ugly event and a lot of work.

Rebuilding Shimmy Dampener

Shimmy Dampener Rebuild Procedure

Nose wheel shimmy dampener:

Piper part number: PS-50152-7

Cleveland Wheels & Brakes

Aircraft Wheels & Brake Division

Parker Hannifin Corp.

Akron, Ohio 44011

Cleveland Model NR: 15-10

Ser Nr: 200

Manufactured: 04/90

O-rings used for rebuild:

MS28775-112 (qty = 2), use Spruce #AN6227B-10

MS28775-008 (qty = 1), use Spruce #AN6227B-3

MS28775-210 (qty = 1), use Spruce #AN6227B-15

Piston nylon ring generally doesn't need replacing. Just replace the above O-rings.

Note: There is a small piston in the rod that has an O-ring that needs to be replaced. Piston can be removed with a 4x40 screw threaded down its middle. The MS28775-008 goes on this piston. Note also, that the dampener has a fill hole accessible by removing the small plug. Fill dampener with MIL-0-5606 hydraulic fluid through fill hole. Be sure to purge all air from the unit, including the center of the control rod, before closing it up. Only fluid should exist on both sides of the control disk throughout the cylinder. Cleveland no longer manufactures this dampener, and Piper no longer supports this dampener. If dampener must be replaced it will have to be replaced with a different type unit, at \$500 - \$700 cost. Get replacement O-rings from Spruce or O-ring dealer. But, be sure they conform to MS28775. See O-ring specs document in ■Misc. Aviation Articles•notebook.

Clock Position of Propeller

Anyone who has ever started an engine by hand propping knows why the prop is installed as it is. It's the only safe place to position it to enable hand starting the engine.

The prop should stop in the 2-8 o'clock position as viewed from the pilot's seat on any 4 cylinder engine. (10:00-4:00 from the proper's point of view) The reason for this is that the engine

normally stops as it is coming up on a compression stroke. A 4 cylinder engine has a compression stroke every half revolution.

Repairing Interior Plastic

I have spent several months refurbishing my Warrior II. The interior was the easy part. First start with a container that can completely cover the trim pieces. Soak them overnight in a Spic-n-span solution. You will be amazed at how clean they will get. Next, repair any crack. BUT DO NOT USE FIBERGLASS. The fiberglass resin will cure hard and it will eventually crack. Instead use the fiberglass cloth and melt it into the plastic on the back side of the trim with plumbers PVC pipe cement. This is much cleaner and neater than trying to use fiberglass resin and the PVC cement will stay flexible. If you have any large gaps or pieces missing, Eastwood products make a plastic resin kit which allows you to fill in those areas and I think it works pretty well. Last, paint the part using the SEM paint that was mentioned in a previous thread. It is the highest quality product for this application. It goes on easy, dries VERY quickly and leaves the trim looking new.

...and...

I used MarHyde vinyl spray on my 77 Archer. Purchased at Pep Boys. First cleaned well using acetone.

Intermittent Ammeter Dance

It might be the alternator, but the signs are more characteristic of a problem in the field circuit. Does it occur more when the load is high (pitot heat on, landing light on, etc)? The field circuit goes from the bus through the field breaker to the ALT side of the master switch, to the overvoltage protector and regulator and finally to the alternator field winding.

Since it's intermittent, try the connections first to see if there is anything obvious. After that, if nothing is found, try the master switch itself. They will sometimes go into an oscillation mode where they'll heat up, break contact, cool down, make contact, etc., with a cycle of about a second. They shouldn't be more than \$50 or so from your friendly Piper dealer (I know, \$50 for a \$3 switch. At least it's less than rebuilding the alternator).

Interior Replacement

The headliner in our Warrior was stained (someone smoked in it for a long time) but was not torn or frayed. I elected to try coloring it. We used the Molecubond spray cans in a pure white. You can get this at WalMart, Kmart or Auto supply. If I remember right it took 4 cans. I did it while the interior was out. Masked off everything and climbed in with a tyvek suit and a charcoal mask. 3M sell a good one for about \$40. That was 10 months ago and went through a very hot summer here in Maryland. Looks like new.

Replacing the side panels and carpets are not hard, just take your time. Don't even try to hit the old holes, just drill new ones. We found that paint stripper worked the best on the floor to get rid of the old adhesive. Definitely get the side and floor insulation from Airtex, the difference in the plane both sound and comfort (easier to heat & cool) is very evident. We used the old pieces of insulation for templates. The new insulation is adhesive backed, in the places where you have to feed it behind bars, wires, etc, make up a mixture of 1 qt water and about 8-10 drops

of Joy or Ivory liquid and spray the adhesive side liberally. This will allow you to slide the insulation into place and when it dries the bond is every bit as good.

We also put our front carpets on a thin piece of aluminum with velcro patches so we can lift the carpets out for annuals, cleaning, etc.

Hole Finder

This is a tip for those redoing interior panels. A simple hole finder can be made up using two old (or new) hack saw blades. First inset an aircraft rivet through one of the holes in the end of the hack saw blade. The rivet should be a snug fit and stick through at least quarter of an inch. Firmly but gently seat the rivet with a hammer so it is tight but not badly damaged. Sharpen the protruding piece into a short stubby spike. Take the second blade and lay it over the first, so the end holes align. The spike you have made with the rivet must face away from the top blade. Join the blades with a rivet, screw etc using the two holes opposite the end where the spike is and make sure this joint is tight enough to ensure the blades remain perfectly aligned. If the lower blade is slipped behind the new panel and the spike moved around until the hidden hole is located, then the hole in the top blade will be directly over the hidden hole and a mark can be made at the correct point on the new panel.

Airtex Interior

I "Airtex'd" my 140 last February...not quite as cold here in NC, but I did find a T-hanger available for the whole month, and it was definitely worth the rent. I replaced the upholstery, side panels, and carpeting with Airtex products. I agree with the writer who said the carpeting needed some trimming...in my case, only the part under the rear seat bottoms. Those Airtex carpet pieces that have snaps prefitted worked well...the snaps were exactly where they were supposed to be (phewww). Also, two of the side panels needed very minor trimming, which involved cutting the plastic-board backing (but NOT the vinyl and fabric facing) to fit, and then regluing the vinyl and fabric back onto the plasticboard. Not at all difficult, just took a little extra time. Like the other writers, I also did not replace headliner....had heard elsewhere that this can be a real pain, for a first-timer. Be sure to also order screws (#4 and #6) from Airtex, as well as their vinyl glue.

Airtex also included a couple of pieces of vinyl scraps to match my new wall panels, along with a couple of pieces of foam, to refinish the armrest cushions. Worked out great. But if you prefer, you can ship your armrests to Airtex, and they will refinish them for you...they re-pad the armrest, and then cover the whole thing in vinyl (plastic armrest base, and all). I saw this on another plane after I did my job, and it looked pretty good.

I also replaced all the window plastic trim, and the overhead panel, with new pieces from Plane Parts...I've always been very pleased with the "fit and finish" of their products. I just ordered a new instrument panel cover set from them...look forward to doing that.

One benefit of the "kit" approach, is that I was able to fly the airplane between kits. Whole job took 1 month, working weekends and just a couple of evenings.

Strut Pressure

With weight on wheels, start 300-350 on mains and 250-275 on nose. Be careful

Use of 337 Form

From: Patrick.Archison@faa.gov [mailto:patrick.Archison@faa.gov]

1. All major alterations are documented on the 337 so an STC'd product being installed on an aircraft that is on the AML needs to have a 337 submitted that essentially says that the installation was made in accordance with the STC. No other approval need be made as an STC is previously approved data. The 337 is submitted through the local FSDO and then forwarded to OKC by the FSDO.

2. The other use of the 337 is for the field approval. If a person is considering performing an alteration that they consider major and does not have any previously approved data, the data may be approved by an inspector in the local FSDO. There are many limitations to our capability to field approve items and they are changing all the time. We have just changed the way we do field approvals as our guidance from headquarters has changed. DER's have much more capabilities than they used to so you may want to consider becoming a DER.

3. Minor alterations (defined in FAR 1) do not require a 337. In fact, if you decide to submit a 337 you have decided that the alteration is major and then you must have approved data. Minor alterations only need acceptable data (install manuals, AC 43.13) and are documented by log book entry.

I can send you a copy of our new handbook guidance if you wish. Give me a call with an address.

Non-Working Position Lights

There's a complete wiring diagram in the parts manual, but you may not need it, just yet. Does the white light on the rudder work? If so, you know that there is voltage to the position light circuit, including wing tips. If not, then you could have trouble with the nav light switch or circuit breaker.

If the white light is working, I would suspect a wiring problem close to the wing tip area. (You have TESTED both wing light bulbs with a separate power source, right?!!) With a volt meter, carefully touch one probe to the center contact of the bulb holder and the other to a good "ground" source along the wing, such as a screw without paint. If you have voltage present, then you may have a poor or missing ground wire from the connector. That being the case, further inspection would be required by removing the lighting fixture and checking the wiring.

Be careful not to "short" the test lead probe between the center contact and side of the bulb socket.

Flap Bearing Rod Ends

The numbers should be F34-14 RH and FL34-14 LH. AC does have them

Low Static RPM

An optical tach measurement should be the 1st step.

Another easy one to check is if the carb heat is partially on, even though the lever is set to off in the cabin.

Bouncing Tachometers

For those with tachs which bounce around...its easy to slip the inner cable out of the outer casing...one end has a retaining clip...and the cable must be slid out this end....carefull cleaning of bot the cable and casing can be achieved in about 45 mins....repack with soft molybdenum

grease. This will do wonders to the smoothness of the readout and the grease damps the cable...which in most cases is responsible for the bouncing needle!

337 Forms for Removing STC Items

I'm an A&P with an IA and lately have been signing up to 20 plus 337's a year. Yes, this is a gray area with a lot of inspectors but technically anything on the aircraft at time of manufacture or installed with a 337, needs a 337 to remove or change it. I have even been required to fill out a 337 for field approval because I changed battery brands listed on the original wt & bal. If in doubt have your IA fill one out. I have even filled out 337's and been told that it wasn't required, but I still put it in the log book for the next guy.

Gascolator Leaks

After years of leaky gascolators (on my 180c 1965) I replaced mine with one from Steves Aircraft they are STC'd for all the piper line and cannot ever leak. check them out at Stevesaircraft.com I don't know the current price but he ships the same day.

New Style Fuel Selector - Shoulder Harnesses

Piper has a kit for the fuel selector. Cost is about \$150 and will convert to the new style.

For the seat belts, you will find that the retractable types are very expensive. I have a 69 Cherokee, and I changed the front ones to the non-retractable, "Y" type. Got them from Aircraft Spruce, and they cost about \$235 each. Plan on about 4 hours labor for each one. Wag Aero and Kosola also have some STC'd belts.

Rebuilding or Replacing Seat Cylinder

Contact Chuck Koch @ www.avfab.com they sell or refurbish your seat cylinders. They also have many other piper seat parts available and are significantly better on price than anyone else!

Valve Lifter Bleed Down

The term lifter unloading (i.e. bleed down) refers to the lifters emptying out in order for the valve to make final closing.

Normal running, the lifter is pressurized through a small hole, when the cam lifts it, the filling hole is blocked with oil trapped inside the lifter. This caused the valve lifting motion to follow the contour of the cam, which is extremely important to produce power. The design of the cam lobe can effect a wide range of application on any given engine, depending on the intended use. When the cam starts to close the valve, and reaches the closed position, oil is "unloaded", through that same hole. This will ensure final closing. If any oil is still trapped, it will not completely close. That, of course will cause valve, seat, and overheating damage such as cracked heads.

The lifters that Lycoming uses are probably the oldest of designs. Like some other designs, they rely on what is termed bleed down clearance.

Lyc. engines, have a bleed down clearance of .028 to .080. Ideally, .050 to .060 is just about right. Valves lifters that are set on the tight end of the scale, will invariably develop less power, use more fuel and are most likely to suffer one of those maladies I've mentioned.

The chapter on lifter bleed down clearance in the Lycoming manual is just a short paragraph. Sadly, it is one of the most misunderstood function of these engines, and one of the biggest problem maker.

Using W100 is probably one of the worst offender, if, say the clearances are close are near the .028 minimum. The "molasses" as I call it, simply cannot unload quickly enough, until it gets hot. The end results of which, include sticking valves, and the rest of the aforementioned maladies. This is another reason for not using that stuff. The multi weight, such as 15/50, will allow unloading to occur with minimum clearances due to the 15W viscosity in cold starts. So most valve related damage is done in the first 5 to 10 seconds of just starting the dinosaur. One member even stated how the engine ran rough when W100 was used in lieu of 15/50 he had been using.

Unfortunately, the more modern designed lifter cannot be used. I hate to admit it, but what the hell, Continental use a better lifter. It's bleed down clearance is in excess of 1/8". They also have fewer valve related problems than Lycoming, but more of other problems than Lycs.

The clatter you hear is just that, the lifter is pimping up. Your Chevy's bleed down clearance is adjustable, as is the Lycomings'. But Chevrolet wisely installed adjustable rocker arms rather than varied sized push rods.

Also in the auto world, we all tend to be lax with oil changes and using proper oil. After cleaning out all the old oil, and a new filter, run a 5W20 or 5W30 Castrol Semi-synthetic or an equivalent, and it should help the clatter assuming the clearance is correct. If it corrects it, go to full Synth. the next time. The engine will love you for it.

Air Filter for 235

I think that if you check your eqpt list you will find a filter callout of Fram Ca161pl. Just so happens that it -- among a lot of other applications -- does fit a 57 Chrysler

Replacing Alternator Filter Capacitor

About that alternator...If you're running, as I am, the Chrysler 12 volt/60 amp (CHR 2642997) then the replacement of that filter capacitor is no easy task. As you see in the photos below the capacitor is actually located internal to the alternator. In fact, the capacitor body is actually physically part of the alternator output lug where you attach the main output wire. In the first picture the capacitor is at the top of the picture with the black lead coming off the top and connecting to the frame. Coaxial to the capacitor, opposite to that lead and going through the frame, is the integral threaded lug which you can see in the second picture. So, you see, not only do you have to remove the alternator, but to actually replace the capacitor you have to tear down the alternator. I wouldn't think an A&P would go to the trouble to do that in the field, but instead either tell you you need to replace the alternator, or just attach a second capacitor external to the alternator. Externally, it could be easily attached right next to the same lug. If I remember correctly, once the engine cowl is removed, even with the nose bowl in place, there is enough room to work at the rear of the alternator to attach an external capacitor.

Missing Log Books

There was a thread a while back on buying a plane that had logs missing. Several said they would not even look at one, and others, myself included said they would consider one. Well, I want to change my vote. My partner wants bigger and faster, so we have been looking at a lot of different airplanes. He found a really "cherry" 1973 Cessna 182. The broker even brought it up from SoCal to show it. Looks nice, very clean in and out. Only problem was a 7 year gap in the logs. I ran the tail number on myairplane.com, and got no hit. In the old logs there was a reference to a different tail # 182 AL instead of 182 AU. So I ran 182 AL. The first thing that pops up is the NTSB report on the fatal accident in 1995. Seems this particular plane went down in the middle of the winter in Wash. The left wing was found 50' up in a tree, and the rest of the plane on the ground. They describe the damage very completely. Only the firewall area was crushed, the rest was not too deformed. The airplane was considered totaled, and delivered to the ins adjuster 5 months later when the snow finally melted.

Alternator Drops Off Line

the voltage regulator adjusts the voltage on the field winding (and thus the current through it) to keep the bus at 14 V. This compensates for varying load and varying alternator shaft speed.

There are two circuits which can fail. The field runs from bus through field breaker to Alt. Master to OVP to regulator to alt. field (F) terminal to field winding to ground. The starts in the main winding and goes through the B terminal through the ammeter through the diode (or main breaker on older planes) then to the battery master to the starter solenoid to the bus.

If you get desperate and replacing the regulator/controller doesn't fix it, you can put volt meters at the regulator input, output and bus. Then you will get readings like these:

Condition _____ Bus _ Before _ After
_____ Reg. _ Reg.

Normal _____ 14 _ 14 _ 1-10 (low for low current and vice versa)
Break before reg _ 12.5 _ 0 _ 0
Failed regulator _ 12.5 _ 12.5 _ 0
Break after reg. _ 12.5 _ 12.5 _ 10 - 12 approx.
Open field winding, 12.5 _ 12.5 _ 10 - 12
Open main winding,
break in main ckt.

Since the last 4 failures have the same symptoms, if you want to try to isolate which one, you would normally measure the windings and wiring with an ohmeter. However, since the failure is intermittent and occurs only when the system has warmed up, but doesn't depend on outside temperature or engine temperature, that would tend to argue against alternator as the problem, leaving most likely, in my opinion, the voltage regulator or overvoltage protector. As you've guessed.

...and...

The alternator's job is to keep the main electrical buss at around 13 - 14 volts. It takes its cue from the voltage regulator which monitors the voltage on the buss and tells the alternator when it is low. The alternator then pushes current on the buss in an attempt to raise the voltage. When the buss voltage reaches the nominal level the regulator then tells the alternator to reduce or stop pushing current. Generally, the ammeter is in series with the alternator output, where it is measuring the current the alternator is pushing onto the buss.

Things that can drag down the buss voltage are an undercharged battery, and any electrical device turned on. When everything is working correctly, you can shut off all devices individually and any ammeter current observed is there to charge a low battery, and provide a small amount of current to operate the instrument panel gauges, and master relay. When the battery becomes fully charged you should see very little ammeter current. When you know the battery is fully charged, then you can estimate the current load each device is pulling by just turning on that device. You will observe the ammeter rising by that amount.

Replacing Circuit Breakers

I've put in a couple circuit breakers (inspected by A&P, of course). It required patience. If I recall, I had to loosen a couple of the screws on adjacent breakers to give the bus enough give to let me winkle out the old breaker and in the new.

Definitely requires care to keep everything straight, and pillows on the rudder pedals to keep you from needing chiropractic care afterwards!

It sounds like you want to replace the non-pullable breakers with pullable. The standard breakers are the Potter and Brumfield W series. The non-pullables are the W58, and the pullables are the W23.

The problem is the pullable types are a little longer and wider than the non-pullables. They might still fit in side-to-side, as the width difference is only 0.03 inches. However, due to the length difference you would have to replace all of them.

One of the folks on the chat, Justin, put some pullables in his older style panel, which you can see at this link, below the larger CDI.

You can get them from the usual suspects, Chief A/C, A/C Spruce, Wicks, Gulf Coast Avionics, etc

Removing Master Switch

You have to remove the complete switch cluster. All the switches, i.e. master, fuel pump, landing light, beacon/strobes, & pitot heat are mounted in one assembly. The good thing is that all go through a common connector. The best and ease of removal is to remove the radio or component above, loosen the radio or component rack and there will be three or four screws that hold the switch cluster in place. From the cockpit facing forward, on the left end just past the nav light reostat switch there is a clear plastic connector. Unplug the connector and then remove the two

counter sunk phillips head screws on each end of the cluster face. The complete assembly will then be able to move aft, rotate slightly, and be pulled out through the front of the panel. Then if you want to replace the switch, take it to the work bench, listen to some music, open a kool aid, and have fun. Of course the installation is just the reverse.

Replacing PA-32 Cargo Door Window

You are hosed, my friend. The older sixes have the cargo window molded directly into the fiberglass. You have to buy the kit directly from Piper. For the sum of \$900 you get a paper pattern and a flimsy frame, and permission to cut up your old door. I ran into this with mine last spring. I think it cost me close to \$1500 to replace the one window.

Limitations on Field Approvals (FAA order 8300.10 effective 9-13-02)

Sec. 9 Alterations not eligible for field approvals.

A weight and balance

1. Changes that increase max gross weight.
2. Changes in center of gravity range limits.
3. Changes that alter operational limits.

Basically if you want to make a change in gross wt (in my case, its an increase thats been commonly done for thirty years on supercubs), you now have to hire a Designated Engineering Rep. He must now either reinvent the wheel, or provide engineering data that proves that what has worked for thirty years will work today. Prior to Sept. 13th this was a very common mod, done on most older supercubs on floats.

Fuel Pipette - Measuring Fuel in Tanks

Aircraft Spruce has one that is calibrated for the Piper PA28, 50 gallon tanks. I have one and it works great.

If you have the spruce catalogue with the polished Luscomb on the cover, look on page 537, right column on the top of the page. Called "Direct fuel level indicators" - Part number is 12-21255. It \$11.95 and I find it to be very accurate.

Brackett Air Filter

The Brackett falling apart is true. The K&N are far superior to just about anything used to filter air on any internal combustion engine. Their racing experience is quite extensive, and very well documented.

I don't work for them either, but have used them illegally in my 140, and I now have a legal one in my Arrow. I raced with them as well.

Blown Exhaust Gasket - 140

140s have a crossover exhaust system, which is excellent. But they have an idiosyncrasy, should the baffling inside the muffler break, and they do in time, #3 cyl is in deep trouble. First sign is burning up gaskets.

The blow proofs are the best, but the flanges and faces must be in good order.

The blow proof is very effective, and if you do have an internal baffling breakage, it will make #3 good and hot, and in some cases cause more damage.

If the cylinder is damaged, they can be repaired, but not all the time. If so better find a reputable shop. In FL. D&S 1-888-409-7555.

The pipe flanges can be straightened, but the head faces should be shaved. There is special tool for this operation.

Your friend is listening to heresay, but the fact that exhaust systems are not checked more often than they should, is an unfortunate fact. I insist that they be checked at every annual, and minimum every other annual.

Replacing Overhead Console

Replace it! About \$100.00 Remember some of the original ones has the T piece in the front that fastens onto the windshield surround as an integral part. If yours is like that you will need to buy the T as well, as the new consoles do not include. Mine came undrilled and this was the hardest part getting everything aligned and a hole finder to locate the rivnuts. remember to mark your wiring carefully and its essential to have help. The red dash light fitting is taped in and will need new duct or aluminum tape to reinstall. It's a good time to replace the O/H speaker!

Panel Mount OAT (Temperature gauge)

There are several choices. The EI units that Linc mentioned is one. Davtron has a good selection available from Chief and A/C Spruce. Their website is pretty bad, but a pure OAT, the M301 they charge around \$130. They also have the 655 that does OAT, and takes the signal from your altitude encoder to display both pressure altitude and density altitude. You also get Volts for free.

The density altitude would be good for here in Southern CA, where DAs are high and traffic dense enough that it's better not to have to do E6B calculations to figure out your power settings as you change altitudes.

Here's the 301 (F or C, \$125 from Chief; the 307 has both F and C with a switch, \$190):

Here's the M303 (OAT F and C, plus Volts, \$220 from Chief):

Here'e the M655 (OAT, Density Altitude, Pressure Altitude, Voltage, \$270 from Chief):

S-Tec Autopilot Report

For anyone interested, here's the scoop on the S-Tec System 40 I just installed in my '68 Arrow 180. This will bore anyone that already has an S-Tec, so you can stop reading now. However, if you're thinking of upgrading you might find a tidbit here and there that's useful.

Installation

Was performed by Avionics Unlimited in Conroe, Texas (North of Houston, 936-788-7333). The scheduled down time was one week, (in on Monday, out on Friday) but I didn't get the airplane to them until Wednesday. They actually had the installation completed by Friday, but S-Tec had shipped them a bad unit so it was actually the following Friday that the aircraft was ready.

They removed the original autopilot that has never worked in the 12 years I've owned the aircraft (I'm told it was a pre-Century model), got a new Turn Coordinator and Heading Indicator with bug, pullable circuit breaker, and new yoke-mounted AP disconnect button. They installed the

autopilot and switches in the lower left subpanel where the original autopilot used to be. This is where I wanted it, they'll put it anywhere.

Did not install the upgrade kit for wiring to accomodate a System 50 upgrade. He said the upgrade would only be \$125 more to upgrade from a -40 to a -50 than if I spent the whole \$ to go to a -50 right now. I think it's about \$3,500 more to upgrade.

The lead time to get the stuff from S-Tec was 3 weeks.

Cost

Gave them a total of \$6,295 and they kept the original autopilot and gyros they replaced. Exactly what they quoted me.

Impressions of Installation

Was impressed with Avionics Unlimited and I recommend them to anyone in the area planning an install. They were very frank about the install, and actually corrected a few minor items that were on my squawk list on their own, without charging me. They did more than they said they would do for the price they quoted me. They also said they were very familiar with Cherokees and installed a lot of autopilots in our type.

Operation

Just as advertised. Will work as a wing leveller only, or track the heading bug, or track a course from the #1 Nav CDI or CDI from my old Garmin AVD-100 GPS. I spent an evening reading the manual on S-Tec's website (highly recommended; www.s-tec.com) so I was familiar with the autopilot when I picked up my Cherokee from the shop.

The wing leveller speaks for itself; punch the ON button and the box comes up in Stabilizer mode; the wings stay level. You can turn the knob on the AP to command the autopilot to turn the aircraft. Max deflection results in a standard rate turn.

Pushing the turn knob toggled between Stabilizer mode and Heading mode. The AP will dutifully follow the heading set with the bug. Turn the bug exactly 180 degrees and the AP won't respond (I guess it doesn't know which way to turn), but something less (like 170 degrees) and the aircraft will enter a standard rate turn in the correct direction and roll out exactly on course.

Dial in a freq on Nav1, center the needle, and establish the heading on the OBS within 10 degrees. Punch the Nav button on the AP and the thing will fly that needle. The AP will continue to change heading until flying through the course, then back the other way as it "bracketts" the course line, so the closer to on course you are the less the AP will hunt for it. If you're more than 10 degrees or one needle width off course when you engage the AP it may take several minutes for the AP to settle down; best to have it close before letting George fly. GPS Steering (GPSS) will actually fly much better, including smooth course intercepts, and entire approach procedures

and holding patters. But this option isn't available for my old AVD-100. Guess I need that new GNS-430....

The Approach mode is basically the same as Navigation mode, except that the AP will make more aggressive heading changes following the needle (like you would need it to do on a localizer). Great for approaches, but flying VORs the NAV mode is more forgiving of the needle jumps you get when the reception is bad from a distant station.

Reverse mode has the same sensitivity as the Approach mode, but will fly the opposite direction of the needle indication, as if you were on a back-course approach tracking the localizer outbound. This is also a great feature for flying a full ILS on the outbound leg (at least in training; when was the last time you actually had to fly a full approach in IMC?). Reverse mode is the primary feature you get with a System 40 as opposed to a System 20.

Flying the GPS uses all of the above modes (NAV, APR, REV). I have a switch that will feed the AP input from either Nav1 or the GPS. The GPS is so accurate I always use it in the APR mode (no signal problems) and, of course, the REV mode is meaningless to GPS operations. I flew about 20 miles out and then punched up our airport on the GPS (a user waypoint, not in the AVD's database) and the bloody thing flew the Cherokee right over my hangar. Cool.

Summation

Would I do it again? You bet. Now I just need the money to upgrade to the -50 for altitude hold...

Starter Turns Slowly

Your plane should have a geared starter. That starter by now is tired. Would suggest a Magnaflite. As for the cables, if your particular AC has the metal batt. box, rather than replacing all the cables, replace the ground (neg) and power (pos) cables. Bogert makes this kit, and it's worth while. The ground cable is too small and the pos cable gets lots of resistance from it's installation. My own has alum. cables, but Bogerts ground, and magmaflite. It can almost taxi with the starter. The Magmaflite is also PMAed so it requires no 337 or any other paper work, other than W&B records. Their warrantee is good as well as the price.

Heater Fails to Turn Off

I had the same problem on my Warrior. The heat control pushes a cable that swings a little metal door open and shut just forward of the firewall. My door was not shutting all the way, and even a very small gap resulted in cooking conditions in the cockpit. My mechanic fabricated a little extension for the arm that increased the leverage that the cable exerts on the door. Sometimes I still have to slide the control back and forth a few times to get it to "slam" shut, but it is now manageable.

Installation Cost - S-Tec 20

I have 3 quotes right now on STEC-20 & 30 installs. The basic labor seems to be 2k for a 20, and only \$500 more for a 30. The units themselves were all withing a couple of hundred dollars. I

never found out what msrp was though. The best price I got on a 20 installed was about 5k. This included the wiring for adding altitude later. I was told that if this was not done, it would be another 2k later for the altitude.

Compression Check - Warm vs Cold

Warming up the engine will add oil to the cylinders. Taking a compression reading with oiled cylinders will never give you a real opinion. The warm up should be done after the cold test is done for comparison. In the real world (all other internal combustion engines) cold is first and foremost, when compression pressure is low, oil is added. If the pressure rises, the rings and/or pistons, or bores are worn. So doing it warm, you've already passed up an opportunity to find any other potential problems.

High Oil Consumption - High Time Engine

Contrary, I believe, to what a lot of folks think a compression check does not identify a worn oil control ring. There are compression rings and oil control rings. A comp check will locate a compression leak. It will not locate an oil leaker. That is as simple as removing a spark plug and looking for oil. Then just hone cyl and replace rings. Can do the job in a day. If that won't do it, then a simple top will.

Metal Plate on Outside of Fiberglass Cowling, Right Side

That plate is where the door will strike the cowling if (when) the door stop gives way and the door swings around past the stop. Happened to me, the screw in the door stop sheared off and the door struck the cowling on that plate. Scratched the paint, but no other damage. Suggest you leave it there.

Instrument panel Light - Nulite

I installed a full panel of Nulites on my 180B. Do not install between the hard panel and the plastic overlay. Causes large gaps and the plastic overlay won't lay right. Tried it - looks real goofy. I installed mine between the hard panel and the instrument. Real easy to do. The wires on the nulites are too short for some instrument locations, so you will have to add extension wires. Make sure you use the proper wire. Since you need an A&P signoff anyway, spend a few more bucks and have them installed on a dimming rheostat. Watch what circuit you connect to - a full panel of nulites draws about 1 amp. Don't overload an existing circuit. I had a separate breaker installed for the system. The whole thing cost me about \$400. I installed the nulites and the mech installed the breaker and rheostat, and signed everything off.

Good Paint Shop

I had mine stripped to the metal and it was in real bad shape. The price including all new glass, substantial body work and all stainless screws came to less than \$8,000. I recommend AvSource in Midland, TX. Their website is www.avsource1.com and you can get an online quote. The best thing was that there were no surprises, including the time to complete the job.

Iridium Spark Plugs

SAVE your money, and buy standard plugs (\$16.95 vs \$46). Unison's Auto Lites will last longer than the Champs, and generally run a buck or so cheaper.

Should you develop any oil burning problems, those over priced candles will foul exactly the same as normal plugs. Then, after the porcelain (same stuff used on standard plugs) is thoroughly saturated, you'll have to throw them away as well.

Gear Activates During Flight

Once the gear is home (up) the system shuts down. The pressure switch is holding oil in check, or holding your gears up. All three micro switches activate the pressure switch. The yellow transit light needs all three to activate the pressure switch, but if only one or two are not making up after the switch is engaged, other than the light coming on, nothing will happen. All three have to be activated.

Should there be a pressure drop (like a cylinder leaking) the pressure loss will be activate, and start the pump.

From experience the nose gear up micro is the most likely to be the culprit. Excessive play in the gear mechanisms, linkages, or improper adjustments will cause your problem. The condition of the switch and activating arm are also suspect. Adjustments of these switches should be followed to the letter.

once the gears reach home, the pressure switch is engaged. If it releases, you will engage the pump. Since you are not hearing or indicating pump run, it is not the problem.

Now you said they replaced all three limit switches, did that include the spring arms? If they were distorted, (bent to make contact, which is a very common error) they too need to be replaced. Adjustments must follow the book, I can't emphasize that enough.

On my own, I have only to replace the squat micro, but every one had had the lever arms bent because some other A&P???? was too lazy to do it right.

On one switch, the locking lever actually was buried inside the micro, when I found it. When the transit light lit up, the gear motor was not running, so it wasn't the pressure switch. Closer inspection revealed that because the locking fingers pressed into the micro, it wore the silicone cover and buried the plunger inside the micro. Result was an intermittent yellow light signal. After that episode, and discovered that the rest were in similar condition, I replaced all including the lever arms. I ran out of switches, and didn't replace the squat micro. It was the only one in tolerance. It will be renewed at next annual.

Yet another indication that the pressure switch is not the cause, is when you let the gears down, the pressure is simply released, the pump reversed and gears go down.

On an emergency gear down, the pressure switch is released, and those springs on the gear pull the gears down. The pump's shuttle valve is by-passed to let the oil out of the pressure side of the cylinders.

You simply remember that if the pressure switch is turning on the transit light, the gear pump motor has to run. It's frustrating.

BTW, micro switches 1SE1 (\$49) can be purchased from Newark Electronics. The lever arms are special order.

Another word of caution, on the down locks, these too can be misleading if they are out adjustments. Though they do not necessarily relate to the up lock mode, if the switches are not adjusted correctly, they can be activated prematurely (all greens on), but the gear may not be locked. Once the three lights come on, this is also the signal for the pump to stop. If it stops too soon, they may not all lock. Fixed a few of those too. It wasn't cheap. This is how critical adjustments, and condition of switches and lever arms are.

Cracked Muffler

I highly recommend a new or OH unit. Don't cheap out with repair attempt. You might want to see how many hours you have on it. Piper "recommends" replacement at 1000hrs of service. Thanks to Tom@lake, he probably saved my life!! While down for a visit and checking out my bird, he noticed white powder residue on the lower support arms, near where the tail pipe exits from the muffler. Long story short, the muffler had cracks and holes in it, between the exhaust port and edge of the muffler! I replaced it with a Wag-Aero unit. I also replaced the heater shroud because of cracks and tears.

Took me about 4 hours of time to do the job, then had it inspected and signed off by my IA. If you're doing the job yourself, consider replacement of the exhaust flange gaskets with Rapco 77611. Also, be sure to use correct hardware.

I'm still disappointed with myself for not picking up on the exhaust residue. While I had been carefully inspecting the exhaust flanges for blow-by, I failed to recognize the more serious situation, right under my nose! The plane had an annual in May, 60 hours ago. I'm reasonably confident that my IA would have noticed the residue and investigated. Knowing that your cabin heat is fed from the muffler, it's imperative that it be 100% intact. You can't have any perforations or leaks! The fact the muffler had over 1000hrs on it should have been a red flag to me, to replace it.

Aircraft records on CD

I received my CD the other day. It has copies of all of the original documents filed with the FAA, including registration applications, airworthiness certificates, 337's etc. It was neat to see the history of the aircraft's early ownership.

I found copies of two letters to the FAA, one from a flight school requesting to change the n-number on my bird and two others to numbers they had reserved for aircraft in their current fleet. A month later, another letter asking for permission to change it back. They were selling the airplanes for new ones, and never did renumber mine...after all my '68 Cherokee was almost two years old in 1970, obviously time to trade the "old" bird in.

Very cool stuff, definitely worth the \$5. The web-site says you need a credit card, but it never did ask me for mine, however. The CD showed up in the mail, with a bill for \$5. (no additional \$ for shipping).

You can order at:

<http://diy.dot.gov/>

Click through on "Federal Aviation Administration" then "Aircraft Payments" then "Request for Copies of Aircraft Records"

Erratic Directional Gyro

Sounds like it is failing. Mine acted in a similar manner. I found a reputable instrument shop and had a fresh rebuilt exchange sent immediately, that was thoroughly bench tested prior to shipment, and was well within specs. It has worked very well for the last several months since installation, has a great warranty, and the shop has been very helpful in answering my questions. I have learned much about our gyro instruments, and will take better care of them. I'm sure there are many good instrument shops near you. My shop is now Berkshire Instrument in Colorado. My local avionics shops will also do some limited instrument work, but I have heard that several people were not entirely happy with their work or prices. Check around. There have been great postings in the past on this subject. Remember, even new gyros won't work properly if they have been on the shelf too long, and members have had to send several back prior to getting one that work properly. I see no problem with rebuilds. Don't ever get the cheap, non TSO'd imports!

Vent Knobs

Heinol & Assoc. now sells new replacements with a brass insert for the shaft/set screw. About \$4 apiece or it may have been 2 for \$6 I forget. Anyway call them and see.

Rudder Pedals Binding

One thing you might check or have your mechanic check is the center mounting support for the rudder pedal tube. I have seen these cracked before and in one case it gave a similar problem. Another case is the rudder torque tube itself was cracked and broken inside the support tube where the bolt goes through.

I'll try to explain what I am talking about;

(1) Under the panel, in the center of the floor console next to the firewall, there is a triangular support that the rudder torque tube goes through. (it is a tube within a tube) This support holds the rudder torque tube in the horizontal alignment and keeps the torque tubes from flexing when the rudder pedals are moved. There have been cases where this support will crack at the base where it is mounted to the floor or at the top where the outer support tube is welded. If the crack is bad enough, when full rudder travel is needed the crack will open up enough to allow a misalignment of the support and it will cause the rudder tubes to bind. Unless there is an obvious separation when you look at it, these cracks are often hard to find. It make take a good cleaning of the area, use a good bright light or possibly a Die Pent check.

(2) The other possible problem as I mentioned earlier, is the internal tube within a tube could be broken where the attach bolt goes through. The only way to see this is to duplicate the problem on the ground or disassemble the torque tubes and inspect them. This problem, in most cases, is the result of corrosion over the years and the tubes not be lubed regularly. If this has happened the torque tube will rotate inside the support tube and not allow full rudder travel. However, when enough pressure is applied in the other direction it will "pop" back into place. Since the bolt is still installed and there is a fracture surface to work against the rudder pedal will continue to work and in most cases it will appear to work normally. However, it is only a matter of time before this fracture surface wears away and the contact will no longer

Removing Air Conditioner

We removed my air conditioner from a 73 PA-28-140 this past May, during annual. My IA discussed the process with the local FSDO office, telling them he was returning it to a "standard" configuration.

It required the standard ring gear and alternator. We removed all the "guts" and made a BIG inspection plate out of the belly door, with some aluminum channel cross members. Left the blower fan and disconnected instrument panel stuff, except for fan control. Official weight & balance gain was 74.5 lbs.

Nosewheel Shimmy

Having been the proud owner of a 140 Cruiser, this is how the shimmy was fixed. First and foremost any wear in leg bushings, oil leaks, proper oil level, and air pressure, must be attended to. Scissors should be in good order, and damper as well.

The culprits are the two ball bearings (452-332 & 453-332) in the strut housing. They are not made for this task. They "rot" easily if not lubricated, and are easily damaged if not tightened properly.

They develop "craters" on the races, and prevent the aircraft from being steered. Move the steering and the bearing goes from one "crater" to another, or shimmy.

Main gears should also have proper toe in. Toe out will induce the nose gear if it has worn bearings.

Cracked Vertical Stabilizer Bar

Go to <http://av-info.faa.gov>

Go to "Special Airworthiness Information Bulletins (SAIB)"

Select "CE-02-43" under the SAIB# heading

Aluminum polish

I have an all polished Cherokee that I've been polishing for the past 8 hrs and I've tried just about every polish made. I've found that Wenol did about the best job for me.

Seat Rollers

My '66 Cherokee uses small sealed bearings as the rollers on the seat track. You can read the manufacturer's part number on the side of the bearing. They're a stock item available at any bearing supply house. About \$23 each the last I checked.

Engine Running Lean or Rich

Sounds like mixture control needs adjustment. I spoke to the rebuilder this morning who worked on my carb. Got a earfull of physics and wished I had recorded the call. He suggested the following can be done to gauge the health of a properly "adjusted" installation:

At runup set wide open throttle and note RPM. Lean to max RPM. Should be not more than 200 RPM and not less than 100 RPM change. If less than 100 RPM you're too lean and if more than 200 your too rich.

Location of Vernatherm

Vernatherm is located on accessory section upper short left center line. Look for large hex cap. Temp sensor in same area. Follow elect wire to it. Have a good Calif day. Love that state -- Tom

Garmin 196

Perhaps this has been covered. Just in case not I thought I would jot down some observations of the Garmin 196 in use in the cockpit.

First, the airplane is a Dakota. It is equipped with a Garmin 530 in the panel. Otherwise the Dakota is unremarkable [except it's MINE]

My son (also a pilot) and I did about 12 hrs of flying last weekend over the Albany, NY to Provincetown, MA (Cape Cod tip) route. Lots of approach work as well as finally getting there and back. The co-pilot's yoke had the 196.

The yoke clamp is superb. It is incredibly adjustable. The 196 basically fits right over the Piper logo in the center of the yoke. Not between the yoke handles, but centered on the spoke of the yoke. Thus, it can be positioned so that it does not hide any instruments. I can then be swivelled up so that you can make the viewing angle perfect.

The attachable antenna seemed to work just fine. We laid it on the top of the glare shield, way forward. It seemed to receive, within one or two, the same birds the 530 was receiving. 7 or 8 as I recall, but that's not something I wrote down.

Since the 196 is equipped for land mode, the underlying road/city structure is FAR more comprehensive than the 530. No color, but FAR more detail available. You can suppress the detail in stages. The first stage is very useful, inasmuch as it greys out, but does not remove, the underlying road structure. In this respect it is actually better than the 530: more detail on roads underneath you, but the level of detail is selectable and the display of that detail can be a shadow background.

I've been using the 530 for about 9 months now in instrument flight. I found the 196, from an enroute navigation perspective, to be equivalent. Entering waypoints, what Garmin calls flight plans (a route), editing same, all very similar/identical to the 530. The ancillary pages of information such as NRST (nearest) I found to be better organized than the 530, because more information can be displayed on the screen at a time. For example, NRST had on one page what the 530 takes a few to provide. I guess that's a technology bump to the screen resolution.

Though the screen is smaller than the 530, positioned in front of the pilot you don't really notice that much. I have another Garmin portable for my boat, a GPS 12MAP, which has a screen that's a few postage-stamps large. The 196 is incredibly large by comparison.

The HSI display was very nice. As was the page that resembles an instrument cluster. I had my son do some standard rate turns and compared the real turn coordinator with the one displayed by the 196. I concluded the 196 T/C could be used in a pinch to help with turns. The lag time existed, but with care, it would help me stay right side up and navigate turns if I went no gyro. The airspeed indicator of course is ground speed, but once again, on an approach in an emergency, with knowledge of low level winds, it could keep a pilot out of trouble if he/she had a failed ASI. Altitude had the typical GPS error.

The 196 has approaches and they are selected in a manner similar to that of the 530. We shot an ILS into ALB on the return flight. The 530 displayed the entire approach, with the usual CYA warning about it being for positional awareness only, use the ILS, stupid, etc. The 196 displayed the final approach course from a major named intersection on that course to the RWY. It was not the IAF, but it was outside the FAF/OM. Once again, in an emergency if the power is shot in the cockpit, the 196 with some vectoring to final, could get me to the runway, as a localizer approach in this case. Of course the 196 does not have a communications radio nor does it have a VOR/ILS receiver like the 530!!

Given the completeness of the accessories, the functionality (air/land/sea) and the excellent human factors, I without hesitation recommend this unit. It's not approved for IFR flight of course, but it's capability is darned near as good as its very big, and much costlier, brother. For VFR operations I think it would be perfect.

Gary 6189

JPI Fuel Flow Gauge

I bought a JPI-450 fuel flow gauge for my Warrior almost 2 years ago. It is about the neatest thing since sliced bread. I was prompted to get it when I landed after a long cross country trip and discovered I had a lot less fuel in the tanks than I thought. So much for anticipated fuel burn computations. From the minute I had it installed it became an important member of my instrument panel. Once I adjusted it to my particular engine/airframe combination, it reads right on what the fuel truck says I used. It is amazing to see what a difference 50 rpm and a little +/- on the mixture does for fuel flow. Recently I had a problem with the gauge. It wanted to skip from "fuel burned" to "fuel remaining". It was still reading correctly, and could be set to "fuel used", but it's not supposed to jump like that. I E-mailed JPI tech support, expecting to hear back in a couple of days. One hour later I had a reply, and a suggestion on a possible cure. I tried what they suggested, to no avail. When I E-mailed back, I got an authorization to return for repair a day later. I sent the unit to JPI on Monday. When I got home from Reno today(Friday), the unit was sitting on my doorstep. The problem appears to have been in the mechanical buttons, not the electronics themselves. The 450 is a great instrument, and it pays for itself in piece of mind. No longer do I have to depend on those \$2.95 Piper gas gauges, or hope I figured the burn correctly.

Upgrade to 60 amp Alternator (CPA 8044)

I replaced my 40 amp alternator with a 60amp last month.

required:

new 60 amp alternator (hard to find)

new voltage reg

new over voltage reg

new panel gage

a "shunt" wire [for panel gauge]

replace wiring to six gage [wiring from [alternator to ammeter to breaker to master contactor to battery & bus]

Parts were about \$1100

labor still not sure but looks like about \$700.

Got the shunt and the panel gage from Wentworth.

It has worked well since except for one broken wire at the alternator which cost me an additional \$124 to get repaired.

Hard starting carburetor engine

Some facts about starting cold gas engines, they all require fuel, lots of it. How it gets there is a problem given the nature of our flying dinosaurs. Most every engine has an enriching device, We have one also, in the case of carbureted engines, the primer. Assuming that this engine is in good health, some raw fuel at or very near the combustion chamber is sufficient to start the ball rolling.

The colder the outside temp., usually will require more fuel.

The primer in nearly all av engines feed all cylinders. In some exceptions, fuel is deposited in the intake tract. The primer itself feeds all cylinders at the same time, should it be in poor condition, there will not be sufficient fuel. Therefore more pumping is required.

In starting, procedure, before you begin to prime, it's a good idea to have fuel available. In the case of most Pipers, priming fuel comes from the filter bowl. It's a good idea to make sure it's filled, turn on the boost pump before priming. Doing so will also fill the carb's float chamber. Now prime, minimum, twice. Crack the throttle a small amount, 1/4" or less, and start. If your batt. is low, the boost pump can be turned off until the engine is running.

Hot starts, no priming, throttle about 1/2", boost pump on (this will help eliminate boiling of fuel and help prevent vaporlock), and go.

In both cases, until the engine is running, feed the throttle gently, once started, go as you wish.

All other associated factors must be in order, plugs, points, the entire magneto including impulse coupler, wires, compression, starter, batt., air filter, etc.

Never, ever pump any updraft carburetor of any type, you already know that, but you're still trying to tempt fate.

Lycomings, Continentals, etc. start very easily given proper methodology.

Priming is the only method to be used to enrich your cylinders. You need a supply of fuel (boost pump), adequate fuel quantity (working primer), small amount of throttle, and you should be off.

Remember that only one or two cylinders will receive fuel even priming, depending on where your engine has stopped.

Oil Consumption - Turbocharged Engine

There are several places where oil consumption can occur with turbo charged engines. Some depend on your particular installation. Compression reading can be good and still use oil.

Valve guide wear, both intake and exhaust. Waste gate if hydraulically operated, if the actuator is damaged. Throttle controller, if hydraulically controlled, for the same reason. The turbo itself, which is oil fed. Sealing method is very intricate. One side in exhaust hot, and the opposite side is very cool. The turbo's biggest enemy is engine shut down. The impeller can reach speeds of 40 to 50K rpms. Near 25,000 is about normal. When one is ready to shut down, ample time should be allotted to allow the turbine to slow down to an acceptable level. If shut down prematurely, the turbine's shaft cannot receive lubrication. Engine no run, turbo no oil.

Conversely, a defective waste gate can make to turbine over rev, this is self explanatory.

Any or all can cause what you're experiencing.

As to oil appearing in fuel over flow, most systems have fuel pumps that receive a signal from the intake manifold. The pressure here is after the turbo (always positive). Oil can very easily enter at this point should the turbo be worn. It ain't fun. Be sure that all those components are not past any serviceable time period.

Rough Engine at 1600 RPM

When at all possible USE nitrogen! When you use air, moisture content is too high and you will have to continually have to put more air in all the time. With nitrogen, no moisture and no more servicing struts.

Also, with air you will be replacing the strut seals.

For now use compressed air until you can get to an FBO that has nitrogen. Most FBO's charge about \$10.00 to \$25.00 to service your struts.

Use Nitrogen to Service Struts

When at all possible USE nitrogen! When you use air, moisture content is too high and you will have to continually have to put more air in all the time. With nitrogen, no moisture and no more servicing struts.

Also, with air you will be replacing the strut seals.

For now use compressed air until you can get to an FBO that has nitrogen. Most FBO's charge about \$10.00 to \$25.00 to service your struts.

...and...

Just about every welding shop carries the small bottles of N. Don't rent it, and stay away from shops that will not sell you the bottle. My own personal bottle is going on 10yrs. The regulator should be a good quality type. You can find a good used one from some welding shop. you'll need an oxygen regulator. You may have to replace the outlet gauge to one that reads at least 500# although you won't need more than 300 to 350. A high pressure hose that will tolerate the pressure, at least 6' in length. Hose shops can make them up. You'll need a shut off valve between the regulator and the fill hose. Be sure it's good for 500#. I use a Whitey brand ball valve.

On the end of the hose, use a quick release/locking valve chuck. Available at any NAPA outlet. These are used on trucks. When removing it, ya gotta be quick.

Aileron Hinge Doubler

During my annual, my AP/IA found a crack in my aileron hinge doubler part #62373-00 or 62373-01. He has found that five out of the last six Cherokee's that he's inspected has had the same crack in the same place. This part had been in service for 6,000 hours before the crack was noticed (don't have any idea when it first began to crack). The price of the part is about \$30.00 and it took about an hour to replace.

Bleeding Brakes

I've tried just about every method and have found the following works best for me, and it only requires 1 person.

- put clear plastic tubing on the bleed valves of each main brake wheel cylinder
- put other ends of these tubes in the brake fluid reservoir, draping the hose up over the top of the engine cowling so you will be able to see the tube content from pilot's seat
- make sure the reservoir is near full
- crack open both wheel cyl bleed valves
- climb in and begin pumping each toe brake while watching the content of the tubing for fluid.
- While pumping you will see fluid with air bubbles move toward the reservoir. Of course, when they reach the reservoir they will float to the top and into the surrounding air.
- periodically pump the hand brake also
- after a while jump out and add fluid to the reservoir
- jump back in and continue pumping toe brakes and hand brake until no more bubbles are seen in tubing.
- jump out and close both wheel cyl bleed valves.

This method works every time for me, resulting in a hard and at top toe brake. Be careful not to spill any of the fluid. It does a job on just about everything it touches. I have an all polished plane and I hate it when I spill.

Split Cowl STC

I purchased the STC (SA5694NM) and parts from
Aviation Development Corporation
1305 N.W. 200th Street
Seattle, Washington 98177

Telephone (206) 546-3011

It cost \$175 plus \$8.30 S/H.

I currently have the nose bowl off for the alteration. The hardware and instructions that were provided seems to be very complete.

Cowl Latches

Wag Aero has the whole assembly for \$95 or you can buy the wing bolt from Skybolt

Cracks in Flaps

My A&P put a doubler over the crack and did the paper work and they said it was fine. That was a year ago and it looks great and looks stronger than the rest of the flap.

Aircraft Data from FAA

As for the logs. Apply to the FAA at 405-954-3261, follow the prompts and apply for a 'Blue Ribbon Package'. This is issued on CD and contains all recorded information on your airplane. Owners, liens, mods etc.

With this information you begin building 'new' logs. If you have receipts or other reliable information about past work, such as an overhaul from a shop who has records, you can also go about partially rebuilding 'past' logs. Any such information must be notarised. Obviously you will never get all the past information and so your logs will be badly lacking - but legal.

Which comes to the real point of this project. I will be legal in the eyes of the FAA, but my airplane value is going to take a hit. And right when I was planning on selling so I can get an Arrow. My question to you guys is this, what kind of price reduction would you expect to get if you bought a plane with reconstructed log books? Thanks!

Replacing Diode & Resistor - Battery Box

The diode/resistor allows the alternator to energize the contactor when the battery is weak -- just after a jump, say. The resistor keeps too much current from flowing and roasting the wiring if one or more of the battery's cells are shorted (the battery resistance is very low).

The diode just keeps the battery from discharging through the resistor into your turn coordinator when the master switch is off. Current can only flow FROM the alternator/bus, not TO it.

I have heard from another chat member that his resistor went bad, as well as that of a friend of his, so I looked into it. As Don said, you can measure the resistor. I measured mine, and it's about 5.5 ohms. Mine is marked 4.7, so that may be the nominal resistance. It looks like an old style TV type fusible wirewound resistor, which seems to be difficult to get any more.

If you need to replace it, you can it from Piper (maybe) or replace it with a 4.7 or 5 ohm 10 watt wirewound flame-resistant resistor. Digi-key has one on page 679 of their catalog for \$1.90 each. They even have a helpful data sheet. The Digi-key part number is 20J5R0-ND

Nav Light Circuit Breaker Tripping

The later planes have 7 or 7.5 Amp breakers protecting 20 guage wire. If you have 20 guage wire, you might consider switching, but only as a last resort.

What might have happened is that the tip lamps (1512s) were replaced with W1290s or 7512-12s. These are "replacements" that take a little more current, more like 1.85 versus 1.5 Amps. The rear lamp takes about 1.7 amps, so that's enough to push it over 5 Amps.

So the other alternative is to find the original 1512s. Sacramento Sky Ranch says this regarding the replacement bulbs:

"The older style is 1512 which is a 21 watt lamp used in older aircraft. If you use this bulb, it might pop the circuit breaker. IF THIS IS HAPPENING USE THE 1512!"

Fuel Smell When Switching Tanks

It's a common problem, but easily remedied. The O-Ring seals around your fuel selector shaft is worn out and needs to be replaced. On my Archer II, first I drained the fuel tanks, then I removed

the selector handle, and the cover, then unscrewed the nut around the shaft. Give the shaft a little twist with the handle, and the whole stem pops right out. Replaced the O-Ring, lubed the stem core with fuel lube, replaced everything back in the order it came off, and Voila! you're done!! I have to admit, I learned about this here on Cherokee Chat and while it was in for annual, (under supervision)I tackled the problem with no surprises.

Inexpensive Optical Tachometer

Concerning a cheapie tach.

I bought one from Tower Hobbies a couple of years ago for \$32 plus shipping.

It works fabulously well! I even got good readings from the back seat.

It has a memory function, so you can compare to a previous reading, and works with two three or four blade props.

The downside is it only reads to the nearest 10 rpm... but since it oscillates between two numbers if its in between them, you can actually read to within 5 rpm or less.

<http://www2.towerhobbies.com/cgi-bin/WTI0095P?FVSEARCH=tach&FVPROFIL>

POH Requirements

The POH actually contains several sections for various purposes, and the regulations on them are different, and have changed over time.

Generally, what you will have in the POH is:

- I. Operating instructions and limitations
- II. Weight and balance
- III. Equipment list
- IV. Supplemental flight manuals

I. Most of the regulation regarding the manuals is for the manufacturer. The manufacturer is required to supply the buyer with a flight manual, according to regulations in FAR Part 23. For airplanes certificated before Mar. 1979 (Cherokees) the only material required is the appropriate flight manual material and placards, spelled out in Part 23. The requirement to carry the stuff is in Far 91.9.

During the 1970s the GAMA came up with a standard flight manual format, which was in time adopted by the manufacturers. It was adopted substantially by the FAA and required for A/C certificated after 1979 (FAR 21.5).

So, under Part 91 you are not required to carry the official Piper-supplied manual. However, as David said, for \$35 they will give you one specially tailored for your serial number A/C, on good paper with all the signatures etc., etc.

II. W & B is actually part of the operating limitations information, but it must be kept up to date when it changes (Part 43), so it's usually listed separately. The best way to get a new, correct version is to get your plane weighed, about \$150 or \$200.

III. The equipment list is also supplied by Piper. The replacement manual I mentioned has a blank equipment list in it. For another \$50 or so, they will give you a copy of the one for your plane when it was built, printed from microfilm. The one they gave me had several problems, aside from being crappy and hard to read. Since my plane was made back when Piper was whacking out three or four planes a day, the guy who marked the slots with Xes would let the stamp dry, so every five or ten marks would end up invisible on the copy. Some of the things not marked as included either really were included (they goofed) or have been added to my plane over the years without logbook entries. Thus, the Piper list is only a starting point. I've been adding to and improving my list over time.

The main reasons for having an up-to-date equipment list is to know what's in your plane, and so that changes can be made, and the W & B updated accurately. For example, when I removed my beacon, the weight and moment arm were given in the list. The mechanic only had to subtract the old ones, and add in the plain, beacon-less fairing's weight and arm.

An article in the February 2001 AOPA Pilot on the subject maintains that an equipment list is required to determine the "condition" of the plane when determining the empty weight and center of gravity, as described in Part 23.29(b).

IV. Supplemental flight manuals are sometimes required to be included in the flight manual by and STC. For example, I have SFMs for my Brackett filter, my 160 engine HP conversion, and my IFR GPS.

In addition, I keep copies of all the relevant 337s and STCs, in case some regulation-happy FAA type gets aggressive about mods during a ramp check.

Side Window Sealing

First, make sure that you get ALL of the old out and the area is clean. I used GE outdoor silicone, about \$5 a tube at Home Depot. Tape up the window just at the fit line and on the outside frame. Place the window to check for fit and placement and set aside, then run a half inch stream of silicone all around and put the window in place. Secure with all of the braces and screws. Run a finger along the outside to smooth the seal, let that dry just enough and then pull the tape off slowly removing the runover. This will make for a good seal. I have no water leaks from the windows now.

Location of Oil Screen

Oil pick up screens are present in every engine in some form or another. Lycs used on Pipers generally have them on the right rear side of the sump

Date: New Directional Gyro - gyro instrument

It took me 3 new sigma units from Spruce before I got one that did not precess. Pay attention to the manufacture date when you receive the unit...if it is over 2 months old (sitting on the shelf), you could have problems. Given the experience I had with a new unit, next time I'll go the overhaul route.

...and

I went exchange with a fresh overhauled like unit on my attitide gyro. It was sent ASAP, I installed the new unit, tested it and it has worked very well. I then sent back my old unit in their shipping box. Get a reputable shop. Talk to them. Ask if they bench test them prior to delivery, even new ones. If they are on the shelf for a few months, even new units will precess and never work properly. Get a fresh unit and get a good warrantee, usually one year. There are many good shops, and several are not so good. I have dealt with both. The questionable shops will state it is your problem and you may tear your whole panel apart, replacing hoses regulators, pumps etc... when in fact, the instrument was bad. Since I live out in the mountain west, I like Berkshire Instruments, out of Montrose, Co. He originally was in Mass, but came west. I feel confident with his work.

High-Pitched Cabin Noise

Had a similar situation...on my first passenger carrying flight....my tachometer was going bad...slowly, it still registered OK, but the noise !!! WOW !!, the tower couldn't understand me. Landed ok, disconnected the tach, no more noise. Replaced the following week

Leaking Fuel Lines

After the last flight as I was pushing the bird back into the hangar I noticed fuel dripping from the cowling! There was also blue stains on the front wheel fairing. A quick inspection was all it took to find the leaking point -- the connector into the carb tee, from the mechanical fuel pump. I quickly got the plane out of the hangar, not knowing why it was leaking. After things cooled down and I got the cowling off, the connector nut was "finger" loose!!

Needless to say, I spent a couple of hours going over all connectors. A tip I picked up from someone else was to paint a thin, yellow line on the connector and adjoining joint as a reference to detect movement of connectors.

Sealing Threads on Fuel Quick Drain

The sealant used by the professionals is called "fuelube". It is available from Aircraft Spruce and other suppliers. It not only seals the connection but also prevents it from seizing up when it is later necessary to remove it.

Above all, don't use teflon tape. It will get loose and clog your fuel system.

Alternator cutting out when hot

you will recall I had a alternator which was cutting out on restart after a flight and time on ramp in hot sun. Well I went throught the ritual of checking resistance, voltage drops, etc across circuit components. All checked okay and seemed to be functioning properly. Then I started engine, checked same voltages. Everything okay. I decided to remove OVC and Regulator for a bench

test where I would use a DC power supply, a resistor load bank, and hair dryer to heat OVC and regulator. Now the OVC is/was a Wico Prestolite)x16799 and the regulator a transistorized Lamar #B00331-2D. Before I took components off airplane I adjusted the regulator from approx 13.85V to a solid 14.2V. (The Lamar has a pot for voltage adjustment.) I don't know what my thinking was at the time but after I disconnected the regulator, I hit the battery and alternator switches and heard the OVC open up. Should not have opened up at this point. I removed both components and proceeded to checked them out on my bench. Once again the OVC kicked out. I had talked with Zeftronics earlier and they had told me they would check out both units for \$25.00 so I decided to send the units to them for test. (They repair all mfg'r) They verified that the OVC was heat sensitive and acting up. I had decided I would replace the OVC regardless of their test result having found an AD where Bergstrom? helicopter had a problem with this particular OVC. I replaced it with a Zeftronics V1510A. Regulator is back in place and everything at this point seems copasetic.

Broken Dipstick Tube

OK guys, this is no big deal but, you gotta know what is going on. The lockwire breaks out the safety hole when some knuckle head way over tightens the dipstick. The best way to fix it I have found is to first off replace tube seal. By now it is probably crushed. Screw the tube out, put a new seal on and give it a good snug. You will feel it seat in place. Now resafety using remaining hole. If both holes are broken out replace tube. Now, keep the knuckle head line boys out of your engine. Oh yeah! Caution -- The tube is plastic and can be broken if abused

K&N Air Filters

Challenger Aviation has the K&N air filters available for the Cherokees.
Part number for the PA-28 140 is CPE1957, \$105.

They claim 2-4 more HP using this filter. I became a believer after watching a Ford Explorer on a dyno get 5HP at full throttle just be changing the air filter to the K&N.

And since we run our aircraft engines at full throttle more than you do on an auto, it's probably a reasonable estimate.

You will also need a cleaning kit for the filter, but you can get that at most any auto parts store. I confirmed that the same K&N cleaning kit that have is the one for the new filter.

Mine is shipping today.

info: www.challengeraviation.com, or 937-667-0510

Fuel Tank Service Bulletin SB 1006

Besides the inspection for corrosion and upgrading the vent hoses, you never know what you might find behind the tanks.

When I pulled my tanks to comply with the S/B, I also found that the main fuel hoses between the tank and the airplane were the original ones from the factory. They were only 22 years old. I

grabbed one of them to bend it to allow the removal of the tank and it "BROKE" in half..... sort of made me go weak in the knees for a second. Needless to say I ordered new fuel lines, which I would recommend, especially if there is no record of them being replaced before. There is suppose to be a metal ID tag around the line with the date of manufacture on it. This will give you some idea as to it's age.

My second big discovery was when I pulled the left tank. The metal line going to the pitot static system had been chafing against the back of the tank. The tank was ok but the aluminum line had chaffed to the point of almost having a hole in it. What really scared me was that while I was inspecting the line I was pushing on the chafed area with my finger nail and it suddenly went through and into the hollow section of the line. This was a loss of airspeed indication waiting to happen!

Also found one of the tank fuel quantity sending units had a weeping gasket, so I replaced them on both tanks.

Anyway, with new gaskets, fuel lines, vent tubes, and pitot static line I was back in business and felt it was well worth the time and money. Besides, it's my rear end that gets strapped in this thing every time it goes up and I'd like to think I am going to be around for a while longer.

Sorry for being so long winded, I guess I could have summed it up in a few words, "Do the Service Bulletin, you won't regret it".

...and...

I learned from my A&P that many (most?) Cherokees are zinc coated on the inside, and with reasonable care, show no corrosion.

All of the problems that have lead to the service bulletin have come from the uncoated planes.

Arrow Up Limit Switches

Newark electronics, about \$45. Be sure to change the little spring actuator, this is a must particularly if some lazy mech bent it to make it work. Be sure that they adjusted exactly like the book.

Ignition/Starter Switch Replacement

If it were only the AD, I would probably not do it. The AD is very easy to comply with, and specifically allows the pilot to do the check. You just have to make sure the switch will kill the engine. If you have a malfunctioning switch, of course, it should be replaced.

The new switches all comply with the AD. These are the prices from Aircraft Spruce and Chief:

Bendix PN 10-357290-1 \$134.50 Right, Left, Both

Bendix PN 10-357210-1 \$189.50 Right, Left, Both, Push to start

Bendix PN 10-357200-1 \$164.50 Right, Left, Both, Start

Which applies to your plane depends on model and serial number. There is also a cheaper alternative, available from Aircraft Spruce:

ACS Gerdes PN A-510-5, \$53 Right, Left, Both
ACS Gerdes PN A-510-2, \$53 Right, Left, Both, Start

A logbook entry should be all that is required.

Lost Log Books

Thanks to all. Lost paperwork in home fire and home insurance only covers the cost of the log books, not the financial impact to the plane. But I do have an adjuster checking into this. Plane is a '72 and so there is simply no way I recover all the maintenance thread from three past owners. I'll have to do this the hard way, but I haven't yet checked with the insurance on my plane. By the way, I had my logs in a three inch thick fire vault, but the heat was too much and they are just ash. Pain in the butt!

You have a very expensive project set out for yourself. Start with new log books and first have an AI sign the aircraft off as airworthy. The missing entries are not as important to the FAA. Use the following link to find STC holders and the page contains the link for the FAA registry.
<http://av-info.faa.gov/stc/default.asp>

The FAA will send you a CD with 337's filed for your plane. However, it takes a long time to get the info and anything sent to them in the last year may not make it on their list.

Figuring Density Altitude

I just remember that the DA is the field elevation plus 200 ft for each 3 degrees F away from the std temp for the field. My field is 670 ft which has a std. temp of 56 F. If the temp is 87 F then there is a 21 degree temp diff which is 7 x 3 degrees or 1400 (200 x7) ft above the field elevation ==> 2070 DA.

Lubricants - Lubrication - Greases

MIL-L-7870 light low temp. displacing lubricating oil, Zip-Chem, Aero-Lube D-5261NS from Krayden's [800-448-0406], LPS-2, WD-40 LPS #2, Chief Aircraft, Aircraft Spruce, Wicks

MIL-H-5606 Mil grade hydraulic, Chief Aircraft, Aircraft Spruce, Wicks

MIL-G-23827 Light low temp grease, Mobil #27, Aeroshell #7, Aircraft Spruce

MIL-G-7711 General purpose high pressure lubricating grease, Aeroshell #6, Aircraft Spruce

MIL-C-21567 Silicone Compound (GE?)

MIL-G-81322 Wide-temp grease Mobil #28, Aeroshell #22, Aircraft Spruce

Grease, "aircraft" high temp Mobil #77, Shell Alvania EP2, Mobilux EP2 (technically not "aircraft" grease)

Parker O-ring Lubricant, Chief Aircraft,

Aero Lubriplate, Aircraft Spruce

MS-122 Dry Release Agent Sprayon Dry Film TFE mold release, MSC Direct

Fuelube, fuel sample drain threads, Aircraft Spruce, Wicks
Dow DC-4, oil filter gasket, spark plug threads, Chief Aircraft, Aircraft Spruce

A couple of notes: the MIL-L-7870 is actually hard to find. I gave up, and after seeing an AOPA Pilot article on lubrication, which showed someone spraying LPS #2 on control hinges, that's what I use. I believe many folks use WD-40. That spec is basically for light displacing oil. One of our short-wing cousins at http://www.karnesec.net/reamy/maintenance/012001/index_nn4.html found the Zip-Chem product mentioned, as well as some of the other equivalents.

I didn't find the silicone compound, but it's only used in one place as a substitute for the MIL-L-7870 in one spot on the Arrows, below 20 F.

Fuelube and DC-4 are not in the chart. Fuelube can be used to lubricate the threads of drain valves before insertion. DC-4 can be used to lubricate oil filter gaskets and spark plugs.

Economy Oil Filter Cutter

Go to a discount tool store, and buy a metal 'nibbler' - a metal cutting tool that cuts a 1/16th or so cut. (Cost ~\$10) Using a large screw driver, punch a hole near the edge of the threaded end of the filter, twist the screw driver, insert nibbler and nibble around the top of the filter, then dismantle filter and inspect. Cut the filter paper along the edges if you must really get into it all. 'Enjoy your Oily hands'

Preheating Engine

We installed an electric oil sump heater unit from Symtec a few years ago in our '66 180C, which happens to be tied down near an power pole. Works great, especially if you have an insulated cowl cover. It doesn't heat as thoroughly as the Tanis system does with the addition of cylinder bands, but it keeps the entire engine compartment in the 45-50 degree range right down to about 10-15 degrees F, which is fine for our New England winters. Colder than that and I don't want to go up anyway. Just plug it in the night before you want to go and it'll start up like it was springtime. I don't remember the exact price, but believe it was around \$200. Easy to install yourself. Because it's a hard pad (made of extruded aluminum) we were able to detach it from our old engine and transfer it over to the new engine during overhaul. I don't think you could do that with the flexible type pads. The URL below will take you to an article about this particular unit. We also use a small ceramic heater to warm up the cabin/panel while preflighting and prepping.
<http://www.symtec-inc.com/cherokee.htm>

Cleaning Windshield

I, like many, used to use lemon pledge. Then one of my friends (Stan) heard about using Turtle Wax Express shine. He tried it and liked it. Once I tried it, I also found that it was very easy to use, and does a great job. Now all of our friends use it.

Get a soft cloth... shake well (the bottle not you). Spray on and wipe off. No smearing, Very easy, does a great job, inexpensive, last a long time, easy to find. Plus it smells good!

Split Nose Bowl

Got mine from Aviation Development Corp 1305 NW 200th St. Seattle, Wa 98177
(206)546-3011, \$175.

Weak Starter

Any automotive electric shop will fix it for say under \$75 (no receipts or gurantees)but if you had an old direct drive one(non geared) it might be time to buy a new lightweight one such as Skytech. Starts better, saves 10# close to the datum on your adjusted weight and balance.

Prop Repitch; Low Static Power

FYI, when a prop is repitched, in addition to a log entry, the prop should be stamped as such. My 76 Cruiser was able to reach published top speed of 142 at 2700 +-25. Engine was stock 150, and prop repitched to legal max of 59, 58" +legal 1" FAA fudge. Props are still a black art, and yes, everyboby has some secret methodology with repitching. You've checked everything, did you include ignmition timing. My old 140 was doggish, until at annual I found 1 mag at 34 deg and one at less that 20, in addition to incorrect gap, if I recall, the Lh had .008 and the right had .025. This situation didn't do much for performance, as well as my run up. One other little item, if you have the crossover type exhaust (mine did as yours probably does too) check the muffler (internally) for a broken internal end baffle. That end should "not" be open.

Side Window Replacement

I replaced (by myself) all of my windows a couple years back. I used the thicker, solar tint (which made a big differance on heat). If you are just replacing these two, of course you'll need to match them to what is in there already. I got mine from Great Lakes Aero @ 800-532-2918. At the time, they had the best pricing. I used GE outdoor silicone sealer. The most important part of the job is to prep the area, removing all of the old sealant or tape. I also, taped the outside, framing the window area, for any silicone overflow, windows too. I now have no water leaks around any window. Each side window took an evening of time.

Leaky Strut

we changed "o" rings, serviced it with hydraulic and air as per usual. It lasted one flying season, cold wx came (Iowa), and the following spring it was flat and messy again. We found that a prior owner had put in the wrong kind of "O" ring, and it got leaky. When we rebuilt we just got another one just like it, and several months down the road, what a mess. A little research revealed that my bird needed the other style (quad I think it was called). We got the parts, proceeded to "re-invent the wheel", and had NO problem after that. The strut even seemed to be more flexible and limber too.

Strut Rechroming

FYI....My 180 is in annual this week and will probably need a strut re-chromed. One of the places mentioned in the tips book has changed name and phone numbers, here is the correct information:

Aerospace Coatings -- Oxford, AL

\$295 for any Cherokee strut up to 1 3/4" diam., in 10-12 days.

Ph. 256-241-2750 (Pat McCarty)

S-Tek Auto Pilot

I have an S-Tec system 40 on order. Lead time is 3 weeks, so plan accordingly. Also, installation time is quoted as 5 days in my aircraft. If you're like me, all the S-Tec model numbers are confusing, so here is the run down.

System 20 - Wing Leveler, Built into TC

System 30 - Wing Leveler, Alt Hold, Built into TC

System 40 - Wing Leveler, External Control Head

System 50 - Wing Leveler, Alt Hold, External Control Head

You can see that 20=40 and 30=50 except for the external control head. The difference is that a system 20 & 30 will not track a back course and 40 & 50 will. The systems are "building block" designs, so you can start with a wing leveler, then if you want to upgrade alt hold you basically just pay the difference; you don't have to start over with your system.

I'm starting with a System 40, including the AP, TC, and new heading indicator (required since mine didn't have a heading bug) including installation and removal of the existing AP (which has not worked since I've owned the aircraft) for \$6600.

Exhaust Gasket Leaks

The white stuff is exhaust leakage. Check it before it causes a more expensive problem, such as cupped stacks. You can do this, remove the old one, clean the surface, replace with blow-proof gasket seals and sealant, tighten, let the sealant cure and check for leakage. Sometimes you can hear the leak during cruise if it gets bad enough. Your biggest problem is getting the old stuff off, if not installed with the sealant.

Cylinder Cracks

Causes of cylinder cracks: Over leaning, worn spark plugs (heat range rises), leaks intake as well as exhaust, loosened valve seats, worn valves, worn valve guides, lifter bleed down clearance incorrect, stretched valves, in the case of crossover exhaust systems, broken muffler baffling (will destroy #3), incorrect ignition timing, worn cam (exhaust lobe). If you had "rebuilt cylinders", a poor weld job will crack by it self. Rebuilt cylinders are not a good deal, as someone pointed out. A rebuilder here in Jax has a 90% failure rate. They do not do good work.

And...

Is it the number 3 cylinder on a Cherokee 140?

If it is, it is probably due to overheating during climb. It is quite usual for this cylinder to get into the 470 degree range during normal climbs. This is really bad, and is made worse if your carburetor runs too lean.

I have read that aluminum loses a lot of its strength when the temperature goes up beyond 400 degrees, and I really try to keep my cylinder head temps below that number. However, unless you have good instrumentation, what can you do?

1) Have your carburetor checked to see that it is flowing correctly... it should go to about 13 gallons per hour or more.

2) Make sure your engine baffles are in really good shape, and plug any holes.

3) Climb out at a higher airspeed... for instance 95 instead of 85 mph. If your plane won't climb out well at a higher speed, you'd be wise to consider some speed mods. At the minimum, flap and aileron gap seals and wheel pants.

And...

The subject of cylinder life has been discussed before. The essence is that the aluminum heads have a fatigue life of about 4500+-hr. Exchange cylinders --even from a Certified Repair Station may be at the end of their fatigue life, even if they meet dimensional specifications thru some renewal processes -- But the aluminum is still near failure. One puts these unknown history cyls on in good faith, but when they reach their fatigue limit, they crack. the owner is angry, but the product, while within spec and cheap, was faulty. This is why a first run engine core is more valuable than a 2nd or 3rd run core. A case of 'pay me now or pay me later'.

Using Wing Covers

I am based out of Parry Sound (CNK4) in the snow belt and have had an aircraft in a hanger one year, and out the following. The hanger really is superior, although much more expensive and in short supply here. (About \$300/month for a hanger or \$300 per year for a tie down.)

Both sets of wing covers I have used were custom made, but I don't think that makes them better than some of the stock ones from Bruce's or wherever, and maybe they were even worse than the standard ones. They were not cheaper anyway.

Both covers I have used had a problem of getting frozen to the wing when it melted and then got cold again or during freezing rain. It was a real pain to get the covers off and I tore one wing cover by accident once. The cover was old and the fabric had deteriorated quite a bit so that may have lead to the problems.

Painting Plastic Instrument Panel

I used a product called SEM Color Coat purchased at Wesco automotive paint supply. This is a special vinyl & plastic paint that's durable, flexible and looks great. I've repainted all of my interior plastic parts and they look new. For the panel overlays I used "Caldera Black" which matches the original black in color and sheen perfectly. I also used this on the lower consol, the trim wheel/flap handle cover, vents, floor ribs, fuel selector, etc... For the overhead stuff and window fairings I used SEM "Super White" which is actually a light Beige that matches the factory headliner. The spray cans are about \$10 each and are worth it. For prep, I brought each piece home, cleaned with 409 & water, and applied several light coats.

Lubricating Mixture and Throttle Cables

I've been very successful with Corrosion-X on both the throttle and mixture cable. For my situation, I had to start from the inside and let the "crud" work out thru the bottom of the cables. Be sure to remove the protective end sleeve on the cable, to permit better access to the cable. Spray and wait -- work the throttles. Took me about 4 hours of this, waiting 20-30 minutes between applications. Be sure to use a rag to catch overspray and minimize mess inside.

Leaning for Landing at High Altitudes

That's a valid concern at high altitude airports. If you need to go around, you'll want all the power you can get.

What I do is level off at pattern altitude before I get to the airport. Lean for max power and leave the mixture control there throughout the landing.

Instrument Overhaul Sources

If you want to go overhauled, I've heard good things about Berkshire Instruments, Attn: Joe Scherben, 68611 E LA SALLE ROAD, MONTROSE, CO 81401-5943, Phone: (800)443-0083, Fax: (970)240-9643.

Also, Nu-Tek Aircraft Instruments, 7169 SW Santa Fe Lake Rd., Augusta, KS 67010, 800-338-7146, Fax: (316)775-1194 or 525 S Topeka, Wichita, KS 67202, 800-338-7146, Fax: 316-264-9804 (note the phone is the same, so I don't know which address applies).

Like Ray, I bought my gyros and altimeter new, but from local instrument shops.

High Oil Temp - Bad Gauge Ground

Mine also is (WAS) the Ground...

In fact just tap-it with your Knuckel. If you get a different Oil-Temp reading, then clean the ground surface.

It's real easy for People to forget about the GROUND Wires. But They are the "OTHER" side of B+. With Bad Grnds, you get bad instruments.

Control Rigging

Before you rig, you must be sure that all cables and linkages are in good order. No accessive play. Set the ailerons and flaps according to the manual using you guage. Be sure you allow for any play (there is always a little of it). Fly it and determine which side is low. Fly all four cardinal points for comparison. If the right wing is still heavy adjust the right flap. No more than 1/8" at a time. Fly it after every adjustments. Do not raise the flap any higher than the guage permits. Coincidentally, my Arrow was r.h. wing low Re rigged and it's rock stable. Adds a tad bit more performance.

Painting Interior Plastic

I've used the Krylon Almond with good results (available at almost any hardware store). Here's what I did: take the trim out (I did one or two pieces at a time), very thoroughly clean it and

lightly sand with fine grit paper. I applied 4 or 5 very light coats of paint, allowing each one to thoroughly dry and again very lightly sanded between each. I reinstalled with new stainless screws and cup washers which really dress it up.

I used basically the same technique with the aluminum trim as well, except was much more aggressive with initial sanding to get all the old paint off and used a primer as first coat.

Have fun, it's a good project that will really dress up the plane.

And:

As Gus says, prep is everything. I did this a few years back and taking it out is the only way. Remove it, mark the backside where it goes (you'll thank yourself for doing this), take it home and clean it. Repair any cracks or worn spots before painting. I used Dutch Boy acrylic enamel cans with the fan spray nosel (about \$2.85 a can). I probably put on five coats for a good thick coating which has held up very well. Earlier this summer, I masked off the windows, cleaned and painted the headliner, looks like new.

Rough Running below 1500 RPM

1. Check the primer.
2. Check primer lines. They can break at the cylinder, or at any fitting.
3. Check throttle shaft. If loose, can & will cause problems that you are having. This was my problem. New throttle shaft was \$120.00. plus 1 hour labor.
4. Check all fuel lines. Remove and check condition by flexing hose. If stiff, replace NOW!
5. Check all carb fittings & carb for any signs of fuel stains.

Good Luck, and \$600.00 isn't too far out of line for a rebuilt carb. Labor for removal & installation of new carb should only take 2 to 3 hours.

And:

If you need an overhaul call Columbia aircraft in Bloomsburg, PA \$350 or so, nice work, they will do what is needed. I use them whenever possible they will let you know how it looked 1-800-222-1522.

Owners Tool Kit

In the plane we try to keep it to a minimum - weight and space. Includes 7/16" wrench (which fits a lot of things in a Cherokee), adjustable wrench, allen wrenches for radios, duct tape, electrical tape, velcro, screwdrivers, pliers, scissors, knife, travel tie down ropes, traveling pitot cover, wheel chocks, qt. of oil, spray water bottle and clean cloths for bug duty, bungee cords. At the airport - too much to mention, but includes oil change equipment, Piper jumper cables, wash and wax materials, extension cords and lights, brake fluid, lots of rags, towels extra work clothes, compressed air tank....

Autocontrol III Operators Manual

I believe the Autocontrol IIIB is the same as the Century IIB. The operator's manual for the Century IIB is available on the Century site. ([Www.centuryflight.com](http://www.centuryflight.com))

Do-it Yourself Side Window Tinting

I tinted the side windows on my 180 with static cling vinyl. I got a kit from Home Depot for patio door. \$12.00. It was enough to do all the side windows. You use soapy water in a spray bottle to wet both surfaces and then squeegee it flat with no bubbles. I cleaned the outside of the windows first, layed the vinyl over the glass, marked it with a magic marker along the frame, cut it with scissors, applied it to the inside. Made the plane alot cooler and took the glare off panel and everything else. Made it much more comfortable to fly and you don't even have to wear sunglasses. Also I put a strip about 8 inches tall at the top of the windshield to take off the sun shining through the top about the sun visor. Mark carefully, cut carefully. The vinyl can be removed by just peeling off. My IA says there is nothing wrong with doing this.

Air Conditioned Plane Alternator Pulley Kit

Piper Service letter 1040 (11-28-2001) lists certain PA-32-300/301 series. No PA32-260 models listed. Various PA28-180/181/200/201 listed
Kit # 767-310, list price \$ 2,089 from a Piper service center/dealer

Heat Shield to Prevent Bubbling of Paint on Cowl

JC Whitney (jcwhitney.com)sells a good heat shielding material (Cool It), and my A&P/IA had no problem with it, in terms of maintenance procedures. The interior of the cowl needs to be cleaned and de-greased very well (but don't get any of it on the paint), and the heat shield is bonded to the cowl with heavy duty adhesive. It has worked as advertised in my plane for the past 18 months.

Removing Old Wing Walk

The problem with removing the wing-walk is that you'll probably remove some paint too. There are several solvants that will work well, but as said, will remove the paint with it. If it is glued on, you can use something to desolve the glue. Now you're not going to believe this; but Ronsonal lighter fluid will do just that and not bother the paint (even plastic). The drastic way is to use paint remover (\$19.95 at Pep Boys-yes, it aircraft), but be very careful with it.

When I painted my plane in '01, I put the self stick stuff back on, so far it has held up very well. I got the 9 inch wide size and set it about 6 inches out.

You could just paint the paint-on stuff back over what is there as an easy fix.

Shoulder Harness - Older Plane

I had front shoulder harness's installed in a PA28-160 with the roof vent off set toward the left side. These are Y shape and can be purchased from Wag-aero or Spruce for about \$240-250 per seat. A new seat belt is included also. The head liner had to be removed and a triangler shaped bracket rivited to the roof and cross rib. The pilots side bracket covers about 1/3 to 1/2 of the roof vent opening. The roof vent extended down past the bracket about 1". This required having some of the side cut off from the roof vent tube and welding a new side in. The whole project required about 8 hrs of AP time and he had the welding done by a very good local welder with very good skills in welding aluminum. The installation looks very well done and hopefully the harness is never put to use, but the added safety is money well spent. The Y harness took a few hours to get use too and adjusting the roof strape and both shoulder stape. Ventilation may be reduced a small amount.

And...

I had them installed 5 yrs ago on a 180C with center vent. Very expensive to buy (from Piper), about 14 weeks delivery, and v. expensive to instal. Total cost was about \$3,500 but worth every cent for safety and peace of mind...

Side Window Scoop - Storm Window with Metal Frame

I have the scoop on my 180 with the frame around the window. It does not stick out as far as the frameless windows but it still does a pretty good job. Definitely worth doing.

Seat Cushion With Lumbar Support

I bought a seat cushion with lumbar support from Oregon Aero. The special show pricing was \$132. The difference was huge - after a 3 3/4 hour flight, I still felt comfortable. Frankly, I was quite surprised at how effective the cushion is - I thought it might be just another snake oil product, but it is not. An additional benefit is that the cushion lifts me up on the seat slightly, so forward visibility is improved.

Here is the link: http://www.oregonaero.com/p24_2001.htm
also... www.seatfoam.com (Hi Tech Foam)

Seat Belt Retractor Repair

My retractor (inertial reel) for my shoulder belt quit retracting a couple of weeks ago. The inertail reel and the belt were removed and it was apparent that it needed to be repaired or replaced. Piper wanted \$940 for the retractor and belt. I noticed that the assembly was made by Pacific Sceintific right here in SoCal. I called them and they could not sell me a replacement -- said I had to get a new one from Piper. But they do have a repair facility --- in Miami Fla. Soooo I sent my old one to "Pacific Scientific" in Miami (seems odd - aught to be "Atlantic Scientific" out there) and got it repared for \$184. Still seems high, but much better than \$940.

Pacific Scientific Aviation Services Co.

11700 N.W. 102nd Road,
Suite 6

Miami, Florida 33178

305-477-4711

305-477-9799 Fax

www.pacscimiami.com

Repitching Propeller - no Gain

I have a 69 140 with the 150HP engine. Full set of speed mods and the PowerFlow exhaust, standard 58" prop.

I had it repitched in February to 60" (the local shop and the A&P had no problem with that). Since the repitch, I've lost about 150 fpm in climb, and more importantly, I've not been able to ever see over 2550 RPM at any cruise altitude. So I gained nothing.

As the summer wore on, the lower performance became a safety issue to me. I had the mechanic check everything in the engine-carb, compression (still in the 70's), timing, etc. All was good. So I repitched last month back to 58".

I've gained my climb back, and I can use the extra RPM for more speed or economy.

I know that others have said that they've had better results, but here are mine.

Muffler Shroud for Cherokee 180

The shroud comes in 2 parts, top & bottom. I only needed the top half. After many phone calls I contacted Aircraft Exhaust Systems at 1-800-227-5951 and talked to Scott. The top half is costing me \$185 with a core. Piper's price for a complete shroud - \$740 and change.

Bleeding Brakes

I ran a clear plastic hose all the way from the bleeder screw to the brake reservoir. Takes a fair amount of patience to clear all the air out of the hose, but if it's clear you can tell when you've accomplished the task. This was in Hints and Tips. As a former automotive brake engineer this is the way to be absolutely certain you have no air in the brake system. BTW, I bled the system 6 years ago and have never had to re-bleed. I don't use the parking brake, I think it is the chief source of air introduction into the brake system.

And...

Steve, I have a hand operated vacuum pump bought from the J.C. Whitney catalogue a few years ago. I've yet to see the system I can't bleed. Cars, motorcycles, etc. Never had to use it on the plane yet but the principle is the same. It takes two hands but only one person. It's called Mityvac and as I recall was about 40 bucks at the time. Just make sure you keep the reservoir filled. It even catches the excess fluid for you.

Notching Wheel Pants to Check Air

I did it, just shy of a half moon and exactly the same size as the nose wheel comes with. What a difference to easily access the valve whenever I want!

First I cut it with the dremel, then filed the rough edges, then sanded, then sealed with some fingernail polish (clear). Maybe fifteen minutes per wheel tops.

Oil Leak at Sparkplug

Suggest clean area vey, very good first. Then check or replace spark plug copper crush washer. Torque spark plug to proper value - 25 Ft #. If that doesn't do it you may have a cracked jug.

Weak Magnetos

500 hours is considered good service from a set of mags and a point in time to consider overhauling, sort of similar to the 2000 hour recommendation for our engines. So I would consider strongly having them overhauled, lots of opportunity for the various parts to start breaking down internally and becoming weak. This would be Option 1. For #2, what heat range plugs are you running and are they correct. A plug that is too cold for the application may lead to difficulty in starting when hot. #3, are the leads and connections in top condition, the connection and spring terminal inside the plug can cause all kinds of havoc if not providing a good connection. #4, the Slick Start is a nice piece of equipment, but you can only get 100% out of it

if the rest of your system is 100% as well, I would consider adding one of these as well to my plane in the future.

And...

It's not just the hours on your mags - but also the years. You have a magnetic core that loses it juice over the years, and you have an electrolytic capacitor that becomes dry over time. Eleven years is what I have been quoted by a shop as reasonable, given that you don't run up a ton of hours. Something to consider about magnetism is that heat ruins it. Whenever I land I open my cowl to help avoid heat soaking. Anyway, the thing is that you can pull and have both those mags gone through with new parts and remagnetised for well under two hundred bucks total. That's a lot cheaper than a new ignition system. You won't get a yellow tag at that price - but do you need one?

Alternator Belt Flops Over

Belts flipping over is a combination of worn pulleys, improperly adjusted tension, wrong belt and misalignment.

Identifying a worn puller is not rocket science, although it will take an insurmountable amount of wear. The alt pulley will wear first. Tension same thing, follow the book. Wrong belt (angles) is hard to detect if it's completely worn, but under the circumstances, a change is in order. The new Gates Green Streaks will tolerate a lot of abuse, but some A&Ps may balk at installation.

Misalignment can be attributed by worn alt. bracket with elongated holes as well as the alt. mount ears themselves. The alt. can be spaced fore and aft on the mounting bracket by using washers. As long as the pulleys are not cocked, the belt will tolerate about 1/8" fore or aft misalignment.

Arrow Gear fails to Retract

There are several reasons for what you've experienced. The pump has a shuttle valve inside. With age they can stick or break the spring inside. The pump itself may not be putting out enough pressure, A pressure test will bear this out. The three retract cylinders, from age, can leak internally. This will literally make the system "freak out". The micro switches, if not carefully adjusted, and have been banged around, will also give false readings. Many mechs. bent the lever arms to make contact and this in itself will cause false signals. Recycling on the ground doesn't necessarily prove that everything is kosher.

The emergency gear pressure switch can also stick from age.

The system is simple and reliable, but it just has to be properly adjusted. Hope this helps.

And...

There's an O-ring on the autogear extender hydraulic dump valve; it is very common for this to leak, preventing the hydraulic system from building up enough pressure to produce retraction. Also, if one of the 3 hydraulic actuators has an internal leak (high to low), this will prevent the system from building up full pressure. The actuators can be checked by disconnecting and capping the lines (1 actuator at a time) and seeing if the remaining gear retract. If the remaining

gear retract, then the disconnected actuator is the bad boy. Checking the valve and actuators and replacing O-rings is much cheaper than removing the pump, and should be done 1st.

Replacing Vacuum Filter

Put some WD-40 on the nut on the firewall. With some help, the only way, hold the screw head and have someone turn the nut off. When you have the assembly removed, long screw, several washers and a large round disk, replace the filter and re-install the whole assy. Use a new nut if possible and while you're at it, replace the vac regulator filter. It is simple. Remove the hose coming from the vac pump. Gently pull it off with a gentle twisting motion. Remove the nut on the firewall and then you can easily replace the foam filter. Reverse the procedure and you're in business!

You will need help unless you have eight-foot arms!

And...

Piper, chose to save money by NOT installing "Nut-Plates". Lame! Especially at the Vac Filter, Duh! Firewall's in the Way.

Purchase two Nut Plates for .50, and install them when you remove the Filter. Then the next time, it's a ONE-Hand Job.

Rebuilding & bleeding Handbrake Master Cylinder

There are two visible o-rings and another that is inside the whole works. This is the one that leaks, and the most important one to replace.

Just take the front seats out, get an "egg crate" and small pillow, and some old towels or rags, then lay down under the panel with a 7/16" wrench and 1/4" drive socket and remove the hand brake master cylinder.

Be careful not to let fluid drip all over the interior of your a/c. Remove the three o-rings and re-install and bleed brakes as per Piper Service Manual.

Should take about 2 to 3 hours including Bleeding of the brakes.

And...

I've rebuilt my toe brake and hand brake cyls. It's real easy. You can buy the o-rings from Spruce. Just make sure you get the correct ones. Regarding bleeding them, I have had FBOs give me back the plane with spongy breaks many times. I finally got tired of it and after experimenting with several methods I've found the best approach is to run clear plastic tubing from each wheel cylinder's bleed valve back to the reservoir. Run the line over the top of the engine cowl so you can watch the line through the windscreen. Make sure the reservoir is nearly full. Then begin pumping the toe and hand brakes until the lines are clear of bubbles. You will probably have to get out several times and add fluid to the reservoir. When done, lock down the bleed valves, drain the fluid from the clear tubing, then adjust the reservoir level. This works every time for me and provides a solid brake. It also only requires one person. Be careful not to spill the fluid on the plane, it will attack paint. Oh yes, don't forget to have your AP sign it off.

Cowl Latches for 140

Brand new ones available from Wag-Aero
Part Number M-738-000
\$98 for the whole assembly

Removing Your Own Radios

As another chat member pointed out, FAR 43 Appendix A (A43.1) paragraph (c) listing the "Preventive maintenance" that can be performed by an owner has been modified recently. The owner it now allowed to remove and replace avionics from trays (see item 31 near the bottom). However, transponders and DMEs are not allowed, probably due to the frequency range.

So, those of us who've been doing it for years can now sleep soundly at night.

Erich

P.S. If the link doesn't work, here's the list:

(c) Preventive maintenance. Preventive maintenance is limited to the following work, provided it does not involve complex assembly operations:

- (1) Removal, installation, and repair of landing gear tires.
- (2) Replacing elastic shock absorber cords on landing gear.
- (3) Servicing landing gear shock struts by adding oil, air, or both.
- (4) Servicing landing gear wheel bearings, such as cleaning and greasing.
- (5) Replacing defective safety wiring or cotter keys.
- (6) Lubrication not requiring disassembly other than removal of nonstructural items such as cover plates, cowlings, and fairings.
- (7) Making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces. In the case of balloons, the making of small fabric repairs to envelopes (as defined in, and in accordance with, the balloon manufacturers' instructions) not requiring load tape repair or replacement.
- (8) Replenishing hydraulic fluid in the hydraulic reservoir.
- (9) Refinishing decorative coating of fuselage, balloon baskets, wings tail group surfaces (excluding balanced control surfaces), fairings, cowlings, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not required.
- (10) Applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices.
- (11) Repairing upholstery and decorative furnishings of the cabin, cockpit, or balloon basket interior when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect the primary structure of the aircraft.
- (12) Making small simple repairs to fairings, nonstructural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper air flow.
- (13) Replacing side windows where that work does not interfere with the structure or any operating system such as controls, electrical equipment, etc.
- (14) Replacing safety belts.
- (15) Replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system.

- (16) Trouble shooting and repairing broken circuits in landing light wiring circuits.
- (17) Replacing bulbs, reflectors, and lenses of position and landing lights.
- (18) Replacing wheels and skis where no weight and balance computation is involved.
- (19) Replacing any cowling not requiring removal of the propeller or disconnection of flight controls.
- (20) Replacing or cleaning spark plugs and setting of spark plug gap clearance.
- (21) Replacing any hose connection except hydraulic connections.
- (22) Replacing prefabricated fuel lines.
- (23) Cleaning or replacing fuel and oil strainers or filter elements.
- (24) Replacing and servicing batteries.
- (25) Cleaning of balloon burner pilot and main nozzles in accordance with the balloon manufacturer's instructions.
- (26) Replacement or adjustment of nonstructural standard fasteners incidental to operations.
- (27) The interchange of balloon baskets and burners on envelopes when the basket or burner is designated as interchangeable in the balloon type certificate data and the baskets and burners are specifically designed for quick removal and installation.
- (28) The installations of anti-misfueling devices to reduce the diameter of fuel tank filler openings provided the specific device has been made a part of the aircraft type certificate data by the aircraft manufacturer, the aircraft manufacturer has provided FAA-approved instructions for installation of the specific device, and installation does not involve the disassembly of the existing tank filler opening.
- (29) Removing, checking, and replacing magnetic chip detectors.
- (30) The inspection and maintenance tasks prescribed and specifically identified as preventive maintenance in a primary category aircraft type certificate or supplemental type certificate holder's approved special inspection and preventive maintenance program when accomplished on a primary category aircraft provided:
 - (i) They are performed by the holder of at least a private pilot certificate issued under part 61 who is the registered owner (including co-owners) of the affected aircraft and who holds a certificate of competency for the affected aircraft (1) issued by a school approved under Sec. 147.21(e) of this chapter; (2) issued by the holder of the production certificate for that primary category aircraft that has a special training program approved under Sec. 21.24 of this subchapter; or (3) issued by another entity that has a course approved by the Administrator; and
 - (ii) The inspections and maintenance tasks are performed in accordance with instructions contained by the special inspection and preventive maintenance program approved as part of the aircraft's type design or supplemental type design.
- (31) Removing and replacing self-contained, front instrument panel-mounted navigation and communication devices that employ tray-mounted connectors that connect the unit when the unit is installed into the instrument panel, (excluding automatic flight control systems, transponders, and microwave frequency distance measuring equipment (DME)). The approved unit must be designed to be readily and repeatedly removed and replaced, and pertinent instructions must be provided. Prior to the unit's intended use, an operational check must be performed in accordance with the applicable sections of part 91 of this chapter.
- (32) Updating self-contained, front instrument panel-mounted Air Traffic Control (ATC) navigational software data bases (excluding those of automatic flight control systems, transponders, and microwave frequency distance measuring equipment (DME)) provided no

disassembly of the unit is required and pertinent instructions are provided. Prior to the unit's intended use, an operational check must be performed in accordance with applicable sections of part 91 of this chapter.

Amdt. 43-36, Eff. 5/31/96

Exhaust Stains on Nosewheel

You are doing your run up with the nose wheel turned towards the left, thus the right back end of the wheel fairing is directly under the exhaust stack. We blistered the paint twice on the fairing - now we have 2 (two) placards - made with a computer label maker which read "Keep Nose Wheel Straight".

Fuel Flow Indicator

I fitted a JP450 fuel flow meter. It is the best thing I ever did. The unit is accurate down to the litre. I programmed the fuel flow meter so that the tabs are the main tanks and when carrying full fuel, the difference is calibrated as the auxliary tank. The advantage of using this method is that when you refuel from drums, I fill to the tabs, and thereby have an accurate fuel reading. The JP450 unit is also linked up to the Garmin GPS 150.

Polished Propeller

I polished my spinner a few years ago. I made a bulkhead out of 1" pine, put a 3/8" threaded rod thru the center of the wood bulkhead, chucked it in my drill press, ran the press at a medium speed and used progressively finer grit sandpaper until I got it smooth enough for metal polish. I believe I used an automotive polishing compound and finished it with Rolite.

...and...

Steve, I take mine to a local metal polishing company once a year and they get it mirror-like for \$30. Then I spray it with Pledge and hit with the occasional metal polish during the rest of the year.

RPM - Manifold Pressure Combinations

Everything you ever wanted to know about power settings is included in three articles on AvWeb by John Deakin. These are fabulous articles. Do a search for the first one, called (I'm not kidding) "Manifold Pressure Sucks".

For those who don't want to bother, this is my best understanding of the literature:

1. The power settings all assume you have leaned the engine to best power, generally 50-100 degrees rich of peak.
2. Airspeed will be the same at equivalent power settings no matter which combination of manifold pressure and RPM utilized.

3. Nevertheless, in general lower RPM and higher manifold pressure is always preferred because lower RPM results in less engine wear; also less horsepower is lost to internal friction at lower RPM. Lower RPM also produces a quieter cabin because prop tip speed is proportionally lower
4. As long as you're operating at a manifold pressure/RPM combination listed in the POH, even when "oversquare", you won't damage the engine.
5. Some props have RPM limitations that may exclude certain manifold/RPM combinations.

In my particular case, the engine just seems 'happier' at certain RPM combinations, referring to vibration. Therefore I also avoid those.

Read the articles! You'll be the local expert on engine power management!

New Voltage Regulator

It looks like both the Electrodelta VR371 (described briefly in their application chart) (www.kellyaerospace.com/esi_charts/Electrodelta/Electrodelta.pdf) and the Zeftronics (www.zeftronics.com/zeftronics/Zeftronics/pdescription.asp?id=R15V0L) R15V0L have integral overvoltage protection.

Source for Strut Seals

Dean Lewis Co.
Vancouver, WA
Tel. 360-693-6211
Part # 732087
Cost... about \$67 ea. plus S&H
Ask for Rick... he know what they're for.
\$68 each, brand new. Ask for Rick

Yoke Emblems

Go to www.engravers.net They make the center insert for the rams horn yoke. It's not listed on the website, but you can call and get them.
As of last August, their price was \$20 ea. I checked Piper's price at the same time and they wanted \$116.

I'm not sure if you have the ram's horn style or bow tie yokes. I got a center emblem for my ram's horns from Wentworth. The were reproductions, not salvaged from a wrecked bird as you would expect. I beleive the cost was around \$20. Wentworth can be reached at 1-800-493-6896 or e-mail at wentacpart@aol.com. Good luck.

Sticking Struts

Assuming you have serviced and charged the struts properly as mentioned below, there is still a general tendancy for cherokee struts to stick a bit. There is a side load on the strut that produces this effect. Keeping the struts clean by wiping them occasionally will help. Some people put a lite coat of hydrolic oil or even a little teflon spray on the outside of the strut surface. both help.

Some of us have learned the "cherokee jiggle" -- after they have slowed down to a reasonable speed they do a little "left-right rudder action and the offending strut settles down.

Stop Drilling Aileron Crack

John - It certainly can be. Use a .125 dia drill - no smaller - and stop drill at each end of crack. Piper does not approve, but it is advisory. Advisory is the keynote. With stop drilling people are afraid for some reason to go to a .125 dia hole. One is actually stress relieving by stop drilling and that means a larger radius. Also, go beyond the crack as the final end may not be visible. Then the crack will propagate to the hole and stop.

Oscillating Alternator Gauge

This problem is usually caused by high resistance in the alternator field circuit. I would suggest first to check or replace the field circuit breaker (should be 5 amp). Make sure that all crimp on connectors in this circuit are also soldered. I had the same problem that would be fixed by replacing the breaker until someone did work behind the panel. The final solution was soldering the field circuit crimp connector which is then screwed to the field breaker.

Installed 60 amp alternator

Had a 60 amp alternator installed on my 180C. Kept having trouble with the old 37 amp system. Here's what was required: 1. New 60 amp alternator (tried two rebuilt ones -- they had to be returned one with a bent pulley and one was binding -- wouldn't make a full 360 turn Some product quality from Electrosystems huh?), 2. a new voltage regulator, 3. a new over-voltage regulator, 4. a special "shunt" wire system, 4. heavier wiring (4 gage I believe), 5. a 60 amp gage for the panel. It is back in service now and seems to be working fine. One question from you electrical wizzards. I now am showing a 14.7 volts from the alternator isn't that a bit high? I was at 13.8 with the old system. The old system after it stabilized would be showing a charge rate of about 3.6 amps. This one is at 7.8 amps.

Auto Pilot Installation

I went the route that Dave/Erich suggested: I installed the System 20 in my Cherokee and had the System 30 wiring harness installed at the same time (about \$150 extra, I believe). Then about 2 years later, I upgraded the system to the -30, which is now just a transducer and servo install, since the wiring was already done.

I did install a new DG with heading bug with the -20, so you could have a great system by having the STEC slaved to either the bug or the VOR. If you ever upgrade to a GPS, it's just another switch to be installed to allow the STEC to track the GPS or the VOR.

It's not cheap, but a great system. Another reason: if you fly IFR, it becomes your backup in the event of a vacuum failure, since it uses electrical power only

Replacing Side Windows

I have replaced all the windows in my 140! As far as I can see the process is the same. It was a snap!! Took about 4 hours to get everything in and cleaned up. I ordered the windows from LP Aeroplastic. I put the foam tape around the perimeter of the window per the instruction and also

used the silicon seal that is used to seal fish tanks. It 2 to 3 time the price...(about \$17 a tube) but it works great.

One thing that should be pointed out is that you really need to file and sand the edges of the new plastic. This will ensure that you don't get any "run-on" cracks. Also, you might want to go to your local drill sharpening house and have a bit sharpen that won't pull through the plastic like a normal 137 deg drill bit. The odds of stress cracking the plastic drop greatly.

If you have some help it will go a little smoother. Don't worry about wiping off the excess sealer until it has cured. It will peel right off. If you try to wipe it off, you'll have a mess.

Leaning for High Altitude Takeoff

I just read 8 responses to your question, how to lean for takeoff at high density altitude... and only one of them was correct.

Most respondents said to lean until rough and then enrich a little. This is correct for economy cruise, but not for max power! To get max power, you lean to maximum RPM... then enrich a little bit so as to have enough gas when the RPM increases during the takeoff run.

As to the caveat about not leaning except below 75% power, that does not mean you have to go to 7500 feet before leaning. During takeoff, your RPM will be well below 2700, so you could not get 100% power even on a standard day at sea level.

100% power will only be available at 2700 RPM.

At a typical takeoff RPM, the percentage power available on a 59 degree day at sea level will only be about 90%... so you only need to go up to about 5000 feet density altitude to be below the critical number of 75%.

But if I'm facing tall trees at the end of a short runway on a hot day, I want max power until I clear those trees, period. The engine won't have time to overheat in that short time.

STC Process

Because I get a lot of questions about getting an S.T.C., I thought this would be a good place to give a summary of what's involved.

The number one concern of the FAA in the STC process is that the performance or safety of the TC'd aircraft is not compromised.

The very first step in the process is to submit an application along with supporting drawing, data, etc.. Usually, if they are going to consider opening a project, they'll want more info so, back and forth you go. Once you have a project open the actual testing begins. In some cases where the FAA has experience, they will give you an idea of the kind of data they need, which helps the process.

In some cases, like when I applied for my gap seal STC, there were not any guide lines, as I was the first to ask for this type of gap seal STC. The FAA knew what they wanted, but couldn't give me much help in setting up tests. It was up to me to devise tests that would meet the manufacturer specs and give the FAA the data they needed. The easy ones were the fuel adhesion deterioration tests. We did extended soak, repeated dip, and repeated splash tests with no failures. The hardest one was the extended-time cold weather test. For this test I spun a slotted

AL bar 3450rpm's(tip speed approx. 200 mph) in a freezer for over 1600 hours! The temperature varied from minus 55 deg. F to 32 deg. F., with numerous starts and stops and long duration runs, again no failures!

The actual airplane tests were over a 2-year period at which time the airplane was kept outside in the northern Illinois climate. During this time period, the airplane flew through heavy rain and in 20 degs. below zero weather, again no failures. Because we didn't have any failures, we had to pull the tape part way off and fly the airplane. The adhesive would not let the tape pull off any further. We went as far as pulling the tape over half off without having adhesive failure or causing a dangerous condition.

We had to write detailed installation and inspection instructions, but as you know you can't make everything foolproof.

It is not easy to get an STC, as anybody that has done it knows. I hope this gives everybody a little insight into what it takes to get an STC.

Hand Brake Ratchet Plate

Our ratchet plate wore out too, several years ago, and we replaced it. Instead of showing it with the other brake parts, Piper catalogs it under Fig. 10, "upper forward cockpit assembly." See if Fig. 10, item 40, P/N 63354-00 is what you're after.

Michael Radios

Michael radios work fine, but check the mfg date if you buy one. Michael starts the warranty period from the date of mfg, not sales date. My MX-11 lost the tx side in less than a year. Michael refused to repair under the warranty because it was past the period, counting from when it was manufactured. The repair was not all that expensive, but it left a bad taste. Other than that, I have had no problems in the 5 years I have had one.

Wimauma mechanic

If you want an owner-assisted annual at a fair price and willing to travel a little, Wimauma FD77, has a good A&P IA, Bob Meiers. It is a grass strip and most hangar space is in use. If Bob's hangar is in use, the annual would have to be done outside, unless a slot is avail in the shed hangar.

STC Requires a 337

Either STC, or Field Approval must be submitted to Oklahoma Via Form 337, w/ copy attached to the Aircraft Flight Manual, which remains in the aircraft. "Minor" Alteration need only a LOG-Book Entry. Which still Provides Tractability.

A Field approval on the other hand gives the FSDO the authority to approve the ■MAJOR■ alteration w/o the STC and the ACO or MIDO involvement. BUT, your Alteration better NOT be a serious-Major Alteration, otherwise the FSDO inspector will hand-it over to the ACO (Aircraft Certification Office).

A 8110-3 is a document created by a FAA designated engineering rep (DER) This guy does an analysis and drawing of a modification. He is an engineer and not a FAA dude at all. He approves the mod as described and the only technical contact with the FAA is a copy sent to ACO for their cognizance. Am a DER - Structures and have created and approved many, many

modifications. Naturally a 337 is produced and sent to FSDO. With a 8110-3, 337 is rubber stamped by FSDO. Been doing it for years.

Removing Grease from Belly

Pep Boys hand cleaner in the plastic tub for \$1.00 and a 3" paint brush works fantastic. Rinses off nice and clean, wont hurt paint, noncorrosive..

Removing Rusted Screws

When I am trying to get out the rusty screws that have no slot left for a phillips screwdriver, I take a left hand drill bit.....yes they do make them, and put it into my drill, put the drill in reverse mode and start drilling. If you have put a little AC50 on the screw before you do this, they will usually just come right out when the drill bit starts to bite. I did this when replacing the screws on my fuel tanks and it worked great.

Flying to the Bahamas

Be prepared to have all your luggage totally gone thru at rtn. They went thru my plane also, and took off wing insp panels. Opened cowl and looked in tail cone with flashlight. In Bahamas asked for flight serv and got - Hey mon, you take off and look around, that is your WX

Removing Rusty Screws

Try soaking the screws w/ penetrating oil, let it do its work, then dip your screw driver tip in valve grinding compound to get the best grip, lean on it and SLOWLY try to start the screw out. usually works for me.

...and...

Drilling the head off is the easiest. The clip nuts are a Piper only, but any of the supply houses carry similar type/ The Piper type is actually a pretty cheap one. Skybolt carries Piper as well as standard clip nuts. Piper are twice as expensive.

Sunvisor Replacement

Try Plane parts Company 310-318-1902. They make the sunvisors

Tail Strobe to Replace Rotating Beacon

If you don't have wingtip strobes, the Whelen HR-CFA comet flash strobe is a must (about \$335). This unit flashes 4 quick falshes each time and is the brightest unit available. It's FAA approved, check with your mechanic and install it yourself in 10 minutes, then he will have no problem getting a 337. I did have to swap out my fuse from 10 amp to 5 amp which my mechanic did for about \$80.

I installed this on my Warrior and love it - everyone tells me how well I show up - day and night.

Alternator Intermittently Trips Off

It sounds like the overvoltage relay is tripping. This could happen if you have an intermittant connection in the field circuit of the alternator. Then the voltage regulator would tell the alternator to put out more voltage to compensate, and if that voltage is too high, the overvoltage protector will trip, once the connection gets better. Once it trips, you need to turn off the alternator side of the master to reset.

I would suspect bad connections between the bus to the field breaker to the master (alternator side) to the overvoltage protector. The master can be temperature sensitive, acting like a thermostat. When you turn it on, a variable connection can cause funny symptoms. The connection can vary as it heats up under the field current. So suspect the master first.

What you could do is troubleshoot the field circuit with the engine off and both master sides on, under conditions that would cause the problem. Measure from the bus, to the output side of the breaker to both sides of the alternator master. Finally to the overvoltage protector and regulator. If there is a voltage drop across the master (for example 12.5V on bus, 12.5 on breaker output, 12.5 on one side of alternator master, 12.0 on the other, then you are dropping 0.5 V on the master. Too much.

While you are doing this, you should also make sure all connections are tight. You can also check the main alternator connections.

Copy of Flight Manual from Piper

I went to my local FBO and gave them the info on my Cherokee. They got me a copy of the original from Piper. It will come to you as a "copy" as the original is now on microfiche file. The original equipment list and w/b was there. Kind of interesting to see what my Cherokee was like in the good old days.

I am sure you can contact Piper direct and get the information from them.

Replacing Slide In Radio

Sheldon, I think if you read the inclosed FAR you will find that you may install your slide in radio. You will need to make the necessary W/B corrections.

14cfr43

Select

Appendix A to Part 43 --Major Alterations, Major Repairs, and Preventive Maintenance Items 31 and 32

Shoulder Harness Installation

Try Kosola Assoc. Inc. 1-800-456-7652. There's replicate the standard Piper, and easily installed, and should by now be approved for the PA28 series.

TFR Website

Found this great site for graphical temporary flight restriction information:

<http://www.tfr.e-firedog.com/>

Wing Cracks

Because my Six has tip tanks, and the POH recommends burning mains first, the occasional hard landing puts undue stress on that panel...hence the eventual cracks. I had both inner panels replaced by my mechanic. A simple project but a lot of tedious drilling and labor. The Piper panels are about \$1200 each and require at least 8 weeks lead time. The factory panels are .025 gauge. I replaced mine with .032 gauge and had no problem with the FAA sign-off. This mod

added about 1 pound. Total cost for labor and paint was about \$8,000.00. It was good to check the inner wing stringers and spar for corrosion, cracks etc. Great peace of mind knowing it was only the skin.

...and...

The name of the company is Williams Airmotive located in Kendallville, IN. Their telephone number is 260-347-0807. I have bought several parts from them while restoring my 1964 PA28-235. They are a good source buying replacement parts or they will install for you.

You want to use caution when replacing wing skins. The wings have a 1 degree negative twist built. Removing and replacing skins can result in losing that twist.

Installation of Fuel Flow Indicator

If you have all the correct parts with which to connect up the fuel transducer, it is very simple to install.

But time and time again we have had to get special hoses made and obtain special connectors. So allow several days of waiting while you manage to get the exact parts you need. In my experience, they don't come with the kit, and you can't tell what you need until you try.

Having said that, I think a fuel flow meter is about the most valuable thing you can get for your plane. You'll be able to fly much further without knots in your stomach, and you'll be able to evaluate the different power settings and leaning procedures. Go for it, but allow the time!

Type Certificate Data Sheet (TCDS)

Here are a couple links to the 2A13 TCDS. Sometimes the FAA changes servers, which means a direct link will break, although their own links get updated, but I'll try anyway:

2A13@FAA

I also found a private link: 2A13@solar-system.com

A couple notes for anyone who's interested:

These things are about 150 K, so on a 56K modem, loading is not blindingly fast. Also, they revise these things pretty often, though I don't know what's changing, maybe serial numbers? It's up to revision 45 now, 12/12/2001.

Paint for Interior Plastic

Try Almond refrigerator paint which is identical to Piper Ivory/Off white, or whatever names they use. Nearly every spray paint maker has such a line.

Frig paint is epoxy and it's flexible and extremely durable. One caution, be sure it's spotlessly clean, and it takes a while to dry. It dries sort of satiny since the plastic parts are not smooth.

Auto Fuel for 180

Check with Peterson Aviation. They have an STC but it requires changing fuel lines, adding another fuel pump. About \$1100. Here is the info from their website.

PA-28-160, -161, -180, -181

Beginning with serial 28-1761, PA-28-160, -161, -180, & -181's are approved for 91 octane mogas. The installation of this STC requires the removal of the Piper installed electric boost pump and the installation of two different electric pumps. This change in pumps was deemed necessary when this airplane failed to pass the minimum flow tests. It's a redundant system, you can run one pump or the other but the two cannot be operated simultaneously.

Other modifications include the replacement of a fuel line fitting in the fuel selector and placarding the airplane for takeoff and landing on the right tank only.

Much of the plumbing on the new pumps is done in our shop to save time when you have the kit installed. Your IA will have to tighten the fittings and mount the completed pump assembly on the firewall, reshape the line from the fuel selector to the firewall fitting, move the gascolator, change the fuel pump switch and install wiring. Placards on the fuel filler openings and on the instrument panel must also be installed. Installation should take approximately four to six hours.

PA-28's of this series with serial numbers below 28-1761 may have the STC installed if the engine installation is revised to that used on number 1761 and up, and if the line from the right tank is at least 3/8 inch diameter. Doing so however, requires a different exhaust, cowling and prop. It's totally impractical unless you need to rebuild the airplane from the firewall forward anyway.

The complete kit for serial 28-1761 and up, including pumps, fittings, placards, installation instructions and Supplemental Type Certificates sells for \$1100.00.

Petersen Aviation Inc.

984 K Road

Minden, Nebraska 68959

phone 308/832-2050

fax 308/832-2311

Sectional Chart Prices

I have been purchasing my charts from:

<http://www.ipilot.com/>

There are no shipping charges on folded charts. Sectional, WAC, low altitude enroute, etc. Sectionals are \$6.70, TCA's \$3.85, and IFR enroute charts are \$3.90.

Unusable Fuel (From Data Sheets)

Unusable Fuel and Oil Quantity Applicable Models and Serial Numbers

Fuel 12.0 lb. at (+103.0) PA-28R-180, PA-28R-200: all Serial Nos.

PA-28-180: S/N 28-E13, and 28-7305001 through 28-7505260

Fuel 12.0 lb. at (+103.0) PA-28-235: S/N 28-E11, and S/N 28-7310001 through 28-7710089

Fuel 12.0 lb. at (+103.0) PA-28-151: S/N 28-7415001 through 28-7715314

Fuel 2.2 lb. at (+103.0) PA-28-140, PA-28-150, PA-28-160: all Serial Nos.

Fuel 2.2 lb. at (+103.0) PA-28-180: S/N 28-03, S/N 28-671 through 28-5859, and 28-7105001 through 28-7205318

Oil 1.8 lb. at (+27.5) PA-28-140, PA-28-150, PA-28-160, PA-28-180: S/N 28-03,

28-1 through 28-1760, and 28-1760A
 Oil 1.8 lb. at (+27.5) PA-28-151: S/N 28-7415001 through 28-7715314
 Unusable Fuel and Oil Quantity Applicable Models and Serial Numbers
 Oil 1.8 lb. at (+40.5) PA-28-150, PA-28-160: S/N 28-1761 through 28-4377
 PA-28-180: S/N 28-1761 through 28-5859, and 28-7105001 through 28-7205318
 Oil 1.8 lb. at (+35.5) PA-28-180: S/N 28-E13, 28-7305001 through 28-7505260
 Oil 1.8 lb. at (+36.5) PA-28R-180: all Serial Nos.
 2A13 Page 38 of 42
 Oil 3.9 lb. at (+35.6) PA-28R-200: S/N 28R-35001 through 28R-35820, and 28R-7135001 through 28R-7135229
 Fuel 2.3 lb. at (+103.0) PA-28-235: S/N 28-10001 through 28-11378, and 28-7110001
 Oil 2.4 lb. at (+41.0) through 28-7210023
 Oil 2.4 lb. at (+36.0) PA-28-235: S/N 28-E11, and 28-7310001 through 28-7710089
 Oil 3.9 lb. at (+30.6) PA-28R-200: S/N 28R-7235001 through 28R-7635545
 Oil 1.8 lb. at (+35.5) PA-28-181: S/N 28-7690001 through 28-8690056,
 Fuel 12.0 lb. at (+103.0) 28-8690061, 28-8690062, and 2890001 through 2890231
 Fuel 30.0 lb. at (+103.0) PA-28R-201: S/N 28R-7737001 through 28R-7837317, 2837001
 Oil 3.9 lb. at (+30.6) through 2837061, and 2844001 and up
 Fuel 30.0 lb. at (+103.0) PA-28R-201T: S/N 28R-7703001 through 28R-7803369, 2831001 through 2831013
 Oil 6.0 lb. at (+19.1) PA-28-161 Cadet: S/N 2841001 through 2841365
 Fuel 12.0 lb. at (+103.0) PA-28-161: S/N 28-7716001 through 28-8616057, and
 Oil 1.8 lb. at (+27.5) 2816001 through 2816119
 Fuel 30.0 lb. at (+103.0) PA-28-236: S/N 28-7911001 through 28-8611008,
 Oil 5.2 lb. at (+36.0) 2811001 through 2811050, and 2845001 and up
 Fuel 30.0 lb. at (+103.0) PA-28RT-201: S/N 28R-7918001 through 28R-8218026
 Oil 3.9 lb. at (+30.6)
 Fuel 30.0 lb. at (+103.0) PA-28RT-201T: S/N 28R-7931001 through 28R-8631005,
 Oil 6.0 lb. at (+19.1) 2831001 through 2831013
 Fuel 30.0 lb. at (+103.0) PA-28-201T: S/N 28-7921001 through 28-7921095
 Oil 6.0 lb. at (+19.1)

Lubricant

The lubrication points and types of lubricants are called out in the service manual. Many places have mil-spec lubricants specified, but you can find the manufacturers' equivalent on the web. For example, if you are looking for MIL-G-23827 (main gear pivot points, and side link assembly for instance) the Sacramento Sky Ranch site says this is Mobil #27 or Aeroshell #7.

A few examples and exceptions are that many places like control surface tie-rod ends and hinges it specifies MIL-L-7870. As far as I can tell, this is the mil-spec equivalent of WD-40 or other light machine oil, and I use LPS-2 for that.

The dry lubricant most people use is just generic silicone lubricant. Again, LPS has a couple versions, but I've never used one of theirs, I've always just gotten it at Pep boys or Radio shack. I use that for yokes, door seals, cowl fasteners, etc.

Electrical System Voltage

If you measure a fully charged battery at the terminals, it should show 13.2. If your starter is dragging, an aged strater and barely enough voltage, will have an effect. My aluminum wires are 34yrs old and the starter spins the prop fast enough to fly on, not really, but you get the idea. With a battery showing 12.6, your charge voltage should be around 13.8 to 14. Me thinks you need to look a little deeper.

Rudder Skin

I purchased one from Williams Airmotive, located in Kindallville,IN. There telephone number is (260) 347-0807. They will either sell you the skin or re-skin your rudder for you

Service Letters & Service Bulletins

Call your local Piper dealer and ask for the SB pub pack. It will include all SB's and SL's for a whole series of A/C. Cost is about \$50.

Trim Shaft Has Excess Play

Replacing the upper and lower bushings on the stab. trim barrel is a very easy job. Just don't drop the trim barrel while changing the bushings! The parts are readily available. If as you described there movement (wobbling) of the jack screw within the trim barrel, you may have to replace the barrel. The barrel is available for around \$100 and figure a few hours labor. Change the bushings at this time also.

Carburetor Needle Valve Bad

The other day I accidentally left the fuel pump on after I shut down (having problems with the right mag). As I exited the plane I saw fuel running from the bottom of the cowl. The short of it is, today I got the problem fixed. The needle valve was badly worn. I would suggest all to occasionally check the pump as it should not cause the carb to overflow.

Removing Propeller Spinner

The spinner is considered a non structural aerodynamic fairing that can be removed as part of preventive maintenance by the owner/operator, to inspect prop hub, bolts, safety wire, spinner attach hardware, etc. Note orientation AND number of washers at each screw before removing. Some props are fine-balanced by adding washers under spinner screws, but painting may negate any fine-tuning. SOME Cherokee models can operate without a spinner and/or back plate (check the TCDS to be sure). Otherwise, you must replace the spinner before flight. You can also remove your prop, but you may not replace it without A&P signoff.

Replacing EGT Leads

There are other brands available depending on probe type. Its made of a bimetal(thermocouple) that produces a electrical output when heated. Match your leads & probe(or order new color

coded attaching wires) from most aircraft suppliers: Chief, Aircraft Spruce. Give them model and brand and they have replacement probes. Work just as good and are much cheaper.

Wing Design

There are three wing types, two different shapes. The original Cherokee wings had a chord (front to back width) that was constant along the length of the wing. In 1972 the Arrow got an extension to the length of the wing, about a foot. This model was renamed the Arrow II, which is what you have. The same thing happened to the Cherokee 180 in 1973, which was renamed the Challenger.

This original wing shape is called the "Hershey bar" or "fat" wing. In 1974 Piper came out with the Warrior, which has approximately the outer half tapered to a smaller tip, like most Cessnas. They have slightly better low and high speed performance. The 180 got them in 1976, becoming the Archer II, the Arrow in 1977 (Arrow III) and the 235 in 1979 (Dakota).

Removing Control Yoke Wheels

I did get the pins out of the yokes. They were not taper pins, rather they were #10 sized straight shear pins. The pins were about 1/4" shorter than the hole into yoke. The factory apparently doped the column with loctite, pushed the column into the yoke, inserted the pin and then proceeded to cave-in the unfilled portion of the pin's yoke hole with a powerful rivet gun and flat set. I had to effectively mill out the caved in portion of the hole and then extract the pin.

The pin nearly fell out of one yoke, but was a real bear in the other. Ultimately I had to drill and tap the pin with a #6-32 tap and pull the pin out (what a pain...). For the most part I'll repeat the factory's process putting the assembly back together, with the exception of caving in the pin's hole. There I'll fill the now milled out outer portion hole with a high grade epoxy as well as coat the pin with loc-tite. I think it was the loc-tite on the pin of the second yoke that made it so difficult to remove

Met Co Aire Wing tips

The only sticky part is that the instructions call for a fairly small overlap of the tips on the wing. Don't put them on farther, even though it seems like they would be more secure. If you do so, you increase the chances you'll have to cut holes in them for the balance weights. All this is in the instructions, just a friendly warning. They definitely give the plane a more solid feel during the flare, less chance for a sudden drop onto the runway. Plus, being fiberglass they won't fall apart like the original plastic ones.

Ramp Checks

Attended a seminar "How to avoid a Ramp Check" at the AOPA convention in Ft Lauderdale last fall.

Under part 91 the FAA is "not authorized" to enter your plane - so do not let them in.

Remember the key word ARROW! You need these docs.

A = Airworthiness Certificate

R = Registration

R = Radio permit (no longer required)

O = POH owners manual
W = Weight and Balance

If they ask for these and they are in the plane - "you enter the plane" and get them".

"never - never" have your pilot license and medical attached to your log book - they should be in your wallet!! Also on a business size card write down your last Medical and BFR.

"never" talk History - where you just flew in from, etc. (you could have violated some airspace or flew over water without life jackets, etc. Make sure you have the correct charts. If you are IFR and canceled with the airport in sight - you need both IFR and sectional charts.

If you allow them in the plane - you are asking for trouble, if you have your log book with you - you are asking for trouble (they need not be with you)- They are not authorized to enter the plane under part 91, under 135 it is a different ball game.

This info was given by an AOPA attorney - who has had numerous ramp checks. If they hold you up time wise, and you have a legitimate departure time, you can advise them that they are delaying your departure - they have to let you go.

Say as little as possible - show as little as possible and "get out of Dodge".

Lubricating Yoke Shafts

just make sure the shaft is clean, and spray on a dry silicone lubricant, available at Radio Shack or other electronics places. Maybe even Home Depot or auto type places. I spray it on steadily while rotating and moving the yoke back and forth, to get complete coverage. I also use the stuff to lubricate the cowl latches.

Rigging - Wing Heavy

First you have to rig both the ailerons and flaps back to a neutral position using a special tool that is described in the service manual along with the procedure for rigging. You do have a service manual, don't you? After this step, fly the plane and determine if you still have a heavy wing--being very careful to keep both fuel tanks equally full and ideally both pilot and copilot seats filled with equal weight. Also insure that your turn and bank or turn coordinator is installed absolutely level so that you can keep the ball perfectly centered when making your wing judgement. Finally, if you still have a "heavy" wing, then adjust the flap on the heavy wing a couple of turns downward (again procedure found in service manual) to increase lift to compensate. Fly the plane again and repeat as necessary to adjust through trial and error until the heavy wing is corrected. Also don't forget to check the tension on the control cables to be sure they are in spec--sloppy cables or overtight cables can cause similar problems. OR take your plane to an experienced A&P who knows Piper Cherokee rigging and say "fix my heavy wing".

Installation of Hat Rack Bulkhead

I got mine a few months ago from Plane Plastics (was Kinzie). The part number is PNW140-001. The cost was \$412. The installation took my mechanic 17 hours or so -- I don't

think he was really up to the task, although he did a good job. You could probably get away with 8 to 12 hours or so. The difficulty is it's over size and unwieldy. You have to cut, check fit, cut, check fit etc. You don't want to over-cut. Also, you have to take out the seats, side panels and rear window trim to get it in. I had already removed the seats and side panels.

It was definitely worth it though: it gives you a bit of extra room behind the back seats, and looks nicer and airier inside than with the cheesy flat cardboard bulkhead. I'm happy with the quality as well. The only downside is it makes access to the area behind the bulkhead more tedious.

...Be sure to verify that you are ordering the bulkhead WITH an access hatch to the rear. They are separated by only one part number, and about \$10.00. If you don't get the hatch, the bulkhead will have to come out each year for annual.

After installing, I spent a couple dollars on additional Velcro tape to attach the hatch more securely and stop the vibration noise.

Also carpet taped a couple document holders from the local NAPA store to hold my registration and airworthiness paperwork.

Strobes which fire just one time

May need to check the bulbs? Also are checking it with just battery power? If the bulbs are weak it won't fire check it with the airplane running if it works then I would suspect a bad bulb. Changed all of mine out and that cured the problem.

Sign Off Preventive Maintenance

FAR 43 states that all entries are supposed to contain five items,

Date

What you did

What you did it in accordance with, ie Maintenance Manual

Signature

License Number

I was called to the carpet many years ago by the FAA for not including the in accordance with in all of my sign offs. May be picky but that's what is in the FAR.

Sealing Side Windows

I just finished installing both the pilot's and door window. An A&P friend of mine actually suggested I use the green windshield sealing tape Chief sells, saying it's much better at sealing out water than silicon sealant. So I did and also found it much easier to lay down as well. The only problem is that it oozes out for a little while and masking tape won't help.

Landing Gear Micro Switches

Here's a few helpfull hints. The micro switchched are available from Newark electronics for 1/3 Piper prices. They can look good, but they can go off after they go on, usually caused by improper adjustments which forces the button past normal travel. If the spring levers have been bent or reshaped, replace them. These are hard to get. Be sure they are adjusted according to the book. If the actuating button has a broken seal around it, replace it. Make sure that what ever actuates the switch is not worn out or distorted.

Rebuilding Vacuum Pump

Rebuilt my 211cc at annual time about 3 months ago with the deluxe kit from Chief Aircraft. Housing was about an extra 60 bucks and was needed. signed off by my A&P. And oh yes, removed mag to get to the one holddown.

Removing Door Seal Cement

One of the best things I have found to soften up the old contact cement (3M 1300L) used on door seals and headliners etc. is Toluol or Xylene. It softens the cement no matter how old it is and doesn't evaporate too quickly like other thinners. It also doesn't harm the painted surface.

Rebuilding Carburetor Heat Box

Rebuilt mine a few years ago. There is no Kit available. However, the individual parts are available and not that difficult to replace. The new flapper comes complete with the felt seal. The grommets are easy to replace. The only problem was getting the screws out of the old shaft to disassemble everything. The screws are staked in place to keep them from coming loose during operation and going into the carb. In my case I was able to reuse the shaft, however the chances are 50/50 that this will happen. Generally when the screws are removed the area where they were staked damages the threads in the shaft as they come out. I installed new screws and staked them. While I had it apart I cleaned everything up and repainted the "outside only" of the heat box, looks like new.

Cleaning Grease from Belly

If you don't mind an obscure product, an Aviation consumer article (Oct. 1998)recommended Tomar TR-1000. "Tomar currently sells TR-1000 in gallon containers for \$8.95 plus shipping and handling. Quart size bottles with spray nozzles will be available by press time. They'll sell for \$6.95, plus shipping and handling. You can contact Tomar Industries at 919-828-0859. "

They also have a web site: <http://tomaircraftcleaner.com/>

...and...

I have been using Gunk Bug & Tar remover for over 10 years now. Does a good job, and with no after affects. You can rinse it off with the water hose.

Actually, I put a tennis ball with air holes cut in it on the bottom of the breather pipe(which terminate within an inch of the inside of the couling). I stuff a small piece of shop cloth in the ball to absorb blow by oil, and change it out often. This helps keep crap off the belly. Certainly this is not an FAA approved method, but a couple of A&Ps have looked at it and thought it was a good idea

...and...

Dawn liquid dishwashing soap (the original blue if you can still find it). It is non-corrosive and a favorite of car buffs. I use several concentrations - and only strong enough to do the job. That helps preserve the wax. After all, they scrubbed birds and beavers with it in Alaska (thank you Exxon)!

The best "wax" for me is Zaino - www.zainobros.com - their system works great, and they have a soap that does a good job on light - medium oil/dirt. The Dawn takes care of the tough stuff. Also a car buff thing.

Sealing Side Windows

Michael, I replaced mine last year and used marine-grade silicon sealant (about 7 bucks). After I had put the black foam tape around the window edges and installed them with the retaining brackets, I used good masking tape around the fuselage window opening AND around the new window. I left a small gap large enough to squeeze in the silicon sealant. I worked it in with my fingertip, smoothing it all around the window. (rubbing alcohol will get it off your skin) Right after smoothing, I pulled off the masking tape. You want to do this before the sealant dries. Let it sit overnight and you have nicely sealed new windows. Best of luck. Oh, the reason I used marine-grade sealant is that it contains no acid.

Repitching Archer II Propeller

Most of the talk about changing the prop pitch relates to changing to a higher power engine, eg. from 150 to 160 HP. Then, to keep the static RPMs in the normal range you can repitch, say from 58 to 60 inches, and pick up a little speed. It comes at a small sacrifice in climb performance.

Also, for some planes lower pitch can improve climb performance while sacrificing cruise speed. For your plane, though, Sensenich is listing only the standard pitch, 62 inch, on their website, <http://www.sensenich.com/direct/piper.htm>

The 2A13 type certificate data sheet only specifies the prop diameter, 76 inch, and that the static RPM range be 2240 to 2340 in standard sea level conditions. With that narrow a range, you probably shouldn't change the pitch. The amount you could change it and remain in that range would probably not change the performance much.

Cabin Fresh Air Leaks

I replaced two of mine with new valves from Piper. Call your local distributor and ask for part number 68671-00. I think I paid \$31 apiece. It seemed reasonable given the effort I would have had to put in to refurbish mine.

Some folks stuff the vents with old socks or nerf balls, which would be cheaper than my solution

Landing Light Bulbs

The Q4509 is about 30 % brighter than the 4509, and takes about the same amount of power (~100W). The H7604 is about the same brightness as the 4509, but requires about half the power (~50W). As far as which, if either, to use there are varying opinions. The H7604 is probably more rugged and takes less power. It is also about half the price, about \$17 versus \$32. Mike (ATM) thinks the H7604 is much better than the others.

I've been using the Q4509 for 10 years now and I've only replaced it once, compared to several times in a year for the 4509. The Q4509 is not be as rugged, and some people have had problems with infant mortality with them because of the way they are made. I can only say I've never had trouble, and I like them.

Technically, they are not approved for aircraft use, although there are varying opinions on the subject. For

Carburetor Heat Shroud Source

Try "Aircraft Exhaust Systems Inc." Their phone number is 1-800-227-5951.

I just replaced mine at annual, both top and bottom. The cost was \$95.00 for the top and \$170.00 for the bottom. There is also a \$100.00 (\$50.00 for each half) core charge but they will give that back to you if you ship them your old one. Great folks to deal with, give them a call.

Frequent Replacement of Oil Filler Door Hinges or Latch

This is a perennial problem with Cherokees. The reason they wear is because they are moving due to vibration in flight. Stop the moving and slow down the wear. I put a 1/4 inch wide by 1/8 inch high piece of foam tape on the mating surface and haven't had a problem since. It does need to be changed every few years

Rebuilding Primer

I recently had a problem with my fuel primer not working ...to make a long story short I found out that it was the o-rings on the fuel primer knob.

I located the right ones the number is MS29513-012 you will need two of them and they are kinda expensive at a dollar apiece but man I did not know that my fuel primer was suppose to work that well. Lubrication: A little Dow Corning silicone lube is fine. Impervious to almost anything and doesn't contaminate.

Flap Rigging

When rigging, all surfaces are set according to the guage shown in the instructions. After establishing that all surfaces, are properly aligned (take into account any play), go fly it to determine which is the low wing. Be sure that fuel quantity is equal. If the right wing is low, lower the right flap. This is trial and error time. Each time you'll have to fly it. Generally, there won't be more than 3/8 inch max on whichever flap you will have to lower. Just remember, there ain't an exact numbet, so move it one or two turns at a time. At no time should the flaps be higher than what the guage indicates as neutral position. Have fun.

Flat Spot on Engine Acceleration

According to Lycoming, the idle circuit for these carburetors stops at somewhere between 1200-1600 rpm. the mixture adjustment on the carburetor controls the mixture up to that point. After that, there is no adjusting the mixture for cruise phase. It is what it is. If you get a stumble when advancing the throttle past that point, your mixture is too rich. It sure sounds like that is your problem, expecially if leaning it helps. The adjustment screws for idle speed and mixture are on the back of the carb toward the firewall (on my 0-360A4M anyway). I had the same problem and incrementally adjusted the mixture screw until it fixed it. You will know if it's too lean if it wants to keep running when you shut it down. I think turning the screw in leaned the mixture, but you should confirm it. I just kept a close eye on the tach and an ear on the engine each flight and adjusted the mixture a little before the next one until it quit doing it

Replacing Individual Spark Plug Wires

The notion that its OK to change 1 or 2 or half a set is completely absurd. Wires deteriorate at the same rate. In the auto industry, nearly every manufacturer, recommends replacing plug wires. The frequency is not great, but in all cases, it's all of them. We spend a ton of money on our airplane, that are powered with less than reliable engine, yet some consider replacing one wire. Penny wise dollar foolish can certainly ruin a day,

Replacing metal Cherokee Logo

I took an impression (rubbing) with a pencil then had a set made up with chrome vinyl. Looks much better, the wash mitt no longer catches and now the airplane is at least 1/10,000 of a mile per hour faster. Imagine, all That for \$20.

Fine Wire vs Massive Electrode Spark Plugs

I really think this question depend on just how much someone flies. Massives typically last 300 hours. Iridium last over the TBO of an engine 2000 hours. Break this down in costs. Each 300 hours you spend roughly \$216.00 per set this equals 7 sets costing you \$1512.00 through your TBO. Iridium cost \$600.00 per set. So the choice is yours do the math. I have been using iridium in all my aircraft for years and they do not wear down like massives. Plus I don't have high costs with constant plug replacements.

Again it really depends on how much you fly.

Alternator Intermittently Drops Off Line

It sounds like the overvoltage protector is tripping. Assuming it is the OVP, you might have some intermittant problem, or the OVP itself might be defective.

Check the voltage at the OVP as well as the bus voltage. One common problem is a high resistance in the alternator field circuit or the connection from the alternator B connection to the bus. Check all connections from the alternator field through the OVP, voltage regulator, and master to the bus, as well as from the alternator B to the battery. If there is high resistance, the voltage regulator will increase the voltage output from the alternator to overcome the loss. That raised voltage may trip the OVP. So you should run it on the ground with a high electrical load (all lights and radios on) and check the voltages. You might also try checking the bus or OVP connections with an oscilloscope on the ground to see if there are any spikes.

Removal of Cockpit Door

I actually just got my letter of authorization from the San Jose FSDO to fly with the door removed for the purpose of taking pictures. All I had to do was send a letter to the FSDO manager with my airplane's make and model, N number, serial number, and my name and address. I don't know if its necessary, but I mentioned the plane would not be flown for commercial purposes. The "operating limitations" letter I received lists all the stuff you need to do when removing the door, and includes several items that pertain only to use of the plane for skydiving.

Panel Light Dimming Transistor (After 1972)

They are 2N3055. They are socketed. It is possible that the socket is corroded also. Available at Radio Shack for less than a buck.

Door Leak Noise

I purchased my Dakota last year. The prior owner had already installed a hand inflatable door seal. At first I thought it was a gimmick, but it makes a big difference. When the seal is not inflated, there is much more cabin noise and draft.

The pump to inflate the seal looks like the pump used to check your blood pressure. I joke to passengers going on their first flight in a small plane that I had it installed for all the people who have heart attacks flying with me. For some reason, they actually believe me! Then they give a nervous laugh and it helps break the tension.

Chief sells one called the Ultimate door seal:

<http://www.chiefaircraft.com/cgi-bin/hazel.cgi?action=serve&item=/Aircraft/Weatherstrip/DoorSeal.html>

Bob fields sells or sold one, but it was hit by an AD, so I don't know the status:

Bob Fields Aerocessories

Address:

340-E Santa Maria St

Santa Paula, CA 93061

Telephone: (805) 525-6236

Water in Cabin after Rain

Beyond hanging or a full cover, water is going to get into the plane. I have sealed and adjusted to the point that no more can be done. In heavy rain, I too will have water in the battery area and passenger carpet next to the side wall. What I did to help drain it, is to drill some holes in several places at low points so the water will not pool. This has worked well, but depending on how the plane is sitting, some will still puddle. After a rain, I will go and soak up any that is there. When I redid the interior and some other things, I cleaned that area and sprayed it down with ACF-50, letting it sit before recovering.

Wide Deck vs Narrow Deck 0-320

The Jugs have either "Wide" Flange, or "Narrow" Flange where it is Bolted to the Case.

There's more, but I'll Let others Chim-in. Also One has the 1/2" Valve, Wide?

BTW they are NOT Interchanable.

An easy method of identifying the narrow ones is that they have re-enforcement plates under the hold down nuts. If you have a 320 with narrow flange, it's best not to increase compression with this barrel .

Replacing Switch - Plastic Panel, Cherokee 140

The plastic panel has tabs that slide into the aluminum channels top and bottom. Comes out pretty easy and pops right back in. Just be careful not to flex to far aft or you can crack or break it just left of the yoke.

Then you just have two screws and the switch can be removed from the rear.

Determining Dates of Current Charts

can be obtained at:

<http://www.naco.faa.gov/content/naco/does/NACOVFRDole.pdf>

If you are like me and rarely fly off the edge of your own sectional, it is always a bummer to order charts for a long trip and find out they will expire before you leave.

Radio Lights Dim Opposite Panel Lights

some avionics dimming circuits are wired to the panel light circuit. They sense voltage. If the panel lights are on, the radio senses the voltage and dims its display for night flying. If the panel lights are off, the radio senses no voltage and the display remains on bright for day flying. So the more voltage the radio senses in the panel light circuit, the dimmer the radio display gets. The radio voltage sensor circuit needs to be wired on the line side of the dimmer, not the load side.

Disabling Automatic Gear System - Uncommanded Gear Down

Disabling the automatic extension is the subject of a Piper SB which later became an AD. There is no need for a STC. Piper can provide you with a copy of the AD which outlines methods of compliance, one of which is disabling the system. An alternative method of compliance is to review and understand how the system works. That's how I comply in my '71 Arrow 200B.

I agree with Carl P. and would recommend you leave the automatic extension system functional. If you don't have the lockout pin that makes it easy to override the automatic extension, then get it installed. It's easy to do and probably less expensive than disabling the system. Further, once the system is disabled, you can't (legally) restore it to use.

...and...

I had problems with my gear extension when I first flew my plane. My mechanic informed me that the speed it actuates at is adjustable. We spent about two hours in the air with the back seat removed to make adjustments while setting up the desired speed and power combinations needed.

I have no problems with the gear extending unexpectedly.

Constant Speed Propeller

Jim, There is an STC from Pacific Propeller, Inc. from the early 70s.

STC # SA2213WE is to convert a Lyc. O-360-A3A engine to Model O-360-A1A engine and installation of a Hartzell HC-C2YK1-B/7666A-0 propeller.

This STC will work with my 65' 180 but not sure if it will work for you, not knowing what engine model your Archer has.

Also there has been a recent AD on the Hartzell Compact Hubs, (several in fact) so be sure to do your home work on the ADs.

I was going to do the conversion several years ago, but have since decided the \$5000 could be better spent.

If you don't need a lot of climb performance you may want to repitch your fixed pitch prop to the max cruise.

Seat Belt Rewebbing

try AmSafe in Arizona for a rewebbing job. 602-850-2850. They had mine looking brand new with webbing to match my upholstery.

Interior Sound Insulation

I redid the interior in my warrior during the winter and used airtex 1" in the side and the 1/4" on the floor including the baggage floor. Also use the 1" on the back of the rear bulkhead. I thought it was quieter, but last weekend on the trip to AOPA, I had one of the other warrior owners from the airport in the right seat and he commented how much more quiet mine was than his.

Use the old insulation for a pattern and on the ones on the pilot's side that are real tight, spray the adhesive with a solution of 1 qt water with 5-6 drops of dish liquid. This will stop the adhesion for awhile and allow you to position it. The ultimate bond is just as good as dry.

I own a graphics shop and we do this all the time.

Cleaning Fuel Screens

There is a screen in the gascolator and 1 in the end of the Electric Boost pump.

TURN FUEL VALVE TO OFF before you remove anything.

The screen in the Gascolator is located above the bowl and held in place by the gasket, can be a pain to get back in without a leak. Make sure you check it several times after install.

To access the screen in the boost pump remove the end of the pump, 1/4 turn, you'll see the pins. Clean in a pan of solvent, blow out with air and reinstall.

Check for leaks.

Converting to 60 amp alternator

I agree. The only critical wiring is the set that Wallace mentioned, and the bus bar. The wiring on the later planes with 60 Amp alternators had # 6 gauge wiring protected by a 60 A breaker. I believe that all the 180Cs (and maybe all Cherokees) have the same setup. As long as you have a 60 Amp breaker and # 6 gauge wiring, you should be all right. The later bus bars (after the 180C) were larger, but that's because they had more electrical stuff attached.

If I understand the parts manual correctly, the last 100 C models, from serial number 28-3378 to 28-4377 had 60 amp alternators, with no other change. So I think you are fine changing to a 60 Amp.

Lost Airworthiness Certificate

I Pasted in the following from the Cessna Pilots News, because I felt some here could be helped:
IN RESPONSE TO MEMBERSHIP COMMENTS CONCERNING THE REPLACEMENT OF
AN

AIRWORTHINESS CERTIFICATE

REPLACING AIRWORTHINESS CERTIFICATE. . .

Recently I discovered that the Airworthiness Certificate for my 1969 Cardinal is not in the pocket that I keep it in the plane. I have looked everywhere for it and haven't found it yet. It was there when I bought the plane (I checked that it had one!) and at my first annual and my last (June). There is no problem with the plane; the paper has just been lost. How do I go about replacing it? Thanks for all the help through the years. I'm sure you guys have saved me a lot of time and money.

Bruce Cunningham, CPA 32585

Dear Mr. Cunningham,

You can contact the FAA registration department directly @ 405/954-3116 and obtain all the aircraft records issued to the FAA headquarters for N30464. This information is in the form of microfiche (about \$3.00), but if you are an AOPA member, AOPA obtains this same information and puts it on paper for the appropriate fee. The aircraft records will contain the FAA Form 1362, Certificate of Airworthiness that you're looking for. Another option you might try is to contact your local Flight Standards District Office to obtain a FAA Form 8130-6, Application for Airworthiness Certificate. Just fill this form out and submit.

Adam Halop, CPA Tech Rep <mailto:adam.halop@cessna.org>

Mr. Halop,

I believe your information about replacing an airworthiness certificate was a little off base. I am a DMIR (Designated Manufacturing Inspection Representative) and a DAR (Designated Airworthiness Representative). I issue Standard Airworthiness Certificates as part of my job.

A Standard Airworthiness Certificate must be on "original" form, ie. it must be an 8100-2 form printed by the FAA and then filled out properly. If you get the AOPA to send you paper copies of the aircraft file all you will have is a copy of the original airworthiness certificate. In addition, if the person (FAA, DMIR or DAR) who issued the original airworthiness certificate when the aircraft was built did it correctly, the airworthiness certificate submitted to Oklahoma City for the aircraft's records, will have the word "copy" written across it. This is how the FAA instructs us to do the paperwork.

The only way to get another Standard Airworthiness certificate is to get a "replacement" certificate. Usually, the FAA has reserved the right to issue replacement certificates only to their own inspectors. So, your information about contacting the FSDO (Flight Standards District Office) to get a replacement certificate is correct. However, they should not need to fill out an 8130-6 (Application for

Airworthiness Certificate). This is only for applying for a certificate for the first time (or if changing categories) for an aircraft. For a replacement certificate, you should only need to give the FAA inspector proof that you are the registered owner, that the aircraft is properly registered and a letter stating why you need a replacement certificate (lost, destroyed, mutilated...etc). The replacement certificate will have the word "replacement" on it, with the date.

In addition, on occasion some FSDOs have allowed some DARs to issue replacements. Someone would have to check with their local FSDO to see if there is a DAR in the area to which that privilege has been delegated.

One thing to take note of is the next to the last line on the 8100-2 form (Standard Airworthiness Certificate). It states that "Any alteration, reproduction, or misuse of this certificate may be punishable by a fine not exceeding \$1000, or imprisonment not exceeding 3 years, or both." The FAA takes Airworthiness Certificates seriously. Be sure you get a proper replacement.

Sincerely,

Tarp Head CPA #45448

Control Cable Tension

Hi. Just wondering about my aileron cable tensions. The service manual calls for 40=-5lbs. My mechanic recently adjusted the tensions and I was wondering whats better? Would the plane fly better with the cable tensions on the low end or high end.

...3 years ago when I bought my 1966 140 and flew it home to Florida from Louisiana I was kinda disappointed in the performance (average IAS was about 82MPH). During the annual we checked the rigging and found ZERO cable tension on several of the flight controls. I had wondered why I was unsuccessful in slipping in crosswinds... the rudder was blowing back to neutral. After adjusting the tensions and rigging the plane the avg IAS now is in the 120's. I consider myself lucky that I didn't really need substantial flight control deflection on that flight to Florida.

Dead Electric Trim - Broken Wire

I have a 1972G-180 and have had to replace the wire coming from the yoke switch twice. The wire looked good but was broken inside. The broken wire was just beyond where it comes out the hole in the control yoke shaft (under the panel of course where it's easy to work on).

In my case however, I could always trim in one direction or the other. That's not to say the primary wire is not broken. Also, the first time the wire shorted out and the trim ran away full forward. Good I was on the ground and found it during runup. Best leave the main trim on/off switch in the off position until you find the problem.

Fluctuating Ammeter - Bad Master Switch

Over the weekend, I finally installed a new Master/Alternator switch on my 76 cruiser. I had read ~ 1.5V drop across the old switch, and thought that it might be the cause of the jumpy and erratic loadmeter indications. What a difference!! Now she is as smooth as Seattle stratus... Only a little motion from the anti-collision strobe, and it doesn't jump immediately up to 60 amps when activated after start, like the old one did. I think that switch can cause diode burnout if its not taken care of promptly. BTW, when starting, I leave the ALT switch OFF until the engine is running, that way the alternator doesn't have to run into a heavy starter load. The new switch cost \$50 from piper, and it took ~1.5 hr to do the work. A&P signed off the work for me.

Stabilator Service Bulletin

Currently going through annual. Inspected stabilator attach brackets as per Piper Service Bulletin 856. Found peeling paint and some surface corrosion on the steel brackets. Plan on removing the brackets, cleaning, corrosion protect and re-installing. Has anyone done this? The rivets connecting the brackets to the skin are no problem. The problem is not removing them but re-installing may be difficult due to rivets connecting the bottom of the brackets to an internal support [stringer]. A custom rivet squeezer may work. No room for a rivet gun. Replacing these rivets with bolts and locknuts looks easy. Would it be a minor alteration? Thanks in advance

...Go with nuts and bolts if that is easier. The nut bolt is stronger than rivets. They are allowed as a direct replacement of rivets in the FAR's and are not considered a modification.

Inspection AD - Hartzell Constant Speed Prop

I just had the hub eddy current inspected on my 300-six. Don't know if its the same AD. If I remember correctly there are two hubs in question. One can be eddy current inspected every 150 hours, the other has to be replaced at some point. Mine is the one that can be inspected and returned to service. Cost was \$95. I think the inspection can actually be done without removal of the prop. I believe the problem on the hub is cracks originating at the threaded hole for the grease "zerk" fitting. The newer style hub has the fitting in a completely different location. Check the Hartzell web site...I think they'll sell you a new prop or hub for 1/2 price...only problem is they list for about \$9500 and \$3000 respectively.

Overhauling Electric Trim

I've had my Arrow since 95, and as I mentioned, the electric trim never worked well. I've read reports of having the jack screw lubricated with the wrong grease which can harden with age or low temperatures. A time or two I've had a mechanic clean the jackscrew, but they never found it in really bad shape. I never got any real improvement on my electric trim that way. One year my mechanic tried to adjust the clutch assembly on the trim servo (never let someone do this unless they know what they are doing!). He managed to get it to work a little better, but then I could barely turn the trim wheel by hand. He said it was a trade-off. Well, no it's not. I just gave up after awhile because the servo would not turn the wheel, & I had my mechanic (a different one this time) adjust it so that at least I could move the trim wheel easier by hand. Finally, last December I had the servo overhauled. They adjust the clutch precisely and lock it down. There is a very small clearance between the friction plate and the pulley (a few mils). So no "ordinary" mechanic should try to "tweak" this clearance. It is very precise. When I had my mechanic

re-install the servo, I gently told him not to touch the set screws on the clutch assembly. He got it back in without any trouble.

The guys who overhauled my servo (Muncie Aviation, 800-742-4895) spent a good portion of their time cleaning "cosmolene" off of it. I had noticed my servo assembly had some kind of goo on it. It looked like old hardened grease. I'm not sure where it came from. Here's what they did to my servo: "Cleaned unit inside and out. Was covered with Cosmolene. Replaced capstan assembly. Installed a new cork washer. Cleaned and adjusted solenoid to pull at 10.5 VDC. Adjusted clearance. Unit bench checked okay."

Here's how the system is supposed to work:

When the button is pushed either way, a solenoid engages (you should hear it click). That solenoid pushes the friction plate (which has a cork surface to grab the pulley) toward the pulley. Then as the servo motor turns, it pulls the cable. When you release the button, the solenoid drops out, and the friction plate retracts. So, when it's not engaged, the trim wheel should move freely by hand.

My servo moves way faster than it ever did, and I am very pleased with the results. But it doesn't go extremely fast.

Adding IFR GPS

For training purposes, you want two VORs. For regular IFR or VFR navigation, enroute and terminal you won't need any VOR. It's there mainly as a backup, both practical and legal. So the only real reason to have two is to have a backup for the ILS, and it's up to you how concerned you are about having only one LOC/GS receiver.

It does sound like it's either a GPS only box, and keep the KX170B, or a GPS/COM and sell the KX170B. Of course you could always keep the KX170B AND add GPS/COM, just don't use the COM on the 170B, but of course that's a little more money. However, the COM is only a little more, and there are advantages to having a combined unit: the GPS can look up whichever COM frequencies are used in your area. The down side is that the COM info takes up a little screen space.

Keep in mind: if you want color, you are limited (now) to the KLN-94, the GNS-430 or a hand-held. A further consideration is: if you keep the 170, you will need to install a NAV/GPS switch and a GPS compatible indicator such as the KI-209A, or find panel space for a separate indicator for the GPS.

As far as cost, installing an overhauled KLN-94 should run about \$5500 to \$6000, depending on various factors. I think the GPS/COM GX-60 from UPSAT should be about the same, the GPS only GX-50 about \$5000 to \$5500.

One final consideration: if you are happy with your current situation vis-a-vis IFR operation, and only want the GPS to go direct, in most cases you can use a VFR/handheld GPS! Don't file /G or /R -- just file your regular airway routing, then ask the controller for direct routing. They don't

care what you are using for navigation, as long as you are in radar contact. The only reason to get IFR GPS is for approaches. So a handheld GPS is one option for an interim solution, until a more obvious choice presents itself or you win the lottery, etc.

Good luck, Steve. It took me about 5 years from deciding I wanted to get an IFR retrofit until I did it. . .

Repairing Fuel Leak, 140 Fuel Selector

The smell when you change tanks is the result of the same o-ring. It's a simple repair.....did it myself at last annual in March. Remove screw in center of selector, then pull off knob. Then you'll see a shaft with a brass gland nut on it. Remove the gland nut, pull off the old o-ring and replace with a Viton o-ring. The size was either 011 or 012, don't remember for sure. Don't get the o-ring at the local hardware store....they're Buna-N and not compatible with gasoline. Use fuel lube when reassembling if you can find it. It's a very sticky type grease that won't wash off. Replace gland nut (snug only, don't get crazy) and knob and you're done. Shouldn't take more than 10-15 minutes to complete. One caveat.....I did this under an owner assisted annual. I don't think it qualifies under the FAA guidelines for owner maint.

Landing Gear Indicator Light Problem

I recently had a problem with my right main gear light on my 1975 Arrow II. I won't get into the details of the firetrucks on the taxiway and such, but in the end it was strictly an indicator problem. I was away from home when this problem presented itself. So, I rented a car and drove 300 miles home. When I returned the next weekend, I found that he had replaced the microswitch, and re-ran some wire from a splice in the wing out to the microswitch. He thought he had it fixed, but then it started acting up again.

I took my plane home anyway, and my regular mechanic traced the problem to a wire that was chafed where it goes from the fuselage into the wing. It was intermittently shorting to ground. Not bad enough to trip the circuit breaker, but it was shunting enough current that the light would not come on. He re-ran new wire from the gear light on the panel out to the microswitch at the gear. Problem solved.

Loud whine in radio

I had the same problem with my Val using the intercom and headsets. Had the Ameri-King unit and cap on the alt but still had the noise. Alt checked out good so I purchased an in-line FM radio noise filter at JC Whitney for \$20 and wired it in. Bingo no noise, perfectly quiet and a cheap fix.

Stop Drilling of Rudder Cracks requires Rudder reskinning

Unless your mechanic is an ace at metal work, which mine admits he is not, I suggest purchasing a reskinned unit. The cost is about the same as buying the skin (and waiting) then paying your mechanic to learn to finish the job. Total installed cost came to about \$1000 about three years ago. I bought the reskinned rudder from a shop in Kendalville, IN for about \$600 with core exchange. I was back in the air in less than 10 days. The guy in Kendalville specializes in reskinning since so many FSDO's have turned up the heat on stop drilled rudders.

Installation of Aftermarket Hat Shelf Rear Bulkhead

If yours is like mine was, an aftermarket version, it will need A LOT of trimming. It required not only taking out all the seats, but the rear side panels and window trims as well. Figure 12 to 17 hours or so of labor, depending on luck and skill.

Sorry to be the bearer of bad news.

On the bright side, they do make the 140 a much nicer, less cramped seeming plane, and the space behind the seat is great for chocks, tool kits, etc that won't mess up the seats.

Wing Skin Cracks in vicinity of Landing Gear

Larry's probably right, hard landings. You should have it checked, not only in the vicinity of the landing gear attachment to the spar, but also at the spar attachment point to the spar carry through.

If you're lucky, the spar will only have flexed elastically, and only the skin is cracked. If you are not lucky, the spar is distorted or cracked. At that point it's between you and your IA.

As far as the cracks themselves, your mechanic should be able to advise you after examining them. May need skin replacement, which is classic aircraft maintenance: \$1000 or \$1500 to install \$300 worth of parts.

Replacement of Gyro Instruments

Last month I replaced my TC and attitude gyro from Berkshire Instruments, now located in Colorado. Both were 'fresh' rebuilds, were tested, and ran well after installation, and come with a warrantee. I learned that gyro instruments, that are just rebuilt or brand new with no storage time are the best bet. Those instruments which have been on the shelf, even new surplus, for more than several months, may have problems. Also don't get those cheap new units, non-TSO'd, or imports. They don't have good precision bearings, and will often fail quickly. I was also told to stay away from some of the large instrument shops that are advertised in Trade-A-Plane.

Lightweight Starter

Installed a Sky-Tec starter 2 weeks ago on my 1975 O-320 Warrior. Best money I've ever spent lately. Prop spins very quickly and starts right up.

Be sure you order the correct model for your aircraft. Sky-Tec web-site has a nifty listing (www.skytecair.com). To determine your configuration you will need to know the number of teeth on your fly-wheel. Also, you may need a short extension for the battery cable which is available from Sky-Tec for 10-12 bucks. Installation is a snap. Make sure you record the serial number for your log book entry. One more thing don't forget to recalculate the weight and balance if you decide on this lite weight 1990's starter technology.

Binding Struts

Sticking is not too terribly uncommon, unless it is stubborn. Causes: worn bushing, worn gear leg, worn oil scrapers, improperly filled, accumulation of debris from worn parts inside the strut,

incorrect air pressure, torque links over tightened and dry, and finally, the use of plain old air as opposed to nitrogen.

Thunderstorm Avoidance

I installed a Strikefinder a year ago for \$5,000 and really like it. An article in Aviation Consumer a few years ago rated it easier to use than the Stormscope WX900. Plus WX900 doesn't have heading stabilization (which enables the display to turn with the airplane). By connecting my Strikefinder to the remote compass for my HSI I obtained heading stabilization. If you don't have an HSI there is a option for the Strikefinder that provides heading stabilization. You can also pay \$1,000 more for a better display, but I find the standard display easy enough to read. If you decide to buy a used Stormscope, I'd suggest sticking with the latest versions. The technology has improved the past few years and the older versions are not as accurate as the newer ones.

Autocontrol Autopilot Repair

Just got my Autocontrol fixed at Autopilots Central in Oklahoma. Total charge was \$1400 for a rebuilt servo, fixed AI, replaced parts and adjustments.

They aren't cheap but the job was done right (as it appears so far), and it was done in one day.

Circuit Breaker Rating

Circuit Breakers, SAY 10a Does NOT break at 10 amps. Circuit Breakers come in about three different varieties. General Purpose, Commercial, and Aircraft grade.

All C/b are rated at HOLD amperage. 10amps will hold 10 amps not Break.

General Purpose C/b are rated at up to 150% HOLD. SO; a 10 amp Gen/purpose C/b will hold 15 amps, and NEVER BREAK.

Aircraft C/b are higher quality and higher standards, which is 125%. So a 10 Aircraft C/b will hold 12.5 amps.

If the over-load is 13 amps, then the C/b may take 150 secs to break. If the Over load is 200% greater then the 10 amp C/b then the Breaker will break in 15 to 30 secs. If the over-Load is 300% to 600% of the rated C/b then the Breaker will trip in 5 to 8 secs. At 1000% or higher greater the Breaker will POP in . second.

So; it's NOT as you thought. NEVER go higher then the Manufactured has installed.

Windshield Replacement

On my last annual I changed the windshileds on my PA-28 140. I ordered them from Great Lakes Aero Products (www.glapinc.com). Originally I wanted them 1/4" thick but it wasn't possible with the serial number of my aircraft.

The folks at Great Lakes were kind to help me choose the proper ones for my aircraft. I ordered them gray tinted and 3/16" thick (the originals were clear and 1/8" thick) The A & P who installed them told me that he dind't need to do any adjustments since it fitted perfectly.

The main advantage are that it's more cooler and less noisy inside the cockpit and...it looks great.

Landing Light Bulbs

4509 Draws 6.9 amps Last 15 to 25 Hours

Q-4509 7.9 amps Last 25 to 75 hours

Ge Halogen h-7603 3.3 amps Last 100 to 150 hours or longer

Q- Runs Very Hot 4509 runs Hot h-7604 runs cool

Halogen produces a "Whiter" light which appears to be "Brighter".

Sagging Door Due to Worn Hinges

When I had the same problem with the door on my '69 Cherokee, my A&P slightly enlarged the holes and installed nylon bushings.

The door now closes better than it has in the 5 years that I've owned her.

Seat Foam

We just redid the interior in our warrior. Go to www.seatfoam.com. These are great people to deal with and sell Conforfoam. If you want to add some height, use the 3-layer. This stuff is amazing! I just did a total of 8 hours in the pane in one day and my butt wasn't sore!

Highly recommended. They also will supply the burn certs.

Avoid Aggressive Leaning

Basically only two rules for leaning . Rule 1 , above 75% power never lean beyond 150 deg F on rich side of peak EGT (takeoff & climb) .Rule 2 , 75% power and below lean to PEAK EGT , or if desired , drop 50 deg F on rich side of peak EGT , if no EGT lean to engine roughness then enrich until engine runs smoothly . Both rules are from Lycoming operators manual . I guess aggressive leaning is cruising at 75% power with a rough engine or takeoff and climb with less than 150 deg F on rich side of peak EGT .

Propeller Guard

It's called McFarlane Prop Guard. My co-WHPer Bert@WHP has it and likes it. Costs \$57.

<http://www.mcfarlane-aviation.com/prop-guard.html>

Very High Oil Pressure

Doug, et al, Per the Lycoming operators manual, Oil press limits for O320s are: idle min. 25 psi, min. in flight 60 psi, Max (cold start up) 100 psi, max at normal operating temp, 90 psi. My '77 140 POH sez about the same except there is no mention of the 100 psi when cold. The oil press adjustment is located on the top right rear of the engine, above and behind the #3 cylinder. there are several types, one with a screw adjustment, the other uses a washer stack for adjustment. I wouldn't concern myself if its in the green, the more the better, nearly circulates the lube and cooling oil better.

Pitted Struts

A little pitting is not a real problem if they are kept clean, the seals are in good shape, and bushing are not worn. What you should look for if rechrome is required is an actual wear pattern. The wear pattern will display a very definite removal of the chrome and copper, and you may even see a nickel pattern as well. This is the plating process, copper, nickel and finally chrome. It will be a positive step shown.

The pitting comes from whence the strut was first plated. Some body was sloppy. As a result, little pits of rust will appear (eventually). Keeping them clean and preventing them from building up will go a long way.

This is also where filling the strut with nitrogen comes into focus. Plain old air gets hot when compressed. When it rubs up against an uneven surface, the seal will have a tough time keeping the oil from leaking. Properly filled, air pressure can rise exponentially. Hot air adds to the problem, and leaks occur. N doesn't get hot. The auto industry offers gas filled shock, and perform far better than the normally air filled type. Plane's no different.

You can use crocus cloth (emory is ok too, but no coarser than 600) and very light oil or even gasoline (be careful with gas), and "dress it" to remove the rust. A very light film of 5606, to keep the dust seal happy, and it will go a long way. You'll need to wipe it some afterwards. My Arrow has been this way since I bought it 9 yrs. ago. All three struts leaked. I replaced bushings and seals and "dressed" the struts (particularly the mains, and filled with N. Still no leaks, and only had to add N when I check the fluid level. Still going strong

Rebuilding Inertial Reels

The O.E.M belts were made by American Safety (AMSAFE) in Phoenix. They have a web site. They offer repair services- I'm waiting on a quote to re-web the reels in one of my client aircraft.

Tip Tank Repair

For anyone who is interested, I found a shop that says they can repair Cherokee 235 and Cherokee 6 tip tanks. They repaired and repainted my engine cowl and did an awesome job.

Here is the info:

Aircraft Paint & Prep Booth
1951 Aviation Drive, Corona, CA 92880
(909) 272-6830
Owner's name is Ed.

For those of you on the east coast:

Mobarak Aircraft
KFPR - Ft. Pierce, Florida
Toll Free Tel - 888-465-7711

Instrument Lighting - Early Models

Piper didn't put in Fred's "lots of little lights" panel lighting into the 140s until 1975.

There are several ways of improving the lighting. You can add a flood "line of lights" under the overhanging glareshield cover lip. You need some type of STC for that, for example with the Dennis Ashby fiberglass glareshield, which replaces your existing glareshield and contains the lights.

<http://www.finitesite.com/glarshild/glarshld.htm>

The easier and probably cheaper method is to use the "Nu-lites" mentioned by W.Ledsman, one for each instrument. They're now about \$40 per instrument, and fairly easy to install. Folks who've gotten them like them. They're flat and fit between the instrument and the panel, or possibly between the panel and the overlay, and direct light through a wedge onto the instrument face.

<http://www.nulite.net/> Available from www.aircraftspruce.com

There are also some interesting ideas from Aeroenhancements that don't cost too much:
<http://www.aeroenhancements.com/> They use an electroluminescent type of flat lighting, either under the glareshield lip, or under the plastic overlays

Removing Air Conditioning

I removed the air conditioning from my 1973 Arrow about 10 years ago. It was working at the time but I thought that recovering useful load would benefit me more, especially since the plane is based in Ohio where A/C is not such a big deal. Also it seemed to me that when I needed the air conditioning the most--on the ground on initial start and during the low and slow first part of the flight--I couldn't use it. Remember the A/C should NOT be engaged for takeoff and climb. Once at altitude of 5000 or higher the outside ram air temp was reasonably cool anyway. Anyway, my first disappointment was in only recovering a net gain of 35 pounds of useful load. Remember that the drop down belly door is specially reinforced and cannot be removed--meaning you retain a lot of extra weight. But the major disappointment was in a rapid onset of constantly recurring twisted skinny alternator belts! Each event required a prop pull to put a new belt on. Never had the problem before removing the A/C compressor and after going through multiple troubleshooting sessions with pulley alignment and belt tension adjustments, I found the only cure was to reinstall the compressor on the old bracket. There went most of my useful load gain! Bottom line--worst mistake I ever made was to pull off the air conditioning. If yours is currently working without alternator belt problems, my strong advice is LEAVE IT ALONE.

I did not reconfigure the system back to original(at least at first). I left the original alternator, mounting bracket and ring gear in place. This was another reason that my useful load gain was modest at best. If you are going to pull the A/C, then go all the way with new alternator, brackets and ring gear. This will add about 1000-1200 dollars to the total cost in addition to the labor to pull off the old components and replace with the new. Also of course you'll have the expense of a prop remove and replace. Probably figure around 1500 dollars at least for the whole job. Done that way you should regain 45 pounds or so of useful load. With luck, you might also find buyers for the old parts and ring gear to bring down the cost.

Hatrack Bulkhead (hat shelf)

Planeplastics in Alva, OK Phone 580-327-1565, sell this bulkhead. It's part number PNW-001 and sells for \$412.

Rubber Bumpers on Cowl, Behind Spinner

On a recent annual, the A/I made me get them before he would sign off on it. They had been missing for years (previous owner had STC to remove the latches and use screws to secure the upper/lower cowl together ('67 PA 28-180)). Anyway I got new ones at the local piper dealer - they were relatively inexpensive (I think that they were about \$28 apiece). Just about the cheapest thing at the annual.

Inflating Oleo Struts

If the aircraft is on the ground, you will need at least 350# to raise it. If on stands, 250 is adequate. If the outlet pressure of your regulator gauge will not indicate high enough, most welding shops carry higher pressure gauges. The regulator will be nearly closed to have a high outlet pressure. You will need a shut off valve just after the outlet side of the regulator, and the hose going to the strut. Hose must also be high pressure. Remember a high pressure valve.

Metal Instrument Panel

I had an all metal panel made from FWASINC for my 160. It looks really sharp. The website is www.fwasinc.com. I paid \$364 because I have the raised brow in my bird. I sent my old plastic panel to him so he would have accurate measurements to put on his computer. It comes in a primer coat and all you have to do is add the paint of your choice. I painted mine fawn like the new Pipers.

Rudder Pedals Flutter

If this is happening in flight I would get real serious about checking my rudder mounting, hinges and hardware, then I'd check my cable tensions and rigging. Also check your rudder balance, this sounds like a prelude to flutter.

Zeftronics Voltage Regulator

Zeftronics regulators are very good. They have a built in trouble indicator light and built in protection against damage due to inadvertent field wire grounding.

I talked at length with their tech and he said that the voltage sensing for the regulator passes through the master switch, field circuit breaker and the overvoltage relay (Zef's is built in). Over time a high resistance in these items causes a voltage drop and that part of the circuit acts as a capacitor messing up the voltage regulators ability to supply a stable output. A new master switch fixed my Warrior. Measure the voltage drop from the regulator to the main buss. It should be less than a few tenths of a volt, if not go down the circuit and find the major drop.

P.S. My Ammeter still bounces with the strobes on. Normal.

Nosewheel Shimmy

I got this problem on my 77 PA-28-151. My nosewheel would shimmy while taxiing and occasionally when decelerating after landing. I had the shimmy dampener replaced (it was very loose to the touch and would no longer hold the pressure when actuated) and the shimmy went away.

It was a bit expensive though because the piper part is not repairable so I had to buy a new dampener. So you might want to look at the dampener and have your A&P see if it is still serviceable

...and...

I fought this for 2 years with 2 local a&ps looking at it. They told me to try replacing the shimmy dampener and when I took it off found it had sufficient damping and was not leaking. I finally fixed it myself in 5 minutes at no charge! Have some one press on the stabilator until you extend the nose strut entirely, lube the scissor gear, then lube and clean the strut with proper lube and then tighten the scissor gear bolts until the strut will not move, then loosen the bolts slightly and work the strut up and down until it moves freely, keep it clean and hopefully it will cure it. Mine was terrible and it got worse with a load or heavy braking. As for the shimmy dampener I know several people who have removed them with absolutely no degradation in performance... I am not advocating this but I think too many a&ps look to the most expensive option they can.

235 Tip Tanks Cross Feeding

I think this cross feeding is a typical problem. I had the same issue with my 64 235. Full tips draining through the selector valve into the mains and on occasion out the main vents too. Your options for repair are:

Pull the fuel selector valve, and clean it thoroughly. I have read a couple of articles in the Cherokee Owners Hints & Tips books of that 'fixing' the problem.

Buy a new one from Piper, about \$3k and a long wait.

Pull the valve and send it to B&S Aircraft - who'll rebuild it for about \$700 and a couple of weeks- talk to Mike James (800) 835-2961. Check the right part number, they don't rebuild the earliest ones, so you may have to replace yours with a later salvaged model and have that rebuilt.

Inflating Struts with Air or Nitrogen

By introducing "air" into the strut, you also introduce moisture. And we all know what moisture does to unprotected metal. Put in the nitrogen. Spend the money now instead of spending MONEY later

AMR&D, Ram 160 HP engine upgrades

our eng upgrade stc is for the 0-320-e2a only, ram aircraft has the stc to upgrade the e3d. the pitch range on our stc is 58" climb, 60" standard and 62" cruise. also the static rpm range for the gross wt. of 1950lbs is 2150 min.- 2425 max, for the gross wt. of 2150lbs the range is 2275min - 2425 max. we recommend a 62" pitch with our tip mod. this give you the climb of a 60" prop and the cruise of a 62" pitch prop. on the 160hp eng.

Service Bulletins from Piper

I just received a pack of SB's from Piper. I ordered a one-time Pub-Pack for the PA-28 series. It includes all of the Service Bulletins/Letters and all of the vendor Service Bulletins/Letters for the PA28/28R-PA44/44T. Cost was \$55. Ordered from the regional Piper service center. It's about 2 lbs. of paper, and only about 10-20 SB's for my PA28-140. I am still going through them to try and sort out the ones that I want. All in all, I am pleased with the service. Piper stated that since I am the registered owner in their database (they use the FAA database), I will automatically receive any future SB's and letters as they are created.

Shelf Life on Gyros

Several weeks ago I asked about problems with a directional gyro. I put in a "rebuilt" gyro and still had significant precession. I then bought a "new" sigma tech and it also precessed (about 1 degree per minute). I checked all the hoses again, the vac pump, the regulator, the gage, etc. and could not find the problem. I then took the plane to a local airport where there was a guy who rebuilds and certifies gyros. He bench checked the "new" gyro and it was faulty. So I went back to the large aircraft parts warehouse in our area and got another "new" gyro -- before putting it in the plane I took it back to the gyro shop for certification. The second "new" gyro also failed. Turns out that there is a shelf life on gyros. Six months. The new gyros were over a year old. Went back to the warehouse and got a third gyro (this one was shipped last month). It checked out fine in both the static and motion test. Gyros should not precess more than 3 degrees in 15 minutes. Lessons learned:

1. rebuilt gyros may not be such a good deal.
2. when you buy a "new" gyro check the shipping date and the shelf life date. --- I was unaware that there was such a thing as shelf life on a gyro. When gyros exceed the shelf life date, they should probably be sent back to the manufacturer for recertification.

Best Prices - Engines & Parts

If you are just looking for parts, the best prices I have found have been through J&J Airparts in TX at 800 569 3892. Very helpful and responsive. I shopped around quite a bit for parts and engines and have saved a many dollars with them: I have bought about \$10K in parts for an O540 so far from them. Contact DIVCO (800 874 1351) for engine case work, Rick Romans (918 835 1311) for crank, cam, and steel parts rework, or Engine Components Inc. (<http://www.eci2fly.com/>) for all rework services.

If you are looking for an entire engine, you might consider Lycoming factory rebuilt or overhauled (or new, if you have a lot of money that you don't want...). These seem to be cost effective, particularly if you aren't sure that some nasty and expensive surprises might not be waiting for you inside the engine.

Factory engines are not cheap, but then neither is any rebuild. They have new accessories, a good warranty, and a lower hassle factor. Look at <http://www.factoryengines.com/>. Freight and other costs (motor mounts, hoses, etc.) are not included.

Touching up paint

own a body shop. Look in the phone book and find a body shop supply that sells PPG paint. If you have a small part that is the color you need and can be removed from A/C , and if not the paint supplier can go to aircraft, they have a machine that reads paint color and will formulate a match some will even put the color in a spray can for you. Larry is right make sure area is clean use a wax & gease remover sold at body shop supply, clean area than sand dry with 400 grit and feather paint edge use a etch prime sold in spray cans also at supply shop spray light coats at most 3-4 coats after 12 hour dry you can used a fine automotive compound and lightly rub new paint area until the dry edge blends in. Best is to be shade area no wind morning is good time, don't spray at night bugs love fresh paint, Cover every thing within 20 feet that you don't want paint on. Very small spots can be brush touched, clean the same, than brush on 1 coat of etch prime let dry 5 min or so than brush on color.

If you check over for chips, even the smallest and keep touched up you stop most exterior corrosion.

Good luck

Arrow pilot Paul

Short in Landing Light Wiring

The problem with your Landing Light wire is common with Cherokees and not many understand the Cause:

The grommet at the Air-filter Box has worn away. The wire Plastic coating has broken and small strands of wire touch Ground.

At Boeing, we NEVER use Rubber Grommets, because of this problem. Still today all G/a Manuf use rubber.

Synthetic materials, (Vinyl) is what Commercial Manuf all use.

Open up the air-box and inspect the rubber Grommet. I suggest all do this at every annual.

Fixing Overhead Vent System

Bruce, we just purchased a '74 Pathfinder (Cherokee 235) that had a similar (if backwards) problem.

During our test flights, we noticed that cold air was leaking in, and the control knob on the ceiling didn't have any effect. We could turn the little vents off, of course, but they are notoriously leaky, so -- in the cold winter air -- little leaks were really noticeable.

However, we bought the plane, and I figured we'd get around to fixing that "little" problem right quick. Little did I know...

It turned out to be anything but a "little" problem! Here's the "fix":

As long as our new bird was laid-up for an engine overhaul anyway, I decided to replace the crappy ceiling plastic (it was so old and brittle that you could push your finger right THROUGH it in spots). While I had it apart, I figured I'd determine WHY we had such a screwy airflow problem.

Well, surprise -- a former owner had removed the blower motor from the aft fuselage section, probably as a way to save weight. (Those blower motors weigh a ton, and don't put out much air anyway. We had one in our Warrior, and it didn't do much...)

So far, so good. Unfortunately, we discovered that the "on-off" control flapper in this model was an integral part of the blower motor -- so when the guy removed THAT, he removed the ability to turn the fresh air on or off!

So, he next did what every ham-fisted owner would do (NOT!): He simply CUT the control cable with a tin-snips, left the control knob in the ceiling, and relied on the little vents in the cabin to turn the air on and off!

Of course, we didn't figure any of this out until after I had disassembled the entire ceiling duct system.

So, we sat down with my A&P, who suggested that we call a boneyard and purchase the flapper control valve out of a "non-blowered" version of the '74 Cherokee line, plus the control cable and reinstall the whole ball of wax.

It sounded simple enough, so a call to Wentworth Aviation resulted in both parts being sent to me (for something like \$170) within a few days.

Next problem: getting into the aft fuselage to re-install the flapper control. When they had removed the blower motor, they had simply duct taped the two remaining hoses together, and called it "done". We now had to insert the flapper control valve back in-line, bolt it to the ceiling, and hook the control cable back up.

The only person small enough to crawl through the bulkhead door in the luggage compartment turned out to be my wife, Mary. At five feet tall, she was **just** small enough to lay back in there on a piece of plywood, and install the new flapper valve. (This saved removing the entire baggage compartment rear bulkhead, which looked like a real joy to do!)

Of course, there were unforeseen problems. The control cable Wentworth sent us was too short. (If you've got the "stretched" fuselage, be sure to order the proper length cable!) Luckily, they sent us the correct one, no extra charge.

Then there was the little problem of the control cable attachment. Not having anything to go on, we didn't know if it went **over** or **under** the control lever, etc. And, we were missing some parts, that Wentworth sent (the little rotating bolt/fixture that the cable attaches to, for instance, is critical -- and we didn't have one.)

Eventually, through trial and error, we got it all together. Then it was a matter of installing the new plastic ceiling parts, obtained from PlanePlastics (formerly Kinzie).

Beware: these kits say "some trimming required", which means you will be removing (in some cases) several INCHES of plastic with your Dremel tool! It's not like putting together a Snap-Tite model airplane, that's for sure!

Another few days of trimming, and trial and error, and everything went together.

And everything now looks great, and works! We can shut off the air when it's cold, and open it up wide when it's hot!

As with all of these things, what took me a week to do the first time around would now take me maybe two days to accomplish. Your problem may not be identical to ours, but chances are the procedures to fix it will be about the same.

You can see pictures of this (and our engine overhaul) project at our Engine Overhaul webpage, http://www.aviating.com/~honeckfamily/engine_overhaul2.htm.

Good luck!

--

Jay Honeck
Iowa City, IA
Pathfinder N56993

and:

I also have a 73 challenger that had similar problem. The air feeding the vent comes from the tail section and depends on "ram" air to force the air to the vents. From the tail, the air passes through a plastic tube about 1 1/4 in OD to a "Y" connector where the air is split to go to either side of your overhead vents. The air is carried forward in poly tubes. In my case, I had found that the poly tubing had slipped out of the connector. It is only held in place with a set screw. The poly tube had cracked and split at the set screw. I rotated the poly tube 180 degrees and added some duct tape to hold it securely. The bad news is that you have to remove the back plastic in the baggage area (which means you have to remove the back side panels also) in order to gain access where you can reach the "Y" connector.

Warrior II Gross Weight Increase

STC Number: SA00397NY

Manufacturer: Piper

Make/Model: PA-28-161

TC Number: 2A13

Description: Increase in maximum gross weight to 2440 pounds

Status: Issued 2/14/96

ACO: NE-NY

STC Holder: Air East Airways, Inc.

8100 Republic Airport

Farmingdale NY 11735-3324

Phone: (631) 756-5500

Notes: The address and phone number above are corrected from the FAA listing and are correct as of 4/9/02.

This STC covers the PA-28-161 only and applies to years 1977 - 1982, serial numbers 28-7716001 through 28-8216300

One Way Strips (J Bonsey)

I was on the ground at my favorite ■get away• airport, the Flying M, in Oregon's coast range foothills this afternoon when I saw a Cessna 172 enter the pattern to land. The runway is 2,300-ft dirt/gravel and is ONE WAY due to tall trees and rising terrain. (3,000 foot vertical wall) There was about 5 knots of wind right down the runway, tailwind for landing.

I watched as the Cessna approached, it looked good and he would touch down very near the approach end of the runway. The Cessna landed hard, bounced on all three wheels, became airborne, bounced on the Rt main & nose, became airborne again and started down nose first.

I was sure that the nose strut would collapse on the next impact, when I heard the pilot add full power to go around.

I instinctively yelled NO DON'T DO IT, but of course he couldn't hear me.

By this time he was well over half way down a 2,300-ft strip, with a TAILWIND, headed for the trees and higher ground.

The plane passed just over me (I ducked) as the pilot steered toward some lower trees. It disappeared from sight then I heard two loud cracks, like gunshots but much louder.

I ran to my plane to see if I could raise him on the radio. Amazingly he answered, said he was having a problem and had hit some trees but was still flying. Just then I saw him emerge on a downwind departure, told him that all the major airplane parts appeared to be intact, and suggested that he go somewhere else.

THE POINT HERE??

This is something I mentioned a couple of weeks ago in a thread regarding getting down and stopped. ONE WAY STRIPS ARE A DIFFERENT ANIMAL.

You might break off an approach when you still have some height and room, but these strips are ONE WAY for a reason, and a go around from a botched landing is OUT OF THE QUESTION. Who knows how many inches that Cessna was from a disaster?

It would surely have been better to take a broken nose strut ON THE GROUND at SLOW SPEED and in a place where rescue could be accomplished if needed.

Part of the drill going into a strip like this (unless you are S.T.O.L., and maybe even then) is to recognize a point on short final when you are absolutely committed to that landing, or to crashing ON that runway. Sometimes there is no ■get out of jail free• card, and assuming this risk is a decision you already made when you chose that airport, and reaffirmed when you passed that point on approach.

PLEASE PLEASE PLEASE get an experienced pilot to show you the ropes before you attempt your first ■one way• airport. They are not necessarily ■dangerous• but there is more risk involved.

Practice on a ■real• airport. Be sure you can land and STOP in that distance EVERY TIME. Do it with a tailwind. Do it from ■a little too high•. Learn to slip to a landing.

After you have gone in with an experienced pilot, go again ALONE before you take passengers. (Call me chicken, but during about my first thousand hours I would NEVER take passengers to an airport that you could not land a 737 on, unless I had already been there first)

If you are still not comfortable, wait a few years. Nobody says you have to go there at all.

Replacing Door Seal Trim Material

Robert, are you talking about the rubber that fits in the door jamb, or the round, sewn fabric (leather) that fills the gap betw the door and the cabin on the inside. I think its called an air gap seal. Had mine done at a local upholstery shop. New leather fabric. Cost \$50.

Removing Bugs from Plane

We just use a spray bottle with water; let the little buggies soak a bit, then wipe off. On the plexiglass we make sure we use a very soft cotton cloth, rub gently straight up and down (no swirling).

As I understand, time is of the essence, since some of the real damage to your finish is caused by flies who will dine on the dead bugs. Flies begin their meal by regurgitating stomach materials/acid onto the meal before ingesting - and that acidic material can do in your paint. And...

I spray pledge on the leading edge before I fly (part of my pre-flight) and wipe off the leading edge when I put the plane away. Bugs come right off

Rechroming Struts

I had both main struts done by Industrial Plating Co. at 1300 Clydesdale Av in Anniston, AL. 800-525-6408. They did an excellent job.I got a quote of about \$275 per strut.

New Brakes Need to Be Broken In

That's what I have done everytime I replace the pads. High speed taxi and brake hard, repeat several times. I get good time-in-service for my pads. I am replacing my brake disc (original ones on my '69 that I bought in '83) this week, along with new tires. I am going with the chrome disc (pads should last even longer) and 8-ply tires this time (they were less than the 6-ply in AirHawk).

A Cherokee can land on 2000 ft and barely touch the brakes, airspeed management.

Prepurchase Items for 235

1. Watch out for the original fuel control valve located under the rear seat. The old ones have a tendency to leak from one tank to the other causing the tip tanks to overflow the mains. They cannot be repaired and need to be replaced with newer model valves.

2. Make sure the prop governor does not leak or even drip oil. A very small leak will cover your windshield with oil.

3. Watch out for corrosion around the wing root and under the baggage door frame.
4. Make sure the tanks have been pulled & resealed and the hoses replaced.
5. Be sure the prop hub has been overhauled per a recent AD. Read the AD carefully and check with a prop shop in interpreting it. Many (most) mechanics get it wrong.

Updating Old Alternator

I don't believe that the old 35-40 Amp alternator is available anywhere. An alternator service can rebuild your old one to 60 amp rating with a few internal parts or exchange it.(don't know if old core is worth much)and your mechanic can file a 337 form for the update. It is identical outside and fits the same bracket. Any automotive electric shop can do it also cheap, cheap

Power Tug - Towbar

Skyline Aviation makes a great little tug for about \$800. I tried the garden tractor thing and it just did not work very good. This little tug is great when the ramp is icy. Their number is 800-535-8640

Paint On Wing Talk

used a can of the wingwalk paint compound from sportys on my 180c. looks great, works great, and has lasted from the summer of 2000 just fine. Aircraft Spruce also sells the same stuff. like the man said 15 bucks and an old paintbrush ain't bad!!

Gross Weight With Engine Modification

All 140s have the same max gross weight of 2150, except for the earliest (1964), which had a max gross of 1950. The 160 HP conversion doesn't increase the max gross weight. You would think that it could be increased to 2200, since that's what the PA 28-160 has, but either nobody thought it worth the effort, or there are enough structural differences between the 140 and the 160 to make it too difficult.

Imported vs TSO'd Instruments

I learned a few things about our gyro instruments. First our lives depend on reliable units, and after all these years, I've decided to get my CFII utilizing my decked-out IFR humble 140. So, I went to a reputable instrument shop in Colorado to exchange my turn coordinator, and replace my attitude gyro, even if still seems to be ok, but is a bit slow to erect. (The DG seem to hold heading well, with minimal drift.) Second. There seems to not be a good record with import gyros. One avionics shop told me they are made overseas (China), are clones, and have poor small high speed bearing technology. They look good, but don't yet meet standards, although they may run adequately for a short while. Bearings are inferior and rust quickly. In other-words, poor reliability, and don't meet TSO standards. Our aircraft have TSO'd gyro's as approved equipment, and import gyros are generally not repairable. Third. I learned there are reputable, as well as poor or marginal overhaul instrument shops. They may not totally do the final tests, and final balance on the gyros after the bearings are replaced. This would result in excessive precession. I told the shop that I expect the best overhauled gyros possible, and be assured that

the gyro is run-in on the bench, re-balanced, and retested in stationary as well as exercised on a moving test table, to ensure drift and precession is minimal.

Replacing Starter - Get Right One

Tell your mechanic to get off his horse and buggy or sell his Edsel! General Motors has been using compact rare earth magnet starters for several years and the Skytech has been around for several years(I think about 8-9). I believe major aircraft manufacturers are now using lightweight ones with Skytech one of the premier ones.

Whichever starter you get, if you order it yourself be sure that you know HOW MANY TEETH your ring gear has.

Apparently not enough to just know the aircraft model. There are at least two sizes of drive gear, and I got the wrong one

Shielding to Eliminate Magnetic Interference

I reported on a problem with a King KI-204 indicator and my pedestal, dash mount compass. With the indicator in the top hole, the compass would not swing, due to the excessive magnetic flux field from the KI-204.

At the suggestion of Leo at Aircraft Services in Orlando, FL., I used mu-metal shielding to wrap the KI-204 indicator head.

This eliminated the compass error previously caused by the indicator head. The price of the shielding material was \$60.00 for a 6" x 15" x 0.004" sheet. Part No. OAS324083

Fuel Smell When Switching Tanks

I had that exact symptom and just changed it myself 2 weeks ago in an owner assisted annual. I had removed the tanks for SB 1006 so I didn't have to worry about the fuel mess. I recommend draining the tanks first. There is one screw holding the fuel selector handle in place...remove it and the handle. Under that is a brass threaded gland. After unscrewing it, the o-ring is on the shaft underneath. Remove and replace o-ring using fuel lube (o-ring is a 011 size, use viton material, it will last much longer). Replace gland and handle and you're done.

Seat Occasionally Unlocks - Slides Back

I have the same problem on my 76 Archer. I hate it. My AP says it is because the holes that the pins go into in the seat tracks are worn and oval. Worn holes lets the pins slide out. I've tried a bunch of things. But the most recent may have worked. I merely adjust the seat back to be slightly more erect. It was reclined slightly and doing IFR was difficult. Since move the seat upright more it hasn't released. I don't know why.

IFR GPS

There are no real "deals" to be had, but there are several choices. Which choice is best for you depends on what's in your airplane already and what else you need.

If you already have two comms and a glide slope and simply need a GPS, the KLN89B is probably the cheapest option. However, I'd also look at the UPS GX50 in this case. I've seen people advertising them for \$4500 installed, which should put it within spittin' range of the 89B.

If you just need a second comm, I'd recommend the GX-60 (that's what I'm installing). It's just under \$6k installed. If you also need a glide slope, then the Garmin 430 is worth looking at. It has everything in one and it has a feature that makes ILS approaches really seamless.

Next, everyone's going to start jumping in and say "buy GPS X because it's easier to use than GPS Y" or "GPS Y sucks because it's hard to use". This is a very subjective area and instead of taking someone else's word, I suggest you find out for yourself. Go to this website: <http://www.gpsforvfr.com/download.htm>. Scroll down to the "GPS Simulators" section and download the simulators for all of the GPS models you might be interested in. Next, scroll down to the "Panel Mounts and Guides" section and download the manual for each one. Then spend some time operating each simulator. Bring two of them up side-by-side on your computer screen and fly the same approach on each simultaneously. This is absolutely the best way to find out what it's like to own each of these and should help solidify your opinions. Do read the manuals though, as NONE of these units are "intuitive".

There are a few other pieces you'll need as well. The GPS must be connected to a CDI. You either need to buy a dedicated CDI or buy a switching unit and share the one you have. Make sure your current CDI is compatible with your GPS if you take this route (KI-208, KI-209 are not, KI-209 is). Also, if you get a GX series you'll need either a serial encoder or an altitude serializer (\$300).

P.S. The GX series manuals are not available from the site above. Go to http://www.upsat.com/gx_docs.shtml to get them.

Adding Shoulder Harnesses

I installed the Piper shoulder belts in my 1965 140. I wanted the inertial reels. Other than the price from Piper, the installation was straight forward. Plan on many hours of install time. Remove the headliner, rivet in several reinforcement pieces. (preformed by Piper) and bolt in the inertial seat belt assembly. Reinstall the headliner. Be very careful where you cut the headliner. It is very difficult to determine where the hole will be located after the headliner is reinstalled. Install the trim plates and it looks like factory. My IA took about ten hours to cut, rivet and bolt in the assembly. I did the remove and replace. I reinstalled the original headliner and it came out OK. Glad it wasn't a new expensive one. After I get the final antenna locations fixed, the headliner will be replaced.

Form of Logbook Entries - Preventive Maintenance

Content, form, and disposition of maintenance, preventive maintenance, rebuilding, and alteration records (except inspections performed in accordance with part 91, part 123, part 125, Sec. 135.411(a)(1), and Sec. 135.419 of this chapter).

(a) Maintenance record entries. Except as provided in paragraphs (b) and (c) of this section, each person who maintains, performs preventive maintenance, rebuilds, or alters an aircraft, airframe, aircraft engine, propeller, appliance, or component part shall make an entry in the maintenance record of that equipment containing the following information:

- (1) A description (or reference to data acceptable to the Administrator) of work performed.
 - (2) The date of completion of the work performed.
 - (3) The name of the person performing the work if other than the person specified in paragraph (a)(4) of this section.
 - (4) If the work performed on the aircraft, airframe, aircraft engine, propeller, appliance, or component part has been performed satisfactorily, the signature, certificate number, and kind of certificate held by the person approving the work. The signature constitutes the approval for return to service only for the work performed.
- In addition to the entry required by this paragraph, major repairs and major alterations shall be entered on a form, and the form disposed of, in the manner prescribed in appendix B, by the person performing the work.
- (b) applies to air carriers and Part 121 or 135 operations...
 - (c) applies to inspections...

UNQUOTE

You can look at the log entries from your log book to see what type of information they put. For an oil change I might put:

Engine oil drained, engine oil filter replaced with Champion CH48110. Engine serviced with eight quarts Aeroshell 15W-50. Engine run up, operates OK, no leaks found.
Erich Schlecht, owner, PPSEL Cert. no. 123456789 ---Signature---

Technically, I suppose you should say something like: in accordance with (abbreviated IAW) instructions in Piper Cherokee Service Manual, Paragraph blah blah, but for something like this people usually don't bother (I guess it's assumed). Anything more complicated you would want to record the authority (service manual, AC43-13, service bulletin, etc.), although the tough stuff needs to be signed by an A&P or IA anyway.

Split Nose Bowl Mod - Two Piece Cowl Mod

Aviation Development Corp. holds the STC. They're located in Seattle. Phone # is 800-944-3011.

Drilling Holes - Wing tips and Stabilator Tips

I've replaced stabilator and wing tips, tried the hole locator tool and the masking tape method of transferring the hole location. Prefer the masking tape method. Mark how far the old tip was on the stabilator. Can use tape or a marker. Remove the tip. Apply a strip of wide masking tape across the stabilator parallel to the tip.

Lay a straight edge across the hole and draw an angled line on the tape line, angle the straight edge (still centered on the hole) and draw a second line approximately 45 degrees to the first line. You will then have two lines on the tape which will accurately locate the hole.

Locate all holes on the tape then slip on the new tip and transfer the locations by aligning the straight edge with the lines and extending the lines to locate the holes on the new tip.

Use a tapered drill to drill the fiberglass, a standard drill will chip the fiberglass. You must get a sign off because you are modifying control surfaces.

And

I've only done the stabilator tips. It's pretty straight forward. Mark where the old tips fit so you can get an idea of how far the new tips fit on the stabilator. Fit the new one approx the same way, making sure the top and bottom are equal. My mechanic loaned me a tool to locate the new holes. It fits in between the stabilator and the tip. The bottom fits in the old hole and the top has a sharp pin which locates the corresponding point on the new tip. It made it a breeze. (A hole finder is available from any good aircraft tool supply house.)

Seat Adjustment Connectors (Gas Cylinder)

CALL CHUCK AT 660-885-7531 CENTRAL AIRMOTIVE CLINTON , MO.

Airwolf air-oil separators

Airwolf is the grand daddy, but they stopped making them for a while until the M20. I tried to buy one but no go, so I bought an M20 at the time \$159. Since then, they got greedy, and it wasn't all that easy to bolt on. It does work. Airwolf had an excellent reputation, and is now back. Airwolf got a little greedy too, but if you shop around, you may fare better. 1-800-326-1534 is Airwolf's number.

Purpose of Rear Seat Floor Vents

It is not related to the battery, it's just that in the 140 the venting is through the spar box under the rear seats, where Piper happened to put the battery. The purpose is to allow air coming in from either the tail mounted air inlets or the wing root inlets to exit the plane. Without an air exit, the cabin would pressurize, preventing fresh air from coming in, which would be bad in the hot summer.

On older planes the exhaust vent was on the top, in the newer (post-68, I think) on the bottom, and those grills near the rear seats allow the air to get into the spar box, and then overboard through the exhaust vent.

It might be that you have a leak, so that fresh air comes in even when the inlet vents are closed. Those eyeball vents tend to leak. Otherwise, you might try plugging the outside air vent with a block of foam when its cold, or put a towel over the grills near the back seats.

Cowl Plugs Protect Starter

If you don't have them already, get a pair of foam inlet plugs. Some people make them by hand. I got mine from Ground Tech in Salisbury, MD. I don't know if that'll fix the problem, but in ten years I have never had the Bendix stick, and I don't lubricate it or anything. Also, my starter gear is still un-rusted, and I attribute this to the plugs keeping the rain out.

Noise in Intercom

Installing filters will only mask the problem for a short time. Several things can be the cause. I had the same problem with my 180 a year ago. The following helped to solve the problem.

1: Check all grounds. Be sure the BATTERY ground to the airframe is clean... remove and buff the airframe connection with some emery cloth or a Scotchbrite pad. Be sure the ring terminal is secure and not corroded.

2: All of the avionics should have there grounds at ONE point. I have a lug with all my radio and accessories grounded to the same point. Be sure that it is clean and tightened.

3: The battery being good is an excellent choice. As stated it is a BIG dumping ground for the noise of your electrical system.

4: I have 1 KX155 that is as quiet as can be. I have a TKM radio that whines. It is in the radio. The radios have input filters on the power supplies. If a surge was sent to your electrical system it is possible that one of them could be damaged. My intercom was smacked by an alternator that went bad. I finally had to replace it with a new unit.

As stated, grounds are the best bet to kill noise. The alternator has a capacitor on it to help attenuate the noise from the alternator. I replace mine in vain. They don't do much.

Trim Switch Replacement

Had the same prob. Went to a local electronics supply, found the same (2) micro switches, soldered it up myself. Cost around \$10 for the 2 switches. Piper wanted \$309 for the same thing. Wasn't all that tough to do. I still have the old pieces, and might be able to get another pair if you are in a pinch. They were identical to the OEM unit. Can you solder? Have you a VOM? Just basic electric aptitude is all you need.

Engine Break in

Read this:

<http://www.avweb.com/articles/breakin.html>

Avweb has many more articles that are interesting reading, snoop around their site.

Radio Causes Compass Error

Thanks for the input -- all data points help! There was no other work at the time, except for radio. Have confirmed with 2 additional radio shops that this is a common problem with the KI-204 head and nearby compasses. My error, E-W is exactly as you described.

In my case, removal of the KI-204 clears up the problem. It was suggested that I try mu-metal foil shielding to contain and minimize the magnetic field from the KI-204. Got some foil on the way, so we'll see

Stopping Leaks, Floor Air Vents

I had a problem with leaky floor vents in my 140. I found the rubber gasket in the valve assembly was basically gone. (Basically a piece of rubber sandwiched between two pieces of aluminum and screwed to an adjustable shaft.) The local Piper dealer sold me two new ones (the whole sandwich) for maybe \$30 each. Part number 68671-00, Valve Assembly, Air Vent. Get new ones, because if they're used, you sure don't want 'em. I left the back valves alone, because they hadn't been rubbed to shreds.

Repairing Overhead Vent Duct

I also have a 73 180. The overhead air vents are connected to two plastic polyethylene tubes about 1 in id to the back of the plane where they are connected together in a Y connection. They

are held in place by a set screw in the Y connection. This is a pretty poor connection. In my plane, the tubing had split and the tubing had popped out of the Y connector. I rotated the tubing 180 degrees, reset the set screw and then duct taped them into place (three years ago). This solved the problem.

Unfortunately, in order to get to the connection, you have to remove the side panels in the rear and then completely remove the hat rack...be careful, the plastic is brittle. You then can lay in the baggage area and stretch into the tail section and reach the pieces. Miller Lite and aspirin helps when you are done

Poor Braking Action

Had a 76 Cruiser, and the brakes were excellent, but not before a little surgery. Brake pads for one are not very good. Use Rapcos they're cheaper, last longer, and stop better. Distorted brake discs is often overlooked, as well as preload of the wheel bearings. Aviation "burns" new linings in. This is good for deep glazing and general break down of the material. Use the Rapcos and dress them to size rather than burning them.

Some owners have installed stainless discs. They don't rust, but...the coefficient of friction required for stopping just ain't there. SS retains heat which further burns up linings and overheat calipers.

The bracket which holds the caliper must be plumb in relation with the disc, if not, no stop.

The caliper itself can corrode internally. This causes steps in the caliper body causing sticking of the pistons, mo' no braking.

The master cylinders, and hand cyl. may need kits or even new O rings. I think that's enough to help you along.

Piper PA28 brakes are probably the best in Gen, Av. Ya just gotta dig a little harder. BTW, they're horrible to bleed, but doable.

Static RPM, Cherokee 140

Max static rpm is 2425 regardless of pitch, this is to stop someone from under pitching there prop. hopefully if you static over 2425 the full throttle in flight rpm will be way over red line. min. static rpm is 2150 for the 1950 gw and 2275 for the 2150gw. if you have the information on weight and balance, this info should be in that section.

■Pierce• 160 HP Engine Conversion

Welcome to the club. I also have a 1975 Warrior, purchased in 1999, that was converted to 160hp under STC SE1226CE. This is a Pearce Engine conversion with the installation of the converted engine back into the aircraft done under STC SA1331CE. Both STCs were reissued to John L. Kuranz in Barrington, Illinois October 12, 1993. I obtained this info from:

[//av-info.faa.gov/stc/search_results.asp](http://av-info.faa.gov/stc/search_results.asp). I sent a letter to Mr. Kuranz address as listed in the STC search and the letter was returned with a note "addressee deceased".

Records indicate the conversion in my aircraft was done (1989) by Ly-Con Engine Rebuilding in Visalia, California.

Maximum continuous rpm is 2500 although in addition to being over that on takeoff, I will also periodically fly 5 to 10 minutes at 2600, 2650 and 2700 rpm when in cruise. I always drop back to 2500 for 10 minutes or so before going to the next higher setting. I have a green arc between 2500 and 2700 however the tach is placarded with the "maximum continuous rpm 2500".

I am also 46 hours into a "new limits"

overhaul. During break in, with my engine shop's approval, I would take the engine to the 2550, 2600, etc. limits for 5 minutes at a time, always dropping back to the 2500 mark for 10 minutes before going to the next higher rpm. Something must have worked because I have no leaks, and went 34 hours before adding my first quart of mineral oil, after the initial 10 hour oil change.

If you are interested and will e-mail me with your address, I can get copies of my STC paperwork and mail them to you for comparison. I have a pretty complete set.

You say you can't get the rpms any higher than 2500. Is that per the STC or the engine limitations? Let me know if you want copies of my paperwork. Safe flying.

337's Signed off by IA, Kept by Oklahoma City

Rob - Yes, an IA must sign off every form 337. For whatever its worth I am an IA. He must then submit the 337 to the local FSDO - A copy that is. In this case there would be no hiccup because of existing STC. The FSDO then sends the form to Oklahoma City where it is filed in a file for the aircraft concerned. Every registered aircraft in the U.S. has a separate file which contains all 337's for that aircraft. The file also contains all kinds of pertinent info for that aircraft.

Need Repair Station Records in Aircraft Records

Hey guys - George just reminded me of a point I wish to pass on about aircraft records. At the last IA seminar in March that I attended, we were advised of the following. All future annual sign off not to happen until all work previously performed by a Certified Repair Station has detail copies in aircraft paper work. What that says is that a log book entry that states details on file at a certain CRS must have copies of details in aircraft records. I was just in contact with an IA from the Miami area and he told me the same thing.

Removing Defroster Vents from Glare shield

It's not the easiest thing to do. If you have long arms, and can stand on your head, it helps. Otherwise, you probably will need 2 people. One to hold the screw at the vent, and the other to take off the self-locking nut under the panel. I swear if I ever do it again, I'll replace the phillips head screws with hex head screws. This would make it a lot easier, especially the reassembly, which is worse than taking them out

Fuel Tank Has Water - Fuel Cap OK

Tom = I highly suspect the LH tank filler neck - the part riveted to the tank - is badly worn. This is the part the cap mates with. They corrode and wear. If this is the problem Skycraft is the only way to fix it properly. Tank has to come completely apart. Also, I might add, Skycraft has a stainless steel replacement filler neck. Ref our magazine for Skycraft. They, in my opinion, are tops. - Tom

New Seat Belts

I chose to spend a few more dollars and buy only new lap belts from Chief Aircraft. They arrived Saturday via FEDEX. I was surprised, quick service! Had them replaced in less than 1hr. They did have the shoulder harness tab, and brand new hardware. Costs about \$150. The hardware has the same part number as the original on the belt hardware. However, you get more belt and have to adjust the lengths on the one side, which is ok. The advantage is little down time, new hardware, and the shoulder harness works better than ever because the nylon retainer bushing is

on the new belt tabs tab. My old one was gone a long time ago. If you order only lap belts, be sure that you ask for the hardware with the shoulder harness tab. No extra charge.

Trimble Radio Repair

Free Flight Systems

Waco, TX

(254) 662-9370

They bought part of the Trimble line, and much of the parts inventory. Fairly quick turn around time, but their not cheap. Then again, who is?

Running Strobe Wires in Wings

I added wingtip landing lights and needed to add wires.

I first removed all access covers and removed partial interior panels. YOU will need to remove back seats and rear bulkhead for mounting of power supply. You will also need to remove entire passenger side panel because you have to route wires to breaker / switch panel.

Next, I used what is called glorods. These are available from any electrical supply store. They are fiberglass rods, about 8' long, day-glo color that screw together and are rigid enough.

Next, I removed wingtips and attached two thin wire to the glorods. One wire was to be used a pull wire and the other is a spare in case I ever need to add anything else. I sprayed a little silicone on the glorods and wire and fed the glorods down the existing grommets that hold your nav. light wire. I verified that the wires went through the grommets and that no bonding or snags occurred. It took me about an hour and half to do the first wing and 30 minutes to do the other. I added tie wraps were I could to finish off the job!

I had my AI check over the work and sign off on it!.

My Cherokee came wing wingtip and tail strobes but I changed the power supply to new, brighter "Comet flash" style. My existing power supply was located behind the bulkhead and I was able to slide myself through the access cover and change out power supply. I did not have to add or change wires

Capacitor Across Alternator

My manual shows the capacitor on the schematic, but doesn't have a value. I believe it is probably .47uf. Aircraft spruce part no is 11-08060, Wag-Aero part no is I-226-000. Both are "approved", PMA'd and both are \$39.95 in my catalogs. Your local auto parts store probably has a non-approved version for less than 10 bucks.

PA-32 Has Forward CG

You have discovered the most important aspect of flying an a/c that has such a large CG envelope, hauls 6 people, and is l-o-n-g. I fly a T-tail Lance and the tendency is actually worse.

The best solution is to move the CG further aft. This is most easily accomplished by putting weight in the aft baggage compartment (more than 50#). Do not worry about hauling around the

extra pounds, because moving the CG further aft will actually improve the fuel efficiency by unloading the horizontal stabilizer.

Other items to watch for are high sink rates, idle power descents, hot starts are different in a fuel injected engine, and the different handling between light and heavy loads.

Spark Plugs & Performance

just changed out all 8 spark plugs on my PA-28-140. Not that the engine was running rough or anything, it was just that I was unable to tell when they were changed last (some looked very old & rusty, some newer). My A&P looked at a few several months ago, his response "don't worry about it, they look good"

To make a long story short, I have never seen the Tach so close to redline, nor has it performed so well, since I bought the plane last summer. Folks, my advice, if you have ANY question about the age/condition of the plugs, just change them ALL out. I think Aircraft Spruce sells them for about \$17 each.

Vertical Card Compass

Changed out my old wet one about 6-8 years ago and haven't had any problems with it. The difference is no comparison. Once you have one you'll never go back to the old style. It's as easy to read as a DG!

Unlocked Primer

Started up my Cherokee 140 last night and thought the engine seemed to be running a bit rough. Nothing I could pin down, but just didn't feel right. Smoothed out pretty well above 2,000RPM and MAGs checked perfect. After extensive run up, leaning to burn off carbon, and Carb heat to handle any ice I took off for a local flight to check it out. (This airstrip is in an agricultural area, and after clearing the gulch at the end of the runway there are miles of uninterrupted suitable landing spots.)

Engine ran well until I throttled back on short final, then I could feel the roughness again. Still nothing I could pin down.

When I pulled the mixture to shut down, the engine sputtered and ran for about 10 seconds before stopping.

I've got just over 50 hours on a Major Overhaul, so I hunted down the mechanic to find out what was going on.

His answer: ■Before I even go out there, check and see if your primer is locked.●

Guess what?...

After all these years of flying, I had failed to properly secure the primer. I can't even remember if I ever used to know what the symptoms would be, but this is something else to add to your troubleshooting list if things just don't seem right. It also occurs to me that an old primer with worn seals might contribute to an unidentified engine problem.

Maintenance Manuals

I have the McCurtain CD-ROM with the service and parts manual. It's a great deal at ~\$45. They are at:

www.mccurtaintg.com

If you want the paper manuals, one of the best sources is Essco. You can find them at:
www.esscoaircraft.com

Overhaul Struts - Not Strut Seal

Strut seals are cheap and easy to change. Refer to piper service manual and SLOWLY release air (nitrogen) from schrader valve on top of strut. Remove the schrader valve and fluid should be up to top of hole you just removed schrader from. If not top off with 5606 hydraulic fluid, reinstall schrader and inflate until 4.5 inches of strut are exposed. This goes for my 1966 140, other years may be slightly different.

Seals are also easy to change. DEFLATE STRUT Jack up airplane or weight tail until front strut is about 8 inches off ground. Disconnect one bolt from Scissors and pull strut out. seal is just up from bottom of tube in aircraft and can be removed with a ice pick or very small screwdriver etc. Just pop a new seal in and reinstall strut and service as above.

In my 140, the seal is NOT an O ring but something called a Quad seal so make sure you get the right one.

Even If you have it done, it should not be very expensive and would not warrant the use of a sealer as they just prolong the agony and can make the strut stiff.

Shoulder Harness STC

Aero Fabricators, Inc. Lyons, WI 414 763 3145
Kosola AV., 1-800-4kosola
and...

Aircraft Spruce sells STD's harnesses for the PA28 series. I have a pair installed on the front seats of my 69 140.

They are fixed harnesses-not retractable, cost about \$235 each, and will take 3-4 hours of labor each to install.

I'm told that Wag-Aero

Warrior Gross Weight Increase

I have checked into the STC to increase gross weight to 2440. The cost to purchase is \$210 and it is held by:

Aireast Airways inc
8100 Republic Airport
Farmingdale, NY 11735
(631) 756-5500
www.aireast.com

They have sent me literature on it, but I have not yet purchased it (partially because my airplane is still at DESAPI in Cadiz OH for painting.

They (Aireast)did say it only applies to 1977 through 1982 Warriors (S/N 28-77160001 through 28-8216300).

Removing Air Conditioning

As an IA please let me advise you to coordinate whatever you do with the local FSDO. There are sixty nine FSDO in the U.S. and if you ask the same question of all of them you may very well get sixty nine different answers. Whatever ans you get you can hang your hat on it because they will "probably" require a 337 and their signature. Above all - you don't want to end up with an illegal airplane no matter how irritated you may be at the A/C. The equipment list and weight and bal must agree with the aircraft and by what authorization was the A/C removed? Wish you the best of luck.
And...

With regards to the refrigerant in the system, be sure you have a qualified HVAC or auto technician REMOVE the gas FIRST. Be aware... if you were to blow the gas off even ACCIDENTLY and you were discovered, the fine is not less than \$50K! It is illegal to loose refrigerants into the air.

If the systems is flat, no gas, then removal should be no problem. Be sure to document that the systems was flat.

For the removal, it is very simple and should not take someone more than an hour to properly do the deed. Make sure that you have some documentation when you have the gas recovered and keep it with you logs as someday someone might want to know what happened to it when you removed the compressor and components. BTW, the gas is worth a lot of money to the right people. DON'T PAY SOMEONE TO TAKE IT OFF YOUR HANDS.

How do I know this? I am in the industry and have seen companies fined hundreds of thousands of dollars for venting gas. Tech's loose everything when caught. All it takes is some "do gooder" looking for a quick buck and a call to the EPA and your screwed. Do it right

Plane Turns With Flaps Extended

It obvious that your flaps have gotten out of adjustment, it doesn't take much. You'll need to get you A&P's help (or someone that has done this) to get them even again. If you look (as you should be doing during pre-flight) at the turn-buckle at the inboard point next to the body of the plane, you'll see the adjustments.

And

Even though your flaps move the same on the ground doesn't mean they move the same in the air - due to wear. Extend the flaps fully on the ground, then lift up on each by hand and see if one has more travel than the other. If you simply measure static rigging on the ground, the weight of the flaps will help them both hang down the same amount and appear correct.

Oil Pressure - High Time Engine

high time engine. Not unusual to see yellow at 1500 or below. Still you have a high time engine. The 15/50 is saving your engine. It cools faster than the molasses. Don't change unless you want to wear out even faster, and use more oil. As someone said, do not tamper with oil pressure adjustments, with a high timer, you'll burn more oil and may cause more severe damage.

And

In my opinion the oil you are using is totally correct. I have used it in my 68 140 since it became avail. The green arc on oil pressure gage is valid at full power - and cruise as well. The yellow arc is for idle power. Your oil pressure is entirely correct. There is only one place to adjust oil pressure and that is on oil pressure relief valve = upper RH side of crankcase by #3 cyl. Suggest leave it alone - all is well!

Remarking airspeed Indicator after Mods

Actually, I don't have any idea what hoops need jumping through to re-mark the ASI. One thing that IS interesting is that the Type Certificate Data Sheet (2A13) specifies the upper speeds (V_{ne} , V_{FE} , V_{no} and the maneuvering speed), but NOT the bottom of the green or white arcs, which are set by the stall speeds.

As you said, the stall speeds can be changed by modifying the airframe, but the others are set by the structural design and construction of the aircraft. The bottoms of the arcs are specified in the POH, but it may be legal to re-mark them, since they aren't in the TCDS.

Electric Fuel Pump Overhaul

Just in case anyone finds themselves in need of an overhaul or new electric fuel pump, as I recently did. Last week mine quit, looked around for new vs. o/h vs. having mine o/h. I found a company up in Canada, Aerospares Acces Inc. (1-800-355-2157) that is an authorized Weldon shop. They wanted \$600 US for a brand new pump, \$500 for an o/h unit and \$250-\$500 for doing mine. I called a few shops in the US and the only one that had one in stock was a o/h unit for \$635 + \$300 for the core. No one had a new unit. I chose the cheap way O/H mine, cost me \$400, they installed brand new motor, and all internal pump parts, the only reused part is the pump housing (no wear on mine). They received the pump this past Monday and I had it back at my house on Wednesday by 10AM, WOW, I'm impressed, \$400 and shipping included in three days. I got the pump installed today and she purrs like a kitten, again, great finally back in the air. If anyone needs this done I would highly recommend that shop, extremely nice and easy to work with, they sell other items such as starters and vacuum pumps.

Hard Starting - Cold - Carburetor

I have two Archers. Both have the same symptom when starting cold. They are starving for fuel. Here is what I do and it works for me. Mixture Rich, 3 pumps on primer, fuel pump on, (delay a moment for fuel pump to build up some back pressure), 1/4 throttle, crank 10-15 seconds, if you hear it fire, then I pump the throttle to throw more fuel into carb. Stop cranking after 15 seconds if it doesn't start. Re-prime with 2 or 3 more shots. Crank, and again when you hear it begin to start, pump the throttle a few times. As you've already read, it is important not to use the throttle in place of primer, nor if engine isn't turning over. But that crucial moment when the engine is cranking over and it is just about to start on fuel from the primer, a quick extra shot from the throttle throws it right over and it starts.

Vertical Compass

The PAI 700 is a fully TSO'd instrument and is a direct replacement for the whiskey compass. It is not preventative maintenance to replace your compass therefore as with any other instrument it requires an A&P mechanic to do the job. Also the installation instructions tell you "NOT" to

mount the vertical compass in the instrument panel. This unit works quite well when properly installed in its mount and it is properly calibrated.

Autopilot Installation

An autopilot is a great asset for long cross-countries or for IFR flights. I've hand flown 9 hrs in a single day in my 180, and its exhausting. Based on this and the (mostly) inop condition of the wing-leveler in my 180, I looked into adding a REAL autopilot to the plane. STEC makes great single and two axis autopilots. They've been in business for a while, and seem to be growing their business (note the acquisition of Meggitt displays).

I wanted two axis control (roll and pitch). Altitude hold is a requirement in my opinion for anyone flying IFR.

The STEC System 30 has two axis control, and will easily fit in the panel - replacing the turn coordinator.

Cost (installed) is roughly \$9k.

A cool add on feature is GPS steering (GPSS). You can actually program an entire flight into the panel-mount GPS and the autopilot will fly it all, gracefully making turns along the way. This is another \$1.5k installed.

Bottom line is the cost is high, and you'd be lucky to get 1/2 the value back at resale. BUT, the ease of long-distance flight would be greatly increased, AND with proper utilization of the autopilot - single pilot IFR should be safer too.

Vertical Card Compass

I agree wholeheartedly with Ken. My vertical card compass is the "beez-nee!" Mounts on windshield post and almost as good as a DG. No more leaking panel mount compass. I have an old one. Get the vertical card and you won't regret it.

Aeroflash Strokes

I put the AEROFLASH wingtip strobes on last year, also with new Metco wingtips. Cost was a consideration. Whelen may be the better product and has some visual advantages, with the visibility of their comet multflash strobe, but I do not like having high voltage wiring going through the wing. (I believe they do have wingtip or separate power supplies also, but at greater cost.) I prefer the wingtip power supplies. I had to pull just one power wire through each wing from the fuselage instead of the high voltage cables. I have noted no major interference, just the mild typical background sound of the power supply capacitors. Installation with the Aeroflash can take less than 5 hours. Paperwork is more for the AEROFLASH, since it is not specifically STC'd for the Pipers, where the Whelens are. Many Piper's now have the Aeroflash units, so field approvals from the FAA should not take too long. My local FSDO approves them quickly, because it is a definite safety enhancement on our aircraft. My IA let me do the install under his direction. There is a great spot for the power supplies on the outer wing rib, adjacent to the spar. Several spacer washers are required, you will see. That was a simple task. The paperwork, which I typed up was the the most time consuming, along with changes made to the aircraft equipment list and weight and balance. If you would like additional info, drop a line or I will be happy to talk to you if you choose the Aeroflash units.

Replace Interior Foam With Side Panels

Tom, if you are going to redo the interior, definitely replace all of the garbage insulation that Piper put in. Airtex will sell you the foam (1" for sidewalls and 1/4" for under the carpet. This isn't too tricky to put in. The easiest way is to use the old ones for patterns. When we pulled ours out, we numbered the panels and the plane, that way when you cut the foam, you know where it goes. The foam from airtex has a self adhesive backing, if you are trying to get it into a tight spot, spray the adhesive side with a mixture of water and ivory liquid, about 8-10 drops in a qt of water. This will stop the adhesion for about an hour and then it's fine.

Seat Foam

Try Hi Tech Foams. Their web site is www.seatfoam.com email is seatfoam@inetnebr.com. Great people to deal with. Do not get the 3 layer as it is too thick for our seats (atleast in the warrior, although with the height all the way down it might work). The 2 layer will work fine.

Bleeding Brakes

After I spent the better part of a day trying to bleed my brakes using the gravity and pressure methods, my A/P showed me the FAST way.

For those with toe brakes...

SLIGHTLY loosen the 9/16" hose fitting that goes to the blue AN fitting at the top of your toe brake cylinder. SLOWLY pull the hand brake handle until you get a little bubbling around the fitting. When the bubbling stops and you get straight fluid, release the handle. Then, SLOWLY depress the toe brake until you get no bubbles, just fluid. WITHOUT releasing pressure on the toe brake, tighten the fitting. (if you release the pedal before tightening the fitting, you let air back in) Voila! No air, firm brakes. Paper towels or shop rags will keep the fluid off your interior. The key is slow and easy pressure, or you'll have red fluid all over. Don't forget to check your reservoir level. Took about 2 minutes to do each side.

High Time on Vacuum Pump

First question--do you have a vacuum back-up system? Anyone flying true IFR should. Its very cheap life insurance. You can get by very nicely with the Precise Flight III shuttle valve manifold system for about \$400 installed. Yeah I can hear all the groans now--afterall, all you need to do is stay current on partial panel IFR. Be honest--how many of us TRULY stay genuinely current (as in comfortable in the real soup) on partial panel IFR including approaches? Back to your original question--if you have vacuum back-up then continue on with your current pump until it fails (as it inevitably will, the same as any mechanical device). No vacuum back-up? Then I would replace the pump now or certainly within the next 100 hours of operation OR avoid any true IFR OR practice partial panel rigorously with an instructor every three months. Flying true IFR is not about saving 3-400 dollars or bragging about how far you stretched your luck without getting caught. Its about conservative judgement and staying well within your real limits. Unless you fly for a living, your skills will get rusty just like the rest of us and you want everything stacked in your favor. Save the testosterone stories for the for those who will never become OLD bold pilots. Incidentally, I've had excellent luck with the Sigma-Tek vacuum pumps. (And I change them out at 750-850 hours even with back-up vacuum--been flying for 32 years and plan to continue for some time to come.)

Single Probe EGT

I have a 140/160, with a single point EGT installed on the #4 (left rear) cylinder, as specified in the maintenance manual. It works just as advertised, BUT, all it really told me was that the Lycoming recommended leaning procedure reliably gets you to peak EGT for the leanest cylinder, the others are all richer and that is just what you want to do. IMHO, a single point EGT is a waste of \$\$\$.

Chrome Valve Covers

Chief Aircraft, 800-447-3408.

www.chiefaircraft.com

Page 86 of their catalog.

Firewall or coving Insulation

Go to a hot rod shop and buy stick-on Thremo wrap.

It's cheap, light, and easy to apply, and even says it's good for Aircraft. How about that. If you use it, be sure it had all oil and grease removed.

To Paint Interior Metal and Plastic

Krylon #3511, Almond Satin, available at Wal-Mart, is as close as anything I've found. The sheen is correct, it is lacquer base, so dries fast and hard, and is an excellent color match. Being lacquer, however, it may lift the old paint if applied over it. Test first, you may need to strip the old paint.

Oil Screen Needs Cleaning

I Assume that you have a four cyl Lyc with an oil filter on the back of the accessory section, and you are draining the sump by means of a Curtiss quick drain. If correct then the oil screen is on the accessory section lower aft right hand side. It is not easy to access and is a hex cap that is lockwired to the accessory housing. Cut the lockwire (do not attempt to break it or pull it loose as you may damage the case) and loosen the hex cap. The center line of the cap is horizontal. You will find that the engine mount almost interferes with the removal of the cap and screen assy. Please note a copper crush washer as a seal. You may want to put a new seal on.

Rams Horn Yokes - Spruce

Aircraft Spruce has a great looking aftermarket yoke. Page 153 in their new catalog. The A-1300 has the small hole, that I think you have. \$136.50 US\$

Copper vs Aluminum Wire Capacity

#2 copper is good for 140 to 190 amps, depends on type of insulation. #1 aluminum is good for 130 to 175 amps. If you now have #1 aluminum or smaller the #2 copper will work fine.

Gyro Instrument Rebuilding

I have been using Nu-Tek for all my gyro rebuilds. Their turnaround has been very fast, and everything works perfectly when returned. I don't know their current prices. You can reach them at 800-338-7146. Good luck!

And...

I just had my AI and DG replaced and purchased from Berkshire instrument. Great to work with-

DG or AI if you send yours in for them to rebuild \$270- they will send you a rebuilt for \$325 if your core is rebuildable. Otherwise the price is \$425. They will bill you for the \$425 and refund if the core is OK. Mine work like a champ.. 1-800-443-0083

Piper Air Conditioning Cure

I have an Arrow with an AC that I purchased a year and a half ago. Belt twisting nightmares for the first six months. Since then I've been on the same belt for about 60 hours. It was all in the alignment. There was an article in POM that described making a tool to check the alignment versus using a straight edge. My mechanic made the tool and found out the alignment was off. He had previously been using a straight edge to check. Getting things aligned might be cheaper than the Piper fix.

Replacing Wing Root Seals

I found it easiest to start underneath the wing. The gap between the wing and the fuselage isn't a uniform width, and there was a space about halfway back from the leading edge which was so narrow that the seal wouldn't "pop right in" for me with any kind of coercion. Eventually I figured out that I could slide the first 18" or so of the seal sideways in from the rear after removing part of the inside (round) portion of the seal (which has to be done in a couple of places anyway to make room for the wing spar). Once I figured that out, the rest was easy.

I also got one of those tools that are used to install the cord that holds window screens in their frame - it is a handle with a narrow plastic roller on the end. It was reasonably effective at pushing the seal into place.

and...

Use a spray bottle with a soap and water combination. Make the mixture good and slick and the seals will pop right in. Remember not to stretch the seal at the bend around the leading edge.

and...

Here is what a piper representative told me at Sun & Fun last year about how to install the wing root seal. She did for many years. It worked for me. You can use soap and water, or regular car wax to make it slick. The key is also to cut the round "bulb" portion off where it goes over the wing spar, as well as around the curve of the leading edge

Aeroflash Strobes

For cost reasons, and for additional safety, I put on the Aeroflash Strobes on my Cherokee Cruiser. The Aeroflash is a simple single flash strobe with a power supply mounted on the last wing tip rib. All we had to do was to route a single 14 volt power wire up each wing.(That is a bit of a story in itself.) I believe the Whelen requires that high voltage wires be pulled through the wing from a single power supply mounted in the fuselage. (Whelen also may have wing tip power supplies.) Anyway, I did not like high voltage wires running through the wing, which I had on my PA-30. Always worried about a fuel leak or ignitable fumes and an arc. The Whelen does have some very distinct advantages, and may infact be a better product. For instance. The Whelen is approved for Piper Aircraft where the Aeroflash is not, and requires more paperwork being submitted for a Field approval from the FAA. (Enough Pipers now have installed these units now, that if the FAA Form 337 is submitted correctly, it could be easily approved. Sample approved 337's may be obtained from members for the asking, which would help your IA if he

doesn't have the sample paperwork for the Aeroflash unit.) The Whelen comet multiple flash is much more visible than the single flash. (Aeroflash makes a multiple flash unit, but it costs almost as much as the Whelen.) I believe whatever the choice, a wingtip strobe system, can greatly enhance the anticollision safety of Cherokee operations.

Constant-speed prop benefits

What you gain in climb or cruise depends on what you are comparing it to. If you currently have a cruise prop on your airplane (a lot of pitch) the benefit of C/S will be in climb. If you have a climb prop, (flat pitch) the benefit will be in cruise, BUT NO MORE than if you repitch your prop to cruise. The idea is to be able to get both ends of the spectrum. The C/S prop will also go "flatter" than even the flattest climb prop, resulting in quicker initial acceleration.

In my handbook for a 1966 Cherokee six - 260, the airplane is available with both props. The published cruise speed and fuel consumption is the same for both. The C/S has a shorter ground run and better rate of climb.

Overhauling Directional Gyro

Send to shop. Try Nutek. 1-800-338-7146. Do not collect \$200, but be prepared to pay. They have done many for me, including one with a heading bug that should not precess.

Slimline Tail Strobe

Bought one for my 180. Easy to install. Use the old wire to pull the new one down the tail. Mounted the power pack next to the battery. Use caution and measure twice and drill once the hole for the fasteners.
It looks good and has been flawless for over 600 hours.

Alternator Replacement

I bought mine through spruce but it actually came from Electrosystems (Inc. Fort Deposit AL 36032.) Make sure you know which one you have. one is a square back and the other is round back..they are not interchangeable I found out when they sent the wrong one initially. I think it was about \$200..

Leaky Fuel Tank Repair

The only legal repair to that - that I am aware of - is disassembly and repair by a Certified Repair Station. Note - no welding should ever be attempted on a Cherokee fuel tank. I will provide reasons upon request. Just had both of mine resealed at \$550.00 per side by Skycraft at North Hampton NH. They did an outstanding rework. Also please note that the Cherokee fuel tank is a structural component of the wing and that it is not interchangeable aircraft to aircraft due to mate drilling of the attachment holes.

Porter Seat Cylinder Repair

Just wanted to share my satisfaction with AvFab's repair of my PL Porter vertical seat adjustment cylinder. 2 day turn around just like they say. Installed it back on the seat today and works great. Cost \$135.00. Beats the heck out of a new price. I had also spoken with PL Porter and they don't sell to consumers. Only sell to distributors such as Piper. Keith in Las Vegas. N32744

Fuel Pressure Readings

The Lycoming Operators Manual for my O-360-A3A in my '65 180C lists fuel PSI Max. 6 and Min 0.5 with an MA-4-5 Carb. Also I see very little if any drop between the engine driven and the electric boost pump. Mine runs around 4psi. The Flight Manual for my 180 lists the green arc between .5 and 5 psi and the red line at 5psi.

Aluminum instrument panel overlay

I just got mine back last week. I have a 1966 Cherokee 160 with raised brow. I sent my panel in to him with pictures. It took about 2 weeks to get it back. My mechanic installed it. I also had him fabricate me a 2-3 inch lip on the top. He said he can do it for other planes so if you are interested let me know. He is good and he doesn't charge an arm and leg. I painted my panel a dark fawn just like the new Pipers. Man, what a difference. It looks really sharp. Email me if you have any more questions. Hope I helped. Definitely worth the money

Converting to Rams Horn Yokes

I just finished getting my '62-160 changed over from the bow-tie yokes and .75" column to ram's horn and the larger column. (I had the cracked bowtie yokes) Cost from Wentworth for a pair of nice ones \$670 plus shipping. I don't have the installation cost yet but my mechanic said I'm going to like the looks and feel. The 337 came fairly quickley.

Troubleshooting non-working annunciator

I assume that:

- 1-- none of the lights light when they're supposed to, eg. engine off.
- 2-- They don't light if you press the test button.

In that case either there is a broken connection between the common side of the lamps and the bus, or the fuse is blown. I don't know exactly where the fuse is, but it should be near the bus, attached to wire W1A, which goes to the lamps.

If it is the fuse, make sure there is no short between the common side of the lamps and ground, using a VOM/ohmmeter to check that wire W1A is not grounded (zero ohms between W1A and ground -- test with master switch off, of course).

Acrylic vs Polycarb Windows

I just did mine with TAP and I used polycarb for a couple of reasons. First I could get it in the darker smoke that I wanted, second it has 1700 times the impact resistance of the next choice, and third it is more flexible. It also doesn't mind if you clean it with Windex unlike the other plastics. So go for the polycarb!

Window Sealing Tape

I replaced my side windows last year and used black foam sealing tape from Chief Aircraft. It's on page 100 of their catalog. P/N LP SP-FT114100. I bought the 100' roll for \$35.

Chrome Cylinders

In my humble opinion, for a complete overhaul, get new cylinders, as Chuck said. The problem is unrelated to chrome, it's that every cylinder's days are numbered, and it will eventually crack. For a fresh overhaul, you want that day to be at least 2000 hours later. The only reason to chrome a cylinder as TT and others have said is to "revive" a worn out cylinder. But even if the chroming is perfect, that cylinder may still crack 10 hours after you put it on.

Most new cylinders are nitrided to harden the interior surface. I seem to remember hearing that manufacturers may be going to through-hardened barrels in place of nitriding, but the point is to get new cylinders.

Historical aside-- Chroming was developed back in the good old days, when the manufacturers had their hands full building complete new engines for the TENS of thousands of planes made each year(!!!) They weren't interested in selling individual cylinders and the prices were very high. So chroming made sense. Now, they want to sell their new cylinders to stay in business, so the prices are competitive, and there are even aftermarket cylinders available.

If you are top-overhauling within, say, 500 hours of TBO, go with what ever is the cheapest that you and your mechanic think is reasonable (and safe)

Removing Windshield Scratches

If the scratches are fine then Brasso works very well...followed by a good polish. If they are deep then something like Micromesh or other brand deep polish, but if deep scratches are tackled it almost always leaves waves. If you do decide to replace, fit the thicker windshields and preferably go tinted.

Strobe to Replace Rotating Beacon

I bought the Flight Strobe FS4400 about seven years ago. I just had to take it apart (it had quit), found the caps had come loose and moved around enough to break a wire off. I repaired that and secured the caps, it works fine now. I need to order another lens due to the old one is looking filmy. You can get it from Spruce for \$105. It's not the brightest, but for the money. It will fit where your beacon is now. I took the fin cap off to get the old beacon out, stuck with age. You can even mount it under the belly. Another choice is Whelen Model 70509 Flasher for \$113, you'll need to order the mounting bracket for the tail fin for an additional \$24, or mount it under the belly.

KX-170B Cosmetic Cure

In my own experience, I was very unhappy with my TKM slide in replacement. The radio would intermittantly stop receiving, after two returns to the factory I sold it (cheap) and the new owner hasn't had much luck. I now have a KX170B what a great radio, I wouldn't part with this one. As far as cosmetic upgrades, Wag Aero (1-262-763-9586) has a new engraved face plate (64 types as well) that will make your radio look like new. The part # for yours is C-375-015 (25.00 cheap). Don't forget to ask for their catalog as well there are a lot of low cost options for us Cherokee owners.

Alternator Failure - Capacitor Destroyed

Had an alternator failure a couple of weeks ago sitting on the ramp while copying my IFR clearance. My first indication was the slight audio hum I always get in the intercom suddenly went away. I looked around for a second then checked the Ammeter and sure enough it was

Zero. Recycled the field switch, then the master switch with no effect and of course canceled my flight.

Now the weird stuff. I was convinced it was the Voltage Regulator (since the alternator was only 2 years old) but after we started checking the VR was OK but the Alternator looked bad. Opened up the cowl and saw what looked like aluminum foil inside the back of the alternator. We took it off and it looked like I had hit an Aluminum party balloon that then somehow got sucked into the Alternator and shorted it out. Well once inside the alternator it became crystal clear what really happened. The internal capacitor and its screw was missing, gone, bye-bye. All that was left was little balls of aluminum foil scattered around the rear half of the alternator including a big wad next to some of the diodes which were all bad.

Indexing of Propeller to Crankshaft

The correct position is in the 2&8 o'clock position as viewed from the cockpit, largely for hand propping purposed. I had installed the prop on my 140 in the same plane as the crankshaft, and found it to be considerably smoother, but difficult to hand prop. My Arrow's prop can only be set this way due to the flange locating pins being of different heights(one way only).

Dipstick For Measuring Fuel

I did the 5 gallon trick (I think I used 2 gallons) and plotted it. I came up with a similar curve to the one in the Hints and Tips. I then transferred every 2.5 gallon mark to a wooden dowel (3/4" diam. I think) and carved rings into the dowel for the fuel level marks. Then I lettered it with permanent marker for the quantities.

The lowest you can read is about 4 gallons. (I always put the dowel as straight up and down as I can in the center of the tab). But I never leave on a trip with only 8 gallons total anyway!

Fact is, I hardly ever use the dipstick. I usually fill either to the top of the tanks or to the bottom of the tabs. But when I'm taking a big load, I want to do the weight and balance right if the fuel is not at either of those two points. So, I've probably used it 15 or 20 times, and never regretted the hour of my time it took to make it.

Stiff Throttle, Mixture & Prop Cables

After having a "stiff" mixture cable break a couple years ago, I suggest you get them checked out. Mine had just worn out with use (82 Archer). Check your logs to see if they've ever been replaced. If not, consider it.

Play in Main Gear Scissors

A little slop is not abnormal, but very, very little is better. Do not overtighten the scissors links. The bushings are probably well worn due to the age of the A/C. The bushings are a standard size item available in any bearing supply house. Have one on hand to give them the proper dimension. I'm sure they don't have a listing for Piper. Any access play on the strut ends (double ends) should be shimmed to minimal side play, but able to move freely. Use thin AN washers. The tie in end of the links do require some washers, since this is where toe in is adjusted. Replace all bolts, and use proper grease when you reassemble. Have fun.

Oil Cooler Air duct tubing

Aircraft Spruce, Varga, Chief, and others sell it (Aeroduct-SCAT) by the foot. Expect to pay about \$12.00 per foot.

If you get the hose with teflon inner lining (-D type?), then that one will not be subject to the recurring inspection AD.

Belts for A/C (Air conditioned) Planes

My 1972 Cherokee uses:

Gates 7M1030 for A/C

Gates 11M1030 for Alternator

Do not lubricate trim cables

If you got any lubrication on the cables you over-lubed them. Mine was slipping too, and I disassembled the whole thing forward of the baggage compartment and soaked all of the components in MEK, including the cables. Then I replaced all of the little pulleys and bushings and put one drop of machine oil on each bushing. After reassembly I tensioned the cables per the manual.

Master Switch Cannot Shut Down Power

I believe that the master solenoid (contactor) is the same on all Cherokees. It has two small terminals for the coil (the "solenoid") and two heavy ones for the "contacts". One contact goes to the battery, the other to the starter solenoid and then to the bus. The solenoid has one terminal going to the battery, the other to the Master switch.

Normally, when you turn on the master, it grounds the coil and current flows from the battery, through the coil, to "ground" (the airplane chassis) and back to the battery. This pulls in the contacts, connecting the battery to the starter solenoid and bus.

The starter solenoid is similar, but separate. It allows the starter switch to connect the battery to the starter. The idea is that the light duty switches control very heavy currents through the contactors.

With yours, the coil is being grounded separately from the Master switch. There must be an intermittent short, either in the contactor, or along the wire going to the master switch. For example, the wire might be touching a bulkhead somewhere, and vibration wore through the insulation and shorted it to ground.

There IS a spring in the contactor to retract the contacts, but it is definitely part of the contactor, not separately repairable. Without further troubleshooting/info, my guess is the starter no longer turns because the battery is weak.

If the battery contactor always activates when the battery is connected, try disconnecting the thin wire on the coil contact that goes to the Master switch (the other should be clearly connected to the battery). If that causes the contactor to de-energize the instrument panel, then the short is external. If not, the short is in the contactor, which must be replaced.

Dancing Ammeter Needle

The problem you have is excessive resistance in your alternator field circuit. If you have a pullable field breaker (5 amp) for your alternator, have it replaced. Inspect the alternator field wiring for poor connections. Instruct the mechanic to solder all connections in the field circuit in addition to crimping. I had the problem resolved by replacing the field breaker in my 68

Cherokee but it came back after having extensive avionics upgrades. Soldering the crimped on connector on the field breaker solved the problem, be sure to remove the connector from the breaker before applying heat

One thing to try is to follow the field circuit, jumpering around the various parts to identify one with high resistance. The circuit goes from the alternator B terminal through the ammeter to the field circuit breaker to alternator side of the master, to the voltage regulator (your plane may not have an external overvoltage relay), and finally to the alternator field terminal. Jumper around these various circuit elements and see if the problem goes away. Since the problem is intermittent, I guess the master switch or the breaker are somewhat more likely culprits, but if not those, it could be any of the other elements, including the interconnecting wires and connections.

Stopping Case Oil Leak

Take it for what it is worth but I have stopped two parting surface leaks in the past year. The procedure sounds funny but appears to work. As others have said use brake cleaner as it works quite well. plug your vent line and connect a vacuum cleaner hose to your oil filler. turn the vacuum cleaner on and this will create a negative pressure in your crankcase. Clean with brake cleaner and let completely dry. with the vacuum still drawing lay a heavy bead or super glue on the splitline and let the vacuum suck it in and then remove the vacuum and let dry for several hours before checking it. Hope if you try this it works as well for you as it did for me.

Landing Light AD

AD 96-10-01/SB 975 which dealt with the possibility of the rubber gasket behind the landing light bulb coming apart and being sucked into the induction system. This problem is due to the peculiar landing light mount design having the landing light within filter on its downstream side. (The air comes in radially through the filter like in the old round auto filters, rather than passing through linearly the way Cessnas do it.)

There was a separate SB or AD calling for repetitive inspection of the filter, to address the problem of the Purolator paper filter material breaking up and being ingested. (Similar problem, different cause). This one is cured by replacing the paper filter with the Brackett, which is basically a wire frame that goes in the same space surrounding the landing light as the paper filter, and supports the oiled foam replaceable element.

So, the Brackett filter gets rid of the second problem, but not the first. I have both complied with the landing light gasket AD and gotten a Brackett filter, which I would highly recommend to anyone.

Changing Out Seats

First of all, I can only go by the parts manual. I think it may be in error. Basically it depends on your model type. The manual claims that for planes starting some time in '74 the adjustable seats had the gas spring for height adjustment. It also states that they stopped using the crank style in '73 for the 140s, and in '71 or '72 for the others.

Which kind of leaves a gap. That may be a mistake, and probably doesn't matter.

The short answer is that your best bet is a salvage yard like Wentworth. The main trick is to make sure you get one of the later (post '72) seats if you have anything other than a 140. That would be PN 99353-15.

On the other hand, if you have a 140, make sure you get a 140 seat, PN 69568-01. The reason for the difference is the increase in fuselage length for the 180s, Arrows and 235s, and the wrong seat won't fit.

In my case it took a long time of phoning to get the right seat for a '76 140 since there were so few, and all the others didn't fit.

Replacing with 3-Blade Propeller

I recently installed a new Hartzell 3-blade Scimitar prop on my Cherokee 235. Same engine as yours, just derated to 235 HP.

So far, I've been very pleased. Compared to my old 2-blade prop, the new prop is quieter (inside and outside the aircraft), has less vibration (my Lycoming is almost as smooth as a Continental), climbs better, and confers a shorter takeoff roll. I haven't noticed any loss in cruise speed.

The only real downside of the new prop (aside from the price) is that I gained 17.5 lbs more on the nose.

Finally, the new prop makes my plane look so sexy that the ramp appeal alone is worth a couple of grand!

Wing Strut Caps

Get them at Spruce or a hardware store.

Might want to call Vista Aviation and have them send them to you in the mail (818)896-6442.

Using anti-seize at exhaust slip joints

Works great. I do it all the time. Be sure that it has a 2000 deg. rating. Use blowproof gaskets as well but with fiber wheel bearing grease on the surfaces, and AS on the threads. It'll get a little messy when starting, but run it first, wait till it's cool, and wipe the access.

Replacing Side Windows

I replaced all four side windows a couple of months ago.

I purchased the one-sided black foam tape from Chief and marine-grade silicon sealer from a local boat supply house. The marine grade does not contain any acid. The old rope putty was ghastly.

Use a putty knife and non-steel brush to thoroughly clean the window's "seat".

Wrap the foam tape all the way around each window, leaving it evenly placed on both sides. set the window in frame and put in your plates and screws. With all the windows in, put 3M fineline masking tape on the outside of the window, close to the gap, and around the fuselage frame of the window. Carefully pump your silicon along the gap, between the two tape lines. You can use your finger to work it into the gap and smooth it over. Pull the masking tape off while the silicon is still fresh and you'll have a sharp installation. Do one window at a time with the silicon or it will dry too quickly.

Replacing Throttle Cable

Do you still have your old throttle knob?

I had the same problem last summer. I found that the cable was available (without the round black knob and knob bushing) for \$ 140.00. It is true that with the knob it sells for over \$ 400.00. The Piper parts catalog lists P/N 12693-04 for my 1968 PA-28-140 throttle cable. The other Piper P/N for the throttle cable w/o knob (not listed in the parts book) is 455-139. If you need a different cable, call Piper and see if they have another P/N for yours. Good Luck.

Wing Spar Inspection - SB 1006

I typed "piper service bulletin 1006" into yahoo.com's google search engine and got these (among others):

From two companies who sell supplies to comply:

<http://www.specialtyhose.com/pipewng.htm>

<http://www.airward.com/piper.htm>

The basic idea is that Piper is hitting two birds with one stone:

1) Many Cherokee owners never take their wing tanks out. This should be done to replace all the fuel hoses, including vent hoses, which get hard over time. If the main hoses fail fuel will pour out of the tank into the wing and from there into the cabin. Bad news.

2) A few unfortunate souls who take out the tanks to replace hoses find to their horror that the main wing spar is severely corroded. A hugely dangerous and expensive situation. To prevent this Piper recommends application of a corrosion preventive goop called Dinotrol AV-8 which you can get from them or other places.

It is a good idea to comply with this even though it takes time and money. Your mechanic might let (or even encourage) you to help. If the tanks have never been removed and have the original screws, taking them out (I think each one has 41 in my plane) will give you a real appreciation why some mechanics are so grouchy at the end of the day!

Compression Testing

It is called a differential compression tester. 80psi goes in, there is a 'calibrated' orifice inside, and you measure the pressure coming out (inside the cylinder). It is a static test, unlike the kind commonly used on cars. You can get the tester from places like ACS or Chief, and you can perform the test yourself, but I would recommend getting some instruction from an A&P first, because you can hurt yourself (smacked in the head by the prop) if you do things incorrectly. You would usually only do this test at annual, or if you suspect some problem with the engine.

One tip about compression tests, the aviation community warms up the engine before taking the test, but if you want the real truth, do it cold engine. You may want to do it warm engine to back up any strange readings.

The warm up before testing is a strange method I've had to deal with in aviation. Doing so, will deposit enough oil on the cylinders to mask worn rings, for example or even a loose valve seat. In the auto world, differential compression is more widely used with race engines, but after a cold test.

Technically, it is to be performed by an A&P.

Prices on New Seat Cylinders

Av-Lok- Installs on PA-28, PA-32, PA-34 aircraft. This is a sealed unit and is normally black in color. I have attached a photo of the Av-Lok for easier identification. The Av-Lok sells for \$250.00 each. These are new and cannot be repaired.

Hydrolok- Installs on many different styles of aircraft. Easily identified by a large spring around the shaft. I have also attached a photo of a hydrolok. These are manufactured by PL Porter. The Piper seats used a SL 10100 cylinder. The overhaul price for this cylinder is \$135.00 each. We can overhaul your cylinder within 2 days of receiving.

Other hydrolok prices:

All SL- series are \$135.00.

All HL- series are \$265.00.

All LL- series are \$135.00.

All Enadine cylinders (UL-) are \$135.00.

All Rotons (19078 and 19054) are \$165.00.

chuck@avfab.com

Lubricating Trim Jack Screw

Luberplate makes a special lube for the jack screw which they call "aero ". they supply it in a toothpaste size tube which will last for years. Every annual I take the screw out and repack it with the lube and the trim works great in cold as well as warm weather.

Nosewheel Shimmy Cure

I had the same problem a while back with my Archer. I got a shimmy on braking and it was made worse when the nose strut got a little low. I put new bushings and bolts in the nose scissors and it cured the problem. Put some muscle into shaking the nose scissors. If it moves even a little bit, you need to tighten it or new bushings/bolts. They are not hard to install and they are the first, cheapest fix to try.

And...

Lift the right engine cowl as though your about to put in oil, remove the retainer clip from the pin that runs through the top of the front strut bracket,(don't move nothing!) slide in a 1/4 in. aviation quality bolt that is long enough to get a self locking head on. Tighten it down snugly. Don't over tighten. Go try some taxiing to see if this helps. If it does help you know the play is caused by the top bushing and the mount holes being woollered out. I do not advocate you leave the bolt in there because that would be an unauthorized mod but it will confirm where its coming from.

Maintenance Requires Service Manual

Anyone doing maintenance on your Cherokee is required to have a current copy available (Close by). This includes an owner/operator doing preventative maintenance. Don't get caught doing an oil change or tire replacement without it. Remember to make a maintenance record entry also. Be careful if you buy a used service manual. Outdated versions are not acceptable. Must always have current data when doing any maintenance.

Ammeter Fluctuates After Gear Retraction

Does your gear unsafe light come on before the fluctuation? That would indicate that the gear is sagging. You might have a slow loss of pressure, there's a sensor that turns off the motor at 2000psi(or somewhere around there). Wire up a temporary light in parallel with the pump motor so you can tell when the motor is running.

You probably won't see it on the jack stands (unless you leave it overnight) unless you pull on the gear. Flight airspeeds tend to pull the flimsy gear doors (according to lopresti) open. I think all of the retractable pipers with this gear system tend to have problems with the gear sagging and the gear unsafe light coming on at some point.

Pull the pump circuit breaker to see if the ammeter settles down. If so you know it is the pump and you can start looking for the pressure leak. OF COURSE YOU WILL RESET THE BREAKER IMMEDIATELY AFTER THE TEST...

Leaky Fuel Selector Valve

If the leak is just out the shaft, piece of cake to cure. Just did this repair on my 140 two weeks ago. To accomplish, need a MS29513-011 O-Ring and a little Fuel Lube (a "gas proof" grease). First off, drain your tanks so that you don't flood the cockpit when you dismantle the valve. Next, remove the valve handle and the upholstery trim plate. Next, take a large socket wrench and unscrew the outer housing. Once removed, note the position of the shaft, coil spring, backing washer, and o-ring. Remove the old O-ring packing and replace with the new. To help reduce future leaks and extend the life of the new packing, lightly lubricate the O-ring and backing washer with Fuel Lube. Now re-assemble the fuel valve in reverse order (you can use Fuel Lube as a gasket paste on the threaded portion of the valve to help reduce future leaks. (If you have a copy of the "Cherokee Hints and Tip 2000", this is explained in more detail on page 354).

Difference between owners handbook and flight manual

The "Owner's Handbook" is an informational piece describing the use and function of your airplane, much like the owner handbook you would get with a new car.

The "FAA Approved Flight Manual" is a legal document issued by the manufacturer and is part of the paperwork of the aircraft that must be carried in the A/C at all times. It is specific to a particular A/C and is updated with revisions from time to time. The "FAA Approved Flight Manual" for my 1966 Cherokee 180 is only about four pages in length. I don't have a copy here or I'd tell you exactly what topics are covered in the document. Planes built since about 1975 have a much larger and more comprehensive Flight Manual incorporating many of the informational features of an Owners Handbook

Home Made Battery Box Mod

Ok, I looked everywhere and couldn't find anything that says that the battery box has to be sealed or 'fully' enclosed. When I redid my interior this fall, I also took out the battery box and totally refinished it by sanding it down to the bare metal and repainting it. I also cut slots where the cables mount to the battery (I found that a Dermal tool with cutting disc's worked best). When I reinstalled it with my Concorde battery (35AXC - sealed) I used heavy rubber grommets around the new copper cables to prevent chaffing. Worked great, even my A&P was impressed and stated how good it looks. I already had the rubber grommets, but they can probably be bought for

.50 or so at Lowes. You have to take out the battery box to do the Bogart mod too. Your choice, \$50 or .50 and a little work on your part. I also replaced the vent lines with new clear tubing and labeled the battery box with the type of battery and "No Service Required". Don't know about you, but I would rather spend that \$50 on flying fuel.

Factory ReMan Engine

I did the same dance a year ago. I called every major rebuilder in Trade-A-Plane and elsewhere to inquire as to how they built their engines and for price quotes for my O-360A4M. It is informative to make a list of what each outfit says they will do to your motor and what they will charge. I went with a FOH exchange through Airpower. It's a pretty straightforward process. Lycoming sends you a shiny new motor in a crate and you send yours back in the same crate. There are some great shops out there and some not so great. What swayed me was the greater probability of new parts being used by the factory. They have more of them than anybody else and more assets to stand behind their engines if there should be a problem. Your engine serial # is in their computer and you can call one of their reps anytime and he can access it. The only drawback for me was that I really kind of wanted the Millennium cylinders-they have those neat looking valve covers too. Lycoming sends a sheet with all the test cell figures for the engine they ship and a video on how to break it in. Any one of these builders could go belly up some day but if Lycoming ever closes up shop, we are all in trouble. BTW, While your engine is out, think about sanding and painting your engine mount if it needs it. Take Scotchbright pads to the firewall and fine steel wool to the aluminum parts off the engine. Send the oil cooler out for OH too. They will get rid of all the gunk inside it and it has a gold anodized look to it. New scat and a teflon hose kit really look good too. Your whole engine area will look terrific. I wipe mine down like most people wipe down their airplanes-but then I'm a little wierd that way. I love the smell of a warm motor right after shut down, especially a new one - like I said, I may be a just little weird. Good luck with it and prepare to open your wallet pretty wide. I'd like to know what shop you finally decide on.

Alternator Belt for 140

The "official" Piper belt that I saw was a Gates Green Stripe #9335. Piper then writes (in white indelible marker) their own part number which for my '67 140 is 73965-015.

Checking Oil in Struts

Checking oil is complex. The AC will have to be jacked up. Remove the air from the strut. Remove the entire valve ass'y. Raise the strut slowly as far as it will go. If any oil comes out, you're ok. If not, lower the strut slowly, and fill. You'll need an oil can with a length of plastic hose to fill. Be sure that there is ample space so that the hose will not completely obscure the fill hole. If empty, it will probably take as many as 5 standard size oil cans. After one can full repeat the process, if no oil comes out, repeat until it does. Once it does, note if the strut is fully compressed, if it is not, let it down again and wait about 20 min. The inner orifices are very small and it will take a little time to fill the inner portion. Repeat, and note if the compressed height is similar. If it is, the entire strut is full. Slowly complete compression, and excess oil will be expelled. Let the strut down slowly. Reinstall the valve body ass'y, and add air (nitrogen)

To add air (Nit.) fill strut to 200-250# and lower the AC. Once lowered, move AC up and down and it should settle. Measure the exposed extended portion which calls for about 3 1/2". 4 to 4 1/2 is better. The mains height should be similar. You may not need more "air", but if you do, add only by taking weight of the nose.

To lower simply tap the Schrader valve (very tiny taps) and bounce until proper height is reached. I'm assuming in all this, that all working parts are in good order.

It sounds complex, but after you're on the third gear, it will be simple.

Filling the mains is the same, except that they should be filled with 300#+ to start before lowering. Exposed height same as nose.

Emptying out the old fluid will require dismantling, and if the struts are not leaking, it's not worth dismantling. Oil BTW is good old 5606.

Arrow Gear Not Properly Retracting

If the gears are retracted on jacks, the override must be held in "Override up position". If they don't completely come up, while holding the override, the bellows has absolutely nothing to do with it.

Your problem is some place else. Check the easiest, the oil level.

The emergency override has several adjustments, your man will need a Piper manual for this.

Mud daubers have been known to fill the pitot tube. Check for this as well.

Owner Assist annual Notes

I just got through with my (first) 140 annual, and I thought I would pass along the highlights. I worked with Brian Stout A&P/IA, at RHV airport, San Jose CA. Very accommodating and reasonable for owner assist annuals. It may have helped that I was a former student of his at SJSU Aviation department, where he is professor and A&P examiner. He also takes care of Rocky Hill's airplanes.

1. Found out you're not supposed to use SCAT hose for the carb intakes, even though all the Cherokees seem to use it. There are special Piper parts. >\$100 each! Now I know why everyone uses SCAT, in spite of it possibly being illegal. Most A&P's don't know any better - they see SCAT, assume it's OK and replace with like if necessary. It took former Piper factory rep to point this out. At least the Piper part looks more durable than SCAT. I hope it lasts a long time.

2. Needed one of the little rubber check valves in the center of the gas cap. No Piper part shown in catalog, just the whole assembly at >\$40! Oh no! Call to Piper turns up part available separately at \$6, only good surprise during annual. Part # is 492-153.

3. Needed to replace Whelen VS strobe/beacon. At over \$330, most expensive part to procure, that I did not know would need replacing before starting the annual. It died the day we started. Fortunately easy to install, even with small fiberglass repair of fairing.

4. Needed to repair nose cowl at rear of the air filter oval 'bowl'. This was the messiest and longest item to complete. Glad I could do it myself. Many hours of labor, mostly cleaning inside of cowl and grinding away old gel-coat. Piper apparently did not wrap the fiberglass reinforcement over the corners on the inside, creating a strength discontinuity at the corner, and it was cracked at top and bottom almost half the length of the corner seam, due to induction filter/landing light assembly cantilevered from the rear of this bowl. All my ram induction air must have been leaking out this crack. I hope I get better performance now.

4. Most frustrating and tedious item was adjusting aileron stops. Hard to get the wrench on them, can only work by feel. Makes arms tired. For some reason, most of them were screwed in all the way, meaning there was no hard stop at the bellcrank, only what the yoke travel would allow. A&P says many Cherokees are like that. I think the frustration level to adjust is beyond the limit of many mechanics?

5. I probably could have saved some \$ by having KX170B overhauled, but I have spent >\$500 on radio 'repair' before (different plane) and radio still failed again within months. I feel better with new Michel and am glad to have slide-in replacement available. Thank you Michel. A&P says 337 not even needed! This was most expensive single part.

With accommodating A&P, you can do almost all the work yourself, under his supervision. He will want to inspect your work. It may be difficult to establish the trust needed, but I would recommend doing as much owner preventive maintenance as you can and properly logging it, before the annual, to demonstrate some competence to the A&P, and working with a A&P/IA, since a different IA may not accept the work of a third party non-A&P (you) for the sign-off. Don't piss the mechanic off by insisting on ordering all the replacement parts yourself to save a few paltry \$ from the overhead. It was worth it to pay the mechanic's overhead to not have to wait for shipping things like wheel bearings, which I did not know how many would be needed until the wheels came off. He had them in stock, so there was no waiting. I don't have the bill yet, so I don't yet know the total cost, but the cost of parts are approximated below.

\$1500. Replace KX170B w/Michel MX170B.

\$330. Replace strobe/beacon.

\$200. Replace induction hoses.

\$200. Replace most wheel bearings/races.

\$50. Fiberglass repair materials.

\$50. Oil, filters, small items.

\$2330. Total

Seat Cylinder Needed Lube

My '77 Cruiser has a vertical adjustable seat. Lately it has failed to return to the upper position, upon investigation, I found that the pivot points (4) were dirty and in need of lubrication, which was done. Then I discovered that the air/spring control assy, (Piper PN76445, P. L. Porter PN10100) had an air valve which controls the amount of air in the chamber, on mine, the large knob was missing. I wasn't familiar with this type of seat or the control. Without the knob, the control is inconspicuous. If you have a similar seat that doesn't work, and has no knob just under your right knee, maybe you only need to lube and press the valve.

Parts and Service Manuals

I Got a complete set of manuals, service and parts from McCurtain Technology Group,

www.mccurtaintg.com SKU#70033

It is a cd-rom, very easy to use \$45.00

Phone, 1-877-603-3578

Heat Shield Material for Cowling

Bought my replacement material from Tiffin Aire Inc., Ohio 800-458-2487 or 419-447-4263 part # 181-337, sold by the yard (approx). They recommended 3M adhesive #847 to apply.

Fuses vs Circuit Breakers

There is such a thing. Check in a Newark catalog. They are the KD1 series made by Eaton. (Circuit breakers which plug into fuse socket).

Unless you are restoring the panel or doing major avionics work or otherwise need to have the entire panel removed, stick with what you have if it is still working. Changing will require FAA field approval, and is a LOT of work, for not much gain. There is no reliability advantage to either. If fuses were less reliable, you would not find them in luxury cars.

You may ask, why do the latest models have CBs? The answer is that it appears more professional and upscale to use CBs because that's what the big boys use. Why do the big boys use CBs? Because the cost is not as much of an issue, and imagine having to carry a full set of spares for all the circuits in a 747.

Remember, a fuse or CB is there to protect the aircraft wiring, not the appliance (load). The fuse or CB rating should depend on the size and length of wiring used.

Low Voltage Light Keeps Coming On

The light goes on because it's not charging. Go back and check the alternator. I'm not certain how you did it, but it should be done on a test bench and impose a load on it. Any automotive alt. rebuild shop can do it. The only difference in the Chrysler alt. used in your plane is the the fan is reversed. The alt., any alt can turn either way, the fan can't. You may have diodes failing, or commutators in poor condition. The battery, if it's getting old and tired, will drive the diodes in the alt. to val halla. We'll assume that all wiring is in good condition. I'm assuming your VR and your OVR are mechanical.

The voltage reg is nothing more than a cut out relay with an amp reg. The OV relay, is only a valve that limits the maximum voltage, in order to protect the rest of the systems including radios. The OV relay is usually affected by your condition. When I bought my Arrow, it had similar malidies. When I removed the alt. which looked good, the opposite was the case when it was mounted on the Holt's test bed. But it looked good. Four regulators had been installed during its life span, but alt. was never touched.

Be sure that your belt is not slipping.

Brakes Need Bleeding

I too had the same brake problem. My brakes would need to be bled often. We had the master cylinder for the hand brake rebuilt because we "thought" we found a small amount of brake fluid on it. The problem was a bit more mystical.

We had a burning smell when the cabin heat was on. It smelled like burning hydraulic oil. We could never find the source until...

During the annual I removed the brake fluid resevoir on our firewall. Guess what.. I found that the small copper tube soldered to the can was leaking fluid into the cabin, behind the firewall blanket. It would run down to the base of the firewall and then into the cabin heat box.

To repair it I removed the resevoir. Heated the can with a small torch to remove the copper tube. Cleaned the tube and can till shiny. Fluxed the washer and tube and carefully soldered the tube into the can. A little paint and the can looks like new. The brakes were bled and all has been perfect since. This was a very ugly problem. It gets cold up there sometimes and that brake fluid was really stinky

Replacing Oil Cooler Hoses

Try Avcells, 866-878-1181. You might consider ordering a kit, since 8yrs. is the life of those hoses.

Lubricating Threads - Fuel Drain Valve

The only thing to use is called "fuelub". It is available from Aircraft Spruce, part # 09-25300. All of the A&P's that I know use it. It is a lubricant and anti-seize compound.

Do not use the pipe thread tape on your airplane because some of it may shred off and later clog your fuel or oil flow.

Michel Radio Repair

I have my MX 11 in for repairs at the factory now. The flat rate charge is \$85.00 for repairs excluding major parts. The TKM factory is in Scottsdale Arizona, area code 460. Talk to Kathy for a RMA number and address, also about the availability of a loaner MX 11.

Battery Slowly Discharging

After a full charge from a charger, disconnect the battery terminals from the battery. Wait a week or so. Reconnect, and try to start the plane. If the battery is weak - you've got a bad battery. The fact that it is new doesn't matter (I've had 6 month old batteries go dead).

If the battery is good, then I'd suspect a moderate resistance path between +12 and ground somewhere in the airframe

You will find connected to the battery terminal a small diode and it is mounted to a bracket next to the battery. The diode isolated from ground through an insulator make of a very thin material. I found that there was a very small dark spot on the insulator that indicated a "leak" and that was enough to sloooooowly drain the battery . Remove the battery cable first.... ground first. Then the hot side. Pull the diode off the bracket. A nut hold it on. Carefully..... very carefully remove the insulator and look for your short. You can buy a new insulator at most electronic stores. Use thermal compound when you reinstall the diode

Proper Rigging Technique

Using your tool, per factory specs., first align the ailerons. Be certain that the tool is at the proper location when measuring. Once the ailerons are set (check all play, and travel, etc.), lock the ailerons in place. Set your flaps in relation to your aileron, and check with the guage. They

should all be on a level plane (assuming there are no gremlins) Once every thing is set, take the plane out for a ride, with evenly filled tanks. If it stays level in flight, you just completed. If it pulls to one side, reset the proper flap. Flap setting should always be downward, and no higher than the level plane. You may have to do this more than once. Move the flaps in 1/8" increments (measure at the trailing edge)

On the fuselage side of the flap, it will most likely vary as much a 3/4" or so.

Be careful when setting your ailerons that you have taken up for play. In flight, if you have not done so, both ailerons will ride higher than normal, not good for performance.

Rear Spar SB - Drilling Drain Holes

You're referring to SB 977 - Inspection of rear attach fitting and addition of inspection panels. My mechanic thought adding the inspection panels was a waste of money, but did drill the drainholes.

Wing Walk Stiffener

The special airworthiness information bulletin you are referring to is CE-01-33. You can read the full SAIB on line at av-info.faa.gov

Fiberglass Cowling Repair

Dan Diehl Aeronautical does a lot of specialty Fiberglass work in Tulsa; I know he has been active in the experimental area. I believe he has done some production aircraft repair/replacement work as well. Dan's phone number is (918) 299-4444 He is located just off the east side of Riverside airport at 1855 North Elm in Jenks 74037

and...

ComTec Composite Technologies) 10 East Third Street Suite 700 Tulsa, OK 74103
918 585-9400 FAX 918 585-9501

Shop facilities 6540 B East Apache Tulsa, OK 74115 918-838-4000

Richard Crownover, President & COO Mobile 918-688-9508 rcrownover@ComTechLLC.Com

Slick vs Bendix Magnetos

Bendix do have some advantages over Slick, but not enough to justify using them. They produce more spark at a lower RPM which gives them a starting advantage. The Bendix start producing spark at 400 RPM while the Slicks start at 700, and that is why you have the impulse coupler on the Slick. The Bendix have a larger magnet so they last longer before they need to be remagnetised. Also the P-timing is easier to find and set in the Bendix.

But - they are very heavy and expensive, and have too many items of compliance. The Slicks will last a long time, and when you overhaul them you will save a lot of money Vs Bendix. They also take much less space under the cowl and when you are fishing around for things like your oil filter that is a nice feature. I just overhauled both my Slick mags (1989 vintage) and it ran me about \$125 without a yellow tag - not bad! I would go with the Slicks unless, as TT points out, you want to spend the bucks and go electronic

T-Tail Lance Handling

The Lance is a great x-country machine. I own a 1979 T-tail Lance.

The T-tails are very different from any GA a/c you may have flown before. DO NOT fly the T-tail Lance without first getting a very experienced T-tail owner/instructor to check you out, including an inflight check out. Make sure the check takes place at an airfield with a long, hard surfaced, runway.

This a/c handles so differently, that you could easily get into trouble your first time out, I'm referring to the t/o and landing phases. In the air, the a/c handles predictably.

If you routinely (or ever) fly into soft and/or short fields, this is not the a/c for you. The T-tail simply has virtually no elevator authority at speeds below 70 knots. The handbook shows a considerable increase in required t/o and landing distances between conventional and T-tail models, as well. Do not let anyone tell you that there is no difference between the two models.

With the above caveats, the T-tail Lance can be a wonderful x-country a/c.

Another Source of Seat Adjustment Cylinders

AvFab has received FAA approval to manufacture and sell a gas spring cylinder for pilot/co pilot seats in PA28s, PA32s, PA34s. Called Av-Lok, 2 yr warranty, direct replacement for part # 89178-010 or 587-404. Price is \$ 250
AvFab phone : 660-885-8317

Aileron Rigging and Speed

I just came out of an annual, in which we replaced the right aileron rod end. We checked and re-rigged the ailerons after the rod end replacement. Wow!!! what a difference. Picked up 2 to 3 kts airspeed in cruise and the left wing heavy that I have been experiencing for all this time went away. You can almost fly the aircraft "hands off". I was really surprised.

Weight and Balance Data

If you call up the factory @ Vero Beach Fl. they will make you a copy of the original that was supplied with the airplane. They were very nice and willing to help. The cost was \$35 for document VB240 This is required to be in the airplane. all you need is the S/N and reg. number.

And...

I had mine weighed last summer, and it took a day. I believe the cost was in the \$200-300 range. I added alot of equipment to the plane (and removed some stuff) over the last year, and each time work was done, the mechanic "re-calculated the WB #'s. I'm glad I did the re-weighing job,

because the actual C.G. was off by nearly an inch, and the usefull load was 25 pounds less than was extrapolated over the years. I think the major cost was that my AP had to rent certified scales, and waited until he had five aircraft to weigh before he did the work, meaning it took a couple of months before the job got done.

Eyeball Vents Leak when Closed

An earlier posting said that "Nurf Balls" (Toys R Us) fit nicely into the eyeball vents

Fuel Smell in Cabin

Don, had a microscopic hole in same line to primer. Tough to find even under a magnifying glass. We had to pressurize it with fuel to see misting.

We just had the same experience. Looked everywhere. Finally, at annual the fuel gascolator [spelling?] rubber seal replaced, and that fixed it.

Choosing Cylinders at Overhaul Time

About a year and a half ago I assisted at a complete rebuild of my O-360-A4A engine and a lot of other changes, mods and upgrades to my Cherokee 180. With lots of time I read everything I could find about which way to go, especially on the engine. What the shops and manufacturers can and do do was not very encouraging with the result that I opted to find a mechanic who knew the engine, was willing to do the job from scratch and also willing to let me help, especially with the buying. I did save money, enough to make the project worthwhile, but better still I think I got a superior result. As for the cylinders I concluded that reworking the old ones was not the best since the cost was not substantially lower than getting new. In the end I bought new cylinder assemblies, the complete assemblies sans the piston pins, from ECI via Aero Aviation (1-800-362-3044) for \$975 each. The pins, from Superior, were \$35 more. At Aero I dealt with Jim who was very knowledgeable and helpful. Superior's pins are much superior to Lycomings which have copper plugs in the ends while Superior's are simply machine rounded. I only have some fifty hours on the new engine to date - it took about a year to do the whole job - and the cylinders appear to be doing fine. Lycoming's are apparently made in Brazil while ECI's are made in Poland. I don't know where Superior's are made but I concluded that theirs and ECI's were both preferable to Lycoming's and substantially equal. The ECIs were about \$100+ cheaper each.

Engine heater on Timer?

i just installed the e-z heat on my cherokee. e-z heat recommends keeping it plugged in all winter, if you plan on flying once a week or so. it heats the oil to 180f, which in turn keeps the moisture from building inside the engine. i also mentioned about putting the heater on a timer and they said, that's when you pick-up the moisture. either keep it plugged in or not at all.

But... Even though it is a pain to arrive early and wait for things to heat up I don't heat if I am not going to fly.

Heating without flying will release moisture which will rust your interior parts. Engine oil has to get up to 180 degrees to get rid of that moisture which it can only do in the air.

Oil Leak - Front of Engine

If it is, as you say spraying from the front, it could be the crankshaft seal behind the prop. I have had this happen on two different occasions with low time engines, 500 to 600 hrs or less after overhaul. Have your mechanic check it out. It is not a big deal to change. Just have to pull the prop, remove the old seal and with a special tool (most shops will have this tool) install the new one. It does "not" require any engine disassembly.

Powerflow Exhaust

I installed a Powerflo exhaust on my 150 hp 1974 PA28 in July, 2001. I did all the work myself and found the instructions to be very straight forward. The job would only have taken 8 - 10 hours if I had not broke two exhaust studs. Performance is as good or better than advertised. This is the cheapest way to get 20+ hp.

Water in Fuel Tanks

In the seven years I had my plane in relatively humid Maryland (and the three years here in dry San Fernando Valley) I only saw water in a tank once. The cause was the cap, but not the gaskets. After many years of use the filler neck wore deep grooves into the caps "ears" which engage the filler neck after a quarter turn to tighten the cap down. These grooves allowed the cap to sit just a little too high, preventing it from pressing down tight enough for the gaskets to do their job.

I ordered a replacement from Wentworth. My gaskets were in better shape than theirs, so I put my gasket on their cap and put it on my plane. Problem solved, so it was definitely the cap, not the gaskets.

Just another thing to try, though if you have two gaskets, that may not be the problem. Oh, well.

Replacing Heater Muff

I got a rebuilt from Aircraft Exhaust Systems Inc. 800-227-5951 for about \$265+\$100(core)+\$43(postage), about \$400 total. You can send yours back to get the \$100 core returned, although you need to get the cheapest shipper.

Removing decals and Labels

Of all the things that I have found for removing glued items (labels and such), Ronseal lighter fluid works the best. It will leave no residue, will not hurt plastic and has a low flash/burn point. If it does ignite, it burns slow. I've used it for year with good success and is much less \$\$ than other stuff.

Oscillating Fuel Pressure Gauge

It could be because the line to the gage is filled with fuel. There should be some air in the line to dampen the pressure pulses generated by the pump. Disconnect the line at both ends and blow the fuel out, then reconnect.

Autocontrol III autopilot heading bug

I've also had problems with the autopilot heading and roll control on my '79 Archer. The problems were quickly diagnosed by the technicians at Lancaster Avionics (at LNS), Lancaster, Pa. One of the few shops around these parts still servicing these older units. The problems were traced to bad connectors - the tension had relaxed over the years. After having one replaced two years ago, I "bit the bullet" a few months ago and had the remaining five CD interconnect plugs replaced this past summer when the problem re-occurred. Total cost for the two visits was about \$550 including a flight check to calibrate the heading bug.

My Arrow had the same unit, and the same problem. Given that it was obsolete, I bit the bullet, and bought an S-tec.

One of it's better features is that they are expandable. I recently installed a heading bug. You can opt for their expensive bug or select one from their list of many, and buy your own. Next item, if Santa doesn't clean out the coffers, is pitch control. Gettin' kinda o' tired of trimmin'.

Determining best Glide Speed

Slow your plane to its approximate best glide speed.

Trim full nose up.

Reduce power to idle.

The airplane will find its own best speed.

The distance to glide will be the same, regardless of weight.

The speed will be greater, and the time shorter, with greater weight; speed less and time greater with less weight; but total available distance to glide should be the same.

But, your trim must be rigged correctly! Your trim should not be rigged to the degree that it can trim you into a stall. Many of us have out-of-rig trim because it is often overlooked while we pay attention to the large control surfaces. If you rig your trim the way the book says - you will find best glide with this method. I use it to land my plane.

Replacing Auxiliary Fuel Pump

If Piper gets \$650, sans exchange, take it. It's a deal. I just replaced mine, it was \$550 plus core charge of \$250. The core was useless. FYI, Weldon makes a near identical pump with greater output, and can tolerate nitro methane used on drag cars, gas too. Brand new, no core charge, \$450.

The new pumps have newer motors and you may have to purchase the mounting brackets as well. Wait'll you see that price, for what they are.

Carbureted Engine - Hard to Start Hot

Here are some reasons for hot engine start difficulties with carbureted engines. Magnetos can weaken when hot, particularly condensers. E gaps incorrectly set will weaken a spark at start, more so when hot. Valves not sealing when hot, if you're not using multigrade oil, try it. It will help your lifters to unload faster and complete sealing. Spark plugs should be clean, and in good condition. Worn center electrode, wide gaps, and those pesky little goobers buried onto the center porcelain can increase resistance. Inoperative impulse coupler. Worn, pitted, or incorrect

point gap. Carburetor float adjustment not to spec. Intake hose leaks. Incorrect idle mixture screw adjustment. Bad spark plug wires (high resistance). Low battery, turning too slow Fuel may be boiling, be sure your boost pump is turned on. Be sure your primer pump doesn't leak. I doubt that some of those reasons may cause your hard hot starts, but they are simply some of the things that can cause your dilemma.

And...

Hard starting is not normal for a carbureted O320. You might verify that the impulse coupling (s) are in good order. They retard the spark for starting. In a previous life I dealt with a/c with 'Shower of sparks' and other forms of ignition boost, without them, it was VERY difficult to get a start. The impulse coupling does the same job on these smaller engines. If there is compression, ignition, and a good fuel air mixture, you should get a start

Vacuum Pump Replacement

Stay with the Airborne/Rapco. They are rebuildable. Replace the filters often, especially the foam one on the regulator. One year is more than enough. I learned the hard way, two pump failures in IFR. The "rubber band" filter is cheap enough. Pumps are expensive. Rebuilding is fine, provided you have a good core, but warranty is worth the extra bucks.

Wing Ding

Lopresti makes the "Wing-Ding"

<http://www.flyfast-lopresti.com/WingDing.htm>

How Much Does Gasoline Weigh

Octanes and Lb/Gal @ 60 F, Sea Level

Gasoline 87 6.2000

Gasoline 89 6.2100

Gasoline 92 6.4130

Don't know the exact number for 100LL but the "standard" 6 Lb/Gal may not be very accurate.

Replacing Cylinders

Dave: Last year I completely redid my O-360 on my Cherokee 180. Lots of new stuff including new ECI cylinder assemblies - ie the full cylinder rig with valves etc installed but no piston pins. I bought them after investigating what was available: Lycoming, Superior, ECI. They are all made abroad. The recommendations were to stay away from Lyc and choose between the other two - both excellent. I got a superb deal on the ECIs and, with new piston pins (be careful not to get the Lyc pins with the plugs in the ends) they came to just a bit over \$1k each.

Hottest Cylinder

#3 is the hottest on my O320. Hope that helps

Starting Engine, Very Cold Temperature

The 15/50 should be able to let the engine roll safely down to 5 or 10 +, but there are several issues to consider. The cam shaft on a Lycoming is on top of the crankshaft, so oil distribution

will be slightly impaired, even cam lubricators are marginal. Starting will require more fuel for priming, and with the piston clearances used in AC engines (.010 min. to .020 max), fuel will find it's way to the crankcase and wreak havoc (in the long haul) with the oil. The battery will be challenged (politically correct), to say the least, even with 15/50, giving all that extra fuel lots of time to meet the crankcase oil.

So I would preheat, just given those two points.

There is also another good reason for the preheat, and that is the extreme difference in temps between the cylinder heads, the cylinders , and the crankcase. This is most crucial during starts. It just takes that much longer for all components to reach a balanced temperature level. Preheat will eliminate that.

Once running, and having reached operating temps., the multi will cool faster than the straight, but flow is not impaired since it is operating near the 15 portion of the viscosity. It's a good idea to use a cooler cover, if only to maintain level oil temps, which will in turn maintain even temps throughout the engine. That's the only thing I hated about living in Chicago, preheating.

A few minor points to remember. If starting your engine in cold weather, run it until it has reached operating temps preferably in flight, then, shut down normally. Short running time will help collect condensation in the crankcase. Multis are less susceptible to this hazard, but it does happen, and never leave your crankcase at low levels, never less than 6 qt. in 320 or 360.

Leaving an engine at legal low limits is not a good idea. Heat is as much a friend as it is an enemy.

Cure for Cloudy Windshield

Chief Aircraft (<http://www.chiefaircraft.com>) sells polishes and scratch removal kits. You might go to their website and do a search. I bought one of the MicroMesh kits some time ago. It worked well

Locking Gas Caps

I got some for my 140. \$750 bucks. <http://www.piperparts.com/> I had a kid drop a hand full of gravel in one tank. That was enough. As for the drain, yes someone could use that, but gas is easy to replace. Getting "stuff" out of the tank is not. Something to think about thought, a C337 driver in Seldovia AK did not check his fuel tanks. Some kids had stolen gas from his drains for their four wheelers and he went in the drink. Got out OK but....

Price of New Voltage Regulator

I just put a new Zeftronics regulator in my Archer. Purchased it from Chief A/C for \$95.00. As pointed out to me by another member, the unit has a built in circuit breaker and warning light in case of a short. It is very straight forward to install- just miserable trying to get at it under the panel.

O-rings for Quick Drains

I got them from Aircraft Spruce. I tried the "O" ring route from an auto parts store and it worked for a while, then started leaking again. They are Curtis CCA-1550 1/8"NPT. Don't ask me why but the 3/8"NPT is actually 5/8" or more in diameter. They were \$8.95 each several months back.

When I needed to change one, I found entire quick drains for \$10 or so from Chief Aircraft. One time I needed one *right away* and found one at the local airport shop for \$5 more. I think it's made by Curtis, and there are several sizes. I don't remember which size I needed.

Adding Transponder

I added the ACK encoder to my Narco Txpd many years ago, didn't have to adjust it and it's still within 100 feet. Cost is only around \$160 in many catalogs. You should be able to get a Txpd and encoder installed for \$1200 to \$1500 (new). YES, you need both. The encoder shows on RADAR your altitude for better (safer) traffic reporting, by transmitting it with the Txpd reply showing on the controllers RADAR screen.

Determining Moment Arm of Starter for Weight and Balance

Look in your aircraft flight manual. (The one printed on 8 1/2 X 11 paper that came from the factory, NOT the pilots handbook). In the original weight & balance section before (probably behind) all the 337's there is an equipment list that gives the arm of everything that was on the plane when it was built.

Replacing Glareshield

Don't bother to recover the top of your panel! Instead, why not install a new glareshield? You have two good options: Avion Research makes a terrific but expensive glareshield, complete with fluorescent floodlighting under the brow. Check it out at www.avion.com/piperpanel.html The glareshield comes complete with holes for the defroster vents.

Your other option is the Dennis Ashby fiberglass glareshield. Less expensive (around \$230) but also less attractive and durable. His phone number is (800) 945-7668

Adjusting Carburetor Heat door

Sometimes making the carb heat seal both open and closed may be impossible. On one Cherokee 140 I worked with, the round tube against which the butterfly valve is supposed to seal was asymmetrical... so you could only get a good seal open or closed, but not both. This may be the case in many carb heat systems, due to distortions caused by the welds.

Having the heat portion open even a little bit will raise your intake temperature a lot (fifty degrees comes to mind) and will rob your engine of up to five horsepower. So if I have to make a choice, I'd get the valve to close off the carb heat rather than let the heat leak in when it's supposed to be closed.

In order to get a good seal in either position, you'll probably have to rebuild the butterfly valve, using a new flexible membrane, cut slightly oversize. AND you're going to have to make sure that the valve's shaft has not worn out the bearing surface. All together this is a difficult and messy job... but it's important.

Wing tanks placarded at 100 octane - reason unknown

BE CAREFUL. It is possible that a previous owner has installed high compression pistons making your engine 160HP. If this was done leagally (with an STC) there will be a plate attached to the engine stating that fact. There will also be entries in the logbooks. This has become a common upgrade and you are lucky if you got it.

If it was done "under the table" there will be no way to know by looking at the engine.

In either case, IF you are running 160 HP you MUST burn the higher octane gas.

Rudder to Nosewheel Alignment

I had my rudder/nose wheel aligned about a year ago. The A&P should do this (with your help). He has to crawl in the back and adjust the turn-buckles. The nose wheel is centered and then I watched the rudder til he had it adjusted to the center. Took about one half hour. Plus the time I took to remove the back seats, the front seats and the hat shelf and put them back in. Hope this answers your questions. Oh, it it flies straight and level and the nose trim works well, also. It does have the slack you mention in another message. This appears to be normal

Replacing Battery Cables with Copper

I got #1 copper from American Aviation. This wire has more ampacity and less resistance than #2 or the #2 Al your plane came with. I think #1 is the way to go for cold starts. I have 25hrs on a new overhaul. a Prestolite (old style) starter and a battery over 5 years old and the engine turns over great. I think #1 is a better choice for the new style starters as it's my understanding that they draw more current. My only comment about American's kit was that the cables were barely long enough - I don't think they accommodated the 5" fuselage increase in my '73 Challenger. I also got the Bogart battery box modification, which I strongly recommend. I went with American instead of Bogart for the cables because I weigh every dollar spent on the plane.

EGT - Typical Readings

My 0360 CHT runs about 400F on climb out and around 375F +/- during cruise (75%).

My Lyc. operators manual lists 500F max at 2700rpm

and 450F max at 75%. Temps are Bayonet location.

So if your probe is under #4 lower plug they may be different.

You should add an EGT also if you don't already have one.

We have been flying a Cherokee 140 and also a 180, both of them with multiple probe EGT and CHT readouts. They have been calibrated in order to be acceptable to the FAA for test purposes. Both these aircraft have been showing a high temp on number 3 cylinder of about 450 degrees on climb-out and 400 degrees in high power cruise. Florida summer temps.

I consider these numbers too high, especially as the other cylinders consistently are about 50 degrees cooler.

On the 140, the EGT on number three also shows signs of being leaner than the rest, and peaks about .8 gallon per hour sooner than the others.

M-20 Air Oil Separator

I had an M20 installed and it is great! No more greasy belly and the oil level doesn't immediately blow down a couple of quarts after an oil change like it used to.

Seat foam - source of temperfoam

OREGON AERO sells the foam or they will rebuild your seats. Phone 1-800-888-6910

Polishing Oxidized Paint

I recently did a fairly in depth search into what type of polisher to purchase.

I purchased an Arrow from the desert country and oxidation was quite obvious.

I compared the standard orbital (like something from an auto parts store) a rotary (such as auto body shops use) and the one that Sporty's sell (dual head random orbit).

The standard orbital--JUNK, don't even waste your time, the skin on an airplane cant support the pressure that needs to be applied to get a good finish. The auto body style are good, HOWEVER unless you are very familiar with how to use it don't try it because it will burn your paint and easily leave swirl marks. That lead me to purchase the dual head random orbital like sold through Sporty's. I did not purchase through sporty's, I found a better price through Top-of-the line address on the web.

<http://shop.store.yahoo.com/tolae/index.html>

This unfortunately was the most expansive way to go, but I guess you get what you pay for. The polisher does work, it is easy to use and no need to apply much pressure.

I purchased the de-oxidizing agent (1500 grid) and the sealer. The sealer is advertised good for six months, it's been one month, still looks good--we'll see about six. I used the de-ox agent and it does remove the oxidation, just have to be somewhat carefull not to swirl (don't go back & forth in the same spot for too long).

I realize this sounds like an ad, but I wouldn't waste my time writing it if I didn't have a good experience with it.

Replacing fuel quick drains

I recently replaced all three of mine with new bought at either Spruce or Chief - I forget which. About \$12 apiece. Wear rubber gloves and have a helper when you unscrew the old ones, lose a bit of fuel and screw in the new. Doesn't take long; I wrapped mine with teflon tape. No need to empty the tanks.

Replacing cowl hinges

The cowl latch hinges have a pin in them that is held in place with a cotter key.

The pins wear and the latches become loose. If you remove one of the pins and take it to a local FBO they will most likely have them in stock. I replaced mine a couple of years ago. I will look in my paper work next time I get to the hangar and will send you the part number. You can order them from aircraft spruce

Cabin Water Leaks

Our Archer II suffered from similar problems. Check the gaskets at the side windows. Although they may appear tight - try pushing in a little and see if any gaps appear. Although I don't recall any gaps in ours, the gasketing looked pretty bad. We cut back the existing seals and taped off

the window edge and caulked clear silicone into the new cut out area. Gee its not damp in our plane anymore

my 140 was tied down on the flight line for a couple of years, and I saw the same thing. I finally went and sat in the thing one nasty and rainy day, and saw water leaking in through the hole the screw for the top latch is held in place with. Good luck with it.

I would suggest getting a cover if your plane is tied-down. I have a 'Bruce's custom Cover' for mine, and have been happy with it.

Ditto the other comment about cleaning the windows before putting the cover on the plane.

If you really want to stop the leak, pull the interior trim and side panels, and sit in the cabin while a friend hoses the plane from the outside. It shouldn't take too long to find the culprit location. The key areas to look are the wing root/cabin seal, the windows, and the door.

Others have suggested that the air vents on the floor will let in water during a gusty thunderstorm. Because of this, I close them after each flight.

Sources of aircraft skins

Try Aircraft Supply in West Mifflin, Pa. or Tiffin Air, Tiffin, Ohio.

I've gotten skins from both and they are cheaper than Piper but still expensive.

Better Voltage Regulator

Get a Zeftronics voltage regulator. It is circuit breaker protected and FAA-PMA. The OEM unit will fry if there is a short to ground, which is too easy because Piper didn't design the charging system properly. They bastardized the Chrysler alternator and put the voltage regulator on the supply side of the alternator instead of the ground side. The field wire connection to the alternator is screwed up too. The push lock special connector (not one of which has ever come off in Chrysler's history) was eliminated in favor of a ring terminal and screw. The blade connector can shift over against the alternator case when the screw is tightened - thus shorting the field wire to ground. My reasonably conscientious A&P found this out the hard way.

Hard to start Plane

Our sage mechanic, Maintenance Officer, at our local squadron of the Civil Air Patrol gave me a few starting tips which has helped. First, I replaced the old Bendix starter switch, with a new TCM unit, took 15 minutes. The old one was worn and the detents seemed loose. Anyway, that did not solve the problem. Still tough to start, however, our sage mechanics advice was: 1. Each plane/engine is a little different, you need to get to know it. Start with the easy stuff, then work up. 2. Check/clean or replace the priming injectors, and check spark plugs. Clean, gap or replace as necessary. I have two primer injectors, on cylinders # 1 & 4. 3. Avoid pumping the throttle. 4. Use short engine start attempts, with first one shot of primer. 5. If it doesn't start, stop and add one or two shots of primer. Don't get impatient and keep cranking, short attempts with pauses. 6.

After three to five attempts, let things cool off for several minutes, before attempting restart. 7. Carefully preheat the engine when needed. 8. If all else fails, have the SLICK impulse magneto removed, inspected, checked/repared or replaced. It may be producing a weak spark.

If this problem continues, I may consider the Unison SLICK START magneto booster system, for around \$300

Aircraft Insulation

Most people assume that insulation in an airplane is for heat or cooling. In an airplane, insulation is used more importantly for vibration, ie. noise reduction. It should be glued to the metal in some form or another to reduce the "oil can" effect. Quantity isn't always the best. Had my Archer seats redone a year ago and the fellow who did them explained it to me. He was completely redoing a 1950's Bonanza, interior completely stripped. Anyway his idea made sense to me. He used a blue foam about 1/4 inch thick with an adhesive backing. I have purchased this from Aircraft Spruce.

Keeping Bugs off of Leading Edges

I got my introduction to flying with a guy who owned a Bonanza and it was always spotless. I discovered he used Pledge on the leading edge of wings and tail and nose of the A/C and he would spray it on after a flight and bugs would wipe off with an easy stroke. The wings always looked shiny too!

I have always kept some in my baggage for the touchup after a flight if needed. Bugs just glide off!

Installing Heated Element in Pitot Static Mast

When I had my Pitot heater installed, they just installed the heating element in the existing pitot mast. My 77 Cruiser had wiring installed and a slot for the rocker switch. Had to buy the element and switch only.

Early Fuel Selector Stiff, Turns 360 degrees

I also have a '65 180, but I think most selectors are similar in this variety. mine was 'sticky' in any rotation, so I took it apart and cleaned it. used a little 'fuel lube' going back together and it is just fine. there are no stops as such, but there are detents you can feel in the handle when it is in a position. hope this helps

S-Tec vs Century autopilot

Why on earth would you want to put an ancient autopilot into your airplane?! Especially when there are modern rate-based autopilots that are reasonably-priced and MUCH safer than an old Century IIB?

The main safety issue here is that your Century IIB will roll over and play dead (perhaps taking you with it) when your vacuum pump fails in IMC. On the other hand, a rate-based autopilot such as the S-Tec System 30 is unaffected by a vacuum pump failure, since it takes its roll information from the electric turn coordinator. For more information on this subject, see Tom Rogers excellent article on autopilots at www.avionicswest.com

Frequent Replacement of Panel Light Transistor

Assuming the circuit is working correctly, repeated failure of power parts is almost always caused by overheating. There are 2 possibilities here - the power transistor is trying to output too much current (2N3055 is rated at 15A), or inadequate heat rejection is at work. To address heat rejection, a heat sink is used. I don't know the setup used in the Cherokee, but if the transistor is not getting a good thermal contact with the heat sink, or the heat sink is missing, then that is a obvious problem. Make sure the heat sink is big enough, the mounting screws are tight, and make sure to use some silicone heat sink compound between the transistor and heat sink. If the heat sink has fins, make sure they are not clogged with debris. A small 12V fan (like the one on your computer CPU) could help, but this depends on the physical set-up of the module. BTW, Anchor Electronics (408)727-3693 has 2N3055 transistors for \$0.95 each, in TO3 package, as well as an assortment of heat sinks, and will ship UPS.

If your 2N3055 is connected using heat sink grease and the problem still exists, consider installing a second 2N3055 in parallel.

White arc is for full flaps

According to my "Piper Private Pilot Manual"(circa 1980)

The white arc specifies the speed range where fully-extended wing flaps can be used safely.

It goes on to say extension of FULL flaps at higher speeds could cause severe strain on the flap extension mechanism.

So I guess unless your POH forbids it, feel free to use one or two notches above the white arc.

All though I'm not real clear why you would want to. Those long desents are where you can make up some of the speed lost in the climb to altitude.

If conditions allow keep the power up and run up into the "yellow" on those long desents.

Duct Tape for Oil Cooler

just cover about half of the cooler. if you are useing multi vis oil (aeroshell 15w50 philips, exxon elite) you really don't need to cover cooler unless oil temp gets too low (out of green)

Why mess around with duct tape? The cooler plate is simple to fabricate and easy to use. My existing plate covers about 95% of the fin area. Duct tape has the nasty habit of disintergrating form weather and UV light and the glue tends to flow with higher temps, making a general mess to clean up.

Just a warning about duct tape. I was ramped checked as a student in a C152. The FBO had covered the air vents in the wing with duct tape because the inlets leaked and the plane was freezing cold. The FAA inspector asked for the STC for the duct tape. He ended up writing it up, saying that if the FAA has not approved it, it can't go on the plane. We ended up appealing and getting field approval, but field approval might not be forthcoming for duct tape under the cowling.

Safety of 1/4 inch windshield

The main reason I replaced the windshield with 1/4 inch was safety. It is well documented that 1/8 inch plexiglass won't stop a bird of any size! I performed sound measurements and only reduced noise level a few dbA. I cant' say how much was do to 1/4 inch glass since I pulled out

the fiberglass insulation and glued Ensolite LSC to the inside of the exterior skins (including headliner replacement - a really time consuming job. The grey wool does look a lot better than the yellowed vinyl, though).

But...

It's a nasty job as you have to carefully sand to a taper all around in order to fit the window channel. It will take several hours and a patient mechanic. Wonder if it was worth it afterwards.

Nav Lights Foiled by Dirty Switch

My Cherokee 140 nav lights wouldn't work even though a voltmeter reading showed 11.8 volts at the wingtip light fixture. Drove me (and several A&Ps) crazy until a young A&P said that the panel switch was probably dirty. Seems there is an on-off switch in the same rheostat switch that controls the interior nav light brightness. The contacts for the switch get dirty. Some electronic switch cleaner spray fixed the problem. It helped that the young A&P was very agile, because he could spray from the front and back of the panel without removing the switch. It's worked for the last two months and four night flights since. The spray cleaner doesn't hurt the panel plastic, but try to keep most of the stuff in the switch area.

140 turns left during Taxi

Your pedals are directly connected to the nose gear, or the steering gear. Main gear wheel alignment will not cause pulling to one side. It will cause some shimmy and tire wear, or odd stopping. Pulling to one side is strictly front wheels or wheel.

Fix gear Cherokees have ball bearings on their nose gears, as opposed to bushings found in retracts. Those bearings are not designed for the job of thrust loads, plus they have tiny ball that are easily affected by dirt and grime. Age will form a low spot on the races which cause the wheel to want to follow right into it. If its straight, you'll hardly know it. Tightening up slack on the scissors help, but a pull to one side calls for replacement. They ain't cheap.

My second 140 had this problem, I finally was tired of fiddling with it, and when the time came to replace the leaking seals, so went the old bearings.

Overhauled Gauges

Have you tried Air Parts of Lock Haven. They had an overhauled oil pressure gauge for my 140, saved me about \$200.

Source For Stabilus Seat Cylinders

I replaced my seat cylinders a year ago. Mine were the stabilus bloc-o-lift. I understand these were not used for too many years. My airplane is a 1978 Archer II. Anyway, I contacted Dean Lewis Associates 7105-A NE 40th Ave Vancouver, Wa. 98661 sorry, I don't have their phone number. They are knowledgeable people and easy to work with. I don't remember the price but it wasn't bad. Quick turn around too.

Do Not Grease elevator cable

My elevator (overhead) trim on my '62 160 has now stuck twice, today I had a close look at it and found the cause - the turnbuckle where the two ends meet was caught between one of the pulleys and the split pin. Obviously there has been gradual slippage and at full up trim the turnbuckle was reaching the pulley above the baggage compartment. I had a close read of the lubrication chart in the owners guide, it warned not to lubricate the pulleys where the cable ran or

the cable itself to prevent slippage. Somewhere in the past a previous owner/A&P had greased the cable.

You can convert some 0-320-E3D engines to 160 HP

Art Mattson R&D has a simple STC for wide deck engines, which if you check your engine S/N, and it has a letter at the end, it is a wide deck engine, and can be modified to 160 hp. It seems like a very simple STC, and retains the 2700 RPM redline, and 2000hr TBO.

Source to rebuild carburetor

columbia aircraft did an excellent job better than it ever ran 570 784 3070 phone

Source of low-cost new engines

Air Power. They're at www.factoryengines.com.

Or.... Triad 800-334-6437

Made Own Sunvisors

Let's see; I took out the old ones on my '67 140 and traced onto some green tinted plexiglas from a glass supply house. Went home and bandsawed them out, sanded the edges and re-installed. Looks and works great, Cost, maybe \$15. If you don't have a bandsaw, the glass supply will cut them out for a few bucks more. Don't try cutting with a saber saw as it will chip.

Locking Gas Caps

I had a situation and needed locking gas caps. <http://www.piperparts.com/>

You are looking at about \$700. It is a rip off but it is the only place to get them. I looked at auto caps. You can get an old style locking cap that works but you would have to change them to fly. A possible way out of the high cost, but not a real good option in my opinion

Source of Decals

AERO D-CALS, P.O. Box 5775, Lakeland, FL 33807

Ask for PA28-140/181 set, 2 large sheets of any possible decal for your Cherokee or if any of your friends have the Brother or Canon Label Maker, they do a great job, I have a Brother P-touch that works well, even used them outside and they last. Use a black on clear tape or white on black. I even redid a NAV-COM faceplate, looks good

Seat Cylinders

Thanks for the information Gus. I contacted Central Airmotive and spoke to Chuck. He stated the Hydrolok pn# SL10100 seat adjust cylinder with the large spring is repairable. It is the one commonly utilized on many later Piper Aircraft adjustable seats. They have a quick turn around (less than one week, which is much quicker than the manufacturer, P. L. Porter Co.) and a cost of about \$135 for an approved repair. If I understand correctly, he stated that the German made STABILUS Bloc-O-Lift has been approved by Piper and is called AVLOK, Piper pn# 587-404 and is over \$400. Central Airmotive has them for about \$250, and they are sealed type and non-repairable, and do not have the large spring, and require minor seat modifications to fit. (I did ask, and I was not given the STABILUS pn#.) They still basically work the same. When I

asked which one is better, he stated that many of the seats with the Hydrolok units have been working properly since the mid seventies.
(Central Airmotive: 660-885-7531.)

New vs Reground Camshaft

Bet you would hate yourself for not spending the few extra bucks for new if the re-ground cam begins to make metal at two hundred hours. We put a new cam in at our field overhaul, since the case was already open....etc.

Ammeter Dance & Battery Box Ground

YI have had the bouncing needle syndrom and decided to check the ground connection on my '67 140. It bolts to the aluminum wing spar box. Aluminum is a fair conductor but forms an oxide quickly that is not! I sanded the spar area and connection, then applied Never-seize (Perma-Tex) which is a conductive silver paste that also helps prevent aluminum oxide from forming. I installed the bolt with new serrated washers front and back. What a difference in ammeter readings! This could also be true of voltage regulator mounting to aluminum bracket. This should probably be done every annual but is often neglected.

Attaching Storm Window Latch

My latch kept falling off also, then I used the auto rearview mirror glue on my Dakota's window latch. It's been 2 years with no problem since.

Fuel Screen in Electric Pump

If you will look at the the fuel line, you'll notice that it goes through the pump, the electric part is just to force it to the carb. Now, something to watch for: I took-off one day and to my shock, noticed the fuel gauge drop to ZERO during climb out. The engine ran fine and the gauge came back up after I leveled off. After checking many things, I had the local FBO take a look and they found the screen in the pump 70% blocked. They replaced it and haven't had that problem again. The repair cost \$157.00, .50 for the part, the rest labor.

(Note: electric pump is in-line with engine pump - fuel screen is at inlet of pump)

Lycoming Oil Pump Impeller SB

Lycoming SB#524, dated Sept 1, 1995, sez: "Caution, GO-435 and GO-480 engines are the ONLY engines approved for use with the steel driving impeller PN60746 and the aluminum driven impeller PN60747. These impellers MUST be used in sets. NEVER use impeller PN60746 with a hardened steel driven impeller." The recommended replacement part Numbers are: LW18109 steel driving impeller, and LW18110 steel driven impeller assy. also PN SSP285 caution tag should be used. These come in Lycoming impeller kit PN 05K19423-S. you should get the service bulletin in your hand for there are other instructions and cautions about the installation

Engine Rough, No RPM Rise at Shutdown

My Cherokee did the exact same thing...

"Leaning" Yes it turned out to be an excessively Leaned engine, and I never Touched the Damn Control. Why? How?

The Seals at the Intake Manifold. I have Posted the Following Many time here and at Other Owner Chat rooms:

Remove the Carb. Get a "Shop-Vac" and On exhaust shove the Hose up into the "HOLE". Turn-on the Shop Vac and Soap-up the entire System. You will need to use Rags around the Hose as Gaskets.

Stand-back and Watch-it BLOW Bubbles like your 1st grader does in your Back-Yard... Takes about 3 hours, so at \$50/hr; it's Cheap. You agree?

Installing External power Plug

Coincidentally, I just installed one myself (after it stayed in the box for about 15 years). The entire plane is ground. If you look at the battery ground you'll see that it is bolted to the spar section that runs through the cabin. I put mine just behind the step on the lower section of body. I did and suggest that you do, add another piece of metal behind the skin as a brace (like a matt). I've only needed to be jumped off a few times, but what a pain to have to lift the seats up. Also, I installed a starter solenoid in line with the cable to the battery, so the outside socket is not 'hot'.

Oil Pump Gear Replacement

I bought the necessary gears from API, Memphis, TN. Their ph # is 901-365-3470. It is a kit which consists of both gears, the p/n is O5K19423-S, and the price was \$255.00; the mfg is Lycoming. These folks are also a source of the gaskets if you need them to.

And

Niagra Airparts has the gears and housing for \$325. (Superior and Lycoming are more expensive) Expect to pay for 8 to 12 hours of shop time to remove and replace the old pump. You'll also need a new oil filter, oil, and some gaskets.

NOTE: Some people try to save time (money) by removing only the accessory case and not the sump. The only way to get a good gasket seal between the sump and accessory case is to remove BOTH to install the new pump.

Nulites

I recently put 12 of them in my Cherokee 180's panel. I put mine on the front of the panel, not behind it, hooked them to the dimmer switch...they are covered by the overlays. They aren't hard to install and work great.

I just repaneled mine. I put them behind the panel on all of my instruments, deleted the old system and wired these into the dimmer assy..

They work good much better than the org. system.

Beware it will set back you instument a bit. If you are going with them I suggest going all the way. Placing it behind the panel and still having the krappy plastic panel my make it hard to completely view your AI

Replacing Panel Dimming Transistors

Replaced my panel dimmer rheostat and transistors resently in my Cruiser. I undid the front panel and removed the whole housing, which I believe you do not need to do unless you are

replacing the rheostat(s) also. I had to remove one radio, rack and all, to gain access from above, and did some of the work on my back under the panel as well. Soldering the wires from the old rheostat was done one at a time, from the front of the panel. It was a pain. (I burned the side of my finger. Ouch!) I obtained the parts from the local Piper dealer initially. Immediately burned out the new transistor, due to a short which I found later after some trouble shooting with my VOM. I finally opened my parts manual for the PA 28, and found they list the specific transistors to be utilized for the particular aircraft serial number and models. Several different types were used. I finally went to an electronics parts store, got the same transistor at less than 1/10th of the Piper parts house cost, and it now works fine! They also had similar rheostats for about 1/3 the price as Pipers, but the dimming range was not as great. Hope this advise helps a bit.

Suggested Alternative Engine Heating

I've used the FireFli from Sure Start (<http://www.surestart-preheaters.com/surstart.htm>) for the past 2 years with great success. The unit is light and easy to use. Add a blanket and 20 - 25 minutes of heater time and the engine/oil is well heated.

I just drive my vehicle up to the tie down spot and use the cigarette lighter in that to draw the power. My tie down neighbor saw mine and immediately went out and bought one himself which has also served him well.

The only downside is the Carbon Monoxide which is high and does enter the cabin. I usually open the door near the end or the pre-heat to air it out prior to start-up.

Nose Strut Going Flat

Could the schraeder valve be leaking, or the crush washer under it? Could you use the old soapy water trick to check for leaks (squirt some on and look for bubbles)?

Ammeter Jitter

As you know, I had a high ammeter reading with some fluctuations recently in my newly acquired Lance. I was nervous that I had a charging system problem, i.e. voltage regulator or alternator. My battery had been overcharged by this condition and boiled over on to the belly of the a/c. This was suspiciously causal for the slight corrosion that was found and addressed in the battery area/belly at the pre-buy/annual just completed. I cleaned up the over-flow, and replaced the battery. The system is now back to normal, and I have a new battery. I am beginning to suspect that many of the "charging system" problems can probably be chased down to a battery beginning to "go bad". Electrical things are kinda magical to me, but apparently the charging system is sensitive enough to try to compensate for a dying battery, and is reflected in strange meter movements.

BTW, a TT tip is to allow a 12-24 hour period of sitting for a newly filled battery before any charging or use to allow the cells to full saturate with acid. I did this and the battery needed very little charging and is now hopefully prepared for a long life.

I will, in the future, not take my battery for granted

Replacing Wing Walk Material

I have done the several times. The paint on type works out better if you use a small roller. This allows you to go right over the old compound. Or, you could chip-up all of the old compound with a scraper that is softer than the aluminum and complete the the latest inspection that came out on them.

The stick on sheet type is nice and quick and does a great job. Lay it out in two pieces to save a great deal of frustration.

Repairing Gyro Instruments

Try Nutek, 1-800-338-7146, they've rebuilt 4 instruments over the last 5 yrs. They're good, and reasonable. They specialize in pressure instruments. They just returned my DG with heading bug for my AP, and it looks brand new.

Repair Rescue 88 Transponder?

I hate to be the one to say this, but the old "Garrett" Rescu 88's are not repairable. Well at least not by the manufacturer. I current work for the company that was once "Garrett" and I looked up this unit in our supply & repair system computer today to see if we even stocked parts for it anymore. Sorry, but no joy!!! You might find an avionics shop some where that might still have the ability to repair it but I do not hold out much hope. I also have one of these units in my 140 and I hope it will last for a long time. If not, it appears I will have to replace it.

It may be that the switch just needs replacing and if so any good avionics shop should be able to do that.

Bubbles in Fiberglass Cowling

Had the problem on the lower right side of the cowl on my 180. Mechanic glued in a fibre insullation and covered it all with reflective tape. Thats worked for about 3yrs now.

Balancing Tires

Not much is written about that any where. There are only a couple rules to go by that are outlined by the FAA in AC65-15 that are concerning the locatiion of the valve stem. I have dis-mounted and remounted more A/C tires than I care to count and have never really come across a tire that needed to be balanced. I think that it's largely due to the small diameter of aircraft tire. AC65-15 is a great book to have around I got my first one about 17 years ago and I still pick it up about once a month or so to revue something(its a great book to pick-up-- and its cheap!!!).

Use of an Oil Pan Heater in Winter

I used an Easy Heat silicone pad heater for several years on my Cherokee 180 with no problems. below about 35 degrees or so, cover your cowling with an old quilt blanket or comforter, along with cowl plugs (you have those right?). The entire engine compartment will be appreciably warmer compared to not being covered. My oil temps on start up would be slightly in the green...about 60 to 70 degrees F.

Keep using it. They work good. Are inexpensive, and provide adequate warming of the oil and cylinders.

P.S. Get an industrial 24 hr timer and set it for about 3 to 4 hrs before you want to fly the day before. Works great.

Repair or Replace VOR Indicator, Glide Slope

Have the same setup in my 1975 crusier. Took both radios and indicators to Lafayette Avionics in Lafayette, IN. They cleaned and calibrated the indicators, cleaned and tuned the radios, even replaced some components in the KX170. The total was about \$200 for everything. Everything works great since. If you are in their area and want a contact, call Ron Wright or his son at (317) 743-3828.

5th Child Seatbelt

My Arrow has the 3rd belt in the back, and was accomplished with a 337 form; however, I do not believe it is a good idea to strap small children into the seat (plane or car) without at least a booster seat. My daughter is 4 and I expect to continue with the booster seat until she is 6-7. Of course, with a booster seat in back, there really is no room for the 3rd child. You might have to leave Mom home!

Rechroming Struts

I recommend Industrial Plating Co. Inc. Aerospace Division. PO Box 2365 1300 Clydesdale Ave. Anniston AL 36202. Phone 256-237-8647.

They did my mains. Well done in reasonable time

Fuel Selector Getting Stiff

Dismantle the selector, put a tiny quantity of very fine grinding paste on the tapered plug and carefully lap it in. Do not lubricate it, this just washes off and leaves it worse than before. The above method is described in a Piper SB. My plane(65 Cherokee 180) was so stiff I had to use both hands to turn it. I was present when my mechanic carried out the work. The selector is velvet smooth two years later. Be sure and get off all the grinding paste....incidentally it only takes a couple of turns to lap in as the material is fairly soft brass.

If you want more details email me: hvl@iafrica.sz

and

I just did mine today. You have to take the top off, be careful not to drop the inner parts, apply fuel lube grease very lightly to the plug valve, the part shaped like a cone. Also under the top piece there is an "o" ring grease it too. Reassemble in the same position as removed. It's not hard, except getting under the panel, I am a big guy. If you're smaller it should be easy.

Wing Walk Inspection, Repair

As per the letter that I recieved from the FAA. this inspection may be done by the owner/pilot. If you have the stick down wing walk all you do is gently peel it up and look about for cracks. after I was finished I replaced it with stick on sheets that I bought by foot at the marine supply store. Worked great!!!

Jack, had mine replaced about 12 months ago. The panel cost me about \$350 US (converted from Aussie) and about 8 hours in labour, including redoing the paint on the wingwalk. My engineer derivetted the top panel off the old wingwalk and used this as a template to drill the rivet holes in

the new panel - reckons it was a snap. It must be a common job as there was plenty of stock in Aussie.

Symptoms of Leaky Exhaust Valve?

If your A&P is positive that there is a leak, don't wait till later on, but do it now. Exhaust leaks lead to loose valve seats and/or damaged valve, and even cracked heads. The worst case scenario, the head breaks off.

More than likely valve bleed down clearances were set to minimums. This is lengthy process (valve damage), but once started it doesn't stop. By your note you have nearly 500hrs, and yes, this is rather early, but then again you're dealing with a 70 yr. dinosaur.

Bleed down clearances are understood and /or examined by fewer A&Ps than imaginable. Oddly, when established after, say the first 50 hrs. or so, it rarely has to be dealt with afterwards. If you so decide to have this valve leak repaired, be sure that the ex-system is also in good order. BTW, just before my Arrow's engine went south. it was running like a top. At first annual after purchase, I checked bleed down clearances, and were all over the place, the valve that broke especially (minimum)I managed about 300Hrs. out of it.

The Zephyrhill guys have a good rep., but if you ever have to have an engine done, use nitrated barrels, and not chromed

Fuel Pressure Slow to come Up

Before you condemn the pressure gauge, especially sence you know it will be big bucks for a new one. Talk to your Mech. and borrow his portable fuel pressure gauge and see what your pressure actually is. Maybe you have a blockage in the line to the gauge

Brakes Locking during Tow

Your braked can lock for a number of reasons, here are a few. Worn or loose bearings, frozen floater brake pad, frozen caliper pins, lots of crud in caliper (outside), dragging caliper piston

Fuel Smell in Cabin

I to had a fuel smell, found that the stem of my feul selector valve was leaking, it needed a new "o" ring. I then greased the plug valve and "o" ring before assembly and

I had the same problem on my 1966 180. Turned out there was a leak in the left tank overflow line. Not enough fuel was leaking to cause stains but enough to cause smell. Pulled tank and replaced all hoses and smell went away.

And

One other thing. I forgot to mention that if the fule bowl at the aux pump is leaking the smell will make its way into the cabin. Check the washer and make sure the bowl is tight. You will see a fuel stain if it has been leaking.

And

I was having a fuel smell in my 140. Had my AP check fuel selector no leak. Turned out to be a leak in the line to the primer.

Breaking in New Cylinders

When I replaced my engine in '96, I was told to do a very short run-up and then take-off, flying at almost full power for an hour. This will set the valves and insure that everything is tight. That is what I did and have had no problems and very little oil burn, maybe a quart every 25 hours or so. That mostly gets blown by and on the belly. I'll probably put one of those air/oil separators on to stop that.

Paint Shop Recommendation - Midwest

Had my Warrior painted last year at B-CAP at Maquoketa, IA (OQW). Very pleased with the results.

Fuel Pressure Lower on Aux Pump than Engine

Same problem..although my aux pump worked fine at first. I suggest you check the screen in the aux pump to ensure it is not full of crud. Second, consider replacing the aux pump. easy to do and not very expensive. The difference between my old and new pump was like nite and day. (Pressures should be the same).

Fuel Burn - Excessive or Not?

The notion that one leans an engine and receive minimal fuel consumption is someone's pipe dream. Any engine, from lawn mowers on up, will consume more fuel if running too lean, and add to that, raising BMEP and detonate. If you have an EGT, lean (in level flight) until the engine starts to run rough, and then add until it runs smooth, and note your EGT. This will serve as a guide line, do that when you lean (or enrichen) you'll know to add just a tad more fuel, or on the rich side. If you end up with 10 gph, that may be what your particular engine requires. Some times short hops will use more fuel as well. Running too lean will always use more fuel. You may consider running your engine, so as to attain max. cruise speed. Using 10gph going 20mph faster is a savings

Excess Oil Blow By after Overhaul

Was "forced" to use a local engine rebuilder after loosing my engine (in the air). The shop came recommended, etc., a lot more to the saga.

Same problems as yours, but now I'm on my home turf. Reasons: poor OH job. Solution: has to replace all four stud assemblies, this time I personally "hand picked" them. Actually not, I just hand picked the shop. I've recently completed a long CC, 24.4hrs., oil consumption 1 3/4 qt. I use 15/50, and no additives. Just this morning, I had to add a qt. didn't quite make 18hrs.

At 280 hrs. One exh. valve had came loose (#3), shortly followed by multicracks, and loose intake seat (#1). Had to buy another barrel. Suspicious, I removed #2 and #4, although compression was good. Noticed cracks visible without die check.

All this only 10hrs. after the first incident.

When the shop was confronted (Aero Engine Works in Jax, Fl.) his attitude was cavalier, to say the least. There have also been several incidents in my area with this shop, including at least two engines coming "unglued". As for your unfortunate dilemma, I have a problem with any rebuild shop that has to consult Lycoming with your problem. These engines have only been around

since the 1930s, and a rebuilder worth his salt, shouldn't have to consult anyone, and should make good on your problem, period.

Rams Horn Yokes - Alternative

You can use the yokes from Piper Tomahawk, they are very nice and they fit right in. You just remove your old yokes from the universal joint and then bolt these in. You can find them from Wentworth.

Installing No Blow Exhaust Gaskets

Be sure the studs are in good condition, and that the header flanges are not distorted. Be sure that the "faces" on the cyl. head are in good condition. You can use fiber wheel bearing grease as a sealer, if not use any anti seize compound on the faces.

If you have a 140 with a crossover exhaust system, be sure to inspect the muffler. Look for broken baffles, and /or ex. pipe "basket".

Smell of Burning Brake Fluid through Heater

We had one hell of a problem with the smell of burning brake fluid when the heater was turned on. I climbed inside and out to find the problem. Found the hand brake cylinder leaking.. so very little. Repaired it. Cleaned everthing! Stil the smell would come back. I went crazy! Looked into the heater box at annual. Found NOTHING! The firewall was clean from the can to the heater.

Then one day I spotted brake fluid on the floor of the hangar at the center of the heater box. Still the firewall was clean! After an exhaustive search I found the root cause.

The brake fluid container on my '68 180 was loosing fluid at a slow rate. I found fluid between the firewall and the insulation INSIDE the aircraft. The can has a copper washer and small piece of copper tube soldered to it through a hole in the back side of the can. There was a crack in the solder, small but none the less enough to lead brake fluid along the tube then into the cabin adn then all the way down to the heater box! Soldered it all up, cleaned it up and re-filled it and now the cabin is as warm as can be and I am not dying from the odor! Litterally!

Retrofitting an Air Conditioning System

I am a air conditioning contractor and have serviced several plane a/c systems. R-12 is available for around 30-40 dollars/pound. The system is very simmlar to a auto system and will use about 3-4 pounds.if the system is tight(no leaks) the r-12 last forever.use new hoses and gaskets, pressure test with nitrogen for leaks,then vacuum test for leaks before charging the system.there are several new refrigerants on the market that are drop in replacements for r-12 unit. I use them in refers and frezers and they work well,however I do not know if faa approved.if you have any questions please email me.

Recurring Problem - Instrument Panel Lights

problems with instrument panel lights are usually short circuits caused by technicians pinching the wires for the panel lights when they re-install instruments....find the shorts and repair

them....rheostats are sometimes damaged by the shorts and are very expensive (\$40 plus)..power transistors are seldom damaged but are available at Radio Shack for under \$2...

SB 1006 - Fuel Vent Lines

Air Ward (<http://www.airward.com/>) at Novato airport in northern California sells a very convenient kit to comply with Piper SB1006. The kit contains all the necessary hardware, including the vent lines. My mechanic and I pulled my main tanks (Cherokee 235) and did the service bulletin at my last annual. The kit contains the Dinitrol compound that you paint on the wing spar behind the tanks, and the structural stainless steel screws that attach the tank to the wing. You'd probably spend more money than the price of the kit assembling all the necessary hardware separately.

My "flexible" fuel hoses (dating from 1969) were anything but flexible, and my original fuel vent hoses had completely decayed. That's why I occasionally smelled fuel in the cabin, especially when the tanks were full. But not any more, since I replaced the vent hoses. Sure gives me peace of mind to have complied with SB1006. Good luck!

Electric Trim - Motor Runs, But Trim Wheel Does Not

It sounds like the clutch pack is slipping. its not that hard to ajust after you have done this once or twice. the trick is to make the clutch strong enough to grip but still allow it to slip when moving it by hand. I don't recommend working with it if you have limited mechanical experience. Take it to some one who has done it before you will be time and money ahead.

Avionics Master Switch

It cost \$150 to put an avionics master in our 180. It is located on the lower right of the radio stack with a nice vertical decal.

Alternate Salvage Yard

You might try "Central Air Parts, Inc." in Staunton, IL. PH (618) 635-3252, Bob Willhoit is the owner/manager but anyone there should be able to help you.

Hatshelf Rear Bulkhead

Try Plane Plastics at www.kinzieind.com or E-mail at planeplastics@vantageassoc.com

Building Up Seats for More Comfort

I use a temperfoam cushion from Oregon Aero. Keeps me from sinking in too far. Temperfoam is winderful. 10+ hours this weekend on 900NM trip. No complaints (except for headwinds). Cost - \$75 for a block of Temperfoam.

Altitude Effects on Fuel Burn

Altitude makes an enormous difference in fuel burn. My Cherokee 235 is equipped with a thirsty Lycoming O-540 and a fuel flow gauge. At 5,000 ft, the engine burns around 15.6 gph. But at 13,000 ft, fuel flow is down to 10.6 gph. At 10,000 ft the engine demands 12.1 gph. So, if you want to save money, strap on that oxygen cannula and fly high! Winds aloft are stronger up high, too, which can either be good or bad, depending on whether you get a tailwind or a headwind. I

usually flight plan for 140 kt (no wind), but I've been groundspeeds as high as 180 kt at altitude with a howling tailwind.

Removing Defroster Ducts for Recovering Panel Top

Been there, did that. The nuts are underneath in the insulation. You'll have to have a close friend(very close) lie under the panel with a nut driver, find the nuts and loosen as you hold the screw heads with a right angle screwdriver. Good luck.

A number of people have recommended drilling the heads off the bolts, then replacing with sheet metal screws upon reassembly. That method works great if you have the windshields out.

Arrow 180 vs 200

Going from 180 to 200hp., is hardly worth the cost. The difference in performance in both is only 5 mph, not kts. A well built 180 equipped with Lasar ignition is more than capable of performing and out performing a 200hp. version. It all boils down to bang for the buck. If you were to acquire an STC, in addition to the engine, you'll need a prop as well. Gets expensive. 5606 oil is used for landing gears and brakes.

Making Oil Cooler Plate

If your aircraft is one that has the oil cooler in the front on the right side (fwd looking aft) you can have a mechanic make one very easily. The oil cooler mounting bracket has two cover plate mounting holes at the bottom just below the oil cooler, with nut plates behind them. They generally take two 10-32 screws about 1/2 inch long. You can make a plate out of .032 or .040 Alum to fit the oil cooler opening and drill it to match up with these two holes. Note: Be sure and leave at least one, preferably two rows of the oil cooler fins exposed when the cover plate is installed. I keep my oil cooler cover in the aircraft at all times during the winter months. If conditions call for it, it's about a 3 minute job to install it and your off and flying.

Adding heated pitot Tube

RE: Pitot heat wiring: I have a '77 Cruiser, it had the circuit breaker, and was wired for heated pitot, all that we had to do was install the heating element in the blade. Very simple, indeed. Cheers, Bob

You should have the wiring there, but even if it is not, it is pretty easy to install. Did it myself years ago. Watch your amp usage though, they suck up a lot of juice. I believe most of the 140s had 30 amp generators/alternators. If you have a full panel or extras like wingtip lights it could be close.

John Little

Excess Play - Landing Gear Links - Probably Bushings

If link replacement is necessary, you will be in a heap of doo doo. The bushings can be replaced easily. They are a standard size available in any bearing supply house.

Replace the through bolts as well, those are the standard AN drilled variety. Be sure to check your toe in for proper alignment while you're at it.

Comments on Narco Nav 122D

I have one in my 235 and I think it's great. I like having VOR/GS/MB in one small unit.

Changing Stall Warning Light to Buzzer

My mechanic did that very thing on my Dakota. No STC was necessary; she simply had it approved by the local FSDO inspector. She said no problem getting it approved.

If you need to contact her, her name is Margie Jake, Bay Air Maintenance, SPG Airport, 727 823-3818.

Source of Seat Cylinders

The posting was from Chuck of Central Airmotive/Aviation Fabricators. Phone # 660-885-7531, e-mail Chuck@centralairmotive.com

PAI 170 Vertical Card Compass

Have had one in my PA28-140 for many years. It beats wet compass hands down but get the proper mount for it. Easy to read and is like a second DG without precessing. Wet compasses should become obsolete.

Pre Heating Engine

From reading the threads I see there are many ways to work this problem. Let me start by saying each has its own worthy solution to the temperatures you are dealing with. After about 20 years of flying in Alaska I have found this to work the best: First you need a full engine cover, black. The sun is the best heater. Many days below 32f I don't need to pre-heat if the sun is out. Kennoncovers.com makes some good ones. Others may be just as good, check around. I use a Tanis system. Tanair.com. For the 0-320 it has an oil pan heating pad and a probe that goes in the oil pan. Probes in the head heat cylinders. You can get probes that double as heaters and sensors so you do not sacrifice CHT as in earlier models. The system on a four banger takes about 250 watts, as I recall, for the lower watt system and 520 watts for the higher watt system. I use the 250 system because it was all that was available at the time. I will go to the 520 watt system soon to save time. The system does take a little time and there are some compromises that have to be dealt with. You are heating the inside of the engine not the engine compartment. Control cables and the like need to be watched for stress in cold conditions. Also the cabin is not heated and care must be used there also. Tanis is an electric system that requires juice from somewhere. If you are near a plug in great, if not you need a generator. Here comes a problem. If you fly where there is no plug available (most places) you have to take a generator with you. In the past this was a problem because of the lack of light portable gens. Honda makes a couple of great options, light, compact and not that expensive when you consider the alternative. Whatever brand you use, you need to time the run time on a fuel sampler from your A/C. You have an empty gen, you drain fuel from your A/C (it will not hurt the gen)in measured amounts for preheat time dependant on temp. This way you run the gen empty before flight. It will cool enough while you pre-flight to go in the A/C and you eliminate fuel in the gen. There can be some smell but very little or none once you get the hang of it. Let me back up a bit to the engine compartment and

cabin. If you have a source of enough electricity use electric heaters for both. There are many good ones on the market that will work without danger of fire. Something to consider for sure anytime you put heat in or near your A/C. This is where a carry on gen has its drawbacks. In order to power those types of heaters it usually takes 2 to 4kw. A very large gen. The market is coming out with some possible candidates that would fit with weight and size that might work for carry on and carry the electric load. Power sources at each end of the flight depend on where you go and the resources at each end. Beginning to see the possibilities? I have not mentioned Red Dragon or other fuel type heaters for a reason. Fire. Here I will probably get responses with other views. Yes, I have used them and they work well. I know many old timers that swear by them. They have many good points and I will let those that like them log in and post. Keep in mind that you are heating the outside of the engine. If you check the web page for Tanis they will tell you all kinds of stats on external heating vs. internal heating and if you check Red Dragon they will have stats for their product as well. I fly with pilots that swear by each. Here are some downers to fuel/flame heaters: You have to stay with them and it is usually cold if you are pre-heating. Turn your back and you won't need to pre-heat anymore. Plus you will be warm for a while around the campfire that used to be your plane. Although very rare, IT DOES HAPPEN. I know of a couple that have burned and have seen a few close calls myself. There are two basic kinds; those that need electricity to power a blower and those that use convection. The first can run off of the A/C battery if no other power is available. A common problem here. The result is obvious. The blower types are safer due to the distance of the flame from the A/C. Convection type must have vertical travel to work. Flame under or nearer A/C. Some use propane. Its effectiveness decrease with temp. i.e. it can be cold enough that propane or LNG will not flow. Some are very versatile with the types of liquid fuel they use. This is a good thing but now you have vaporization problems at cold temps. These situations are of course extreme for most places down there (the lower 48). The generator method or electric power has the benefit of plug-in and leave. Go back inside, have lunch etc. To be fair, your generator could catch on fire. But you placed it far enough away that in case it did all you loose is a generator. Many things to digest, I could go on but you get the idea. Take what you need from all input and apply it to what circumstances fit you. In the words of Dennis Miller, " Of course that's just my opinion, I could be wrong"

Warm flying
John Little
N7145R

Stainless Steel Screws

I just replaced the screws on both of my tanks on an Arrow II, paid \$34 per side for the complete stainless kit, looked into buying them seperately by the bag per 100 pieces and it was cheaper to buy the kit. I purchased from D&D Aircraft Supply (800-468-8000), in Hampton, New Hampshire. Very good service, nice people and I had the parts in 2 days, no additional shipping costs. I agree about having to be carefull removing old screws, some of them I had to take a pick and remove all paint and crud out of the slot or the screwdriver started to strip out the screw. I did not have to use an extractor after cleaning with a pick.

Power Loss After Rain Storm

Craig, you could have trouble with the humidity (sweating) inside of the mag I have seen this many times before when I was The DOM of a small Charter service. Does the power come up after 20-30 min. or after letting the AC set a day. If so, that's the trouble

Changing to ■T• Instrument Panel Configuration

Avion Research makes a STC'd panel. Check WWW.avion.com They are expensive at \$2275 might be more now, but they do look good

Source of Rams Horn Yokes

David, on page 155 of the Aircraft Spruce catalog there are Rams Horns control wheels available. ACS will even provide a 337 for your use. (You have to call them). I put them on my airplane, they fit the shaft, and eliminate the "Crack Inspection" as they are metal.

Less Expensive Trim Switch

Or instead of paying the Piper, you can pay Aircraft Spruce \$8.99 and then pay an IA to sign it off. We did that, and it works on our Arrow!

High Oil Consumption: Arrow (nitrided cylinders)

I'm an A&P, and I'm here to tell you that your mech is in left field with his opinion on multigrade. I'm sure you've been reading this site and that everyone using it, is having excellent success with 15/50. Some of my A&P friends feel the same as yours. Contrary to popular belief, the 360s that make it to TBO is not the rule. The nitrided barrels are basically a surface hardened steel as opposed to the an added plating of a chrome barrel. The nitrided break in faster and lasts longer than either plain cyl. or chrome.

That was my reason for asking which barrels you had.

Since you have 1200 hrs. I would strongly recommend that a wobble test be performed on your valves, in particular the exhaust. Since you have nitrided cyl., you will most assuredly experience lower oil consumption.

I purchased my Arrow with 900hrs., and had just been annualized (???)It did have 100W. It was burning about 1 per 6hrs. Just shy of oil and filter change time, I changed. Consumption dropped to 8 than 10 hrs. This has been my experience in every case, Lyc, Cont. and Frnaklins.

The wobble test is not only to examine guide wear, but to prevent breakage of the crappy, expensive valve. Mine and a friend's Arrow (Bob is an A.&P and IA) had major engine problems at just under 1300hrs. So, yes switch to 15/50, and have a wobble test performed. Bob and I do not use any additives with our oil. Good luck

Replacing Wing Root Seal

The white rubber sold by Chief or Wag aero is much softer and I feel looks better. I have done several installations and found that soap is the best lubricant...use a spray bottle.

The best tool I have found is an old Cherokee upper/outer door handle....works great and will not tear the rubber....be very careful of a screwdriver. You must cut away the tubular part of the seal where it crosses over the main spar on top of the wing...be very careful its very easy to cut through the seal, especially if the knife runs away. The piece you cut out should be slightly

shorter than you measure..then you stretch it slightly. this helps it not to bow up. Start on top of the wing next to the flap, in most cases the seal should be long enough to allow you one mistake at the spar, and still have enough to start again.

At the front where it goes round the leading edge do not pull it tight as the rubber will shrink slightly as it settles down and will pull the rubber into the gap looking unsightly.

I glued short strips to the inspection panels and then put a pop rivet at either end...this stops the rubber pulling away in flight

and...

I just recently replaced mine on an Arrow. I removed the old and cleaned the area well, a good rag soaked in karosene (per my mechanic's suggestion, strong enough to remove the sticky crap, not enough to harm the paint). Warm seal in the sun is best, I used clear silicone grease (3M makes it) applied some to wing and fuselage, then started on top trailing edge of the wing worked my way forward, around leading edge and underneath. Needed to trim the bottom section of the seal around the spar, I used some clear, stay flexible silicone (3M) where the bottom section was removed. I added the silicone after a good rain storm, I saw some dampness on the rear floor. As far as tools, be very carefull using a screwdriver, I poked a small hole in the lower section of the seal using one. I think maybe a VERY DULL putty knife or old screwdriver might work. I found my fingers to work well, although not the easiest way on your fingers. Good Luck. Tom

Performance: 3 blade prop

Can't speak for the 235, but repairing my Arrow's prop would have cost more that the purchase of the Hartzell program. It added 14# to the nose, it is smoother, the climb about the same, noise level down. Performance was a disappointment. Had to make some adjustments even though it was supposedly already set for the Arrow. I also gained more ground clearance. If I had to do it over, I'd stay with the two bladed. Besides the cost at the time, TBO for the three blader will outlive me and the plane. In the real world, the fewer blades the more efficient the prop, but the prop also has to absorb the engine's power, vibration, and myriads of other issues, solution, add more blades. I doubt that a two blader would have worked on a P51 or a Corsair. Choice is yours. BTW they sure look great.

Loss of Navigation Lights

On most 140s, the thumbwheel actually controls two swithces, the "radio panel lights" and the overhead light are powered through the rheostat; the three nav lights are powered through a connected switch that is activated by turning the thumbwheel. The nav light switch can go bad or the connections come loose (more common) and you would lose the navs and still have panel lights.

Replace Wing Walk Stiffener without Removing Wing

Replaced mine in Aussie about 6 months ago for about \$250 US plus labour about 4 hours. No big deal. The panel is supplied complete top skin and ribbed strengthener. It is easily replaced without removing the wing. My mechanic used the deriveted old top panel to predrill the new

panel and it fitted straight in, merely paint over. The design seemed to me to be a bit lacking in that the panel will flex under weight of walking on the wing, thus eventually leading to fatigue. Replacement seemed easier though than any patching. 78 Archer with 5000 hours, first replacement of this panel. It seems a relatively common problem but not easily noticed at 100 hours unless you know where to look. Significant flex in the walkway is a dead giveaway to take a closer look. Good luck.

Retention of 337 Forms

If you need the actual reference then get a copy of FAR part 91.417 and read it. I do not have a copy of Cherokee hints to see what it actually says but if it states that a 337 is to be kept for only 1 year, then it is incorrect. If you read the referenced FAR it states in section (2) (B) "The owner operator shall retain the following records for the periods prescribed". Per (2) (b) (2), and I quote "The records specified in paragraph (a) (2) of this section shall be retained and transferred with the aircraft at the time of aircraft is sold". Paragraph (a)(2)(vi) states "Copies of the forms prescribed by 43.9 (a) of this chapter for each major alteration to the airframe and currently installed engine, rotors, propellers and appliances".

In other words, all FAA form 337's should be maintained as part of the aircraft records (forever) and in most cases a copy of the 337 kept with the POH. This comes in real handy if you get a ramp check. Trust me, I have been there and done that. It is just as important as the weight and balance data for the aircraft.

I am sorry if the previous owner or mechanics did not adhere to this reg. If they had it would make things a lot easier.

AMR&D Prop Mod

Prop tip mod STC seems to work as advertised, based on short cross country flight today. It was 58" pitch before, A.M.R.&D. repitched it to 60" after the tip mod. Engine still produces static RPM in the range for 58" pitch even though repitched to 60". RAM supplemental flight manual on the 160hp STC calls for 2325 - 2425 RPM full power stationary static run-up w/ 58" pitch prop. Today turned @2375 RPMs at full static run-up (2350 on my tach which reads 50 - 60 rpm lower than actual). Leaning the run-up brought it to 2400rpm. Climbout was as before as far as I can tell, so again as advertised, repitching 2" steeper does not seem to penalize you in climb nor static run-up after the tip mod STC is performed.

What he does in the STC is make the tips of the prop look like a tapered wingtip. Tips are ground and polished to a 45 degree angle. He also dressed a few nicks and painted the back of the prop for no-charge. The re-pitch was \$75, the tip mod STC \$300. With shipping back to me, bill was \$435.

Arrow Gear Problems

I have owned a 67 Arrow for 10 years now. When I first purchased my plane it had many things wrong with it. The mechanic I had do my prepurchase inspection was a friend of the mechanic that had been maintaining the plane for the previous owner. I was unaware of this. I had a few problems that the pilots of the field where I first kept my plane thought were normal for an old plane. I found a mechanic that was exceptional and when I started having a gear problem I took the plane to him. He found several things badly wrong with the plane and we decided to perform

an annual inspection even though it was not due for 7 months because of some of the repairs that needed to be made. We worked together on the airplane for 5 months and \$10,000.

I was amazed that the plane could fly after learning about how it worked and how poor it had been maintained.

There are two things about your landing gear you should be aware of. There is a 1968 A.D. to change the downlocks on the mains. The early style downlocks were the wrong shape and would hangup on the gear. Per my mechanic I ordered the parts for one side so I could compare the parts with what was on my plane and if they were the same I could return them and just pay the restocking fee (the A.D. had not been complied with for almost 25 years on my plane).

The second item about your gear is the backup gear extender pitot is on the side of the plane in the propeller slipstream. A change in throttle position will affect its operation. When your plane was not making proper power the speed of the air passing into the pitot was slower preventing normal gear retraction. I spent 2 hours with my mechanic in the air to ensure the extension would occur at the proper speed and throttle position.

Persistent Burned Valves

Have your mech. check the lifter bleed down clearances. They should be .028 to .080. Around .050 +/- .005 is ideal, the exhaust being on the plus. If you have a 4 into 1 guage, rotate the probes, the guage can be out of calibration. If the sensors are too close to the head, they will show hotter. My Arrow operates best between 1280 & no more than 1400. My Lasar will alter the ignition timing if it gets too hot. Did the valves receive a final lap when assembled? Are the baffles in your mufflers in good condition? If they're broken, it can overheat.

Is the engine's ignition timing correct? Are there any intake leaks? Hope you find the problem.

Slow Electric Trim

Tom, I have a 151 Warrior and my Electric trim would move so slow you had to keep watching the trim wheel to make sure it was moving. Per another suggestion, I made sure that the jackscrew on the stablator was clean and well lubed. It helped, but still slow. I removed the electric trim motor and sent it to USAvionics (phone #610-258-1706), they overhauled, (\$457.50).

After re-install the trim wheel rotates fast, Just like a cessna. Hope this helps. Vic

Power off Glide Speed - 140

I have a '69 140B. The book speed says 80mph. I have read others that say anywhere up to 85mph. My CGI says 83mph is a good speed. I have used 80, 83(?) and 85 all with about the same results, about 2 miles per 1000 ft alt. Good luck.

Replacement of Wing Root Seal

I bought white wing root seal from Wag-Aero. They were only ones who carried it. I think it looks better than the old black stuff but you have to clean it every once in a while.

Repair of Collins Radios

Check with Avionics Unlimited in Conroe, TX., they repair Collins. 936-788-7333

Low Fuel Pressure on Takeoff

I had this problem many years ago, when I would go to full power for take-off. The needle would move to ZERO, not a good thing. I spent about \$150 to find out that the screen in the electric fuel pump was about 70% clogged. Parts .50, labor \$150. Solved the problem. Take a look there, then follow the fuel lines for any bend or crimping.

Cherokee 235 Fuel Selector

The part number for the fuel selector valve in my 1970 Cherokee 235 is 1H65-4. This is one of the most common valves in the 4-tank Cherokees, including the PA-32. Fortunately, B&S Aircraft Parts in Wichita (800) 835-2961 rebuilds these units for about \$740. That sure beats Piper's price of more than \$3,000 for a new valve!

However, B&S Aircraft doesn't have exchange units, and their turnaround time to overhaul these valves is about 4-5 business days. However, Quest Aviation in Florida (904) 961-9300 keeps a supply of overhauled valves in stock and can ship them out via FedEx or UPS overnight. Their price for an overhaul exchange is \$850 plus shipping.

By the way, B&S Aircraft Parts told me they will buy old fuel selector valve cores for \$350-400. So if you have one lying around, you might want to call them!

Unfortunately, removing this valve and installing the replacement usually requires defueling the aircraft (all 84 gallons in my case). A&P mechanics are apparently not allowed to put the fuel back in the airplane without elaborate filtering. However, you can defuel your own airplane and reuse the fuel, provided you can find a place to store 84 gallons in the meantime!

Lubrication - Stabilator Jack Screw

I have also looked for Aero-Lubriplate. I called the factory Tech Rep. at one of the distribution centers. (about 5 yrs. ago) They said that the newer Acft. manuals state that you can use any good quality spray Lube (NOT WD-40 it attracts too much dust).

Curing Ammeter Dance

Replacing my Master Switch helped stop my ammeter jitter on my '67 140. Bought it from Aircraft Spruce. It's an exact match replacement. I can lookup the part # A/C Spruce sells it under if you want. Ammeter still does it slightly but not as much. I've also heard replacing the alternator circuit breaker can help solve this problem sometimes. Also, check that the overvoltage protector located up under panel close to left side cabin bulkhead near where pilot's knee would be... check that the wire terminal junctions there are all mated tightly together.

STC - Gross Weight, Warrior; STC Search

I think you are out of luck on this one. The STC is for a PA-28-161 as follows: STC Number SA00397NY Manufacturer PIPER Make Model PA-28-161 TC Number 2A13 Description Increase in maximum gross weight to 2440 pounds. Status Issued 2/14/96 ACO NE-NY STC Holder Air East Airways, Inc 864 Schroetter Avenue Franklin Square NEW YORK 11010 UNITED STATES Use this link to find the STC you may be interested in: http://av-info.faa.gov/stc/description_search.asp

Arrow Gear Microswitches Intermittent

When the micro switches get old, they become unreliable due to the spring arm losing its temper, or the button under it loads up with dirt. The latter is most likely to occur. You can buy those micro switches from Newark Electronics for less than 1/3 the cost from Piper. Be sure to buy the spring arm with it. I've replaced 4 on my Arrow so far.

When the Lights go Out

I had this happen a few times before I found that someone had put a higher wattage bulb in the vertical fin light. Replaced it and it hasn't happened again. If it happens again, feel the breaker, is it warm? (too much load), is it cool? (a short).

Adding Shoulder Harnesses

I put the Wag Aero harness in my 140 and I regret it. I don't regret having shoulder harnesses (I now feel naked without them), but the Wag-Aero installation is less than ideal. The hang-from-the-ceiling aspect creates a sense of clutter in the cockpit. Plus, they're not very adjustable, so it's hard to fit them when a big or small passenger rides with you. In addition, b/c they lack an inertial reel, if you put the shoulder harnesses on snug for TO and landing, you can't lean forward and grasp the flap handle. So, the shoulder harnesses are great if you're about to go into the trees, not so great if you have to drop a notch of flaps, reach the landing gear, etc. I am ASTOUNDED that the price of Piper harnesses has gotten to \$1400. I recall it being closer to the \$450 per side as Bill mentioned. Wag Aero is cheaper, but even if the Piper set is \$1400, it's worth it. You wear a seat belt every minute of every flight, and minor irritations add up quickly.

Incidentally, installation for my Wag Aero set was only about 4 hours each.

Also, the FAA has recently relaxed the 337 requirements for shoulder harness installation. There are some IAs out there who specialize in installing non-STC'd shoulder harnesses. This might be worth looking into. They are a lot cheaper, and may work just as well. And...

Get ready for a shock! Total investment for installing the harnesses in my 66 180 was \$2100. Blows my mind but I felt it was worth the investment. Piper sells the harnesses as a set with retractable reels that attach to the side of ceiling just over the rear windows. (part number 764-981V at \$1400 per set.) Installation requires peeling back the headliner and riveting in the hardware. The install took about 16 hours @ \$45 per hour. I am pleased with the results, they do look very professional and work reasonably well.

Another option I used for years was the Hooker Quickie harness which attach to the rear seat belts (no rear seat passenger option) and worked reasonably well. Hooker can be reached at 815 233-5478. Wag Aero also offers kits at \$220 per seat but I just didn't like the installation which hang directly from the ceiling and obstruct the view of rear seat passengers. Good luck

Replacing Electric Trim Switch

We had the same problem on our Arrow and I didn't want to pay the ridiculous price! So we bought a switch from Aviation Spruce and Specialty for \$ 8.95 which performs the same function. Our IA says it's OK, as it's an aviation quality switch. You'll have to mount it with a small plate.

The stock number is MTA-1069 and you'll find it on page 370 in their latest catalogue.

Replacing Tip Tank Fuel Lines - 235

We went through this several years ago, maybe it'll be helpful to someone today: For whatever reason, the tip tank fuel lines developed pinhole leaks and either needed to be unused or replaced, we opted to replace them, and here's how we did it without even having to remove the mains. Of course the tips have to come off, but once they are, disconnect the bad lines under the rear seat from the fuel selector, then if need be, use a tubing cutter so you can have a straight shot from one end of that fuel line to the other (but don't pull it out yet). We just used #12 electrical wire and pushed it through the old fuel line from out at the end of the wing till it came out the newly disconnected inside end. Tie the #12 off inside so it can't come loose; at the outside end, cut the #12 wire off at least 15 feet beyond the end of the wing. The #12 now becomes a guide for the new fuel line you're going to be putting in. Making sure the #12 stays put, pull the old fuel line out the end of the wing, then slide this #12 through the new fuel line. Make sure your #12 is long enough that the entire length of new fuel line has wire running through it even before you start the new line through the first wing rib. We found that once we started sliding the new fuel line in place, it would indeed NOT go through the other ribs and associated grommets just lickity split, but by wiggling the line some it would go through without much further effort, and as I recall, once all the prep work was done, sliding the new line in place only took about 10 minutes. The biggest pain in the whole process was reaching up and around to get to the hardware that mounted that tip tank in place. One other thing. Once the new line is ready to be hooked up, do the plumbing at the tip tank first, then do the ferrule inside. If you do the inside first, it's hard coupled, and if the fitting at the tank doesn't match up perfectly things will be difficult. The ferrule arrangement inside is a compression fitting, and can be put anywhere on the line you need it to be, so do the tank end first. I know this probably isn't at the top of most lists out there, but please just respond with a "howdy" so I'll know you thought all this was worth reading. Regards to you all. Bill

Hot Starts on Fuel Injected Arrow

I've been flying a P28R/180 for 11 years in the Desert Southwest and this works every time:

- 1.) mixture idle cutoff
- 2.) fuel pump ON
- 3.) throttle open 1 inch
- 4.) crank until start
- 5.) retard throttle advance mixture

Repairing Paint Nicks & Chips

I had some corrosion in my Imron(polyurethane paint) snaded to bare metal, THouroughly wetted with white vinegar (yes, mild acetic acid etches the aluminum) and then with a small hole in a cardboard mask spray with Krylon to build up a gloss. Krylon or Rustoleum holds well on aluminum,.

Complying with SB 1006

I did this SB two years ago. I used the Air Ward Kit(800 524 3264, WWW.airward.com) everything was included tank screws, hoses gaskets anti corrosion and instructions. I did it with the annual. Pull the tips and inspect your wing from wing tip to wing tip at the same time. Get a screw removing tool from Air Ward or US Industrial Tool and Supply Co. (Part No.TP 328 \$21). This tool attaches to a rivet gun and allows you to beat the screw to death while applying torque at the same time. Only one screw managed to resist and required drilling. I found one small spot of corrosion in the entire wing. However, all tubes and hoses were original from Piper.

The Air Ward kit was not cheap, but everything is there and of good quality.

By the way, use this opportunity to completely inspect the wing interior and corrosion proof everything. Also plan ahead and pull any wires you may ever think you need. I added tip strobes and future wing tip landing lights. It will never be easier. And...

It's not that big a deal. I was a new Cherokee owner two years ago, and this was the first thing I did.

It seems rather invovled if you read the SB, but, as others have pointed out, it's no more than popping about 100 screws, pulling out the tanks, then taking a look around. There's some anticorrosive goop you're supposed to smear on the spar. We didnt have any when I did it, which I regret. We Corrosion X'd the area, but the goop would probably be better. You'll have to order it in advance.

My screws were agony to get out, rusted over, painted in. My IA had to drill, hammer, and grunt for about 3 hours to get them all out.

Well worth it, though. Both vent hoses were brittle and broken in half. That explained the fuel smell in the cockpit. The wing and spar area looked fine.

Total bill, around \$300. Be sure to replace the screws with the proper type. The fuel tanks are integral part of the wings, and the proper screws are required

Replacing Alternator Belt (140) with Gates Belt

Try the latest from Gates: Gates Green Stripe XL #9335. Be sure that all your fittings allow the alt. to align with the flywheel. And...

I got one from CarQuest, The receipt is faded but it looks like FBG 7325. The numbers are clear the letters aren't, so check the numbers. Cost was about \$6 in '96. It still looks new. Gates makes the one for Piper \$\$\$\$.

Replacing side windows

Paul, I have replaced the side windows in my 140 a couple of times by buying a sheet of Lexan and using the old window as a pattern. Then installed with clear silicone. very inexpensive. Don

Source of Yoke Emblems

AeroEnhancements, best know for their custom panel overlays, also makes yoke inserts. I don't know about the cost, but you can call them at 1 800 821 AERO.

SkyTec Starter

When I did my engine two years ago, installed a Sky-tec starter purchased from Barry-Jay Aviation. Weight saving from 17 down to just 7 lbs approx!! Turns over very well in cold weather and eliminates the and worn Bendix gears of old. It is much easier on your starter ring gear teeth as it engages before turning over rather than spinning and crashing into the teeth as with a Bendix drive. Since the starter pinion engages the ring gear teeth first, then starts spinning, it sounds differently as it turns over slowly about half a turn and then speeds up (this is because the gears are engaged). There are a few other manufacturers of similar construction (jumping on the bandwagon with permanent magnet motors) and small size, now. Barry Jay lists the starters for \$349 plus shipping. You also need a \$12 cable extension because of the considerably smaller size. It's the only way to go! Rebuilding or replacing with a overhauled original style Delco or Prestolite and Bendix drive just ain't worth it! Hope this helps.

Landing Light AD (96-10-01)

They had problems with a few aircraft swallowing rubber pieces from around landing light so Piper has a kit providing a metal cup that installs behind bulb and new rubber seals to glue to components, AD96-10-01 (service bulletin SB975). Check with parts dealer for kit. I opted for the Q4509 bulb (halogen) which is a bit more expensive but brighter. Direct replacement.

Fuel Smell When Switching Tanks

I have a '69 Cherokee that had a fuel smell whenever the fuel switch was left on a tank when not in use (flying). My A&P told me to replace the "O" ring. He gave me one and told me how to replace it. After replacing the "O" ring, I have not had the smell since. Do not use just any "O" ring as the fuel will eat up some of them. (I never had the smell while flying, but the side wall would be slightly damp when sitting still a while).

Oil Pump AD - Metal Found

My 1975 Warrior, 0320-E3D with a 160 HP conversion, also had the AD problem. My mechanic, Medallion Engines at No. Las Vegas (VGT) has tried it both ways. Removing necessary accessories, oil sump and oil pump housing and removing the engine. They have found it went faster to remove the engine which made getting to the oil pump faster and easier. Also made ensuring no leaks when put back together better. I opted to have my engine removed. Took 55 minutes and the engine was on the stand. 6-7 hours total time to comply with the AD removing the engine and 10+ doing it with the engine on the airplane.

I will never find out how long it would really have taken because my 1850 hour engine decided it wanted an overhaul. When we removed the oil pump housing, it looked like someone had dumped a bunch of metal in and run the impellers. Scoring and gouging throughout. Then cut open the oil filter and found long slivers of metal. Up to this point I had never had problems. Faithfully have sent my oil in for analysis every 25 hours. Always came back normal. Never before found metal in the filter, although it is evident something was going on. Burned 1 quart of oil every 8 - 10 hours. Just did an annual in March, with compression all in the low to mid 70s. Anyway, while it will be expensive, the AD may have saved me some grief in the air. Good luck with yours. Keith N32744

STC Search Engine

There are some STC's for adding a constant speed prop to the 180's. Presumably you can get better climb without losing cruise speed with these mods, but I have no hard data. I can't get to the STC search engine now, but it's under here: <http://av-info.faa.gov/>

Replacement of control yokes

Replaced a set on a previously owned 140 Cruiser. Found a crack during annual while complying with AD 69-22-02. Got my set from Central Air Parts in Illinois. It took a little time for them to find a good used set but they did and it cost me \$200. In order to keep everything legal with the FAA, I sent them out to a local shop and had the old powder coat removed, the yokes mag particle & Dye pen checked for cracks or other damage. Once a clean bill of health was established I had them re-powder coated. These little extra steps cost me about another \$100. I replaced the center piper emblems with new from piper which cost about another \$75. They were installed using the AD and Piper Service Letter No 527D as the references for approval. To do this you have to make sure you have the exact part numbered yokes called out in the AD and the Service Letter. I installed the PTT's later when we put in an intercom.

Leaky Defroster Ducts (in summer)

~~The cables operating these vents get old and rusty. I suggest you soak the heck out of the cables by dribbling WD40 right through the spiral wound casings~~

Cabin Speaker Replacement; ALN Headsets

If I remember I replaced mine with a Radio Shack 4" dia speaker, nothing fancy 8 ohm. It sounds fine when I don't use my headsets. By the way I converted a set of Pilot 11-40(David Clark

Clones) to ANL(automatic Noise limiting) with a Headsets Inc. kit (about \$160) What a difference

Low Power; Tach Replacement

I had a very similar problem in a previously owned aircraft. We found both the muffler baffle was broken and the Tach was off some 175 RPM only at the top end of the range. We replaced with new/overhauled muffler which greatly improved the performance, but still was low on RPM. We used a digital tester to check the Tach and found the RPM low. We were unable to repair the Tach so we bought a new one from "Mitchell" through Aircraft Spruce, Mitchell p/n D1-112-5023, price was \$150.00. After receiving the new Tach, I called Mitchell and learned that if I sent it to them with a check for \$10.00, they would install the range markings and set the hour meter to the correct hours and tenths currently on the old tach.(makes log book entries a lot simpler) This Tach was installed some 4 years ago and at last check the delta between it and the true tach was less than 10 RPM.

Replacing Control Yoke Universal Joints

Yes, it is a complex repair and the parts are expensive. Besides the fact that new part is not predrilled, getting the old one out is no easy task. The universal is held in place with a tapered pin that is seated when installed. If it is the original pin you will most likely destroy it in the process of removing it. One has to be careful not to damage the yoke shaft when removing this pin. There are a number of suggestions on how to remove the pin in recent POM's. I had the one on the right side of my aircraft replaced about two years ago. Much to my dismay we went through two (2) universals before we got it right. This was not fun at \$175.00 each (1999 dollars). If you do it yourself or have someone do it, I would suggest the services of a local machine shop to drill the holes for you. They won't charge much and it will be well worth it.

Vernier Mixture Control

try www.alcorav.com they will sell you the vernier control kit and stc (cost is around \$130.00) I have it in my '67 235 I'm now working on replacing the throttle control cable can't find one that is approved yet but I'll let you know when I find out what is legal to install

Intermittent Fuel Gauge

I did remove the panel cover and the plexi glass and found that by pulling out on the gauge away from the base, it started working. It appears that the gauge was grounding out on the base. I gently pulled out on the gauge enough to where it would stay, and it is working perfectly now.

Low Take-off Power, Poor Climb

I had the same symptoms until I had my annual in April this year. Immediately my A&P found a bad muffler, the insides had come loose, blocking the exhaust tail pipe. Now the rpm is back to 2650 full throttle instead of 2500. Climb is back to about 750 fpm at 95 mph. I get nearly 1000 fpm at 80 mph but it is harder to see over the nose.
Get thee to thy mechanic soon.

Removing Stuck Fuel Tank Screws

There are as many different ways to remove screws as there are people to remove them. For those that you have soaked for a while, try a phillips bit with a set of serrations that run at right angles to the tip. Many tool houses carry a extensive line of different ones. Some work one place and another in one.

For those really stubborn ones, and those that have already rounded out:

Buy some #2 Robertson bits, and maybe one with a screwdriver handle. They are a square tipped. Drill into the head with a 9/64" drill bit, and insert the bit fully into the hole. You will begin to learn the correct drill depth as you go. With the heat generated from drilling, the frozen screws turn right out. Those that should break, will break off flush with the lower flange of the wing, and you can take them out with vise grips after the tank is removed.

Be sure to check all the nut plates for position before you reinstall the tank, they tend to move around on you.

Engine Hesitates When Throttle Advanced

your problem is in the idle circuit in the carburetor. There are three holes along one wall of the throat, close to where the butterfly closes. All three must be clean... and you probably have an obstruction in one or more of them.

These holes provide gas until about 1400 RPM when the main jet takes over. If you have the passages to them cleaned out your hesitation will disappear

Nosewheel Shimmy

On my 1979 Archer 11, I had a shimmy on braking and roll out. Put new bushing in nose wheel assembly, took care of the shimmy, Check for play in the nose wheel assembly

Deicing fluid

I carry a small 2 gallon garden pressure tank with the environmentally safe antifreeze, propylene glycol, whenever I go cross country. I've used it many times with no damage to the paint. You don't need to use very much. Make sure not to use regular antifreeze, ethylene glycol, as it is quite toxic and environmentally damaging.

180 - Max Propeller RPM

Here is an excerpt from the FAA Type Certificate Data Sheet for the 180. If your serial number is in the stated range this should be the data you are looking for. If not give me your serial number and I'll repost the correct data for you.

III - Model PA-28-180, (Cherokee), 4 PCLM (Normal Category), Approved August 3, 1962; 2 PCLM (Utility Category), Approved December 6, 1966, for S/N 28-03; 28-671 through 28-5859; and 28-7105001 through 28-7205318.

Engine Limits

S/N 28-671 through 28-1760, and 28-1760A (except S/N 28-1571 and S/N 28-1573 (See NOTE4):

Maximum permissible takeoff, 2475 r.p.m.

For all other operations, 2700 r.p.m. (180 hp)

S/N 28-1571; 28-1573; 28-1761 through 28-5859; and 28-7105001 through 28-7205318:

For all operations, 2700 r.p.m. (180 hp)

Propeller and Propeller Limits

Sensenich M76EMM or 76EM8 on S/N 28-671 through 28-1760, and 28-1760A (except 28-1571 and 28-1573).

Sensenich M76EMMS or 76EM8S5 on S/N 28-1571, 28-1573; 28-1761 through 28-5859; and 28-7105001 through 28-7205318.

Static r.p.m. at maximum permissible throttle setting not over 2450 r.p.m., not under 2275 r.p.m.

No additional tolerance permitted.

Diameter: Not over or under 76".

235 - Fuel Drains from Tip to Main tanks

Had this problem once in 15 years. Turned out that I had left the lever half way between the tip tank position and the main tank position. You may need to replace the sealing rings in the fuel selector box if this problem continues. Pull the rear seat and check for evidence of leaking too.

Repair Mesh Vents - Leading Edge of Wing

If the wire mesh on the vent is not actually rusted through or broken, the following works. Give it a good brushing with a suitable wire brush. Make a hook out of 40 thou locking wire and pull the mesh forward carefully in stages until it is back where it should be. Paint it with an airbrush.

Door Seal Adhesive

My IA suggested using 3M 8001 door seal gasket glue. I did front door and baggage compartment--worked great.

Sticking Struts

Nature of the beast sadly. When I first got my cherokee I spent a fair bit of money rebuilding struts, rechroming, spraying and wiping with hydrolic fluid after flights. I think it's a good idea to keep them clean as possible but I also believe you can throw all the money you want at the problem and never find a cure. Just seems to be part of owning a cherokee. Recently I had a strut that started leaking. Now that was a pain in the butt! And if it's bad enough, you ain't flying. Be happy all yours does is stick a little. tc

Oil Pump AD

I also have a 1969 140 (though the original engine has been replaced with one manufactured in 1966), and my AI said it didn't need any changes to comply with AD 96-09-10.

When the AD was published in the Federal Register (in the June 10, 1996 issue, page 29271), the notice contained the following text:

---begin quote---

One commenter states that the AD omits a required modification of older pump housings, as referenced in SB's 1164 and 1341. The FAA does not concur. The earlier configuration incorporates a fixed shaft and cotter pin with a different aluminum impeller. That configuration is not affected by this AD. The FAA has clarified the applicability of the AD to state that only aluminum impellers, P/N LW 13775, are affected.

Some commeters state that only aluminum impellers, P/N LW 13775, should be affected by this AD. The FAA concurs and has revised this AD accordingly.

---end quote---

Also, the March 2001 edition of Advisory Circular 43-16A, page 20-21, contains a section on this AD.

In particular, it says:

---begin quote---

Also, everyone should be aware that the requirements of AD 96-09-10 DO NOT APPLY to some Textron Lycoming aluminum oil pump impellers (P/N 60747). These earlier style oil pumps incorporate an aluminum impeller with a fixed shaft secured with a cotter pin and a two-piece oil pump housing. The nonapplicability of the impeller part number mentioned above is explained in Amendment 39-9586 of which AD 96-09-10 is a part. Any questions regarding this disparity should be addressed to the contact information listed in the last paragraph of AD 96-09-10. A copy of Amendment 39-9586 may be obtained from the internet by accessing the ``Federal Register Online".

---end quote---

An A&P told me that you can determine which kind of pump and impeller you have by removing one of the magnetos from the accessory case and inspecting the pump through the hole. This is a lot cheaper than replacing the gears!

Disclaimer: I'm just conveying information that I've found (from government sources) on the Internet. You should verify the information for yourself, and you should discuss with your own mechanic and/or IA whether you need to replace the oil pump to comply with the AD, or if not for AD compliance, for the sake of your safety.

Panel Rocker type switches

I also have a '68 180D and changed my tail strobe rocker to a split rocker when I added tip strobes. I also changed the landing light rocker to a DPDT center off rocker when I added wing tip pulse landing lights with RMD wing tips. I purchased the switches at Aircraft Spruce.

Fuel selector valve

John

At 2921 tach hrs my A&P son and I followed the instructions in the Piper Cherokee Service Manual Ch 9 sections 17 thru 23 and successfully svcd the fuel selector valve at the cost of 4 hrs labor and a few cents worth of valve grinding compound and an 'O' ring or two. I can't imagine a certified shop having a problem reassembling the valve

Hot Starts - 180

My Archer starts pretty easily with mixture at idle cut off and throttle fully advanced. When it fires, advance mixture and retard throttle, QUICKLY. Works for me. And... Just went through this problem with our 1974 Archer. (See previous posting). Turns out the points on the left mag needed to be regapped. I don't exactly understand why it started so well cold, but gave us fits when it was hot. We have slick mags and the points should be gapped to 0.010. So far, now the airplane starts great when hot.

Slow Interia Reel Harness

Ray, generally in my experience, the problem is not so much the retractor, but that the belts become stiffer over time and the retractor will not accomodate the extra bulk. Good luck

Replacing interior floor

Replaced mine with ENSOLITE. It supposedly helps with the sound insullation. Price wasn't bad and it complies with FAR 25.853 (a). When we removed the old insullation, it was so bad one of the screws from the metal sheet on top of the carpet had worn a hole through the skin of the airplane. Wish someone had replaced it sooner. And... Contact Lindean Upholstery on Boeing Field (Seattle). When I redid my Challenger 180 interior I gutted the interior out to the interior side of the exterior skin. They furnished one kind of Ensolite for wall/ceiling insulation and another, stiffer Ensolite for the floor. Works really well. Incidentally they also rebuilt the seats before recovering and did an excellent job including custom lumbar support located for my 6'4" frame

Airtex Leather

Airtex had my plane for just over a week. They did the whole interior, repaired the damaged plastic, covered it with a wool like material. The interior came out great. Total cost was around \$6K

Removal of AC system

I did this conversion on my arrow. Required a new ring gear to accomodate the wider alt belt. The alternator was then located on the other side and required new brackets for the mount. Total cost was about 1300 dollars in 1995 with most of that being for a new ring gear. I heard that some have managed to track down a used ring gear for this conversion and saved some money. For me this was money well spent. Since the conversion I have had no problems with the wider belt and original configuration. Prior to this I spent at least three to four thousand on various problems directly related to the air conditioning system.

Bubbling Paint on Cowl

The heat reflective material would be your best bet. It is also available from aircraft parts sellers in an double sided foil with a "rag" center core. The race shop material may be cheaper. Most materials can be installed with 1300 3M adhesive. Just brush it on with a brush on both surfaces, let it dry to a skin and then stick together. (Make sure you have it where you want it, it will tear if you try to pull it to reposition.) The heat reflected back in to the engine would be unmeasureable, it will blow out the rear of the cowl, and will protect your paint.

Rewebbing Belts

Southern Safety in Griffin, GA rewbedded my seatbelts including the retractable shoulder straps. They also do a lot of work for Delta and couple of other large clients, so they are usually pretty busy.

.....July 5, 2001

Slick vs Bendix Mags

In my opinon, buy the Slicks. If your mechanic still thinks the new Slicks are "throw-aways" maybe it's time to find a new mechanic. The old Slick 4000 series that was not rebuildable has been out of production for over 20 years.

New Slick 4300 series mags are just as re-buildable as any Bendix. Also, check how many AD's have been posted on the Bendix mags vs. Slick.

Standby Alternator

The only one I'm aware of is from GAMI: <http://www.gami.com/supplenator.html> Keith

In a recent posting on the Avionics West website (www.avionicswest.com), avionics guru Tom Rogers questioned the wisdom of installing a digital tach. My Cherokee 235 panel includes the Horizon P-1000 digital tach as a replacement for my primary tach. I've flown with it for several years now, and have found it extremely accurate, easy to use, and very reliable. But it wasn't until this week that the instrument really paid for itself. En route back to my home base under

VFR, I noticed the Horizon tach was flashing an amber warning light, indicating that the two mags were sending inconsistent information. The engine continued to run fine, but clearly something was wrong. Yesterday, I asked the local mechanics to troubleshoot the problem. They found that the P-lead on the left mag was chafed and shorting out against the firewall. That was causing the anomalous reading on the tach. The problem was intermittent and didn't show up on the ground, only in cruise flight. We suspect the wind pushed the wire against the firewall.

Needless to say, a mechanical tach would not have detected this problem. But thanks to the digital tach, we were able to find the problem before it became more serious. Of course, the Horizon digital tach does a lot more, too. It detects the failure of a mag and lets the pilot know which mag failed, so that he can switch over to the good mag. And it automatically calculates mag drop during runup. Safety features like these are the most compelling reason to switch to a digital tach, in my opinion. The fact that the Horizon only costs about \$500 is icing on the cake! Check its features out at <http://members.aol.com/horizonins/>

Renewing Interior Plastic

I was going to paint my interior plastic in my 79 Dakota but decided to try something else. I took all plastic out and purchased about 25 gallons of bleach. I then poured the bleach in a big plastic garbage can and soaked the pieces. They came out looking like new and if they get scratched now the color will be the same.

Recommended paint Shops

David: A few years ago (around 1992), I had my Cherokee 180 painted at Aircraft Refinishers, located at the Cambridge-Dorchester airport (CGE) on Maryland's Eastern Shore. They did a terrific job, and for what was then a reasonable price. Although I'm sure their prices have gone up, I suspect they're still one of the best paint shops on the East Coast. You might drop in for a visit and a look at their photo album of past jobs.

Michael Sutton

I'm in the same position. '65W has the original 1967 paint and it looking quite a bit worn. So far I've looked at Lancaster Aero (Smoketown PA) and Tom Iwasz (Woodbine NJ). Lancaster Aero seems to have a decent reputation from the limited number of people I've talked to. Haven't heard a lot about Mr. Iwasz yet. There's also a shop at Trenton/Mercer but I have no info on them. The little options are the one's that seem to add the cost - painting inside of door, new wing root seals, replacement of exterior hardware, fixing minor dings/dents. I've also been thinking of adding the AMRD speed mods at the same time while its down, all the data I've seen so far indicates much improved low speed handling and maybe 5-10% cruise speed increase. Gary Shelby

Davtron OAT Gauge

A while back there was some discussion about alternative OAT gauges. I solved the problem by installing the Davtron Model 307 Digital OAT/Voltmeter.

The OAT sensor is mounted under the left wing and is unaffected by sunlight or engine heat. The display is easy to read even in bright light and is self-dimming for night flying. As a bonus, this unit also displays buss voltage which gives a more complete picture of battery and alternator health than an ammeter alone. FAA/PMA approved.

Check it out at Aircraft Spruce. <http://www.aircraftspruce.com/catmain.php?dest=cathome.html>

Replacing Control yokes

I bought two used Rams horns and shafts for my '67 235 from commander@bestnetpc.com (you need to know the diameter of the shaft before ordering) the installation is easy 2 bolts at the u-joint at the end of the control colum and your a/p can help you file a form 337

Erratic Fuel pressure Gauge

Anybody have any solutions for a fuel pressure gauge that takes several minutes after engine start, to indicate any pressure? This only occurs during the first flight of the day.

If worse comes to worse, and the gauge has to be replaced ... where can I get one (it's in a 1974 Warrior)?

I had a similar problem, and when I took off, the gauge would move toward ZERO. Took a while but found the screen in the electric fuel pump to be 70% clogged. Replaced it and have not had a problem since. Cost .50 in parts, \$100 in labor.

Wheel pant Repair

Jim,

Regarding wheel pant repairs, try contacting an auto body shop which does fiberglass repairs. I used a small independent body shop which specialized in corvettes. They know plastic! They repaired the cowling on my '68 PA-28-180 very nicely. For the interior plastic, lay up some fiberglass cloth and use epoxy on the underside of the molding. Putting a thin washer in the epoxy to add strength would increase the life of the plastic. Good luck

Engine Exceeds Redline - Repitching prop

i saw the same problem after installing a 160hp engine. so i spoke with sensenich propeller company. they said most people repitch the prop to 60. this i had done while it was being fully reconditioned at sensenich for a total of \$500.

i now see at 2450rpm at 3000 to 4000ft around 129mph. i have no knots2u speed mods.

Finding Engine Oil Leaks

It is best to wash the engine down with a solvent like varsol and blow it dry. Then if you have some idea as to the general area, you can spray it with a dye penetrant developer. It goes on almost clear, but within a few seconds it turn a powdery white. Then run the engine or fly and the leak shows up as a dark line against the light background. Try just an engine runup first. If the leak is very large, it should show up rather quickly. Running it or flying for very long might force the leak over to large an area to locate the source.

Wing Ding

LoPresti Speed Merchants [<http://www.flyfast-lopresti.com>] sells something called a "wing ding" which does exactly what you describe. If you go to their web site, you will see photos of one installed. It lines up with several screws and takes about 5 minutes to install. It wasn't cheap (I seem to remember it was about \$90), but most of that goes for the STC which comes with it. As expensive as it may sound, I am sure it is cheaper than replacing/repairing a door.

Short Life - A/C Belt (Air Condition - AC)

I have been in the same situation where the a/c belt will roll over in an hour or two. I can guarantee your problem is alignment. The pulley on the propeller and the idler pulley are probably in alignment since they are fixed in their position. You can tell by looking up from below the engine. You should add, remove or shift the washers on the alternator mounts to bring it into alignment with the other two. I think they get misaligned when someone changes the alternator and doesn't pay attention to the washer positions on reinstallation. It can also shift if you have any welding done on the mount because they do tend to crack. Another thing is to make sure the belt is really tight on initial installation and then check it after a flight when it is hot. Mine can be plucked like a guitar string. I resolved this problem on my aircraft about 5 years ago and even though I have changed alternators and pulled the prop a couple of times, I have never had the belt roll over problem return. 1973 PA28-180

Chroming a Spinner

To the best of my knowledge, the FAA does not allow for chroming of the spinner. My mechanic ran in to the same issue about 5 years back, his solution, strip the chrome off and take the spinner to a polishing shop. Most likely, the same shop that strips the chrome or for that matter chromes the spinner, should be able to put a high polished shine on the spinner. As tarnish marks start to show, use Flitz to remove them and keep the spinner in bright, shiny condition.

Aero Enhancement Panel Lights

I have the Aero Enhancements dual glare shield light strips and they work quite well in illuminating the top half of the instrument panel & radios. They do not totally illuminate all the upper instruments. I too looked for alternatives to the failing instrument panel dimmer wheel. I looked into Aero Enhancements panel overlays, and had a problem aligning the overlays with the panel mounting screws. It would have taken quite a bit of custom fit trimming, on my part ... and I decided it wasn't worth the high price.

I have recently installed the Nu-Lite instrument light rings ... they look GREAT. It did take two full days to get them all in, since all the instruments need to be unscrewed from the panel, and

there are limited areas where the Nu-Lite can be inserted (I put them between the panel and the instrument). A couple of major points to note ... you'll probably need longer instrument mounting screws (since you have to account for the 1/4" thickness of the Nu-Lite) ... you may also have to trim all the holes in the plastic panel overlay, where the instrument knobs extend. Since the instruments are recessed 1/4" further (after installing the Nu-lite), the knobs could not be installed without cutting the overlay. I replaced the existing dimmer rheostat with a new one, located elsewhere on the panel. The Nu-Lites and the Aero Enhancements Ultra-Vision dual glare shield light strips, make for a very impressive night time panel.

Hatrack Bulkhead

I just replaced my 68 140 rear bulkhead with a new hatrack. Kinzie Plastics, recently purchased by Plane Plastics, makes a decent product. Try them at 580-327-1565. They wait until they have enough orders, then make a batch at a time. Check the thickness (thinness?) at the rear outboard corners of the hatshelf itself.

Their instructions are pretty generic. Remove the original panel and use it as a template. Also remove the rear side panels of the interior. I found it easier to also remove the plywood shelf to which the rear seats are attached. Remove the screws attaching the plywood to the hinge at the rear of the the plywood.

Electric OAT Probe

I installed an Electronics International in my Dakota (different plane) last fall because I installed a one piece windshield. Instructions said probe could mount in cowl because it was shielded but the probe picked up 10 degrees of engine heat even when the cable was shielded with race car heat shield. So, after many discussions with the factory, I installed the probe in the side of the plane. It is a great unit, giving density altitude and starts timing at 300 feet above ground. I highly recommend it and I think they have re-written the installation manual.

Manuals

just about every manual known to mankind at ESSCO in Akron, OH 330-644-7724 email at esscoeast@aol.com. website at esscoaircraft.com got the service manual and parts catalog for my '66 140, complete.