GARMIN

Garmin Device

Installation Manual

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CURRENT REVISION DESCRIPTION

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DEFINITIONS OF WARNINGS, CAUTIONS, AND NOTES

WARNING

Warnings *are used to bring to the installer's immediate attention that not only damage to the equipment but personal injury may occur if the instruction is disregarded.*

CAUTION

Cautions are used to alert the individual that damage to equipment may result if the procedural step is not followed to the letter.

NOTE

Notes *are used to expand and explain the preceding step and provide further understanding of the reason for the particular operation.*

WARNING

This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This Notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our web site at www.garmin.com/prop65.

CAUTION

The front bezel, keypad, and display can be cleaned with a microfiber cloth or with a soft cotton cloth dampened with clean water. DO NOT use any chemical cleaning agents. Care should be taken to avoid scratching the surface of the display.

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1 GARMIN DEVICE INSTALLATION OVERVIEW

1.1 Unpacking Unit

Carefully unpack the equipment and make a visual inspection of the unit for evidence of damage incurred during shipment. If the unit is damaged, notify the carrier and file a claim. To justify a claim, save the original shipping container and all packing materials. Do not return the unit to Garmin until the carrier has authorized the claim.

Retain the original shipping containers for storage. If the original containers are not available, a separate cardboard container should be prepared that is large enough to accommodate sufficient packing material to prevent movement.

1.2 Introduction

This manual provides an overview of the Garmin Device and its mechanical and electrical installation aspects.

NOTE

The Garmin Device is not a TSO-certified product and has received no FAA approval or endorsement, and is therefore not suitable for installation in a type-certificated aircraft.

The following outline describes the organization of this manual:

Section 1 This section gives a basic overview of the Garmin Device system and interface. This section contains generic information that pertains to all components of the Garmin Device system, such as wiring and backshell considerations.

Section 2 This section describes the electrical and installation aspects of the Garmin Device.

Section 3 This section describes the electrical and installation aspects of the Garmin GPS and SiriusXM® antennas.

Section 4 This section contains software, configuration, database, and SiriusXM® activation information.

Section 5 This section contains post-installation checkout for the Garmin Device.

Appdx A This section contains pinout information for all Garmin Device LRU's.

Appdx B This section contains outline and installation drawings for the Garmin Antennas and Garmin Device units.

Appdx C This section connector installation instructions.

Appdx D This section contains interconnect drawings for the Garmin Device.

1.3 System Overview

TBD

1.4 General Garmin Device LRU Specifications

1.4.1 Garmin LRU Part Numbers

Table 1-1 Garmin Device LRU Part Numbers

LRU	Unit Only Part Number	Assembly Part Number
Garmin Device Americas DB	011-02920-00	010-01057-00
Garmin Device Atlantic DB	011-02920-00	010-01057-01
Garmin Device Pacific DB	011-02920-00	010-01057-02
Garmin Device Americas DB	011-02920-01	010-01057-10

Table 1-2 Contents of Garmin Device Assembly (010-01057-XX)

Item	Garmin P/N	Quantity
Garmin Device	011-01747-XX	1
Cleaning Cloth	013-00380-00	1
SD Card, Dummy	145-00561-00	1
Important Safety and Product Information	190-00720-52	1
Jeppesen Free Single Update	190-10003-03	1

1.4.2 Power Specifications

All LRUs are capable of operating at either 14 or 28 VDC. See Table 1-3 for current draw specifications.

Table 1-3 Garmin Device LRU Power Requirements

LRU	Supply Voltage	Approx. Current Draw
Garmin Device	10-32 Vdc	2.0 Amp @ 14Vdc 1.0 Amp @ 28Vdc

1.4.3 Physical Specifications

Measurements do not account for space or weight of wiring, cables, etc.

Table 1-4 Garmin Device LRU Physical Specifications

LRU	Bezel Width	Bezel Height	Depth Behind Panel (includes recommended backshell)	Unit Weight (Unit Only)	Unit Weight (w/connector)	Nutplate Weight
Garmin Device	10.85 inches (275.5 mm)	7.82 inches (198.6 mm)	3.57 inches (90.7 mm)	4.55 lbs (2.064 kg)	TBD	0.045 lbs (.0204 kg)
Garmin Device	10.85 inches (275.5 mm)	7.82 inches (198.6 mm)	3.57 inches (90.7 mm)	4.66 lbs (2.112 kg)	TBD	0.045 lbs (.0204 kg)

1.4.4 Cooling Requirements

While no forced cooling air is required for the Garmin Device, it is highly recommended that the air behind the panel be kept moving (by ventilation or a fan).

NOTE

Avoid installing the Garmin Device LRUs near heat sources. If this is not possible, ensure that additional cooling is provided. Allow adequate space for installation of cables and connectors. The installer will supply and fabricate all of the cables. All wiring should be in accordance with FAA AC 43.13-1B and AC 43.13-2A.

1.5 Mounting

Refer to Sections 2 and 3 for specific mounting instructions for each component of the Garmin Device, and to Appendix C for Outline & Installation Drawings.

1.6 Wiring/Cabling Considerations

Use MIL-W-22759/16 (or other approved wire) AWG #22 or larger wire for all connections unless otherwise specified. The standard pin contacts supplied in the connector kit are compatible with up to AWG #22 wire. See Figure D-1 for power/ground wire info. In cases where some installations have more than one LRU sharing a common circuit breaker, sizing and wire gauge is based on aircraft circuit breaker layout, length of wiring, current draw on units, and internal unit protection characteristics. Do not attempt to combine more than one unit on the same circuit breaker.

RG400 or RG142 coaxial cable with 50 Ω nominal impedance and meeting applicable aviation regulations should be used for the installation.

1.7 Wiring Harness Installation

Allow adequate space for installation of cables and connectors. Ensure that routing of the wiring does not come in contact with sources of heat, RF or EMI interference. Analog Input wires routed too close to spark plugs, plug wires, or magnetos may result in erratic readings.

The installer shall supply and fabricate all of the cables. The connector is available in the Garmin Device Connector Kit (011-01921-10). Electrical connections are made through a 50 pin D-subminiature connector for the Garmin Device units. Appendix A defines the electrical characteristics of all input and output signals. Required connectors and associated hardware are supplied with the connector kit.

CAUTION

Check wiring connections for errors before connecting any wiring harnesses. Incorrect wiring could cause internal component damage.

Table 1-5 Pin Contact and Crimp Tools Part Numbers

LRU	Contact Type	Garmin Contact Part Number	Recommended Positioner	Recommended Insertion/ Extraction Tool	Recommended Hand Crimping Tool
Garmin Device	Socket, MilCrimp, Size 20	336-00022-02	M22520/2-08, Daniels K13-1	M81969/1-04 for size 22D pins and M81969/1-02 for size 20 pins	M22520/2-01

Insertion/Extraction tools from ITT Cannon are all plastic; others are plastic with metal tip.

Non-Garmin part numbers shown are not maintained by Garmin and consequently are subject to change without notice.

1.7.1 Cable Location Considerations

Use cable meeting the applicable aviation regulation for the interconnect wiring. Any cable meeting specifications is acceptable for the installation. When routing cables, observe the following precautions:

- All cable routing should be kept as short and as direct as possible.
- Check that there is ample space for the cabling and mating connectors.
- Avoid sharp bends in cabling.
- Avoid routing near aircraft control cables.
- Avoid routing cables near power sources (e.g., 400 Hz generators, trim motors, etc.) or near power for fluorescent lighting.
- Route the GPS antenna cable as far as possible away from all COM transceivers and antenna cables.

1.7.2 Cable Installation

1. Route the coaxial cable to the unit location. Secure the cable in accordance with good aviation practices.
2. Trim the coaxial cable to the desired length and install the BNC connector (330-00087-00) per the cabling instructions on Figure 1-1. If the connector is provided by the installer, follow the connector manufacturer's instructions for cable preparation.

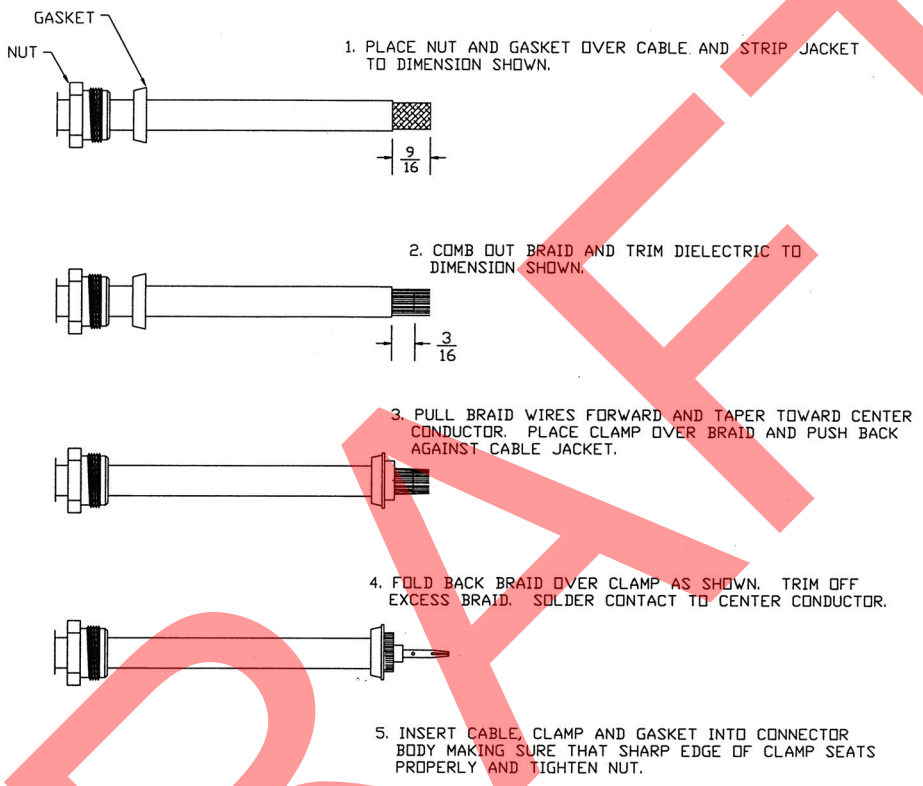

Figure 1-1 Coax Cable Installation

3. Contacts for the 50 pin connectors must be crimped onto the individual wires of the aircraft wiring harness. Table 1-5 list contact part numbers (for reference) and recommended crimp tools.

1.7.3 Backshell Assemblies

Connector kits include backshell assemblies. Garmin's backshell connectors give the installer the ability to quickly and easily terminate shield grounds at the backshell housing. The instructions needed to assemble the backshell connector w/Shield Block grounding system are located in Appendix B.

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2 GARMIN DEVICE

Insert picture

Figure 2-1 Garmin Device

2.1 Equipment Description

The Garmin Device is not suitable for installation in a type-certificated aircraft.

The Garmin Device is mounted flush to the aircraft instrument panel using four #6 screws. The Garmin Device is available in two models. The Garmin Device is a Garmin Display Unit with a GPS receiver. The Garmin Device provides these same features plus an SiriusXM® receiver.

2.1.1 Navigation Functions

- Display of position and ground speed
- Display of stored navigation and map databases
- Area navigation functions using the determined position/velocity and stored navigation data
- Advisory approach navigation functions and associated databases

2.1.2 Interface Summary

The Garmin Device uses RS-232 communications interfaces. The Garmin Device communicates with the following Garmin LRUs:

- GDL 39/GDL39R
- GNS 400/500 Series Units
- GTN 6XX/7XX
- GTX 327/330 Transponder
- SL30 Nav/Comm Transceiver
- SL40 Comm Transceiver

2.2 Electrical Specifications

2.2.1 Electrical Characteristics

Table 2-1 Garmin Device Supply Voltages

Characteristics	Specifications
Power Requirements	14/28 VDC

2.2.2 Power Consumption

Table 2-2 Garmin Device Power Requirements

LRU	14V (Maximum)	14V (Typical)	28V (Maximum)	28V (Typical)
Garmin Device	3.0 Amp	1.8 Amp	1.9 Amp	0.9 Amp
Garmin Device	3.5 Amp	2.0 Amp	2.0 Amp	1.0 Amp

2.2.3 GPS Specifications

The Garmin Device uses a high-sensitivity GPS receiver that continuously tracks and uses up to 12 satellites to compute and update its position.

Table 2-3 Garmin Device GPS Specifications

Characteristics	Specifications
Acquisition Time	a) Warm Start (position known to 10 nm, time known to 10 minutes, with valid almanac and ephemeris): Less than 5 seconds b) Cold Start (position known to 300 nm, time known to 10 minutes, with valid almanac): Less than 45 seconds c) AutoLocate™ (with almanac, without initial position or time): Less than 60 seconds
Update Rate	5/second, continuous
Positional Accuracy	<10 meters
Antenna Power Supply	Voltage (4.5 to 5.0), current (50 mA max)

2.2.4 Antennas

Table 2-4 lists Garmin and non-Garmin antennas currently supported by the Garmin Device. Refer to Section 3 for Garmin antenna installation information. For non-Garmin antennas, follow the manufacturer's installation instructions.

Table 2-4 Garmin Device Supported Antennas

Model	Mount Style	Conn Type	Antenna Type	Mfr	Antenna Part Number	Garmin Order Number
GA 26C	Suction Cup, Magnetic or Flange Mt	BNC	GPS	Garmin	011-00149-04	010-10052-04
GA 26XM	Ground Plane Mt	TNC	SiriusXM®	Garmin	013-00268-10	010-11373-00
GA 55	Stud Mount	TNC	SiriusXM®	Garmin	011-01033-00	010-10600-01
GA 55A	ARINC 743	TNC	SiriusXM®	Garmin	011-01153-00	010-10598-00
GA 56	Stud Mount	BNC	GPS	Garmin	011-00134-00	010-10040-01
GA 57X [1]	Screw Mount, ARINC 743 Footprint	BNC TNC	GPS SiriusXM®	Garmin	011-01032-10	010-11370-10

[1] The GPS antenna connector is BNC type. The SiriusXM® antenna connector is TNC type.

NOTE

The GPS antenna should provide a gain of 16 to 25dB, and requires a 4.5V to 5V supply voltage that can provide 50mA max.

2.3 Environmental Specifications

The Garmin Device has an Operating Temperature Range of -20°C to +60°C.

2.4 Installation Requirements

2.4.1 Required Accessories

Each of the following accessories is provided in the Installation Kit (010-12150-00), which is sold separately. The connector kit is required to install the unit (Figure 2-2). The Garmin Device Nutplate is available to reinforce the panel cutout in thin panel installations.

Table 2-5 Garmin Device Required Accessories

Item	Garmin P/N	Quantity
Garmin Device Connector Kit*	011-01921-10	1
Garmin Device Nutplate*	115-01725-01	1

*Included in Garmin Device Assembly (010-00667-XX) Table 1-1

Table 2-6 Contents of Garmin Device Connector Kit (011-01921-00)

Item	Garmin P/N	Quantity
Sub-Assy,bkshl w/Hdw,Jackscrew	011-01855-04	1
Conn, Rcpt,D-Sub, Crimp Socket, C	330-00625-50	1
Contact, Sckt, D-Sub, Crimp, Size 20	336-00022-02	30

2.4.2 Additional Equipment Required

A 3/32” hex drive tool is required to secure the Garmin Device to the panel as described in Section 2.7 Unit Installation.

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Figure 2-2 Garmin Device Mounting Accessories

2.5 Installation Considerations

Fabrication of a wiring harness is required. Sound mechanical and electrical methods and practices are recommended for installation of the Garmin Device. Refer to Section 1.6 for wiring considerations, Appendix A.1 for pinouts.

Connector kits include backshell assemblies. Garmin's backshell connectors give the installer the ability to quickly and easily terminate shield grounds at the backshell housing. The instructions needed to assemble the backshell connector w/Shield Block grounding system are located in Appendix B.

NOTE

The Garmin Device rear connector (J3701) is electrically isolated. For installations using shielded cables, a ground pin must be tied to the connector shell.

2.6 Mounting Requirements

Refer to Appendix C for outline and installation drawings.

2.7 Unit Installation

The Garmin Device is installed by holding the unit flush with the instrument panel and fastening the four 3/32" hex socket head screws to the panel as shown in Figure C-1.1 and C-1.2.

2.8 Continued Airworthiness

Maintenance of the Garmin Device is "on condition" only. Periodic maintenance of the Garmin Device is not required. Instructions for Continued Airworthiness (ICA) are not required for this product under 14 CFR Part 21 since the Garmin Device has received no FAA approval or endorsement.

2.9 Panel Cutout Template

A template that can be used for marking the panel for cutout is available from www.garmin.com. See Figure C-1.3 for complete dimensions.

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3 GPS/SIRIUSXM® ANTENNA INSTALLATION

This section contains general information as well as installation information for GPS and SiriusXM antennas. Use this section to mount the GPS/SiriusXM antenna(s).

In an installation with multiple Garmin Device units, each Garmin Device can be configured to use its own internal GPS receiver, or to receive GPS data transmitted by another Garmin Device. A minimum of one GPS antenna is required for installations using more than one Garmin Device unit, as the Garmin Device will "share" the GPS information with all Garmin Device units. Additional GPS antennas may be used for redundancy, but are not required.

NOTE

Only a single GPS antenna is required for installations using more than one Garmin Device unit, as the Garmin Device will "share" the GPS information with all Garmin Device units.

3.1 Garmin Antennas

If using a Garmin GA 26C or GA 26XM, refer to the accompanying installation instructions (190-00082-00 or 190-00522-03). For GA 55/55A, or GA 56 or GA 57X antennas, refer to this section and the outline and installation drawings beginning with Figure C-1.

Garmin recommends the antennas shown in Table 3-1. However, any equivalent GPS or SiriusXM® antenna that meets the specifications listed in Table 3-2 and Table 3-3 should work with the system.

Table 3-1 Supported Garmin Antennas

Model	Part Number	Description	Weight	Mounting Configuration
GA 26C	011-00149-04	GPS Antenna	NA	Flange, Magnetic, or Suction Cup Mount (for in-cabin mounting)
GA 26XM	013-00268-10	SiriusXM® Antenna	NA	Flange, Magnetic, or Suction Cup Mount (for in-cabin mounting)
GA 55	011-01033-00	SiriusXM® Antenna	0.25 lbs (0.11 kg)	Stud mount (Tear-drop form factor)
GA 55A	011-01153-00	SiriusXM® Antenna	0.43 lbs (0.20 kg)	Thru-mount (ARINC 743 style mount)
GA 56	011-00134-00	GPS Antenna	0.24 lbs (0.11 kg)	Stud mount (Tear-drop form factor)
GA 57X	011-01032-10	GPS/Siri-usXM® Antenna	0.47 lbs (0.21 kg)	Thru-mount (ARINC 743 style mount)

Table 3-2 GPS Antenna Minimum Requirements

Characteristics	Specifications
Frequency Range	1565 to 1585 MHz
Gain	16 to 25 dB typical, 40 dB max.
Noise Figure	<4.00 dB
Nominal Output Impedance	50 ohms
Supply Voltage	4.5 to 5.5 VDC
Supply Current	up to 50 mA
Output Connector	BNC

Table 3-3 SiriusXM® Satellite Radio Antenna Minimum Requirements

Characteristics	Specifications
Frequency Range	2332.5 to 2345 MHz
Gain (Typical)	24 dB*
Noise Figure	<1.2 dB
Nominal Output Impedance	50 ohms
Supply Voltage	3.6 to 5.5 VDC
Supply Current (maximum)	55 mA
Operating Temperature Gain	-50 to +85° C

*For each 1 dB gain over 24 dB, add 1 dB of attenuation into the antenna cable path between the antenna and the Garmin Device.

It is the installer's responsibility to ensure that their choice of antenna meets FAA standards according to the specific installation. This installation manual discusses only the antennas listed in Table 3-1. Other antennas may be acceptable but their installation is not covered by this manual.

There are several critical factors to take into consideration before installing an antenna for a satellite communications system. These factors are addressed in the following sections.

3.2 Antenna Mounting Considerations

The information in this section does not pertain to in-cabin (internal) mounted antennas such as the GA 26C, refer to the accompanying installation instructions (190-00082-00).

No special precautions need be taken to provide an electrical bonding path between the GPS Antenna and the aircraft structure.

3.2.1 VHF COM/GPS Interference

On some installation VHF COM transceivers, Emergency Locator Transmitter (ELT) antennas, and Direction Finder (DF) receiver antennas can re-radiate through the GPS antenna. The Garmin Device does not interfere with its own GPS receiver. However, placement of the GPS antenna relative to a COM transceiver and COM antenna, ELT antenna, and DF receiver antenna is critical.

Use the following guidelines, in addition to others in this document, when locating the Garmin Device and its antennas.

- GPS Antenna—Locate as far as possible from all COM antennas and all COM transceivers, ELT antennas, and DF antennas. The GPS antenna is less susceptible to harmonic interference if a 1.57542 GHz notch filter is installed on the COM transceiver antenna output.
- Locate the Garmin Device as far as possible from all COM antennas.

If a COM antenna is found to be the problem, a 1.57542 GHz notch filter (Garmin P/N 330-00067-00) may be installed in the VHF COM coax, as close to the COM as possible.

If a COM is found to be radiating, the following can be done:

1. Replace or clean the VHF COM rack connector to ensure good coax ground.
2. Place grounding straps between the Garmin Device unit, VHF COM and a good ground.
3. Shield the VHF COM wiring harness.

3.2.2 GPS/SiriusXM® Antenna Mounting Location

The GPS antenna is a key element in the overall system performance and integrity for a GPS navigation system. The mounting location, geometry, and surroundings of the antenna can affect the system performance and/or availability. The following guidance provides information to aid the installer in ensuring that the optimum location is selected for the installation of the GPS antenna. The installation guidelines presented here meet the intent of AC 20-138A section 16. The greater the variance from these guidelines, the greater the chance of decreased availability. Because meeting all of these installations guidelines may not be possible on all aircraft, these guidelines are listed in order of importance to achieve optimum performance. Items 4a - 4c below are of equal importance, and their significance may depend on the aircraft installation. The installer should use their best judgment to balance the installation guidelines.

1. Mount the antenna on top of the aircraft in a location with an unobstructed view of the sky, as close to level as possible with respect to the normal cruise flight attitude of the aircraft. If the normal flight attitude is not known, substitute the waterline, which is typically referenced as level while performing a weight and balance check.
2. The GPS antenna should be mounted in a location to minimize the effects of airframe shadowing during typical maneuvers. Typically mounting farther away from the tail section reduces signal blockage seen by the GPS antenna.
3. The GPS antenna should ideally be located at the opposite end of the aircraft from the COM unit in order to make the GPS less vulnerable to harmonics radiated from the COM itself.

4a. The GPS antenna should be mounted no closer than two feet (edge to edge) and ideally three feet from any VHF COM antenna or any other antenna which may emit harmonic (or other) interference at the L1 frequency of 1575.42 MHz. An aircraft EMC (Electromagnetic Compatibility) check can verify the degradation of GPS in the presence of interference signals. If an EMC check reveals unacceptable interference, insert a GPS notch filter in line with the offending VHF COM or the (re-radiating) ELT transmitter.

NOTE

The separation requirement does not apply to GPS and COM combination antennas, provided the antenna has been tested to meet Garmin's minimum performance standards. The separating requirement includes the combination with an SiriusXM antenna element as well.

4b. The GPS antenna should be mounted no closer than two feet (edge to edge) and ideally three feet from any antennas emitting more than 25 watts of power. An aircraft EMC check can verify the degradation of GPS in the presence of interference signals.

4c. To minimize the effects of shadowing at 5° elevation angles, the GPS antenna should be mounted no closer than 6 inches (edge to edge) from other antennas, including passive antennas such as another GPS antenna or SiriusXM antenna.

5. To maintain a constant gain pattern and limit degradation by the windscreen, avoid mounting the antenna closer than 3 inches from the windscreen.
6. For multiple GPS installations, the antennas should not be mounted in a straight line from the front to the rear of the fuselage. Also varying the mounting location will help minimize any aircraft shading by the wings or tail section (in a particular azimuth, when one antenna is blocked the other antenna may have a clear view).

Figure 3-1 shows the recommended placement of antennas.

Add antenna placement figure

Figure 3-1 Recommended Antenna Placement

3.2.3 Buried Antenna (below the skin covering or glareshield) Mounting

There are potential performance issues related to buried antennas that the kit builder/installer should be aware of prior to electing to install a buried antenna. See also Section 3.5.3, Non-structural Installation to Glareshield.

- Some gain of the antenna may be lost as the signal needs to penetrate through the skin of the aircraft. The loss may not be apparent, but under the some of the worst case signal scenarios signal availability may be affected.
- The materials in some aircraft are not suitable for GPS signals to penetrate, care should be taken to properly modify the aircraft structure to accommodate this. Modifications of this sort are not recommended or inferred by Garmin or the installation of the Garmin Device, and the installer should seek the guidance of the kit manufacture for such modifications.
- SiriusXM® – FIS antennas may typically be buried without performance impact if the overlying material is fairly transparent to the satellite signal.

Figure 3-2 shows example areas of some mounting locations which have been used. Low satellite reception and tracking are compromised in these installations due to fuselage and tail blockage. It is not possible to determine the full impact of these locations, however initial flight testing has not shown any significant impact to availability, your results may vary.

Add buried antenna figure

Figure 3-2 Carbon/Glass Buried Antenna Area

Mounting the antenna under the glare shield (Figure 3-3) is a good option for SiriusXM® – FIS antennas, although it is not typically the best option for a GPS antenna. This location results in the aft fuselage shading the antenna.

Add buried antenna figure

Figure 3-3 Glare Shield Buried Antenna Area

NOTE

Due to the excessive temperature environment and large areas of signal blockage caused by the fuselage, mounting the antenna under the engine cowling (forward of the firewall) is not recommended and likely will not provide adequate GPS reception.

3.2.4 Antenna Doubler/Backing Plate

The antenna installation must provide adequate support for the antenna considering a maximum drag load of 5 lbs. (at subsonic speed). When penetrating the skin with a large hole (i.e. for the coax connector) a doubler plate is required to re-instate the integrity of the aircraft skin. Never weaken the aircraft structure when choosing a mounting area. Make use of any available reinforcements where appropriate.

3.2.5 Antenna Grounding Plane

Although no ground plane is required, the antennas typically perform better when a ground plane is used. The ground plane should be a conductive surface as large as practical, with a minimum diameter of 8 inches. To use an antenna in aircraft with fabric or composite skin, a ground plane is recommended. It is usually installed under the skin of the aircraft, below the antenna, and is made of either aluminum sheet or of wire mesh.

3.2.6 Antenna Grounding

The antenna is grounded through the mounting hardware and the coax connection. The mounting hardware (washers and nuts) and doubler plate should make contact with an unpainted grounded surface ensuring proper antenna grounding. It is important to have good conductivity between the coaxial shield and the ground plane. The bottom of the antenna does not need to make contact with the ground plane (i.e. the surface may be painted). The antenna will capacitively couple to the ground plane beneath the paint or aircraft cover.

3.3 Teardrop Footprint Antenna Installation (GA 55 and GA 56)

This section describes the structural mounting of the teardrop footprint antenna installation.

An acceptable installation method is to use Garmin P/N: 115-00846-10 doubler plate with the GA 55 or GA 56 stud mount antennas. Another acceptable method is to fabricate and install one of three doublers (Figure 3-4, Figure 3-5, and Figure 3-6), depending on the thickness of the skin. The three doubler designs vary only by number of rivets and hole preparation for installation with flush rivets. Table 3-4 provides a summary of design and installation details for selecting the appropriate antenna doubler/backplate.

Figure 3-7 shows an example of the doubler installed between stringers on the top fuselage skin, just off centerline. The location should be flat, with no gaps between the skin and doubler, to keep from deforming the skin during installation.

Table 3-4 Teardrop Footprint Antenna Doubler Design and Installation

Aircraft Skin Thickness	0.032" to 0.049"	0.049" to 0.051"	0.051" to 0.063"
Doubler Design (Figure)	Figure 3-4	Figure 3-5	Figure 3-6
Number of Rivets Required	12	16	16
Type of Rivets Required[1]	MS20426AD4-x	MS20426AD4-x	MS20426AD4-x
Skin Preparation for Rivets	Dimple	Dimple	Countersink
Doubler Preparation for Rivets	Countersink	Countersink	None
Skin Cutout Detail (Figure)	Figure 3-8	Figure 3-9	Figure 3-10
Doubler Installation (Figure)	Figure 3-11	Figure 3-12	Figure 3-13

[1]Rivet length determined at installation, dependent on thickness of material (rivet length = grip length + 1.5 * rivet diameter)

Refer to the drawings beginning with Figure C-1 for Garmin Antenna installation drawings.

3.3.1 Preparation of Doubler

1. Use Garmin P/N: 115-00846-10, or refer to Table 3-4 for guidance on selecting the appropriate doubler drawing based on the thickness of skin at the antenna location. Make the doubler from 2024-T3 Aluminum (AMS-QQ-A-250/5), 0.063" sheet thickness.
2. For installation in aircraft skins of thickness less than 0.051", countersink the rivet holes in the doubler for use with flush head rivets (MS20426AD4-x).
3. When using Garmin P/N: 115-00846-10 doubler, sixteen rivet holes exist in the part. For installation of Garmin P/N: 115-00846-10 in skins of thickness between 0.032" and 0.049", only the rivets identified for use through the skin cutout detail (Figure 3-8) and doubler installation (Figure 3-11) are required.

3.3.2 Antenna Installation Instructions

1. Refer to Table 3-5 and the outline and installation drawings beginning with Figure C-3 for guidance on selecting the appropriate mounting cutout. Drill or punch the holes to match the mating part (doubler).
2. Install a doubler plate to reinforce the aircraft skin, as required. Refer to Section 3.3.1 for doubler preparation and Table 3-5 for additional guidance on the doubler installation. Dimple aircraft skin when the skin thickness is less than 0.051" for installation of flush head rivets. Countersink aircraft skin when the skin thickness is between 0.051" and 0.063" for installation of flush head rivets.
3. For the stud mount teardrop footprint antenna, place install gasket on top of aircraft skin using the four screw holes to align the gasket.
4. Washers and locking nuts are required to secure the antenna. Torque the four #8-32 stainless steel locking nuts 12-15 in-lbs. Torque should be applied evenly across all mounting studs or screws to avoid deformation of the mounting area.
5. Ensure that the antenna base and aircraft skin are in continuous contact with the gasket or o-ring, as appropriate to the antenna model.
6. Seal the antenna and gasket to the fuselage using Dow Corning 738 Electrical Sealant or equivalent. Run a bead of the sealant along the edge of the antenna where it meets the exterior aircraft skin. Use caution to ensure that the antenna connectors are not contaminated with sealant.

CAUTION

Do not use construction grade RTV sealant or sealants containing acetic acid. These sealants may damage the electrical connections to the antenna. Use of these type sealants may void the antenna warranty.

3.3.3 Reference Figures

Figure to be added

Figure 3-4 Doubler Design, Teardrop Footprint Antenna, Skin Thickness 0.032" to 0.049"

Figure to be added

Figure 3-5 Doubler Design, Teardrop Footprint Antenna, Skin Thickness 0.049" to 0.051"

Figure to be added

Figure 3-6 Doubler Design, Teardrop Footprint Antenna, Skin Thickness 0.051" to 0.063"

Figure to be added

Figure 3-7 Sample Doubler Location, Teardrop Footprint Antenna, Metal Skin Aircraft

Figure to be added

Figure 3-8 Skin Cutout Detail, Teardrop Footprint Antenna, Skin Thickness 0.032" to 0.049"

Figure to be added

Figure 3-9 Skin Cutout Detail, Teardrop Footprint Antenna, Skin Thickness 0.049" to 0.051"

Figure to be added

Figure 3-10 Skin Cutout Detail, Teardrop Footprint Antenna, Skin Thickness 0.051" to 0.063"

Figure to be added

Figure 3-11 Doubler Installation, Teardrop Footprint Antenna, Skin Thickness 0.032" to 0.049"

Figure to be added

Figure 3-12 Doubler Installation, Teardrop Footprint Antenna, Skin Thickness 0.049" to 0.051"

Figure to be added

Figure 3-13 Doubler Installation, Teardrop Footprint Antenna, Skin Thickness 0.051" to 0.063"

3.4 ARINC 743 Footprint Antenna Installation (GA 55A, GA 57X)

This section describes the structural mounting of the ARINC 743 footprint antenna (GA 55A, GA 57X) installation. One acceptable method is to use Garmin P/N: 115-00846-00 doubler plate. Another acceptable method is to fabricate and install one of three doublers, Figure 3-14, Figure 3-15, or Figure 3-16, depending on the thickness of the skin. The three doubler designs vary only by number of rivets and hole preparation for installation with flush rivets. Figure 3-24 shows installation of the ARINC 743 footprint antenna.

Table 3-5 provides a summary of design and installation details for the antenna doubler. Figure 3-17 shows an example of the doubler installed between stringers on the top fuselage skin, just off centerline. The location should be flat, with no gaps between the skin and doubler, to keep from deforming the skin during installation.

Table 3-5 ARINC 743 Footprint Antenna Doubler Design and Installation

Skin Thickness	0.032" to 0.049"	0.049" to 0.051"	0.051" to 0.063"
Doubler Design (Figure)	Figure 3-14	Figure 3-15	Figure 3-16
Number of Rivets Required	12	16	16
Type of Rivets Required[1]	MS20426AD4-x	MS20426AD4-x	MS20426AD4-x
Skin Preparation for Rivets	Dimple	Dimple	Countersink
Doubler Preparation for Rivets	Countersink	Countersink	None
Skin Cutout Detail (GA 55A)	Figure 3-18	Figure 3-19	Figure 3-20
Doubler Installation (Figure)	Figure 3-21	Figure 3-22	Figure 3-23

[1]Rivet length determined at installation, dependent on thickness of material (rivet length = grip length + 1.5 * rivet diameter)

3.4.1 Preparation of Doubler

1. Use Garmin P/N: 115-00846-00, or refer to Table 3-5 for guidance on selecting the appropriate doubler drawing based on the thickness of skin at the antenna location. Make the doubler from 2024-T3 Aluminum (AMS-QQ-A-250/5), 0.063" sheet thickness.
2. For installation in aircraft skins of thickness less than 0.051", countersink the rivet holes in the doubler for use with flush head rivets (MS20426AD4-x).
3. When using Garmin P/N: 115-00846-00 doubler, sixteen rivet holes exist in the part. For installation of Garmin P/N: 115-00846-00 in skins of thickness between 0.032" and 0.049", only the rivets identified for use through the skin cutout detail (Figure 3-18) and doubler installation (Figure 3-21) are required.

3.4.2 Antenna Installation Instructions

1. Refer to Table 3-5 (and the outline and installation drawings beginning with Figure C-1) for guidance on selecting the appropriate mounting cutout. Drill or punch the holes to match the mating part (doubler).
2. Install a doubler plate to reinforce the aircraft skin, as required. Refer to Section 3.4.1 for doubler preparation and Table 3-5 for additional guidance on the doubler installation. Dimple aircraft skin when the skin thickness is less than 0.051" for installation of flush head rivets. Countersink aircraft skin when the skin thickness is between 0.051" and 0.063" for installation of flush head rivets.
3. Place the install gasket on top of aircraft skin using the four screw holes to align the gasket.
4. Locking nuts are required to secure the antenna (locking nuts installed on doubler). Torque the four supplied #10-32 stainless steel screws (Garmin P/N: 211-60212-20, MS51958-67, or equivalent) 20-25 in-lbs. Torque should be applied evenly across all mounting studs to avoid deformation of the mounting area.
5. Ensure that the antenna base and aircraft skin are in continuous contact with the gasket.
6. Seal the antenna and gasket to the fuselage using Dow Corning 738 Electrical Sealant or equivalent. Run a bead of the sealant along the edge of the antenna where it meets the exterior aircraft skin. Use caution to ensure that the antenna connectors are not contaminated with sealant.

CAUTION

Do not use construction grade RTV sealant or sealants containing acetic acid. These sealants may damage the electrical connections to the antenna. Use of these type sealants may void the antenna warranty.

3.4.3 Reference Figures

Figure to be added

Figure 3-14 Doubler Design, ARINC 743 Footprint Antenna, Skin Thickness 0.032" to 0.049"

Figure to be added

Figure 3-15 Doubler Design, ARINC 743 Footprint Antenna, Skin Thickness 0.049" to 0.051"

Figure to be added

Figure 3-16 Doubler Design, ARINC 743 Footprint Antenna, Skin Thickness 0.051" to 0.063"

Figure to be added

Figure 3-17 Sample Doubler Location, ARINC 743 Antenna, Metal Skin Aircraft

Figure to be added

Figure 3-18 Skin Cutout Detail, ARINC 743 Footprint Antenna, Skin Thickness 0.032" to 0.049"

Figure to be added

Figure 3-19 Skin Cutout Detail, ARINC 743 Footprint Antenna, Skin Thickness 0.049" to 0.051"

Figure to be added

Figure 3-20 Skin Cutout Detail, ARINC 743 Footprint Antenna, Skin Thickness 0.051" to 0.063"

Figure to be added

Figure 3-21 Doubler Installation, ARINC 743 Footprint Antenna, Skin Thickness 0.032" to 0.049"

Figure to be added

Figure 3-22 Doubler Installation, ARINC 743 Footprint Antenna, Skin Thickness 0.049" to 0.051"

Figure to be added

Figure 3-23 Doubler Installation, ARINC 743 Footprint, Skin Thickness 0.051" to 0.063"

Figure to be added

Figure 3-24 Installation of ARINC 743 Footprint Antenna

3.5 Non-Structural Mount Installation

This section provides installation examples and considerations for non-structural mounting of teardrop and ARINC 743 footprint antennas. Typical installations may be below a non-metallic glareshield, under the composite or fabric skin, or on an external, non-structural surface. Other non-structural installations may exist, but are not presented in this manual.

External mounting of the antenna is preferred, although the antenna can be mounted inside the aircraft. When mounted internally, the antenna does not have to be aligned with the aircraft forward direction, but should be equal to the aircraft typical cruise attitude.

There should be a solid mechanical base in the mounting area for the antenna, and existing surfaces or brackets may be used with the doubler plate. Alternately, non-structural brackets may be fabricated in the field as necessary to mount the antenna. Brackets should be made of minimum 0.032" thickness aluminum and should span as short a distance as possible.

Some fabric aircraft include aluminum paste in the fabric finishing process, often referred to as "silver coats". Presence of thick fabric and/or heavy "silver coats" may degrade the signal strength of the antenna.

3.5.1 Generic Non-structural Antenna Installation

Figure 3-25 shows the generic non-structural installation for the ARINC 743 footprint (GA 55A/GA 57X) antenna. The teardrop footprint antennas (GA 55, GA 56 stud mount) can also be installed in this manner.

For mounting the teardrop style antenna (GA 55 or GA 56), a doubler plate similar to Figure 3-4 or P/N 115-00846-10 can be used with the mounting surface to support the antenna. Rivets used to secure the doubler plate to the mounting surface are optional in a non-structural installation. Screws, washers, and locking nuts as shown in the outline and installation drawings beginning with Figure C-1, are required to secure the Teardrop style antenna to the mounting surface. Torque the locking nuts to 12-15 in-lbs, torque should be applied evenly across all mounting studs.

A doubler plate similar to Figure 3-11, or P/N 115-00846-00 (ARINC 743 style) can be used with the mounting surface to support the antenna. Rivets used to secure the doubler plate to the mounting surface are optional in a non-structural installation. Locking nuts are required to secure the ARINC 743 antenna (locking nuts installed on doubler). Torque the four supplied #10-32 stainless steel screws (Garmin P/N: 211-60212-20, MS51958-67, or equivalent) evenly across all mounting screws.

3.5.2 Considerations for Non-Structural Mounting

External mounting of the antenna is preferred, although the antenna can be mounted inside the aircraft. When mounted internally, the antenna does not have to be aligned with the aircraft forward direction, but should be equal to the aircraft typical cruise attitude.

There should be a solid mechanical base in the mounting area for the antenna, and existing surfaces or brackets may be used with the doubler plate. Alternately, non-structural brackets may be fabricated in the field as necessary to mount the antenna. Brackets should be made of minimum 0.032" thickness aluminum and should span as short a distance as possible.

Some fabric aircraft include aluminum paste in the fabric finishing process, often referred to as "silver coats". Presence of thick fabric and/or heavy "silver coats" may degrade the signal strength of the antenna.

Figure to be added

Figure 3-25 Generic Non-structural ARINC 743 Footprint Antenna Installation

3.5.3 Non-Structural Installation to Glareshield

Figure 3-26 shows an example of a bracket created to support an antenna mounted on the underside of the glare shield. Figure 3-27 shows the non-structural mounting of the antenna under the glareshield, with the bracket assembly shown in Figure 3-26.

Figure to be added

Figure 3-26 Example Bracket Antenna Mounting Under Glareshield

Figure to be added

Figure 3-27 Example Non-structural Antenna Mounting Under Glareshield

3.5.4 Non-structural Installation to Airframe

Internal Non-structural Installation

Figure 3-28 and Figure 3-29 show examples of under the fabric skin non-structural mounting of the antenna to the airframe of a tube-and-fabric aircraft.

In Figure 3-28, a bracket is made to attach to the airframe, just under the fabric for a teardrop antenna installation. The doubler plate and mounting hardware described in the generic installation (Section 3.5.1) are used with the bracket as the antenna mounting surface. In Figure 3-29, a similar case is shown using the generic installation of the ARINC 743 footprint antenna. The doubler plate is optional for this type of installation with either the Teardrop or the ARINC 743 antenna.

Figure to be added

Figure 3-28 Example Teardrop Antenna Installation In Airframe Under Fabric Skin

Figure to be added

Figure 3-29 Example ARINC 743 Footprint In Airframe Under Fabric Skin

External Non-structural Installation

Figure 3-30 is an example of an external, non-structural mounting of the antenna in a tube-and-fabric aircraft. The antenna support bracket shown should be made of 2024-T3 Aluminum with a minimum material thickness 0.032" and maximum distance between airframe tubes of 36". The bracket is installed to the airframe under the fabric, and the antenna is mounted externally to the bracket. The generic installation of the (Section 3.5.1) antenna is used, with the antenna support bracket as the mounting surface. Follow the applicable gasketing and sealant instructions in Section 3.3.2 (Teardrop style) or Section 3.4.2 (ARINC 743 style).

Figure to be added

Figure 3-30 Example Non-structural Antenna Mounting On Airframe

Minimum Distance from Metal Tube Structure Requirements

Figure 3-31 shows minimum distance from metal tube structure requirements for internal, non-structural mounting of the antenna. Table 3-6 presents minimum distance requirements between the tube structure and the antenna for cases where the antenna sits underneath the fabric in a metal-tube structure aircraft. Figure 3-31 illustrates the tube diameter (d) and minimum distance (l) references in the Table 3-6.

Figure to be added

Figure 3-31 Example Teardrop Footprint Antenna Mounting Under Fabric Skin

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Table 3-6 Minimum Distance Required Between Tube Structure and Antenna

Illustrated Case	Tube Diameter d (in)	Minimum Distance l (in)
Top of antenna at or above the center of the tube structure (Figure 3-31, top)	0.625	3.6
	0.75	4.3
	1.00	5.7
	1.25	7.2
Top of antenna between the center and bottom of the tube structure (Figure 3-31, bottom)	0.625	7.2
	0.75	8.6
	1.00	11.5
	1.25	14.3

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4 SOFTWARE, CONFIGURATION, DATABASES, AND SIRIUSXM® ACTIVATION

4.1 Configuration Mode

Some software loading and all configuration settings are performed in the configuration mode. To enter configuration mode, hold down the left-hand softkey (softkey #1) while powering on the Garmin Device.

Figure to be added

4.2 Software/Audio Data Identification

4.2.1 LRU Software and Audio Data Version Identification

Do the following steps to verify the unit's current software and audio data versions:

1. Turn on the unit in configuration mode.
2. Use the FMS Joystick or Touch Panel to select the CONFIG MAIN page (if needed).

Figure to be added

3. Note the displayed software and audio database versions.

Figure to be added

4. Use the FMS Joystick or Touch Panel to scroll down as needed to display the audio database (and other) information.

4.3 Software Loading Procedure

Software loading is performed in normal mode.

See the Garmin website (www.garmin.com) for instructions on downloading and installing software.

4.3.1 Garmin Device Software Loading Procedure

1. Power on the Garmin Device in normal mode, then insert the properly formatted SD card into the SD card slot.

NOTE

It is also acceptable to insert the SD card before powering on the unit.

2. A Software update window will appear on the screen, highlight YES and press the ENT key to begin the update.

Figure to be added

3. The unit will reboot, then software update will begin automatically.
4. Ensure power is not removed while the update is being performed
5. The unit will reboot after the update is complete.

4.4 Configuration Pages

4.4.1 Main Configuration Page

The Main Configuration Page is used to display LRU (device) specific information such as Unit and System ID's and Database information for the various databases used by the Garmin Device. This page has no user-selectable options.

1. In configuration mode, use the FMS Joystick or Touch Panel to select and view the MAIN Page.

Figure to be added

4.4.2 ACFT Configuration Page

The Aircraft Configuration Page allows setting the parameters for Flight Planning, Aircraft Identifier, and Map Symbol. The aircraft's cruise speed, fuel flow, aircraft identifier, and map symbol can be entered on this page.

The flight planning fields let you adjust the default values (cruise speed and fuel flow) used for flight planning calculations.

Aircraft Identifier–The aircraft identifier can be entered using the FMS Joystick.

Map Symbol– The aircraft symbol that is displayed on the Map page can be selected.

1. In configuration mode, use the FMS Joystick or Touch Panel to select the ACFT Page.

Figure to be added

2. Use the FMS Joystick or Touch Panel to select the desired configurable item and make the desired change. Then press the ENT Key or use the FMS Joystick or Touch Panel to select the next item. Press the FMS Joystick to move the cursor to the page selection menu when finished.

Figure to be added

4.4.3 W/B (Weight/Balance) Configuration Page

The W/B Configuration Page allows setting the weight and balance parameters for the airplane, these parameters are then used on the Main Menu W/B Page in normal mode. Weight/Balance may be used during pre-flight preparations to verify the weight and balance conditions of the aircraft. By entering the weight and arm values into the Aircraft window, the Garmin Device can calculate the total weight, moment, and center of gravity (CG).

Before entering the various figures, the empty weight of the airplane and the arm (or "station") for each weight should be determined. These figures should be determined using the pilot's operating handbook for the airplane, which also notes the weight limitations and fore/aft CG limits. Compare those figures to the values calculated by the Garmin Device.

Each station listed in the Station window has an editable name and arm location. This allows the setting of the units of measure used for that station (weight, or units of avgas or jet fuel). Optionally a maximum value can be set for a particular station (e.g. a fuel tank might have a max capacity of 50 gallons) or the max can be set to zero so that no maximum will be imposed.

The LOADING LIMITS window contains fields for the entry of minimum and maximum aircraft weight, and the minimum and maximum CG location.

1. In configuration mode, use the FMS Joystick to select the W/B Page.

Figure to be added

2. Use the FMS Joystick to select the desired configurable item and make the desired change, then press the ENT Key or use the FMS Joystick to select the next item.
3. To create a new station, press the NEW softkey, enter the name, units, max weight, and arm, then highlight DONE and press the ENT key.
4. To edit or delete a station, highlight the desired station, then press the edit or delete softkey.
5. Press the FMS Joystick to move the cursor to the page selection menu when finished.

4.4.4 UNITS Configuration Page

The Units Configuration Page allows selection of the desired displayed units for the listed items in the Units Configuration window. The various settings for Location Format, Map Datum, and Heading can be accessed in the Position Configuration window. See the Garmin Device Pilot's Guide for a description of Location Format and Map Datum.

1. In configuration mode, use the FMS Joystick to select the UNITS Page.

Figure to be added

2. Use the FMS Joystick to select the desired configurable item and make the desired change. Then press the ENT Key or use the FMS Joystick to select the next item. Press the FMS Joystick to move the cursor to the page selection menu when finished.

Figure to be added

4.4.5 DSPL (Display) Configuration Page

The DSPL Configuration Page allows setting the parameters for Display and Backlight Control configuration.

1. In configuration mode, use the FMS Joystick to select the DSPL Page.

Figure to be added

2. Use the FMS Joystick to select the desired configurable item and make the desired change. Then press the ENT Key or use the FMS Joystick to select the next item. Press the FMS Joystick to move the cursor to the page selection menu when finished.

Figure to be added

4.4.5.1 Display Configuration Window:

Backlight Intensity: Can be set to Auto or Manual (this setting is also available in normal mode on the Display Setup page).

Auto–Sets the backlight intensity (display brightness) based on the aircraft's instrument lighting bus voltage.
Manual–Allows setting the display brightness by changing the Backlight Intensity (0-9) setting found beside the 'Manual' setting.

Default Mode: Can be set to Auto or Manual (described above). This controls the backlight mode that will be active each time the system is powered on.

4.4.5.2 Automatic Backlight Control Window (settings apply only to 'Auto' setting):

Input Voltage–Displays the current lighting bus voltage

Backlight Level–Displays the current backlight level (0-100%)

Graph–Brightness is displayed as the vertical (Y) axis, and aircraft lighting bus voltage is displayed as the horizontal (X) axis. The graph changes according to the auto backlight control settings, and the lighting bus voltage.

Off Threshold–Sets the lighting bus threshold voltage. At the threshold voltage, the backlighting is turned on per the Min Brightness setting. Below the threshold voltage, the backlighting defaults to a Backlight Level of 100% . The' ±' setting controls the range that the Off Threshold voltage is in effect. Default values are 2.9V & ±0.15V.

Min Brightness (Voltage and Percentage)–Sets the lower bus voltage required to turn the backlighting on to the percentage of brightness set by the Min % setting. Default values are 3.0V and 10%.

Max Brightness (Voltage and Percentage)–Sets the upper bus voltage required to turn the backlighting on to the percentage of brightness set by the Max % setting. Default values are 12.0V and 100%.

Input Type–Sets the aircraft lighting bus voltage for either 12 or 24V input to match the aircraft lighting bus voltage.

Time Constant–Adjusts the speed (in seconds), that the brightness level responds to changes in the input voltage level.

4.4.6 SOUND Configuration Page

The SOUND Configuration Page allows setting the parameters for various alert and message tones.

1. In configuration mode, use the FMS Joystick to select the SOUND Page.

Figure to be added

2. Use the FMS Joystick to select the desired configurable item and make the desired change. Then press the ENT Key or use the FMS Joystick to select the next item. Press the FMS Joystick to move the cursor to the page selection menu when finished.

Figure to be added

The configuration options for the SOUND Configuration Page are listed/described as follows:

Alert Volume – Controls the volume level of audio alerts (settings: Off, 1-10)

Message Tones – Controls the volume level of message tones (settings: Off, 1-10)

Terrain Audio – Enables/disables terrain awareness audio alerts

TIS Audio – Enables/disables TIS traffic audio alerts

Alert Output – If set to MONO + STEREO, alert tones and messages will be output on both the mono and stereo outputs. If set to MONO ONLY, alert tones and messages will be output only on the mono output.

4.4.7 COMM Configuration Page

The COMM Configuration Page allows setting the parameters for the communication ports.

1. In configuration mode, use the FMS Joystick to select the COMM Page.

Figure to be added

2. Use the FMS Joystick to select the desired configurable item and make the desired change. Then press the ENT Key or use the FMS Joystick to select the next item. Press the FMS Joystick to move the cursor to the page selection menu when finished.

Figure to be added

A green checkbox will appear next to the name of each RS-232 port when it is receiving valid data.

The RS-232 comm port configuration options for the COMM Configuration Page are listed/described as follows:

Garmin Data Transfer - The proprietary format used to exchange data with a PC.

NMEA Out - Supports the output of standard NMEA 0183 version 3.01 data at a baud rate of 4800.

Aviation In - The proprietary format used for input to the Garmin Device (baud rate of 9600) from an FAA certified Garmin panel mount unit. Allows the Garmin Device to display a Go To or route selected on the panel mount unit, which eliminates the need to enter the destination on both units.

Aviation In/NMEA & VHF Out - Receives aviation data and transmits out both NMEA data, at 9600 baud, and VHF frequency tuning information to a Garmin Nav/Comm radio.

TIS In - Receives TIS data from a Garmin Mode S transponder.

TIS In/NMEA & VHF Out - Receives TIS data and transmits out both NMEA data, at 9600 baud, and VHF frequency tuning information to a Garmin Nav/Comm radio.

MapMX - The preferred data source when interfacing with an external navigator, and is only available from Garmin units with a WAAS GPS receiver. When MapMX data is received, the Garmin Device display can show more accurate information about the external navigator flight plan (e.g. DME, arcs, and holding patterns).

SL30 Nav/Comm - RS-232 format. Outputs frequency tuning and course selection data to an SL30.

SL40 Comm - Outputs frequency tuning data to an SL40.

4.5 Garmin Database Updates

The Garmin Device MFD database updates can be obtained by visiting the 'flyGarmin' website (www.fly.garmin.com). The 'flyGarmin' website requires the unit's System ID to update databases. This allows the databases to be encrypted with the unit's unique System ID when copied to the SD Card.

Since these databases are stored internally in each Device, each Device will need to be updated separately. The SD card may be removed from the applicable Device after installing the database(s). After the databases have been updated, check that the appropriate databases are initialized and displayed on the splash screen during power-up.

4.5.1 Updating Garmin Databases

Equipment required to perform the update is as follows:

- Windows-compatible PC computer (Windows 2000 or XP recommended)
- SanDisk SD Card Reader, P/Ns SDDR-93 or SDDR-99 or equivalent card reader
- Updated database obtained from the flyGarmin website
- SD Card, 2 GB recommended (Garmin recommends SanDisk® or Toshiba brand)

After the data has been copied to the SD card, perform the following steps:

1. Insert the SD card in the card slot of the Garmin Device to be updated.
2. Turn on the Garmin Device to be updated.

NOTE

Steps 1 and 2 can be performed in reverse order.

3. Upon turn-on, a screen appears which lists the databases on the SD card. A green checkbox indicates that the database already installed on the G300 is up to date, an empty checkbox indicates that the database on the SD card is more current and should be installed (alternatively, the Database Update page can be accessed via Main Menu > Tools > Database > Menu > Update Databases).

Figure to be added

1. The database(s) can be updated by either highlighting UPDATE ALL and pressing the ENT key; or by using the FMS Joystick to highlight a single database and pressing the ENT Key.

Figure to be added

2. When the update process is complete, the screen displays the database status.

Figure to be added

3. Once the database(s) have been updated, the SD card can be removed from the unit

Figure to be added

4. The unit must be restarted by pressing the Restart softkey.

4.5.2 Available Databases

Airport Directory Data

The Airport Directory contains airport statistics such as pattern altitudes, noise abatement information, FBO phone numbers, hours of operation, local attractions, ground transportation, lodging, and services. This database is updated on a quarterly cycle, and has no expiration date.

Basemap

The basemap contains data for the topography and land features, such as rivers, lakes, and towns. It is updated only periodically, with no set schedule. There is no expiration date.

Chartview™ Database

ChartView is an optional feature that must be activated by purchasing a ChartView unlock card (010-00769-53). ChartView resembles the paper version of Jeppesen® terminal procedures charts. The ChartView database is stored on an SD memory card that remains in the display during normal operation. The ChartView database is updated by removing the database card, updating the database on the card, and reinserting the card. ChartView data is updated by purchasing database subscription updates from Jeppesen Sanderson.

FliteCharts

The FliteCharts database contains terminal procedure charts for the United States only. This database is updated on a 28-day cycle.

Jeppesen® Aviation Data (NavData™)

The Jeppesen database contains the general aviation data (NavData) used by pilots (Airports, VORs, NDBs, SUAs, etc.) and is updated on a 28-day cycle.

Obstacle

The obstacle basemap contains data for obstacles, such as towers, that pose a potential hazard to aircraft. Obstacles 200 feet and higher are included in the obstacle database. It is very important to note that not all obstacles are necessarily charted and therefore may not be contained in the obstacle database. This database is updated on a 56-day cycle.

SafeTaxi

The SafeTaxi database contains detailed airport diagrams for selected airports. These diagrams aid in following ground control instructions by accurately displaying the aircraft position on the map in relation to taxiways, ramps, runways, terminals, and services. This database is updated on a 56-day cycle, and has no expiration date.

Terrain

The terrain database contains the elevation data which represents the topography of the earth. This database is updated on an irregular basis.

VFR/IFR Chart Viewing

VFR, IFR, and TPC Charts can be obtained by visiting the 'flyGarmin' website (www.fly.garmin.com).

4.6 Sirius XM® Activation Instructions (Garmin Device only)

Follow the below instructions to activate the SiriusXM receiver in the Garmin Device.

Before SiriusXM Satellite Weather can be used, the service must be activated by calling SiriusXM at 1.800.985.9200. Service is activated by providing SiriusXM Satellite Radio with a Radio ID. SiriusXM Satellite Radio uses the Radio ID to send an activation signal that allows the Garmin Device MFD to display weather data an/or entertainment programming. SiriusXM service should activate in 45 to 60 minutes.

1. The Radio ID can be displayed by accessing the XM Audio Page, and then pressing the INFO Softkey. Record the Radio ID for reference during SiriusXM Activation.
2. Make sure that the aircraft's SiriusXM antenna has an unobstructed view of the southern sky. It is highly recommended that the aircraft be outside of and away from the hangar.
3. Hook up the aircraft to external power if available. The complete activation process may take 45-60 minutes or more, depending on the demand on the SiriusXM activation system.
4. Power on the avionics and allow the Garmin Device to power up. Do not power cycle the units during the activation process.
5. Go to the SiriusXM Info Page. During the activation process the unit may display several different activation levels, this is normal and should be ignored. When the service class (Aviator Lite, Aviator, or Aviator Pro) and all of the weather products for the class that you subscribed to are displayed, the activation is complete. Wait 30 seconds to allow the Garmin Device to store the activation before removing power.

NOTE

During the activation process do not change channels or pages.

APPENDIX A GARMIN DEVICE PINOUTS

A.1 Garmin Device

A.1.1 J4601 Connector

The J4601 connector is used only for connections to the GSU 25.

Figure to be added

Figure A-1 View of J4601 Connector from Back of Unit

Pin	Pin Name	I/O
1	CAN BUS HI	Out
2	CAN BUS LO	--
3	RESERVED	--
4	RS-232 TX	Out
5	RS-232 RX	In
6	GND	--
7	PWR 1	In
8	PWR 2	In
9	GND	--

A.1.2 J4602 Connector

Figure to be added

Figure A-2 View of J4602 Connector from Back of Unit

Table A-1 J4602

Pin	Pin Name	I/O
1	MONO AUDIO OUT HI	Out
2	STEREO AUDIO OUT LO	--
3	STEREO AUDIO OUT LEFT	Out
4	SPARE	--
5	SPARE	--
6	DO NOT USE	--
7	DO NOT USE	--
8	DO NOT USE	--
9	CDU SYSTEM ID PROGRAM* 2	In
10	CDU SYSTEM ID PROGRAM* 1	In
11	RESERVED FOR FUTURE DEVELOPMENT, DO NOT USE	--
12	RESERVED FOR FUTURE DEVELOPMENT, DO NOT USE	--
13	RS-232 OUT 3	Out
14	RS-232 IN 2	In
15	POWER GROUND	--
16	POWER GROUND	--
17	CONFIG MODULE POWER OUT (3.3V VERY LOW CURRENT)	Out
18	MONO AUDIO OUT LO	--
19	STEREO AUDIO OUT RIGHT	Out
20	STEREO AUDIO OUT LO	--
21	RESERVED FOR FUTURE DEVELOPMENT, DO NOT USE	In
22	RESERVED FOR FUTURE DEVELOPMENT, DO NOT USE	In

Table A-1 J4602

Pin	Pin Name	I/O
23	RS-232 IN 4	In
24	RS-232 IN 5	In
25	CDU SYSTEM ID PROGRAM* 3	In
26	28V LIGHTING BUS HI	In
27	SIGNAL GROUND	--
28	CAN BUS TERMINATION	--
29	RS-232 IN 3	In
30	RS-232 OUT 2	Out
31	AIRCRAFT POWER 2	In
32	AIRCRAFT POWER 1	In
33	CONFIG MODULE CLOCK	I/O
34	SIGNAL GROUND	--
35	SIGNAL GROUND	--
36	SIGNAL GROUND	--
37	SIGNAL GROUND	--
38	RESERVED FOR FUTURE DEVELOPMENT, DO NOT USE	In
39	RESERVED FOR FUTURE DEVELOPMENT, DO NOT USE	In
40	RS-232 OUT 4	Out
41	RS-232 OUT 5	Out
42	CDU SYSTEM ID PROGRAM* 4	In
43	14V LIGHTING BUS HI	In
44	SIGNAL GROUND	--
45	CAN BUS LO	I/O
46	CAN BUS HI	I/O
47	RS-232 IN 1	In
48	RS-232 OUT 1	Out
49	CONFIG MODULE GROUND	--
50	CONFIG MODULE DATA	I/O

* Indicates Active Low

A.1.3 J4603 Connector

J4603 is used for CAN connections to LRUs other than the GSU 25.

Figure to be added

Figure A-3 View of J4603 Connector from Back of Unit

Pin	Pin Name	I/O
1	CAN BUS HI	Out
2	CAN BUS LO	--
3	RESERVED	--
4	RESERVED	--
5	RESERVED	--
6	RESERVED	--
7	RESERVED	--
8	RESERVED	--
9	RESERVED	--

A.1.4 Aircraft Power

AIRCRAFT POWER 1 AND AIRCRAFT POWER 2 are “diode ORed” to provide aircraft power redundancy. Use 22 AWG wire (min) for all power and ground connections.

Table A-2 Aircraft Power

Pin Name	Connector	Pin	I/O
AIRCRAFT POWER 1	J4602	32	In
AIRCRAFT POWER 2	J4602	31	In
POWER GROUND	J4602	15	--
POWER GROUND	J4602	16	--

A.1.5 Configuration Module

Connect the configuration module to the PFD1 unit; do not connect a config module to PFD2 or the MFD.

Table A-3 Configuration Module

Pin Name	Connector	Pin	I/O
CONFIG MODULE POWER OUT (3.3V, very low current)	J4602	17	Out
CONFIG MODULE CLOCK	J4602	33	I/O
CONFIG MODULE GROUND	J4602	49	--
CONFIG MODULE DATA	J4602	50	I/O

A.1.6 CDU System ID Program Pins

CDU SYSTEM ID PROGRAM* 4, pin 42. Demo mode is for in-store demonstration use only, never ground pin 42 in an aircraft installation.

Table A-4 CDU System ID Program Pins

Pin Name	Connector	Pin	I/O
CDU SYSTEM ID PROGRAM* 1	J4602	10	In
CDU SYSTEM ID PROGRAM* 2	J4602	9	In
CDU SYSTEM ID PROGRAM* 3	J4602	25	In

Table A-5 Demo Mode

(J4602, Pin 42)	DISPLAY MODE
Open	MFD
Ground	DEMO

A.1.7 Serial Data

A.1.7.1 RS-232

5 Channels of RS-232 I/O data.

Table A-6 RS-232

Pin Name	Connector	Pin	I/O
RS-232 IN 1	J4602	47	In
RS-232 OUT 1	J4602	48	Out
RS-232 IN 2	J4602	14	In
RS-232 OUT 2	J4602	30	Out
RS-232 IN 3	J4602	29	In
RS-232 OUT 3	J4602	13	Out
RS-232 IN 4	J4602	23	In
RS-232 OUT 4	J4602	40	Out
RS-232 IN 5	J4602	24	In
RS-232 OUT 5	J4602	41	Out

A.1.7.2 CAN Bus Termination

Pin 28 of the J4602 connector is used as the CAN Bus Termination.

A.1.8 Lighting

The Garmin Device display and keys can be configured to track 28 VDC or 14 VDC lighting busses using these inputs.

Table A-7 Lighting

Pin Name	Connector	Pin	I/O
14V LIGHTING BUS HI	J4602	43	In
28V LIGHTING BUS HI	J4602	26	In

A.1.9 Audio

A.1.9.1 Mono Audio

Table A-8 Mono Audio

Pin Name	Connector	Pin	I/O
MONO AUDIO OUT HI	J4602	1	Out
MONO AUDIO OUT LO	J4602	18	--

A.1.10 Stereo Audio

Table A-9 Stereo Audio

Pin Name	Connector	Pin	I/O
STEREO AUDIO OUT LEFT	J4602	3	Out
STEREO AUDIO OUT LO*	J4602	20	--
STEREO AUDIO OUT RIGHT	J4602	19	Out
STEREO AUDIO OUT LO*	J4602	2	--

*The left and right common pins (pins 2 and 20) may be tied together or only one may be used. It is not necessary to use both common pins.

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APPENDIX B CONNECTOR INSTALLATION INSTRUCTIONS

CAUTION

This instruction manual assumes skill and knowledge of aircraft harness fabrication techniques. DO NOT PERFORM THIS INSTALLATION IF YOU ARE UNQUALIFIED.

NOTE

The Garmin Device rear connector (J4601) is electrically isolated. For installations using shielded cables, a ground pin must be tied to the connector shell.

B.1 Jackscrew Backshell Installation Instructions

B.1.1 Shield Block Installation Parts

Table B-1 and Table B-2 list the parts needed to install a Shield Block. Parts listed in Table B-1 are supplied in the Device Connector Kit (011-01921-00). Parts listed in Table B-2 are to be provided by the installer.

Table B-1 Parts supplied for a Shield Block Installation (Figure B-1)

Figure Ref	Description	GPN or MIL spec
1	Cast Backshell Housing	125-00175-00
6	Contacts	336-00094-00
12	Clamp	115-01078-04
13	Screw,4-40x.375,PHP,SS/P,w/Nylon	211-60234-10
14	Cover	115-01079-04
15	Screw,4-40x.187,FLHP100,SS/P,w/Nylon	211-63234-06

Table B-2 Parts not supplied for a Shield Block Installation (Figure B-1)

Figure Ref	Description	GPN or MIL spec
2	Multiple Conductor Shielded Cable (2-conductor shown in Figure B-1)	Parts used depend on method chosen
3	Drain Wire Shield Termination (method optional)	Parts used depend on method chosen
4	Braid, Flat (19-20 AWG equivalent, tinned plated copper strands 36 AWG, Circular Mil Area 1000 -1300)	Parts used depend on method chosen
5	Floating Shield Termination (method optional)	Parts used depend on method chosen
7	Ring terminal, #8, insulated, 18-22 AWG	MS25036-149
	Ring terminal, #8, insulated, 14-16 AWG	MS25036-153
	Ring terminal, #8, insulated, 10-12 AWG	MS25036-156

Table B-2 Parts not supplied for a Shield Block Installation (Figure B-1)

Figure Ref	Description	GPN or MIL spec
8	Screw, PHP, 8-32x.312", Stainless	MS51957-42
	Screw, PHP, 8-32x.312", Cad Plated Steel	MS35206-242
9	Split Washer, #8, (.045" compressed thickness) Stainless	MS35338-137
	Split Washer, #8, (.045" compressed thickness) Cad-plated steel	MS35338-42
10	Flat Washer, Stainless, #8, .032" thick, .174"ID, .375" OD	NAS1149CN832R
	Flat washer, Cad-plated Steel, #8, .032" thick, .174"ID, .375" OD	NAS1149FN832P
11	Silicon Fusion Tape	-

NOTE

In Figure B-1, "AR" denotes quantity "As Required" for the particular installation.

Figure to be added

Figure B-1 Shield Install onto a Jackscrew Backshell (78 pin example)

B.1.2 Shield Termination Technique – Method A.1 (Standard)

NOTE

For the following steps please refer to the drawings showing the installation of a Jackscrew Backshell.

1. The appropriate number of Jackscrew Backshells will be included in the particular LRU connector kit.

Figure to be added

Figure B-2 Method A.1 for Shield Termination

Table B-3 Shielded Cable Preparations for Garmin Connectors

Backhell Size	Number of Pins Std/ HD	Float Min (inches)	Float Max (inches)	Ideal Float (inches)	Window Min (inches)	Window Max (inches)	Ideal Window (inches)
1	9/15	1.25	2.25	1.75	2.75	5.25	4.25
2	15/26	1.5	2.5	2.0	3.0	5.5	4.5
3	25/44	1.5	2.5	2.0	3.0	5.5	4.5
4	37/62	1.5	2.5	2.0	3.0	5.5	4.5
5	50/78	1.5	2.5	2.0	3.0	5.5	4.5

2. At one end of a shielded cable (item 2) measure a distance between “Window Min” to “Window Max” (Table B-3) and cut a window (max size 0.35”) in the jacket to expose the shield (Figure B-2). Use caution when cutting the jacket to avoid damaging the individual braids of the shield. When dealing with a densely populated connector with many cables, it may prove beneficial to stagger the windows throughout the “Window Min” to “Window Max” range. If staggering is not needed the “Ideal Window” length is recommended.

Suggested tools to accomplish the window cut:

- Coaxial Cable Stripper
- Thermal Stripper
- Sharp Razor Blade

3. Connect a Flat Braid (item 4) to the shield exposed through the window of the prepared cable assembly (item 2) from step 2. The Flat Braid should go out the front of the termination towards the connector. It is not permitted to exit the rear of the termination and loop back towards the connector (Figure B-2). Make this connection using an approved shield termination technique.

NOTE

FAA AC 43.13-1B Chapter 11, Section 8 (Wiring Installation Inspection Requirements) may be a helpful reference for termination techniques.

Preferred Method:

Slide a solder sleeve (item 3) onto the prepared cable assembly (item 2) and connect the Flat Braid (item 4) to the shield using a heat gun approved for use with solder sleeves. It may prove beneficial to use a solder sleeve with a pre-installed Flat Braid versus having to cut a length of Flat Braid to be used. The chosen size of solder sleeve must accommodate both the number of conductors present in the cable and the Flat Braid (item 4) to be attached.

Solder Sleeves with pre-installed Flat Braid

A preferred solder sleeve would be the Raychem S03 Series with the thermochromic temperature indicator (S03-02-R-9035-100, S03-03-R-9035-100, S03-04-R-9035-100). These solder sleeves come with a pre-installed braid and effectively take the place of items 3 and 4. For detailed instructions on product use, reference Raychem installation procedure RCPS 100-70.

Raychem recommended heating tools:

- HL1802E
- AA-400 Super Heater
- CV-1981
- MiniRay
- IR-1759

Individual solder sleeves and Flat Braid

Solder Sleeves:

Reference the following MIL-Specs for solder sleeves.
(M83519/1-1, M83519/1-2, M83519/1-3, M83519/1-4, M83519/1-5)

Flat Braid:

If the preferred Raychem sleeves are not being used, the individual flat braid selected should conform to ASTMB33 for tinned copper and be made up of 36 AWG strands to form an approximately 19-20 AWG equivalent flat braid. A circular mil area range of 1000 to 1300 is required. The number of individual strands in each braid bundle is not specified. (e.g. QQB575F36T062)

NOTE

Flat Braid as opposed to insulated wire is specified in order to allow continuing air worthiness by allowing for visual inspection of the conductor.

Secondary Method:

Solder a Flat Braid (item 4) to the shield exposed through the window of the prepared cable assembly (item 2). Ensure a solid electrical connection through the use of acceptable soldering practices. Use care to avoid applying excessive heat that burns through the insulation of the center conductors and shorts the shield to the signal wire. Slide a minimum 0.75 inches of Teflon heat shrinkable tubing (item 3) onto the prepared wire assembly and shrink using a heat gun. The chosen size of heat shrinkage tubing must accommodate both the number of conductors present in the cable and the Flat Braid (item 4) to be attached.

Teflon Heat Shrinkable Tubing:

Reference the following MIL-Spec for Teflon heat shrinkable tubing (M23053/5-X-Y).

4. At the same end of the shielded cable (item 2) and ahead of the previous shield termination, strip back "Float Min" to "Float Max" (Table B-3) length of jacket and shield to expose the insulated center conductors (Figure B-2). The "Ideal Float" length may be best to build optimally.

   Preferred Method:

   The jacket and shield should be cut off at the same point so no shield is exposed. Slide 0.75 inches minimum of Teflon heat shrinkable tubing (item 5) onto the cable and use a heat gun to shrink the tubing. The chosen size of heat shrinkage tubing must accommodate the number of conductors present in the cable.

   Secondary Method:

   Leave a max 0.35 inches of shield extending past the jacket. Fold this 0.35 inches of shield back over the jacket. Slide a solder sleeve (item 5) over the end of the cable and use a heat gun approved for solder sleeves to secure the connection. The chosen size of solder sleeve must accommodate the number of conductors present in the cable.

5. Strip back approximately 0.17 inches of insulation from each wire of the shielded cable (item 2) and crimp a contact (item 6) to each conductor. It is the responsibility of the installer to determine the proper length of insulation to be removed. Wire must be visible in the inspection hole after crimping and the insulation must be 1/64 – 1/32 inches from the end of the contact as shown in Figure B-3.

Figure to be added

Figure B-3 Insulation/Contact Clearance

6. Insert newly crimped pins and wires into the appropriate connector housing location as specified by the installation wiring diagrams.
7. Cut the Flat Braid (item 4) to a length that, with the addition of a ring terminal, will reach one of the tapped holes of the Jackscrew backshell (item 1) (Figure B-1). An appropriate amount of excess length without looping should be given to the Flat Braid (item 4) to allow it to freely move with the wire bundle.

NOTE

Position the window splice to accommodate a Flat Braid (item 4) length of no more than 4 inches.

8. Guidelines for terminating the newly cutoff Flat Braid(s) (item 4) with insulated ring terminals (item 7):
   - Each tapped hole on the Jackscrew Backshell (item 1) may accommodate only two ring terminals (item 7).
   - It is preferred that only two Flat Braid(s) (item 4) be terminated per ring terminal. Two Flat Braids per ring terminal will necessitate the use of a Ring terminal, #8, insulated, 14-16 AWG (MS25036-153).
   - If only a single Flat Braid is left or if only a single Flat Braid is needed for this connector a Ring terminal, #8, insulated, 18-22 AWG (MS25036-149) can accommodate this single Flat Braid.
   - If more braids exist for this connector than two per ring terminal, it is permissible to terminate three braids per ring terminal. This will necessitate the use of a Ring terminal, #8, insulated, 10-12 AWG (MS25036-156).
9. Repeat steps 2 through 8 as needed for the remaining shielded cables.
10. Terminate the ring terminals to the Jackscrew Backshell (item 1) by placing items on the Pan Head Screw (item 8) in the following order: Split Washer (item 9), Flat Washer (item 10) first Ring Terminal, second Ring Terminal (if needed) before finally inserting the screw into the tapped holes on the Jackscrew Backshell. Do not violate the guidelines presented in Step 8 regarding ring terminals.
11. It is recommended to wrap the cable bundle with Silicone Fusion Tape (item 11) (GPN: 249-00114-00 or a similar version) at the point where the backshell clamp and cast housing will contact the cable bundle.

NOTE

Choosing to use this tape is the discretion of the installer.

12. Place the smooth side of the backshell clamp (item 12) across the cable bundle and secure using the three screws (item 13). Warning: Placing the grooved side of the clamp across the cable bundle may risk damage to wires.
13. Attach the cover (item 14) to the backshell (item 1) using the two screws (item 15).

B.1.3 Shield Termination Technique - Method A.2 (Daisy Chain)

In rare situations where more braids need to be terminated for a connector than three per ring terminal it is allowable to daisy chain a maximum of two shields together before coming to the ring terminal (Figure B-4). All other restrictions and instructions for the shield termination technique set forth for Method A.1 are still applicable.

NOTE

The maximum length of the combined braids should be approximately 4 inches.

Figure to be added

Figure B-4 Method A.2 (Daisy Chain) for Shield Termination

B.1.4 Shield Termination – Method B.1 (Quick Term)

If desired, the drain wire termination (item 3) and the floating shield termination (item 5) can be effectively combined into a "Quick Term". This method eliminates the float in the cable insulation and moves the placement of the window which was described by the dimensions "Window Min" and "Window Max" from Method A. This technique is depicted in Figure B-5.

NOTE

The original purpose for separating the shield drain termination (item 3) from the float termination (item 5) in Method A was to allow for a variety of lengths for the drain wires so that the shield drain terminations (item 3) would not all "bunch up" in the harness and to eliminate loops in the drain wires. If Method B is chosen, as described in this section, care must be taken to insure that all drain shield terminations can still be inspected. With connectors which require a large number of shield terminations it may be best to use Method A. This will allow the drain shield terminations (item 3) a larger area to be dispersed across.

Using this method, the instructions from Section B.1.2 (Method A) are followed except that:

1. Step 2 is eliminated

2. Steps 3 and 4 are replaced by the following:
   At the end of the shielded cable (item 2), strip "Quick Term Min" to "Quick Term Max" (Table B-4) length of the jacket to expose the shield. Next trim the shield so that at most 0.35 inches remains extending beyond the insulating jacket. Fold this remaining shield back over the jacket.

   Connect a Flat Braid (item 4) to the folded back shield of the prepared cable assembly. The flat braid should go out the front of the termination towards the connector. It is not permitted to exit the rear of the termination and loop back towards the connector. (Figure B-5). Make this connection using an approved shield termination technique.

NOTE

FAA AC 43.13-1B Chapter 11, Section 8 (Wiring Installation Inspection Requirements) may be a helpful reference for termination techniques.

Preferred Method:

Slide a solder sleeve (item 3) onto the prepared cable assembly (item 2) and connect the Flat Braid (item 4) to the shield using a heat gun approved for use with solder sleeves. It may prove beneficial to use a solder sleeve with a pre-installed Flat Braid versus having to cut a length of Flat Braid to be used. The chosen size of solder sleeve must accommodate both the number of conductors present in the cable and the Flat Braid (item 4) to be attached.

NOTE

Reference Section B.1.2 for recommended solder sleeves and flat braid. The same recommendations are applicable to this technique.

Secondary Method:

Solder a Flat Braid (item 4) to the folded back shield on the prepared cable assembly (item 2). Ensure a solid electrical connection through the use of acceptable soldering practices. Use care to avoid applying excessive heat that burns through the insulation of the center conductors and shorts the shield to the signal wire. Slide a minimum of 0.75 inches of Teflon heat shrinkable tubing (item 3) onto the prepared wire assembly and shrink using a heat gun. The chosen size of heat shrinkage tubing must accommodate both the number of conductors present in the cable as well as the Flat Braid (item 4) to be attached.

Teflon Heat Shrinkable Tubing:

Reference the following MIL-Spec for general Teflon heat shrinkable tubing (M23053/5-X-Y)

Figure to be added

Figure B-5 Method B.1 (Quick Term) for Shield Termination

Table B-4 Shielded Cable Preparations – (Quick Term)

Backshell Size	Number of Pins Std/HD	Quick Term Min (inches)	Quick Term Max (inches)	Quick Term Float (inches)
1	9/15	1.25	2.25	1.75
2	15/26	1.5	2.5	2.0
3	25/44	1.5	2.5	2.0
4	37/62	1.5	2.5	2.0
5	50/78	1.5	2.5	2.0

B.1.5 Shield Termination-Method B.2 (Daisy Chain-Quick Term)

In rare situations where more braids need to be terminated for a connector than three per ring terminal it is allowable to daisy chain a maximum of two shields together before coming to the ring terminal (Figure B-6). All other restrictions and instructions for the shield termination technique set forth for Method B.1 are still applicable.

NOTE

The maximum length of the combined braids should be approximately 4 inches.

Figure to be added

Figure B-6 Method B.2 (Daisy Chain-Quick Term) for Shield Termination

B.1.6 Daisy Chain between Methods A and B

In rare situations where more braids need to be terminated for a connector than three per ring terminal and a mixture of Methods A and B have been used, it is allowable to daisy chain a maximum of two shields together from a Method A termination to a Method B (Figure B-7). All other restrictions and instructions for the shield termination technique set forth for Method A and B are still applicable.

NOTE

The maximum length of the combined braids should be approximately 4 inches.

Figure to be added

Figure B-7 Daisy Chain between Methods A and B

B.1.7 ID Program Pins (Strapping)

NOTE

The Garmin Device rear connector (J4601) is electrically isolated. For installations using programming pins, a ground pin must be tied to the connector shell.

ID Program Pins provide a ground reference used by the hardware as a means of configuration for system identification. The following instructions will illustrate how this ground strapping should be accomplished with the Jackscrew Backshell:

1. Cut a 4 inch length of 22 AWG insulated wire.

WARNING

Flat Braid is not permitted for this purpose. Use only insulated wire to avoid inadvertent ground issues that could occur from exposed conductors.

2. Strip back approximately 0.17 inches of insulation and crimp a contact (item 6) to the 4” length of 22 AWG insulated wire. It is the responsibility of the installer to determine the proper length of insulation to be removed. Wire must be visible in the inspection hole after crimping and the insulation must be 1/64 – 1/32 inches from the end of the contact as shown in Figure B-3.
3. Insert newly crimped pins and wires into the appropriate connector housing location as specified by the installation wiring diagrams.
4. At the end opposite the pin on the 22 AWG insulated wire strip back 0.2 inches of insulation.
5. Terminate this end via the ring terminals with the other Flat Braid per Steps 8 and 11 pertaining to shield termination. If this ground strap is only wire to terminate, attach a Ring terminal, #8, insulated, 18-22 AWG (MS25036-149).

B.1.8 Splicing Signal Wires

NOTE

Figure B-8 illustrates that a splice must be made within a 3 inch window from outside the edge of clamp to the end of the 3 inch max mark.

WARNING

Keep the splice out of the backshell for pin extraction, and outside of the strain relief to avoid preloading.

Figure B-8 shows a two wire splice, but a maximum of three wires can be spliced. If a third wire is spliced, it is located out front of splice along with signal wire going to pin.

Splice part numbers:

- Raychem D-436-36/37/38
- MIL Spec MIL-S-81824/1

This technique may be used with shield termination methods: A.1, A.2, B.1, B.2, C.1 and C.2.

Figure to be added

Figure B-8 D-Sub Spliced Signal Wire illustration