

GIA 64

Installation/User Guide

OEMs should obtain the most recent copy of the Installation Guide or Manual documents prior to equipment, configuration, installation and/or use.

DRAFT

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1. Overview

The GIA 64 series of line replaceable units (LRU) are a family of integrated avionics units (IAU) for use with a Garmin Integrated Flight Deck (GIFD). The GIA 64 provides the following functionality:

- Interface capability to other GIFD system components using Ethernet (HSDB), RS-232, RS-485, RS-422, ARINC 429, and other interfaces.
- Interface capability to third party equipment using RS-232, RS-485, RS-422, ARINC 429, and other interfaces.
- Command and control of the GFC 700 autopilot (if equipped) or various third party autopilots.
- A VHF COM transceiver capable of 25 kHz or 8.33 kHz operation in the band from 118.000 MHz to 136.975 MHz (25 kHz spacing) or 136.992 MHz (8.33 kHz spacing). Extended range operation in the band from 137.000 MHz to 151.975 MHz (25 kHz spacing only) is available as an additional option.
- A 15 channel WAAS certified GPS receiver.
- A VOR/ILS Localizer receiver operating from 108.00 MHz to 117.95 MHz (50 kHz spacing).
- An ILS Glide Slope receiver operating from 329.15 MHz to 335.00 MHz (paired with an active ILS localizer frequency).

2. Physical Characteristics

2.1. Dimensions

The following GIA 64 dimensions are with respect to unit only measurements and does not include connectors and racks used for installation.

	Width (inches)	Height (inches)	Depth (inches)
GIA 64W	3.78"	6.18"	8.28"
GIA 64H	3.57"	6.74"	8.28"
GIA 64E	3.78"	6.18"	8.28"

2.2. Weight

Unit/Accessories	Weight
GIA 64W (Unit Only)	5.4 lbs (2.45 kg)
GIA 64H (Unit Only)	5.5 lbs (2.49 kg)
GIA 64E (Unit Only)	5.6 lbs (2.54 kg)
Mounting Rack Configuration 1	1.0 lbs (0.45 kg)
Mounting Rack Configuration 2	1.3 lbs (0.59 kg)
Mounting Rack Configuration 3	1.6 lbs (0.74 kg)

3. GIA 64 Interfaces

RF Interfaces

Interface	All Variants
VHF COM RF In/Out	1
VOR/LOC RF In	1
Glide Slope RF In	1
GPS RF In	1

General IO

Interface	GIA 64W	GIA 64H	GIA 64E
Ethernet (HSDB)	3	3	3
RS-232	10	10	10
RS-485/422	5	5	8
ARINC 429 (RX)	10	10	15
ARINC 429 (TX)	3	3	6
ARINC 429 (TX) / ARINC 717 (TX)	1	1	1
CAN	2	2	2
GPS PPS Output	1	1	1
GPS ARINC 743 (TX)	0	0	1
ARINC 708 (RX)	0	0	1
Configurable Discrete Inputs	29	29	29
Active High Discrete Inputs	12	12	12
Active High Autopilot Disconnect Input	1	1	1
Discrete Outputs	14	14	14
Annunciators	24	24	24
Superflags	6	6	6
Analog Flight Director (Pitch/Roll) Inputs	1	1	1
General Purpose DC Input	1	1	1
General Purpose DC Output	1	1	1
Analog Lateral CDI Outputs	1	1	1
Analog Vertical CDI Outputs	1	1	1
Configurable AC ARINC 407 (X/Y/Z) Inputs / DC SIN/COS Inputs	1 (DC Mode Only)	1 (DC Mode Only)	3
Configurable AC/DC Outputs	3 (DC Mode Only)	3 (DC Mode Only)	3
Configurable AC/ARINC 407 Outputs	0	0	2
Remote Annunciator Input Interface	1	1	1
King Serial DME Interface	1	1	1

In addition to the interfaces listed above, the GIA 64 can interface to a wide variety of 3rd party equipment, including but not limited to:

- Autopilots
- Altitude Encoders/Serializers
- Fuel Management Systems
- Lightning Detection Systems
- Traffic Awareness Systems
- Data Link Systems
- External Annunciators
- DME Equipment
- ADF Receivers
- Stall Warning Systems
- Radar Altimeters
- Weather Radars
- Flight Data Recorders

NOTE

Interface capabilities are dependent upon the GIA 64 variant being installed.

3.1. General IO Considerations

Implementation of available IO should take system and aircraft requirements in to account when using IO to interface to additional LRUs within the system. Connection and use of available configurable interfaces vary between model variants and system integration requirements. System and aircraft requirements should be considered prior to configuring any GIA 64 provided interfaces.

3.2.1. Ethernet

The GIA 64 has a total of 3 Ethernet interfaces. All Ethernet interfaces support IEEE standard 802.3 for 10 base T Ethernet.

3.2.2. RS-485/422

The GIA 64 has a total of 5 to 8 RS-485 transceivers (dependent on model variant). Transceivers can be paired together to make one RS-422 interface allowing up to 2 to 4 RS-422 interfaces.

3.2.3. Discrete IO

The GIA 64 has configurable discrete I/O in order to use the pins on the external connector more efficiently. Each discrete interface, input and output, is configurable between either active high or low. All of the discrete outputs have a default state of inactive implemented during and after a reset. This is specifically targeted at those outputs supporting auto pilot functionality, ensuring that those outputs reset when the microprocessor resets.

3.2.4 ARINC 429/717

The GIA 64 provides a single configurable ARINC 429 transmitter that can set up to operate as an ARINC 717 transmitter. Output is designed to meet the ARINC standard the output is configured to.

3.2.5. ARINC 429

The GIA 64 provides both ARINC 429 receivers and transmitters designed to meet ARINC 429 specifications. Available interfaces are dependent on model variant.

3.2.6. Configurable Analog IO

The following analog interfaces are configurable as a DC or AC mode interface. Available modes are dependent on model variant.

- Configurable AC ARINC 407 (X/Y/Z) Inputs / DC SIN/COS Inputs
- Configurable AC/DC Outputs

3.3 COM IO

3.3.1 Key Event Out

The Key Event Out active low discrete output signals that the GIA COM is transmitting. In installations with more than 2 VHF COM radios, this input can be used to connect to the Transmit Interlock input on the other radios.

3.3.3 Emergency COM Operation

The Emergency COM Operation active low discrete input tunes the transceiver to the emergency frequency, 121.500 MHz, when active.

4. Installation Consideration

4.1. GIA 64 Pinout

GIA 64 pinouts specific to model variants can be obtained by contacting Garmin International.

4.2. Cabling and Wiring Consideration

Cabling and wiring must be installed in accordance with AC 43.13-1B CHG 1 Chapter 11, Sections 8 through 13. The following issues must be addressed:

- Do not expose cabling and wiring to chafing
- Avoid sharp bends in cabling and wiring harnesses
- Make sure ample space is provided for cabling and wiring harnesses and connectors to allow connection and disconnection.
- Do not route cabling and wiring harnesses near electrical noise sources or high current electrical wiring (such as power lines to DC electrical motors)
- Do not route cabling and wiring harnesses near flight control cables
- Do not route cabling and wiring harnesses near heat sources
- Appropriate wiring should be shielded
- Wiring pigtail lengths must not exceed 3.0 inches

4.3. Bonding

Electrical equipment, supporting brackets, and racks must be electrically bonded to the aircraft's main structure or a designated aircraft groundplane. Refer to the following documents for acceptable bonding techniques:

- AC 43.13-1B CHG 1, "Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair", Chapter 11, "Aircraft Electrical Systems"
- SAE ARP 1870A, "Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety"
- A bonding procedure developed and supplied by the aircraft manufacturer (if available)

The electrical bond must achieve direct current (DC) resistance less than or equal to 2.5 milliohms to local structure where the equipment is mounted. Compliance must be verified by inspection using a calibrated milliohm meter.

4.4. Cooling Considerations

The GIA 64 meets all TSO requirements without external cooling. However, as with all electronic equipment, lower operating temperatures extend equipment life. On the average, reducing the operating temperature by 15-20 °C (25 to 35 °F) doubles the mean time between failure (MTBF). Recommended airflow rating is 1 CFM (cubic foot per minute) at a pressure equivalent to 0.1 inches of water. Potential damage to your GIA 64 may occur by using outside forced air to cool the equipment. Therefore, it is recommended that an electric forced air fan be installed, of the indicated rating, to cool this equipment.

Units tightly packed in the avionics stack heat each other through radiation, convection, and sometimes by direct conduction. Even a single unit operates at a much higher temperature in still air than in moving air. Fans or some other means of moving the air around electronic equipment are usually a worthwhile investment. A 5/8" diameter air fitting is provided on the rear of the mounting rack for the purpose of admitting cooling air under such conditions. If a form of forced air cooling is installed, make certain that rainwater cannot enter and be sprayed on the equipment.

4.5. Mounting Requirements

The GIA 64 mounting surface must be capable of providing structural support and electrical bonding to the aircraft to minimize radiated EMI and provide protection from High-Intensity Radiated Fields (HIRF).

4.6. Antenna Installation

The GIA 64 does not include antennas for the VHF COM, VOR/LOC, Glide Slope, and GPS RF Interfaces. All antennas must be installed and bonded in accordance with the manufactures installation instructions with the addition to the Garmin guidance provided in section 4.6.1.

4.6.1. COM Antenna Location

The GIA 64 COM antennas must be mounted as far as is practical from any protruding aircraft features such as engines or propellers. Garmin recommends COM antennas be mounted a minimum of:

- Six (6) feet from all other VHF COM antennas
- Six (6) feet from DME antennas
- Four (4) feet from ADF sense antennas
- Three (3) feet from any GPS antennas
- Three (3) feet from any GIA 64 units
- As far as practical from any ELT (emergency locator transmitter) antennas
- As specified in the installation instructions for DF (direction finder) receiver antennas

5. Power

The GIA 64 implements independent dual power supplies for the COM and the remaining GIA 64 system. The following table notes the power specifications for the GIA 64 operating at either of the primary voltage levels.

Current Draw	Power	
	13.75 VDC	27.5 VDC
COM Transmitter Inactive	0.6 A	0.3 A
COM Transmitter Active	6.0 A	4.3 A
Current Draw (all other functions)	1.6 A	0.8 A

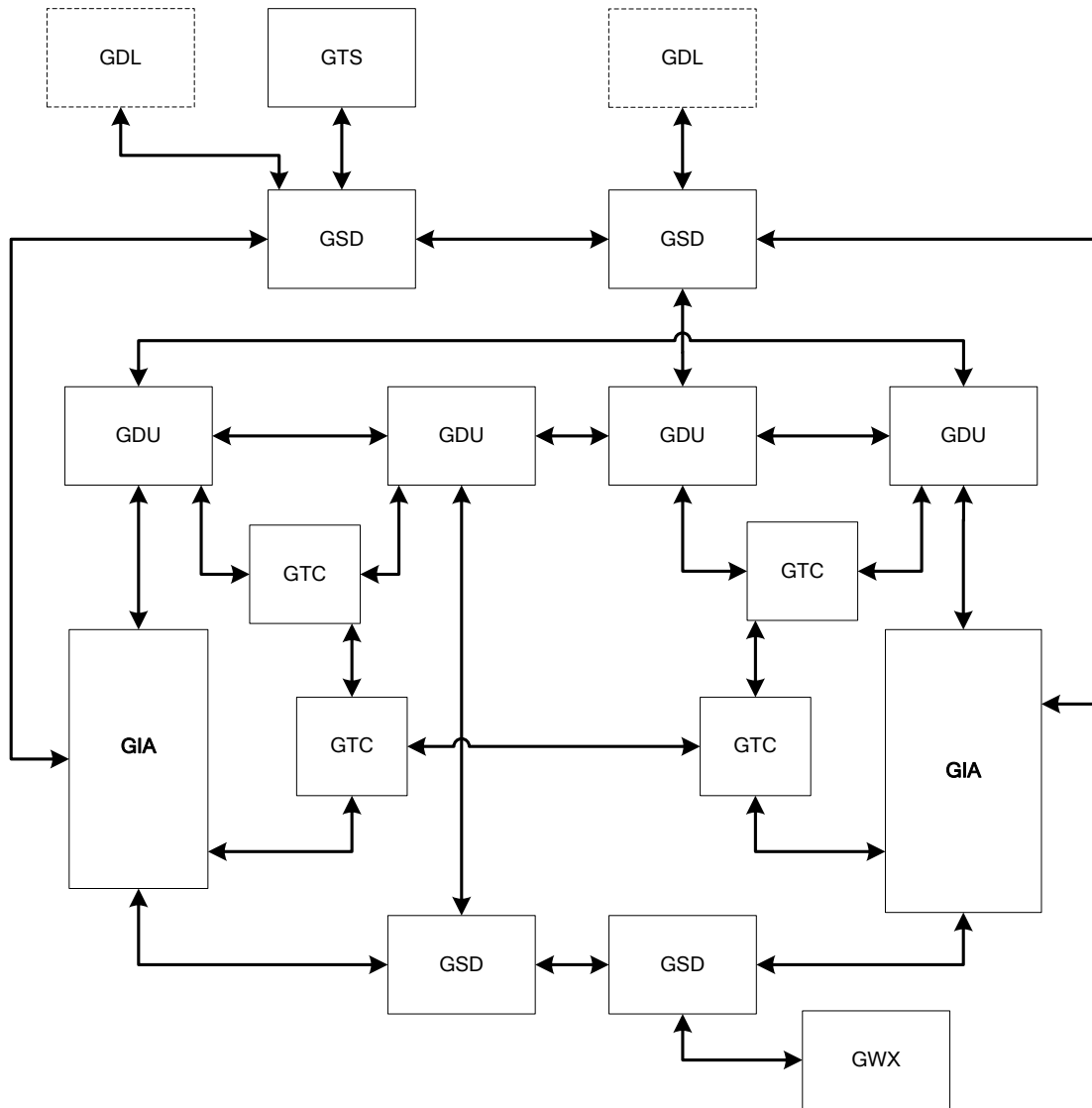
6. Environmental

GIA 64 Environmental Qualification Form can be obtained by contacting Garmin International.

7. System Integration

Integration of the GIA 64 is configurable and dependent on the system and aircraft the equipment is being installed in. All aircraft and system level requirements should be taken into account prior to installation.

The following is a general diagram of dual GIA 64 system.



8. Unit Authorization

8.1. Transmitter Grant of Equipment Authorization

CAUTION

The operation of unapproved cellular telephones or other unapproved cellular devices aboard aircraft while airborne is prohibited by FCC rules. Due to the potential for interference with onboard systems, the operation of unapproved cellular communication devices while onboard an aircraft that is on the ground is subject to FAA regulations 14 CFR 91.21.

FCC regulation 47 CFR 22.925 prohibits airborne operation of unapproved cellular telephones installed in or carried aboard aircraft. Unapproved cellular telephones must not be operated aboard any aircraft while the aircraft is off the ground. When any aircraft leaves the ground, all unapproved cellular telephones on board that aircraft must be turned off.

Unapproved cellular telephones that are on, even in a monitoring state, can disrupt GPS performance.

NOTE

The FCC authorization for the COM Extended Range Option is for equipment certification purposes only; it does NOT constitute an authorization to operate the COM transmitter in the frequency range from 137.000 to 151.975 MHz in the United States (as described in 47 CFR 87.147(f)). Additional agency authorizations are required to operate the COM transmitter in these frequency bands. Contact Garmin Product Support for more information.

8.2. Telecommunications Authority Equipment Authorizations

The following table provides the current authorizations held by the GIA 64. Additional authorizations will be added as needed.

Country	Telecommunications Authority	GIA 64 (All Model Variants)
United States	FCC	FCC ID: IPH-0271500
Canada	Industry Canada*	IC ID: 1792A-0271500 IC M/N: GMN-01410

*This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference; and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

**Cet appareil est conforme aux normes CRN d'Industrie Canada relatives aux appareils exempts de licence. Son fonctionnement est soumis aux deux conditions suivantes :*

- (1) cet appareil ne doit pas causer d'interférences; et*
- (2) cet appareil doit accepter toutes les interférences reçues, y compris celles qui sont susceptibles de nuire à son bon fonctionnement.*

NOTE

Canadian installations are required to meet Industry Canada specifications for maximum radiation as documented in Radio Specifications Standard 102 (RSS-102). For more information about RF exposure and related Canadian regulatory compliance, contact:

Manager, Radio Equipment Standards
 Industry Canada
 365 Laurier Avenue
 Ottawa, Ontario
 K1A 0C8

In accordance with Canadian Radio Specifications Standard 102 (RSS 102), RF field strength exposure to persons from an antenna connected to this device should be limited to 60V/m for controlled environment and 28V/m for uncontrolled environment.