

GDL[®] 50(R)/51(R)/52(R)

Data Link

Installation Manual



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DEFINITIONS OF WARNINGS, CAUTIONS, AND NOTES



WARNING

A warning means injury or death is possible if the instructions are not obeyed.



CAUTION

A caution means that damage to the equipment is possible.



NOTE

A note gives more information.



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.



NOTE

References to GDL 5X in this installation manual refer to the Garmin GDL 50, GDL 51 and GDL 52 unless specifically noted otherwise. References to GDL 5XR in this installation manual refer to the Garmin GDL 50R, GDL 51R and GDL 52R unless specifically noted otherwise.



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FCC ID: IPH-02895

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and may cause harmful interference to radio communications if not installed and used in accordance with the instructions. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet that is on a different circuit from the unit.
- Consult the dealer or an experienced radio/TV technician for help.

2. IC

IC: 1792A-02895

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M/N: A02895



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1 GENERAL DESCRIPTION

1.1 Introduction

This manual provides installation guidance, but does not provide any approval, which may be required in some cases, to install these devices in an aircraft. This manual is not a substitute for an approved airframe-specific maintenance manual, installation design drawing, or complete installation data package.

Attempting to install equipment by reference to this manual alone and without first planning or designing an installation specific to your aircraft may compromise your safety and is not recommended. The content of this manual assumes use by competent and qualified avionics engineering personnel and/or avionics installation specialists using standard aviation maintenance practices in accordance with Title 14 of the Code of Federal Regulations and other relevant accepted practices. This manual is not intended for use by individuals who do not possess the competencies and abilities set forth above.



NOTE

Garmin recommends installation of the GDL® 5X/5XR by a Garmin-authorized installer. To the extent allowable by law, Garmin will not be liable for damages resulting from improper or negligent installation of the GDL 5X/5XR. For questions, please contact Garmin Product Support at 1-888-606-5482.

1.2 Equipment Description

The Garmin GDL 50/50R/51/51R/52/52R products are not TSO-certified products and have received no FAA approval or endorsement. These products can provide the following data: GPS, SiriusXM weather/audio, ADS-B traffic and weather, attitude and pressure to compatible displays and audio devices using Bluetooth® wireless technology and/or over wired connections.

The GDL 52/52R data link products include internal WAAS-enabled GPS, dual-band ADS-B & SiriusXM receivers, and attitude & pressure sensors. The GDL 51/51R product provide the same functionality except for the dual band ADS-B receiver. The GDL 50/50R products provide the same functionality except for the SiriusXM receiver.

The GDL 5X provide these functions in a portable form factor that includes applicable internal GPS/SXM/ADS-B antennas, and an internal battery. The GDL 5XR products are remote mount versions that require external antennas and power connections. No battery is provided in the remote mount versions.

The GDL 50/50R/52/52R receives Traffic (ADS-B/ADS-R and TIS-B) on both Universal Access Transceiver (UAT) and 1090 ES (Extended Squitter) frequency bands. When in range of a ground station, these units will receive FIS-B weather over the UAT link.

The GDL 5X/5XR products provide this information to Garmin® units like the aera® 660/795/796, G3X™ Touch™ displays and devices running Garmin Pilot™. These products will request this information over a Connxt® data connection. Please see additional information in the pilot's guide for your display.

1.2.1 Features Summary

- Internal SXM antenna (51/52 only)
- Internal GPS antenna (5X only)
- Internal ADS-B antenna (50/52 only)
- External SXM antenna port (51/51R/52/52R only)
- External GPS antenna port
- External ADS-B antenna port (50/50R/52/52R only)
- 3.5 mm audio jack (audio out only) (51/52 only)
- 2 RS-232 ports
- Wired audio out (51R/52R only)
- Micro-USB port for charging, power, and SW updates (GDL 5X only)
- Supports Bluetooth Connections to 2 displays + 1 audio device
- Attitude Sensor
- Pressure Sensor

1.2.2 Compatible Displays

The following Garmin devices are compatible with the GDL 5X/5XR units.

- aera 660
- aera 795/796
- G3X Touch Displays (GDU™ 4XX)
- Garmin Pilot App

1.2.3 Compatible Audio Devices

Although not an exhaustive list, the following Garmin audio panels are compatible with the GDL 5X/5XR units.

- GMA™ 245
- GMA 345
- GMA 350c

Additionally, aviation headsets that support the Bluetooth A2DP Profile (audio streaming) should be compatible with the GDL 5X/5XR products. See the applicable pilot's guide and headset manual for additional information.

1.3 Technical Specifications

1.3.1 Physical Characteristics

Table 1-1 GDL 5X Physical Characteristics

Characteristic	Specification
Height (GDL 51)	1.30 inches (33.0 mm)
Height, Antenna Down (GDL 50/52)	1.50 inches (38.1 mm)
Height, Antenna Up (GDL 50/52)	3.37 inches (85.6 mm)
Width	4.90 inches (124.4 mm)
Depth	3.40 inches (86.4 mm)
Weight, GDL 5X	0.75 lbs (0.34 kg)
Height w/Mounting Bracket	1.51 inches (38.3 mm)
Width w/Mounting Bracket	5.26 inches (133.6 mm)
Depth w/Mounting Bracket	3.52 inches (89.5 mm)
Weight w/Mounting Bracket	0.81 lbs (0.37 kg)
Height w/Mounting Bracket and Non-Slip Pad	1.65 inches (41.9 mm)
Width w/Mounting Bracket and Non-Slip Pad	7.50 inches (190.5 mm)
Depth w/Mounting Bracket and Non-Slip Pad	5.50 inches (139.7 mm)
Weight w/Mounting Bracket and Non-Slip Pad	1.06 lbs (0.48 kg)

Table 1-2 GDL 5XR Physical Characteristics

Characteristic	Specification
Height	1.60 inches (40.6 mm)
Width	6.10 inches (154.9 mm)
Depth	5.00 inches (127.0 mm)
Depth w/Connector	6.46 inches (164.2 mm)
Weight, GDL 50R	0.77 lbs (0.35 kg)
Weight, GDL 51R	0.78 lbs (0.35 kg)
Weight, GDL 52R	0.83 lbs (0.38 kg)

1.3.2 General Specifications

Table 1-3. General Specifications

Characteristic	Specification
Operating Voltage	14/28 VDC refer to Table 1-4 for detailed power requirements
Temperature Range	-20°C to +60°C (operation) -20°C to +30°C (storage) -20°C to +50°C (short term storage) 0°C to +40°C (battery charging range)
Maximum Altitude	55,000 ft
Headphone Output	Output amplifiers: 1 Stereo 3.5mm output for lineout/consumer audio Power, Load, and Distortion: 20 mW into a 16 Ω Load with < 1.0% THD Typical Operating Distortion: <1% THD+N 3dB Frequency Response Bandwidth: 20 Hz to 20 kHz for Music Typical Output Voltage @ 100% Output: 1.0 VRMS into a 600 Ω load
Bluetooth Connectivity	Bluetooth 3.00 Compliant, allows music and connections to Connex capable displays. Bluetooth supports SPP and A2DP. The GDL stores 14 paired devices and overwrites the least recently connected device when a new device is paired. Only 1 Bluetooth audio connection is allowed at one time.
USB Port (GDL 5X only)	The Micro-USB port is rated for 10W of input power (only in charging mode). Max input current is 2A. USB 2.0 compatible and mass storage mode available.

1.3.3 Power Requirements

Table 1-4 lists the power requirements for the GDL 5X/5XR units. Aircraft power input voltage range is 10-32 VDC. The GDL 5X/5XR will operate down to emergency voltage (9V). USB input voltage range is 5V +/- 0.25V.

Table 1-4. Power Specifications

Unit	Aircraft Power - Unit On, Not Charging	Aircraft Power - Unit On, Charging	Aircraft Power - Unit Off, Charging	USB Power - Unit On	USB Power - Unit On, Charging	USB Power - Unit Off, Charging
GDL 50	0.17A @14V	0.35A @ 14V	0.82A @ 14V	0.4 A @ 5V	0.92A @ 5V	2.0A @ 5V
	0.09A @ 28V	0.18A @ 28V	0.40A @ 28V			
GDL 50R	0.17A @14V	NA	NA	NA	NA	NA
	0.09A @ 28V					
GDL 51	0.17A @14V	0.35A @ 14V	0.82A @ 14V	0.4 A @ 5V	0.92A @ 5V	2.0A @ 5V
	0.09A @ 28V	0.18A @ 28V	0.40A @ 28V			
GDL 51R	0.16A @ 14V	NA	NA	NA	NA	NA
	0.09A @ 28V					
GDL 52	0.27A @ 14V	0.50A @ 14V	0.84A @ 14V	0.67A @ 5V	1.24A @ 5V	2.0A @ 5V
	0.14A @ 28V	0.24A @ 28V	0.41A @ 28V			
GDL 52R	0.30A @ 14V	NA	NA	NA	NA	NA
	0.15A @ 28V					

1.4 Reference Documents

The following publications are sources of additional information for installing the GDL 5X/5XR. Before installing the unit, the technician should read all relevant referenced materials along with this manual.

Table 1-5 GDL 5X/5XR Reference Documents

Document	P/N
G3X/G3X Touch Installation Manual	190-01115-01
aira 795/796 Pilot's Guide	190-01194-00
Garmin Pilot User's Guide	190-01501-00
User's Guide, Garmin Pilot for Android	190-01532-00
G3X Touch Pilot's Guide	190-01754-00
aira 660 Pilot's Guide	190-02017-20
GDL 50/51/52 User's Guide	190-02087-02

2 INSTALLATION OVERVIEW

2.1 Introduction

This section provides the necessary information for the installation and checkout of the GDL 5X/5XR. Installation of the GDL 5X/5XR will differ according to equipment location and other factors. The appendices contain interconnect wiring diagrams, mounting dimensions, and information pertaining to installation.

Careful planning and consideration of the suggestions in this section are required to achieve the desired performance and reliability from the GDL 5X/5XR. The guidance of FAA advisory circulars AC 43.13-1B and AC 43.13-2B, where applicable, may be found useful for making retro-fit installations that comply with FAA regulations.

2.2 Installation Materials

2.2.1 Unit Configurations

The GDL 5X/5XR can be identified by the part numbers listed in Table 2-1.

Table 2-1 GDL 5X/5XR Available Configurations

Model	Part Number	Notes
GDL 50	010-01561-00	GDL 50, Unit Only (011-03910-00)
GDL 50R	010-01561-10	GDL 50R, Unit Only (011-03910-10)
GDL 51	010-01561-40	GDL 51, Unit Only (011-03910-40)
GDL 51R	010-01561-50	GDL 51R Unit Only (011-03910-50)
GDL 52	010-01561-20	GDL 52 Unit Only (011-03910-20)
GDL 52R	010-01561-30	GDL 52R Unit Only (011-03910-30)

2.3 Available Accessories

2.3.1 Standard Accessories

Each of the following accessories are provided with the GDL 5X units. No accessories are provided with the GDL 5XR units.

Table 2-2 GDL 5X Accessories

Item	Garmin P/N	Qty
Mounting Bracket	145-02489-00	1
Suction Cup w/Cable Slot	253-00503-00	1
Vehicle Power Adapter 5V 2.0A, Micro-USB	320-00239-53	1
Cable Assy, Micro B to A Style USB, Mass Storage, 0.5m	320-00559-00	1

2.3.2 Accessories Not Supplied

Each of the following accessories are provided separately. For the GDL 5XR units, a single connector kit (010-12498-60) and mounting hardware (not provided) are required to install the unit.

Table 2-3 GDL 5X Available Accessories

Equipment	Garmin P/N
MCX to BNC Adapter Cable	010-10121-00
AC Adapter Cable, Micro B	010-11478-02
Cable Assembly, Data/Power (GDL Bare Wire)	010-11686-40
Cable Assembly, Data/Power with Mount (aera 795/796)	010-11686-50
Cable Assembly, 12C Cig Lighter to 18 Pin Connector	010-11686-60
Cable Assembly, Data/Power with Mount (aera 660)	010-12373-02
Mounting Kit	010-12498-00
Portable Friction Mount	010-12498-10
Mounting Bracket	010-12498-20
Vehicle Power Cable, Micro-USB	010-12498-30
GA 24 MCX SXM Antenna	010-12498-40
GDL 50/52 ADS-B Replacement Antenna	010-12498-70
Carry Case	010-11270-00
GA 25 MCX External GPS Antenna	010-10702-00
GA 27C GPS Antenna Kit	010-10052-02

Table 2-4 GDL 5XR Available Accessories

Equipment	Garmin P/N
GA 25 BNC Remote GPS Antenna (Low Profile)	010-10701-00
GA 24 TNC SXM Antenna (GDL 51R/52R only)	010-12498-50
GDL 5XR Connector Kit	010-12498-60
GA 26C, GPS Antenna	010-10052-04

Table 2-5 Contents of Connector Kit (010-12498-60)

Equipment	Garmin P/N	Quantity
Backshell w/Hardware, Jackscrew 15/26 pin	011-01855-01	1
D-Sub Connector Receptacle, Crimp Socket 15 ckt	330-00625-15	1
Contact, Socket, Mil Crimp, Size 20, 20-24 AWG	336-00022-02	16

2.3.3 Additional Equipment Required

- Cables: The installer will fabricate and supply all system cables. Interconnect wiring diagrams are detailed in [Appendix B](#).
- For GDL 5X mounting bracket hardware (not provided): #8-32 100° flat head screw (4 ea.) and #8-32 self-locking nut (4 ea.).
- For GDL 5XR hardware (not provided): (6 ea) #6-32 screw and (6 ea) #6-32 self-locking nut for installing the GDL 5XR unit to the aircraft frame.
- Push/Pull (that can be manually reset) circuit breaker (3 Amp recommended).
- Tie Wraps or Lacing Cord
- Ring Terminals (for grounding) #8 size
- Silicon Fusion Tape (GPN 249-00114-00) to wrap the cable bundle. Silicone fusion tape is available at most major suppliers like Mouser, Digi-key, and Home Depot.
- Solder Sleeves for terminating the shields of the cable to the GDL 5XR backshell. See [Section 3.3](#) for part numbers.
- Heat shrink tubing

2.4 Installation Considerations

The GDL 5XR interfaces with various avionics equipment. Fabrication of a wiring harness is required. Sound mechanical and electrical methods and practices are required for installation of the GDL 5XR.

2.4.1 Compass Safe Distance

After reconfiguring the avionics in the cockpit panel, if the unit is mounted less than 12 inches from the compass, recalibrate the compass and make the necessary changes for noting correction data.

2.4.2 GDL 5X Battery Information

If these guidelines are not followed, the internal Lithium Ion battery may experience a shortened life span or may present a risk of damage to the unit, fire, chemical burn, electrolyte leak, and/or injury.

- Do not leave the unit exposed to a heat source or in a high temperature location, such as in the sun in an unattended aircraft on a hot day. To prevent damage, remove the unit from the aircraft or store it out of direct sunlight.
- Do not disassemble, puncture, damage, or incinerate the unit/battery.
- When storing the unit for a limited length of time (less than 30 days), store within the following temperature range: -4° to 122°F (-20° to 50°C).
- When storing the unit for an extended time, store within the following temperature range: -4° to 86°F (-20° to 30°C).
- Do not operate the unit outside of the following temperature range: -4° to 140°F (-20° to 60°C).
- Do not remove or attempt to remove the battery.
- Do not immerse or expose unit to water or other liquids.
- Do not use a power and data cable that is not approved or supplied by Garmin.
- Contact your local waste disposal department to dispose of the device in accordance with applicable laws and regulations.
- The battery LED of the GDL 5X will flash red, if the battery is too hot/cold to charge. This indication will only occur when the unit is in standby.
- Garmin recommends fully charging the unit with a USB wall charger (1A or higher), before first use. (USB ports on most PC's supply only 0.5A.)

2.5 GDL 5X/5XR Installation Guidance for Best Wireless Performance

The GDL 5X/5XR products can use Bluetooth wireless technology to create Connex[®] connections to display devices. For optimal wireless performance make sure the unit has an unobstructed view of the Connex enabled devices.

GDL 5XR mounting location will vary for each installation depending on aircraft body type (metal or fiberglass) and the surrounding structures/equipment. For best performance, mount the GDL 5XR with the front of the unit (LEDs and connectors) facing the cockpit and centered laterally between the two aircraft sides.

The GDL 5X Connex wireless antenna is located on the front face of the unit as shown in the red rectangle in Figure 2-1.



Figure 2-1 GDL 5X Connex Antenna Location

The GDL 5XR ConnexT wireless antenna is located on the front face of the unit as shown in the red rectangle in Figure 2-2 below.



Figure 2-2 GDL 5XR ConnexT Antenna Location

Do not install the GDL 5XR in a metal box or beneath a floor panel, as this will attenuate (decrease) the wireless signal. If the installation contains another device that uses Bluetooth wireless technology, mount the devices apart from each other as much as possible (at minimum, leave a small gap between the devices) to prevent signal interference.



NOTE

If poor ConnexT wireless performance is observed, check the auto reconnect settings and disable any devices that are not intended to be used.

2.6 Cabling and Wiring

Refer to the interconnect examples in [Appendix B](#) for wire gauge guidance.

If using larger barrel contacts, make sure that no two contacts are mounted directly adjacent to each other. This minimizes the risk of contacts touching and shorting to adjacent pins and to ground.

Use wire and cable meeting the applicable aviation regulation. Use the following precautions when routing wire and cable:

- Keep wire and cable as short and direct as possible
- Avoid sharp bends
- Avoid routing near power sources (e.g. 400 Hz generators, trim motors, etc) or near power of fluorescent lighting
- Route the GPS, ADS-B, SiriusXM antenna cables as far as possible away from all COM transceivers and other antenna cables.
- RG400 or RG142 coaxial cable with 50 Ω nominal impedance and meeting applicable aviation regulations should be used when installing optional external antennas.



NOTE

Avoid installing the unit near heat sources. If this is not possible, provide additional cooling. Allow adequate space for installation of cables and connectors. The installer will supply and fabricate all of the cables.

2.7 Cooling Air

The GDL 5X/5XR does not have provisions for attaching cooling air, however the thermal characteristics of the installation should always be assessed. An undesirable thermal condition could be created due to the unit's own internal power dissipation combined with restricted ventilation, or due to heat generated by adjacent equipment. Limiting thermal build up, by means of fan or natural convection is always a good practice and recommended to increase the product lifespan.

2.8 Configuration, and Adjustment Options

The GDL 5X/5XR has several configuration/adjustment options. More information about these configuration items can be found in the connected display pilot's guide. The configuration/adjustments are as follows:

- Cabin Pressure Setting
 - Pressurized Cabin or Unpressurized Cabin
- Attitude Sensor Reset
 - Use this to zero the pitch/roll to the current aircraft attitude.
- Compatibility Mode
 - Using this setting may improve Garmin Pilot Connex data connections.
- Auto Reconnect Settings for paired wireless devices

The GDL 5X/5XR products can simultaneously support up to: 2 wireless display devices, 1 wireless audio device, 2 wired display devices, and 1 wired audio device.



NOTE

If poor Connex wireless performance is observed, check the auto reconnect settings and disable any devices that are not intended to be used.

2.9 Front Panel

The GDL 5X/5XR units have several status LEDs visible on the face of the unit that indicate the unit's current status. Table 2-6 describes the operation of the status LEDs. GDL 5X LEDs are auto-dimming, GDL 5XR LEDs are fixed brightness.

Table 2-6 GDL 5X/5XR Status LEDs

LED Color/ State	Battery/Power	Connex	GPS	ADS-B (GDL 50/50R/ 52/52R only)	SXM (GDL 51/51R/52/ 52R only)
OFF	Unit off	No active connection	No GPS fix	No Ground Signal	No signal
RED	*Charging (solid) Fault (flashing)	Not used	Fault	Fault	Fault
ORANGE	*Battery <=20%	N/A	Firmware update	N/A	Firmware update
GREEN	*Battery >= 20% OR External power is applied *Battery saver feature (flashing)	N/A	GPS fix	Ground station signal received in the last minute	Minimum required or better signal
BLUE	N/A	Active connection (solid) OR Pairing list cleared (flashing)	N/A	N/A	N/A

*GDL 5X only

2.10 Updating Software

Software updates for the GDL 5X/5XR can be received through your Garmin display device. See the display device documentation for details. The GDL 5X (but not the GDL 5XR) products can also use WebUpdater to receive SW updates. To use WebUpdater, connect the GDL 5X to an internet connected computer using a Micro-USB cable and follow the instructions at www.garmin.com/webupdater.

2.10.1 Checking Software Version

The GDL 5X/5XR comes pre-loaded with system software. However, if the software is out of date, it is recommended that current software be loaded.

The current version of software can be viewed on the connected display. See the Pilot's Guide of the connected display for instructions.

2.10.2 Downloading Flight Data Log

The GDL 5X has a flight data logging feature. To access the data log, connect the GDL 5X to a computer using the Micro-USB cable. The log files will be stored in the "Garmin/Logs" directory.

2.10.3 Activating a SiriusXM Subscription (GDL 51/51R/52/52R only)

SiriusXM offers several subscription options. Go to <http://www.siriusxm.com/sxmaviation> to find which subscription package is best for your needs.

Before you can activate your SiriusXM subscription, you must have the radio ID. The radio ID is available in the product box, the unit's S/N tag, and on the System Information Page of a connected device. See the owner's manual provided with your device for more information.

1. Contact SiriusXM by phone at (866) 528-7474 or go to <http://care.siriusxm.com> to subscribe.
2. Provide the necessary information to the SiriusXM representative or on the web site to activate your antenna.
3. Verify the functionality of the activated services:
 - For SiriusXM weather, on a connected device, view the Weather Products list and confirm that your subscribed services are listed. See the owner's manual provided with your device for more information.
 - For SiriusXM radio, on a connected device, go to the SiriusXM Audio Page and confirm that radio channels are available. See the owner's manual provided with your device for more information.
4. If the service is not activated within the hour, go to <http://care.siriusxm.com> or contact SiriusXM by phone at 1-855-MYREFRESH (697-3373).



NOTE

For the unit to receive the SiriusXM signal, it must be powered on, facing skyward.

2.11 Noise

To reduce noise on the audio lines, care must be taken to minimize effects from coupled interference and ground loops.

Coupled interference can sneak into audio system interconnecting cables when they are routed near large AC electric fields, AC voltage sources, and pulse equipment (strobos, spark plugs, magnetos, EL displays, CRTs, etc). Interference can also couple into audio system interconnecting cables by magnetic induction when they are routed near large AC current-carrying conductors or switched DC equipment (heaters, solenoids, fans, autopilot servos, etc).

Ground loops are created when there is more than one path in which return currents can flow, or when signal returns share the same path as large currents from other equipment. These large currents create differences in ground potential between the various equipment operating in the aircraft. These differences in potential can produce an additive effect at an audio panel signal input.

The audio panel may "see" the desired input signal plus an unwanted component injected by ground differentials, a common cause of alternator-related noise. This is the main reason why all audio jacks should be isolated from ground. Terminating audio shields just at one end eliminates another potential ground loop injection point.

Single-point grounding cannot be overstressed for the various avionics producing and processing audio signals. Single-point, in this context, means the various pieces of equipment share a single common ground connection back to the airframe. Good aircraft electrical/charging system ground bonding is also important.

The wiring diagrams and accompanying notes in this manual should be followed closely to minimize noise effects.

2.12 Mounting Requirements

The GDL 5X/5XR mounting surface must be capable of providing structural support.

The GDL 5X is mounted using a GDL 5X mounting bracket ([Appendix A-4](#)). See [Section 3.5](#) for installation instructions.

The GDL 5X/5XR includes a sensitive attitude measurement sensor. Consider the following when selecting a mounting location:

- Mount the unit with the FWD arrow aligned to within 3.0° of the longitudinal axis of the aircraft (LED bezel parallel to the wing spar). Mount the GDL 5XR so the connectors point in the aft direction.
- The unit can be mounted with the serial tag pointing straight up or straight down, within 30 degrees of a level flight position.
- Using the connected display, cage the gyros while the plane is in a level flight position.
- For proper attitude performance the unit should be rigidly mounted to the aircraft.
- The unit should be mounted to the aircraft with the LED bezel facing toward the rear of the aircraft.
- To prevent degraded accuracy, avoid placing the unit near areas that are prone to severe vibration.
- The mounting location for the unit should be protected from rapid thermal transients, in particular large heat loads from nearby high-power equipment.

3 INSTALLATION PROCEDURE

3.1 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 which is large enough to accommodate sufficient packing material to prevent movement.

3.2 Wiring Harness Installation

Allow adequate space for installation of cables and connectors. The installer shall supply and fabricate all cables. All electrical connections to the GDL® 5XR are made through one 15-pin D-subminiature connector. [Section 4](#) defines the electrical characteristics of all input and output signals. Required connectors and associated hardware are supplied with the connector kit.

See [Appendix B](#) for examples of interconnect wiring diagrams. Construct the actual harnesses in accordance with the aircraft manufacturer authorized interconnect standards.



CAUTION

Check wiring connections for errors before installing the GDL 5XR. Incorrect wiring could cause internal component damage.

Table 3-1. Pin Contact Part Numbers

Manufacturer [1]	15-pin D-Subminiature
	20-24 AWG
Garmin P/N	336-00022-02
Military P/N	M39029/63-368

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

Table 3-2 Recommended Crimp Tools

Manufacturer [1]	Hand Crimping Tool	20-24 AWG	
		Positioner	Insertion/ Extraction Tool
Military P/N	M22520/2-01	M22520/2-08	M81969/1-04
Daniels	Daniels AFM8	K13-1	M81969/1-04

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

3.3 Backshell Assembly

Garmin's backshell gives the installer the ability to easily terminate shield grounds at the backshell housing using the Shield Block. To assemble the backshell, refer to the Jackscrew Backshell Installation Instructions in the G3X™/G3X Touch™ Installation Manual (190-01115-01).

3.4 Coax Cable Installation

1. Route the coaxial cable to the unit location. Secure the cable in accordance with good aviation practice.
2. Trim the coaxial cable to the desired length and install the connector. If the connector is provided by the installer, follow the connector manufacturer's instructions for cable preparation.

3.5 Equipment Mounting

The GDL 5X can be mounted on the glare-shield.

The GDL 5XR will mount remotely. The GDL 5XR will be secured to the airframe using six screws supplied by the installer. For installation and assembly, refer to the outline and installation drawings in [Appendix A](#).



WARNING

When installing the GDL 5X in an aircraft, place the unit securely so it does not interfere with aircraft operating controls or obstruct the pilot's view.

3.6 Continued Airworthiness

Other than for regulatory checks, maintenance of the GDL 5X/5XR is 'on condition' only. Periodic maintenance of the GDL 5X/5XR is not required. Instructions for Continued Airworthiness (ICA) are not required for this product under 14 CFR Part 21 since the GDL 5X/5XR has received no FAA approval or endorsement.

3.7 Antenna Installation

3.7.1 ADS-B Antenna Installation

The GDL 50/52 units include an ADS-B antenna. An optional blade-type ADS-B antenna mounted on the bottom exterior of the aircraft can be connected to the GDL 50/52 using a cable connection to the unit's MCX connector.

The GDL 50R/52R requires an external ADS-B antenna for reception. The antenna should be mounted on the bottom of the aircraft and located at least 3.3 feet from high power transmitting antennas such as VHF Comm, HF transmitter, DME, Transponder, and Radar. The connection is made by attaching the cable from the external antenna to the BNC connector on the GDL 50R/52R. The GDL 50/50R/52/52R requires a UHF antenna that meets the following specifications:

- Standard 50 Ω vertically polarized antenna with a VSWR < 1.7:1 at 978 MHz and < 1.5:1 at 1090 MHz.
- TSO-C66, TSO-C74, or TSO-C112 antennas that also meet the VSWR specification.

3.7.2 GPS/SiriusXM Antenna Installation

This section contains general information as well as installation information for GPS/SXM antennas. Garmin recommends the antennas shown in [Table 3-6](#). However, any equivalent antenna that meets the specifications listed in [Table 3-3](#) will work with the GDL 5X/5XR GPS external antenna input. Any equivalent antenna that meets the specifications listed in [Table 3-4](#) will work with the GDL 5X/5XR external SiriusXM antenna input.

The GDL 5X can receive GPS position information using the unit's internal antenna or by connecting an external antenna to the MCX connector. It is recommended to verify the ability of the GDL 5X to receive GPS information through the internal antenna as GPS reception quality is dependent upon the installation. The GDL 5X/5XR can receive GPS information with any connected aera® or GDU™ 4XX display.

A GPS antenna is not required to be connected to a GDL 5XR when the unit is connected to a Garmin Aera 660/795/796 or GDU 4XX display. For best performance, mount the GPS, SiriusXM antennas on top of the aircraft and at least 3.3 feet away from all high power transmitting antennas.

Although no ground plane is required, the antenna typically performs better when a ground plane is used. The ground plane should be a conductive surface as large as practical, and is typically made of either aluminum sheet or wire mesh.

Table 3-3 GPS Antenna Minimum Requirements

Characteristics	Specifications
Frequency Range	1565 to 1585 MHz
Gain	16 to 25 dB typical, 40 dB max
Noise Figure	Less than 4.00 dB
Nominal Output Impedance	50 Ω
Supply Voltage	4.5 to 6.5 VDC
Supply Current	up to 60 mA

Table 3-4 XM 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 Ω
Supply Voltage	3.6 to 5.5 VDC
Supply Current (maximum)	150 mA
Operating Temperature Gain	-40 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 GDL 51R/52R. Note that gain specifications are defined at the output of connector for some antennas, e.g. GA 24 TNC. Additional attenuation will be required for any modifications made to the cabling to these external antennas.

3.8 Non-Garmin Antennas

Table 3-5 lists non-Garmin antennas currently supported by the GDL 5X/5XR. For non-Garmin antennas, follow the manufacturer’s installation instructions. It is the installer’s responsibility to make sure the antenna meets FAA standards according to the specific installation.

Table 3-5 Supported Non-Garmin Antennas

Model	Mount Style	Conn Type	Antenna Type	Mfr	Antenna Part Number	Garmin Order Number
Comant 2480-201 VHF/GPS*	Screw Mount, Teardrop Footprint	BNC/TNC*	VHF COM/ GPS	Comant	CI 2480-201	N/A
Comant 420-10 XM only** antenna	Screw Mount ARINC 743 Footprint	TNC	XM	Comant	CI 420-10	N/A

*The GPS antenna connector is TNC type. The VHF COM antenna connector is BNC type.

**GDL 51R/52R only

3.9 Garmin Antennas



NOTE

See the *G3X/G3X Touch Installation Manual (190-01115-01)* for detailed GPS antenna installation information. All antenna mounting and unit installation recommendations applicable to the *GDU37X/4XX* also apply to the *GDL 5X/5XR*.



NOTE

It is the installer's responsibility to make sure the antenna meets FAA standards according to the specific installation.

Table 3-6 Supported Garmin Antennas

Model	Part Number	Install Manual	Mounting Configuration
GA 26C (GPS)	011-00149-04	190-00082-00	Flange, Magnetic, or Suction Cup Mounts (for in-cabin mounting)
GA 35 (GPS/WAAS)	013-00235-0X	190-00848-00	Thru-Mount (tear drop form factor)
GA 36 (GPS/WAAS)	013-00244-0X	190-00848-00	Thru-Mount (ARINC 743 type mount)
GA 37 (GPS/XM)	013-00245-0X	190-00848-00	Thru-Mount (ARINC 743 type mount)
GA 55 (XM)	011-01033-00	190-00355-08	Stud Mount (tear drop form factor)
GA 55A (XM)	011-01153-00	190-00355-08	Thru-Mount (ARINC 743 type mount)
GA 56 (GPS)	011-00134-00	190-00094-00	Stud Mount (tear drop form factor)
GA 57X (GPS/XM)	011-01032-10	190-00522-02	Thru-Mount (ARINC 743 type mount)
GA 24 MCX (XM)	010-12498-40	N/A	Flange, Magnetic, or Suction Cup Mounts (for in-cabin mounting)
GA 24 TNC (XM)	010-12498-50	N/A	Flange, Magnetic, or Suction Cup Mounts (for in-cabin mounting)
GA 26 XM	013-00268-10	N/A	Flange, Magnetic, or Suction Cup Mounts (for in-cabin mounting)

3.10 Post Installation Checkout

An in-aircraft checkout may be performed in the aircraft on the ramp.

3.10.1 Power On Check

To start the GDL 5X, press and release the power button. Applying power to either the GDL 5X or GDL 5XR will also turn the devices on. Verify the Power LED stays illuminated green after the boot sequence completes.

3.10.2 Connex[®] Data Link Check

1. If a Connex connection is active, the Connex LED will be solid blue on the face of the GDL 5X/5XR. See the applicable display Pilot's Guide to pair the display with the GDL 5X/5XR or for configuring the serial port for wired connections.
2. Verify that any connected devices are receiving the proper information from the GDL 5X/5XR.
3. Use the display to verify the configuration options in [Section 2.9](#) are set accordingly.

4 SYSTEM INTERCONNECTS

4.1 Pin Function List

4.1.1 GDL® 5X Connections

Figure 4-1 shows the locations of the GPS Antenna, SiriusXM Antenna, Audio, and Data/Power ports for the GDL 5X units.

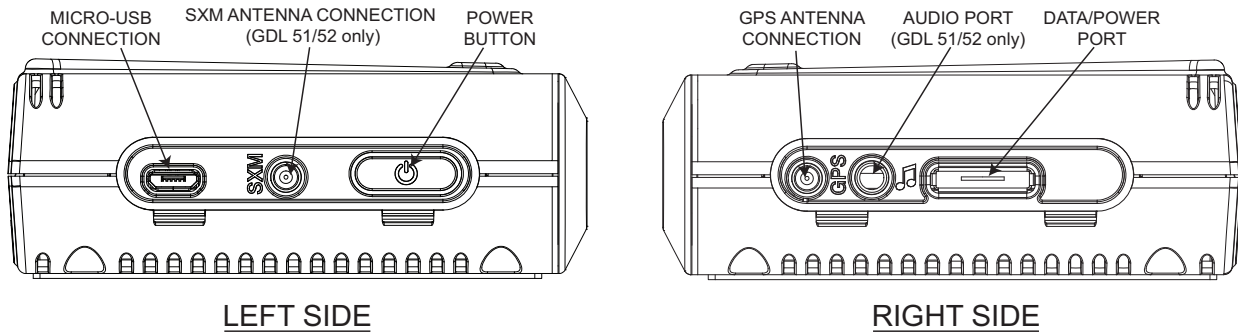


Figure 4-1 GDL 5X Connections

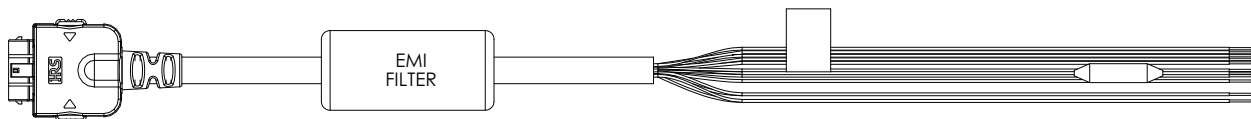


Figure 4-2 GDL 5X to Bare Wire Power/Data Cable (010-11686-40)

Table 4-1 GDL 5X Pin List

Connection Name	Wire Color	AWG
Vin 10-32 VDC	RED	26
RESERVED	GRAY	28
RS-232 RX 2	WHITE/ORANGE	28
RS-232 TX 2	ORANGE	28
RS-232 RX 1	WHITE/GREEN	28
RS-232 TX 1	GREEN	28
GROUND	BLACK	26

4.1.1.1 GDL 5X Power Connections

Use the Bare Wire Power/Data Cable ([Table 4-2](#)) to connect the red wire to aircraft power (10-32 VDC) and the black wire to aircraft ground.

4.1.1.2 GDL 5X RS-232 Electrical Characteristics

The RS-232 input/outputs conform to EIA Standard RS-232C with an output voltage swing of at least $\pm 5V$ when driving a standard RS-232 load.

Table 4-2 GDL 5X RS-232

Connection Name	Wire Color
RS-232 RX 2	WHITE/ORANGE
RS-232 TX 2	ORANGE
RS-232 RX 1	WHITE/GREEN
RS-232 TX 1	GREEN

4.1.1.3 GPS Antenna Connection

The GPS antenna connection uses a MCX connector, see [Section 3.9](#) for compatible antennas.

4.1.1.4 SXM Antenna Connection

The SXM antenna connection uses a MCX connector, see [Section 3.9](#) for compatible antennas.

4.1.2 GDL 5XR Connector

Figure 4-3 shows the 15 pin D-sub connector pin numbers and Figure 4-4 shows all GDL 5XR connectors.

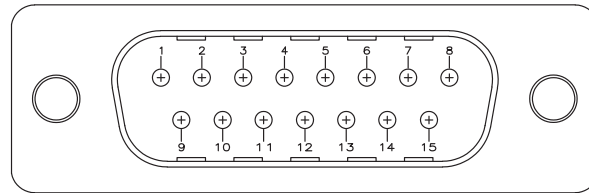


Figure 4-3 View of GDL 5XR Connector

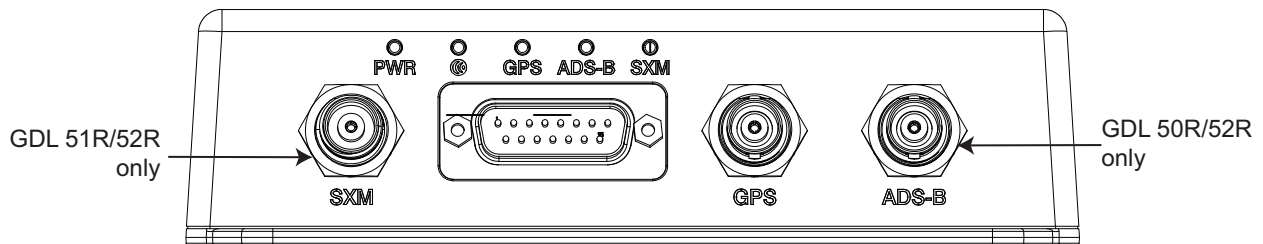


Figure 4-4 GDL 5XR connections

Table 4-3 GDL 5XR Pin List

Pin	Pin Name	I/O
1	RESERVED	--
2	RESERVED	--
3	RESERVED	--
4	RESERVED	--
5	RS-232 TX 2	Out
6	RS-232 RX 2	In
7	RS-232 TX 1	Out
8	RS-232 RX 1	In
9	POWER GROUND	--
10	AIRCRAFT POWER	In
11	SIGNAL GROUND	--
12	SIGNAL GROUND	--
13	MUSIC OUT LEFT (GDL 51R/52R only)	Out
14	MUSIC OUT COMMON (GDL 51R/52R only)	--
15	MUSIC OUT RIGHT (GDL 51R/52R only)	Out

4.1.2.1 GDL 5XR Aircraft Power

Connect pin 10 to aircraft power (14/28 VDC) and pin 9 to aircraft ground (see [Appendix B](#)). It is recommended that a 3 Amp fuse or circuit breaker be used to supply power to the GDL 5XR.

4.1.2.2 GDL 5XR RS-232 Electrical Characteristics

The RS-232 outputs conform to EIA Standard RS-232C with an output voltage swing of at least $\pm 5V$ when driving a standard RS-232 load (see [Appendix B](#)).

4.1.2.3 Music Output

The GDL 51R/52R MUSIC OUT signals are part of a differential pair (along with the MUSIC RIGHT and MUSIC LEFT signals). The MUSIC OUT COMMON signal should be used as part of a differential pair. See [Figure B-2](#) for an example connection to the GMA245 audio panel.

4.1.2.4 GPS Antenna Connection

The GPS antenna connection uses a BNC connector, see [Section 3.9](#) for compatible antennas.

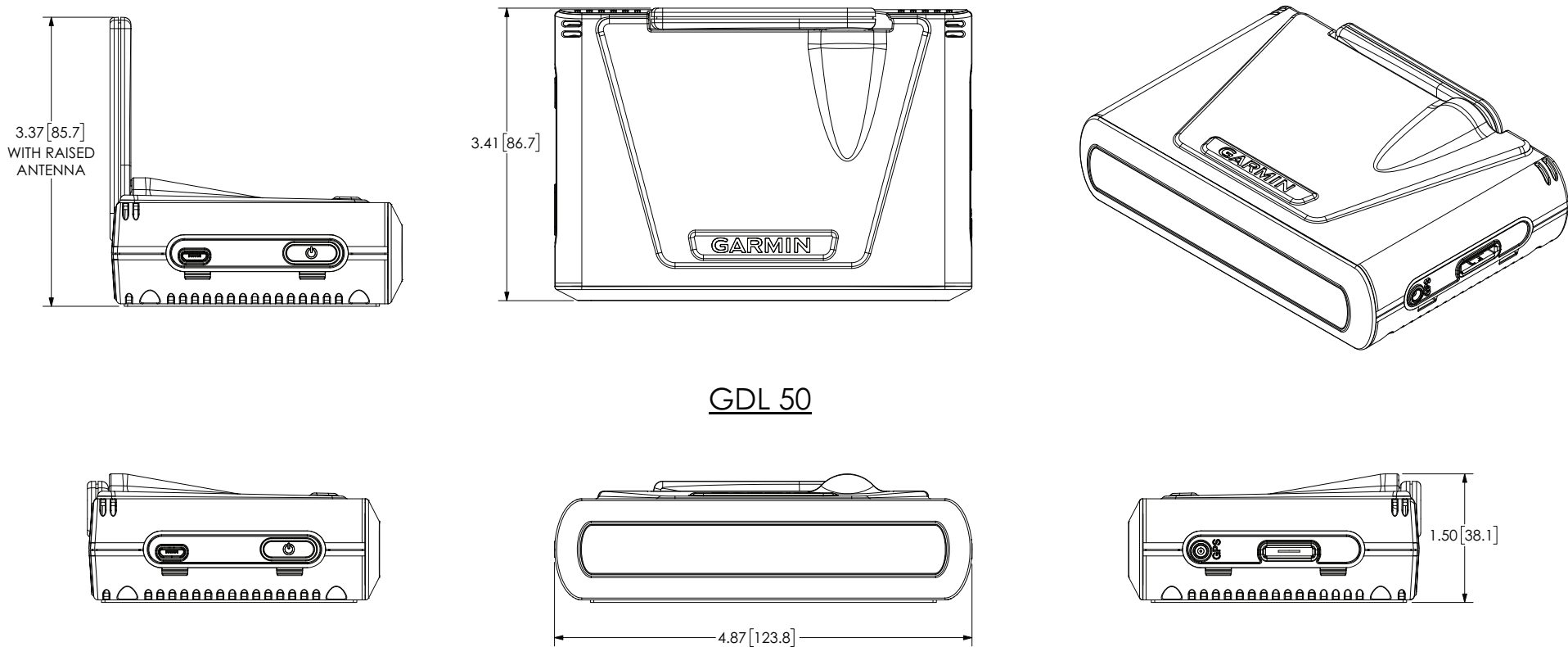
4.1.2.5 SXM Antenna Connection

The GDL 51R/52R SXM antenna connection uses a TNC connector, see [Section 3.9](#) for compatible antennas.

4.1.2.6 ADS-B Antenna Connection

The GDL 50R/52R ADS-B antenna connection uses a BNC connector, see [Section 3.7.1](#) for compatible antennas.

APPENDIX A OUTLINE AND INSTALLATION DRAWINGS

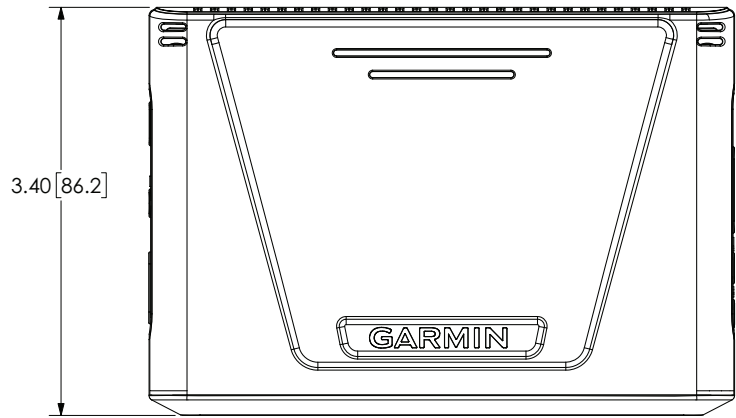


GDL 50

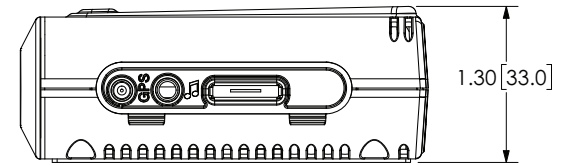
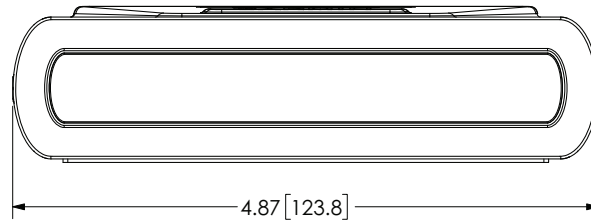
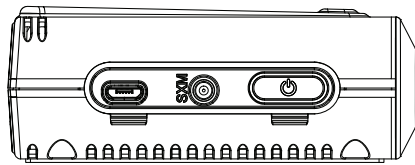
- NOTES:
 1. DIMENSIONS: INCHES[mm]. METRIC VALUES ARE FOR REFERENCE ONLY.
 2. DIMENSIONS ARE NOMINAL AND TOLERANCES ARE NOT IMPLIED UNLESS SPECIFICALLY STATED.

Figure A-1 GDL® 50 Outline Drawing

APPENDIX A OUTLINE AND INSTALLATION DRAWINGS



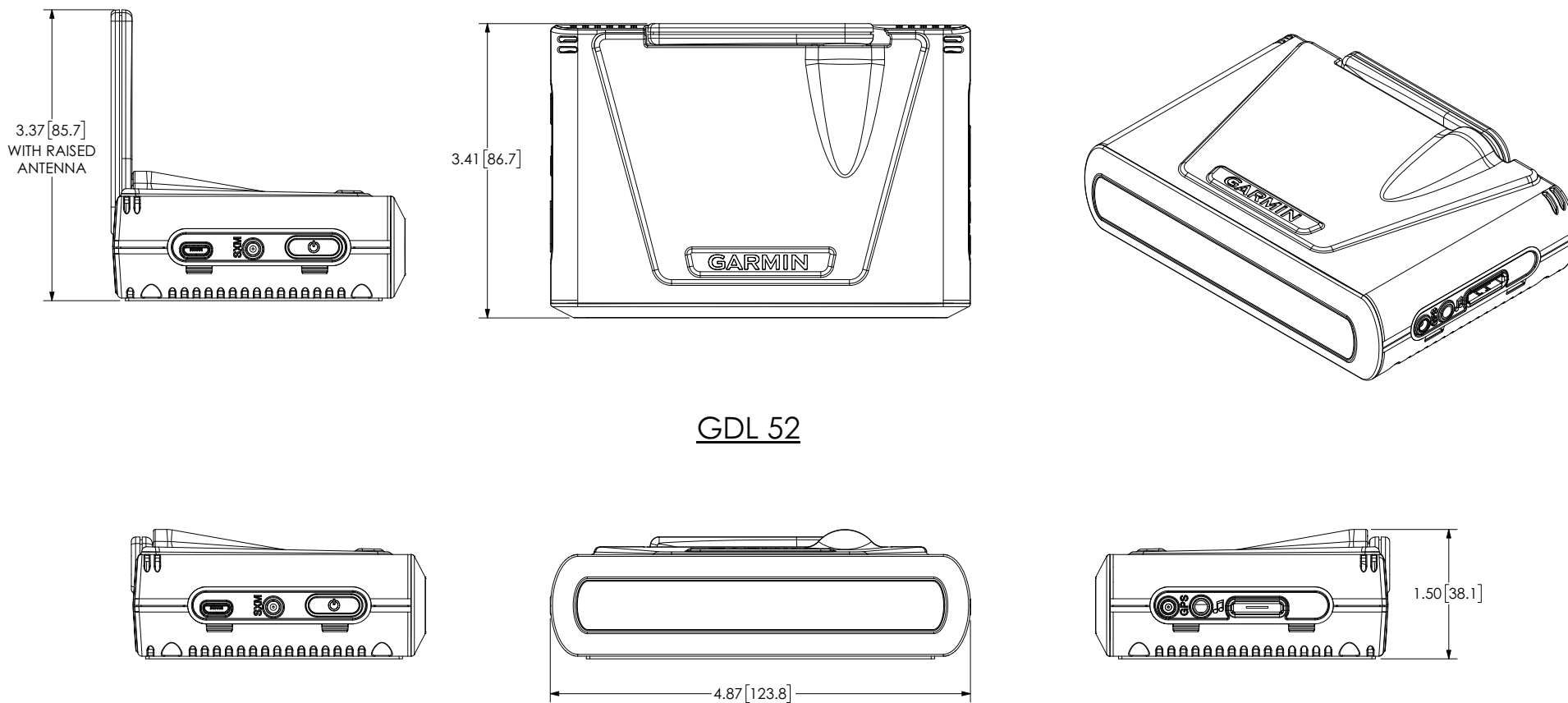
GDL 51



- NOTES:
1. DIMENSIONS: INCHES[mm]. METRIC VALUES ARE FOR REFERENCE ONLY.
 2. DIMENSIONS ARE NOMINAL AND TOLERANCES ARE NOT IMPLIED UNLESS SPECIFICALLY STATED.

Figure A-2 GDL 51 Outline Drawing

APPENDIX A OUTLINE AND INSTALLATION DRAWINGS



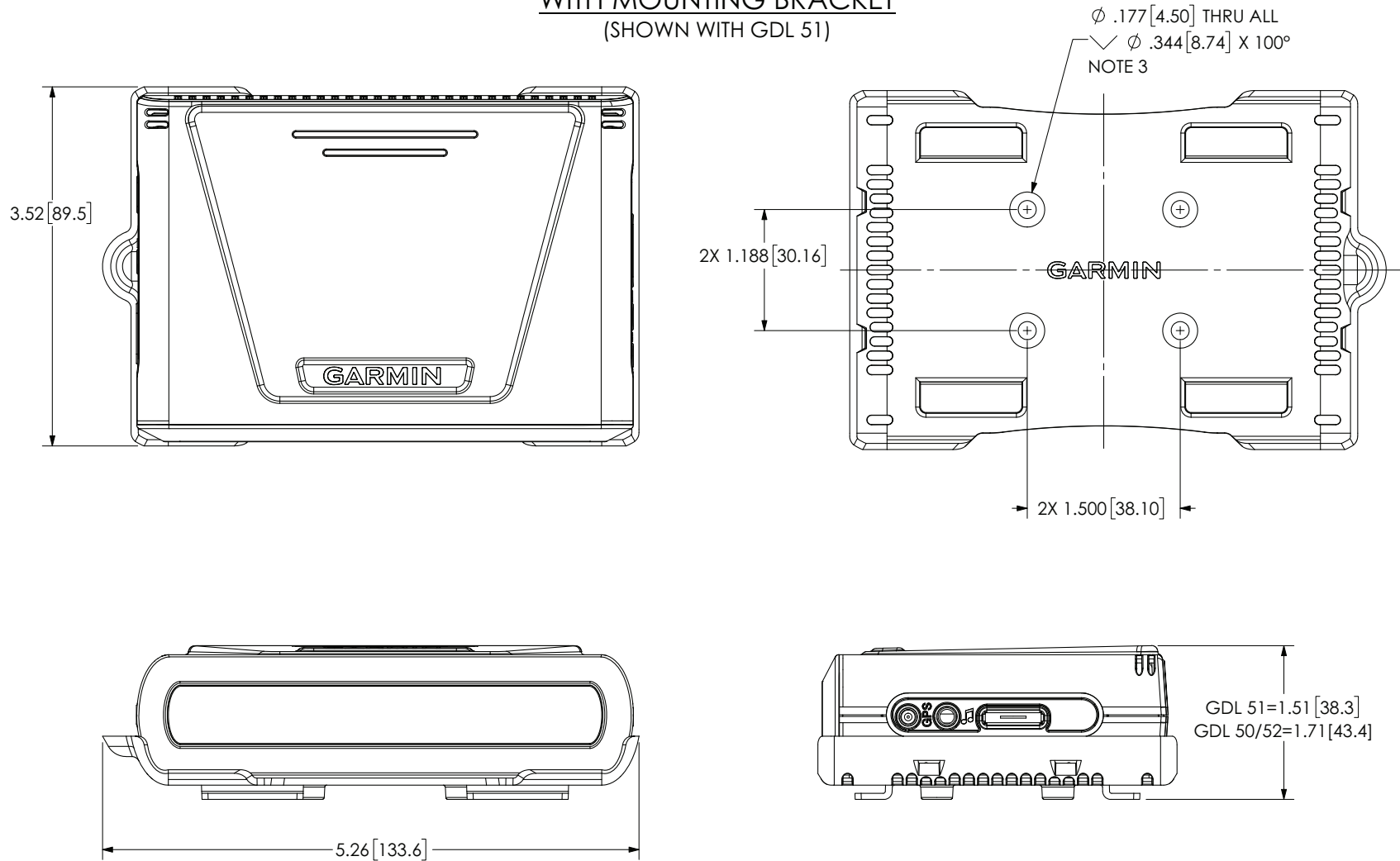
GDL 52

- NOTES:
1. DIMENSIONS: INCHES[mm]. METRIC VALUES ARE FOR REFERENCE ONLY.
 2. DIMENSIONS ARE NOMINAL AND TOLERANCES ARE NOT IMPLIED UNLESS SPECIFICALLY STATED.

Figure A-3 GDL 52 Outline Drawing

APPENDIX A OUTLINE AND INSTALLATION DRAWINGS

WITH MOUNTING BRACKET
(SHOWN WITH GDL 51)



NOTES:

1. DIMENSIONS: INCHES[mm]. METRIC VALUES ARE FOR REFERENCE ONLY.
2. DIMENSIONS ARE NOMINAL AND TOLERANCES ARE NOT IMPLIED UNLESS SPECIFICALLY STATED.
3. MOUNTING HOLES ARE FOR #8 100° FLAT HEAD SCREWS.

Figure A-4 GDL 51 with Mounting Bracket Outline and Installation Drawing

APPENDIX A OUTLINE AND INSTALLATION DRAWINGS

WITH MOUNTING BRACKET & NON-SLIP PAD ACCESSORY
(SHOWN WITH GDL 51)

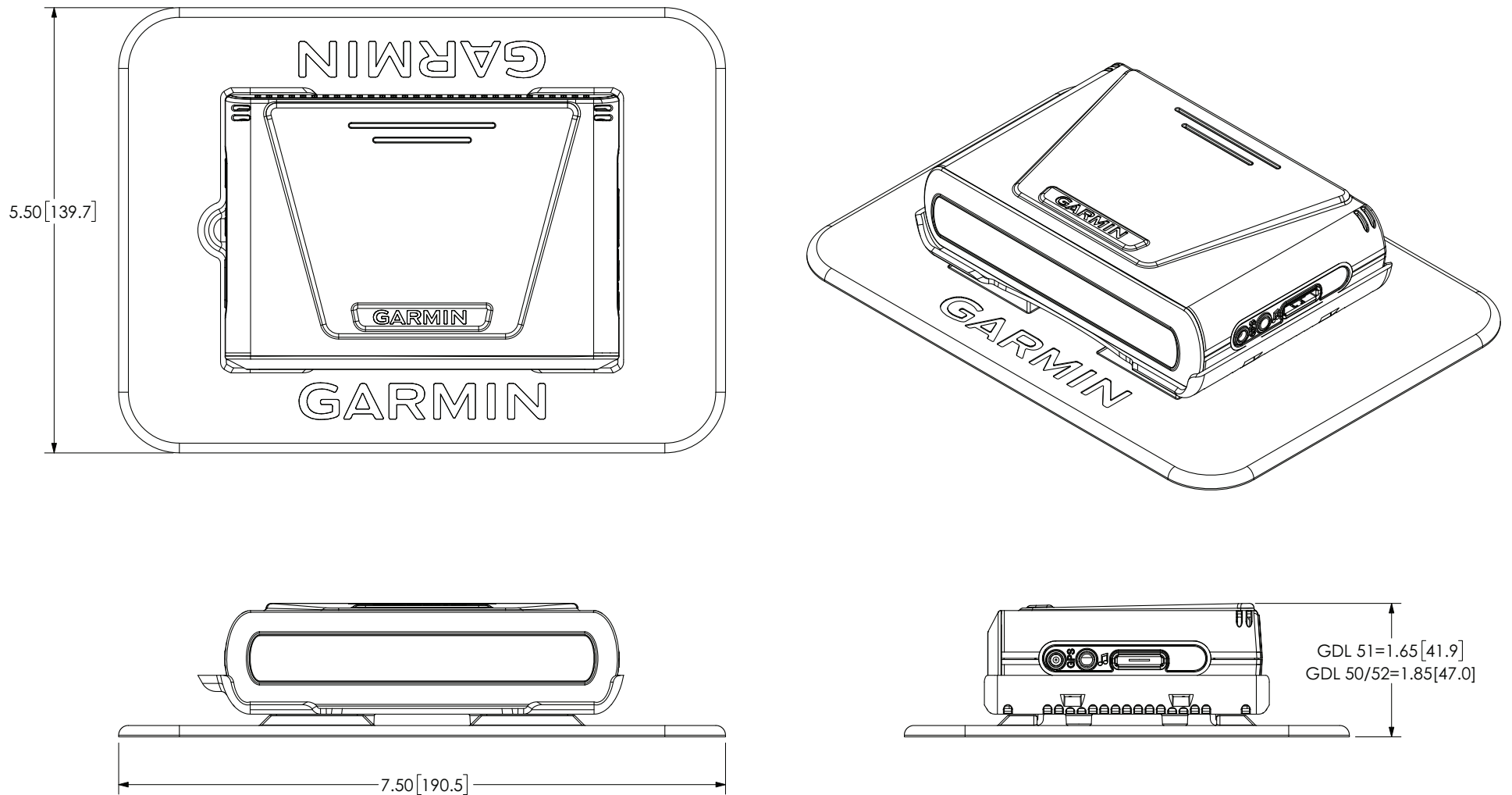
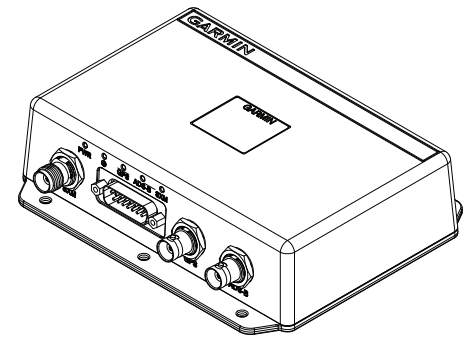
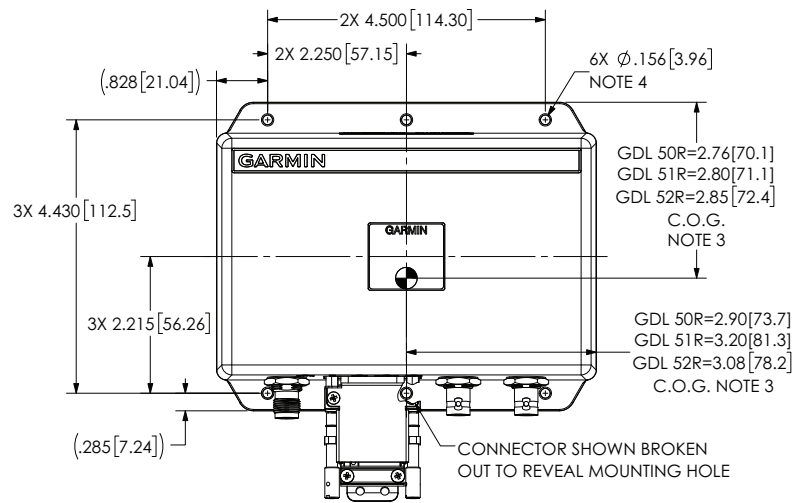
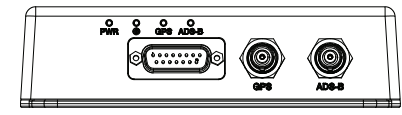
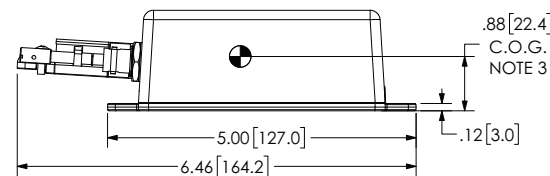
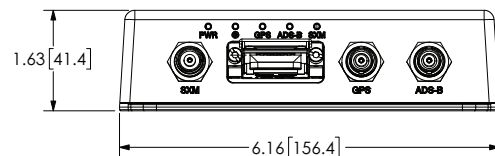


Figure A-5 GDL 51 with Mounting Bracket and Pad Outline and Installation Drawing

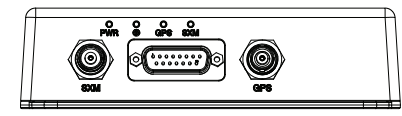
APPENDIX A OUTLINE AND INSTALLATION DRAWINGS



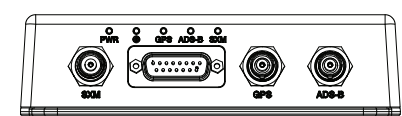
GDL 5XR UNITS
 (GDL 52R SHOWN)



GDL 50R



GDL 51R



GDL 52R

- NOTES:
 1. DIMENSIONS: INCHES[mm]. METRIC VALUES ARE FOR REFERENCE ONLY.
 2. DIMENSIONS ARE NOMINAL AND TOLERANCES ARE NOT IMPLIED UNLESS SPECIFICALLY STATED.
 3. CENTER OF GRAVITY (C.O.G.) LOCATION SHOWN IS WITHOUT CONNECTOR KIT INSTALLED.
 4. MOUNTING HOLES FOR #6 100° FLAT HEAD SCREWS.

Figure A-6 GDL 5XR Outline and Installation Drawing

APPENDIX A OUTLINE AND INSTALLATION DRAWINGS

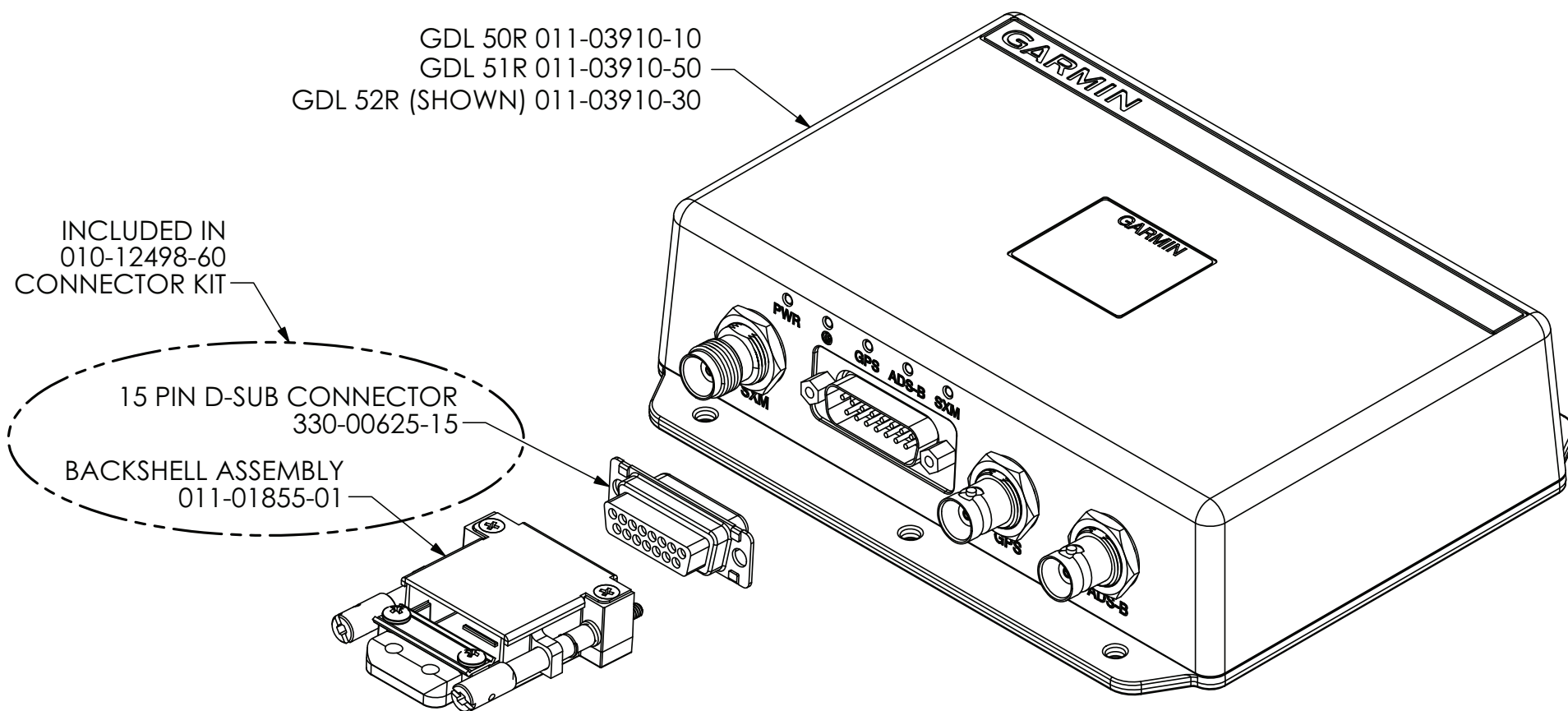
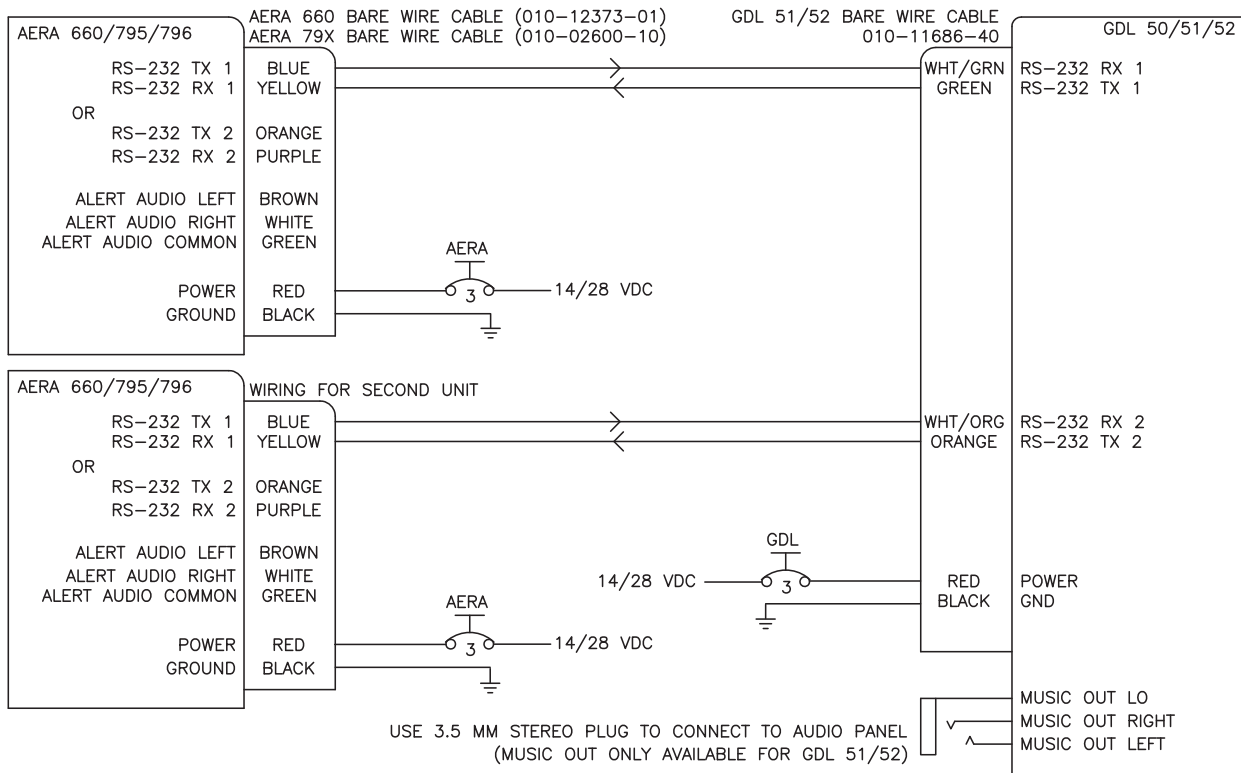


Figure A-7 GDL 5XR Installation Drawing

APPENDIX B INTERCONNECT DRAWINGS

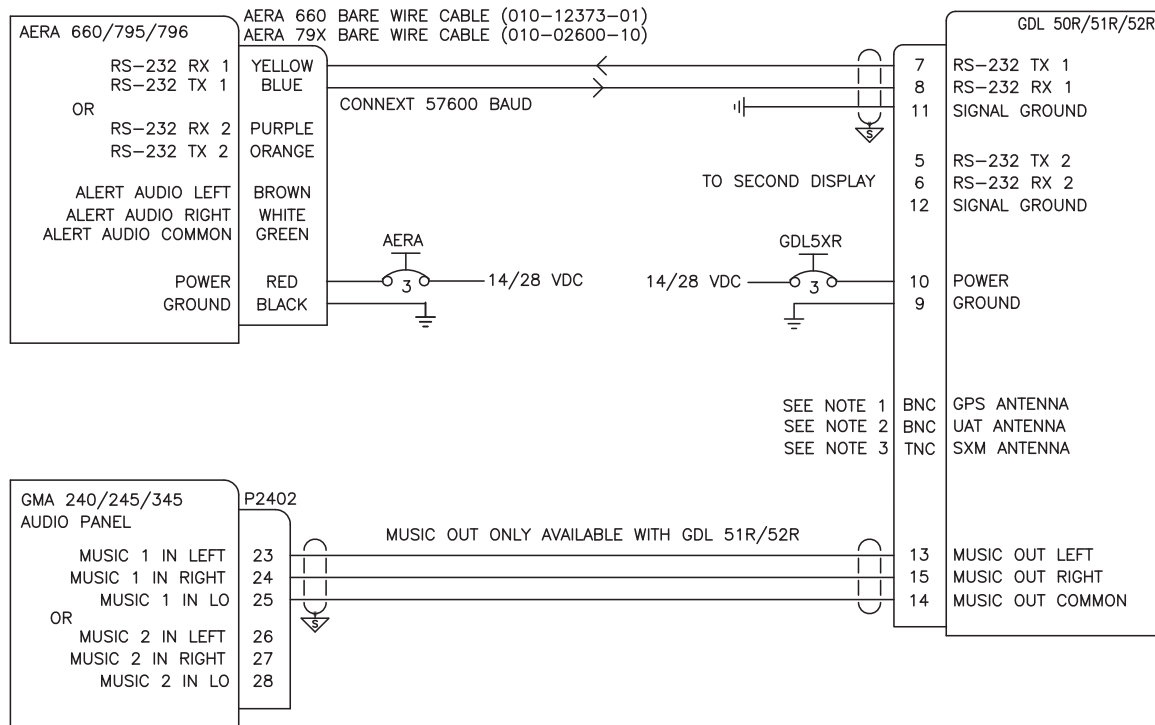


CONFIGURATION GUIDANCE

1. AERA 660/795/796 WITH GDL 50/51/52

- A. THE GDL 50/51/52 MAY BE CONNECTED TO EITHER SERIAL (RS-232) PORT ON THE AERA 660/795/796
- B. ON THE AERA 660/795/796 INTERFACE SETUP PAGE
 - SET SERIAL PORT CONNECTED TO GDL 50/51/52 TO "CONNEXT 57600 BAUD"
 - THE DEVICE INFORMATION WILL APPEAR WHEN COMMUNICATION IS ESTABLISHED WITH THE GDL 50/51/52.

Figure B-1 GDL® 5X - aera® 660/79X



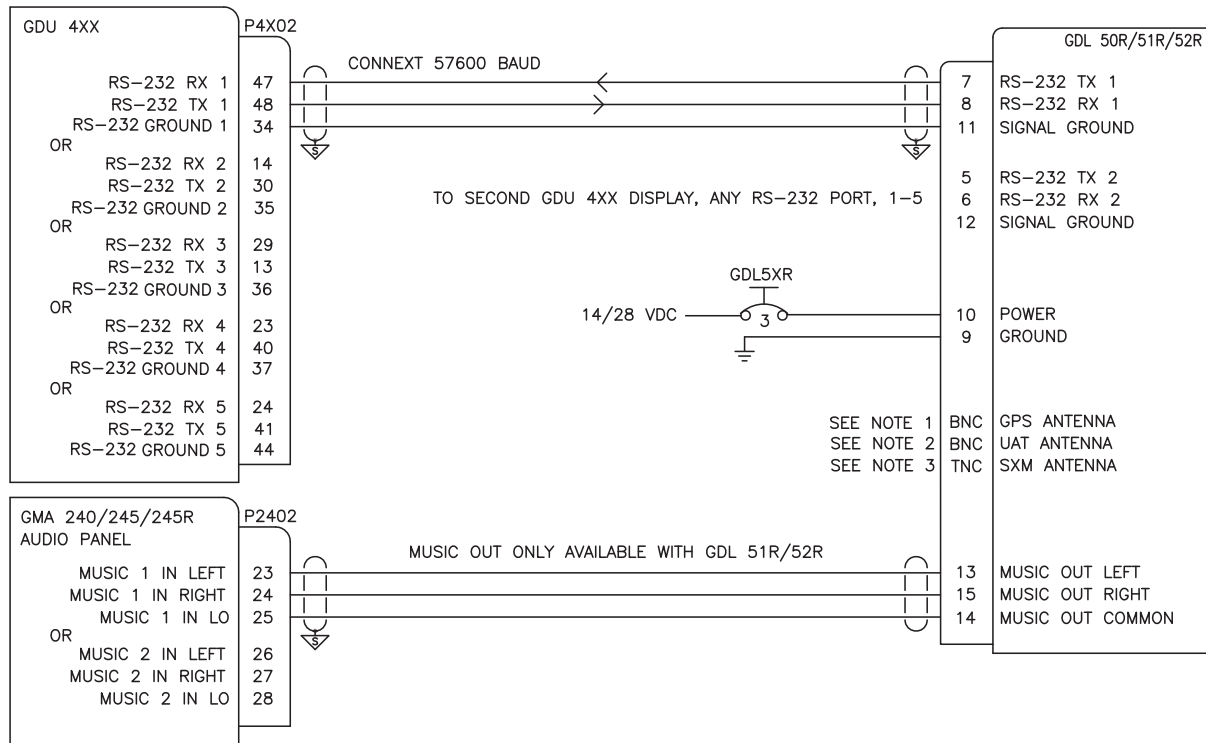
- NOTE 1: EXTERNAL GPS ANTENNA NOT REQUIRED WHEN CONNECTED TO AERA 660/795/796
- NOTE 2: EXTERNAL UAT ANTENNA SHOULD BE MOUNTED ON BOTTOM OF AIRCRAFT WITH 1 METER SEPARATION FROM COM AND XPDR ANTENNAS
- NOTE 3: SXM ANTENNA SHOULD BE LOCATED ON GLARE SHIELD (GA26XM, GA24TNC) OR TOP OF AIRCRAFT (GA55/55A/57X)

CONFIGURATION GUIDANCE

1. AERA 660/795/796 WITH GDL 50R/51R/52R

- A. THE GDL 50R/51R/52R MAY BE CONNECTED TO EITHER SERIAL (RS-232) PORT ON THE AERA 660/795/796
- B. ON THE AERA 660/795/796 INTERFACE SETUP PAGE
 - SET SERIAL PORT CONNECTED TO GDL 50R/51R/52R TO "CONNEXT 57600 BAUD"
 - THE DEVICE INFORMATION WILL APPEAR WHEN COMMUNICATION IS ESTABLISHED WITH THE GDL 50R/51R/52R.

Figure B-2 GDL 5XR - aera 660/79X, GMA™ 24X(R)



- NOTE 1: EXTERNAL GPS ANTENNA NOT REQUIRED WHEN CONNECTED TO GDU 4XX DISPLAY
- NOTE 2: EXTERNAL UAT ANTENNA SHOULD BE MOUNTED ON BOTTOM OF AIRCRAFT WITH 1 METER SEPARATION FROM COM AND XPDR ANTENNAS
- NOTE 3: SXM ANTENNA SHOULD BE LOCATED ON GLARE SHIELD (GA26XM, GA24TNC) OR TOP OF AIRCRAFT (GA55/55A/57X)

CONFIGURATION GUIDANCE

1. GDU 4XX WITH GDL 50R/51R/52R

- A. THE GDL 50R/51R/52R MAY BE CONNECTED TO SERIAL (RS-232) PORT 1-5 ON THE GDU 4XX AND EITHER OR BOTH SERIAL PORTS ON THE GDL 50R/51R/52R MAY BE CONNECTED TO A GDU 4XX AS SHOWN ABOVE
- B. ON THE GDU 4XX RS-232 INTERFACE SETUP PAGE
 - SET SERIAL PORT CONNECTED TO GDL50R/51R/52R TO "CONNEXT 57600 BAUD"
 - A GREEN CHECK MARK IS SHOWN NEXT TO THE CONNECTION WHEN COMMUNICATION IS ESTABLISHED WITH THE GDL50R/51R/52R.

Figure B-3 GDL 5XR - GMA 24X(R), GDU™ 4XX

GARMIN  **®**