

# **TOTAL PERFORMANCE** **VAN'S AIRCRAFT**

14401 Keil Road NE, Aurora, Oregon, USA 97002

PHONE 503-678-6545 • FAX 503-678-6560 • [www.vansaircraft.com](http://www.vansaircraft.com) • [info@vansaircraft.com](mailto:info@vansaircraft.com)

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## **REVISION DESCRIPTION:**

Since all the KAI pages regarding W&B and the Installed Equipment list are similar, only a general description of the two types of changes made to various sections is provided below. These changes resulted from relocating the Weight and Balance Worksheet and the Installed Equipment List.

- a. The Installed Equipment List was moved to the Maintenance Manual from the POH.
- b. The Weight and Balance Worksheet and W&B-2 (the blank page that followed) were moved to the Maintenance Manual (Rev 9) from the Production Acceptance Procedure. The "WEIGHT AND BALANCE RECORD" page was page W&B-2 of the RV-12 Production Acceptance Procedures.

Example: Following is an example of how this change affected *Section 44A Skyview Autopilot Servos*.

"Step 6: In the RV-12 Maintenance Manual (MM) "INSTALLED EQUIPMENT LIST" table, mark the "DYNON AUTOPILOT SERVO" as installed in the "INSTALLED" column.

Enter 4.6 lb for "Weight" , 101.5 in for "Location/Arm" and 467 in-lb "Moment" onto the same line as "DYNON AUTOPILOT SERVO".

## **NOTE: The remaining steps on this page are only applicable to a flying aircraft.**

Step 7: In the RV-12 Pilot Operating Handbook (POH) "YOUR AIRPLANE" table, enter the new total values for the arm, weight, and moment of the installed equipment.

Step 8: In the RV-12 POH "YOUR AIRPLANE" table, recalculate and enter new values for the Empty Weight, Empty Moment, and Empty Arm.

Step 9: Make an entry, as calculated in the previous step, on the WEIGHT AND BALANCE RECORD page of the RV-12 Maintenance Manual as follows:

As of this date: \_\_\_/\_\_\_/\_\_\_"

was

"Step 6: On Page 4-2 SkyView and 4-4 of the RV-12 Pilot Operating Handbook: Enter the text "AUTOPILOT" onto a blank line under the "ITEM" column in both tables.

Enter 4.6 lb for "Weight" , 101.5 in for "Location/Arm" and 467 in-lb "Moment" onto the same line as "AUTOPILOT" in both tables.

Recalculate and enter new values for the Empty Weight, Empty Moment and Empty Arm on Page 4-4 of the POH.

Step 7: Make an entry on page W&B-2 of the RV-12 Production Acceptance Procedures as follows:

As of this date: \_\_\_/\_\_\_/\_\_\_"

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The changes described above were applied to the following pages. The updated Rev level is listed:

40-15 (Rev 2)  
43-11 (Rev 2)  
43B-08 (Rev 2)  
43C-07 (Rev 1)  
44A-05 (Rev 4)  
44B-10 (Rev 1)  
53-12 (Rev 3)  
53B-06 (Rev 1)  
58-06 (Rev 1)  
61-08 (Rev 1)

Additional changes were also made and are described below in the usual manner.

**Page 44A-04 REV 3:** Add "(WITH FLAPS UP AND WITH FLAPS DOWN)" to the WARNING.

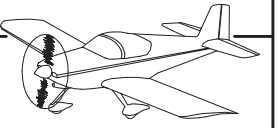
**Page: 44B-03 REV 1:** Add: "Step 4: Insert the bolt that will attach the Pitch Servo Pushrod Assembly to the arm of the Garmin GSA 28 Autopilot Servo. See Figure 2." Repaginate remaining steps.

**Page 44B-06 REV 1:** Add "(WITH FLAPS UP AND WITH FLAPS DOWN)" to the WARNING.

**Page 44B-07 REV 2:** Show additional cut lines for GMC 307 in Figure 2. Add "(GMC 305)" after hardware callouts in Figure 2.

**Page: 53-10 REV 2:** Deleted fuse amperage values shown in Figure 2, except for GPS ADSB, "2" AMP.

**Page: 53B-05 REV 1:** Deleted AMP values from fuses in Figure 2, except for GPS ADSB, "2" AMP.

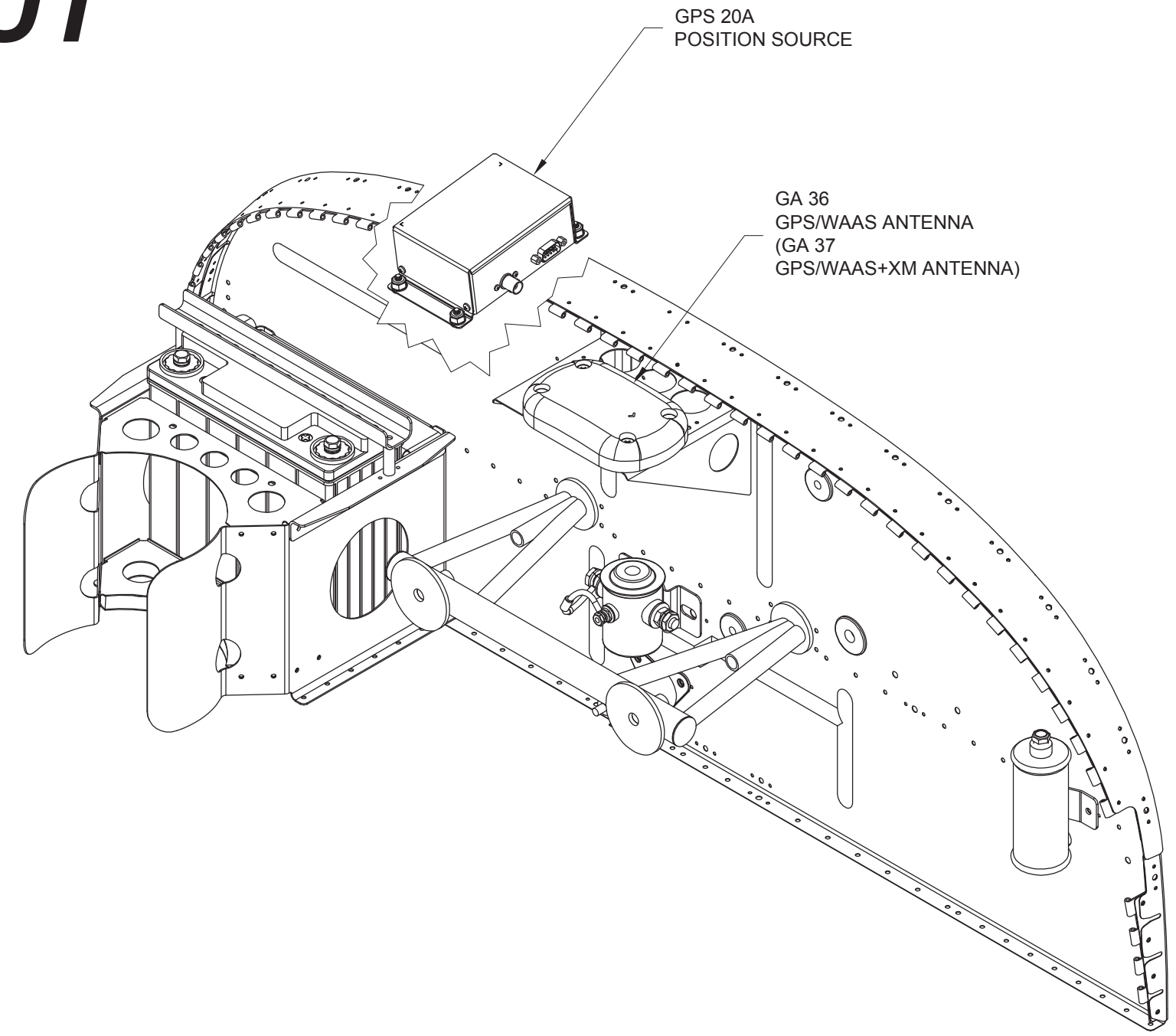


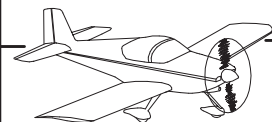
# **SECTION 61:**

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# **GARMIN**

# **ADS-B OUT**





**NOTE:** This section includes instructions for the installation of a GA 36 GPS/WAAS Antenna. Alternatively, a GA 37 GPS/WAAS+XM Antenna can be installed by performing the additional steps where noted.

**Step 1:** If present, remove the F-00069 G3X Antenna Plate (with antennas) from the F-1201R Antenna Shelf. See Section 42N.

**Step 2:** Attach a F-00069A GA 36 Drill Template to the antenna shelf as shown in Figure 1.

**Step 3:** Match-Drill #12 the two holes in the drill template into the antenna shelf as shown in Figure 1.

**Step 4 (GA 37):** Match-Drill 1/4 the TNC hole in the drill template into the antenna shelf as shown in Figure 1.

**Step 5:** Remove the drill template from the antenna shelf.

**Step 6 (GA 37):** Use a step drill to enlarge the 1/4 TNC hole in the antenna shelf to 5/8 as shown in Figure 2.

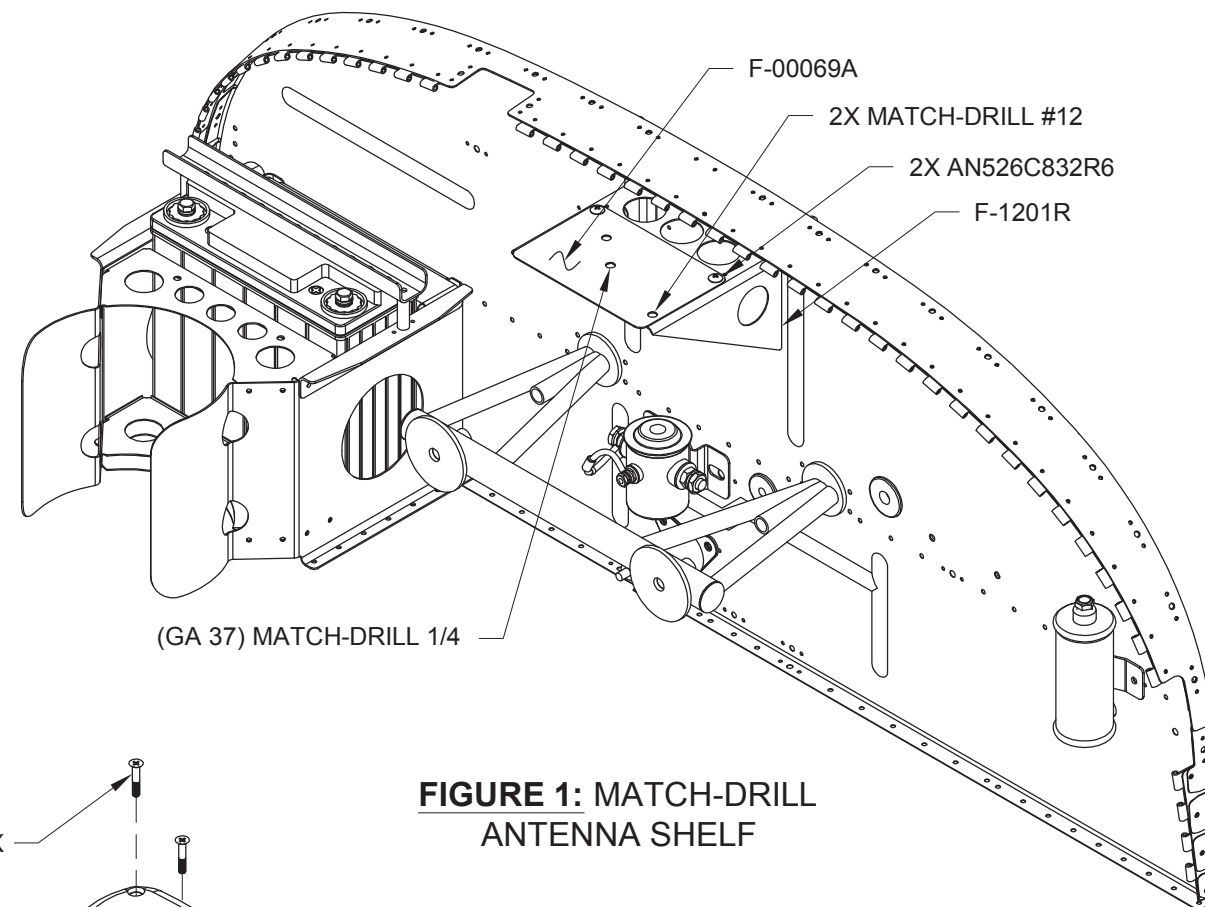
**NOTE:** The "FWD" marking on the GA 36 (or GA 37) housing indicates the orientation of least aerodynamic drag\*. While this marking can be ignored with respect to aerodynamics (because the antenna will be installed underneath the cowl), the orientation of the marking does affect how the antenna attaches to the shelf.

*\*As determined by a select team of Garmin aerodynamicists after rigorous wind tunnel testing and computational fluid dynamics analysis.*

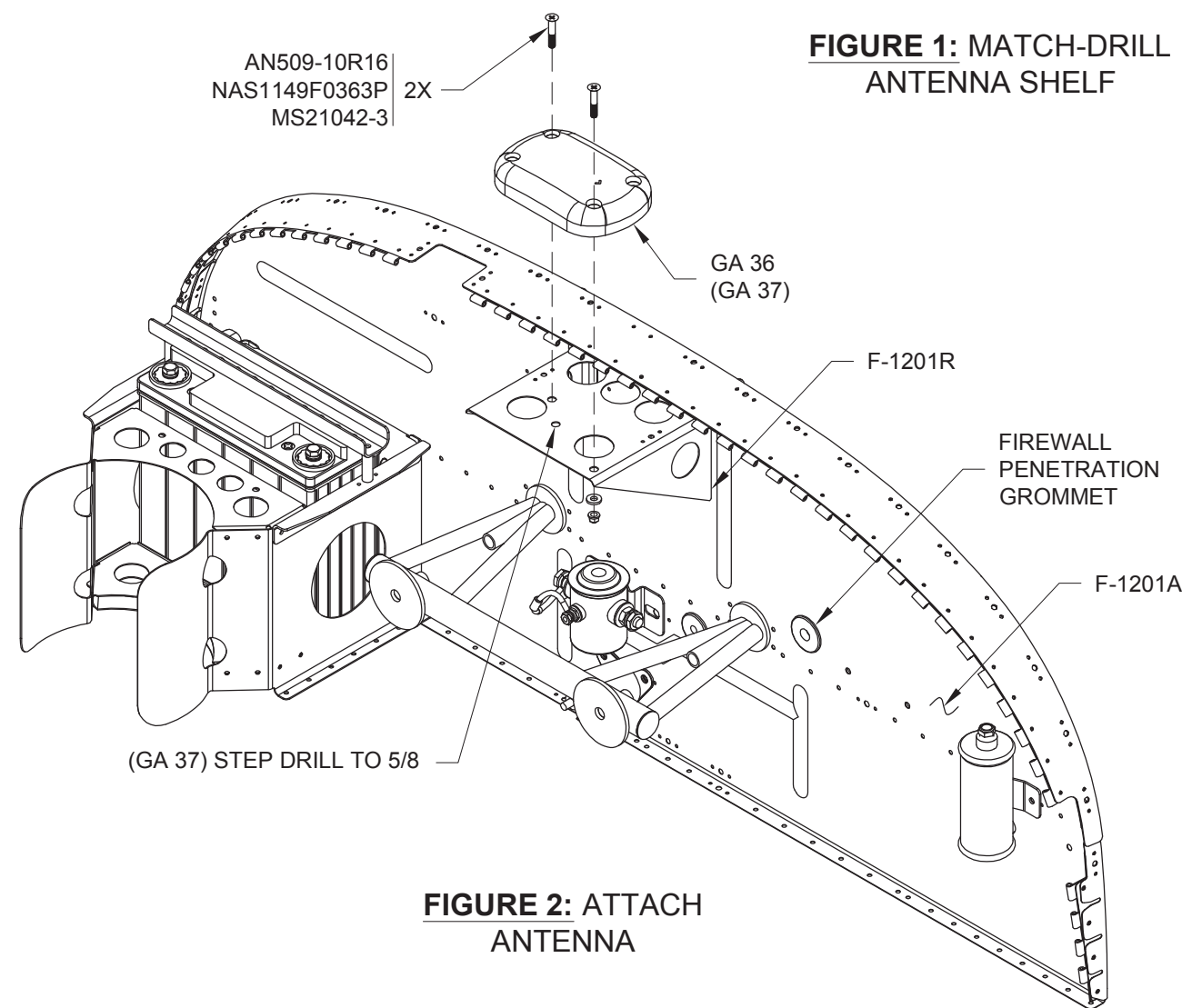
**Step 7:** Orient the GA 36 (or GA 37) antenna so that the "FWD" marking points toward the left side of the aircraft and attach the antenna to the shelf with the hardware shown in Figure 2.

**Step 8:** If desired, perform the steps on Page 61-07 to relocate the GA 26C Low-Profile Remote Antenna and/or GA 26XM Remote Antenna G3X. Otherwise, disconnect and remove the GA 26C and/or GA 26XM antennas from the aircraft.

**Step 9:** Connect the WH-00122 Garmin GPS Antenna Cable to the GA 36 antenna (or to the blue band connector on the GA 37 antenna).



**FIGURE 1: MATCH-DRILL ANTENNA SHELF**



**FIGURE 2: ATTACH ANTENNA**



**NOTE: Review Section 5.15 regarding the drilling of stainless steel.**

Step 1: Drill 1/4 hole in the F-1201A Firewall Top in the location shown in Figure 1. Firmly hold a wooden block against the firewall top opposite the location being drilled.

Use a step drill to enlarge the 1/4 hole to 3/4. Firmly hold a wooden block against the firewall top opposite the location being drilled.

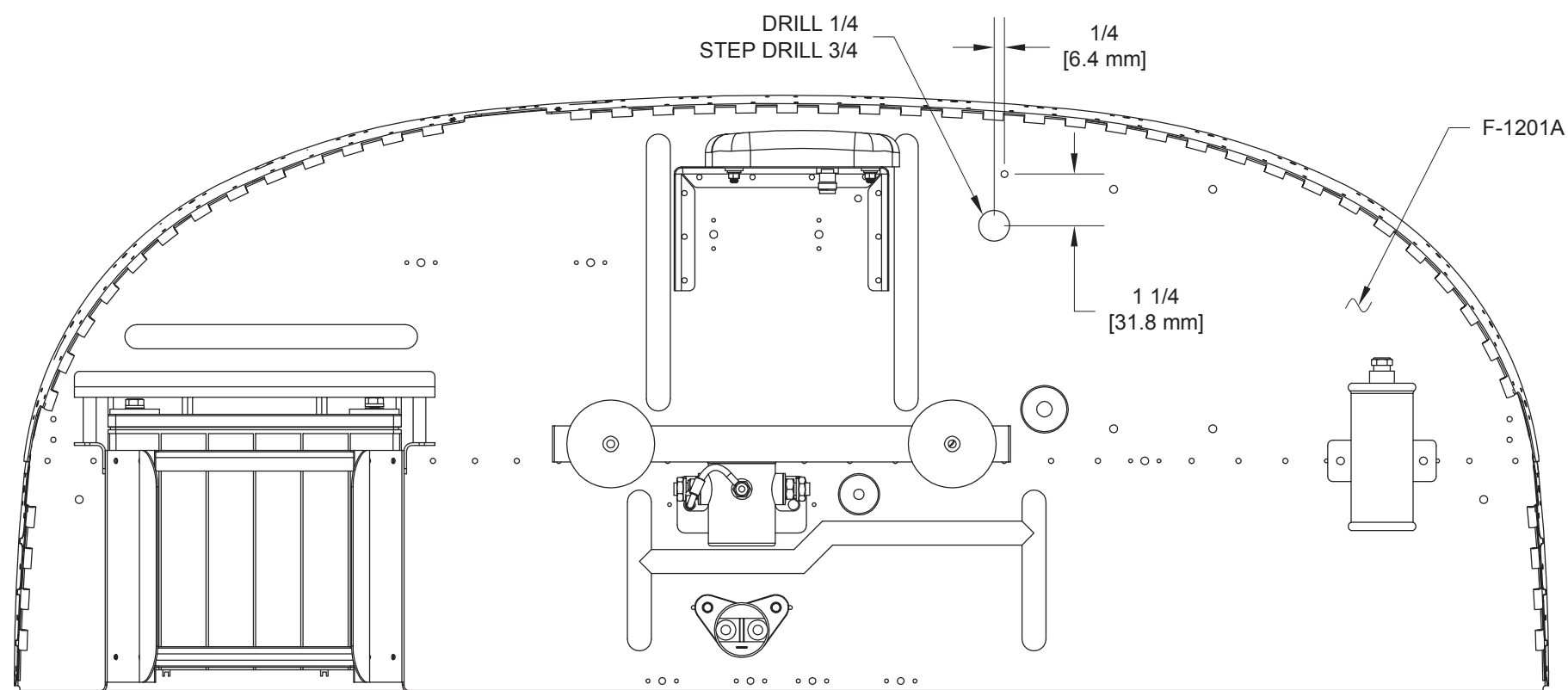
Step 2: Route the WH-00122 cable through an AN931-4-12 firewall penetration grommet and then aft through the hole in the firewall top.

Step 3 (GA 37): Connect the WH-00128 Garmin XM Antenna Cable to the GA 37 antenna (yellow band).

Step 4 (GA 37): Route the WH-00128 cable through the firewall along the same path as the WH-00122 cable.

Step 5 (GA 37): Connect the WH-00128 cable to the receptacle labeled "SXM" directly below the receptacle labeled "GPS" on the forward face of the GDU 465 display.

Step 6: Install the firewall penetration grommet in the 3/4 hole.



**FIGURE 1: DRILL FIREWALL**

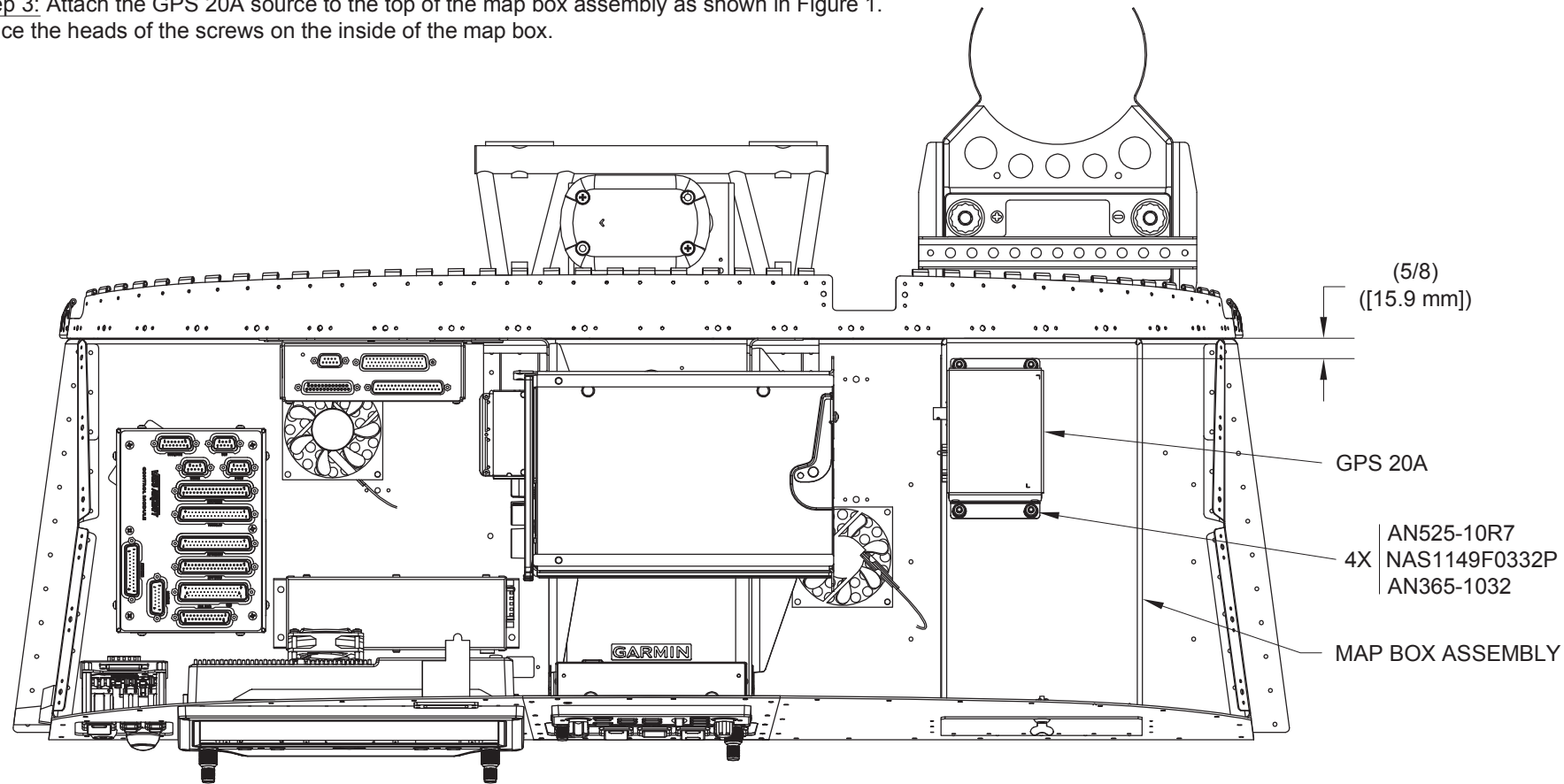


**NOTE: Perform the following steps if you have a map box installed.**

**Step 1:** Place the GPS 20A Position Source on the top surface of the Map Box Assembly as shown in Figure 1.

**Step 2:** Match-Drill #12 the holes in the GPS 20A source into the map box.

**Step 3:** Attach the GPS 20A source to the top of the map box assembly as shown in Figure 1. Place the heads of the screws on the inside of the map box.



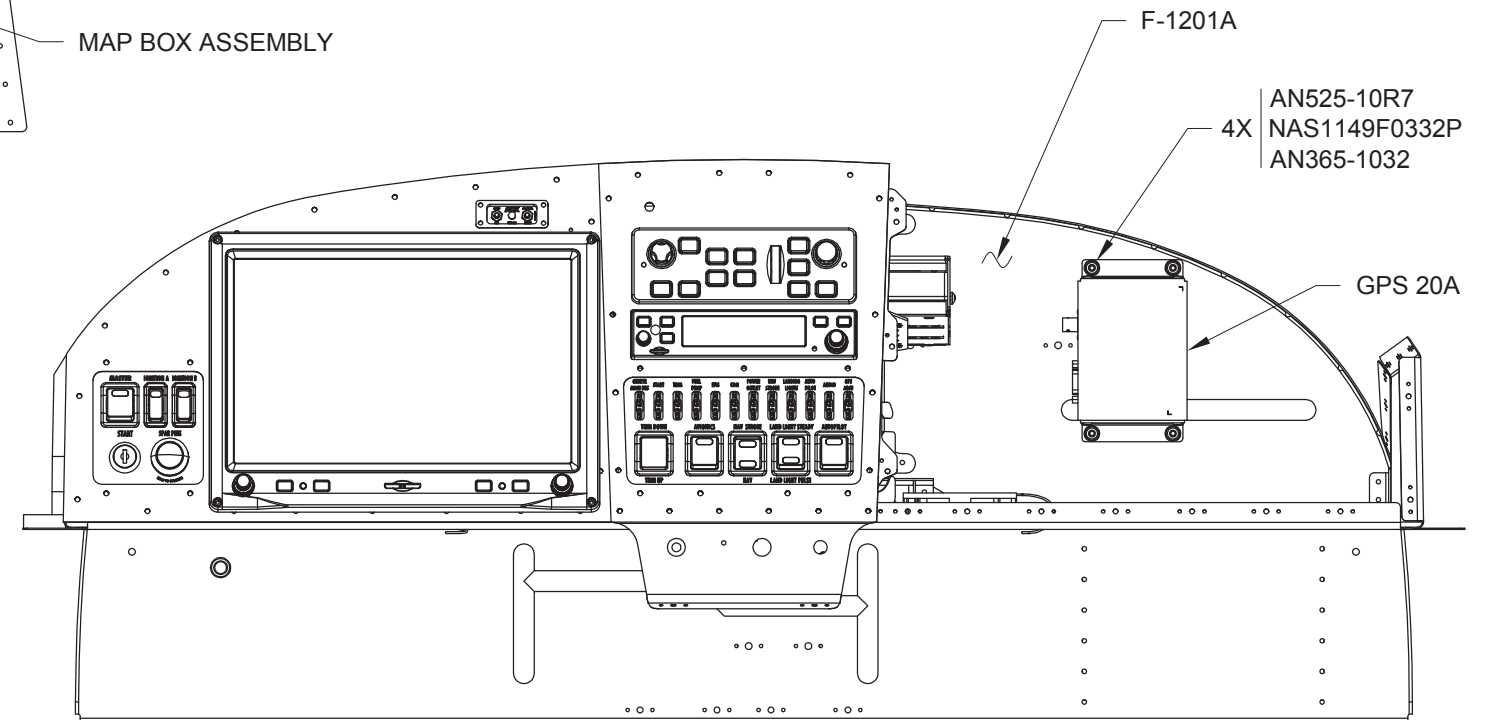
**FIGURE 1: ATTACH GPS 20A TO MAP BOX**

**NOTE: Perform the following steps if you do not have a map box installed.**

**Step 4:** Place the GPS 20A Position Source on the aft side of the F-1201A Firewall Top as shown in Figure 2.

**Step 5:** Match-Drill #12 the holes in the GPS 20A source into the firewall top.

**Step 6:** Attach the GPS 20A source to the aft side of the firewall top as shown in Figure 2. Place the heads of the screws on the forward face of the firewall.



**FIGURE 2: ATTACH GPS 20A TO FIREWALL**





Step 1: Connect the WH-00121 Garmin ADS-B Out Harness as shown in Figure 1.

When connecting two d-sub connectors together, place a drop of blue Loctite on the external threads of each thumb screw and then fully tighten them into the ES-00164 4-40 F/F .250 1/4 Hex Standoffs. See Figure 1.

Step 2: Insert the TQ3058 (RED) wire coming from the 9-pin d-sub labeled "GPS20A" on the WH-00121 harness into position 12 of the 15-pin d-sub labeled "BATTERY" on the WH-00101 G3X Touch Harness as shown in Figure 1.

Step 3: Strip the end of the TQ3007 (RED) wire coming from the 9-pin d-sub labeled "GPS20A" on the WH-00121 harness and splice it into the F1117 (WHT/RED) wire coming from the 50-pin d-sub labeled "EFIS" on the WH-00101 G3X Touch Harness. Use an ES-00019 sleeve.

Step 4: Route the WH-00122 Garmin GPS Antenna Cable from the firewall penetration grommet towards the right side along the same path as the WH-00121 harness and connect it to the GPS 20A Position Source.

Step 5: Secure any loose harnesses or wires with tie-wraps as required. Refer to Section 42N.

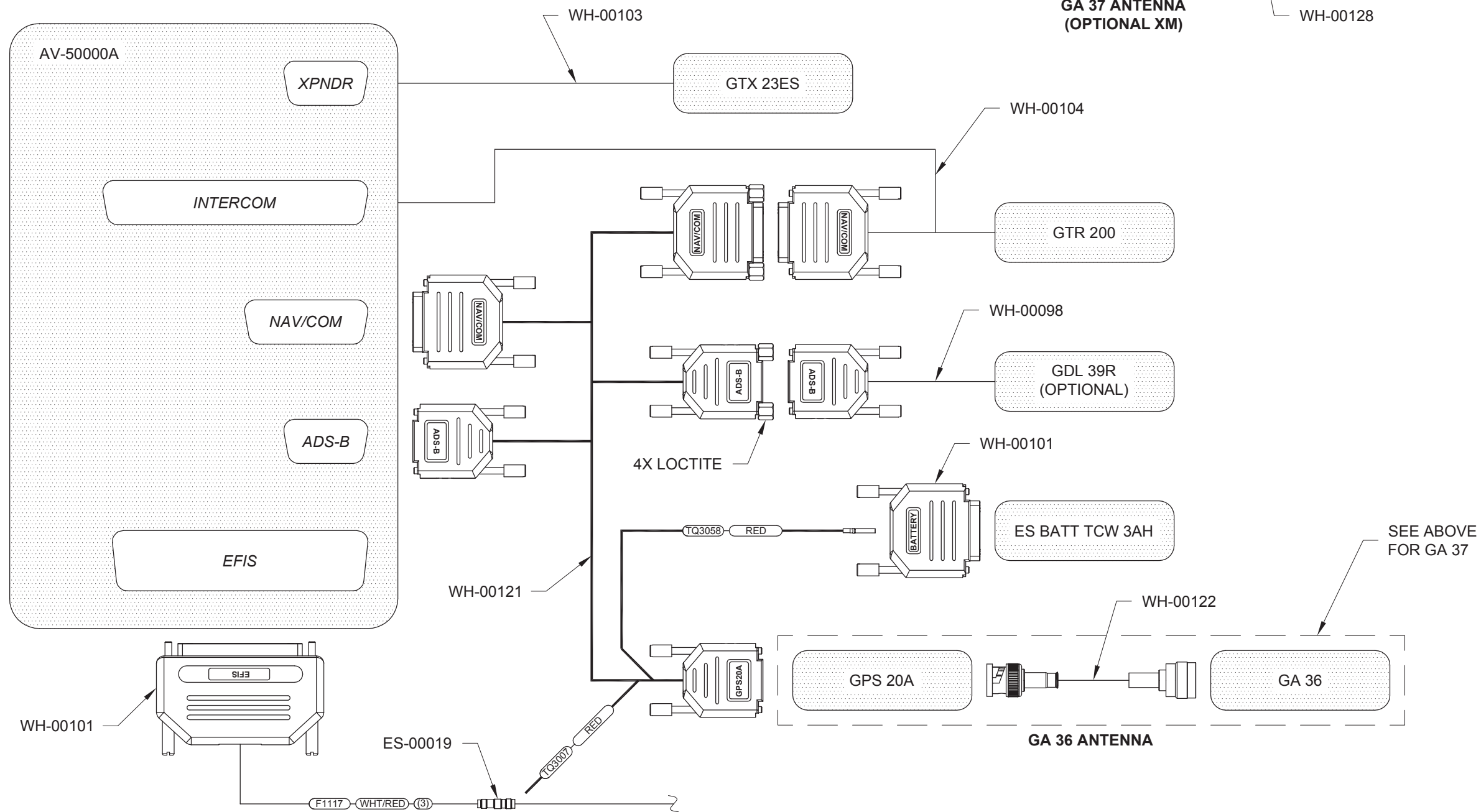
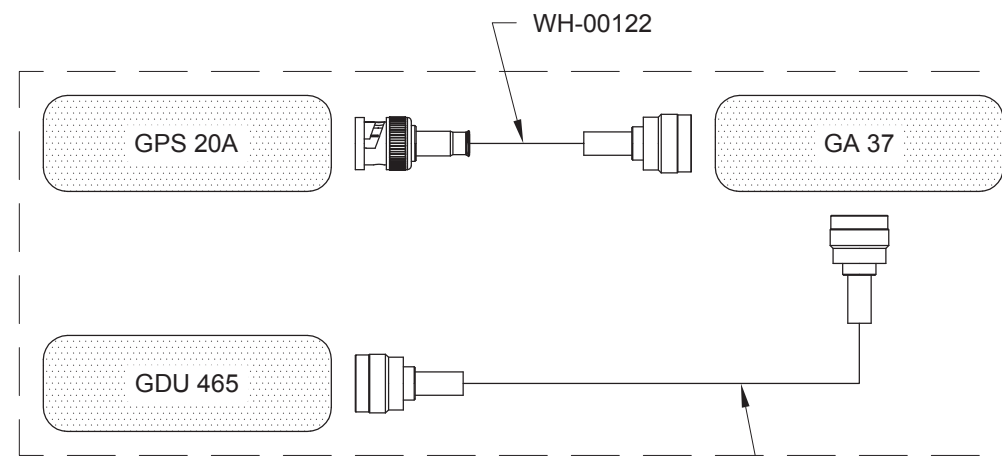


FIGURE 1: ADS-B OUT SCHEMATIC



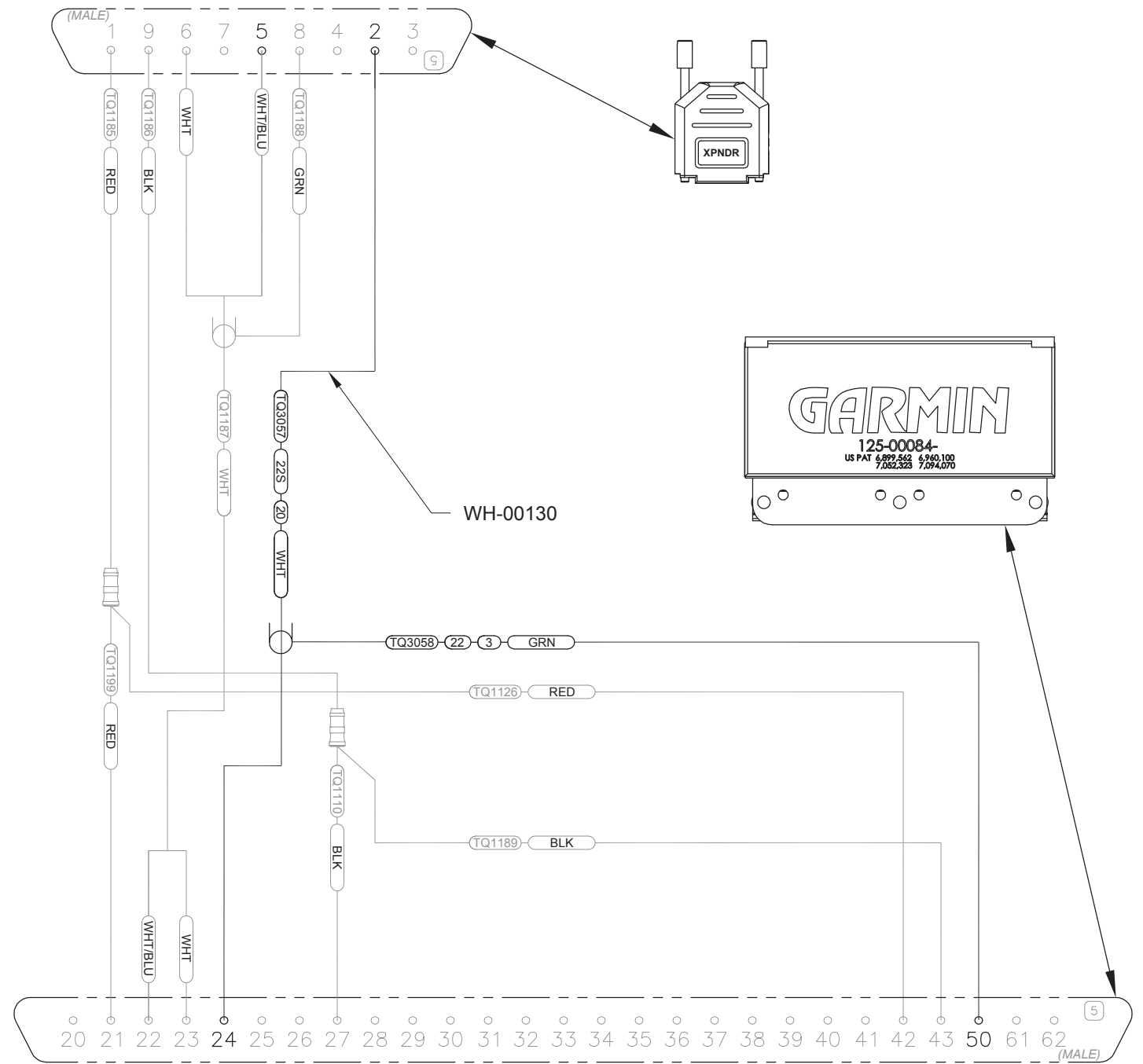
**NOTE:** Skip this page if you purchased your Garmin Avionics Kit after 02/26/2016.

Step 1: Locate the WH-00103 GTX 23ES XPNDR Harness (attached to the Garmin Transponder Tray).

Step 2: Modify the WH-00103 harness to incorporate the WH-00130 Garmin XPNDR ADS-B Out Mod as shown in Figure 1.

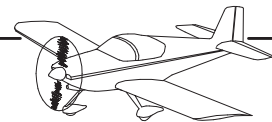
Step 3: Reconnect the 62-pin d-sub labeled "GARMIN" on the modified WH-00103 harness to the Garmin Transponder Tray.

Step 4: Reconnect the 9-pin d-sub labeled "XPNDR" on the modified WH-00103 harness to the "XPNDR" receptacle on the AV-50000A RV-12 Control Module. See Section 42N.



**FIGURE 1:** MODIFY THE WH-00103 GTX 23ES XPNDR HARNESS





**NOTES: Perform the steps on this page to install or relocate the GA 26C Low-profile Remote Antenna and/or GA 26XM Remote Antenna G3X. Otherwise, remove the GA 26C and/or GA 26XM from the aircraft.**

Order the following items from Van's Aircraft:

QTY	ITEM
1	F-1201R Antenna Shelf
2	K1000-08
4	AN426AD3-3.5
10	LP4-3

**Step 1:** Hold the new F-1201R Antenna Shelf against the forward side of the F-1201A Firewall Top in the approximate location shown in Figure 1.

Ensure that the antenna shelf does not contact the throttle cable, VA-107 Brake Reservoir, radiator hose, or any other component.

**Step 2:** If present, detach the GEA 24 Engine Indication System from the F-00052 GEA 24 Attach Plate. See Section 42N.

**Step 3:** If not already done, install the F-00052 GEA 24 Attach Plate on the firewall top in accordance with Section 42N.

**Step 4:** Position the antenna shelf on the firewall top in the location shown in Figure 1.

**Step 5:** Match-Drill #30 the holes in the antenna shelf into the firewall top and GEA 24 attach plate using a 12" long drill bit. See Figure 1.

**Step 6:** Remove the GEA 24 attach plate from the firewall top and use a step drill to enlarge the five #30 holes to 5/16.

**Step 7:** Attach nutplates to the antenna shelf in accordance with Section 29A.

**Step 8:** Rivet the antenna shelf to the firewall top as shown in Figure 1. Place the shop head of each rivet on the forward side of the firewall.

Cover each shop head with a blob of fuel tank sealant.

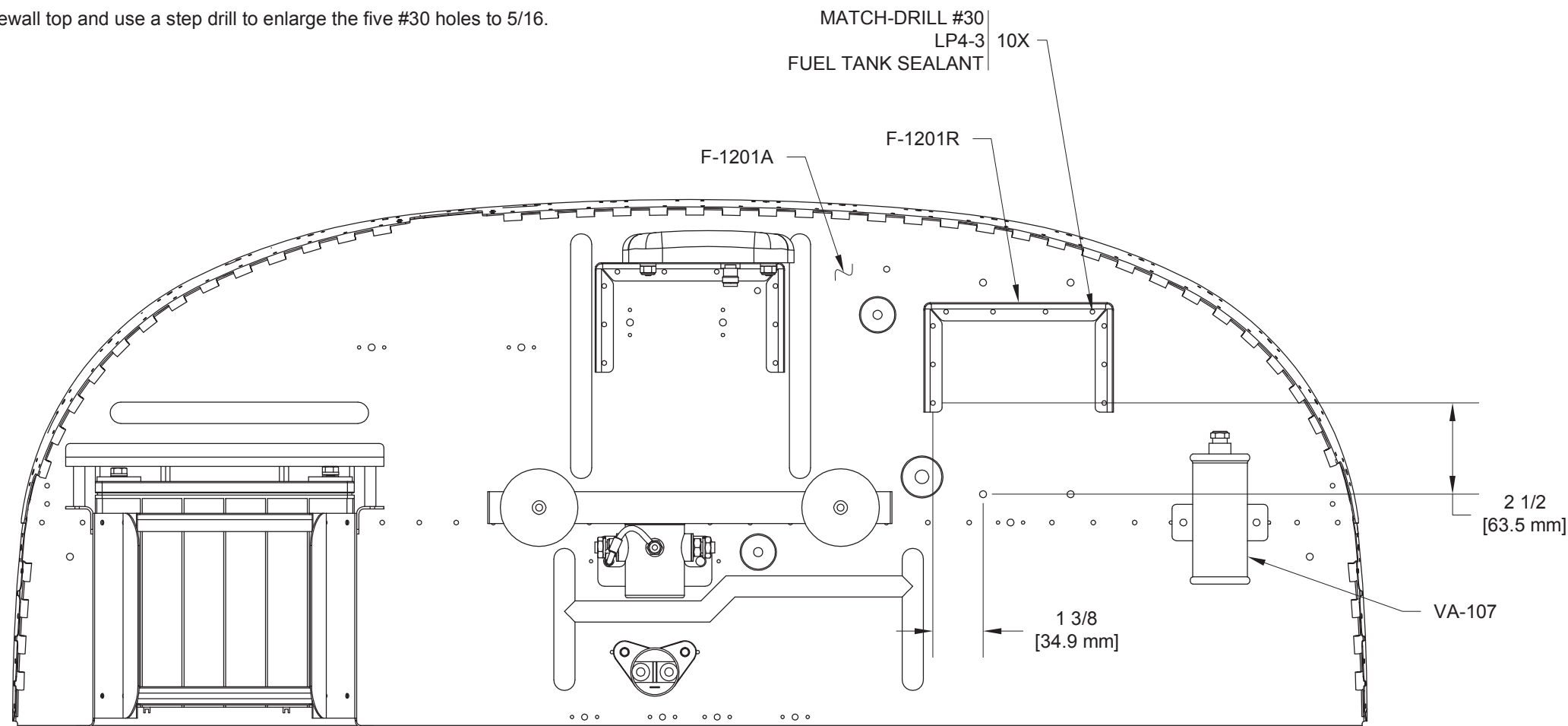
**Step 9:** If not already done, attach the GA 26C antenna and/or GA 26XM antenna to the F-00069 G3X Antenna Plate in accordance with Section 42N.

**Step 10:** Attach the antenna plate to the new antenna shelf in accordance with Section 42N.

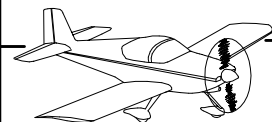
**Step 11:** Route/connect the GA 26C antenna cable and/or GA 26XM antenna cable to the GDU 460/465 display in accordance with Section 42N.

**Step 12:** Install or reattach the F-00052 GEA 24 Attach Plate (and GEA 24 Engine Indication System) to the firewall top in accordance with Section 42N.

**Step 13:** If not already done, complete Section 42N.



**FIGURE 1: ATTACH SECOND ANTENNA SHELF (OPTIONAL)**



Step 1: Navigate to the Van's Aircraft website downloads page.

Download the latest "G3X-PRE-SETS-READ-ME-MM-DD-YY.pdf" file. Open the READ-ME and follow the instructions for entering the latest settings into the G3X.

Step 2: Download the latest "RV-12 G3X Touch Electrical System" schematic from the Van's Aircraft website.

**NOTE: Any weight and balance information recorded for the aircraft must be updated. Depending on the state of your kit some steps may not be applicable.**

Step 3: In the RV-12 Maintenance Manual (MM) "INSTALLED EQUIPMENT LIST" table, mark the "GA 26C" and "GA 26XM" as uninstalled in the "INSTALLED" column. Subtract their weights and moments from the totals. Perform this step even if the GA 26 and/or GA 26XM will be retained.

Add the "ADS-B Out G3X" in the "ITEM" column and on the same line add a checkmark to the "INSTALLED COLUMN."

Enter the corresponding "Weight," "Location/Arm" and "Moment" onto the same line as "ADS-B Out G3X" from one of the four options shown in Table 1.

**NOTE: Steps 4-6 on this page are only applicable if a final weight and balance as specified in the PAP has been completed.**

Step 4: In the RV-12 Pilot Operating Handbook (POH) "YOUR AIRPLANE" table, enter the new total values for the arm, weight, and moment of the installed equipment.

Step 5: In the RV-12 POH "YOUR AIRPLANE" table, recalculate and enter new values for the Empty Weight, Empty Moment, and Empty Arm.

Step 6: Make an entry, as calculated in the previous step, on the WEIGHT AND BALANCE RECORD page of the RV-12 Maintenance Manual as follows:

As of this date: \_\_\_/\_\_\_/\_\_\_ the following values represent current Weight and Balance calculations resulting from the installation of the ADS-B Out G3X Optional Kit.

Revised Empty Weight: \_\_\_\_\_ lbs

Revised Empty Moment: \_\_\_\_\_ in-lbs

Revised Empty Arm: \_\_\_\_\_ in

Signed: \_\_\_\_\_

**NOTE: The remaining steps on this page are only applicable for aircraft which have passed a final airworthiness inspection.**

Step 7 (ELSA): Make an appropriate entry in the airframe logbook. See example below:

Installed the ADS-B Out G3X option in accordance with Van's Aircraft KAI Section 61 and confirmed proper operation.

Signature \_\_\_\_\_ Certificate # \_\_\_\_\_

Step 7 (SLSA): Complete the notification N 16-01-16 (available from the Van's Aircraft web site) corresponding to the ADS-B Out G3X installation.

Step 8: Section complete.

<u>OPTION</u>	<u>WEIGHT (LB)</u>	<u>ARM (IN.)</u>	<u>MOMENT (IN.-LB)</u>
1. GARMIN GA 36 OR GA 37 + GPS 20A	1.70	47.00	79.93
2. GARMIN GA 36 OR GA 37 + GPS 20A + GA 26C	2.07	46.38	95.91
3. GARMIN GA 36 OR GA 37 + GPS 20A + GA 26XM	1.88	46.57	87.54
4. GARMIN GA 36 OR GA 37 + GPS 20A + GA 26C + GA 26XM	2.25	46.07	103.51

**TABLE 1: WEIGHT AND BALANCE OPTIONS**  
(INCLUDES PARTS AND HARDWARE)