

CHAPTER 10 REVISION LIST



The following list of revisions will allow you to update the Lancair IV construction manual chapter listed above.

Under the "Action" column, "R&R" directs you to remove and replace the pages affected by the revision. "Add" directs you to insert the pages shown and "R" to remove the pages.

Page(s) affected	Current Rev.#	Action	Description
10-1 thru 10-18	0	None	Rewrote section C.
10-19 thru 10-21	AN2	R&R	
10-22 thru 10-26	0	None	



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Chapter 10	REV. AN2/11-25-98
Wing Tips	

CHAPTER 10

FAST-BUILD

WING TIPS



REVISIONS

From time to time, revisions to this assembly manual may be deemed necessary. When such revisions are made, you should immediately replace all outdated pages with the revised pages. Discard the out dated pages. Note that on the lower right corner of each page is a "revision date." Initial printings will have the number "0" printed and the printing date. All subsequent revisions will have the revision number followed by the date of that revision. When such revisions are made, a "table of revisions" page will also be issued. This page (or pages) should be inserted in front of the opening page (this page) of each affected chapter. A new "table of revisions" page will accompany any revision made to a chapter.

Arrows

Most drawings will have arrows to show which direction the parts are facing, unless the drawing itself makes that very obvious. "A/C UP" refers to the direction that would be up if the part were installed in a plane sitting in the upright position. IN most cases the part shown will be oriented in the same position as the part itself will be placed during that particular assembly step. However, time goes on and changes are made, so careful attention should be paid to the orientation arrows. That old cartoon of the guy agonizing over the plans for his canoe, built one end up, one end down, should not happen in real life. Especially to you.

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1. INTRODUCTION
2. SPECIAL PARTS, TOOLS & SUPPLIES LIST
 - A. PARTS
 - B. TOOLS
 - C. SUPPLIES
3. CONSTRUCTION PROCEDURE
 - A. MOUNTING THE WING TIP



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Chapter 10

REV. 0/2-01-98

WINGTIPS



1. INTRODUCTION

The Lancair IV uses upswept wing tips which are angled back at 12 degrees. For your convenience, the tips are one piece and installation is very straight forward.

Since the wing tips are the only non-carbon, horizontally oriented part on the aircraft, it is suggested that you install the navigation antennae in one or both of the wing tips. Although the antennas are not included in the kit, the method of installing them in the wing tips is described in this chapter.

The new style wingtips are simplified to shorten the build time. The wing tips shipped with the new fast build wings have the fuel vent line NACA scoop included, the wingtip support rib installed, and the wing tip light mount is incorporated into the wingtip.

Instructions for installing wing tip lighting are also provided, but which style of aircraft lighting you use is your decision.



10-2

Chapter 10

REV. 0/2-01-98

WINGTIPS

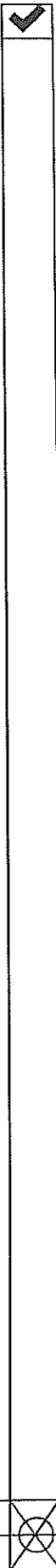
2. SPECIAL PARTS, TOOLS & SUPPLIES

A. PARTS

- 1* Wing tip, left
- 1* Wing tip, right
- * Screws, MS24694-S5
- * Rivets, AN42694-S5
- * Nutplates, K1000-08
- 1 Light assembly, Whelen A650-PG ††
- 1 Light assembly, Whelen A650-PR ††
- 1* Lens, left
- 1* Lens, right
- * Nutplates, MS21069
- * Screws, MS24694-S26
- a/r Cork washers
- 4 Hose clamps, small
- a/r* Hose, plastic, 1/4" I.D.
- a/r Antennas and mounting hardware, as desired ††

* Denotes parts that are supplied with your kit.

†† Denotes parts that are available from Neico as options.



B. TOOLS

Files or Dremel™ tool for cutting and trimming fiberglass parts

Cleco tool and about 8-10 clecoes

Drill motor

1/8" drill bit

1/4" drill bit

#20 drill bit

#29 drill bit

#50 drill bit

100° countersink

Hacksaw or tubing cutter for aluminum tubing

#2 Phillips screwdriver

Straight slot screwdriver

Rivet squeezing tool

Saw for cutting rib from fiberglass sheet

Straight edge, 24" or longer

Sanding block, long and straight



C. SUPPLIES

- Sandpaper, #40 grit
- Epoxy
- Flox
- BID material
- Instant glue
- Masking tape
- Hysol
- Mixing cup
- Tongue depressor/mixing stick



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Chapter 10

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WINGTIPS

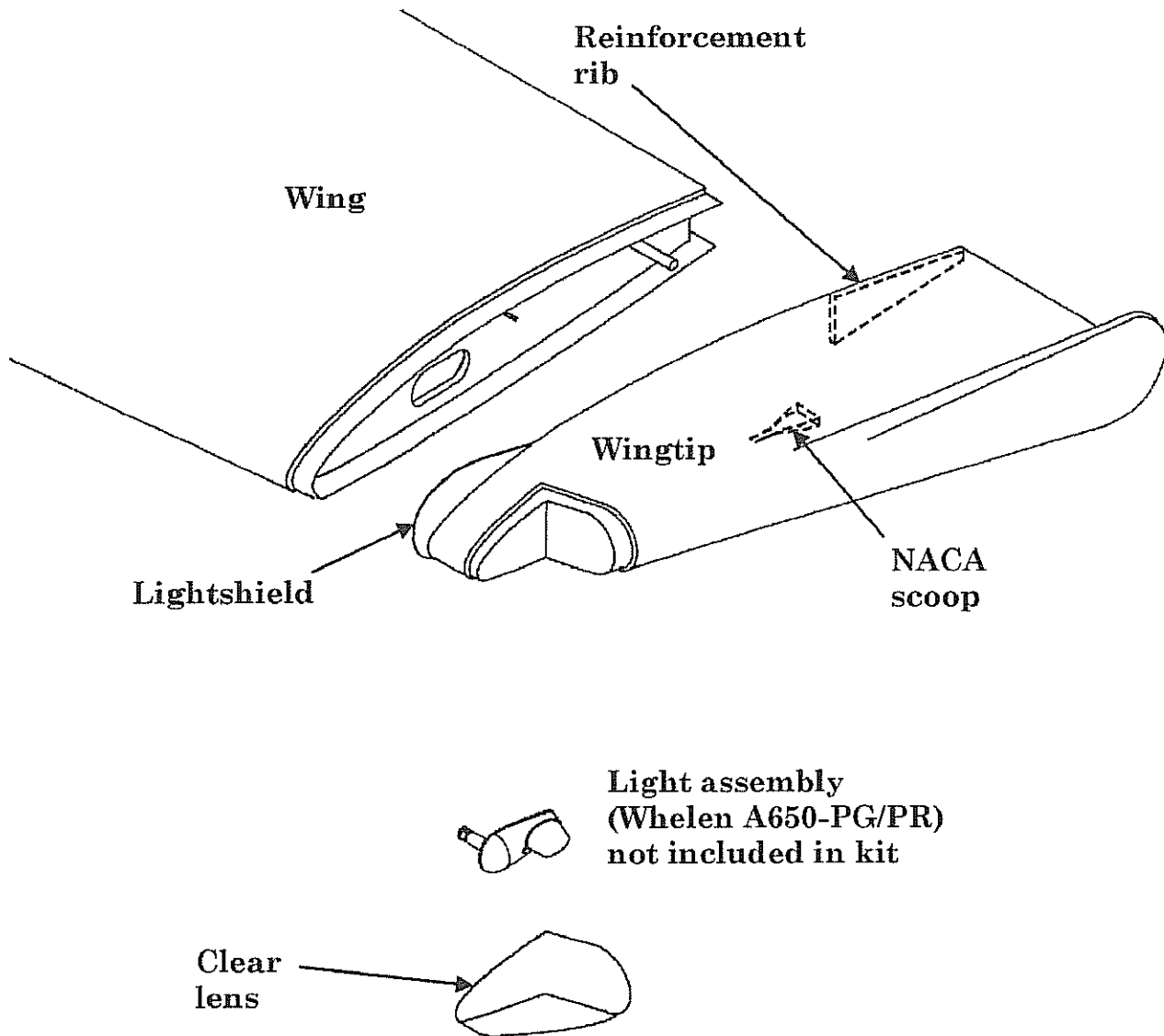


3. CONSTRUCTION PROCEDURE
A. MOUNTING WING TIP

A wing tip mounting flange is molded into each upper and lower wing skin at BL 171. The wing tip is secured to the flange with countersunk screws and nutplates.

Exploded View of the Wing Tip

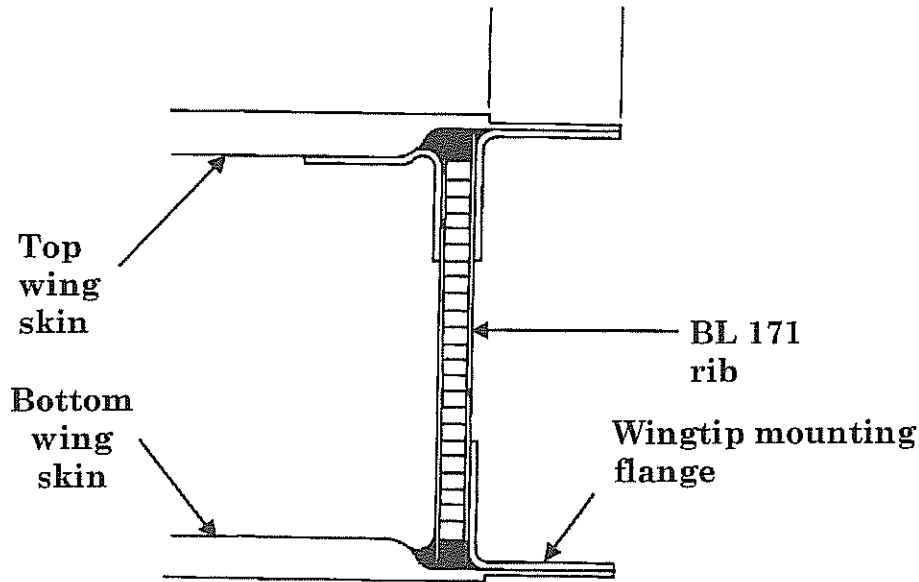
Figure 10:A:1



A1. Trim the molded wing tip flange to a 1" width. See Figure 10:A:2.

Trimming Wing Tip and Joggle

Figure 10:A:2

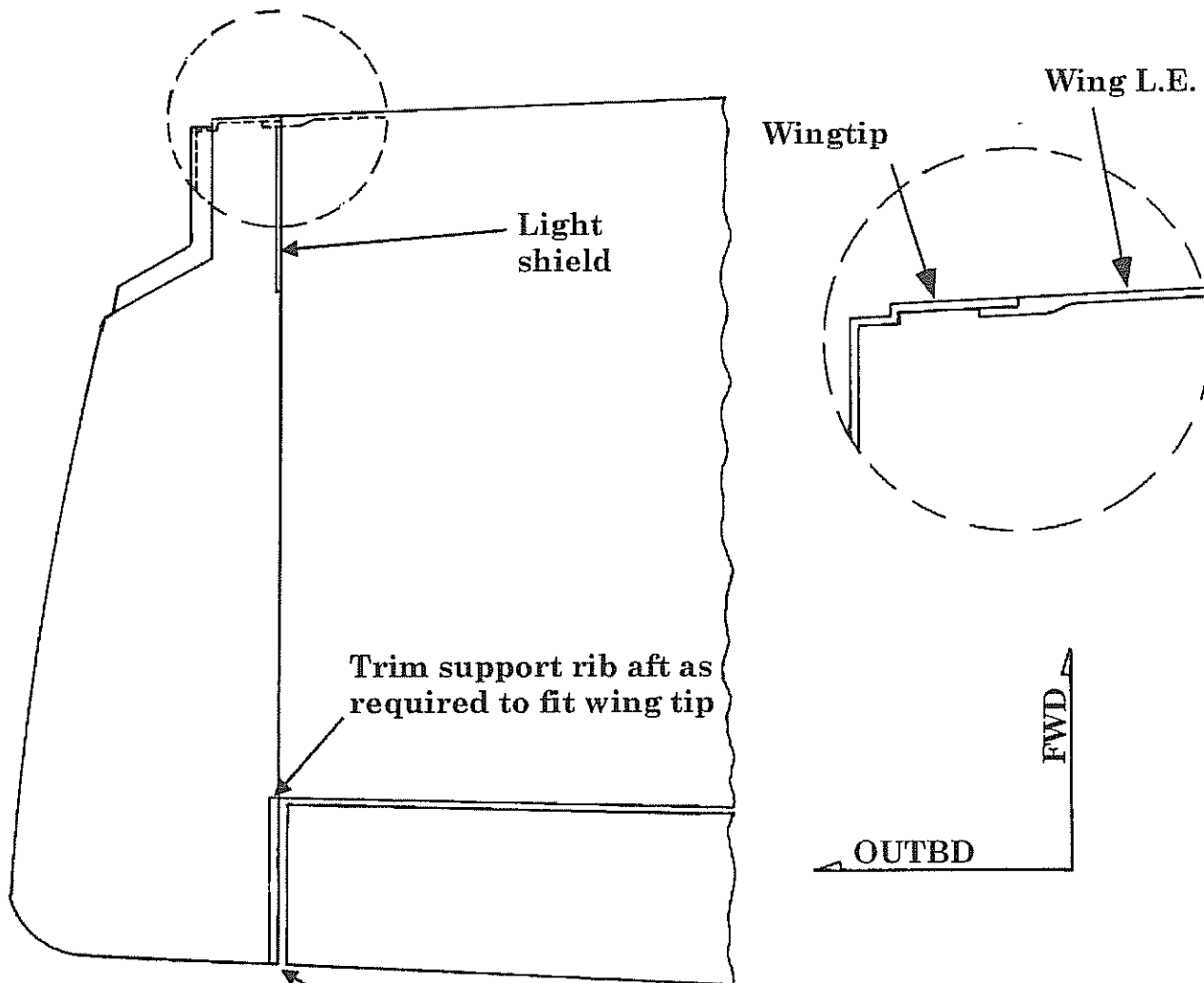


A3. Slip the wing tip onto the wing tip flange. Push the wing tip aft until the L.E. of the tip aligns with the L.E. of the wing. At this point, the T.E. of the wing tip should align with the T.E. of the aileron. See Figure 10:A:3.



Aligning the Trailing Edges

Figure 10:A:3



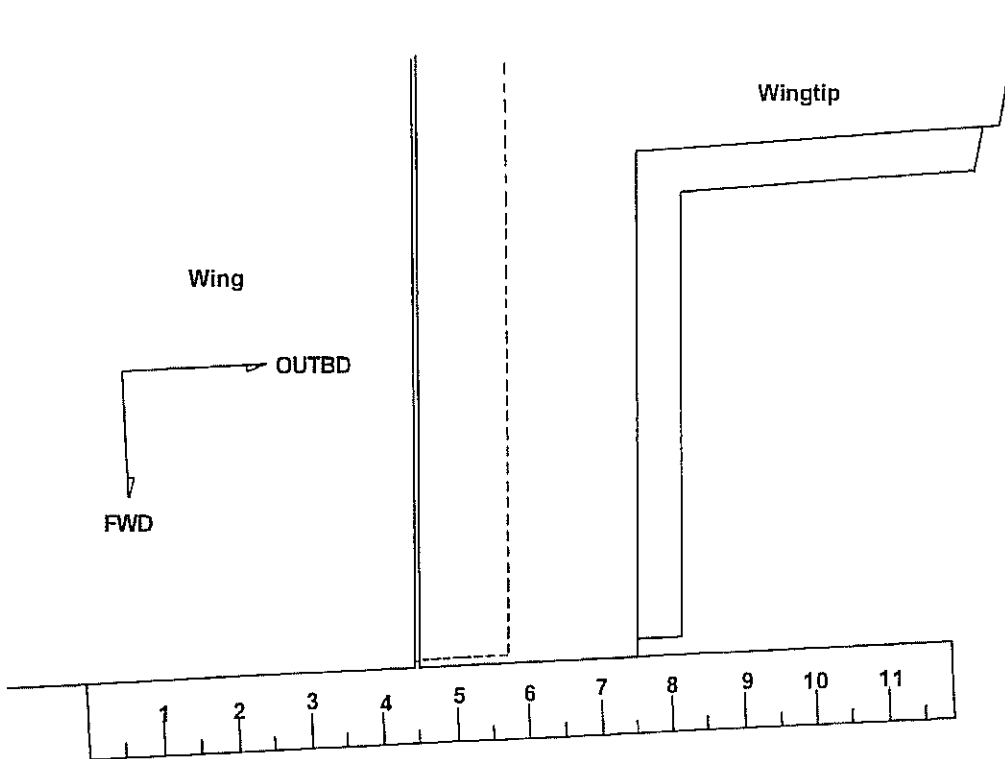
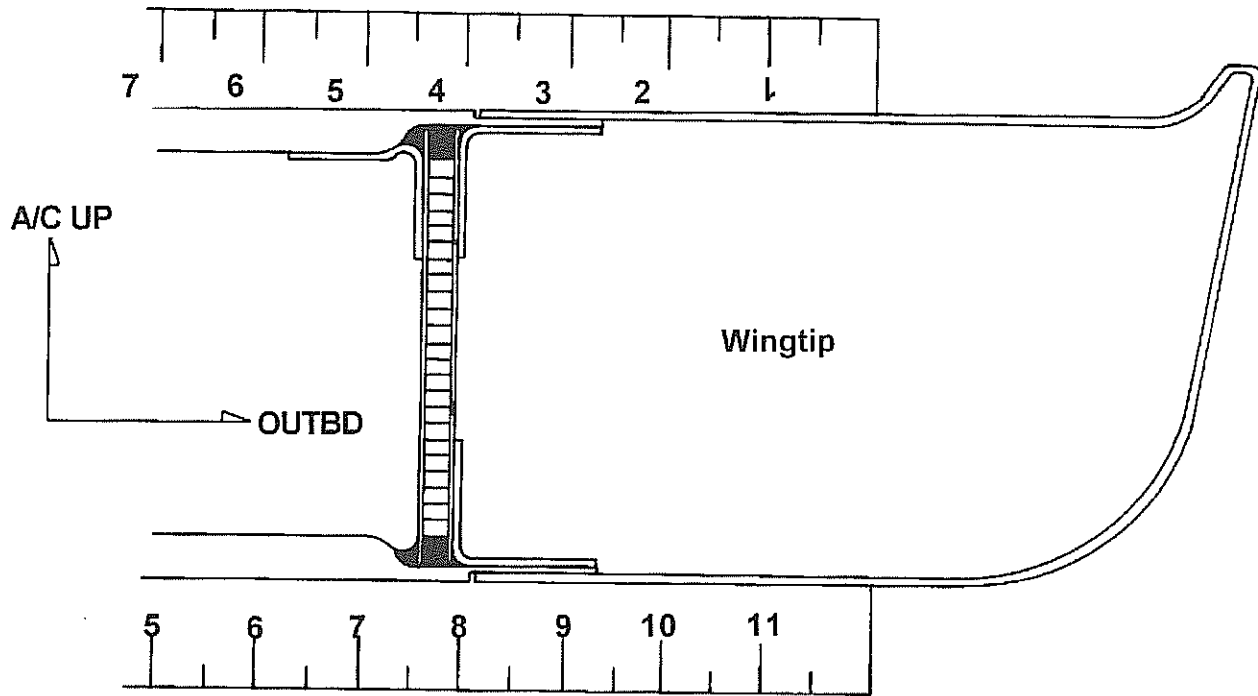
Wingtip and aileron T.E.'s should be aligned.

Some body work may be necessary to align the ailerons to the wingtips.

- A4. Check that the wing tip is level with the top and bottom wing skins by resting a straight edge on each skin, extending out 3-4" onto the tip. The wing tip will, of course, begin to sweep up, but there should be a flat transition area to the wing skins. Once satisfied with the alignment of the wingtip, sand the inboard end straight with a long board sander.

Checking the Wing Tip to the Wing Skin Alignment

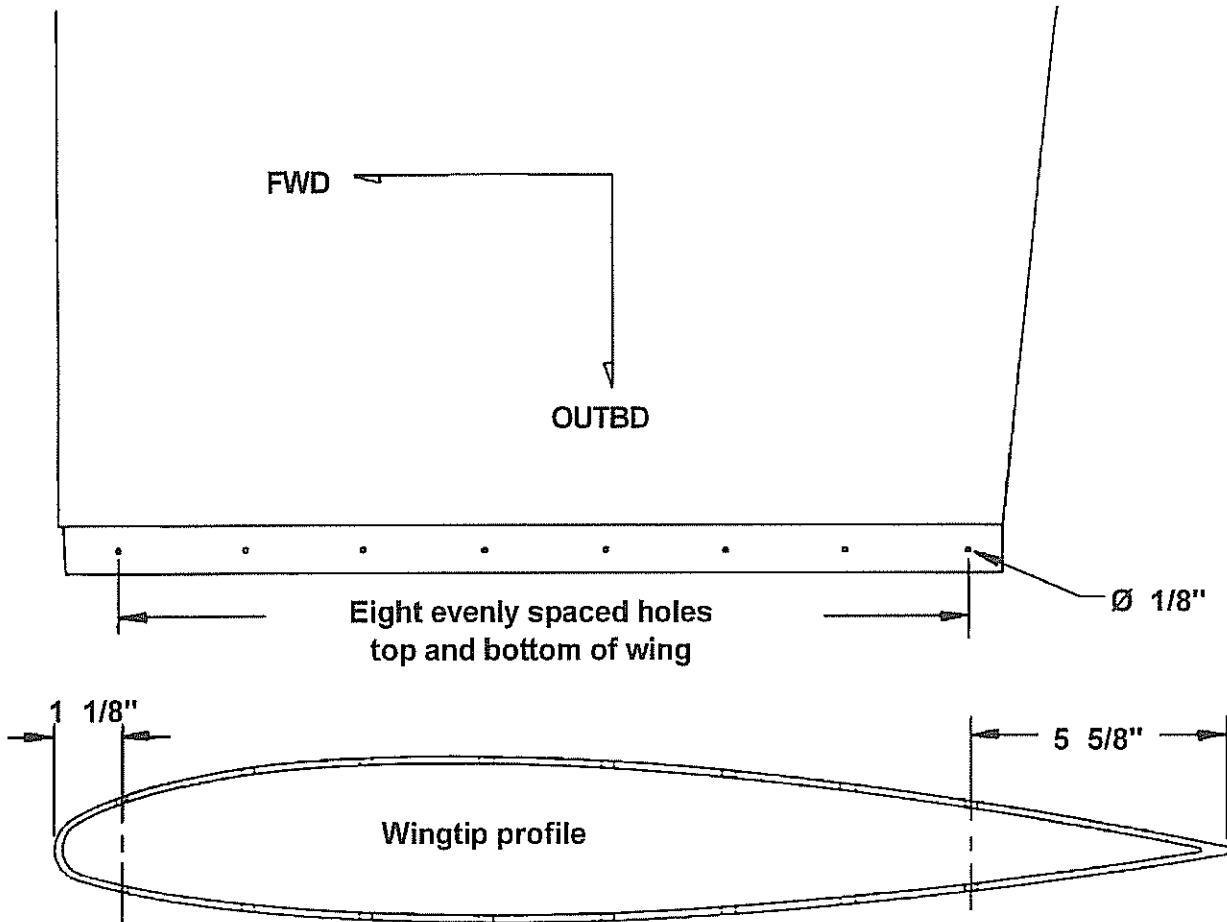
Figure 10:A:4:a



- A5. When satisfied that the wing tip is aligned properly, drill 1/8" cleco holes through the wing tip and wing tip flange where the mounting screws will be located. See Figure 10:A:5 for screw locations.

Mounting Screw Locations

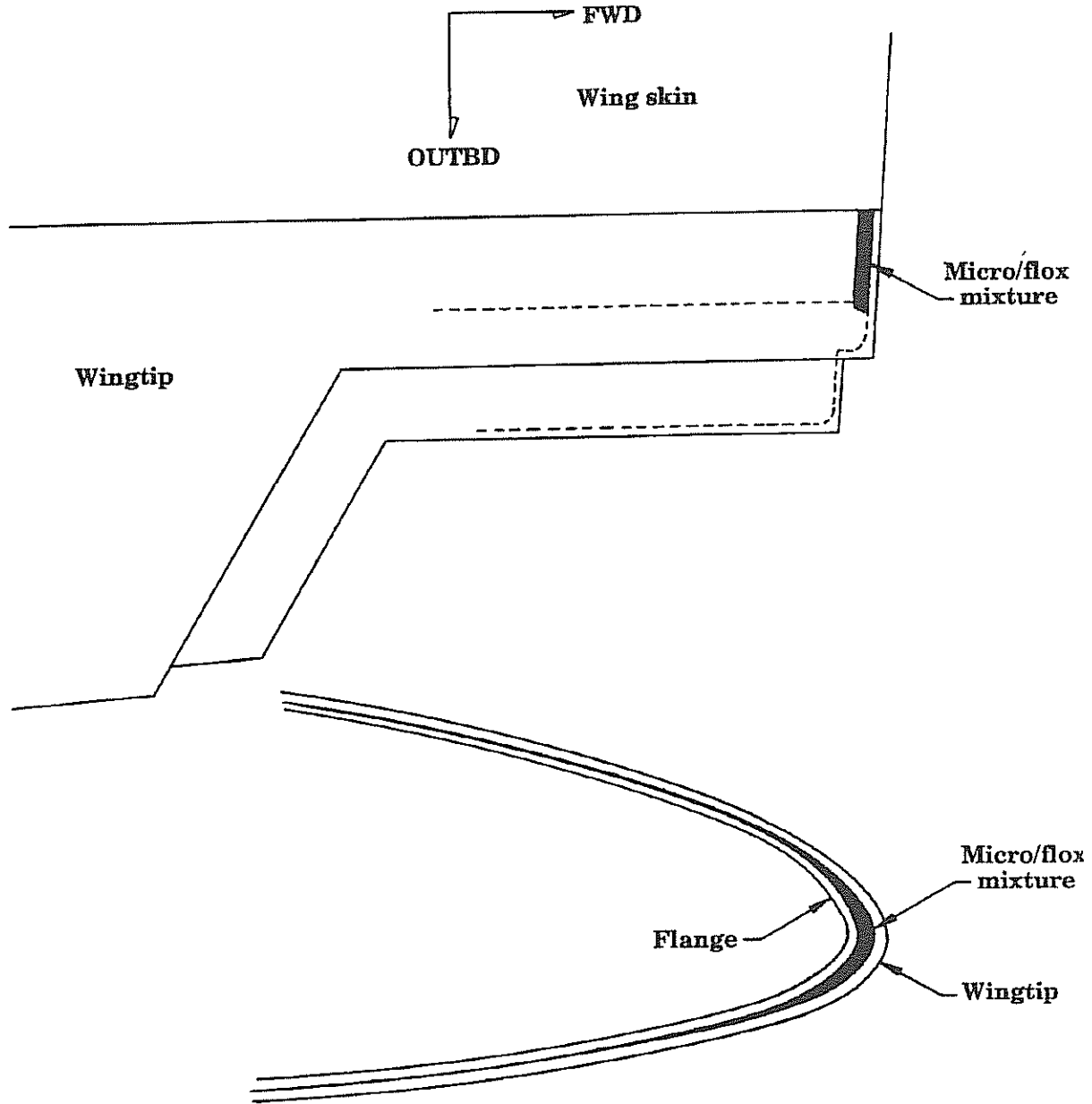
Figure 10:A:5



- A6. If the wing tip does not rest against the flange in the L.E. area (this shape may vary slightly from builder to builder) you can do a release at this time by applying thin release tape to the wing tip and building up the wing tip flange with a micro/flox mixture. See Figure 10:A:6.

Building up the Flange

Figure 10:A:6

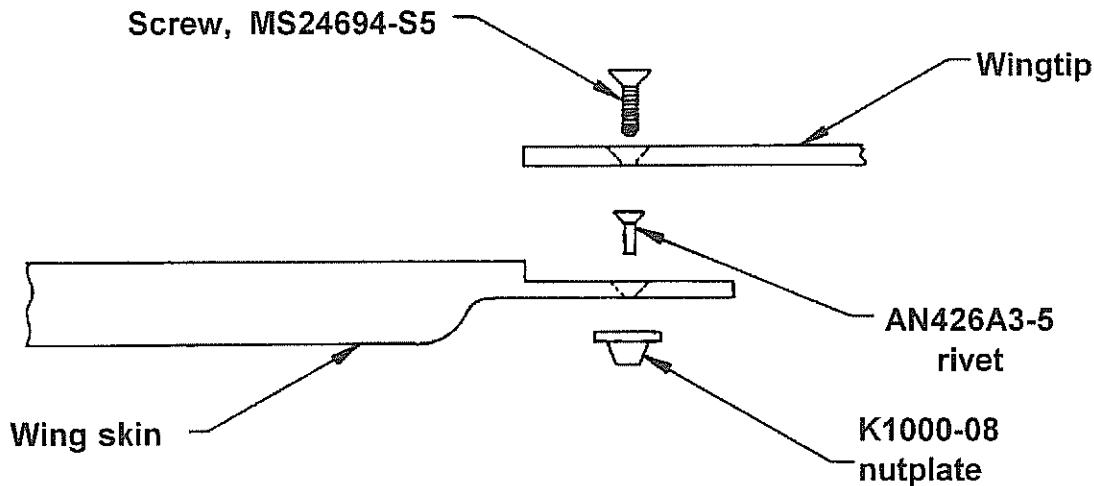


- A7. Enlarge the 1/8" cleco holes to a #20 drill size to accommodate the MS24694-S5 mounting screws. Countersink the wing tip to fit the flush type screw heads.

NOTE: If you have decided to pursue the navigation antenna which is mounted in the wing tip, now is a good time to install it (before you rivet the wing tip mounting nutplates to the flange). Read section D for more information on nav antenna installation.

Wing Tip Mounting

Figure 10:A:7



- A8. Secure K1000-08 nutplates to the wing tip flange at each mounting screw location with AN426A3-5 rivets.
- A9. Install your wing tip with the mounting screws and check for alignment once again. Install the aileron and check that the wing tip does not interfere with the aileron travel. A .050" gap between the wing tip and the aileron is standard after paint. Sand the outboard tip of the aileron if the gap is too narrow. You can also trim up to .05" off the T.E. of the wing tip to match the T.E. of the aileron, if necessary.

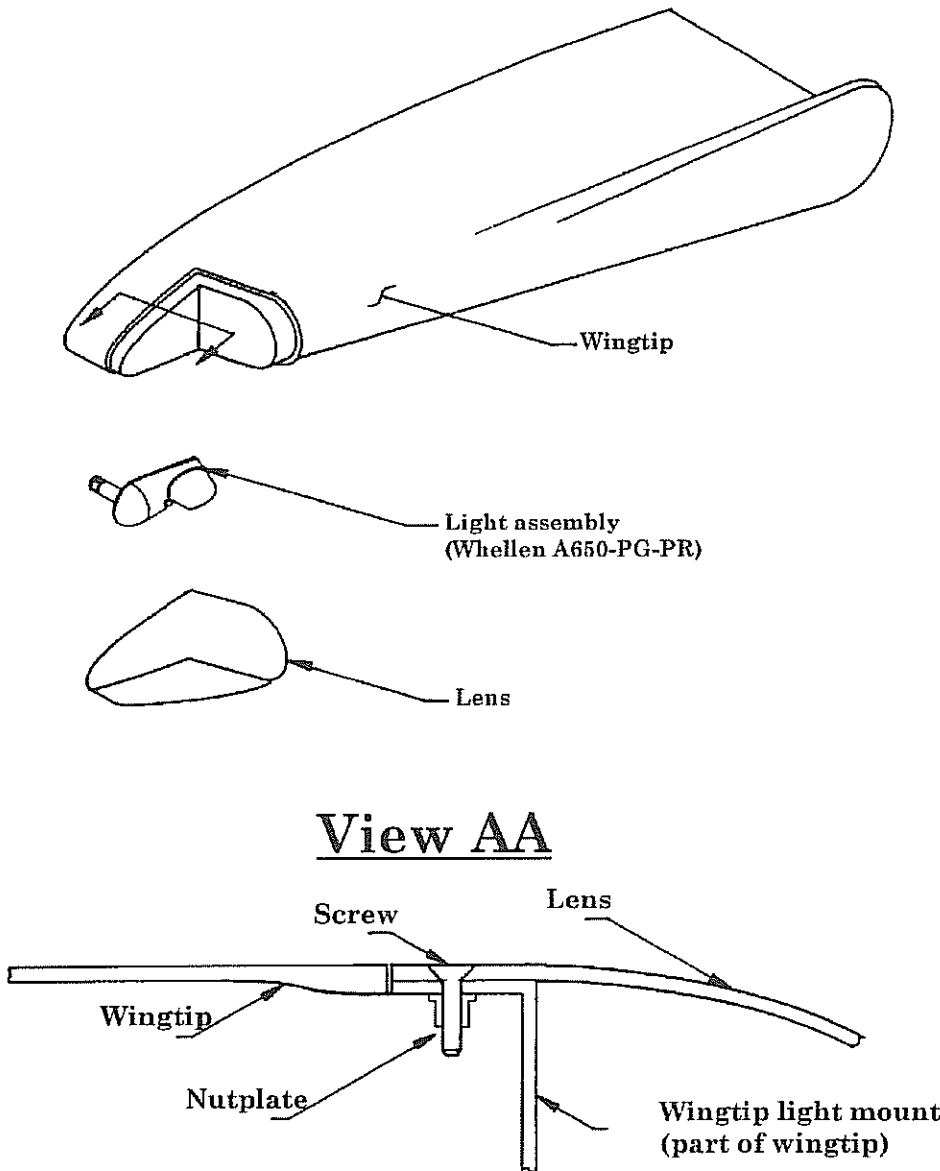


B. WING TIP LIGHTING

The Lancair IV wing tip is molded to accept a Whelen A650-PG/PR position/strobe light (red light on left tip, green on right). Fiberglass tip light mounts are provided for easy mounting of the position/strobe light assemblies and lenses. A tail strobe light (Whelen A500) is mounted on the rudder later in construction to conform to FAA regulations. The power supply (Whelen A413A) for all lighting is located in the fuselage and installation will also be covered later in construction.

Wing Tip Light Assembly

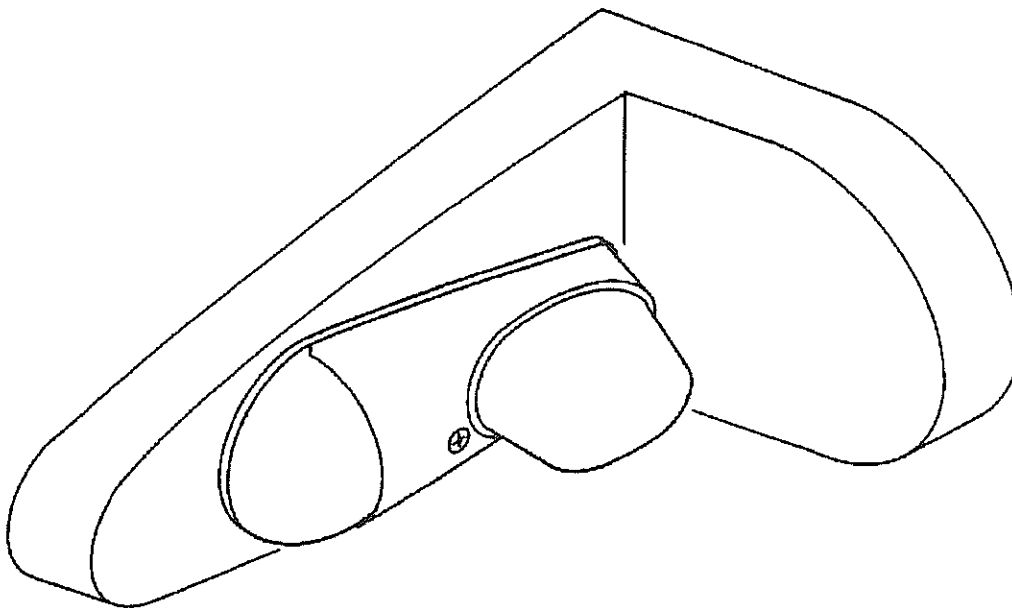
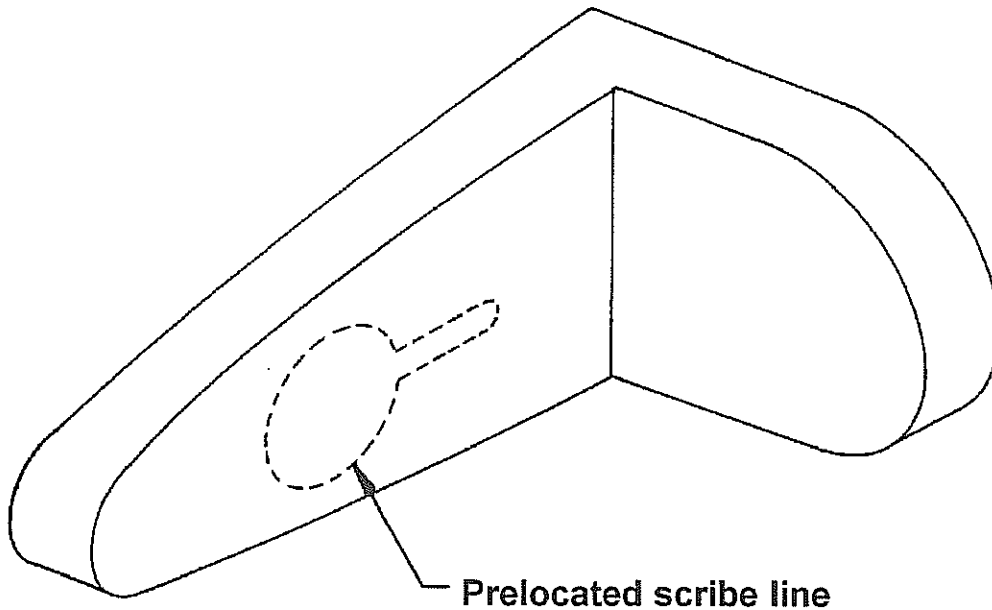
Figure 10:B:1



- B1. Locate the position light/strobe assembly on the wing tip light mount as shown in Figure 10:B:2. There are scribe marks on the vertical face of the light mount. Use the scribe marks as a guide to grind out the fiberglass so the position light/strobe assembly can rest flat on the light mount. Some additional trimming may be necessary, but keep the grinding to a minimum.

Locating Position Light/Strobe Assembly

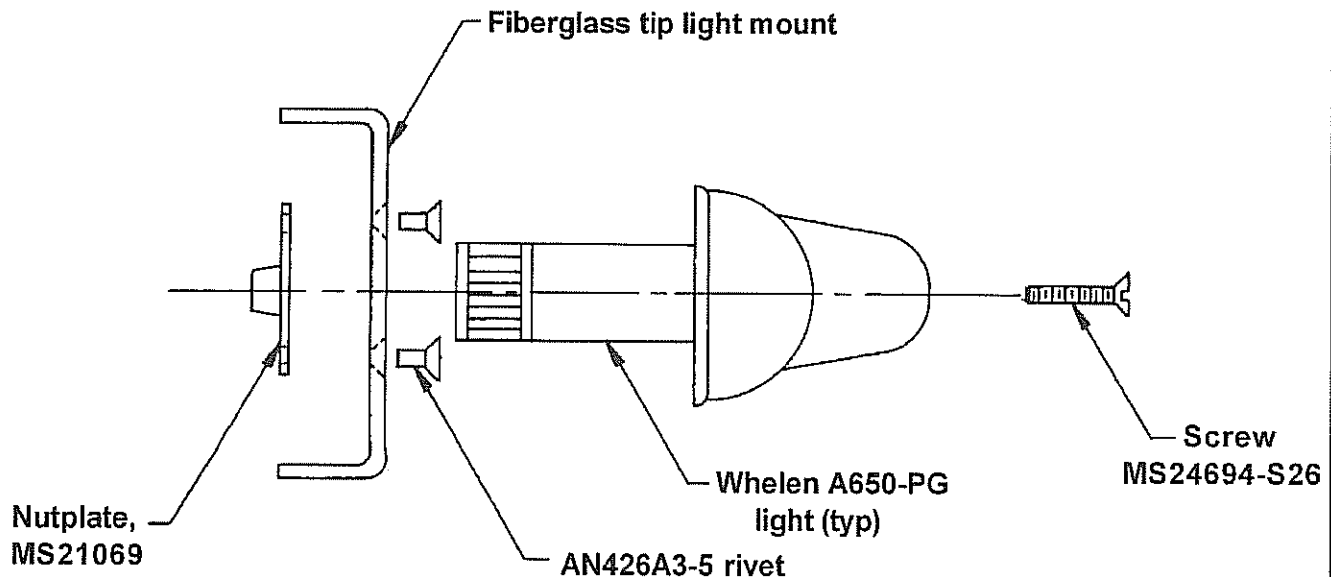
Figure 10:B:2



- B2. Use the position light's mounting holes as guides to drill #29 holes through the wing tip light mount.
- B3. Use AN426A3-5 rivets to secure an MS21069 nutplate to the inboard face of the wing tip light mount at each mounting bolt hole. Note: You may also use countersunk pop rivets if unable to squeeze the rivets.
- B4. Secure the position light assembly to the wing tip light mount with MS24694-S26 countersunk screws.

Securing Light Assembly to the Wing Tip Light Mount

Figure 10:B:3



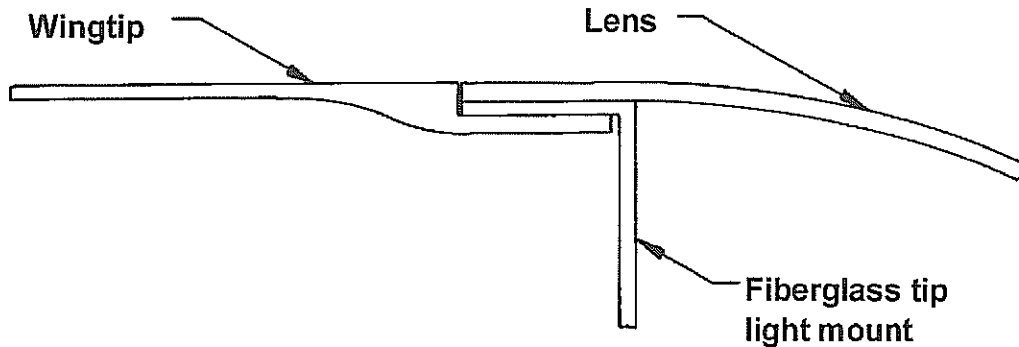
- B5. Trim the wing tip light mount so it will fit in the wing tip joggle. The surface of the light mount should be about 0.090" below the surface of the wing tip around the perimeter of the joggle. This will allow the clear lens to fit flush with the wing tip.

NOTE: When the light mount is positioned on the wing tip, the position light may touch the BL 171 rib. It is okay to rout a hole in the BL 171 nose rib to get clearance for the position light assembly.

- B6. When you are satisfied with the fit of the wing tip light mount, use a few drops of instant glue to temporarily secure the mount to the wing tip joggle.
- B7. Trim the clear lens to fit into the wing tip joggle, flush with the surface of the wing tip.

Fitting the Clear Lens to the Wing Tip

Figure 10:B:5

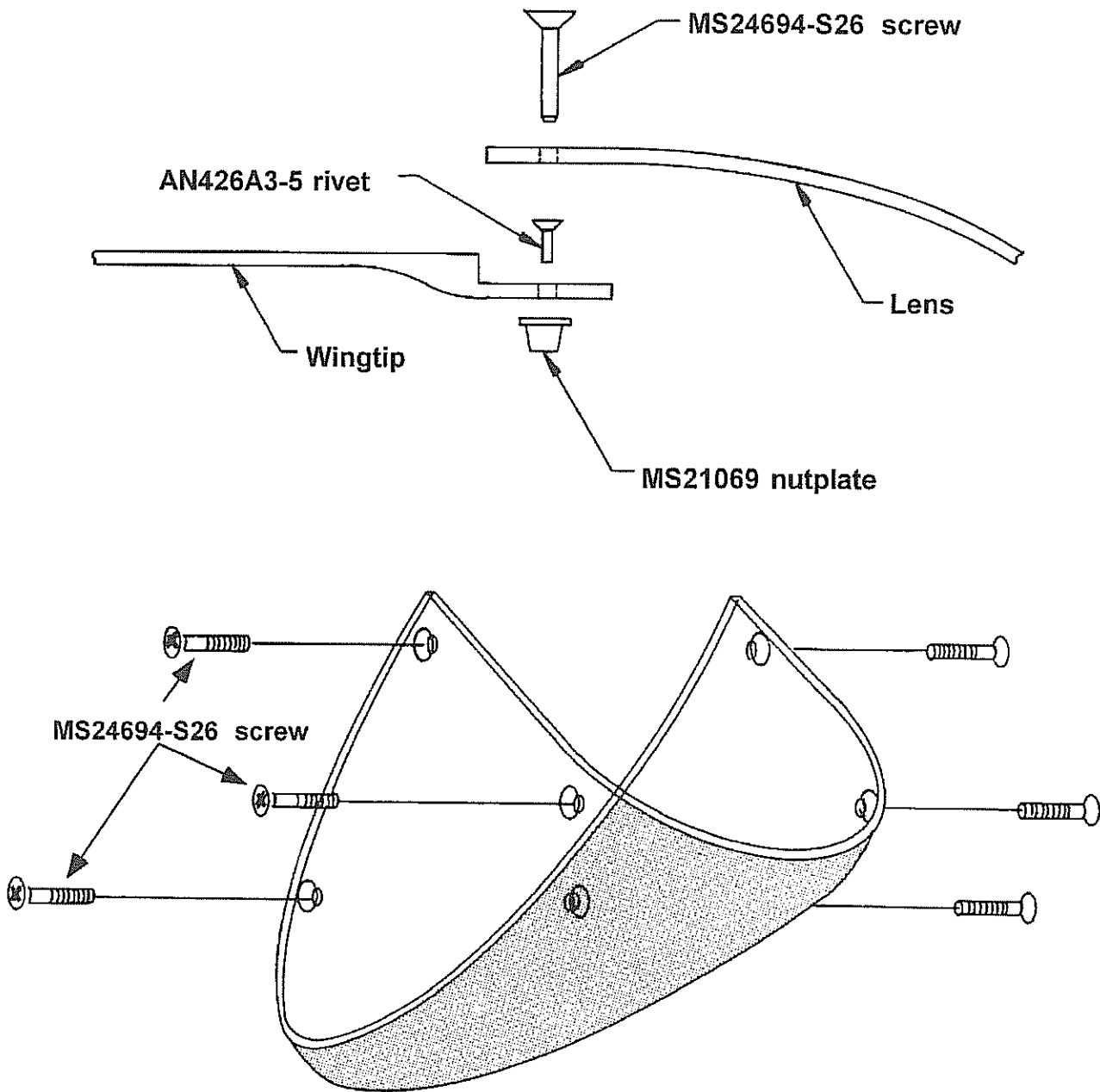


- B8. When satisfied with the fit of the lens, temporarily secure the lens to the wing tip with masking tape. Don't use instant glue to secure the lens as the glue will fog up the clear plastic.
- B9. Drill six #29 holes through the lens and wing tip joggle. The locations for these holes are given in Figure 10:B:6. Be extremely careful when drilling through the clear plastic lens. There are drills made especially for plexiglass available (Aircraft Spruce has them) that make the drilling process safer. If you must use normal drills it is a good idea to apply masking tape to the lens first, then lightly center punch (no, not with a big hammer) where you are about to drill. Drill a very small, #50 hole first, then drill progressively larger ones until you reach #29. If you don't drill very slowly, the plastic could shatter.



Mounting the Lens and the Light Mount to the Wing Tip

Figure 10:B:6

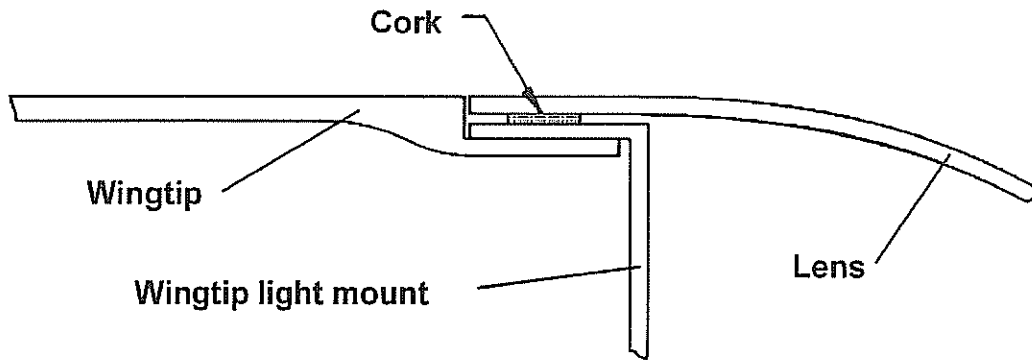


- B10. When you've finished drilling, remove the lens and wing tip light mount from the wing tip. Use AN426A3-5 rivets to secure MS21069 nutplates to the joggle at each mounting hole location.

- B11. Carefully countersink the clear plastic lens for MS24694-S26 screws.
- B12. That was easy, wasn't it? Now assemble the position light assembly, light mount, and clear lens onto the wing tip. If the lens still doesn't rest flush with the wing tip surface, you can insert a thin cork washer between the lens and the light mount to bring the lens surface up flush with the wing tip surface.

Adjusting the Height of the Lens

Figure 10:B:7

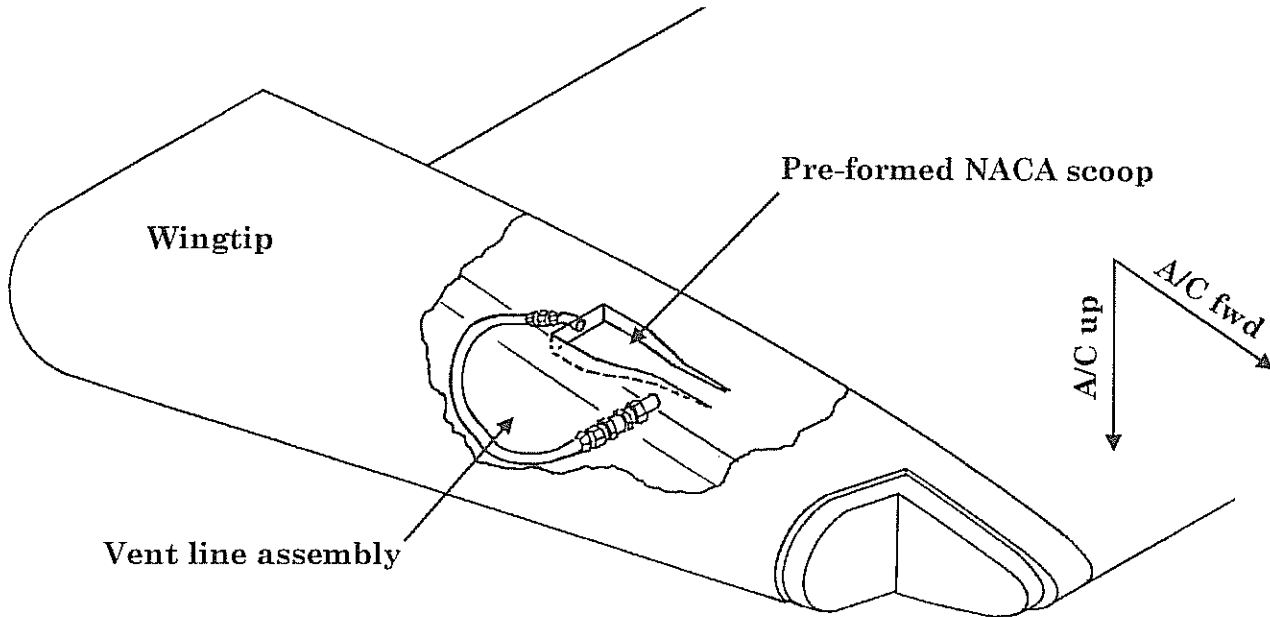


C. FUEL VENT COMPLETION

Way back in Chapter 6, you bonded a 3/8" aluminum fuel vent to the top wing skin, running from the coreless area around the fuel cap to just outboard of the BL 171 rib. Now you will finish the vent system by installing 3/8" rubber line with a check valve and connecting it from the vent tube to the NACA scoop.

Fuel Vent System

Fig. 10:C:1



- C1. Install the check valve (P/N 545) and thread the nut that you already attached to the tube into position. The arrow stamped on the check valve indicates the flow direction. You can also determine the flow direction by blowing into one end and then the other. Make sure the flow direction through the check valve is going into the tank, not out of it.

Warning: You must be sure the check valve is installed the right direction. Failure to do so will not allow proper air flow into the fuel tank causing loss of engine power.

- C2. Cut a 3" piece of 3/8"X.035 Dia. aluminum tube and flare one end with a 100° flaring tool.

C3. Drill a 3/8" hole through the aft face of the small NACA scoop. Prefit the unflared end of the aluminum tube in the hole. You may want to bend the tube up slightly to accommodate the AN818-6D nut and make installation of the hose easier (see fig. 10:C:2). Place the AN819-6D farrel and the AN818-6D nut on the tube, being sure they are on the correct direction. To make sure, attach the AN815-6D union to the flared end of the 3" vent tube and run the nut over the farrel and onto the union. Once satisfied with the fit, remove the union and tape the farrel and nut to the flared end of the tube. Sand the area around where you just drilled the 3/8" Dia. hole. Rough up the surface of the 3" long aluminum tube where it will be bonded to the NACA duct. Clean all areas with MC.

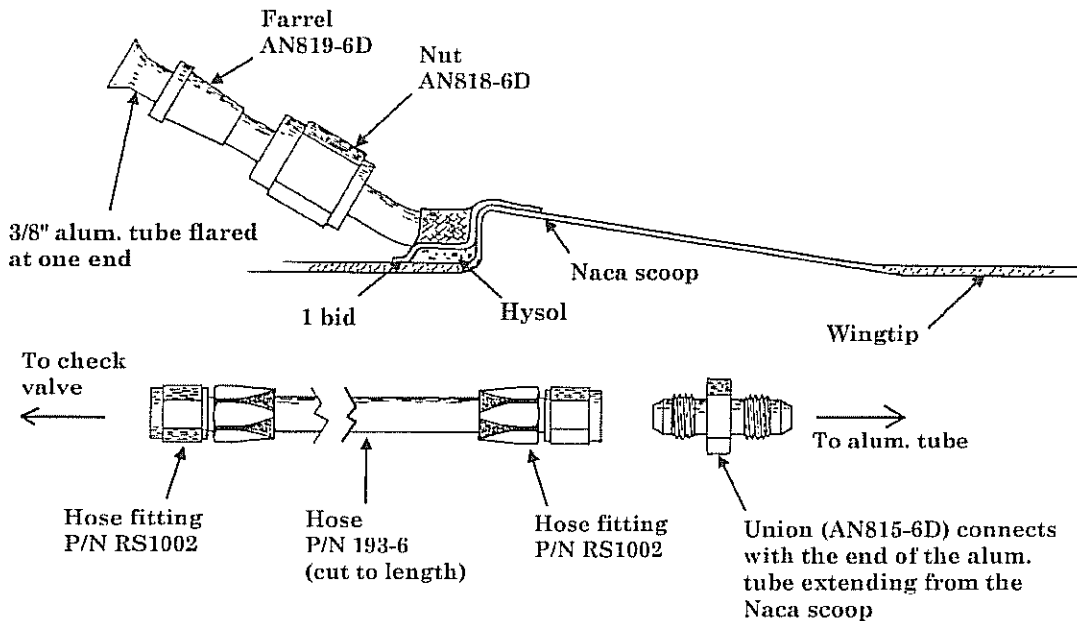
C4. Use Hysol (with a little floc added) to pot the end of the 3" long tube into the aft face of the NACA scoop (see fig. 10:C:2). Install a 1 BID to secure the tub and Hysol, and to seal the hole. Let cure.

Note: You may elect to let the Hysol radius cure, and then prep the area and install the 1 BID.

C5. Cut two 12" lengths of 193-6 rubber hose, one for each wing. Thread the tapered half of the RS1002 hose fitting counter-clockwise onto one end of the 12" 193-6 hose you just cut. Thread the other part of the fitting into that one to secure the hose inside the fitting. Pre-fit the hose in the wingtip and cut the open end to the length desired, making sure to allow enough length to take the wingtip on and off. Install the other RS1002 hose fitting on the other end.

Bonding the Vent Tube to the NACA Duct

Fig. 10:C:2



- C6. Remove the tape, thread the AN815-6D union onto the aluminum tube, and tighten it down.
- C7. Connect one end of the hose to the check valve and the other end to the union on the aluminum tube.
- C8. Install the hose and tighten down the fittings. The vent tube system is now complete.

WARNING: Be extremely careful not to get debris in the vent line. A clogged vent tube will cause engine failure.

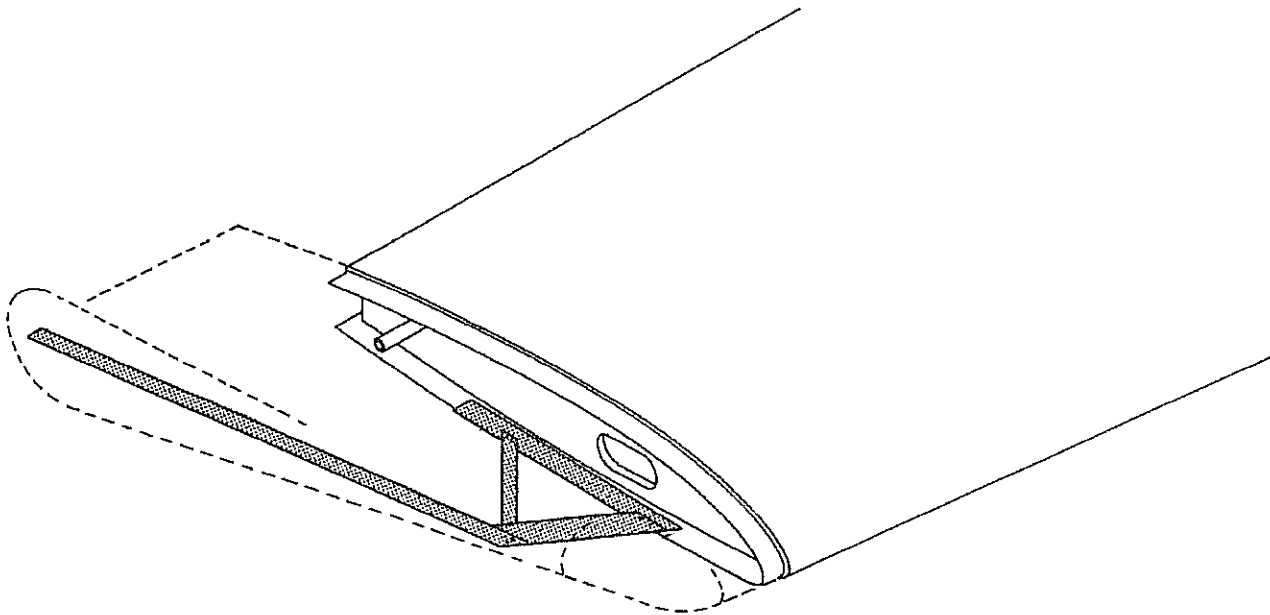


D. ANTENNA INSTALLATION

Hiding the VOR navigation (nav) antenna in the Lancair IV is tricky. We've had an antenna specially built that will fit inside the wing tip of the IV. The antenna may look too simple to work, but it works very well. Installed in the fiberglass wing tip, the antenna uses the carbon fiber wing as a ground plane. K.C.I now has this special nav antenna available to Lancair builders.

Navigation Antenna Installation

Figure 10:D:1

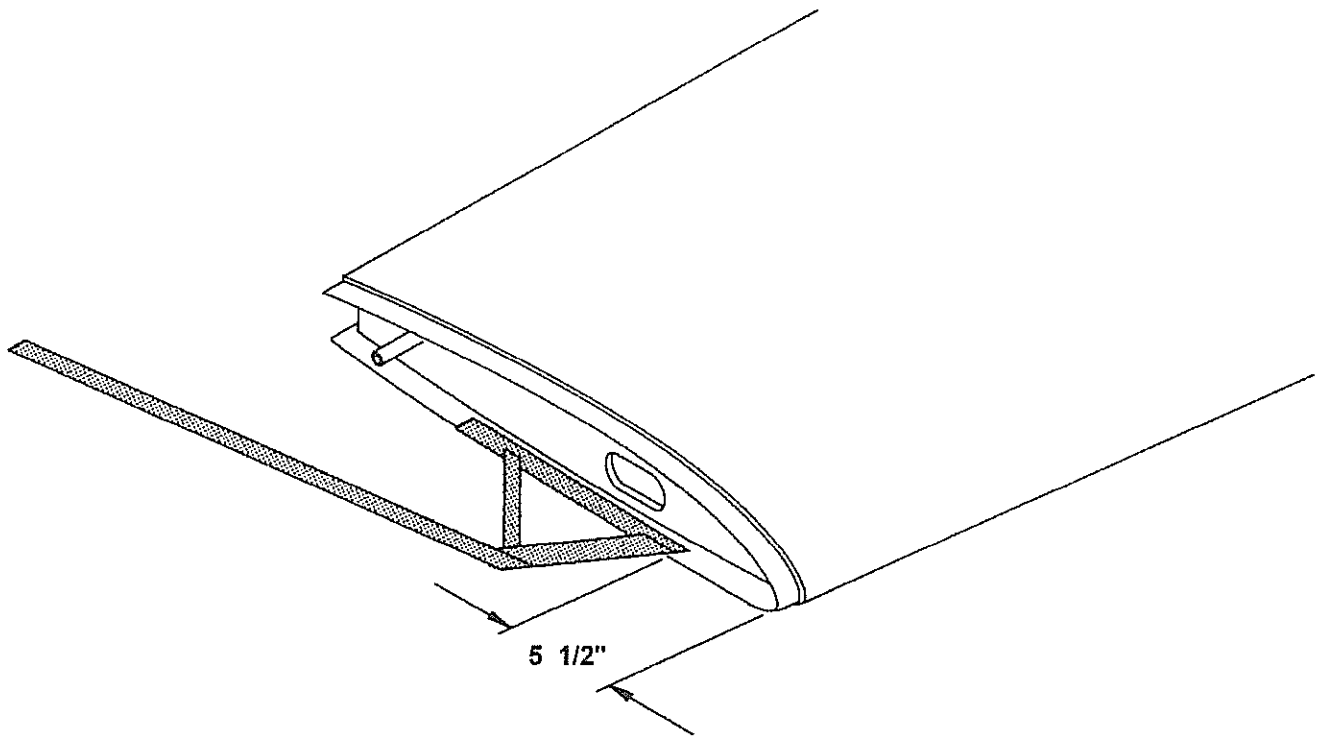


We're not saying you **HAVE** to use this particular nav antenna. You could mount your nav antenna somewhere on the fuselage, hanging out in the wind, but why not use your composite airframe to it's maximum potential and keep everything inside.

- D1. The nav antenna is mounted on the lower wing tip mounting flange, 5 1/2" aft of the wing L.E. See Figure 10:D:1. Tack glue the antenna to the flange and install your wing tip. The nav antenna can be curved upwards to match the swoop of the wing tip. Make sure the wing tip does not interfere with the aft edge of the antenna.

Location of the Nav Antenna

Figure 10:D:2



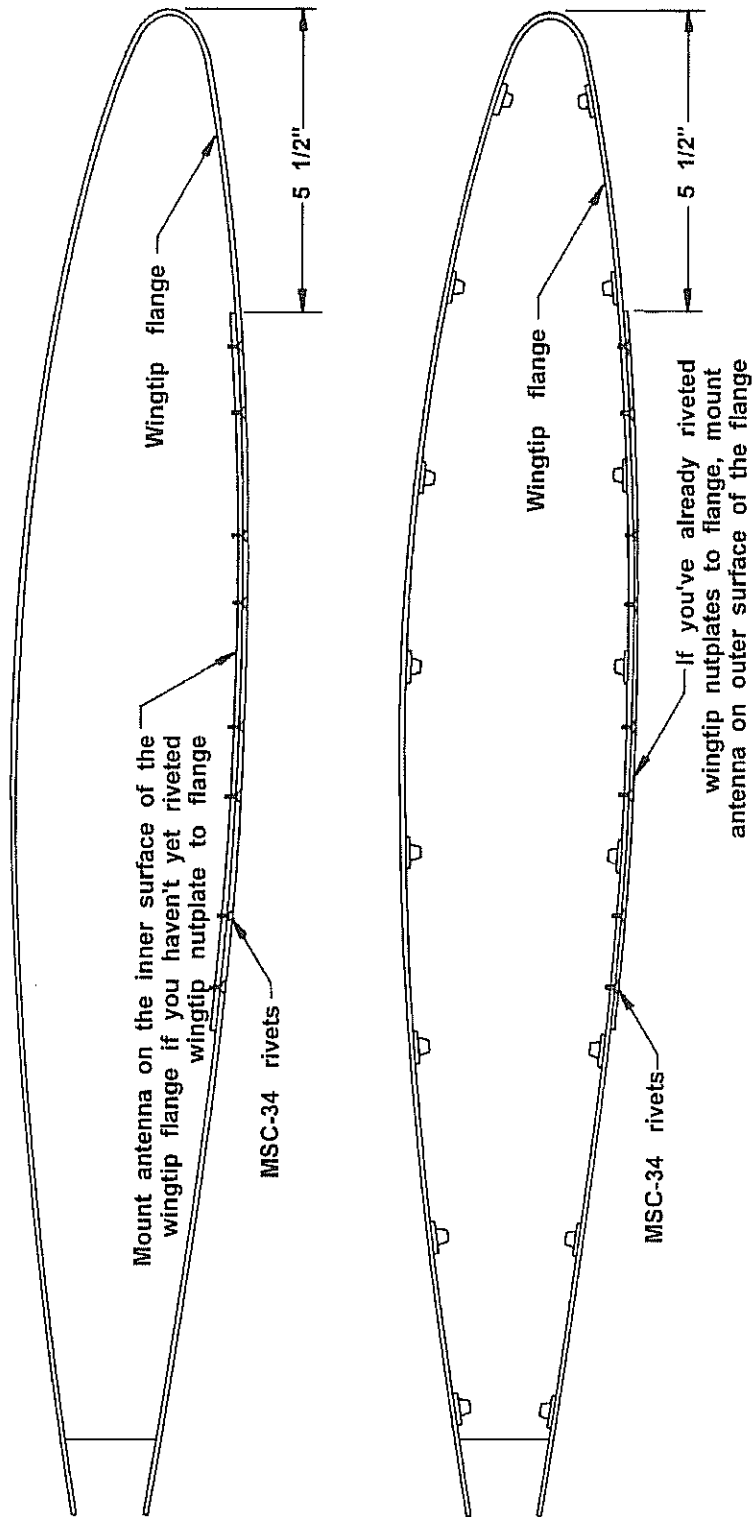
- D2. If you have already installed the nutplates that secure the wing tip to the wing tip flange, these nutplates will interfere with mounting the nav antenna on the inner surface of the lower flange. In this case, you would mount the antenna on the outer (bottom) surface of the flange, sandwiched between the flange and the wing tip. This will push the wing tip slightly lower than the bottom surface of the wing, but since the antenna is very thin the mismatch is practically unnoticeable. You can sand the wing tip slightly thinner where it rests on the antenna to make the mismatch even less (leave enough wing tip material to countersink for mounting screws).

If the nutplates for mounting the wing tip have not yet been riveted to the wing tip flange, you can mount the nav antenna to the inner surface of the lower flange. This will allow the wing tip to rest properly on its mounting flange. See Figure 10:D:3 for both methods of antenna mounting.



Nav Antenna Mounting

Figure 10:D:3



- D3. The nav antenna is secured to the wing tip mounting flange with eight MSC-34 countersunk pop rivets. Because the bottom wing skin is used as a ground plane for the nav antenna, these rivets will be the main link between the antenna and the carbon fiber wing skin. If the antenna is mounted on the outer surface of the lower wing tip flange, you can sand off any primer and paint from the flange to give better contact between antenna and carbon fiber.
- D4. With an ohmmeter, you can test the continuity between the nav antenna and the bottom wing skin. There must be contact for the nav to work properly.
- D5. Follow the manufacturers instructions for wiring the nav antenna. This is a simple process of stringing RG-58 coaxial cable through the electrical tube you have previously installed, then wiring connectors on the inboard and outboard ends of the wing. Again, follow the manufacturers instructions for installing the connectors.
- D6. If you haven't yet installed the wing tip mounting nutplates, do so now by referring back to section "A" of this chapter. When drilling for the wing tip mounting screws, you can simply drill through the nav antenna (don't drill through any of the antenna's rivets or wire mounting studs) and mount the nutplates on top of the antenna. See Figure 10:D:4. The rivets that secure the nutplates will help maintain continuity between the antenna and the carbon fiber.



Securing the Wing Tip Nutplates to the Flange (If you haven't done so already)

Figure 10:D:4

