

## SECTION : 8 THE FUSELAGE

The RV-8/8A fuselage is a semi-monocoque or stressed-skin structure. The strength of a monocoque fuselage is very similar to nature's most perfect monocoque structure, the egg. Like the egg, the fuselage can withstand tremendous loads when properly applied, but is subject to localized failure when subjected to concentrated loads. The shape of the skin is determined and maintained by internal frames, bulkheads, longeron angles and skin stiffener strips. The longerons and bulkheads also provide localized strength for the attachment of wings, empennage, controls, canopy, etc.

All the ribs, bulkheads, and skins are prepunched at Van's factory. No jigs or alignment fixtures are required. When the holes align, the fuselage must be straight. The only required assembly fixtures are a sturdy, level table to assemble the bulkheads and other subassemblies, and two, sturdy saw horses to support the fuselage while riveting. Once the skins are riveted in place, the fuselage becomes very rigid and self-supporting.

The final fuselage assembly process will require approximately 350 3/32-inch (silver) clecos and 125 1/8 (copper) clecos.

**NOTE: This section contains instructions for both RV-8 and RV-8A. For areas of major difference between the RV-8 and RV-8A an entire subsection will be designated "This section RV-8 (or 8A) Only:". In areas with minor differences, single steps will be designated "RV-8 Only:" or "RV-8A Only:". Any text without a designation pertains to both models. Steps or Subsections with an "only" statement should only be used if it corresponds to the model you are building.**

For ease of tooling and forming, larger RV-8/8A bulkheads and fuselage ribs are formed in two or more pieces and then riveted together to form the complete part. Before assembly, round and smooth all edges and corners of the parts. The fuselage bulkheads are straightened using flutes similar to those on the wing and empennage ribs, by fluting between the pre punched rivet holes as needed to make the part flat and straight. The one exception is the firewall. Its flanges must not be fluted, to provide a flat surface for mounting the cowling attach hinges. Some fuselage parts are made of 2024-T4 bar stock or 6061-T6 extruded angle, neither of which are alclad, and must be primed before assembly. Priming the parts made from alclad aluminum sheet stock is optional. If you desire good paint adhesion to the powder coated parts, remove the gloss with a Scotch-bright™ pad or fine sandpaper.

**IF BUILDING WITH AN RV-8 OR 8A QUICKBUILD FUSELAGE KIT, BEGIN CONSTRUCTION ON PAGE 41**

### FIREWALL

**CAUTION: Stainless steel parts are very sharp, handle the Firewall with care!**

**NOTE: Stainless steel will quickly dull cutting tools (drills, Deburring tools, and Unibits™). Use plenty of lubricant (Van's Aircraft sells and uses Boelube™), and keep the cutting speed low. Use a Unibit or hole saw (place a piece of wood on the back side of the firewall) to make any holes over 1/4 inch diameter.**

- ❑ Remove the tab from the F-801E-L-1 & -R-1 Side Angles, and both sides of the F-801C-1 Upper Angle (See "Exploded View Aft", DWG 60). Break apart the four gussets and the four spacers that are joined together on F-801JKWY. File or sand off the excess flashing from each of the eight parts. Deburr the edges of the stainless steel and aluminum firewall parts shown on DWG 60.
- ❑ Cleco the F-801C-1 Upper Angle, F-801D-1 Lower Angle, F-801E-L-1 & -R-1 Side Angles, F-801F-1 Middle Angle, and the F-801H-R-1 & -L-1 Center Angles to the aft side of the F-801A-1 Firewall.
- ❑ Cleco the two F-801J-1 Spacers, and the WD-802-L-1 & -R-1 Engine Mount Brackets to the two upper corners of the firewall. Cleco the two F-801K-1 Spacers, and the WD-803-L-1 & -R-1 Lower Engine Mount Brackets to the two lower corners of the firewall.
- ❑ Cleco the two W-801W Gussets, and the two W-801Y Gussets in place on the aft side of the firewall.
- ❑ Cleco the two F-801L Backing Plates in place on the fwd side of the firewall (See "Exploded Iso View Fwd", DWG 60). Be sure the backing plates are positioned with the large hole nearer to the bottom of the firewall.
- ❑ **CAUTION: In this step, do not match-drill the 13 holes at each end of the F-801C-1 common to each of the WD-802-L-1 & -R-1 engine mount brackets. These holes will be drilled later in construction when the fuselage longerons are in place.**
- ❑ From the front side of the firewall, final-drill #30 all of the 1/8 holes. Final-Drill #40, the 3/32 holes used for installing the six nutplates that rivet on through the firewall. The 1/4 hole in each backing plate should be match-drilled through the firewall if In-flight Adjustable Rudder Pedals are being used. Do not drill if using ground adjustable rudder pedals.

- ❑ Uncleco all parts. Final-Drill the 3/32 nutplate attachment holes in the flanges of the F-801F-1 Middle Angle, and F-801H-R-1 Center Angle.
- ❑ Put an 8-degree fwd bend in the top portion of the firewall. Place the firewall, flange side up, on a worktable with the bend line aligned with the edge of the table. The bend line is centered on the flange notch at each end per the dimensions in the "Exploded Iso View Fwd", on DWG 60. Clamp a sharp cornered board (cut to fit inside the firewall flanges) along the bend line, and bend the firewall per "View A-A", DWG 60.
- ❑ Deburr all rivet holes in the stainless steel firewall.
- ❑ Dimple countersink all the #30 rivet holes in the web of the stainless steel firewall for flush heads on the fwd side, except the four holes used to attach the two F-801L Backing Plates.
- ❑ **CAUTION: In the following step do not dimple countersink the four holes that attach the two nutplates at the bottom of the firewall.**
- ❑ Dimple countersink the #40 holes in the stainless steel firewall that attach nutplates through the F-801F-1 Middle Angle, and the F-801C-1 Upper Angle.
- ❑ Machine-countersink the holes in all the aluminum Firewall Assembly parts that match with dimpled holes in the F-801A-1 Firewall.
- ❑ Machine countersink the #30 rivet attach holes on each F-801L Backing Plate for a flush head on the fwd side (See "Plan View", DWG 60).
- ❑ Machine countersink the #40 nutplate attachment holes on the F-801F-1 Middle Angle, and the F-801H-R-1 Center Angle for flush rivets (See "Exploded Iso View Aft", DWG 60). Countersink the side opposite the nutplate location.
- ❑ Machine countersink the four nutplate attachment rivet holes on the aft side of the F-801D-1 Lower Angle for flush rivets (See "Plan View", DWG 60).
- ❑ Deburr all rivet holes in all the Firewall Assembly parts.
- ❑ Prime the aluminum parts if/as desired.
- ❑ Rivet the four nutplates to the F-801H-R-1 Center Angle and the six nutplates to the top flange of the F801F-1 Middle Angle.
- ❑ Re cleco all Firewall Assembly parts to the F-801A-1 Firewall (See "Exploded Iso View Aft", DWG 60). Rivet all parts to the firewall. Back riveting works well for most of the rivets if you space a plate off of the worktable to allow for the firewall flange.
- ❑ **RV-8A Only:** – Install rivets in the two rivet holes at each end of the row designated "leave open", near the bottom of the firewall in the "Plan View", DWG 60.

### RV-8 FORWARD FUSELAGE FLOOR

**(This section RV-8 Only)**

- ❑ Final-Drill #40, the 3/32 nutplate attachment holes on the F-802K-1 L. G. Fwd Crossmember, and the F-802L-1 L. G. Aft Crossmember lower flanges (DWG 61). Machine countersink #40, the nutplate attach rivet holes drilled in this step for flush rivets.
- ❑ Cleco the F-802K-1 L. G. Fwd Crossmember, F-802L-1 L. G. Aft Crossmember, F-836-L-1 & -R-1 Floor Ribs, and the F-802M-L-1 & -R-1 Intercostal Ribs to the F-822-1 Fwd Floor Panel (DWG 61). Temporarily label the skins bottom and top sides.
- ❑ Final-Drill #30, all 1/8 holes common between the F-822-1 Fwd Floor Panel and all clecoed parts. Final-Drill #30, all 1/8 holes common between the F-802K-1 L. G. Fwd Crossmember, the F-802L-1 L. G. Aft Crossmember, the F-802M-L-1 & -R-1 Intercostal Ribs, and the F-836-L-1 & -R-1 Floor Ribs.
- ❑ (Parts can be removed temporarily to improve access).
- ❑ Final-Drill #30, the 1/8 holes (with no parts clecoed to them) on the fwd portion of the F-822-1 Fwd Floor Panel, that are designated for dimple countersinking on the Dimpling the Fwd Floor Panel diagram (DWG 61).
- ❑ Final-Drill #40, all the nutplate attachment holes in the fwd floor panel.
- ❑ Final Drill #40, the eight 3/32 holes in the F-836-L-1 & -R-1 Floor Ribs.
- ❑ Uncleco all parts and deburr all the holes drilled in the previous three steps.
- ❑ Dimple countersink the F-822-1 Fwd Floor Panel at the hole locations shown in the Dimple Diagram ONLY! Dimple countersunk the holes for flush rivet heads on the top (interior) side of the skin.
- ❑ Dimple countersink the #30 holes in the F-802M-L-1 & -R-1 Intercostal Ribs, and the F-836-L-1 & -R-1 Floor

- Ribs that are common with holes dimpled in the previous step.
- ❑ Machine countersink for dimples the #30 holes in the F-802K-1 L. G. Fwd Crossmember, and the F-802L-1 L. G. Aft Crossmember that match up with holes that were previously dimple countersunk on the forward floor panel.
  - ❑ Dimple countersink the #40 holes in the F-836-L-1 & -R-1 Floor Ribs that are common with the F-850-1 Bottom Skin (DWG 75).
  - ❑ On the top side of the F-822-1 Forward Floor Panel, Machine Countersink #40, the nutplate attachment rivet holes for flush rivets.
  - ❑ Prime all parts if/as desired.
  - ❑ Rivet the K1000-06 nutplates to the F-802K-1 L. G. Fwd Crossmember and F-802L-1 L. G. Aft Crossmember. Use a #40 piloted countersink cutter to Machine Countersink the screw holes at each nutplate just riveted on to accept #6 screw dimples.
  - ❑ Rivet the five K1000-08 nutplates to the bottom surface of the F-822-1 Fwd Floor Panel.
  - ❑ **NOTE: The F-802K-1 L.G Fwd Crossmember is designated "Do Not Rivet" at this time.** Cleco the F-802K-1 L. G. Fwd Crossmember, the F-802L-1 L.G. Aft Crossmember, F-802M-L-1 & -R-1 Intercostal Ribs and F-836-L-1 & -R-1 Floor Ribs to the Fwd Floor Panel. Rivet the parts to the Fwd. Floor Panel using rivet callouts on DWG 61.

### RV-8 COOLING AIR RAMP ASSEMBLY

#### (This section RV-8 Only)

- ❑ Trim the flange on each side of the F-867A-1 Cooling Air Ramp. Refer to "F-867A-1 Trim Detail" on DWG 61.
- ❑ Cleco the F-867C-1 Attach Angle, and the F-867D-1 Stiffener to the F-867A-1 Cooling Air Ramp (See "Cooling Air Ramp Assembly Exploded Iso View", DWG 61). Final-Drill all 3/32 holes in the cooling air ramp, to #40. Final-Drill the 1/8 holes in the cooling air ramp adjacent to the rolled portion at the fwd end, to #30.
- ❑ Uncleco all parts and deburr all holes drilled in the previous step. Dimple countersink the #40 and #30 holes for flush rivets on the exterior side (side opposite the bent flanges) of the F-867A-1 Cooling Air Ramp. Dimple countersink the #40 holes in the F-867D-1 Stiffener and the F-867C-1 Attach Angle.
- ❑ Cleco the F-867C-1 Attach Angle to the F-802K-1 L.G. Fwd Crossmember. Final-Drill #30, all attach angle to L.G. fwd crossmember rivet holes. Uncleco and deburr the holes drilled in this step.
- ❑ Prime the Cooling Air Ramp Assembly parts if/as desired.
- ❑ Rivet the F-867C-1 Attach Angle to the F-802K-1 L.G. Fwd Crossmember (See "Fwd Floor Assembly Exploded Iso View", DWG 61).
- ❑ Back-Rivet the F-867D-1 Stiffener to the F-867A-1 Cooling Air Ramp (See "Cooling Air Ramp Assembly Exploded Iso View", DWG 61). **NOTE: The cooling air ramp will be riveted to the attach angle in a later step.**

### RV-8A FORWARD FUSELAGE SUBFLOOR ASSEMBLY

#### (This section RV-8A Only)

- ❑ Cleco the F-802U-1 Crossmember, F-893-L-1 & -R-1 Fwd Floor Ribs, and F-892-L-1 & -R-1 Aft Floor Ribs to the F-890-1 Fwd Floor Panel (DWG 61A). Temporarily label the skin "Bottom Side", on the side the ribs and crossmembers are clecoed. Label the other side, "Top Side".
- ❑ Final-Drill #30, all 1/8 holes common between the F-890-1 Fwd Floor Panel and all clecoed parts. Final-Drill #30, all 1/8 holes common between the F-802U-1 Crossmember and the five ribs.
- ❑ Final-Drill #40, the holes for attaching all the nutplates to the F-890-1 Fwd Floor Panel.
- ❑ Uncleco all parts and deburr all holes drilled in the two previous steps.
- ❑ **NOTE: Do not dimple countersink the four outboard #30 holes on each end of the crossmember that are also common with the F-802R-L-1 & -R-1 Fuselage Bulkheads (DWG 61A & 63A).**
- ❑ Dimple-countersink the F-890-1 Fwd Floor Panel at the hole locations common with the five floor ribs and the F-802U-1 Crossmember. Dimple countersunk the holes for flush rivet heads on the top (interior) side of the skin.
- ❑ Machine countersink the #40 nutplate attachment rivet holes for flush heads on the top side of the F-890-1 Forward Floor Panel.
- ❑ Machine-countersink the #30 holes in the top flange of the F-893-L-1 & -R-1 Fwd Floor Ribs that are common with dimpled holes in the F-890-1 Fwd Floor Panel.

- ❑ Dimple-countersink the #30 holes in the top flange of the F-892-L-1 & -R-1 Aft Floor Ribs and F-802U-1 Crossmember that are common with dimpled holes on the F-890-1 Fwd Floor Panel.
- ❑ Prime all of the parts from the section if/as desired.
- ❑ Rivet the five nutplates in place on the right hand, fwd corner of the F-890-1 Fwd Floor Panel.
- ❑ Cleco the F-802U-1 Crossmember, F-892-L-1 & -R-1 Aft Floor Ribs and the F-893-L-1 & -R-1 Fwd Floor Ribs to the bottom of the F-890- Fwd Floor Panel. **CAUTION: Do not rivet at this time. They will be riveted much later in the fuselage assembly.**

### RV-8A COOLING AIR RAMP ASSEMBLY

#### (This section RV-8A Only)

- ❑ Use the F-867A-1 Trim Template to mark and trim the F-867A-1 Cooling Air Ramp as shown in the Cooling Air Ramp Assembly Exploded Iso View on (DWG 61A.)
- ❑ Trim the flange on each side of the F-867A-1 Cooling Air Ramp as shown in the "Cooling Air Ramp Assembly Exploded Iso View", DWG 61A.
- ❑ Cleco the F-867C-1 Attach Angle, and the F-867D-1 Stiffener to the F-867A-1 Cooling Air Ramp (See "Cooling Air Ramp Assembly Exploded Iso View", DWG 61A). Final-Drill all 3/32 holes in the cooling air ramp to #40. Final-Drill the 1/8 holes in the cooling air ramp, adjacent to the rolled portion at the fwd end to #30.
- ❑ Uncleco all parts and deburr all holes drilled in the previous step. Dimple countersink the #40, and the #30 holes for flush rivets on the exterior side (side opposite the bent flanges) of the F-867A-1 Cooling Air Ramp. Dimple countersink the #40 holes in the F-867D-1 Stiffener, and F-867C-1 Attach Angle.
- ❑ Cleco the F-867C-1 Attach Angle to the F-802U-1 Crossmember (See "Exploded Iso View", DWG 61A). Final-Drill #30, all 1/8 Attach Angle to crossmember rivet holes. Uncleco and deburr the holes drilled in this step.
- ❑ Prime the Cooling Air Ramp Assembly parts if/as desired.
- ❑ Back-Rivet the only the F-867D-1 Stiffener to the Cooling Air Ramp (See "Cooling Air Ramp Assembly Exploded Iso View", DWG 61A). **NOTE: The cooling air ramp will be riveted to the attach angle in a later step.**

### RV-8 LANDING GEAR BOX ASSEMBLY

#### (This section RV-8 Only)

- ❑ Flute between each of the holes in the F-802A-R-1, and -L-1 Fwd L.G. Bulkhead flanges, so that they are straight and lay flat on a flat surface. Do the same to the F-802B-R-1 & -L-1 Aft L.G. Bulkheads.
- ❑ Separate the left and right F-802H-1 Aft Corner Angles from each other (See "Separating F-802H-1", DWG 62). Separate the Left and Right F-802G-1 Fwd Corner Angles from each other (See "Separating F-802G-1", DWG 62).
- ❑ Remove the tab from the F-802-C-1 Left and Right L.G. Box Webs as shown in Trimming F-802C-1, DWG 62. Final-Drill the 1/8 Fuel Tank Vent Line anchor clamp hole to #19 (See "Left L.G. Box Assembly", DWG 62)
- ❑ Smooth and deburr the edges of the F-802E-L-1 & -R-1 Forward Angles, the F-802F-L-1 & -R-1 Aft Angles, and all parts from the previous three steps. **NOTE: The angles are punched from fairly heavy material, which will require more finish work than most parts. A small bench top belt sander works well for smoothing the edges on these parts.**
- ❑ Cleco together all the parts shown in the Right L.G. Box Assembly exploded view on DWG 62. Cleco the WD-822-R-1 L.G. Box Weldment and WD-813-1 Bolt Weldment to the Right L.G. Box Assembly (See "L.G. Box Installation", DWG 62).
- ❑ Repeat the previous step for the Left L.G. Box Assembly.
- ❑ **NOTE: Do not match-drill holes common between the WD-813-1 Bolt Weldment and the F-802G Fwd Corner Angle or F-802H-1 Aft Corner Angle.** Final-Drill #30, all 1/8 holes common between the parts clecoed together in the previous step. Final-Drill #12, all 3/16 holes common between the clecoed parts except as mentioned at the beginning of this step.
- ❑ Machine countersink the one #30 hole that is underneath the F-878-L-1 & -R-1 Mid Cabin Braces in the aft side of the F-802B-L-1 & -R-1 Aft L.G. Bulkheads for attachment of the L.G. Box Weldments (See the blow up detail in "L.G. Box Installation", DWG 62).
- ❑ Final-Drill #40, all nutplate attachment rivet holes in the Fwd and Aft L.G. Bulkheads of the right L.G. Box Assembly.
- ❑ Machine countersink all nutplate attachment rivet holes drilled in the previous step, for flush heads on the

- exterior of the right L.G. Box Assembly.
- ❑ Machine countersink all the #30, F-802E-R-1 Fwd Angle to F-802A-R-1 Fwd L.G. Bulkhead attach holes for flush heads on the exterior (forward) side.
  - ❑ Disassemble both L.G. Box Assemblies and Deburr holes that have been final-drilled in all the parts. Also Deburr the 3/16 holes at the top of the Fwd and Aft L.G. Bulkheads.
  - ❑ Prime all parts if/as desired.
  - ❑ Cleco the F-802E-R-1 Fwd Angle to the F-802A-R-1 Fwd L.G. Bulkhead. Cleco the F-802G-R-1 Fwd Corner Angle to the fwd L.G. bulkhead. Cleco the F-802F-R-1 Aft Angle to the F-802B-R-1 Aft L.G. Bulkhead. Cleco the F-802H-R-1 Aft Corner Angle to the aft L.G. bulkhead. Cleco in place any nutplates that install on the fwd. and aft L.G. bulkheads for the Right L.G. Box Assembly.
  - ❑ Rivet the Angles, and the nutplates to each of the Right Landing Gear Bulkheads. Refer to DWG 62 for rivet callouts.
  - ❑ Repeat the two previous steps for the Left L.G. Box Bulkheads.
  - ❑ Cleco then rivet the F-802C-R-1 L.G. Box Web to the right Fwd and Aft L.G. Bulkhead Assemblies.
  - ❑ Repeat the previous step for the Left L.G. Box Assembly.
  - ❑ Cleco the WD-822-R-1 L.G. Box Weldment to the Right L.G. Box Assembly. Cleco the WD-822-L-1 L.G. Box Weldment to the Left L.G. Box Assembly.
  - ❑ Temporarily bolt the WD-813-1 Bolt Weldments to the L.G. Box Assemblies with a bolt in each of the four corners. Temporarily install a bolt in the hole that joins the F-802H-L-1 & -R-1 Aft Angles to the F-802F-L-1 & -R-1 Aft Corner angles, and the F-802G-L-1 & -R-1 Forward Corner Angles to the F-802E-L-1 & -R-1 Forward Corner Angles.
  - ❑ Match-Drill #12, the bolt hole in the WD-813-1 Bolt Weldments using the common hole in the Fwd. and Rear Corner Angles on each L.G. Box Assembly as a guide.
  - ❑ Remove the WD-813-1 Bolt Weldments from both of the L.G. Box Assemblies, and Deburr the holes drilled in the previous step.
  - ❑ Reinstall the WD-813-1 Bolt Weldments with all the bolts as depicted on DWG 62. **NOTE: Two of the bolts in each WD-813-1 Bolt Weldment are not installed at this time.**
  - ❑ Install the five bolts that attach each Fwd and Aft Corner Angle to the L.G. Box Assemblies.
  - ❑ Deburr the F-878-L-1 & -R-1 Mid Cabin Braces (See "L.G. Box Installation", DWG 62).
  - ❑ Cleco the left and right F-878-L-1 & -R-1 Mid Cabin Braces to the Left and Right L.G. Box Assemblies. **NOTE:** A F-802B-L-1 Aft L.G. Bulkhead to WD-822-1 L.G. Box Weldment rivet hole is also common to the mid cabin brace. Remove the mid cabin brace and mark the hole to not be riveted until the mid cabin brace is installed. Mark the same hole on the right side of the aircraft.
  - ❑ Cleco the L.G. Box Assemblies to the Fwd Floor Assembly (See "L.G. Box Installation", DWG 62). Rivet all holes that attach the WD-822-L-1 & -R-1 L.G. Box Weldments to the Fwd and Aft L.G. Bulkheads of each L.G. Bulkhead Assembly, **except** for the two holes identified in the previous step.
  - ❑ Final-Drill #30, all the 1/8 holes common between the four F-802G-L-1 & -R-1 and F-802H-L-1 & -R-1 Corner Angles and the Fwd Floor Assembly.
  - ❑ If there is any misalignment, Final-Drill the large bolt holes in the Fwd Floor Panel using the holes in the WD-813-1 Bolt Weldments as a guide.
  - ❑ Uncleco the L.G. Box Assemblies from the Fwd. Floor Assembly, and Deburr all holes drilled in the two previous steps.
  - ❑ **NOTE: Do not rivet the Fwd Corner Angles at this time!** Cleco both L.G. Box Assemblies to the Fwd. Floor Assembly. Rivet both the L.G. Box Assemblies to the Fwd Floor Assembly through the F-802H-L-1 & -R-1 Aft Corner Angles only. See "Right L.G. Box Assembly", DWG 62 for rivet callouts.
  - ❑ Cleco the F-802T-1 Aft Upper Brace, and the F-802N-1 Fwd Upper Brace onto the L.G. Box Assemblies (See "L.G. Box Installation", DWG 62). Final-Drill #30, all 1/8 holes common between the fwd upper brace, aft upper brace and the L.G. Box Assemblies. Final-Drill #12, all the 3/16 holes common between the fwd upper brace, aft upper brace and the L.G. Box Assemblies. **NOTE: F-802T is an important structural part, and should NOT be omitted or modified.**
  - ❑ Cleco the F-864D-1 Throttle Quadrant Bracket in place on the aft side of the Left L.G. Box Assembly (See "Left

- L.G. Box Assembly", DWG 62). Cleco the F-878-L-1 & -R-1 Mid Cabin Braces to the aft sides of the Left and Right L.G. Box Assemblies (See "L.G. Box Installation", DWG 62). Final-Drill #30, all 1/8 holes in these parts.
- ❑ Uncleco all parts from the previous two steps.
  - ❑ Final-Drill #40, the 3/32 nutplate attachment rivet holes in the F-864D-1 Throttle Quadrant Bracket, and the F-878-L-1 & -R-1 Mid Cabin Braces.
  - ❑ Machine Countersink the nutplate attach holes for the six, forward most nutplates in the F-878-L-1 & -R-1 Mid Cabin Braces, for flush rivets. Do nothing to the aft most nutplate location at this time.
  - ❑ Deburr all the holes in the parts that were final-drilled in the four previous steps.
  - ❑ Dimple countersink the nutplate attach holes in the F-864D-1 Throttle Quadrant Bracket for flush rivets.
  - ❑ Prime these parts if/as desired.
  - ❑ Radius the edge of eight washers to allow them to nest with the corner radius of the F-802E-L-1 & -R-1 Forward Angles and F-802F-L-1 & -R-1 Aft Angles (DWG 62). Prime the washers after shaping.
  - ❑ Cleco and then rivet, the F-802N-1 Fwd Upper Brace and F-802T-1 Aft Upper Brace to the L.G. Box Assemblies. Install the bolts attaching both the braces to the L.G. Box Assemblies. **NOTE: The two bolts on each side attaching the braces through the Fwd and Aft Angles of the L.G. Box Assembly, require the use of the washers just made in the previous step.**
  - ❑ Dimple Countersink the nutplate attachment rivet holes on three nutplates and rivet them to the F-864D-1 Throttle Quadrant Bracket (See "Left L.G. Box Assembly", DWG 62). Rivet the throttle quadrant bracket to the Left L.G. Box Assembly.
  - ❑ Rivet the six nutplates to the F-878-R-1 & -L-1 Mid Cabin Braces. Rivet the left and right mid cabin braces to the Left and Right L.G. Box Assemblies.
  - ❑ Install the two bolts that attach each Mid Cabin Brace to the L.G. Box Assemblies (See "L.G. Box Installation", DWG 62).

### **RV-8 FORWARD FUSELAGE SUB STRUCTURE**

#### **(This section RV-8 Only)**

- ❑ Flute the flanges of the F-866B-1 Upper Fwd Baggage Bulkhead and the F-866A-1 Lower Fwd Baggage Bulkhead, between the holes, to make them straight and flat. Deburr the edges of both bulkhead parts (DWG 63).
- ❑ Separate the F-870B-1 Outboard Stiffener from the F-870E-1 Skin Stiffener (See "Separating F-870BE", DWG 63). Mark the F-870B-1, and F-870E-1 stiffeners with their name and part.
- ❑ Separate the two F-870D-1 Stiffeners from each other and from the F-870C-1 Inboard Stiffener (See "Separating F-870CD", DWG 63). Cut the taper on the two stiffeners by trimming as shown in Detail A.
- ❑ Deburr the edges of the stiffeners from the two previous steps.
- ❑ Cleco the two F-870D-1 Stiffeners, and the F-870C-1 Inboard Stiffener to the F-870-1 Fwd Baggage Floor (See "Fwd Baggage Floor Assembly view", DWG 63). Final-Drill #40, all the 3/32 holes common between the stiffeners and the fwd baggage floor. Uncleco the stiffeners.
- ❑ Final-Drill the 3/32 nutplate attachment holes in the F-870C-1 Inboard Stiffener, the F-870B-1 Outboard Stiffener and the bottom edge of the F-866A-1 Lower Fwd Baggage Bulkhead.
- ❑ Cleco the F-866D Mounting Plate in position on the bottom aft side of the F-866A-1 Lower Fwd Baggage Bulkhead. Final-Drill #30, the three 1/8 holes common between the mounting plate and the lower fwd baggage bulkhead.
- ❑ Cleco the F-866B-1 Upper Fwd Baggage Bulkhead and the F-866A-1 Lower Fwd Baggage Bulkhead to the F-802N-1 Fwd Upper Brace (See "Fwd Fuselage Substructure", DWG 63). Final-Drill #30, the 1/8 holes common between the forward baggage bulkheads and the forward upper brace. Uncleco the fwd baggage bulkheads.
- ❑ Deburr the screw holes, and all the final-drilled holes in the parts depicted in the "Fwd Baggage Floor Assembly", DWG 63, the F-866A-1 Lower Fwd Baggage Bulkhead, F-866B-1 Upper Fwd Baggage Bulkhead, F-866D Mounting Plate, and F-802N-1 Fwd Upper Brace.
- ❑ Deburr the edges and all of the screw holes on the F-871-1 Forward Baggage Side.
- ❑ Machine countersink for dimples, the forward side of the three holes in the F-866D Mounting Plate. Dimple countersink the three mounting plate attach holes at the bottom of the F-866A-1 Lower Fwd Baggage Bulkhead, for flush rivet heads on the forward side.

- ❑ Dimple countersink all of the nutplate attach rivet holes in the F-866A-1 Lower Fwd Baggage Bulkhead, the F-870C-1 Inboard Stiffener and the F-870B-outboard Stiffener. Refer to DWG 63 to determine which side of the parts the nutplates will be mounted.
- ❑ Dimple countersink all the #40 rivet holes in all the Fwd Baggage Floor parts depicted in the "Fwd Baggage Floor Assembly", DWG 63, for flush rivet heads on the upper side.
- ❑ Prime all parts if/as desired.
- ❑ Dimple countersink the attachment holes on fourteen nutplates. Rivet the nutplates to the F-870C-1 Inbd Stiffener, F-870B-1 Outboard Stiffener and the bottom edge of the F-866A-1 Lower Fwd Baggage Bulkhead.
- ❑ Back rivet, the two F-870D-1 Stiffeners, and the F-870C-1 Inbd Stiffener to the F-870-1 Fwd Baggage Floor (See "Fwd Baggage Floor Assembly", DWG 63).
- ❑ Rivet the F-866D Mounting Plate to the aft side of the F-866A-1 Lower Fwd Baggage Bulkhead (See "Fwd Fuselage Substructure", DWG 63).
- ❑ Cleco the F-866A-1 Lower Fwd Baggage Bulkhead and F-866B-1 Upper Fwd Baggage Bulkhead to the F-802N -1 Fwd Upper Brace. **NOTE: Riveting will be delayed until later, to allow removal for improved rivet access when riveting the forward fuselage side skins to the forward L.G. Box Bulkhead Assemblies.**
- ❑ Cleco the F-871-1 Fwd Baggage Side to the F-822-1 Forward Floor Panel and the Right L.G. Box Assembly (1/8 clecos hold well in the K1000-08 nutplates).
- ❑ Cleco the Firewall Assembly to the Fwd Floor Assembly and the F-871-1 Fwd Baggage Side.
- ❑ Final-Drill #30 the 1/8 holes common between the F-822-1 Forward Floor Panel and the F-801D Lower Angle of the Firewall Assembly. Remove the Firewall Assembly and deburr the holes drilled in this step.
- ❑ Machine countersink nine holes in the center of the bottom flange of F-801D-1 Lower Angle (See "Exploded Iso View Aft", DWG 60). Dimple countersink the holes in the F-822-1 Fwd Floor Panel that are common with the nine holes in the lower angle that were machine countersunk in this step.
- ❑ Apply a thin layer of Fuel Tank Sealant to the surface of the Fwd Floor Assembly that contacts the F-801D-1 Lower Angle of the Firewall Assembly to prevent any wayward engine compartment oil from seeping into the cockpit area. Only apply sealant in the center / cooling air ramp area where the holes were dimple-countersunk in the previous step. The rest of the Firewall perimeter will be sealed when the remaining skins are installed. Re-cleco the Firewall Assembly in place on the Fwd Floor Assembly.
- ❑ Rivet the **(AN470 rivet locations only)** Firewall Assembly to the Fwd Floor Assembly. Refer to the "Fwd Fuselage Sub Structure", DWG 63 for rivet callouts and a depiction of the nine rivet holes that need to be clecoed but not riveted at this time.
- ❑ Cleco the Fwd Baggage Floor Assembly to the F-866A-1 Lower Fwd Baggage Bulkhead, F-871-1 Fwd Baggage Side and the Firewall Assembly using 1/8 clecos.

### RV-8A FORWARD FUSELAGE SUB STRUCTURE

**(This section RV-8A Only)**

- ❑ Flute the flanges of the F-866B-1 Upper Fwd Baggage Bulkhead and the F-866A-1 Lower Fwd Baggage Bulkhead, between the holes, to make them straight and flat. Deburr the edges of both bulkhead parts (DWG 63A).
- ❑ Separate the F-870B-1 Outboard Stiffener from the F-870E-1 Skin Stiffener (See "Separating F-870BE", DWG 63A). Mark the F-870B-1 and F-870E-1 stiffeners with their name and part numbers to make them identifiable later in the fuselage construction.
- ❑ Separate the two F-870D-1 Stiffeners from each other and from the F-870C-1 Inbd Stiffener (See "Separating F-870CD", DWG 63). Cut the taper on the two stiffeners by trimming as shown in Detail A.
- ❑ Deburr the edges of the stiffeners from the two previous steps.
- ❑ Cleco the two F-870D-1 Stiffeners, and the F-870C-1 Inboard Stiffener to the F-870-1 Fwd Baggage Floor (See "Fwd Baggage Floor Assembly", DWG 63A). Final-Drill #40, all the 3/32 holes common between the stiffeners and the Fwd Baggage Floor
- ❑ Final-Drill the 3/32 nutplate attachment holes in the F-870C-1 Inboard Stiffener, the F-870B-1 Outboard Stiffeners and the bottom edge of the F-866A-1 Lower Fwd Baggage Bulkhead.
- ❑ Cleco the F-866D Mounting Plate in position on the bottom aft side of the F-866A-1 Lower Fwd Baggage Bulkhead ("Fwd Fuselage Substructure", DWG 63A). Final-Drill #30, the three 1/8 holes common between the mounting plate and the lower fwd baggage bulkhead.
- ❑ Deburr the edges and all of the screw holes on the F-899-1 Fwd Baggage Side (See "F-899-1 Reference View",

- DWG 63A).
- ❑ Cleco the F-899-1 Fwd Baggage Side to the F-890-1 Fwd Floor Panel. 1/8 clecos work well in the #8 nutplates.
- ❑ Cleco the Firewall Assembly to the Fwd Floor Assembly and the F-899-1 Forward Baggage Side.
- ❑ Final-Drill #40, the 3/32 nutplate attachment holes in the F-802R-L-1 & -R-1 Fuselage Bulkheads.
- ❑ Final-Drill #40 the nutplate attachment rivet holes in the F-864DA-1 Throttle Quadrant Bracket (See "Fwd Fuselage Substructure", DWG 63A).
- ❑ Cleco the F-864DA-1 Throttle Quadrant Bracket in place on the aft side of the F-802R-L-1 Fuselage Bulkhead (See "Fwd Fuselage Substructure", DWG 63A). Final-Drill #30, the 1/8 holes common between the throttle quadrant bracket and the fuselage bulkhead.
- ❑ Cleco the F-866B-1 Upper Fwd Baggage Bulkhead and the F-866A-1 Lower Fwd Baggage Bulkhead to the F-802VPP Fuselage Bulkhead Brace (See "Fwd Fuselage Substructure", DWG 63A).
- ❑ Cleco the F-802R-L-1 & -R-1 Fuselage Bulkheads to the aft flange of the F-802VPP Fuselage Bulkhead Brace.
- ❑ Cleco the F-802R-L-1 & -R-1 Fuselage Bulkheads in place on the F-890-1 Fwd Floor Panel and cleco the Fwd Baggage Floor Assembly between the Firewall Assembly and the F-866A-1 Lower Fwd Baggage Bulkhead. This will allow the F-802R / F-866 Assembly to stand on its own.
- ❑ Final-Drill #30, the 1/8 holes common between the F-866A-1 & B-1 Forward Baggage Bulkheads and the F-802VPP Fuselage Bulkhead Brace.
- ❑ Final-Drill #30, the 1/8 holes common between the F-802R-L-1 & -R-1 Fuselage Bulkheads and the F-802VPP Fuselage Bulkhead Brace.
- ❑ Final-Drill #30, the 1/8 holes common between the F-802R-L-1 & -R-1 Fuselage Bulkheads and the F-890-1 Fwd Floor Panel.
- ❑ Uncleco and disassemble all parts from the F-890-1 Fwd Floor Panel in the reverse order from what they were assembled in this subsection except for the F-899-1 Fwd Baggage Side and the Firewall Assembly.
- ❑ Deburr the screw holes, and all the final-drilled holes in the parts depicted in the Fwd Baggage Floor Assembly view on DWG 63A, the F-866A-1 Lower Fwd Baggage Bulkhead, F-866B-1 Upper Fwd Baggage Bulkhead, F-866D Mounting Plate, F-802VPP Fuselage Bulkhead Brace, and F-802R-L-1 & -R-1 Fuselage Bulkheads.
- ❑ Machine countersink for dimples, the forward side of the three holes in the F-866D Mounting Plate. Dimple countersink the three mounting plate attach holes at the bottom of the F-866A-1 Lower Fwd Baggage Bulkhead, for flush rivet heads on the forward side.
- ❑ Dimple countersink all of the nutplate attach rivet holes in the F-866A-1 Lower Fwd Baggage Bulkhead, the F-870C-1 Inbd Stiffener and the F-870B-1 Outboard Stiffener. Refer to DWG 63A to determine which side of the parts the nutplates will be mounted.
- ❑ Dimple countersink all the #40 rivet holes in all the Fwd Baggage Floor parts depicted in the "Fwd Baggage Floor Assembly", DWG 63, for flush rivet heads on the upper side.
- ❑ Machine countersink the #40 nutplate attachment rivet holes in the F-802R-L-1 & -R-1 Fuselage Bulkheads for flush rivets. Machine-Countersink the opposite side of the fuselage bulkhead from which the nutplate mounts on. Refer to the "Fwd Fuselage Substructure", DWG 63A for details on the mounting positions for each nutplate.
- ❑ Prime all parts if/as desired.
- ❑ Dimple countersink the attachment holes on fourteen nutplates. Rivet the nutplates to the F-870C-1 Inbd Stiffener, F-870B-1 Outboard Stiffener and the bottom edge of the F-866A-1 Lower Fwd Baggage Bulkhead.
- ❑ Back rivet, the two F-870D-1 Stiffeners, and the F-870C-1 Fwd Baggage Floor Stiffener to the F-870-1 Fwd Baggage Floor (See "Fwd Baggage Floor Assembly", DWG 63A).
- ❑ Rivet the F-866D Mounting Plate to the aft side of the F-866A-1 Lower Fwd Baggage Bulkhead (See "Fwd Fuselage Substructure", DWG 63A).
- ❑ Final-Drill #30 the 1/8 holes common between the F-890-1 Fwd Floor Panel and the F-801D-1 Lower Angle of the firewall assembly (See "Fwd Fuselage Substructure", DWG 63A). Remove the F-899-1 Fwd Baggage Side and Firewall Assembly and deburr the holes drilled in this step.
- ❑ Machine countersink nine holes in the bottom flange of F-801D-1 Lower Angle (See "Exploded Iso View Aft", DWG 60A). Dimple -countersink the holes in the F-890-1 Fwd Floor Panel that are common with the nine holes in the lower angle that were machine-countersunk in this step.

- ❑ Apply a thin layer of Fuel Tank Sealant to the surface of the F-890-1 Fwd Floor Panel that contacts the F-801D-1 Lower Angle to prevent any wayward engine compartment oil from seeping into the cockpit area. Only apply sealant in the center / cooling air ramp area where the holes were dimple-countersunk in the previous step. The rest of the Firewall perimeter will be sealed when the remaining skins are installed. Re-cleco the Firewall Assembly in place on the Forward Fuselage Floor Assembly using the F-899-1 Fwd Baggage Side to brace it in position.
- ❑ Rivet the F-801D-1 Lower Angle of the Firewall Assembly to the F-890-1 Fwd Floor Panel. Only rivet the AN470 rivet locations. Refer to the "Fwd Fuselage Sub Structure", DWG 63A for rivet callouts and a depiction of the nine rivet holes that need to be clecoed but not riveted at this time.

### CENTER SECTION

The F-804-2 bulkhead has been mated and drilled with the main wing spars at the factory in a fixture that holds dimensions and alignment very accurately. **Do not use the F-804-1 center Section if you have one that came with your wing kit. It is not compatible with the pre-punched fuselage.**

- ❑ Begin by drilling the rudder cable holes in the F-804A-2 Center Section Fwd Bulkhead Subassembly, and the F-804B-2 Center Section Aft Bulkhead Subassembly with an appropriate sized Unibit™. Refer to Note: 1 & 2 on DWG 64. **CAUTION: There are different hole positions for the RV-8 and RV-8A.**
- ❑ **RV-8A Only:** Both the F-804A-2 Center Section Fwd Bulkhead Subassembly and WD-821-L/R Landing Gear Mount Weldments are provided with pre-drilled holes. There may be a slight mismatch between the holes in the Center Section Fwd Bulkhead Subassembly and landing gear mount weldments. Test the alignment fitting the landing gear weldment to the center section. Begin by clamping the F-804A-2 Center Section Fwd Bulkhead subassembly in a vise (or other suitable holding fixture) with the spar web in a horizontal plane. Be sure to protect all parts of the subassembly from scratches or other damage while clamped in the vise.
- ❑ **RV-8A Only:** Place the WD-821 Landing Gear Weldments in their approximate positions on the F-804A-2 Center Section Fwd Bulkhead Subassembly (See "Landing Gear Weldment Detail", DWG 67A). The lower outboard flange of Center Section Fwd Bulkhead Subassembly must be locally trimmed to allow the Landing Gear Weldments to lay flat on the spar web. Progressively trim the flange a little bit at a time so that the final cutout will allow 1/32 clearance from weldment to the bulkhead. For the last few trim iterations, insert a couple of bolts through the bulkhead and Weldments to ensure near perfect alignment. Smooth the edges of the finished cutout in the bulkhead and apply protective primer to the bare aluminum areas.
- ❑ **RV-8A Only:** Verify that all the bolts attaching the WD-821 Landing Gear Weldments to the F-804A-2 Center Section Fwd Bulkhead Subassembly can be inserted with reasonable effort. Refer to DWG 67A for bolt call-outs. Note those holes into which the bolts could not be inserted with reasonable effort. Carefully inspect the hole(s) in which the bolts did not fit well by shining a light through from the opposite side as you look through the hole, and note the areas where removal of material from the landing gear weldments would help the fit of the bolt in the hole. Remove the landing gear weldments, and using a round file, remove material from the landing gear weldment holes in the areas of mismatch. Remove material from only the holes in the Weldments. **WARNING: Do not remove any material from the holes in the spar center section. Do not run a drill bit or reamer through the weldment/spar stack, as this will remove material from the F-804-2 Center Section Fwd Bulkhead Subassembly.**
- ❑ **RV-8A Only:** Re-fit the WD-821 Landing Gear Weldments to the F-804A-2 Center Section Fwd Bulkhead Subassembly to verify the fit of the bolts in the holes. Repeat the hole clean-up operation until all bolts can be inserted with reasonable effort. This is one of the more tedious and time-consuming steps in construction of the RV-8A. Please work carefully and patiently on this part of the fuselage. Completion of this step ensures that subsequent installation and/or removal of the landing gear weldments and wings is easily accomplished.
- ❑ **RV-8A Only:** Make a small shim for each WD-821 Landing Gear Weldment as detailed in the "Landing Gear Weldment Detail", DWG 67A. Use the hole in each landing gear weldment to mark the hole location then remove the shim and drill the hole to size. Remove the landing gear weldments. The shim can be double-flush riveted to the landing gear weldment or just taped in place to make sure it is not forgotten during weldment installation.
- ❑ **RV-8A Only:** Insert the U-801A-L-1 & R-1 Main Gear Legs into the appropriate WD-821 Landing Gear Weldment. Put a bolt into the hole in the landing gear weldment to align the gear leg. Remove the bolt. Working carefully to not disturb the position of the gear leg. Final-Drill the hole all the way through with a 7.9 mm or a .311" reamer. Store the gear legs for later installation.
- ❑ Make the two F-804M Seat Belt Lug Spacers using in the "F-804M Seat Belt Lug Spacer" view on DWG 64.
- ❑ Deburr the edges and holes of the two F-804L-1 Seat Belt Attach Lugs (See "Center Section Assembly", DWG 64).
- ❑ Make the F-849 Fwd Control Mount (See "F-849 Fwd Control Mount", DWG 64).
- ❑ Temporarily bolt the F-849 Fwd Control Mount to the front side of the F-804A-2 Center Section Forward Bulkhead Subassembly using the one pre drilled hole (See "Center Section Assembly", DWG 64). Square then clamp the

- forward control mount to the top flange of the center section forward bulkhead subassembly. Match-Drill the second hole #12 using the associated hole in the center section forward bulkhead subassembly. Disassemble, and deburr the drilled hole.
- ❑ **CAUTION: Be aware of the flange locations designated Do Not Flute on DWG 64, Center Section Assembly.** Flute between the holes on the F-804C-FL, FR, AL, and AR Center Section Bulkheads so they are straight and lay flat on your worktable.
- ❑ Cleco the F-804C-FL and -FR Center Section Fwd Bulkheads to the F-804A-2 Center Section Fwd Bulkhead. Temporarily install the 1/4 NAS bolts through the bolt holes to insure alignment. Final-Drill #30, all 1/8 holes common between the F-804C-FL and -FR Center Section Fwd Bulkheads and the F-804A-2 Center Section Fwd Bulkhead.
- ❑ **RV-8 only:** Final-Drill #40, the nutplate attachment rivet holes for the four nutplates above the lower F-804F-1 3/4 Center Section Bar on the F-804A-2 Center Section Fwd Bulkhead. Machine Countersink the nutplate attachment rivet holes on the fwd side of the center section fwd bulkhead for flush rivets.
- ❑ Final-Drill #40, the nutplate attachment rivet holes for the two nutplates in the vertical leg of the F-804C-FL Center Section Fwd Bulkhead. Machine Countersink the nutplate attachment rivet holes on the fwd side of the center section fwd bulkhead for flush rivets. Disassemble the F-804A-2 Center Section Fwd Bulkhead Subassembly.
- ❑ Deburr the edges and holes of all the Center Section Assembly components as needed and prime the parts that are not anodized.
- ❑ **RV-8 only:** Install 12 AN4-11A bolts (six on each side) in the 1/4 holes on the F-804A-2 Center Section Fwd Bulkhead Subassembly, that were left open for attaching WD-821-L-1 & -R-1 Landing Gear Weldments. Leave open, the two holes at the top of the bulkhead that will later be used to attach the F-878-L-1 & -R-1 Mid Cabin Braces.
- ❑ **RV-8 only:** Rivet the four nutplates on to the F-804A-2 Center Section Fwd Bulkhead Subassembly.
- ❑ Rivet the two nutplates on to the F-804C-FL Fwd Bulkhead.
- ❑ Cleco the F-804C-FL and -FR Center Section Fwd Bulkheads to the F-804A-2 Center Section Fwd Bulkhead Assembly using the temporary bolts for alignment as done previously. Rivet the F-804C-FL and -FR Center Section Fwd Bulkheads to the F-804A-2 Center Section Fwd Bulkhead Assembly Refer to "Center Section Assembly view", DWG 64 for rivet callouts. The two F-804M Seat Belt Lug Spacers, the two F-804L-1 Seat Belt Attach Lugs, and the F-849 Fwd Control Mount will be installed later when permanently joining the F-804A-2 and the F-804B-2 Center Section Bulkhead Sub Assemblies. Remove the temporary bolts.
- ❑ Cleco the F-804C-AL and -AR Center Section Aft Bulkheads to the F-804B-2 Center Section Aft Bulkhead. Temporarily install 1/4 NAS bolts through the bolt holes to insure alignment.
- ❑ Cleco the F-814E-L-1 & -R-1 Seat Ramp Supports, and the F-804J-L-1 & -R-1 Aft Floor Support Angles, to the aft side of the F-804B-2 Center Section Aft Bulkhead (See "F-804B-2 Assembly", DWG 64).
- ❑ Final-Drill #30, the 1/8 holes common between the parts clecoed in the previous step. Final-Drill from the forward side, the two 1/4 holes at the location of each F-804G-1 Center Section Vertical Bar.
- ❑ Machine countersink on the **fwd** side, the hole for the rivet that lies under each of the F-804G-1 Center Section Vertical Bars (See the blow up of the "F-804B-2 Assembly" view on DWG 64).
- ❑ Match-Drill #12 the top and bottom bolt hole in the F-814E-L-1 & -R-1 Seat Ramp Supports using the common holes in the F-804B-2 Center Section Aft bulkhead as a guide. Uncleco all parts on the Center Section Aft Bulkhead Subassembly.
- ❑ Final-Drill #40, the nutplate attach rivet holes in the F-814E-L-1 & -R-1 Seat Ramp Supports, and the F-804J-L-1 & -R-1 Aft Floor Support Angles (See "F-804B-2 Assembly", DWG 64). Machine Countersink the nutplate attachment rivet holes final-drilled in this step, for flush rivets.
- ❑ Deburr the edges and holes of all parts as needed and prime the parts that are not anodized.
- ❑ Rivet the nutplates to the F-814E-L-1 & -R-1 Seat Ramp Supports, and the F-804J-L-1 & -R-1 Aft Floor Support Angles (See "F-814E-L-1 & -R-1 Seat Ramp Supports", and "F-804J-L-1 & -R-1 Aft Floor Support Angles", DWG 64).
- ❑ Cleco all parts previously fitted and drilled to the F-804B-2 Center Section Aft Bulkhead Subassembly (See "F-802B-2 Assembly Exploded", DWG 64). Use the temporary bolts in the F-804C-AL and -AR Center Section Aft Bulkheads as done previously. Install the AN470 and AN426 rivets shown in the enlarged view on DWG 64. **NOTE: The two holes on each F-804C Center Section Aft Bulkhead that also attach the F-804G-1 Center Section Vertical Bars, do not get riveted at this time.**

- ❑ Install the two bolts in each of the F-814E-L-1 & -R-1 Seat Ramp Supports. **NOTE: Only tighten the nuts on the bottom bolts finger tight at this time**
- ❑ Rivet the two F-804G-1 Center Section Vertical Bars to the F-804B-2 Center Section Fwd Bulkhead Subassembly. Use temporary AN4 bolts in the bolt holes to maintain alignment while riveting.
- ❑ The F-804A-2 and F-804B-2 Center Section Sub Assemblies must be held in correct alignment while they are being joined and while the fuselage is being assembled. Make two hard wood or particleboard spacers 1 7/16 (1.438) thick. The exact size of these spacers is not important, but the thickness is, as they will simulate the spar as the bulkhead is fixed in its final position. Drill holes in these spacers to allow the installation of the NAS-1304-50 1/4 close tolerance bolts. The holes in the spacer blocks may be oversized to allow the bolts to pass through easily. This spacer will remain in the bulkhead throughout fuselage construction, until it is time to install the wings. If you choose, make the spacer extra long so that it protrudes out the side of the fuselage. This would allow for the future attachment of appropriate length legs for the fuselage to stand on while completing other work on the interior.
- ❑ Join the F-804A-2 and F-804B-2 Center Section Sub Assemblies using the 1/4 NAS bolts and the spacers made in the previous step. The NAS bolts that attach the wing spars and join the halves of the F-804 bulkhead, fit the holes very precisely and may have to be tapped into place. Lubricate the shank of the with Boelube™ (a dry, waxy lubricant available from Van's Aircraft and aircraft tool suppliers) or some equivalent. Use washers and lightly tightened nuts on the bolts to hold every thing in place (**Caution:** to not compress the thickness of the spacer blocks). Cleco the top plate of the F-804B-2 Center Section Aft Bulkhead Subassembly, to the top flange of the F-804A-2 Center Section Forward Bulkhead Subassembly.
- ❑ Final-Drill #30, all of the 1/8 holes in the top plate of the F-804B-2 Center Section Aft Bulkhead Assembly. Final-Drill #40, all of the 3/32 nutplate attachment holes in the top plate of the Center Section Aft Bulkhead Assembly.
- ❑ Machine countersink the nutplate attachment rivet holes in the top plate of the F-804B-2 Center Section Aft Bulkhead Assembly for flush rivets. Uncleco the top flange and remove the temporary bolts joining the Fwd and Aft Center Section Bulkhead Assemblies. Deburr all holes drilled in the previous step.
- ❑ Install the two nutplates on the F-804B-2 Center Section Aft Bulkhead Subassembly top plate, that do not rivet through the top flange of the F-804A-2 Center Section Forward Bulkhead Subassembly.
- ❑ Reassemble the F-804A-2 Center Section Fwd Bulkhead Subassembly, and the F-804B-2 Center Section Aft Bulkhead Subassembly using the spacers and bolts. While joining the two sub assemblies, install the F-849 Fwd Control Mount, the two F-804L-1 Seat Belt Attach Lugs, and the two F-804M Seat Belt Lug Spacers using the bolts specified in the "Center Section Assembly" view, DWG 64.
- ❑ **NOTE:** In this step, refer to the "Center Section Assembly" top view on DWG 64 for details on rivet holes to leave open until joining with other parts later. Rivet the nutplates to the fwd flange of the Center Section Bulkhead Subassembly. Install the 1/8 rivets in the fwd flange.
- ❑ Install the eight SB750-10 Bushings in the lower holes provided for future wire routing, etc. (See "Center Section Assembly", DWG 64).
- ❑ **RV-8A Only:** Position the WD-821-L & -R Landing Gear Weldments on the fwd side of the Center Section Assembly and insert a couple of bolts in each to hold them in their installed positions (DWG 67A).
- ❑ **RV-8A Only:** Cleco the two F-804N-1 Bulkhead Caps in place on the Center Section Assembly (See "Left Cockpit Rail", DWG 67A). Note the interference between the fwd bottom portion of the bulkhead caps and the WD-821 Landing Gear Weldments. With the bulkhead cap flanges inserted between the landing gear weldments and the center section assembly, mark the flange on each bulkhead cap to remove just enough material to remove the interference.
- ❑ **RV-8A Only:** Uncleco the F-804N-1 Bulkhead Caps and trim to the marks made in the previous step. Remove the WD-821-L & -R Landing Gear Weldments from the Center Section Assembly.

#### **SEAT RIB SUBASSEMBLY**

- ❑ Make two F-806E Spacers shown in F-806E Spacer view on DWG 65.
- ❑ Cleco the F-806C-1 & D-1 Rear Spar Attach Bars to the F-806B-1 Rear Spar Attach Bulkhead (See "F-806B-1 Rear Spar Attach Bulkhead Assembly", DWG 65).
- ❑ Cleco the two F-806G-1 Seat Belt Attach Lugs, and the F-806F-L-1 & -R-1 Gussets to the F-806B-1 Bulkhead. **NOTE: Proper orientation of the gussets is tipped fwd.**
- ❑ Use a piece of 1/4 plywood (or something of equivalent thickness) for spacers to level the F-806B-1 Bulkhead on a drill press table to match-drill the bolt hole at each outboard end. With most Drill presses, you will have to swing the table off to one side and drill at the edge, to provide support for the Bulkhead. Use another piece of

- 1/4 material as a spacer between the ends of the two rear spar attach Bars. First match-drill #30 through the Bulkhead, the F-806C-1 Bar, F-806E Spacer and F-806D-1 -1 Bar. Final-Drill the two holes to size with a #12 drill.
- ❑ Final-Drill #30, all the 1/8 holes common between the parts clecoed to the F-806B-1 Rear Spar Attach Bulkhead.
- ❑ Slightly flute the bottom flange of the F-814A-L-1 & -R-1 Fwd Inboard Seat Ribs, between the holes as needed, to line up the holes when checked with a straight edge.
- ❑ Final-Drill #40, the nutplate attachment rivet holes on the F-814C-L-1 & -R-1 Inboard Seat Rib Angles (See "F-814A-R-1 Fwd Right Inboard Seat Rib Assembly", DWG 65). Machine Countersink the nutplate attachment rivet holes drilled in this step, for flush rivets
- ❑ Make the Left and Right F-805D Brackets. A full-scale view of the Left Bracket is shown on DWG 65.
- ❑ Cleco the F-814C-R-1 Fwd Inboard Seat Rib Angle to the F-814A-R-1 Fwd Inboard Seat Rib (See "F-814A-R-1 Fwd Right Inboard Seat Rib Assembly", DWG 65).
- ❑ Cleco the F-814HPPX Fwd Seat Belt Anchor, and the F-814J Fwd Seat Belt / Vent Anchor to the F-814G-1 Seat Belt Anchor. Cleco the Seat Belt Anchor Assembly to the F-814A-R-1 Fwd Inboard Seat Rib Assembly.
- ❑ Cleco the right F-805D-R Bracket to the F-814A-R-1 Fwd Inboard Seat Rib Assembly and clamp in position as instructed in F-814A-R-1 Fwd Right Inboard Seat Rib Assembly view on DWG 65. Match-Drill #30, the aft hole in the bracket then final-drill #30, the fwd hole in the bracket.
- ❑ Repeat the previous three steps for the Left Fwd Inboard Seat Rib Assembly. It is a mirror image of the right except for the use of another F-814PPHX Fwd Seat Belt Anchor, in place of the F-814J Fwd Seat Belt / Vent (See "F-814A-L-1 Fwd Left Inboard Seat Rib Assembly", DWG 65).
- ❑ Final-Drill #30, all the 1/8 holes on both Fwd Left & Right Inboard Seat Rib Assemblies.

*If you intend to install the optional manual or electric aileron trim, Refer to DWG OP-1 (Electric Aileron Trim) or DWG OP-6 (Manual Aileron Trim) and complete the bracket fitting and drilling to the Fwd Inboard Seat Ribs at this time.*

- ❑ Slightly flute the bottom flange of the F-815A-L-1 & -R-1 Forward Outboard Seat Ribs, between the holes, as need to line up the holes when checked with a straight edge (See "Seat Ribs", DWG 65).
- ❑ Final-Drill #12, the hole in the aft bottom flange tab on the F-815A-L-1 & -R-1 Fwd Outboard Seat Ribs (See "Seat Ribs", DWG 65).
- ❑ Trim the fwd corner of the bottom flange, and final-drill #12, the hole in the fwd bottom flange tab of the F-815B-L-1 & -R-1 Aft Outboard Seat Ribs, as shown in the F-815B-L-1 & -R-1 Trim Detail on DWG 65.
- ❑ Cleco the F-814A-L-1 & -R-1 Fwd Inboard Seat Rib Assemblies and the F-814B-L-1 & -R-1 Aft Inboard Seat Ribs, to the F-806B-1 Rear Spar Attach Bulkhead Assembly (See "Seat Ribs", DWG 65).
- ❑ Cleco the F-813-L-1 & -R-1 Aft Outboard Seat Ribs to the F-806B-1 Rear Spar Attach Bulkhead Assembly.
- ❑ Cleco the F-815A-L-1 & -R-1 Forward Outboard Seat Ribs, and the F-815B-L-1 & -R-1 Aft Outboard Seat Ribs to the F-806B-1 Rear Spar Attach Bulkhead Assembly.
- ❑ Final-Drill #30, all 1/8 holes common between the F-806B-1 Rear Spar Attach Bulkhead and the parts clecoed in place in the previous three steps.
- ❑ Lay the Seat Rib Assembly upside on a pair of saw horses.
- ❑ Flute the F-827-1 Left Center Bottom Skin stiffening flange, forward of the F-806B-1 Rear Spar Attach Bulkhead, every 1 1/2 to produce a curve in this portion of the skin that matches the curve on the bottom of the F-814A-L-1 & -R-1 Fwd Inboard Seat Ribs (F-826-1 and F-827-1 Center Bottom Skins view, DWG 65).
- ❑ Cleco the F-826-1 & F-827-1 Center Bottom Skins to the Seat Rib Assembly.
- ❑ Final-Drill #40, all of the 3/32 holes common between the F-826-1 & F-827-1 Center Bottom Skins and the Seat Ribs Assembly.
- ❑ Uncleco the F-826-1 & F-827-1 Center Bottom Skins from the Seat Ribs Assembly.
- ❑ Since the two Center Bottom Skins join at an angle because of the angled belly matching the wing dihedral, break the edge of the F-826-1 Center Bottom Skin to help it lay tight on the F-827-1 Center Bottom Skin after being riveted (Refer to LAP JOINTS in section 5). Each of the Center Bottom Skins also require an edge break on the aft outboard edge where it will contact the conical portion of the left and right F-823-1 Mid Fuselage Side Skins (Refer to Mid Fuselage Side Skin And Structure, DWG 69).

- ❑ Uncleco all parts in the Seat Rib Assembly. Deburr and smooth the edges, and all the lightening holes. Deburr the rivet holes in all the parts.
- ❑ Dimple Countersink all rivet holes in the bottom flanges of all the seat ribs and the F-806B-1 Rear Spar Attach Bulkhead.
- ❑ Dimple Countersink all #40 holes in the F-826-1 Right Center Bottom Skin and the F-827-1 Left Center Bottom Skin, which are common with holes in the Seat Rib Assembly. **NOTE: Do not dimple countersink the fwd and aft most rows of holes that are not common with holes in any of the seat ribs (See "F-826-1 & F-827-1 Center Bottom Skins", DWG 65).**
- ❑ Prime the F-806C-1 & D-1 Bars, F-805D Brackets, and the F-806E Spacers. Prime all the remaining parts if/as desired.
- ❑ **NOTE: Do not rivet any holes that will also attach Fwd and/or Aft Seat Ribs to the F-806B-1 Bulkhead in this step.** Cleco the F-806C-1 & D-1 Bars, the two F-806G-1 Seat Belt Attach Lugs, and the F-806F-L-1 & -R-1 Gussets to the bulkhead (See "F-806B-1 Rear Spar Attach Bulkhead Assembly", DWG 65). Rivet all parts to the bulkhead using rivet call outs in F-806B-1 Rear Spar Attach Bulkhead Assembly Rivets view on DWG 65.
- ❑ Rivet nutplates to the F-814C-L-1 & -R-1 Inboard Seat Rib Angles.
- ❑ Cleco the F-814HPPX Fwd Seat Belt Anchor, and the F-814J Fwd Seat Belt / Vent Anchor to the F-814G-1 Seat Belt Anchor, and rivet them together.
- ❑ Cleco the right Seat Belt Anchor Assembly to the F-814A-R-1 Fwd Inboard Seat Rib.
- ❑ Cleco the F-814C-R-1 Inboard Seat Rib Angle, and the F-805D Bracket, to the F-814A-R-1 Fwd Inboard Seat Rib. Rivet together all the parts clecoed to the Fwd Inboard Seat Rib (refer to F-814A-1 & F-814B-1 Fwd Inboard Seat Rib Rivets). **NOTE: Do not rivet the four, fwd most holes in the Inboard Seat Rib Angle that will also attach the F-814E-R-1 Right Seat Ramp Support (See "Detail C", DWG 69).**
- ❑ Repeat the previous three steps for the F-814A-L-1 Fwd Left Inboard Seat Rib Assembly. The only difference being a second F-814HPPX in place of the F-814J Fwd Seat Belt / Vent Anchor.
- ❑ Cleco the F-814A-L-1 & -R-1 Fwd Inboard Seat Rib Assemblies, and the F-814B-L-1 & -R-1 Aft Inboard Seat Ribs to the F-806B-1 Rear Spar Attach Bulkhead Assembly, and to each other (See "Seat Ribs", DWG 65). Rivet the aft inboard seat ribs to the F-814C-1 Inboard Seat Rib Angles. Rivet the fwd and aft inboard seat ribs to the Rear Spar Attach Bulkhead Assembly.
- ❑ Cleco the F-813-L-1 & -R-1 Aft Outboard Seat Ribs to the F-806B-1 Rear Spar Attach Bulkhead Assembly and rivet them in place.
- ❑ Cleco the F-826-1 & F-827-1 Center Bottom Skins to the Seat Rib Assembly.
- ❑ **NOTE: Do not rivet the skin to the F-813-L-1 & -R-1 Aft Outboard Seat Ribs, or the aft most three holes on the F-814B-L-1 & -R-1 Aft Inboard Seat Ribs in this step.** Rivet the F-826-1 & F-827-1 Center Bottom Skins to the Rear Spar Attach Bulkhead Assembly, and the Inboard Seat Ribs.
- ❑ The F-815A-L-1 & -R-1 Fwd Outboard Seat Ribs, and the F-815B-L-1 & -R-1 Aft Outboard Seat Ribs are shown on DWG 65 for reference only, but are not riveted to the Rear Spar Attach Bulkhead Assembly or the two Center Bottom Skins at this time.

**LONGERON BENDING**

*Protect the surface of the longeron material from the vice jaws when bending the longerons.*

- ❑ Reference DWG 66 for bending the F-843-L-1 Lower Longerons. Begin with the twist on the fwd portion as shown in Step One. Clamp the lower longeron in a vice with the 0-deg. / 90-deg. point aligned with the edge of the vice jaws. Clamp a large adjustable wrench, with jaws padded with tape, to the fwd end of the angle (See "Longeron Twisting", DWG 66). Twist in the direction shown in Step One of the F-843-L-1 Lower Longerons detail. Check for the specified amount of twist using a digital level, or equivalent device.
- ❑ Remove the F-843-L-1 Lower Longerons from the vice. Place the aft end of the lower longeron on a hard surface (Concrete Floor) and hit along the vertex with a heavy hammer to open the angle as shown in Step Two (Refer to DWG 66 for definition of vertex). Check the angle using the 96.5° Template on DWG 66. If you can not get the angle to change...get a bigger hammer. **NOTE: The goal is to attain a progressive change in angle, from the value specified for the end, to no change at the 90-deg. / 0-deg. point on the lower longeron.** After the adjustment is completed, use a file or sander to smooth any dents that were hammered into the vertex edge.
- ❑ Clamp the F-843-L-1 Lower Longerons in the vice and complete the twist on the aft portion of the lower longeron as shown in Step Three in the F-843-L-1 Lower Longerons detail, DWG 66.
- ❑ Complete the previous three steps for the F-843-R-1 Lower Longerons. **Note: The finished part is a mirror image of the left.**
- ❑ Mark a rivet center line on the F-844-L & -R (RV-8) or F-898-L & -R(RV-8A) Auxiliary Longerons as shown on DWG 66.
- ❑ Bend a slight curve in the F-844-L (RV-8) or F-898-L (RV-8A) Auxiliary Longerons (See "Curving F-844-L/F-898L Auxiliary Longerons", DWG 66). Produce the specified curve by clamping the auxiliary longeron in a vice, preload it in the direction you wish the bend to occur, and then give it a moderate whack adjacent to the vice, with a soft faced hammer (See "Longeron Bending", DWG 66). Make a slight bend every two inches along the auxiliary longerons length to produce the curve. **NOTE: Anytime you bend an angle in one plane, it tends to also bend in the other. Lay the auxiliary longeron on a flat surface, to check for unwanted curve or bend in the other plane. Correct any unwanted bend by progressively clamping the other web of the angle in the vice and whack it in the direction to remove the unwanted bend.** Repeat the processes in this step until you have the proper amount of curve with it flat in the other plane.
- ❑ Repeat the previous step to curve the F-844-R (RV-8) or F-898-R (RV-8A) Auxiliary Longerons. **NOTE: The finished part is a mirror image of the left.**
- ❑ Refer to the F-887-L-1 Upper Longerons diagram on DWG 66 for bending the left upper longeron. The bending process is the same as for the Auxiliary Longerons except there are four sharp, concentrated bends in specific locations rather than numerous slight bends to make a curve. Mark the webs of one longeron angle, TOP and LEFT SIDE, to correspond to the top and left side views in the F-887-L-1 Upper Longerons view on DWG 66, to help alleviate confusion while bending. Carefully measure, and mark the bend locations on the longeron angle.
- ❑ Complete each bend by aligning the vice jaw ends with the bend line on the angle, to produce a sharp bend concentrated at the line. The amount of bend at the fwd bend location is easily checked by aligning a long straight edge beside the angle while it is still clamped in the vice, and measuring for the proper amount of displacement. Check the bend angles at the aft bend location by laying the angle beside a chalk line placed on the floor, and then measuring the displacement. Once again, making a bend in one plane will change the angle in the other plane, so keep checking and adjusting as necessary until reaching the specified angles. Remove any twist that happens at the location of the bend using the same process that was used to add the twist to the Lower Longerons. When the longeron bending is completed properly, the longeron will be straight in both planes between each bend location, and will have sharp concentrated bends of the specified angle, at each bend location.
- ❑ Repeat the previous two steps for the F-887-R-1 Upper Longerons, using the F-887-R-1 Upper Longerons diagram on DWG 66. When completed, the right upper longeron will be a mirror image of the left.

**RV-8 FWD FUSELAGE STRUCTURE****(This section RV-8 Only)**

- ❑ Add a curve to the top 4 1/2 inches of the F-804H -1 -1 Center Section Side Plates to make them closely match the contour of the F-804 Center Section Fwd and Aft Bulkheads (See "Mid Fuse Side Skins And Structure", DWG 69). Clamp a 2X4 board on the edge of your worktable, spaced off the table with 1/8 thick spacers. Slide the center section side plate between the table and the board and push down to produce a slight bend along the edge of the table. Make a bend approximately every 1/2 inch as needed to make it match the shape of the center section fwd and aft bulkheads. **NOTE: Be sure to make a left and a right part.**
- ❑ Add a curve in the upper six inches of the F-802D-1 Landing Gear Box Plates to make them match the curve of the fwd and aft L.G. Bulkheads, using the same technique used in the previous step (DWG 67). Once again, be sure to bend a left and a right part.
- ❑ Separate the two F-848-1 Upper Longerons Gussets from each other (See "Separating F-848-1", DWG 67). Use the same bending process as in the previous two steps to make a left and a right upper longeron gusset. Add curve to match the inside surface of the F-804C-FL and -FR Center Section Fwd Bulkhead flanges (See "Fwd Fuse Side Skins and Structure", DWG 67 for the upper longeron gussets installed location).
- ❑ Radius the aft outboard edge of the F-848-1 Upper Longerons Gussets so they will nest in the flange bend radius of the F-804C-FL and FR Center Section Fwd Bulkheads, on the Center Section Assembly.
- ❑ Mark the four edges of the F-8456-1 that need to be radiused. Mark each of the four parts on the F-8456-1 with their part number and then separate them from each other (See "Separating F-8456-1", DWG 67). Radius the marked edge on each gusset so that it will nest in the flange bend radius of the F-804C-FL and FR Center Section Fwd Bulkheads, on the Center Section Assembly.
- ❑ Smooth and deburr the edges of all parts from the previous two steps.
- ❑ Place a piece of carpet, etc. on top of your worktable to protect the bottom skins of the fuselage.
- ❑ Place the Fwd Fuselage Sub Structure and the F-804 Center Section Assembly on the carpeted work table and cleco them together where they join at the center section assembly bottom flanges, and the F-878-L-1 & -R-1 Mid Cabin Braces (DWG 67). Cleco at the center section bottom flanges from the inside.
- ❑ Cleco the left and right F-804H-1 Center Section Side Plates to the side of the F-804 Center Section Assembly. Cleco at a few locations from the inside to allow for fitting up the skins later.
- ❑ Verify that the bend angle of the flanges on the F-804C-AL, AR, FL, & FR bulkheads are correct and that they lay flush to the F-804H-1 Center Section Side Plates. If they do not, use a hand seamer to adjust the bend angle and then re-flute them as necessary so they are straight.
- ❑ Move the Fwd Fuselage Sub Structure so that the left side overhangs the edge of the worktable. Place the F-843-L-1 Lower Longerons in place along the left edge of the F-822-1 Fwd Floor Panel with the bend centered on the bend relief notch in the edge of the fwd floor panel (DWG 67).
- ❑ Align the vertex of the F-843-L-1 Lower Longerons angle with the edge of the F-822-1 Fwd Floor Panel, and clamp in position. Clamp the fwd end of the lower longeron angle with two clamps so that it is held in flush contact with both webs of the WD-803-L-1 Lower Engine Mount Bracket. Clamp the F-843-L-1 Lower Longerons to the fwd and aft wings of the WD-822-1 L.G. Box Weldment (DWG 67).
- ❑ Match-Drill #30, the aft most hole in the F-822-1 Fwd Floor Panel that matches with the aft end of the F-843-L-1 Lower Longerons. Cleco the hole from the inside, to lock in the aft position of the lower longeron. Match-Drill #30, the four bolt hole locations at the fwd end of the fwd floor panel that are common with the WD-803-1 Lower Engine Mount Bracket. Final-Drill the four bolt holes to #12. Install temporary bolts in the fwd and aft most bolt holes, to lock the fwd position of the lower longeron to the engine mount bracket (See "F-843-1 Details", DWG 67).
- ❑ Match-Drill #30, the remaining 1/8 holes common between the F-822-1 Fwd Floor Panel and the to the F-843-L-1 Lower Longerons. Cleco as you drill.
- ❑ Final-Drill #19, the two screw holes common between the F-822-1 Fwd Floor Panel, the F-813-L-1 Lower Longerons, and the WD-822-L-1 L.G. Box Weldment. Machine countersink the two #19 holes (flush head on the bottom side of the fwd floor panel) for flush screws (See "F-843-1 Details", DWG 67).
- ❑ Unbolt and unclesco the F-843-L-1 Lower Longerons from the F-822-1 Fwd Floor Panel. Deburr all the rivet and bolt holes in the fwd floor panel, lower longeron, and the WD-803-1 Engine Mount Bracket, that were drilled in the three previous steps.
- ❑ Radius the aft end of the vertex on the F-843-L-1 Lower Longerons (See "Detail C", DWG 67).
- ❑ Cleco and temporarily bolt the F-843-L-1 Lower Longerons in place on the Fwd Fuselage Substructure. Cleco from the inside on every hole. Install the two screws to hold the lower longeron flush with the bottom of the WD-822-L-1 L.G. Box Weldment.

- ❑ Move the Fwd Fuselage so that the right side overhangs the worktable and repeat the previous seven steps for the F-843-R-1 Lower Longerons.
- ❑ Drill 1/8, all 1/8 holes in the WD-822-L-1 & WD-822-R-1 to remove the powder coat paint.
- ❑ Put the F-844-R Auxiliary Longerons in place in the notch in the right L.G. Box Assembly. Cleco the F-802S-1 Spacer and F-802D-1 Landing Gear Box Plate, to the Fwd and Aft L.G. Bulkheads. Cleco from the inside to allow for fitting of the side skin later.
- ❑ Check the alignment of the holes in the landing gear box plate, and the F-802A-R-1 Fwd L.G. Bulkhead and F-802B-R-1 Aft L.G. Bulkhead, particularly near the top. If there is any misalignment, remove the landing gear box plate and flute the flange an additional amount, between the holes that are misaligned. Re cleco the landing gear box plate.
- ❑ Repeat the previous step for the left side L.G. Box.
- ❑ Final-Drill #40, the two nutplate attachment holes that are common between the F-804 Center Section Assembly fwd top flange, and each of the F-878-1 Mid Cabin Braces.
- ❑ Final-Drill #30, the 1/8 hole at the aft end of the F-878-L-1 & -R-1 Mid Cabin Braces, common to the F-804 Center Section Assembly.
- ❑ Cleco the F-848-1 Upper Longerons Gussets, F-845-1 Gussets, and F-846-1 Gussets in place on the Center Section Fwd Bulkhead flanges to check the fit. Add additional radius to any of the gussets that do not nest flush on the inside surface of the bulkhead flanges. Uncleco and remove all the gussets.
- ❑ Uncleco the Fwd Fuselage Sub Structure from the Center Section Bulkhead Assembly.
- ❑ Deburr the #30 and #40 holes in the F-878-L-1 & -R-1 Mid Cabin Braces, and the fwd top flange of the F-804 Center Section Assembly.

**RV-8A FWD FUSELAGE STRUCTURE****(This section RV-8A Only)**

- ❑ Add a curve to the top 4 1/2 inches of the F-804H-1 Center Section Side Plates to make them closely match the contour of the F-804 Center Section Fwd and Aft Bulkheads (See "Mid Fuse Side Skins And Structure", DWG 69). Clamp a 2X4 board on the edge of your worktable, spaced off the table with 1/8 thick spacers. Slide the center section side plate between the table and the board and push down to produce a slight bend along the edge of the table. Make a bend approximately every 1/2 inch as needed to make it match the shape of the center section fwd and aft bulkheads. **NOTE: Be sure to make a left and a right part.**
- ❑ Separate the two F-848-1 Upper Longerons Gussets from each other (See "Separating F-848-1", DWG 67A). Use the same bending process as in the previous step to make a left and a right upper longeron gusset. Add curve to the upper longeron gussets to match the inside surface of the F-804C-FL and -FR Center Section Fwd Bulkhead flanges. See "Fwd Fuse Side Skins and Structure", DWG 67A for the upper longeron gussets installed location.
- ❑ Radius the aft outboard edge of the F-848-1 Upper Longerons Gussets so they will nest in the flange bend radius of the F-804C-FL and FR Center Section Fwd Bulkheads, on the Center Section Assembly. Smooth and deburr the edges of the upper longeron gussets.
- ❑ Place a piece of carpet, etc. on top of your worktable to protect the bottom skins of the fuselage.
- ❑ Place the Fwd Fuselage Sub Structure and the F-804 Center Section Assembly on the carpeted work table and cleco them, from the inside, together where they join at the center section assembly bottom flanges (DWG 67A).
- ❑ Cleco the left and right F-804H-1 Center Section Side Plates to their appropriate side of the F-804 Center Section Assembly. Cleco at a few locations from the inside to allow for fitting up the skins later.
- ❑ Verify that the bend angle of the flanges on the F-804C-AL, AR, FL, & FR bulkheads are correct and that they lay flush to the F-804H-1 Center section Side Plates. If they do not, use a hand seamer to adjust the bend angle and then re flute them as necessary so they are straight.
- ❑ Move the Fwd Fuselage Sub Structure so that the left side overhangs the edge of the worktable. Put the F-843-L-1 Lower Longerons in place along the left edge of the F-890-1 Fwd Floor Panel with the bend centered on the relief notch in the edge of the panel (DWG 67A).
- ❑ Align the vertex of the F-843-L-1 Lower Longerons angle with the edge of the F-890-1 Fwd Floor Panel, and clamp in position. Clamp the fwd end of the lower longeron angle with two clamps so that it is held in flush contact with both webs of the WD-803-L-1 Lower Engine Mount Bracket (DWG 67).



- ❑ Match-Drill #30, the fwd most hole in the F-890-1 Fwd Floor Panel that matches with the fwd end of the F-843-L-1 Lower Longerons and the WD-803-L-1 Lower Engine Mount Bracket. Cleco the hole from the inside, to lock in the fwd position of the lower longeron.
- ❑ Mark the F-843-L-1 & -R-1 Lower Longerons for trimming using the oval gear leg opening in each side of the F-890-1 Fwd Floor Panel (See "Aft Iso View", DWG 67A).
- ❑ Uncleco the F-843-L-1 Lower Longeron from the F-890-1 Fwd Floor Panel.
- ❑ Trim the aft end of the F-843-L-1 Lower Longeron to match the gear leg opening that was marked previously (See "Aft Iso View", DWG 67A). Deburr and smooth the edges after trimming.
- ❑ Radius the aft end of the vertex on the F-843-L-1 Lower Longeron (See "Detail B", DWG 67A).
- ❑ Cleco and clamp the F-843-L-1 Lower Longeron in place on the Fwd Fuselage Substructure.
- ❑ Move the Fwd Fuselage so that the right side overhangs the worktable and repeat the previous eight steps for the F-843-R-1 Lower Longeron.
- ❑ Cleco the F-848-1 Upper Longerons Gussets in place on the Center Section Fwd Bulkhead flanges to check the fit. Add additional radius to either of the gussets if they do not nest flush on the inside surface of the bulkhead flanges. Uncleco and remove the gussets.
- ❑ Remove the Fwd Fuselage Sub Structure from the Center Section Bulkhead Assembly.

#### **MID FUSELAGE SKINS AND STRUCTURE**

- ❑ Separate the F-805B-L-1 & -R-1 Floor Support Angles from each other (See "F-805B-1 Floor Support Angle Detail", DWG 69). Deburr the edges of the Floor Support Angles.
- ❑ Deburr the edges of F-860A-L-1 & -R-1 Fwd Arm Rest, F-860B-L-1 & -R-1 Middle Arm Rest, and F-00860C-L-2 & F-860C-R-1 Aft Arm Rest (See "Left and Right Arm Rest Rivets", DWG 69).
- ❑ Deburr the edges of the F-805-L-1 & -R-1 Fuselage Bulkheads and the F-806A-L-1 & -R-1 Fuselage Bulkheads (See "Mid Fuse Side Skin and Structure", DWG 69). Enlarge the 1/8 pilot hole at the top of each bulkhead for a snap-bushing to allow routing the static line and wiring.
- ❑ Deburr the edges of the two F-805G-1 Gussets, and the F-815C-L-1 & -R-1 Outboard Seat Rib Angles (See "Detail B", DWG 69).
- ❑ Final-Drill # 40, the nutplate attachment rivet holes in all parts from the four previous steps.
- ❑ Machine Countersink the nutplate attachment rivet holes in the F-815C-L-1 & -R-1 Outboard Seat Rib Angles, and the F-806-L-1 & -R-1 Fuselage Bulkheads for flush rivets.
- ❑ Deburr, then dimple countersink, the nutplate attachment rivet holes in the F-860B-L-1 Mid Arm Rest, and the F-00860C-L-2 & F-860C-R-1 Aft Arm Rests.

If you are going to install the optional Rear Seat Throttle, Refer to DWG OP-2 and the other documentation supplied with the RV-8 Rear Seat Throttle kit. Cut a slot between the two index holes in the F-860B-L-1 Mid Left Arm Rest, and add the required holes to the F-806-L-1 Left Fuselage Bulkhead and the F-804C-AL & -FL Bulkheads

- ❑ Deburr the edges of the two F-823-1 Mid Side Skins.

**NOTE: Refer to the F-823-1 Rolling Detail and F-823-1 Bend Line Locations, Dwg 74 for the following five steps.**

- ❑ The F-823-1 Mid Side Skins are supplied flat, but the aft lower edge must be reshaped with a conical bend to wrap around the F-807 bulkhead. Mark the location of the bend line parallel to, and 1/4 below, the row of pre-punched holes that will be used to attach the skin to aft bottom edge of the F-815B Seat Ribs.
- ❑ Cut a 45-degree bevel on the 2 edge of a 2" X 4" board approximately 24 inches long. Align the bend line previously drawn on the F-823-1 Mid Side Skin, with the edge of a flat worktable, and clamp the board over the skin with the beveled edge aligned with the bend line.
- ❑ Measure and draw a line 5/8 from the edge of the mid side skin, to use as a reference for positioning the "forming angles" on the skin. Clamp a 3/4 aluminum angle under the skin, adjacent to the 5/8 offset line. Match -Drill #40 one skin hole to the angle, at each end. Remove the angle. Clamp the second angle to the first angle with the vertexes aligned. Match-Drill the two #40 holes to the second angle. The web on the end of the upper angle used to make the small radius needs to be relieved to miss the board clamped to the table. Cleco the two angles to the edge of the skin. Add at least two clamps to lock the angles in place. Put a large "C" clamp or Vicegrip™ pliers on the angles near the aft end of the skin to use as a handle while rolling the skin.
- ❑ Roll the skin upwards and inwards towards the table, forcing a sharp bend of approximately 1/8 radius to take place at the forward end, but tapering in a cone shape towards the aft end. You do not have to complete the

bend all in one attempt. Work it a little at a time to get the required shape. Remove the forming angles and hand massage to final shape. It is easier to install an under-rolled skin than a skin that has been rolled too far.

- ❑ Complete the previous four steps for the other F-823-1 Mid Side Skin. Be careful to bend it from the opposite side of the one done previously, so that you have a left and a right skin.
- ❑ On a work table, cleco the Seat Rib Subassembly, to the F-804 Center Section Assembly where they join at the Center Section Assembly bottom flanges and the F-814E-L-1 & -R-1 Seat Ramp Supports.
- ❑ Final-Drill #30, the 1/8 holes common between the F-814E-L-1 & -R-1 Seat Ramp Supports and the F-814A-L-1 & -R-1 Inboard Seat Rib assemblies.
- ❑ Use a fly cutter turned slowly in a drill press to cut a hole in the F-815A-R-1, and the Right F-823-1 Mid Side Skin, for routing the rear seat air vent hose. Refer to DWG 69 for the pilot hole location and size. Deburr the edges of both holes.
- ❑ Cleco the F-815A-L-1 & -R-1 Forward Outboard Seat Ribs, F-815B-L-1 & -R-1 Aft Outboard Seat Ribs, and F-815C-L-1 & -R-1 Outboard Seat Rib Angles to the Seat Rib Assembly. Cleco from the inside out to make it easy to add the skins in the following steps.
- ❑ Cleco the Left and the Right F-823-1 Mid Side Skins to the Mid Fuselage Assembly. **NOTE: The conical wrap portion of the Mid Side Skins, slips between the Center Bottom Skin and the F-813-1 Aft Outboard Seat Rib on each side.**
- ❑ Cleco the F-807 Bulkhead Assembly to the F-814B-L-1 & -R-1 Aft Inboard Seat Ribs, F-813-L-1 & -R-1 Aft Outboard Seat Ribs, and the Left and Right F-823-1 Mid Side Skins.
- ❑ Cleco all the parts shown in the "Left and Right Arm Rest Rivets" view on DWG 69, to the Left F-823-1 Mid Side Skin, the F-807 Fuselage Bulkhead Assembly, and the F-804 Fuselage Bulkhead Assembly.
- ❑ Repeat the previous step with all of the parts for the right side.
- ❑ Cleco the F-805G-L-1 & -R-1 Gussets to the Left and Right F-805 Fuselage Bulkheads.
- ❑ Cleco the F-805B-L-1 & -R-1 Floor Support Angles to the Left and Right F-805G Gussets and the F-814C-L-1 & -R-1 Inboard Seat Rib Angles.
- ❑ Final-Drill #30, the 1/8 holes for attaching the F-807 Fuselage Bulkhead to F-813 -L-1 & -R-1 Aft Outboard Seat Ribs, and F-814B-L-1 & -R-1 Aft Inboard Seat Ribs.
- ❑ Final-Drill #30, all the 1/8 holes for joining all the parts shown in the "Left and Right Arm Rest Rivets" view on DWG 69. Final-Drill #30, the 1/8 rivet holes that attach the F-00860C-L-2 & F-860C-R-1 Aft Arm Rests to the F-807 Bulkhead Assembly.
- ❑ Final-Drill #30, the 1/8 rivet holes that attach the Left and Right F-805G Gussets to the Left and Right F-805 Bulkheads.
- ❑ Final-Drill #30, the 1/8 rivet holes that attach the F-805B-L-1 & -R-1 Floor Support Angles to the Left and Right F-805G Gussets and the F-814C-L-1 & -R-1 Inboard Seat Rib Angles.

#### **JOINING THE RV-8 FWD & MID FUSELAGE SUBASSEMBLIES**

**(This section RV-8 Only)**

- ❑ Cleco the Fwd Fuselage Substructure to the Center Section Assembly and the Mid Fuselage Assembly (DWG 67). Cleco from the inside, at the fwd and aft bottom flanges of the center section assembly and the top flange where it interfaces with the F-878-1 Mid Cabin Braces. **NOTE: The F-822-1 Fwd Floor Panel is sandwiched between the fwd and aft bottom flanges of the F-804 Center Section Assembly and the F-826-1 & F-827-1 Center Bottom Skins (See "Detail B", DWG 67).**
- ❑ Cleco the F-814A-L-1 & -R-1 Fwd Inboard Seat Rib Assemblies to the F-814E-L-1 & -R-1 Seat Ramp Sub Assemblies (See "Detail C", DWG 69).
- ❑ Deburr the punched openings, and edges of the F-820-L-1 & -R-1 Fwd Side Skins.
- ❑ Cleco the F-820-L-1 Fwd Side Skin to the left side of the Fwd Fuselage Substructure (DWG 67). **NOTE: The fwd side skin lays on top (overlaps on the outside) of the F-823-1 Mid Fuselage Side Skin.** Be liberal with the use of clecos, to hold the skin tight to the sub structure and assure correct alignment of the fwd portion of the fuselage.
- ❑ Cleco the F-820-R-1 Fwd Side Skin to the right side of the Fwd Fuselage Substructure.
- ❑ Cleco the F-870E-1 Skin Stiffener, and the F-870B-1 Outboard Stiffener to the interior surface of the F-820-L-1

& -R-1 Fwd Side Skins (See "Fwd Fuselage Side Skins And Structure", DWG 67).

- Cleco the F-864C-1 Angle in place on the interior surface of the F-820-L-1 Fwd Side Skin (See "Throttle Quadrant Assembly", DWG 68).
- Cleco the F-865B-1 Angle to the interior side of the F-820-R-1 Fwd Side Skin (See "Right Console Assembly", DWG 68).

#### **JOINING THE RV-8A FWD & MID FUSELAGE SUBASSEMBLIES**

##### **(This section RV-8A Only)**

- Cleco the Fwd Fuselage Substructure to the Center Section Assembly and the Mid Fuselage Assembly (See "Fwd Fuse Side Skins and Structure", DWG 67A). Cleco from the inside, at the fwd and aft bottom flanges of the center section assembly. **NOTE: The F-890-1 Fwd Floor Panel is sandwiched between the fwd and aft bottom flanges of the F-804 Center Section Assembly and the F-826-1 & F-827-1 Center Bottom Skins (See "Detail B", DWG 67A).**
- Cleco the F-814A-L-1 & -R-1 Fwd Inboard Seat Rib Assemblies to the F-814E-L-1 & -R-1 Seat Ramp Sub Assemblies (See "Detail C", DWG 69).
- Space the Center Section / Fwd Floor Panel Assembly up off of the worktable with a couple of wood boards approximately one & 1/2 thick.
- Final-Drill #40, the nutplate attachment rivet holes in the top surface of the WD-821-L & -R Landing Gear Weldments (DWG 67A). Machine Countersink the holes for flush rivet heads on the top surface. Rivet on nutplates at both locations.
- Install the WD-821-L & -R Landing Gear Weldments in position on the front of the Center Section Assembly. Use three bolts, two at the top and one at the outboard bottom to assure that the landing gear weldment is positioned flush to the Center Section Assembly (See "Landing Gear Weldment Detail", DWG 67A). Enlarge the openings in the F-890-1 Fwd Floor Panel if necessary, to allow the WD-821 Landing Gear Weldments to align with the bolt holes in the Center Section Assembly.
- Clamp the F-843-L-1 Lower Longerons and a .063 thick spacer (two pieces of .032 stacked together) to simulate the F-895-L-1 Doubler Plate, tightly to the side of the WD-821-L Landing Gear Weldment (DWG 67A).
- Clamp the F-843-L-1 Lower Longerons tight to both flanges of the WD-803-L-1 Engine Mount Bracket in two places.
- Clamp the F-843-L-1 Lower Longerons near the bend at its center. Align the vertex of the lower longeron with the outboard edge of the F-890-1 Fwd Floor Panel.
- Check that the gap between the fwd pad on the WD-821-L-1 Landing Gear Weldment and the F-843-L-1 Lower Longerons is no greater than 1/16. If you have a gap of 1/16 or less, it will be acceptable to pull it tight to the longeron with the attach bolts. If more than 1/16, use a spacer made from aluminum scrap or re-bend the brace tube **slightly** as required. It is acceptable to slightly bend the forward pointing brace tube of the landing gear weldment so that the flange of the lower longeron aligns with the doubler plate.
- Position the fwd fuselage assembly so that the left side is overhanging the worktable slightly.
- Match-Drill #30, the 1/8 holes common between the F-890-1 Fwd Floor Panel and the to the F-843-L-1 Lower Longerons with the exception of the three aft most holes. These three holes will be drilled after the WD-821-L-1 & -R-1 Landing Gear Weldments have been removed. Cleco as you drill. Be sure to drill square to the longeron. **Particularly** the two holes that will also attach the F-802W-L-1 & -R-1 Longerons Clips (See "Aft Iso View", DWG 67A).
- Repeat the previous six steps for the F-843-R-1 Lower Longerons.
- Final-Drill #12, the four bolt holes common between the F-890-1 Fwd Floor Panel and the WD-803-L-1 & -R-1 Engine Mount Brackets and F-843-L-1 & -R-1 Lower Longerons. Install temporary bolts in the fwd and aft most bolt holes (See "Aft Iso View", DWG 67A).
- Separate the F-802W-L-1 & -R-1 Longerons clips from each other (See "Separating F-802W-1 Longerons Clips", DWG 67A).
- Cleco the F-802W-L-1 & -R-1 Longerons Clips in place at the bottom of the F-802-R-1 & -L-1 Fuselage Bulkheads (See "Aft Iso View", DWG 67A). Final-Drill #30, the 1/8 holes common between the fuselage bulkheads and the longeron clips.
- Cleco the F-866A-1 Lower Forward Baggage Bulkhead to the F-802VPP Fuselage Bulkhead Brace (See "Fwd Fuse Substructure", DWG 63A).
- Cleco the F-802R-L-1 & -R-1 Fuselage Bulkheads to the aft flange of the F-802VPP Fuselage Bulkhead Brace.

- Cleco the F-802R-L-1 & -R-1 Fuselage Bulkheads in place on the F-890-1 Fwd Floor Panel, At the same time, cleco the F-870 Fwd Baggage Floor Assembly between the F-801 Firewall Assembly and the F-866A-1 Lower Fwd Baggage Bulkhead. This will help brace the F-802R / F-866 Assembly to stand on its own.
- Radius the aft outboard edge of the F-895-L-1 & -R-1 Doubler Plates so they will nest in the flange bend radius of the F-804C-FL and FR Center Section Bulkheads, on the Center Section Assembly (DWG 67A).
- Deburr the edges of the F-895-L-1 & -R-1 Doubler Plates.
- Cut apart the two F-895B Spacers from each other (See "Separating F-895B-1", DWG 67A). Deburr the edges of the two spacers. Cleco the F-895-L-1 & -R-1 Doubler Plates to the side flange of the Center Section Assembly using a couple of clecos inserted from the inside to allow adding the skins later. Cleco the F-895B Spacers to the fwd end of the F-895-L-1 & -R-1 Doubler Plates using clecos inserted from the inside.
- Deburr the punched openings, and edges of the F-891-L-1 & -R-1 Fwd Side Skins.
- Insert the F-898-L Auxiliary Longerons in place in the notch in the F-802R-L-1 Fuselage Bulkhead.
- Cleco the F-891-L-1 Fwd Side Skin to the left side of the Fwd Fuselage Substructure (DWG 67A). **NOTE: The fwd side skin lays on top (overlaps on the outside) of the F-823-1 Mid Fuselage Side Skin.** Be liberal with the use of clecos, to hold the skin tight to the sub structure and assure correct alignment of the fwd portion of the fuselage.
- Insert the F-898-R Auxiliary Longerons in place and cleco the F-891-R-1 Fwd Side Skin to the right side of the Fwd Fuselage Substructure.
- Cleco the F-870E-1 Skin Stiffener, and the F-870B-1 Outboard Stiffener to the interior surface of the F-891-L-1 & -R-1 Fwd Side Skins (See DWG 63A & "Fwd Fuselage Side Skins And Structure", DWG 67A).
- Cleco the F-8100C-1 Angle in place on the interior surface of the F-891-L-1 Fwd Side Skin (See "Throttle Quadrant Assembly", DWG 68A).
- Cleco the F-8101B-1 Angle to the interior side of the F-891-R-1 Fwd Side Skin (See "Right Console Assembly", DWG 68A).

#### **TAILCONE BULKHEADS**

- Separate the F-886-L-1 & -R-1 Rudder Stops, F-810C-1 & F-811C-1 Angles, and the F-812B-1 Angle / Control Stop from the F-800 Angle Parts by cutting at the locations shown in F-800 Parts Separation diagram on DWG 70. Label each by part number before separating.
- Radius the ends of the F-810C-1 & F-811C-1 Angles as shown in the F-810B-1 and F-811-1 Bulkhead Assembly views on DWG 70, so that they nest tightly inside of the F-887-L-1 & -R-1 Upper Longerons. Deburr and smooth all the edges of the rudder stops, angles, and control stop.
- Cleco the F-812A-1, and F-812C-1 Bulkheads to each other as shown in F-812-1 Bulkhead Assembly view on DWG 70. Final-Drill #30, all 1/8 holes common between the two parts.
- Use a hand seamer to open the bend angle of the flanges on the F-812A-1 Bulkhead (fwd) so that its flanges are parallel to the flanges on the F-812C-1 (aft) Bulkhead (DWG 70). **NOTE: Identify the F-812A-1 by the 1/8 holes in the side flanges.**
- **RV-8 Only:** Mark the vertical position of the WD-409 Tail Spring Mounts top edge on the front side of the F-812 Bulkhead Assembly (See "Section View A-A", DWG 73).
- **RV-8 Only:** Clamp the WD-409 Tail Spring Mount to the fwd surface of the F-812 Bulkhead Assembly. Make sure it is centered on the bulkhead and that the top edge is aligned with the vertical positioning mark made in the previous step.
- **RV-8 Only:** Match-Drill #30, the two keeper rivet Holes in the F-812 Bulkhead Assembly into the WD-409 Tail Spring Mount. Cleco as you drill each hole.
- **RV-8 Only:** With the WD-409 Tail Spring Mount still clamped in place, machine countersink #30, the two keeper rivet holes drilled in the previous step, for flush rivet heads on the aft side.
- **RV-8 Only:** Uncleco and unclamp then deburr the WD-409 Tail Spring Mount, F-812A-1 Bulkhead, and the F-812C-1 Bulkhead.
- **RV-8 Only:** Dimple countersink the #30 rivet holes common between the F-812A-1 Bulkhead and the F-812C-1 Bulkhead, for flush rivet heads on the aft side (DWG 70).
- **RV-8 Only:** Prime the WD-409 Tail Spring Weldment. Prime the F-812A-1, and F-812C-1 Bulkheads if/as desired.

- ❑ **RV-8 Only:** Rivet the F-812A-1 Bulkhead to the F-812C-1 Bulkhead at only the dimple countersunk hole locations (DWG 70).
- ❑ **RV-8A Only:** Make the F-712E Tie Down Bar as shown in F-712E Tie Down Bar view on DWG 70.
- ❑ **RV-8A Only:** Position the F-712E Tie Down Bar on the front side of the F-812-1 Bulkhead Assembly and clamp in position (See "F-812-1 Bulkhead Assembly", DWG 70). Match-Drill #30, the 1/8 tie down bar holes to the bulkhead assembly.
- ❑ **RV-8A Only:** Disassemble the parts from the previous step. Deburr the holes and edges of all the parts.
- ❑ **RV-8A Only:** Dimple Countersink the holes in the F-812A-1 & F-812C-1 Bulkheads for flush rivet heads on the aft side of the bulkhead assembly. **NOTE: Do not dimple countersink the four holes common with the F-812E Tie Down Bar that will be later final-drilled to #12 for the installation of bolts when the vertical stabilizer is attached (See "F-812-1 Bulkhead Assembly", DWG 70).**
- ❑ **RV-8A Only:** Machine countersink on the aft side of the F-712E Tie Down Bar, the four rivet holes that are common with dimpled holes in the F-812A-1 & F-812C-1 Bulkheads. Prime the tie down bar. Prime the F-812A-1 & F-812C-1 Aft Bulkheads if/as desired.
- ❑ **RV-8A Only:** Cleco and rivet the F-812A-1 Bulkhead, F-812C-1 Bulkhead, and the F-712E Tie Down Bar together (See "F812-1 Bulkhead Assembly", DWG 70).
- ❑ Separate the two F-811B-1 Stab Attach Bars from each other as shown in F-811B-1 Stab Attach Bar Separation diagram on DWG 70.
- ❑ Remove the portion of the F-811A-1 & F-811E-1 Bulkheads that is depicted in F-811A-1 & E-1 Bulkhead Trim view on DWG 70.
- ❑ Cleco together the F-811A-1 & E-1 Bulkheads, the two F-811B-1 Stab Attach Bars, and the F-811C-1 Angle to make an F-811-1 Bulkhead Assembly as shown on DWG 70. **NOTE: The F-811A-1 Aft Bulkhead does not have the small tabs at the top.**
- ❑ Use a hand seamer to open the bend angle of the flanges on the F-811A-1 Bulkhead so that they are parallel to the flanges on the F-811E-1 Bulkhead.
- ❑ Final-Drill #30, the 1/8 holes common between the F-811A-1 & E-1 Aft Bulkheads. Final-Drill #30, the four 1/8 holes common between the F-811B-1 Stab Attach Bars and the two bulkheads. Match-Drill #30, the remaining holes common between the bulkheads and the stab attach bars.
- ❑ Label the position of the two F-811B-1 Stab Attach Bars on the F-811-1 Bulkhead Assembly. Disassemble the parts from the two previous steps.
- ❑ **RV-8A Only:** – As an option, the F-811B-1 Stab Attach Bars can be tapered for weight reduction. Refer to "Optional F811B-1 Stab Attach Bar Taper", DWG 70.
- ❑ Deburr the holes and edges of all the F-811 Bulkhead Assembly parts.
- ❑ Prime the two F-811B-1 Stab Attach Bars and the F-811C-1 Angle. Prime the F-811A-1 & E-1 Bulkheads if/as desired.
- ❑ Cleco together the F-811-1 Bulkhead Assembly as shown in the F-811-1 Bulkhead Assembly view on DWG 70. Rivet the five rivet locations that join the F-811A-1 & F-811E-1 Aft Bulkheads to each other. **NOTE: Do not rivet the F-811B-1 Stab Attach Bars or the F-811C-1 Angle to the bulkheads at this time!**
- ❑ Cleco the F-810C-1 Angle to the F-810B-1 Bulkhead (See "F-810B-1 Bulkhead Assembly", DWG 70). Final-Drill #30, all holes common between the bulkhead and the angle.
- ❑ Uncleco the parts from the previous step. Deburr all holes and edges of both parts. Flute the flanges of F-810B-1 Bulkhead between the holes so that the holes are aligned when checked with a straight edge. Prime the F-810C-1 Angle. Prime the bulkhead if/as desired.
- ❑ Cleco, and then rivet the F-810C-1 Angle to the F-810B-1 Bulkhead using rivets called out in "F-810B-1 Bulkhead Assembly", DWG 70.
- ❑ Cleco the F-809-L-1 & -R-1 Bulkhead parts together, orientated as shown in the "F-809-1 Bulkhead Assembly", DWG 70. Final Drill #30, the 1/8 rivet holes common between the two parts.
- ❑ Uncleco the F-809 Bulkhead Assembly. Flute the flanges of F-809-L-1 & -R-1 Bulkheads between the holes so that the holes are aligned when checked with a straight edge. Deburr the edges and final-drilled holes in the bulkhead parts. Prime the bulkhead parts if/as desired.
- ❑ Cleco the F-809 Bulkhead parts back together.

- ❑ Rivet the F-809-L-1 & -R-1 bulkheads together only!
- ❑ Cleco the F-808-L-1 and F-808-R-1 Bulkhead parts together in the orientation shown in the F-808-1 Bulkhead Assembly view on DWG 70. Final Drill #30, the 1/8 rivet holes common between the bulkhead parts.
- ❑ Uncleco the F-808-1 Bulkhead Assembly. Flute the flanges of F-808-L-1 & -R-1 Bulkheads between the holes so that the holes are aligned when checked with a straight edge. Deburr the edges and final-drilled holes in the bulkhead parts.
- ❑ Prime the F-808-1 Bulkhead parts if/as desired. Cleco the Bulkhead parts together orientated as shown in the F-808-1 Bulkhead Assembly view on DWG 70.
- ❑ Rivet the F-808-R-1 & -L-1 Bulkheads to each other only!
- ❑ Remove the portions of the F-00807A-L-2 & F-807-R-1 Bulkheads as shown in Details A, B, and C on DWG 70
- ❑ Cleco the F-00807A-L-2 and F-807A-R-1 Bulkhead parts together in the orientation shown in the F-807-1 Bulkhead Assembly view on DWG 70.
- ❑ Final Drill #30, the 1/8 rivet holes common between all the bulkhead parts clecoed in the previous step.
- ❑ Cleco the two F-807D-1 Harness Fairleads in place on the aft side of the F-807B-1 Bulkhead (See "F-807-1 Bulkhead Assembly", DWG 70).
- ❑ Final-Drill #40 the 3/32 holes common between the F-807D-1 Harness Fairleads and the F-807B-1 Bulkhead.
- ❑ Remove the F-807D-1 Harness Fairleads from the F-807B-1 Bulkhead.
- ❑ Dimple countersink, flush on the forward side, the #40 holes in the F-807B-1 Bulkhead used to attach the F-807D-1 Harness Fairleads. Machine Countersink the corresponding #40 holes in the two harness fairleads.
- ❑ Cleco, then rivet, the F-807D-1 Harness Fairleads to the aft side of the F-807B-1 Bulkhead (See "F-807-1 Bulkhead Assembly", DWG 70).
- ❑ Uncleco the F-807-1 Bulkhead Assembly. Flute the flanges of F-00807A-L-2 & F-807A-R-1 Bulkheads between the holes so that the holes are aligned when checked with a straight edge. Deburr the edges and final-drilled holes in the bulkhead parts.
- ❑ Prime the F-807 Bulkhead parts if/as desired.
- ❑ Cleco the F-807 Bulkhead Assembly parts together in the orientation shown in the F-807-1 Bulkhead Assembly view on DWG 70.
- ❑ Rivet the F-00807A-L-2 & F-807A-R-1 Bulkheads to each other.

#### **AFT FUSELAGE ASSEMBLY**

- ❑ Trim the two indexing horns from the vertical flange of the F-818B-L-1 & -R-1 Baggage Rib Angles to make the part look the same as depicted in the "Baggage Rib Assembly", DWG 71.
- ❑ Cleco the F-818B-L-1 Baggage Rib Angle to the F-818-L-1 Baggage Rib as shown in the "Baggage Rib Assembly", DWG 71. Final-Drill #30, all 1/8 holes common between the baggage rib angle and the baggage rib. Repeat this step with the right baggage rib and baggage rib angle.
- ❑ Cleco then final-drill #40 the F-818D-1 Bellcrank Rib to the F-818-L-1 & -R-1 Baggage Ribs.
- ❑ Uncleco the F-818B-L-1 & -R-1 Baggage Rib Angles from the F-818-L-1 & -R-1 Baggage Ribs.
- ❑ Final-Drill #40, the nutplate attachment rivet holes in the F-818B-L-1 & -R-1 Baggage Rib Angles. Final-Drill #12, the screw hole at the location of each nutplate in both of the baggage rib angles. Machine Countersink the nutplate attachment rivet holes for flush rivets.
- ❑ Deburr all holes in the F-818B-L-1 & -R-1 Baggage Rib Angles, and F-818-L-1 & -R-1 Baggage Ribs. Deburr and smooth the edges of the left and right baggage rib angles and baggage ribs. Deburr the edges of the F-818D-1 Bellcrank Rib.
- ❑ Use the punched indicator marks as a guide to trim the F-857B-L-1 & -R-1 Seat Belt Brackets so that they appear as shown in "F-857B-1 Seat Belt Bracket Trim Detail", DWG 71. Deburr and smooth the edges of both seat belt brackets.
- ❑ Cleco then final-drill #30 F-857E-R-1 Inbd Seat Belt Bracket and F-857D-R-1 Outboard Seat Belt Bracket to the F-857B-R-1 Seat Belt Bracket as shown in "Detail D", DWG 71. Uncleco the seat belt bracket parts. Deburr all final-drilled holes, and the edges of the seat belt bracket parts. Prime the seat belt bracket parts if/as desired. Cleco and rivet the three seat belt bracket parts as shown in "Detail D", DWG 71.

- Repeat the previous step using the F-857E-L-1 Inbd Seat Belt Bracket, F-857D-L-1 outboard Seat Belt Bracket, and F-857B-L-1 Seat Belt Bracket. The assembly will be a mirror image of the right side.
- Deburr and smooth the edges of the F-819-1 Aft Deck, and F-810D-1 Spacer & F-811D-1 Spacer / Control Stop (See "Detail E", DWG 71).
- Deburr and smooth the edges of the F-888-L-1 & -R-1 Mid Longerons.
- Deburr and smooth the edges of the F-889-L-1 & -R-1 Lower Longerons, and the F-857C-L-1 & -R-1 Seat Belt Brackets (See "Detail D", DWG 71).
- Cleco together the right Seat Belt Bracket Assembly, F-857C-R-1 Seat Belt Bracket, and F-889-R-1 Lower Longeron as shown in "Detail D", DWG 71. Final-Drill #12, the 3/16 holes common between the seat belt bracket, seat belt bracket assembly, and lower longeron.
- Repeat the previous step for the left Seat Belt Bracket Assembly, F-857C-L-1 Seat Belt Bracket, and F-889-L-1 Lower Longeron.

#### **ADDING TAILCONE TO FWD FUSELAGE**

- Deburr all openings, and the edges of the F-824-L-1 & -R-1 Aft Side Skins, F-842-1 Aft Bottom Skin Fwd, and F-828-1 Aft Bottom Skin.
- Position the Fwd/Mid fuselage assembly so that the aft end extends beyond the edge of the worktable.
- Cleco the F-889-R-1 Lower Longeron and F-888-R-1 Mid Longeron to the F-824-R-1 Aft Side Skin.
- Repeat the previous step with the F-824-L-1 Aft Side Skin, F-889-L-1 Lower Longeron, and F-888-L-1 Mid Longeron.
- Cleco the F-807-1 bulkhead assembly in place on the mid fuselage as shown in "Mid Fuse Side Skin and Structure", DWG 69.
- Cleco the F-818-L-1 & -R-1 Baggage Rib Assemblies, and F-818D-1 Bellcrank Rib to the F-807-1 Bulkhead Assembly (See "Baggage Rib Assembly" and "Aft Fuselage", DWG 71). Final-Drill #30, the 1/8 holes common between the fwd flange of the left and right Baggage Rib Assemblies, and the F-807 Bulkhead Assembly.
- Final-Drill #30, the 1/8 holes common between the F-807 Bulkhead Assembly and the F-00860C-L-2 Aft Left Armrest and F-860C-R-1 Aft Right Armrest.
- Remove the clecos from the right side of the F-807-1 Bulkhead Assembly and cleco the F-824-R-1 Aft Side Skin to the mid fuselage. **NOTE: The top edge of the aft side skin aligns with the top edge of the right F-823-1 Mid Side Skin, and the two rows of holes on the fwd edge of the aft side skin are common with the two rows of holes on the aft edge of the mid side skin.**
- Repeat the previous step with the F-824-L-1 Aft Side Skin.
- Cleco the F-808-1 Bulkhead Assembly in place on the F-818-L-1 & -R-1 Baggage Rib Assemblies and the F-824-L-1 & -R-1 Aft Side Skins.
- Cleco the F-809 & F-810 Bulkhead Assemblies in place on the F-824-L-1 & -R-1 Aft Side Skins.
- Final-Drill #30, the 1/8 holes common between the aft flange of the F-818-L-1 & -R-1 Baggage Rib Assemblies and the F-808-1 Bulkhead Assembly.

- Cleco the F-828-1 Aft Bottom Skin in place on the F-811-1 Bulkhead Assembly and F-812-1 Bulkhead Assembly (See "Side View and Bottom View", DWG 74). Cleco the sides of the aft bottom skin to the Lower Longerons, and F-824-L-1 & -R-1 Aft Side Skins. **NOTE: The side edges of the aft bottom skin are sandwiched between the F-889-L-1 & -R-1 Lower Longerons and the F-824-L-1 & -R-1 Aft Side Skins. The fwd edge of the aft bottom skin is sandwiched between the F-842-1 Aft Bottom Skin Fwd, and the F-810-1 Bulkhead Assembly.**
- Uncleco the aft portion of the F-826-1 Right Center Bottom Skin and F-827-1 Left Center Bottom Skin.
- Cleco the F-842-1 Aft Bottom Skin, Fwd in place on the bottom of the tail cone portion of the fuselage (See "Side View and Bottom View", DWG 74). **NOTE: The fwd edge of the aft bottom skin fwd, is sandwiched between the F-807-1 Bulkhead Assembly and the F-826-1 Aft Center Bottom Skin or F-827-1 Aft Center Bottom Skin, and the wrap around portion of the left and right F-823-1 Mid Side Skins. The side edges of the aft bottom skin, fwd are sandwiched between the F-889-L-1 & -R-1 Lower Longerons and the F-824-L-1 & -R-1 Aft Side Skins.** Slip the fwd end of the aft bottom skin fwd in place first. Then tilt the aft end of the

- aft bottom skin fwd, up and cleco one hole at the F-810-1 Bulkhead Assembly to hold it up while you adjust its alignment on the fuselage.
- Uncleco the upper 6 inches of the left and right F-820-L-1 & -R-1 Fwd Side Skins, F-823-1 Mid Side Skins, and F-824-L-1 & -R-1 Aft Side Skins to allow them to be peeled back for inserting the F-887-L-1 & -R-1 Upper Longerons.
- Insert the F-887-L-1 & -R-1 Upper Longerons into place on the fuselage assembly. If either of the upper longerons does not lie in their proper position without being forced, it should be removed, and bent or twisted until it correctly matches the diagrams on DWG 66. **NOTE: Because of the heavy material thickness, the flange ends on the center section bulkheads do not always form entirely. Check that the outboard sides of the upper longerons are flush with the outboard surface of the left and right F-804H-1 Center Section Side Plates. If they are not, reform the upper portion of the flange as needed.**
- Re cleco the upper portion of all the skins to capture the F-887-L-1 & -R-1 Upper Longerons in place.
- Smooth and deburr the two F-804N-1 Bulkhead Caps and the F-816A-L-1 & -R-1 Cockpit Rails (See "Left Cockpit Rail", DWG 72).
- Cleco the two F-804N-1 Bulkhead Caps in place on the fwd and aft center section bulkheads (Left Cockpit Rail view, DWG 72).
- Cleco the F-816A-L-1 & -R-1 Cockpit Rails in place. Put clecos in each of the six holes that are common with the top flange on the left and right center section fwd and aft bulkheads (Left Cockpit Rail view, DWG 72).
- Adjust the position of the F-887-L-1 & -R-1 Upper longerons so that the forward bend mark in each upper longeron is centered in the small notch on the fwd outboard edge of the F-816-L-1 & -R-1 Cockpit Rails.
- Cleco the F-848-1 Upper Longeron Gussets to the fwd flange of the F-804C-FL and -FR Center Section Fwd Bulkheads (Refer to Fwd Fuse Side Skins and Structure view, on DWG 67).
- Cleco the left and right F-845-1 & F-846-1 Gussets to the fwd flange of the F-804C-FL and -FR Center Section Fwd Bulkheads (See "Fwd Fuse Side Skins and Structure", DWG 67).
- Use two clamps, to clamp the F-887-L-1 & -R-1 Upper Longerons flush to both webs of the WD-802-L-1 & -R-1 Engine Mount Brackets.
- Clamp each F-848-1 Upper Longeron Gusset tightly against its associate F-887-L-1 or -R-1 Upper Longeron
- Use clamps as needed on the remaining portion of the F-887-L-1 & -R-1 Upper Longerons, to hold the fuselage side skins top edge flush to the vertex of the upper longeron for drilling.

#### **DRILLING FUSELAGE SKINS**

*Because of the thickness of some of the parts in the fuselage sub structure, and the presence of other parts with holes that must be matched, use care to always be square to the skin surface when drilling.*

*Many of the fuselage bulkheads have small tabs that are common with rivet holes in the fuselage longerons. When final-drilling these holes use a scrap piece of wood for a backup block to prevent the tabs from being pushed out of position.*

- **RV-8 Only:** Match-Drill #30, the 1/8 holes in the F-820-L-1 & -R-1 Fwd Side Skins through the F-843-L-1 & -R-1 Lower Longerons. The five fwd most holes will also be match-drilled to the WD-803-L-1 & -R-1 Engine Mount Brackets. Start drilling at the fwd end of the lower longeron and work towards the back (See, DWG 67). **NOTE: The fwd side skin is properly positioned relative to the lower longeron when the edge of the two tabs at the bottom of the skin, are aligned with the vertex of the lower longeron.**
- **RV-8 Only:** Position the F-844-L & -R Auxiliary Longerons so the previously drawn center lines are visible through all the corresponding holes in the F-820-L-1 & -R-1 Fwd Side Skins.
- **RV-8 Only:** Match-Drill #30, the 1/8 holes in the F-820-L-1 & -R-1 Fwd Side Skins that are common with the F-

- 844-L & -R Auxiliary Longerons. Match-Drill #40, the 3/32 holes in the F-820-L-1 & -R-1 Fwd Side Skins common with the F-844-L & -R Auxiliary Longerons.
- ❑ **RV-8 Only:** Match-Drill #30, the 1/8 holes in the F-820-L-1 & -R-1 Fwd Side Skins, that are common with the F-887-L-1 & -R-1 Upper Longerons, and the WD-802-L-1 & -R-1 Upper Engine Mount Brackets.
  - ❑ **RV-8 Only:** Match-Drill #30, the 1/8 holes in the F-801C-1 Upper Angle that are common with the F-887-L-1 & -R-1 Upper Longerons, and the WD-802-L-1 & -R-1 Upper Engine Mount Brackets (DWG 67). **NOTE: Be sure to drill square to the top web of the F-887-L-1 & -R-1 Upper Longerons.**
  - ❑ **RV-8 Only:** Match-Drill #40, the 3/32 holes in the F-820-L-1 & -R-1 Fwd Side Skins, which are common with the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ **RV-8 Only:** Final-Drill #19, the 1/8 holes in the F-820-L-1 & -R-1 Fwd Side Skins near the bottom of the L.G. Box Assemblies, for structural screws as called out in "Detail B", DWG 74.
  - ❑ **RV-8 Only:** Final-Drill #30, the 1/8 holes in the F-820-L-1 & -R-1 Fwd Side Skins not drilled in the previous steps.
  - ❑ **RV-8 Only:** Final-Drill #40, the 3/32 holes in the F-820-L-1 & -R-1 Fwd Side Skins not drilled in the previous steps.
  - ❑ **RV-8A Only:** Match-Drill #30, the 1/8 holes in the F-891-L-1 & -R-1 Fwd Side Skins through the F-843-L-1 & -R-1 Lower Longerons. The five fwd most holes will also be match-drilled to the WD-803-L-1 & -R-1 Lower Engine Mount Brackets. Start drilling at the fwd end of the lower longeron and work towards the back (See, DWG 67A). **NOTE: The fwd side skin is properly positioned relative to the lower longeron when the edge of the two tabs at the bottom of the skin, are aligned with the vertex of the lower longeron.**
  - ❑ **RV-8A Only:** Position the F-898-L & -R Auxiliary Longerons so the previously drawn center lines are visible through all the corresponding holes in the F-891-L-1 & -R-1 Fwd Side Skins.
  - ❑ **RV-8A Only:** Match-Drill #40, the 3/32 holes in the F-891-L-1 & -R-1 Fwd Side Skins common with the F-898-L & -R Auxiliary Longerons. Match-Drill #30, the 1/8 holes in the fwd side skins that are common with the auxiliary longerons and WD-803-L-1 & -R-1 Engine Mount Brackets.
  - ❑ **RV-8A Only:** Match-Drill #30, the 1/8 holes in the F-891-L-1 & -R-1 Fwd Side Skins, that are common with the F-887-L-1 & -R-1 Upper Longerons, and the WD-802-L-1 & -R-1 Upper Engine Mount Brackets.
  - ❑ **RV-8A Only:** Match-Drill #30, the 1/8 holes in the F-801C-1 Upper Angle, which are common with the F-887-L-1 & -R-1 Upper Longerons, and the WD-802-L-1 & -R-1 Upper Engine Mount Brackets. **NOTE: Be sure to drill square to the top web of the F-887-L-1 & -R-1 Upper Longerons.**
  - ❑ **RV-8A Only:** Match-Drill #40, the 3/32 holes in the F-891-L-1 & -R-1 Fwd Side Skins, which are common with the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ **RV-8A Only:** Final-Drill #40, the 3/32 holes in the F-891-L-1 & -R-1 Fwd Side Skins not drilled in the previous steps.
  - ❑ **RV-8A Only:** Final-Drill 3/16, the five bolt holes common between the F-891-L-1 & -R-1 Fwd Side Skins, F-843-L-1 & -R-1 Lower Longerons, F-895-L-1 & -R-1 Doubler Plates and aft flange on the WD-821-L-1 & -R-1 Landing Gear Weldments (See "Fwd Fuse Side Skins and Structure", DWG 67A).
  - ❑ **RV-8A Only:** Match-Drill #30, the two bolt holes common between the F-891-L-1 & -R-1 Fwd Side Skins, F-843-L-1 & -R-1 Lower Longerons, F-895-L-1 & -R-1 Doubler Plates and the fwd flange (foot) on the WD-821-L-1 & -R-1 Landing Gear Weldments using the two holes in the fwd flange as a guide. Cleco the first hole after you drill. Final-Drill 3/16, the holes match-drilled in this step. Drill from the outside. Install a temporary bolt after drilling the first hole, remove the cleco and final-drill the second hole.
  - ❑ Match-Drill #40, the 3/32 holes in the left and right F-823-1 Mid Side Skins, that are common with the F-887-L-1 & -R-1 Upper Longerons (DWG 69).
  - ❑ Final-Drill #30, the 1/8 holes, and #40 the 3/32 holes, in the left and right F-823-1 Mid Side Skins, that were not drilled previously.
  - ❑ Final-Drill #40, the 3/32 holes not yet drilled at the aft end of the F-826-1 Right Center Bottom Skin, and F-827-1 Left Center Bottom Skin.
  - ❑ Final-Drill #40, the 3/32 holes in the F-842-1 Aft Bottom Skin Fwd (See "Side View and Bottom View", DWG 74)
  - ❑ Final-Drill #40, the 3/32 holes in the F-828-1 Aft Bottom Skin.
  - ❑ Match-Drill #40, the 3/32 holes in the F-824-L-1 & -R-1 Aft Side Skins, which are common with the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ Final-Drill #40, the 3/32 holes in the F-824-L-1 & -R-1 Aft Side Skins that are common with the left and right F-

- 888-1 Aft Mid Longerons, and F-889-1 Aft Lower Longerons.
- ❑ Final-Drill #40, all 3/32 holes in the F-824-L-1 & -R-1 Aft Side Skins that were not drilled in the two previous steps.
  - ❑ Reposition the fuselage to some short sawhorses sized to allow you to comfortably reach to the bottom floor area of the cockpit. The fuselage can be safely supported below the F-843-L-1 & -R-1 Lower Longerons and the F-828-1 Aft Bottom Skin.
  - ❑ Final-Drill #30, the 1/8 holes in the F-826-1 Right Center Bottom Skin, the F-827-1 Left Center Bottom Skin, and the F-822-1 (RV-8) or F-890-1 (RV-8A) Fwd Floor Panel that are common with the holes in the fwd and aft bottom flanges of the F-804 Center Section Assembly. Match-Drill #40, the four 3/32 holes centered on the bottom of the F-804 Center Section Bulkhead Assembly. Two of the holes are in the F-826-1 Right Center Bottom Skin, and two of the holes are in the F-827-1 Left Center Bottom Skin.
  - ❑ Temporarily cleco the F-807B-1, F-808B-1, F-809B-1 and F-810A-1 Bulkhead Tops to their corresponding bulkhead sections as shown on DWG 70. Cleco the F-825-1 Aft Top Skin to the F-807B-1, F-808B-1, F-809B-1 and F-810A-1 Bulkhead Tops and the F-887-L-1 & -R-1 Upper Longerons (See "Side View and Top View", DWG 74). **NOTE: Clecoing on the aft top skin will correctly align the fuselage for drilling the remaining parts.**
  - ❑ Fit the F-819-1 Aft Deck to the top of the F-887-L-1 & -R-1 Upper Longerons at the aft fuselage, and cleco it to the F-810 Bulkhead Assembly with the F-810D-1 Spacer in place (See "Detail E", DWG 71). Position the aft end of the aft deck so that it is **centered** on the fuselage and then clamp it in place. Use a pen to transfer the position of the notches in the aft deck for the F-811B-1 Stab Attach Bars, to the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ Match-Drill #30, the 1/8 holes in the F-819-1 Aft Deck that are common with the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ Mark the location of the aft face of the F-812 Bulkhead assembly, on the F-887-L-1 & -R-1 Longerons for later trimming as shown in "Detail G", DWG 71.
  - ❑ Cleco the F-812B-1 Angle / Control Stop in position on the F-819-1 Aft Deck. Cleco the F-811C-1 Angle, and F-811D-1 Spacer / Control Stop in place on the bottom of the aft deck (See "Detail E", DWG 71).
  - ❑ Final-Drill #12, the two holes in the F-812B-1 Angle / Control Stop that receive AN3 bolts. Slip a temporary bolt in each hole as you drill.
  - ❑ Final-Drill #30, the 1/8 holes in the F-812B-1 Angle / Control Stop. Final-Drill #30, the 1/8 holes in the F-819-1 Aft Deck that are common with the F-811 and F-810 Bulkhead Assemblies.
  - ❑ Verify there is a cleco in every hole in the upper portion of the F-804N-1 Bulkhead Caps.
  - ❑ Verify that the F-823-1 Mid Side Skins are flush against the sides of the F-887-L-1 & -R-1 Upper Longerons. Cleco every hole if needed.
  - ❑ Align the outboard edge of the F-816-L-1 & -R-1 Cockpit Rails so they are flush with the outer surface of the F-823-1 Mid Side Skins and clamp in position. **NOTE: Pay particular attention to the fwd end of the cockpit rail.**
  - ❑ Match-Drill #40, the F-887-L-1 & -R-1 Upper Longerons using the 3/32 holes in the F-816-L-1 & -R-1 Cockpit Rails as a guide. Be sure to drill square to the top surface of the longeron.
  - ❑ Final-Drill #40, the 3/32 holes common between the F-816-L-1 & -R-1 Cockpit Rails, and the top flanges of the F-804C-FL & FR Center Section Fwd Bulkheads and F-804C-AL & AR Center Section Aft Bulkheads.
  - ❑ **RV-8 Only: NOTE: Align the outboard edge of each landing gear box web flush with the vertex of its associated upper longeron. Wrap a ratchet type cargo strap around the fuselage where the F-802-1 Landing Gear Box Assemblies are located and then ratchet it just tight enough to align the longeron vertexes with the edges of the landing gear box webs.** Match Drill #30, the five holes at the top of the F-802C-L-1 & -R-1 Landing Gear Box Web to the F-887-L-1 & -R-1 Upper Longerons (See "Fwd Fuse Side Skins and Structure", DWG 67).
  - ❑ Cleco an F-817-L-1 Seat Back Support Plate in place on the F-806A-L-1 Left Fuselage Bulkhead and F-805-L-1 Left Fuselage Bulkhead (See "Left Cockpit Rail", DWG 72). Repeat this step with the seat back support plate for the right side of the fuselage.
  - ❑ Final-Drill #30, the 1/8 holes common between the F-817-L-1 & -R-1 Seat Back Support Plates and the F-806A-L-1 & -R-1 Left and Right Fuselage Side Bulkheads and F-805-L-1 & -R-1 Left and Right Fuselage Side Bulkheads.
  - ❑ Separate the two F-856-1 Spacers from each other, then smooth and deburr the edges (See "F-856-1 Spac-

- ers" , DWG 72).
- ❑ Cleco an F-856-1 Spacer in position on the bottom of the F-816-L-1 & -R-1 Cockpit Rails (See "Detail A", DWG 72).
  - ❑ Cleco the WD-808 Front Seatback Support in place between the F-817-L-1 & -R-1 Seat Back Support Plates. **NOTE: If you do not have any 3/16 clecos, final-drill #12 a couple matching holes in the front seatback support and the seat back side plates, then insert temporary bolts to hold the assembly in position.**
  - ❑ Match-Drill #30 the two 1/8 holes in each foot of the WD-808 Front Seatback Support, up through the F-856-1 Spacer and F-816-L-1 & -R-1 Cockpit Rail. Cleco each hole as you drill. Match-Drill #30, all holes in the cockpit rail that are common with the front seatback support. Cleco as you drill. Final-Drill #30, all remaining 1/8 holes common between each cockpit rail and its associated spacer.
  - ❑ Final-Drill #19, the previously drilled #30 holes common between the WD-808 Front Seatback Support and the F-816-L-1 & -R-1, that are called out to receive AN509 screws. (See "Detail A", DWG 72)
  - ❑ Final-Drill #12, the four 3/16 holes in each foot of the WD-808 Front Seatback Support that are common with holes in the F-817-L-1 & -R-1 Seat Back Support Plates.
  - ❑ Final-Drill #30, the 1/8 holes in the two F-804N-1 Bulkhead Caps.
  - ❑ Remove the F-804N-1 Bulkhead Caps from the fuselage.
  - ❑ Final-Drill #40, the nutplate attachment rivet holes in the F-824A-1 Aft Side Skins, that are used for attaching the F-824B Cover Plates.
  - ❑ Cleco the F-886-L-1 & -R-1 Rudder Stops in place on the aft fuselage and final-drill #30 the 1/8 attach holes (See "Detail H", DWG 71).
  - ❑ **RV-8 Only:** Uncleco the F-812 Bulkhead Assembly, and F-828-1 Aft Bottom Skin, and remove them from the fuselage (DWG 71 & 74). **NOTE: Push the bottom portion of the F-810 Bulkhead Assembly fwd slightly to make the aft bottom skin pull out more easily.**
  - ❑ **RV-8 Only:** Cleco every other rivet hole in the F-819-1 Aft Deck, and the portion of the F-824-L-1 & -R-1 Aft Side Skins, that are aft of the F-810 Bulkhead Assembly, to help stiffen this area while the WD-409 Tail Spring Mount is being fitted.
  - ❑ **RV-8 Only:** Cleco the WD-409 Tail Spring Mount to the F-812 Bulkhead Assembly at the two previously machine countersunk hole locations (DWG 73).
  - ❑ **RV-8 Only:** Make a mark above each WD-409 Tail Spring Mount attachment bolt hole, on the aft side of the F-811 Bulkhead assembly, to use for locating the tail spring mount at the proper elevation (See "View B-B", DWG 73).
  - ❑ **RV-8 Only:** Cleco the F-812 Bulkhead and WD-409 Tail Spring Mount in place on the fuselage.
  - ❑ **RV-8 Only:** Make shims 3/4 square from scrap aluminum to shim any gap between the WD-409 Tail Spring Mount and the F-811 Bulkhead Assembly.
  - ❑ **RV-8 Only:** Clamp the fwd end of the WD-409 Tail Spring Mount to the F-811 Bulkhead Assembly. Use the previously made marks to set the vertical position. **NOTE: Sight through the tube on the tail spring mount, and center the bottom F-810 Bulkhead Assembly tooling hole to locate the tail spring mounts correct lateral position.**
  - ❑ **RV-8 Only:** Match-Drill #30, the two bolt hole locations common between the F-811 Bulkhead Assembly, the WD-409 Tail Spring Mount, and any shims that are in place.
  - ❑ **RV-8 Only:** Use Detail C on DWG 73 as a full size template to mark the F-828-1 Aft Bottom Skin for the trimming required to clear the WD-409 Tail Spring Mount. Remove the marked portion of the aft bottom skin, then smooth and deburr.
  - ❑ **RV-8 Only:** Final-Drill 3/4, the 3/32 hole in the F-828-1 Aft Bottom Skin shown in the "F-828-1 Tail Wheel Spring Trim", DWG 73.
  - ❑ **RV-8 Only:** Re-cleco the F-828-1 Aft Bottom Skin on the fuselage to verify their is no interference with the WD-409 Tail Spring Mount. Enlarge the opening in the aft bottom skin if / as required.
  - ❑ Uncleco and remove the F-825-1 Aft Top Skin, and the F-807B-1, F-808B-1, F-809B-1 and F-8010A-1 Bulkhead Tops.
  - ❑ Uncleco and remove the F-812B-1 Angle / Control Stop, F-886-L-1 & -R-1 Rudder Stops, and F-819-1 Aft Deck (DWG 71).
  - ❑ Uncleco and remove the WD-808 Front Seatback Support and F-856-1 Spacers. Mark the top side of each

- spacer (DWG 72).
- ❑ Uncleco and remove the F-816A-L-1 & -R-1 Cockpit Rails and F-817-L-1 & -R-1 Seat Back Support Plates.
  - ❑ Reposition the fuselage back to sitting upright on the worktable.
  - ❑ Remove both of the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ Uncleco and remove all of the parts for the tail cone in the reverse order of what they were installed.
  - ❑ Uncleco and remove the F-823-L-1 & -R-1 Mid Side Skins, and all other related parts that are attached to the Seat Rib Assembly with clecos.
  - ❑ Uncleco and remove the Seat Rib Assembly from the Center Section Assembly.
  - ❑ Re-cleco the F-822-1 (RV-8) or F-890-1 (RV-8A) Fwd Floor Panel to the fwd and aft bottom flanges of the Center Section Assembly. Cleco from the inside of the fuselage.
  - ❑ Reposition the Fwd Fuselage Sub Structure and Center Section Assembly so that the two rows of rivet holes that are common with the fwd and aft bottom flanges of the F-804 Center Section Bulkhead Assembly, overhang the edge of the table and are accessible from the bottom. Put some ballast weight inside to prevent it from tipping off the edge of the table.
  - ❑ Machine countersink for dimples, the #30 holes in the F-822-1 (RV-8) or F-890-1 (RV-8A) Fwd Floor Panel that are common with holes in the fwd and aft bottom flanges of the Center Section Assembly. These holes will accept dimples in the common holes in the F-826-1 Left Center Bottom Skin and F-827-1 Right Center Bottom Skin.
  - ❑ Uncleco and remove the F-820-L-1 (RV-8) or F-891-L-1 (RV-8A) Fwd Side Skins, from the Center Section Assembly, and the Fwd Fuselage Sub Structure. **NOTE: Remove only the skin, re-cleco all sub-structure parts back to their respective locations.**
  - ❑ **RV-8A Only:** Cleco the F-880C-L-1 Fwd Seat Ramp Rib to the F-8112-L-1 Mid Cabin Cover Support (Aft Iso View, DWG 67A). Temporarily mount the fwd seat ramp rib / mid cabin cover support assembly to the F-802R-L-1 Fuselage Bulkhead and the top of the WD-821-L Landing Gear Weldment using screws (See "Fwd Fuse Side Skins and Structure", DWG 67A & 68A)
  - ❑ Clamp the F-883-1 (RV-8) or F-883A-1 (RV-8A) Fuel Valve Bracket in position as shown in Fuel Valve Bracket Installation view on DWG 68 or 68A. **NOTE: Shorten the fuel valve bracket at the outboard end slightly if it is too long.**
  - ❑ Mark the F-844-L (RV-8) or F-898-L (RV-8A) Auxiliary Longerons for the screw locations common between it and the F-883-1 (RV-8) or F-883A-1 (RV-8A) Fuel Valve Bracket.
  - ❑ Drill #19, the holes marked in the previous step. **NOTE: Do not match-drill the holes in the F-883-1 or F-883A-1 Fuel Valve Bracket that are common with the F-878-L-1 (RV-8) or F-8112-L-1 (RV-8A) Mid Cabin Brace. They will be done after the fuselage side skin has been riveted to allow for any lateral movement that takes place.**
  - ❑ **RV-8 Only:** Unbolt and/or uncleco and remove all unriveted parts that are in place on the Fwd Fuselage Sub Structure.
  - ❑ **RV-8A Only:** Unbolt and/or uncleco and remove all unriveted parts that are in place on the Fwd Fuselage Sub Structure except for the F-843-L-1 & -R-1 Lower Longerons.
  - ❑ **RV-8A Only:** Match-Drill #30, the three 1/8 holes in the F-890-1 Fwd Floor Panel not drilled previously that are common with the F-843-L-1 & -R-1 Lower Longerons.

#### **PREPARING FUSELAGE PARTS FOR FINAL ASSEMBLY**

*In the following steps, portions of the substructure will be machine countersunk to accept dimple countersunk rivet holes or screw holes in the skins, and other portions will be dimple countersunk. Refer to DWG 74 or DWG 74A for the skin rivet callout diagrams to determine which rivet hole locations use round head rivets, and which locations use flush rivets or flush screws. All of the holes in skins will be dimple countersunk, except where specifically told to machine countersink.*

- ❑ **RV-8 Only:** Machine countersink for dimples, the #30 holes in the F-843-L-1 & -R-1 Lower Longerons side webs, that are common with #30 dimple countersunk holes in the bottom edge of the F-820-L-1 & -R-1 Fwd Side Skins (Refer to DWG 67 & 74).
- ❑ **RV-8 Only:** Machine countersink for a dimple, the five #30 holes in the bottom web of the F-843-L-1 & -R-1 Lower Longerons that are common with dimple countersunk holes in the F-822-1 Fwd Floor Panel that will

- receive AN426 rivets (F-843-1 Details, DWG 67).
- ❑ **RV-8 Only:** Machine countersink for dimples, the #30 holes in the F-844-L & -R Auxiliary Longerons side webs, that are common with #30 dimple countersunk holes in the F-820-L-1 & -R-1 Fwd Side Skins.
  - ❑ **RV-8 Only:** Machine countersink for dimples, the #30 holes in the F-802D-L-1 & -R-1 L. G. Box Plates, that are common with dimple countersunk #30 rivet holes in the F-820-L-1 & -R-1 Fwd Side Skins.
  - ❑ **RV-8 Only:** Machine countersink for dimples, the #40 holes in the F-844-L & -R Auxiliary Longerons side webs, that are common with #40 dimple countersunk holes in the F-820-L-1 & -R-1 Fwd Side Skins.
  - ❑ Machine countersink for flush rivets, the inboard side of the #30 holes in the F-817-L-1 & -R-1 Seat Back Support Plates (DWG 72).
  - ❑ **RV-8A Only:** Machine countersink for dimples, the #30 holes in the F-843-L-1 & -R-1 Lower Longeron side webs, that are common with #30 dimple countersunk holes in the bottom edge of the F-891-L-1 & -R-1 Fwd Side Skins (See DWG 67A & 74A).
  - ❑ **RV-8A Only:** Machine countersink for dimples, the #30 holes in the F-898-L & -R Auxiliary Longeron side webs, that are common with #30 dimple countersunk holes in the F-891-L-1 & -R-1 Fwd Side Skins.
  - ❑ **RV-8A Only:** Machine-Countersink the three aft most #30 holes in the F-843-L-1 & -R-1 that are common with the F-890-1 Fwd Floor Panel, for flush rivet heads on the top surface. This is to provide a flat surface for the contact area of the WD-821-L-1 & -R-1 Landing Gear Weldments (See Aft Iso View, DWG 67A).
  - ❑ **RV-8A Only:** Machine countersink for dimples, the #40 holes in the F-898-L & -R Auxiliary Longeron side webs, that are common with #40 dimple countersunk holes in the F-891-L-1 & -R-1 Fwd Side Skins.
  - ❑ With the left and right F-804H-1 Center Section Side Plates still clecoed to the Center Section Assembly, machine countersink for dimples, the #40 holes in each side plate that are common with dimple countersunk #40 holes in the left and right F-823-1 Mid Side Skins.
  - ❑ Machine countersink for dimples, the #30 holes in the top surface of each F-856-1 Spacer (See "Detail A", DWG 72).
  - ❑ Machine countersink for dimples, the #19 holes in the top surface of each F-856-1 Spacer (See "Detail A", DWG 72).
  - ❑ **RV-8 Only:** Machine countersink for dimples, the #19 screw holes in the F-843-L-1 & -R-1 Lower Longeron side webs, that are common with dimple countersunk screw holes in the F-820-L-1 & -R-1 Fwd Side Skins (DWG 74).
  - ❑ **RV-8 Only:** Machine countersink for flush screws, the top web of the F-844-L Auxiliary Longeron at the #19 holes common with the F-883-1 Fuel Valve Bracket (DWG 68).
  - ❑ **RV-8A Only:** Machine countersink for flush screws, the top web of the F-898-L Auxiliary Longeron at the #19 holes common with the F-883A-1 Fuel Valve Bracket (DWG 68A).
  - ❑ **RV-8 Only:** Machine countersink for dimples, the #19 screw holes in the F-802D-L-1 & -R-1 L. G. box plates, that are common with dimple countersunk #19 screw holes in the F-820-L-1 & -R-1 Fwd Side Skins.
  - ❑ **RV-8 Only:** Remove the two screws and the two temporarily installed bolts from the F-843-L-1 & -R-1 Lower Longérons.
  - ❑ Uncleco and remove, all remaining parts attached to the Center Section Assembly and the Fwd Fuselage Sub Structure with clecos.
  - ❑ Machine countersink for dimples, the #40 holes in the left and right F-857C Angles that are common with dimple countersunk #40 holes in the F-824-L-1 & -R-1 Aft Side Skins (See "Detail D", DWG 71).
  - ❑ Machine countersink for a flush rivet, the #30 rivet hole in each F-814C-1 Inboard Seat Rib Angle, used for attaching the F-805B-L-1 & -R-1 Floor Support Angles (See "Detail D", DWG 69).
  - ❑ Machine countersink for dimples, the #40 holes in the F-888 Aft Mid Longérons and the F-889 Aft Lower Longérons that are common with dimple countersunk holes in the F-824-L-1 & -R-1 Aft Side Skins.
  - ❑ **RV-8 Only:** Machine countersink #30 for dimples, the five #30 holes in the tab at the fwd end of the F-889-L-1 & -R-1 Aft Lower longérons (DWG 71).
  - ❑ **RV-8A Only:** Machine countersink #30 for dimples, the five #30 holes in the tab at the fwd end of only the F-889-R-1 Aft Lower longeron (DWG 71).
  - ❑ **RV-8A Only:** Machine countersink the two #40 holes in the F-895B-1 Spacers to accept dimples in the F-891-L-

- 1 & -R-1 Fwd Side Skins.
  - ❑ Machine countersink for dimples, the #40 holes in the top web of the F-887-L-1 & -R-1 Upper Longérons that are common with #40 dimple-countersunk holes in the F-816A-L-1 & -R-1 Cockpit Rails. **NOTE: Do not machine countersink two of the holes near the aft end of each cockpit rail are marked do not rivet (See "Left Cockpit Rail", DWG 72).**
  - ❑ Machine countersink #40 for dimples, all of the #40 holes in the side web of the F-887-L-1 & -R-1 Upper Longérons.
  - ❑ Machine countersink #30 for dimples, the #30 holes on the side web of the F-887-L-1 & -R-1 Upper Longérons, that are common with the WD-802-L-1 & -R-1 Upper Engine Mount Brackets and #30 dimple countersunk holes in the F-820-L-1 & -R-1 Fwd Side Skins. **CAUTION: Do not machine- countersink the holes in the top web of the upper longérons that are common with the F-801C-1 Upper Angle (See "Fwd Fuse Skins and Structure", DWG 67).**
  - ❑ Deburr all match-drilled and final drilled holes in all the loose fuselage substructure parts.
  - ❑ Deburr all holes in all fuselage skins.
  - ❑ Trim the two indexing tabs from the bottom of the F-820-L-1 & -R-1 (RV-8) or F-891-L-1 & -R-1 (RV-8A) Fwd Side Skins, and deburr the area where they were removed.
  - ❑ Deburr the holes in the fwd and aft bottom flanges of the Center Section Bulkhead Assembly.
  - ❑ Deburr the #30 holes in the F-814E-L-1 & -R-1 Seat Ramp Supports that were final-drilled to the Fwd Inboard Seat Rib Assemblies. Deburr the corresponding holes in the Fwd Inboard Seat Rib Assemblies.
  - ❑ Deburr the rivet holes at the fwd and aft ends of F-826-1 and F-827-1 Mid Bottom skins.
  - ❑ Deburr all open rivet holes on Fwd Fuselage Sub Structure.
- Refer to DWG 74 or 74A for the following steps, to identify which holes in the fuselage skins need to be dimple countersunk for flush rivets.*
- ❑ Dimple countersink the #40 holes in the Firewall Assembly side flanges that are common with dimple countersunk holes in the F-820-L-1 & -R-1 (RV-8) or F-891-L-1 & -R-1 (RV-8A) Fwd Side Skins.
  - ❑ Dimple countersink #40, the side flanges of the F-866A-1 Lower Fwd Baggage Bulkhead. **NOTE: Do not dimple countersink the small tabs at the top, which nest behind the F-887-L-1 & -R-1 Upper Longérons.**
  - ❑ **RV-8A Only:** Dimple countersink the #40 holes in the F-802R-L-1 & -R-1 Fuselage Bulkheads that are common with holes in the F-891-L-1 & -R-1 Fwd Side Skins.
  - ❑ Dimple countersink the four #40 holes at the center aft end of the F-822-1 (RV-8) or F-890-1 (RV-8A) Fwd Floor Panel that are located between the rows of holes common to the fwd and aft bottom flanges of the Center Section Bulkhead Assembly. Two of these holes are common with two holes in the F-826-1 Right Center Bottom Skin, and the other two holes are common with two holes in the F-827-1 Left Center Bottom Skin.
  - ❑ **RV-8 Only:** Dimple countersink the five #30 holes on each side of the F-822-1 Fwd Floor Panel that are common with the previously machine countersunk holes in the bottom web of the F-843-L-1 & -R-1 Lower Longérons (See "F-843-1 Details", DWG 67).
  - ❑ Dimple countersink the #40 holes in the F870E-1 Skin Stiffener, F-870B-1 Outboard Stiffener (DWG 63 or 63A).
  - ❑ **RV-8 Only:** Final-Drill #40, then deburr, the nutplate attachment rivet holes on the F-864C-1 and F-865B-1 Throttle Quadrant Angles (See "Throttle Quadrant Assembly view and Right Console Assembly", DWG 68).
  - ❑ **RV-8 Only:** Dimple-countersink the #40 holes in the F-865B-1 Angle, and F-864C-1 Throttle Quadrant Angles that are common with dimpled countersunk holes in the F-820-L-1 & -R-1 Fwd Side Skins (DWG 68). Dimple Countersink #40, the nutplate attachment rivet holes in the throttle quadrant angles.
  - ❑ **RV-8A Only:** Final-Drill #40, then deburr, the nutplate attachment rivet holes on the F-8100C-1 and F-8101B-1 Throttle Quadrant Angles (See "Throttle Quadrant Assembly" and "Right Console Assembly", DWG 68A).
  - ❑ **RV-8A Only:** Dimple countersink the #40 holes in the F-8100B-1 Angle, and F-8101C-1 Angle that are common with dimpled countersunk holes in the F-891-L-1 & -R-1 Fwd Side Skins (DWG 68A). Dimple Countersink #40, the nutplate attachment rivet holes in the F-8100B-1 Angle, and F-8101C-1 Angle.
  - ❑ Dimple countersink the #40 holes in the F-860A-L-1 & -R-1 Fwd Arm Rests, F-860B-L-1 & -R-1 Mid Arm Rests, and F-00860C-L-2 & F-860C-R-1 Aft Arm Rests that are common with dimple countersunk holes in the left and right F-823-1 Mid Side Skins (DWG 69 & 74 or 74A).
  - ❑ Dimple countersink the #40 holes in the F-805-L-1 & -R-1 Fuselage Bulkheads, and the holes in the F-806-L-1 & -R-1 Fuselage Bulkheads, that are common with dimple countersunk holes in the left and right F-823-1 Mid

- Side Skins. **NOTE: Do not dimple countersink the small tabs at the top, which nest behind the F-887-L-1 & -R-1 Upper Longerons.**
- ❑ Dimple countersink the #40 holes in the F-815A-L-1 & -R-1 Fwd Outboard Seat Ribs, and F-815B-L-1 & -R-1 Aft Outboard Seat Ribs, that are common with dimple countersunk holes in the left and right F-823-1 Mid Side Skins.
  - ❑ Dimple countersink #40, the rivet holes in the F-815C-L-1 & -R-1 Angles that are common with dimple countersunk holes in the left and right F-823-1 Mid Side Skins.
  - ❑ Dimple countersink the #40 holes in the flanges of the F-807A-1, F-808-1, F-809-1, F-810B-1, F-811A-1 & E-1, and the F-812A-1 & C-1 Bulkheads that are common with dimple countersunk holes in the F-842-1 Aft Bottom Skin Fwd, F-828-1 Aft Bottom Skin, and the left and right F-824-1 Aft Side Skins. **NOTE: Do not dimple-countersink holes in the small tabs that are common with the F-887-L-1 & -R-1 Upper Longerons, F-888-L-1 & -R-1 Mid Longerons, or F-889-L-1 & -R-1 Lower Longerons.**
  - ❑ Dimple countersink the #40 holes in the bottom flange of the F-818A-L-1 & -R-1 Baggage Ribs that are common with dimple countersunk holes in the F-842-1 Aft Bottom Skin Fwd (DWG 71 & 74 or 74A).
  - ❑ Dimple countersink the #19 holes in the F-824-L-1 & -R-1 Aft Side Skins, for # 8 screws for the rudder cable exit guide clamp attachment (DWG 74 or 74A).
  - ❑ Dimple countersink the F-824B Cover Plate attachment screw holes located at the inspection cover openings at the aft end of the left and right F-824-1 Rear Side Skins, for #6 screws (Detail A, DWG 74 or 74A). Dimple countersink the #40 nutplate attachment rivet holes.
  - ❑ **RV-8 Only:** Dimple-countersink the #19 screw holes in the F-820-L-1 & -R-1 Fwd Side Skins for #8 screws.
  - ❑ Apply a slight roll to some edges of the fuselage skins before they are dimpled, to provide a flush fit to the underlying skin (refer to LAP JOINTS in section 5 of the construction manual). Roll the aft edge of the F-820-L-1 & -R-1 (RV-8) or F-891-L-1 & -R-1 (RV-8A) Fwd Side Skins. Roll the aft edge of the left and right F-823-1 Mid Side Skins. Roll the aft edge of the F-826-1 Right and F-827-1 Left Center Bottom Skins. Roll the bottom edge of the F-824-L-1 & -R-1 Aft Side Skins. Roll the aft edge of the F-842-1 Aft Bottom Skin Fwd.
  - ❑ Dimple countersink the #40 holes at the aft end of the F-827-1 Left Center Bottom Skin, and F-826-1 Right Center Bottom Skin.
  - ❑ Dimple countersink the #30 holes at the fwd end of the F-827-1 Left Center Bottom Skin, and F-826-1 Right Center Bottom Skin, that are common with holes in the fwd and aft bottom flanges of the Center Section Assembly. Dimple countersink the two #40 holes at the fwd end of the left center and right center bottom skins, that are positioned between the two rows of holes that are common with the fwd and aft Center Section Bulkhead Assemblies bottom flanges.
  - ❑ Dimple countersink the #30 and #40 rivet holes in all the exterior fuselage skins that are designated for flush rivets (Refer to rivet callout details, DWG 74 or 74A). **CAUTION: The #30 holes at the fwd end of the F-842-1 Aft Bottom Skin Fwd for an RV-8A should not be dimpled on the left side because of the step installation (See "Detail C", DWG 71).**
  - ❑ Dimple countersink the #30 and #40 holes in the F-816A-L-1 & -R-1 Cockpit Rails. **NOTE: Two holes near the aft end do not get dimpled (See "Left Cockpit Rail", DWG 72).** Dimple countersink the three #40 holes in the flange at the top of the F-804C-FL & FR Center Section Bulkheads, and the F-804C-AR & AL Center Section Bulkheads, that are common with dimpled holes in the cockpit rails.
  - ❑ Dimple countersink the four #19 holes in the F-816A-L-1 & -R-1 Cockpit Rails for #8 flush head screws.
  - ❑ Make notches in the F-887-L-1 & -R-1 Upper Longerons for the F-811C-1 Horizontal Stab Attach Bars as shown in "Detail A", DWG 66. Use the pen lines previously located by the notches in the F-819-1 Aft Deck, as the reference for locating the notches in the upper longerons.
  - ❑ Trim the aft end of the F-887-L-1 & -R-1 Upper Longerons as shown in "Detail G", DWG 71.
  - ❑ Prime the F-887-L-1 & -R-1 Upper Longerons, F-844-L & -R (RV-8) or F-898-L & -R (RV-8A) Auxiliary Longerons, F-843-L and -R-1 Lower Longerons, and the left and right F-857C Seat Belt Angles. Prime all other parts if/as desired.

#### **FUSELAGE FINAL ASSEMBLY**

- ❑ **RV-8 Only:** Cleco the F-843-L-1 & -R-1 Lower Longerons to the F-822-1 Fwd Fuselage Sub Structure (DWG 67). Install the two screws and the four bolts in the bottom web of each lower longeron. Rivet the lower longerons to the F-822-1 Fwd Floor Panel.
- ❑ **RV-8 Only:** Fit the Fwd Fuselage Sub Structure to the Center Section Assembly. Cleco the bottom flanges of the center section assembly from the inside. Rivet the nutplate to each mid cabin brace and the top flange of

- the center section assembly. Rivet and bolt the F-878-L-1 & -R-1 Mid Cabin Braces to the center section assembly (See "Detail A", DWG 67).
- ❑ **RV-8A Only: NOTE: Do not rivet the two holes in each lower longeron that are also common with the F-802W-L-1 & -R-1 Longerons Clips in this step.** Cleco the F-843-L-1 & -R-1 Lower Longerons to the F-890-1 Fwd Floor Panel (DWG 67A). Install the four bolts at the fwd end of each lower longeron. Rivet the lower longerons to the fwd floor panel.
- ❑ **RV-8A Only:** Fit the Fwd Fuselage Sub Structure to the Center Section Assembly. Cleco the bottom flanges of the center section assembly from the inside.
- ❑ Remove the nut from the bottom bolt in each F-814E-1 Seat Ramp Supports, and push the bolt forward just enough to allow clearance for bucking the bottom rivet common between the seat ramp support and the F-814A-L-1 & -R-1 Forward Inboard Seat Rib Assemblies. Cleco the Seat Rib Subassembly to the F-804 Center Section Subassembly. Rivet the F-814A-L-1 & -R-1 Forward Inboard Seat Rib Assemblies to the F-814E-L-1 & -R-1 Seat Ramp Sub Assemblies (See "Detail C", DWG 69). Reinstall the washers and nut (once again only finger tight) on each of the bottom bolts.
- ❑ Cleco the F-815A-L-1 & -R-1 Fwd Outboard Seat Ribs, and the F-815B-L-1 & -R-1 Aft Outboard Seat Ribs to the Seat Rib Assembly from the inside. Install the F-806E Spacer and Bolt at each F-815 outboard seat rib (See "Detail A", DWG 69). Rivet the fwd outboard, and aft outboard seat ribs to the F-806B-1 Rear Spar Attach Bulkhead.
- ❑ Rivet the F-815A-L-1 & -R-1 Fwd Outboard Seat Ribs to the F-826-1 Left Center Bottom Skin and F-827-1 Right Center Bottom Skin (DWG 74).
- ❑ Rivet the F-805G-1 Gussets to the F-805-L-1 & -R-1 Bulkheads (See "Detail B", DWG 69).
- ❑ Dimple countersink the attachment rivet holes in the nutplates then rivet them to the F-00860C-L-2 & F-860C-R-1 Aft Arm Rest (DWG 69).
- ❑ Rivet the three nutplates to the F-806A-L-1 & -R-1 Fuselage Bulkhead.
- ❑ Cleco and then rivet, the F-806A-L-1 and F-805-L-1 Fuselage Bulkheads to the F-860B-L-1 Mid Left Arm Rest (See "Left and Right Arm Rest Rivets", DWG 69). Repeat this step for the right side of the aircraft.
- ❑ Cleco and rivet the F-00860C-L-2 Aft Arm Rest, and the F-860A-L-1 Fwd Arm Rest, in place on the F-806A-L-1 and F-805-L-1 Fuselage Bulkheads as shown in the "Left and Right Arm Rest Rivets", DWG 69. Repeat this step with the same parts for the right side.
- ❑ Back rivet the Arm Rest Assemblies except the **F-00860C-L-2 & F-860C-R-1 Aft Arm**, to the left and right F-823-1 Mid Side Skins.
- ❑ Rivet the nutplates to the F-815C-L-1 & -R-1 Outboard Seat Rib Angles (See "Detail B & E", DWG 69).
- ❑ **Cleco** the F-815C-1 Outboard Seat Rib Angle, F-804H-1 Center Section Side Plate, F-887-L-1 & -R-1 Upper Longerons and F-823-1 Mid Side Skin / Arm Rest Assemblies, to each side of the Center Section and Seat Rib Assemblies.
- ❑ **RV-8 Only:** Rivet the five holes at the top end of the F-802C-L-1 & -R-1 L. G. Box Webs to the F-887-L-1 & -R-1 Upper Longerons (See "Fwd Fuse Side Skins and Structure", DWG 67).
- ❑ Rivet the thirteen holes common between the F-887-L-1, WD-802-L-1 Upper Engine Mount Bracket, and F-801C-1 Upper Angle (See "Fwd Fuselage Side Skins and Structure", DWG 67). Rivet the same holes on the right side.
- ❑ Dimple the attachment rivet holes in four nutplates, then rivet the nutplates to the F-870B-1 Outboard Stiffener (DWG 63 & 67 or 63A & 67A).
- ❑ **RV-8 Only:** Dimple the attachment rivet holes in seven nutplates, then rivet nutplates to the F-864C-1 and F-865B-1 Throttle Quadrant Angles (DWG 68).
- ❑ **RV-8 Only:** Back rivet the F-864C-1 Throttle Quadrant Angle, and the F-870B-1 Outboard Stiffener to the interior side of the F-820-L-1 Fwd Side Skin (DWG 67 & 68).
- ❑ **RV-8 Only:** Back rivet the F-865B-1 Throttle Quadrant Angle, and the F-870E-1 Skin Stiffener to the interior right side of the F-820-R-1 Fwd Side skin (DWG 67 & 68).
- ❑ **RV-8A Only:** Dimple the attachment rivet holes in nine nutplates, then rivet the nutplates to the F-8100C-1 and F-8101B-1 Throttle Quadrant Angles (DWG 68A).
- ❑ **RV-8A Only:** Back rivet the F-8100C-1 Throttle Quadrant Angle, and the F-870B-1 Outboard Stiffener to the interior side of the F-891-L-1 Fwd Side Skin (DWG 67A & 68A).
- ❑ **RV-8A Only:** Back rivet the F-8101B-1 Throttle Quadrant Angle, and the F-870E-1 Skin Stiffener to the interior



- side of the F-891-R-1 Fwd Side skin (DWG 67A & 68A).
- ❑ **RV-8A Only:** Rivet nutplates to the F-802R-L-1 & -R-1 Fuselage Bulkheads (See "Fwd Fuselage Substructure", DWG 63A).
  - ❑ **RV-8A Only:** Dimple the attach holes on three nutplates and rivet them to the F-864DA-1 Throttle Quadrant Bracket (See "Fwd Fuselage Substructure", DWG 63A). Rivet the throttle quadrant bracket to the F-802R-L-1 Fuselage Bulkhead.
  - ❑ **RV-8A Only:** Cleco then rivet the F-802W-L-1 & -R-1 Longerons to the F-802R-L-1 & -R-1 Fuselage Bulkheads (See "Aft Iso View", DWG 67A).
  - ❑ **RV-8A Only:** Cleco then rivet the F-802R-L-1 & -R-1 Fuselage Bulkheads to the F-802VPP Fuselage Bulkhead Brace.
  - ❑ **RV-8A Only: NOTE: Do not rivet the bottom flange of the F-802R bulkheads at this time.** Cleco the F-802R / F-802VPP assembly in place on the forward fuselage assembly. Rivet the F-802W-L-1 & -R-1 Longerons to the F-843-L-1 & -R-1 Lower Longerons and F-890-1 Fwd Floor Panel.
  - ❑ If a final decision has been made on using a carbureted or fuel injected engine, the fuel filter mounting bracket and the proper fuel pump mounting bracket should be installed now. Refer to the Fuel System installation section and DWG 82 / DWG 82A. **NOTE: If an engine choice has not yet been made, the brackets can be installed when you get to the Fuel System Installation section later in the construction manual.**

*It is optional to fit and make the fuel system and brake lines at this time. Even if you haven't decided on which fuel pump you will require, the fuel lines from each fuel tank to the fuel valve can be made. The installation is simplified because of the greatly improved access in the area of the fwd cockpit floor and the L.G. Boxes (RV-8). If you choose to do so, temporarily cleco the F-844-L Auxiliary Longerons, and F-883-1 or F-883A-1 Fuel Valve Bracket in place on the fwd fuselage (DWG 67 & 68 for RV-8 or 67A & 68A for RV-8A). Refer to DWG 82 & 83 (for an RV-8) or DWG 82A (for an RV-8A), and the FUEL SYSTEM & BRAKE SYSTEM sections of the construction manual. Once the lines are made and installed, most can easily be removed and then reinstalled after painting.*

- ❑ **RV-8 Only: NOTE: Before installing F-820-L-1 & -R-1 Fwd Side Skins in this step, apply a 1/8 bead of fuel tank sealant along the flange corner of the F-801A-1 Firewall where it will contact the fwd side skins.** Cleco the F-844-L Auxiliary Longerons, F-802S-1 Spacer, F-802D-L-1 L. G. Box Plate to the F-820-L-1 Fwd Side Skin with a small number of clecos (DWG 67). Cleco the left fwd side skin in place on the fwd portion of the fuselage. Repeat this step for the right side.
- ❑ **RV-8 Only:** Because of the difficulty installing the MSP-42 blind rivets at the bottom of the wing spar opening on left and right F-823-1 Mid Side Skins, they need to be installed now. Uncleco the bottom portion of left F-823-1 Mid Side Skin so it and the F-804H-1 Center Section Side Plate can be pulled away from the underlying structure enough to install the blind rivets (DWG 74).
- ❑ **RV-8 Only:** Repeat the previous step with the right side skins.
- ❑ **RV-8 Only:** Cleco the F-848-1 Upper Longerons Gusset, F-846-1 Gusset, and F-845-1 Gusset in place on each side of the fuselage (DWG 67).
- ❑ **RV-8 Only:** Uncleco and remove the F-870-1 Fwd Baggage Floor, and F-871-1 Fwd Baggage Side (DWG 63).
- ❑ **RV-8 Only:** Uncleco and remove the F-866A -1 Lower Fwd Baggage Bulkhead and the F-866B-1 Upper Fwd Baggage Bulkhead, to improve riveting access.
- ❑ **RV-8A Only: NOTE: Before installing F-891-L-1 & -R-1 Fwd Side Skins in this step, apply a 1/8 bead of fuel tank sealant along the flange corner of the F-801A-1 Firewall where it will contact the fwd side skins.** Cleco the F-898-L Auxiliary Longerons to the F-891-L-1 Fwd Side Skin with a small number of clecos (DWG 67A). Cleco the left fwd side skin in place on the fwd portion of the fuselage.
- ❑ **RV-8A Only:** Repeat the previous step using the same parts for the right side.
- ❑ **RV-8A Only:** Because of the difficulty installing the MSP-42 blind rivets at the bottom of the wing spar opening on left and right F-823-1 Mid Side Skins, they need to be installed now. Uncleco the bottom portion of left F-823-1 Mid Side Skin so that it and the F-804H-1 Center Section Side Plate can be pulled away from the underlying structure enough to install the blind rivets (DWG 74).
- ❑ **RV-8A Only:** Repeat the previous step with the right side skins.
- ❑ **RV-8A Only:** Cleco the left and right F-848-1 Upper Longerons Gussets in place (See "Fwd Fuse Side Skins and Structure", DWG 67A).

- ❑ **RV-8A Only:** Cleco the F-895B-1 Spacers and F-895-L-1 & -R-1 Doubler Plates in place on the sides of the fuselage (DWG 67A).
- ❑ **RV-8A Only:** Uncleco and remove the F-871-1 Fwd Baggage Side (DWG 63).
- ❑ Add some ballast to the fwd fuselage floor in preparation for adding the tail cone.
- ❑ Cleco the F-807 Bulkhead in place on the fuselage. Rivet the web of the F-807 Bulkhead to the F-813-L-1 & -R-1 Aft Outboard Seat Ribs (DWG 69).
- ❑ Cleco then rivet the F-818B-L-1 & -R-1 Baggage Rib Angles to the F-818-L-1 & -R-1 Baggage Ribs (DWG 71).
- ❑ Rivet the nutplates to the F-818B-L-1 & -R-1 Baggage Rib Angles.
- ❑ Cleco, then rivet the F-818-L-1 & -R-1 Baggage Ribs to web of the F-807 Bulkhead and F-814B-L-1 & -R-1 Inboard Seat Ribs.
- ❑ Dimple the attachment rivet holes in four nutplates, then rivet them to the F-824B Cover Plate opening, at the aft end of the F-824-L-1 & -R-1 Aft Side Skins (See "Detail A", DWG 74).
- ❑ Rivet the three nutplates to the F-888-L-1 & -R-1 Mid Longerons.
- ❑ **NOTE: Do not rivet holes that are common to the F-807, F-808, or F-809 Bulkhead Assemblies in this step.** Back rivet the left and right F-888-1 Aft Mid Longerons to their appropriate F-824-L-1 & -R-1 Aft Side Skins.
- ❑ Cleco the F-824-L-1 & -R-1 Aft Side Skins to the left and right F-823-1 Mid Side Skins, F-807 Bulkhead and the F-887-L-1 & -R-1 Upper Longerons.
- ❑ **RV-8 Only:** Cleco the F-811C-1 Angle and the two F-811B-1 Stab Attach Bars to the F-811 Bulkhead (See "F-811-1 Bulkhead Assembly", DWG 70). Rivet all but the bottom hole in each stab attach bar. Cleco the WD-409 Tail Spring Mount and any shims made when it was previously fitted, in place on the F-811 Bulkhead Assembly and clamp in position. Final-Drill 1/4 for the attach bolts (See "View B-B", DWG 73). Remove the tail spring mount and deburr the holes in all the parts.
- ❑ **RV-8 Only:** Mount the WD-409 Tail Spring Mount and shims to the F-811 Bulkhead Assembly using bolts (See "View B-B", DWG 73).
- ❑ **RV-8 Only: NOTE: Do not rivet any holes that are also common to the F-889-L-1 & -R-1 Lower Longerons and F-824-L-1 & -R-1 Aft Side Skins in this step.** Cleco then rivet the F-812 Bulkhead Assembly to the F-828-1 Aft Bottom Skin. It is helpful to position the aft bottom skin so that it is hanging off of the edge of your work table and held in position with a 25 lb. shot bag or other heavy object.
- ❑ **RV-8 Only:** Cleco and rivet the F-811 Bulkhead Assembly to the F-828-1 Aft Bottom Skin. **NOTE: Do not rivet any holes that are also common to the F-889-L-1 & -R-1 Lower Longerons and F-824-L-1 & -R-1 Aft Side Skins.**
- ❑ **RV-8 Only:** Cleco and rivet the aft end of the tail spring mount with the two keeper rivets (See "View A-A", DWG 73).
- ❑ **RV-8A Only:** Cleco, then rivet, the F-811C-1 Angle and the two F-811B-1 Stab Attach Bars to the F-811 Bulkhead (See "F-811-1 Bulkhead Assembly", DWG 70).
- ❑ **RV-8A Only:** Cleco and rivet the F-811 and F-812 Bulkhead Assemblies to the F-828-1 Aft Bottom Skin. It is helpful to position the aft bottom skin so that it is hanging off of the edge of your work table and held in position with a 25 lb. shot bag or other heavy object. **NOTE: Do not rivet any holes that are also common to the F-889-L-1 & -R-1 Lower Longerons and F-824-L-1 & -R-1 Aft Side Skins.**
- ❑ Slide the aft end of the F-889-L-1 & -R-1 Lower Longerons into position on the F-811 and F-812 Bulkhead Assemblies.
- ❑ Cleco the F-811 Bulkhead / F-812 Bulkhead / F-828-1 Aft Bottom Skin / F-889-L-1 & -R-1 Lower Longerons, Subassembly to the F-824-L-1 & -R-1 Aft Side Skins.
- ❑ Cleco the left and right F-857C Angles, F-808-1 and F-809-1 Bulkhead Assemblies and F-810B-1 Bulkhead in place on the F-824-L-1 & -R-1 Aft Side Skins (DWG 71).
- ❑ Rivet the aft end of the F-818-L-1 & -R-1 Baggage Bulkheads to the F-808 Bulkhead Assembly.
- ❑ Cleco the F-842-1 Aft Bottom Skin Fwd in place on the fuselage.
- ❑ For improved riveting access, reposition the fuselage on short sawhorses directly below the F-804 Center Section Bulkhead Assembly, and the F-810 Bulkhead Assembly. Riveting the fuselage inverted may be easier if riveting with two people.

**SKIN RIVETING**

For fuselage skin riveting, refer to the skin diagrams and rivet size legend on DWG 74 or 74A as a guide for determining rivet sizes.

It is helpful to support the fuselage upside down while riveting. Particularly if working with a helper as it can be positioned at a comfortable height to allow sitting inside on a short stool or chair.

- Rivet the F-820-L-1 & -R-1 (RV-8) or F-891-L-1 & -R-1 (RV-8A) Fwd Side Skins to the substructure, with the following exceptions. **NOTE: Do not rivet the fwd side skins to the F-843-L-1 & -R-1 Lower Longerons or the F-801-1 Firewall. Do not rivet the holes that are common with the bottom four holes in each F-804H-1 Center Section Side Plate (DWG 69). Only rivet the keeper rivets along the upper edge of the fwd side skins to the F-887-L-1 & -R-1 Upper Longerons in rivet hole locations with rivet legend symbols, on the F-820-L-1 & -R-1 skin diagrams on DWG 74.**
- Rivet the left and right F-823-1 Mid Side Skins to the sub structure with the following exceptions. **NOTE: Do not rivet any hole locations that do not have a rivet legend symbol. Do not rivet the F-00860C-L-2 & F-860C-R-1 Aft Arm Rests until you have riveted the F-807 Bulkhead Assembly.**
- Rivet the left and right F-824-1 Aft Side Skins, F-842-1 Aft Bottom Skin Fwd, and F-828-1 Aft Bottom Skin to the sub structure with the following exceptions. **NOTE: Do not rivet any hole locations that do not have a rivet size designated.**
- Rivet the F-826-1 Right Center Bottom Skin, and F-827-1 Left Center Bottom Skin to the aft bottom flange of the Center Section Assembly. **NOTE: Do Not Rivet the fwd bottom flange of the center section assembly at this time.** After Riveting, final torque the nuts on the bottom bolts that attach the F-814E-L-1 & -R-1 Seat Ramp Supports to the F-804 Center section Assembly.
- Rivet all open holes in the aft portion of the F-826-1 Right Center Bottom Skin and F-827-1 Left Center Bottom Skin.

If you have been riveting with the fuselage inverted, flip it to right side up on the sawhorses.

- Cleco the F-819-1 Aft Deck, F-810D-1 Spacer, and F-811D-1 Spacer / Control Stop in place on the aft fuselage (See "Detail E", DWG 71). **NOTE: The F-811D-1 Spacer / Control Stop is the down elevator travel stop. Leaving it unriveted at this time will allow it to be easily removed for any trimming required when adjusting elevator travel.**
- Cleco and bolt the F-812B-1 Angle / Control Stop in place on the aft fuselage (See "Detail E", DWG 71). **NOTE: The F-812B-1 Angle / Control Stop is the up elevator travel stop. Leaving it unriveted at this time will allow it to be easily removed for any trimming required when adjusting elevator travel.** Rivet on the aft deck.
- Cleco, then rivet, the F-818D-1 Bellcrank Rib to the F-818-L-1 & -R-1 Baggage Bulkheads (DWG 71). Shorten the length of the two rivets for each side approximately 1/32.

**NOTE ON BATTERY LOCATION CHOICES**

The choice of battery location is dependent on primarily two factors. Your choice of engine model and the type of flying that you will do the majority of the time.

- A RV-8 or 8A with a Lycoming IO-360 Angle Valve engine should have the battery installed at the aft location. There is a large variety of different model numbers of the angle valve engine, some with crankshaft counterweights, some without, but they all are in a weight range that requires the aft battery location.

If using any other Lycoming model between 150 and 180 HP, either battery location could be used depending on what propeller is selected, and what type of flying you will primarily be doing.

- If you are using a 180 HP engine and you want to maximize utility (be the least restricted in the amount of weight that can be carried in the rear seat and aft baggage area), the forward battery location could be used. If you expect to mostly use the airplane for solo sport / fun flying, then the aft battery location could be used to provide a more desirable C.G. location while flying solo.
- If using the lightest weight engine choice (150-160 HP) and a wood propeller, then the fwd battery location should be used to provide as much rear seat and aft baggage payload capability as possible.

Refer to the weight and balance examples in Section 14 of the construction manual as an aid in choosing your battery location.

- **Aft Battery Installation Only:** Cut the F-877B Angle at the notches to make two F-877B-1 Angles (See "Aft Battery Installation", DWG 71). Cleco the two angles to the F-877A-1 Battery Tray. Final-Drill #30, the 1/8 holes common between the battery tray and the two angles. Final-Drill #40, the 3/32 holes common between

the battery tray and the two angles, and the 3/32 holes used for attaching the four nutplates to the aft side flange of the battery tray.

- **Aft Battery Installation Only:** Disassemble the battery tray. Machine countersink the eight #40 nutplate attachment holes on the aft flange of the F-877A-1 Battery Tray, for flush rivet heads on the aft side. Machine countersink the six battery tray mounting screw holes in the F-877A-1 Battery Tray, for flush screw heads on the top surface. Deburr the edges and all screw holes in the battery tray, the two F-877B-1 Angles, and the F-877C Battery hold down. Prime the parts if/as desired.
- **Aft Battery Installation Only:** Cleco and rivet the F-877B-1 Angles to the F-877A-1 Battery tray using the #30 holes (See "Aft Battery Installation", DWG 71). Rivet a nutplate to each side, and the four nutplates to the aft flange of the battery tray. Mount the battery tray to the F-818B-L-1 & -R-1 Baggage Rib Angles with screws. When ready to install the battery, use the F-877C Battery Hold Down and the bolt hardware to anchor the battery in the battery tray.
- Rivet the F-857D-R-1 Outboard Seat Belt Bracket and F-857E-R-1 Inboard Seat Belt Bracket to the F-857B-R-1 Seat Belt Bracket (See "Detail D", DWG 71). Repeat this step with the parts for the left side seat belt bracket assembly.
- Bolt the F-857B-R-1 Seat Belt Bracket to the F-857C-R-1 Seat Belt Bracket, and F-889-R-1 Lower Longeron (See "Detail D", DWG 71). Repeat this step with the Left Seat Belt Bracket Assembly.
- Rivet the aft end of the F-00860C-L-2 Aft Left Arm Rest & F-860C-R-1 Aft Right Arm Rest to the F-807 Bulkhead Assembly (DWG 69). Rivet the F-00860C-L-2 Aft Left Arm Rest & F-860C-R-1 Aft Right Arm Rest to the left and right F-823-1 Mid Side Skins.
- Rivet the F-806A-L-1 & -R-1 Bulkheads to their associated F-806F-L-1 & -R-1 Gusset (See "Detail A", DWG 69). Rivet the F-805-L-1 & -R-1 Bulkheads to their associated F-805G-1 Gussets (See "Detail B", DWG 69).
- Rivet the F-805B-L-1 Floor Support Angle and F-805B-R-1 Floor Support Angle to their associated F-805G-1 Gusset and F-814C-L-1 or -R-1 Inboard Seat Rib Angle (See "Detail B & D", DWG 69).
- Rivet the outboard tab on the fwd end of the F-860A-L-1 & -R-1 Fwd Arm Rests, to the F-804C-AL and -AR Aft Center Section Bulkheads (See "Left and Right Arm Rest Rivets", DWG 69).
- Cleco, then rivet the F-816-L-1 & -R-1 Cockpit Side Rails to the top flanges of the F-804C-FL & FR Center Section Fwd Bulkheads, F-804C-AL & AR Center Section Aft Bulkheads, and the F-887-L-1 & -R-1 Upper Longe-rons (See "Left Cockpit Rail", DWG 72).
- Cleco the F-804N-1 Bulkhead Caps in place (DWG 72). They will not be riveted at this time so they can be later removed to access rivets that attach the F-821-1 Fwd Top Skin, access bolts that mount the WD-814 Wind-screen Support, and access for riveting nutplates to the bulkhead caps for the F-865-1 Right Console.
- Cleco, then rivet, the F-817-L-1 & -R-1 Seat Back Support Plates to the F-805-L-1 & -R-1 and F-806-L-1 & -R-1 Bulkheads (See "Left Cockpit Rail", DWG 72).
- Cleco the two F-856-1 Spacers and the WD-808 Seat Back Weldment in place on the bottom of the F-816-L-1 & -R-1 Cockpit Side Rails. Rivet the spacers and the front seat back support to the cockpit side rails. Install the screws and bolts that attach the front seat back support to the cockpit side rails and the F-817-L-1 & -R-1 Seat Back Support Plates.

**RV-8 FORWARD BOTTOM SKINS**

(This section RV-8 Only)

- Invert the fuselage on short sawhorses.

If building an RV-8 with a standard fuselage kit, skip ahead to, and complete the main landing gear installation section. Return here when it is completed.

- Final-Drill #30, the 1/8 holes in the inboard flanges of the F-851-L-1 & -R-1 Fwd Bottom Skins that are common with the dimple countersunk holes in the F-822-1 Forward Floor Panel (DWG 75 & 61).
- **CAUTION: The forward most hole in each F-822-1 Forward Floor Panel, that is common with the F-801D-1 Lower Angle on the firewall assembly gets dimpled in the reverse direction from the rest (DWG 60).** Deburr, then dimple countersink, the #30 holes drilled in the previous step so that they properly nest with the holes common in the F-822-1 Forward Floor Panel.
- Cleco the F-850-1 Bottom Skin, and the F-851-L-1 & -R-1 Fwd Bottom Skins in place on the fwd fuselage. **NOTE: The outboard edges of all three skins slip between the F-820 -L-1 & -R-1 Forward Side Skins and the F-843-L-1 & -R-1 Lower longerons (DWG 75).**

- ❑ Final-Drill #40, the 3/32 holes common between the F-850-1 Bottom Skin and the F-802K-1 L.G. Fwd Crossmember, the F-802L-1 L.G. Aft Crossmember, and the F-820M-L-1 & -R-1 Intercostal Ribs (DWG 61 and 75).
- ❑ Final-Drill #40, the 3/32 holes common between the F-851-L-1 & -R-1 Forward Bottom Skins, the F-802K-1 L.G. Forward Crossmember, and the bottom flanges of the F-801 Firewall Bulkhead Assembly (DWG 61 and 75).
- ❑ Mark the location of any holes in the outboard edges of the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins, that are common with screw holes in the bottom edge of the F-820-L-1 & -R-1 Fwd Side Skins.
- ❑ Uncleco and remove the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins.
- ❑ Final-Drill #19, the holes in the outboard edges of the F-850-1 Bottom Skin, and F-851-L-1 & -R-1 Forward Bottom Skins that were previously marked as being common with screw holes in the F-820-L-1 & -R-1 Forward Side Skins.
- ❑ Final-Drill #30, all the 1/8 holes **not** dimple countersunk in the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins.
- ❑ Final-Drill #40, the 3/32 holes in the F-850-1 Bottom Skin that are common with the F-836-L-1 & -R-1 Floor Ribs.
- ❑ Machine countersink for dimples, all the #40 holes in the F-802K-1 L.G. Forward Crossmember and the F-802L-1 L.G. Aft Crossmember.
- ❑ Deburr all holes and edges of the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins. Deburr all holes in the forward bottom fuselage substructure that are common with holes just deburred in the bottom skin and forward bottom skins.
- ❑ Put a slight roll in the aft edge of the F-850-1 Bottom Skin (refer to LAP JOINTS in section 5 of the construction manual).
- ❑ Dimple countersink, all of the #40 holes in the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins, for flush rivets.
- ❑ Dimple countersink, all of the not yet dimpled #30 holes in the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins.
- ❑ Dimple countersink all of the #19 holes in the outboard edges of the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins, for #8 flush screws.
- ❑ Prime the machine countersunk holes in the F-802K-1 L.G. Forward Crossmember, and F-802L-1 L.G. Aft Crossmember if/as desired. Prime the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins if/as desired.
- ❑ Uncleco and remove the F-802K-1 L.G. Forward Crossmember, from the F-822-1 Forward Floor Panel (DWG 61).
- ❑ Place a blob of RTV or fuel tank sealant, midway between the aft end of the F-836-L-1 & -R-1 Floor Ribs and the forward bottom flange of the F-804 Center Section Bulkhead Assembly. Make the blob big enough to bridge between the F-822-1 Fwd Floor Panel and the F-850-1 Bottom Skin.
- ❑ Cleco the F-850-1 Bottom Skin in place on the bottom of the forward fuselage. Cleco only to the F-836-L-1 & -R-1 Floor Ribs, and the portion of the F-802L-1 L.G. Aft Crossmember between the two floor ribs (DWG 61 & 75).
- ❑ Rivet the F-850-1 Bottom Skin to the F-836-L-1 & -R-1 Floor Ribs by lifting the side portions of the bottom skin for bucking access (DWG 74). **NOTE: Make a support cushion of upholstery foam to support a thin bucking bar and hold it tight against the rivets as you drive them.**
- ❑ Rivet the bottom four holes in each F-804H-1 Center Section Side Plate and F-820-1 Fwd Side Skin that were previously left unriveted (DWG 74). **NOTE: Install the MSP-42 rivets first by unclecoing and prying the center section side plate and fwd side skin out slightly to allow for fully inserting the rivet.**
- ❑ Cleco, then rivet, the remaining holes in the F-850-1 Bottom Skin, with the exception of the three holes in each F-802M-L-1 & -R-1 Intercostal Rib, which will be done later. **NOTE: The outboard edges of the bottom skin slip between the F-820-L-1 & -R-1 Forward Side Skins and the F-843-L-1 & -R-1 Lower Longerons.**
- ❑ Cleco, then rivet, the fwd edge of the F-850-1 Bottom Skin to the F-802K-1 L.G. Forward Crossmember. **NOTE: Curl the skin up slightly to gain bucking access to the rivets.**
- ❑ Cleco the F-802K-1 L.G. Forward Crossmember to the F-822-1 Forward Floor Panel.
- ❑ Rivet the F-802K-1 L.G. Forward Crossmember to the F-822-1 Forward Floor (DWG 61). Rivet the two nut-plates to the F-802K-1 L.G. Forward Crossmember and F-822-1 Forward Floor Panel (Installing the Bottom Skins view, DWG 75).

- ❑ Rivet the three holes in each F-802M-L-1 & -R-1 Intercostal Rib, that are common with the F-850-1 Bottom Skin.
- ❑ Apply a bead of fuel tank sealant to the aft corner edge of the bottom firewall flanges, to seal the closed lower fuselage area from oil intrusion, etc.
- ❑ Cleco, then rivet the F-851-L-1 & -R-1 Forward Bottom Skins, to holes common in the F-822-1 Fwd Floor Panel and the F-802K-1 L.G. Fwd Crossmember and F-802M-L-1 & -R-1 Intercostal Ribs (DWG 73). **NOTE: Do not rivet the fwd most hole in each forward bottom skin flange that is common to the F-867 Cooling Air Ramp Assembly (DWG 75).**
- ❑ Install rivets and screws, in all hole locations in the F-820-L-1 & -R-1 Forward Side Skins that were left open until the installation of the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins (DWG 74). **NOTE: Temporarily removing the outboard most bolt in the F-802G-1 Fwd Corner Angle and F-802H-1 Aft Corner Angle on each L.G. Box Assembly provides improved access for the two rivets that fall within each L.G. Box Assembly (DWG 62).**
- ❑ Cleco the F-867 Cooling Ramp Assembly in place on the fwd fuselage.
- ❑ To allow for the installation of MK-319 Blind Rivets, final-drill the rivet holes common between the F-867C-1 Angle and the F-867 Cooling Air Ramp Assembly with a #34 drill (See "Detail B", DWG 75). Uncleco and remove the cooling air ramp assembly from the fuselage.
- ❑ Deburr the holes in the cooling ramp assembly and the F-867C-1 Angle that were final-drilled #34 in the previous step.
- ❑ Apply a thin layer of fuel tank sealant to the F-802K-1 L.G. Crossmember and the F-822-1 Forward Floor Panel where they contact the F-867 Cooling Air Ramp Assembly.
- ❑ Cleco the F-867 Cooling Air Ramp Assembly in place and rivet to the F-867C-1 Attach Angle, F-822-1 Forward Floor Panel, and F-801 Firewall Bulkhead Assembly.
- ❑ Apply a bead of fuel tank sealant the full length of the F-867 Cooling Air Ramp Assembly, on each side where it contacts the F-851-L-1 & -R-1 Forward Bottom Skins. **NOTE: Use a small, heavy gauge bag (Ziplock Freezer™ type) to apply the sealant. Put mixed sealant in the bag, remove excess air, and seal it closed. Cut off a small portion of the bag corner and squeeze the bag to apply the sealant. Use a Popsicle™ / craft type stick with a 3/16 radius on the end, to form a smooth fillet with the sealant, the full length of the cooling air ramp.**
- ❑ Deburr the holes and edges of the F-861PP-L & -R Landing Gear Cover Plates. Use a round tube or pipe to hand form a slight curve on the end of each landing gear cover plate so it approximately matches the shape of the F-850 -1 Bottom Skin and F-851-1 Forward Bottom Skins. **NOTE: It does not have to fit precisely. The covers will be trimmed off later to clear the landing gear.**
- ❑ Dimple countersink the six holes in the F-861PP-L & -R Landing Gear Cover Plates for #6 flush screws.
- ❑ Flip the fuselage over so it is once again sitting upright on short sawhorses.

#### **RV-8A FORWARD BOTTOM SKINS**

**(This section RV-8A only)**

- ❑ Check for any loose tools, bucking bars, etc. and then turn the fuselage inverted and support it on short sawhorses.
- ❑ Make the F-896-L & -R Nose Gear Reinforcement Angles (See "F-896-L Nose Gear Reinforcement Angle", DWG 61A).
- ❑ Make the F-897-L & -R Nose Gear Reinforcement Angles (See "F-897-L Nose Gear Reinforcement Angle", DWG 61A). Note that one edge of each F-897 Nose Gear Reinforcement Angle must be radiused to allow it to nest tightly together with its associated F-896-L or -R Nose Gear Reinforcement Angle when installed.
- ❑ Clamp the F-896-L-1 & -R-1 Nose Gear Reinforcement Angles in place beside the left and right F-893-1 Fwd Floor Ribs as shown in the "Exploded Iso View", DWG 61A. Position the nose gear reinforcement angles flush against the bottom surface of the F-890-1 forward floor panel and flush against the aft side of the firewall. Match-Drill #30, the nose gear reinforcement angles using the 1/8 holes in the fwd floor ribs as a guide. Cleco as you drill.
- ❑ Clamp the F-897-L-1 & -R-1 Nose Gear Reinforcement Angles in place. Position them so they fit flush to the back of the F-896-L-1 & -R-1 Nose Gear Reinforcement Angles and the bottom surface of the F-890-1 Fwd Floor Panel. Match-Drill #30, the nose gear reinforcement angles using the 1/8 holes in the F-890-1 Fwd Floor Panel as a guide. Cleco as you drill.

- ❑ Cleco the F-894-1 Forward Fuselage Bottom Skin in place on the F-802U-1 Crossmember, the bottom flanges of the firewall, and the five floor ribs (DWG 61A). NOTE: The sides of the skin slip between the F-843-L-1 or -R-1 Lower Longerons and F-891-L-1 or -R-1 Fwd Side Skins.
- ❑ Bend the two tabs on the F-894-1 Fwd Fuselage Bottom Skin around the flange corner of the F-893-L-1 & -R-1 Fwd Floor Ribs (See "Cooling Air Ramp Assembly", DWG 63A).
- ❑ Use the F-893-L-1 & -R-1 Fwd Floor Ribs to mark the short firewall flanges for trimming (See "Cooling Air Ramp Assembly", DWG 63A).
- ❑ Final-Drill #40, all 3/32 holes common between the F-894-1 Fwd Fuselage Bottom Skin, and the F-802U-1 Crossmember, five floor ribs, and firewall assembly bottom flanges.
- ❑ Match-Drill 3/16, the seven bolt hole locations on each side of the F-894-1 Fwd Fuselage Bottom Skin using the 3/16 holes in the F-891-L-1 or -R-1 Fwd Side Skins as a guide.
- ❑ Use a wood block to hold the small tabs on the F-894-1 Fwd Fuselage Bottom Skin tight against the F-893-L-1 or -R-1 Fwd Floor Ribs and then match-drill #40 using the hole in the firewall flange and fwd floor rib as a guide.
- ❑ Uncleco and remove the F-894-1 Fwd Fuselage Bottom Skin, the four Nose Gear Reinforcement Angles, five floor ribs, and the cross member from the fuselage.
- ❑ Machine-countersink for dimples, the #40 holes in the bottom flange of the F-802U-1 Crossmember that are common with dimpled holes in the F-894-1 Fwd Fuselage Bottom Skin.
- ❑ Final-Drill #30, the 1/8 holes on the side and aft edges of the F-894-1 Fwd Fuselage Bottom Skin.
- ❑ Deburr all of the holes in the F-894-1 Fwd Fuselage Bottom Skin.
- ❑ Deburr the #30 holes in the nose gear reinforcement angles, F-890-1 Fwd Floor Panel and the F-893-L-1 & -R-1 Fwd Floor Ribs.
- ❑ Deburr the #40 holes in the F-802U-1 Crossmember, F-892-L-1 & -R-1 Aft Floor Ribs, and F-893-L-1 & -R-1 Fwd Floor Ribs.
- ❑ Machine countersink the #30 holes in the web of the F-893-L-1 & -R-1 Fwd Floor Ribs for flush rivet heads on the inboard side.
- ❑ Dimple countersink the #30 holes on the side and aft edges of the F-894-1 Fwd Fuselage Bottom Skins that are designated for flush rivets (DWG 74A).
- ❑ Dimple countersink the #40 holes in the F-894-1 Fwd Fuselage Bottom Skin for flush rivets on the exterior side (DWG 74A).
- ❑ Dimple countersink the #40 holes in the F-893-L-1 & -R-1 Fwd Floor Ribs and the F-892-L-1 & -R-1 Aft Floor Ribs that are common with dimpled holes in the F-894-1 Fwd Fuselage Bottom Skin (DWG 61A).
- ❑ Prime the F-896-L-1 & -R-1 and F-897-L-1 & -R-1 Nose Gear Reinforcement Angles. Prime the F-894-1 Fwd Bottom Skin, F-802U-1 Crossmember and the five floor ribs if/as desired.
- ❑ Cleco the F-802U-1 Crossmember, the two F-892-L-1 Aft Floor Ribs, and F-892-R-1 Floor Rib to the F-894-1 Fwd Fuselage Bottom Skin (See "Exploded Iso View", DWG 61A). Cleco the F-867C-1 Attach Angle to the F-802U-1 Crossmember.
- ❑ Back rivet the crossmember and three floor ribs to the F-894-1 Fwd Fuselage Bottom Skin (rivet callouts on DWG 74A).
- ❑ Rivet the F-867C-1 Attach Angle and the center F-892-L-1 Aft Floor Rib to the F-802U-1 Crossmember (See "Exploded Iso View", DWG 61A). **NOTE: Do not rivet the outboard aft floor ribs at this time.**
- ❑ Rivet the F-897-L-1 & -R-1 Nose Gear Reinforcement Angles to the F-890-1 Fwd Floor Panel.
- ❑ Rivet the F-896-L-1 & -R-1 Nose Gear Reinforcement Angles to the F-893-L-1 & -R-1 Fwd Floor Ribs.
- ❑ Place a blob of RTV, or fuel tank sealant, midway between the aft end of the F-892-L-1 & -R-1 Floor Ribs, and the aft edge of the F-894-1 Fwd Fuselage Bottom Skin. Make the blob big enough to bridge between the F-890-1 Fwd Floor Panel and the F-894-1 Bottom Skin.
- ❑ Cleco the F-894-1 Fwd Fuselage Bottom Skin Assembly in place on the fuselage.
- ❑ Rivet the F-892-L-1 & -R-1 Aft Floor Ribs to the F-890-1 Fwd Floor Panel with blind rivets.
- ❑ Rivet the F-802U-1 Crossmember to the F-890-1 Fwd Floor Panel and the F-802R-L-1 & -R-1 Fuselage Bulk-

- heads. Rivet the two nutplates to the F-802U-1 Crossmember and F-890-1 Fwd Floor Panel.
- ❑ Apply a thin layer of fuel tank sealant to the top flange of the F-893-L-1 & -R-1 Fwd Floor Ribs and cleco them in place on the F-894-1 Fwd Fuselage Bottom Skin. Rivet the fwd floor ribs to the fwd fuselage bottom skin. Begin riveting at the aft end of fwd floor ribs and work to the fwd end. The fwd end of the F-893 ribs must be lifted up to provide hand/bucking bar access.
- ❑ Apply Fuel tank sealant to the bottom flanges of the firewall to seal between it and the F-894-1 Fwd Fuselage bottom Skin & F-893-L-1 & -R-1 Fwd Floor Ribs.
- ❑ Rivet the F-893-L-1 & -R-1 Fwd Floor Ribs to the F-890-1 Fwd Floor Panel. **NOTE: Do not rivet the fwd most hole in each forward floor rib flange that is common to the F-867 Cooling Air Ramp Assembly (See "Cooling Air Ramp Assembly", DWG 63A).**
- ❑ Rivet the bottom four holes in each F-804H-1 Center Section Side Plate and F-890-1 Fwd Side Skin that were previously left unriveted (DWG 74A). **NOTE: Install the MSP-42 rivets first by unclecoing and prying the center section side plate and fwd side skin out slightly to allow for fully inserting the rivet.**
- ❑ Rivet all unriveted holes in the F-894-1 Fwd Fuselage Bottom Skin (DWG 74A).
- ❑ Cleco the Cooling Air Ramp Assembly to the F-867C-1 Attach Angle and at the base of the firewall (DWG 61A & 63A).
- ❑ Final-Drill #34, the dimpled holes common between the Cooling Air Ramp Assembly and the F-867C-1 Attach Angle. Uncleco the Cooling Air Ramp Assembly and deburr the dimpled holes final drilled in this step.
- ❑ Apply fuel tank sealant to the portion of the F-802U-1 Crossmember that contacts the aft edge of the Cooling Air Ramp Assembly. Apply sealant to the fwd edge of the F-890-1 Fwd Floor Panel where it is contacted by the Cooling Air Ramp Assembly.
- ❑ Cleco the Cooling Air Ramp Assembly in place Rivet the F-867C-1 Attach Angle, F-890-1 Forward Floor Panel, and F-801 Firewall Bulkhead Assembly.
- ❑ Apply a bead of fuel tank sealant the full length of the F-867 Cooling Air Ramp Assembly on each side where it contacts the F-893-L-1 & -R-1 Fwd Floor Ribs. **Note: Use a small, heavy gauge bag (Ziplock Freezer™ type) to apply the sealant. Put mixed sealant in the bag, remove excess air, and seal it closed. Cut off a small portion of the bag corner and squeeze the bag to apply the sealant. Use a Popsicle™ / craft type stick with a 3/16 radius on the end, to form a smooth fillet with the sealant, the full length of the cooling air ramp.**
- ❑ Flip the fuselage over so it is once again sitting upright on short sawhorses.

#### RV-8A MAIN LANDING GEAR MOUNT INSTALLATION

(This section RV-8A only)

- ❑ Install the WD-821-L-1 & -R-1 Landing Gear Weldments in the fuselage using the hardware called out in the Fwd Fuse Side Skins And Structure view, and Landing Gear Weldment Detail view on DWG 67A.

#### IF BUILDING WITH A RV-8 OR 8A QUICKBUILD FUSELAGE KIT, BEGIN CONSTRUCTION HERE.

#### TAILCONE STIFFENER INSTALLATION

(This section RV-8 only)

- ❑ Position a F-00773A Tailcone Stiffener as a drill template on the outside of the F-824PPL Aft Side Skin in the same position as the stiffener will be installed. See F-00773A Detail on DWG 73.
- ❑ Match-Drill #40 all the holes in the stiffener into the side skin. Deburr and dimple the holes in the side skin then rivet the stiffener to the inside of the side skin using the rivet callouts on DWG 74. Repeat this procedure on the right side of the aircraft to install the remaining stiffener.

#### RV-8 MAIN LANDING GEAR AND TAILWHEEL INSTALLATION

(This section RV-8 only)

- ❑ Final-Drill 7/16 the 7/16-inch bolt hole in each WD-813 L.G. Bolt Weldment and its associated hole in the F-822-

- 1 Fwd Floor Panel to remove powder coating and correct any misalignment in the holes (See DWG 75).
- ❑ Repeat the previous step for the two 1/4-inch bolt holes (final-drill 1/4) in each WD-813 L.G. Bolt Weldment.
  - ❑ Place the fuselage inverted on saw horses and adjust its position so the forward center portion of the F-822-1 Forward Floor Panel is level laterally and longitudinally.
  - ❑ File a small radius on the corners of the U-801-L & -R Gear Legs so they nest flush in the U-804 Inboard Main Gear Attach Brackets.
  - ❑ Nest the U-804 Inboard Main Gear Attach Brackets tight to the U-801-L & -R Gear Legs and clamp in position (See DWG 75).
  - ❑ Use a drill press to match-drill 7/16 each U-804 Inboard Main Gear Attach Bracket using the 7/16 hole in the U-801-L & -R Gear Legs as a guide. Use a slow drill speed, drill lube (Boelube™ available from Van's), and plenty of pressure.
- 
- ❑ Label the U-804 Inboard Main Gear Attach Brackets (left or right as appropriate) to identify which U-801 Gear Leg they are common with. Remove the inboard main gear attach brackets from the gear legs. Install temporary 5/16-inch bolts through each inboard main gear attach bracket and a U-806-1 Inboard Wear Plate, to hold them in alignment relative to each other. Use a drill press to match-drill the 7/16 hole, drilled in the inboard landing gear attach brackets in the previous step, into the inboard wear plate.
  - ❑ Install the U-801-L Gear Leg, U-804 Inboard Main Gear Attach Bracket, U-806-1 Inboard Wear Plate, and U-805-1 Outboard Wear Plate onto the fuselage using only the 7/16 bolt, nut, and washer. Repeat this step for the right gear leg and related parts.
  - ❑ Fit the U-803 Outboard Main Gear Attach Brackets to each gear leg. Position them as shown in "View A-A", DWG 75. File the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Fwd Bottom Skins slightly if they interfere with the corners of the main gear attach bracket.
  - ❑ Insert a temporary 3/8 bolt in each U-803 Outboard Main Gear Attach Bracket and U-805-1 Outboard Wear Plate pair to maintain their alignment with each other.
  - ❑ Attach two plumb lines from the leading edge of the U-801-L & -R Gear Legs (one at the outboard end and one near the inboard end of each leg). Attach one plumb line through the center tooling hole of the F-812-1 Bulkhead Assembly.
  - ❑ Re-position the U-801-L & -R Gear Legs so that the four plumb lines on the gear legs are in alignment with each other when checked with a taught string line or long straight edge on the floor. Make the distance from the outer plumb line on each gear leg to the plumb line at the F-812 Bulkhead Assembly equal within 1/4-inch when measured along the floor. Adjust the position of the two gear legs as required.
  - ❑ Draw a pen line on the F-822 Forward Floor Panel next to each gear leg so that accidental movement of the gear legs from their proper position will be evident. With the gear legs in proper position, tighten the nuts on each 7/16 bolt to prevent the leg from moving out of position.
  - ❑ Double check that the U-805-1 Outboard Wear Plates and U-803 Outboard Main Gear Attach Brackets are still properly located as shown in "View A-A", DWG 75.
  - ❑ Using the forward hole in each U-803 Outboard Main Gear Attach Bracket as a guide, drill a 3/8 hole through the F-822-1 Forward Floor Panel, F-843-L-1 or -R-1 Lower Longerons and left or right WD-822 L.G. Box Weldment. Insert a bolt into the drilled hole to hold position, then drill the aft hole location in each outboard main gear attach bracket into the fuselage structure and insert another bolt.
  - ❑ Use the 5/16 holes in both of the U-804 Inboard Main Gear Attach Brackets and U-806-1 Inboard Wear Plates to Match-Drill 5/16, the holes in the F-822-1 Forward Floor Panel and the WD-813 L.G. Bolt Weldments. Drill one hole in each inboard main gear attach bracket, insert a 5/16 bolt to maintain position, and then drill the other hole.
  - ❑ With at least one 5/16 bolt still in place from the previous step, match-drill 1/4 the hole in the WD-813 L.G. Bolt Weldments into each end of the U-806-1 Inboard Wear Plates.
  - ❑ **RV-8 Quick build Fuselage Only:** Final-Drill 1/4 the drilling access holes in the F-850-1 Bottom Skin and F-851-L-1 & -R-1 Forward Bottom Skins (See "Installing the Bottom Skins", DWG 75).
  - ❑ Match-Drill 1/4 the F-822-1 Forward Floor Panel, F-843-L-1 & -R-1 Lower Longerons, and F-822-L-1 & -R-1 L.G. Box Weldments using the hole at each end of the left and right U-805-1 Outboard Wear Plates.

- ❑ Remove gear legs, brackets, and wear plates from the fuselage. Deburr all drilled holes in the fuselage, wear plates, and brackets.

*A finished RV-8 stands tall when it's on its wheels. The exact "best time" to permanently mount the landing gear will depend on the exact assembly sequence you choose, available help and workspace, etc. Don't be in a hurry to get it on the gear -- we have found it much more convenient to keep the top longeron of the fuselage at "navel height" until all the fwd upper fuselage, canopy installation, instrument panel, engine controls, and other interior fuselage work is complete.*

*Return to this point in the landing gear installation section when you are ready to permanently install the landing gear.*

- ❑ Install the U-801 landing gear legs. Refer to DWG 75 for the correct landing gear attachment hardware. The gear leg openings in the U-803 Outboard Attach Bracket and U-804 Inboard Attach Bracket are designed smaller than the nominal gear leg thickness. This will cause a 1/32-inch (approximate) gap between the outboard attach brackets and their associated F-805-1 Outboard Wear Plates, and the inboard attach brackets and their associated F-806-1 Inboard Wear Plates when all the nuts have been properly torqued. **NOTE: Hardened 3/8-inch washers are used under the nuts on the bolts used for attaching the U-803 Outboard Attach Brackets to the fuselage. Refer to "Landing Gear Installation", DWG 75 for specific hardware part designations.**
- ❑ When tightening the nuts on the NAS bolts that attach the U-803 Outboard Attach Brackets to the fuselage, a socket can be fitted to the nut with the use of a universal joint, and an assortment of different length extensions to allow the torque wrench to be located outside of the L.G. Box Assembly. Tighten the nuts on each outboard attach bracket by first hand-tightening each nut until it just contacts the washer, then alternate between them, tightening in 5 in./lb. increments until reaching the final torque of 240 in/lbs. This will leave a gap of approximately 0.030-inch between the face of each outboard attach bracket and the U-805-1 Outboard Wear Plates. **CAUTION: DO NOT over tighten these bolts. Doing so will bend the outboard attach bracket and actually weaken the assembly. Check these bolts and re-torqued after the first ten flying hours, then again at 50 hours, and annually thereafter. Failure to do so could lead to premature wear. The consequences of a loose gear leg are easy to imagine.** If you put the proper torque on the bolts and there is less than the required .030 gap, then file or machine the faces of the outboard attach bracket until the correct gap is obtained.
- ❑ Torque the remaining landing gear attachment bolts to the standard values for each bolt size and nut type.
- ❑ Trim the outboard end of the F-866PP-L & -R Landing Gear Cover Plates as needed to provide clearance to the U-801-L-1 & -R-1 Gear Legs and U-803 Outboard Attach Brackets and install them with the hardware depicted on DWG 75.
- ❑ Install the FSTS635-1 Full Swivel Tail Spring in the WD-409 Tail Spring Mount (See "Iso View", DWG 73). Coat the machined surfaces with grease before installing to prevent rust. Refer to "View B-B", DWG 73 for hardware depiction.
- ❑ Install the U Tail Wheel 6-inch, WD-102 Axle With Tail Fork, and associated hardware on the WD-101 FSTW Mount Base (See "Exploded Iso View", DWG 73).

### RV-8A MAIN LANDING GEAR INSALLATION

(This section RV-8A only)

- ❑ **RV-8A Quick Build Fuselage Only:** Install the U-801A-L & -R Main Gear Legs in the WD-821-L & -R Landing Gear Weldments (See DWG 67A).
- ❑ **RV-8A Quick Build Fuselage Only:** Put a bolt into the 5/16-inch hole in each landing gear weldment to align the gear leg. Remove the bolt. Working carefully to avoid disturbing the position of the gear leg, final-drill the hole all the way through with a 7.9 mm drill bit or a .311-inch ream.
- ❑ **RV-8A Quick Build Fuselage Only:** Remove the main gear legs and store them for later installation.

*A finished RV-8A stands tall when it's on its wheels. The exact "best time" to permanently mount the landing gear will depend on the exact assembly sequence you choose, available help and workspace, etc. Don't be in a hurry to get it on the gear -- we have found it much more convenient to keep the top longeron of the fuselage at "navel height" until all the fwd upper fuselage, canopy installation, instrument panel, engine controls, and other interior fuselage work is complete.*

*Return to this point in the landing gear installation section when you are ready to permanently install the landing*

gear.

- ❑ Apply a coating of light grease to all the machined surfaces of the U-801A-L & -R Main Gear Legs and the WD-821-L & -R Landing Gear Weldments.
- ❑ Insert the main gear legs in the landing gear weldments and bolt them in place with the hardware depicted in "Fwd Fuse Side Skins and Structure", DWG 67A.

### RV-8A STEP INSTALLATION

(This section RV-8A only)

- ❑ Mark the locations of the four bolt holes at the corners of the F-8120A Step Support Block (See "Detail C", DWG 71). Drill #10 the four hole locations using a drill press.
- ❑ Partially insert the round tube of the WD-832 Step Weldment through the opening in the left side of the F-842-1 Aft Bottom Skin Fwd (the opening may need to be enlarged to clear the weld around the tube). Slide the F-8120A Support Block onto the round tube of the step weldment and then cleco the step weldment to the fuselage using the holes common to the aft bottom skin fwd and the F-889-L-1 Lower Longeron.
- ❑ Rotate the F-8120A Step Support Block so that it lays flush with the F-818-L-1 Baggage Rib. Position the WD-832 Step Weldment so that the curved plate on the exterior of the F-842-1 Aft Bottom Skin Fwd lays flush with the skin, then clamp the support block in place on the baggage rib.
- ❑ Final-Drill #30 all 1/8 holes in the step weldment that are common with P.P holes in the F-842-1 Aft Bottom Skin Fwd and the F-889-L-1 Lower Longeron. Match-Drill #30 all remaining 1/8 holes in the step weldment into the aft bottom skin fwd.
- ❑ Uncleco the WD-832 Step Weldment and remove any chips between it and the F-842-1 Aft Bottom Skin Fwd. Cleco the step weldment to the fuselage using every hole.
- ❑ Clamp the F-8120A Step Support Block to the F-818-L-1 Baggage Rib.
- ❑ Match-Drill #12 the F-818-L-1 Baggage Rib using the three accessible holes in the F-8120A Support Block. Temporarily insert a bolt in each hole as you drill it. Remove the WD-832 Step Weldment from the fuselage and match-drill through the fourth hole in the step support block.
- ❑ Prime the WD-832 Step Weldment.
- ❑ Mark the top of the F-8120A Step Support Block to simplify returning it to the same position.
- ❑ Remove the F-8120A Step Support Block from the fuselage and deburr the #12 holes previously drilled in the F-818-L-1 Baggage Rib.
- ❑ Install the F-8120A Step Support Block using the hardware depicted in "Detail C", DWG 71. **NOTE: Riveting on the WD-832 Step Weldment must be delayed until later so that it is not in the way while fitting the F-872C -L Flap Fairing.**

### FRONT SEATBACK

- ❑ Separate the F-832C-L-1 & -R-1 Seatback Angles from each other (See DWG 76).
- ❑ Trim the bottom corner of the F-832C-L-1 & -R-1 Seatback Angles (See "Detail D", DWG 76).
- ❑ Separate the F-832BD to make an F-832B Seatback Angle, and F-832D Seatback Angle.
- ❑ Smooth and deburr the edges of the four seat back angles.
- ❑ Remove the tabs from the seat belt openings in the F-832A-1 Front Seatback (See "Front Seatback Assembly", DWG 76). A thin abrasive cutting disk in a die grinder tool works well for cutting the thin material.
- ❑ Deburr the edges of the F-832A-1 Front Seatback
- ❑ Make the F-832E-1 Front Seatback Hinge by cutting to length and drilling 1/8 locating holes as shown in "Front Seatback Assembly" and "Detail E", DWG 76. Cut the pin one inch longer than the hinge and bend it 90 degrees to provide a handle for inserting and removing the pin.
- ❑ Use the 1/8 locating hole to cleco the F-832E-1 Front Seatback Hinge in place at the bottom of the F-832A-1 Front Seatback.

- ❑ Align the F-832E-1 Front Seatback Hinge parallel to the bottom edge of the F-832A-1 Front Seatback and clamp in position. Match-drill 1/8 the unclecoed end of the front seatback hinge using the common hole in the front seatback.
- ❑ Cleco the F-832C-L-1 & -R-1 Seatback Angles and the F-832D & F-832B Seatback Angles in place on the F-832A-1 Front Seatback. Because of the bow in the seatback angles, first cleco each end of the F-832C-L-1 & -R-1 Seat Back Angles then pull them in alignment and install a cleco in one hole between each corrugation of the front seatback.
- ❑ Use a block of wood to back-up the middle portion of the hinge while match-drilling it #30 using the common holes in the F-832D Seatback Angle and the F-832A-1 Seatback. Uncleco the previously drilled hole at each end of the hinge and final-drill #30.
- ❑ Final-Drill #30 all the remaining 1/8 holes in the Front Seatback Assembly.
- ❑ Uncleco all Front Seatback Assembly parts and deburr the #30 holes in all the parts.
- ❑ Prime all of the Front Seatback Assembly parts if/as desired.
- ❑ Cleco together the Front Seatback Assembly and rivet at all #30 hole locations (See "Front Seatback Assembly", DWG 76).

### REAR SEATBACK

- ❑ Deburr the edges of the F-833A Rear Seatback, F-833B-L-1 & -R-1 Rear Seatback Sides, F-833C-1 Seatback Top Flange, F-833E Seatback Top Panel, and F-833F Seatback Top Web (See "Rear Seatback Assembly" and "Detail A", DWG 76).
- ❑ Make the F-833D-1 Rear Seatback Hinge by cutting it to length and then removing the center four eyelets as shown in "F-833D-1 Rear Seatback Hinge", DWG 76. Cut the pin in half and bend a 90 degree, one inch leg on one end of each piece to use as a handle.
- ❑ Drill a 1/8 and a 3/32 locating hole in the F-833D-1 Rear Seatback Hinge as shown in "Detail C", DWG 76.
- ❑ Use the 1/8 locating hole to cleco the F-833D-1 Rear Seatback Hinge in place on the bottom of the F-833A Rear Seatback. Align the hinge parallel to the bottom edge of the rear seatback and clamp in position.
- ❑ Match-Drill 1/8 the unclecoed end of the F-833D-1 Rear Seatback Hinge using the hole in the F-833A Rear Seatback as a guide.
- ❑ Cleco together all the Rear Seatback Assembly parts as shown in "Rear Seatback Assembly" and "Detail A", DWG 76.
- ❑ Mark where the upper end of the F-833B-L-1 & -R-1 Rear Seatback Sides intersect the tab on each side of the F-833C-1 Seat Back Top Flange so that a slight bend can be made to allow the tabs to lay flush on the rear seatback sides.
- ❑ Uncleco and remove the F-833C-1 Seat Back Top Flange from the rear seat assembly. Use a hand seamer to make a slight bend at the mark made on each seat back top flange tab so that it aligns with the F-833B-L-1 & -R-1 Rear Seatback Sides when installed.
- ❑ Cleco the F-833C-1 Seat Back Top Flange back in place on the rear seat assembly.
- ❑ Match-Drill #30 the remaining undrilled holes in the F-833D-1 Rear Seatback Hinge using the common holes in the F-833A Rear Seatback as a guide. Back-up the hinge with a wood block and cleco as you drill.
- ❑ Uncleco the hole at each end of the F-833D-1 Hinge and final-drill them #30.
- ❑ Final-Drill #30 all 1/8 holes in the rest of the Rear Seatback Assembly.
- ❑ Disassemble the Rear Seatback Assembly.
- ❑ Deburr the holes in all the parts of the Rear Seatback Assembly.
- ❑ Prime all of the Rear Seatback Assembly parts if/as desired.
- ❑ Cleco the F-833F Seatback Top Web to the F-833E Seatback Top Panel. Rivet all holes common between the two parts except the one hole at each end of the seatback top web that is also common with the F-833B-L-1 & -R-1 Rear Seatback Sides.
- ❑ Cleco the F-833C-1 Seatback Top Flange to the F-833F Seatback Top Web. Rivet all holes common between the two parts except the one hole at each end of the seatback top web that is also common with the F-833B-L-1 & -R-1 Rear Seatback Sides.
- ❑ Cleco the remaining rear seat parts to the upper portion of the seat as shown in "Rear Seatback Assembly",

DWG 76.

- Rivet all remaining holes in the rear seatback assembly. A C-frame dimpling/riveting tool used with a rivet gun works well to back drive most of these rivets.

### SEAT FLOORS

- Trim the upper corners of each flange on the F-829C-L-1 & -R-1 Foot Wells (See "F-829C-1 Foot Well Recess Trim", DWG 77)
- Deburr the edges of the F-830-1 Left Seat Floor, F-831-1 Right Seat Floor, F-829A-1 Front Seat Floor, F-829C-L-1 & -R-1 Foot Well Recesses, F-829B-L-1 & -R-1 Foot Well Inboard Webs, and F-829D-L-1 & -R-1 Foot Well Outboard Webs (See "Seat Floors and Foot Wells", DWG 77).
- Remove the connect tab to separate the two F-805F-1 Spacers (See "Detail C", DWG 77). Smooth and deburr the edges of the spacers.
- Cleco the F-831-1 Right Seat Floor and its associated F-805F-1 Spacer into place (See DWG 77). In is necessary to curl the right seat floor slightly to slip it in place.
- Cleco the F-830-1 Left Seat Floor and its associated F-805F-1 Spacer into place.
- Cleco the F-834-1 Aft Baggage Floor and F-835-1 Rear Baggage Shelf into place (See "Aft Baggage Area", DWG 71). 1/8-inch clecos can be used where nutplates are already installed.
- Cleco the two F-862B-1 Attach Plates to the F-862-1 Rear Baggage Bulkhead (See "Detail F", DWG 71). Final-Drill #30 the 1/8 holes common between the attach plates and rear baggage bulkhead.
- Final-Drill #30 the 1/8 holes in the F-834-1 Aft Baggage Floor common with the F-830-1 Left Seat Floor, F-831-1 Right Seat Floor, and the F-807 Bulkhead Assembly (See DWG 71 and 77).
- Final-Drill #30 the 1/8 holes common between the F-834-1 Aft Baggage Floor, and the F-818-L-1 & -R-1 Baggage Ribs and F-888-L-1 & -R-1 Mid Longerons (See "Aft Baggage Area", DWG 71).
- Final-Drill #30 all of the 1/8 holes in the F-831-1 Right Seat Floor and the F-830-1 Left Seat Floor.
- Final-Drill #12 the forward two holes for mounting the F-837-1 Aft Control Mount (See "Detail B", DWG 77)
- Temporarily mount the F-837-1 Aft Control Mount by installing bolts in the forward two mounting holes (See "Detail B", DWG 77).
- Match-Drill #12 through the F-830-1 Left Seat Floor and F-814C-L-1 Inbd Seat Rib Angle, and the F-831-1 Right Seat Floor and F-814C-R-1 Inbd Seat Rib Angle using the aft two mounting holes in the F-837-1 Aft Control Mount as a guide.
- Remove the F-837-1 Aft Control Mount. For the two bolt holes drilled in the previous step, drill #40 nutplate attach holes in the F-830-1 Left Seat Floor and F-814C-L-1 Inbd Seat Rib Angle, and in the F-831-1 Right Seat Floor and F-814C-R-1 Inbd Seat Rib Angle.
- Mark the location of the two bolt holes in both F-445 Flap Bearing Block (See "F-445 Flap Bearing Block", DWG 77). Final-Drill #10 the two bolt holes in each of the blocks using a Drill Press.
- Trim the two corners from both F-445 Flap Bearing Block as shown in "F-445 Flap Bearing Block", DWG 77. A band saw with a wood cutting blade works well for trimming the blocks.
- Fit an F-445 Flap Bearing Block to each end of the WD-806 Flap Actuator Weldment and position it in the fuselage as shown in "Detail D", DWG 77. **NOTE: Position the blocks so that a trimmed corner is at the outboard aft corner of each block as installed.** Temporarily bolt each flap bearing block in position using the aft hole locations.
- Match-Drill #12 the F-830-1 Left Seat Floor, F-831-1 Right Seat Floor, and F-815C-L-1 & -R-1 Outboard Seat Rib Angles using the fwd bolt hole in the F-445 Flap Bearing Blocks.
- Separate the five F-830B-1 Floor Stiffeners by removing the connect tabs between them. Smooth and deburr the edges of the floor stiffeners.
- Cleco an F-830B-1 Floor Stiffener and the F-805C-1 Floor Support Angle to the F-829A-1 Front Seat Floor (See "F-829A-1 Front Seat Floor Assembly", DWG 77).
- Install the F-829A-1 Front Seat Floor into place using a few temporary screws to maintain alignment (See DWG 77).
- Match-Drill #19 the two screw holes common between the F-829A-1 Front Seat Floor & F-805C Floor Support

Angle into the two F-805D Brackets (See "Detail A", DWG 77).

- Unscrew and remove the F-829A-1 Front Seat Floor from the fuselage. Deburr the #19 holes drilled in the previous step.
- Drill #40 holes for mounting a nutplate to both F-805D Brackets. Deburr the #40 holes and machine countersink on the top side for flush rivets (See "Detail B", DWG 77).
- Rivet the nutplates to the F-805D Brackets.
- Draw a center line on the bottom half of the F-832E-1 Front Seatback Hinge with the line centered on the locating hole.
- Cleco the bottom half of the F-832E-1 Front Seatback Hinge to the F-829A-1 Front Seat Floor (See "F-829A-1 Front Seat Floor Assembly", DWG 77). Position the front seatback hinge with the centerline centered in the 1/8 holes of the front seat floor. Match-Drill #30 the front seatback hinge using the 1/8-inch holes in the front seat floor as a guide.
- Cleco the F-829B-R-1 Right Foot Well Inboard Web and F-829D-R-1 Right Foot Well Outboard Web to the F-829C-R-1 Right Foot Well Recess (See "Foot Well Assembly", DWG 77). **NOTE: The foot well inboard webs mount to the interior side of the foot well recess flanges.** Cleco together the foot well inboard web, the foot well outboard web, and the foot well recess for the left side to make it a mirror image of the right. Slightly bend the tabs at the bottom corner of each foot well web to minimize the amount of gap between the foot well webs and the foot well recess.
- Final-Drill #40 the 3/32 holes common between the foot well inboard webs, the foot well outboard webs, and the foot well recesses.
- Cleco the left and right Foot Well Assemblies to their respective sides of the F-829A-1 Front Seat Floor (See "Foot Well Assembly", DWG 77).
- Final-Drill #40 all 3/32 holes in the F-829A-1 Front Seat Floor.
- Disassemble all parts currently attached to the F-829A-1 Front Seat Floor. Deburr all holes in the parts.
- Deburr the F-837-1 Aft Control Mount.
- Remove the WD-806 Flap Actuator Weldment and F-445 Flap Bearing Blocks from the fuselage. Label the blocks left and right.
- Uncleco and remove the F-830-1 Left Seat Floor, F-831-1 Right Seat Floor, the F-805F-1 Spacers, and the F-834-1 Aft Baggage Floor.
- Machine countersink the #40 holes in the F-805C Floor Support Angle.
- Machine countersink the #40 nutplate attachment rivet holes in the two F-805F-1 Spacers.
- Machine countersink the #40 nutplate attachment rivet holes at two bolt hole locations in the F-814C-L-1 & -R-1 Inboard Seat Rib Angles, used for mounting the F-837-1 Aft Control Mount (See "Detail B", DWG 77).
- Drill #40 holes in the F-815C-L-1 & -R-1 Outboard Seat Rib Angles for attaching a nutplate at the forward mounting bolt location for each F-445 Flap Bearing Block (See "Detail D", DWG 77). Machine countersink the top side of the #40 nutplate attachment rivet holes for flush rivets, deburr the bottom side, then install the nutplate called out in "Detail D". The rivets can be set using a homemade rivet squeezer made by grinding a smooth face on the jaws of Vicegrip™ pliers.
- Cleco together the F-830-1 Left Seat Floor and the F-831-1 Right Seat Floor using the holes that are common between them as shown in "Seat Floors", DWG 77. Cleco from the bottom.
- Separate the F-830DEF-1 Floor Stiffener into two F-830D-1, two F-830E-1, and two F-830F-1 Floor Stiffeners. **NOTE: Notches in the F-830DEF-1 Floor Stiffener indicate the separation points of the stiffeners.**
- Separate the six F-830C-1 Floor Stiffeners from each other.
- Smooth and deburr the edges of the floor stiffeners from the two previous steps.
- Cleco three F-830C-1 Floor Stiffeners in place on the F-830-1 Left Seat Floor and F-831-1 Right Seat Floor (See "Seat Floors", DWG 77). Cleco from the bottom.
- Cleco four F-830B-1 Floor Stiffeners in place on the F-830-1 Left Seat Floor.
- Cleco F-830D-1 and F-830E-1 Floor Stiffener to the bottom of the F-830-1 and F-831-1 Seat Floors.
- Remove the F-830B-1 Stiffener that is common with holes that attach the F-833D-1 Rear Seatback Hinge.
- Draw a centerline along the bottom surface of the bottom half of the F-833D-1 Rear Seatback Hinge that is cen-

- tered on the 3/32-inch locating hole
- ❑ Cleco the F-833D-1 Rear Seatback Hinge into position on the F-830-1 Left Seat Floor (See "Seat Floors", DWG 77). Align the centerline on the rear seatback hinge with the P.P. holes in the left and right seat floors, then match-drill #30 a hole into the undrilled end of the rear seatback hinge. Match-Drill #30 all of the remaining 3/32 holes into the rear seatback hinge.
  - ❑ Remove the F-833D-1 Rear Seatback Hinge from the F-830-1 and F-831-1 Seat Floors.
  - ❑ Final-Drill #30 the 3/32 holes in the F-830B-1 Floor Stiffener that is common with holes that attach the F-833D-1 Rear Seatback Hinge.
  - ❑ Final-Drill #30 the 3/32-inch holes in the two F-830F-1 Floor Stiffeners that are common with holes that attach the F-833D-1 Rear Seatback Hinge. **NOTE: The outboard most hole in both F-830F-1 Floor Stiffener will be left 3/32-inch.**
  - ❑ Cleco the two F-830F-1 Floor Stiffeners in place on the F-830-1 and F-831-1 Seat Floors.
  - ❑ Match-Drill #40 the keeper rivet hole into the F-830F-1 Floor Stiffener using the hole in the F-831-1 Right Seat Floor as a guide. Final-Drill #40 the outboard most hole in both F-830F-1 Floor Stiffener.
  - ❑ Cleco the F-833D-1 Rear Seatback Hinge in place on the F-830-1 and F-831-1 Seat Floors.
  - ❑ The overlap of the F-830-1 Left Seat Floor onto the F-831-1 Right Seat Floor causes a bump in the F-833D-1 Rear Seatback Hinge which makes insertion and removal of the hinge pin more difficult. Use some scrap .025 aluminum sheet to make a shim to put under the portion of the rear seatback hinge that is common to the F-831-1 Right Seat Floor and then match drill it using the #30 holes in the rear seatback hinge.
  - ❑ Uncleco the F-833D-1 Rear Seatback Hinge and all floor stiffeners from the F-830-1 and F-831-1 Seat Floors. Deburr all holes in the left and right seat floors, all seat floor stiffeners, the rear seatback hinge, and the F-834-1 Aft Baggage Floor. Deburr all of the holes in the fuselage substructure that are common with holes in the left and right seat floors.
  - ❑ Final-Drill #40 the nutplate attachment rivet holes at the eight nutplate locations on the rear flanges of the F-834-1 Aft Baggage Floor (See "Aft Baggage Area", DWG 71). Dimple countersink the #40 nutplate attachment rivet holes for flush rivet heads on the fwd side.
  - ❑ Dimple countersink all the #40 holes in the F-829A-1 Front Seat Floor for flush heads on the top surface.
  - ❑ Dimple countersink the #40 holes in the F-829C-1 Foot Well Recesses, the F-829B-L-1 & -R-1 Foot Well Inboard Webs, and the F-829D-L-1 & -R-1 Foot Well Outboard Webs for flush heads toward the interior of the foot well recesses.
  - ❑ Dimple countersink all the #40 holes in the F-830-1 and F-831-1 Seat Floors for flush heads on the top surface.
  - ❑ Dimple countersink all the #40 holes in the F-830B-1, C-1, D-1, E-1, & F-1 Floor Stiffeners.
  - ❑ Prime the cockpit floor parts if/as desired.
  - ❑ Back rivet the F-830B-1, D-1, E-1, & F-1 Floor Stiffeners to the F-830-1 Left Seat Floor using the 3/32 flush rivets called out in "Seat Floors", DWG 77. (Only rivet the three F-830B-1 Floor Stiffeners that use 3/32 rivets, and only one of the rivets used to attach the F-830F-1 Floor Stiffener is 3/32.) **NOTE: Do not rivet the F-830C-1 Floor Stiffeners at this time.**
  - ❑ Back rivet the F-830D-1, E-1, & F-1 Floor Stiffeners to the F-831-1 Right Seat Floor using 3/32 flush rivets.
  - ❑ Rivet the F-833D-1 Rear Seatback Hinge and the associated F-830B-1 Floor Stiffener to the F-830-1 Left Seat Floor (See "Seat Floors", DWG 77). An easy way to set the rivets is using a rivet gun on the optional arbor shaft that comes with most of the C-frame dimple/riveting tools available from tool suppliers. Put a cupped rivet set of the appropriate size in the base of the tool. Lay the rivet head in the cupped set and back drive the shop head of the rivet using the rivet gun and flush arbor. **NOTE: Do not rivet the two holes common to the F-814C-1 Inbd Seat Rib Angles that get LP4-3 rivets later.**
  - ❑ Dimple countersink the attachment rivet holes in the four nutplates that mount on the F-830-1 and F-831-1 Seat Floors for later attaching the F-876-L-1 & -R-1 Aft Cabin Covers (See "Seat Floors", DWG 77). Back rivet the nutplates to the left and right seat floors.
  - ❑ Dimple countersink the attachment rivet holes in the five nutplates that mount on the F-829A-1 Front Seat Floor. Back rivet the nutplates to the front seat floor.
  - ❑ Dimple countersink the attachment rivet holes in the eight nutplates that mount on the aft flanges of the F-834-1 Aft Baggage Floor, then rivet them in place (See "Aft Baggage Area", DWG 71).
  - ❑ Back rivet the F-830B-1 Floor Stiffener and F-805C-1 Floor Support Angle to the F-829A-1 Front Seat Floor (See "F-829A-1 Front Seat Floor Assembly", DWG 77). **NOTE: Be sure the floor support angle is oriented**

**the correct way.** Rivet the F-832E-1 Front Seatback Hinge to the front seat floor.

- ❑ Rivet the F-829B-R-1 Right Foot Well Inboard Web and F-829D-R-1 Right Foot Well Outboard Web to the F-829C-R-1 Right Foot Well Recess (See "Foot Well Assembly", DWG 77).
- ❑ Repeat the previous step with the parts for the left Foot Well Assembly.
- ❑ Rivet each Foot Well Assembly to the F-829A-1 Front Seat Floor (See "Foot Well Assembly", DWG 77).

*Delay final riveting of the seat floors and aft baggage floor until after the F-872CPP -1Flap Fairings (See DWG 80) have been riveted to the fuselage (which can't be done until after the wings have been fitted), and installation work for a rear mounted battery (if required) has been completed.*

**Return to this point when the seat floors can be permanently installed.**

- ❑ Cleco the F-831-1 Right Seat Floor and F-805F-1 Spacer in place (See DWG 77).
- ❑ Cleco the F-830-1 Left Seat Floor and F-805F-1 Spacer in place.
- ❑ Cleco the three F-830C-1 Floor Stiffeners in place on the F-830-1 & F-831-1 Seat Floors.
- ❑ Cleco the F-834-1 Aft Baggage Floor in place.

**RV-8A Only** – Be sure the WD-832 Step Weldment is riveted to the fuselage before riveting in place the F-834-1 Aft Baggage Floor (See "Detail C", DWG 71).

- ❑ Rivet the F-830-1 & F-831-1 Seat Floors, and the F-834-1 Aft Baggage Floor in place with blind rivets (See DWG 71 & 77).
- ❑ Rivet the F-830C-1 Floor Stiffeners to the F-830-1 & F-831-1 Seat Floors.
- ❑ Rivet the four nutplates to the fwd edge of the F-831-1 Right Seat Floor, F-805F-1 Spacer, and F-805B-R-1 Floor Support Angle (See "Detail C", DWG 77).
- ❑ Rivet the four nutplates to the fwd edge of the F-830-1 Left Seat Floor, the F-805F-1 Spacer, and the F-805B-L-1 Floor Support Angle
- ❑ Rivet the four nutplates (used for mounting the F-837-1 Aft Control Mount) to the two F-814C-1 Inboard Seat Rib Angles and the F-830-1 & F-831-1 Seat Floors (See "Detail B", DWG 77).
- ❑ Trim the two unused flanges from the fresh air vent/nozzle of your choice (See Van's Aircraft web store for available fresh air vent options: SV-6 or SV-7) and the VENT SV-2 Hose Adapter, and attach them to the F-814J Fwd Seat Belt / Vent Anchor (See "Rear Seat Fresh Air Vent", DWG 85).

**RV-8 CONSOLES AND SEAT RAMP**

**(This Section RV-8 Only)**

- ❑ Temporarily attach the F-883-1 Fuel Valve Bracket to the F-844-L Auxiliary Longerons (See "Fuel Valve Bracket Installation", DWG 68).
- ❑ Clamp the inboard end of the F-883-1 Fuel Valve Bracket to the F-878-L-1 Mid Cabin Brace and match-drill #19 the screw hole common between the two parts. Remove the fuel valve bracket and deburr the holes drilled this step.
- ❑ Machine-countersink the hole drilled in the F-878-L-1 Mid Cabin Brace in the previous step for flush screws on the top surface.
- ❑ Temporarily install the F-883-1 Fuel Valve Bracket with one screw at each end (See "Fuel Valve Bracket Installation", DWG 68).
- ❑ Deburr the holes and edges of both F-881-1 Mid Cabin Covers.
- ❑ Mount the F-881-1 Mid Cabin Covers in place on the left and right sides of the fwd cockpit using enough screws to assure alignment (See DWG 68).
- ❑ Match-Drill #19 the two holes in both F-881-1 Mid Cabin Covers that are common with the F-844-L & -R Auxiliary Longerons.
- ❑ Mark the location of the Fuel Valve Handle hole, punched in the F-883-1 Fuel Valve Bracket, on the left F-881-1 Mid Cabin Cover (See "Fuel Valve Bracket Installation", DWG 68).
- ❑ Remove the left and right F-881-1 Mid Cabin Covers. Deburr the two screw holes previously match-drilled in the F-844-L & -R Auxiliary Longerons.
- ❑ Use a Unibit™ to drill a 3/8 hole, located as previously marked, in the left F-881 Mid Cabin Cover for the Fuel



## Valve Handle.

- ❑ Drill #40 rivet holes at the two screw hole locations in the F-844-L & -R Auxiliary Longerons for attaching the nutplates. Machine countersink the nutplate attachment rivet holes for flush rivets.
- ❑ Rivet nutplates to the F-844-L & -R Auxiliary Longerons at the two screw hole locations.
- ❑ Final-Drill #40 the nutplate attachment rivet holes in the F-880B-L-1 & -R-1 Fwd Seat Ramp Ribs, and the F-880A-1 Fwd Seat Ramp (See "Seat Ramp Assembly", DWG 68).
- ❑ Remove the tabs from both sides of the F-879-1 Seat Ramp (See "Seat Ramp Assembly", DWG 68).
- ❑ Deburr all holes and edges of the F-880B-L-1 & -R-1 Fwd Seat Ramp Ribs, F-880A-1 Fwd Seat Ramp, and F-879-1 Seat Ramp.
- ❑ Dimple countersink the #40 holes in the F-880B-L-1 & -R-1 Fwd Seat Ramp Ribs and the F-880A-1 Fwd Seat Ramp for flush rivets.
- ❑ Prime the F-880B-L-1 & -R-1 Fwd Seat Ramp Ribs, F-880A-1 Fwd Seat Ramp, and F-879-1 Seat Ramp if/as desired.
- ❑ Dimple the rivet holes in the nutplates and rivet them to the F-880B-L-1 & -R-1 Fwd Seat Ramp Ribs and the F-880A-1 Fwd Seat Ramp.
- ❑ Temporarily mount the F-865-1 Console with enough screws to assure it is properly positioned (See "Right Console Assembly", DWG 68). Match-Drill #19 the aft two screw holes in the F-865-1 Console into the right F-804N-1 Bulkhead Cap. Remove the console.
- ❑ Uncleco the right F-804N-1 Bulkhead Cap. Use a nutplate as a guide to match-drill #40 the nutplate attachment rivet holes into the bulkhead cap at both screw locations, then deburr the #40 holes and the #19 screw holes drilled in the previous step.
- ❑ Machine countersink the nutplate attachment rivet holes in the F-865-1 Bulkhead Cap for flush rivets. Rivet the nutplates to the bulkhead cap.
- ❑ Make the F-864E-1 Cable Anchor (See "F-864E-1 Cable Anchor", DWG 68).
- ❑ Remove the small tab from the fwd end of the F-864A-1 Throttle Quadrant Mount (See "Throttle Quadrant Assembly", DWG 68).
- ❑ Deburr the holes and edges of the F-864A-1 Throttle Quadrant Mount and the F-864B-1 Throttle Quadrant Cover.
- ❑ Cleco the F-864E-1 Cable Anchor to the F-864A-1 Throttle Quadrant Mount. Square the cable anchor with the top edge of the throttle quadrant mount and clamp it in position.
- ❑ Match-Drill #30 the F-864E-1 Cable Anchor using the three remaining 1/8 holes in the F-864A-1 Throttle Quadrant Mount as a guide. Cleco as you drill. Uncleco and then final-drill #30 the original 1/8 positioning hole in the cable anchor and throttle quadrant mount.
- ❑ Remove the F-864E-1 Cable Anchor from the F-864A-1 Throttle Quadrant Mount. Deburr the #30 holes in the cable anchor that were drilled in the previous step.
- ❑ Tap the four #30 holes in the F-864E-1 Cable Anchor for 8-32 screws.
- ❑ Final-Drill #19, then deburr, the four #30 holes (common with the F-864E-1 Cable Anchor) in the F-864A-1 Throttle Quadrant Mount.
- ❑ Final-Drill #40, then deburr, the nutplate attach rivet holes in the F-864B-1 Throttle Quadrant Cover.
- ❑ Prime the F-864E-1 Cable Anchor, F-864B-1 Throttle Quadrant Cover, and F-864A-1 Throttle Quadrant Mount if/as desired.
- ❑ Rivet the nutplates to the F-864B-1 Throttle Quadrant Cover (See "Throttle Quadrant Assembly", DWG 68).
- ❑ Install the throttle quadrant mount assembly using the hardware depicted in "Throttle Quadrant Assembly", DWG 68. **NOTE: During final assembly, the throttle quadrant and the engine control cables must first be installed on the throttle quadrant mount assembly. The cables are then threaded through the bulkheads and firewall from back to front, and then the mount assembly is screwed and bolted in place.**

**RV-8A CONSOLES AND SEAT RAMP****(This Section RV-8A Only)**

- ❑ Cleco the F-880C-L-1 Fwd Seat Ramp Rib to the F-8112-L-1 Mid Cabin Cover Support (See "Seat Ramp Assembly" and "Iso View", DWG 68A). Repeat this step with the parts for the right side. Final-Drill #30 the 1/8

holes common between the fwd seat ramp ribs and the mid cabin cover supports.

- ❑ Final-Drill #40 the nutplate attachment rivet holes in the F-880C-L-1 & -R-1 Fwd Seat Ramp Ribs and the F-8112-L-1 & -R-1 Mid Cabin Cover Supports. Uncleco the fwd seat ramp ribs from the mid cabin cover supports and deburr all holes and edges of the four parts.
- ❑ Dimple countersink the #40 nutplate attachment rivet holes in the F-880C-L-1 & -R-1 Fwd Seat Ramp Ribs for flush rivets (See "Aft Iso View", DWG 67A).
- ❑ Machine-countersink the #40 nutplate attachment rivet holes in the F-8112-L-1 & -R-1 Mid Cabin Cover Supports for flush rivets.
- ❑ Prime the F-880C-L-1 & -R-1 Fwd Seat Ramp Ribs and F-8112-L-1 & -R-1 Mid Cabin Cover Supports if/as desired.
- ❑ Rivet the F-880C-L-1 Fwd Seat Ramp Rib to the F-8112-L-1 Mid Cabin Cover Support (See "Aft Iso View", DWG 67A). Repeat this step with the parts for the right side.
- ❑ Rivet the nutplates to the F-880C-L-1 & -R-1 Fwd Seat Ramp Ribs and F-8112-L-1 & -R-1 Mid Cabin Cover Supports. **NOTE: Dimple-countersink the rivet holes in the nutplates for the fwd seat ramp ribs.**
- ❑ Install the Left and Right Mid Cabin Cover Support / Fwd Seat Ramp Assemblies in place in the fuselage (See DWG 67A & 68A).
- ❑ Temporarily attach the F-883A-1 Fuel Valve Bracket to the F-898-L Auxiliary Longerons (See "Fuel Valve Bracket Installation", DWG 68A).
- ❑ Clamp the inboard end of the F-883A-1 Fuel Valve Bracket to the F-8112-L-1 Mid Cabin Cover Support and match-drill #19 the screw hole common between the two parts. Remove the fuel valve bracket and deburr the holes drilled in this step.
- ❑ Machine countersink the hole drilled (in the previous step) in the F-8112-L-1 Mid Cabin Cover Support for a flush screw on the top surface.
- ❑ Reinstall the F-883A-1 Fuel Valve Bracket.
- ❑ Cleco the F-8113B-R-1 Console Side Rib in place on the F-8113A-R-1 Mid Cabin Cover (See "Iso View", DWG 68A). Final-Drill #40 the 3/32 holes common between the two parts. Repeat this step with the parts for the left mid cabin cover.
- ❑ Uncleco the F-8113B-L-1 & -R-1 Console Side Ribs from the F-8113A-L-1 & -R-1 Mid Cabin Covers and deburr the holes and edges of the four parts.
- ❑ Dimple countersink the #40 holes in the F-8113A-L-1 & -R-1 Mid Cabin Covers and F-8113B-L-1 & -R-1 Console Side Ribs for flush rivets (See "Right Console Assembly", DWG 68A).
- ❑ Prime the F-8113A-L-1 & -R-1 Mid Cabin Covers and F-8113B-L-1 & -R-1 Console Side Ribs if/as desired.
- ❑ Rivet the F-8113B-L-1 & -R-1 Console Side Ribs to their corresponding F-8113A-L-1 & -R-1 Mid Cabin Cover (See "Right Console Assembly", DWG 68A).
- ❑ Mount the left and right F-8113 Mid Cabin Cover Assemblies in place in the fwd cockpit using the four inboard screw locations to assure alignment.
- ❑ Match-Drill #19 the four outboard holes in the left and right F-8113 Mid Cabin Cover Assemblies into the F-898-L & -R Auxiliary Longerons.
- ❑ Mark the location of the Fuel Valve Handle hole, punched in the F-883-1 Fuel Valve Bracket, on the left F-8113 Mid Cabin Cover Assembly (See "Fuel Valve Bracket Installation", DWG 68A).
- ❑ Remove the left and right F-8113 Mid Cabin Cover Assemblies. Deburr the four screw holes previously match-drilled in the F-898-L & -R Auxiliary Longerons.
- ❑ Use a Unibit™ to drill a 3/8 hole, located as previously marked, in the left F-8113 Mid Cabin Cover Assembly for the Fuel Valve Handle.
- ❑ Drill #40 rivet holes at the four screw hole locations in the F-898-L & -R Auxiliary Longerons for attaching the nutplates. Machine-countersink the nutplate attachment rivet holes for flush rivets. **NOTE: Remove the F-8112-L-1 & -R-1 Mid Cabin Cover Supports and F-883A-1 Fuel Valve Bracket to improve riveting access.**
- ❑ Rivet nutplates to the F-898-L & -R Auxiliary Longerons at the four screw hole locations.
- ❑ Remove the small tab from both sides of the F-879-1 Seat Ramp (See "Seat Ramp Assembly", DWG 68A).

- Final-Drill #40 the nutplate attachment holes on the aft edge of the F-880A-1 Fwd Seat Ramp.
- Deburr all holes and edges of the F-880A-1 Fwd Seat Ramp and F-879-1 Seat Ramp (See "Seat Ramp Assembly", DWG 68A).
- Dimple countersink the #40 holes in the F-880A-1 Fwd Seat Ramp for flush rivets.
- Prime the F-880A-1 Fwd Seat Ramp, and F-879-1 Seat Ramp if/as desired.
- Dimple the rivet holes in the nutplates and rivet them to the F-880A-1 Fwd Seat Ramp.
- Temporarily mount the F-8101-1 Console with enough screws to assure that it is properly positioned (See "Right Console Assembly", DWG 68A). Match-Drill #19 the aft two screw holes in the F-8101-1 Console into the right F-804N-1 Bulkhead Cap. Remove the console.
- Uncleco the right F-804N-1 Bulkhead Cap and deburr the holes drilled in the previous step.
- Drill #40, then machine countersink nutplate attachment rivet holes in the F-804N-1 Bulkhead Cap for flush rivets. Rivet the nutplates to the bulkhead cap.
- Make the F-864E-1 Cable Anchor (See "F-864E-1 Cable Anchor", DWG 68A).
- Remove the small tab from the fwd end of the F-8100A-1 Throttle Quadrant Mount (See "Throttle Quadrant Assembly", DWG 68A).
- Deburr the holes and edges of the F-8100A-1 Throttle Quadrant Mount and the F-8100B-1 Throttle Quadrant Cover.
- Cleco the F-864E-1 Cable Anchor to the F-8100A-1 Throttle Quadrant Mount. Square the cable anchor to the top edge of the throttle quadrant mount and clamp it in position.
- Match-Drill #30 the F-864E-1 Cable Anchor using the three remaining 1/8 holes in the F-8100A-1 Throttle Quadrant Mount as a guide. Cleco as you drill. Uncleco and then final-drill #30 the original 1/8 positioning hole in the cable anchor and throttle quadrant mount.
- Remove the F-864E-1 Cable Anchor from the F-8100A-1 Throttle Quadrant Mount. Deburr the #30 Holes in the cable anchor that were drilled in the previous step.
- Tap the four #30 holes in the F-864E-1 Cable Anchor for 8-32 screws.
- Final-Drill #19, then deburr, the four #30 holes (common with the F-864E-1 Cable Anchor) in the F-8100A-1 Throttle Quadrant Mount.
- Final-Drill #40, then deburr, the nutplate attach rivet holes in the F-8100B-1 Throttle Quadrant Cover.
- Prime the F-864E-1 Cable Anchor, F-8100B-1 Throttle Quadrant Cover, and F-8100A-1 Throttle Quadrant Mount if/as desired.
- Rivet the nutplates to the F-8100B-1 Throttle Quadrant Cover (See "Throttle Quadrant Assembly", DWG 68A).
- Install the throttle quadrant mount assembly using the hardware depicted in "Throttle Quadrant Assembly", DWG 68A. **NOTE: During final assembly, the throttle quadrant and the engine control cables must first be installed on the throttle quadrant mount assembly. The cables are then threaded through the bulkheads and firewall from back to front, and then the mount assembly is screwed and bolted in place.**

#### EMPENNAGE ATTACHMENT

- Separate the two F-810E Spacers from the F-885 Spacer (See "F-810E-885", DWG 78). Smooth and deburr the edges of the three spacers.
- Level the fuselage side to side and front to back. Check side to side at the F-804-1 Center Section Bulkhead Assembly, and front to back at the F-819-1 Aft Deck.

*The horizontal stabilizer mounts to the fuselage with zero incidence. It is properly positioned when the chord centerline is parallel to the upper longerons. The tooling holes in the ribs are on the chord line and can be used as a cross check.*

- Loosely clamp the Horizontal Stabilizer rear spar to the F-811B-1 Stab Attach Bars. Put an F-810E Spacer under both sides of the HS-814-1 Splice Angle (See "Detail A", DWG 78), and a 3/16 spacer (drill bit) under the center point of the Horizontal Stabilizer Rear Spar (See "Horizontal Stab Attach" and "Side View", DWG 78).
- Center the Horizontal Stabilizer laterally on the fuselage by using the joint line where the left and right HS-603PP Rear Spar Channels meet at the center of the spar. Center the joint line between the two F-811B-1 Stab Attach Bars. Clamp the horizontal stabilizer rear spar tightly to the two stab attach bars. Clamp the HS-

814-1 Splice Angle at both F-810E Spacers.

- Place a small spacer block on top of each half of the horizontal stabilizer at the intersection of the HS-608 Rib and the HS-603 Rear Spar Channel. Be sure that both spacer blocks are the same height and are at the same span wise location (the exact location is not important as long as it is the same on both sides).
- Place a level across the horizontal stabilizer on top of the two spacer blocks and check that the horizontal stabilizer is level to the fuselage. If it is not, first double-check that the fuselage is actually level side to side. If the horizontal stab is out of level, place some thin shim stock under the F-810E Spacer on the side that is low.
- With the horizontal stabilizer clamped in the proper position, match-drill #30 the horizontal stabilizer rear spar using the two holes in each F-811B-1 Stab Attach Bar as a guide. Cleco each hole as you drill.
- Measure the distance from the aft outboard corner of the right horizontal stabilizer to a point on the side of the tailbone close to the aft edge of the F-823-1 Mid Side Skin (See "Squaring Horizontal Stab with Fuselage", DWG 85). The exact point on the tailbone is not important, however, choose a point that has an identifiable, corresponding point (such as a rivet) on the other side of the tailbone. Make the same measurement for the left side of the horizontal stabilizer. Adjust the horizontal stabilizer so the measurements are within 1/4-inch of each other.
- Verify that the front of the horizontal stabilizer is tightly clamped in place and the F-810E Spacers are properly positioned (See "Detail A", DWG 78), then mark the bolt hole locations as shown. **NOTE: The lateral position of the outboard hole is measured from the edge of the longeron, not the end of the HS-814-1 Splice Angle.**
- Use a #30 bit to initially drill the four HS-814-1 Splice Angle bolt holes through the splice angle, the F-819-1 Aft Deck, F-887-1 Upper Longeron, F-810D-1 Spacer, and F-810C Angle. Final-Drill #12 the four bolt holes. Deburr, and install a temporary bolt, washer, and nut in each hole as you drill.
- Double-check that the horizontal stabilizer is still level front to back and then final-drill #12 the four bolt holes that are used to attach the horizontal stabilizer rear spar to the F-811B-1 Stab Attach Bars. Temporarily install a bolt, nut, and washer as you drill each hole.
- Trim the bottom end of the VS-702 Front Spar as shown in "VS-702 Trim Detail", DWG 78.
- Cleco the F-884 Attach Plate to the aft side of the horizontal stabilizer front spar (See "Vertical Stab Attach", DWG 78).
- **RV-8A Only:** Mark the location for the two rivet holes in the bottom corners of the lower VS-410PP Hinge Bracket on the vertical stabilizer (See "Aft View", DWG 78).
- **RV-8A Only:** Drill #30 the two rivet holes, marked in the previous step, through the VS-410PP Hinge Bracket, VS-808PP Vertical Stab Spar Doubler, and VS-803PP Vertical Stab Rear Spar.
- **RV-8A Only:** Machine countersink the #30 holes drilled in the previous step for flush rivet heads on the forward side of the vertical stabilizer rear spar.
- **RV-8A Only:** Install rivets in the holes that were machine countersunk in the previous step (See "Aft View", DWG 78).
- Position the vertical stabilizer on the fuselage by clecoing the locating hole in the rear spar to the center hole in the F-812B-1 Angle/Control Stop, and lightly clamping the VS-702 Front Spar to the F-885 Spacer and F-884 Attach Plate. Position the top and side edges of the spacer flush with the top and side edges of the attach plate. **NOTE: If your vertical stabilizer does not have the locating hole, drill one as directed in "Aft View", DWG 78.**
- Measure from the top of the vertical stabilizer to each tip of the horizontal stabilizer as shown in "Squaring Vertical Stab", DWG 85. Adjust the lateral position of the top of the vertical stabilizer so the two measurements are equal, then clamp through the access holes in the F-824 -1 Aft Side Skins to hold the rear spar in position.
- **RV-8 Only:** Mark the location of the three bolt holes used to attach the bottom of the vertical stab spar to the fuselage (See "View A-A", DWG 73).
- **RV-8 Only:** Drill #30 through the vertical stab rear spar, F-812-1 Bulkhead Assembly, and WD-409 Tail Spring Mount, at the three hole locations marked in the previous step. Cleco each hole as you drill.
- **RV-8 Only:** Final-Drill 1/4" for AN4 bolts, the three holes drilled in the previous step.
- **RV-8 Only:** Remove any chips caught between the vertical stab spar and the F-812-1 Bulkhead Assembly. Temporarily bolt the vertical stab rear spar to the F-812-1 Bulkhead Assembly and WD 409 Tail Spring Mount using the holes drilled in the previous step.
- **RV-8A Only:** Use an angle drill to match-drill #30 the vertical stabilizer rear spar using the four holes in the F-712E Tie Down Bar as a guide (See DWG 78). Cleco each hole as you drill.

- ❑ **RV-8A Only:** Final-Drill #12 the four holes drilled in the previous step.
- ❑ **RV-8A Only:** Remove any chips caught between the vertical stab spar and the F-812-1 Bulkhead Assembly. Temporarily bolt the vertical stab rear spar to the F-812 Bulkhead and F-712E Tie Down Bar using the holes drilled in the previous step.
- ❑ Match-Drill #30 into the vertical stabilizer rear spar, the two 1/8 holes in the F-812B-1 Angle / Control Stop (See "Vertical Stab Attach", DWG 78).
- ❑ Final-Drill #12 the two holes drilled in the previous step, then temporarily install bolts.
- ❑ Clamp a wood stick or some other type of straight edge to, and centered on, the middle hinge brackets (See "Centering Vertical Stab", DWG 85). Attach string or fine thread to both ends of the stick, equal-distant from the vertical stabilizer skin. Stretch the strings tightly to a point at the forward end of the fuselage that is on the centerline. Use P.P. holes in the F-802N-1 Fwd Upper Brace (RV-8) or F-802VPP Fuselage Bulkhead Brace (RV-8A) as a reference for finding the fuselage center. Position the vertical stabilizer so that the forward portion is centered between the string lines and clamp in position.
- ❑ Adjust the vertical position of the front of the vertical stabilizer so that the three rudder hinge points are aligned. This can be checked by placing a long straight edge against the aft edges of the rudder hinge brackets on the vertical stabilizer. Reposition the front of the vertical stabilizer up or down until the straight edge contacts all three hinge brackets. If you don't have a long enough straight edge, you can use a piece of thread as a string line, pulled tight through the center of the hinge bracket bolt holes, to check the alignment.
- ❑ Double check that the VS-702 Front Spar is securely clamped to the F-885 Spacer and F-884 Attach Plate with the edges of the spacer aligned with the edges of the attach plate, that the forward end of the vertical stabilizer is centered on the fuselage (centered between the string lines), and that the three rudder hinge points on the vertical stabilizer rear spar are aligned.
- ❑ Match-Drill #30 the eleven 1/8 holes in the F-884 Attach Plate into the VS-702 Front Spar and F-885 Spacer (See "Vertical Stab Attach", DWG 78). Cleco as you drill.
- ❑ Final-Drill #12 the four bolt holes used to attach the F-884 Attach Plate to the horizontal stabilizer front spar. Temporarily insert a bolt in each hole as you drill.
- ❑ Uncleco the F-884 Attach Plate and F-885 Spacer from the VS-702 Front Spar. Deburr the #30 rivet holes common between the three parts. Deburr the four #12 bolt holes in the horizontal stabilizer front spar and the attach plate.
- ❑ Prime the F-884 Attach Plate and F-885 Spacer if/as desired.
- ❑ Rivet the F-884 Attach Plate and F-885 Spacer to the VS-702 Front Spar (See "Vertical Stab Attach", DWG 78). **NOTE: It is not necessary to rivet all of the hole locations at this time. Holes with more difficult access can be delayed until the vertical stabilizer is removed from the fuselage.**
- ❑ Temporarily bolt the F-884 Attach Plate to the horizontal stabilizer front spar.
- ❑ Attach the left and right elevators to the horizontal stabilizer using the hardware depicted on DWG 5. First mount the elevators using temporary bolts at the two outboard hinge points on each elevator. Determine the size and number of spacer washers required between the WD-605-R-1 & -L-1 Elevator Horns and the VA-146 Flange Bearing.
- ❑ Remove both elevators.
- ❑ Insert the 1/4 bolt in the WD-605-R-1 Elevator Horn and then add the previously determined spacer washers.
- ❑ Reattach the right elevator by first inserting the 1/4 bolt in the VA-146 Flange Bearing and then inserting temporary bolts at the two outboard hinge locations.
- ❑ Place the previously determined spacer washers for the left elevator on the 1/4 bolt, then attach the left elevator using temporary bolts at the two outboard hinge points.
- ❑ Clamp the counterbalance arm of each elevator to the outboard end of the horizontal stabilizer to lock them in the neutral position.
- ❑ Mark the F-841 Pushrod Assembly attachment bolt hole location on the aft most WD-605 Elevator Horn (See "Side View", DWG 78). Drill the hole location with a #40 drill, then final-drill #12.
- ❑ Make a drill guide block out of hardwood that closely fits the space between the WD-605-L-1 & -R-1 Elevator Horns. Position the drill guide block between the two elevator horns and mark the location of the previously drilled #12 hole.
- ❑ Remove the drill guide block and, using a drill press, drill a 3/16 hole through the block at the mark made in the previous step.

- ❑ Position the drill guide block between the WD-605-1 Elevator Horns with the 3/16 hole aligned with the previously drilled hole in the elevator horn.
- ❑ Double check that both of the elevators are still clamped in their neutral positions and clamp the drill guide block in place between the WD-605-1 Elevator Horns. Match-Drill #12 the undrilled elevator horn through the previously drilled elevator horn and the drill guide block. Remove the clamps and drill guide block and deburr the #12 holes in both elevator horns.

#### **ELEVATOR CONTROL SYSTEM**

- ❑ Separate the F-635 Bellcrank parts as shown in "F-635 Separation Detail" on DWG 79. Smooth and deburr the edges of the three parts.
- ❑ Cleco together the two F-635A Bellcranks, F-635B Spacer, and VA-146 Flange Bearing (See "F-635 Bellcrank Assy", DWG 79). Final-Drill #30 the eight holes common between these parts.
- ❑ Disassemble and deburr all the parts of the F-635 Bellcrank Assembly.
- ❑ Prime the parts of the F-635 Bellcrank Assembly if/as desired. **NOTE: If priming the VA-146 Flange Bearing, mask the side of the bearing inserts to prevent primer from entering.**
- ❑ Cleco and then rivet together the F-635 Bellcrank Assembly.
- ❑ Cut the F-841 Pushrod to length (See "F-841 Pushrod Assembly", DWG 79). Deburr both ends of the pushrod after cutting.
- ❑ Mark the eight rivet hole locations on both ends of the F-841 Pushrod. To simplify marking the rivet locations, make a pattern out of a strip of paper. Wrap the strip of paper around the outside of the pushrod and trim it until the ends just meet. Flatten out the strip of paper and fold it in half three times. Unfold the paper, wrap it around the pushrod, then mark the crease locations on the pushrod. The eight marks will be equally spaced around the pushrod.
- ❑ Insert a VA-101 Threaded Rod End into both ends of the F-841 Pushrod. Drill #30 the eight rivet holes in both ends of the pushrod while remaining within the edge distance dimension shown in "F-841 Pushrod Assembly", DWG 79. Cleco each hole as you drill.
- ❑ Mark the position of both VA-101 Threaded Rod Ends to simplify reassembly (the holes will only align in one position). Uncleco and remove the threaded rod ends from the F-841 Pushrod. **NOTE: Temporarily thread a rod end bearing into both threaded rod ends to provide a handle for pulling it out of the tube.**
- ❑ Deburr the holes in the F-841 Pushrod and VA-101 Threaded Rod Ends that were drilled previously.
- ❑ Clean the interior of the F-841 Pushrod by pulling a small cloth lightly wetted with solvent through the pushrod with a string or piece of wire.
- ❑ Reinsert and cleco the VA-101 Threaded Rod Ends into the F-841 Pushrod. Rivet the threaded rod ends to the pushrod using the blind rivets specified (See "F-841 Pushrod Assembly", DWG 79).
- ❑ The VA-101 Threaded Rod Ends and the F-841 Pushrod are bare aluminum and must be primed inside and out. Prime them after assembly because with the close fit of the threaded rod ends and the pushrod, it can be very difficult to assemble after primer is applied to the parts. Priming the inside of the pushrod is easily accomplished by closing one end of the threaded rod end with tape. Pour a small quantity of primer in the open end and then tape it shut also. Incline the pushrod so the primer runs slowly from one end to the other. Rotate the pushrod slightly and then pour back to the opposite end. Repeat until the entire inside surface is coated. Untape the ends and pour out the excess. Prime the exterior of the pushrod and threaded rod ends.
- ❑ Thread on the rod end bearings and jamb nuts shown in "F-841 Pushrod Assembly", DWG 79. **CAUTION: The primer must be completely dry before installing the jam nuts and rod end bearings. Wet primer can migrate into the rod end bearings and freeze the bearing.**
- ❑ The VA-101 Threaded Rod End on the aft (elevator) end of the F-841 Pushrod Assembly can interfere with the WD-605-1 Elevator Horns if the rod end bearing adjustment is too short. The F-841 Pushrod Assembly has been designed so that this rod end bearing is installed with maximum extension; just slightly more than 1/2 thread engagement. This prevents any interference between the threaded rod end and the elevator horns. There is no interference concern with the forward threaded rod end and F-635 Bellcrank Assembly, therefore, all length adjustments is accomplished with the forward rod end bearing. Adjust the forward rod end bearing to achieve the overall bolt hole center-to-center distance shown in "F-841 Pushrod Assembly", DWG 79. **WARN-**

- ING: After final adjustment, both rod end bearings must have more than 1/2 of their threads engaged in the threaded rod ends.** This prevents the Pushrod Assembly from fully unscrewing from the rod end bearings in the event that both jamb nuts become loose.
- ❑ Make the F-840 Push Rod Assembly in the same manner as the F-841 Push Rod Assembly (See "F-840 Pushrod Assembly", DWG 79). To make a paper marking template for the six rivets at both ends F-840 Push Rod, cut a paper strip to length, as done previously, but after folding it in half once, fold it into equal thirds.
  - ❑ Prime the interior and exterior of the F-841 Pushrod Assembly as was done previously with the F-840 Pushrod Assembly.
  - ❑ Install the jamb nuts and rod end bearings on both ends of the F-840 Pushrod Assembly and adjust them to achieve the bolt hole center-to-center distance shown in "F-840 Pushrod Assembly", DWG 79. **WARNING: Both rod ends must have more than 1/2 of their threads engaged to prevent separation if both jam nuts become loose.**
  - ❑ Install the jam nuts and rod end bearings on both ends of the F-839-2 Pushrod Assembly. Adjust them for a bolt hole center-to-center distance as shown in "F-839-2 Pushrod Assembly", DWG 79).
  - ❑ Final-Drill 1/4 the hole at both ends of the WD-807 Control Column used for attaching the WD-411 Front Control Stick and WD-412B Rear Control Stick Base.
  - ❑ Final-Drill #12 the rod end bearing holes in the WD-807 Control Column used to attach the control column to the F-849 Fwd Control Mount and F-837-1 Aft Control Mount.
  - ❑ Final-Drill #12 the holes in the WD-807 Control Column used to attach the W-816 Aileron Pushrod Assemblies.
  - ❑ Remove the bushings that are supplied in the WD-411 Front Control Stick and WD-412B Rear Control Stick Base.
  - ❑ Use a file or sander to progressively remove material from the ends of both bronze bushings. Remove material until they closely fit between the brackets to which they attach at both ends of the WD-807 Control Column (See "Detail B" and "Detail C", DWG 79). **NOTE: Finish the ends of the bushings to match the taper of the brackets on the control column. This will prevent the bushings from developing a slight bend when the bolts are tightened which can cause binding of the control sticks.**
  - ❑ Use a file or sander to progressively remove material from the ends of the tubes which sleeve the bronze bushings in the WD-411 Front Control Stick and WD-412B Rear Control Stick Base. Remove material until, when bolted in place, the brackets on the WD-807 Control Column clamp on the bushings and just clear the tubes (See "Detail B" and "Detail C", DWG 79).. Do not remove so much material that there is excessive side play in the control sticks.
  - ❑ Insert the WD-812 Rear Control Stick into the WD-412B Rear Control Stick Base. Mark the location of the retention bolt and drill the #12 hole (See "Rear Control Stick Assembly", DWG 79). Disassemble and deburr the holes. Reinsert the rear control stick into the rear control stick socket and secure using the hardware specified.
  - ❑ Temporarily bolt the WD-411 Front Control Stick and the Rear Control Stick Assembly in place on the WD-807 Control Column.
  - ❑ Insert the F-839-2 Pushrod Assembly into the WD-807 Control Column and temporarily bolt it to the WD-411 Front Control Stick and WD-412B Rear Control Stick Base.
  - ❑ Adjust the length of the F-839-2 Pushrod Assembly so that the WD-411 Front Control Stick and WD-812 Rear Control Stick are parallel with each other. Tighten the jam nuts of the Pushrod Assembly to lock the rod end bearings in place.
  - ❑ The WD-411 Front Control Stick is supplied long and will have to be trimmed to final length. The maximum length of the front control stick above the pivot bushing is shown in "Detail C", DWG 79. The additional length produced by a stick grip, and any switches that protrude from the top of it, must be taken into account when cutting the front control stick to final size.
  - ❑ Remove the WD-411 Front Control Stick and Rear Control Stick Assembly from the WD-807 Control Column.
  - ❑ With the F-839-2 Pushrod Assembly still inside the WD-807 Control Column, position the control column in the fuselage by inserting the aft end through the rectangular opening in the F-804 Center Section Bulkhead Assembly from front to back. To get it started through the opening, lay the control column on its side, with the fwd end angled to one side of the fwd cockpit area.
  - ❑ Install the rod end bearings and jamb nuts on the F-837-1 Aft Control Mount as shown in "Section F-F" and "Detail B", DWG 79. Temporarily mount the F-837-1 Aft Control Mount in place on the seat floors (See "Detail B", DWG 77). Install the rod end bearings and jamb nuts on the F-849 Fwd Control Mount as shown in See

- "Section G-G" and "Detail C", DWG 79.
- ❑ Attach the WD-807 Control Column to the rod end bearings on the F-849 Fwd Control Mount and F-837-1 Aft Control Mount using the hardware depicted in "Detail B" and "Detail C", DWG 79.
  - ❑ Install the WD-411 Front Control Stick and the Rear Control Stick Assembly on the WD-807 Control Column. Connect both ends of the F-839-2 Pushrod Assembly to the front control stick and Rear Control Stick Assembly with the hardware specified.
  - ❑ Install the F-840 Pushrod Assembly by inserting it through the rectangular opening in the aft side of the F-804 Center Section Bulkhead Assembly, sliding it forward enough to drop the aft end below the F-830-1 Left Seat Floor, then sliding the push rod aft through the opening in the F-807 Bulkhead Assembly.
  - ❑ Attach the F-635 Bellcrank Assembly to the aft end of the F-840 Pushrod Assembly (See "Detail A", DWG 79).
  - ❑ Attach the F-635 Bellcrank Assembly to the F-818B-L-1 & -R-1 Baggage Rib Angles (See "Detail A", DWG 79).
  - ❑ Attach the F-840 Pushrod Assembly to the WD-412B Rear Control Stick Base (See "Detail B", DWG 79).
  - ❑ With the elevators still clamped in their neutral position, attach the forward end of the F-841 Pushrod Assembly to the F-635 Bellcrank Assembly (See "Detail A", DWG 79) and attach the aft end to the WD-605-1-L/R Elevator Horns (See "Side View", DWG 78).
  - ❑ Using the forward rod end bearing of the F-841 Pushrod Assembly, adjust the overall length of the F-841 Pushrod Assembly so the Control Sticks are perpendicular to the upper longerons. After adjusting, tighten the jamb nut and pushrod attach hardware. CAUTION: The rod end bearings of all pushrods must have at least 1/2 of their threads engaged.
  - ❑ Unclamp the elevator tips from the horizontal stabilizer.
  - ❑ Allowable elevator travel is found in Section 15. Trim material from the F-811D-1 Spacer / Control Stop and F-812B-1 Angle / Control Stop to allow for the proper amount of elevator travel (See "Elevator Stop Adjustment", DWG 78). Trim the stops so the flanges of both WD-605-1-L/R Elevator Horns contact the stops at maximum deflection. Relieve the bottom flange of the HS-603 Rear Spar if this was not done during the horizontal stabilizer construction, but **DO NOT** remove any material from the HS-609PP Rear Spar Reinf. Bar (See "Exploded Iso View", DWG 3).
  - ❑ Rivet and bolt the F-811D-1 Spacer / Control Stop and F-812B-1 Angle / Control Stop in place on the F-819-1 Aft Deck (See "Detail E", DWG 71). Since the vertical stabilizer must be removed for riveting access, this step can be delayed until it is removed for final painting, etc.

#### **RUDDER STOPS**

- ❑ Install the rudder on the vertical stabilizer (See DWG 7).
- ❑ Clamp the balance arms of the elevators to the horizontal stabilizer so they are held in the neutral position.
- ❑ Cleco the F-886-L-1 & -R-1 Rudder Stops to the aft fuselage (See "Detail E", DWG 71). Mark the aft edge of the F-824-L-1 and -R-1 Aft Side Skins on the rudder stops (See "Detail H", DWG 71).
- ❑ Trim the F-886-L-1 & -R-1 Rudder Stops as shown in "Detail H" of DWG 71, until the distance between the elevators and the rudder matches that shown in "Rudder Deflection", DWG 85. To mark for the initial trim, unclco the rudder stops and lower them slightly while keeping them vertically aligned with the holes in the F-824 -1 Aft Side Skins. Rotate the rudder to the proper distance from the elevator trailing edge, and mark a line on the rudder stop using the front face of the R-405 Rudder Horn as a guide (DWG 7).
- ❑ Trim the F-886-L-1 & -R-1 Rudder Stops just short of the line that was marked in the previous step. Complete the trimming of the rudder stops using "Detail H" on DWG 71 as a guide.
- ❑ Cleco the F-886-L-1 & -R-1 Rudder Stops in place on the fuselage and check the rudder travel. Make final trim adjustments to the contact surface of the rudder stops as needed to get the specified dimension between the elevators and rudder at maximum deflection.
- ❑ Machine countersink the four rivet holes in the F-886-L-1 & -R-1 Rudder Stops for the flush rivets specified in "Detail A" of DWG 74. Deburr/smooth the edges.
- ❑ Prime the F-886-L-1 & -R-1 Rudder Stops if/as desired.
- ❑ Rivet the F-886-L-1 & -R-1 Rudder Stops in place on the aft fuselage (See "Detail A", DWG 74).

**FLAP MOTOR**

- Final-Drill 1/4 the holes in the A-406-1 Aileron Bracket-Outboard used for attaching the ES-FA-PA-270-12-5 Flap Linear Actuator (See "Detail E", DWG 79). Final-Drill #12 the 3/16 holes in the Aileron Bracket-Outboard used to attach it to the F-00807A-L-2 Bulkhead. Attach the nutplates to the aileron bracket-outboard.
- Final-Drill 1/4 the holes in the three clevis brackets on the WD-806 Flap Actuator Weldment (See "Detail D", DWG 79).
- Install the WD-806 Flap Actuator Weldment in the fuselage (Detail D, DWG 77).
- Note: If retrofitting from the ES 85615-157-1 to the ES-FA-PA-270-12-5 Flap Actuator use TOOL-00111 as a template to alter the F-860C-L-1 until it resembles F-00860C-L-2 (See DWG 69)
- Use a 12v battery connected to the two larger wires to run the Flap Linear Actuator until the shaft is fully retracted. Reversing the leads will make the motor run the other way. The three smaller wires are for the linear actuator position sensor. See the "ES-FA-PA-270-12-5 Flap Linear Actuator Wire Color Codes" table on Page 8-76.
- Install the CM-4M Rod End Bearing and jam nut on the end of the Flap Linear Actuator shaft. Adjust the Rod End Bearing to align it axially with the Flap Linear Actuator base mounting hole and set the Flap Linear Actuator assembly overall length (See DWG 79). Torque the jam nut.
- Attach the A-406-1 Aileron Bracket-Outboard to the Flap Linear Actuator. Install the Flap Linear Actuator in the fuselage and attach it to the WD-806 Flap Actuator Weldment (Detail D & E, DWG 79).
- Attach the A-406-1 Aileron Bracket-Outboard to the F-00807A-L-2 Bulkhead (See "Detail E", DWG 79). If needed remove material from the Aileron Bracket-Outboard in order to assure a flush fit against the F-00807A-L-2.
- Assemble the F-00876 Flap Actuator Cover Assembly as shown in "F-876-1 Aft Cabin Cover", DWG 79. Attach the MS21051-L08 Nutplate to the aft side of the F-807 Bulkhead Assembly (See "Detail E", DWG 79).
- During final assembly, the F-00876 Flap Actuator Cover Assembly and the F-876-1 Aft Cabin Covers are installed as shown in "F-876-1 Aft Cabin Cover", DWG 79.

**RUDDER CONTROL CABLES**

- Deburr the two F-805E-1 Rudder Cable Supports (See "F-805B-1 Floor Support Angle Detail", DWG 69). Final-Drill #40 and machine-countersink the nutplate attachment rivet holes. Rivet the nutplate to each rudder cable support.
- Install the two F-852A Aft Rudder Cable Assemblies, working from the back towards the front. After passing them through the holes in each fuselage bulkhead, push a snap bushing over the cable ends and snap them into the bulkhead. Refer to DWG's 65 and 70 for rudder cable snap bushing locations. **NOTE: The 4" plastic tubes on both Rudder Cable Assemblies are positioned at the cable exit holes in the F-824 -1 Aft Fuse Side Skins (See "Side View", DWG 78). The 13" plastic tubes are routed with the forward end of the cables to the F-805B-1 Floor Support Angles (See DWG 69).**
- Push a snap bushing over the ends of both F-852A Aft Rudder Cable Assemblies, then pass the ends of the Rudder Cable Assemblies through the F-805E-1 Rudder Cable Supports (See "F-805B-1 Floor Support Angle Detail", DWG 69). Anchor the 13" plastic tubes to the rudder cable guides as shown in "Section F-F", DWG 69. The 13" plastic tubes prevent the rudder cables from rubbing against the inboard side of the Foot Well Assemblies.
- Attach the F-805E-1 Rudder Cable Supports to the F-805B-L-1 & -R-1 Floor Support Angles using the appropriate hole location for the model type you are building (See "F-805B-1 Floor Support Angle Detail", DWG 69).
- Push a snap bushing over the ends of both F-852A Aft Rudder Cable Assemblies, then pass the ends of the cables through the holes in the F-804B-2 Center Section Aft Bulkhead and the F-804A-2 Center Section Forward Bulkhead (See DWG 64). Press the snap bushings into the holes in the Center Section Aft Bulkhead. Push a snap bushing over the ends of both Rudder Cable Assemblies and press them into the holes in the Center Section Forward Bulkhead.
- Anchor the 4" plastic tube at the aft end of both F-852A Aft Rudder Cable Assemblies to the F-824-L-1 & -R-1 Aft Fuse Side Skins (See "Side View", DWG 78).
- Temporarily connect the aft end of both F-852A Aft Rudder Cable Assemblies to the R-405PD Rudder Horn (See "Side View", DWG 78).

**RUDDER PEDALS**

*This section covers the installation of the in-flight adjustable rudder pedals supplied standard with the RV-8 / 8A fuselage kit. If you are using the optional ground adjustable rudder pedals refer to DWG OP-3 (for RV-8) or OP-3A (for RV-8A).*

*If you intend to install the optional Rear Seat Rudder Pedals, do so while installing the front seat rudder pedals. Refer to DWG OP-5 (RV-8) or OP-5A (RV-8A)*

- Final-Drill #12 the outboard two 1/8 holes in the end plate of the WD-817 Rudder Slide Bar (See "Exploded Reference View", DWG 81).
- Final-Drill #12 the two 1/8 holes in the flange of the WD-818 Rudder Socket.
- Insert the tube of the WD-817 Rudder Slide Bar fully into the WD-818 Rudder Socket and temporarily bolt them in place on the forward cockpit floor and Firewall Assembly (See "Isometric View", DWG 81).
- Match-Drill #12 one of the 1/8 holes in the WD-818 Rudder Socket into one wall of the WD-817 Rudder Slide Bar (do not drill through both walls). Temporarily insert a short AN3 bolt in the hole, then match-drill #12 the hole in the opposite side. Unbolt the rudder slide bar and rudder socket from the forward cockpit floor and Firewall Assembly. Separate the rudder socket from the rudder slide bar, and deburr all of the #12 holes in both parts.
- Final-Drill 1/4 the hole in the WD-816 Rudder Slide that receives the F-8103E Lock Pin (See "F-8103 Release Assembly", DWG 81).
- Put the F-8107 Slide Collar and WD-816 Rudder Slide in place on the WD-817 Rudder Slide Bar. If the rudder slide does not move smoothly on the rudder slide bar, use a small hone in a hand drill to hone the portion of the rudder slide that is causing the binding.
- Temporarily bolt the WD-818 Rudder Socket to the WD-817 Rudder Slide Bar.
- Drill a #30 hole in the top of the F-8107 Slide Collar and WD-817 Rudder Slide Bar (See "Side View", DWG 81). Install a blind rivet in the #30 hole.
- Put the WD-804-L & -R Rudder Pedals in place on the WD-816 Rudder Slide (See Exploded Reference View" and "Isometric View", DWG 81). Check that both rudder pedals pivot smoothly with no binding. Hone the rudder pedals as needed so that they pivot smoothly.
- Place an F-874 Rudder Pedal Slide Block on the outboard ends of the WD-816 Rudder Slide (See "Isometric View", DWG 81). **NOTE: The wider portion of the block faces down.** Position the blocks with just enough clearance to the WD-804-L & -R Rudder Pedals so that they still pivot smoothly with no binding.
- Clamp the bottom flange of the WD-818 Rudder Socket to the edge of a flat worktable with the bottom surface of the two F-874 Rudder Pedal Slide Blocks resting flush on the table surface.
- Match-Drill #12 the hole in the forward side of the F-874 Rudder Pedal Slide Blocks into one wall of the WD-816 Rudder Slide tube (do not drill through both walls of the tube). Insert a short AN3 bolt in the hole to maintain alignment, then match-drill #12 the hole in the aft side of the rudder pedal slide blocks into the opposite wall of the rudder slide tube.
- Unclamp the WD-818 Rudder Socket from the table edge, then remove the F-874 Rudder Pedal Slide Blocks and the WD-804-L & -R Rudder Pedals from the WD-816 Rudder Slide. Deburr the #12 holes match-drilled in the two previous steps.
- Apply a thin coating of light grease to the interior of the tube on the WD-804-L & -R Rudder Pedals, and the outside surface of the tube on the WD-816 Rudder Slide. Reinstall the left and right rudder pedals on the rudder slide.
- Bolt the two F-874 Rudder Pedal Slide Blocks in place on the WD-816 Rudder Slide (See "Isometric View", DWG 81).
- Clamp the bottom flange of the WD-818 Rudder Socket to the edge of a flat worktable. Slide the WD-816 Rudder Slide fully forward so that it touches the F-8107 Slide Collar.
- With the two F-874 Rudder Pedal Slide Blocks flush to the worktable surface, match-drill 1/4 through the top of the WD-817 Rudder Slide Bar tube using the F-8103E Lock Pin hole in the WD-816 Rudder Slide as a guide.
- Slide the WD-816 Rudder Slide to the aft most position against the WD-818 Rudder Socket.
- With the two F-874 Rudder Pedal Slide Blocks still flush to the table surface, match-drill 1/4 through the top of the WD-817 Rudder Slide Bar tube using the F-8103E Lock Pin hole in the WD-816 Rudder Slide as a guide.
- Unclamp the WD-818 Rudder Socket, then remove it and the WD-816 Rudder Slide from the WD-817 Rudder Slide Bar.
- Use a sharp scribe to mark the WD-817 Rudder Slide Bar with additional hole positions approximately one inch on center between the two holes drilled previously.
- Reinstall the WD-816 Rudder Slide and WD-818 Rudder Socket, and clamp to the table as before.

- ❑ Match-Drill 1/4 the other hole positions by centering each scribe mark in the F-8103E Lock Pin hole and then using the lock pin hole as a guide for drilling.
- ❑ Unclamp the WD-818 Rudder Socket, then remove it and the WD-816 Rudder Slide from the WD-817 Rudder Slide Bar.
- ❑ Deburr the 1/4 holes drilled in the WD-817 Rudder Slide Bar.
- ❑ Reassemble the WD-816 Rudder Slide and WD-818 Rudder Socket onto the WD-817 Rudder Slide Bar.
- ❑ Deburr and smooth the edges of the WD-820-L & -R Left and Right Brake Pedal Assemblies (See "Isometric View", DWG 81).
- ❑ Final-Drill #12 the 3/16 hole in the outboard leg of the WD-804-L & -R Rudder Pedals. Deburr the two holes drilled in this step (See DWG 81).
- ❑ Final-Drill #12 the 3/16 hole in both lugs used for mounting the bottom of the brake master cylinders to the WD-816 Rudder Slide tube. Deburr the two holes drilled in this step.
- ❑ Attach the WD-820-L & -R Brake Pedal Assemblies to their respective WD-804-L & -R Rudder Pedals. Use a combination of thick and thin washers as spacers to minimize slop at the pivot points. The Brake Pedal Assemblies must move freely with no friction to prevent the brakes from dragging.
- ❑ Install the brake line fittings on the two brake master cylinders. Orient them as shown in "Front View", DWG 83.
- ❑ Mount the bottoms of the brake master cylinders to the WD-816 Rudder Slide (See "Isometric View", DWG 81).
- ❑ Mark the master cylinder bolt hole position on the WD-820-L & -R Brake Pedals (See "Drilling WD-820", DWG 81). **NOTE: This hole location provides a brake pedal angle as shown in "Side View" on DWG 81. If you desire a different brake pedal angle adjust this hole location. Someone with a much larger than average foot size might prefer the brake pedals to be tilted further forward to prevent inadvertent brake application when moving the rudder pedals to the extreme ends of the travel range.**
- ❑ Use a #30 bit to drill a pilot hole in the WD-820-L Brake Pedal at the mark made in the previous step. Final-Drill the hole #12.
- ❑ Attach the top of the master cylinder to the WD-820-L Brake Pedal (See "Detail C", DWG 81).
- ❑ Clamp a small board across the aft side of both inboard, vertical tubes of the WD-804-L-1 & -R-1 Rudder Pedals to align them with each other.
- ❑ Position the WD-804-L-1 & -R-1 Rudder Pedals so that they are vertical as shown in "Side View", DWG 81.
- ❑ Insert a 3/16 drill bit into the bolt hole in the top of the right master cylinder. Position the WD-820-R Brake Pedal so that it is aligned with the WD-820-L Brake Pedal. Check that the tip of the drill bit aligns with the bolt hole location mark on the right brake pedal. If it does not, mark a new location using the point on the drill bit. **NOTE: The goal is to drill a hole in the right brake pedal, as close as possible to the original mark, so that the pedals are aligned with each other.**
- ❑ Drill the brake cylinder attach hole in the WD-820-R Brake Pedal by first pilot drilling #30, then final-drilling #12.
- ❑ Attach the second master cylinder to the WD-820-R Brake Pedal (See "Detail C", DWG 81).
- ❑ Double check that both brake pedals operate smoothly, and that when depressed and released, the brake cylinders re-extend fully.
- ❑ Break apart the six F-8103C Release Spacers from each other (See "F-8103C Release Spacer", DWG 81). Final-Drill #30 the 1/8 holes in each of the release spacers. Remove any portion of the connect tabs from the six parts, smooth and deburr the edges, and deburr the #30 holes.
- ❑ Deburr the two F-8103B Lifter Plates and the plate on the F-8102 Release Cable. Final-Drill #30 the 1/8 holes in the two lifter plates and the release cable plate. Deburr the #30 holes in the three parts.
- ❑ Rivet the two F-8103B Lifter Plates, six F-8103C Release Spacers, and F-8102 Release Cable plate together with the parts positioned as shown in "F-8103 Release Assembly", DWG 81.
- ❑ Make the F-8103E Lock Pin as shown in "F-8103E Lock Pin", DWG 81.
- ❑ Assemble the F-8103E Lock Pin using the steps shown in "F-8103E Lock Pin Assembly", DWG 81. **NOTE: The roll pin must be pressed fully through the hole in the lock pin, and then pressed back the other direction to center it. This will make the diameter of the roll pin more constant and prevent the lock pin from binding in the guide.** A small bench vice can be used to press the roll pin through the lock pin. Use a small

- wood block with a 1/8 hole to allow for pressing the roll pin beyond the opposite side of the lock pin.
  - ❑ Drill a hole in the F-8102A Handle as shown in "F-8102A Handle", DWG 81.
  - ❑ Install the F-8103 Release Assembly on the WD-816 Rudder Slide using the hardware shown in "F-8103 Release Assembly", DWG 81.
  - ❑ Cut a slot in the F-8102B Fairlead Insert as shown in "Detail B", DWG 81. Use a small C-clamp to press the fairlead insert into the fairlead on the WD-818 Rudder Socket.
  - ❑ Route the free end of the F-8102 Release Cable through the F-8102B Fairlead Insert (See "Isometric View", DWG 81).
  - ❑ Move the rudder pedals to the most forward position. Cut the cable to desired length allowing approximately 5/8 extra for tying a knot in the end.
  - ❑ Move the rudder pedals to the aft most position.
  - ❑ Insert the free end of the F-8102 Release Cable into the hole drilled in the F-8102A Handle (See "F-8102 Cable Assembly", DWG 81). Pull the wire out through the side of the handle and tie a single half-hitch knot in the end. Pull on the handle to pull the wire back inside and tighten the knot.
- When in use, lubricate the WD-817 Rudder Slide Bar occasionally. Use only silicone spray lube as it leaves no residue that will attract dust and dirt which will cause sticking and binding of the assembly. **CAUTION: Do not spray any silicone spray lube on the rudder slide bar, while it is installed in the cockpit, until after the cockpit area has been painted. Any silicone over-spray will be impossible to remove and it will ruin the paint job.***
- ❑ Bolt the Rudder Pedal Assembly to the forward cockpit floor and Firewall Assembly (See "Isometric View", DWG 81).
  - ❑ Match-Drill 1/4 the 1/4 hole in both F-801L Backing Plates into the Firewall Assembly (See "Plan View" and "Exploded Iso View", DWG 60).
  - ❑ Connect both F-852B Forward Rudder Cable Assemblies to their associated F-852A Aft Rudder Cable Assembly (See "Isometric View", DWG 81).
  - ❑ Attach an AN43B eyebolt to the fwd end of both F-852B Fwd Rudder Cable Assemblies (See "Isometric View", DWG 81).
  - ❑ Attach the eyebolts on the F-852B Forward Rudder Cables to the Firewall Assembly using the 1/4 holes previously match-drilled from the F-801L Backing Plates (See DWG 60 & 81). While the rudder is held in its neutral position, vary the combination of washers between the fwd and aft side of the Firewall Assembly to adjust the rudder pedal position to vertical (See "Side View", DWG 81). If the rudder pedals need to tilt aft more, position more washers on the fwd side of the firewall. If they need to tilt fwd more, move washers from the front side to the aft side of the firewall.

### FUEL SYSTEM

*All fuel lines are made from AT0-035X3/8 aluminum tube. These lines are cut to length, bent as required for routing, and have their ends flared for fittings. Remember to install the B-nut and sleeve before flaring the end of the tube. An aircraft 37 degree flaring tool is required. Where required, install AN-931 grommets on the lines before installing the final end fittings. Avoid making sharp bends in the tubing as it will tend to collapse and restrict the flow.*

**NOTE: The fuel systems on the RV-8 and RV-8A are similar. Because of this, the RV-8 Fuel System drawing 82 will be used as the primary reference for both models. Drawing 82A will be used for detailing the differences for a RV-8A.**

- ❑ Remove the handle from the fuel valve (See "Detail A", DWG 82). File or sand the small pointer off the end of the handle. The handle arm will be the pointer indicating which fuel tank is selected.
- ❑ Make the two F-883B Spacers (See "F-883B Spacer", DWG 82).
- ❑ Install the pipe plug and two elbow fittings in the fuel valve (See "Detail A", DWG 82).
- ❑ Install the appropriate fitting in the bottom of the fuel valve to match the fuel pump that will be used (See "Detail A", DWG 82). If using an Airflow Performance pump for a fuel injection system, hold the fuel valve in position on the F-883-1 Fuel Valve Bracket to determine the alignment of the AN826-6D fitting relative to the path of the fuel return line from the fuel pump.

- ❑ **RV-8 Only:** Install snap bushings in the F-822-1 Forward Floor Panel and the F-861PP-L & -R Landing Gear Cover Plates for routing the fuel vent lines (See "View C-C", DWG 82).
- ❑ **RV-8 Only:** Install the vent line bulkhead fittings in the fuselage side and orient them as shown in "View E-E", DWG 82.
- ❑ **RV-8A Only:** Install snap bushings in the F-890-1 Forward Floor Panel, the F-894-1 Fwd Fuselage Bottom Skin, and the F-8100C-1 Throttle Quadrant Angle for routing the fuel vent lines (See "View A-A", DWG 82A).
- ❑ **RV-8A Only:** Install the vent line bulkhead fitting on each side of the fuselage (See "Left Side Iso View", 82A).
- ❑ Make the left and right fuel vent lines and mount them in the fuselage (See DWG 82 or 82A). Soft wire (wire coat hanger) can be used to model the required shape of the line and then copy it with the aluminum tubing. After mounting the vent lines, curve the tube slightly where it exits the bottom of the fuselage and then trim as shown in "View C-C", DWG 82 or "View A-A", DWG 82A.
- ❑ **RV-8 Only:** Cleco an F-1048D Fuel Filter Bracket in place on the F-822-1 Forward Floor Panel (See "Detail B" and "ISO View Carbureted Fuel System", DWG 82). Final-Drill #30 the 3/32 holes common between the fuel filter bracket and the forward floor panel. **CAUTION: Do not to go too deep with the drill and damage the F-850-1 Bottom Skin.**
- ❑ **RV-8A Only:** Cleco an F-1048D Fuel Filter Bracket in place on the F-890-1 Forward Floor Panel (See "Left Side Iso View", DWG 82A). Final-Drill #30 the 3/32 holes common between the fuel filter bracket and the forward floor panel. **CAUTION: Do not to go too deep with the drill and damage the F-894-1 Fwd Fuselage Bottom Skin.**
- ❑ Uncleco the F-1048D Fuel Filter Bracket, then deburr the holes in it and the F-822-1 (RV-8) or F-890-1 (RV-8A) Forward Floor Panel that were drilled in the previous step.
- ❑ Machine countersink the four #30 holes in the F-1048D Fuel Filter Bracket for flush rivets on the top surface (See "Detail B", DWG 82).
- ❑ Rivet the F-1048D Fuel Filter Bracket in place on the F-822-1 (RV-8) or F-890-1 (RV-8A) Forward Floor Panel (See "Detail B", DWG 82).
- ❑ Make two F-1048E Fuel Cradle Pads (See "F-1048E Fuel Cradle Pad", DWG 82). **NOTE: Make two additional fuel cradle pads if you are installing an Airflow Performance fuel pump.**
- ❑ Install an F-1048E Fuel Cradle Pad on both flanges of the F-1048D Fuel Filter Bracket (See "Detail B", DWG 82). Clamp the ES Airflow Filter in place on the F-1048D Fuel Filter Bracket. **NOTE: Point the fuel flow direction arrows towards the firewall.**
- ❑ Use the positioning hole in the F-822-1 (RV-8) or F-890-1 (RV-8A) Forward Floor Panel to locate the VA-201 Facet Mount Bracket or F-1048D Fuel Filter Bracket (See DWG 82, "Detail D" for a Facet Fuel Pump or "Detail F" for an Airflow Performance Pump). Cleco the corresponding hole in the bracket to the positioning hole and match-drill the remaining holes #30. Match-drill #30 the positioning hole.
- ❑ Remove the VA-201 Facet Mount Bracket or the F-1048D Fuel Filter Bracket and deburr all holes drilled in the previous step.
- ❑ **Fuel Injected Engine Installations Only:** Machine-countersink the #30 mounting holes in the F-1048D Fuel Filter Bracket for flush rivets on the top surface.
- ❑ **Carbureted Engine Installations Only:** Final-Drill #40 the 3/32 nutplate attachment rivet holes in the VA-201 Facet Mount Bracket (See "Detail D", DWG 82). Machine-countersink the four nutplate attachment rivet holes for flush rivets, then rivet the nutplates in place.
- ❑ Rivet the VA-201 Facet Mount Bracket (See "Detail D", DWG 82) or the F-1048D Fuel Filter Bracket (See "Detail F", DWG 82) to the F-822-1 (RV-8) or F-890-1 (RV-8A) Forward Floor Panel.
- ❑ Mount the Fuel Valve to the F-883-1 Fuel Valve Bracket (See "Detail A", DWG 82).
- ❑ Make the tank fuel lines (See DWG 82 or 82A). Size them so they protrude from the sides of the fuselage according to the dimension shown in "Iso View Fuel Injected System", DWG 82. When the wings are later fitted, the ends can be marked relative to the fitting on the fuel tanks for final trimming. **NOTE: If an inverted fuel pickup assembly is installed in the fuel tanks, the tank fuel lines should be sized to allow for a forward bend in the fuel lines after they exit the fuselage as shown in the "Inverted Fuel System Option", DWG 82.**
- ❑ **RV-8 Only:** Secure the right tank fuel line to the front of the F-804A-2 Center Section Forward Bulkhead as shown in the two ISO Views on DWG 82.

- ❑ **RV-8A Only:** Secure the right tank fuel line to the inboard brace tubes of the WD-821-L & -R Landing Gear Weldments as shown in "Bottom Iso View", DWG 82A.
- ❑ **RV-8 Only:** Install snap bushings in the F-802A-1 and B-1 L.G. Bulkheads as shown in the two ISO Views on DWG 82.
- ❑ Make the fuel line that connects between the Fuel Valve (bottom outlet) and the fuel filter.
- ❑ If using a Facet pump, mount it to the VA-201 Facet Mount bracket. Be sure to orient it with the flow arrow pointing toward the firewall (See "Iso View Carbureted Fuel System" and "Detail D", DWG 82).
- ❑ If using an Airflow Performance pump, install the two F-1048E Fuel Cradle Pads on the flanges of the F-1048D Fuel Filter Bracket, then mount the pump on the bracket. Rotate the pump so the two aft fitting ports are directed toward the fuel line snap bushings in the F-802A-L-1 Fwd L.G. Bulkhead (RV-8) or toward the opening in the F-802R-L-1 Fuselage Bulkhead (RV-8A), then tighten the clamp (See "Iso View Fuel Injected System", DWG 82 or "Left Side Iso View", DWG 82A).
- ❑ Install the fuel bulkhead fitting in the firewall (See "Iso View Fuel Injected System" or "Iso View Carbureted System", DWG 82).
- ❑ Make and install the fuel line that runs between the fuel filter and the fuel pump. **Note: The line needs to be made in place.** First complete the flare on the aft end of the line, slip the line through the snap bushings (RV-8) and connect it to the fuel filter. Mark the fwd end of the line for trimming to proper length. Disconnect the line from the fuel filter and slide it forward to complete the flare on the forward end.
- ❑ Make and install the fuel line between the fuel pump and the bulkhead fitting on the firewall.
- ❑ **Fuel injected System Only:** Make and install the fuel return line between the Airflow Performance fuel pump and the fitting on the bottom of the fuel valve following the same process used for the previous fuel pump line (See "Detail A" and "Iso View Fuel Injected System", DWG 82).

### BRAKE SYSTEM

**NOTE: The brake systems on the RV-8 and RV-8A are similar. Because of this, the RV-8 Brake System DWG 83 will be used as the primary reference for both models. DWG 82A will be used for detailing the differences for an RV-8A.**

- ❑ Install the VA-107 Brake Fluid Reservoir on the Firewall Assembly using the hardware depicted (See "Isometric View", DWG 83).
- ❑ **RV-8 Only:** Install the brake line fittings through the F-822-1 Fwd Floor Panel, inside each of the L.G. Box Assemblies (See "Front View" and "Isometric View", DWG 83). **NOTE: An AN960 washer is required as a spacer on each fitting.**
- ❑ **RV-8A Only:** Install the brake line fittings through the hole in the bottom plate of the WD-821-1 Landing Gear Weldments (See "Bottom Iso View", DWG 82A).
- ❑ Install the two brake line fittings in the F-866D Mounting Plate (Detail A, DWG 83). Orient them as shown in "Front View", DWG 83.
- ❑ Make the Left and Right Brake Lines (See DWG 83 or 82A). Connect them to the fittings at each end and clamp them to the F-802E-L-1 & -R-1 L.G. Box Web (RV-8) or the aft side of the F-802R-L-1 & -R-1 Fuselage Bulkheads (RV-8A).
- ❑ Install the two F-8105 Brake Hoses (DWG 83).
- ❑ Install the Male Nylon Tee on the VA-107 Brake Fluid Reservoir using thread sealant.
- ❑ Install the two reservoir lines between the Brake Fluid Reservoir (See "Push-To-Connect Tee", DWG 83) and the fittings on the top of each Brake Master Cylinder (See "Push-To-Connect Elbow", DWG 83).

**If installing the optional Van's Aircraft Static System Kit, do so now before riveting on the aft upper skin. Refer to the Static Source view on DWG 85 and the documentation supplied with the Static System Kit**

### AFT UPPER SKIN AND BULKHEADS

- ❑ Make plywood backboards as shown in "Backboards", DWG 85 to provide a work platform to lay on when work-

- ing inside the tail cone.
- ❑ Deburr the F-807B-1, F-808B-1, F-809B-1, and F-810A-1 Bulkheads.
  - ❑ Final-Drill #40 the 3/32 rivet holes used for attaching the two nutplates to the F-808B-1 Bulkhead (See "F-808-1 Bulkhead Assembly", DWG 71).
  - ❑ Cleco the F-807B-1, F-808B-1, and F-809B-1 Bulkheads to their respective bulkhead assemblies (See DWG 70 and 71).
  - ❑ Final-Drill #30 the 1/8 holes common between the F-807B-1, F-808B-1, and F-809B-1 Bulkheads and their respective bulkhead assemblies
  - ❑ Deburr the edges of the F-869-L-1 & -R-1 Bulkhead Gussets (See "Detail A", DWG 71).
  - ❑ If desired, tie down ring stowage is available behind the rear seat as shown in "Detail A", DWG 71. Make two homemade nutplates by welding a 3/8-16 nut to a small steel plate that has a 3/8-inch hole drilled in the center. Then drill and rivet the homemade nutplates to the F-869-1 Bulkhead Gussets. An alternate method is to use a small aluminum block approximately 3/8 thick, drilled 5/16 and then tapped 3/8-16.
  - ❑ Cleco the F-869-L-1 & -R-1 Bulkhead Gussets to the F-807 Bulkhead Assembly (See "Detail A", DWG 71).
  - ❑ Cleco the F-810A-1 Bulkhead to the forward flange of the F-819-1 Aft Deck (See "Detail E", DWG 71). Final-Drill #30 the 1/8 holes common between the bulkhead and the aft deck.
  - ❑ If using manual elevator trim, final-drill 5/8 the left 3/16 tooling hole in the F-810A-1 Bulkhead for a bushing (See "Detail E", DWG 71).
  - ❑ Deburr the edges of the F-882-1 Canopy Rail Receptacle. Cleco the canopy rail receptacle to the aft side of the F-807B-1 Bulkhead (See "Detail B", DWG 71). Final-Drill #40 the 3/32 holes common between the bulkhead and the canopy rail receptacle.
  - ❑ Smooth and deburr the edges of the F-825-1 Aft Top Skin.
  - ❑ Cleco the F-825-1 Aft Top Skin in place on the aft fuselage.
  - ❑ Position the outboard edges of the F-869-L-1 & -R-1 Bulkhead Gussets so they are parallel with the edge of the F-887-L-1 & -R-1 Upper Longerons and clamp in place.
  - ❑ Smooth and deburr the edges of the two F-858-1 Shoulder Harness Anchors (F-858-1 Shoulder Harness Anchor view, DWG 71).
  - ❑ Straighten any curvature in the F-858-1 Shoulder Harness Anchors so they lay flat against the inside surface of the F-825-1 Aft Top Skin.
  - ❑ Modify the aft end of the two F-858-1 Shoulder Harness Anchors as depicted in "F-858-1 Shoulder Harness Anchor", DWG 71. File the aft end of the shoulder harness anchors to a reduced thickness so the aft portion overlaps the flange of the F-808 Bulkhead Assembly. The top surfaces of the shoulder harness anchor and flange are to be flush with the F-825-1 Aft Top Skin.
  - ❑ Cleco the two F-858-1 Shoulder Harness Anchors in place on the bottom of the F-825-1 Aft Top Skin.
  - ❑ Final-Drill #30 the 1/8 holes common between the F-825-1 Aft Top Skin and the two F-858-1 Shoulder Harness Anchors.
  - ❑ Final-Drill #40 the 3/32 holes common between the F-825-1 Aft Top Skin and the F-807B-1, F-808B-1, F-809B-1, and F-810A-1 Bulkheads, and the F-882-1 Canopy Rail Receptacle.
  - ❑ Final-Drill #40 the 3/32 holes along the edges of the F-825-1 Aft Top Skin that are common with the F-824-L-1 & -R-1 Aft Fuse Side Skins and the F-887-L-1 & -R-1 Upper Longerons.
  - ❑ Drill #30 the holes common between the F-869-L-1 & -R-1 Bulkhead Gussets and the F-807B-1 Bulkhead.
  - ❑ Uncleco and remove the F-882-1 Canopy Rail Receptacle, the F-807B-1, F-808B-1, F-809B-1, and F-810A-1 Bulkheads, and the F-869-L-1 & -R-1 Bulkhead Gussets.
  - ❑ Deburr all final-drilled holes in the parts from the previous two steps.
  - ❑ Deburr the #30 holes in the F-887-L-1 & -R-1 Upper Longerons that were match drilled from the F-869-L-1 & -R-1 Bulkhead Gussets.
  - ❑ Apply a slight bend to the side edges of the F-825-1 Aft Top Skin (See "LAP JOINTS", Section 5K of the construction manual).
  - ❑ Dimple countersink all #30 and #40 holes in the F-825-1 Aft Top Skin for flush rivets on the exterior surface.

- ❑ Dimple countersink, flush fwd side, the #40 holes in the web of the F-807B-1 Bulkhead that are common with the holes in the F-882-1 Canopy Rail Receptacle. Dimple countersink the #30 holes in the F-807B-1 Bulkhead that are common with holes in the F-869-L-1 & -R-1 Bulkhead Gussets for flush heads on the forward side.
- ❑ Dimple countersink the three #30 holes in forward flange of the F-869-L-1 & -R-1 Bulkhead Gussets that are common with #30 holes in the F-807B-1 Bulkhead.
- ❑ Dimple countersink the #40 holes in the flanges of the F-807B-1, F-808B-1, F-809B-1, and the F-810A-1 Bulkheads.
- ❑ Dimple countersink, flush on the forward side, the #40 holes in the web of the F-808B-1 Bulkhead used for attaching the two nutplates (See "F-808-1 Bulkhead Assembly", , DWG 70).
- ❑ Dimple countersink the #40 holes in the flanges of the F-882-1 Canopy Rail Receptacle.
- ❑ Prime the F-858-1 Shoulder Harness Anchors and the remaining parts from this section if/as desired.
- ❑ Cleco, then rivet, the F-882-1 Canopy Rail Receptacle to the aft side of the F-807B-1 Bulkhead (See "Detail B", DWG 71).
- ❑ Dimple countersink the attach holes on the nutplates for attaching the F-862-1 Rear Baggage Bulkhead to the F-808B-1 Bulkhead, then rivet them in place (See "F-808-1 Bulkhead Assembly", DWG 70 and "Aft Baggage Area", DWG 71).
- ❑ Cleco, then rivet, the F-807B-1, F-808B-1, F-809B-1, and F-810A-1 Bulkhead in their proper locations on the aft fuselage (See DWG 70 and 71).
- ❑ Rivet the F-869-L-1 & -R-1 Bulkhead Gussets to the F-807 Bulkhead Assembly and the F-887-L-1 & -R-1 Upper Longerons (See "Detail A", DWG 71).
- ❑ Cleco, then rivet, the F-825-1 Aft Top Skin and F-858-1 Shoulder Harness Anchors in place on the aft fuselage.

#### **FWD UPPER FUSELAGE**

- ❑ Lightly scuff all surfaces of the Vent SV-1 NACA vent housing using fine sandpaper to promote adhesion of the bonding adhesive and paint. Pay particular attention to the bonding flange of the Vent.
- ❑ Bond the Vent SV-1 NACA Hose Interface in place on the F-820-L-1 Fwd Side Skin (RV-8) or F-891-L-1 (RV-8A) using fuel tank sealant.
- ❑ Final-Drill #12 the two 3/16 holes in the two tabs on the WD-814 Windscreen Support that are common with holes in the inboard flanges of the F-816A-1 Cockpit Rails (See "Detail B", DWG 72).
- ❑ Temporarily bolt the WD-814 Windscreen Support in place on the fuselage using the holes final-drilled in the previous step (See "Detail B", DWG 72). Clamp the fwd portion of the base flange on the windscreen support to the F-816A-1 Cockpit Rails. Adjust the size of the WD-814 as necessary. Shims may be used to fill gaps.
- ❑ Match-Drill #12 the six 3/16 holes in both base flanges of the WD-814 Windscreen Support into the F-816A-1 Cockpit Rails and F-887-1 Upper Longerons. Be sure to drill square to the top leg of the upper longerons.
- ❑ Remove the WD-814 Windscreen Support from the fuselage and deburr.
- ❑ Cleco the F-866A-1 Lower Fwd Baggage Bulkhead and the F-866B-1 Upper Fwd Baggage Bulkhead to the F-802N-1 Fwd Upper Brace (RV-8) or F-802VPP Fuselage Bulkhead Brace (RV-8A). Rivet the lower fwd baggage bulkhead and the upper fwd baggage bulkhead to the fwd upper brace (RV-8) or fuselage bulkhead brace (RV-8A) (See "Fwd Fuselage Substructure", DWG 63 or 63A).
- ❑ Rivet the F-866A-1 Lower Fwd Baggage Bulkhead to the F-820-L-1 & -R-1 Fwd Side Skins (RV-8) or F-891-L-1 & -R-1 (RV-8A) (See DWG 74 or 74A).
- ❑ Separate the F-803D-L-1 & -R-1 Clips from the F-803C-1 Instrument Panel Attach Flange (See "F-803C-1 Trim Detail" and "Detail A", DWG 84).
- ❑ Cleco the upper two screw holes in both sides of the F-803A-1 Instrument Panel to the lower two screw holes in both sides of the F-803B-L-1 & -R-1 Instrument Sub-Panels. This shifts the instrument panel downward by one set of holes, maintains alignment of the instrument sub-panels, and provides clearance for clecoing the F-803C-1 Instrument Panel Attach Flange to the instrument sub-panels. (See "F-803-1 Assembly", DWG 84)
- ❑ Cleco the F-803C-1 Instrument Panel Attach Flange and the F-803D-L-1 & -R-1 Clips to the F-803B-L-1 & -R-1 Instrument Sub-Panels.
- ❑ Final-Drill #40 the two holes in the F-803D-L-1 & -R-1 Clips that are common with the F-820-L-1 & -R-1 Forward Side Skins.



- ❑ Deburr and dimple countersink the holes that were final-drilled in the previous step in the F-803D-L-1 & -R-1 Clips so they will nest with the common holes in the F-820-L-1 & -R-1 Forward Side Skins.
- ❑ Final-Drill #40 the 3/32 holes common between the F-803B-L-1 & -R-1 Instrument Sub-Panels, the F-803C-1 Instrument Panel Attach Flange, and the two F-803D-1 Clips.
- ❑ Uncleco the instrument panel parts. Final-Drill #40, then machine countersink (flush on the aft side), the nut-plate attachment rivet holes in the F-803B-L-1 & -R-1 Instrument Sub-panels.
- ❑ Machine countersink (flush on the aft side) all of the holes common between the F-803B-L-1 & -R-1 Instrument Sub-Panels and the F-803C-1 Instrument Panel Attach Flange See "F-803-1 Assembly", DWG 84).
- ❑ Determine the desired location for mounting the front seat fresh air vent. Vans Aircraft's demonstrators have it mounted in the bottom of the F-803B-L-1 Left Instrument Sub-Panel.
- ❑ Deburr the edges and holes of all the parts in the F-803-1 Assembly (See "F-803-1 Assembly", DWG 84). Prime the parts if/as desired.
- ❑ Rivet the nutplates to the F-803B-L-1 & -R-1 Instrument Sub-Panels.
- ❑ Temporarily screw the F-803A-1 Instrument Panel to the F-803B-L-1 & -R-1 Instrument Sub-Panels with the instrument panel shifted downward one hole position as before.
- ❑ Rivet the F-803C-1 Instrument Panel Attach Flange and the F-803D-L-1 & -R-1 Clips to the F-803B-L-1 & -R-1 Instrument Sub-Panels. **NOTE: Do not rivet the eight holes (four in large flange and four in small flanges) at the top center portion of the instrument sub-panel until after positioning it into the fuselage.**
- ❑ Remove the two temporary screws from one side of the instrument panel.
- ❑ Position the instrument panel assembly in place in the fuselage (See DWG 84). Cleco the F-803D-L-1 & -R-1 Clips to the F-820-L-1 & -R-1 Forward Side Skins. Reinstall the two temporary screws in the side of the F-803A-1 Instrument Panel.
- ❑ Remove the vinyl from and deburr the edges of the F-821B-1 Aft Baggage Door Support Strip and F-821C-1 Forward Baggage Door Support Strip (See "Exploded Iso View", DWG 84).
- ❑ Bolt the WD-814 Windscreen Support in place as shown in "Detail B" and "Detail C", DWG 72.
- ❑ Remove the vinyl from the interior surface of the F-821-1 Forward Top Skin.
- ❑ Remove the sections of the F-821-1 Forward Top Skin shown in "F-821-1 Trim Detail", DWG 74.
- ❑ Cleco the F-821B-1 Aft Baggage Door Support Strip and F-821C-1 Forward Baggage Door Support Strip into position on the interior surface of the F-821-1 Forward Top Skin using one hole at the center and one hole at both ends of the baggage door support strips.
- ❑ Cleco the F-821-1 Forward Top Skin, F-821B-1 Aft Baggage Door Support Strip, and F-821C-1 Forward Baggage Door Support Strip in place on the forward fuselage. Begin by clecoing the top center of the forward top skin and baggage door support strips to the F-803B-L-1 & -R-1 Instrument Sub-Panels, F-866B-1 Upper Forward Baggage Bulkhead and Firewall Assembly. Then work progressively outboard and down the sides.
- ❑ Final-Drill #30 the two 1/8 holes in the tab at the fwd end of the F-873G-1 Hinge Support (See "Baggage Door Aft View" and "Exploded Iso View", DWG 84).
- ❑ Deburr, then dimple the two holes in the F-873G-1 Hinge Support, final-drilled in the previous step, so they nest with the two common, dimpled holes on the Firewall Assembly.
- ❑ Cleco the F-873G-1 Hinge Support to the F-873H Spacer and F-821-1 Forward Top Skin. Cleco the hinge support to the F-866B-1 Upper Forward Baggage Bulkhead and Firewall Assembly (See "Baggage Door Aft View" and "Exploded Iso View", DWG 84).
- ❑ Final-Drill #30 the two 1/8 holes in the aft tab of the F-873G-1 Hinge Support that are common with the F-866B-1 Upper Forward Baggage Bulkhead.
- ❑ Final-Drill #40 the 3/32 holes in the F-821-1 Forward Top Skin that are common with the F-803C-1 Instrument Panel Attach Flange, the F-866B-1 Upper Forward Baggage Bulkhead and F-821B-1 Aft Baggage Door Support Strip, the F-873G-1 Hinge Support and F-873H Spacer, and the Firewall Assembly and F-821C-1 Forward Baggage Door Support Strip.
- ❑ Separate the two F-8104 Fwd Skin Support Ribs (See "F-8104 Fwd Skin Support Rib", DWG 72).

- ❑ Position the F-8104-L Forward Skin Support Rib against the F-821-1 Fwd Top Skin and WD-814 Windscreen Support as shown in "Detail D", DWG 72.
  - ❑ Mark the location of the P.P. holes in the F-821-1 Fwd Top Skin on flange of the F-8104-L Forward Skin Support Rib. Remove the rib and make sure that 3/32 holes, drilled at the marks in the support rib, will have proper edge distance. Make adjustments as necessary to the angle of the flange so it fits flush against the fwd top skin and hole edge distance is maintained.
  - ❑ Match-Drill #40 the holes common between the F-821-1 Fwd Top Skin and the F-8104-L Forward Skin Support Rib. Cleco as you drill. **NOTE: Do not drill the holes common to the WD-814 Windscreen Support at this time.**
  - ❑ Repeat the three previous steps for the F-8104-R Forward Skin Support Rib.
  - ❑ Uncleco and remove the F-821-1 Forward Top Skin. **NOTE: Label the outer surface of the F-821B-1 Aft Baggage Door Support Strip and the F-821C-1 Forward Baggage Door Support Strip before removing them to make it easier to later identify the correct surface for dimpling.**
  - ❑ Final-Drill #40 the 3/32 holes along the left and right edges of the F-821-1 Forward Top Skin that are common with the F-820-1 (RV-8) or F-891-1 (RV-8A) Forward Side Skins and the F-887-L-1 Upper Longerons.
  - ❑ Final-Drill #30 the 1/8 holes along the left edge of the F-821-1 Forward Top Skin that are common with the F-820-L-1 (RV-8) or F-891-L-1 (RV-8A) Forward Side Skin, F-887-L-1 Upper longeron, and WD-802-L-1 Engine Mount Bracket.
  - ❑ Deburr all the edges and rivet holes of the F-821-1 Forward Top Skin.
  - ❑ Dimple countersink all the #40 holes in the F-821-1 Forward Top Skin.
  - ❑ Dimple countersink the #30 holes along the left edge of the F-821-1 Forward Top Skin.
  - ❑ Deburr the #40 holes in the F-803C-1 Instrument Panel Attach Flange, F-866B-1 Upper Forward Baggage Bulkhead, F-821B-1 Aft Baggage Door Support Strip, F-821C-1 Forward Baggage Door Support Strip, F-873G-1 Hinge Support, F-873H Spacer, F-8104 Support Ribs, and Firewall Assembly that are common with holes in the F-821-1 Forward Top Skin.
  - ❑ Dimple countersink the #40 holes in the F-803C-1 Instrument Panel Attach Flange, F-866B-1 Upper Forward Baggage Bulkhead, F-821B-1 Aft Baggage Door Support Strip, F-821C-1 Forward Baggage Door Support Strip, F-8104 Support Ribs, and Firewall Assembly.
  - ❑ Cleco the F-873H Spacer to the top of the F-873G-1 Hinge Support. Machine Countersink the F-873H. **NOTE: Machine countersinking will slightly enlarge the holes in the spacer.**
  - ❑ Prime all the parts from this section if/as desired.
  - ❑ Cleco the F-821B-1 Aft Baggage Door Support Strip, F-821C-1 Forward Baggage Door Support Strip, F-873G-1 Hinge Support, F-873H Spacer, and F-821-1 Forward Top Skin in place on the fuselage.
- NOTE: Delay riveting the F-821-1 Forward Top Skin for as long as possible to provide improved access to the interior of the fuselage for installing the instrument panel, electrical system, engine controls, etc. The baggage door, canopy, and engine cowl installations can be mostly completed with the forward top skin clecoed in place.**
- ❑ Rivet the F-8104 Forward Skin Support Ribs to the F-821-1 Fwd Top Skin (See "Exploded Iso View", DWG 72).
  - ❑ Rivet the F-873G-1 Hinge Support to the Firewall Assembly and F-866B-1 Upper Forward Baggage Bulkhead (See "Baggage Door Aft View", DWG 84).
  - ❑ Rivet the F-803D-L-1 & -R-1 Clips to the F-820-1 (RV-8) or F-891-1 (RV-8A) Forward Side Skins (See DWG 74 or 74A).
  - ❑ Rivet the F-821-1 Forward Top Skin to the fuselage with the following exceptions: Do not rivet the holes common with the top flange of the Firewall Assembly and the engine cowl attach hinge until the engine cowl attach hinge has been fitted (See "Cowling Attach Detail", DWG 48). Do not rivet the holes that are common with the F-873G-1 Hinge Support and the F-873H Spacer to allow attaching the F-873J Hinge during the baggage door installation.

- ❑ Match-Drill #30 the holes of the F-8104-L & -R Forward Skin Support Ribs into the WD-814 Windscreen Support. Remove any chips between the forward skin support ribs and the windscreen support. Deburr the aft side of the holes in the forward skin support ribs.
- ❑ Rivet the F-8104-L & -R Forward Skin Support Ribs to the WD-814 Windscreen Support (See "Detail D", DWG 72).
- ❑ Seal the upper portion of the Firewall Assembly by applying a bead of fuel tank sealant to the aft side where it intersects with the F-821-1 Forward Top Skin.

### **BAGGAGE DOOR**

- ❑ Make two F-873K Latch Pins as shown in "F-873K Latch Pin", DWG 84. First drill the 1/8 hole located as shown, then cut / file a slot perpendicular to the hole. Radius the ends of the pin as shown.
- ❑ Smooth and deburr the edges of the F-873L-1 Lock Arm
- ❑ Deburr the edges of the F-873E-1 Baggage Door Outboard Rib, F-873F-1 Angle, F-873B-1 Baggage Door Fwd Rib, F-873C-1 Baggage Door Aft Rib, and F-873A-1 Baggage Door Skin (See "Baggage Door Exploded View", DWG 84). Pay particular attention to the baggage door forward rib and baggage door aft rib. Smooth any bumps that are present at the flange notches on the top flanges of the ribs.
- ❑ Cleco the F-873E-1 Baggage Door Outboard Rib, F-873F-1 Angle, F-873B-1 Baggage Door Fwd Rib, and F-873C-1 Baggage Door Aft Rib to the F-873A-1 Baggage Door Skin (See "Baggage Door Exploded View", DWG 84).
- ❑ Cleco the F-873D-1 Baggage Door Inner Skin to the F-873E-1 Baggage Door Outboard Rib, F-873F-1 Angle, F-873B-1 Baggage Door Fwd Rib, and F-873C-1 Baggage Door Aft Rib.
- ❑ Use a Unibit™ to enlarge the tooling hole at the outboard end of the F-873B-1 & C-1 Baggage Door Ribs (See "Baggage Door Exploded View", DWG 84).
- ❑ Final-Drill #40 all the 3/32 holes common to the F-873A-1 Baggage Door Skin and substructure.
- ❑ Final-Drill #30 all the 1/8 holes common to the F-873D-1 Baggage Door Inner Skin and substructure.
- ❑ Cut the F-873J Hinge to size as shown in "F-873J Hinge", DWG 84. **NOTE: Cut the pin 1/2-inch longer than the hinge to allow for bending a 90-degree leg on the end to use as a handle.**
- ❑ Remove the clecos from the holes common between the F-873F-1 Angle and the F-873A-1 Baggage Door Skin.
- ❑ Clamp the F-873J Hinge in position as shown in "Baggage Door Aft View", DWG 84.
- ❑ Match-Drill #40 the holes in the F-873A-1 and F-873F-1 Angle into the F-873J Hinge.
- ❑ Uncleco all the baggage door parts.
- ❑ Deburr all the #30 and #40 rivet holes in all the baggage door parts.
- ❑ Dimple countersink all #40 rivet holes in the F-873A-1 Baggage Door Skin for flush rivets on the exterior surface.
- ❑ Dimple countersink the #40 holes in the F-873E-1 Baggage Door Outboard Rib and the F-873B-1 & C-1 Baggage Door Ribs.
- ❑ Machine countersink the #40 holes in the F-873F-1 Angle.
- ❑ Dimple countersink the #30 holes in the outboard flange of the F-873D-1 Baggage Door Inner Skin and the corresponding holes in the F-873E-1 Baggage Door Outboard Rib.
- ❑ Prime the baggage door parts if / as desired.
- ❑ Back rivet the F-873E-1 Baggage Door Outboard Rib to the F-873A-1 Baggage Door Skin (See DWG 74).
- ❑ Cleco, then rivet, the F-873F-1 Angle, F-873J Hinge, F-873B-1 Baggage Door Forward Rib, and F-873C-1 Baggage Door Aft Rib to the F-873A-1 Baggage Door Skin and to each other (See "Baggage Door Exploded View", DWG 84 and DWG 74).
- ❑ Cleco the F-873D-1 Baggage Door Inner Skin to the F-873B-1 Baggage Door Forward Rib and F-873C-1 Baggage Door Aft Rib.
- ❑ Lay the baggage door in place on the fuselage and verify that it fits flush around its perimeter. If it does not,

remove it, then tweak / twist it slightly to get a flush fit on the fuselage. Once satisfied with the fit, secure the door in place on the fuselage using duct tape around the perimeter.

- ❑ Climb inside the fuselage and rivet the F-873D-1 Baggage Door Inner Skin to the F-873B-1 Baggage Door Forward Rib and F-873C-1 Baggage Door Aft Rib (See "Baggage Door Exploded View", DWG 84). Rivet as many holes as you are able to. This will lock the baggage door in its proper shape to match the fuselage. **NOTE: Rivet from the middle of each baggage door rib towards each end.**
- ❑ Untape and remove the baggage door from the fuselage.
- ❑ Finish riveting any open holes common between the F-873D-1 Baggage Door Inner Skin, the F-873B-1 Baggage Door Forward Rib, and F-873C-1 Baggage Door Aft Rib.
- ❑ Rivet the F-873D-1 Baggage Door Inner Skin to the F-873E-1 Baggage Door Outboard Rib and F-873F-1 Angle (See "Baggage Door Exploded View", DWG 84).

**NOTE: The RV-8/8A forward baggage door uses a standard cabinet lock assembly that is not supplied with the kit. If you intend to use a standard keyed aircraft ignition switch, you can order the ES A-510-2K Magneto Switch from the Vans Aircraft Accessories Catalog. This switch kit comes with two cabinet locks which match the key for the ignition switch.**

- ❑ Insert the lock assembly into the baggage door and install the tabbed locking washer and nut. Tighten the nut so that two of the flats align with the locking tabs on the washer. Bend the two locking tabs and crimp them against the nut with pliers to safety it in place.
- ❑ Enlarge the inside diameter of two snap bushings as instructed in "Baggage Door Exploded View", DWG 84. A slow turning Unibit™ works well.
- ❑ Install a snap bushing in the F-873B-1 Baggage Door Forward Rib and F-873C-1 Baggage Door Aft Rib.
- ❑ Insert an F-873K-1 Latch Pin through one of the snap bushings and, while working through the access hole in the F-873D-1 Baggage Door Inner Skin, attach it to the F-873L-1 Lock Arm. Use the clevis pin specified and safety wire it in place (See "Lock Assembly Detail", DWG 84). Insert, then attach, the second latch pin to the lock arm. Work carefully so the first latch pin does not slip out of the snap bushing.
- ❑ Remove the screw and lock washer from the back of the lock assembly. Insert the key in the lock and turn it fully clockwise (baggage door latched closed). With the F-873L-1 Lock Arm positioned horizontal (parallel to the F-873K-1 Latch Pins), put it on the lock assembly, reinstall the lock washer and screw, and tighten the screw.

**NOTE: Do not complete the remaining steps for installing the baggage door until the F-821-1 Forward Top Skin has been riveted to the fuselage.**

- ❑ Place the baggage door on the fuselage and locate it so the outboard edge of the door aligns with the outboard edge of the F-821-1 Fwd Top Skin. Check for the specified clearance between the F-821-1 Forward Top Skin and the F-873J Hinge (See "Baggage Door Aft View", DWG 84).
- ❑ Tape the baggage door in position with duct tape.
- ❑ Have a helper use a paint stir stick (or something similar in size) to hold the free half of the F-873J Hinge tightly against the F-873G-1 Hinge Support. Match-Drill #40 the holes in the F-821-1 Forward Top Skin (and underlying structure) into the F-873J Hinge. Cleco as you drill, and use a new (sharp) drill bit when drilling.
- ❑ Untape and remove the baggage door from the fuselage. Remove the pin from the F-873J hinge.
- ❑ Deburr the #40 holes in the hinge half, cleco it to the F-821-1 Forward Top Skin, F-873H Spacer, and F-873G-1 Hinge Support, then rivet it in place (See DWG 74).
- ❑ Position the baggage door on the fuselage and insert the hinge pin.
- ❑ The pin hole in both F-873M Latch Blocks is drilled at a slight angle to compensate for the taper angle of the fuselage side. The latch blocks have an indexing mark to aid in their positioning. When installed, the indexing mark must be at the bottom end of the block and facing aft. Label the blocks "forward" and "aft". Mark a vertical centerline (centered on the 5/16-inch hole) on the aft side of the aft latch block and on the forward side of the forward latch block.
- ❑ Use tape to hold the forward and aft F-873M Latch Blocks in position on the fuselage. Do not put any tape over the 5/16 holes for the F-873K Latch Pins.
- ❑ Close the baggage door and turn the key to engage the F-873K Latch Pins in the F-873M Latch Blocks.
- ❑ Pull the baggage door tightly closed by stretching two strips of duct tape between the F-873A-1 Baggage Door Skin and the F-820-R-1 (RV-8) or F-891-R-1 (RV-8A) Forward Side Skin. Verify that the door is flush with the F-821-1 Forward Top Skin.

- ❑ Rotate the F-873M Latch Blocks so the previously drawn centerlines are visible in the two 1/8 screw pilot holes in the Firewall Assembly and F-866B-1 Upper Forward Baggage Bulkhead. Mark the location of the screw pilot holes by match-drilling #30 into both latch blocks. **NOTE: Only drill 1/16-inch deep to mark the location of each screw hole.**
- ❑ Remove the F-873M Latch Blocks from the fuselage.
- ❑ Using a drill press, drill #30, then final-drill #19, the pilot holes in the F-873M Latch Blocks.
- ❑ Machine countersink the two screw holes in both F-873M Latch Blocks for flush screws. Countersink the side of the latch blocks that will be visible in the baggage door opening.
- ❑ To aid in pin engagement, use a #19 piloted countersink to slightly chamfer the edge of the 5/16 latch pin hole in both F-873M Latch Blocks.
- ❑ Install the F-873M Latch Blocks in the fuselage using the hardware depicted in "F-873M Latch Block", DWG 84.
- ❑ Use a small amount of lubricating grease in both F-873M Latch Block pin holes to help the latch operate smoothly. Vaseline is a good choice since, being water-soluble, it is relatively easy to clean up.
- ❑ If you wish to minimize the possibility of water entry into the forward baggage area through the baggage door hinge, install piece of foam as shown in "Baggage Door Aft View", DWG 84. You must use a closed cell type foam so that it doesn't act as a sponge. Make it 1-1/8 wide X 1 high X 14-1/4 long.

### MANUAL ELEVATOR TRIM CABLE INSTALLATION

**NOTE: If electric elevator trim has been chosen, the manual trim cable is omitted from the Fuselage Kit.**

The RV-8/8A manual trim control is a functional, though unconventional, vernier control. A vernier is a control cable that rotates for fine adjustment, but has a button that "unlocks" the threads and allows rapid push-pull movement. Most of us have encountered vernier controls in other airplanes where they are commonly used as a prop, or mixture control. Because the trim is very effective, it is conceivable that rapid trim application while the airplane is traveling at high speed could produce high G loads, possibly even destructive loads. Because of this remote possibility, disable the rapid push-pull action of the cable, leaving the rotational vernier action as the only way to move the trim tab.

- ❑ Pry up the rubber button on the manual trim cable with a small screwdriver. Work carefully because the button is held with an adhesive and it is possible to damage the handle. When the rubber button is out, remove the plunger shaft. Without this shaft, the vernier control cannot be released and all action will be limited to the twist screw function.
- ❑ Replace the rubber button with a 1" chrome snap-in hole plug from the local hardware store.
- ❑ Remove the left elevator if it is installed on the horizontal stabilizer.
- ❑ Begin installing the trim cable from the cabin end. Starting through the instrument sub panel and then routing it aft through the designated holes in the bulkheads (See "Fwd Fuselage Substructure" of DWG 63, DWG 69, DWG 70, and "Detail E" of DWG 71). Snap bushings are used in all of the bulkheads through which the trim cable passes.
- ❑ Install the left elevator. Feed the trim cable through the leading edge opening and the snap bushing in the elevator spar and out through the opening in the elevator bottom skin (See "Manual Trim Assembly", DWG 4.)
- ❑ Drill 1/8 holes at the four corners of the WD-415 Trim Cable Anchor Bracket (See DWG 4).
- ❑ Turn the knob on the trim cable so that it is positioned slightly nose down (turned in towards the panel) of the mid point of its travel.
- ❑ Thread the WD-415 Trim Cable Anchor Bracket onto the cable.
- ❑ Thread the jamb nut and clevis onto the end of the cable (thread the clevis on more than 1/2 of its thread depth). Temporarily connect the clevis to the trim tab horn with the clevis pin.
- ❑ Position the trim tab in trail to the elevator and adjust the position of the WD-415 Trim Cable Anchor Nut so that its mounting plate position matches the bottom of the elevator. Cleco the E-816PP Trim Cover Plate in place using 3/32 clecos. Using the dimension in "Manual Trim Assembly", DWG 4 as a guide, determine the best position for the trim cable anchor nut and verify clearance of the cable to the trim cover plate. Readjust the position of the clevis and/or the trim cable anchor nut on the trim cable as necessary.

- ❑ Remove the E-816PP Trim Cover Plate, clevis, jamb nut, and WD-415 Trim Cable Anchor Nut. Clamp the trim cable anchor nut to the trim cover plate and match-drill #30 through the four 1/8 holes in the trim cable anchor nut mounting plate.
- ❑ Reinstall the WD-415 Trim Cable Anchor Nut, jamb nut, clevis and clevis pin as done previously. Cleco the trim cable anchor nut to the E-816PP Trim Cover Plate. Cleco the trim cover plate to the bottom of the elevator. Check for the desired travel of the trim tab (see Section 15).
- ❑ Readjust the position of the clevis and/or the position of the WD-415 Trim Cable Anchor Nut to get the proper up and down trim tab travel and have more than 50% thread engagement of the clevis to the end of the cable.
- ❑ Once adjusted, take measurements to allow you too easily return the clevis and the WD-415 Trim Cable Anchor Nut to the same position on the trim cable.

**NOTE: The WD-415 Trim Cable Anchor Nut will not be riveted to the E-816PP Trim Cover Plate until final assembly of the airplane because it is difficult to thread onto the trim cable with the trim cover plate attached.**

**When installing the left elevator during final assembly, use the previously measured dimensions to position the WD-415 Trim Cable Anchor Nut and clevis on the trim cable as they were before. Rivet the trim cable anchor nut to the E-816PP Trim Cover Plate.**

### WING/FUSELAGE ASSEMBLY

*During this phase of construction it is necessary to attach the wings to the fuselage to allow for drilling the rear spar/center section attach, finishing the flap control mechanism, installing the wing tank/fuselage attach brackets, fabricating and fitting fuel & vent lines, and installing the wing root and flap intersection fairings.*

*Actual installation of the wing panels should be very simple, as the spars have been pre-fitted and drilled for the center section assembly at the factory. It is helpful to file a slight bevel on the root ends of the spar to assist getting it started sliding through the slot in the fuselage bulkhead, and to prevent it from scratching and galling the bulkhead bars as it slides through. Support the inboard ends of the wings when inserting to prevent the bottom of the spar from dragging along the inside of the fuselage bottom skin. As the wings are pushed in near center, be sure that the fuselage center bottom skins (which overhangs the fuselage) doesn't catch on the wing skin. When bringing the spar into its exact position, lining up the bolt holes in the bulkhead and spar, it is often helpful to use drift pins. This could be a disposable hardware store bolt with the threaded portion removed and the end rounded or tapered on a grinder. Gently driving this lubricated pin into a nearly aligned hole will center the bulkhead/spar hole so that the bolts can be installed without excessive force. We recommend that 7/16 hardware store bolts be used for test fitting to prevent damage to the holes and NAS bolts. When temporarily fitting the wings it is only necessary to install two 7/16 bolts for each wing (one in a top hole and one in a bottom hole). This will minimize the chance for causing any damage to the holes and allows the choice of holes that will be easiest to tap the bolts back out (particularly on an RV-8A).*

**NOTE: Refer to "Section B-B", DWG 80 for main wing spar hardware callouts when doing the final wing installation. When installing the wing for the last time, lubricate the NAS bolts with some type of spray lube (LPS-2™, etc.). In lieu of that, a light coat of ordinary motor oil will do. Do not lubricate the threaded portion of the bolt because the torque specifications are for unlubricated threads.**

- ❑ Eleven holes along the inboard edge of the W-804-2-R and W-704-L Wing Lower Inboard Skins (ten of which are common with the root W-710 Inboard Rib) remain open and are used to secure (with screws) the F-826-1 and F-827-1 Center Bottom Skins (See "Bottom View", DWG 17A and "Section B-B", DWG 80). Draw a straight line on the wing lower inboard skins from the center of each screw hole towards the wing tip. Make a mark on each line 3" outboard from the center of the holes. When the wings are attached, and the F-826-1 and F-827-1 Center Bottom Skins cover the screw holes, it will be possible to measure back from the marks and locate the screw holes on the overlapping center bottom skins.
- ❑ Rub the spar stub surfaces with Boelube™ or candle wax to help them slide into the center section assembly more easily.
- ❑ Use a Unibit™ to drill a hole in the lower fuselage side to allow the pitot line from the left wing to enter the fuselage.
- ❑ Position the fuselage so that it is level laterally and longitudinally. The wings can be fitted with the fuselage on the landing gear or other supports as long as it can be leveled. It is helpful to have it high enough off the floor to allow working under the wings while rigging the flaps and ailerons.
- ❑ Insert the wings in the fuselage and pin them in place. This is best done with three people; one in the fuselage to direct movement of the wing for hole alignment, and the other two handling the wing. If the wing spar stub fits tight in the center section assembly, the person at the outboard end can move it up and down while pushing to help it slide in. **NOTE: Insert the W-816 Aileron Pushrod Assemblies before attaching the wings to the fuselage if the wing tips are already attached with blind rivets, or if there is limited space outboard of**

**the wing tips once the wings are attached.**

- Recheck that the fuselage is level.
- Square the wing to the fuselage. This can be done by measuring the distance from corresponding points on the wing tips to a common, centerline point on the aft fuselage in a manner similar to that shown in "Wing Alignment", DWG 85. Equate these distances and, at the same time, check that the wings have no forward or aft sweep. The sweep can be checked by dropping four plumb lines from the wing leading edges (two on each wing at inboard and outboard points). When they all fall in a straight line, as viewed from the side, there is no wing sweep. Up to 1/2" forward or aft sweep at the tip is acceptable. The important thing is that both wings have the same sweep, if any. Mark the inboard/outboard position of the W-807DPP Rear Spar Attach Plate on the F-806D Rear Spar Attach Bar (See "Section C-C", DWG 80).

*It is time to measure and set the very important wing incidence angle. Take your time and make sure you understand all the concepts and measurements of this critical task, especially the importance of the correct hole placement and edge distance. This is one place where there is only one chance to get it right. If the hole used to join the rear spar to the fuselage is mis-placed or mis-drilled, the repair can be extremely difficult.*

- Set the incidence of each wing by using a carpenter's level and a spacer block as shown in "Setting Wing Incidence", DWG 85. Rest one end of a level on the wing at the forward face of the front spar web, and the other end on a spacer placed directly over the web of the rear spar. Shift the rear of the wing up or down to center the level. The spacer size has been calculated to provide the desired 1/2° positive incidence angle. Check several points along the span of the wing to verify the level reading. Again, it is important that both wings be the same.

**It is extremely important that there is at least 5/8" from fastener center to the edge of the part, in both the rear spar and F-806 Rear Spar Attach Bars. If unable to maintain proper edge distance, call Van's Aircraft for assistance before proceeding further.**

- Clamp the rear spar in place and locate the center point of the hole (See "Section C-C", DWG 80). To help drill square you can tape a small piece of flat aluminum beside the hole location and use the reflection to align the drill bit. You can also drill a piece of aluminum or steel (about 1/2" thick and about 2" by 2") on a drill press for a pilot hole that is square. Clamp this block in place on the rear spar attach. Initially drill an undersize hole starting with no more than a 3/16 bit. After checking and re-checking the wing fore and aft alignment and incidence angle, enlarge the hole to 5/16 diameter. Drill with a long stiff drill bit or better yet a reamer so the drill motor can clear the fuselage and make a straight hole.
- Use the reference lines and marks on the bottom of the W-804-2-R and W-704-L Wing Lower Inboard Skins to transfer the screw hole positions to the F-826-1 and F-827-1 Center Bottom Skins. Drill #30 the screw hole locations in the left and right center bottom skins. **NOTE: Do not final-drill the screw holes at this time.**
- **RV-8 Only:** Make the left and right F-863-1 Tank Attach Brackets (See "F-863-1 Tank Attach Bracket", DWG 80).
- **RV-8 Only:** Make the bend adjustments required so the F-863-1 Tank Attach Brackets fit flush with the fuselage side skins and the T-405 Angles on the fuel tanks as shown in the top view of "Wing/Fuselage Junction", DWG 80. This can be done by clamping the tank attach bracket in a bench vise with the desired bend line clamped adjacent to the vice jaws, and then hitting it with a large hammer while protecting it with a wood block.
- **RV-8 Only:** The two open holes in the F-820-L-1 & -R-1 Fwd Side Skins are the bolt hole locations for attaching the F-863-1 Tank Attach Brackets. Center the F-863-1 Tank Attach Brackets on the two open holes in the fwd side skins, then clamp in place on the T-405 Angles on the fuel tanks (See "Wing/Fuselage Junction" and "Section A-A", DWG 80). Be sure that the tank attach brackets fit tightly against the fuselage sides, then match-drill #12 the two holes in the fuselage into the tank attach brackets. Insert a bolt after drilling the first hole to assure alignment.
- **RV-8A Only:** Make the left and right F-863A Tank Attach Brackets (See "F-863A Tank Attach Bracket", DWG 80).
- **RV-8A Only:** Make the bend adjustments required so that the F-863A Tank Attach Brackets fit flush with the fuselage side skins and the T-405 Angles on the fuel tanks as shown in the top view of "Wing/Fuselage Junction", DWG 80. This can be done by clamping it in a bench vise with the desired bend line clamped adjacent to the vice jaws, and then hitting it with a large hammer while protecting it with a wood block. **NOTE: The relationship of the tank attach brackets to the T-405 Angles is the same as what is shown for the RV-8 on DWG 80 except that the leg of the tank attach bracket that bolts to the fuselage faces fwd instead of aft (See "RV-8A Fwd Wing/Fuselage Junction", DWG 80).**
- **RV-8A Only:** Position the F-863A Tank Attach Brackets on the side of the fuselage as shown in "RV-8A Fwd Wing/Fuselage Junction", DWG 80, then clamp in place on the T-405 Angles. Be sure that the tank attach brackets fit tightly against the fuselage sides, then match-drill #12 the two tank attach bracket holes into the side of the fuselage. Insert a bolt after drilling the first hole to assure alignment.

- Remove the F-863-1 or F-863A Tank Attach Brackets from the fuselage and deburr the holes that were match-drilled in the previous step.
- Bolt the F-863-1 or F-863A Tank Attach Brackets in place on each side of the fuselage (See "Section A-A", DWG 80).
- Bolt the F-863-1 or F-863A Tank Attach Brackets to the fuselage, then clamp them to the T-405 Angles on the fuel tanks. Mark, then drill 1/4", the bolt hole which is common to the two parts (See "Section A-A", DWG 80). The remaining work on the tank attach brackets will be completed after the wings are removed.
- Make vent lines to connect between the vent line fittings on both sides of the fuselage and the vent line fittings on the root rib of both fuel tanks (See "Iso View Carbureted System", DWG 82).
- Mark both fuel lines that are to connect to the fuel pick-up tube fittings on the fuel tanks so they can be trimmed to final length after the wings are removed.
- Connect the inboard end of the W-816 Aileron Pushrod Assemblies to the WD-807 Control Column (See "Detail B", DWG 79).
- Tape a stick to one of the control sticks and to the side of the fuselage to hold the WD-807 Control Column in its neutral position.
- Place the WD-421 Aileron Bellcranks in their neutral position as determined by the W-730 Bellcrank Jig (See "Aft Iso View", DWG 15A). Adjust the length of the W-816 Aileron Pushrod Assemblies to fit between aileron bellcranks and WD-807 Control Column. Attach the aileron pushrod assemblies to the aileron bellcranks with the hardware depicted in "Side View", DWG 15A).
- Insert the W-818 Pushrod Assemblies into both wings and attach them to the WD-421 Aileron Bellcranks.
- Attach the ailerons to the wings (See DWG 13A). Position the ailerons in their neutral position, then adjust the W-818 Pushrod Assemblies to fit between the aileron and the WD-421 Aileron Bellcranks.
- Free the control sticks and check the up and down aileron travel of both ailerons (See Chapter 15 in the Construction Manual). Changing the neutral position of the WD-421 Aileron Bellcranks will change the differential relationship of the up versus down travel of the ailerons.
- Once again, anchor one of the control sticks in the neutral position.
- Make the two F-847 Flap Pushrods (See "Flap Pushrod Attachment", DWG 80).
- Use a 12V battery to retract the E-85615-157-1 Linear Actuator Assembly (flap motor) to the flaps up position.
- Temporarily disconnect the W-818 Pushrod Assemblies from the ailerons and allow the ailerons to swing down.
- Attach the F-847 Flap Pushrods to both flaps (See "Flap Pushrod Attachment", DWG 80).
- Install the flaps on the wings with the hinge pins (See DWG 14A).
- Swing the left flap into its up position while inserting the F-847 Flap Pushrod through the hole in the fuselage and position it so its trailing edge aligns with the trailing edge of the left aileron. It will be necessary to push down the leading edge skin on the flap to get it to go under the top skin on the wing. Trim the inboard edge of the flap top skin as required to clear the fuselage when the flap is in its full up position.
- Attach the F-847 Flap Pushrod to the WD-806 Flap Actuator Weldment (See "Flap Pushrod Attachment", DWG 80). Adjust the length of the flap pushrod so the flap is aligned with the aileron in the neutral position.
- Slowly extend the flap motor to lower the flap to the full down position. Monitor the F-847 Flap Pushrod for any interference with the fuselage as the flap motor is extended. If the flap pushrod interferes with the floor or fuselage skin, use washers to adjust the lateral position of the flap pushrod in the clevis of the WD-806 Flap Actuator Weldment. If necessary, slightly enlarge the holes in the floor and/or fuselage skin.
- Repeat the two previous steps for the right flap.
- Trim the inboard edge of the bottom skin on both flaps to parallel the F-826-1 or F-827-1 Center Bottom Skins (See "View E-E Flap Fairing", DWG 80).
- Retract the flap motor to place the flaps in the full up position.

**WING ROOT AND FLAP INTERSECTION FAIRINGS**

- Cleco an F-872APP Fwd Wing Root Fairing to each of the F-872BPP Aft Wing Root Fairings using the match hole common between the two parts (See "Fwd and Aft Wing Root Fairings", DWG 80). Align the long, straight,

- outboard edge of the two fairings parallel with each other as shown, then draw a line on the aft wing root fairing along the aft edge of the fwd wing root fairing.
- ❑ Use a hand seamer to form a slight joggle in the F-872BPP Aft Wing Root Fairings as shown in "Fwd and Aft Wing Root Fairings", DWG 80. Be sure to joggle the second aft wing root fairing in the opposite direction to make a left and right part.
  - ❑ Cleco the F-872BPP Aft Wing Root Fairings in place on the top of the left and right wing using the holes left open for that purpose (See "Top View", DWG 17A). Drill out the rivets if they were installed in these holes.
  - ❑ Match-Drill #30 the top wing spar flange on both wings using the match hole at the fwd edge of the F-872BPP Aft Wing Root Fairings as a guide.
  - ❑ Draw a reference line on the outside surface of the T-701 Tank Leading Edge Skins, 1/4-inch from the inboard edge. The line is used to center the screw holes that are punched in the F-872APP Fwd Wing Root Fairings on the tank leading edge skin (Section A-A view, DWG 80).
  - ❑ Cleco the F-872APP Fwd Wing Root Fairings to the F-872BPP Aft Wing Root Fairings and the wing spar flange using the match hole common to the parts.
  - ❑ Pull the F-872APP Fwd Wing Root Fairings tight around the leading edge of the fuel tanks with the P.P. holes aligned with the reference line drawn on the T-701 Tank Leading Edge Skins. Mark the approximate location of the wing leading edge on the fwd wing root fairings..
  - ❑ Form the F-872APP Fwd Wing Root Fairings around a 1-1/2" (approx.) diameter piece of pipe or tubing centered on the line drawn for the wing leading edge. Form them a little at a time while checking them on the wing until they closely fit the leading edge.
  - ❑ Cleco the F-872APP Fwd Wing Root Fairings to the F-872BPP Aft Wing Root Fairings. Pull the fwd wing root fairings tight around the leading edge and cleco the bottom aft most hole in the fairing to the first open screw hole in the F-826-1 or F-827-1 Center Bottom Skins (the forward most of the screw holes that were located from the Lower Inboard Wing Skins). Verify that the reference line drawn on both T-701 Tank Leading Edge Skins is visible in the P.P. holes in the fwd wing root fairings. Also, verify that the fwd wing root fairings fit flush on the fuel tank by laying a straight edge over them span wise; they are flush to each other when the straight edge is parallel to both parts.
  - ❑ Match-Drill #30 all the screw holes in the F-872APP Fwd Wing Root Fairings into the T-701 Tank Leading Edge Skins. Start drilling at the top of the front spar, then work forward and around the bottom towards the rear.
  - ❑ Mark along the F-872APP Fwd Wing Root Fairings and F-872BPP Aft Wing Root Fairings for an even 3/16 gap between the edge of the fairings and the side of the fuselage.
  - ❑ With the flaps in full up position, hold the F-872CPP-L Flap Fairing in place on the left side of the fuselage (See "Wing / Fuselage Junction", DWG 80). To fit properly, the bend for the portion of the flap fairing that fits under the fuselage needs to be completed by hand. The bend needs to be nearly 90 degrees at the point just aft of the flap trailing edge and become shallower as it goes aft towards the back of the fairing.
  - ❑ Tape the F-872CPP-L Flap Fairing to the side of the fuselage and adjust its position as shown in "Wing/ Fuselage Junction", "Section D-D", and "View E-E Flap Fairing" on DWG 80. The leading edge of the flap fairing slips underneath the F-872BPP Aft Wing Root Fairing., trim or file slightly as needed. It will also require some hand massaging and bending to get a good final fit. When the final position is determined, secure the flap fairing.
  - ❑ Match-Drill #40 the pre-punched holes that were left open in the F-823-1 Mid Side Skin (DWG 74) into the fwd portion of the F-872CPP-L Flap Fairing from inside the fuselage. Match-Drill the remaining holes into the fuselage using the pre-punched holes in the flap fairing as a guide.
  - ❑ Repeat the three previous steps for the F-872CPP-R Flap Fairing.
  - ❑ Final-Drill #19 the match hole common between each F-872APP Fwd Wing Root Fairings, F-872BPP Aft Wing Root Fairings, and the top flange of the front wing spars.
  - ❑ Final-Drill #19 all remaining screw holes common between the F-872APP and F-872BPP Wing Root Fairings and the wings.
  - ❑ Final-Drill #19 all remaining screw holes common between the F-826-1 and F-827-1 Center Bottom Skins and the bottom of the wings.
  - ❑ Remove the Wing Root and Flap Fairings.
  - ❑ Remove the Flaps and Ailerons from the wings. **NOTE: Taking the time to draw little diagrams of the hardware for attaching the ailerons and other control connections, and then putting the diagrams and hard-**

**ware in Ziplock™ type plastic bags will save a lot of time at final assembly.**

- ❑ Remove both wings from the fuselage.
- ❑ Deburr all the rivet and screw holes associated with the installation of the wing root and flap fairings.
- ❑ Drill #40 nutplate attach rivet holes in the root of the wings for the nutplates that are used to secure the F-872APP Fwd Wing Root Fairings, the F-872BPP Aft Wing Root Fairings, and the F-826-1 and F-827-1 Center Bottom Skins. Do not forget to drill for the nutplate under the top flange of the wing spar (See "Section A-A", "B-B", and "Fwd and Aft Wing Root Fairings", DWG 80).
- ❑ Dimple countersink the #8 screw holes and the #40 nutplate attachment holes in the T-701 Tank Leading Edge Skins
- ❑ Dimple countersink all of the #8 screw holes in the W-704-L and W-705-R Wing Lower inboard Skins, and the aft most hole in the W-702 Wing Upper Inboard Skins (the additional thickness of the W-727 Wing Walk Doubler makes dimple countersinking the remaining screw holes in the wing upper inboard skin too difficult, these, and the hole in the top flange of the wing spar, will have to be machine countersunk after the nutplates are attached).
- ❑ Machine countersink the #40 nutplate attachment rivet holes in the W-704-L and W-705-R Wing Lower inboard Skins and W-702 Wing Upper Inboard Skins for flush rivets.
- ❑ Machine-countersink the #40 nutplate attachment rivet holes in the top flange of both wing spars for flush rivets.
- ❑ Rivet all the wing root fairing nutplates to the wings (See "Section A-A", "B-B", and "Fwd and Aft Wing Root Fairings", DWG 80). **NOTE: Dimple countersink the attachment rivet holes in those nutplates that will themselves be accommodating dimples.**
- ❑ Machine countersink the #8 screw holes in the W-702 Wing Upper Inboard Skins and underlying structure, and the screw hole in the top flange of the wing spar. Use a #40 piloted countersink cutter. The #40 pilot in the cutter will center in the nutplate.
- ❑ Trim the inboard edge of the F-872APP Fwd Wing Root Fairings and F-872BPP Aft Wing Root Fairings to the marks made previously. Smooth and deburr the trimmed edges. **NOTE: During final assembly, F-8121 Wing Gap Seal will be used to seal the gap between the fwd and aft wing root fairings and the fuselage sides (Section B-B, DWG 80).**
- ❑ Dimple countersink the #8 screw holes in the outboard edges of the F-826-1 and F-827-1 Center Bottom Skins.
- ❑ Dimple countersink the #8 screw holes in the F-872APP Fwd Wing Root Fairings and F-872BPP Aft Wing Root Fairings.
- ❑ **RV-8A Only:** Rivet the WD-832 Step Weldment to the fuselage (See "Detail C", DWG 71).
- ❑ **RV-8A Only:** Use some stiff paper (manila file folder works well) to make a paper template of the F-872CPP-L Flap Fairing. Use some of the holes in the flap fairing to make holes in the paper template so that it can be clecoed to the fuselage.
- ❑ **RV-8A Only:** Take some measurements and cut a hole in the paper pattern to fit around the leg of the WD-832 Step Weldment (See "Flap Fairing Installation, RV-8A", DWG 80). Cleco the paper template in place on the fuselage. Trim the opening in the paper template for a 1/16-inch gap around the leg of the step weldment. Use tape to adjust the hole size in the fairing in areas where the gap is excessive. Mark the template for any interference with the round head rivets in the step weldment.
- ❑ **RV-8A Only:** Uncleco the paper template and make a cut between the hole and the inboard edge of the flap fairing as shown in "F-8120E Installation", DWG 80 so it can be removed from/installed around the leg of the WD-832 Step Weldment. Use the template to transfer the hole, cut location, and any rivet interference, to the F-872CPP-L Flap Fairing.
- ❑ **RV-8A Only:** Make the hole and cut in the F-872CPP-L Flap Fairing for the WD-832 Step Weldment leg. Use a round file to remove the areas that will have interference with the step weldment rivet heads
- ❑ **RV-8A Only:** Cleco the F-872CPP-L Flap Fairing in place to check the fit with the WD-832 Step Weldment. Match Drill #40 the three rivet holes in the flap fairing that are common to the step weldment.
- ❑ **RV-8A Only:** Make the F-8120E Splice Plate as shown in "F-8120E Splice Plate", DWG 80, then match-drill #40 the holes into the F-872CPP-L Flap Fairing. Deburr and dimple the holes in the flap fairing and splice plate for flush rivets.
- ❑ Dimple countersink the #40 holes in the F-872CPP-L & -R Flap Fairings for flush rivets. Dimple countersink the #40 holes in the F-842-1 Aft Bottom Skin Fwd. **NOTE: On an RV-8A, machine countersink the #40 rivet**

**holes in the WD-832 Step Weldment.**

- Prime the wing root fairings and flap fairings if/as desired.
- Cleco and rivet the F-872CPP-L & -R Flap Fairings in place on the fuselage (See DWG 80). **NOTE: On an RV-8A, the F-872CPP-L Flap Fairing must first be positioned around the leg of the WD-832 Step Weldment and the F-8120E Splice Plate riveted on before clecoing the flap fairing in place.**

*Return to the seat floor section, Page 50, and complete the installation of the seat floors.*

- Cut a 1/4 wide slot in the T-405 Tank Attach Angle on each fuel tank as shown in "Section A-A", DWG 80. Use a 1/4 bolt to check that it slips through the slot with no resistance. The purpose of the slot is to allow the tank to pull away from the fuselage in case of an accident.
- Install a nutplate on each F-863-1 (RV-8) or F-863A (RV-8A) Tank Attach Brackets as shown in "Section A-A", DWG 80. Be sure to orient the nutplate in the position shown. **NOTE: Refer to "Section A-A", DWG 80 during final assembly for proper installation and safety wiring of the tank attach angle bolt.**

**ES-FA-PA-270-12-5 Flap Linear Actuator Wire Color Codes**

Motor + (Extend actuator when +V is applied) 18 ga. - Blue  
Motor - (Retract actuator when +V is applied) 18 ga. - Brown  
POT Wiper 26 ga. - Red  
POT 5VDC 26 ga. - Yellow  
POT GND 26 ga. - White

