TOTAL PERFORMANCE
VAN'S AIRCRAFT
14401 Keil Road NE, Aurora, Oregon, USA 97002
PHONE 503-678-6545 • FAX 503-678-6560 • www.vansaircraft.com • info@vansaircraft.com
Service Letters and Bulletins: www.vansaircraft.com/public/service.htm

REVISION DESCRIPTION:

Page: 09-10 REV 1: Delete Step 1.

Step 1: Install the WD-1207 Upper Horn flush to the forward side of the Spar Box using the hardware called out in Figure 1.

Step 2: Shim the gap, if any, between the aft face of the Spar Box and the flange of the WD-1207. See Figure 1 detail. Note shim thickness.

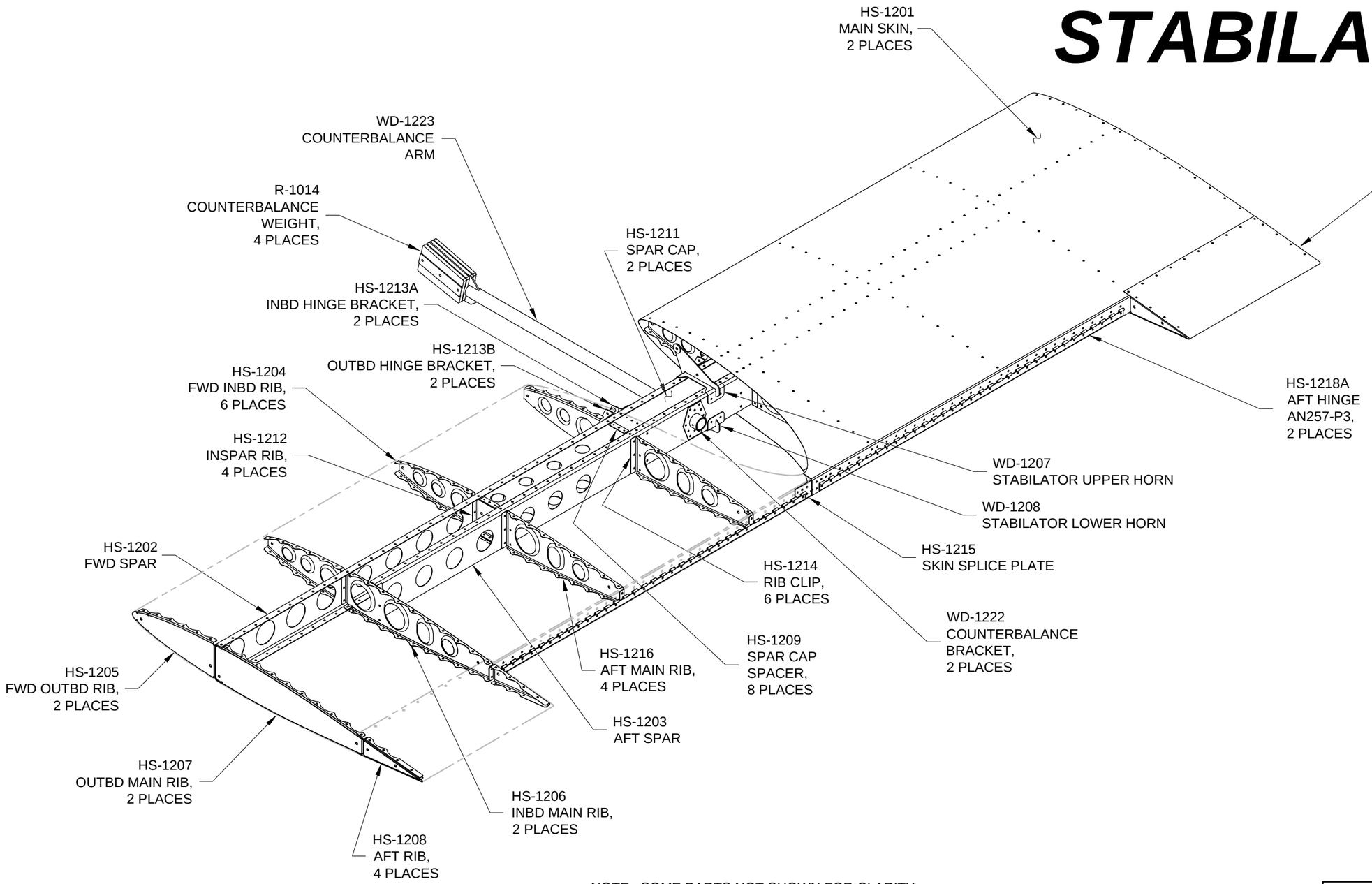
Step 3: Calculate the material stack-up which is the sum of the shim, parts and washer thicknesses. In this case, the stack-up value must be between .220 and .255 in.

Example: A builder used a .032 shim and plans to use one AN960-10 washer under the head of the bolt. The stack-up is .040(spar) + .032(shim) + .056(horn) + .063(washer) = .191 in. Since .191 in. is below the acceptable range an additional AN960-10L washer will be required under the head of the bolt for a total of .223 in. which is now acceptable.

Step 4: Repeat Steps 1-3 for the WD-1208 Lower Horn.

Renumber previous Steps 2-5 to 5-8.

SECTION 9:
STABILATOR



NOTE: SOME PARTS NOT SHOWN FOR CLARITY

DATE OF COMPLETION: _____
PARTICIPANTS: _____

NOTE: The spars in Figure 1 are shown unbent and oriented as if the flanges bend down. All countersinking done on the spars and spar caps will be done on the outer surfaces.

Step 1: Machine countersink the HS-1202 Fwd Spar for 1/8 inch rivets in the holes on both of the flanges as called out in Figure 1.

Step 2: Machine countersink the HS-1203 Aft Spar for 1/8 inch rivets in the holes on both of the flanges as called out in Figure 1.

Step 3: Machine countersink the HS-1202 Fwd Spar for 3/32 inch rivets in the nutplate attach rivet holes on the web as called out in Figure 1.

Step 4: Machine countersink both of the HS-1211 Spar Caps for 3/32 inch rivets in the holes called out in Figure 1.

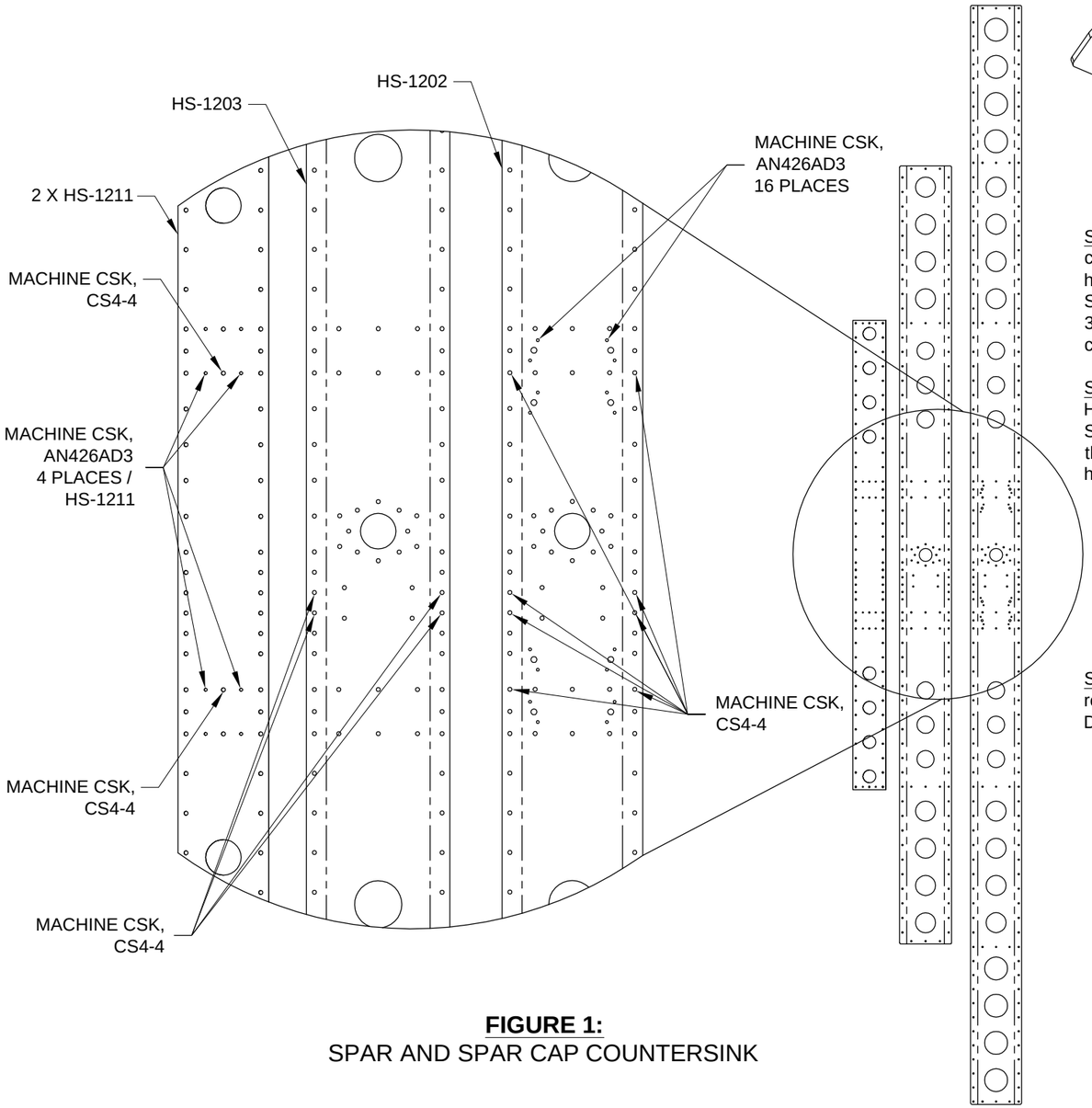


FIGURE 1:
SPAR AND SPAR CAP COUNTERSINK

Step 5: Machine countersink the HS-1213 Hinge Bracket at the nutplate attach rivet holes for 3/32 inch rivets per call-out in Figure 2.

Step 6: Final-Drill #12 the HS-1213 Hinge Bracket through all of the 3/16 inch holes as called out in Figure 2.

Step 7: Trim the HS-1213 Hinge Bracket to make the HS-1213A Inbd and HS-1213B Outbd Hinge Brackets by removing the material shown hatched in Figure 2.

Deburr all edges and drilled holes.

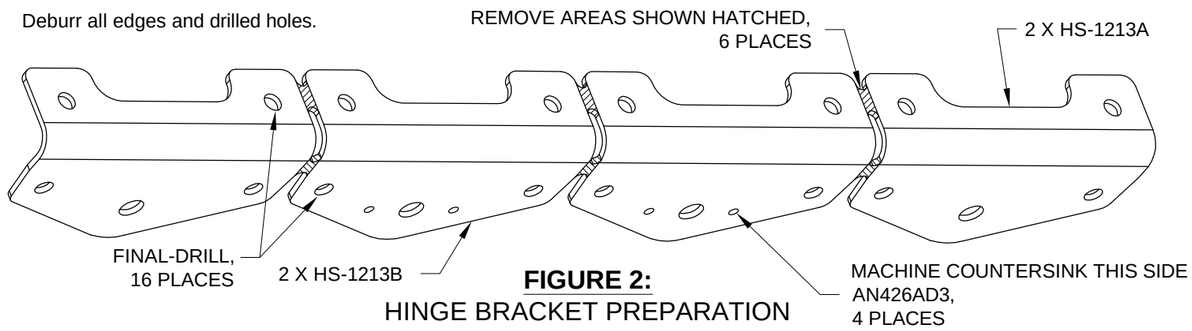


FIGURE 2:
HINGE BRACKET PREPARATION

Step 8: Machine countersink the #40 holes in the HS-1209 Spar Cap Spacers for 3/32 inch rivets per call-out in Figure 3.

Step 9: Separate the HS-1209 Spar Cap Spacers by removing the material shown hatched in Figure 3.

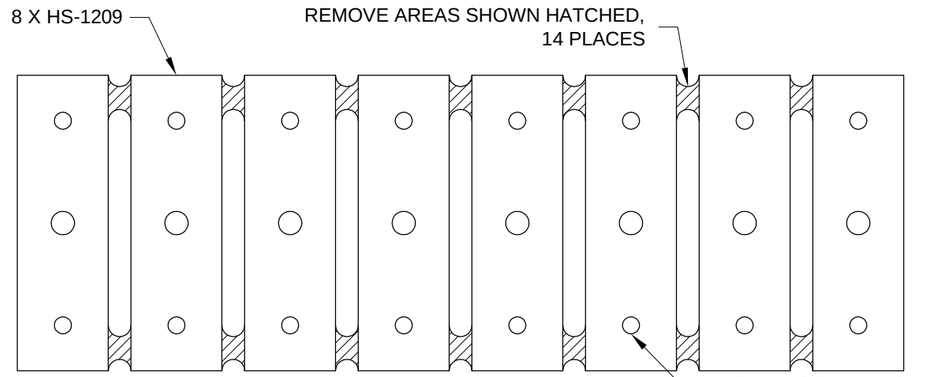


FIGURE 3:
SPAR CAP SPACER PREPARATION

Step 10: Separate the HS-1224 Doublers by removing the material shown hatched in Figure 4. Deburr the edges of the separated parts.

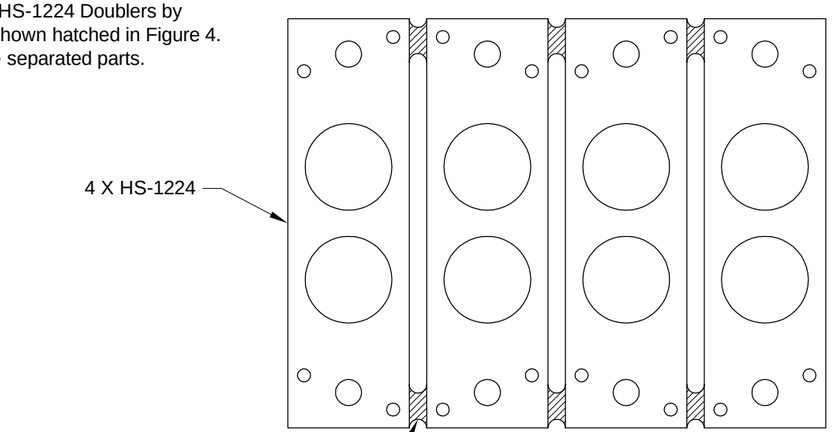


FIGURE 4:
DOUBLER SEPARATION

NOTE: The proper orientation of the spars (top, bottom, forward, aft) is critical throughout the Stabilator assembly. Make sure that all spar flange holes align with spar cap holes.

Step 1: Cleco the HS-1209 Spar Cap Spacers, the HS-1212 Inspar Ribs and the two HS-1211 Spar Caps together as shown in Figure 1. Orient the spar caps so that the closely spaced holes in the top spar cap align with the closely spaced holes in the bottom spar cap, and the machine countersunk holes face away from the inspar ribs. Orient the inspar ribs with the tooling holes positioned as shown in Figure 1. When all are oriented correctly, the lightening hole in the web of each inspar rib will align when sighting through all of the inspar ribs from the end.

Step 2: Rivet the HS-1211 Spar Caps, HS 1212 Inspar Ribs, and HS-1209 Spar Cap Spacers together using rivets called out in Figure 1.

Remove any remaining clecos.

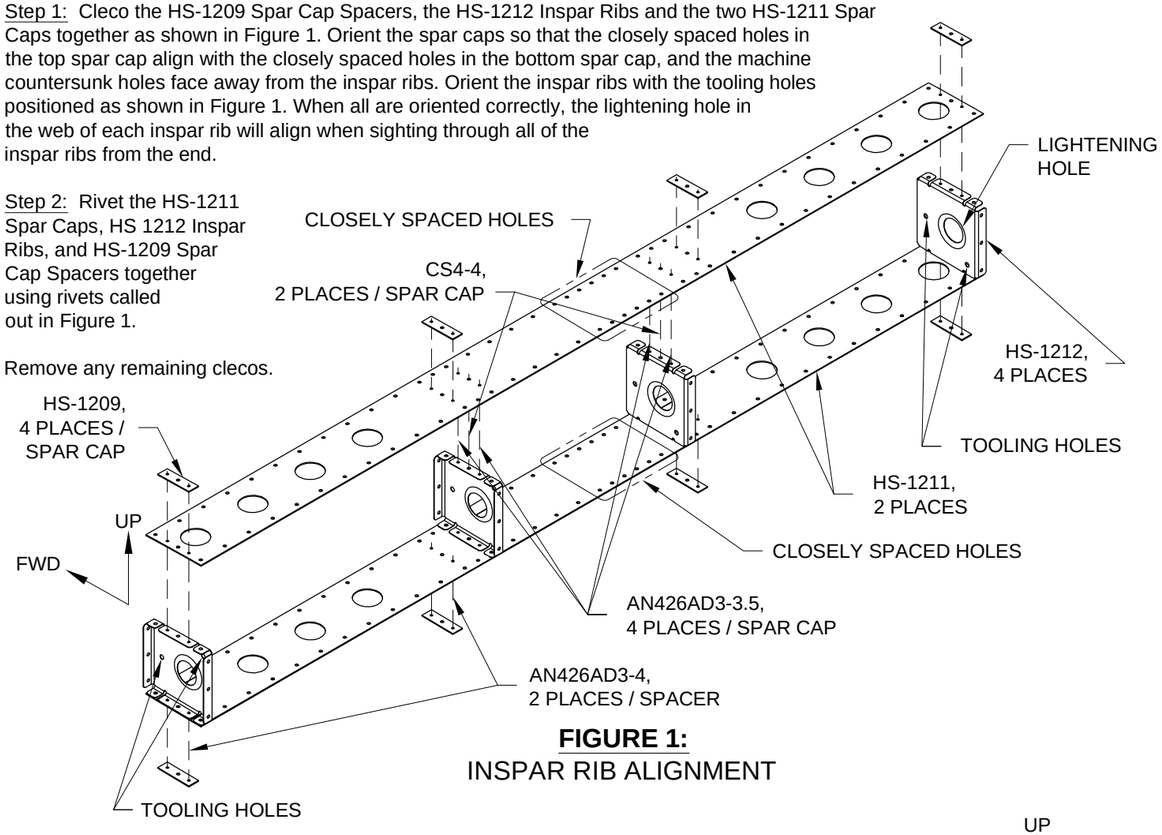


FIGURE 1:
INSPAR RIB ALIGNMENT

Step 3: Cleco the HS-1202 Fwd and HS-1203 Aft Spar to the HS-1212 Inspar Ribs, as shown in Figure 2. Hereafter refer to this subassembly as the Spar Box Assembly.

Step 4: Cleco the WD-1207 Upper and WD-1208 Lower Horns to the HS-1202 Fwd and HS-1203 Aft Spars. Identify the upper horn by the 3/16 inch identifier hole. Point both of the horns forward as shown in Figure 2. Mark the top and bottom of the Spar Box Assembly for reference later.

Step 5: Final-Drill #12 the fastener holes of the WD-1207 Upper and WD-1208 Lower Horns into the webs of both spars as called out in Figure 2. Insert an AN3 bolt into each hole before drilling the next.

Remove the upper and lower horn, deburr the holes and set the two horns aside.

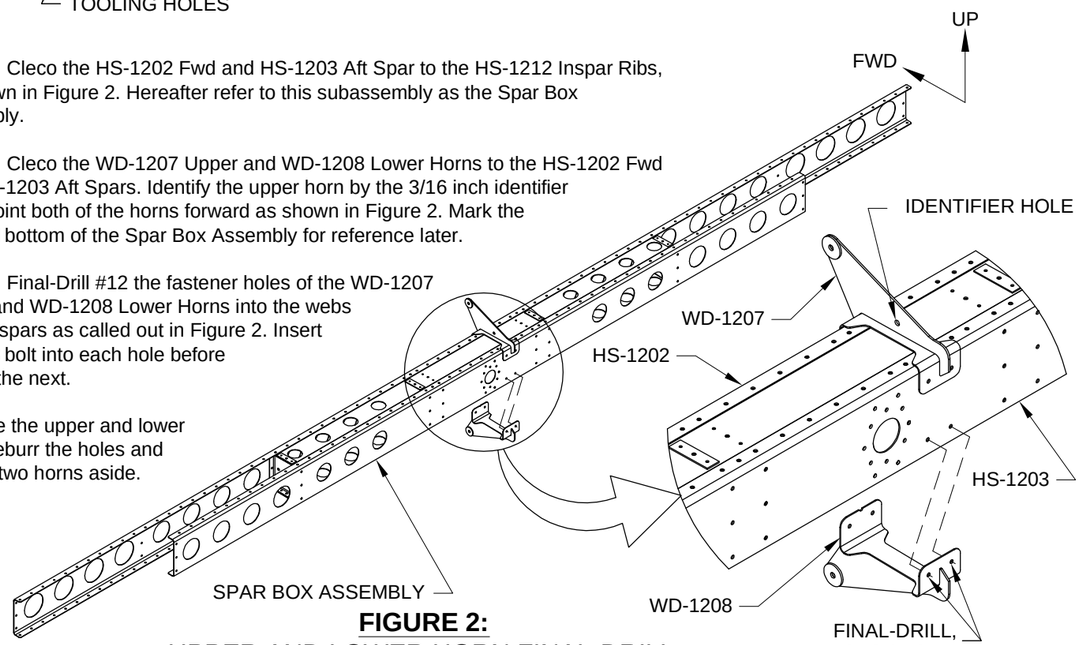


FIGURE 2:
UPPER AND LOWER HORN FINAL-DRILL

Step 6: Final-Drill #30 all of the holes in the plate of both of the WD-1222 Counterbalance Brackets.

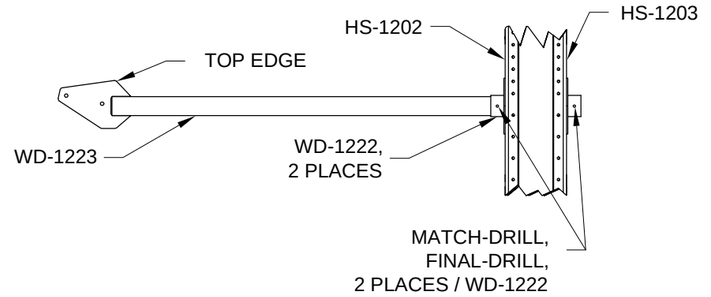
Step 7: Align each WD-1222 Counterbalance Bracket to the corresponding holes in the HS-1202 Fwd and HS-1203 Aft Spar. Turn both brackets 90° and cleco them in that position, as shown in Figure 3, Detail A-A.

Step 8: Insert the WD-1223 Counterbalance Arm into the forward WD-1222 Counterbalance Bracket (clecoed to the HS-1202 Fwd Spar) through the Spar Box Assembly, then into the aft WD-1222 Counterbalance Bracket. Bring the aft end of the counterbalance arm flush with the aft edge of the aft counterbalance bracket, and orient the counterbalance arm as shown in Figure 3. Clamp the counterbalance arm to the counterbalance brackets.

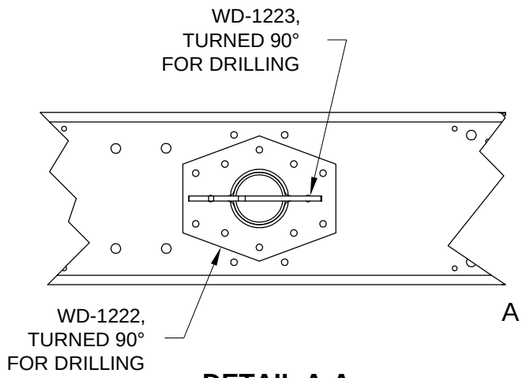
Step 9: Match-Drill #30 the two holes from the neck of each WD-1222 Counterbalance Bracket into the WD-1223 Counterbalance Arm. Cleco as you go. Then final-drill #12 per call-out in Figure 3, Detail B-B. Temporarily insert an AN3-14A bolt after final-drilling the first hole.

Step 10: Rotate the counterbalance arm and counterbalance brackets 90°, make sure the top edge of the counterbalance arm (see call-out in Figure 3, Detail B-B) is oriented with the top side of the Spar Box Assembly. Mark the counterbalance brackets in relation to the Spar Box Assembly, and the counterbalance arm.

Remove the counterbalance arm and brackets, remove the HS-1202 Fwd and HS-1203 Aft Spar. Deburr holes, and clear away chips.



DETAIL B-B



DETAIL A-A

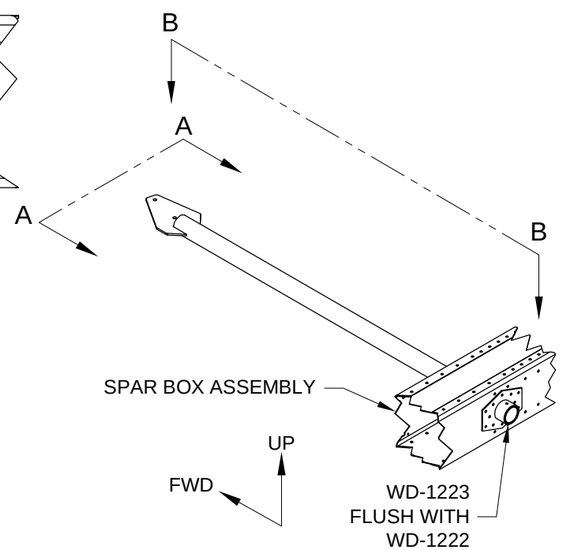


FIGURE 3:
COUNTERBALANCE ARM MATCH-DRILL

Step 1: Cleco the HS-1224 Doublers to the inner surface of the HS-1202 Fwd Spar web. Final-Drill #12 the 3/16 inch holes.

Step 2: Final-Drill #40 the 3/32 inch nutplate attach rivet holes in the HS-1224 Doublers.

Step 3: Bolt one of the called out nutplates through one of the #12 holes in the HS-1202 Fwd or HS-1203 Aft Spar for the WD-1207 Upper and WD-1208 Lower Horn. Using the nutplate as a guide, match-drill #40 the first nutplate attach rivet hole as called out in Figure 1. Cleco the first #40 hole, then match-drill the other attach rivet hole. Repeat this step for all of the nutplates that are common to the upper and lower horns in the fwd and aft spar.

Step 4: Machine countersink the nutplate attach rivet holes flush on the outer surface of the HS-1202 Fwd and HS-1203 Aft Spar per call-out in Figure 1.

Mark the positions, remove the nutplates and doublers, deburr all drilled holes, clear away chips and re-cleco.

Step 5: Rivet the HS-1224 Doublers, and the called out nutplates to the inner surface of the HS-1202 Fwd Spar web using rivets called out in Figure 1.

Step 6: Rivet the nutplates for the WD-1207 Upper and WD-1208 Lower Horn to the HS-1202 Fwd and HS-1203 Aft Spars using the rivets called out in Figure 1.

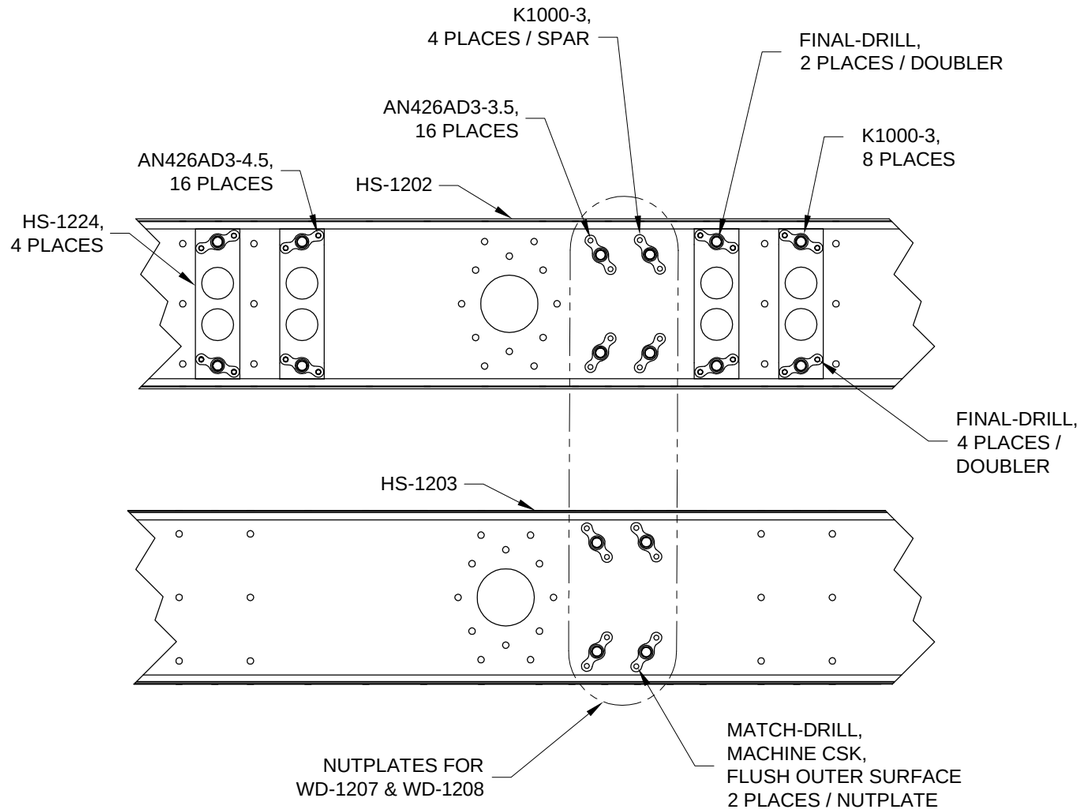


FIGURE 1:
SPAR PREPARATION

Step 7: Rivet a nutplate to both of the HS-1213B Outbd Hinge Brackets using hardware called out in Figure 2.

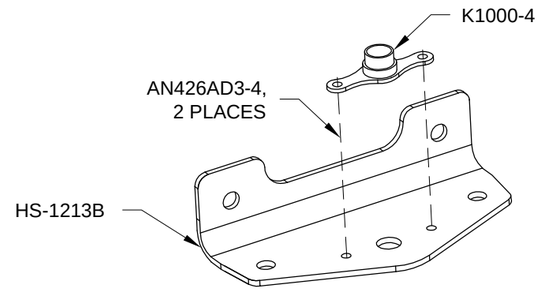


FIGURE 2:
HINGE BRACKET NUTPLATE

Step 8: Rivet the WD-1222 Counterbalance Brackets to the HS-1202 Fwd and HS-1203 Aft Spar in their previously marked positions per call-out in Figure 3.

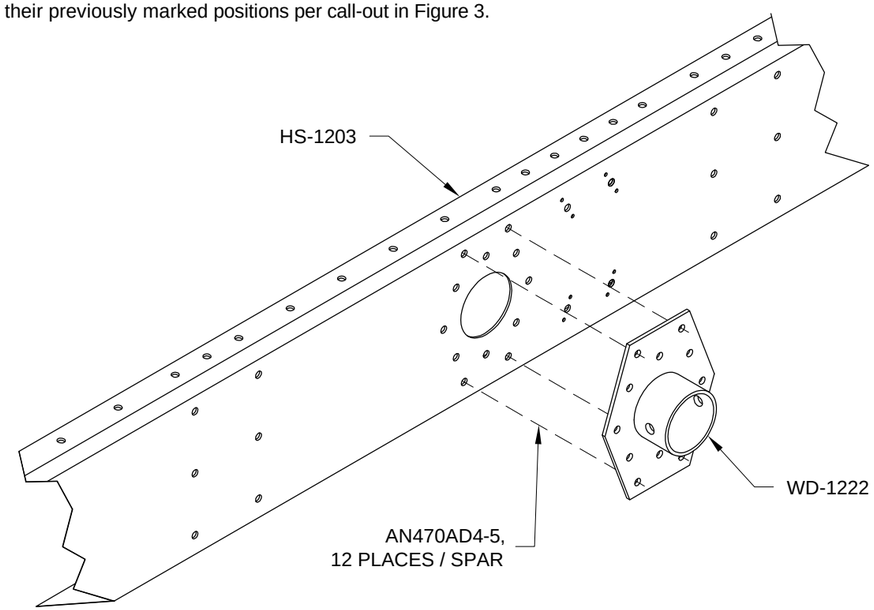


FIGURE 3:
COUNTERBALANCE BRACKET INSTALLATION

Step 1: Cut the 5/16 aluminum tube to make four HS-1210 Hinge Stops per dimensions in Figure 1.

Deburr the hinge stops.

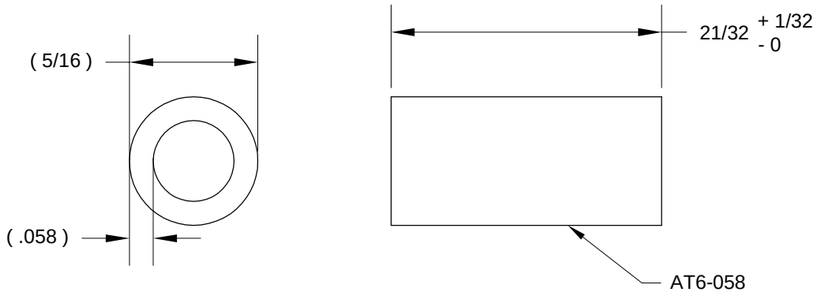


FIGURE 1:
HS-1210 HINGE STOP FABRICATION

Step 2: Separate the HS-1214 Rib Clips by removing the material shown hatched in Figure 2.

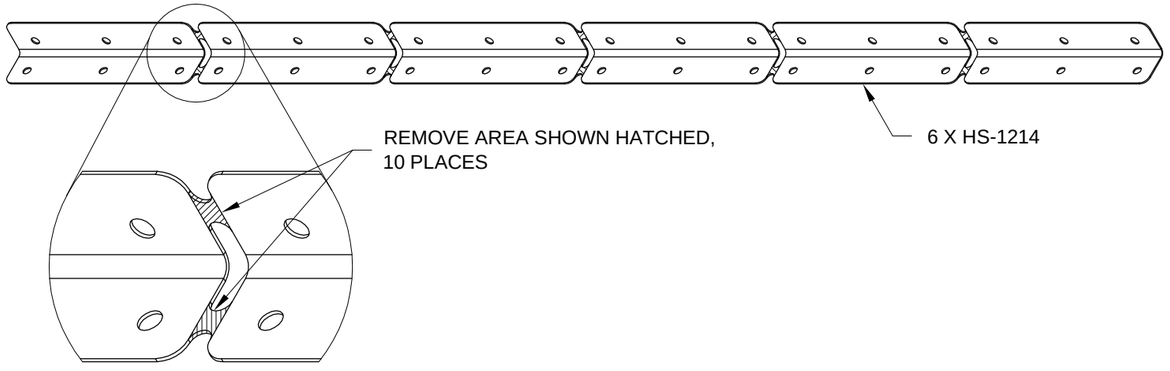


FIGURE 2:
RIB CLIP SEPARATION

Step 3: Cleco the Spar Box Assembly back together. Check alignment of HS-1202 Fwd and HS-1203 Aft Spar flange holes to the corresponding holes in both HS-1211 Spar Caps. All spar flange holes must align with spar cap holes.

Step 4: Rivet the previously countersunk holes in both flanges of the HS-1202 Fwd and HS-1203 Aft Spar to the HS-1211 Spar Caps per call-out in Figure 3.

Step 5: Rivet the HS-1202 Fwd and HS-1203 Aft Spar to the inboard HS-1212 Inspar Ribs using rivets called out in Figure 3.

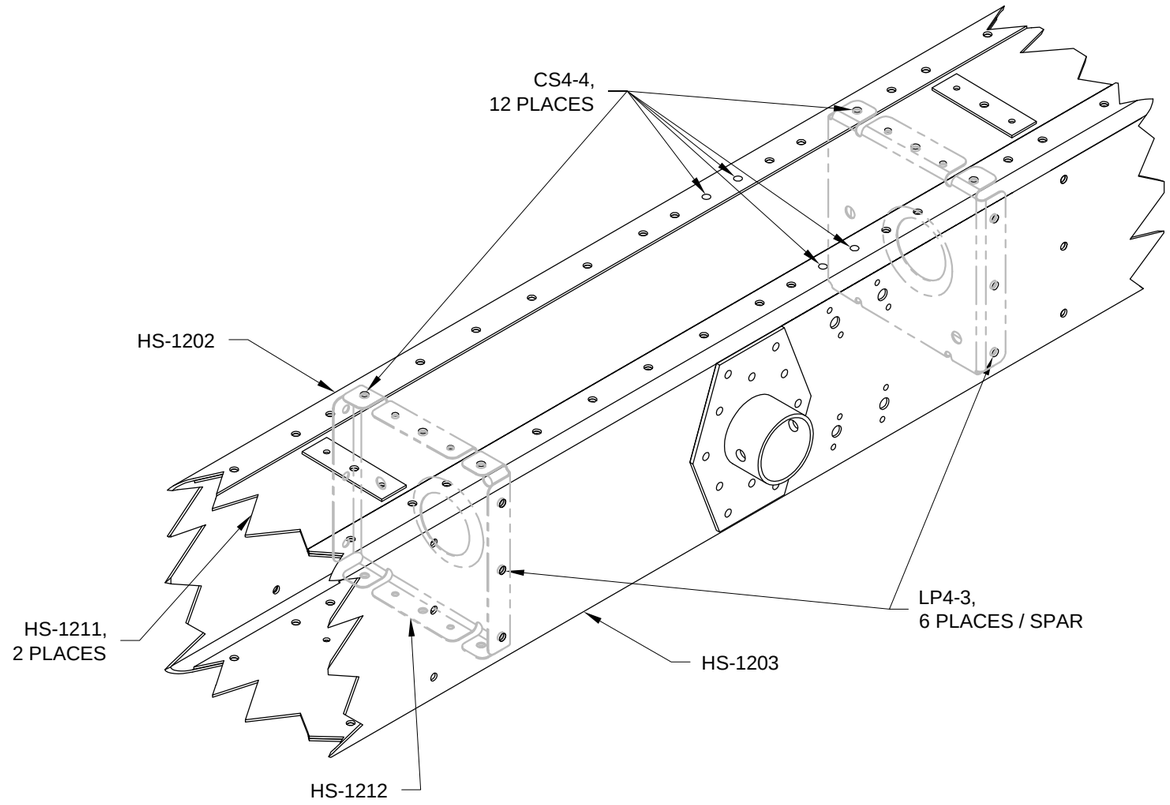


FIGURE 3:
SPAR BOX ASSEMBLY

Step 1: Rivet the HS-1214 Rib Clips to the HS-1203 Aft Spar per call-outs in Figure 1. Note the orientation of each rib clip, and be sure that all three holes of each rib clip align to all three holes of the aft spar before riveting.

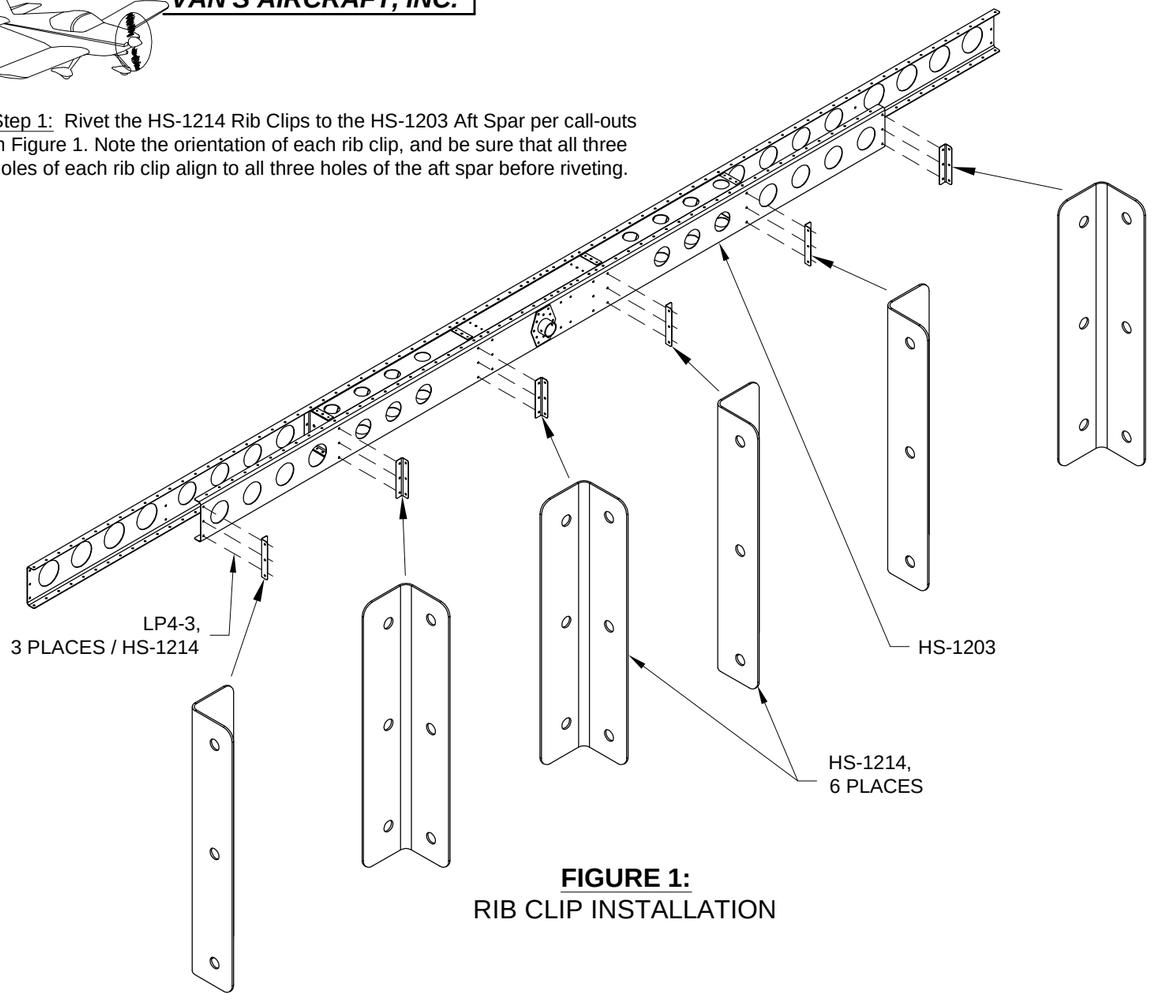


FIGURE 1:
RIB CLIP INSTALLATION

Step 2: Radius the edges at the narrow end of the HS-1204 Fwd Inbd Ribs and HS-1205 Fwd Outbd Ribs as shown in Figure 2.

A great way to form the radius is with a fine file.
Deburr all of the ribs.

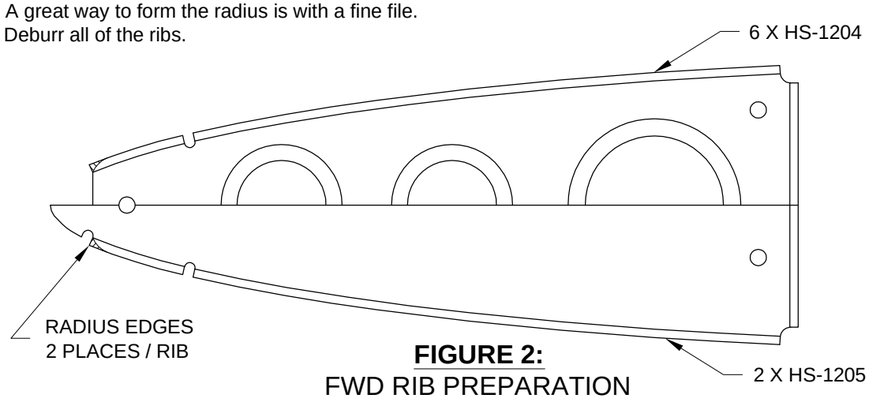


FIGURE 2:
FWD RIB PREPARATION

NOTE: Figure 3 illustrates the installation of the ribs for the right side of the stabilator. Steps 3, 4, and 5 describe installation for the ribs on the right side of the stabilator. Installation for the ribs on the left side of the stabilator is a mirror of the right. Perform the remaining steps on this page on both sides of the stabilator. Flute ribs as necessary per Section 5N.

Step 3: Rivet the HS-1216 Aft Main Ribs and the HS-1206 Inbd Main Rib to the HS-1214 Rib Clips per call-out in Figure 3.

Step 4: Rivet the HS-1204 Fwd Inbd Ribs to the HS-1202 Fwd Spar per call-out. Include the forward flange of the HS-1206 Inbd Main Rib when installing the outer most fwd inbd rib. Orient all the rib flanges as shown in Figure 3.

Step 5: Rivet the HS-1205 Fwd Outbd Rib to the HS-1207 Outbd Main Rib through the HS-1202 Fwd Spar. Orient the flanges of the fwd outbd rib and the outbd main rib so that they point inboard as shown in Figure 3.

Hereafter refer to the Spar Box Assembly with all of the ribs attached as the Stabilator Skeleton Assembly.

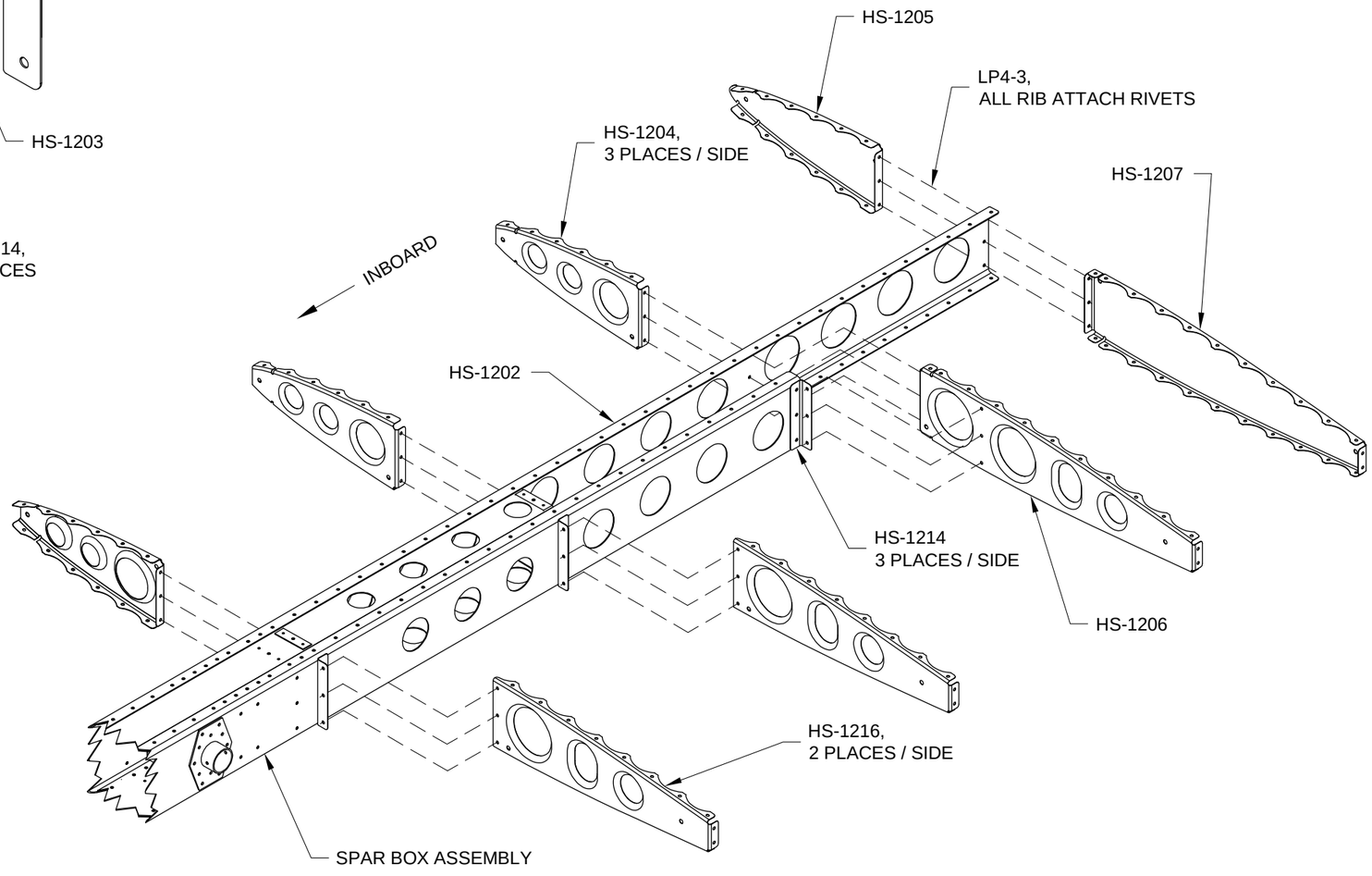


FIGURE 3:
STABILATOR SKELETON ASSEMBLY

Step 1: Install the HS-1213A Inbd and HS-1213B Outbd Hinge Brackets to the HS-1202 Fwd Spar using the hardware called out in Figure 1.

Step 2: Install the HS-1210 Bushings between the HS-1213A Inbd and HS-1213B Outbd Hinge Brackets using the hardware called out in Figure 1. When installing each bushing or tightening the bolt the inbd and outbd hinge brackets should not yield to the bushings. Trim or replace bushings as necessary to maintain the spacing and angle of the inbd and outbd hinge brackets.

NOTE: Ribs attached to the Spar Box Assembly not shown in Figure 1.

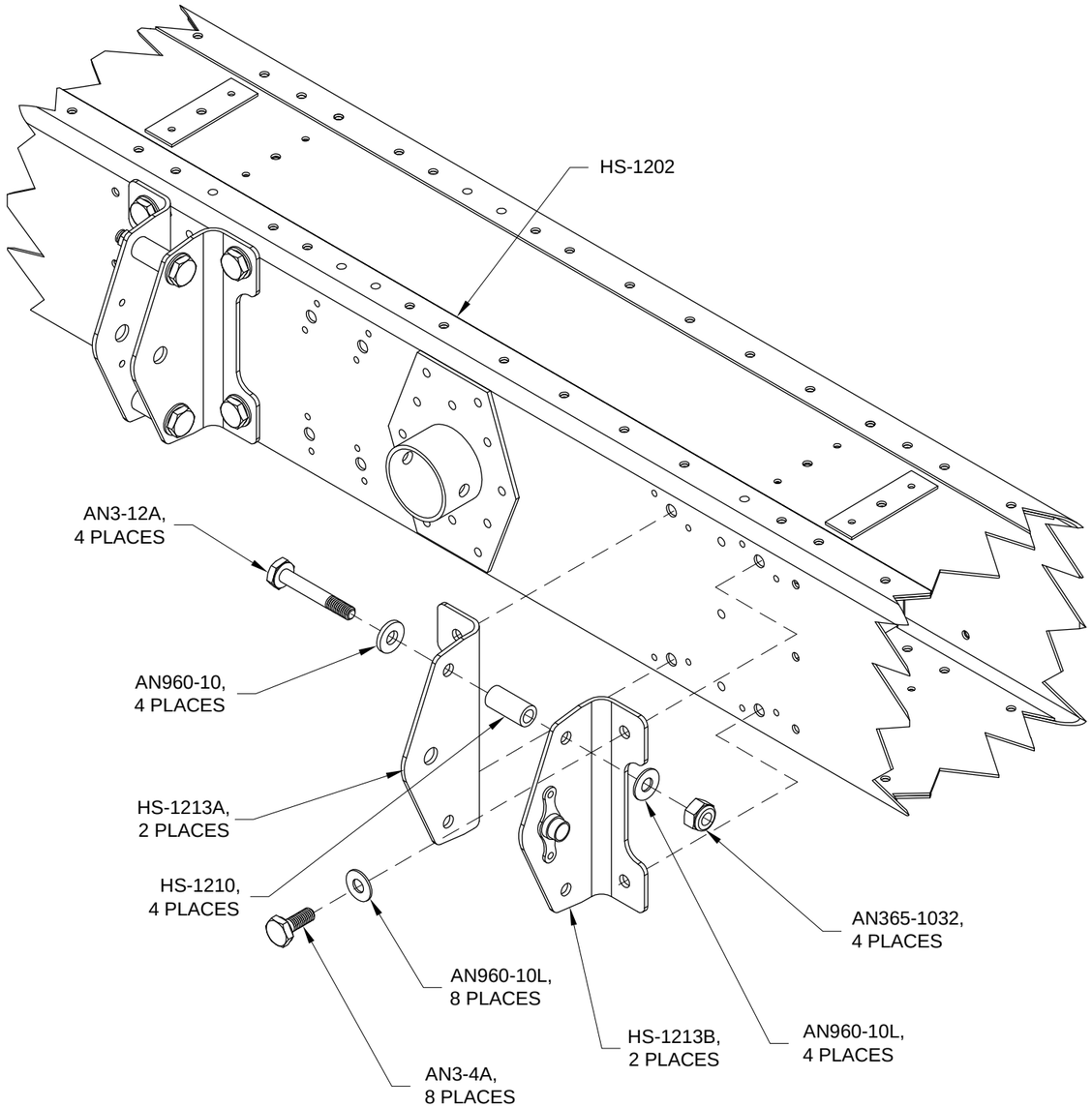


FIGURE 1:
HINGE BRACKET INSTALLATION

NOTE: The HS-1218A Aft Hinge halves were cut to length on Page 8-3, Step 4.

Step 3: Mark one of the HS-1218A Aft Hinge halves as right and the other as left, and label the inboard end of each hinge as indicated in Figure 2.

Step 4: Apply masking tape to the HS-1218A-R and HS-1218A-L Aft Hinges as shown in Figure 2. Count from the same end of both hinge halves. Mask the HS-1218A-L at the 14th eyelet and the 28th eyelet. Mask the HS-1218A-R at the sixth eyelet and the 20th eyelet. These areas will be omitted when drilling in Step 5.

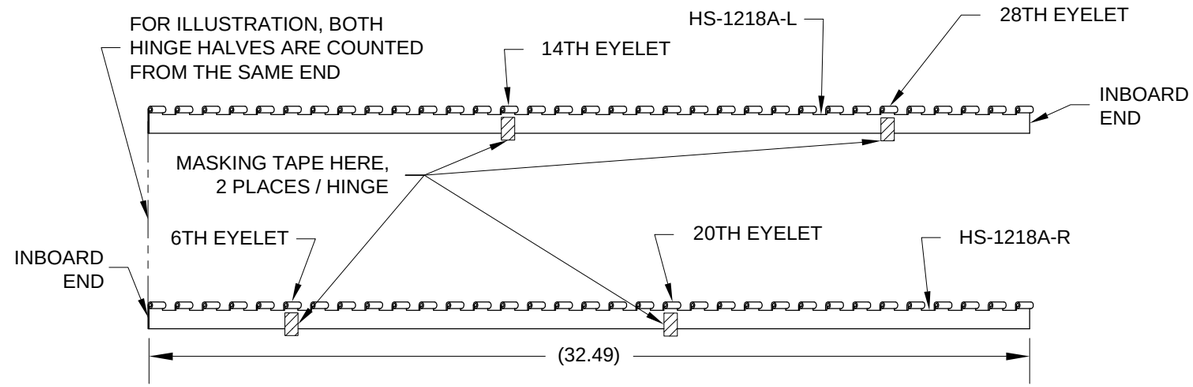


FIGURE 2:
STAB HINGE MASKING

CAUTION: Before performing Step 5 study the HS-1223 Drill Guide to identify the difference between the notched edges (used in Section 8) and the un-notched edges used in this section.

NOTE: For tips using the HS-1223 Drill Guide refer to Page 8-3, Figure 5.

Step 5: Match-Drill #30 the HS-1218A-R Aft Hinge using the HS-1223 Drill Guide as called out in Figure 3. Orient the un-notched inset edges of the drill guide to be flush against the eyelets of the aft hinge half. Clamp the drill guide onto the aft hinge half. Use only the holes that are centered below each aft hinge eyelet, as shown in Figure 3. Omit the holes that align with the masking tape applied in Step 4. Reposition the drill guide and repeat Step 5 until the aft hinge half is match-drilled at each eyelet, except where the masking tape is applied.

Repeat Step 5 for the HS-1218A-L Aft Hinge.

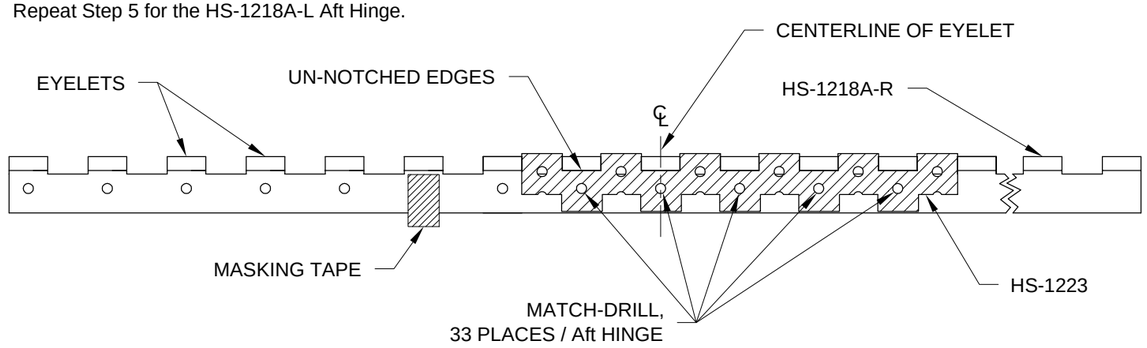


FIGURE 3:
STAB HINGE INITIAL DRILLING

Step 1: Mark one of the HS-1201 Main Skins as HS-1201-R, that will be the right main skin. Mark the other main skin as HS-1201-L, that will be the left main skin.

Step 2: Cleco the HS-1218A-L & -R Aft Hinge to the HS-1201-R Main Skin. Orient the hinges flush to the inside surface of the aft flange aligned to the hole pattern nearest to the bend of the aft flange as shown in Figure 1.

Step 3: Match-Drill #30 the holes at each masking tape location from the HS-1201-R Main Skin into the HS-1218A-L & -R Aft Hinges. Match-Drill #30 the hole at the inboard end of both aft hinges.

Remove the aft hinges, deburr the holes and clear away any chips.

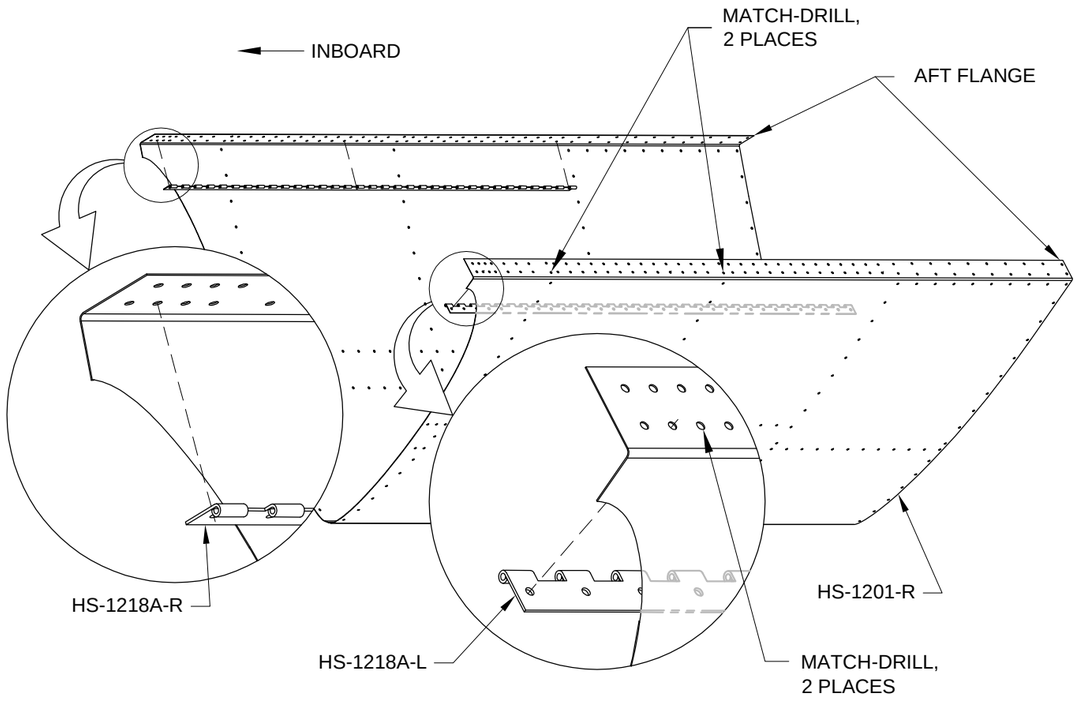


FIGURE 1:
STAB HINGE MATCH-DRILLING

Step 4: Cleco the HS-1201-R & -L Main Skins to the Stabilator Skeleton Assembly as shown in Figure 2. Cleco all of the holes in the bottom side of one of the main skins. Guide the upper aft flange of the main skin to the outside of the lower aft flange. Then cleco all of the holes on the top side.

Complete Step 5 with the first main skin. Then repeat this step for the remaining main skin.

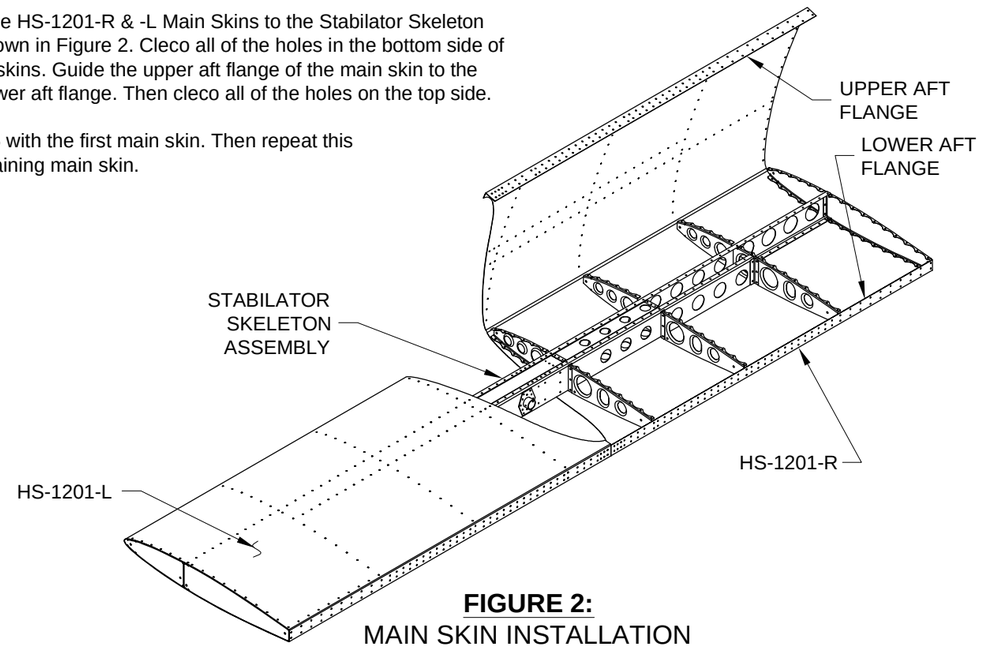


FIGURE 2:
MAIN SKIN INSTALLATION

NOTE: Figure 3 calls out the rivets and locations for the HS-1201-R Main Skin. Rivets and locations for the left side main skin are a mirror of the right. The entire bottom side of the main skin is a mirror of the top side.

Step 5: Rivet only the top and bottom surface of the HS-1201-R & -L Main Skins to the Stabilator Skeleton Assembly per call-outs in Figure 3. Leave open the aft flanges of the main skins. Begin at the leading edge of the main skin and finish at the trailing edge. Leave open the aft outboard row of holes on the top and bottom, called out in Figure 3.

Step 6: Rivet the remaining open holes in the top and bottom of the Stabilator Skeleton Assembly between the HS-1201-R & -L Main Skins per call-out in Figure 3. Refer to the Stabilator Skeleton Assembly with the main skins attached as the Stabilator Assembly.

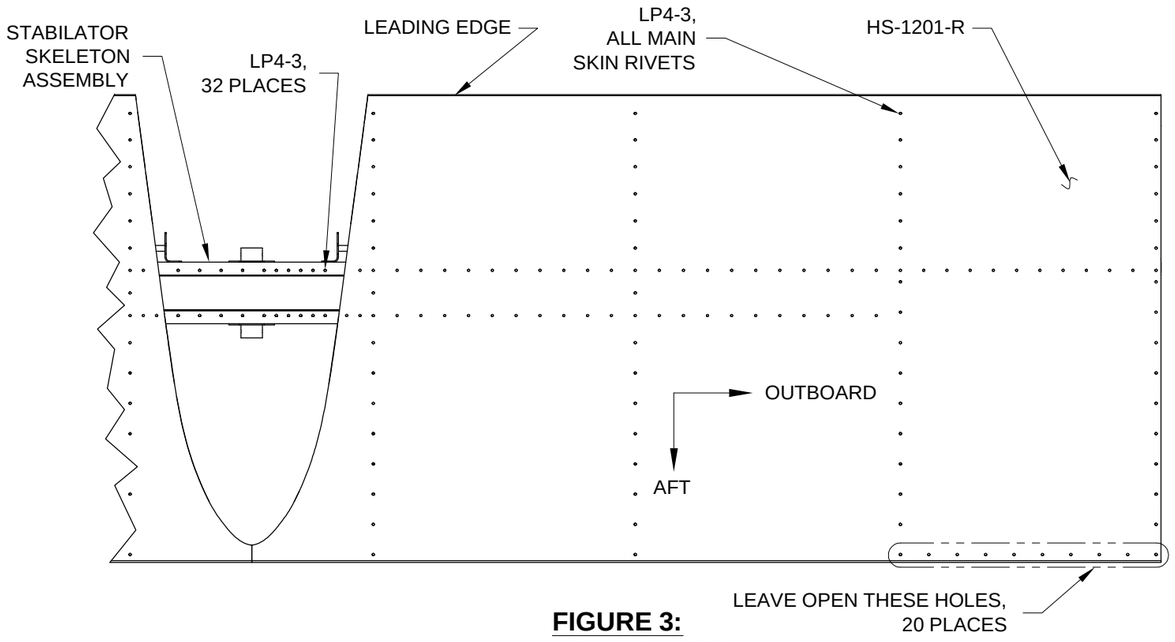


FIGURE 3:
MAIN SKIN RIVETS

Step 1: Cleco the HS-1215 Skin Splice Plate to the aft flanges where the HS-1201-R & -L Main Skins meet as shown in Figure 1.

Step 2: Match-Drill #52 the 1/16 holes in the HS-1215 Skin Splice Plate into the aft flanges of the HS-1201-R & -L Main Skins called out in Figure 1.

Remove the skin splice plate, deburr holes and clear away any chips.

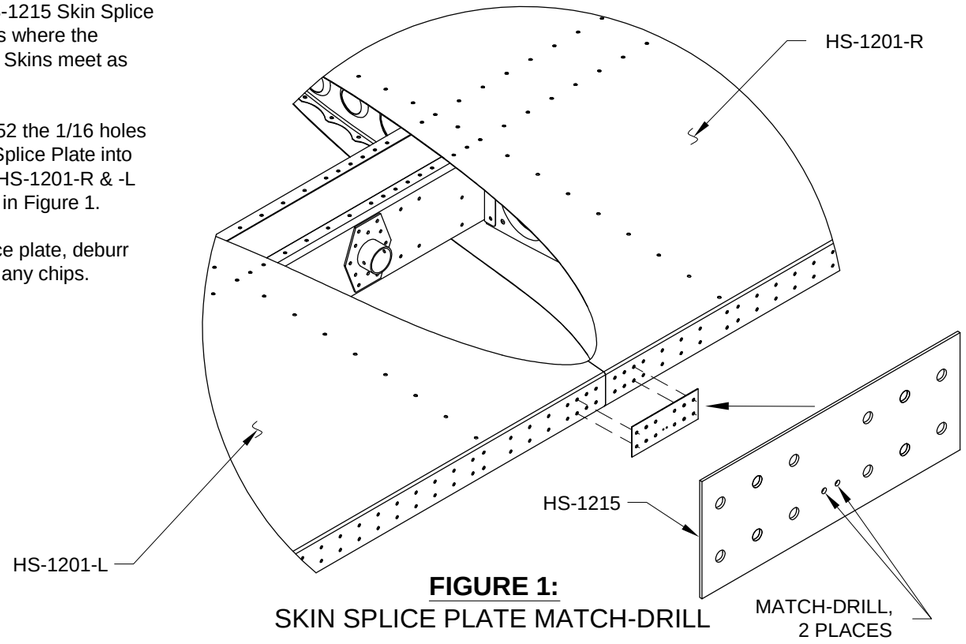


FIGURE 1:
SKIN SPLICE PLATE MATCH-DRILL

NOTE: Step 3 through Step 5 describe installation for parts on the right side of the Stabilator Assembly, installation for parts on the left side is a mirror of the right.

Step 3: Rivet the HS-1218A-R Aft Hinge to the HS-1201-R Main Skin. Include the HS-1216 Aft Main Ribs when riveting the holes common to the aft hinge, main skin and aft main ribs. Include the HS-1215 Skin Splice Plate, on the inside surface of the aft flange, when riveting the holes common to the aft hinge, main skin and skin splice plate. See Figure 2.

Step 4: Rivet one of the HS-1208 Aft Ribs through the HS-1201-R Main Skin to the HS-1207 Outbd Main Rib. Rivet one of the HS-1208 Aft Ribs through the HS-1201 Main Skin to the HS-1206 Inbd Main Rib. Orient the rib flanges as shown in Figure 2.

Step 5: Rivet all of the remaining holes in the aft flanges of the HS-1201-R Main Skin. See Figure 2.

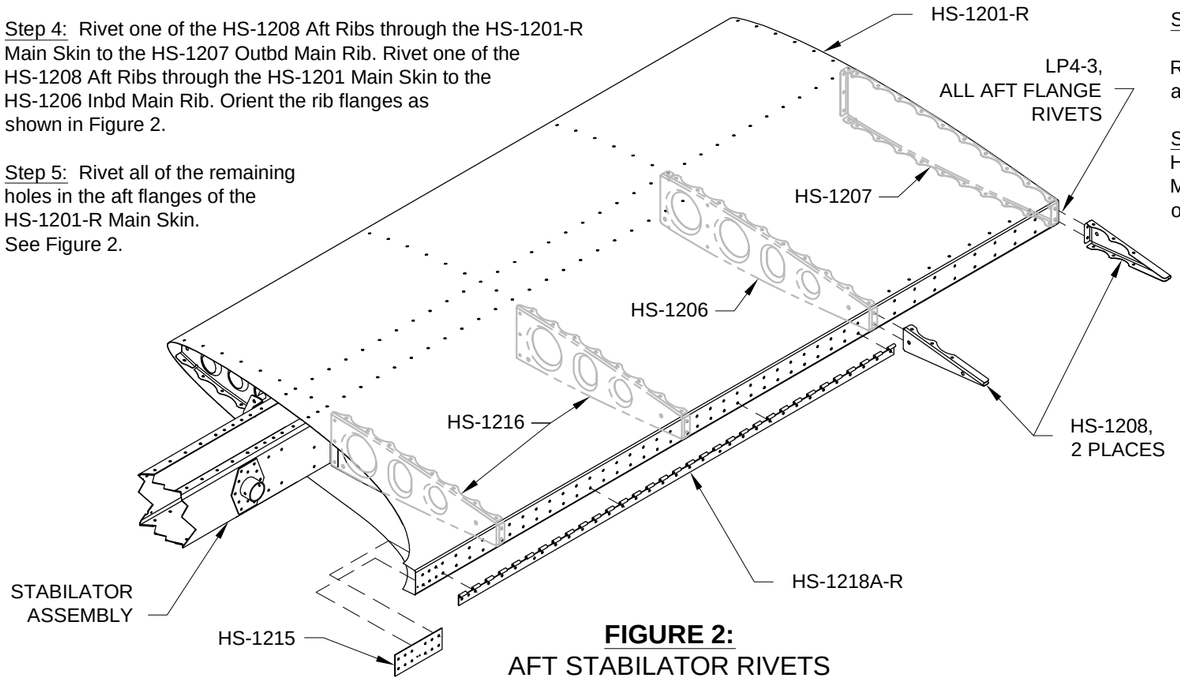


FIGURE 2:
AFT STABILATOR RIVETS

Step 6: Separate the HS-1217 Aft Skins by removing the material called out in Figure 3.

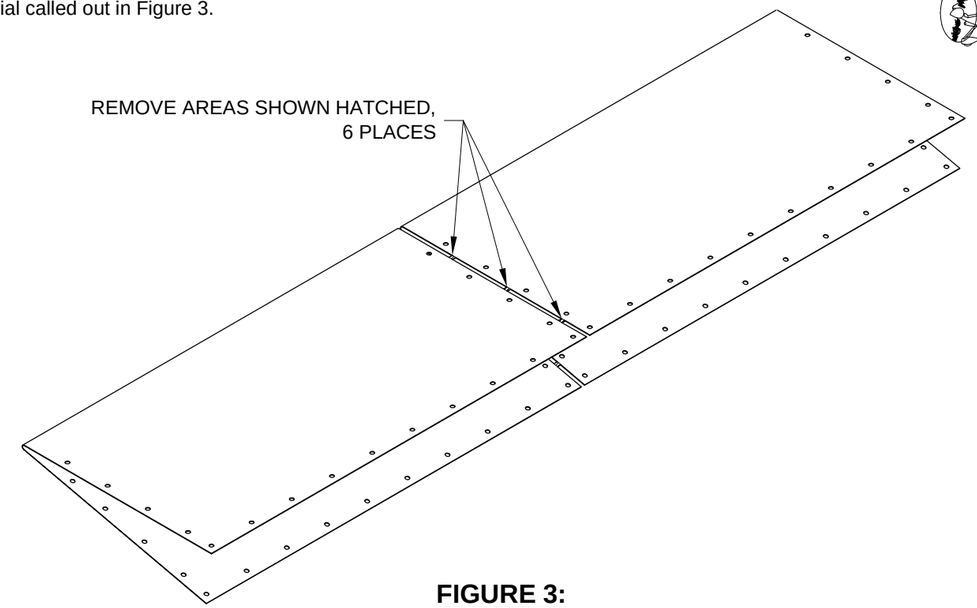


FIGURE 3:
HS-1217 AFT SKIN SEPARATION

NOTE: Figure 2 illustrates the installation of the HS-1217 Aft Skin for the right side of the Stabilator Assembly. Installation for the aft skin on the left side is a mirror of the right.

Step 7: Pinch the aft edge of the HS-1217 Aft Skin until the open end lays flat on the aft edge of the main skin. Cleco the aft skin to the HS-1201-R Main Skin and the HS-1208 Aft Ribs.

Step 8: Match-Drill #30 the holes from the HS-1217 Aft Skin into the HS-1208 Aft Ribs called out in Figure 4.

Remove the aft skin, deburr the holes and clear away any chips.

Step 9: Rivet the HS-1217 Aft Skin to the HS-1208 Aft Ribs and the HS-1201-R Main Skin using rivets called out in Figure 4.

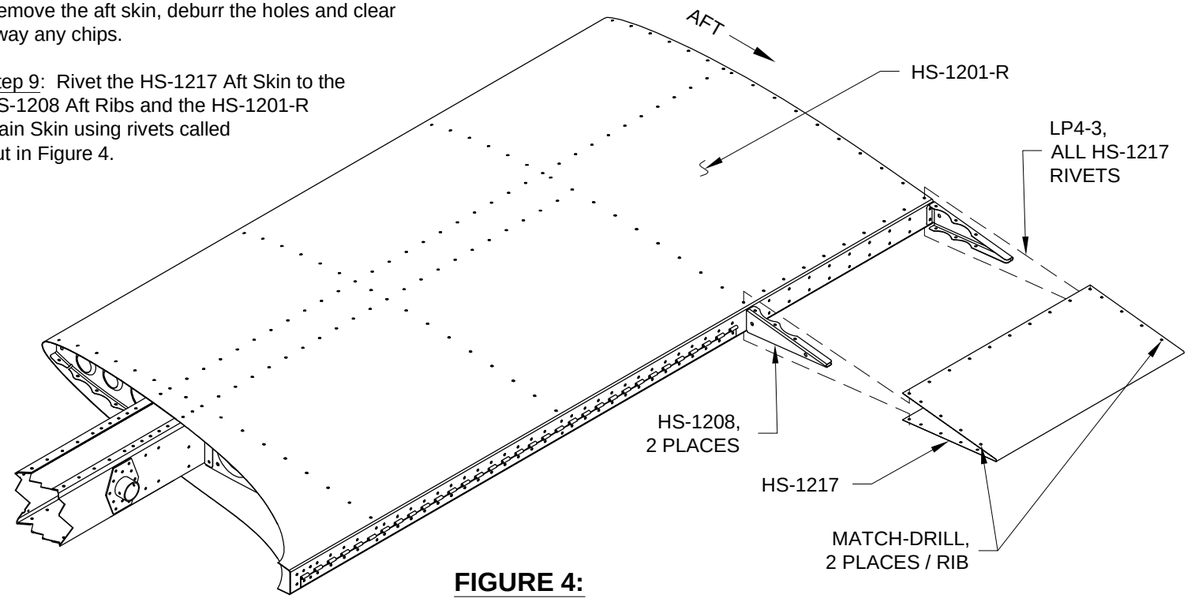


FIGURE 4:
AFT SKIN INSTALLATION

Step 1: Install the WD-1207 Upper Horn flush to the forward side of the Spar Box using the hardware called out in Figure 1.

Step 2: Shim the gap, if any, between the aft face of the Spar Box and the flange of the WD-1207. See Figure 1 detail. Note shim thickness.

Step 3: Calculate the material stack-up which is the sum of the shim, parts and washer thicknesses. In this case, the stack-up value must be between .220 and .255 in.

Example: A builder used a .032 shim and plans to use one AN960-10 washer under the head of the bolt. The stack-up is .040(spar) + .032(shim) + .056(horn) + .063(washer) = .191 in. Since .191 in. is below the acceptable range an additional AN960-10L washer will be required under the head of the bolt for a total of .223 in. which is now acceptable.

Step 4: Repeat Steps 1-3 for the WD-1208 Lower Horn.

Step 5: Insert the WD-1223 Counterbalance Arm into the Stabilator Assembly. Align the previously match-drilled #12 holes in the counterbalance arm to the corresponding holes in the WD-1222 Counterbalance Brackets. See Figure 2.

NOTE: Figure 2 illustrates the hardware for the aft counterbalance bracket. The forward counterbalance bracket hardware fastens through the counterbalance arm in the same method shown.

Step 6: Temporarily install the WD-1223 Counterbalance Arm to each of the WD-1222 Counterbalance Brackets using the hardware called out in Figure 2.

Step 7: Final-Drill #12 the holes in the R-1014 Counterbalance Weights.

Step 8: Install the R-1014 Counterbalance Weights to the WD-1223 Counterbalance Arm with the hardware called out in Figure 2.

NOTE: The counterbalance arm final installation and the Anti-Servo Tab installation will be completed during Section 11: Emp Attachment.

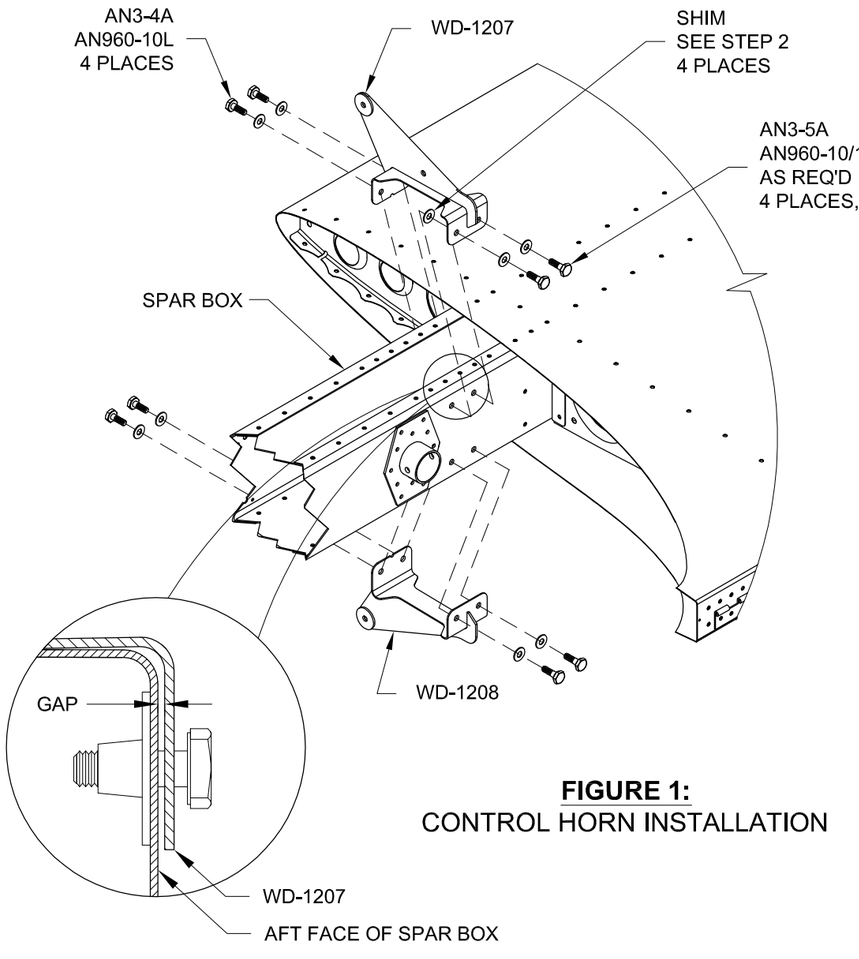


FIGURE 1:
CONTROL HORN INSTALLATION

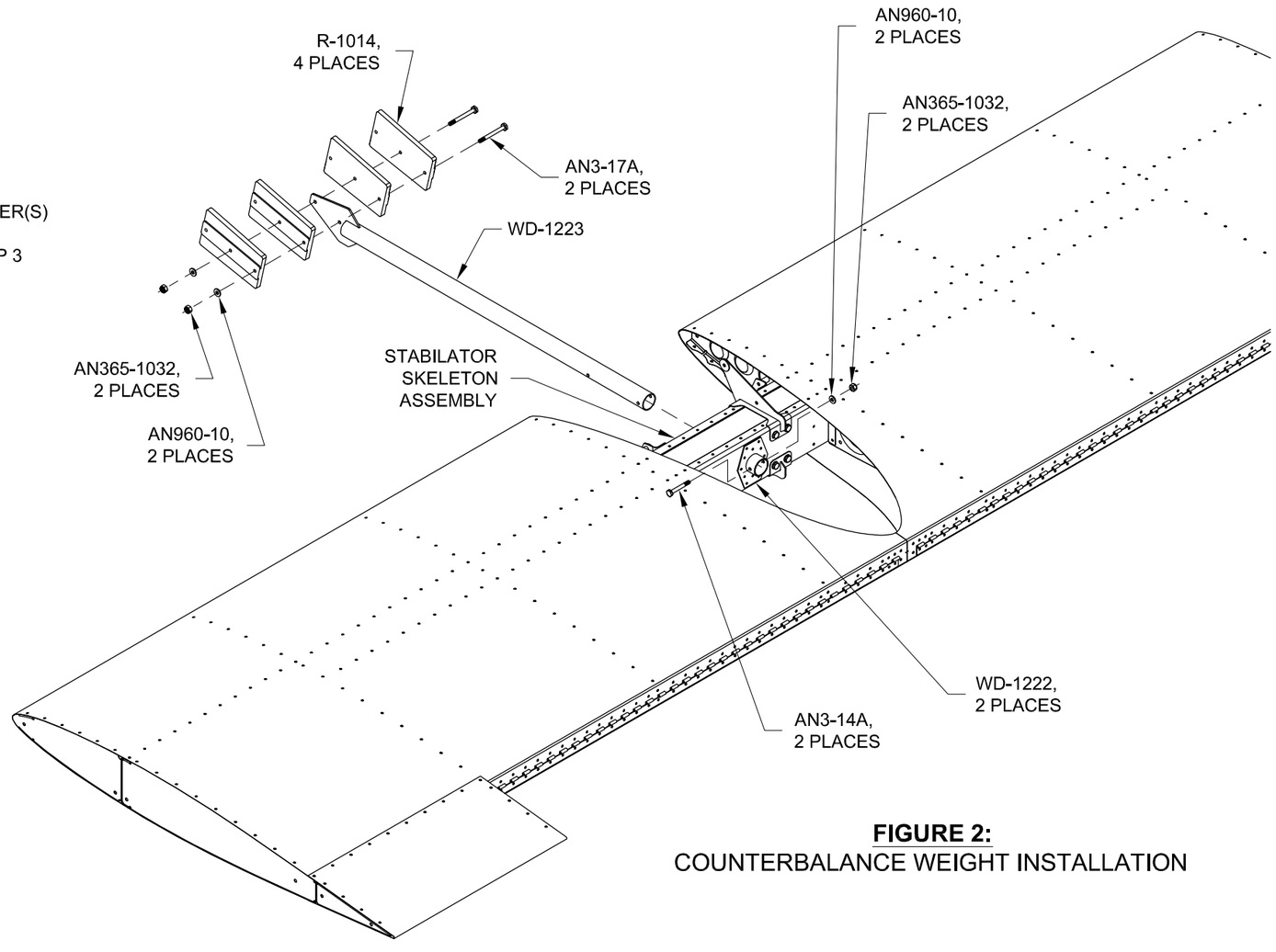


FIGURE 2:
COUNTERBALANCE WEIGHT INSTALLATION