

Express LINK

NEWSLETTER

June, 1997 - No.13



We're On Again !

The "Orphan" Is "Re-Adopted"

EXPRESS Production Slated To Resume, Using Sub-Contractors.

After a protracted round of court controlled hearings, depositions, assorted meetings and seemingly endless attorney gymnastics the EDI bankruptcy proceedings have, at last, drawn to a close with the following results:

Owner of the rights to the **EXPRESS** cruciform tooling, inventory, engineering records, and production potential is Paul Fagerstrom, from Mount Laurel, New Jersey, who purchased the CT assets from Ralph Kenner. Kenner was the principal creditor involved in the proceedings. Paul has been joined by Larry Olsen who will manage the day to day operation on production facilities to be located on the airport at Olympia, Washington.

The owner of N540ED is Ralph Kenner. Future plans for the airplane are unknown.

The owner of N550ED (conventional gear) is Bruce Newlan of Napa, CA who plans to use as many parts as he can to complete his own conventional gear **EXPRESS**.

The ownership of N-90ED, Series 90, purchased from Mike Betts, remains with David Ullrich.

In discussions with Larry Olsen, who has found himself overwhelmed with the sheer volume of the tooling and inventory which has been moved from Redmond, OR to Olympia, he revealed that his immediate plans include preparing for a rather understated appearance at Oshkosh, supported by an estimated 12 to 15 **EXPRESS** examples - the idea being to officially announce the near term resumption of production and offer support to the existing builders of both CT and Series 90 **EXPRESS** models.

Also high on the list of tasks to be completed right away is a careful inventory of the existing material, parts and tooling so that builders who need specific parts may be able to order from Larry in the near future at the number listed at the end of this article. There is apparently a substantial number of parts in inventory.

Larry also plans a careful evaluation of the existing tooling and fixtures to determine what might be done to allow for faster and more accurate construction by future builders. (Ed. Note: We can think of several right off hand!) Options such as the cargo pod and optional seating etc. will not be offered or will additional "non functional" features be explored until adequate builder support, documentation and production are assured.

According to Larry, new **EXPRESS** fiberglass parts will be made by a subcontractor who has had extensive experience producing parts for Glassair. A new production facility is currently being completed, which will support **EXPRESS** molded parts manufacturing.

Other details are yet to be revealed, such as the extent to which the rewriting and completion of the construction documentation will be done, when publication of a Pilot's Operating Manual will be done, how future kit sales will be promoted, whether regional builder support centers will be viable, etc., but Larry and Paul have promised a careful, conservative approach to the future of the **EXPRESS**, focusing on supporting the existing builders, as they feel that the **EXPRESS** will speak for itself as more and more flying examples appear on airports in the U.S. and overseas.

For more information contact:
Larry Olsen,
EXPRESS AIR-CRAFT, INC.
7825 Old Highway
99 S.E., Suite 200,
Olympia Airport,
Olympia, WA
98501,
Telephone:
(360)352-3554 or
Fax(360)3523431

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Another Editorial?

Yes! The last time we strayed from the technical and useful stuff in the *EXPRESS LINK* was in the June/July 1995 issue. In that piece we discussed the future of the CT *EXPRESS* as related to the decision by EDI to quit producing the CT in favor of the Series 90. Having been both witness and participant in both earlier production attempts, we are constrained to comment again as we anticipate another attempt to successfully produce what should be a spectacularly successful kit plane.

EDI advertising convinced a number of people that the CT version was "dangerous" to an extent that unnecessarily exposed EDI to a potential economic disaster when the Cruciform tail either "fell off" or "quit flying" altogether at an altitude so low that recovery would be impossible. The result: a few panic driven kit sales, then nothing after the panic died down, leaving builders with CT models as well as Series 90 models, adrift. Had existing builders not stuck together and waited out this latest assault on a design that does not deserve its reputation, it is difficult to imagine the wasted time and money. And all for nothing.

As more and more examples of CT *EXPRESSes* "come on line" it is becoming more and more apparent that the CT is not inherently dangerous, when flown properly, and does not compare in any way with the stall/spin accident rate of, for example, the Lancair 360 which has killed a goodly number of people. In point of fact, **THERE HAS NOT BEEN ANY REPORTED INADVERTENT INCIDENT OF A TAIL DEPARTURE** (structurally or aerodynamically) on a CT that has come to our attention since before July, 1995. (and even then the only report(s) that we know of came from David Ullrich). By this date we are certain that there is a total of several thousand incident free CT flight hours (with the exception of documented nose gear problems) with more being flown every day.

The point is: There is no apparent reason to suspect the CT model of being anything less than a fast, safe, comfortable, efficient kit aircraft which can still

be competitive in today's market-place as simply what it is - the best four place kit plane for the money - and support its future production.

While saying that, we want, at the same time, to admonish the new owners of the *EXPRESS* not to forget the lessons of history, lest they are sentenced to repeat the earlier results.

Do not forget that the biggest asset that a kit airplane manufacturer has, is satisfied builders. Builders who are happy with honest, reasonable factory support will sell more kits than a magazine full of four color ads.

Listen to builders who are anxious to help you succeed, because when you do, we do. There is a host of builders who have created some marvelous innovations while working toward completion of their projects and some outstanding craftsmen (and women) who have won awards for their work and are justly proud of, and happy with, the results. If you ask, and listen to what they tell you, they will gladly share their expertise to help you make the *EXPRESS* an "orchid" out of a "camellia," a great airplane out of a fine airplane. If you are looking for ways to make the *EXPRESS* easier to build and maintain, and faster and more comfortable and more beautiful - **ASK THE BUILDERS FOR THEIR HELP, AND PUT IT TO WORK.**

If you are convinced that some mod or other would be useful or helpful, instead of spending the time and money trying it at the factory, ask for builder volunteer help. They will tell you in a hurry whether the gadget or fix you have in mind will work, or how to make it work best if it is important.

We hope you will concentrate on what you can do the best - produce and distribute well-made parts and kits, create uniform, well-illustrated documentation, continually **REFINE AND TEST** your basic product, make timely changes where appropriate, and have technical support available which has the experience of building an *EXPRESS* and can speak from experience. Leave the fancy, full color ads for manufacturers who must resort to "glitz" to sell kits.

The *EXPRESS* will sell itself!

Ed

The *EXPRESS* In "CYBERSPACE"

It had to happen - a web page for the *EXPRESS*.

Mark Turner who has been actively promoting and coordinating plans for the *EXPRESS* gathering at Rochester International just before OSHKOSH '97 has established a web page to facilitate planning for that event. Plans to continue the web page after OSHKOSH are not known, but hopefully someone will continue as host in the future.

The address is:

<http://www.millcomm.com/~wdr/mark/express.html>. Check it out!

Also, for those of you who may have missed the note in the latest Sport Aviation the E-mail address for Ex Link or CBROS is:

bcopeland@compuserv.com



Look Before You Leap !

Elevator Trim Tab Hinging

When preparing to place the hinge for the elevator trim tab, consider attaching the hinge on the lower elevator skin rather than the upper skin as shown in the factory documentation. The reason for this choice is that it is more likely that you will be using more "down" trim tab position (up elevator) than "up" tab position (down elevator) and it is much easier to obtain a large movement of the tab on the hinge side. Hinging the tab on the bottom skin locates the "cuff" portion on the upper side where a smaller angular movement is required.

Think about it!

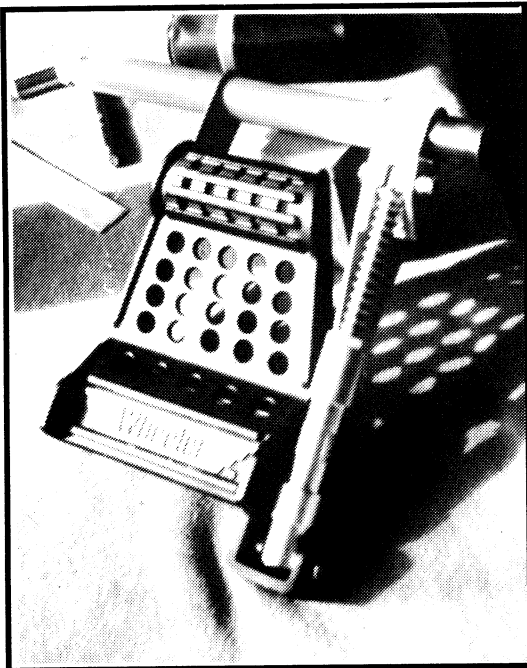
It is also not necessary to expose any of the linkage outside the elevator or trim tab skin as enough mechanical advantage can be obtained by careful location of the attaching linkage in the trim tab close to the trim tab skin opposite the hinge. Doing so will make the trim more sensitive, but this can be mitigated by restricting the voltage to the servo motor.

Improved Upper Master Cylinder Bracket

A Great Place For Your Feet!

Henri Walser, from St. Julien De Cifly, France, furnishes information on the work he has done to make a visual treat of his **EXPRESS** rudder pedals and documents a machined part designed to strengthen the rudder pedal hanging bracket for the brake master cylinder attachment.

Not trusting the factory documented brake master cylinder attachment design in procedure 7.040, Henri has had two left hand and two right hand copies of the part, shown in the sketch below, right, machined from hard aluminum. The sketch is basically self explanatory, but he cautions that the builder needs to be certain to make one left and one right copy for both pilot and co-pilot positions (if brakes are fitted to both positions), and that all dimensions shown are in Millimeters. The sketch is presented here in reduced form to save space. If you would like the full size drawing, contact **CBROS, Inc.** and we will provide you with a copy (complete with decimal conversion).



Above: The modified rudder pedal and upper attach bracket

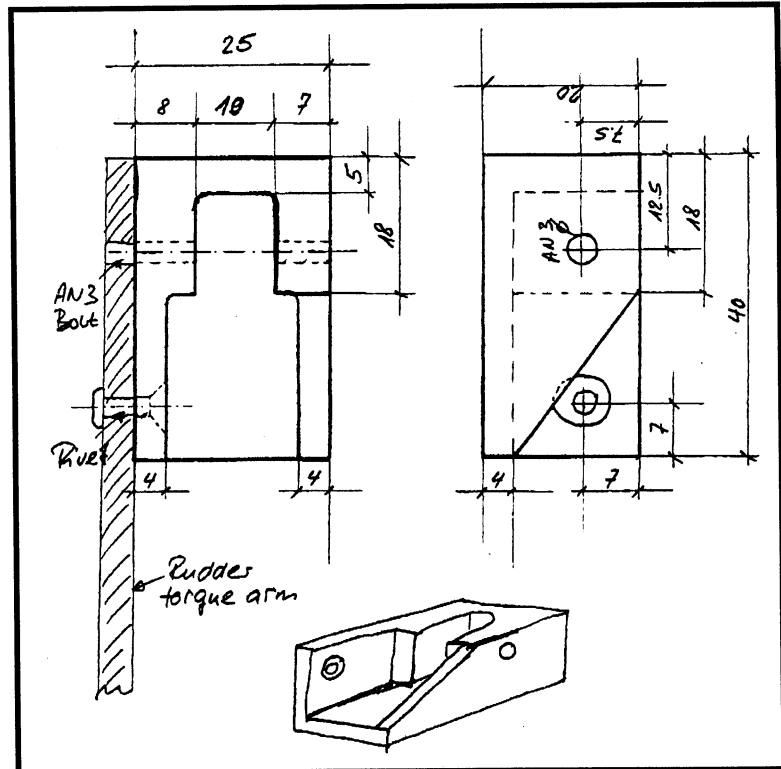
As shown in the picture below left, Henri has done what we consider an exceptional job of modifying his **EXPRESS** rudder pedals. What you can't see in this black and white reproduction, is that the pedals are either anodized, powder coated or painted black leaving the **EXPRESS** lettering uncoated. In color the contrast is spectacular.

Thanks Henri.

Ed Note: For more detailed information builders can contact Henri by writing to: Henri Walser, Chateau de Vaux, F-71800, St. Julien de Cifly, France.

Subsequently, **EXPRESS** builder Del DeLatore who has machined the modified landing gear bracket discussed in issue 12, has reviewed the original drawing for these brackets and advises that he will reproduce them for \$38.75 each. (4 required for dual controls)

If interested call Del at (408)683-2373.



Above: One half scale drawing of upper master cylinder attach bracket. All dimensions are in Milimeters. Part machined from hard aluminum, four required.

Wanted: Builder Input

In this issue you will find a variety of information furnished by several individual builders. We think that one of the main functions of the **EXPRESS LINK** is to act as a sort of "clearing house" for the exchange of builder generated information. Our thanks for their contributions to this issue goes to Ed Bernard, Henri Walser, John Boubelik, Reinhard Metz, Jerry Sjostrand and Dick Lind.

As you might imagine, it is difficult for one person to generate enough interesting material to fill an entire newsletter, so outside help is always appreciated.

If you are inclined to participate, stories or material which include photographs or diagrams are usually the most interesting. Form is not important - editing is the easiest part. If you can submit material on a disk, we are currently running Word Perfect 6.1, for Windows. Color photographs are OK - try for highest contrast.

Remember what you learned in kindergarten: **SHARE !** (and play nicely)

...Ed

IO-540 Cooling Plenum - Trying to Beat The Heat

PART ONE

Following the documented, unqualified success of the installation of a cooling plenum secured to the baffling of the IO-540 in Bob Gisbourne's *EXPRESS*, CBROS, nearing the point where a decision on sealing the cooling air with flexible silicone material or opting for the more complicated, but better sealing fiberglass plenum needed to be made, decided that the plenum was the way to go. The metal portion of the baffling which was furnished with our IO-540 had several corners designed to fit around the engine mount attachments on the engine that had proved to be difficult to seal completely using the normal silicone rubber material that seals most cooling chambers. In fact, if silicone rubber was to be used, it was obvious that a large amount of RTV would be required to effect even a reasonable seal.

After reviewing pictures of the installation of the plenum on Gisbourne's *EXPRESS*, which were taken by Jerry Sjostrand as he constructed Bob's, we became convinced that the project was within our ability and we decided to proceed. The following procedure assumes

that the top and bottom cowling have been fitted as closely as possible to its final position.

Following Jerry's directions, the first step was to mold the top of the plenum which would fit inside the top cowl with about 1/2 of clearance from the inside top of the top cowl and eventually be secured to the metal baffle. To make a top for the plenum which would fit inside the top cowl was a relatively simple matter of locating the outline of the baffle on the outside of the top cowl and applying a layer of bag film, a layer of "lite" peel ply and three layers of fiberglass to the area, plus about 1 1/2 inches all around which could be trimmed to exact size in the next step. The front of the plenum top was determined by measuring from the aft end of the top cowl to the aft edge of the circular part of the cowl that fits over the starter ring gear. As part of this lay up process, two layers of uni-glass were added to the front edge to stiffen this area where the silicone rubber seal will eventually be installed to seal the plenum to the top cowl. This flexible seal is crucial to the process as, remember, the plenum is solidly attached to the engine and the cowl is not, so some movement must be allowed for.

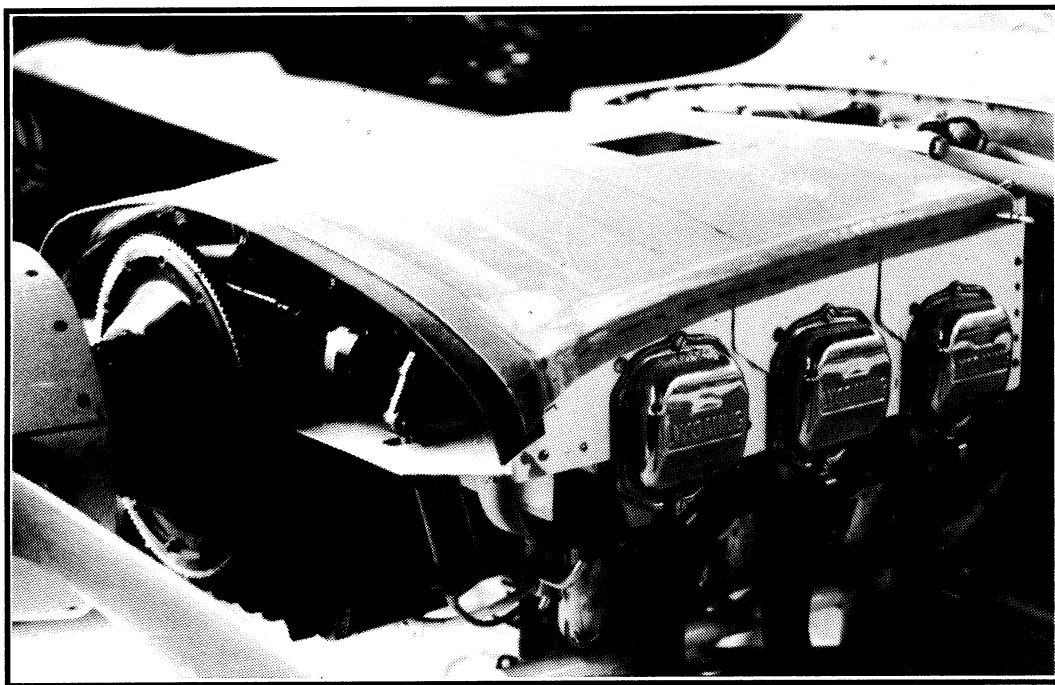
After curing, the new part was located as closely as possible to its final

position under the cowl, and trimmed 1/2 inch outside the baffle on each side and the rear. Next the rough trimmed plenum top was secured in its proper position inside the cowl using bondo and several 1/2 inch soft foam blocks to emulate its eventual working clearance, the cowl was installed in its proper position and foam blocks were hot glued to the outside of the metal baffle at several places around the perimeter so that the elevation of the top of the plenum could be reproduced when the cowl was removed and the top of the plenum was refitted in position by itself. After securing the foam blocks, an effort was made to retain the horizontal location of the plenum top by marking the edges of the foam blocks where they met the plenum top.

With the cowl removed, the plenum top was replaced in its proper position and 1/2 inch foam pieces were hot glued around the entire inside of the metal baffle and trimmed and sanded so that the plenum top ended up at the elevation dictated by the foam blocks originally glued to the outside. These foam pieces could be "let in" so that their outside edges are flush with the outside of the metal baffle, however we opted to ignore this additional complexity as being unnecessary. If your side metal baffles are

one piece, it would be appropriate to include this step and, after the flanges have been completed, the plenum can be forced inside the metal baffle and secured there. Ours will probably be installed with the flanges on the outside of the metal baffles.

Next, the plenum top was carefully replaced in its proper position and an outline of the inside of the inside foam pieces was drawn on the plenum top which was then trimmed 1/4 inch outside the outline, and the outside foam blocks removed. Pay particular attention to the front corners to insure that sufficient clearance is maintained where the cowl comes close to the metal baffle. To make the flanges which will secure the plenum to the metal



Above: Cooling plenum being constructed on Bob Gisburn's *EXPRESS* by Jerry Sjostrand

(Continued on page 5)



(Continued from page 4)

baffle the next step is to secure the plenum top to the foam which is glued inside the metal baffle. We used "instant" glue in several places around the perimeter.

In addition, since we decided not to retain the foam on the inside of the metal baffle because our plenum will fit on the outside, we covered the area where the flange will be made with aluminum tape as a release agent (with a coat of wax for good measure) and masked off the area beyond the edge of the flange to keep things tidy.

Next issue - we finish the plenum project.



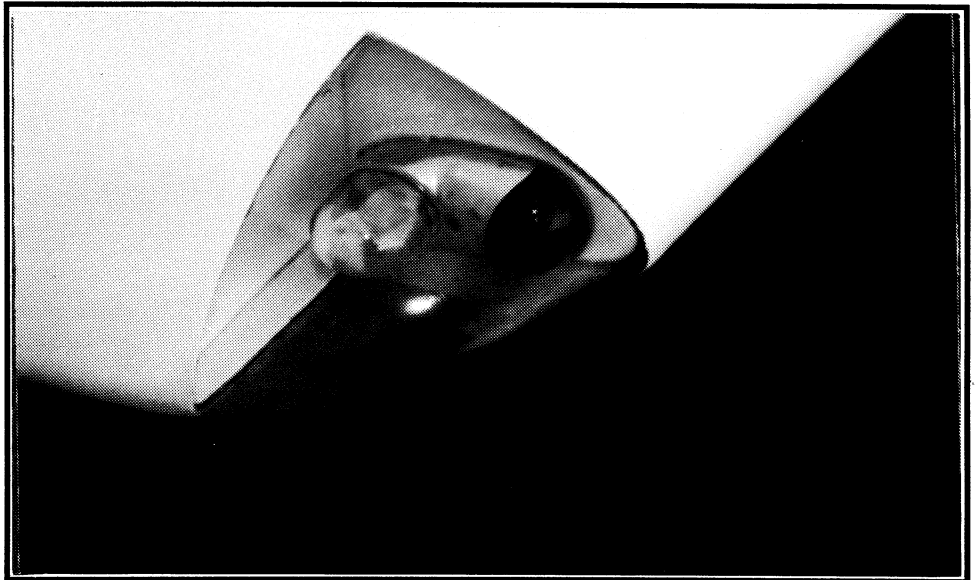
MORE FROM DICK LIND'S CRUCIFORM

As most of you know by now, Dick Lind's cruciform **EXPRESS** won the award for "Best Composite" at Sun 'N Fun '97. On the right are pictures of some additional features of Dick's **EXPRESS** which, no doubt, contributed to his success.

Picture No.1 is the strobe and position light built into the left wingtip (There is one in the right wing also). This location is in contrast to the exterior mounting suggested by factory documentation and manufacture of the wing tip. Neatly done.

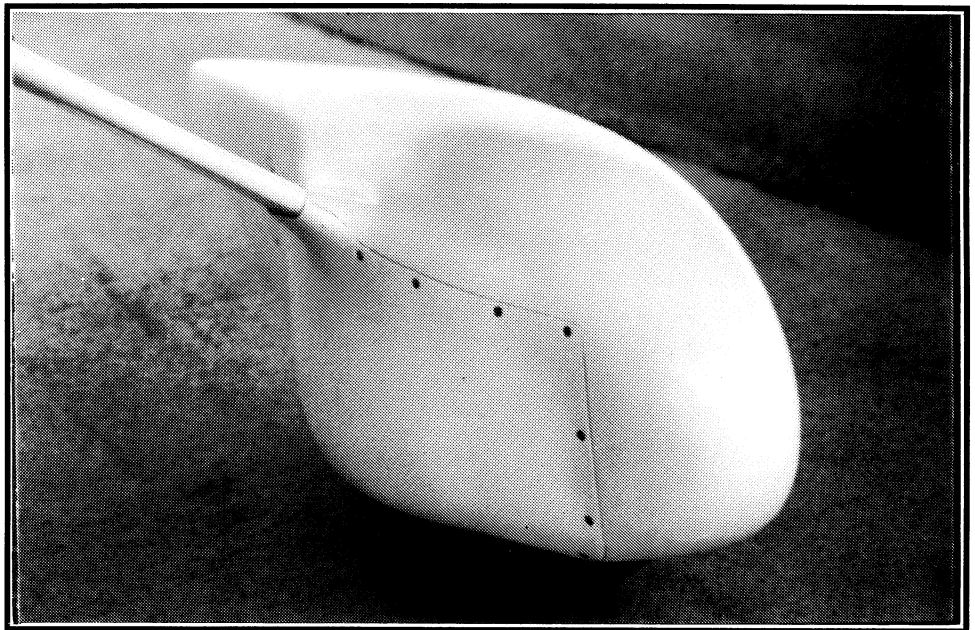
Picture No.2 shows the left main wheel fairing which features a larger than usual inboard fairing for the brake assembly. Very sturdy and very clean.

Picture No. 3 would be impossible to identify without actually seeing the location of this small, streamlined fairing. In fact, it covers the aileron actuating bellcrank and push rod. It differs from the standard design to allow for center hinging of the ailerons (similar to the elevators). Very clean, very strong, reduced system "play", easy to maintain and allows for consistent gaps above and below the aileron where it meets the wing trailing edge.

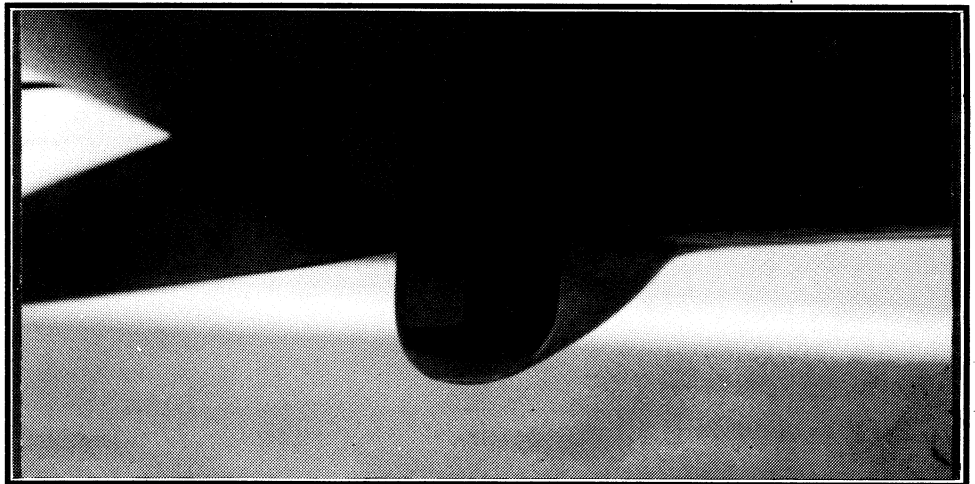


Above: Picture No. 1

Below: Picture No. 2



Below: Picture No. 3



Give Us A Brake !

Matco Or Cleveland, Sure, But Which Part Numbers? Look Before you Leap !

Submitted by: John Boubelik

Searching for the most effective brake system for my *EXPRESS* I asked many folks at Oshkosh '96 for advice on what brakes I should use. I felt that double-puck brakes would be more appropriate than a single puck system.

After talking to the Aircraft Spruce folks and the Cleveland folks, no one seemed to know exactly what to use. I finally got some firm advice recommending the Aircraft Spruce kit #5, which included wheels, single-puck brakes, rotors, tires, and tubes priced at \$770 and ordered the parts.

Do Not order this item.

As I was getting ready to install this stuff recently, another *EXPRESS* builder, who also happens to be an A&P, was visiting my hangar.

When he saw the brake system I was getting ready to install, without hesitation, he told me they would never stop a airplane the size of the *EXPRESS*..

I then called the Cleveland folks (again) and this time talked to Sandy. She knows it all! She knew what Wheeler used when they included these parts with their kit and it definitely was not what I had bought from Aircraft Spruce.

I received two 10-20 master cylinders with my kit, and bought two more in order to have dual brakes. As you may know, these take 3/16 inch line. The Cleveland emergency brake lever I purchased uses 1/4 inch line. This is somewhat irritating but, I'm sure, solvable.

Getting the wrong brakes was not only irritating, but potentially dangerous.

The recommended brakes from Cleveland (and Wheeler) are P/N 199-60 or 199-60C (for chrome). This is a double-puck design.

Thanks John !

John can be reached at:
301 E. Main, El Dorado, AR 71730
Tele:(501)863-8000

New Subscribers

The following is a list of new subscribers to *EXPRESS LINK*. Included with their address, where appropriate, is a note about what they have, what they need or what they are planning relative to their *EXPRESS* projects. If you can help them out, please get in touch with them and offer whatever you have.

Lou Addressi

94 West Court Drive
Centereach, NY 11720
Has 4 kits. Needs Series 90 tail

Ed Blake

124 Lakeshore Drive
Eastchester, NY 10209
Series 90 builder

Steve Bussey/Bob Shoemaker

1235 Pine Island Road
Merritt Island, FL 32953
Need upper fuse,, tail(CT or S-90), wingtips, cowling, engine mount, landing gear, flap actuator, and construction docs.

Rick Fernandez

1630 Medical Lane
Fort Myers, FL 33909
Contemplating Chevy 350 installation

Frank Hanish

8675 Marigold Circle #312
Eden Pararie, MN 55344
Auriga builder

Al Hornebink

C/O St. Cloud Glass
2316 Division
Saint Cloud, MN 56301
Wants complete kit.

Tom Magill

1625 Green Meadow Lane
Chesterton, NY 46304
Series 90 builder.

Mel Parmalee

6245 Woodland Drive
Shawnee, KS 66218
Series 90 retrofit kits.

Jim Phelps

12015, 2467th Street N.E.
Arlington, WA 98223
Has kits 1 and 2 only.

Skip Popiak

P.O. Box 392
Putnam, CT 06260
Completing Series 90. Expects to fly in Fall '97.

David Powell

4 Cyrus Rex Road
Rogers, AR 72756
Needs Series 90 tail.

Don Pugh

605 Pennsylvania Drive
Denton, TX 76025
Contemplating Ford V-6 installation

Happy Smith

Route 6, Box 649
Rogersville, TN 37857
No kits yet.

Chuck Stephenson

10 Capitol Circle
Napa, CA 94559
Needs windows, main landing gear and rudder pedals.

Mark Turner

3908 Dawnhaven N.E.
Rochester, MN 55906
Has flying example.

Jay Villalva

2303 Skipjack Lane
Chesapeake, VA 23323
Has complete Wheeler Kit. Worked as volunteer on construction of N-540EX at Gig Harbor.

R.O. Wagner

2205 East Dale Circle
Deland, FL 32720
Purchased kit from Mike Nackerman.
Needs "T" brace, outboard LG bracket and 2 rudder pedals.

Dave Younkin

5401 Matterhorn
Sridy, MN 55432
Looking for complete kit.

Laslo Zamoli, Jr.

414 Eagle View Drice
Bath, PA 18014
Looking for complete kit.



EXPRESS STUFF FOR SALE:

CRUCIFORM EXPRESS.

MOSTLY COMPLETE INCLUDING ALL KIT FURNISHED COMPONENTS, A MID TIME (1135 HRS) LYCOMING, O-540, AND MANY OTHER "EXTRAS".

Brought to its present stage of completion by an experienced, careful builder who was killed in the crash of a Glassair, this project provides an outstanding opportunity for an owner who likes to fly as much as build. Left to complete construction are the flaps and ailerons, installation of windows and windshield and mating of the wings to the fuselage.

This project is very complete. For example, the engine is complete as removed from a Call Air within the last two years including the original baffling, starter, alternator and oil cooler. At the same time, also furnished are a new, in the box, lightweight starter and alternator and vacuum pump and an EDI engine mount. Also included are Cleveland brakes and wheels. Other "extras" include yellow tagged instruments such as a Collins Nav receiver and coupled, rectilinear glide slope indicator, with a power converter, a Collins Comm transceiver, a Collins audio panel and a wet compass.

CBROS Inc. has personally inspected this project and have found the workmanship to be above average, and the kit very complete. We have made a video tape of this project which documents the stage of completion, the quality of workmanship and all components included with this project. If you are interested in obtaining a copy, a call to CBROS Inc., at (510)455-1036 and a check for \$15 (to cover cost of copying) will get one on its way.



A STRUCTURALLY COMPLETE SERIES 90 EXPRESS ORIGINALLY INTENDED AS THE EDI, SERIES 90, TURBINE DEMONSTRATOR.

Owner/builder Ed Watson is unhappily offering his "extremely" fast build EXPRESS kit for sale. Constructed by Ed, under the watchful eye and with the help of Dick Lind of Complete Composites, this aircraft provides a new owner with a quick way to a flying, Series 90, EXPRESS.

The only significant modification to the original kit design was to include extra reinforcing layers of fiberglass on the leading edges and aft shear webs of the wings.

Ed was contemplating the installation of an Allison B-250, with the support of EDI and Allison, to fly around the country as a factory demonstrator. When EDI quit and Allison was acquired by another company, his original plans went out the door.

All structural components, including control surfaces are complete, with the exception that the rudder has not been closed. Doors and windows have not been installed, but are included in their original packaging. No instrument panel installation has been planned, and no engine or engine mount is included. Also missing is a flap actuator and door hinges, both of which are easy to come by.

Ed is asking \$40K, and actually has more than that invested in kit components, not including the investment of his time.

For more detailed information contact Ed directly at:

7461 Batista Street, San Diego, CA
Tele: (W)(619)291-7311, x1887
(H)(619)277-8818



FOR SALE

1. Wheeler EXPRESS. 4 place/200mph kit airplane, partly done, at less than the cost of the parts.

All the pre-molded parts, instruction manuals, new steel landing gear, windows, wheels, tires and hardware parts are included. The wings are closed out, the tail is on, the rudder is on and the elevators are on. The windows need to be put in and the flaps and ailerons need to be built.

Asking \$26,500 OBO for the whole kit.

2. Whelen Dual Strobe with both wing tip strobe/position lights. New in the box. \$450.

For either item call:
Paul Lux (619) 487-5929.



EXPRESS KIT FOR SALE

Complete kit. Engine mount and exhaust for IO-540. Factory built cruciform tail. Wings complete (not closed). Lower fuselage kit complete. All work open for inspection.

Asking \$35,000.

Contact Jeff Arnold,
Phone (540) 382-4965,
Fax (540) 382-3859

FOR SALE

Cruciform kit, complete.

In an advanced state of assembly, this project was originally an EDI Quick-Build kit, mostly assembled by an A&P mechanic.

The wings are 95% complete and include 92 gallon fuel capacity, steel leg main gear fitted, VOR antenna installed, and the flaps and ailerons assembled.

The fuselage and tail have been assembled and is ready for engine mounting and detail work. A com antenna is installed in the fin in the factory built tail. The seats are assembled and installed with the front seats set up for air spring positioning. The rear seats have been modified to fold.

The kit is complete as furnished by EDI and includes windows, rudder pedals, MAC stick grips and a multitude of small parts and sub assemblies.

The nose gear leg is an improved and reinforced unit as built by Larry Olsen. The cowling is an improved design as furnished with the "Moriah". No engine mount is included, but a design, approved by a certified stress engineer, for installing a PZL Franklin, 220 HP engine is available and can be furnished.

An Audio Visual Avionics engine monitoring system with all transducers is available.

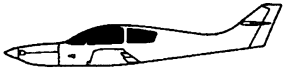
Asking price: \$27,000

For information contact:

Howard Zehetner
15322 Daybreak Lane
Fontana, CA 92337-0941
Phone: Home: (909)356-4948
. (message and Fax)
Hangar (909)982-6422
E-mail:
103707.3431@compuserv.com

FOR SALE:

IO-540 Engine mount. Manufactured by EDI. Will not fit certain IO-540 models. Call to find out if yours will fit.
John Kee
(803)328-3286



Builder Alert ! Main Gear Attach Bolts/Brackets

Submitted by Ed Bernard (N-55EX)

PROBLEM:

After 25 landings, the main landing gear on N58PP was found to be loose at both the U-bolt connection, and where the landing gear saddle attaches to the landing gear bracket on rib R. After disassembly it was found that the U-bolts and main landing gear brackets had deformed slightly, allowing for some play between the main gear and the U-bolt. Also, the holes through the gear saddle for the bolts which attach the saddle to the rib R bracket were found egg shaped and distorted. The saddle was also slightly distorted at the outboard points where it contacts the main landing gear. The attaching bolts were also slightly bent. N58PP was constructed using the production version of the main landing gear and brackets from E.D.I., which uses an aluminum gear saddle and no U-bolt saddle.

Any looseness of the U-bolt allows the main gear to hang slightly loosely from the main gear saddle when in flight. Upon landing, the main gear is hammered into its saddle and the aluminum is not sufficiently strong to resist distortion.

As a precautionary measure, the landing gear in N55EX was examined. N55EX has made over 400 landings, (including many poor ones). No distress was found. Its main gear saddle (see figure 1) is made of 4130 steel and the U-bolts are spaced from the main landing gear by a simple 4130 steel U-bolt saddle (see figure 2, shown on opposite page), which eliminates point contact between the gear leg and U-bolt.

HISTORY:

N55EX was constructed using the prototype gear legs and attach saddles as originally designed by Mike McDaniel of E.D.I. The main gear saddle is made of 4130 steel as shown in figure 1. Note that it is 3/4 of an inch thick and 2 inches wide. The main gear is held in place by a U-bolt spaced from the main gear by a simple U-bolt saddle as shown in figure 2. The ends of the channel in the U-bolt saddle were filed as needed to ensure that the U-bolt fit snugly in the saddle.

Because of production costs in machining the 4130 steel main gear saddle, the material was changed to aluminum (2024-T3, 6061-T3 or 6061-T6, but definitely not 7075). Also the U-bolt saddle was eliminated. The dimensions of the aluminum saddle were changed to be 1-1/4 inches thick and 2-1/2 inches wide. The cutout for the main gear was deepened to maintain the same location of the gear relative to the rib R bracket. No drawing of this bracket is shown.

SOLUTION FOR N58PP:

For reassembly, U-bolt saddles will be used. This is quite important as it keeps the gear firmly cushioned against the main gear saddles when in flight. New main gear saddles, as shown in figure 3, opposite page, will be constructed of 4140 steel. These brackets are 1 inch

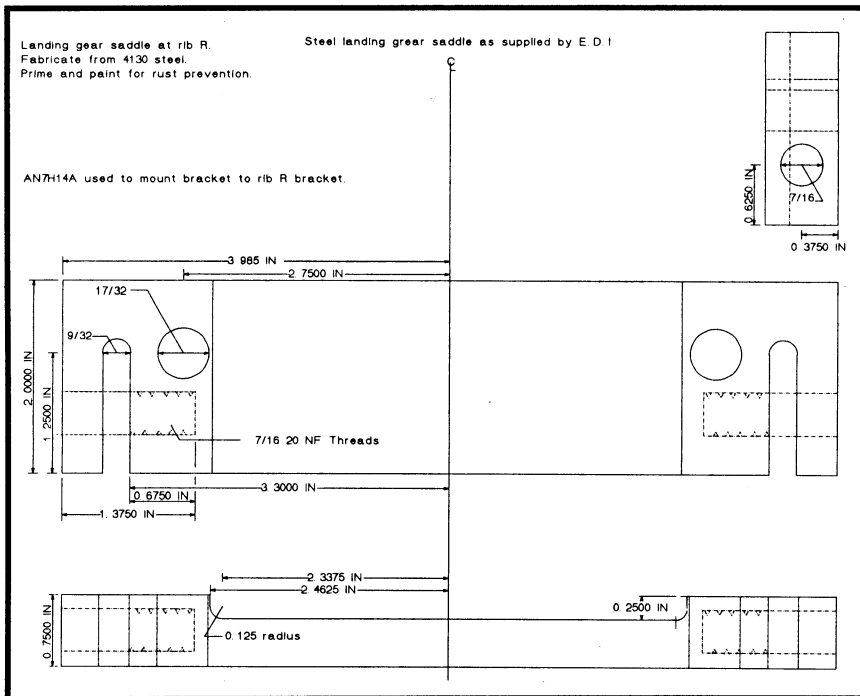
thick and will move the main gear leg(s) 1/8 inch lower in the airplane at rib R. This will raise the airplane at the main gear by 3/8 to 1/2 inch. If this change in height had not been desired, the brackets would have been made 3/4 inch thick.

Note that the main gear saddles in figure 3 also use a 1/8 inch longer bolt to attach to rib R. The bolt hole has also been deepened. This allows the shank of the bolt to enter the bracket where much of the load is transferred from bracket to bolt.

The saddles in figure 3 also narrow the cutout for the main gear bracket. This will eliminate most of the fore to aft play between the main gear and its saddle.

When assembling the saddle in the airplane it is important to use washers where possible between the faces of the tongues on the rib R bracket and the main gear saddle if the attaching bolts are to be highly torqued. These washers are very difficult if not impossible to install. Without them, highly torquing the bolts can cause bending of the welds on the rib R bracket.

Ed Note: Having already heard about the potential for this problem from owners of flying examples, please refer to the article on page 5 in issue 12. Not having actual "field" experience with either proposed "fix" we cannot comment on whether either solution is satisfactory, but we can say that Ed Bernard is usually "right on" with his engineering solutions. Let your conscience be your guide.



Left:
FIGURE 1
Original
Steel landing
gear saddle
as supplied
by EDI.

Technical Publications Available

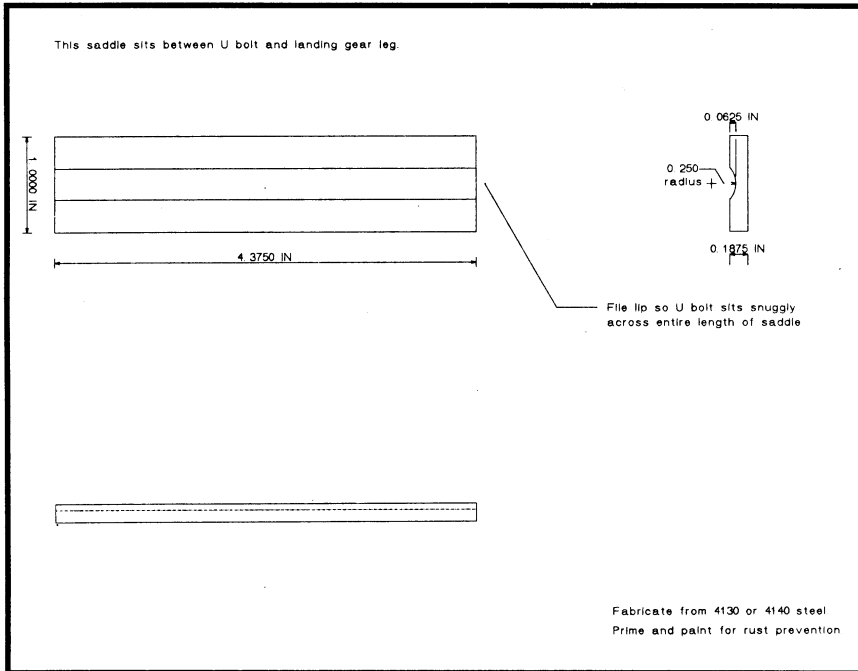
Engine Cooling And Engine Installation Data For The Technically Inclined

Bob Gisbourn has generously supplied **EXPRESS** Link with several copies of two different SAE papers which deal in great depth with the theoretical fundamentals of engine cooling and operating environments.

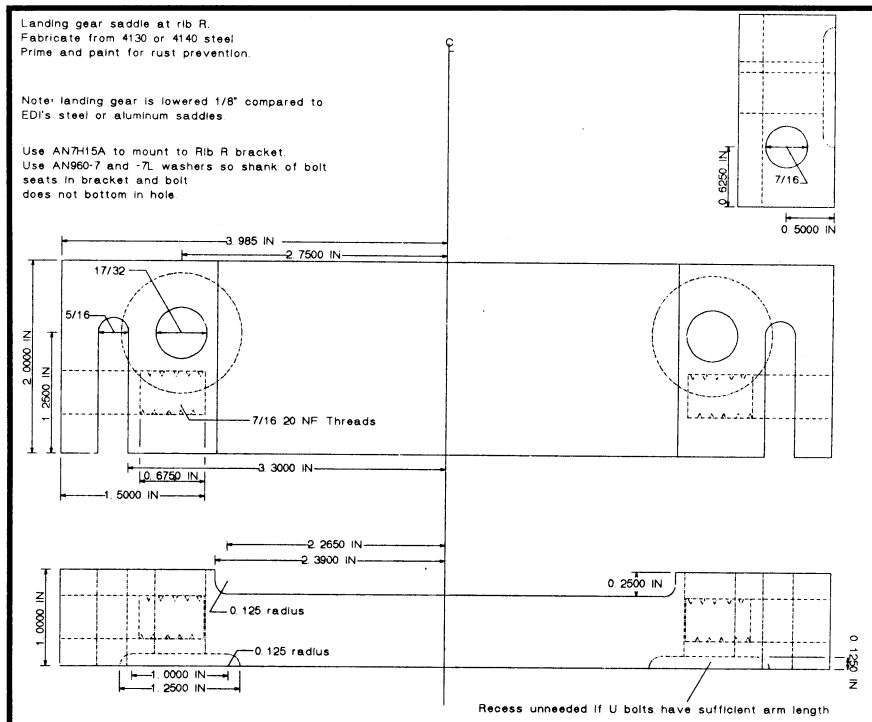
“The Development of Reciprocating Engine Installation Data For General Aviation Aircraft”, eight pages, discusses techniques for obtaining reliable installation data and methods for their application to assure efficient, minimum drag design.

The SAE technical Paper entitled **“Determination Of Installed Reciprocating Engine Cooling Requirements Through Flight Test”**, nine pages, proposes a detailed flight test procedure which will provide a systematic means of working cooling installation problems for air-cooled, reciprocating engine aircraft. This paper is of particular interest to the builder who is interested in solving a cooling problem or reducing drag. While highly technical, some useful information is extractable and an extensive list of references is included for those who may wish to explore further.

If you would like a copy of either or both publications, call CBROS Inc., and we will forward copies without cost.



Above: FIGURE 2
Original Steel landing gear saddle as supplied by EDI.



Above: FIGURE 3
Replacement steel landing gear saddle to be machined from 4130 or 4140 steel.



Builder Input

Following up on an article in issue No. 12, here is some additional material from Reinhart Metz, presented here for use by *EXPRESS* builders. Some of the following procedures are offered as supplements to factory documentation and some procedures are unique to his *EXPRESS*, but generic enough to be of use to most *EXPRESS* Builders.

Ergonomic Instrument Panel Layout

About six months ago, just as I was thinking through my panel, Kitplanes ran an excellent series of articles on panel layout and content. It impressed me immensely with its emphasis on simplicity and "intelligent" layout, and turned my focus from building the most impressively stuffed panel to building the most ergonomic panel I could think of. Picture No. 1 is what I came up with, and the rationale: (Incidentally, one key element of good looks, in my opinion, is choice of paints and colors. I found the Pratt and Lambert Cessna instrument panel paint exceptionally pleasing, and used it on all the inset panels. The rest needed a contrasting, low reflection gray, which was difficult to come up with. I finally settled on several coats of sandable gray, car primer, burnished to a semi-flat finish. Sounds a bit crazy, but try it-you'll like it!)

As shown in the picture below, the panel is actually, relatively conventional (starting with the Wheeler articulated

panel with suitable reinforcement), and attempts to condense and organize various elements as much as possible, short of installing one of those color LCD, whole panel systems.

The flight instruments are conventional. To their left is a fresh air eyeball vent, the clock and the ignition switch, located so that the key doesn't get in the way of anything else.

To the right of the flight instruments are the engine instruments, which are second in the priority of your attention. On the left of this group are the fuel gauges, and to their right, the engine instruments. A key to simplicity here is the Vision Microsystems VM1000, which does an incredible job of combining what is otherwise an extensive clutter of panel space consumption which generally is out of proportion in area to the "value added". Included in this section above the standard engine controls, are the trim indicator and flap control and indicator, in an easily reachable position, close to, but separate from the engine controls.

In the next panel to the right are the radios. A classic layout, which has the radios in the center, with more stuff that needs to be scanned further to the right, is not totally sensible. My choice of communication/navigation equipment was also scrutinized to maximize efficiency, comprehensive functionality, redundancy, and modernness. (Note: the pic-

ture shows a dummy cardboard insert and not my final plan, which is as follows:) Topping the stack is the PM2000, which combines the audio panel with the intercom. Next, functionally classic dual NAV/COMs, implemented, not as the mindless pair of KX155s, but rather as one KX155 (a concession to the continuing need to deal with VORs, and the other being the modern equivalent: The GPS/COM, in this case Garmin. Ed Note: Since the pictures furnished by Reinhard are in color and may not reproduce with enough contrast to allow the reader to identify additional elements, the following additional description is offered for clarity: Below the flight instrument stack is a row of rocker switches, appropriate to the required tasks. To the right of the comm stack is a circuit breaker panel which includes a functional circuit diagram. Two unidentified rocker switches are installed below the circuit breaker panel. On the far right "wing" is a fresh air eyeball vent and below it, what appears to be a Hobbs meter.



Rudder Assembly Technique

Although not obvious at first, the rudder cannot simply be assembled and closed out on a flat surface. The reason is that it is thicker at the bottom than at the top, and closure on a flat surface would warp the trailing edge relative to the center line of the leading edge (shear web). Specifically, the trailing edge must be supported in a plane that is defined by the center line of the leading edge. The instructions call for the generation of a multi-ribbed jig, for which the templates are not provided. In any case, there is a simpler method to achieve alignment, as follows:

The intent is to rest the half of the rudder containing the shear web, ribs and hardware, on a surface that makes the trailing edge parallel to the center line of the shear web. This can be accomplished as follows: Cut a piece of 1/4" plywood roughly the size of the rudder.



Above: Instrument panel as described in text

(Continued on page 11)



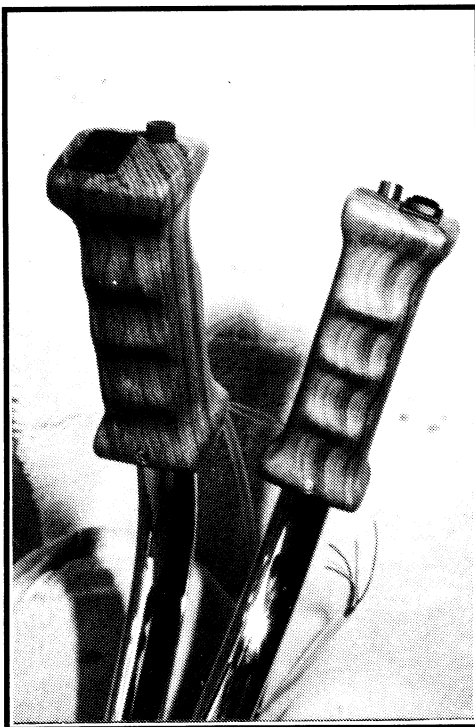
(Continued from page 10)

Along one of its long edges glue a piece of 1" angle iron. Place this assembly under the rudder half you are working on, with the angle edge under the trailing edge of the rudder piece. Now, elevate the end of the angle under the top corner of the rudder by 1/2 the difference in thickness of the shear web and skin at the top hinge, and 1/2 the difference in thickness of the shear web and skin at the bottom hinge (approx. 3/4"), and allow the 1/4" plywood to "warp" underneath the assembly. Now the whole rudder is supported so that the trailing edge is straight, and parallel to the center line of the shear web, and the rudder can be closed in this position .



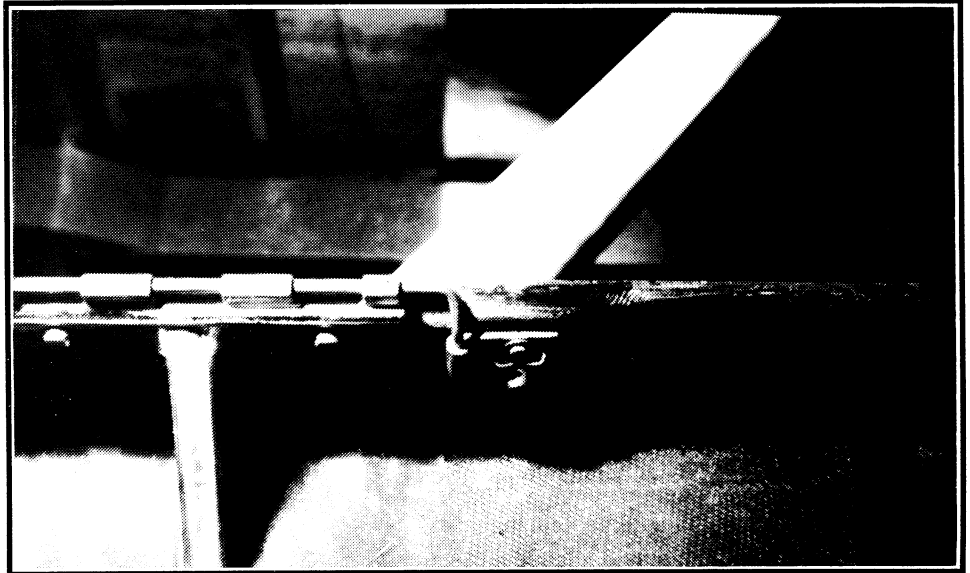
Control Stick Grips

Money will buy you all kinds of fancy or chunky stick grips. I chose to make my own, out of Teak, which is very easy to work with. After drilling the center out very carefully, and drilling pilot holes for the switches in from the top, I used a home-made undercutting router-like tool (made from a right-angle bent and sharpened nail) in my Dremel to create a fit wider area inside the grip for the switches. See picture below, left.



Hinge Pin Retention

This is a technique I picked up from a Glassair builder, that is cleaner than most others I have seen. The pin is bent at the end and fastened with a short piece of hinge stock, via a screw through and flush with the surface of the wing. See picture below. Easy to install, and easy to preflight check, requires only one end of pin to be dealt with.



Map/Instrument Lights

I needed some white light for reading maps, and since not everything on the panel is self-illuminated, some aim-able red light. (Incidentally, I don't particularly care for any of the self-illuminating add-ons available for normally not self-lit instruments—they trash their clean lines. I'd rather add red flood lighting). The solution I chose was an articulating map reading light from the Ford Mustang, easily available from a junk yard. In the front of it I embedded five high intensity red LEDs (Radio Shack p/n), each installed in a 1/4" dia, 3/4" long aluminum tube, with a piece of 16 ga copper wire, surrounded by heat shrink tubing. The assembly is then mill fibered in 5 holes drilled into the front of the map light. The copper wire then allows the individual lights to be aimed at different parts of the panel as desired. See picture below.





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Documentation: CBROS, Inc has retained an extensive file of patterns and templates for all procedures through flap and aileron construction. We will be happy to share them with any builder for the cost of copying them. If you have a particular need, give us a call at (510) 455-1036.

Materials/supplies available: CBROS, Inc. can furnish vacuum bag material, 7781 fiberglass cloth, and self stick window covering, for use on your *EXPRESS*. If you are interested in any of the above, call John or Bill at CBROS, Inc. for prices.

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