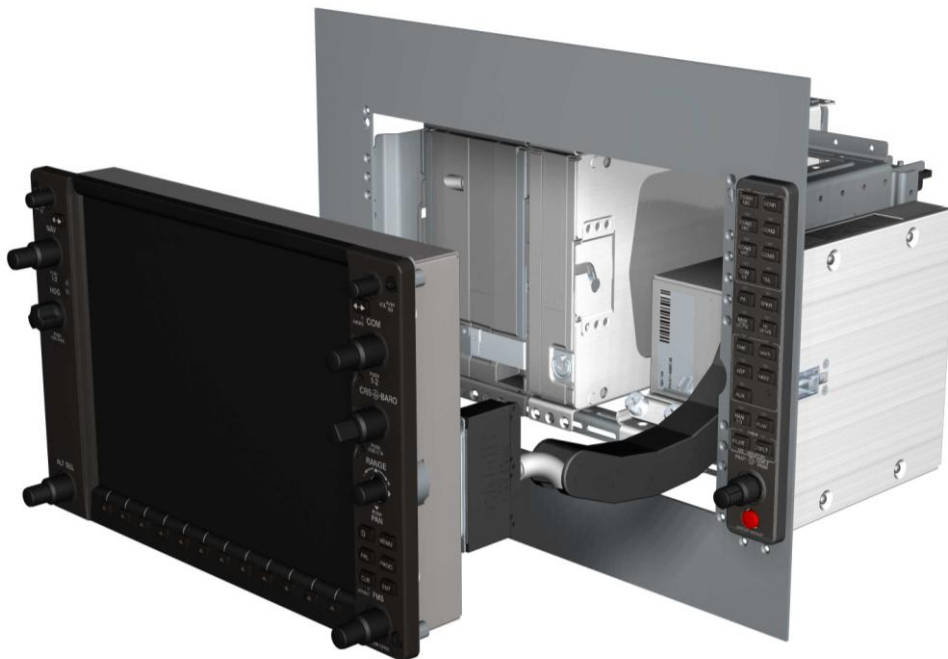


G1000® INTEGRATED FLIGHT DECK SYSTEM MAINTENANCE MANUAL

(LJ/VLJ AIRCRAFT)



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RECORD OF REVISIONS

Revision	Date	Section	Pages	Description
A	5/7/08	----	----	Initial Release
B	1/23/09	All	All	General manual revision to make content current with GDU v9.01. This includes maintenance information on GSR56 and GDL59 LRUs.
C	3/30/09	Front Matter	iv	Changed GDU software version to 9.03.
		2	2-8 and 2-9	Added section 2.5, GTS 8XX TCAS System, added figure 2-7.
		3	3-13 through 3-15	Added section 2.5, GTS 8XX TCAS System, added figure 2-7.
		4	4-4 and 4-5	Added GTS 8XX to Section 4.4. Added GTS 8XX Configuration to Table 4-1.
		5	5-73, 5-109, 5-134, 5-135	Added Section 5.1.9.19, GTS Configuration Page. Added Figure 5-24, GTS Configuration Page. Renumbered figures. Added new section 5.1.7.21, GTS 8XX Advisory Messages. Added Figures 5-3, 5-54, 5-55, and 5-56.
		6	6-13 and 6-14	Added new sections 6.23 and 6.24, GTS 8XX and GPA 65 replacement instructions.
		7	7-58	Added new section 7.16, GTS 8XX TCAS.
		8	8-6	Added new section 8.8, GTS 8XX tests.
		9	9-1	Deleted the Service Timer information in Section 9.1. Renumbered sections.
		Appendix A	A-37 through A-42	Added new sections A.22, A.23, A.24, and A.25.

Revision	Date	Section	Pages	Description
D	03/02/10	Front Content		Changed GDU software statement to v10.0X.
		1	1-1	Revised introductory text.
		2	2-1	Revised text in section 2.1 and added Table 2-1, AHRS operational modes.
			2-2	Revised Figure 2-1, G1000 Block Diagram.
			2-3	Revised Figure 2-2, G1000 Flight Instrument Data Paths.
		4	4-9	Revised Section 4.7 for GDU v10.0X.
		5	5-5	Revised GRS 77 troubleshooting table information.
			5-6	Revised HDG fail troubleshooting table information.
			5-7	Added GRS 77 Config Module troubleshooting information to table.
			5-8	Revised section 5.1.4, Failed Path Messages for GDU 10.0X.
			5-12	Added symbology note.
			5-21	Revised information for CHNL 1.
			5-54	Revised GRS 77 information in message table.
			5-62	Revised GWX 68 advisory message information.
			5-65 and 5-66	Added "Reload the GDU Software" to table.
			5-79	Added "GRS 77" to section 5.1.8.7 heading, revised table contents for first symptom.
			5-80	Added section 5.8.7.1, GRS 77 Calibration Message and Figure 5-11.
			5-81	Added section 5.1.8.7.2, GRS77 Troubleshooting Questions for the Operator.

Revision	Date	Section	Pages	Description
			5-82	Added section 5.1.8.7.3, GRS 77 Operational Modes. Added Tables 5-2 and 5-3.
			5-84	Added section 5.1.8.7.4, GRS Troubleshooting On The Aircraft.
			5-86	Added section 5.1.8.7.5, GMU 44 Magnetometer-heading red X.
			5-87	Added section 5.1.8.7.6, GMU Communications.
			5-96	Revised Figure 5-17, AHRS/Air Data Input Configuration Page. Added new text under section heading.
			5-98	Added GRS/GMU calibration page section text and figures.
			5-118	Added GTS Configuration Page section/information with figures.
			5-121	Added section 5.1.9.21, GSD 41 Status Page section/information with figures.
			5-123	Added section 5.1.9.22, GWX Configuration Page section with figures and troubleshooting tables.
			5-124	Added section 5.1.9.23. GWX Troubleshooting Table.
			5-128	Added Section 5.1.9.24, Weather Radar page Annunciations.
			5-129	Added Section 5.1.9.25, Synchronous Interference
		6	6-1	Added introductory information (6.1).
		9	9-2	Revised GSM 85(A) Servo Gearbox information.
			9-3	Revised section 9.5, GSA 8(X) Greasing Procedure.
		10	All	Revised entire section to reflect GDU 10.0X.

DOCUMENT PAGINATION

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Appendix A	A-1 to A-60

This manual reflects the configuration and operation of GDU software version 10.0X.

The following are general safety precautions that are not related to any specific procedure and therefore do not appear elsewhere in this maintenance manual. These are recommended precautions that personnel should understand and apply during the many phases of maintenance and repair.

KEEP AWAY FROM LIVE CIRCUITS. Maintenance personnel shall observe all safety regulations at all times. Turn off system power before making or breaking electrical connections. Regard any exposed connector, terminal board, or circuit board as a possible shock hazard. Components which retain a charge shall be discharged only when such grounding does not result in equipment damage. If a test connection to energized equipment is required, make the test equipment ground connection before probing the voltage or signal to be tested.

DO NOT SERVICE ALONE. Personnel shall not under any circumstances reach into or enter any enclosure for the purpose of servicing or adjusting the equipment without immediate presence or assistance of another person capable of rendering aid.

INFORMATION SUBJECT TO EXPORT CONTROL LAWS

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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 the Garmin web site at www.garmin.com/prop65.

CAUTION

The GDU lamps contain mercury and must be recycled or disposed of according to local, state, or federal laws. If you have any questions or would like additional information, please refer to our web site at the following website: www.garmin.com/aboutGarmin/environment/disposal.jsp.

CAUTION

The GDU lens is coated with a special anti-reflective coating which is very sensitive to skin oils, waxes and abrasive cleaners. **CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING.** It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

NOTE

The information contained in this manual is for reference only and must be tailored for specific aircraft installations.

NOTE

System software configuration and operation may differ between different aircraft models. Procedures given in this manual are for general reference only. Always refer to approved OEM aircraft installation and/or maintenance data for correct software versions/part numbers and procedures for a specific aircraft model when returning an aircraft to service.

NOTE

At times, to more closely match the LRU nomenclature displayed on the configuration pages, and where appropriate, only the prefix of the LRU will be listed (i.e., GTX 33(X); GTX, etc.).

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SECTION 1

INTRODUCTION

This manual contains the necessary information relative to performing top-level maintenance on the Garmin G1000 Integrated Flight Deck installed in very light jet and light jet aircraft. The content of this manual is generic. The information depicted in the display pages are only examples — always refer to approved airframe specific information before performing maintenance.

Different aircraft manufacturers may employ various methods to suit a particular installation — always use approved OEM documents for aircraft checkouts. Operational information including G1000 functions, features, procedures, limitations, etc. are contained in the applicable aircraft Pilot's Guide.

1.1 Document Overview

This manual is organized as follows:

Section 1 — Introduction

Section 2 — G1000 Description

Section 3 — LRU Descriptions

Section 4 — Configuration Mode

Section 5 — Troubleshooting

Section 6 — LRU Replacement Procedures

Section 7 — LRU Software Installation

Section 8 — Return To Service Testing

Section 9 — Periodic Maintenance

Section 10—Reconfiguring The G1000

Appendix A—LRU Connector Pins

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SECTION 2

G1000 DESCRIPTION

This section contains information relative to the major subsystems of the G1000 including theory of operation.

2.1 G1000 FLIGHT INSTRUMENTATION

The GRS 77 AHRS, GDC 74B Air Data Computer, and GMU 44 Magnetometer supply the G1000 with flight instrumentation data. This data consists of aircraft attitude, heading, altitude, airspeed, vertical speed, and outside air temperature information, all displayed on the PFD (the same data is displayed on the MFD in reversionary mode.) Data outputs from the GRS 77 and GDC 74B are sent directly to the PFD via ARINC 429. Additional communications paths connect the GRS and GDC 74B to GIA 63W units providing redundancy.

The GRS 77 receives GPS data from both GIAs, airspeed data from the GDC 74B, and magnetic heading from the GMU. Using these three external sources, combined with internal sensor data, the GRS accurately calculates aircraft attitude and heading.

In addition to using internal sensors, the GRS 77 AHRS uses GPS information, magnetic field data and air data to assist in attitude/heading calculations. In normal mode, the AHRS relies upon GPS and magnetic field measurements. If either of these external measurements is unavailable or invalid, the AHRS uses air data information for attitude determination. Four AHRS modes of operation are available (Table 2-1) and depend upon the combination of available sensor inputs. Loss of air data, GPS, or magnetometer sensor inputs is communicated to the pilot by advisory alerts.

Table 2-1. AHRS Operational Modes

AHRS Modes	Available AHRS Functions			Available Sensor Inputs		
	Pitch	Roll	Heading	GPS Input (at least one)	GMU 44 Magnetometer	GDC 74B Air Data Computer
Normal	X	X	X	X	X	X
Reversionary: No GPS	X	X	X	-----	X	X
Reversionary: No Magnetometer	X	X	-----	X	-----	X
Reversionary: No Magnetometer No Air Data	X	X	-----	X	-----	-----

Figure 2-1 illustrates a three display G1000 system.

NOTE

The block diagrams shown in this section are not specific to any particular aircraft — refer to the OEM maintenance documentation for aircraft specific diagrams.

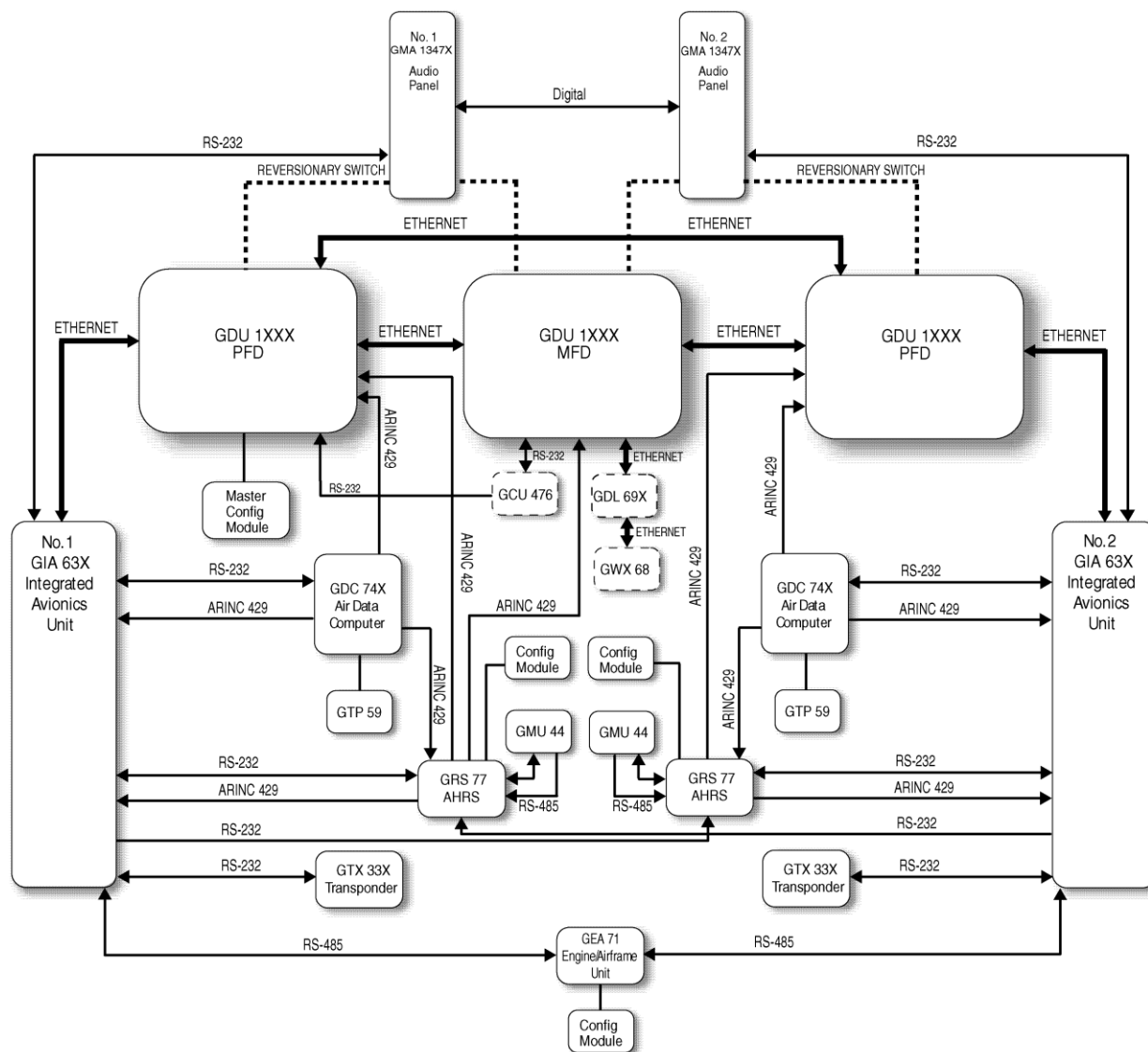


Figure 2-1. G1000 Block Diagram (Three Display)

Figure 2-2 illustrates the data paths for G1000 flight instruments.

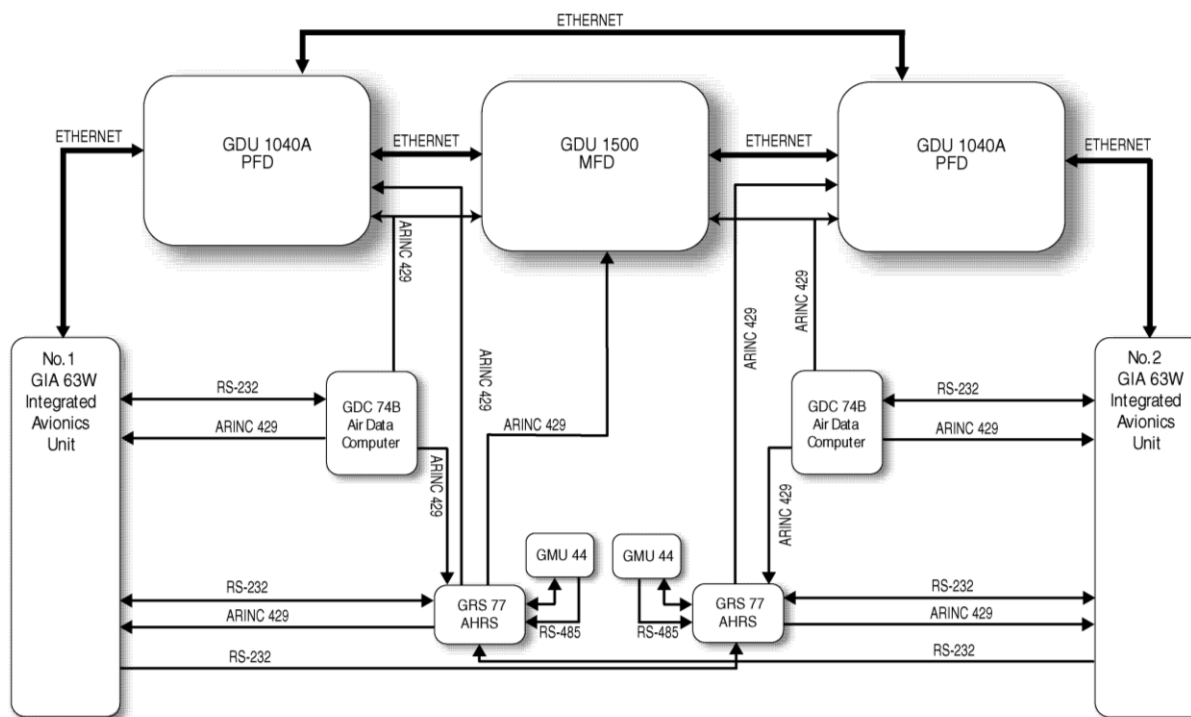


Figure 2-2. G1000 Flight Instrument Data Paths

2.2 NAVIGATION AND COMMUNICATION SYSTEMS

The GIA 63W LRUs house the VHF COM, VHF NAV, and WAAS GPS receivers. COM and NAV digital audio is sent to the GMA 1347D Audio Panel. GPS data is sent to the GRS 77 and both displays for processing. The GTX 33 and GTX 33D Mode S Transponders communicate with their respective GIA. Transponder data is sent from the GIA to the PFD. The GMA 1347D Audio Panel controls audio selections and the reversionary mode.

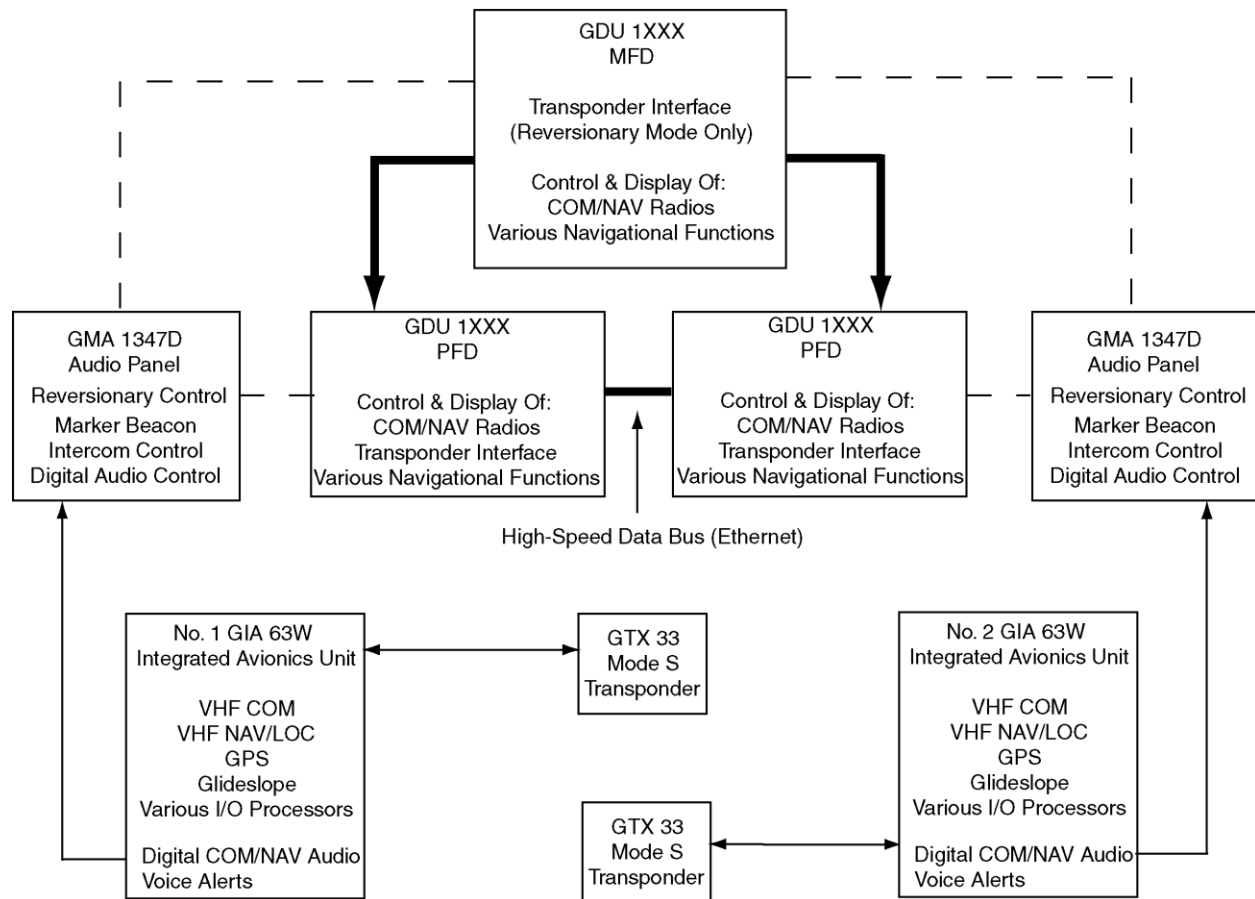


Figure 2-3. G1000 Navigation and Communication Data Paths

2.3 GFC 700 INTERCONNECT

Figure 2-4 illustrates the GFC 700 autopilot interconnections.

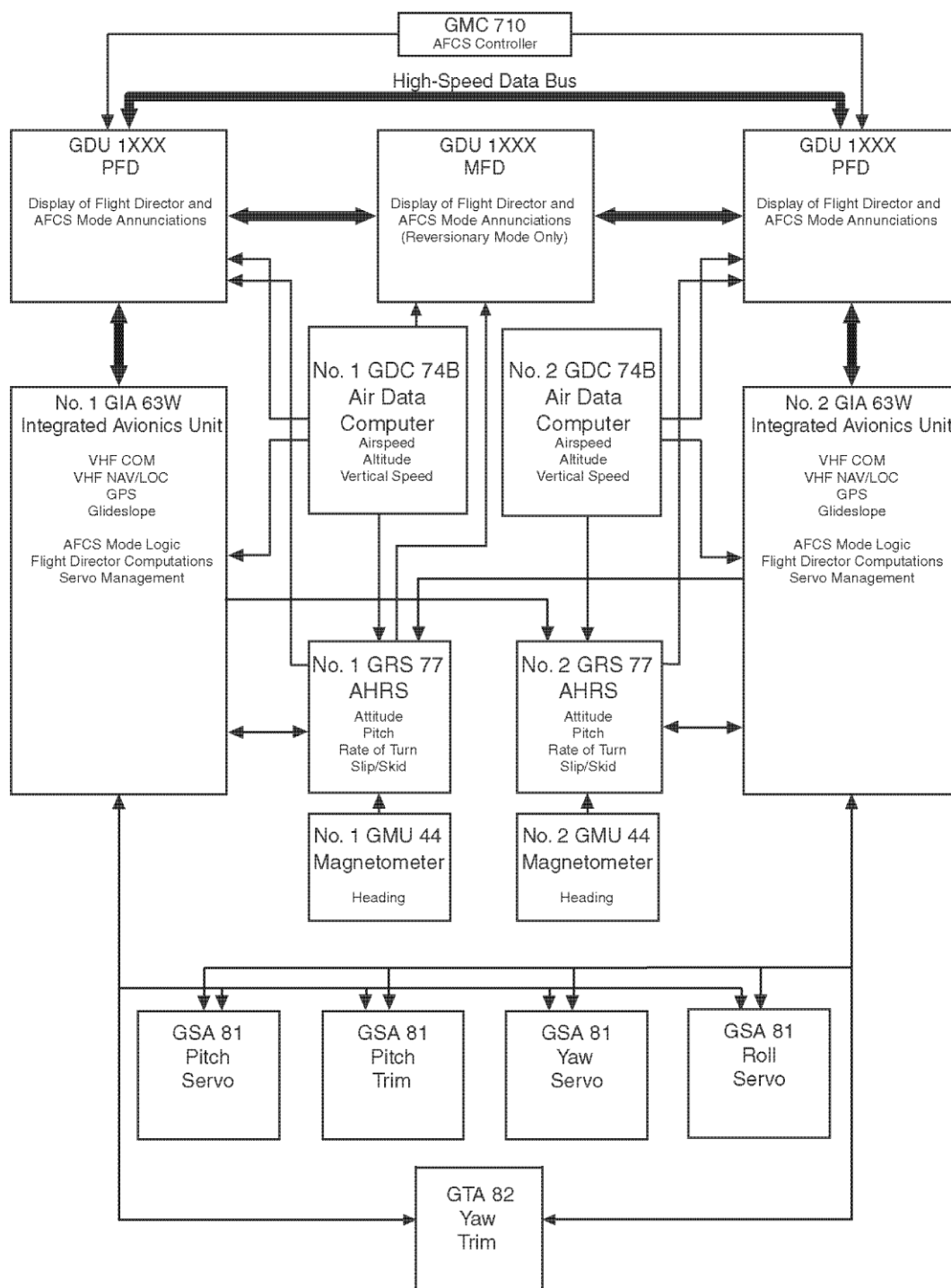


Figure 2-4. GFC 700 Autopilot Interconnect Block Diagram

2.4 GDU OVERVIEW

The GDU provides display and control for the G1000. Typical VLI/LJ installations involve three GDUs with optional remote control devices.



Figure 2-5. Three Display Installation

2.4.1 GDU Communication

HSDB

The term HSDB refers to an Ethernet based high speed data bus communications capability, providing an interface between individual sub-systems (LRUs) of the G1000 system. Each connection between those sub-systems is a point-to-point full-duplex connection that utilizes standard Ethernet technology combined with Garmin proprietary protocols. The displays communicate directly with other LRUs via HSDB. These other LRUs include integrated avionics units, serial data concentrators, data link receivers, and weather radars. In the G1000, the integrated avionics unit is the GIA 63/63W. The GIA 63/63W communicates with additional LRUs and discretes, concentrating serial, analog, and discrete input and output data. This data provides a means for the GDU to communicate indirectly with additional LRUs. These indirect LRUs include audio panels, engine acquisition units, and FADECs.

ARINC 429

The GDU communicates directly with other LRUs via ARINC 429. These LRUs include Attitude and Heading Reference Systems (AHRS) and Air Data Computers (ADC).

RS-232

The GDU communicates directly with remote control units and provides debugging information via RS-232.

Dimming

The GDU provides dimming of the displays and other integrated control/display LRUs (such as the audio panels and remote controllers).

Uploading and Configuring Software

The display SD card slots are used to upload and configure G1000 software. A software loader card contains software files and configuration files. An SD card can also be used to download maintenance data.

GDU Software

GDU software is uploaded into each GDU individually from a software loader card. GDUs are configured in a similar manner as other LRUs. LRUs are uploaded with software after the GDU software is loaded.

Databases

The basemap and navigation databases are stored internally in each GDU. Other databases are stored on a SD card that remain resident in the GDU. These databases include the terrain, obstacle, SafeTaxi, ChartView, FliteCharts, and airport terrain databases. Each GDU retains its own copy of each database. Some product features such as ChartView and TAWS require a one-time activation by means of a uniquely programmed SD card.

2.5 GTS 8XX TCAS System

The term “GTS 8XX” refers to the family of Garmin Traffic Advisory System (TAS) or Traffic Alert and Collision Avoidance System (TCAS I) microprocessor-based sub-systems used to interface to various avionics display and navigation equipment. An example of the GTS 8XX Sub-System is illustrated in Figure 2-6.

The basic functions provided by the GTS 8XX include:

- Output relative altitude and bearing of targets tracked through active and passive surveillance using ARINC 429 protocol or Garmin’s proprietary HSDB protocol.
- Generate Traffic Advisories, via visual annunciation, aural annunciation, voice messages and serial data using ARINC 429 protocol or Garmin’s proprietary HSDB protocol to aid pilots in visual acquisition of traffic targets.

Higher level functions of the GTS 8XX include:

- Active interrogation and tracking of up to 45 intruders equipped with Mode A/C transponder.
- Active interrogation and tracking of up to 30 intruders equipped with Mode S transponder (GTS 820/GTS 850 only).
- Passive surveillance of traffic targets by monitoring ADS-B messages received on 1090 MHz band, and correlation with targets tracked through active surveillance.
- Passive surveillance of traffic targets by monitoring ADS-B messages received from a connected UAT device.

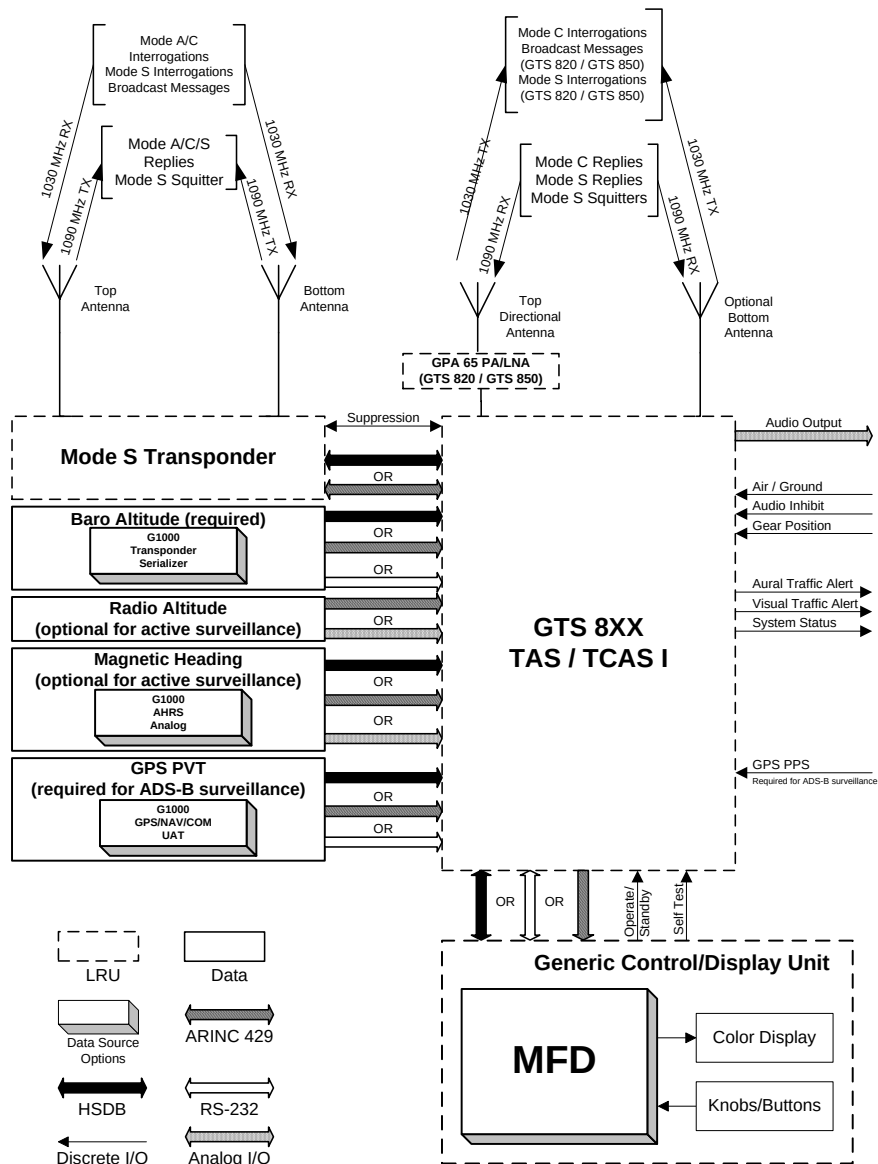


Figure 2-6. GTS 8XX

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SECTION 3

LRU DESCRIPTIONS

This section describes the G1000 Line Replaceable Units (LRUs) that can be installed in VLI/LJ aircraft. Not all of the LRUs described in this section are standard equipment, some are optional depending on the specific model of aircraft. Refer to OEM maintenance documentation for the exact quantity of LRUs used in a specific installation.

3.1 DISPLAYS (MFD/PFD)

3.1.1 GDU 1500



Figure 3-1. GDU 1500

The GDU 1500 is a 15-inch LCD with 1024 x 768 resolution and is configured as a Multi Function Display. It displays navigation information and engine/airframe instrumentation. The GDU 1500 communicates with both GDU 1040's and the GDL 69A through a High-Speed Data Bus (HSDB) Ethernet connection and with the GCU 475 via RS-232.

3.1.2 GDU 1040A



Figure 3-2. GDU 1040A

In certain VLI configurations, two 1040A's are configured as PFD's that feature a 10.4-inch LCD with 1024 x 768 resolution. The 1040A installed on the left/pilot side is designated as PFD1, and the one installed on the right/copilot side is designated as PFD2. These units communicate with each other, the MFD (GDU 1500), and with the on-side GIA 63W Integrated Avionics Unit through a High-Speed Data Bus (HSDB) connection.

3.1.3 GDU 1240A

In certain VLI configurations there are three GDU 1240A LCD's. Each GDU is configured as one of two PFDs or one MFD. The GDU 1240A features a 12-inch LCD with 1024 x 768 resolution. The unit installed on the left/pilot side is designated as PFD1, and the one installed on the right/copilot side is designated as PFD2. The unit installed in the center is designated the MFD. These units communicate with each other and with the on-side GIA 63W Integrated Avionics Unit through a High-Speed Data Bus (HSDB) connection. These units communicate with each other and with the on-side GIA 63W Integrated Avionics Unit through a High-Speed Data Bus (HSDB) connection.



Figure 3-3. GDU 1240A

3.2 GMA 1347/1347D AUDIO PANEL



Figure 3-4. GMA 1347D Audio Panel

The GMA 1347D Audio Panel integrates NAV/COM digital audio, intercom system, and marker beacon controls. Manual display reversion is also controlled by the GMA 1347D. The GMA 1347D is normally installed between the MFD and PFD. The GMA 1347D can also be installed in dual-audio panel applications (usually paired with a dual-PFD setup). The GMA 1347D communicates with both GIA LRUs using RS-232 digital interface. Software and configuration settings are received through a RS-232 digital interface with the GIA. Two audio panels are typically installed.

3.3 GIA 63/63W INTEGRATED AVIONICS UNIT



Figure 3-5. GIA 63W Integrated Avionics Unit

The GIA 63W is the central 'Integrated Avionics Unit' (IAU) in the G1000. It functions as the main communication hub, linking all LRUs (except GIA2) with the on-side PFD. Each GIA 63W contains a GPS WAAS receiver, VHF COM/NAV/GS receivers, a flight director (FD) and system integration microprocessors. Each GIA 63W is paired with a CDU via HSDB connection. The GIA 63Ws are not paired together and do not communicate with each other directly.

3.4 GRS 77 ATTITUDE, HEADING, AND REFERENCE UNIT (AHRS)



Figure 3-6. GRS 77 AHRS

The GRS 77 provides aircraft attitude and heading information via ARINC 429 to both the on-side GDU and the on-side GIA 63W. The GRS 77 contains advanced sensors (including accelerometers and rate sensors) and interfaces with the on-side GMU 44 to obtain magnetic field information, with the GDC 74B to obtain air data, and with both GIA 63Ws to obtain GPS information.

3.5 GMU 44 MAGNETOMETER



Figure 3-7. GMU 44 Magnetometer

The GMU 44 measures local magnetic field. Data is sent to the GRS 77 for processing to determine aircraft magnetic heading. This LRU receives power directly from the GRS 77 and communicates with the GRS 77 using an RS-485 digital interface.

3.6 GDC 74B AIR DATA COMPUTER

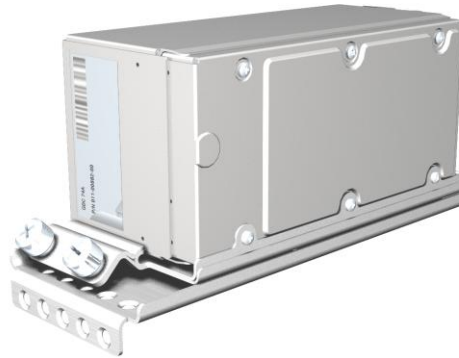


Figure 3-8. GDC 74B Air Data Computer

The GDC 74B processes data from the pitot/static system as well as the OAT probe. This LRU provides pressure altitude, airspeed, vertical speed and OAT information to the G1000, and communicates with the on-side GIA 63W, on-side GDU and on-side GRS 77 using an ARINC 429 digital interface. The GDC 74B is designed to operate in reduced vertical separation minimum (RVSM) airspace.

3.7 GEA 71 ENGINE/AIRFRAME UNIT



Figure 3-9. GEA 71 Engine/Airframe Unit

The GEA 71 receives and processes signals from the engine and airframe sensors. It communicates with both GIA 63Ws using RS-485.

3.8 GDL 69A SATELLITE DATA LINK RECEIVER



Figure 3-10. GDL 69/69A Satellite Data Link Receiver

The GDL 69A is a satellite radio receiver that displays real-time weather information on the MFD and the inset map of the PFD. It also provides digital audio entertainment. The GDL 69A communicates with the MFD via HSDB connection. A subscription to the XM Satellite Radio service is required to enable the GDL 69A.

3.9 GDL 90 GPS WAAS RECEIVER/UAT



Figure 3-11. GDL 90 Universal Access Transceiver/GPS WAAS Receiver

The GDL 90 LRU is a remote-mounted unit containing a GPS/WAAS Receiver and a Universal Access Transceiver (UAT). The GDL 90 transmits data via the UAT data link and receives data from other UAT equipped aircraft as well as FIS-B weather. The received data can be output to an appropriate display.

3.10 GSA 80/ 81 AFCS SERVOS/GSM 85(A) SERVO GEARBOX



Figure 3-12. GSA 80 Servo

The GSA 80/81 servos are used for the automatic control of aircraft pitch, roll, and yaw. These units interface with each GIA 63W. The GSM 85(A) servo gearbox transfers the output torque of the GSA 80 servo actuator to the mechanical flight-control surface linkage.

3.11 GWX 68 WEATHER RADAR



Figure 3-13. GWX 68 Weather Radar

The GWX 68 provides airborne weather and ground mapped radar data to the MFD through the GDL 69A and GSD via an HSDB connection.

3.12 GTP 59 OAT PROBE



Figure 3-14. GTP 59 OAT Probe

The GTP 59 OAT probe provides outside air temperature which is used by the GDC 74A. Communication interface to the G1000 is through the GDC 74.

3.13 GTX 33/33D MODE S TRANSPONDER



Figure 3-15. GTX 33/33D Transponder

The GTX 33 and GTX 33D are solid-state transponders that provide Modes A, C and S capability. The GTX 33D includes Mode S with diversity. Both transponders can be controlled from either PFD (only one transponder is active at a time). Each transponder communicates with the on-side GIA 63W through RS-232.

3.14 GCU 475 MFD CONTROL UNIT



Figure 3-16. GCU 475 MFD Control Unit

The GCU 475 provides the flight management system (FMS) controls for the MFD through an RS-232 digital interface.

3.15 GMC 715 AFCS CONTROL UNIT



Figure 3-17. GMC 715 AFCS Control Unit

The GMC 715 provides the controls for the GFC 700 AFCS through an RS-232 digital interface.

3.16 GSD 41 DATA CONCENTRATOR



Figure 3-18. GSD 41 Data Concentrator

The GSD 41 is a data concentrator used to expand the input and output capabilities of the G1000. Communication is through the high speed data bus.

3.17 GRC10/GRT10

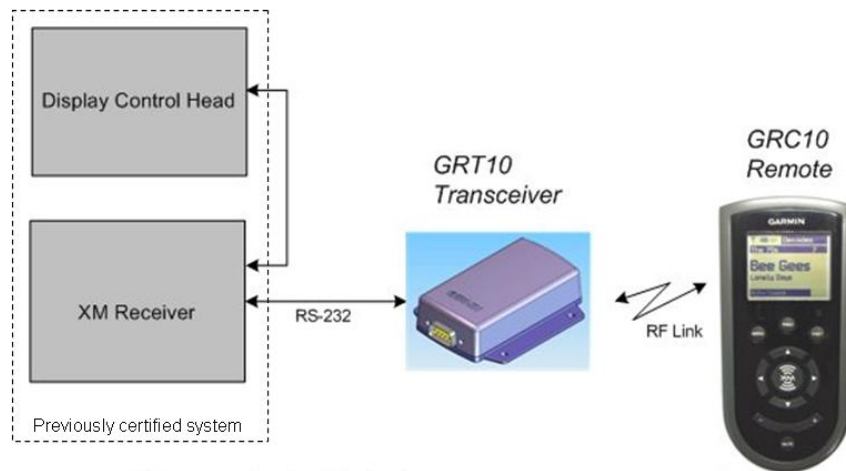


Figure 3-19. GRT 10 Remote Controller and GRC 10 Wireless Transceiver

3.17.1 GRC 10 XM Remote Control

The GRC 10 remote control allows passenger interface with the GDL XM radio without input from the pilot or co-pilot.

3.17.2 GRT 10 XM Wireless Transceiver

The GRT 10 wireless transceiver operates at 2.4 GHz and allows the user to interface wirelessly with the GDL XM radio by receiving and transmitting information to the GRC 10 remote control via RF.

3.18 GCU 477



Figure 3-20. GCU 477 Remote Controller

The GCU 477 is a panel-mounted user control interface that enables the flight crew to control the G1000 Flight Management System (FMS). The GCU 477 has 40 alpha-numeric keys, 15 special function keys, one dual rotary encoder, and one joystick encoder. The unit sends data over an RS-232 serial connection to the G1000 that informs the CDU (Control Display Unit) when the manual interface controls are being operated by the user.

3.19 GSR56/GDL59

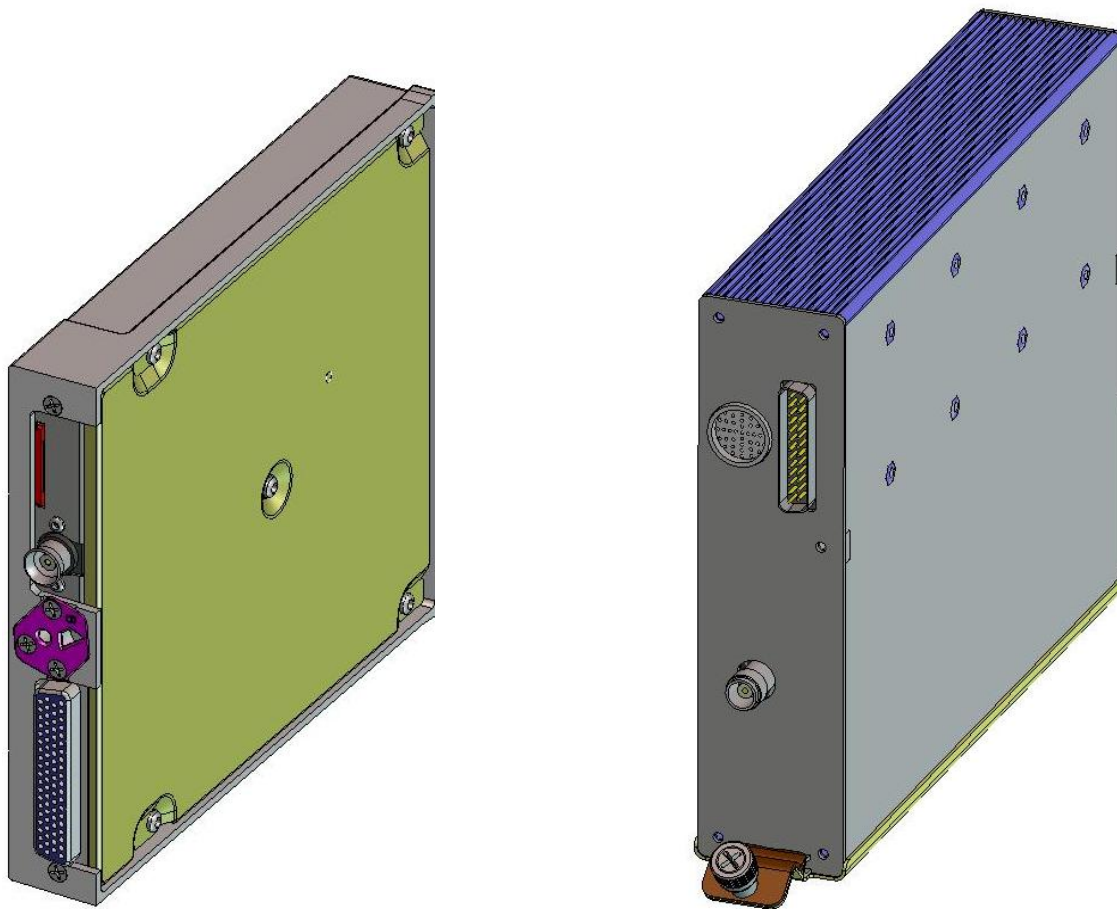


Figure 3-21. GDL 59 and GSR 56 Units

The GDL 59 serves as a short range, high speed data link between the aircraft and ground based networks. The GDL 59 is located in the aircraft and provides communications through an 802.11 RF link when on the ground. The GDL 59 also provides a flight data logger function. When paired with the GSR 56 Iridium data link the GDL 59 provides in-flight voice calling and short burst data communications to ground based networks. The GDL 59 has various connection options to aircraft audio panels and a plain old telephone service (POTS) handset. The GDL 59 provides an effective means for aircraft avionics, pilots, and potential passengers to transfer voice and data between the aircraft and ground networks.

3.20 GTS 8XX/GPA 65/GA 58

“GTS 8XX” refers to a family of Garmin Traffic Advisory System (TAS) or Traffic Alert and Collision Avoidance System (TCAS I) used to interface to various avionics display and navigation equipment produced by Garmin.

The GTS 8XX family of products consists of the GTS 800, GTS 820 and GTS 850. The GTS 800 TAS product consists of the one LRU which has low power (40 watts) transmit capability, and one GA 58 directional antenna. The GTS 820 TAS and GTS 850 TCAS I products include one LRU paired with one GPA 65 PA/LNA amplifier module, which allows high power (200W) transmit capability, and one GA 58 or other Garmin approved directional antenna. An optional second antenna may also be installed with either system. The optional second bottom mounted antenna may be omnidirectional or a Garmin approved directional antenna.

	GTS 800	GTS 820	GTS 850
Traffic Advisory System (TAS)	X	X	
Traffic Alert and Collision Avoidance System (TCAS I)			X
LRU	X	X	X
GPA 65 PA/LNA		X	X
GA 58 or other Garmin Approved Directional Antenna	X	X	X
Optional Garmin Approved Directional or Omnidirectional Antenna	X	X	X

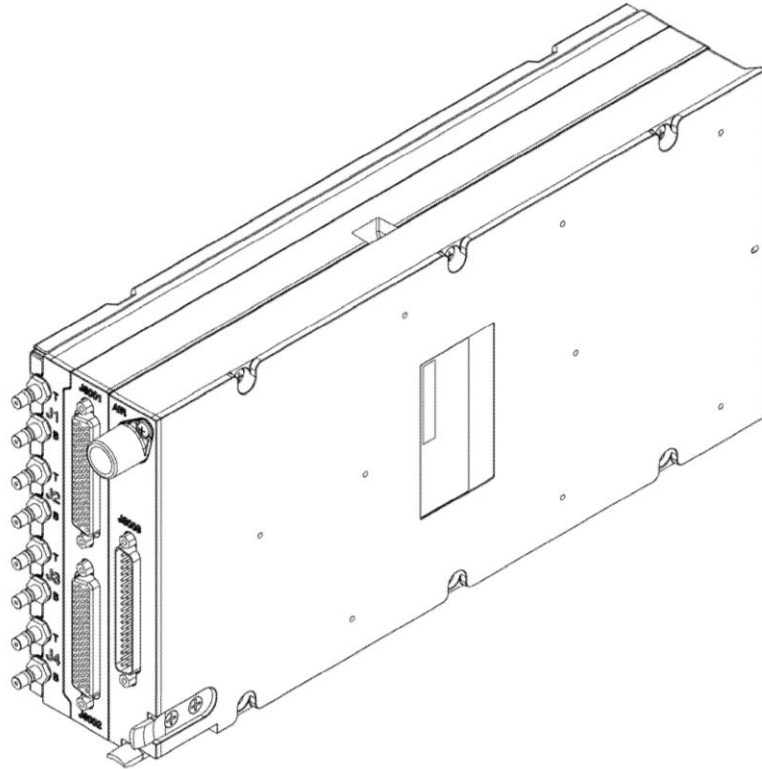


Figure 3-22. GTS 8XX TCAS Unit

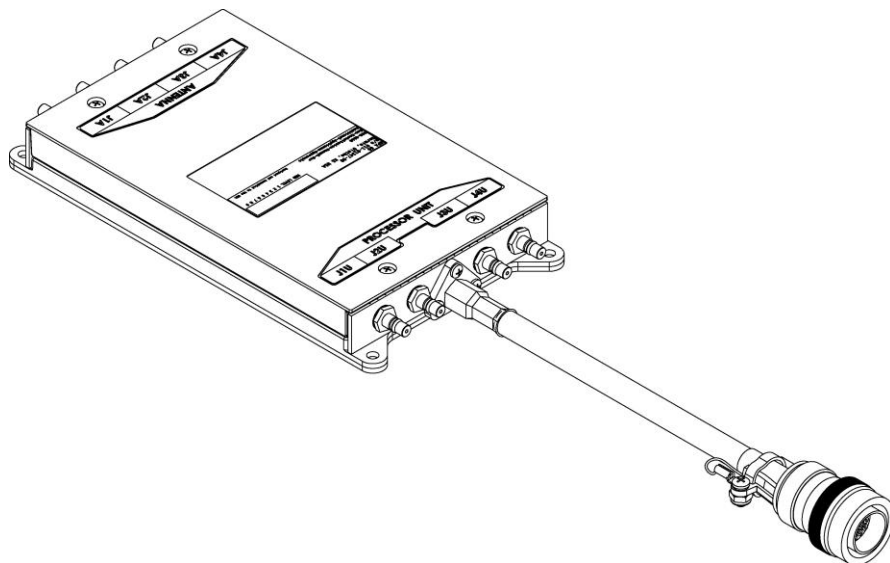


Figure 3-23. GPA 65 Power Amplifier

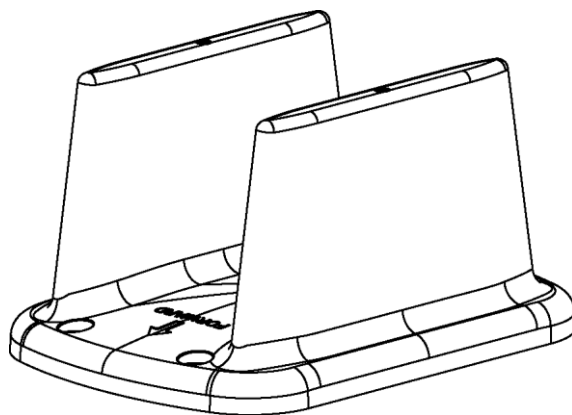


Figure 3-24. GA 58 Antenna

Blank Page

SECTION 4

CONFIGURATION MODE

This section describes the configuration mode of operation which is used in the troubleshooting process. This section presumes basic familiarity with the operation of the G1000.

4.1 INTRODUCTION

Configuring, calibrating, and troubleshooting is performed when the G1000 is in configuration mode.

To put the G1000 in configuration mode:

1. Press and hold the ENT key on the PFD1 while applying power.
2. Release the ENT key after 'INITIALIZING SYSTEM' is displayed in the upper left corner of PFD1. Note: if a GDU 1500 is installed, you must press the 12th softkey instead of ENT, since there is no ENT key.
3. Repeat step 1 for the MFD and PFD2 (if installed). The System Status Page (Figure 4-1) is displayed on the MFD and the PFD.

SYSTEM STATUS		
GDU5 ONLINE	GIA5 ONLINE	OTHER LRUS ONLINE
MFD1 ☒	GIA1 ☐	GDL69 ☐
PFD1 ☐	GIA2 ☐	GMX ☐
PFD2 ☐		
LRU	DATA	
GDC1 - GIA1	PART NUMBER 006-B0319-30	
GDC1 FPGA	VERSION A5.00a	
GEA1 - GIA1	PRODUCT GDU1040	
GEA1 - GIA2	DESCRIPTION SYS Nav 01 2005 11:05:17	
GIA1	COPYRIGHT (c) 2002-05 Garmin Ltd or subs	
GIA1 AUDIO	SERIAL NUMBER 86501322	
GIA2	MODEL NUMBER 4	
GIA2 AUDIO	FUNCTIONS PRESENT 0	
GMA1 - GIA1	STATUS ONLINE	
GMA1 - GIA2	BB PART NUMBER 006-B0191-02	
GMU1	BB VERSION 2.01	
GMU1 FPGA	AVIATION DB CYCLE Worldwide 0509	
GRS1 - GIA1	BASEMAP DB VERSION Worldwide 1.01	
GRS1 FPGA	SAFETAXI DB CYCLE US 0509	
GRS1 MV DB	TERRAIN DB VERSION WW 2.02	
GTX1 - GIA1	APT TRN DB VERSION NOT AVAILABLE	
GTX1 - GIA2	OBSTACLE DB CYCLE US 05B5	
MFD1		

Figure 4-1. System Status Page (Configuration Mode)

4.2 CONFIGURATION PAGE GROUPS AND PAGES

NOTE

Certain "protected" configuration pages are critical to aircraft operation and safety. The technician is unable to modify or change settings on these pages. They are viewable to aid in troubleshooting.

Configuration pages are grouped according to their function. The active page title is displayed at the top of the screen in the center. In the bottom right corner of the screen, the current configuration page group, number of pages available in the group, and placement of the current page within the group are indicated by icons. The page groups and pages listed in this section are nonspecific. Page groups and pages can change depending on the configuration in a specific aircraft (Table 4-1).

4.2.1 User Interface

Once the G1000 is in configuration mode, the FMS knob is used to cycle through the different configuration pages, to change page groups, and to change pages in a group. The following can be performed using the FMS knob:

- Press the small FMS knob to activate the cursor.
- Rotate the large FMS knob to cycle the cursor through different data fields.
- Rotate the small FMS knob to change the contents of a highlighted data field. This action displays an options menu for the particular field, or in some cases, allows you to enter data for the field.
- Press the ENT key to confirm a selection.
- Press the small FMS knob to cancel a selection.
- Pressing the small FMS knob again turns the cursor off.
- The CLR key can also be used to cancel a selection or turn the cursor off.

NOTE

The MFD/PFD, Audio Panel, MFD Control Unit and AFCS controls are described in the Pilot's Guide.

4.2.2 Softkeys

Some configuration pages have commands or selections that are activated by the display softkeys (Figure 4-2). If a softkey is associated with a command, that command will be displayed directly above the key. A grayed-out softkey shows a command that is unavailable. A softkey that is highlighted shows the current active selection.



Figure 4-2. G1000 Softkeys

4.3 SECURE DIGITAL (SD) CARDS

Software files are uploaded to the G1000 using a Secure Digital (SD) Data Card. The card contains all necessary files to load software and configuration settings to all G1000 LRUs. All software and configuration parameters are pre-determined by Garmin and/or the OEM. During removal and replacement of LRUs, software and configuration files may need to be reloaded (refer to Section 7).

Use the correct card part number because each card part number defines all files found on the card for a specific G1000 installation except for certain configuration settings such as the aircraft registration number (N#) which must be entered manually.

Use care when using the card during maintenance. The G1000 is designed to immediately initialize the card upon power-up. On-screen prompts must be given careful attention in order to avoid potential loss of data. Always read and thoroughly understand all related information before attempting to use the card.

NOTE

Remove power from the G1000 before inserting an SD card.

The GDU data card slots use the secure digital (SD) cards and are located on the top right portion of the display bezels (Figure 4-3). Each display bezel is equipped with two SD card slots. SD cards are used for navigation database and system software updates in addition to terrain database storage.

To install an SD card:

1. Insert the SD card in the SD card slot with the label facing to the left.
2. Push the card in fully and release, the spring latch should hold the card in place. The end of the card should be nearly flush with the face of the display bezel.

To remove an SD card:

Gently press on the SD card to release the spring latch and eject the card.



Figure 4-3. GDU Bezel SD Card Slots

Table 4-1. Configuration Page Groups

SYSTEM System Status Date/Time Setup Main Lighting Audio Alert Configuration System Upload File Manager Diagnostics Terminal Maintenance Log OEM Diagnostics Terminal System Configuration System Data Paths System Setup Manifest Configuration	GDU RS-232/ARINC 429 Config GDU Status GDU Test Diagnostics Serial / Ethernet I/O Alert Configuration Airframe Configuration	GDC GDC Configuration
GIA RS-232/ARINC 429 Config CAN/RS-485 Configuration GIA I/O Configuration COM Setup GIA Status CAN Configuration	GSD GSD ARINC Configuration GSD RS-485 Configuration GSD I/O Configuration GSD Status	GDL GDL69 Configuration
GTX RS-232/ARINC 429 Config Transponder Configuration	GRS AHRS/AIR Data Input GRS/GMU Calibration	OTHER STORMSCOPE S-TEC®
GFC GFC Configuration GFC Status	GMA GMA Configuration	GWX GWX Configuration
RMT Remote Status	CAL Fuel Tank Calibration Flaps & Trim Calibration HSCM Calibration Airframe Calibration	
GEA Engine Data GEA Status GEA Configuration Fuel Calibration	GTS GTS Configuration	

4.4 CONFIGURATION FILES

NOTE

The GRS 77 AHRS and GMU 44 Magnetometer LRUs do not use configuration files but do require several calibrations during installation and/or maintenance.

The G1000 loader card contains the following configuration files (this list is nonspecific and can differ depending on the requirements of a particular installation):

- AIRFRAME - contains data such as airspeed parameters, engine/airframe sensor limitations, fuel tank parameters and alerting system settings that tailor a G1000 PFD or MFD to a specific airframe.
- SYSTEM - configures the G1000 Ethernet to communicate with a PFD, MFD, and GIAs and other LRUs that support HSDB.
- MANIFEST - uploads a manifest of all software part numbers and versions associated with an approved system configuration.
- MFD1 - configures the MFD serial/discrete communications and alerting system settings.
- PFD1/PFD2 - configures PFD serial/discrete communication and alert system settings.
- GIA1/GIA2 - these files configure GIA1/GIA2 serial/discrete communication settings.
- GMA1/GMA2 - configures GMA audio and serial communication settings.
- GTX1/GTX2 - configures GTX transponder and serial communications settings.
- GEA1/GEA2 - configures GEA engine/airframe parameters.
- GDC1/GDC2 - configures GDC air data values for the aircraft.
- GDL69 - configures GDL 69/69A data link and communications settings.
- GMC - configures the GMC 710.
- GCU - configures the GCU 475.
- CALIBRATION - configures the fuel and trim calibration data.
- GWX - configures the GWX 68 weather radar settings.
- AUDIO - configures all of the audio messages for the G1000 including tones and voice messages.
- GTS – configures the GTS 8XX TCAS.

4.4.1 Configuration File Retention

The G1000 stores all configuration settings in various locations allowing the configuration of the system to be retained in the aircraft during maintenance. Since the G1000 is installed in a variety of aircraft, it is essential that aircraft specific data be retained at the aircraft level. Figures 4-4 and 4-5 illustrate a block diagram of how a typical G1000 stores configuration settings.

The GRS 77 and GDC 74B configuration modules function differently than the rest of the system. The GDC 74B's configuration file is loaded directly to GDC internal memory, a copy is also stored in the GDC configuration module. The GRS 77 configuration module stores calibration data recorded during installation calibration procedures and does not store configuration settings.

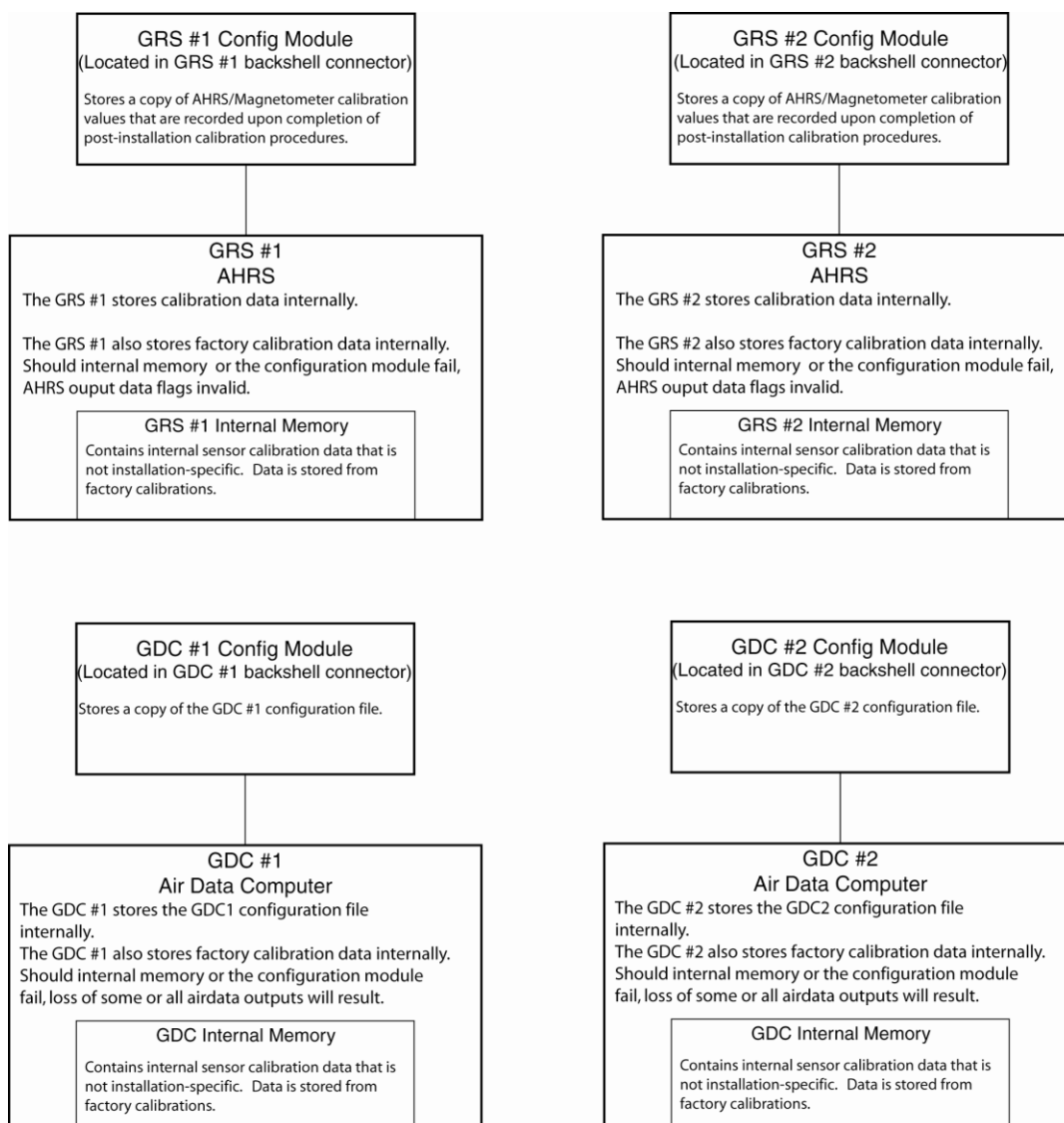


Figure 4-4. GRS/GDC Configuration File Storage (3 Display)

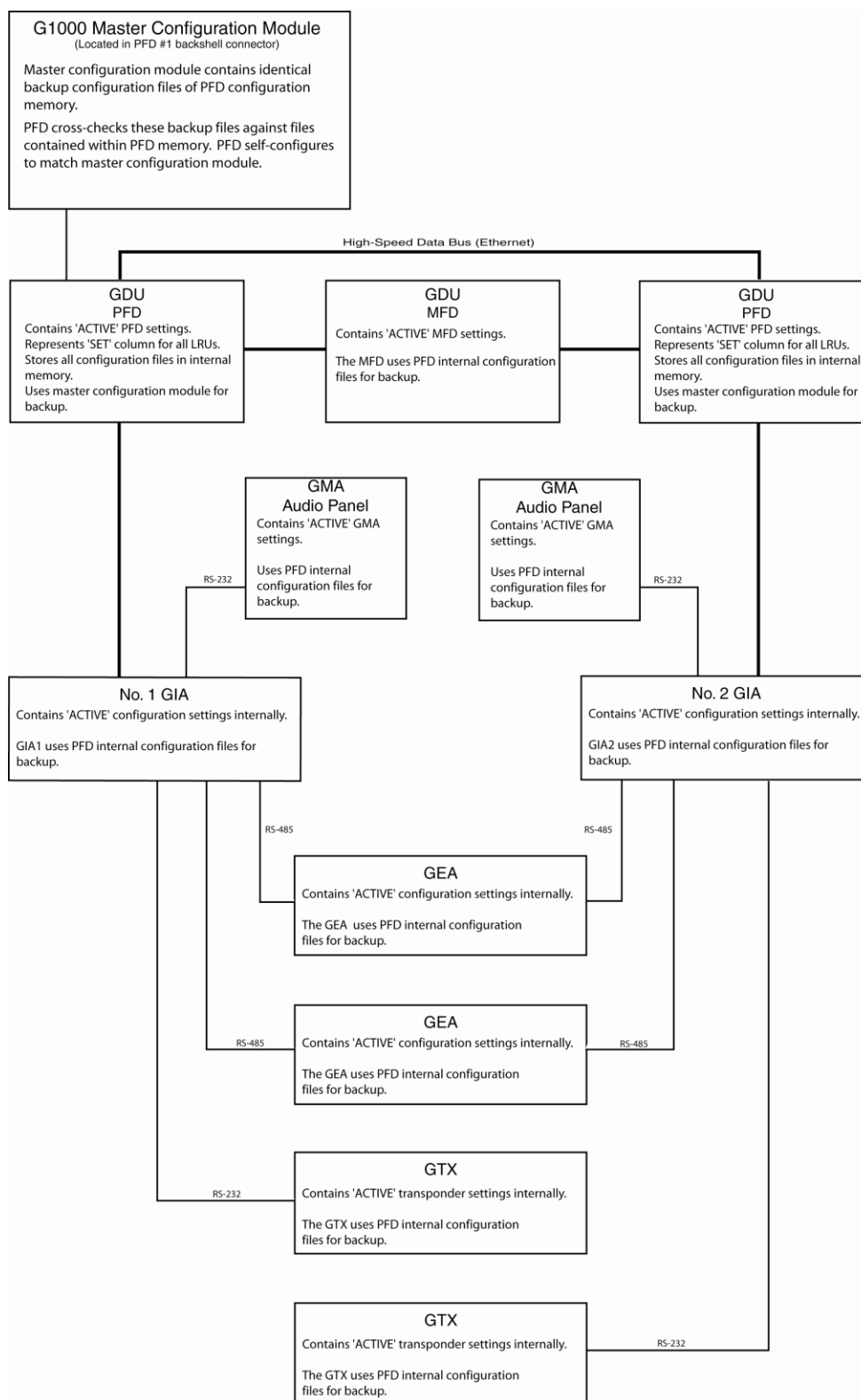


Figure 4-5. System Configuration File Storage (3 Display)

4.5 'SET' AND 'ACTIVE' COMMANDS

The SET and ACTIVE commands on various configuration pages are used for setting input/output conditions (Figure 4-6).

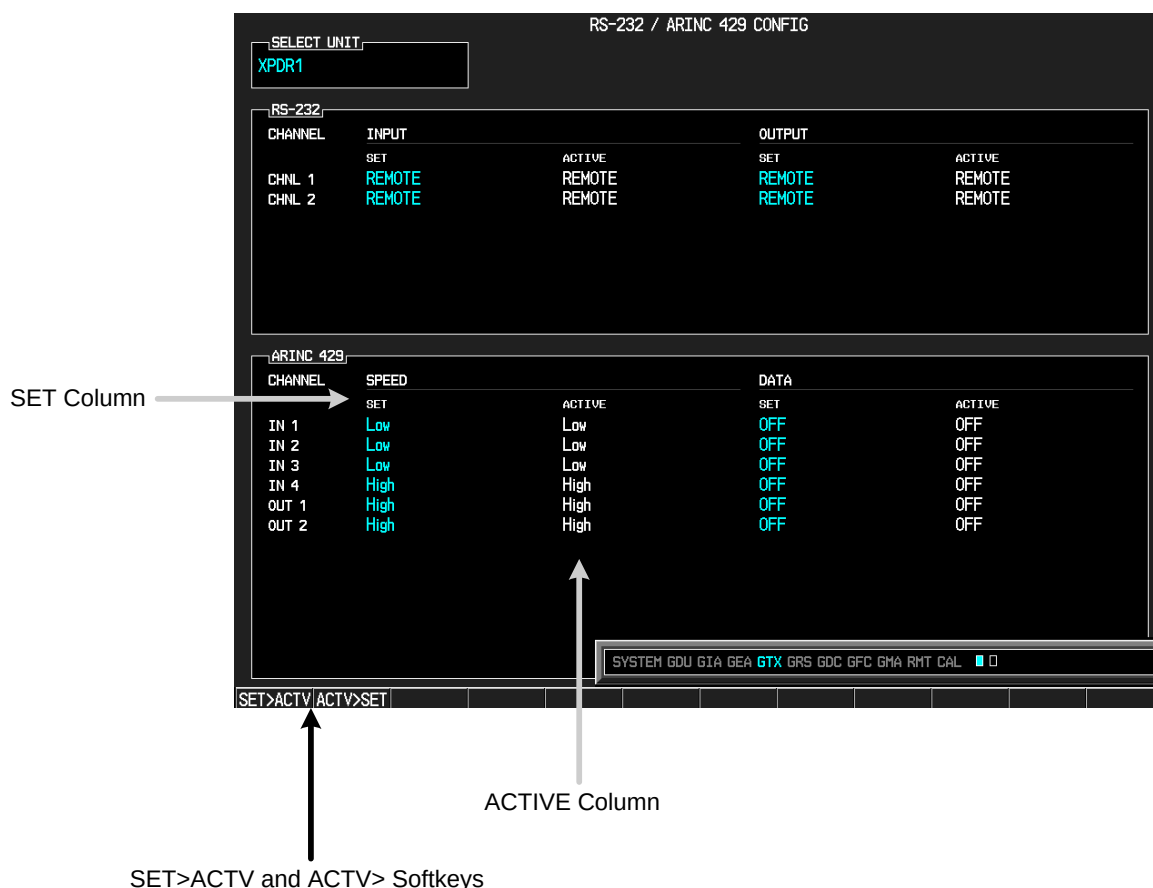


Figure 4-6. SET and ACTIVE Softkeys and Columns

4.5.1 SET and ACTIVE Softkeys

Look for inequalities (configuration mismatches) between the SET and ACTIVE columns when troubleshooting. Certain problems may be resolved by pressing the SET>ACTV softkey which reloads settings to the specific LRU from the PFD (this can also be accomplished by reloading the configuration files to the LRU using the G1000 SW loader card.) *Use the ACTV>SET softkey with care. If an improperly configured unit is installed, this softkey causes a wrong configuration to replace the correct one.*

SET — refers to a setting or group of settings that reside in PFD1's internal memory and/or master configuration module.

ACTIVE — refers to a current setting stored and used in a LRU. LRUs store the 'active' settings within internal memory.

Data can be manually copied from one column to the other using the following two softkeys:

SET>ACTV (Set to Active) — allows the user to send the information in the SET column (data stored in the master configuration module) to the ACTV column (data used by the LRU).

ACTV>SET (Active to Set) — causes the current settings of the LRU to be copied to the master configuration module as SET items.

4.6 CONFIGURATION STATUS

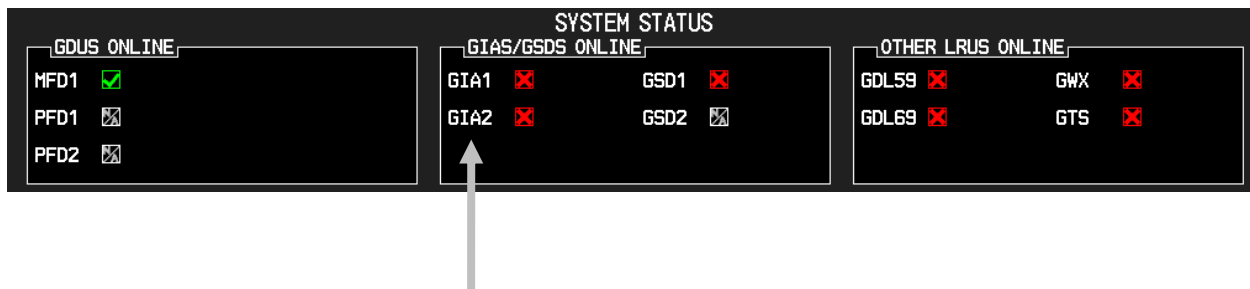
Whenever configuration settings are changed, on-screen prompts and/or confirmation similar to those shown in Figure 4-7 are displayed.



Figure 4-7. Configuration Status Prompts

4.7 DATA STATUS AND PATH INDICATIONS

Various configuration pages use an indicator light system to show data status. Unless otherwise noted, the following applies to all configuration page status indicators:

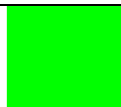
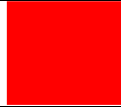
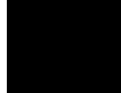


INDICATED ITEM

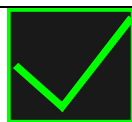
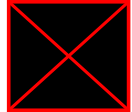
Figure 4-8. Data Status Indications

4.7.1 Data Status Indications

Software Data Status Indications— Pre-GDU v9.10

	The LRU is online and reports that the item located next to the indicator box is communicating.
	The LRU is online, and reports that the item located next to the indicator box is not communicating.
	The LRU is not reporting a status for the item located next to the indicator box. This may be because the data is not available, not applicable, or not expected.

Software Data Status Indications— GDU v9.10 and Above

	The LRU is online and reports that the item located next to the indicator box is communicating.
	The LRU is online, and reports that the item located next to the indicator box is not communicating.
	The LRU is not reporting a status for the item located next to the indicator box. This may be because the data is not available, not applicable, or not expected.
	The LRU is not reporting status for the item located next to the indicator box. This may be due to the fact that the data is not available or is not expected.
	“True” condition; i.e., necessary conditions have met in order to activate the item.
	“False” condition; i.e., necessary conditions have not been met in order to activate the item.
	“High” condition; i.e., the system expects a high voltage or a high resistance input to trigger the item (fan operation, etc.).
	“Low” condition; i.e., the system expects a low voltage or a low resistance input to trigger the item (fan operation, etc.).

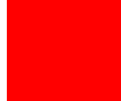
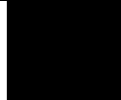
4.7.2 Data Path Indications

SYSTEM DATA PATHS				
LRU	CHANNEL	STATUS	MONITOR	DATA PATH
MFD1	IN 1	✖	ON	FAIL
MFD1	IN 2	✖	ON	FAIL
GIA1	IN 1	?	OFF	UNKNOWN
GIA1	IN 2	?	OFF	UNKNOWN
GIA1	IN 3	?	OFF	UNKNOWN
GIA1	IN 4	?	OFF	UNKNOWN
GIA1	IN 5	?	OFF	UNKNOWN
GIA1	IN 6	?	ON	UNKNOWN
GIA1	IN 7	?	OFF	UNKNOWN
GIA1	IN 8	?	OFF	UNKNOWN
GIA2	IN 1	?	ON	UNKNOWN
GIA2	IN 2	?	ON	UNKNOWN
GIA2	IN 3	?	ON	UNKNOWN
GIA2	IN 4	?	OFF	UNKNOWN
GIA2	IN 5	?	ON	UNKNOWN
GIA2	IN 6	?	ON	UNKNOWN
GIA2	IN 7	?	OFF	UNKNOWN
GIA2	IN 8	?	OFF	UNKNOWN
GSD1	A429 IN 1	?	ON	UNKNOWN
GSD1	A429 IN 2	?	ON	UNKNOWN
GSD1	A429 IN 3	?	ON	UNKNOWN

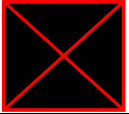
DATA PATH (STATUS
COLUMN)

Figure 4-9. Data Path Indications (Example)

Data Path Indications— Pre-GDU v9.10

	The LRU located next to the indicator box is communicating.
	The LRU located next to the indicator box is not communicating.
	No status. This may be because the data is not available, not applicable, or not expected.

Data Path Indications— GDU v9.10 and Above

	The item located next to the indicator box is communicating.
	The LRU reports that the item located next to the indicator box is not communicating.
	The LRU is not reporting a status for the item located next to the indicator box. This may be because the data is not available, not applicable, or not expected.
	“True” condition; i.e., necessary conditions have met in order to activate the item.
	“False” condition; i.e., necessary conditions have not been met in order to activate the item.
	“High” condition; i.e., the system expects a high voltage or a high resistance input to trigger the item (fan operation, etc.).
	“Low” condition; i.e., the system expects a low voltage or a low resistance input to trigger the item (fan operation, etc.).

SECTION 5

TROUBLESHOOTING

This section contains troubleshooting methods and procedures which are designed to help isolate a defective LRU. The procedures and methods described are generic and must be adapted for specific situations.

5.1 TROUBLESHOOTING METHODS

5.1.1 Visual Hardware Inspection

Begin troubleshooting with a visual inspection. Check for corrosion, damage, or other defects. Replace any damaged parts as required. Inspection may require the temporary removal of an LRU to gain access to connectors. Follow the guidance given in Section 6 for LRU replacement. Refer to the OEM maintenance documentation for instructions on removing any aircraft access panels.

5.1.2 LRU Failure Annunciations

When an LRU fails or is not receiving data, a large red 'X' is displayed in windows relating to the failed LRU (Figure 5-1 and Table 5-1).

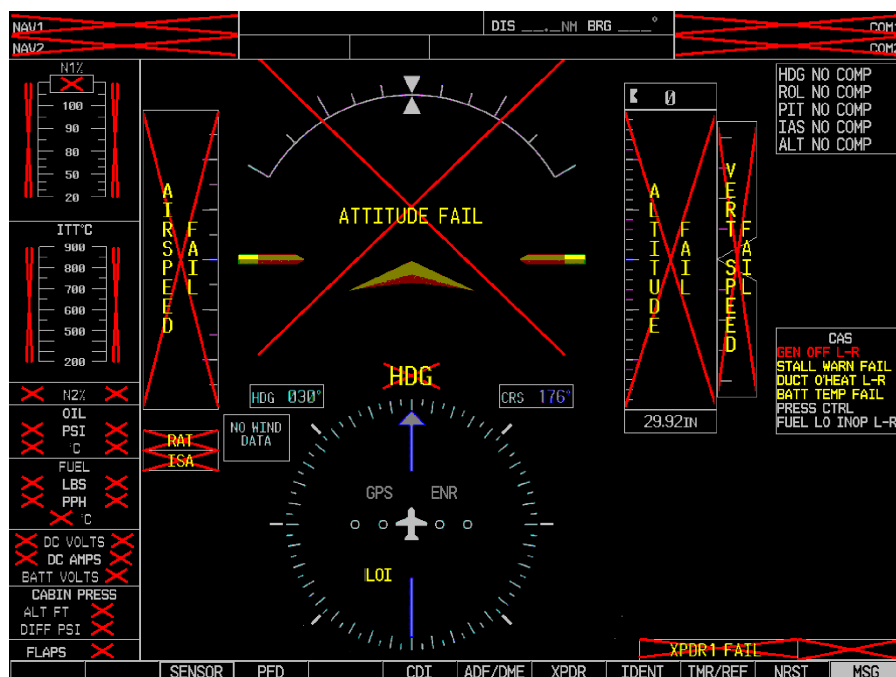


Figure 5-1. LRU Failure Annunciation

5.1.2.1 LRU Failure Annunciations and Recommended Actions

Table 5-1 lists specific annunciations, the associated LRU, and recommended actions to take. Use the information listed in Table 5-1 in conjunction with Figure 5-1.

Table 5-1. LRU Failure Annunciations and Recommended Actions

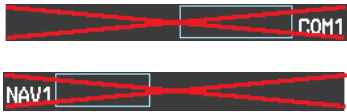
Annunciation	Associated LRU	Recommended Actions
NAV1 or COM1 	GIA1	• Check PFD1 Alert Window for GIA1 configuration, software or failed data path error messages. Correct any errors before proceeding. • Swap GIA1 and GIA2 and reconfigure for their new positions to verify location of problem — if problem follows GIA1, replace GIA1. • Check Ethernet interconnect from GIA1 to MFD or PFD1 (based on aircraft configuration) and unit connector pins for faults — if problem persists, replace PFD1.
NAV2 or COM2 	GIA2	• Check PFD1 Alert Window for GIA2 configuration, software or failed data path error messages. Correct any errors before proceeding. • Swap GIA1 and GIA2 and reconfigure for their new positions to verify location of problem — if problem follows GIA2, replace GIA2. • Check Ethernet interconnect from GIA2 to MFD or PFD2 (based on aircraft configuration) and unit connector pins for faults — if problem persists, replace MFD or PFD2 (based on aircraft configuration).

Table 5-1. (continued)

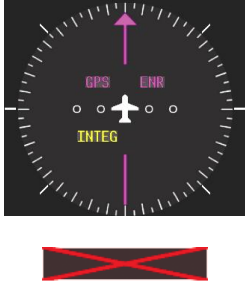
GPS INTEG or Time 	GIA1 or 2	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Check PFD1 Alert Window for GIA1/2 configuration, software or failed data path error messages. Correct any errors before proceeding. • Verify the aircraft is located where the GPS antennas have a clear view of the sky. • Verify the aircraft is not parked in close proximity to a hanger with the doors open equipped with a GPS repeater • On the MFD AUX – GPS STATUS page, check for erratic GPS Signal Strength bars. If they are erratic, external interference is affecting the GPS receiver. Locate source of interference and remove. • Swap GIA1 and GIA2 to verify location of problem. If problem follows the GIA, replace the GIA. • Check corresponding GPS antenna and cable for faults. Correct antenna or cable fault. • Check PFD1 to GIA1 and PFD2 (or MFD) to GIA2 Ethernet interconnect for faults. Correct interconnect fault. If problem persists replace PFD1, PFD2 or the MFD that shows the problem.

Table 5-1. (continued)

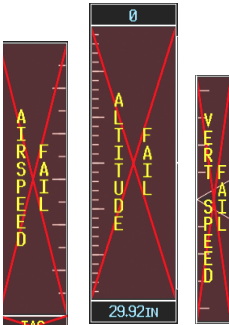
XPDR FAIL 	GTX 33 or 33D	• Check PFD1 Alert Window for GIA1/2 and GTX 33 configuration, software or failed data path error messages. Correct any errors before proceeding. • Perform a SET>ACTV configuration reset on the GTX Transponder Configuration page for each installed GTX. • Verify the aircraft registration is entered for the transponders on the GTX Transponder Configuration page. • Check the GIA and GTX racks for connector pin faults (push-back or bent) on the RS-232 interconnect lines. • Replace the GTX 33/33D. If problem persists, replace the GIA.
AIRSPEED FAIL ALTITUDE FAIL VERT SPEED FAIL  	GDC 74B	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Check PFD1 Alert Window for PFD1/2, MFD or GDC configuration, software or failed data path error messages. Correct any errors before proceeding. • Inspect GDC 74B pitot/static ports and plumbing for blockage. • Check GDC 74B configuration settings for the PFDs, MFD, GIA1, and GIA2. Reload if unsure they are correct. • If PFDs, MFD, and GIA configuration settings are correct, replace the GDC 74B. If problem persists, replace the GDC 74B configuration module.
OAT and TAS  	GTP 59	• Check OAT probe wiring, probe, and connectors for faults or damage. • Replace GDC 74B Config Module. • Replace the GTP 59. If problem remains. replace GDC 74B.

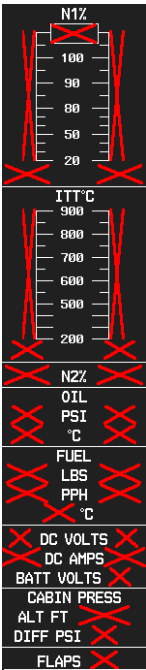
Table 5-1. (continued)

	GRS 77	• See Section 5.1.8.7.1 and following for background information concerning loss of attitude, questions to ask the operator and troubleshooting steps. • Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Ensure metal objects (tool boxes, power carts, etc.) are not interfering with the magnetometer and aircraft is not in hangar, near other buildings, parked over metal drainage culverts or on hard surfaces that may contain steel reinforcements. • Check PFD1 Alert Window for PFD1/2, MFD or GRS configuration, software or failed data path error messages. Correct any errors before proceeding. Ensure GRS 77 unit connector is secure and proper wire harness strain relief is provided. • Ensure the GRS 77 is fastened down tightly in the mounting rack and that the mounting rack is not loose (CAUTION - do not loosen the mounting rack hardware to the airframe shelf or the aircraft will need to be re-leveled and the PITCH/ROLL OFFSET procedure performed). • Cycle GRS 77 power to restart initialization. • Ensure GPS has acquired at least four satellites, has a 3D navigation solution, and a DOP of less than 5.0. This is particularly important for an ATTITUDE FAIL that appears during ground operation only. • Perform an Engine Run-Up Test to check if engine vibration is causing the GRS 77 to go offline. • Replace GRS 77. If problem persists, replace the GRS77 configuration module. • Contact Garmin Aviation Product Support for additional assistance if condition continues after replacing the GRS 77 and config module.

Table 5-1. (continued)

Annunciation	Associated LRU	Recommended Actions
HDG FAIL 	GRS 77 & GMU 44	• See Section 5.1.8.7.1 and following for additional background information about a heading red-X before replacing a unit at the end of these steps. • Check PFD1 Alert Window for PFD1/2, MFD, GMU or GRS configuration, software or failed data path error messages. Correct any errors before proceeding. • Ensure metal objects (tool boxes, power carts, etc.) are not interfering with the magnetometer and aircraft is not in hangar, near other buildings, parked over metal drainage culverts or on hard surfaces that may contain steel reinforcements • Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Cycle power after moving aircraft away from metal objects to determine if metal objects were the source of the interference. Allow up to five minutes for the heading to reinitialize. • Perform a Magnetometer Interference Test to check for interference from onboard electrical system components (e.g. NAV lights). Pay particular attention to any new electrical devices that have been installed since the aircraft was new. Correct any discrepancies that do not allow this test to pass before continuing. • Ensure GRS 77 and GMU 44 connectors are secure. • Check the wiring and any inline connectors between the GRS and GMU for faults. • Recalibrate the GMU 44. • Replace the GMU 44. If problem persists, replace the GRS 77.

Table 5-1. (continued)

Engine/Airframe Sensors 	GEA 71 & GIA 63W	• Check PFD1 Alert Window for GIA1/2 or GEA1/2 configuration, software or failed data path error messages. Correct any errors before proceeding. • Verify GEA1/2 internal power supply and calibration status boxes are green in configuration mode. – If the internal power supply box is red, check for shorted sensors that receive 5V, 10V or 12V power from the GEA. – If the calibration status boxes are red, replace the GEA 71. • Verify internal, external, and reference voltages listed in the Main Analog and I/O A Analog boxes are not dashed out (does not include Aircraft Power 1 and 2). If any voltages are dashed out, replace the GEA. • Check the MFD AUX – SYSTEM STATUS page if the GEA is online (green checkmark is present). If GEA is not online (Red-X is present), verify the unit is receiving power at the GEA rack connector. • Reload configuration files to both GIA's and the GEA. • Replace the GEA 71. If problem persists, check the GIA/GEA interconnect wiring and unit connector pins for faults.
	GRS 77 Config Module	This indication is displayed if the AHRS/MAG system has been replaced and has not been calibrated. It also is displayed if there are problems with the GRS77 config module and/or associated wiring.

5.1.3 System Status Page Failure Indications

The System Status Page in the AUX group of pages displays the status for all detected LRUs. Active LRUs are indicated by green check marks and failed LRUs are indicated by red “X”s.

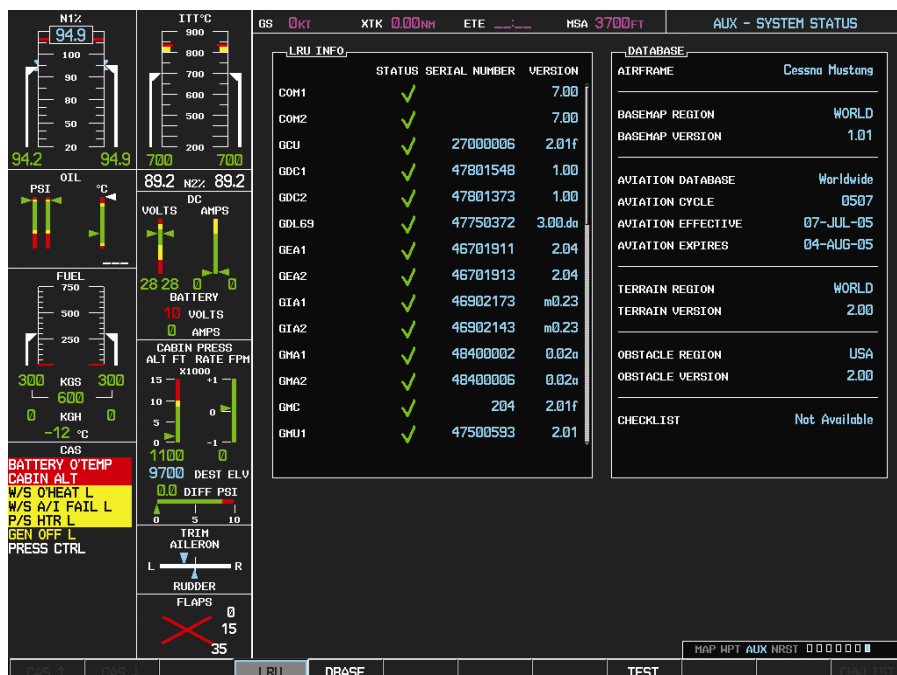


Figure 5-2. System Status Page (AUX Group)

5.1.4 Failed Path Messages

The following message indicates that a data path connected to the GDU (PFD1, PFD2, or MFD) or the GIA 63W (1 or 2) has failed.

FAILED PATH – A data path has failed. Check configuration mode.

The FAILED PATH message is triggered by a timeout of any one digital channel. The channels that are checked are listed on these pages in config mode:

1. GDU RS-232 / ARINC 429 CONFIG (PFD1/2, and MFD)
2. GIA RS-232 / ARINC 429 CONFIG (GIA1 and GIA2)
3. GIA CAN / RS-485 CONFIGURATION (GIA1 and GIA2)

Important — once the FAILED PATH message has been triggered, it will remain on the list of messages until the next power cycle. This latching was implemented so that for intermittent failures, the message would remain at the end of the flight (to alert the maintenance crew). In addition, this keeps the crew from having to acknowledge message repeatedly in the case of intermittent failures.

NOTE

For GDU software below V7.01, the data path boxes may not be present on the GDU and GIA configuration pages. Troubleshooting failed path messages will require manually checking the data lines using a continuity tester and may require swapping GDUs, GIAs or other units to determine if the fault lies in the unit or wiring. Garmin recommends following the troubleshooting instructions for the red data boxes below to help find the cause of the fault.

5.1.5 System Data Paths Page

NOTE

Refer to Section 2 for data path indication definitions.

There is a system data paths page (Figure 5-3) which is viewed in configuration mode. All of the data path information for every LRU is displayed on this one page.

SYSTEM DATA PATHS				
LRU	CHANNEL	STATUS	MONITOR	DATA PATH
PFD1	IN 1	✖	ON	FAIL
PFD1	IN 2	✖	ON	FAIL
GIA1	IN 1	?	ON	UNKNOWN
GIA1	IN 2	?	ON	UNKNOWN
GIA1	IN 3	?	ON	UNKNOWN
GIA1	IN 4	?	ON	UNKNOWN
GIA1	IN 5	?	ON	UNKNOWN
GIA1	IN 6	?	ON	UNKNOWN
GIA1	IN 7	?	ON	UNKNOWN
GIA1	IN 8	?	ON	UNKNOWN
GIA2	IN 1	?	ON	UNKNOWN
GIA2	IN 2	?	ON	UNKNOWN
GIA2	IN 3	?	ON	UNKNOWN
GIA2	IN 4	?	ON	UNKNOWN
GIA2	IN 5	?	ON	UNKNOWN
GIA2	IN 6	?	ON	UNKNOWN
GIA2	IN 7	?	ON	UNKNOWN
GIA2	IN 8	?	ON	UNKNOWN

Figure 5-3. System Data Paths Page (Configuration Mode)

ARINC 429, CAN, Ethernet high speed data bus (HSDB), RS-232 or RS-485 is selected by pressing the appropriate softkey at the bottom of the screen (Figure 5-4). A solid red box indicates a failed data path for the associated LRU.



Figure 5-4. Softkey Selection of Data Types

Check each of the Bus Types on the system data paths screen by pressing the respective softkeys. Figure 5-5 shows two red marks when the CAN bus is selected. These indications show that the CHNL 2 path for GIA1 and GIA2 is not working.

SYSTEM DATA PATHS				
LRU	CHANNEL		CONFIG	STATUS
GIA1	CHNL 1	☒	TRUE	TRUE
GIA1	CHNL 2	☐	TRUE	FALSE
GIA2	CHNL 1	☒	TRUE	TRUE
GIA2	CHNL 2	☐	TRUE	FALSE

Figure 5-5. CHNL 2 Path for GIA1 and GIA2

After the failed paths for the GIA on the system data path page are observed, turn the large FMS knob to navigate to the GIA page group. The RS-232/ARINC 429 CONFIG is displayed as page one on the GIA page group (Figure 5-6). Once the GIA page group is selected, use the small FMS knob to navigate to the CAN configuration page.

RS-232 / ARINC 429 CONFIG

SELECT UNIT

GIA1

RS-232

CHANNEL	DATA	SET	INPUT	ACTIVE	SET	OUTPUT	ACTIVE
CHNL 1	☒	GDC74 #1		GDC74 #1	GDC74 #1		GDC74 #1
CHNL 2	☐	OFF		OFF	GRS77 #2		GRS77 #2
CHNL 3	☐	OFF		OFF	OFF		OFF
CHNL 4	☐	OFF		OFF	OFF		OFF
CHNL 5	☒	GTX 33 #1		GTX 33 #1	GTX 33 #1		GTX 33 #1
CHNL 6	☒	GRS77 #1		GRS77 #1	GRS77 #1		GRS77 #1
CHNL 7	☒	GMA1347 #1		GMA1347 #1	GMA1347 #1		GMA1347 #1
CHNL 8	☐	OFF		OFF	OFF		OFF

ARINC 429

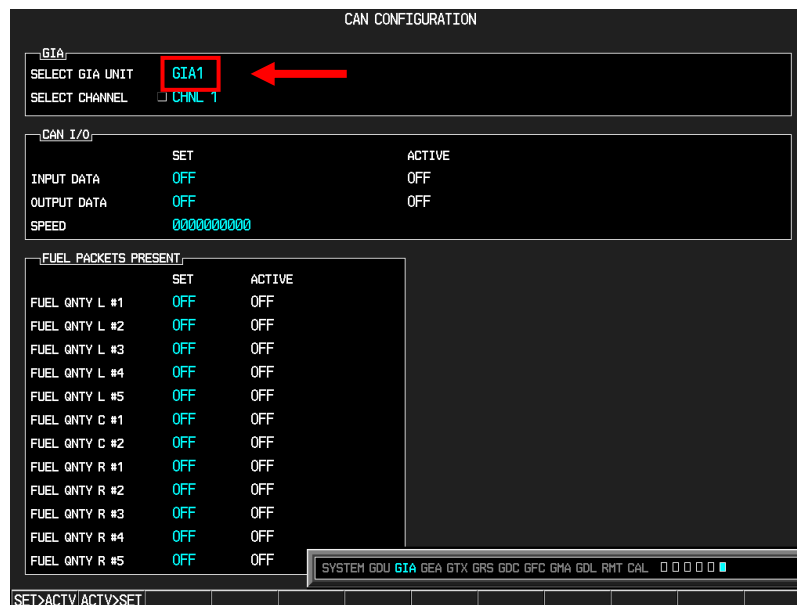
CHANNEL	DATA	SPEED	ACTIVE	DATA	ACTIVE
IN 1	☐	Low	Low	OFF	OFF
IN 2	☐	Low	Low	OFF	OFF
IN 3	☐	Low	Low	OFF	OFF
IN 4	☐	Low	Low	OFF	OFF
IN 5	☒	Low	Low	GDC74 #1	GDC74 #1
IN 6	☒	High	High	GRS77 #1	GRS77 #1
IN 7	☐	Low	Low	OFF	OFF
IN 8	☐	Low	Low	OFF	OFF
OUT 1		Low	Low	OFF	OFF
OUT 2		High	High	OUT ADAS	OUT ADAS
OUT 3		Low	Low	OFF	OFF
SDI		Common	Common		

SET>ACTV ACTV>SET

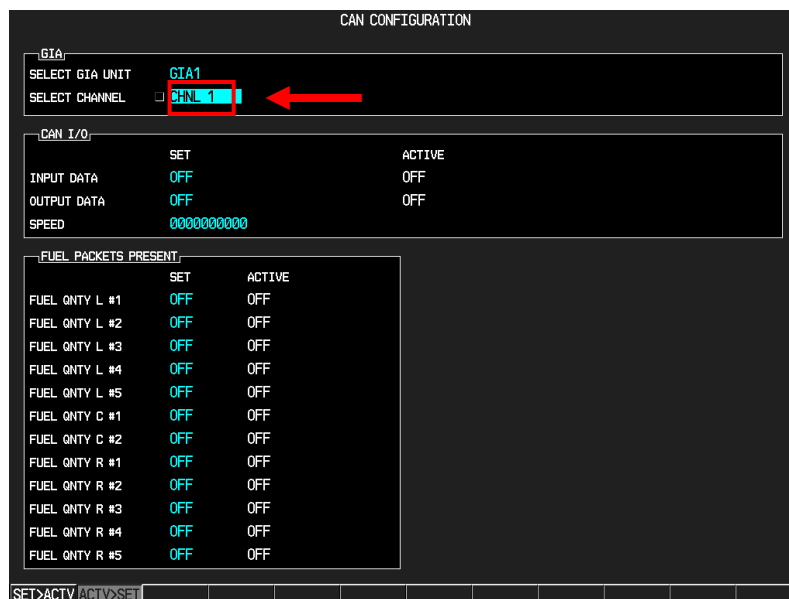
CLR NV

Figure 5-6. RS-232/ARINC 429 Config Page

First select the desired GIA to check by enabling the cursor (press the FMS knob). Turn the small FMS knob to bring up the drop down menu. Turn the large FMS knob to select GIA1 or GIA2 and press the ENT key (see the figure below).



Once the red box on GIA1 CHNL 2 path on the system data path page is displayed, turn the large FMS knob to the select channel box (see the figure below). Turn the small FMS knob to display the pull down menu, and select CHNL 2. Repeat this process to investigate any other failed paths which are displayed.



5.1.6 Troubleshooting Tables

NOTE

Pre GDU 9.11 symbology is used in the following tables to avoid duplication of information.

5.1.6.1 GDU RS-232/ARINC 429 Configuration Page (PFD1/2 and MFD)

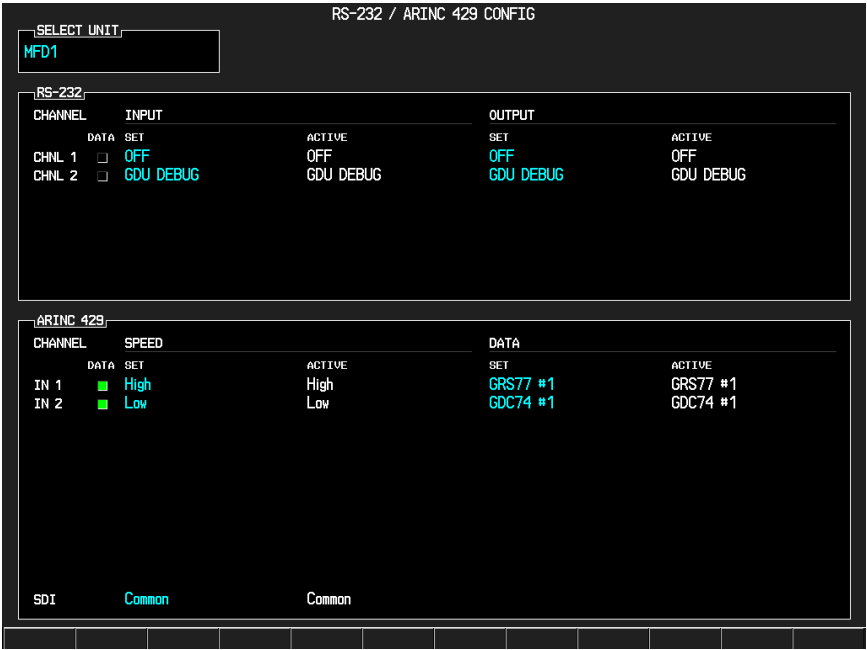


Figure 5-7. Main RS-232/ARINC 429 Configuration Page

The main RS-232/ARINC 429 configuration page (Figure 5-7) troubleshooting tables which follow show display status for the various pages. Note that channel assignments with their associated LRUs will differ depending on the specific aircraft configuration. The tables are only examples.

SELECT UNIT—PFD1			
RS-232 WINDOW			
Channel	LRU	Indicator	Status
CHNL 2	GMC 710 or GMC 715		PFD1/GMC 710 or GMC 715 data path is functioning correctly.
			PFD1/GMC 710 or GMC 715 data path is not functioning correctly. • Check PFD1 Alert Window for PFD1 or GMC configuration or software error messages. Correct any errors before proceeding. • Verify GMC is powered on by pressing the “ANN TEST” softkey on the MFD AUX - SYSTEM STATUS page to see if the key indicators turn on. • If GMC indicator lights do not come on, remove unit and verify power and ground are present at the GMC connector. – If power or ground is not present, troubleshoot aircraft wiring for faults. – If power and ground are present, check the PFD1 and GMC connector for damaged pins. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD1. – Replace original PFD1 if box turns green after swapping displays. • Replace the GMC.
			PFD1/GMC 710 or GMC 715 data path functionality is unknown. Reload PFD1 configuration file.

SELECT UNIT—PFD1			
ARINC 429 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
IN 1	GRS 77 #1		PFD1/GRS 77 data path is functioning correctly
			PFD1/GRS 77 #1 data path is not functioning correctly. • Check PFD1 Alert Window for PFD1 or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS1. – Replace original GRS1 if box turns green after swapping units. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD1. – Replace original PFD1 if box turns green after swapping displays. • Check the PFD1/GRS 77 #1 interconnect wiring and unit connector pins for faults. • Replace GRS 77 #1.
			PFD1/GRS 77 data path functionality is unknown. Reload PFD1 configuration file.

SELECT UNIT—PFD1			
ARINC 429 WINDOW			
(Con't.)			
IN 2	GDC 74B #1		PFD1/GDC 74B #1 data path is functioning correctly
			PFD1/GDC 74B #1 data path is not functioning correctly. • Check PFD1 Alert Window for PFD1 or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #1 status is OK using the System Status Page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD1. – Replace original PFD1 if box turns green after swapping displays. • Check the PFD1/GDC 74B #1 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #1.
			PFD1/GDC 74B #1 data path functionality is unknown. Reload PFD1 configuration file.

SELECT UNIT—PFD2			
RS-232 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
CHNL 2	GMC 710 or GMC 715		PFD2/GMC 710 or GMC 715 data path is functioning correctly.
			PFD2/GMC 710 or GMC 715 data path is not functioning correctly. • Check PFD1 Alert Window for PFD2 or GMC configuration or software error messages. Correct any errors before proceeding. • Verify GMC is powered on by pressing the “ANN TEST” softkey on the MFD AUX - SYSTEM STATUS page to see if the key indicators turn on. • If GMC indicator lights do not come on, remove unit and verify power and ground are present at the GMC connector. – If power or ground is not present, troubleshoot aircraft wiring for faults. – If power and ground are present, check the PFD2 and GMC connector for damaged pins. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD2. – Replace original PFD2 if box turns green after swapping displays. • Replace the GMC.
			PFD2/GMC 710 or GMC 715 data path functionality is unknown. Reload PFD2 configuration file.

SELECT UNIT—PFD2 ARINC 429 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
IN 1	GRS 77 #2		PFD2/GRS 77 #2 data path is functioning correctly.
			PFD2/GRS 77 #2 data path is not functioning correctly. • Check PFD1 Alert Window for PFD2 or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #2 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS2. – Replace original GRS2 if box turns green after swapping units. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD2. – Replace original PFD2 if box turns green after swapping displays. • Check the PFD2/GRS 77 #2 interconnect wiring and unit connector pins for faults. • Replace GRS 77 #2.
			PFD2/GRS 77 #2 data path functionality is unknown. Reload PFD2 configuration file.

SELECT UNIT—PFD2

ARINC 429 WINDOW

(Con't.)

IN 2	GDC 74B #2		PFD2/GDC 74B #2 data path is functioning correctly.
			PFD2/GDC 74B #2 data path is not functioning correctly. • Check PFD1 Alert Window for PFD2 or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #2 status is OK using the System Status Page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD2. – Replace original PFD2 if box turns green after swapping displays. • Check the PFD2/GDC 74B #2 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #2.
			PFD2/GDC 74B #2 data path functionality is unknown. Reload PFD2 configuration file.

SELECT UNIT—MFD ARINC 429 WINDOW			
Channel	LRU	Indicator	Status/Recommended Action
IN 1	GRS 77 #1		MFD/GRS 77 #1 data path is functioning correctly.
			MFD/GRS 77 #1 data path is not functioning correctly. • Check PFD1 Alert Window for MFD or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS1. – Replace original GRS1 if box turns green after swapping units. • Swap MFD and PFD1 (if the same P/N) to confirm if the problem is in the original MFD. – Replace original MFD if box turns green after swapping displays. • Check the MFD/GRS 77 #1 interconnect wiring and unit connector pins for faults. – Replace GRS 77 #1.
			MFD/GRS 77 #1 data path functionally is unknown. Reload MFD configuration file.

SELECT UNIT—MFD ARINC 429 WINDOW (Con't.)			
IN 2	GDC 74B #1		MFD/GDC 74B #1 data path is functioning correctly
			MFD/GDC 74B #1 data path is not functioning correctly. • Check PFD1 Alert Window for MFD or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #1 status is OK using the AUX – SYSTEM STATUS page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap MFD and PFD1 (if the same P/N) to confirm if the problem is in the original MFD. – Replace original MFD if box turns green after swapping displays. • Check the MFD/GDC 74B #1 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #1.
			MFD/GDC 74B #1 data path functionality is unknown. Reload MFD configuration file.

SELECT UNIT—MFD RS-232 WINDOW			
Channel	LRU	Indicator	Status
CHNL 1	GMC 710		MFD/GMC 710 data path is functioning correctly.
			MFD/GMC 710 data path is not functioning correctly. • Verify GMC 710 is powered on. • If GMC 710 will not power on, remove unit and verify power and ground are present at the GMC connector. 1. If power or ground is not present, troubleshoot aircraft wiring for faults. 2. If power and ground are present, replace GMC 710. • Load MFD and GMC 710 configuration files. • Swap MFD and PFD1 to confirm if the problem is in the original MFD. • Replace original MFD if box turns green after swapping displays. • Check the MFD/GMC 710 interconnect wiring for faults. • Replace GMC 710 if problem remains.
			MFD/GMC 710 data path functionality is unknown. Reload MFD configuration file.

5.1.6.2 GIA RS-232/ARINC 429 Configuration Page (GIA1 and GIA2)

SELECT UNIT
RS-232 / ARINC 429 CONFIG

GIA1

RS-232

CHANNEL	DATA	SET	ACTIVE	OUTPUT	SET	ACTIVE
CHNL 1	☐	GDC74 #1	GDC74 #1	GDC74 #1	GDC74 #1	GDC74 #1
CHNL 2	☐	OFF	OFF	GRS77 #2	GRS77 #2	GRS77 #2
CHNL 3	☐	AFCS DEBUG	AFCS DEBUG	AFCS DEBUG	AFCS DEBUG	AFCS DEBUG
CHNL 4	☐	OFF	OFF	OFF	OFF	OFF
CHNL 5	☐	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS
CHNL 6	☐	GRS77 #1	GRS77 #1	GRS77 #1	GRS77 #1	GRS77 #1
CHNL 7	☐	GMA1347 #1	GMA1347 #1	GMA1347 #1	GMA1347 #1	GMA1347 #1
CHNL 8	☐	GIA DEBUG	GIA DEBUG	GIA DEBUG	GIA DEBUG	GIA DEBUG

ARINC 429

CHANNEL	DATA	SPEED	SET	ACTIVE	DATA	SET	ACTIVE
IN 1	☐	Low	Low	Low	OFF	OFF	OFF
IN 2	☐	Low	Low	Low	OFF	OFF	OFF
IN 3	☐	Low	Low	Low	OFF	OFF	OFF
IN 4	☐	Low	Low	Low	OFF	OFF	OFF
IN 5	☐	Low	Low	Low	GDC74 #1	GDC74 #1	GDC74 #1
IN 6	☐	High	High	High	GRS77 #1	GRS77 #1	GRS77 #1
IN 7	☐	Low	Low	Low	OFF	OFF	OFF
IN 8	☐	Low	Low	Low	OFF	OFF	OFF
OUT 1		High	High	High	IESI OUT	IESI OUT	IESI OUT
OUT 2		High	High	High	DATA LOGGER	DATA LOGGER	DATA LOGGER
OUT 3		Low	Low	Low	EMBR GP OUT	EMBR GP OUT	EMBR GP OUT
SDI		LNAV 1	LNAV 1	LNAV 1			

SET>ACTV
ACTV>SET
CLR NV

Figure 5-8. GIA RS-232/ARINC 429 Configuration Page

The following GIA RS-232/ARINC 429 Configuration Page troubleshooting tables which follow show display status for the various pages. Note that channel assignments with their associated LRUs will differ depending on the specific aircraft configuration. The tables are only examples.

SELECT UNIT—GIA1 RS-232 WINDOW			
Channel	LRU	Indicator	Status/Recommended Action
CHNL 1	GDC 74B #1		GIA1/GDC 74B #1 data path is functioning correctly.
			GIA1/GDC 74B #1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #1 status is OK using the AUX – SYSTEM STATUS page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Check the GIA1/GDC 74B #1 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #1.
			GIA1/GDC 74B #1 data path functionality is unknown. Reload GIA1 configuration files.
CHNL 2	GRS 77 #2 (output only)		GIA1/GRS 77 #2 output data path is not monitored. A black box is normal.
CHNL 5	GTX 33D #1 w/TIS		GIA1/GTX 33 #1 data path is functioning correctly.
			GIA1/GTX 33 #1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GTX configuration or software error messages. Correct any errors before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Check the GIA1/GTX 33 #1 interconnect wiring and connector pins for faults. • Replace GTX 33 #1.
			GIA1/GTX 33D #1 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA1 RS-232 WINDOW (Con't.)			
CHNL 6	GRS 77 #1		GIA1/GRS 77 #1 data path is functioning correctly.
			GIA1/GRS 77 #1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS1. – Replace original GRS1 if box turns green after swapping units. • Check the GIA1/GRS 77 #1 interconnect wiring and unit connector pins for faults. • Replace GRS 77 #1.
			GIA1/GRS 77 #1 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA1 RS-232 WINDOW (Con't.)			
CHNL 7	GMA 1347D #1		GIA1/GMA 1347D #1 data path is functioning correctly.
			GIA1/GMA 1347D #1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GMA configuration or software error messages. Correct any errors before proceeding. • Verify GMA #1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GMA is offline before proceeding. • Swap GMA 1347D #1 and GMA 1347D #2, reconfigure both GMA's to their new locations to confirm if the problem is in the original GMA 1347D #1. – Replace original GMA 1347D #1 if box turns green after swapping units. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Check the GIA1/GMA 1347D #1 interconnect wiring and connector pins for faults.
			GIA1/GMA 1347D #1 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA1 ARINC 429 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
IN 5	GDC 74B #1		GIA1/GDC 74B #1 data path is functioning correctly.
			GIA1/GDC 74B #1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #1 status is OK using the AUX – SYSTEM STATUS page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Check the GIA1/GDC 74B #1 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #1.
			GIA1/GDC 74B #1 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA1 ARINC 429 WINDOW (Con't.)			
IN 6	GRS 77 #1		GIA1/GRS 77 #1 data path is functioning correctly.
			GIA1/GRS 77 #1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS1. – Replace original GRS1 if box turns green after swapping units. • Check the GIA1/GRS 77 #1 interconnect wiring and unit connector pins for faults. a. Replace GRS 77 #1.
			GIA1/GRS 77 #1 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA2 RS-232 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
CHNL 1	GDC 74B #2		GIA2/GDC 74B #2 data path is functioning correctly.
			GIA2/GDC 74B #2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #2 status is OK using the AUX – SYSTEM STATUS page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Check the GIA2/GDC 74B #2 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #2.
			GIA2/GDC 74B #2 data path functionality is unknown. Reload GIA2 configuration files.
CHNL 2	GRS 77 #1 (output only)		GIA2/GRS 77 #1 output data path is not monitored. A black box is normal.

SELECT UNIT—GIA2 RS-232 WINDOW (Con't.)			
CHNL 5	GTX 33/33D #2 w/TIS		GIA2/GTX 33 #2 data path is functioning correctly.
			GIA2/GTX 33 #2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GTX configuration or software error messages. Correct any errors before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. — Replace original GIA2 if box turns green after swapping units. • Check the GIA2/GTX 33 #2 interconnect wiring and connector pins for faults. • Replace GTX 33 #2.
			GIA2/GTX 33 #2 data path functionality is unknown. Reload GIA2 configuration files.

SELECT UNIT—GIA2 RS-232 WINDOW (Con't.)			
CHNL 6	GRS 77 #2		GIA2/GRS 77 #2 data path is functioning correctly.
			GIA2/GRS 77 #2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #2 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS2. – Replace original GRS2 if box turns green after swapping units. • Check the GIA2/GRS 77 #2 interconnect wiring and unit connector pins for faults. - Replace GRS 77 #2.
			GIA2/GRS 77 #2 data path functionality is unknown. Reload GIA2 configuration files.

SELECT UNIT—GIA2 RS-232 WINDOW (Con't.)			
CHNL 7	GMA 1347D #2		GIA2/GMA 1347D #2 data path is functioning correctly.
			GIA2/GMA 1347D #2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GMA configuration or software error messages. Correct any errors before proceeding. • Verify GMA #2 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GMA is offline before proceeding. • Swap GMA 1347D #1 and GMA 1347D #2, reconfigure both GMA's to their new locations to confirm if the problem is in the original GMA 1347D #2. – Replace original GMA 1347D #2 if box turns green after swapping units. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Check the GIA2/GMA 1347D #2 interconnect wiring and connector pins for faults.
			GIA1/GMA 1347D #2 data path functionality is unknown. Reload GIA2 configuration files.

SELECT UNIT—GIA2 ARINC 429 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
IN 5	GDC 74B #2		GIA2/GDC 74B #2 data path is functioning correctly.
			GIA2/GDC 74B #2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GDC configuration or software error messages. Correct any errors before proceeding. • Verify GDC 74B #2 status is OK using the AUX – SYSTEM STATUS page on the MFD. If it has a Red-X, troubleshoot why the GDC is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Check the GIA2/GDC 74B #2 interconnect wiring and unit connector pins for faults. • Replace GDC 74B #2.
			GIA2/GDC 74B #2 data path functionality is unknown. Reload GIA2 configuration files.

SELECT UNIT—GIA2 ARINC 429 WINDOW (Con't.)			
IN 6	GRS 77 #2		GIA2/GRS 77 #2 data path is functioning correctly.
			GIA2/GRS 77 #2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GRS configuration or software error messages. Correct any errors before proceeding. • Verify GRS77 #2 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GRS is offline before proceeding. • Ensure GRS connector is secure and proper wire harness strain relief is provided. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Swap GRS1 and GRS2 (if a GRS2 is installed) to confirm if the problem is in the original GRS2. – Replace original GRS2 if box turns green after swapping units. • Check the GIA2/GRS 77 #2 interconnect wiring and unit connector pins for faults. • Replace GRS 77 #2.
			GIA2/GRS 77 #2 data path functionality is unknown. Reload GIA2 configuration files.

5.1.6.3 GIA RS-485 Configuration Page (GIA1 and GIA2)

RS-485 CONFIGURATION

SELECT GIA UNIT

GIA1

RS-485

CHANNEL	INPUT DATA	ACTIVE	OUTPUT DATA	ACTIVE
	DATA SET		SET	
CHNL 1	☐ GEA 1	GEA 1	GEA 1	GEA 1
CHNL 2	☐ GEA 2	GEA 2	GEA 2	GEA 2
CHNL 3	☐ OFF	OFF	OFF	OFF
CHNL 4	☐ GFC700	GFC700	GFC700	GFC700
CHNL 5	☐ OFF	OFF	OFF	OFF

CLOCKED DATA INTERFACE

CHANNEL	INPUT/OUTPUT DATA
	SET ACTIVE
CHNL 1	OFF OFF

SET>ACTV

ACTV>SET

Figure 5-9. GIA RS-485 Configuration Page

The following GIA RS-485 Configuration Page troubleshooting tables which follow show display status for the various pages. Note that channel assignments with their associated LRUs will differ depending on the specific aircraft configuration. The tables are only examples.

SELECT UNIT—GIA1 RS-485 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
CHNL 1	GEA1		GIA1/GEA1 data path is functioning correctly.
			GIA1/GEA1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GEA configuration or software error messages. Correct any errors before proceeding. • Verify GEA1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GEA is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Swap GEA1 and GEA2, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA1. – Replace original GEA1 if box turns green after swapping units. • Check the GIA1/GEA1 interconnect wiring and connector pins for faults.
			GIA1/GEA1 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA1 RS-485 WINDOW (Con't.)			
CHNL 2	GEA2		GIA1/GEA2 data path is functioning correctly.
			GIA1/GEA2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GEA configuration or software error messages. Correct any errors before proceeding. • Verify GEA2 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GEA is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Swap GEA1 and GEA2, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA2. – Replace original GEA2 if box turns green after swapping units. • Check the GIA1/GEA2 interconnect wiring and connector pins for faults.
			GIA1/GEA2 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA1 RS-485 WINDOW (Con't.)			
CHNL 4	GFC 700		GIA1/GFC 700 data path is functioning correctly.
			GIA1/GFC 700 data path is not functioning correctly. • Check PFD1 Alert Window for GIA, GFC or GSA configuration or software error messages. Correct any errors before proceeding. • Verify all GSA servo statuses are OK using the AUX - SYSTEM STATUS PAGE on the MFD. If one or all have a Red-X, troubleshoot why the servos are offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA1. – Replace original GIA1 if box turns green after swapping units. • Check the GIA1/GSA interconnect wiring and connector pins for faults.
			GIA1/GFC 700 data path functionality is unknown. Reload GIA1 configuration files.

SELECT UNIT—GIA2 RS-485 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
CHNL 1	GEA1		GIA2/GEA1 data path is functioning correctly.
			GIA2/GEA1 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GEA configuration or software error messages. Correct any errors before proceeding. • Verify GEA1 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GEA is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Swap GEA1 and GEA2, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA1. – Replace original GEA1 if box turns green after swapping units. • Check the GIA2/GEA1 interconnect wiring and connector pins for faults.
			GIA2/GEA1 data path functionality is unknown. Reload GIA2 configuration files.

SELECT UNIT—GIA2 RS-485 WINDOW (Con't.)			
CHNL 2	GEA2		GIA2/GEA2 data path is functioning correctly.
			GIA2/GEA2 data path is not functioning correctly. • Check PFD1 Alert Window for GIA or GEA configuration or software error messages. Correct any errors before proceeding. • Verify GEA2 status is OK using the AUX - SYSTEM STATUS PAGE on the MFD. If it has a Red-X, troubleshoot why the GEA is offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Swap GEA1 and GEA2, reconfigure both GEA's to their new locations to confirm if the problem is in the original GEA2. – Replace original GEA2 if box turns green after swapping units. • Check the GIA2/GEA2 interconnect wiring and connector pins for faults.
			GIA2/GEA2 data path functionality is unknown. Reload GIA2 configuration files.
CHNL 4	GFC 700		GIA2/GFC 700 data path is functioning correctly.
			GIA2/GFC 700 data path is not functioning correctly. • Check PFD1 Alert Window for GIA, GFC or GSA configuration or software error messages. Correct any errors before proceeding. • Verify all GSA servo statuses are OK using the AUX - SYSTEM STATUS PAGE on the MFD. If one or all have a Red-X, troubleshoot why the servos are offline before proceeding. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to confirm if the problem is in the original GIA2. – Replace original GIA2 if box turns green after swapping units. • Check the GIA2/GSA interconnect wiring and connector pins for faults.
			GIA2/GFC 700 data path functionality is unknown. Reload GIA2 configuration files.

5.1.7 Advisory Messages

In normal mode the G1000 displays a variety of system messages and/or annunciations (Figure 5-10). System messages are normally displayed on the PFD and are viewed by pressing the MSG softkey. This section provides a listing of possible messages, alerts, and annunciations. Aircraft specific alerts are not covered. The following advisory messages are intended to aid in isolating failures to a defective LRU. They are not listed in their order of importance.



Figure 5-10. Advisory Messages

5.1.7.1 GDU Cooling Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
MFD COOLING – MFD has poor cooling. Reducing power usage.	The MFD has exceeded its operating temperature range.	- Check cooling fan and wiring. - Replace cooling fan. - If problem persists, replace the MFD. - If problem continues contact Garmin aviation product Support for assistance.
PFD1 COOLING – PFD1 has poor cooling. Reducing power usage.	PFD1 has exceeded its operating temperature range.	Same as above.
PFD2 COOLING – PFD2 has poor cooling. Reducing power usage.	PFD2 has exceeded its operating temperature range.	Same as above.

5.1.7.2 GDU Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
MFD “key” KEYSTK – key is stuck.	The G1000 has determined a key is stuck on the MFD.	• Select the GDU Test Page and verify key is stuck (if key is stuck the corresponding indicator will be green). • Exercise suspected stuck key and reset GDU Test Page to see if indicator remains green without pressing the key. • If problem persists replace the display.
PFD1 “key” KEYSTK – key is stuck.	The G1000 has determined a key is stuck on PFD1.	
PFD2 “key” KEYSTK – key is stuck.	The G1000 has determined a key is stuck on PFD2.	

5.1.7.3 Database and Software Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
MFD DB ERR – MFD aviation database error exists.	The MFD has encountered an error in the Jeppesen database.	• Reload aviation database into the display. • Contact Garmin technical support for assistance.
PFD1 DB ERR – PFD1 aviation database error exists.	PFD1 has encountered an error in the Jeppesen database.	
PFD2 DB ERR – PFD2 aviation database error exists.	PFD2 has encountered an error in the Jeppesen database.	
MFD DB ERR – MFD Basemap database error exists.	The MFD has encountered an error in the Basemap database.	• Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. – If the error clears, the problem is with the bottom slot. Insert and remove a SD card multiple times to clean the contacts. If the card still does not work in the bottom slot, leave the card in the top slot or replace the display. • Swap with a supplemental data card from another display in the same system. • If problem remains in the same GDU, contact Garmin aviation product support to see if a Basemap file may be obtained to load into the display. • If problem moves to the other display, replace the supplemental data card. You may need to replace all data cards as a set to keep the database cycles the same and prevent database mismatch errors.
PFD1 DB ERR – PFD1 Basemap database error exists.	PFD1 has encountered an error in the Basemap database.	
PFD2 DB ERR – PFD1 Basemap database error exists.	PFD2 has encountered an error in the Basemap database.	

Advisory Message	Possible Cause	Recommended Actions
MFD DB ERR – MFD terrain database error exists.	The MFD has encountered an error in the terrain database.	• Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. – If the error clears, the problem is with the bottom slot. Insert and remove a SD card multiple times to clean the contacts. If the card still does not work in the bottom slot, leave the card in the top slot or replace the display. • Swap with a supplemental data card from another display in the same system. • If problem remains in the same GDU, replace that GDU. • If problem moves to the other display, reload the database on the data card or replace it. You may need to replace all data cards as a set to keep the database cycles the same and prevent database mismatch errors.
PFD1 DB ERR – PFD1 terrain database error exists.	PFD1 has encountered an error in the terrain database.	
PFD2 DB ERR – PFD1 terrain database error exists.	PFD2 has encountered an error in the terrain database.	
MFD DB ERR – MFD obstacle database error exists.	The MFD has encountered an error in the obstacle database.	
PFD1 DB ERR – PFD1 obstacle database error exists.	PFD1 has encountered an error in the obstacle database.	
PFD2 DB ERR – PFD2 obstacle database error exists.	PFD2 has encountered an error in the obstacle database.	
MFD DB ERR – MFD airport terrain database error exists.	The MFD has encountered an error in the airport terrain database.	
PFD1 DB ERR – PFD1 airport terrain database error exists.	PFD1 has encountered an error in the airport terrain database.	

Advisory Message	Possible Cause	Recommended Actions
PFD2 DB ERR – PFD2 airport terrain database error exists.	PFD2 has encountered an error in the airport terrain database.	• Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. – If the error clears, the problem is with the bottom slot. Insert and remove a SD card multiple times to clean the contacts. If the card still does not work in the bottom slot, leave the card in the top slot or replace the display. • Swap with a supplemental data card from another display in the same system. • If problem remains in the same GDU, replace that GDU. • If problem moves to the other display, reload the database on the data card or replace it. You may need to replace all data cards as a set to keep the database cycles the same and prevent database mismatch errors.
MFD DB ERR – MFD Safe Taxi database error exists.	The MFD has encountered an error in the safe taxi database.	
PFD1 DB ERR – PFD1 Safe Taxi database error exists.	PFD #1 has encountered an error in the safe taxi database.	
PFD2 DB ERR – PFD2 Safe Taxi database error exists.	PFD #2 has encountered an error in the safe taxi database.	

Advisory Message	Possible Cause	Recommended Actions
MFD DB ERR – MFD ChartView database error.	The MFD has encountered an error in the ChartView database.	• Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. – If the error clears, the problem is with the bottom slot. Insert and remove a SD card multiple times to clean the contacts. If the card still does not work in the bottom slot, leave the card in the top slot or replace the display. • Reload ChartView from Jeppesen's loader program. • Replace supplemental data card. You may need to replace all data cards as a set to keep the database cycles the same and prevent database mismatch errors. • Replace MFD.
MFD DB ERR – MFD Terminal Procs database error exists.	The MFD has encountered an error in the Terminal Procedures database.	
DB MISMATCH – Aviation database version mismatch. Xtalk is off.	The G1000 has found the Jeppesen aviation database in the PFDs and MFD do not match.	Load the same cycle of aviation database to all displays.
DB MISMATCH – Aviation database type mismatch.	The G1000 has found the Jeppesen aviation database types do not match.	Load same type aviation database to all displays.

Advisory Message	Possible Cause	Recommended Actions
DB MISMATCH – Terrain database version mismatch.	The PFD and/or MFD have different terrain database versions installed.	Insert three identical version terrain database cards in the PFD's and MFD.
DB MISMATCH – Obstacle database version mismatch.	The PFD and/or MFD have different obstacle database versions installed.	
DB MISMATCH – Terrain database type mismatch.	The PFD and/or MFD have different terrain database types installed.	
DB MISMATCH – Airport Terrain database mismatch. Xtalk is off.	The PFD and/or MFD have different airport terrain database types installed.	
CAS INOP	The G1000 has found the PFDs and/or MFD software versions do not match.	No Dispatch. Software correction needed.
CAS INOP	The Aviation databases do not match on all 3 displays.	No Dispatch. Database correction required.
SW MISMATCH – GDU software version mismatch. Xtalk is off.	The G1000 has found the PFDs and/or MFD software versions do not match.	Load correct software version.
MANIFEST – PFD1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in PFD #1.	Load correct software version.
MANIFEST – PFD2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in PFD #2.	
MANIFEST – MFD software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in MFD.	

Advisory Message	Possible Cause	Recommended Actions
CNFG MODULE – PFD1 configuration module is inoperative.	The PFD master configuration module has failed.	• Check master configuration module connector and wiring for damage inside the GDU connector backplate. • Replace master configuration module wiring and pins. • If problem persists, replace master configuration module. <u>NOTE</u> New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

5.1.7.4 COM Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
COM1 SERVICE – COM1 needs service. Return unit for repair.	The GIA63W has determined COM1 needs service.	Replace GIA1.
COM2 SERVICE – COM2 needs service. Return unit for repair.	The GIA63W has determined COM2 needs service.	Replace GIA2.
COM1 PTT – COM1 push-to-talk key is stuck.	The COM1 external push-to-talk (PTT) switch is stuck in the enabled (or “pressed”) state.	• Press the push-to-talk switch(s) again to cycle its operation. • Check push-to-talk switch(s) and wiring. • Check GIA1/GMA 1347 #1 interconnect. • Switch GIA1 and GIA2, to verify location of problem. – If problem follows the unit, replace GIA1. – If problem persists replace GMA 1347 #1.
COM2 PTT – COM2 push-to-talk key is stuck.	The COM2 external push-to-talk (PTT) switch is stuck in the enabled (or “pressed”) state.	• Press the push-to-talk switch(s) again to cycle its operation. • Check push-to-talk switch(s) and wiring. • Check GIA2/1347 #2 interconnect. • Switch GIA1 and GIA2, to verify location of problem. – If problem follows the unit, replace GIA2. – If problem persists replace GMA 1347 #2.

Advisory Message	Possible Cause	Recommended Actions
COM1 TEMP – COM1 over temp. Reducing transmitter power.	The G1000 has detected an over temperature in COM1.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA1. • If problem persists contact Garmin aviation product support for assistance.
COM2 TEMP – COM2 over temp. Reducing transmitter power.	The G1000 has detected an over temperature in COM2.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA2. • If problem persists contact Garmin aviation product support for assistance.

5.1.7.5 NAV Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
NAV1 SERVICE – NAV1 needs service. Return unit for repair.	The G1000 has detected a failure in NAV1 receiver.	Replace GIA1.
NAV2 SERVICE – NAV2 needs service. Return unit for repair.	The G1000 has detected a failure in NAV2 receiver.	Replace GIA2.
NAV1 RMT XFR – NAV1 remote transfer key is stuck.	The NAV1 external remote transfer switch is stuck in the enabled (or “pressed”) state.	• Press the NAV1 external remote transfer switch again to cycle its operation. • Check NAV1 remote transfer switch and wiring. • Switch GIA1 and GIA2, to verify location of problem. – If problem follows the unit, replace GIA1.
NAV2 RMT XFR – NAV2 remote transfer key is stuck.	The NAV2 external remote transfer switch is stuck in the enabled (or “pressed”) state.	• Press the NAV2 external remote transfer switch again to cycle its operation. • Check NAV2 remote transfer switch and wiring. • Switch GIA1 and GIA2, to verify location of problem. – If problem follows the unit, replace GIA2.

5.1.7.6 Glideslope Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
G/S1 SERVICE – G/S1 needs service. Return unit for repair.	The G1000 has detected a failure in G/S1 receiver.	Replace GIA1.
G/S2 SERVICE – G/S2 needs service. Return unit for repair.	The G1000 has detected a failure in G/S1 receiver.	Replace GIA2.
G/S1 FAIL – G/S1 is inoperative.	The G1000 has detected a failure in G/S1 receiver.	- Switch GIA1 and GIA2 to verify location of problem: - If problem follows the unit, replace GIA. - If problem does not follow unit, check G/S1 antenna and cabling.
G/S2 FAIL – G/S2 is inoperative.	The G1000 has detected a failure in G/S2 receiver.	- Switch GIA1 and GIA2 to verify location of problem: - If problem follows the unit, replace GIA. - If problem does not follow unit, check G/S2 antenna and cabling.

5.1.7.7 GPS Advisory Messages

NOTE

Ensure that no cell phones or devices in the cabin using cell phone technology are turned on or in a monitoring state before starting GPS troubleshooting procedures.

Advisory Message	Possible Cause	Recommended Actions
GPS1 SERVICE – GPS1 needs service. Return unit for repair.	The G1000 has detected a failure in GPS1 receiver.	Replace GIA1.
GPS2 SERVICE – GPS2 needs service. Return unit for repair.	The G1000 has detected a failure in GPS2 receiver.	Replace GIA2.
GPS1 FAIL – GPS1 is inoperative.	The G1000 has detected a failure in GPS1 receiver.	- Switch GIA1 and GIA2, to verify location of problem. - If problem follows the unit, replace GIA1. - If problem does not follow the unit, check GPS1 antenna and cabling.
GPS2 FAIL – GPS2 is inoperative.	The G1000 has detected a failure in GPS2 receiver.	- Switch GIA1 and GIA2, to verify location of problem. - If problem follows the unit, replace GIA2. - If problem does not follow the unit, check GPS2 antenna and cabling.

Advisory Message	Possible Cause	Recommended Actions
GPS NAV LOST – Loss of GPS navigation. GPS fail.	The G1000 has lost GPS navigation information.	• Verify the area the aircraft was traveling through did not have loss of GPS coverage. FAA NOTAMs may be issued for periods of outages. • Using the MFD AUX – GPS Status page, verify the signal strength bars are not erratic. If so, this indicates outside interference is affecting the GPS receivers. Find and remove the source of interference (i.e. cell phones, FBO datalink antennas, etc.). • Check GPS antenna and cabling.

5.1.7.8 GIA Cooling Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GIA1 COOLING – GIA1 temperature too low.	GIA1 operating temperature is too low.	Allow unit to warm up.
GIA2 COOLING – GIA2 temperature too low.	GIA2 operating temperature is too low.	Allow unit to warm up.
GIA1 COOLING – GIA1 over temperature.	GIA1 has exceeded its operating temperature range.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA1. • If problem persists contact Garmin Aviation Product Support for assistance.
GIA2 COOLING – GIA2 over temperature.	GIA2 has exceeded its operating temperature range.	• Check fan, wiring and air tubing for proper operation (if applicable). • Replace cooling fan if unable to determine if operating correctly. • Replace GIA2. • If problem persists contact Garmin Aviation Product Support for assistance.

5.1.7.9 GIA Configuration Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GIA1 CONFIG – GIA1 configuration error. Config service req'd.	The G1000 has detected a GIA configuration mismatch.	- Reload GIA configuration files including optional equipment configuration files that list GIA 1 or 2 in the PRODUCT box on the system upload page. - Replace master configuration module, check config module harness for faults and replace if necessary. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.
GIA2 CONFIG – GIA2 configuration error. Config service req'd.		
GIA1 CONFIG – GIA1 audio config error. Config service req'd.	The G1000 has detected a GIA audio configuration mismatch.	- Reload GIA audio software and configuration files. - Replace master configuration module, check config module harness for faults and replace if necessary. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
GIA2 CONFIG – GIA2 audio config error. Config service req'd.		
HW MISMATCH – GIA hardware mismatch. GIA1 or GIA2 communication halted.	The G1000 has detected a non-WAAS GIA 63.	Replace GIA63 with a WAAS unit.

Advisory Message	Possible Cause	Recommended Actions
MANIFEST – GIA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GIA 1.	Load correct software version.
MANIFEST – GIA2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GIA 2.	
GIA1 SERVICE – GIA1 needs service. Return unit for repair.	The G1000 has detected a failure in GIA1.	Replace GIA1.
GIA2 SERVICE – GIA1 needs service. Return unit for repair.	The G1000 has detected a failure in GIA2.	Replace GIA2.

5.1.7.10 GDC 74B Related Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
MANIFEST – GDC 74B#1 software mismatch Communication halted.	The system has detected an incorrect software version loaded in the GDC 74B #1.	Load correct software version.
MANIFEST – GDC 74B #2 software mismatch Communication halted.	The system has detected an incorrect software version loaded in the GDC 74B #2.	
BACKUP PATH – Airdata using backup data path.	The GDC 74B is using a backup ARINC 429 data path.	Troubleshoot for a failed data path.

5.1.7.11 GRS 77 Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
AHRS1 TAS – AHRS1 not receiving airspeed.	The GRS 77 #1 is not receiving airspeed information from the GDC 74B #1.	• Check GRS #1/GDC 74B #1 interconnect. • Replace the GDC 74B #1 • If problem persists, replace the GRS 77 #1
AHRS2 TAS – AHRS2 not receiving airspeed.	The GRS 77 #2 is not receiving airspeed information from the GDC 74B #2.	• Check GRS #2/GDC 74B #2 interconnect • Replace the GDC 74B #2 • If problem persists, replace the GRS 77 #2

Advisory Message	Possible Cause	Recommended Actions
AHRS1 GPS – AHRS1 using backup GPS source.	GRS 77 #1 is using a backup GPS source.	- Troubleshoot the possible loss of either GPS receiver. - Replace the GRS 77.
AHRS1 GPS – AHRS1 not receiving backup GPS information.	GRS 77 #1 is not receiving backup GPS information from the cross-side GIA 63W.	
AHRS1 GPS – AHRS operating exclusively in no-GPS mode.	The GRS 77 is operating in the absence of GPS.	
AHRS1 GPS – AHRS1 not receiving any GPS information.	GRS 77 #1 is not receiving GPS data from either GIA 63W.	
AHRS2 GPS – AHRS2 using backup GPS source.	GRS 77 #2 is using a backup GPS source.	
AHRS2 GPS – AHRS2 not receiving backup GPS information.	GRS 77 #2 is not receiving backup GPS information from the cross-side GIA 63W.	
AHRS2 GPS – AHRS2 operating exclusively in no-GPS mode.	The GRS 77 #2 is operating in the absence of GPS.	
AHRS2 GPS – AHRS2 not receiving any GPS information.	GRS 77 #2 is not receiving GPS data from either GIA 63W.	
AHRS1 SRVC – AHRS1 magnetic field model needs update.	AHRS #1 magnetic field model has expired.	Reference Garmin SB 0533 for update instructions.
AHRS2 SRVC – AHRS2 magnetic field model needs update.	AHRS #2 magnetic field model has expired.	
MANIFEST – AHRS1 software mismatch. Communication Halted.	The G1000 has detected an incorrect software version loaded in GRS 77 #1.	Load correct software version in the GRS77.
MANIFEST – AHRS2 software mismatch. Communication Halted.	The G1000 has detected an incorrect software version loaded in GRS 77 #2.	
AHRS MAG DB – AHRS magnetic model database version mismatch.	The G1000 has detected a magnetic model database version mismatch.	Reference Garmin SB 0533 for update instructions.
BACKUP PATH – AHRS using backup data path.	The PFD is using a backup ARINC 429 data path to receive AHRS data.	Troubleshoot for a failed data path.

5.1.7.12 GMU Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
MANIFEST – GMU1 software mismatch. Communication Halted.	The G1000 has detected an incorrect software version loaded in GMU 44 #1.	Load correct software version in the GMU44.
MANIFEST – GMU2 software mismatch. Communication Halted.	The G1000 has detected an incorrect software version loaded in GMU 44 #2.	
HDG FAULT – AHRS1 magnetometer fault has occurred.	A fault has occurred in GMU 44 #1.	• Check GMU 44/GRS 77 interconnect for faults. • Replace GMU 44 #1 • If problem persists, replace GRS 77 #1
HDG FAULT – AHRS2 magnetometer fault has occurred.	A fault has occurred in GMU 44 #2.	• Check GMU 44/GRS 77 interconnect for faults. • Replace GMU 44 #2 • If problem persists, replace GRS 77 #2

5.1.7.13 GEA 71 Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GEA1 CONFIG – GEA1 configuration error. Config service req'd.	The G1000 has detected a GEA #1 configuration mismatch.	- Reload GEA configuration files including optional equipment configuration files that list GEA 1 or 2 in the product box on the system upload page. - Replace master configuration module, check config module harness for faults and replace if necessary. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.
GEA2 CONFIG – GEA2 configuration error. Config service req'd.	The G1000 has detected a GEA #2 configuration mismatch.	
MANIFEST – GEA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GEA 71 #1.	Load correct software version.
MANIFEST – GEA2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GEA 71 #2.	
BACKUP PATH – EIS using backup data path.	The GEA 71 is using a backup RS-485 data path.	Troubleshoot for a failed data path.

5.1.7.14 GMA 1347D Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
MANIFEST – GMA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GMA 1347D #1.	Load correct software version.
MANIFEST – GMA2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GMA 1347D #2.	Load correct software version.
GMA1 SERVICE – GMA1 needs service. Return unit for repair.	The G1000 has determined GMA 1347D #1 needs service.	Replace GMA 1347D #1.
GMA2 SERVICE – GMA2 needs service. Return unit for repair.	The G1000 has determined GMA 1347D #2 needs service.	Replace GMA 1347D #2.
GMA1 FAIL – GMA 1 is inoperative.	The G1000 has detected a failure in GMA 1347D #1.	• Ensure GMA 1347D #1, both GIAs and all GDUs are receiving power. • Troubleshoot for a failed data path. • Replace GMA 1347D #1.
GMA2 FAIL – GMA 2 is inoperative.	The G1000 has detected a failure in GMA 1347D #2.	• Ensure 1347D #2, both GIAs and all GDUs are receiving power. • Troubleshoot for a failed data path. • Replace GMA 1347D #2.

Advisory Message	Possible Cause	Recommended Actions
GMA1 CONFIG – GMA1 configuration error. Config service req'd.	The G1000 has detected a GMA 1347D #1 configuration mismatch.	• Reload GMA #1 configuration files including optional equipment configuration files that list GMA 1 in the product box on the System Upload page. • Replace GMA 1347D #1. • If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. <u>NOTE</u> New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.
GMA2 CONFIG – GMA2 configuration error. Config service req'd.	The G1000 has detected a GMA 1347D #2 configuration mismatch.	• Reload GMA #2 configuration files including optional equipment configuration files that list GMA 2 in the PRODUCT box on the system upload page. • Replace 1347D #2. • If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. <u>NOTE</u> New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.

Advisory Message	Possible Cause	Recommended Actions
GMA XTALK – GMA crosstalk error has occurred.	The G1000 has detected an error in the communication between GMA 1347D #1 and GMA 1347D #2.	• Ensure both units are receiving power. • Ensure both units are configured. • Check interconnect wiring and connector pins for faults. • Replace GMA 1347D #1 with a known good unit. • If problem persists, reinstall original 1347D #1 and replace GMA 1347D #2.
BACKUP PATH – Audio panel using backup data path.	The GMA 1347 is using a backup RS-232 data path.	• Troubleshoot for a failed data path.

5.1.7.15 GMC 710 or GMC 715 Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GMC CNFG – GMC Config error. Config service req'd.	The G1000 has detected a GMC 710 or GMC 715 configuration mismatch.	• Load GMC configuration files. • Replace GMC. • If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.
GMC FAIL – GMC is inoperative.	The G1000 has detected a failure in the GMC 710 or GMC 715.	Replace the GMC 710 or GMC 715.
MANIFEST – GMC software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the GMC 710 or GMC 715.	Load correct software version.

5.1.7.16 GCU 475 Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GCU CNFG – GCU Config error. Config service req'd.	The G1000 has detected a GCU 475 configuration mismatch.	• Load GCU configuration files, • Replace GCU. • If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.
GCU FAIL – GCU is inoperative.	The G1000 has detected a failure in the GCU 475.	Replace the GCU 475.
MANIFEST – GCU software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the GCU 475.	Load correct software version.

5.1.7.17 GWX 68 Advisory Messages

The following table lists GWX 68 advisory messages, possible causes, and recommended actions to resolve the condition. The technician is not required to perform all the recommended actions, only those needed to determine the cause of the fault.

Advisory Message	Possible Cause	Recommended Actions
GWX CONFIG – GWX configuration error. Config service req'd.	The G1000 has detected a GWX 68 configuration mismatch between the GWX and PFD1.	• Load GWX configuration file from a G1000 software loader card. • Perform GWX Pitch/Roll level and calibration procedure. • For systems with GDU software version less than 9.0, on PFD1 in config mode, select the SYSTEM UPLOAD page and press the UPDT CFG softkey. • For systems with GDU software version less than 9.0, replace PFD1 master configuration module, check config module wiring for faults and replace if necessary. • If problem persists, replace the GWX. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the PFD1 master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old terrain and other cards will no longer work as they will remain locked to the old system ID number.

Advisory Message	Possible Cause	Recommended Actions
GWX FAIL – GWX is inoperative.	The G1000 does not detect the presence of the GWX 68.	• Check GWX unit is receiving power and ground. • Check GWX connector for security. • If the GWX communication path passes through other units such as a GDL 69A or GSD 41 to the display, check those units for proper operation. • Check Ethernet connections between the GWX and display for faults. • If problem persists, replace the GWX
GWX SERVICE – Needs service. Return unit for repair.	The G1000 has detected the GWX 68 is present but it is reporting an issue.	• Refer to the GWX troubleshooting table for troubleshooting steps. • Refer to Garmin Service Bulletin #0941, "Erroneous GWX service message may be displayed." • If problem persists, replace the GWX.
MANIFEST – GWX software mismatch. Communication halted.	The G1000 has detected an incorrect software version in the GWX 68.	• Load the correct GWX software version from a G1000 software loader card.
'RDR FAULT' message on radar page	The G1000 has detected the GWX 68 is present but it is reporting an issue.	• Refer to the GWX troubleshooting table for troubleshooting steps. • Refer to Garmin Service Bulletin #0941, "Erroneous GWX service message may be displayed." • If problem persists, replace the GWX.
'RADAR FAIL' message on radar page	The G1000 does not detect the presence of the GWX 68.	• Check GWX unit is receiving power and ground. • Check GWX connector for security. • If the GWX communication path passes through other units such as a GDL 69A or GSD 41 to the display, check those units for proper operation. • Check Ethernet connections between the GWX and display for faults. • If problem persists, replace the GWX.
'STAB INOP' message on radar page	Stabilization function is not available due to lack of attitude data. Caused by "attitude fault" on GWX config page.	• Refer to ATTITUDE fault troubleshooting section. • If problem persists, replace the GWX.

5.1.7.18 Miscellaneous Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
XTALK ERROR – A flight display cross talk error has occurred.	A communication error has occurred between the MFD and PFDs.	• Ensure a database error has not occurred (identified in the ADVISORY MESSAGES window on the PFD). • If a database error has occurred, correct error before proceeding. • Check display Ethernet interconnect wiring. • Replace PFD1 with a known good unit, to verify location of problem. • If problem persists, reinstall original PFD1 and replace PFD2. • If problem persists, reinstall PFD2 and replace MFD.
SIMULATOR – Sim mode is active. Do not use for navigation.	The G1000 is in simulator mode.	• Check wiring (pin 54 in all GDU connectors should be empty). • Replace PFD1 with a known good unit, to verify location of problem. • If problem persists, reinstall original PFD1 and replace PFD2. • If problem persists, reinstall PFD2 and replace MFD.
DATA LOST – Pilot stored data lost. Recheck settings.	Pilot stored data has been lost.	• If the CLR key was held during a power cycle, disregard message. • Cycle power to PFD1 and Ensure CLR key is not stuck on the GDU TEST page. • If problem persists, replace PFD1.

Advisory Message	Possible Cause	Recommended Actions
MFD SERVICE – needs service. Return unit for repair.	The G1000 has determined the MFD needs service.	• Ensure the MFD connector is fully seated and locked. • If the unit was started in a very dark environment the photocells may not have enough light to initially raise the CCFT level. Go to the GDU STATUS page in configuration mode, ensure CCFT CRNT 1 & 2 levels are above 50. • If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises. – If the CCFT level rises, disregard the message. – If the CCFT level does not rise, replace the MFD. – Reload the GDU Software. • Replace the MFD.
PFD1 SERVICE – needs service. Return unit for repair.	The G1000 has determined PFD #1 needs service.	• Ensure the PFD connector is fully seated and locked. • If the unit was started in a very dark environment the photocells may not have enough light to initially raise the CCFT level. Go to the GDU STATUS page in configuration mode, ensure CCFT CRNT 1 & 2 levels are above 50. • If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises. – If the CCFT level rises, disregard the message. – If the CCFT level does not rise, replace the PFD. – Reload the GDU Software. • Replace the PFD.

Advisory Message	Possible Cause	Recommended Actions
PFD2 SERVICE – needs service. Return unit for repair.	The G1000 has determined PFD #2 needs service.	• Ensure the PFD connector is fully seated and locked. • If the unit was started in a very dark environment the photocells may not have enough light to initially raise the CCFT level. Go to the GDU STATUS page in configuration mode, ensure CCFT CRNT 1 & 2 levels are above 50. • If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises. – If the CCFT level rises, disregard the message. – If the CCFT level does not rise, replace the PFD – Reload the GDU Software. • Replace the PFD.
PFD1 CONFIG – PFD1 configuration error. Config service req'd.	The G1000 has detected a PFD #1 configuration mismatch.	• Reload PFD 1 Configuration files including optional equipment configuration files that list PFD 1 in the PRODUCT box on the System Upload page. Also reload unlock cards for TAWS, ChartView, etc. • Press the UPDT CFG softkey on the Configuration Upload Page in the System Page Group to load configuration files into the configuration module. • Check PFD1 configuration module wiring for faults and replace if necessary. • Replace PFD1 configuration module. • Replace the PFD1. <u>NOTE</u> New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

Advisory Message	Possible Cause	Recommended Actions
PFD2 CONFIG – PFD2 configuration error. Config service req'd.	The G1000 has detected a PFD #2 configuration mismatch.	• Reload PFD 2 Configuration files including optional equipment configuration files that list PFD 2 in the PRODUCT box on the System Upload page. • Press the UPDT CFG softkey on the Configuration Upload Page in the System Page Group to load configuration files into the configuration module. • Check PFD1 configuration module wiring for faults and replace if necessary. • Replace PFD1 configuration module. • Replace the PFD2. <u>NOTE</u> New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.

Advisory Message	Possible Cause	Recommended Actions
MFD CONFIG – MFD configuration error. Config service req'd.	The G1000 has detected a MFD configuration mismatch.	• Reload MFD Configuration files including optional equipment configuration files that list MFD in the PRODUCT box on the System Upload page. • Press the UPDT CFG softkey on the Configuration Upload Page in the System Page Group to load configuration files into the configuration module. • Check PFD1 configuration module wiring for faults and replace if necessary. • Replace PFD1 configuration module. • Replace the MFD. <u>NOTE</u> New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
PFD1 VOLTAGE – PFD1 has low voltage. Reduce power usage.	PFD1 is not receiving sufficient voltage.	Check input voltage to PFD1. If input voltage is ok, replace PFD1.
PFD2 VOLTAGE – PFD2 has low voltage. Reduce power usage.	PFD2 is not receiving sufficient voltage.	Check input voltage to PFD2. If input voltage is ok, replace PFD2.
MFD VOLTAGE – MFD has low voltage. Reduce power usage.	The MFD is not receiving sufficient voltage.	Check input voltage to the MFD. If input voltage is ok, replace the MFD.

Advisory Message	Possible Cause	Recommended Actions
TAWS FAIL	A TAWS system failure has occurred.	• If message occurred on the first power up after unlocking TAWS, cycle system power to reinitialize TAWS and message should clear. • Ensure each GDU contains a supplemental data card. • Verify GIAs and GPS are online using the MFD AUX – SYSTEM STATUS page. • Verify GPS has a position lock. • Ensure an Airport Terrain, Obstacle, Terrain, Aviation Database, or GDU SW mismatch has not occurred. Correct any database and software errors.
TAWS TEST	TAWS system is currently being tested.	Normal annunciation during self test. Test will take up to two minutes to complete.
TAWS INHB	TAWS system alerting is disabled	Enable TAWS system alerting by pressing the MENU button from the MAP – TAWS page.
TAWS N/A	GPS accuracy not high enough to enable TAWS	Satellite coverage insufficient in the area for TAWS calculations. Contact Garmin Aviation Product Support for assistance if persistent.

5.1.7.19 GDL 69/69A Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GDL 69 FAIL – GDL 69 has failed.	The G1000 has detected a failure in the GDL 69/69A.	• Replace GDL 69/69A. • Check GDL 69/69A antenna and cabling.

5.1.7.20 GTX 33/33D Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
XPDR1 CONFIG – XPDR1 configuration error. Config service req'd.	The G1000 has detected a GTX 33 configuration mismatch.	- Perform a SET>ACTV configuration reset on the GTX Config page and verify the aircraft registration is present. - If error is still present, reload config files from a loader card. - If problem persists, replace master configuration module, check config module harness for faults and replace if necessary. NOTE New Terrain/Obstacle cards, Jeppesen Aviation Database and other optional features (i.e. TAWS unlock card) will need to be replaced if the master configuration module is changed. The G1000 ID number will change to a new number when installing a new master config module. The old Terrain and other cards will no longer work as they will remain locked to the old System ID number.
XPDR2 CONFIG – XPDR2 configuration error. Config service req'd.		
MANIFEST – GTX1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GTX 33 #1.	Load correct software version
MANIFEST – GTX2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GTX 33 #2.	
XPDR1 SRVC – XPDR1 needs service. Return unit for repair.	The G1000 has detected a failure in GTX 33 #1.	Replace GTX 33D #1.
XPDR2 SRVC – XPDR2 needs service. Return unit for repair.	The G1000 has detected a failure in GTX 33 #2.	Replace GTX 33/33D #2.
XPDR1 FAIL – XPDR1 is inoperative.	GTX 33D #1 is not responding.	- Troubleshoot for a failed data path. - Replace GTX 33D #1
XPDR2 FAIL – XPDR is inoperative.	GTX 33/33D #2 is not responding.	- Troubleshoot for a failed data path. - Replace GTX 33/33D #2.
BACKUP PATH – Transponder using backup data path.	The GTX 33 is using a backup RS-232 data path.	Troubleshoot for a failed data path.

5.1.7.21 GTS 8XX Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
CALIBRATION DATA FAULT	Stored factory calibration parameters are invalid.	Replace the unit.
CONFIGURATION DATA FAULT	Stored system configuration parameters are invalid or Mode S address is invalid (All 0's or F's). Fault will persist until configuration is corrected.	Reconfigure the GTS 8XX. If problem persists, replace the unit.
FPGA FAULT	Check of the FPGA image failed. Fault will persist until valid FPGA image is loaded.	If upload of FPGA image was recently attempted, retry the upload. Otherwise, replace the unit.
ROM FAULT	Internal non-volatile memory failure, or invalid data image detected.	If upload of audio image or IGRF magnetic field image was recently attempted, retry the upload. Otherwise replace the unit.
EXECUTION FAULT	CPU execution fault has occurred.	Cycle power and retry self test. If fault persists, replace the unit.
ELECTRICAL FAULT	One of the internal electrical voltages are out of range. Fault will persist until power is cycled.	Check aircraft power supply. If fault persists, replace the unit.
WHISPER SHOUT FAULT	Transmitted power is out of tolerance.	Check cable loss configuration, antenna installation and all cable connections and retry self test. If fault persists, replace the unit.
TRANSMIT POWER FAULT	One of the internal transmitter power source voltages are out of range. Fault will persist until power is cycled.	Check aircraft power supply. If fault persists, replace unit.
1030 MHZ FREQUENCY SOURCE FAULT	Transmit Frequency synthesizer is not locked.	Cycle power and retry self test. If fault persists, replace unit.
1090 MHZ FREQUENCY SOURCE FAULT	Receive Frequency synthesizer is not locked.	Cycle power and retry self test. If fault persists, replace unit.

Advisory Message	Possible Cause	Recommended Actions
RECEIVER CALIBRATION FAULT	-----	Check antenna installation and all cable connections and retry self test. Ensure that self test occurs in area free of buildings and large objects that can reflect signals. If fault persists, replace unit.
TRANSMITTER CALIBRATION FAULT	-----	Check antenna installation and all cable connections and retry self test. Ensure that self test occurs in area free of buildings and large objects that can reflect signals. If fault persists, replace unit.
BAROMETRIC ALTITUDE INPUT FAULT	Own ship barometric altitude calculation is invalid or has timed out.	Check wiring to source of barometric altitude and ensure that source is operating. Fault will clear as soon as valid barometric altitude data is received.
MAIN BOARD TEMPERATURE FAULT	Main board temperature or RF receiver temperature is greater than 90° Celsius or less than -60° Celsius.	Fault will persist until internal temperature returns to acceptable range.
TCAS EQUIPAGE TIMEOUT FAULT	TCAS Equipage data is not being received or has timed out for 800 ms.	Check wiring to TCAS Equipage data source and ensure that source is operating. Fault will clear as soon as valid TCAS Equipage data is received.

5.1.8 Common Problems

5.1.8.1 GDU

Symptom	Recommended Actions
• Display will not track photocell • Keyboard will not track photocell	• If you suspect the settings were manually changed by an operator, reload PFD1/2, MFD, GCU and GMC Configuration files including optional equipment configuration files that list PFD1/2 and MFD in the PRODUCT box on the System Upload page. • For displays, go to the GDU TEST page in configuration mode. Cover and uncover the photocells and verify that PHOTOCELL A or PHOTOCELL B value changes. If values do not change, replace the display.
• Display will not track dimmer bus • Keyboard will not track dimmer bus	• If you suspect the settings were manually changed by an operator, reload PFD1/2, MFD, GCU and GMC Configuration files including optional equipment configuration files that list PFD1/2 and MFD in the PRODUCT box on the System Upload page. • Check display dimmer input to verify voltage is present. • Replace display if dimmer voltage is present.
• Display is blank • Display resets • Display flickers	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Cycle power. If GDU recovers, observe display for yellow text containing error information at the top of the screen. If message indicates software need to be re-loaded, then re-load software. Otherwise, replace the GDU. • Use a bright light to verify LCD is active. • Adjust avionics dimmer control full clockwise. • Manually turn up backlight on the PFD and load configuration files to the GDU. • Ensure slide lock is fully engaged with the locking tabs on the back of the unit. If slide lock is not fully engaged, remove connector and verify the locking tabs on the GDU are perpendicular to the connector. If necessary, straighten them before reseating connector. • Ensure GDU is receiving power and ground. If a circuit breaker is tripped, determine source of short before resetting breaker. • Ensure circuit breakers have not failed and power wire connections are secure. • Swap PFD1 and PFD2. If problem follows unit, replace the display.

Symptom	Recommended Actions
SD card is stuck in GDU	- DO NOT insert a screwdriver of any length into the card slot. - DO NOT pry against the overlay. - DO NOT force the SD Card out. - Use a small screwdriver in the groove on the side of the exposed end of the card to help pull out the card. You may need to push the card in further to release the card locking mechanism. - If card was inserted with the label facing to the right, do not attempt to remove. Return the unit to Garmin for repair. - If the card can be removed, check the card for having more than one label. Two or more labels on the card will cause sticking. Remove all but one label. - Ensure the SD card is from SanDisk. Use of other SD Cards is not recommended.
A button/knob/joystick does not appear to function	Go to the GDU TEST page in configuration mode and verify button, knob, or joystick operates correctly by observing a change in color from red to green in the button/knob/joystick icon when the button/knob/joystick is pressed. If a button is stuck, the button icon will be green without pressing the button as soon as you turn to the GDU TEST page. If problem is verified, replace GDU.
Terrain/Obstacle/SafeTaxi does not display	- Ensure supplemental data cards are inserted correctly in the lower slots of all three GDU's. - Allow the system to verify the data on the cards for approximately five minutes after power-up. - If a database does not activate, reload the problem database onto the SD Card or replace the card. You may need to replace all data cards as a set to keep the database cycles the same and prevent database mismatch errors.

5.1.8.2 GIA 63W

Symptom	Recommended Actions
Weak COM transmit power	• Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to verify the unit or aircraft wiring is the problem. • If problem follows unit, replace GIA. • If problem does not follow unit, check COM antenna and cabling for faults.
Weak COM receiver	• Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to verify the unit or aircraft wiring is the problem. • If problem follows unit, replace GIA. • If problem does not follow unit, check COM antenna and cabling for faults.
No COM side tone	• Swap GIA1 and GIA2, reconfigure both GIA's to their new locations to verify the unit or aircraft wiring is the problem. • If problem follows unit, replace GIA. • If problem persists, replace 1347D # with a known good unit. • If problem persists, reinstall original 1347D #1 and replace 1347D #2.
COM Bleed over	• Verify on the GMA CONFIGURATION page that "Disable Split COM" has a green box. Due to the closeness of the COM antennas and high power of the COM transceivers, Split COM operation is not approved. • If the box is black (indicating COM ½ button is active), highlight "Disable Split COM" with the curser and press the ENT key to turn the box green which will deactivate Split COM mode.

5.1.8.3 WAAS GPS

Symptom	Recommended Actions
Will not acquire satellites	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Using the MFD AUX – GPS Status page, verify the signal strength bars are not erratic. If so, this indicates outside interference is affecting the GPS receivers. Find and remove the source of interference (i.e. cell phones, FBO datalink antennas, etc.). • Check date and time on Date/Time Setup Page. If date and time are incorrect, enter the correct date and time. • Swap GIA1 and GIA2, reconfigure both GIA's to their new locations, to verify location of problem. If problem follows unit, clear the GPS almanac by performing the following steps: – Using the PFD in config mode, go to the GIA RS-232/ARINC 429 Config Page. At the top of the screen, select the GIA that cannot acquire satellites (GIA1 or GIA2) and press the ENT key. – Press the “CLR NV” softkey at the bottom of the screen. – Select “OK” in the “Clear GIA nonvolatile memory?” pop-up window. – Reload GIA Audio and Config files from a loader card. Be sure to reload the config files for any optional equipment installed on the aircraft that require the GIA config to be updated. – Cycle power on the system and allow it to restart in normal mode. Place the aircraft outside and allow 15-30 minutes for the GPS to acquire a position and download a new almanac. • If clearing nonvolatile memory is unsuccessful and the GPS still cannot acquire a position, replace the GIA. • Check GPS antenna and cabling.

5.1.8.4 NAV

Symptom	Recommended Actions
Weak NAV receiver	- Set up a NAV/COM Ramp Test Set to radiate a test signal. - Swap GIA1 and GIA2, reconfigure both GIA's to their new locations, to verify location of problem. - If problem follows unit, replace GIA. - If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.

5.1.8.5 Glideslope

Symptom	Recommended Actions
Weak G/S Receiver	- Set up a NAV/COM Ramp Test Set to radiate a test signal. - Swap GIA1 and GIA2, reconfigure both GIA's to their new locations, to verify location of problem. - If problem follows unit, replace GIA. - If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.

5.1.8.6 GDC 74B

Symptom	Recommended Actions
Altitude is different than standby altimeter	- Perform a pitot/static check (see applicable airframe specific maintenance manual for procedure). Allow the GDC to warm up for fifteen minutes before checking accuracy, per Garmin Service Advisory 0606. - Determine which instrument is outside limits and recalibrate or replace. Note: Both units may individually be in spec but show a difference in altitude. Do not return a GDC to Garmin for service if not outside limits. - If GDC is outside limits, recalibration may be performed in accordance with Garmin Service Bulletin 0720, Section 2.7.3.
GDC 74B Config file does not load.	- Replace GDC 74B config module. - If problem persists, replace GDC 74B config module wire harness.

5.1.8.7 GRS 77 AHRS

Symptom	Recommended Actions
AHRS does not complete initialization	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Ensure GPS has acquired at least four satellites, has a 3D navigation solution, and a DOP of less than 5.0. This is particularly important if this issue appears during ground operation only. • Calibrate the GRS 77. If the message 'Calibrate AHRS/Mag' is present, perform the GRS/GMU Calibration per Section 7.5.8. • Check GRS 77 configuration module wiring for damage. • Check GRS 77 connector for bent pins. If no damage can be found, replace GRS 77 configuration module. • If problem persists, replace the GRS 77.
Attitude appears unstable	• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. • Ensure the four GRS 77 mounting screws are tight. Finger tight is not sufficient, a screwdriver must be used to verify. • Ensure mounting rack and airframe shelf are secure and all hardware and brackets are present (CAUTION - do not loosen the mounting rack hardware to the airframe shelf or the aircraft will need to be re-leveled and the PITCH/ROLL OFFSET procedure performed). • Ensure GRS 77 connector is securely fastened and proper strain relief is provided. • Remove GRS 77 connector and verify there are no bent pins. • Replace the GRS 77. • Contact Garmin for further troubleshooting if required.

5.1.8.7.2 GRS77 Operational Modes

In order to compute valid pitch and roll outputs, the GRS77 requires valid GPS information or valid inputs from both the magnetometer and air data computer. In order to compute valid heading outputs, the GRS77 requires valid input from the magnetometer. Insufficient inputs will prevent the AHRS from initializing. See table 5-2 for the attitude and heading outputs the GRS can provide based on the available data inputs.

Table 5-2. GRS 77 Modes

GRS77 Mode	GRS77 Input			GRS77 Output		
	GPS data	GMU44 data	GDC 74 data	Heading	Pitch	Roll
Primary	Good	Good	Doesn't matter	Valid	Valid	Valid
Reversion No-GPS	Bad	Good	Good	Valid	Valid	Valid
Reversion No-Mag	Good	Bad or anomaly	Good	Invalid	Valid	Valid
Reversion No-Mag No-Air	Good	Bad or anomaly	Bad	Invalid	Valid	Valid
Coast On Gyros	Bad	Either or Both Bad		Invalid	Invalid	Invalid
Output Unreliable	Bad	Either or Both Bad		Invalid	Invalid	Invalid

For reports of difficulty associated with AHRS realignment in flight, ensure that the pitch and roll limits listed in table 5-2 are not being violated. Table 5-3 shows the pitch and roll limits that the pilot must maintain for the AHRS to realign itself. If the pilot was performing maneuvers outside these limits, it can delay indefinitely the reinitialization of the GRS.

Table 5-3. GRS77 Pitch/Bank Limits for Cold Start when Airborne

Mode of Operation Entered Following Initialization	Sensor Inputs Available and Valid				Bank Limit in Degrees	Pitch Limit in Degrees
	All Inertials	GPS	Mag	Air Data		
Primary Mode	YES	YES	YES	YES	± 20.0	± 5.0
Reversion – No GPS Mode	YES	NO	YES	YES	± 10.0	± 5.0
Reversion – No GMU44 Mode	YES	YES	NO	YES	± 10.0	± 5.0
Reversion – No GMU44 and No Air Data Mode	YES	YES	NO	NO	± 10.0	± 5.0

5.1.8.7.3 GRS77 Troubleshooting Questions for the Operator

If possible, ask the operator the following questions to help the technician gather the information to accurately troubleshoot the GRS77 operation.

1. What specifically was the nature of the failure? Was it a red-X of only heading, only pitch/roll, or both?
2. If there was a red-X of pitch or roll information, did the PFD display the "AHRS Align: Keep Wings Level" message (which is indicative of an AHRS reset), or the "Attitude Fail" message (which is indicative of either AHRS invalidating its output, or a communication path failure)?



Figure 5-12. Attitude Fail Indication



Figure 5-13. AHRS Align Message

3. What exactly was the aircraft doing in the two minutes that preceded the failure (taxing on the ground, flying straight-and-level flight, turning, climbing, etc)? If the problem occurred on the ground, was it within 100 feet of a hanger using GPS repeaters?
4. How long did the failure last? Was it brief or sustained? Was it repetitive in nature? If it was repetitive, about how many times did it happen? Did it happen on more than one day?
5. Was the problem correlated with a specific maneuver or a specific geographic area?
6. Can the problem be repeated reliably?
7. Were any of the following message advisory alerts observed (must select a PFD soft-key to see them) within an hour of the occurrence of the problem?:
 - a. AHRS not receiving airspeed.
 - b. AHRS using backup GPS source
 - c. AHRS not receiving any GPS information
 - d. AHRS not receiving backup GPS information
 - e. AHRS magnetic-field model out of date
 - f. AHRS extended operation in no-GPS mode
8. Did the onset of the problem occur shortly after a software upload to one or more G1000 LRU, or shortly after a repeat of the magnetometer calibration procedure?
9. Was a cell phone on in the aircraft at the time?
10. Were there any GPS Alert messages or loss of position lock?

5.1.8.7.4 GRS Troubleshooting on the Aircraft

1. Review the airframe logbook. See if any G1000, other avionics or electrical maintenance had been performed recently.
2. Check power wire connections at the circuit breakers. Several models of aircraft have had loose wire terminals causing intermittent power glitches. Also, check for intermittent circuit breakers.
3. Have ground power put on the aircraft.
4. Turn on G1000 and record the system software level on the MFD. This will be needed if assistance from Garmin Product Support is required.
5. After the G1000 system has initialized (about one minute from power on), note any Red-X's on the displays, ALERT messages and Red-X's on the MFD Aux – System Status page.
6. Try to verify the issue still exists before proceeding to the physical inspection below.
7. Turn off G1000 and gain access to the GRS77.
8. Inspect the physical installation of the GRS.
 - a. Is the connector tight and locking slider engaged to the locking tabs on each side of the GRS connector?
 - b. Is the wire harness loose and able to move around during flight? *This condition may cause the wire to pull on or vibrate the connector making intermittent connections.*
 - c. Is the GRS mounted tight to the rack? *If any doubt exists, use a screwdriver to check the tightness of the four mounting screws.*
 - d. Look around the GRS for any heavy objects that may not be fastened tight to the structure that could induce GRS vibration.
 - e. Look for evidence of water or fluid contamination in the area around the GRS.
 - f. Unplug the GRS connector and check for bent pins.
 - g. Inspect the wire harness clamp on the rear of the connector to verify it's not too tight and damaging wires. Also check for some sort of protective wire wrap between the wires and the clamp. If the wire clamp is installed upside down, it has sharp edges that can cut into the wires.
 - h. Verify the locking slider spring is strong enough to keep the slider in the locked position by cycling the slider.
 - i. Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.
 - j. Ensure metal objects (tool boxes, power carts, etc.) are not interfering with the magnetometer and aircraft is not in hangar, near other buildings, parked over metal drainage culverts or on hard surfaces that may contain steel reinforcements
 - k. Check PFD1 Alert Window for PFD1/2, MFD or GRS configuration, software or failed data path error messages. Correct any errors before proceeding.
 - l. Ensure GRS 77 unit connector is secure and proper wire harness strain relief is provided.

- m. Ensure the GRS 77 is fastened down tightly in its mounting rack and that the mounting rack is not loose (CAUTION - do not loosen the mounting rack hardware to the airframe shelf or the aircraft will need to be re-leveled and the PITCH/ROLL OFFSET procedure performed).
 - n. Cycle GRS 77 power to restart initialization.
 - o. Ensure GPS has acquired at least four satellites, has a 3D navigation solution, and a DOP of less than 5.0. This is particularly important for an ATTITUDE FAIL that appears during ground operation only.
 - p. Perform an Engine Run-Up Test to check if engine vibration is causing the GRS 77 to invalidate outputs or reset.
 - q. Perform the Magnetic Interference Test to determine if there is significant magnetic interference from some device on the aircraft.
 - r. Replace GRS 77.
 - s. If problem persists, replace the GRS77 Configuration module.
9. If the condition is not resolved by following these instructions, contact Garmin Product Support for additional assistance. In rare cases, a Garmin Field Service Engineer may need to visit your facility to retrieve the fault logs stored in the GRS to determine if the fault is in the GRS or the aircraft.

5.1.8.7.5 GMU 44 Magnetometer- Heading Red-X



Figure 5-14. Heading Failure Indication

For Heading issues, a heading Red X (steady or intermittent) as seen above is the typical fault indication. Normally there will also be a green check mark on the MFD Aux-System Status page for the GMU, indicating that the GRS77 and the GMU44 are operating.

In addition to the troubleshooting information provided in the beginning of this section, the technician should be aware of the following AHRS system characteristics during ground operation that could cause the Red-X. This is important if the operator finds the Red-X only occurs during ground operations.

- GRS77 ground operation is heavily dependent on GPS data inputs. Be sure to correct any GPS performance problems (i.e. interference caused by some types of cell phones, GPS repeaters or any other device that transmits in the area) before troubleshooting the GRS77/GMU44. For GPS data to be considered valid, the receiver must be tracking at least 4 satellites and have a 3D GPS Solution.
- When taxiing without reliable GPS information, heading performance is susceptible to the presence of magnetic anomalies (metal buildings, underground steel culverts, steel grates in the ramp). Localized sources of interference on the ground may consistently Red-X the heading in the same spot while taxiing, this is not caused by a failure of the GMU44 or its calibration. If no observable steel structures are present, the Red-X is most likely caused by an unseen underground disturbance. To confirm this, the heading will repeatedly Red-X in the same area during multiple taxi runs.
- The GRS77 may invalidate (Red-X) the heading if the following are present: it does not have GPS information, it senses a magnetic anomaly and senses aircraft movement. Remove those influences to determine if one of them caused the Red-X.

- When the aircraft is on the ground and stationary, the aircraft yaw rate must be less than 1.5 degrees/second to use GPS track information to determine heading. This logic is applied regardless of magnetic anomaly detection. This could cause a heading Red-X if the aircraft is moving due to wind, operators entering/exiting the aircraft or any other disturbance that moves the wings and tail.

Check to see if any new equipment has been installed on the aircraft within three meters of the GMU44. Perform a Magnetic Interference Test if there is any doubt about potential sources of interference.

Common interference items are NAV light assemblies with the negative wire grounded to the aircraft structure, and HID landing/taxi lighting systems.

5.1.8.7.6 GMU Communications

The GMU status on the MFD Aux – System Status page indicates the health of the GRS77 to GMU44 RS-232 data path. If a Red-X is present for the GMU, check this RS-232 data path for faults before replacing these units.

5.1.8.8 GEA

Symptom	Recommended Actions
Fuel quantity flags intermittently	• Check for an open in the wiring and connectors between the GEA, signal conditioner, and the sender (hi, low, or signal ground lines). • Check fuel sender for an open or dead spot. • For capacitance systems, refer to the airframe maintenance manual for troubleshooting information.
Engine instruments are missing on the MFD	Clear user data on each GDU by holding down the CLR button while powering on each GDU. Keep the other display off while clearing user data.
Battery discharge indication	Consult the OEM Maintenance manual for troubleshooting information. If the battery is not truly discharging, recalibrating the measuring circuit may be necessary using the HSCM Configuration Page in Configuration Mode.

5.1.8.9 GMA 1347D

Symptom	Recommended Actions
Noise in Audio	Most often the cause of the noise is external to the GMA 1347D. Try the following to locate the source of the noise before replacing the 1347D: • Try a different pair of headsets. Noise cancelling headsets may pick up and/or generate more noise than standard headsets from their own circuitry. • Check for noise with engines turned off. • If the noise is present only when the engines are running, check the generator and/or ignition system as possible sources of noise (see applicable airframe maintenance manual). • Check for noise as all electrical equipment is turned on and off (strobes, other radios, etc.). • If the noise is identified from one electrical system or component refer to the applicable airframe specific maintenance manual. • Ensure the NAV/COM squelch is not open. • Ensure the ADF and DME audio is not active. • Ensure the marker beacon audio is not active. • Ensure the ICS squelch is not open. • Master squelch level can be adjusted on the 1347D CONFIGURATION page for higher noise environments. • Replace unit only after all possible external sources of noise are eliminated.
Buttons Do Not Work.	Some buttons are disabled in the GMA CONFIGURATION page by default. This is to remove potential sources of audio noise for inputs that are not used. If in doubt as to which buttons should be disabled, reload GMA config files and other config files for optional equipment installed in the aircraft (i.e. ADF, HF, etc.) from the loader card.
COM Bleed over	Verify on the GMA CONFIGURATION page that “Disable Split COM” has a green box. Due to the closeness of the COM antennas and high power of the COM transceivers, Split COM operation is not approved. If the box is black (indicating COM ½ button is active), highlight “Disable Split COM” with the cursor and press the ENT key to turn the box green which will deactivate Split COM mode.
Speaker Cuts Out	Reduce volume level of the item that caused the speaker to cut out when turned up. A speaker protection circuit disables the speaker output if the volume is too high. If the volume is not sufficient, replace aircraft cabin speaker, reference the Airframe Maintenance Manual.
Mic Audio Heard in Speaker	Reduce ICS Volume.

5.1.8.10 XM

Symptom	Recommended Actions
No XM audio is heard No XM weather information is displayed	• Ensure the following items are not preventing the audio panel from distributing XM audio (reference applicable G1000 Pilot's Guide): • Verify the XM volume is not muted on the AUX – XM RADIO page on the MFD. • Verify no music sources are plugged into the AUX music input jack. Verify the COM squelch is not open. Verify the ICS squelch is not open. • Verify the marker beacon tones are not being received. • Verify the headphone (if equipped) volume is turned up. • Go to the AUX – SYSTEM STATUS page on the MFD and ensure unit is online. If a red X is present, verify the unit is receiving power at the rack connector. • Check Garmin service literature for GDL software advisories. Ensure there are no GDL advisory Messages in the alert window. If there is an Alert for software or configuration error or mismatch, reload the file noted in the Alert. • Restart the PFD and MFD in configuration mode and go to the GDL page. Verify unit is active. • Verify the Signal number is "2" or "3". If it is "0" or "1" check the GDL 69/69A antenna and cabling for faults. • Reseat the GDL 69/69A to verify the coax connector is fully seated. • If unit is not active, contact XM Customer service at to have a refresh signal sent to your unit. You will need to provide them the Audio Radio ID (and Data Radio ID number for XM weather) numbers. Also verify with XM that the correct Weather package (Aviator Lite or Aviator) is on the account, and that no traffic service has been activated against that Radio ID. The unit must be on for approximately one hour after the request for the refresh has been sent to receive the signal. • Alternatively, you may also go to XM's website at http://www.xmradio.com/refresh/ and enter the radio ID's to have a refresh signal sent. • If there is still problems receiving weather products after performing the above step, call XM and have the account deactivated, and a new account activated to clear out any corrupt account information. • Verify there is a good ground connection through the aircraft between the MFD and the GDL69/69A unit. Reference the Aircraft Maintenance Manual for instructions on how to check bonding and ground points. • If problem persists, replace the GDL 69/69A.

5.1.9 Using Configuration Pages in Troubleshooting

In addition to LRU failure annunciations, data path failure and advisory messages, the information displayed on the configuration pages can be used to help troubleshoot the G1000.

5.1.9.1 GDL 69 Page

NOTE

Configuration settings are not adjustable on the GDL 69 Page.

GDL69		
CONFIGURATION		
SELECT GDL ANTENNA	SET Comant CI 2580-410	ACTIVE
ANTENNA GAIN (LOWER dB)	25.00	
CABLE LOSS INCLUDING INLINE ATTENUATORS IF USED (NOMINAL dB)	3.00	
GDL CONFIGURABLE ATTENUATION (dB)	8.0	8.0
ETHERNET PORT 2	DISABLE	DISABLE
ETHERNET PORT 3	DISABLE	DISABLE
ETHERNET PORT 4	DISABLE	DISABLE
DATA		
	AUDIO RADIO	DATA RADIO
ID	08EH60CC	3C8H60HP
ACTIVE	YES	YES
SIGNAL	3	3
DIAGNOSTICS		
	AUDIO RADIO	DATA RADIO
QUALITY OF SERVICE	1-----0	1-----0
TERRESTRIAL ERROR STATUS	2T--0000	2T--0000
SATELLITE 1 ERROR	3T--0000	3T--0000
SATELLITE 2 ERROR	4T--0000	4T--0000
TUNER STATUS	5LD-----	5LD-----

Figure 5-15. GDL 69 Configuration Page

The following information describes how the GDL 69 Configuration Page is arranged.

CONFIGURATION—this window contains the following fields:

- SELECT GDL ANTENNA—selects the GDL antenna.
- ANTENNA GAIN (LOWER dB)—sets the antenna gain value.
- CABLE LOSS INCLUDING INLINE ATTENUATIONS IF USED (NOMINAL dB)—Sets the inline cable loss attenuation value.
- GDL CONFIGURABLE ATTENUATION (dB)—sets the desired GDL attenuation value.
- ETHERNET PORT 2, 3, 4—enables and/or disables the desired Ethernet port.

NOTE

‘AUDIO RADIO’ refers to the XM audio receiver installed in the GDL 69A. ‘DATA RADIO’ refers to the XM data receiver installed in both the GDL 69 and GDL 69A.

DATA:

- a. ID—displays the identification number for the GDL 69/69A.
- b. ACTIVE—displays the active status for the GDL 69/69A.
- c. SIGNAL—displays the signal level for the GDL 69/69A.
 - 0 – no signal
 - 1 – weak signal
 - 2 – adequate signal
 - 3 – good signal

NOTE

Levels 2 and 3 should allow for proper operation of all GDL69/69A audio and weather options. Levels 0 and 1 are likely indications of problems with availability. A “204” message in the signal field indicates that signal information has not initialized.

DIAGNOSTICS (For XM use only, not useful for troubleshooting):

- a. QUALITY OF SERVICE—displays the quality of service for the GDL 69/69A.
- b. TERRESTRIAL ERROR STATUS—displays the terrestrial error status for the GDL 69/69A.
- c. SATELLITE 1 ERROR—displays the error status for satellite 1.
- d. SATELLITE 2 ERROR—displays the error status for satellite 2.
- e. TUNER STATUS—displays the tuner status for the GDL 69/69A.

5.1.9.2 GDL 90

Refer to the GDL 90 Installation Manual for troubleshooting information.

5.1.9.3 GMA 1347 Configuration Page



Figure 5-16. GMA Configuration Page (Display Format 1 and 2)

The following information describes the arrangement of the GMA Configuration Page. There are two display formats, display format 1 and display format 2.

DISPLAY FORMAT 1:

SELECT GMA UNIT—displays the currently selected GMA 1347 audio panel.

HEADSET VOLUME:

Adjustable range is between –31 and + 31 for the following:

- MUSIC #1, 2—sets the music input volume levels.
- UNSWITCHED IN #1, 2, 3—sets unswitched input volume levels.
- ALTITUDE WARNING—sets the altitude warning input volume level.
- PASSENGER VOLUME—sets the passenger volume.
- MASTER VOLUME MIN—sets the passenger volume.

SPEAKER VOLUME:

- CREW AUDIO—sets the crew audio volume level. Speaker volume adjustable range is between –31 and 31.
- PILOT MIC VOLUME—adjusts Pilot Mic Volume for PA speaker.
- COPILOT MIC VOLUME—adjusts Copilot Mic Volume for PA speaker.

MASTER SQUELCH:

- SENSITIVITY VALUE—sets the Master Avionics Squelch (MASQ™) threshold value. Value is adjustable between –31 and 31.

MARKER BEACON:

- a. HI/LO SENSE THRESHOLD—sets Hi/Lo marker sensitivity thresholds, value is adjustable between –31 and 31.
- b. VOLUME—adjusts marker beacon volume, value is adjustable between –31 and 31.

HAIL TONE:

- a. CHIME INHBT TIME—sets chime inhibit time, value is adjustable between 0 and 255 seconds.
- b. VOLUME—adjusts hail tone volume, value is adjustable between –31 and 31.

DISPLAY FORMAT 2:

KEYPAD ANNUNCIATORS—The following audio panel settings can be enabled or disabled:

- a. DISABLE COM3—disables COM3 button in situations where no COM3 is installed.
- b. DISABLE TEL—disables TEL button in situations where no telephone is installed.
- c. DISABLE DME—disables DME button for situations where no DME is installed.
- d. DISABLE ADF—disables ADF button for situations where no ADF is installed.
- e. DISABLE AUX—disables AUX button for situations where no auxiliary input is connected.
- f. DISABLE SPEAKER—disables SPEAKER button for situations where no speaker input is connected.
- g. DISABLE PA—disables PA button for situations where no PA input is connected.
- h. DISABLE PLAY—disables PLAY button for situations where no play input is connected.
- i. DISABLE MUSIC—disables music input.
- j. DISABLE REC—not used in certain installations.

CONFIGURATION INPUTS—the following audio panel settings can be enabled or disabled:

- a. MASQ INHIBIT—disables the Master Squelch circuit, which switches out aircraft radios during times of 'silence' to reduce the noise heard by the occupants. The Master Squelch threshold value is used to adjust the trip level of the circuit.
- b. ICS MUTE—mutes the MUSIC 1 channel during ICS activity.
- c. INTERNAL SIDETONE—causes the audio panel to provide COM sidetone in situations when the GIA radios do not provide sidetone.
- d. MUTE AUDIO ON TX/RX—all secondary COM audio is muted upon transmitting over primary COM. Upon detection of primary COM transmission, all secondary COM is muted.
- e. ANALOG INSTALL—COM 1 and COM 2 are connected using the analog interfaces instead of the digital interface.
- f. RECORD COM 2—during split-COM operation, the digital clearance recorder records COM 2 only and playback only on the co-pilot's channel.
- g. POWER-UP w/ AUX ON—enables the GMA 1347 to always power up with the AUX channel enabled.
- h. DUAL INSTALL—the audio panel is part of a dual-installation.
- i. DISABLE SPLIT COM—allows split-COM feature to be disabled for installations where split-COM operation is not desired.
- j. COM 2 ON-SIDE—in a dual audio panel installation, this designates the unit as a 'right-hand/co-pilot' unit.
- k. DISABLE 347 BEEP—not used in certain installations.

- l. SPKR ON PWR ON—when green, automatically turns the speaker on when the audio panel is turned on.
- m. ALLOW MUSIC MUTE—enables the music mute toggle function for Music 1 using the MKR key.
- n. PASS AUTO SQL—allows the passenger mic squelch to always be set to auto regardless of the pilot's selection of auto or manual squelch.
- o. INTRCOM ON PWR ON—not used in certain installations.
- p. DSBL ICS SIDETONE—not used in certain installations.
- q. MUS 2 MUTE ON RAD—mute music #2 on radio when passengers hear radios
- r. PASS HANDSET INST—passenger handset install
- s. SEL AUDIO TO PASS—route selected audio to passengers
- t. PA TO SPKR PA—sent to speaker in GMA 1347C/D
- u. CABIN ON PWR ON—cabin button selected on power-up
- v. CAB HAIL OVERRIDE—cabin hail override
- w. SPKR ON RMT FAIL—speaker on remote communication failure
- x. DISABLE XSIDE MIC ON RMT FAIL—disable cross-side microphone on remote communication failure
- y. 347 IN G1000—GMA 1347 installed in G1000
- z. O2 MIC 2 SPEAKERS—send the oxygen microphone mask audio out to both the cross-side and the on-side speaker
- aa. TEL RNG AS ALERT—enable audio panel's telephone ringer input as an analog alert input only when dual communication has failed

5.1.9.4 AHRS/Air Data Input Configuration Page

Basic operation of the GRS77 AHRS and GDC74B ADC can be observed from this page. It displays a list of all primary data parameters being sent to the GIA's and GDU's for attitude information, and provides a useful cross-reference for predicted values. It allows you to see the digital values for the information that is fed to the G1000 system. This screenshot shows a system with two GRS77 and two GDC74X units installed, if your system only has one of each the **AHRS 2** and **AIR DATA 2** sections will be dashed out.

AHRS / AIR DATA INPUT					
AHRS 1					
T HDG	264.7°	ROLL	+0°	PITCH	+0°
X ACC	0.04	Y ACC	-0.07	Z ACC	0.00
AIR DATA 1					
SAT	24°C	IAS	0KT	TAS	0KT
B ALT	1505FT	D ALT	2886FT	P ALT	1506FT
STATIC PRESS	28.33IN	DIFF PRESS	0.00IN	MACH	0.000
AHRS 2					
T HDG	265.8°	ROLL	+0°	PITCH	+0°
X ACC	0.06	Y ACC	-0.05	Z ACC	0.01
AIR DATA 2					
SAT	25°C	IAS	0KT	TAS	0KT
B ALT	1520FT	D ALT	2994FT	P ALT	1521FT
STATIC PRESS	28.31IN	DIFF PRESS	0.01IN	MACH	0.000
SYSTEM GDU GIA GEA GTX GRS GDC GFC GMA GDL CAL 0					

Figure 5-17. AHRS/Air Data Input Configuration Page

This page displays real time data from the GRS 77 (AHRS 1) and GDC74B (Air Data1). If the AHRS 1 or Air Data 1 fields are blank, the units are not online and the cause should be determined.

AHRS 1, 2:

- T HDG—True heading value input from GRS 77, expressed in degrees.
- ROLL—Roll value input from GRS 77, expressed in degrees.
- PITCH—Pitch value input from GRS 77, expressed in degrees.
- X ACC—X Axis acceleration value, expressed in m/s^2 .
- Y ACC—Y Axis acceleration value, expressed in m/s^2 .
- Z ACC—Z Axis acceleration value, expressed in m/s^2 .

AIR DATA 1, 2:

- a. SAT—Static Air Temperature measurement input from GDC 74B, expressed in degrees Celsius.
- b. IAS—Indicated Air Speed measurement input from GDC 74B, expressed in knots.
- c. TAS—True Air Speed measurement input from GDC 74B, expressed in knots.
- d. B ALT—Barometric corrected altitude input from GDC 74B, expressed in feet.
- e. D ALT—Density altitude input from GDC 74B, expressed in feet.
- f. P ALT—Pressure altitude input from GDC 74B, expressed in feet.
- g. STATIC PRESS—The raw value of the atmospheric pressure in the static input.
- h. DIFF PRESS—The raw value of the pressure in the pitot vs. static inputs.
- i. MACH—Displays aircraft speed in Mach number.

5.1.9.5 GRS/GMU Calibration Page



Figure 5-18. GRS/GMU Calibration Page

- When using this page to perform GRS or GMU calibrations, all screens must be in config mode.
- You may not be able to use the COM radios while all screens are in config mode, advise ATC of this if needed before placing both units in config mode after you've taxied to the compass rose.
- The three boxes in the Communication Status block (GPS, Air Data and Magnetometer) must be green before performing any calibration procedures.
- The Magnetometer box indicates that the communication status between the GRS and the GMU on the RS-485 line. If the box is red, it indicates a wiring problem between the units, the GMU44 has failed or a GRS77 communication port failure.

5.1.9.6 Engine Data Page

ENGINE DATA									
DATA									
ALT AMPS 1	___A	TACH SENSOR 1	0rpm	N1 ENG1	___%	ITT ENG1	___°C		
ALT AMPS 2	___A	TACH SENSOR 2	___rpm	N1 ENG2	___%	ITT ENG2	___°C		
PRP D ICE CUR 1	___A	D ICE PRESS	___PSI	N2 ENG1	___%	TIT ENG1	___°C		
PRP D ICE CUR 2	___A	FUEL PRESS ENG1	0PSI	N2 ENG2	___%	TIT ENG2	___°C		
AIRCRAFT PWR 1	1V	FUEL PRESS ENG2	___PSI	N3 ENG1	___%	OT ENG1	82°C		
AIRCRAFT PWR 2	1V	FUEL QTY LEFT	___GL	N3 ENG2	___%	OT ENG2	___°C		
BATT VOLTS 1	1V	FUEL QTY RIGHT	___GL	EGT ENG1 1	322°C	CHT ENG1 1	50°C		
BATT VOLTS 2	___V	FUEL FLW ENG1	0GL/HR	EGT ENG1 2	181°C	CHT ENG1 2	41°C		
		FUEL FLW ENG2	___GL/HR	EGT ENG1 3	128°C	CHT ENG1 3	42°C		
		FUEL FLW RTN 1	___GL/HR	EGT ENG1 4	116°C	CHT ENG1 4	42°C		
		FUEL FLW RTN 2	___GL/HR	EGT ENG1 5	119°C	CHT ENG1 5	132°C		
		MAP ENG1	38IN	EGT ENG1 6	117°C	CHT ENG1 6	68°C		
		MAP ENG2	___IN	EGT ENG2 1	___°C	CHT ENG2 1	___°C		
		VAC ENG1	___IN	EGT ENG2 2	___°C	CHT ENG2 2	___°C		
		VAC ENG2	___IN	EGT ENG2 3	___°C	CHT ENG2 3	___°C		
		OP ENG1	___PSI	EGT ENG2 4	___°C	CHT ENG2 4	___°C		
		OP ENG2	___PSI	EGT ENG2 5	___°C	CHT ENG2 5	___°C		
ENGINE HOURS	0.0			EGT ENG2 6	___°C	CHT ENG2 6	___°C		

Figure 5-19. Engine Data Page

The Engine Data Page displays engine sensor readings in real-time. Items shown in Figure 5-19 are typically used in most aircraft. There are no configurable parameters on this page.

DATA:

- ALT AMPS 1, 2—Alternator Amps measurement, expressed in amperes.
- PROP D ICE CUR 1, 2—Propeller De-Ice current measurement, expressed in amperes.
- AIRCRAFT PWR 1, 2—Aircraft power input measurement, expressed in volts DC.
- BATT VOLTS 1, 2—Battery Voltage measurement, expressed in volts DC.
- ENGINE HOURS—Displays engine time in hours, as measured by the engine tachometer input.
- TACH SENSOR 1, 2—Tachometer sensor measurement, expressed in revolutions per minute (RPM).
- D ICE PRESS—De-Ice system pressure measurement, expressed in pounds per square inch (PSI).
- FUEL PRESS ENG 1, 2—Fuel Pressure measurement, expressed in pounds per square inch (PSI).
- FUEL QTY RIGHT, LEFT—Fuel Quantity measurement, expressed in gallons (GL).
- FUEL FLW ENG 1, 2—Fuel Flow measurement, expressed in gallons per hour (GL/HR).
- MAP ENG 1, 2—Manifold Air Pressure sensor reading, expressed in inches/mercury (″/Hg).
- VAC ENG 1, 2—Vacuum measurement, expressed in inches/mercury (″/Hg).
- OP ENG 1, 2—Oil Pressure, expressed in pounds per square inch (PSI).

- n. N1, N2, N3 ENG 1, 2—Compressor spool speeds, expressed in percent RPM. (Turbine aircraft only)
- o. EGT ENG 1, 2 (1-6)—Exhaust Gas Temperature, expressed in degrees Celsius.
- p. ITT ENG 1, 2—Interstage Turbine Temperature, expressed in degrees Celsius. (Turbine aircraft only)
- q. TIT ENG 1, 2—Turbine Intake Temperature, expressed in degrees Celsius. (Turbine aircraft only)
- r. OT ENG 1, 2—Oil Temperature, expressed in degrees Celsius.
- s. CHT ENG 1, 2 (1-6)—Cylinder Head Temperature, expressed in degrees Celsius.

5.1.9.7 GEA Status Page

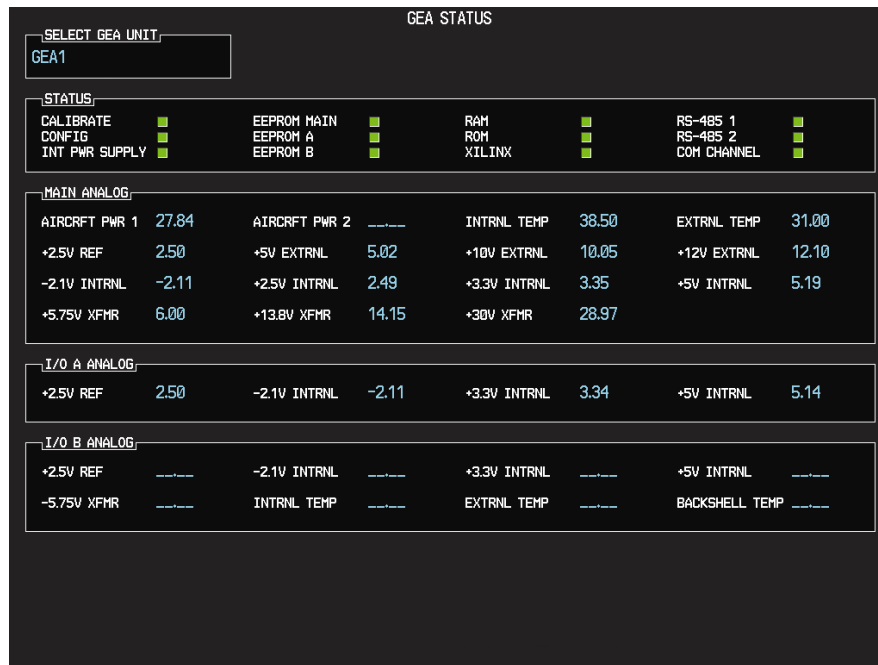


Figure 5-20. GEA Status Page

This page displays various items related to the GEA 71 and its operation. The technician can use this page to aid in diagnosis and troubleshooting of the GEA 71.

SELECT GEA UNIT:

This box displays the currently selected GEA 71 engine/airframe unit.

STATUS:

NOTE

A green box indicates good working order. A red box indicates an issue. Contact Garmin for assistance.

- CALIBRATE—Displays status of GEA 71 calibration.
- CONFIG—Displays status of GEA 71 configuration.
- INT PWR SUPPLY—Displays status of the GEA 71 +5, +10, and +12 sensor power supply voltages. If it is red, troubleshoot as for Engine Instrument Red-X's.
- EEPROM MAIN, A, B—Displays status of internal EEPROM for main, I/O 'A' and I/O 'B' boards.
- RAM, ROM, XILINX—Displays status of internal memory and FPGA.
- RS-485 1, 2—Displays status of RS-485 I/O channels.
- COM CHANNEL—Displays whether or not the main RS-485 channel usage is greater than 80%. Red indicates a utilization of greater than 80%, whereas green indicates a utilization of less than 80% of the channels' capacity (preferred). A red box is not cause for replacement of the unit, it is an indicator of communication capacity utilization.

5.1.9.8 GEA Configuration Page

CAUTION

The data contained on the GEA Configuration Page (Figure 5-21) is critical to aircraft safety. Although the content can be viewed, the technician cannot make changes unless authorized and equipped to do so.

The screenshot displays the GEA Configuration Page with two main sections: GEA and DATA. The GEA section shows selected parameters: GEA1, GEA I/O A, and 1A. The DATA section is a table with columns for SET, ACTIVE, and VALUE, listing various configuration parameters and their current values.

GEA CONFIGURATION			
GEA			
SELECT GIA/GEA PAIR	GEA1		
SELECT GEA BOARD	GEA I/O A		
SELECT CHANNEL	1A		
DATA			
	SET	ACTIVE	VALUE
INPUT TYPE	BATT AMPS 1	BATT AMPS 1	-----
SENSOR TYPE	LINEAR	LINEAR	
UPDATE RATE	10Hz	10Hz	
GAIN	25mV	25mV	
HSCM CTRL	ENBL	ENBL	
CONST CURNT	DSBL	DSBL	
RESIST DIV	ENBL	ENBL	
BIPLR	ENBL	ENBL	
GND LOW SIDE	DSBL	DSBL	
PARAM #1	-1.100000000e+002	-1.100000000e+002	
PARAM #2	1.100000000e+002	1.100000000e+002	
PARAM #3	1.200000000e+003	1.200000000e+003	
PARAM #4	0.000000000e+000	0.000000000e+000	
PARAM #5	0.000000000e+000	0.000000000e+000	
PARAM #6	0.000000000e+000	0.000000000e+000	
FILTER	0.300000012	0.300000012	
HYSTERESIS	0.000000000	0.000000000	

ANLG/CUR ANLG IN CUR MON ENG TEMP BKSHELL ANNUNC DIGITAL DSCRT COPY VERIFY

Figure 5-21. GEA Configuration Page

These pages show configuration settings for all inputs/outputs of the GEA 71 Engine/Airframe Unit. All settings are pre-established for a particular installation and are loaded from the appropriate G1000 Loader Card. Input/Outputs are categorized by groups and are brought on-screen by the pressing appropriate softkey. All settings are contained in the 'GEA 1' configuration file.

GEA—This box indicates which GEA, GEA circuit board, and/or GEA I/O channel is currently selected for display.

DATA—This box displays current configuration settings for the selected inputs/outputs in the GEA window.

SOFTKEYS:

- ANLG/CRNT—Displays analog/current configuration settings.
- ANLG IN—Displays analog in configuration settings.
- CRNT MON—Displays current monitor configuration settings.
- ENG TEMP—Displays engine temperature sensor configuration settings.
- BKSHELL—Displays backplate thermocouple configuration settings.
- ANNUNC—Displays annunciation configuration settings.

- g. DIGITAL—Displays digital input configuration settings.
- h. DSCRT—Displays discrete input configuration settings.
- i. COPY—Copies the selected input/output or channels in preparation for a SET>ACTV or ACTV>SET command. VERIFY—Verifies that the COPY command operated successfully and stores appropriate Cyclic Redundancy Checks (CRCs) or checksums in the master configuration module.

5.1.9.9 GDU Status Page

The GDU Status Page (Figure 5-22) displays various items relating to the GDU and its operation. Use this page to help diagnosis and troubleshoot the GDU.

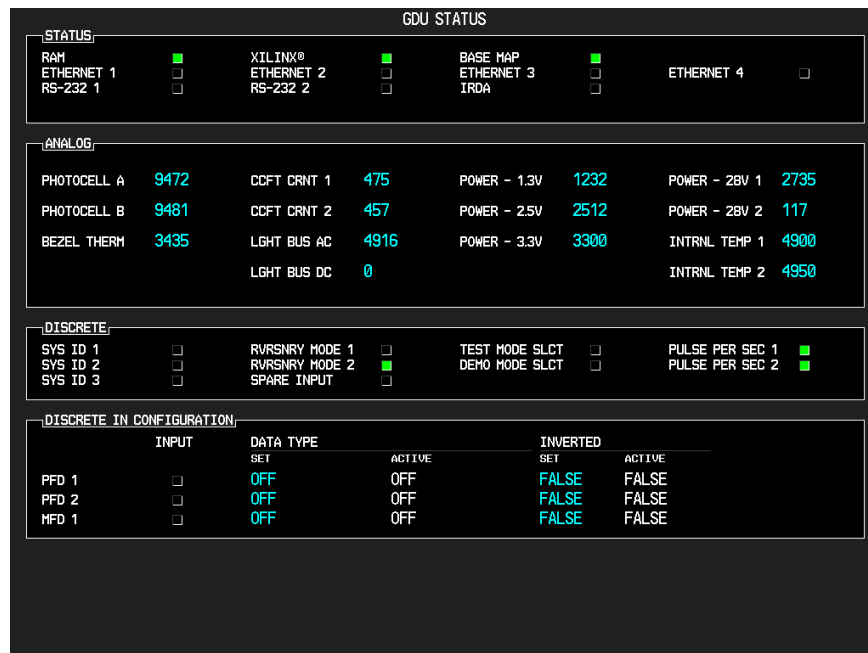


Figure 5-22. GDU Status Page

The following information describes how the GDU Status Page is arranged.

'STATUS' Window:

- a. RAM—Indicates condition of GDU 104X RAM memory. If it does not pass, the unit may not initialize.
- b. XILINX—Indicates condition of GDU 104X XILINX processor. If it does not pass, the unit may not initialize.
- c. BASE MAP—Indicates condition of stored basemap in the GDU 104X. A green box indicates the basemap has been installed. If the box is black, the basemap will need to be loaded. Contact Garmin for assistance.
- d. ETHERNET 1, 2, 3—Indicates status of the GDU 104Xs Ethernet channel. A green box indicates the ETHERNET loopback tests passed. A red or black box indicates it may not be used or a wiring fault is present.
- e. RS-232 1, 2—Indicates status of the GDU 104X's RS-232 channel. A green box indicates the RS-232 loopback tests passed. A red or black box indicates it may not be used or a wiring fault is present.

- f. IRDA—Indicates status of GDU 104X IrDA infrared port. Used for Garmin testing, it is not activated at this time
- g. ETHERNET 4—Indicates status of GDU 104Xs Ethernet channel 5. Used for Garmin testing, it is not activated at this time

'ANALOG' Window:

- a. PHOTOCCELL A, B: Displays the input value of display photocells, between 0 and 9999. The values can be converted to a percentage by adding a decimal place two digits over from the right (example: 8035 = 80.35%). If there is a significant split (~30% to 50%) you can expect the display to appear different from the other display in the aircraft, IF both of their lighting curves are set to the same values. Replace the display if one photocell reading is significantly different from the other.
- b. BEZEL THERM—Displays the temperature of the GDU bezel, expressed in degrees Celsius. (Example: 2064 = 20.64 degrees Celsius)
- c. CCFT CRNT 1, 2—Displays an indication of current flowing through the display backlight bulbs. Number does not reflect actual current value and is not useful for troubleshooting.
- d. LGHT BUS AC—Displays the input value of the AC lighting bus, if enabled. Disregard number if it is not used in the installation.
- e. LGHT BUS DC—Displays the input value of the DC lighting bus, if enabled. Disregard number if not used in the installation.
- f. POWER (1.3V, 2.5V, 3.3V, 28 V 1/2)—Displays power input voltages of various internal components. Should be within 10% of the desired voltage. (example: for 2.5V field, 2500 = 2.500 Vdc; for 28V Field, 3633 = 36.33 Vdc). Replace the display if these values are more than 10% from the desired voltage.
- g. INTRNL TEMP 1, 2—Displays the internal temperature sensor values of the display, in degrees Celsius (example: 45267 = 45.267°C).

'DISCRETE' Window:

GDU System ID 1	GDU System ID 2	GDU System ID 3	Display Mode
Black	Black	Green	MFD
Black	Black	Black	PFD #1
Green	Black	Black	PFD #2

- a. SYS ID 1, 2, 3—Displays the current system ID assigned to the display. Green indicates that the System ID pin is strapped to ground. Black indicates that the System ID pin is left 'open' and not strapped to ground.
- b. RVRSNRY MODE 1, 2—Displays the current status of the reversionary modes. Reversionary Mode 1 is activated by the GMA 1347 reversion button. Reversionary Mode 2 is activated by a second GMA 1347, if installed. Reversionary 1 input is a ground on Pin 58, reversionary 2 input is a ground on Pin 15.

- c. SPARE INPUT—A green box indicates Pin 14 is grounded. This input should have a black box, if it is green check for connector miswiring or a bent pin.
- d. TEST/DEMO MODE SLCT—A green box indicates Pin 53/54 is grounded. These inputs should have a black box, if either box is green check for connector miswiring or a bent pin.
- e. PULSE PER SEC 1, 2—Displays status of GPS time synchronization inputs (from GIA) to the GDU. Used for Garmin testing, not useful for troubleshooting.

'DISCRETE' Window:

The 'Discrete' Window displays the current configuration of discrete inputs into the display. These settings are loaded with the G1000 Loader Card and must not be changed. The input box is green if it is receiving the input, black if no input is expected, or red for a missing input. If the active column does not match the set column, load PFD/MFD configuration files. These settings are loaded with the G1000 Loader Card and must not be changed.

5.1.9.10 GDU Test Page

The GDU Test Page (Figure 5-23) shows a graphical layout of all display buttons in red. Each red button turns green when the button is pressed indicating correct operation of the button.

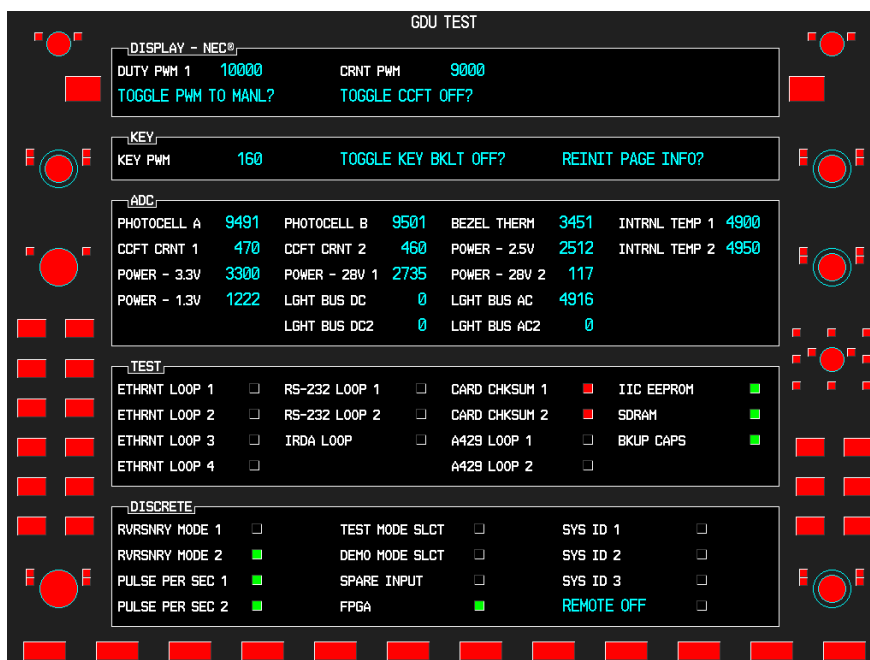


Figure 5-23. GDU Test Page

GDU Test Page Window Descriptions

'DISPLAY-NEC' Window:

- DUTY PWM 1—Displays the display brightness duty pulse width modulation. Value range is between 0 and 9999 and corresponds to the display brightness value shown. Not useful for troubleshooting.
- CRNT PWM—Displays percentage of current pulse-width-modulation to backlight bulbs. Value is between 0 and 10,000, showing the percentage of the maximum allowable current to the backlight. Not useful for troubleshooting.
- TOGGLE PWM TO MANL?— Allows the technician to manually adjust the display brightness.
- TOGGLE CCFT OFF?— Allows the technician to turn off the backlight current controller.

'KEY' Window:

- KEY PWM—Displays the keypad pulse width modulation brightness value. Range is between 0 and 9999 and corresponds to the keypad brightness value shown. Not useful for troubleshooting.
- TOGGLE KEY BKLT OFF?—Allows the technician to toggle the keyboard backlight off.
- REINIT PAGE INFO?—Allows technician to re-initialize all information on the test page.

'ADC' Window:

- a. PHOTOCELL A, B—Displays the input value of display photocells, between 0 and 9999. The values can be converted to a percentage by adding a decimal place two digits over from the right (Example: 8035 = 80.35%). If there is a significant split (~30% to 50%) you can expect the display to appear different from the other display in the aircraft, IF both of their lighting curves are set to the same values. Replace the display if one photocell reading is significantly different from the other.
- b. BEZEL THERM—Displays the temperature of the GDU bezel, expressed in degrees Celsius.
- c. CCFT CRNT 1, 2—Displays an indication of current flowing through the display backlight bulbs. Number does not reflect actual current value and is not useful for troubleshooting.
- d. POWER (2.5V, 3.3V, 28 V 1, 2; 1.3V)—Displays power input voltages of various internal components. (Example: for 2.5V field, 2500 = 2.500 Vdc; for 28V Field, 3633 = 36.33 Vdc) They need to be within 10% of desired voltages. Replace the display if these values are more than 10% from the desired voltage.
- e. LGHT BUS DC, AC—Displays input value of AC and DC lighting bus inputs, depending on which is configured. Disregard number if not used in the installation.
- f. INTRNL TEMP 1, 2—Displays the internal temperature of the GDU, expressed in degrees Celsius.

'TEST' Window:

- a. IIC EEPROM—Displays the condition of the GDU configuration module EEPROM chip, located in the backplate connector. It should be green for the PFD and red for the MFD. If it is red on the PFD, check configuration module wiring and pins for damage before replacing the configuration module.
- b. DATACARD CHKSUM 1, 2—Requires the use of a special datacard. Tests the datacard reader interface function. Used for Garmin testing, not useful for troubleshooting.
- c. NAND, NOR FLASH, SDRAM—Displays the condition of various GDU internal components.
- d. A429 LOOP 1, 2—Indicated the status of the GDU 104Xs ARINC 429 channels. A green box indicates the ARINC 429 loopback tests passed. A red or black box indicated it may not be used or a wiring fault is present.
- e. ETHERNET 1, 2, 3—Indicates status of the GDU 104Xs Ethernet channel. A green box indicates the ETHERNET loopback tests passed. A red or black box indicates it may not be used or a wiring fault is present.
- f. RS-232 1, 2—Indicates status of the GDU 104X's RS-232 channel. A green box indicates the RS-232 loopback tests passed. A red or black box indicates it may not be used or a wiring fault is present.
- g. IRDA—Indicates status of GDU 104X IrDA infrared port. Used for Garmin testing, it is not activated at this time.
- h. BKUP CAPS—Indicates status of the Backup Capacitor Test. A green box indicates the test passed, a red box indicates it failed.

'DISCRETE' Window:

GDU System ID 1	GDU System ID 2	GDU System ID 3	Display Mode
Black	Black	Green	MFD
Black	Black	Black	PFD #1
Green	Black	Black	PFD #2

- a. RVRSNRY MODE 1, 2—Displays the current status of the reversionary modes. Reversionary Mode 1 is activated by the GMA 1347 reversion button. Reversionary Mode 2 is activated by a second GMA 1347, if installed. Reversionary 1 input is a ground on Pin 58, reversionary 2 input is a ground on Pin 15.
- b. PULSE PER SEC 1, 2—Displays status of GPS time synchronization inputs (from GIA 63/GIA 63W) to the GDU. Used for Garmin testing, not useful for troubleshooting.
- c. TEST, DEMO MODE SELECT—A green box indicates Pin 53/54 is grounded. These inputs should have a black box, if either box is green check for connector miswiring or a bent pin.
- d. FPGA—Displays the condition of the GDU FPGA processor. If it does not pass the unit may not initialize.
- e. SYS ID 1, 2, 3—Displays the current system ID assigned to the display. Green indicates that the System ID pin is strapped to ground. Black indicates that the System ID pin is left 'open' and not strapped to ground. (See table below) PFD #2 is not used in certain aircraft.
- f. REMOTE OFF—Allows the display to control power of a remote system. Not used in any installation at this time.

5.1.9.11 Diagnostics Page

Information on the diagnostics page is protected and cannot be changed.

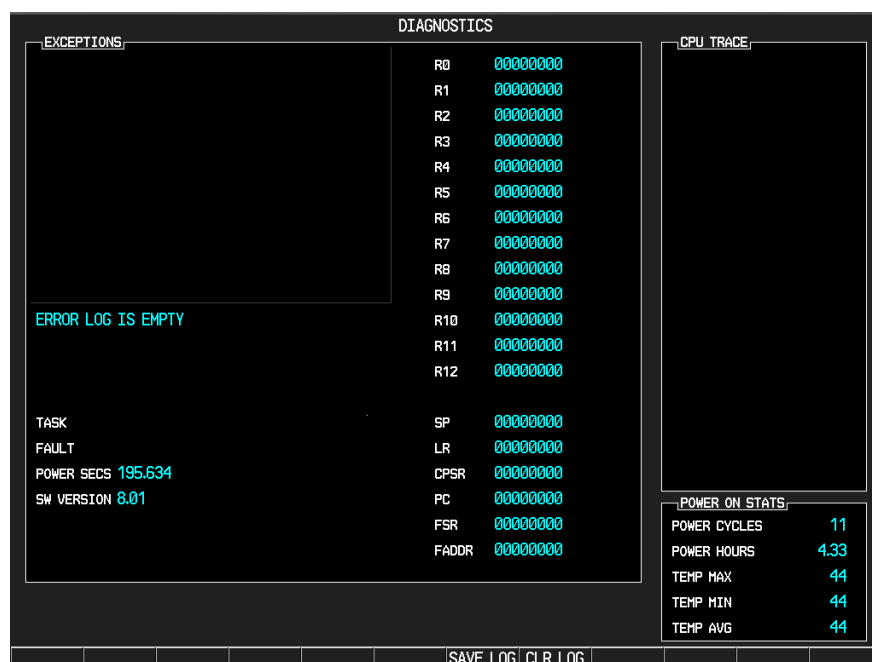


Figure 5-24. Diagnostics Page

5.1.9.12 Serial/Ethernet I/O Page

The Serial/Ethernet I/O Page displays Ethernet communication statistics (Figure 5-25). If Ethernet communication symptoms are suspected, this page logs errors as they occur and displays them. A few errors are generally not cause for unit rejection. If there are a substantial, growing number of errors logged, it indicates an Ethernet communication issue. Use the FMS knob to check all three Ethernet ports. There should generally be a continually increasing number in the RCV GOOD FRAMES and XMT GOOD FRAMES to show Ethernet communications are working. This data on this page is protected and cannot be changed.

If the number of errors are continually increasing, check the Ethernet wiring between GDU's and GIA's for any disconnects. If none are found, troubleshoot which LRU or GDL is causing the problem (PFD, MFD, GIA 1, or GIA2).

SERIAL / ETHERNET I/O			
<u>ETHERNET STATISTICS</u>			
SELECT PORT	ETHERNET 1	XMT GOOD FRAMES	120
RCV GOOD FRAMES	28	XMT MAX COLLISION ERRORS	0
RCV COLLISION DETECTION	0	XMT LATE COLLISION ERRORS	0
RCV ALIGNMENT ERRORS	0	XMT UNDERRUN ERRORS	0
RCV OVERRUN ERRORS	0	XMT LOST CARRIER SENSE	0
RCV RESOURCE ERRORS	0	XMT DEFERRED	0
RCV CRC ERRORS	0	XMT SINGLE COLLISIONS	0
RCV SHORT FRAME ERRORS	0	XMT MULTIPLE COLLISIONS	0
FC RCV UNSUPPORTED	0	FC XMT PAUSE	0
FC RCV PAUSE	0	XMT TOTAL COLLISIONS	0
<u>HSDB STATISTICS</u>			
XMT PINGS	235	NUM RX PRODC	1209
NUM TX PRODC	2931	NUM RX ACK REQ	422
NUM TX ACK REQ	41	NUM RX ACKS	432
NUM TX ACKS	422	MIN ACK MS	9
NUM TX RETRYs	1	MAX ACK MS	28
NUM TX ABORTS	0	MNGR ENTRYs PEND	1
NUM WRITE FAIL	0	LRU ONLINE CHNGs	2
NUM OVERRUNS	0		
NONVOL			

Figure 5-25. Serial/Ethernet I/O Page

5.1.9.13 Alert Configuration Page

The Alert Configuration Page displays all crew alerting system (CAS) messages and their causes. The information on this page is protected and cannot be changed.

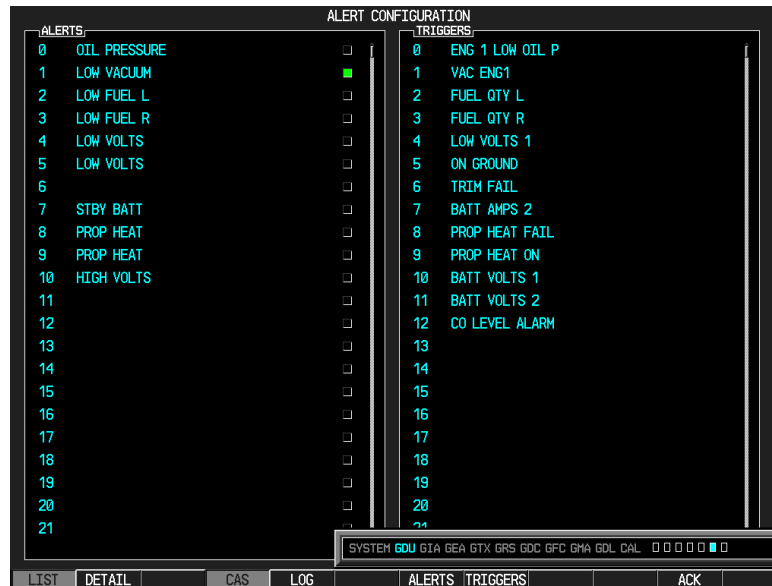


Figure 5-26. Alert Configuration Page

5.1.9.14 Airframe Configuration Page

The Airframe Configuration Page displays the airframe configuration parameters for instruments, airspeed bugs, and other items. The data on this page is protected and cannot be changed.

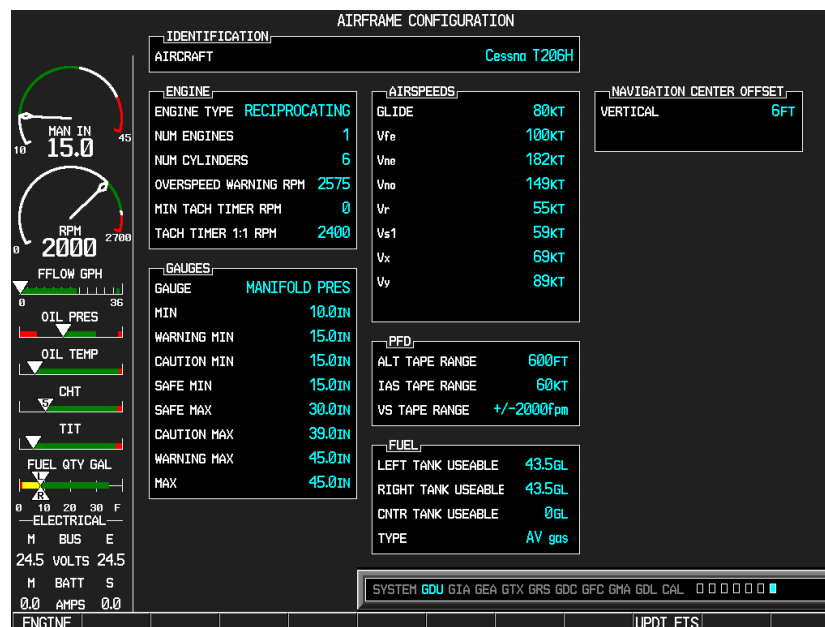


Figure 5-27. Airframe Configuration Page

5.1.9.15

RS-232/ARINC 429 Configuration Page (GIA 63/63W)

RS-232 / ARINC 429 CONFIG

SELECT UNIT
GIA1

RS-232

CHANNEL	INPUT		OUTPUT	
	DATA	SET	SET	ACTIVE
CHNL 1	☒	GDC74 #1	GDC74 #1	GDC74 #1
CHNL 2	☐	AFCS DEBUG	AFCS DEBUG	AFCS DEBUG
CHNL 3	☐	OFF	OFF	OFF
CHNL 4	☐	OFF	OFF	OFF
CHNL 5	☒	GTIX 33 #1 w/ TIS	GTIX 33 #1 w/ TIS	GTIX 33 #1 w/ TIS
CHNL 6	☒	GRS77 #1	GRS77 #1	GRS77 #1
CHNL 7	☒	GMA1347 #1	GMA1347 #1	GMA1347 #1
CHNL 8	☐	OFF	OFF	OFF

ARINC 429

CHANNEL	SPEED		DATA	
	DATA	SET	SET	ACTIVE
IN 1	☐	Low	Low	OFF
IN 2	☐	Low	Low	OFF
IN 3	☐	Low	Low	OFF
IN 4	☐	Low	Low	OFF
IN 5	☒	Low	Low	GDC74 #1
IN 6	☒	High	High	GRS77 #1
IN 7	☐	Low	Low	OFF
IN 8	☐	Low	Low	OFF
OUT 1	☐	Low	Low	OFF
OUT 2	☐	Low	Low	OFF
OUT 3	☐	Low	Low	OFF
SDI	Common		Common	

SYSTEM GDU GIA GEA GTX GRS GDC GFC GMA GDL CAL ■ ■ ■ ■ ■

SET>ACTV/ACTV>SET
CLR NV

Figure 5-28. RS-232/ARINC 429 Configuration Page

Main ARINC 429 and RS-232 communications channels for GIA 1 and GIA 2 are displayed on this page. All settings are pre-established for a particular installation and are loaded from the G1000 Loader Card and should not be changed. The 'GIA 1' and 'GIA 2' configuration files contain the settings shown on this page.

Windows:

- SELECT UNIT—displays the currently selected GIA 63/GIA 63W unit.
- RS-232—displays active RS-232 configuration settings for currently selected GIA.
- ARINC 429—displays active ARINC 429 configuration settings for currently selected GIA.

Softkeys:

The following softkeys are displayed on this page:

- SET>ACTV—See configuration section for description.
- ACTV>SET—See configuration section for description.
- CLR NV—clears all 'Active' settings from memory from the selected GIA 63/GIA 63W and restores default settings. The GIA and optional equipment configuration files need to be reloaded if the memory is cleared.

5.1.9.16 CAN/RS-485 Config Page

This page displays settings for the Controller Area Network (CAN) and RS-485 channels used by the GIA 63/GIA 63W. All settings are pre-established for a specific installation and are loaded from the appropriate G1000 Loader Card. The settings should not be changed. The 'GIA 1' and 'GIA 2' configuration files contain the settings shown on this page.

CAN / RS-485 CONFIGURATION

SELECT GIA UNIT

GIA1

CAN

CHANNEL	INPUT DATA		OUTPUT DATA		SPEED	
	DATA SET	ACTIVE	SET	ACTIVE	SET	ACTIVE
CHNL 1	☐ OFF	OFF	OFF	OFF	1000000	1000000
CHNL 2	☐ OFF	OFF	OFF	OFF	1000000	1000000

RS-485

CHANNEL	INPUT DATA		OUTPUT DATA	
	DATA SET	ACTIVE	SET	ACTIVE
CHNL 1	☒ GEA 1	GEA 1	GEA 1	GEA 1
CHNL 2	☐ OFF	OFF	OFF	OFF
CHNL 3	☐ OFF	OFF	OFF	OFF
CHNL 4	☒ GFC700	GFC700	GFC700	GFC700
CHNL 5	☐ OFF	OFF	OFF	OFF

CLOCKED DATA INTERFACE

CHANNEL	INPUT/OUTPUT DATA
CHNL 1	SET: OFF, ACTIVE: OFF

SYSTEM GDU GIA GEA GTX GRS GDC GFC GMA GDL CAL

SET>ACTV / ACTV>SET
0 0 0 0

Figure 5-29. CAN/RS-485 Configuration Page

Windows:

- SELECT GIA UNIT—displays the currently selected GIA 63/GIA 63W.
- CAN—displays active Controller Area Network configuration settings for currently selected GIA.
- RS-485—displays active RS-485 configuration settings for currently selected GIA.
- CLOCKED DATA INTERFACE—displays active Clocked Data Interface settings, typically only used when interfacing to an external DME.

Softkeys:

The following softkeys appear on this page:

- SET>ACTV—see configuration section for description.
- ACTV>SET—see configuration section for description.

5.1.9.17 GIA I/O Configuration Page

GIA I/O CONFIGURATION

SELECT GIA UNIT

GIA1

SELECT INPUT/OUTPUT

DISCRETE IN

CONFIGURATION									
CHANNEL	DATA	DATA TYPE	ACTIVE	INVERTED	SET	ACTIVE	SET	ACTIVE	SET
IN* 1	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 2	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 3	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 4	☐	AFCS GO AROUND	AFCS GO AROUND	FALSE	FALSE	0	0	0	0
IN* 5	☐	PLT CTRL WHL	PLT CTRL WHL	FALSE	FALSE	0	0	0	0
IN* 6	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 7	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 8	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 9	☐	PLT PIT TRM ARM	PLT PIT TRM ARM	FALSE	FALSE	0	0	0	0
IN* 10	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 11	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 12	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN 13	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN 14	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN 15	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN 16	☐	FLAP RETRACT	FLAP RETRACT	FALSE	FALSE	0	0	0	0
IN 17	☐	FLAP EXTEND	FLAP EXTEND	FALSE	FALSE	0	0	0	0
IN* 1A	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 2A	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 3A	☐	PLT PIT TRM UP	PLT PIT TRM UP	FALSE	FALSE	0	0	0	0
IN* 4A	☐	PLT PIT TRM DWN	PLT PIT TRM DWN	FALSE	FALSE	0	0	0	0
IN* 5A	☐	OFF	OFF	FALSE	FALSE	0	0	0	0
IN* 6A	☐	OFF	OFF	FALSE	FALSE	0	0	0	0

SYSTEM GDU GIA GEA GTX GRS GDC GFC GMA GDL CAL ☐ ☐ ☐ ☐

SET>ACTV/ACTV>SET

Figure 5-30. GIA I/O Configuration Page

Discrete and analog input/output channels for GIA 1 and GIA 2 are shown on this page. All settings are pre-established for a specific installation and are loaded from the G1000 Loader Card. The settings should not be changed. The 'GIA1' and 'GIA2' configuration files contain the settings shown on this page.

Windows:

SELECT GIA UNIT—displays the currently selected GIA 63/GIA 63W unit.

SELECT INPUT/OUTPUT—displays input/output type that is displayed for the currently selected GIA.

Options include:

- Discrete In
- Discrete Out
- Analog In
- Analog Out

Configuration—displays active I/O configuration settings for the currently selected GIA and input/output type. A green box indicates an input is active, a black/red box indicates an input is not active or not is use.

Softkeys:

The following softkeys appear on this page.

- SET>ACTV: See configuration section for description.
- ACTV>SET: See configuration section for description.

5.1.9.18 COM Setup Page



Figure 5-31. COM Setup Page

Windows:

- a. SELECT GIA UNIT—displays the currently selected GIA 63/GIA 63W.
- b. CALIBRATION

NOTE

Making incorrect adjustments will disable the COM and require GIA replacement.

- c. FREQUENCY—selects a VHF communication frequency. For purposes of setting squelch and sidetone levels, only the frequencies 118.00, 127.00, 136.975 can be used.

SPACING:

Selection	Description
25.0 kHz	Selects the traditional 25 kilohertz spacing (760 channel)
8.33 kHz	Selects 8.33 kilohertz channel spacing, required in certain areas of the world.

- d. SQ 250—sets the squelch threshold for 25 kHz channel spacing operation. May be set to any value between 0 (zero) and 63. The higher the number, the less signal is required to break squelch.
- e. SQ 833—sets the squelch threshold for 8.33 kHz channel spacing operation. May be set to any value between 0 (zero) and 63. The higher the number, the more signal required to break squelch.
- f. SIDETONE—sets the side tone audio output level. May be set to any value between 0 (zero) and 63.
- g. MIC GAIN—sets the headset microphone gain level to any value between 0 (zero) and 63.

5.1.9.19 GIA Status Page

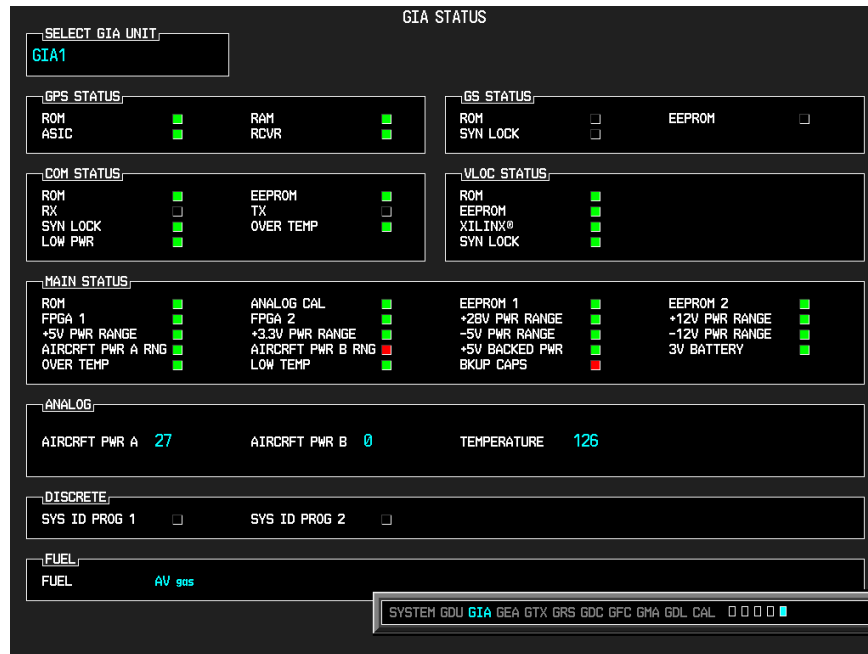


Figure 5-32. GIA Status Page

This page displays various items related to the operation of the GIA 63/GIA 63W. The technician can use this page to aid in diagnosis and troubleshooting.

Windows:

- SELECT GIA UNIT—displays the currently selected GIA 63/GIA 63W.
- GPS STATUS (ROM, RAM, ASIC, RCVR)—displays the condition of various GPS receiver hardware components. Black boxes may indicate the GPS is not locked onto valid signals, and may not be an indication of a failed unit.
- GS STATUS (ROM, SYN LOCK, EEPROM)—displays the condition of various Glideslope receiver hardware components. Black boxes may indicate the GS is not locked onto valid signals, and may not be an indication of a failed unit.
- COM STATUS (ROM, EEPROM, SYN LOCK)—displays the condition of various COM transceiver hardware components.
- RX—displays whether or not the GIA 63/GIA 63W COM is currently receiving. (Green = Receiving)
- TX—displays whether or not the GIA 63/GIA 63W COM is currently transmitting. (Green = Transmitting)
- LOW PWR—informs the technician of a low power condition for the COM transceiver. (Green = Low Power)
- OVER TEMP—informs the technician of an over-temperature condition for the COM transceiver. (Red = Over-temperature, Green = Normal-temperature)
- VLOC STATUS (ROM, XILINX, SYN LOCK, EEPROM)—displays condition of various NAV receiver components. These boxes should be green, a red box indicates an internal failure.

MAIN STATUS:

- a. ROM, FPGA 1/3, EEPROM 1/2—displays the condition of various GIA 63/GIA 63W main board components. These boxes should be green, a red box indicates an internal failure.
- b. +5, +3.3, -5, +12/-12, +28 PWR RANGE—displays condition of various internal power supply ranges. They need to be within 10% of desired voltages. Replace the unit if these values are more than 10% from the desired voltage.
- c. AIRCRFT PWR A/B RNG—displays the technician that the main power inputs of the GIA 63/GIA 63W are within acceptable ranges. If a box is red, and the Aircraft PWR voltage is listed as 0 in the Analog Status box below, check that all aircraft buses are on and GIA breakers are pushed in.
- d. ANALOG CAL—displays the condition of the GIA calibration. (Green = Valid Analog Calibration)
- e. OVER TEMP—informs the technician of an over-temperature condition on the GIA 63/GIA 63W main board. (Red = Over-temperature, Green = Normal-temperature)
- f. LOW TEMP—informs the technician of a low temperature condition on the main board. (Red = Low-temperature, Green = Normal-temperature)
- g. BKUP CAPS—indicates status of the Backup Capacitor Test. A green box indicates the test passed, a red box indicates it failed.

ANALOG STATUS:

- a. AIRCRFT PWR (A, B)—displays aircraft power input values, expressed in Volts DC (example: 2214 = 22.14 Vdc).
- b. TEMPERATURE—displays the internal temperature of GIA unit, expressed in degrees Fahrenheit (example: 12267 = 122.67°F).
- c. DISCRETE:
- d. SYS ID PROG 1, 2—identifies the assigned GIA number when two or more GIA units are installed. Green indicates that the System ID pin is left strapped to ground. Black indicates that the System ID pin is left 'open' and not strapped to ground. GIA #3 and GIA #4 may not be used in certain VLJ aircraft.

GIA System ID 1	GIA System ID 2	GIA Unit Number
Black	Black	#1 GIA
Green	Black	#2 GIA
Black	Green	#3 GIA
Green	Green	#4 GIA

- e. FUEL—displays the type of fuel to be used on the aircraft.

5.1.9.20 GTS Configuration Page

GTS CONFIGURATION

FAULT

CALIBRATION	✓	CONFIGURATION	✓	FPGA	✓	ROM	✓
EXECUTION	✓	ELECTRICAL	✓	WHISPER SHOUT	✓	TRANSMIT POWER	✓
1030 MHz	✓	1090 MHz	✓	PA/LNA	✓	RECEIVER	✓
TRANSMITTER	✓	BARO ALTITUDE	✓	TEMPERATURE	✓	TCAS EQUIP TIMEOUT	✓
RADIO ALTITUDE	✓						

STATUS

UNIT TYPE GTS 850 TEMPERATURE 30.0°C RADIO ALTITUDE AVAILABLE

AUDIO TEST **RUN SELF-TEST**

CONFIGURATION

	SET	ACTIVE
TOP ANTENNA	GARMIN GA58	GARMIN GA58
TOP ANT CBL LOSS	1.5dB	1.5dB
BOTTOM ANTENNA	GARMIN GA58	GARMIN GA58
BOT ANT CBL LOSS	1.5dB	1.5dB
MODE S ADDRESS	A00000	A00000
VOLUME	0.0dB	0.0dB
VOICE	MALE	MALE
ADS-B TX	INSTALLED	INSTALLED
LANDING GEAR	RETRACTABLE	RETRACTABLE

NOTE: The GTS mode S address must be updated through the transponder configuration.

SET>ACTV ACTV>SET

Figure 5-33. GTS Configuration Page

This page displays various items related to the configuration of the GTS. The technician can use this page to aid in diagnosis and troubleshooting.

FAULT Windows:

a. **FAULT**—displays configuration page status indicators for the GTS 8XX. A Red-X indicates the item has a fault. See below for item description and actions.

- **Calibration** – Stored factory calibration parameters are invalid. Return unit to Garmin for service.
- **Configuration** – Stored system configuration parameters are invalid or Mode S address is invalid (all 0's or F's). Reload GTS configuration file and verify Mode S address.
- **FPGA** – Check of the FPGA image failed. Reload GTS software. If fault persists, return unit to Garmin for service.
- **ROM** – Internal non-volatile memory failure, or invalid data image detected. If upload of audio image or IGRF magnetic field model was recently attempted, retry the upload. If fault persists, return unit to Garmin for service.
- **Execution** – a CPU execution fault has occurred. Cycle power and retry self test. If fault persists, return unit to Garmin for service.
- **Electrical** – One of the internal voltages are out of range. Cycle power, check aircraft power supply for proper voltage and power connections for proper polarity. If fault persists, return unit to Garmin for service.

- Whisper Shout – Transmitted power is out of tolerance. Reload GTS config file, check antenna installation and all cable connections, then retry self test. If fault persists, return unit to Garmin for service.
- Transmit Power – One of the internal transmitter power source voltages are out of range. Cycle power, check aircraft power supply for proper voltage and power connections to the GPA for proper polarity. If fault persists, return unit to Garmin for service.
- 1030 MHz – Transmit frequency synthesizer is not locked. Cycle power and retry self test. If fault persists, return unit to Garmin for service.
- 1090 MHz – Receive frequency synthesizer is not locked. Cycle power and retry self test. If fault persists, return unit to Garmin for service.
- PA/LNA – PA/LNA communications parity status or PA/LNA power supply status has failed. Fault will clear as soon as communications parity status and power supply status are valid. Check all wire and cable connections and retry self test. If fault persists, return unit to Garmin for service.
- Receiver – Check antenna installation and all cable connections and retry self test. Ensure that self test occurs in area free of buildings and large objects that can reflect signals. The receiver self calibration is performed before the transmitter self calibration. If a receiver calibration fault occurs, the transmitter self calibration will not be performed. If fault persists, return unit to Garmin for service.
- Transmitter – Check antenna installation and all cable connections and retry self test. Ensure that self test occurs in area free of buildings and large objects that can reflect signals. If fault persists, return unit to Garmin for service. The transmitter self calibration can only be performed after a successful receiver self-calibration. If fault persists, return unit to Garmin for service.
- Baro Altitude – Own ship barometric altitude calculation is invalid or timed out. Check wiring to source of barometric altitude and ensure the source is operating. Fault will clear as soon as valid barometric altitude data is received.
- Temperature – Main board temperature or RF receiver temperature is greater than 90 degrees C or less than -60 degrees C. Fault will persist until temperature returns to acceptable range between those values.
- TCAS Equip Timeout – TCAS equipage data is not being received or has timed out. Check wiring to TCAS equipage data source and ensure the source is operating. Fault will clear as soon as valid TCAS equipage data is received.
- Radio Altitude – Radio altimeter has not remained active for five or more consecutive updates within the first ten surveillance updates after power up or reset, or the radio altitude status has been inactive for three or more consecutive seconds after the first ten seconds of operation. Check wiring to source of radio altitude and ensure that source is operating. Fault will clear as soon as valid radio altitude data is received.

STATUS Window: —displays the status of the GTS 8XX. An audio test and self-test may be run from this window.

The self test feature also checks the following external parameters.

- Mag Variation Available status – Magnetic variation data (difference between ‘True’ North and Magnetic North) is available.
- GPS Available status – GPS Position, Velocity and Time source is configured and valid data is available. Otherwise source is not configured, data is not available or data is not valid.
- Display #1 Active status – Traffic display #1 discrete input is active.
- Display #2 Active status – Traffic display #2 discrete input is active.
- Radio Altitude Available status – Radio altimeter source is configured, and valid data is available. Otherwise source is not configured, data is not available, or data is not valid.
- Mag Heading Available status – Magnetic heading source is configured, and valid data is available. Otherwise source is not configured, data is not available, or data is not valid.
- Airborne Self Test Allowed status – Self test while airborne is allowed if active, otherwise self test can only be initiated on the ground.

CONFIGURATION Window: —displays GTS 8XX configuration information. This is preset by the GTS Configuration file.

5.1.9.21 GSD 41 Status Page

GSD STATUS

SELECT GSD UNIT

GSD1

MAIN STATUS

FPGA 1	✓	FPGA 2	✓	RAM	✓	ROM	✓
OVER TEMP	✓	LOW TEMP	✓	SYSTEM FAILURE	✓	STATUS FLGS VALID	✓
SUPRCAP FAIL CNT	1	ACTIVE MODE	CONFIGURATION				

HARDWARE STATISTICS

MAX SYS TEMP	64.50°C	MIN SYS TEMP	18.00°C	UNIT PWRUP CNT	1571	UNIT PWRON TIME	1155.36

VOLTAGE RANGE MONITOR

SYS VOLT FLGS VAL	✗	+28V PWR RANGE	✓	+12V PWR RANGE	✓	+5V PWR RANGE	✓
+3.3V PWR RANGE	✓	+2.5V PWR RANGE #1	✓	+2.5V PWR RANGE #2	✓	+1.3V PWR RANGE	✓
+1.2V PWR RANGE #1	✓	+1.2V PWR RANGE #2	✓	-5V PWR RANGE	✓	-12V PWR RANGE	✓
AIRCRAFT PWR A RNG	✓	AIRCRAFT PWR B RNG	✓	SUPRCAP VOLT MON	✗		

ANALOG

AIRCRAFT PWR A	27.15	AIRCRAFT PWR B	27.05	TEMPERATURE	28.50°C

DISCRETE

SYS ID PRG 1	L	SYS ID PRG 2	L

FUEL

Jet A

Figure 5-34. GSD Status Page

This page shows the internal status of several items within the GSD.

MAIN STATUS Window: displays internal component status.

- FPGA 1/2 – Status of this processor, should be green. A red box indicates a failure.
- RAM/ROM – Status of this memory, should be green. A red box indicates a failure.
- OVER TEMP – A red box indicates the unit temperature exceeded 85 degrees Celsius.
- LOW TEMP – A red box indicates the unit temperature was below -65 degrees Celsius.
- SYSTEM FAILURE – FPGA 1/2 or RAM/ROM failure.
- STATUS FLGS VALID – Other status data is currently valid.
- SUPRCAP FAIL CNT – The feature not currently used.
- ACTIVE MODE – Displays the operational mode of the GSD.

HARDWARE STATISTICS: displays temperature and time statistics for the GSD.

- MAX SYS TEMP – displays the maximum temperature the GSD has reached.
- MIN SYS TEMP – displays the lowest temperature the GSD has reached.
- UNIT PWRUP CNT – The number of times the GSD has been turned on.
- UNIT PWRON TIME – The amount of time the GSD has been turned on.

VOLTAGE RANGE MONITOR: monitors internal and external voltages of the GSD.

SYS VOLT FLGS VAL – A green box indicates all system voltage flags are valid. A red box indicates one or more voltages are out of range.

XXV PWR RANGE items – A green box indicates the internal voltage is within acceptable limits. A red box indicates a voltage that is out of spec, which may require replacement of the GSD.

ANALOG: Shows GSD power input voltages and current internal temperature.

DISCRETE: Shows if the SYS ID PROG 1/2 pins are grounded. This determines the assigned number to the GSD in systems with multiple GSD units (i.e. GSD1, GSD2, GSD3).

FUEL: Shows the configured fuel type. This is set by the GSD Configuration file from a System Software loader card.

5.1.9.22 GWX Configuration Page

NOTE

The 'ATTITUDE DATA' window of the GWX configuration page (Figure 5-35) provides the last known valid attitude source and radar solution during the current power cycle. It does not necessarily indicate that the GWX is currently receiving a valid attitude input.

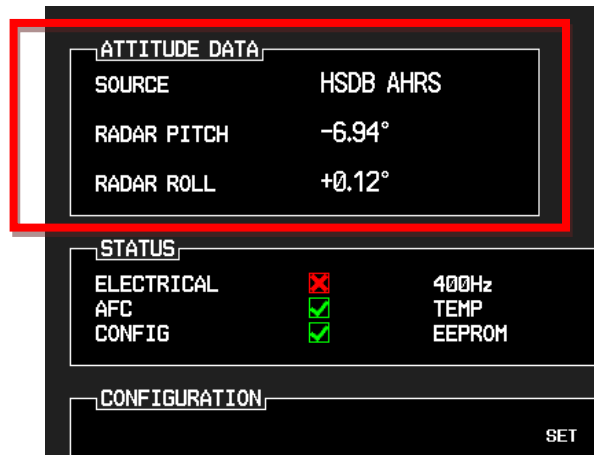


Figure 5-35. Attitude Data

5.1.9.22.1 GWX Configuration Page Data Fault Indications

Data fault indications for the GWX are displayed in the status box on the GWX configuration page (Figure 5-36).

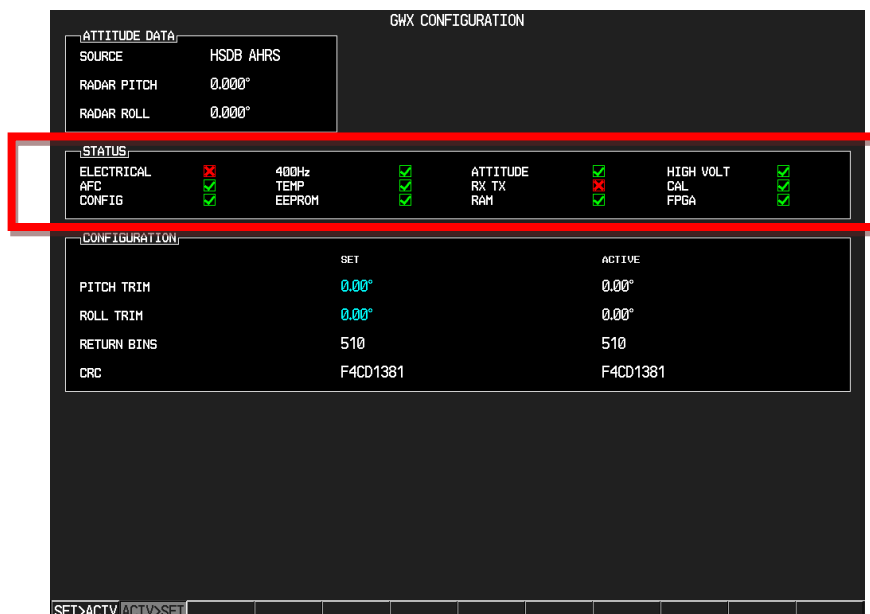


Figure 5-36. Status Box—GWX Configuration Page

5.1.9.23 GWX Troubleshooting Table

Table 5-4 lists the various GWX fault indication descriptions and corrective actions.

NOTE

The fault indications are reset if PFD1 is transitioned from normal mode to configuration mode. It will return if the fault is persistent. It may not return if the fault is intermittent. The fault indications also reset with a power cycle to the unit. Note: transitioning the MFD to configuration mode will not reset the fault indications.

Table 5-4. GWX 68 Fault Indications/Troubleshooting

STATUS INDICATOR BOX	FAULT INDICATION		FAULT INDICATION DESCRIPTION	CORRECTIVE ACTION
ELECTRICAL			Voltages within the unit are out of range.	• Cycle unit twice to confirm problem. • Replace the GWX 68 if condition remains.
400Hz			Attitude input is not valid if using the 400hz input. A valid 400Hz attitude signal must be received then lost to set this box to red in the current power cycle.	• N/A for G1000s, this box should always be green. • For non-G1000s, check for missing 400 Hz attitude information from AHRS source (refer to AHRS section or manufacturer's manual). • If problem persists, replace the GWX.
HIGH VOLT			Monitoring for >33V at the power input to the GWX. Transitions unit to standby mode if over 33V.	• Check voltage at input of unit (should be <33V). If over 33V, troubleshoot aircraft power system. • Check if condition occurred due to aircraft system power spike due to other non-G1000 electrical equipment loads. • Correct issues that cause aircraft electrical system power spikes. • If problem persists, replace the GWX • Cycle power on unit only to see if fault remains, if it does, replace the GWX.
AFC			Automatic frequency control within the unit has a fault, will make unit enter Standby mode.	• If problem persists, replace the GWX.

STATUS INDICATOR BOX	FAULT INDICATION		FAULT INDICATION DESCRIPTION	CORRECTIVE ACTION
TEMP			Unit temp >85°C.	• If condition occurred during flight, replace the GWX 68. • If condition occurs on the ground due to excessive heat inside the radome, turn unit off and allow it to cool before further use. • If the condition occurs on the ground and the temperature is normal in the radome, replace the GWX 68.
RX TX			Magnetron fault within the unit, will make unit enter Standby mode.	• Ensure GWX software version 2.10 or later is installed (see applicable service bulletin). • If problem persists, replace the GWX.

STATUS INDICATOR BOX	FAULT INDICATION		FAULT INDICATION DESCRIPTION	CORRECTIVE ACTION
CAL			Bad factory calibration data.	Replace the GWX 68.
CONFIG			GWX and GDU configuration do not match.	Troubleshoot per GWX config message in the Advisory Message table.
EEPROM			Internal EEPROM component failed.	Replace the GWX 68.
RAM			Internal RAM component failed.	Replace the GWX 68.
FPGA			Internal FPGA component failed.	Replace the GWX 68.
ATTITUDE			The unit does not have a valid attitude source via A429 databus or 400Hz input.	- Check the AHRS source for proper operation (refer to AHRS section or manufacturer's manual). - If problem persists, replace the GWX.

Table 5-5. Miscellaneous Radar Faults

Symptom	Possible Cause	Resolution
Radar audibly noisy during ground operation.	Excessive gear train noise or radome interference	- Remove radome. - Inspect interior surfaces of the radome for contact with the radar dish. Correct interference by adjusting or replacing radome. - If no radome interference is found, perform the following: - Turn on the G1000. - Select the radar page on the MFD. - Press the following softkeys in the following order: 7, 9, 9, 7. - Press the MODE softkey - Press the TEST softkey. The radar dish will begin scanning, but it will not be transmitting. - Test the horizontal and vertical modes to exercise the gear train and evaluate for noise. - Replace the GWX 68 if the gears are excessively noisy.
Radar fails to make a full vertical or horizontal sweep on the screen.	Radome Interference or GWX 68 failure	- Remove the radome and inspect interior surfaces for contact with the radar dish. Correct interference by adjusting or replacing the radome. - If problem persists, replace the GWX.

5.1.9.24 Weather Radar Page Annunciations

NOTE

See the applicable Pilot's Guide for all of the weather radar page display annunciations. The Weather Radar Page may display a "STAB INOP" annunciation indicating a radar stabilization problem (Figure 5-37). A likely cause is a faulty AHRS. See 5.1.8.7.5 for attitude troubleshooting information.



Figure 5-37. Weather Radar Page (STAB INOP)

There may be "RDR FAULT" and "FAIL" indications on the MFD radar page in normal mode (Figure 5-38). Perform the recommended troubleshooting actions in table 5-5 for these annunciations.

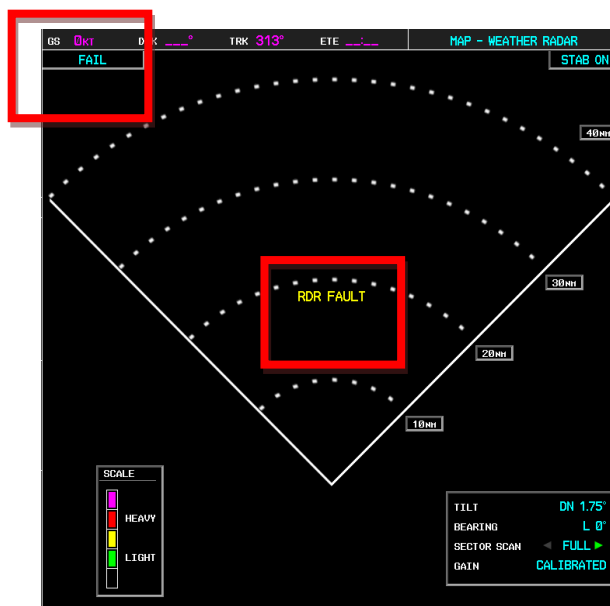


Figure 5-38. Weather Radar Page (FAIL and RDR FAULT)

5.1.9.25 Synchronous Interference

Another radar unit operating nearby the GWX (especially another GWX 68), can cause thin arcs to display on the screen. These arcs are colored with green edges (Figure 5-39). This does not indicate a radar failure. The display will correct itself once the aircraft is moved away from the interfering radar unit.

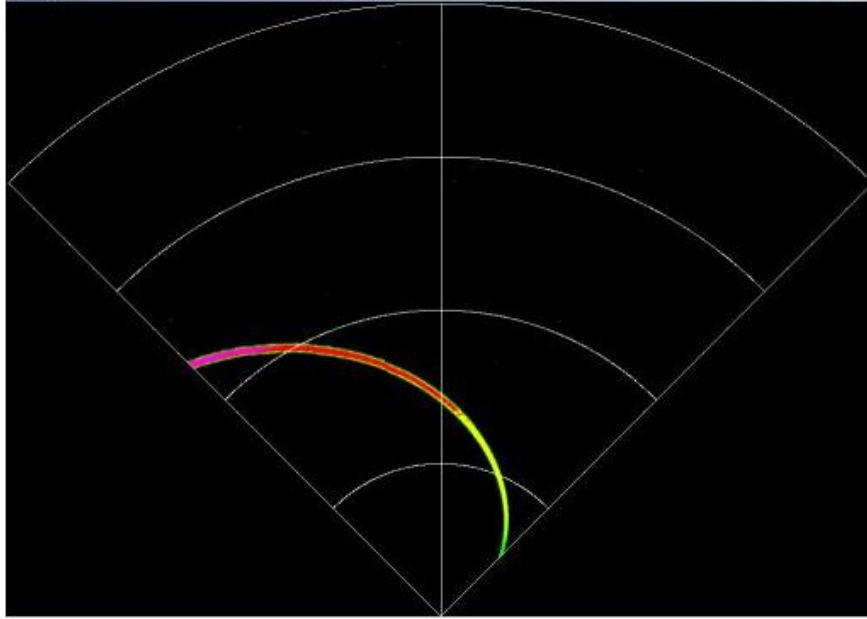


Figure 5-39. Weather Radar Page Arcs

5.1.10 TROUBLESHOOTING THE GFC 700 AUTOPILOT

Troubleshooting the GFC 700 involves the use of the GFC Configuration Page and the GFC Status Page.

5.1.10.1 GFC Configuration Page

The following information describes how the GFC Configuration Page is arranged.

CAUTION

The data contained on the GFC Configuration Page is vital to aircraft safety.

NOTE

All settings made on the GFC Configuration Page are contained in the GFC configuration file.

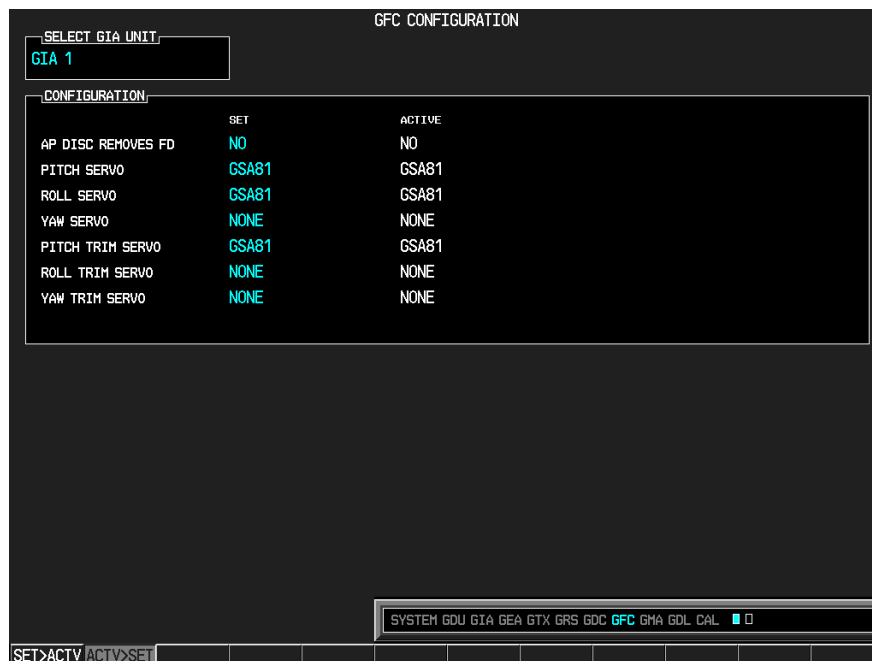


Figure 5-40. GFC Configuration Page

'SELECT GIA UNIT'—This box displays the currently selected GIA.

'CONFIGURATION'—This box displays the following:

- AP DISC REMOVES FD—Turns the autopilot flight director on or off.
- PITCH SERVO—Displays the currently selected pitch servo.
- ROLL SERVO—Displays the currently selected roll servo.
- YAW SERVO—Displays the currently selected yaw servo.
- PITCH TRIM SERVO—Displays the currently selected pitch trim servo.
- ROLL TRIM SERVO—Displays the currently selected roll trim servo.
- YAW TRIM SERVO—Displays the currently selected yaw trim servo.

5.1.10.2 GFC Status Page

The screenshot shows the GFC Status page with the following sections:

- SELECT GIA UNIT:** GIA 1
- SELECT SERVO AXIS:** PITCH SERVO
- GIA STATUS:** AP DISCONNECT (Green indicator)
- MONITOR BOARD STATUS:**
 - SERVO PROGRAM 1 (Green indicator)
 - SERVO PROGRAM 2 (Black indicator)
 - SERVO PROGRAM 3 (Black indicator)
 - AP DISCONNECT (Green indicator)
 - PFT (PASSED)
 - HIGH RES LOAD CELL CAL (Green indicator)
 - HIGH RNG LOAD CELL CAL (Green indicator)
- CONTROL BOARD STATUS:**
 - SERVO PROGRAM 1 (Green indicator)
 - SERVO PROGRAM 2 (Black indicator)
 - SERVO PROGRAM 3 (Black indicator)
 - AP DISCONNECT (Green indicator)
 - PFT (PASSED)
- DRIVE SERVO:** RPM 0.00rpm
- SERVO DATA:**
 - VOLTAGE 0.00V
 - CURRENT 0.00A
 - SPEED 0.00rpm
 - TORQUE 0.00in-lb
 - CLUTCH ENGAGE STATUS (Black indicator)
- SLIP CLUTCH TEST RESULTS:**

	NOSE UP	NOSE DOWN
MIN	in-lb	in-lb
MAX	in-lb	in-lb
- SYSTEM STATUS BAR:** SYSTEM GDU GIA GEA GTX GRS GDC GFC GMA GDL CAL (Green indicator)
- Bottom Buttons:** TEST SVO TEST ALL, ENG CLCH DRV SRVO, RST GAIN

Figure 5-41. GFC Status Page

The GFC Status page displays the following status information regarding the GFC 700"

GIA STATUS

AP DISCONNECT: Displays the condition of the AP DISC +28 VDC input to the GIAs and servos, which is required for the Autopilot to operate. A green status indicator displays the AP DISC switch is closed and the GFC 700 is actively receiving 28. volts. A black indicator box indicates the GIAs and servos are no longer receiving the +28 VDC AP DISC power (switch open or other fault).

MONITOR/CONTROL BOARD STATUS

Displays the condition of various monitor board components.

SERVO PROGRAM (1-3): Servo program discretes are used to determine the HW strapping for each

GSA to define the servo type. This information can be cross-referenced against the system interconnects

to verify proper servo grounding.

AP DISCONNECT: Same as GIA Status.

PFT: Indicates whether the pre-flight test has passed or failed.

HIGH RES & HIGH RNG LOAD CELL CAL: Displays the condition of the high resolution and high range load cells on the monitor board. If box is black, this indicates a corrupt or missing load cell calibration; return the servo to Garmin.

DRIVE SERVO

Allows the technician to enter a desired RPM at which to manually drive the selected servo. Direction of rotation is controlled by the polarity of the RPM (+ or -). After the speed is entered, the technician may use the ENG CLCH and DRV SRVO softkeys to drive the servo.

NOTE

The flight controls must be clear and safe to operate before manually driving the servo.

SLIP CLUTCH TEST RESULTS (GFC Status Page)

This window is used during the automatic slip clutch torque measurement check.

NOTE

This automated clutch check method is NOT approved as an acceptable means of compliance with the annual slip clutch maintenance requirements.

5.1.10.3 GFC 700 Annunciations

The GFC 700 AFCS Annunciation field is located above the airspeed tape on the PFD as shown in Figure 5-42.



Figure 5-42. GFC 700 Annunciation Field

Table 5-5 lists the annunciations may appear in the AFCS annunciation field.

Table 5-6. AFCS Annunciations

Condition	Annunciation	Recommended Actions
Pitch Failure		- Check the AUX – SYSTEM STATUS page to see if the servo is online (green check). - Check that the affected servo is receiving power. - Check the servo wiring and connector. - Ensure PTRM switches are not stuck. - If failure condition still exists, remove and replace the affected servo.
Roll Failure		
MET Switch Stuck, or Pitch Trim Axis Control Failure		
AFCS System Failure		- Check that no red X's are present on the MFD and PFDs. - Check that there are no Alert Messages present in the PFD Alert window. Correct any software or configuration errors noted. - Go to the AUX SYSTEM STATUS page on the MFD and verify that all LRUs have a 'green' check. - Download GIA fault logs and review for failure information. - If the OAT and TAS is Red-X'd and the attitude indication is present, troubleshoot.
Emergency Descent Mode		- AP engaged when aircraft altitude above 30,000 ft and cabin pressurization is lost. - Selected Heading set 90° left of current heading; Selected Altitude set to 15000 ft.
Elevator Mistrim Up		- If mistrim annunciations persist, check the Pitch Trim servo for proper operation. Verify that the servo is online at the AUX – SYSTEM STATUS page. - Check the Pitch Trim servo wiring and connector. Ensure the servo is receiving power. - Check the aircraft trim control rigging. - If mistrim condition still exists, remove and replace the affected servo.
Elevator Mistrim Down		
Aileron Mistrim Left		- Check for possible fuel imbalance. - Check aileron control rigging. - If mistrim condition still exists remove and replace the roll servo.
Aileron Mistrim Right		
Rudder Mistrim Left		- Check the AUX – SYSTEM STATUS page to see if the servo is online (green check). - Check that the affected servo is receiving power. - Check the servo wiring and connector. - If failure condition still exists, remove and replace the affected servo.
Rudder Mistrim Right		

Condition	Annunciation	Recommended Actions
Preflight Test		- Reset system power. - Allow the system to complete pre-flight tests. The preflight test should finish within 2 minutes. If it does not pass, the red 'PFT' annunciation is shown. In case of PFT failure, troubleshoot in the same manner as for the red 'AFCS' annunciation.
		

5.1.10.4 GFC 700 Pre-Flight Testing

This section was created to help determine why the GFC 700 has failed the Pre-Flight Test indicated by the red PFT annunciation, it defines the PFT sequence for the servos and the GFC 700 system and then provides troubleshooting information to help resolve failures. The PFT is performed by both GIA's at startup, and needs to pass on both GIA's before the autopilot can be engaged.

The PFT is only started if the AHRS has aligned, the GIA's and servos are configured and the certification gains are valid. If the PFT has not completed after one minute from when the initialization started, the PFT will fail. After the system PFT has passed, it will be performed again if a servo resets, if the autopilot servo breaker is reset or the cross side GIA restarts it. Generally, the PFT failure fault is logged in the GIA Maintenance Log and not in the Servo Maintenance Logs unless the GIA log fault identifies a servo problem.

NOTE

Thoroughly understanding the operation of the G1000 in Configuration mode is recommended before starting this procedure. The GFC Status Page may be used to check the status of the servos and engage them to aid in troubleshooting.

1. To access the GIA and GSA Maintenance Logs, perform the following steps:
2. Start the G1000 in Configuration mode.
3. Use the FMS knob on PFD1 to go to the Diagnostics Terminal page in the System group. This page allows the technician to view maintenance logs associated with the GFC 700.
4. Choose 'GIA 1' or 'GIA 2' in the LRU window.
5. In the SERVO window, choose 'NONE' to view the GIA Maintenance Log, or choose a servo to view their logs.
6. Using the FMS knob, choose 'VIEW MAINTENANCE LOG' in the COMMAND window.
7. Press the ENT key.
8. When the Maintenance Log data starts to display in the OUTPUT window, you may see "More...press any key to continue..." at the bottom of the OUTPUT window. This informs you there is more data to display and the system has paused allowing you to view the data before continuing. To see more of the data, reselect the "VIEW MAINTENANCE LOG" in the COMMAND window and press the ENT key. The "...press any key to continue..." function is not active at this time.
9. Scroll through the OUTPUT list by pressing the OUTPUT softkey.

The GIA Maintenance Log can record any of the following faults:

- FCS Task not started: Bad gains. The FCS task has not started because the gains are not present or have been corrupted. Reload the gain files to correct.
- FCS Task not started: Gain structure out of range. The FCS task has not started because the gains are not compatible with the GIA software. Reload the gain files to correct.
- PFT FAIL: Timeout, <STEP>. Pre-flight test has failed because the specified step has not passed in the allotted time. See the GIA pre-flight steps for a description of the possible values for <STEP> on the failed GIA and corrective actions.
- PFT FAIL: Cross GIA Failed, State: <STEP>. Pre-flight test has failed on opposite GIA. <STEP> specifies the pre-flight test step on selected GIA that was in progress when the pre-flight test failed on the opposite GIA. See the GIA pre-flight steps for a description of the possible values for <STEP> on the failed GIA and corrective actions.
- PFT FAIL: <STEP>. Pre-flight has failed because the step specified has failed. See the GIA pre-flight test steps for a description of the possible values for <STEP> on the failed GIA and corrective actions.
- AHRS MON invalid: <STATE>. The AHRS monitor has detected that the AHRS data is invalid. The possible values for <STATE> are:
 - Mon Prmtr Invalid: The ARINC 429 data used by one of the monitors has not been received.
 - Attitude Prmtr Invalid: The ARINC 429 pitch or roll angle has not been received.
 - Exceeded Attitude Limits: The pitch or roll angle has exceeded the engagement limits.
 - Cross Hdg Accel Fail: Cross heading acceleration monitor failed.
 - Vert Accel Fail: Vertical acceleration monitor failed.
 - Fltrd Cross Hdg Accel Fail: Filtered cross heading acceleration monitor failed.
 - Fltrd Vert Accel Fail: Filtered vertical acceleration monitor failed.
 - Roll Accel Fail: Roll acceleration monitor has failed.
 - Normal Accel Fail: Normal acceleration has failed. Troubleshoot the GRS 77 for the cause of the failure.
- Stuck switch invalidated parameter: <AXIS>. A MET switch in the specified axis is stuck. Check the MET (trim) switches for proper operation.
- PRMTR: <PARAMETER> MODE:<MODE> Parameter lost. The mode specified by <MODE> has been disengaged because the parameter specified by <PARAMETER> has become invalid. The following is a list of some of the possible values for <PARAMETER>:
 - a. AD TDM Comm Valid: The specified mode has been disengaged because communication with the servos, via the Time Division Multiplexer protocol, has been lost.
 - b. AP Pitch MET not stuck: The specified mode has been disengaged due to a stuck pitch MET switch.
 - c. Check the MET (trim) switches for proper identification.

GFC Pre-Flight Test Procedure

1. System initializing, verify GFC powered. This step checks to ensure the GFC is powered up. Ensure the GIA is connected to the autopilot disconnect on the GFC Configuration page. Ensure all configured servos are communicating on the System Status page.
2. System initializing, verify GIA audio is valid. This step checks to ensure the GIA audio region has been loaded and configured. Load GIA audio files to correct.
3. System initializing, verify required servos are configured. This step checks to ensure the current servo configuration matches the servo configuration specified in the certification gain file. Reload the gain files to correct.
4. System initializing, verify selected side. This step checks to ensure the PFD is online and sending the selected AFCS side data over HSDB to the GIA. Ensure the PFD is turned on. Ensure the Ethernet connection from the PFD to the GIA is functioning.
5. System initializing, verify AHRS monitor. This step checks to ensure the AHRS monitor is valid and not reporting an AHRS failure. NOTE: AHRS monitor will be assumed valid if on the ground. Ensure the GRS 77 and GDC 74B are turned on and sending valid data.
6. System initializing, verify configured servos are valid. This step checks to ensure that none of the servos are reporting any type of failure. Note that trim servos will report a failure on stuck MET switches. Ensure MET switch is not stuck. Cycle power on all servos.
7. System initializing, verify cross GIA valid. This step checks to ensure the cross-side GIA is online and communicating with all servos from ARINC 485 data lines. The cross-side GIA must also pass its AHRS monitoring. Ensure both GIAs are online and communicating with all servos.
8. Verify cross GIA initialized. This step checks to ensure the cross-side GIA is initialized. Cycle power on all servos and GIAs. Ensure the PFD1/2 and MFD are turned on.
9. Verify servo type. This step checks to ensure the servos are correct type. Verify servos are correct type.
10. Verify servo first certification data. This step checks to ensure the servos and the GIAs have the same certification gains. Reload the certification gains to all GIAs and servos.
11. Verify servo second certification data. This step checks to ensure the servos and the GIAs have the same certification gains. Reload the certification gains to all GIAs and servos.
12. Updating servo RTC. This step sets the servo system time to the GIA system time.
13. Verify servo PFT status. This step checks to ensure all servos have passed their own pre-flight test.
14. Verify AP disconnect enabled. This step checks to ensure GIA 1, GIA 2, and all servos are connected to the 28 volt autopilot disconnect. Ensure the autopilot disconnect is connected to all GIAs and servos and is registering 28 volts. Ensure the autopilot disconnect switch is not pressed.
15. Verify servo validity. This step checks to ensure all servos are online and communicating with valid data. Ensure all servos are turned on and communicating.
16. Verify cross GIA PFT is completed. This step checks to ensure the cross-side GIA is also on step 14. Cycle power on all servos and GIAs. Ensure the PFD1/2 and MFD are turned on.
17. PFT completed. The pre-flight test is successfully completed.
18. PFT failed. The pre-flight test has failed.

5.1.10.5 Servo Troubleshooting

Whenever a servo fault occurs, a status message is logged to the corresponding servo control or monitor maintenance log. This information is also accompanied by a time and date stamp. An "RTC DATE" entry is made every time a servo is powered on, it is normally not useful for troubleshooting.

The following is a listing of possible faults that could be reported in a GSA fault log. Faults can occur in either the monitor board processor or the control board processor, both of which are contained in the GSA unit.

Monitor Processor

The monitor processor contains the logs that are found in these processors:

- 2 - Pitch Servo
- 4 - Roll Servo
- 6 - Yaw
- 8 - Pitch Trim Servo
- 10 - Roll Trim Servo
- 12 - Yaw Trim Servo

There are two main groupings of faults that can occur in the monitor processor:

- a. The first grouping of faults can occur during the GSA unit pre-flight test (PFT). If there is a fault during PFT the unit will not be able to transition to normal mode and the only way to clear this state would be to cycle unit power.
- b. The second grouping of faults can occur during normal mode. These faults generally cause a disconnect of power to the GSA and report that a fault has occurred to the GIA.
- c. The Notes column indicates any actions that can be taken to troubleshoot the problem in the aircraft by the technician. Any faults that are not listed here indicate an internal problem requiring replacement of the servo. If the items in the Notes column check out ok, replace the servo.

PFT Faults

MONITOR PFT STEP	NOTES
"INTERNAL COMM FAIL"	This can sometimes be a result of a failure on the other internal servo board, check faults on the other processor
"UNSW POWER INV"	Check unit power
"MON SOL PWR ON FAIL"	Check unit power and AP Disconnect power
"CTL SOL PWR ON FAIL"	Check unit power and AP Disconnect power
"SOL PWR FAIL"	Check unit power and AP Disconnect power
"CERT DATA UNINSTALLED"	Upload the certification gain file to the Monitor board
"STRAP CODE MISMATCH"	Check the connector strap inputs to the unit

Normal Mode Faults

MONITOR FAULT	NOTES
"GIA DIS FAULT"	Check the AP Disconnect power into the unit
"HOST DATA DIF"	Check the AHRS wiring to the system
"HOST DATA INV"	Check the AHRS wiring to the system
"SVO PWR INV"	Check unit power and AP Disconnect power
"STRP CODE CHNG"	Check the connector strap inputs to the unit
"MET STUCK SWTCH"	Check the MET switch inputs into the system
"MET STATUS DIF"	Check the MET switch inputs into the system

Control Processor

The control processor contains the logs that are found in these processors:

- 3 - Pitch Servo
- 5 - Roll Servo
- 7 - Yaw
- 9 - Pitch Trim Servo
- 11 – Roll Trim Servo
- 13 – Yaw Trim Servo

There are two main groupings of faults that can occur in the control processor.

- a. The first grouping of faults can occur during the GSA unit pre-flight test (PFT). If there is a fault during PFT the unit will not be able to transition to normal mode and the only way to clear this state would be to cycle unit power.
- b. The second grouping of faults can occur during normal mode. These faults generally cause a disconnect of power to the GSA and report that a fault has occurred to the GIA.
- c. The Notes column indicates any actions that can be taken to troubleshoot the problem in the aircraft by the technician. Any faults that are not listed here indicate an internal problem requiring replacement of the servo. If the items in the Notes column check out ok, replace the servo.

PFT Faults

CONTROL PFT STEP	NOTES
"INT COMM TEST FAIL"	This can sometimes be a result of a failure on the other board, check faults on other processor
"CTL MOT PWR ON FAIL"	Check unit power and AP Disconnect power
"MON MOT PWR ON FAIL"	Check unit power and AP Disconnect power
"HALL 1 FAIL"	Check unit power and AP Disconnect power
"HALL 2 FAIL"	Check unit power and AP Disconnect power
"HALL 3 FAIL"	Check unit power and AP Disconnect power
"HALL 4 FAIL"	Check unit power and AP Disconnect power
"HALL 5 FAIL"	Check unit power and AP Disconnect power
"HALL 6 FAIL"	Check unit power and AP Disconnect power
"CURR OFFST FAIL"	Check unit power and AP Disconnect power
"SVO TYPE FAIL"	Check unit power and AP Disconnect power
"CERT DATA UNINSTALLED"	Upload the certification gain file to the Control board
"STRAP CODE MISMATCH"	Check the connector strap inputs to the unit

Normal Mode Faults

CONTROL FAULT	NOTES
"GIA DIS FAULT"	Check the AP Disconnect power into the unit
"HOST DATA DIF"	Check the AHRS wiring to the system
"HOST DATA INV"	Check the AHRS wiring to the system
"SVO PWR INV"	Check unit power and AP Disconnect power
"STRP CODE CHNG"	Check the connector strap inputs to the unit
"MET STUCK SWTCH"	Check the MET switch inputs into the system
"MET STATUS DIF"	Check the MET switch inputs into the system

5.1.10.6 GIA and GSA Maintenance Logs

If additional assistance is needed troubleshooting autopilot faults, the Maintenance logs can be downloaded to an SD card as a text file (.txt) and emailed to Garmin Aviation Product Support at avionics@garmin.com. Please call Garmin Aviation Product Support before you send a Maintenance Log to notify them you are sending it to prevent a delay in response. You may download multiple GIA and GSA Maintenance Logs to the same file, however in your email to Garmin you must furnish the order in which they were downloaded (i.e. GIA1, then GIA2, then SRVO PTCH MON, then SRVO PTCH CTL, etc.).

1. Insert a FAT 32 formatted SD card into the top slot of the PFD1 before turning on the displays.
2. Power up PFD1/2 and MFD in the configuration mode.
3. On the PFD1 in the System page group, use the small FMS knob to scroll to the Diagnostics Terminal page.
4. Press the LG2CRD softkey at the bottom of the PFD1. Verify that the softkey text grays out. This indicates the recording function is active and all text that is displayed in the OUTPUT window will be saved to the card.
5. Enable the cursor by pressing the FMS knob, select "GIA1" in the LRU drop down menu and then press the ENT key to select it.
6. Skip the SERVO box and move the cursor to the COMMAND box and select "View Maintenance Log" in the drop down menu then press the ENT key. The error log data will be displayed in the OUTPUT box. If you see the "more...press any key to continue" text at the bottom of the screen, you may need to reselect "View Maintenance Log" for GIA data to allow it to continue scrolling down the screen (pressing any key will not continue, disregard the text instruction you to do so). Continue to scroll through all the OUTPUT data until you see the text, "End of Fault Log".
7. Move the cursor back to the LRU box, select "GIA2" in the LRU drop down menu and then press the ENT key to select it.
8. Skip the SERVO box and move the cursor to the COMMAND box and select "View Maintenance Log" in the drop down menu then press the ENT key. The error log data will be displayed in the OUTPUT box. If you see the "more...press any key to continue" text at the bottom of the screen, you may need to reselect "View Maintenance Log" for GIA data to allow it to continue scrolling down the screen (pressing any key will not continue, disregard the text instruction you to do so). Continue to scroll through all the OUTPUT data until you see the text, "End of Fault Log".
9. If you need to download Servo fault logs (usually done at the request of Garmin Product Support), perform the following steps. Otherwise, skip to step 10.
10. In the LRU box, you may select either "GIA1" or "GIA2".
11. In the SERVO box, choose a servo using the FMS knobs. Each servo contains two logs, one in the Monitor (MON) processor and one in the Control (CTL) processor. You must download both for each servo separately.
12. In the COMMAND box, select "View Maintenance Log" and press the ENT key.
13. The log will appear in the OUTPUT box. It will scroll to the end automatically. When it is complete, repeat steps a-c for the other servos in the aircraft. Be sure to note the order the servos were downloaded in including the Monitor or Control logs to email to Garmin Product Support. Without knowing the order in which the logs were downloaded, Garmin will be unable to process them and will ask for another full download.
14. Press the LG2CRD softkey to turn off the recording function.

15. Wait 1 minute for the system to save the data from the download to the SD card.
16. While you are waiting for the data to be saved to the SD card, record the order of the LRU's and/or Servos were downloaded so that you can provide that information to the OEM or Garmin to help decipher the order of the error data.
17. Power down the G1000 and remove the SD card.
18. Insert the SD card in the card reader of a laptop or desktop computer and open the "diag_buf_log.txt" file from the SD card using the WordPad program. Verify that all of the fault logs were downloaded by checking for the "End of Fault Log" message at the end of the GIA data, and that the last servo log entry has the current date.

Insert the fault log as an attachment to an email and include the LRU order how the data was downloaded and send to Garmin Aviation Product Support at avionics@Garmin.com.

5.2 CALIBRATION PROCEDURES

5.2.1 GDC 74B Calibration Procedure

This procedure discusses the use of the GDC 74B Field Calibration Utility (software; P/N T06-A0156-00) to adjust the calibration of GDC 74B LRUs that have failed the 14 CFR Part 43 Appendix E tests due to altitude drift or have failed the ICA limits for RVSM certification.

Both the GDC 74B Field Calibration Utility and the GDC 74B Field Calibration Instructions (190-00303-82) can be downloaded from the dealer resource section of the Garmin website at www.garmin.com. First download the GDC 74B Field Calibration Instructions Document, then follow the steps listed in that document to download and run the GDC 74B Field Calibration Tool.

5.2.1.1 Limitations

The following limitations should be noted:

- a. These procedures should be performed at room temperature on the bench and not in the aircraft.
- b. The Field Calibration Utility should only be used to correct errors due to altitude drift. If the drift is greater than the limits defined in the utility at any of the test points, the utility will not allow the calibration to continue and the GDC 74B must be returned to Garmin.
- c. If the GDC 74B unit does not pass 14 CFR Part 43 Appendix E and the RVSM limits for ICA that apply to the GDC 74B after the calibration utility has been run, the GDC 74B unit should be returned to Garmin.

5.2.1.2 Required Equipment

The following equipment is required to perform calibration.

- a. GDC 74B LRU
- b. Power supply capable of producing 14/28V at 500 mA.
- c. PC with a Serial Port or serial port adapter
- d. Pressure control system capable of generating the correct static pressures for zero feet, 11,000 feet, 30,000 feet, and 41,000 feet.

NOTE

Field calibration of GDC 74B requires a pressure control system with altitude accuracy equal to or better than ± 5 feet at sea level, ± 15 feet at 30,000 feet, and ± 15 feet at 41,000 feet. The pressure control system must control altitude automatically.

- e. Fabricate a cable built to interface a GDC 74B to a PC Serial Port (see Figure 5-43). The cable is not available from Garmin.

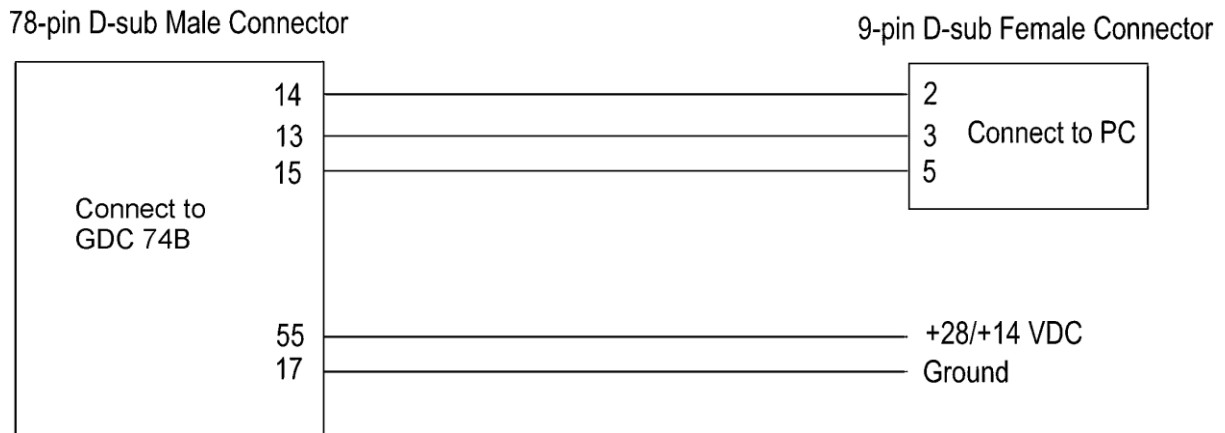


Figure 5-43. GDC 74B PC Interface Cable

5.2.1.3 Software Installation

Before beginning the procedure, the utility must be downloaded from the Garmin website.

1. Enter the dealer resource portion of the Garmin website (www.garmin.com).
2. From the technical resource list, click on the link for the GDC 74B Field Calibration Utility.
3. Follow the instructions to save the file to the PC (it is recommended to create a folder 'C:\Garmin' as a target directory for the file).

NOTE

Set the airspeed to zero (or unset) during calibration. If the airspeed is >80 knts, SSEC corrections start to apply and could change the results.

5.2.1.4 Procedure

1. Connect the GDC 74B to the pressure control system.
2. Connect the GDC 74B to the PC serial port using the interface cable (Figure 5-43).
3. Connect the interface cable to the power supply (Figure 5-43).
4. Power on the GDC 74B and the pressure control system.
5. Set the pressure control system to a pressure altitude of 40,000 feet and determine that leakage is less than 140 feet per minute.
6. Run GDC_FieldCal.exe.
7. Click on 'Begin Field Calibration'.

NOTE

The GDC 74B Field Calibration utility requires that the GDC 74B and the pressure control system be powered on for a minimum of 20 minutes before calibration.

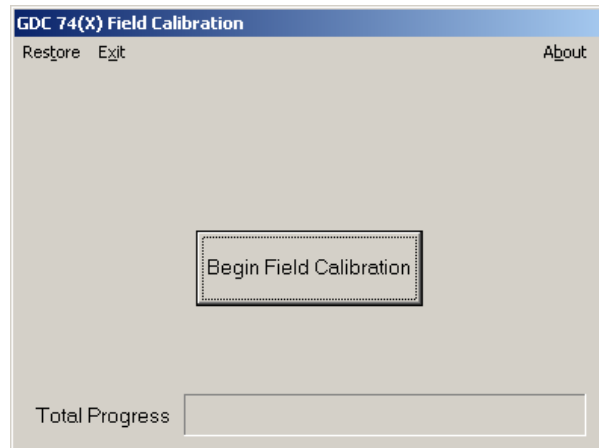


Figure 5-44. GDC 74B Field Calibration Utility, Main Page

8. Select the Serial Port on the PC that will be used to communicate with the GDC 74B and click 'OK'.

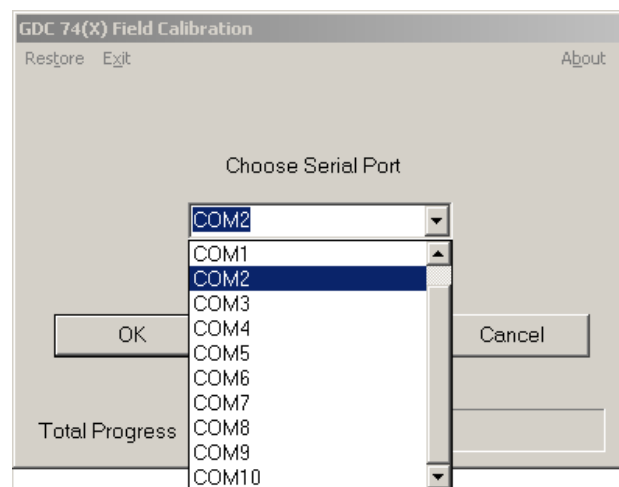


Figure 5-45. Serial Port Pull-Down List

9. After communication with the GDC 74B is established, the 'Full Backup' screen appears while a full backup of the original unit setting is saved to a file named BKUP_(serial_num)_YYYYMMDD_HHMMSS.txt. This file can be used (by Garmin) to restore the unit to the original settings if necessary.
10. After the full backup file has been created, the 'Prepare To Take Measurements' screen is displayed while the program retrieves the unit type from the GDC 74B.
11. After the unit type has been determined, the 'Set altitude to 0 ft' screen (Figure 5-46) appears.
12. Set the pressure control system to a pressure altitude of 0 feet according to the on-screen instructions.
13. Allow the on-screen altitude reading to stabilize, then click 'OK'.
14. After the 0 feet calibration is complete, the 'Set altitude to 11,000 ft' screen is displayed.
15. Set the pressure control system to a pressure altitude of 11,000 feet.

16. Allow the on-screen altitude reading to stabilize, then click 'OK'.
17. After the 11,000 feet calibration is complete, the 'Set altitude to 30,000 ft' screen is displayed.
18. Set the pressure control system to a pressure altitude of 30,000 feet.19. Allow the on-screen altitude reading to stabilize, then click 'OK'.
19. After the 30,000 feet calibration is complete, the 'Set altitude to 41,000 ft' screen is displayed.
20. Set the pressure control system to a pressure altitude of 41,000 feet.
21. Allow the on-screen altitude reading to stabilize, then click 'OK'.
22. After the altitude calibrations are complete, the 'Program Calibration to Unit?' screen (Figure 5-46) appears. Click 'OK' to program the new calibration to the GDC 74B unit.

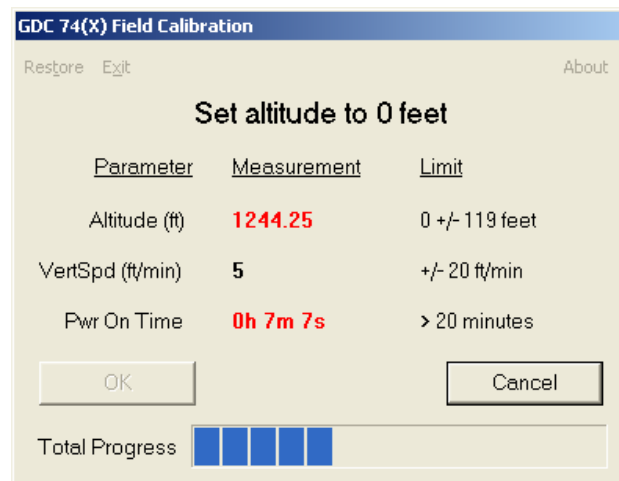


Figure 5-46. '0 Feet' Calibration Screen

NOTE

If any of the three measurements (Altitude, Vertical Speed, Power On Time) are outside of their respective displayed limits, the displayed measurement will appear in red, and the 'OK' button will be unavailable (grayed-out). If successful calibration is not achievable, clicking 'Cancel' will halt the program and produce the below popup message.

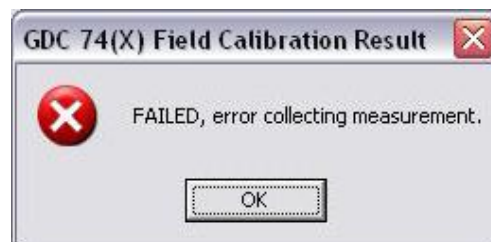


Figure 5-47. 'Calibration Failed' Screen

NOTE

Before the new calibration is written to the unit, the program stores the current calibration to a file named CAL_(serial_num)_YYYYMMDD_HHMMSS.txt that can be used to restore the original calibration back to the unit if needed.

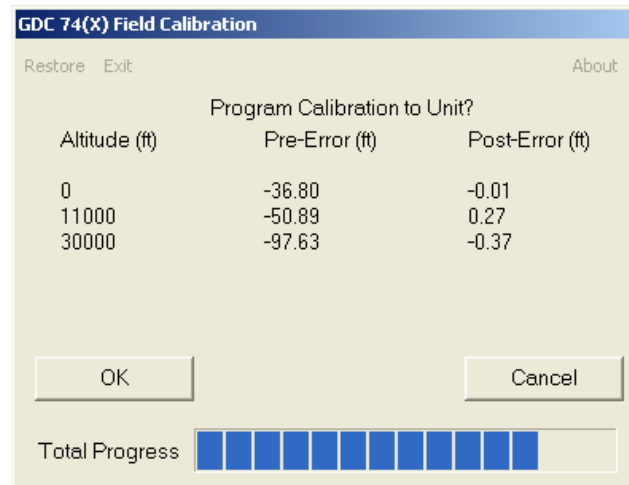


Figure 5-48. 'Program Calibration to Unit' Screen

23. Ensure that the pop-up cal result window shows 'PASSED', press 'OK' to confirm message.

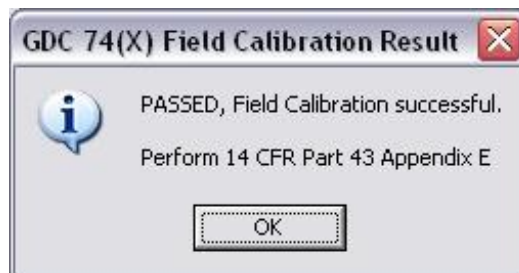


Figure 5-49. 'Field Calibration Result' Screen

24. Return the pressure control system to ambient pressure before disconnecting the pitot and static lines from the GDC 74B.
25. Click on 'Exit' in the upper left corner to exit the program.
26. The Field Calibration is now completed. The unit may be installed in the aircraft (per the instructions in this manual) to perform the operational system testing portion of 14 CFR Part 43 Appendix E and also the RVSM levels.

5.2.1.5 Restore Original Calibration

If needed, the original calibration can be restored to the unit using the following steps.

1. Run GDC_FieldCal.exe.
2. Select 'Restore' from the upper left-hand corner of the page.
3. Select the CAL_(serial_num)_YYYYMMDD_HHMMSS.txt calibration file to restore to the unit and click 'Open'.

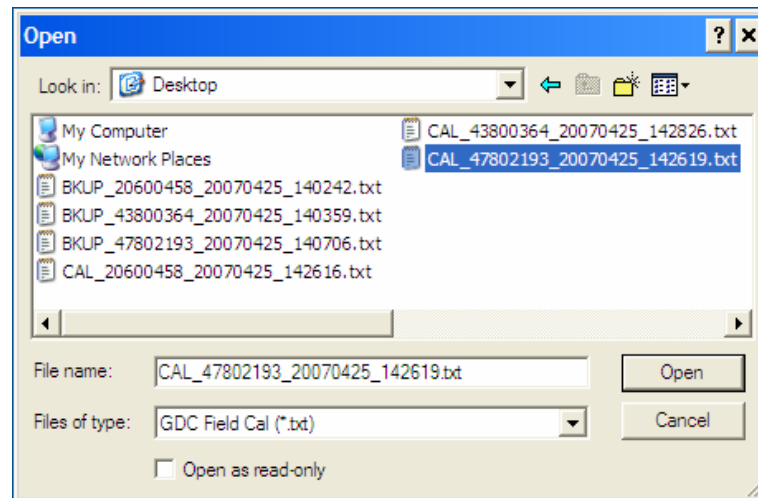


Figure 5-50. Calibration Files Screen

4. Select the Serial Port on the PC that will be used to communicate with the GDC 74B, and click 'OK'. A progress bar screen appears while the calibration is being restored to the unit.
5. If restoration is successful, the screen will display 'Completed' before returning to the main entry screen.
6. Click on 'Exit' in the upper left corner to exit the program.
7. The original calibration is now restored, the unit may be installed in the aircraft (per the instructions in this manual) to perform the operational system testing portion of 14 CFR Part 43 Appendix E and also the RVSM levels.

5.2.1.6 Calibration File Storage

Save copies of the calibration (BKUP and CAL) files for permanent storage. These files are located in the C:\Garmin directory, or in the same directory where the GDC_FieldCal.exe file resides. E-mail copies of these files to avionics@garmin.com. Please enter "GDC 74B Field Calibration Data" in the subject line, as shown in Figure 5-51.

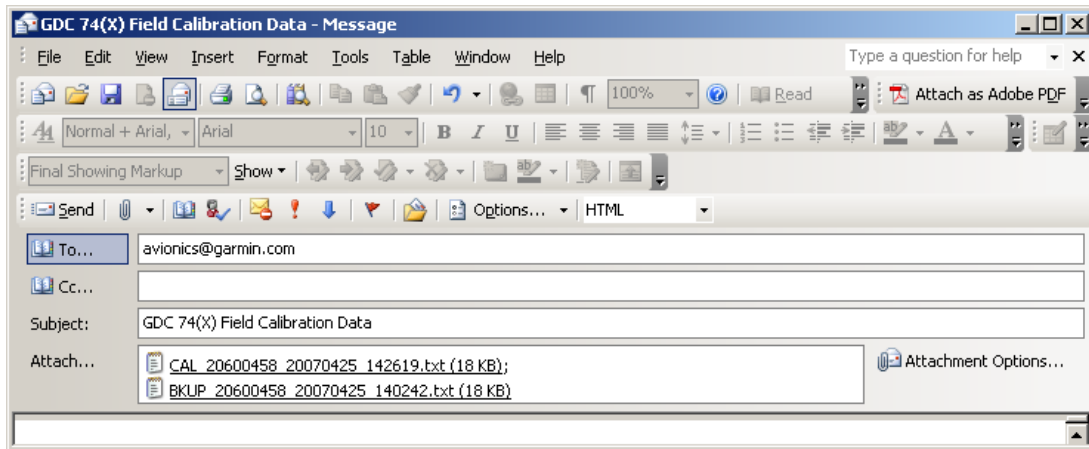


Figure 5-51. Post-Calibration Email Example

5.2.1.7 Software Version

To display the software version of the GDC 74B Calibration Utility follow these steps:

1. Click on 'About' in the upper right hand corner of the program, the software version is displayed.

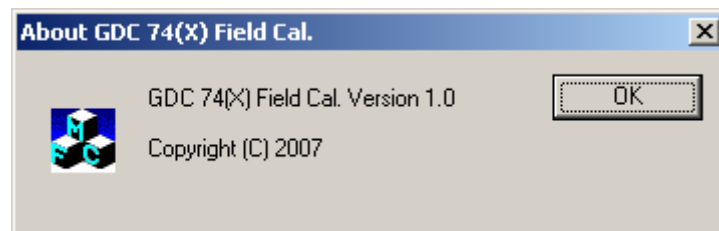


Figure 5-52. The 'About' Screen

2. Click 'OK' to return to previous screen.

5.2.2 GEA 71 Standby Battery High-Side Current Monitor Calibration Procedure

This procedure may or may not be required depending on the specific OEM requirements. Consult the OEM Maintenance Manual for instructions on using this page.

HSCM CALIBRATION

GEA / CHANNEL

HSCM ENABLED GEA
GEA1

HSCM ENABLED GEA I/O A CHANNEL
1A

CONFIGURED INPUT TYPE
BATT AMPS 1

CURRENT DATA

VALUE
-0.58492

CURRENT OFFSET
0.00000

CURRENT CORRECTED VALUE
-0.58492

CALIBRATION DATA

VALUE
-0.58492

CALIBRATION OFFSET
0.58492

CALIBRATION CORRECTED VALUE
0.00000

CAUTION: Ensure the selected HSCM circuit has voltage applied, but no current flowing through it.

SYSTEM GDU GIA GEA GTX GRS GDC GFC GMA GDL RMT GWX CAL □ □ ■

STORE

Figure 5-53. HSCM Calibration Page

5.3 BACKPLATE CONNECTORS

The following figures depict the physical locations of the Backplate Connectors viewed with the LRU removed. Pin numbers are included in the illustrations.

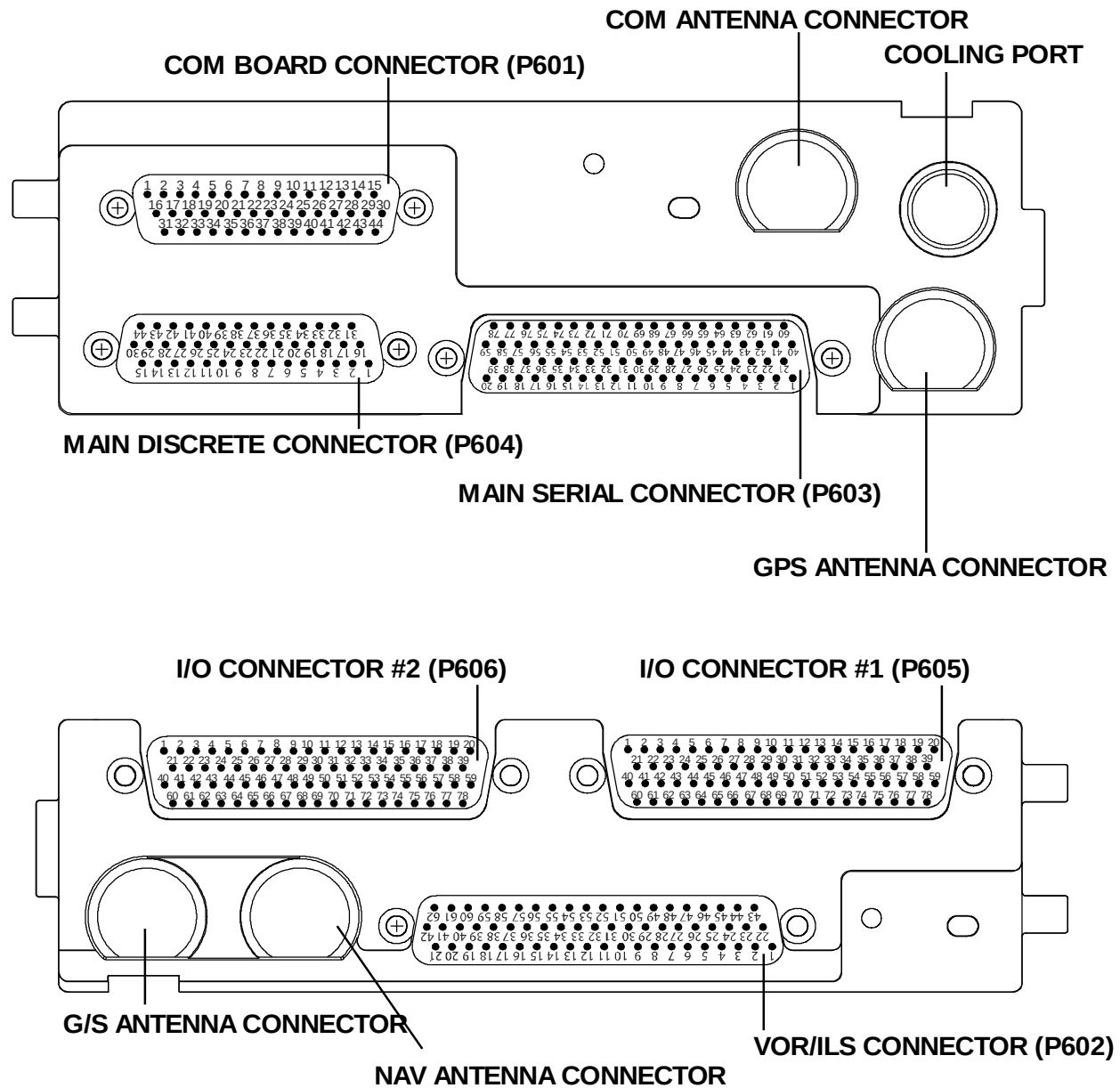


Figure 5-54. GIA 63W Backplate Connectors

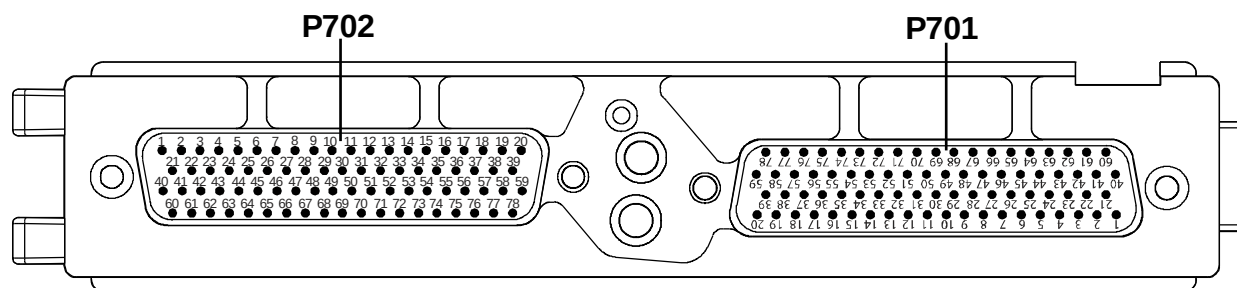


Figure 5-55. GEA 71 Backplate Connectors

NOTE

The GSD 41 Backplate is similar to the GEA 71 Backplate (Figure 5-55). The only difference is the Keyplate (Figure 5-56). The GSD 41 Backplate contains the "B" Keyplate, the GEA 71 Backplate contains the "A" Keyplate. Refer to the GSD 41 Installation Manual (P/N 190-00303-00), and the G1000 Installation Manual (190-00303-00) for more information.

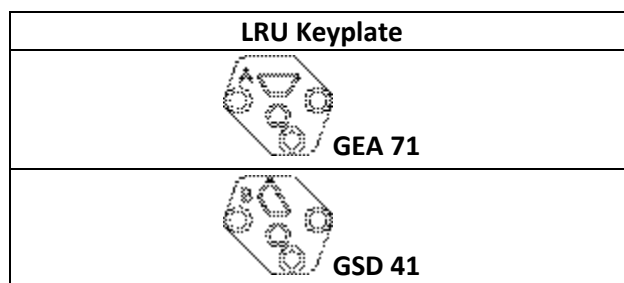


Figure 5-56. GSD 41 Keyplate Information

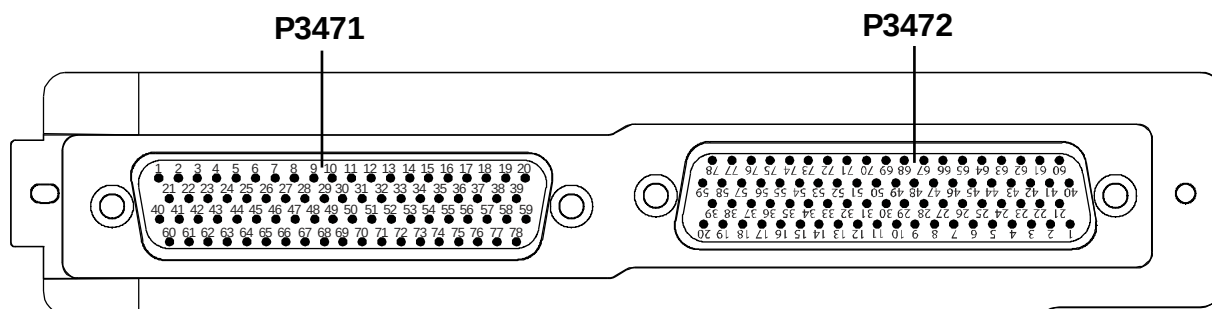


Figure 5-57. GMA 1347D Backplate Connectors

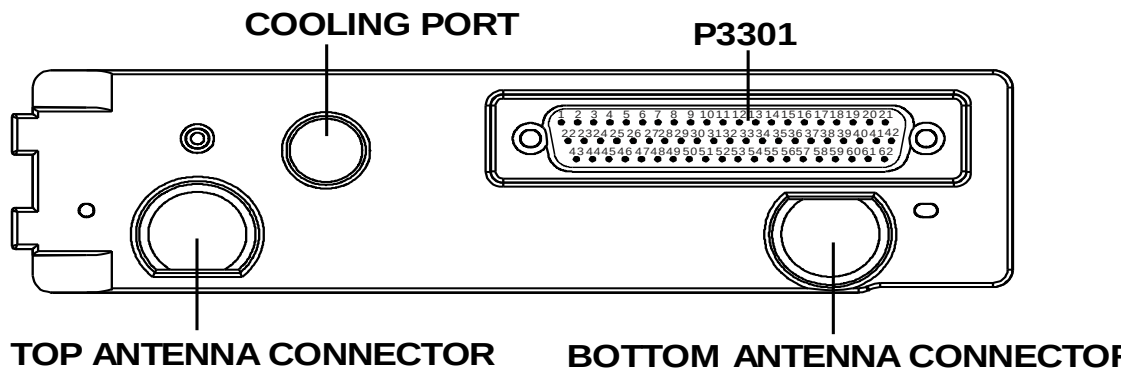


Figure 5-58. GTX 33/33D Backplate Connectors

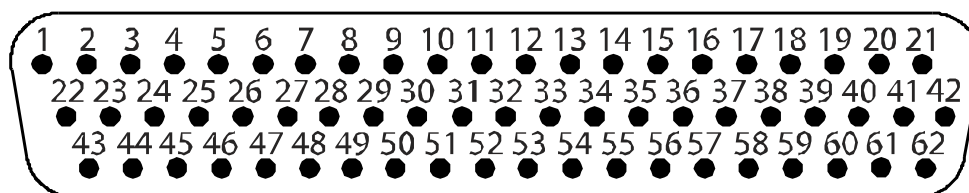


Figure 5-59. GDU 1040A/1500 Backplate Connector (P10001)

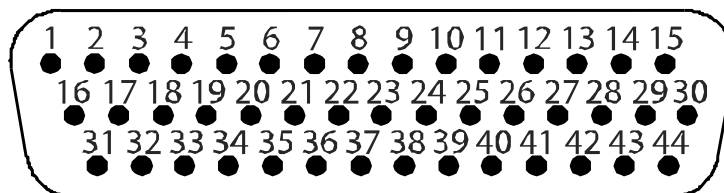


Figure 5-60. GRS 77 Backplate Connector (P771)

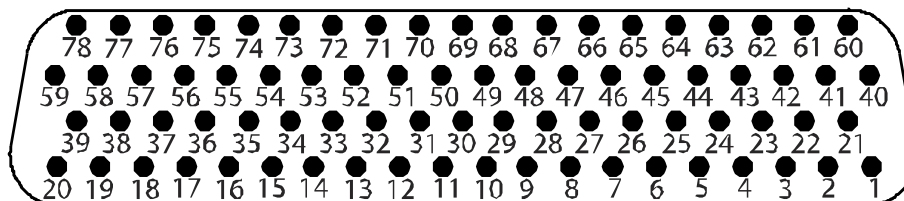


Figure 5-61. GDC 74B Backplate Connector (P741)

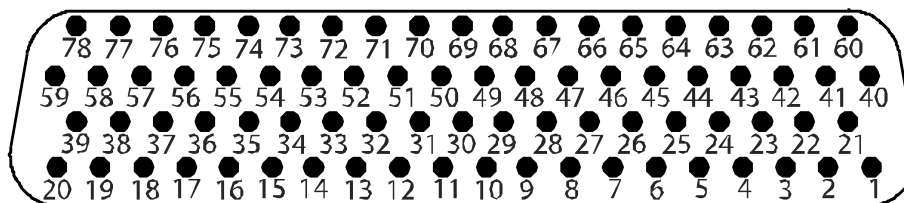


Figure 5-62. GDL 69A Backplate Connector (P691)

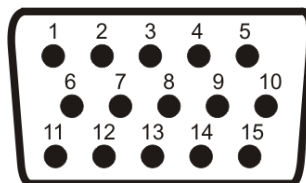


Figure 5-63. GCU 475 Backplate Connector (P4751)

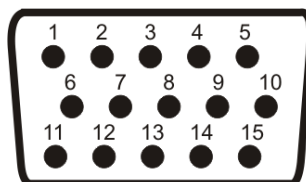


Figure 5-64. GMC 710 or GMC 715 Backplate Connector (P7101)

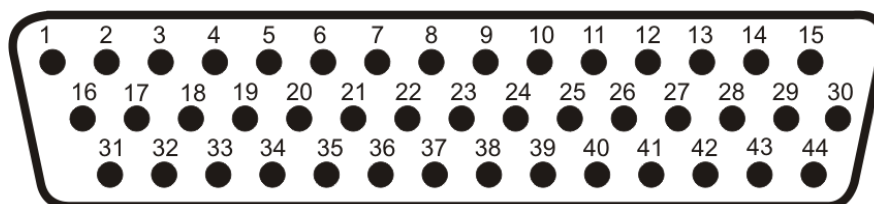


Figure 5-65. GWX 68 Backplate Connector (P400)

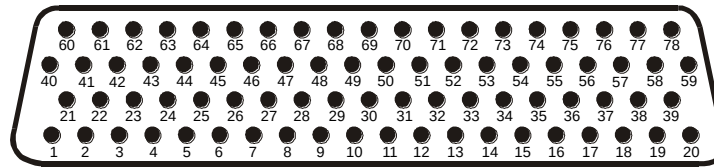


Figure 5-66. GSD 41 Backplate Connector (P411)

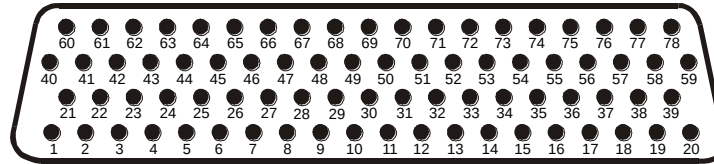


Figure 5-67. GSD 41 Backplate Connector (P412)

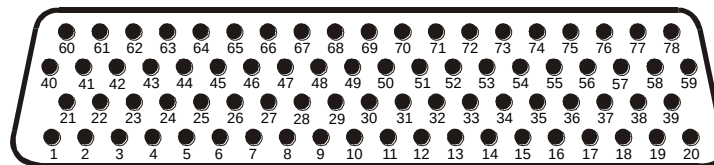


Figure 5-68. GTS 8XX Backplate Connector P8001 (Digital)

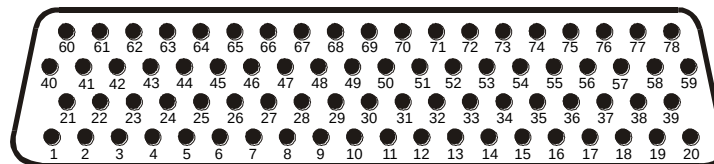


Figure 5-69. GTS 8XX Backplate Connector P8002 (Analog/Discrete)

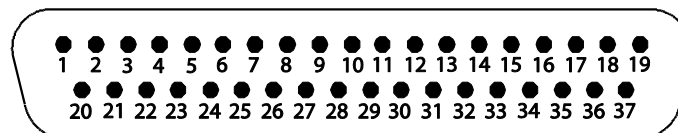


Figure 5-70. GTS 8XX Backplate Connector P8003 (Power Supply)

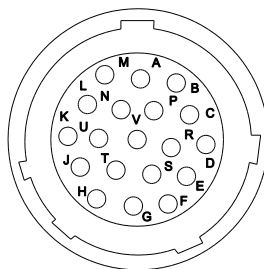


Figure 5-71. GPA 65 Backplate Connector P651

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SECTION 6

LRU REPLACEMENT PROCEDURES

This section contains general replacement procedures for a defective LRU. Refer to the installation and outline drawings in each LRU installation manual for detailed installation/removal procedures.

6.1 ACCESSING LRUs

The G1000 mounting system is designed to simplify the installation, removal, and servicing of G1000 LRUs. The system typically consists of a main system rack, LRU racks, a cable harness protection system (CHiPS) harness assembly, and any required cooling accessories or other structural supports mounted behind the instrument panel. Typically, the PFD and MFD mount to the instrument panel cutout directly in front of the main system rack. In this way, LRUs are quickly accessible by removing and disconnecting the display.

Before removing an LRU, verify its software part number and version against the software configuration listed in the required equipment list.

To check an LRU software part number and/or version:

1. Start the G1000 in configuration mode.
2. The system status page (Figure 6-1) displays a list of LRUs in the LRU window. Activate the cursor and use the FMS knob to scroll through the list in the window and select the displayed LRUs.
3. The software part number and version is displayed in the data window. Compare this to the software configuration in the required equipment list.
4. If a faulty LRU is not reporting its software version and part number, check aircraft maintenance logs for the last software version that was loaded and verify it against the required equipment list. The software manifest page can also be used to check part numbers and versions.

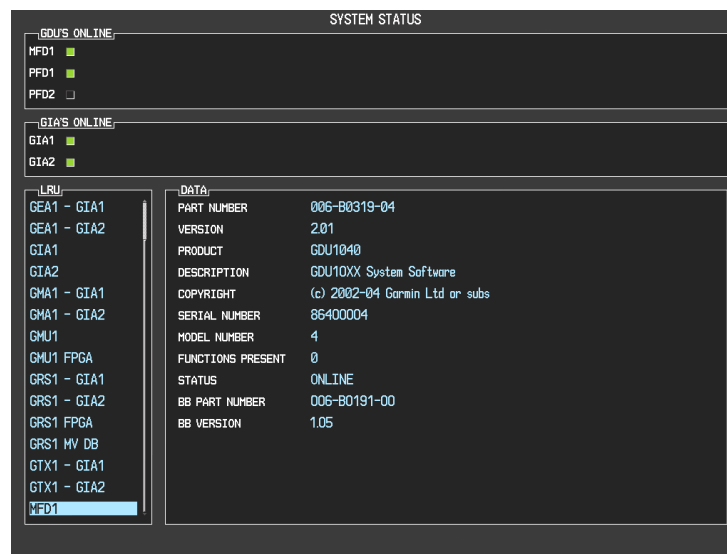


Figure 6-1. System Status Page (Configuration Mode)

6.2 GDU 1XXX Display (includes all 10, 12 and 15 inch displays)

To remove:

1. Turn each of the four or six locking sockets one quarter turn counterclockwise until they reach their stops using a 3/32" hex drive tool.
2. Gently pull the display out of the panel being careful not to drop it. The display is about 3 inches long.
3. Remove the connector from the back of the unit by pushing the slide lock tab on the side of the connector to release it and pull the connector away from the unit.
4. Remove and save any SD cards for installation in the replacement display.

To install:

1. Inspect the wire harness connector for damaged pins.
2. Attach the connector to the front of the unit by pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **The locking tabs must be engaged on both ends of the connector.**
3. Hold the GDU flush with the instrument panel and making sure the locking stud alignment marks are in the vertical position.
4. Turn each of the four or six locking sockets one quarter turn clockwise using a 3/32" hex drive tool (this may require applying a small amount of forward pressure to engage the quarter turn sockets).
5. Install unit software and configuration files according to the information in Section 7.

6.3 GMA 1347

To remove:

1. Insert a 3/32" hex drive tool into the access hole on the unit face and rotate counterclockwise until the unit can be freely pulled from the rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Insert a 3/32" hex drive tool into the access hole and rotate the mechanism 90° counterclockwise to insure correct position before placing the unit in the rack.
3. Gently push the unit into the rack and engage the connectors.
4. Insert a 3/32" hex drive tool into the access hole and rotate the mechanism clockwise until the unit is firmly seated in the rack. Avoid excessive tightening.
5. Install unit software and configuration files according to the information in Section 7.

6.4 GIA 63/GIA 63W

To remove:

1. Loosen Phillips screw to unlock unit handle.
2. Pull the GIA lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.
3. Slide the unit out of the rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Lift the unit handle, gently push the unit into the rack and engage the connectors.
3. Push the GIA lever down towards the bottom of the unit. Avoid excessive force.
4. If lever fails to go down with moderate pressure, stop and make sure the floating backplates in the rack can move to align itself with the unit upon insertion. In extreme cases, the wire harness going to the connectors may need to be pressed up or down to allow the backplate to slide and align.
5. Lock the handle into the GIA body and tighten the Phillips screw.
6. Install unit software and configuration files according to the information in Section 7.

6.5 GRS 77

To remove:

1. Remove the connector from the front of the unit by pushing on the slide lock tab on the side of the connector to release it and then pull the connector away from the unit.
2. Loosen four screws holding the unit to the mounting rack (do not loosen mounting rack bolts).

To install:

1. Inspect wire harness connector for damaged pins before installing the new unit.
2. Fasten unit to mounting rack using a screwdriver. Hand tightening the knurled nuts is insufficient.
3. Attach connector to the front of the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **The locking tabs must be engaged on both ends of the connector.**
4. Install unit software and configuration files according to the information in Section 7.

6.6 GMU 44

NOTE

Do not use a magnetic screwdriver or steel screws to mount the GMU44 or the cover plate.

To remove:

1. Loosen three screws connecting the unit to the aircraft mounting plate.
2. Disconnect cable.

To install:

1. Inspect wire harness connector for damaged pins before installing the new unit.
2. Connect cable making sure it is properly secured.
3. Fasten unit to the aircraft mounting rack.
4. Install unit software and configuration files according to the information in Section 7.

6.7 GDC 74B

To remove:

1. Loosen two thumb screws securing unit to the mounting rack.
2. Remove the connector from the back of the unit by pushing on the slide lock tab on the side of the connector to release it and then pull the connector away from the unit.
3. Disconnect the pitot static plumbing from unit.
4. Remove all Teflon tape or sealing compound. **Be careful not to allow the Teflon™ tape or sealing compound to fall inside unit.**

To install:

1. Inspect wire harness connector and pitot-static plumbing for damage before installing new unit.
2. Connect the pitot-static plumbing to the unit.
3. Attach connector to the back of the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **The locking tabs must be engaged on both ends of the connector.**
4. Slide the unit fully into the rack.
5. Install the locking bracket and tighten the two thumb screws that secure unit to the mounting rack.
6. Install unit software and configuration files according to the information in Section 7.

6.8 GEA 71

To remove:

1. Loosen the Phillips screw to unlock unit handle.
2. Pull the GEA 71 lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.
3. Slide the unit out of the rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Pull the handle up, then gently push the unit into the rack and engage the connectors.
3. Push the GEA 71 lever down towards the bottom of the unit. **Avoid excessive force.**
4. If the lever fails to go down with moderate pressure, stop and make sure the floating backplate in the rack can move to align itself with the unit upon insertion. In extreme cases, the wire harness going to the connectors may need to be pressed up or down to allow the backplate to slide and align.
5. Lock the handle into the GEA 71 body and tighten the Phillips screw.
6. Install unit software and configuration files according to the information in Section 7.

6.9 GTX 33

To remove:

1. Loosen the Phillips screw to unlock unit handle.
2. Pull the GTX 33 lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.
3. Slide the unit out of the rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Pull the handle up, then gently push the unit into the rack and engage the connectors.
3. Push the GTX 33 lever down towards the bottom of the unit. **Avoid excessive force.**
4. If lever fails to go down with moderate pressure, stop and make sure the floating backplate in the rack can move to align itself with the unit upon insertion. In extreme cases, the wire harness going to the connectors may need to be pressed up or down to allow the backplate to slide and align.
5. Lock the handle into the GTX 33 body and tighten the Phillips screw.
6. Install unit software and configuration files according to the information in Section 7.

6.10 GDL 69/69A

To remove:

1. Loosen the Phillips screw to unlock unit handle.
2. Pull the GDL lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.
3. Slide the unit out of rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Pull the handle up and gently push the unit into the rack engaging the connectors.
3. Push the GDL lever down towards the bottom of the unit. Avoid excessive force.
4. If lever fails to go down with moderate pressure, stop and make sure the floating backplate in the rack can move to align itself with the unit upon insertion. In extreme cases, the wire harness going to the connectors may need to be pressed up or down to allow the backplate to slide and align.
5. Lock the handle into the GDL body and tighten the Phillips screw.
6. Install unit software and configuration files according to the information in Section 7.

6.11 GDL 90

To remove:

1. Turn the DZUS fastener on the front bottom of the unit counter clockwise $\frac{1}{4}$ turn to unlock the unit.
2. Slide the unit out of rack.

To Install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Gently push the unit into the rack engaging the connectors.
3. Turn the DZUS fastener on the front bottom of the unit clockwise $\frac{1}{4}$ turn to lock in the unit. Do NOT use the DZUS fastener to draw the unit into the rack, damage may result.
4. Configure unit according to GDL90 Installation manual P/N 560-1049-02.

6.12 GSA 80/81

To remove:

1. Disconnect the GSA connector.
2. Loosen and remove the servo attachment bolts using a socket or open-wrench.
3. Carefully remove the servo and place a protective cover on the output gear.
4. Place a protective cover over the GSM 85(A).

To install:

1. Inspect the output gear for abnormal wear and the absence of grease.
2. Carefully place the servo into the capstan, ensuring proper orientation and alignment. Units will be flush when properly seated. No gap should be present. Do not tighten mounting bolts if a gap is present or GSM 85(A) damage will occur requiring replacement.
3. Fasten the servo to the capstan using the existing hardware.
4. Inspect the backshell assembly and connector for damaged pins.
5. Connect backshell assembly to the unit.
6. Install unit software and configuration files according to the information in Section 7.

6.13 GSM 85(A)

NOTE

If GSM 85(A) removal and installation instructions are present in the OEM Maintenance Manual, follow those instead of this section.

To remove:

1. Remove the GSA 80/81 Servo Motor according to Section 6.10.
2. Refer to the OEM Maintenance Manual instructions to de-rig the flight control cabling or chain.
3. Use a socket or open-wrench to loosen and remove the servo attachment bolts.
4. Carefully remove the servo mount.

To install:

1. Verify the unit has been set to the correct torque value according to the OEM Maintenance Manual.
2. Follow the installation instructions in the OEM Maintenance Manual or respective Garmin servo installation drawing.
3. Reinstall the GSA 80/81 Servo motor according to Section 6.10.
4. No software or configuration file loading is required for the GSM 85(A) units as they do not contain electronics.

6.14 GSD 41

To remove:

1. Loosen the Phillips screw to unlock unit handle.
2. Pull the GSD lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.
3. Slide the unit from rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Pull the handle up and gently push the unit into the rack engaging the connectors.
3. Push the GSD 41 lever down towards the bottom of the unit. Avoiding excessive force.
4. If lever fails to go down with moderate pressure, stop and make sure the floating backplate in the rack can move to align itself with the unit upon insertion. In extreme cases, the wire harness going to the connectors may need to be pressed up or down to allow the backplate to slide and align.
5. Lock the handle into the GSD 41 body and tighten the Phillips screw.
6. Install unit software and configuration files according to the information in Section 7.

6.15 GRT 10

To remove:

1. Remove the connector from the back of the unit by pushing on the slide lock tab on the side of the connector to release it and then pull the connector away from the unit.
2. Remove the four mounting screws that hold the unit to the aircraft structure.

To install:

1. Inspect the wire harness connector for damaged pins before installing unit.
2. Install the unit to the aircraft structure with four screws.
3. Attach the connector to the back of the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **The locking tabs must be engaged on both ends of the connector.**
4. Match the RF frequency with the remote (GRC 10) by following the instructions in the GDL69 Installation Manual, P/N 190-00355-02.

6.16 GDL59

To remove:

1. Loosen the Phillips screw and unlock the unit handle.
2. Pull the GDL lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.
3. Slide the unit out of rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Pull the handle up and gently push the unit into the rack engaging the connectors.
3. Push the GDL lever down towards the bottom of the unit. Avoid excessive force.
4. If lever fails to go down with moderate pressure, stop and make sure the floating backplate in the rack can move to align itself with the unit upon insertion. In extreme cases, the wire harness going to the connectors may need to be pressed up or down to allow the backplate to slide and align.
5. Lock the handle into the GDL body and tighten the Phillips screw.
6. Install unit software and configuration files according to the information in Section 7.

6.17 GSR 56

To remove:

1. Turn the ratchet mechanism located at the front of the unit counter clockwise until it drops free of the locking pawl on the unit.
2. Slide the unit out of rack.

To install:

1. Inspect the rack connectors for damaged pins before installing the new unit.
2. Gently push the unit into the rack engaging the connectors.
3. Lift the ratchet mechanism to allow the collar to engage the locking pawl on the unit and turn it clockwise.
4. If ratchet mechanism does not turn with moderate force, stop and make sure the unit is aligned in the rack and there is no blockage (i.e. FOD in the rack).
5. The GSR56 does not require software or configuration loading if replaced. Instead, Garmin and/or Iridium need to be contacted to establish service with the new unit.

6.18 GCU 47X (includes the 475, 476 and 477)

To remove:

1. Turn each of the four locking sockets one quarter turn counterclockwise until they reach their stops using a 3/32" hex drive tool.
2. Pull unit up gently to remove unit from the panel.
3. Remove the connector from the back of the unit by pushing on the slide lock tab on the side of the connector to release it and then pull the connector away from the unit. If the unit connector uses thumb screws instead of a slide lock, they must be disconnected on both sides.

To install:

1. Inspect wire harness connector for damaged pins before installing the new unit.
2. Attach connector to the back of the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **Locking tabs must be engaged on both ends of the connector.** If the unit connector uses thumb screws instead of a slide lock, they must be tightened on both sides securely.
3. Install and hold the unit flush with the instrument panel and ensure that locking stud alignment marks are in the vertical position.
4. Turn each of the four locking sockets one quarter turn clockwise using a 3/32" hex drive tool (this may require applying a small amount of forward pressure to engage the quarter turn sockets).
5. Install unit software and configuration files according to the information in Section 7.

6.19 GMC 71X (includes the 710 and 715)

To remove:

1. Turn each of the four locking sockets one quarter turn counterclockwise until they reach their stops using a 3/32" hex drive tool.
2. Pull unit out gently to remove unit from the panel.
3. Remove the connector from the back of the unit by pushing on the slide lock tab on the side of the connector to release it and then pull the connector away from the unit. If the unit connector uses thumb screws instead of a slide lock, they must be disconnected on both sides.

To install:

1. Inspect wire harness connector for damaged pins before installing the new unit.
2. Attach connector to the back of the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **Locking tabs must be engaged on both ends of the connector.** If the unit connector uses thumb screws instead of a slide lock, they must be tightened on both sides securely.

3. Install and hold the unit flush with the instrument panel and ensure that locking stud alignment marks are in the vertical position.
4. Turn each of the four locking sockets one quarter turn clockwise using a 3/32" hex drive tool (this may require applying a small amount of forward pressure to engage the quarter turn sockets).
5. Install unit software and configuration files according to the information in Section 7.

6.20 GWX 68

NOTE

Take care to avoid any contact between tools that can become magnetized and the magnetron. Even momentary contact of a potentially magnetic object with the magnetron case will cause serious weakening of the magnetic field. Use of non-magnetic tools (typically beryllium copper or titanium) is recommended when installing or servicing the GWX 68.

The GWX 68 is located behind the radome. To access the GWX 68, remove the screws holding the radome according to aircraft manufacturers instructions. **Do not scratch or damage the radome.**

To remove:

1. Remove the connector from the unit by pushing on the slide lock tab on the side of the connector which releases it and pull the connector away from the unit.
2. Remove the four mounting bolts. Note and save the shims or washers behind each mounting bolt location. They will need to be reinstalled in the same locations.

To install:

1. Place the same shims or washers in the same location where they were removed and install the four mounting bolts. Torque the bolts to the specifications given in the OEM maintenance manual.
2. Attach the connector to the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **The locking tabs must be engaged on both ends of the connector.**
3. Verify that the wiring harness has been routed and secured in such a way that it can not be struck by or interfere with unit movement throughout the full range of sweep and tilt.
4. Install the radome according to the OEM manufacturer's instructions.
5. Install unit software and configuration files according to the information in Section 7.

6.21 GTA 82

To remove:

1. Remove the connector from the unit by pushing on the slide lock tab on the side of the connector to release it and then pull the connector away from the unit.
2. Remove the four mounting screws that hold the unit to the aircraft structure.

To install:

1. Inspect the wire harness connector for damaged pins before installing the unit.
2. Install the unit to the aircraft structure with four screws.
3. Attach connector to the unit by first pressing the slide lock tab on the side of the connector, then align and mate the unit and wire harness connectors together, and then release the slide lock tab. **The locking tabs must be engaged on both ends of the connector.**
4. Install unit software and configuration files according to the information in Section 7.

6.22 CONFIGURATION MODULE REPLACEMENT

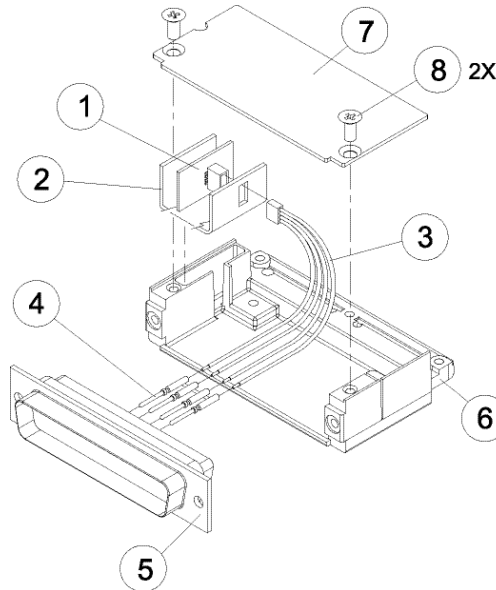


Figure 6-2. Configuration Module Assembly

To remove:

1. Remove two screws (item 8) from cover (item 7) and remove cover.
2. Remove the configuration module by sliding it up and out of slot.
3. Unplug the connector from the configuration module (item 1). Do not use tools, the connector is fragile and could break.

To install:

1. Inspect the connector for damaged pins.
2. Insert the connector into configuration module (item 1).
3. Slide the configuration module (item 1) down into the slot.
4. If the GRS 77 AHRS configuration module is replaced, see Section 7 and recalibrate the unit.
5. If the GDC 74 configuration module is replaced, see Section 7 and reload the configuration file.
6. If the PFD1 master configuration module is replaced:
 - a. Turn the PFD1 on in configuration mode.
 - b. Go to the system upload page in the system page group.
 - c. Press the 'UPDT CFG' softkey.

The G1000 ID number will change when the PFD1 master configuration module is replaced. The supplemental database cards, SVT unlock, TAWS unlock, and other SD cards may need to be replaced since they will be locked to the old system ID number. Contact Garmin for assistance in determining which cards will need to be replaced. Subscription information with Garmin and Jeppesen will also need to be updated with the new system ID number.

6.23 GEA 71 BACKSHELL THERMOCOUPLE REPLACEMENT

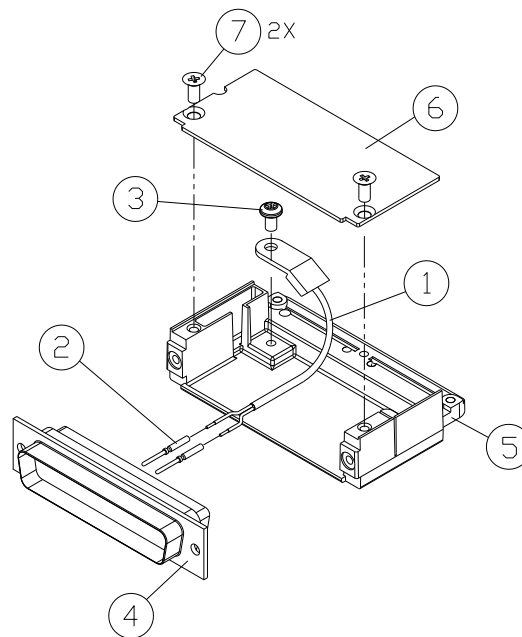


Figure 6-3. GEA 71 Backshell Thermocouple Assembly

Item #	Description	Qty. Needed	Garmin Part Number
1	3" Thermocouple, K type	1	925-L0000-00
2	Pins #22 AWG	2	336-00021-00
3	Screw	1	211-60234-08

To remove:

1. Remove the GEA 71 with the connector backplate.
2. Remove the connector J701 (item 5) from the backplate.
3. Remove the cover (item 6) from the backplate.
4. Unscrew the thermocouple from the boss on the backshell. Remove the thermocouple pins from the connector.

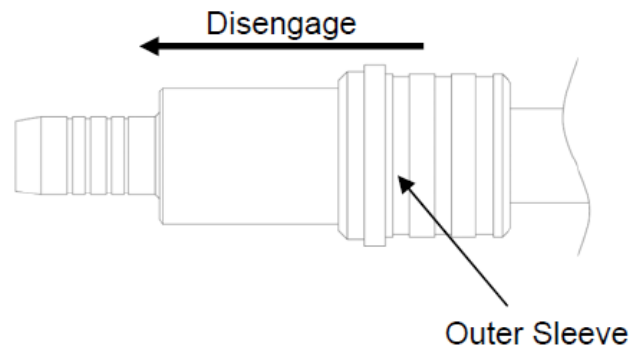
To install:

1. Crimp pins (item 2) onto each of the thermocouples wires (item 1). Make sure the pre-stripped wire length is 1/8" before you crimp.
2. Insert the newly crimped pins and wires into the appropriate connector housing location (item 6). Place the thermocouple body (item 1) onto the backshell boss (item 5). Place the thermocouple as shown in Figure 6-3 (the wires exit towards the bottom of the backshell).
3. Tightly fasten the thermocouple to the backshell using the screw that is provided (item 6).
4. Fasten the cover (item 6) to the backshell using the screw that is provided (item 7).
5. Reinstall the connector to the backplate and reinstall the unit.

6.24 GTS 8XX

To remove:

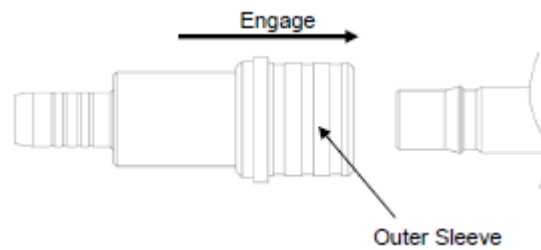
1. If a cooling hose is attached to the unit, remove it from the air fitting and set aside.
2. Turn the harness connector jackscrews counterclockwise to disengage them from the unit.
3. Pull the harness connectors away from the unit.
4. Disengage the QMA coax connectors by pulling back firmly on the outer sleeve of the QMA plug away from the jack connector. This will disengage the locking mechanism that secures the plug connector to the jack connector. Pulling on or disengaging the QMA connectors in any other way is not recommended and may cause damage to both the connectors and coaxial cable.



5. Loosen the unit hold down clamp by turning it counterclockwise until it disengages the unit hold down tab.
6. Pull the unit up slightly at an angle and pull the unit out of the rack from the connector end of the unit.

To install:

1. Hold the unit at a slight angle with the connector end up and slide the back of the unit into the rack engaging the curled up lip at the back of the rack.
2. Fully seat the unit the rest of the way into the rack.
3. Pull the locking clamp up and turn it clockwise to engage the unit hold down tab tightly.
4. Attach the QMA coax connectors by holding the outer sleeve of the QMA plug to align the connectors and insert the plug onto the jack until it snaps into place. There will be an audible “snap” when the connectors are fully engaged. No tools are required for the insertion of a QMA plug onto a QMA jack.

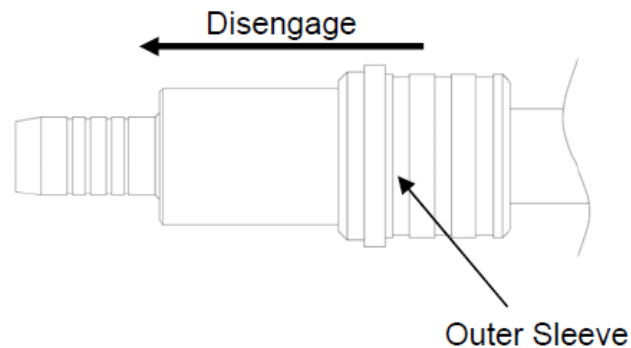


5. Install the harness connectors and tighten the connector jackscrews to secure the connectors.
6. If a cooling hose was attached to the unit, reinstall the cooling hose to the air fitting.

6.25 GPA 65

To remove:

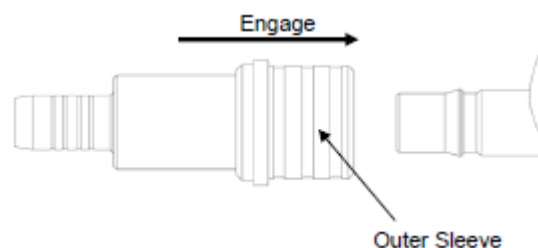
1. Remove the harness connector by rotating the locking barrel until it disengages from the mating connector.
2. Disengage the QMA coax connectors by pulling back firmly on the outer sleeve of the QMA plug away from the jack connector. This will disengage the locking mechanism that secures the plug connector to the jack connector. Pulling on or disengaging the QMA connectors in any other way is not recommended and may cause damage to both the connectors and coaxial cable.



3. Remove the four screws holding the unit to the structure.

To install:

1. Install the four screws to attach the unit to the structure.
2. Attach the QMA coax connectors by holding the outer sleeve of the QMA plug to align the connectors and insert the plug onto the jack until it snaps into place. There will be an audible “snap” when the connectors are fully engaged. No tools are required for the insertion of a QMA plug onto a QMA jack.
3. Reconnect the harness connector and rotate the locking barrel until it stops.



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SECTION 7

LRU SOFTWARE INSTALLATION

This section describes how to install, configure, and test software for a replacement LRU.

NOTE

DO NOT REMOVE POWER FROM THE G1000 WHEN LOADING SOFTWARE. Do not rely on only the aircraft batteries during the software loading process. Connect a ground power unit to the aircraft for software loading. Power loss during a software upgrade may cause a LRU to become corrupted and unresponsive requiring replacement. Replacing corrupted units are not covered under warranty.

GENERAL NOTES:

1. GDL 90 — refer to section 4 in the GDL 90 Installation Manual (P/N 560-1049-02) for software loading and configuration procedures.
2. GRT 10 and GRC 10 — the GRT 10 and GRC 10 do not require software loading if they are replaced. However, their RF pairing ID must be configured. Refer to the GDL 69/69A Installation Manual P/N 190-00355-02, section 4 for instructions.
3. GSR 56 — the GSR 56 does not require software or configuration loading if it is replaced. Contact Garmin and/or Iridium to establish service.
4. Software Loader Card — the software loader card must have the correct software version before loading any files into the G1000. Loading the files from a previous software version loader card will prevent the system from operating correctly. Verify the software part number on the MFD AUX – SYSTEM STATUS page matches the software part number listed in the “ldr_part_nmbr.txt” file on the loader card.
5. Displays — place all displays in the same mode (configuration or normal) for loading software unless instructed differently. The software load may not be successful if the displays are not in the same mode.
6. Supplemental Database Cards — remove supplemental database cards from the lower slot of the displays before loading software into any unit. Not removing the cards may corrupt them during a software upload. Replacing corrupted database cards are not covered under warranty.
7. SanDisk SD™ Cards — Garmin recommends the use of SanDisk SD™ cards for loading software and configuration files.
8. Optional Equipment — determine what optional equipment (i.e. ADF, DME, GWX Radar, WX500, KTA810 TAS, KRA405B RA, GTX #2 XPDR, etc.) is installed in the aircraft before loading software. Optional equipment configuration files will need to be reloaded after an LRU replacement to activate them. Failure to load configuration files for optional equipment will prevent them from working properly.

9. Optional Features — determine what optional features (i.e. TAWS, Synthetic Vision (SVT), Jeppesen ChartView, etc.) are installed before loading the AIRFRAME configuration file. If the AIRFRAME configuration file is loaded from the system software card, you will need to unlock the optional features using their unlock cards according to the instructions in Section 10. Failure to load configuration files for optional features will prevent them from working.
10. Using the ENT Key — pressing the ENT key will check and uncheck the highlighted configuration box.

7.1 UPLOAD SUMMARY

This section gives an overview of the steps involved in uploading software.

1. Remove the supplemental database cards from the bottom slot of each display. The cards contain a FliteChart or ChartView database which is only used by the MFD. Note which card was removed from the MFD so it can be reinserted in the MFD later after software and configuration loading is complete.
2. Insert the G1000 software loader card into the top slot of PFD1.
3. Start the G1000 in configuration mode.
4. Press the NO softkey at the “Do you want to update system files?” prompt.
5. When the SYSTEM STATUS page appears, select the SYSTEM UPLOAD Page on PFD1 using the FMS knob.
6. Activate the cursor and rotate the small FMS knob to activate the pop-up box.
7. Highlight the correct aircraft model option in the AIRFRAME field pop-up box
8. Press the ENT key.
9. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box.
10. Highlight the correct aircraft model “Base Configuration” option file.
11. Press the ENT key.
12. Press the CLR ALL softkey.
13. Using the FMS knob, select the desired unit software and configuration files to upload (defined in the sections which follow).
14. Once the desired files are selected, press the LOAD softkey.
15. When the upload is complete, press the ENT key to close the “upload complete” window.
16. View the SUMMARY field and ensure that the load is complete.
17. After the software and configuration files are loaded, turn off the G1000 and reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card which was removed from the MFD back into the MFD.

7.1.1 System Upload Page Softkeys

The following softkeys are used in conjunction with the system upload page:

- CHK ALL—checks all software and configuration files.
- CHK SW—checks all software files (not used in these procedures).
- CHK CFG—checks all configuration files (not used in these procedures).
- CLR ALL—clears all checked files.
- LOAD—loads all checked files.

7.2 GDU 1XXX DISPLAY (INCLUDES ALL 10, 12 AND 15 INCH DISPLAYS)

7.2.1 Reinstalling an Original Display

If the removed display(s) are reinstalled in their original positions, no software or configuration loading is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.2.2 Installing Original Display(s) in Opposite Locations

If PFD1, PFD2, or the MFD are installed in opposite locations for troubleshooting, no software or configuration loading is required. The displays do not need to be returned to their original position.

Only switch displays that are the same size.

7.2.3 Installing a New, Repaired, or Exchanged Display

If a new, repaired or exchanged display is installed, the correct software, configuration and Jeppesen aviation database files must be loaded. Retain the database SD card(s) from the original display to install in the new display after loading software. See Section 10 for Jeppesen aviation database update instructions.

7.2.4 Loading GDU Software

1. Remove the supplemental database cards from the bottom slots of each display. Note which one was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading are complete. It could contain a FliteChart or ChartView database which is only used in the MFD.
2. Insert the G1000 software loader card into top slot of the replacement unit.
3. Hold the ENT and CLR keys on the replaced display and restore power by closing the applicable circuit breaker (power up only the replaced unit).
4. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the display, release the ENT and CLR keys.
5. Press the ENT key to acknowledge the following prompt:

```
DO YOU WANT TO CLEAR USER SETTINGS?  
PRESS CLR FOR NO AND ENT FOR YES  
YOU HAVE 10 SECONDS BEFORE YES IS RETURNED
```

6. When the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt appears, press the YES softkey.
7. Press any key to confirm update completion after the software has finished loading.
8. When the “DO YOU WANT TO UPDATE SPLASHSCREEN” prompt appears, press the YES softkey (This is optional and may not be displayed).
9. Press any key to confirm update completion after the splash screen has finished loading.
10. When the SYSTEM STATUS page appears, turn off the display.
11. Turn on the display in configuration mode and allow to initialize up to when the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt appears, and then turn off the display. This sets the System ID in the new display.
12. Continue with loading GDU Configuration files.

7.2.5 Configuring the Displays

1. Insert the G1000 software loader card into the top slot of PFD1.
2. Power PFD1, PFD2, and the MFD on in configuration mode.
3. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
5. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
6. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
7. Press the CLR ALL softkey.
8. For PFD1 replacement, select the following files:
 - AIRFRAME Configuration File
 - ALERTS Configuration File (may not be present on some models)
 - SYSTEM Configuration File
 - MANIFEST Configuration File
 - PFD1 Configuration File
 - CALIBRATION Configuration File
9. For PFD2 replacement, select the following file:
 - PFD2 Configuration File
10. For MFD replacement, select the following file:
 - MFD Configuration File
11. Press the LOAD softkey.
12. When the upload is complete, press the ENT key to close the “upload complete” window.
13. View the summary field and ensure that the load is complete.
14. Load configuration files for optional equipment (i.e. ADF, DME, GWX Radar, WX 500, KTA 810 TAS, KRA 405B RA, GTX #2 XPDR, etc.) that list PFD1/2, MFD, Airframe, System, Manifest or Alerts files in them. These must be loaded in order for the optional equipment to function correctly.
15. If the airframe configuration file was loaded earlier, use the optional feature unlock cards to unlock optional features such as TAWS, ChartView, SVT, etc. (refer to Section 10). These cards should be with the aircraft.
16. Load the navigation database (refer to Section 10).
17. Turn off the system and reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.2.6 Testing the GDU

If the display is removed or replaced, the following tests are recommended.

1. Start all displays in normal mode.
2. Press the YES softkey to acknowledge the agreement on the MFD. Allow the displays to initialize for approximately one minute. The GRS 77 AHRS and GDC 74B Air Data Computers require longer initialization periods than the other LRUs. During startup, this causes the attitude, airspeed, and altitude fields to be invalid during the first ~60 seconds of PFD power-up.
3. Check the PFD1/2 and MFD displays for the following:
 - Check that all COM/NAV display fields are valid in the top corners of both PFDs.
 - Check that altitude, airspeed, vertical speed and OAT fields are valid on both PFDs.
 - Check that attitude and heading are valid (unless an AHRS calibration is required).
 - Check that the engine instrument fields are valid on the MFD.
4. Push the red display reversion button on both GMA 1347 #1 and #2. Verify both displays enter reversionary mode (both should have valid altitude, airspeed, vertical speed, and engine instruments.)
5. Deactivate reversionary mode by pushing the red reversion button.

NOTE

Make sure the navigation database is present. Refer to Section 10 for navigation database update instructions.

7.3 GIA 63W INTEGRATED AVIONICS UNITS

7.3.1 Reinstalling an Original GIA 63W

No software or configuration loading is required if the removed GIA is reinstalled in its original position (GIA1 and GIA2 in their original racks). This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.3.2 Installing Original GIA 63Ws in Opposite Locations

No software loading is required if the original GIAs are installed in opposite locations (opposite unit racks) for troubleshooting. However, the units must be reconfigured. Follow the instructions below to reconfigure:

1. With the G1000 turned off, remove the GIA units and install in the opposite location.
2. Turn on the system and place all displays in configuration mode.
3. On PFD1, use the FMS knob to navigate to the GIA RS-232/ARNIC 429 CONFIG page.
4. In the SELECT UNIT box in the upper left corner of the screen, verify GIA1 is listed.
5. Press the SET>ACTV softkey in the lower left corner of the screen (see Figure 7-1).

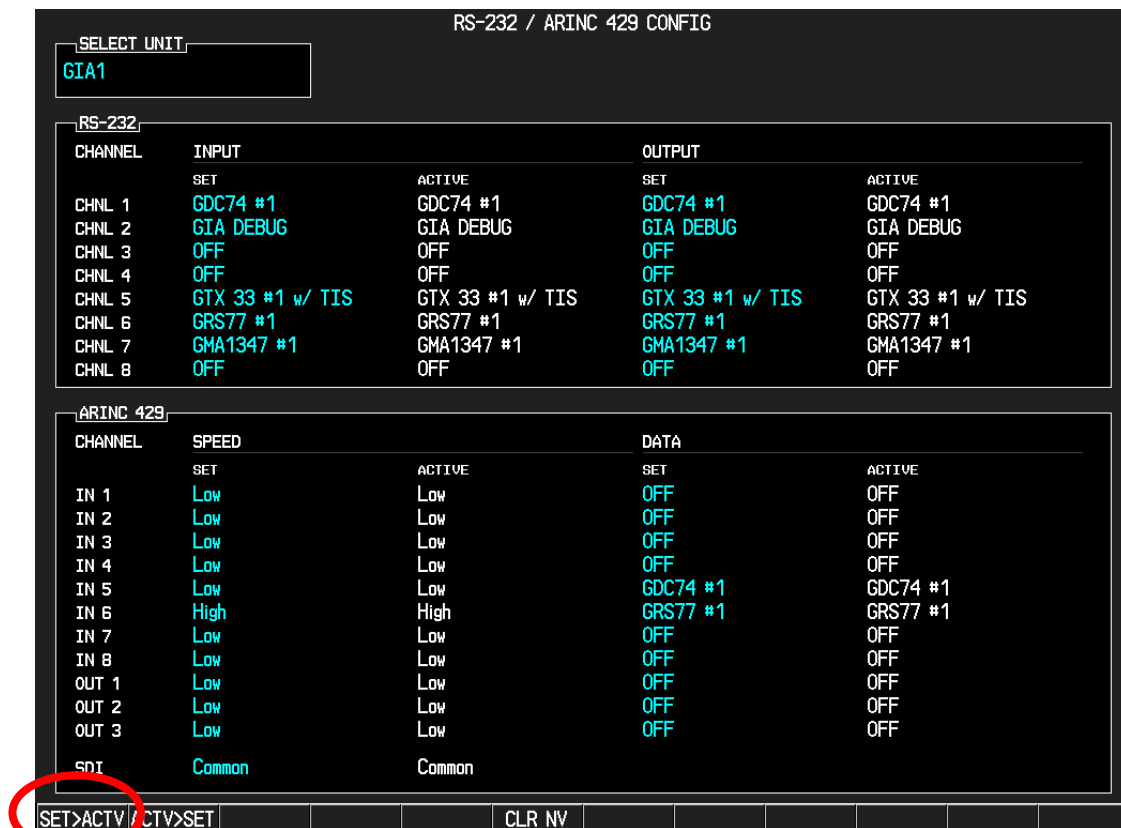


Figure 7-1. SET>ACTV Softkey Location

6. When the "Activate parameter settings?" window appears, verify OK is highlighted and press the ENT key.

7. When the "GIA #1 Configured" window shows "Complete", press the ENT key to select OK in the window.
8. Activate the cursor, turn the small FMS knob to show the list of GIA choices, highlight GIA2 in the pop-up box and press the ENT key.
9. Press the SET>ACTV softkey in the lower left corner of the screen.
10. When the "Activate parameter settings?" window appears, verify OK is highlighted and press the ENT key.
11. When the "GIA #2 Configured" window shows 'Complete', press the ENT key to select OK in the window.
12. Turn off the system.

7.3.3 Installing a New, Repaired, or Exchanged GIA 63W

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at "DO YOU WANT TO UPDATE SYSTEM FILES?" prompt.
5. After the system status page appears on PFD1, use the small FMS knob to turn to the system upload page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model "Base Configuration" option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GIA (1 or 2) Software File
 - GIA (1 or 2) Configuration File
 - GIA (1 or 2) Audio Software File
 - GPS (1 or 2) Software File
 - Audio Configuration File
 - GIA Gains Software File
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. Load configuration files for optional equipment (i.e. ADF, DME, GWX Radar, WX500, KTA810 TAS, KRA405B RA, GTX #2 XPDR, etc.) that list GIA (1 or 2) files in them. These must be loaded in order for the optional equipment to function correctly with the G1000.
14. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.3.4 Testing a GIA

If the unit is removed or replaced, the following tests are recommended.

7.3.4.1 GPS Signal Acquisition Test

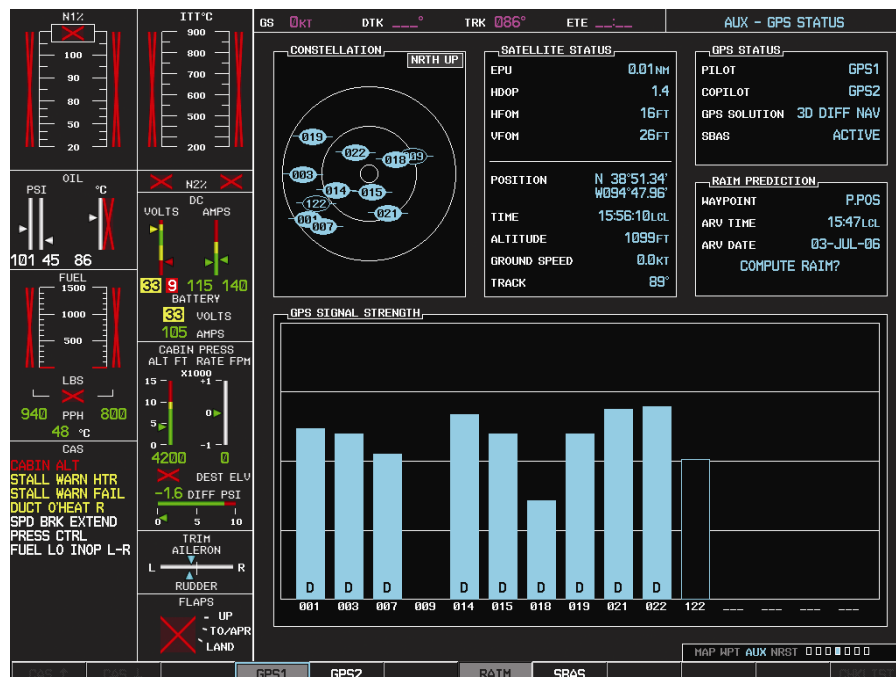


Figure 7-2. AUX-GPS Status Page

The GIA 63W units normally acquire a 3D GPS navigation solution within 5-10 minutes of startup, provided the aircraft is outside (or indoors with a GPS repeater).

NOTE

In some rare instances when the GPS receiver is taking longer than normal to acquire, a date and/or time change may be required.

1. Select the satellite status page on the MFD (4th page in AUX group). Two softkeys on the bottom of the display allow the user to toggle between GPS 1 and GPS 2.
2. Verify that both receivers show 3D Navigation on the MFD.

7.3.4.2 VHF COM Interference Test

This test must be conducted outside. Use of a GPS repeater inside a hangar may result in a failed test. Once the signal acquisition test has been completed successfully, perform the following steps:

1. On the MFD, monitor GPS signal strength bars on the 3rd AUX Page.
2. On the PFD, ensure that the CDI is set to GPS. If it is not, press the 'CDI' softkey until GPS ENR is displayed.
3. Verify that the yellow GPS "LOI" (loss of integrity) annunciation is not displayed (see Figure 7-3).



Figure 7-3. Loss Of Integrity Annunciation

4. Select 121.150 MHz on the No. 1 COM transceiver.
5. Transmit for a period of 30 seconds while monitoring GPS 1 signal strength levels.
6. During the transmit period, verify that the GPS "LOI" annunciation is not displayed on the PFD and verify that GPS 1 does not lose a 3-D navigation solution on the MFD.
7. Repeat steps 5-6 and re-transmit while monitoring GPS 2 signal levels on the MFD.

8. Repeat steps 4 through 7 for the following frequencies:
 - 121.175 MHz
 - 121.200 MHz
 - 131.250 MHz
 - 131.275 MHz
 - 131.300 MHz
9. Repeat steps 4 through 8 for the No. 2 COM transceiver (GIA2).
10. Select the 4th AUX page on the MFD.
11. Change the COM channel spacing from 25 kHz to 8.33 kHz in the COM CONFIG field.
12. Go back to the 3rd AUX page.
13. Select 121.185 MHz on the No. 1 COM transceiver (GIA1).
14. Transmit for 35 seconds while monitoring GPS 1 signal strength levels. During the transmit period, verify that the GPS “LOI” annunciation is not displayed on the PFD and verify that GPS 1 does not lose 3D navigation on the MFD.
15. Repeat steps 14 and 15 while monitoring the GPS 2 (GIA2) signal levels on the MFD.
16. Repeat steps 14 through 16 for each of the following frequencies:
 - 121.190 MHz
 - 130.285 MHz
 - 131.290 MHz
17. Repeat steps 14 through 17 for the No. 2 COM transceiver (GIA2).
18. On the MFD, select the 4th AUX page and change the COM channel spacing back to 25 kHz.

7.3.4.3 VOR/LOC/GS Test

Check the VOR, ILS, and Glideslope functions with ramp test equipment. Operate the equipment according to the test equipment manufacturer’s instructions. Adjust the RF signal to a level adequate to perform the test. Note that the PFD CDI will not show a course deviation bar unless a valid VHF NAV frequency is tuned.

1. Simulate a VOR signal on radial 000° with a course-width of 20°.
2. Verify full-scale deflection of the CDI while applying a 10° deviation signal.
3. Operate the CDI with both right and left deviations for both NAV 1 and 2.
4. Operate the glideslope indicator with up and down deviation indications.

7.4 GMA 1347 Audio Panel

7.4.1 Reinstalling an Original GMA 1347

No software or configuration loading is required if the original GMA 1347 is reinstalled. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.4.2 Installing Original GMAs in Opposite Locations

1. If the original GMA #1 and GMA #2 are installed in opposite locations for troubleshooting, configuration loading is required.
2. With the system turned off, remove the GMA units and install in the opposite location.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, use the large FMS knob to navigate to the GMA Configuration page.
5. In the select unit box in the upper left corner of the screen, verify GMA1347 #1 is listed.
6. Press the SET>ACTV softkey in the lower left corner of the screen (see Figure 7-4).

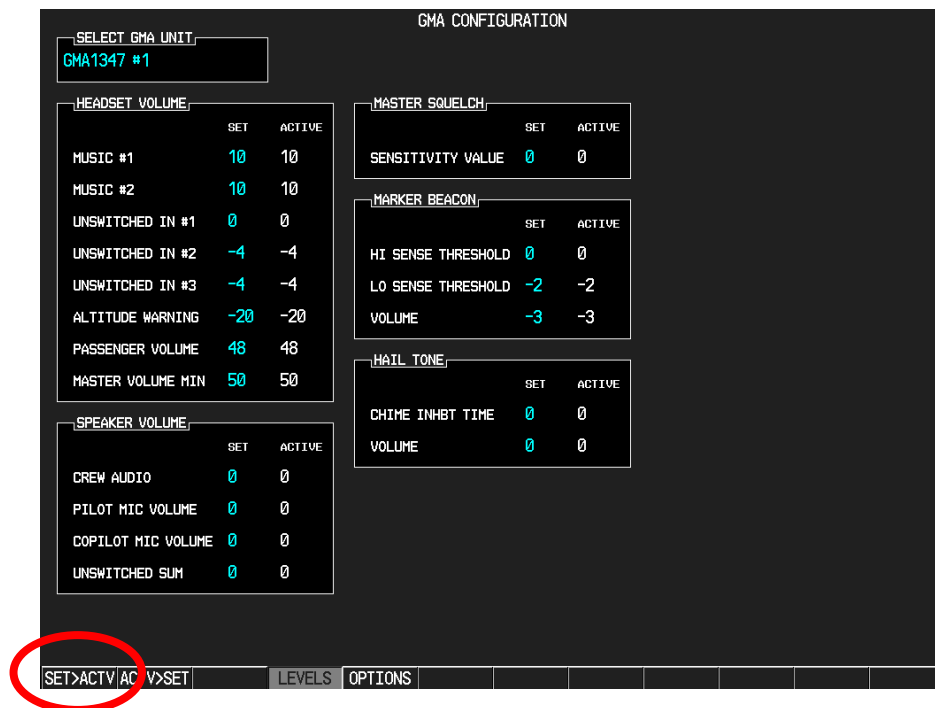


Figure 7-4. SET>ACTV Softkey on GMA Config Page

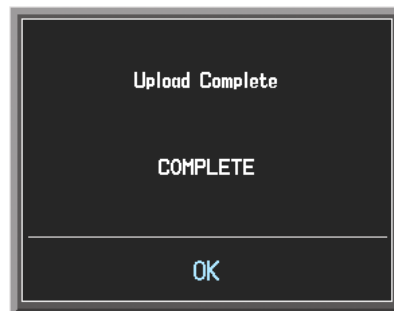
7. When the "Activate parameter settings?" window appears, verify OK is highlighted and press the ENT key.
8. When the "GMA #1 Configured" window shows "Complete", press the ENT key to select OK in the window.
9. Activate the cursor, turn the small FMS knob to show the list of GMA choices, highlight GMA1347 #2 in the pop-up box and press the ENT key.
10. Press the SET>ACTV softkey in the lower left corner of the screen.

11. When the “Activate parameter settings?” window appears, verify OK is highlighted and press the ENT key.
12. When the “GMA #2 Configured” window shows “Complete”, press the ENT key to select OK in the window.
13. Turn off the system.

7.4.3 Installing a New, Repaired, or Exchanged GMA 1347

If a new, repaired or exchanged GMA 1347 is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GMA (1 or 2) – software and configuration files
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ PASS in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.

13. Load the optional config files for optional equipment (i.e. ADF, DME, GDL59, HF, etc.) that list GMA (1 or 2) files in the PRODUCT window for them. These must be loaded in order for the optional equipment to function correctly.
14. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.4.4 GMA Testing

If unit is removed or replaced, the following tests are recommended.

7.4.4.1 Intercom System (ICS) Check

Except for marker beacon operation, an in-aircraft checkout may be performed in the aircraft on the ramp with known good microphone, headset, and speaker.

1. Plug in headsets at each ICS position.
2. Ensure that the MAN SQ button is off (no light).
3. Adjust volume for each position and verify that the ICS is working properly.
4. Check pilot and copilot ICS positions for isolation and proper operation of volume and squelch controls.
5. Press the PA key. Verify that microphone audio is heard over the passengers headsets when the Push-To-Talk (PTT) key is pressed.

7.4.4.2 Transceiver Operational Check

Perform a ramp test radio check by operating the installed transceivers, microphone, microphone key and audio over the headphones and speaker.

1. Verify that communications are clear and PTT operation is correct for each pilot position.
2. Select the audio source corresponding to each installed avionics unit (i.e. NAV1, NAV2, COM1, COM2) and check for audio over the headsets.
3. Press the SPKR key and verify that the selected audio is heard over the speaker.

7.4.4.3 Failsafe Operation Check

GMA 1347 #1

1. Turn the GMA 1347 #1 off by pulling the GMA 1347 #1 circuit breaker. This directs all COM 1 phone audio, MIC audio and MIC key to the pilot's position.
2. Check the failsafe operation by operating the COM 1 microphone, microphone key and audio over the headphones. All volume control for the COM audio should be made through the PFD volume control. Verify proper operation of COM 1 using the failsafe operation.
3. Close the GMA 1347 #1 circuit breaker to continue testing.

GMA 1347 #2

1. Turn the GMA 1347 #2 off by pulling the GMA 1347 #2 circuit breaker. This directs all COM 2 phone audio, MIC audio and MIC key to the co-pilot's position.
2. Check the failsafe operation by operating the COM 2 microphone, microphone key and audio over the headphones. All volume control for the COM audio should be made through the PFD volume control. Verify proper operation of COM 2 using the failsafe operation.
3. Close the GMA 1347 #2 circuit breaker to continue testing.

7.4.4.4 Marker Beacon Test

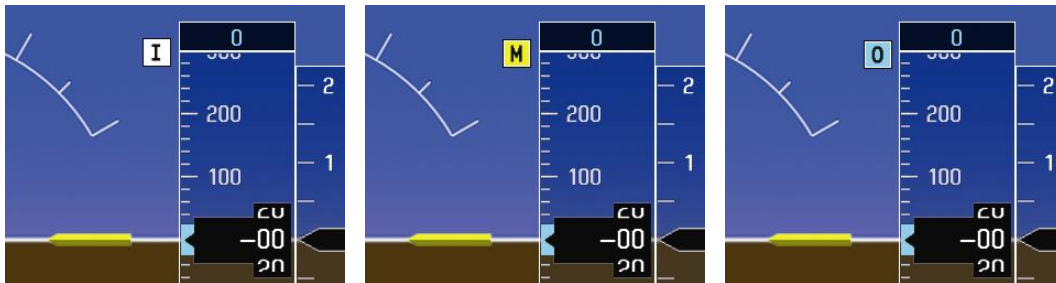


Figure 7-5. Marker Beacon Symbology

1. Using a ramp tester, simulate the outer marker, middle marker and inner marker signals by following the test equipment manufacturer's instructions.
2. Verify that each marker audio signal is present over the headphones and speaker.
3. Verify that the outer, middle, and inner annunciations appear on the PFD when the corresponding signal is applied. Marker beacon annunciations appear at the upper left corner of the altitude indicator on the PFD as shown in Figure 7-5.
4. Operate the MKR MUTE key on the GMA 1347 and ensure that the audio signal is muted.

7.5 GRS 77 AHRS AND GMU 44 MAGNETOMETER

7.5.1 Reinstalling an Original GRS 77

If the original GRS 77 is reinstalled, no software loading is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

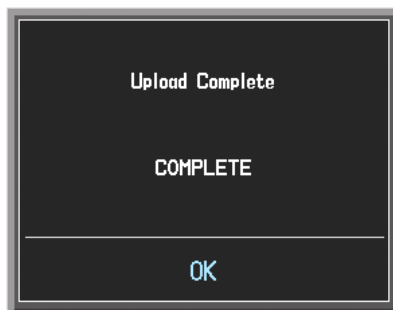
7.5.2 Installing Original GRS 77s in Opposite Locations

No software loading or calibration is required if the original GRS units are installed in opposite locations (GRS #1 and GRS #2 in opposite unit racks) for troubleshooting. **Only switch the units, DO NOT loosen the GRS racks or the Pitch/Roll recalibration will be required to re-level the units.**

7.5.3 Installing a New, Repaired, or Exchanged GRS 77

If a new, repaired or exchanged GRS 77 is installed the correct software file must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey.
9. Using the FMS knob and ENT key select the following file:
 - GRS (1 or 2) – Software file
10. Once the file is selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates  in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.5.4 Installing a New GRS 77 Configuration Module

If the GRS 77 configuration module was replaced, no software loading is required. Calibration procedure A1, B, and D are required.

7.5.5 Reinstalling an Original GMU 44

If the original GMU 44 is reinstalled, no software loading is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.5.6 Installing Original GMU 44s in Opposite Locations

No software loading is required if the original GMU units are installed in opposite locations (opposite unit racks) for troubleshooting. However, the Magnetometer Calibration Procedure is required.

7.5.7 Installing a New, Repaired, or Exchanged GMU 44

If a new, repaired or exchanged GMU 44 is installed the correct software file must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey.
9. Using the FMS knob and ENT key select the following file:
 - GMU (1 or 2) – Software file
10. Once the file is selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.5.8 GRS/GMU Calibration

System Software for certain VJ aircraft allows valid outputs from the AHRS, prior to completion of the AHRS and magnetometer calibration procedures, as long as the GRS 77 can definitively determine that the aircraft is not moving. This gives a technician the ability to perform functional tests during aircraft assembly that require valid AHRS outputs. Additionally, a “CALIBRATE AHRS/MAG” message will be displayed on the PFD until a successful magnetic calibration has been completed.

The criteria used by the AHRS to determine the aircraft is moving are as follows:

1. If valid GPS data is available and each component of 3D GPS velocity is less than 4 knots, the aircraft is considered “not moving” and attitude/heading will become valid.
2. If valid 3D GPS data is not available, but valid true airspeed is less than 30 knots, the aircraft is considered “not moving” and attitude/heading will become valid.
3. If both 3D GPS and true airspeed are unavailable, attitude/heading will not become valid.
4. No configuration is required for the GRS 77, unless the mounting bolts that secure the mounting rack are loosened. If the mounting bolts are loosened, a new post-installation calibration is required. Any GMU 44 that is removed and/or replaced requires a magnetometer calibration.

There are six calibration procedures available:

- Pitch/Roll Offset (Procedure A1)
- Pitch/Roll Offset, Manual Entry (Procedure A2)
- Magnetometer Calibration, (Procedure B)
- Heading Offset Compensation, (Procedure C)
- Engine Run-Up Vibration Test, (Procedure D)
- Magnetometer Interference Test, (Procedure E)

NOTE

Procedures A2 and C are not required and should not be performed on certain aircraft. Contact Garmin for assistance determining if these procedures should be needed.

When ready to perform the procedures, turn off both PFDs and MFD by pulling the PFD and MFD circuit breakers. Restart all displays in configuration mode. Follow the steps given for each procedure on-screen at the GRS/GMU CALIBRATION page. Note that the CALIBRATE command cannot be selected and activated until the installer acknowledges all required steps have been carried out by pressing the ENT key on each step.

Table 7-1. GRS 77/GMU 44 Calibration

Condition	Calibration Procedure Required		
	A1	B	D
Removed or replaced the GRS 77 without loosening mounting rack bolts	None Required		
Replaced the GRS 77 and loosened mounting rack bolts	X	X	X
Replaced the GRS 77 Configuration Module	X	X	X
Replaced the GMU 44 (new serial number)		X	
GMU 44 was removed and reinstalled (does not include new, repaired or exchanged units)	None Required		

7.5.8.1 Procedure A1: Pitch/Roll Offset Calibration



Figure 7-6. Pitch/Roll Offset

This procedure must be performed for both GRS 77 units installed in the aircraft. This procedure must be carried out with the engine off.

1. Level the aircraft (per aircraft manufacturer's instructions) to within $\pm 0.25^\circ$ of zero pitch and zero roll. Initiate the AHRS Ground Pitch/Roll Aircraft Level compensation mode by performing the following steps:
2. Enter configuration mode and go to GRS/GMU CALIBRATION page as shown in Figure 7-6. This page is protected and requires a keystroke password to perform the calibration.
3. Press the following softkeys in sequence:
 - Softkey 9
 - Softkey 10
 - Softkey 11
 - Softkey 12
4. Ensure that the No. 1 GRS 77 is selected.
5. Select PITCH/ROLL OFFSET, and then press the ENT key.
6. Follow the checklist items displayed on the PFD and press the ENT key as each one is completed or confirmed. When the CALIBRATE field is blinking, press the ENT key to begin the procedure.
7. After several seconds, a new checklist appears in the lower half of the PFD. Press the ENT key as each item is confirmed. When the CONFIRM AIRCRAFT IS LEVEL field is blinking, press the ENT key to continue.

8. The result of the pitch/roll offset compensation is displayed on the PFD. If successful, the AHRS records the required pitch and roll offsets, informs the operator of a successful conclusion and returns to normal operation.
9. Press the ENT key on the PFD. Repeat steps 1 through 4 for GRS 77 #2.

7.5.8.2 Procedure B: Magnetometer Calibration

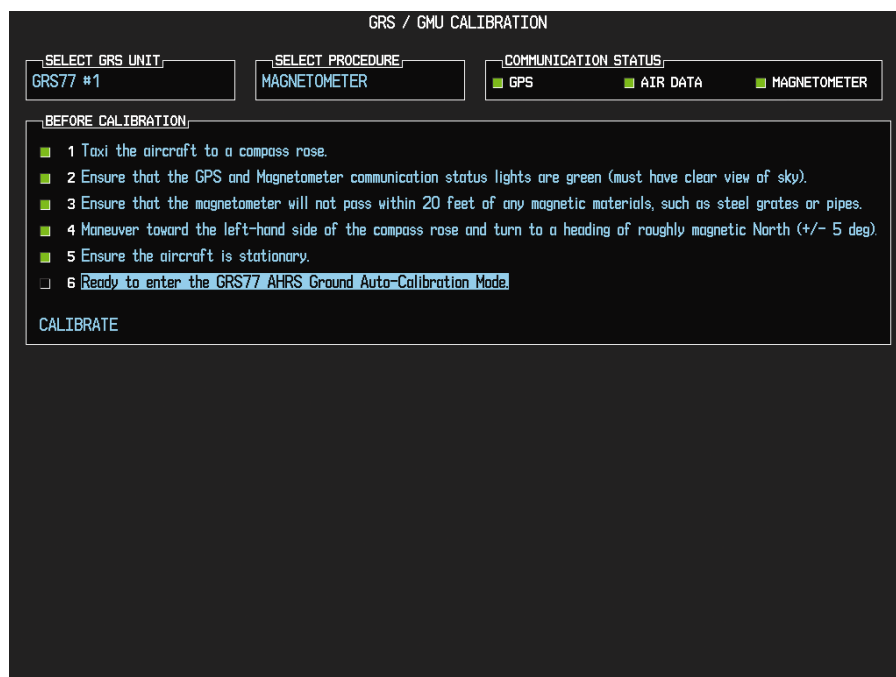


Figure 7-7. Magnetometer Calibration

NOTE

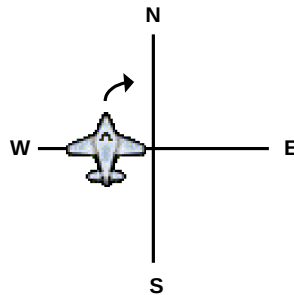
Calibration Procedure B must be performed for both GRS/GMU installation pairs installed in the aircraft. Calibration Procedure A1 must be successfully completed prior to attempting this procedure.

NOTE

Calibration procedure B must be carried out on a calibrated compass rose or magnetically clean area in order to guarantee measurements free of environmental magnetic disturbances. Attempting to carry out this maneuver on a typical ramp area will not yield a successful calibration. The accuracy of the AHRS cannot be guaranteed if this calibration is not performed on a compass rose or in a magnetically clean area. If a compass rose is not available, a site (usually at the end of a ramp away from buildings and steel structures) can be evaluated for use according to Section 5.9 of the Garmin GRS77/GMU44 Installation Manual, P/N 190-00303-10 (available for free download from Garmin's Dealers Only website). If the site passes the test per the requirements of Section 5.9, it completes the magnetometer calibration procedure (repeating it below is not necessary) and may be used as a location to perform the magnetometer calibration procedure in the future.

Taxi the aircraft to a compass rose. Ensure that there are no nearby magnetic materials on or near the perimeter of the compass rose. If unavoidable, maneuver the aircraft to keep the magnetometer from passing within twenty feet (6.1 meters) of such objects. Additionally ensure that vehicles or other aircraft are adequate distance away from the aircraft under test.

At the compass rose, align the aircraft with a heading of magnetic north ($\pm 5^\circ$) with sufficient offset to the left (west) of the North/South axis to allow a clockwise turn around the compass rose as shown in the figure below:



NOTE

This procedure provides instructions for calibrating both GRS 77 magnetometer's separately. It is acceptable to calibrate both magnetometer's simultaneously. This is accomplished by putting both PFD1 and PFD2 in configuration mode and following the procedure below, using PFD1 to calibrate GRS 77 #1 and PFD2 to calibrate GRS 77 #2.

With the aircraft stationary, initiate the GRS 77 AHRS magnetometer calibration procedure as follows:

1. If the MFD and PFD(s) are not in configuration mode, proceed with Steps 2 through 4. If the MFD and PFD(s) are already in configuration mode, skip ahead to Step 5.
2. Enter the configuration mode by holding the ENT key on each PFD while applying power. Release the ENT key when the words INITIALIZING SYSTEM are displayed on each display. Enter configuration mode by holding down softkey number 12 while applying power to the MFD. Release softkey number 12 when the words INITIALIZING SYSTEM are displayed.
3. On the PFD, turn the FMS outer knob clockwise until the GRS Page Group is selected.
4. At the GRS Page Group, turn the inner FMS to display the GRS/GMU Calibration page.
5. The GRS/GMU Calibration page is protected and requires a keystroke password to perform the calibration. Press the following softkeys in sequence:
 - Softkey 9
 - Softkey 10
 - Softkey 11
 - Softkey 12
6. Press the FMS inner knob to highlight GRS 77 #1. The FMS inner knob can now be turned to select either GRS 77 #1 or GRS 77 #2 for calibration. Press the ENT key after selecting the desired GRS 77 unit to calibrate. The SELECT PROCEDURE field is now blinking.
7. Using the FMS inner knob, select MAGNETOMETER and press the ENT key. If the MAGNETOMETER selection continues to blinking, press the ENT key again.

8. Follow the checklist items displayed on the PFD and press the ENT key as each one is completed or confirmed. When the CALIBRATE field is blinking, press the ENT key to begin the procedure.
9. The PFD advises the operator when to turn the aircraft, when to stop, and when to turn again.
10. Upon instruction to turn, taxi the aircraft in a right turn. After approximately 30° of turn from the last heading, the PFD instructs the operator to stop the aircraft.

NOTE

Due to the difficulties in executing smooth, accurate turns the PFD may incorrectly interpret a station and instruct to “HOLD POSITION” prior to full completion of a 30° turn. If this scenario is encountered, it is best for the operator to ignore the “HOLD POSITION” command and instead use outside references to complete the approximate 30° turn. Instead of using the PFD instruction to turn as a real-time indication of when to turn, simply judge the 30° ($\pm 5^\circ$) turn increments of the aircraft by using the compass rose radials. Dwelling at these 30° increments for the time recommended by the PFD should result in successful calibration. The PFD guides the operator to dwell at multiple headings around a complete circle.

NOTE

Due to high winds or excessive airframe vibration, the operator may encounter a condition where the PFD restarts the 18-second countdown without full completion of the previous countdown. If this is encountered more than once for a given station, the operator should begin turning to the next station (approximately 30°). A minimum of 2 successful stations per quadrant is required, where a successful station is a full 18-second countdown followed by instruction to move. Ensure that if stations are skipped, at least a minimum of 2 stations per quadrant are completed. Thus, it may sometimes be required to dwell at a station after a countdown restart. A maximum of 30 stations is allowed for the entire calibration procedure. If too many countdown restarts are encountered, the calibration will fail with the message, “TOO MANY STATIONS”.

11. Repeat the turn-and-stop process until the PFD instructs the operator that a successful calibration is complete.
12. Press the ENT key on the PFD.
13. Repeat steps 1 through 13 for GRS 77 #2 if a simultaneous calibration was not performed on PFD2.

7.5.8.3 Procedure D: Engine Run-Up Vibration Test

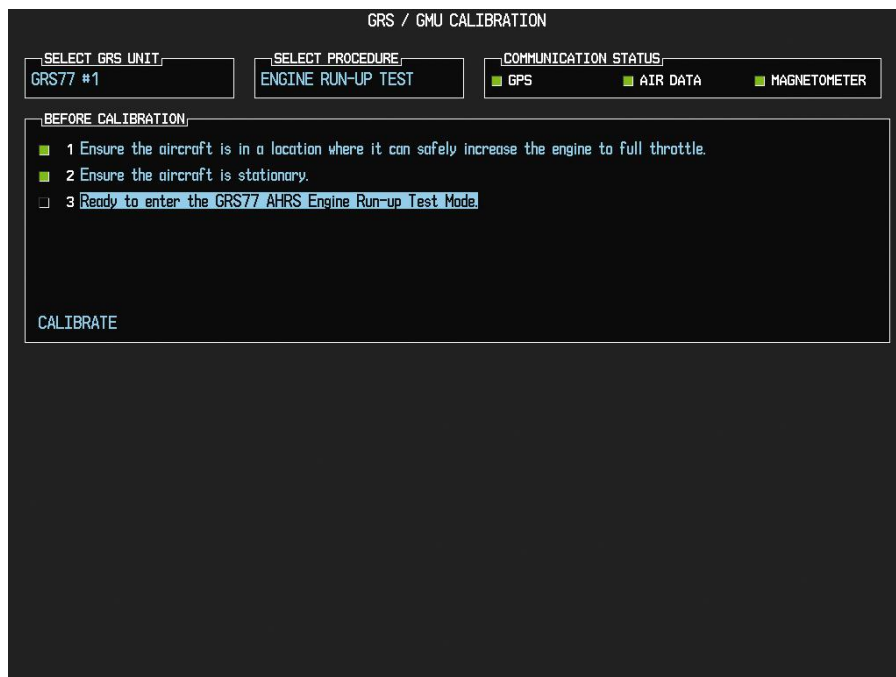


Figure 7-8. Engine Run-Up

This procedure must be performed for both GRS 77 units installed in the aircraft. Calibration Procedures A1 and B are not required prior to this procedure.

1. Press the FMS inner knob to highlight GRS 77 #1. The FMS inner knob can now be turned to select either GRS 77 #1 or GRS 77 #2 for calibration. Press the ENT key after selecting the desired GRS 77 unit to calibrate. The SELECT PROCEDURE field is now blinking.
2. Select the ENGINE RUN-UP TEST procedure.
3. Press the ENT key.
4. Follow the checklist items displayed on the PFD, and press the ENT key as each one is completed or confirmed. When the CALIBRATE field is blinking, press the ENT key to begin the procedure.
5. The PFD display instructs the operator to gradually increase power from idle to full throttle and back to idle over a period of 2-4 minutes.
6. When the operator has completed the engine run-up and the engine is back to an idle setting, press the ENT key to indicate that the process is complete. When this is done, the TEST COMPLETE field stops blinking.
7. The PFD informs the operator if the installation has passed or failed the vibration test. If the test fails, the specific measurements causing the failure are identified and numeric values are displayed on the PFD.
8. If failures are indicated, the engine run-up test may be repeated once or at most twice. If the test does not pass after three attempts, then the installation should not be considered reliable until the source of the vibration problem is identified and remedied.

9. In the event of repeated failure of the engine run-up test, record the values that are reported to be out of range for future reference. The following are potential causes for failure of the engine run-up test:
 - Excessive flexibility of GRS77 and/or GMU44 mechanical mounting with respect to airframe.
 - Vibrational motion of GRS77 and/or GMU44 caused by neighboring equipment and/or supports.
 - Mounting of GRS77 at a location that is subject to severe vibrations (for example, close to an engine mount.)
 - Mounting screws and other hardware for GRS77 and/or GMU44 not firmly attached.
 - Absence of mounting supports recommended by the aircraft manufacturer.
 - GRS77 connector not firmly attached to unit.
 - Cabling leading to GRS77 or GMU44 not firmly secured to supporting structure.
 - An engine / propeller that is significantly out of balance.
 - In some aircraft, attempting the engine run-up test on a day with very strong and/or gusty winds may cause the test to occasionally fail. However, windy conditions should not be taken as evidence that the test would pass in calm conditions; an actual pass is required before the installation can be considered adequate.
10. Press the ENT key on the PFD.
11. Repeat steps 1 through 6 for GRS 77 #2.
12. With the G1000 in normal mode, the aircraft can now be taxied back and the engine can be shut down for final testing. When the PFD powers up in normal mode, the AHRS attitude and heading information displayed should become valid within 1 minute of power-up.

7.5.8.4 Procedure E: Magnetometer Interference Test

Note: Two common reasons for a failed magnetometer interference test are:

- New equipment is installed in close proximity to the GMU 44 magnetometer
- An existing or new electronic device has become grounded through the aircraft structure instead of via the proper ground wire in a twisted shielded pair.

This procedure validates that no electronic device is interfering with the operation of the GMU 44 magnetometer which directly affects the determination of attitude and heading by the GRS 77 AHRS. Calibration Procedures A-1 through D are not required prior to this execution of this procedure.

The screenshot displays the 'GRS / GMU CALIBRATION' screen. At the top, there are three sections: 'SELECT GRS UNIT' with 'GRS77 #1' selected, 'SELECT PROCEDURE' with 'MAG INTERFERENCE TEST' selected, and 'COMMUNICATION STATUS' with checkboxes for 'GPS', 'AIR DATA', and 'MAGNETOMETER'. Below these is a 'BEFORE CALIBRATION' section containing a checklist with three items: '3 Prepare a detailed test sequence with precise start and stop times for exercising all electronic devices.', '4 Ensure the aircraft is stationary', and '5 Ready to enter the GRS77 AHRS Magnetometer Interference Test Mode.' A 'CALIBRATE' button is located below the checklist. The 'CALIBRATION PROCEDURE' section contains the following text: 'Begin test sequence.', 'Select TEST COMPLETE when finished.', and 'The calibration status will then be displayed.' At the bottom, there is a 'TEST COMPLETE?' label next to a horizontal bar.

Figure 7-9. Magnetometer Interference

1. Enter configuration mode and go to GRS/GMU Calibration page as shown in Figure 7-9.
2. This page is protected and requires a keystroke password to perform this test. Press the following softkeys in the following order: 9, 10, 11, and 12.
3. Select GRS unit and press the ENT key.
4. Select MAG INTERFERENCE TEST and press the ENT key.
5. Follow the checklist items displayed on the PFD, and press the ENT key as each one is completed or confirmed.

NOTE

The 3rd item on the checklist instructs the operator to “prepare a detailed test sequence with precise start and stop times for operating all electronic devices”. Only the electronic devices that are likely to affect the operation of the GMU 44 magnetometer need be included in the test sequence. The list of relevant electronic devices will vary from aircraft to aircraft. An example of an appropriate test sequence is given in Table 7-2.

Table 7-2. Magnetometer Interference Test Sequence

Elapsed Time since Start of Test (min:secs)	Action
0:00	Test begins
0:10	Aileron full right
0:20	Aileron full left
0:30	Aileron level
0:40	Flaps down
0:50	Flaps up
1:00	Landing gear up
1:20	Landing gear down
1:40	Speed brake up
1:50	Speed brake down
2:00	Navigation lights on
2:10	Navigation lights off
2:20	Landing lights on
2:30	Landing lights off
2:40	Taxi lights on
2:50	Taxi lights off
3:00	Landing + Taxi lights on
3:10	Landing + Taxi lights off
3:20	Strobes on
3:30	Strobes off
3:40	Recognition lights on
3:50	Recognition lights off
4:00	Turn on all wing-tip lights simultaneously (typically will include navigation lights, recognition lights and strobe)

Elapsed Time since Start of Test (min:secs)	Action
4:10	Turn off all wing-tip lights simultaneously
4:20	Beacon on
4:30	Beacon off
4:40	Pitot heat on
4:50	Pitot heat off
5:00	End of test

- When the CALIBRATE field is blinking, press the ENT key to begin the procedure, and have a stopwatch ready to begin recording the elapsed time.

NOTE

It is important that the “time equals zero” moment corresponds with the moment the PFD first displays the blinking TEST COMPLETE message. The operator should carry out the actions called for in the prepared test sequence.

It is important that all actions are carried out in the order and at the precise elapsed time as specified in the prepared test sequence. When the operator has completed the actions specified in the test sequence, press the ENTER button to indicate that the process is complete. When this is done, the TEST COMPLETE field stops blinking. The PFD informs the operator if the installation has passed or failed the magnetometer interference test. If the test passes, no further action is required for this test. If the test fails, the installation should be considered unreliable until the source of magnetic interference is identified and remedied. When the magnetometer interference test fails, record the three-magnetometer maximum deviation values and their corresponding timestamps. Any maximum deviation value greater than 2.5 milliGauss indicates a problem that must be resolved. Compare the corresponding timestamps with the prepared test sequence to identify which action produced the problem. Contact Garmin for assistance in resolving the problem.

- Press the ENT key on the PFD to finish this procedure.
- Verify attitude and heading, on PFD in normal mode.

7.6 GDC 74B AIR DATA COMPUTER

7.6.1 Reinstalling an Original GDC 74B

No software or configuration loading is required if the original GDC 74B is reinstalled. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

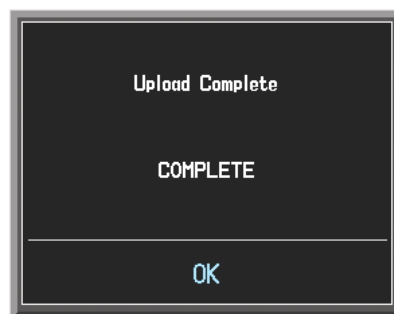
7.6.2 Installing Original GDC 74Bs in Opposite Locations

If the original GDC #1 and GDC #2 are installed in opposite locations for troubleshooting, configuration loading is required.

NOTE

Any pitot/static covers must be removed in order to successfully execute the configuration loading to the GDC 74B.

1. Place the software loading card in the top slot of PFD1.
2. Apply system power and place all displays in configuration mode.
3. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
5. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
6. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
7. Press the CLR ALL softkey.
8. Using the FMS knob and ENT key select the following file:
9. GDC 1 and GDC 2 Configuration files
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ PASS in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.

13. After the configuration, files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.6.3 Installing a New, Repaired, or Exchanged GDC 74B

The correct software and configuration files must be loaded if a new, repaired, or exchanged GDC 74B is installed.

NOTE

Any pitot/static covers must be removed in order to successfully execute the software and configuration loading to the GDC 74B.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GDC (1 or 2) – software and configuration files
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.

13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.6.4 Installing a New GDC 74B Configuration Module

The correct configuration files must be loaded, if the GDC 74B configuration module has been replaced.

NOTE

Any pitot/static covers must be removed in order to successfully perform configuration loading to the GDC 74B.

1. Place the software loading card in the top slot of PFD1.
2. Apply system power and place all displays in configuration mode.
3. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
5. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
6. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
7. Press the CLR ALL softkey at the bottom of the screen.
8. Using the FMS knob and ENT key, select the following files:
 - GDC (1 or 2) – Configuration file
9. Once the files are selected press the LOAD softkey.
10. When the upload is complete, press the ENT key to select OK in the upload complete window.



11. Verify that each column indicates ☐ PASS in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
12. After the configuration file is loaded, turn off the system and remove the software loader card.

7.6.5 GDC 74B Testing

NOTE

To avoid damage to the GDC 74(X), both the pitot and static ports must be connected to the pressure control system. Throughout this procedure, ensure that vertical speed does not exceed $\pm 30,000$ feet per minute. Ensure that airspeed does not drop below -50 knots or rise above 450 knots. It is acceptable to connect the pitot and static ports together, using either the pressure control system or external plumbing, as long as the leak specification of step 5 is met.

NOTE

Allow the unit to warm up for 15 minutes before performing the tests below. Verification of the altimeter and airspeed must be performed using an air data test set (ADTS). The static port and altimeter must be verified in accordance with Title 14 of the Code of Federal Regulations (CFR) § 91.411 and Part 43 Appendix E. To prepare the G1000 for Part 43 Appendix E testing perform the Part 43 App E test with the G1000 in normal mode.

NOTE

The baro setting on PFD1 will apply to both GDC 74B #1 and GDC 74B #2 altitude readings when they are selected as the active sensor. The copilot's display and baro setting can be ignored.

The following tests are beyond the requirements set forth in Appendix E, and are required only when appendix E tests are required.

1. Allow the unit to warm up for 15 minutes before performing the tests.
2. Pitot/Static Airspeed Test
3. Command air data test set (ADTS) to simulate air speeds shown in the table below.
4. Wait for ADTS to report that target values have been achieved.
5. Verify that computed air speeds shown on the PFD are within the tolerances specified in the OEM maintenance documentation.

Calibrated air speed, knots	Allowed tolerance, $\pm$ knots
50	5.0
80	3.5
100	2.0
120	2.0
150	2.0

Static Port Vertical Speed (Rate of Climb) Test

Command ADTS to change the altitude at the rates shown in the table below.

1. Wait for ADTS to report that target rates have been achieved.
2. Verify that the rate of climb reported by the vertical speed field on the PFD is within the tolerances specified in the following table:

Vertical Speed, feet/minute	Allowed tolerance, $\pm$ feet/minute
2000	100
0	45
-2000	100

7.7 GEA 71 Engine/Airframe Interface Unit

7.7.1 Reinstalling an Original GEA 71

No software or configuration loading is required if the original GEA 71 is reinstalled. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.7.2 Reinstalling Original GEA 71s in Opposite Locations

If the original GEA #1, GEA #2 or GEA #3 are installed in opposite locations for troubleshooting, configuration loading is required.

1. Place the Software Loading card in the top slot of PFD1.
2. Apply system power and place all displays in configuration mode.
3. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
5. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
6. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
7. Press the CLR ALL softkey.
8. Using the FMS knob and ENT key select the following file:
 - GEA 1, GEA 2 and/or GEA 3 Configuration files (load the files that apply to the switched unit positions)
9. Once the files are selected press the LOAD softkey.
10. When the upload is complete, press the ENT key to select OK in the upload complete window.

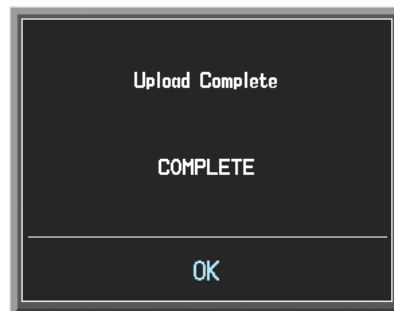


11. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
12. Load configuration files for optional equipment that list GEA (1, 2 or 3) in them. These must be loaded in order for the optional equipment to function correctly with the G1000.
13. After the configuration file is loaded, turn off the system and remove the software loader card.

7.7.3 Installing a New, Repaired, or Exchanged GEA 71

The correct software and configuration files must be loaded if a new, repaired, or exchanged GEA is installed.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GEA (1, 2 or 3) – software and configuration files (load the files that apply to the switched unit position)
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. Load configuration files for optional equipment that list GEA (1, 2 or 3) in them. These must be loaded in order for the optional equipment to function correctly with the G1000.
14. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.7.4 GEA 71 Testing

The following tests are recommended if the unit is removed or replaced. Each GEA 71 sensor input must be checked with the aircraft engine off.

1. Verify all engine information systems are valid on the MFD, and no GEA 71 related alerts appear on the PFD.
2. Operate and test all discrete, analog, and/or digital inputs and check for appropriate responses.

7.8 GTX 33/33D TRANSPONDER

7.8.1 Reinstalling an Original GTX

No software or configuration loading is required if the original GTX is reinstalled. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.8.2 Installing a New, Repaired, or Exchanged GTX

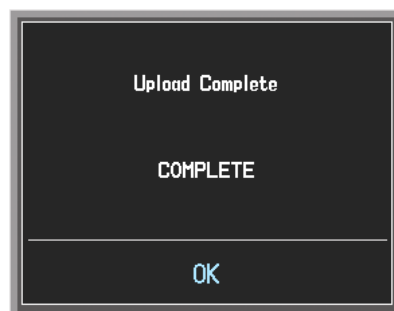
If a new, repaired or exchanged GTX is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GTX (1 or 2) – software and configuration files

NOTE

GTX 2 may be considered optional equipment. The files for GTX 2 may be included in an Option file that you will need to select from the FILE box.

10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates  **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. Enter the Aircraft Registration Number on the GTX configuration page per Section 10.
14. After the file loads and registration configuration are complete, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.8.3 GTX 33/33D Testing

The following tests are recommended if the unit is removed or replaced:

The integrated transponder/altitude reporting system must be verified in accordance with Title 14 of the Code of Federal Regulations (CFR) §§ 91.411 and 91.413.

Transponder Ramp Test

Refer to Title 14 CFR Part 43 Appendix F for testing criteria. This test requires the use of a Mode S ramp generator. Specific instructions for operating the ramp tester are contained in the applicable operator's manual.

7.9 GDL 69A REMOTE DATALINK RECEIVER

7.9.1 Reinstalling an Original GDL 69A

No software or configuration loading is required if the original GDL 69A is reinstalled. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.9.2 Installing a New, Repaired, or Exchanged GDL 69A

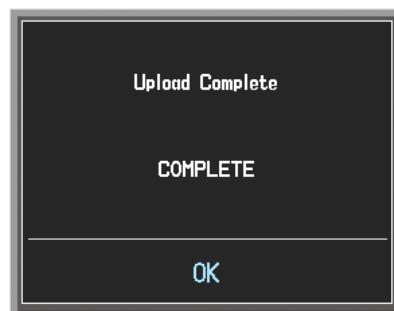
Correct software and configuration files must be loaded if a new, repaired or exchanged GDL 69A is installed.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GDL – software and configuration files

NOTE

The GDL 69A may be considered optional equipment. The files for GDL 69A may be included in an option file that you will need to select from the FILE box.

10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates  in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

NOTE

See the GDL 69A XM Satellite Radio Activation Instructions, Garmin part number 190-00355-04, for instructions on activating the GDL 69A.

7.9.3 GDL 69A Testing

Verify the desired services are activated on the MFD AUX-XM page by pressing the INFO softkey at the bottom of the display to show the subscription information.

7.10 GSA 8X AUTOPILOT SERVO MOTOR (INCLUDES THE 80 AND 81)

7.10.1 Reinstalling Original Servos

If the removed servos are reinstalled (same serial numbers), no software loading is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.10.2 Installing New, Repaired, or Exchanged Servos

If a new, repaired or exchanged Servo Motor is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GSA (Pitch, Roll, Yaw or Pitch Trim)—Software file
 - GSA (Pitch, Roll, Yaw or Pitch Trim) GAINS—Software file

10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.10.3 GSA 8X Testing

The following procedure verifies the proper operation of the GFC 700 AFCS. The technician performing these checks must be thoroughly familiar with GFC 700 operation (refer to the applicable Garmin G1000 Cockpit Reference Guide for operating instructions).

Autopilot Pre-Flight Test

NOTE

Power up the system in normal mode. The autopilot preflight test will run on every full autopilot power-on.

NOTE

A red AFCS annunciation is displayed until both GIAs, the AHRS, and the autopilot servos appear online. Make sure a white 'PFT' annunciation is displayed in the upper right corner of PFD1. Upon successful completion of the test (takes approximately 10 to 15 seconds) the autopilot disconnect aural alert sounds and the annunciation clears.

NOTE

If the 'PFT' annunciation turns red, the test has failed and additional troubleshooting has to be performed before continuing the test. If the aural alert is not heard, but pre-flight testing passed, engage the autopilot by pressing the AP key and disengage the autopilot by pressing the AP key again. Visual and aural disconnect alerting should clear. If no alert is heard, check the GIA 1/GMA 1 and GIA 2/GMA 2 audio interface.

AFCS Switch Checks

To verify the AFCS systems buttons and switches are operating correctly, perform the following checks:

1. Actuate both halves of the Manual Electric Trim (MET) switch on the same direction. The trim clutch should engage and the trim wheel should run on the selected direction. Check operation in both directions.
2. Press the AP DISC button and hold while actuating the MET switch. The trim wheel should stop running.
3. Release the AP DISC button. The trim wheel should resume running.
4. Release the MET switch.
5. Press the AP key on the GMC 71X and engage the autopilot.
6. Press and hold the left half of the MET switch. The autopilot should command a normal disengagement, and the trim wheel should stop moving and rotate freely when moved manually. A single disconnect tone is heard and a flashing amber "AP" and "YD" is visible on the PFD.
7. Engage the autopilot again by pressing the AP key on the MFD. The pitch and roll clutches should engage, resisting movement of the control wheel.
8. Press and hold the CWS switch. "CWS" is annunciated in white on the PFD and the control wheel should now move freely when moved manually.
9. Release the CWS switch. The "CWS" annunciation is replaced by a green "AP." The autopilot should hold the control wheel at its present attitude.

10. Press the AP DISC switch. The autopilot should command a normal disengagement. A single disconnect tone is heard and a flashing amber "AP" is visible on the PFD.
11. Make sure the control yoke is free in pitch and roll axes.
12. Engage the autopilot again by pressing the AP key on the GMC 71X.
13. Pull the AP SERVOS circuit breaker. The autopilot should command an abnormal disconnect, consisting of a continuous disconnect tone and a flashing red "AP" and amber "YD" annunciation.
14. Press the AP DISC button to silence the autopilot abnormal disconnect tone.
15. Reset the AP SERVOS breaker.
16. Wait for the preflight test sequence to successfully complete again.
17. Press the TO/GA button. "TO" should be annunciated on the PFD for both pitch and roll modes and the command bars should indicate a wings-level climb to 10 degrees.
18. Press the FD key on the GMC 71X twice to deactivate the 'Go Around' mode and reset the flight director. Green "PIT" and "ROL" annunciations and the flight director command bars are visible on the PFD.
19. Center the trim wheel if it is not already centered.
20. Press the AP key to engage the autopilot.
21. Press the CWS button and verify there is no residual force on the control wheel for the pitch axis.
22. Disengage the autopilot by pressing the AP DISC switch.

Autopilot Clutch Overpower Check

NOTE

The GFC 700 uses electronic torque limiting as well as mechanical slip clutches to limit the maximum servo effort. When the system is on the ground, the electronic torque limiting is removed, allowing manual checks of the slip-clutch settings. The clutch overpower check is not necessary if the GSM 85(A) servo mount was not changed or serviced.

1. Engage the autopilot by pressing the AP key on the GMC 71X.
2. Apply force to the control yoke to determine if the Autopilot clutches can be overpowered in pitch and roll. Overpowered means that the control surfaces can be moved by applying force to the control wheel or the rudder pedals against the resistance of the engaged Autopilot. If the Autopilot clutches cannot be overpowered, check the servo clutch torque settings.
3. Apply force to the rudder pedals to determine if the Autopilot clutch can be overpowered in yaw. If the Autopilot clutch cannot be overpowered, check the servo clutch torque settings.
4. Actuate the MET switch (this causes an autopilot disconnect). While the trim is running, grasp the aircraft pitch trim wheel and verify that the trim clutch can be overpowered by preventing the trim wheel from moving. If it cannot be overpowered, check the trim servo clutch torque setting. Verify also that the trim wheel moves smoothly in both directions throughout the entire trim range during MET operation. If the trim wheel hesitates excessively (more than 2 seconds without motion), this may indicate that the pitch trim clutch is slipping. First verify

proper clutch setting and cable tension. If both clutch setting and cable tension are within tolerance, check the aircraft pitch trim system for excessive friction.

Manual Electric Trim Speed Check

Check in the OEM Maintenance Manual to see if this check needs to be performed.

Autopilot Operation Checks

1. Push the HDG knob in to synchronize the heading bug to the present aircraft heading on the HSI.
2. Engage the Autopilot and Yaw Damper by pressing the AP key on the GMC 71X.
3. Select Heading mode by pressing the HDG key on the MFD. The command bars should be level and the control wheel should be stationary (very slow movement acceptable, due to the aircraft not being perfectly level).
4. Turn the HDG knob to the left and verify that the command bars move to the left and the control wheel turns to the left (counter-clockwise).
5. Turn the HDG knob to the right and verify that the command bars move to the right and the control wheel turns to the right (clockwise).
6. Push the CWS button and verify that "CWS" is annunciated in white on the PFD. Pull the control wheel to the middle of the pitch control range.
7. Release the CWS button. Verify that the Autopilot clutches re-engage and hold the wheel stationary.
8. Holding the control wheel lightly, turn the NOSE UP wheel on the GMC 71X, to increase the pitch reference. Verify that the command bars move up approximately 1/2 degree and the control wheel begins moving aft.
9. Hold the control wheel and press the CWS button, re-synchronizing the pitch reference and re-centering the control wheel.
10. Release the CWS button and verify that servo clutches re-engage before releasing the control wheel.
11. Turn the NOSE DN wheel on the GMC 71X. Verify that the command bars command down and the control wheel begins moving forward.
12. Hold the controls and press CWS to re-center the command bars and stop control wheel movement.
13. With the Autopilot still engaged and the CWS button pressed, move the control wheel to its aft limit.
14. Release the CWS button and apply continuous forward pressure, slowly moving the control wheel. After 1 or 2 seconds, the trim wheel should begin moving in a trim up direction.
15. Grip the control wheel and press the CWS button. Trim motion should stop.
16. Move the control wheel to the forward limit and release the CWS button.
17. Slowly pull back on the control wheel. After a similar delay, the trim wheel should begin to trim down.

18. Relieve pressure on the wheel and the trim motion should stop. Verify that the trim wheel is free to turn.
19. Hold the control wheel and press the AP DISC switch to disconnect the autopilot.
20. Engage VS mode by pressing the VS key on the GMC 71X. Verify the PFD display 'VS' in green and indicates a pitch reference of '0 FPM'.
21. Press the FLC key on the GMC 71X and verify that "FLC" is annunciated on the PFD in green.
22. Press the ALT key on the GMC 71X and verify that the "ALT" annunciation is displayed in green on the PFD.
23. Press the FD key and verify that the mode annunciations and command bars are removed from the display.
24. Press the YD key and verify that the "YD" annunciation is displayed in green on the PFD.
25. Press the rudder pedals and verify that the yaw servo is resisting movement of the rudder pedals.
26. Press the AP DISC button and verify that a flashing yellow "YD" annunciation is displayed on the PFD.
27. Verify that the rudder pedals move freely.

7.11 GCU 47X KEYPAD (INCLUDES 475, 476 AND 477)

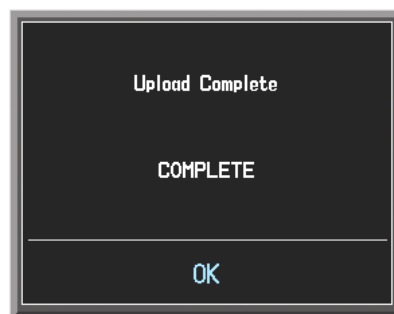
7.11.1 Reinstalling an Original GCU 47X

If the GCU 47X that was removed is reinstalled (same serial number), no software loading or configuration is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.11.2 Installing a New, Repaired, or Exchanged GCU 47X

If a new, repaired or exchanged GCU 47X is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the software loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor; rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GCU – software and configuration files
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates  in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.11.3 GCU 47X Testing

Perform a basic operational check to verify the buttons and knobs work.

7.12 GMC 71X Autopilot Controller (includes 710 and 715)

7.12.1 Reinstalling an Original GMC 71X

If the removed GMC 71X is reinstalled (same serial number), no software loading or configuration is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.12.2 Installing a New, Repaired, or Exchanged GMC 71X

If a new, repaired or exchanged GMC 71X is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor, rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GMC – software and configuration files
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ PASS in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.

13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.12.3 GMC 71X Testing

Perform a basic operational check to verify the buttons and knobs work.

7.13 GWX 68 RADAR

7.13.1 Reinstalling an Original GWX 68

If the removed GWX 68 is reinstalled (same serial number), no software loading or configuration is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.13.2 Installing a New, Repaired, or Exchanged GWX 68

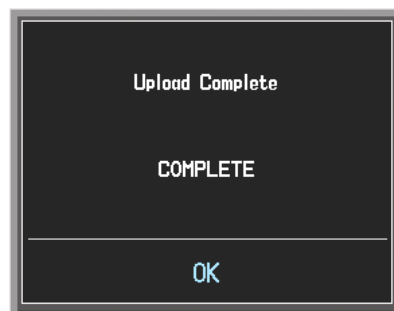
If a new, repaired or exchanged GWX 68 is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor, rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GWX – software and configuration files

NOTE

GWX 68 may be considered optional equipment. The files for GWX 68 may be included in an Option file that you will need to select from the FILE box.

10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.13.3 GWX 68 Testing

Operation of the GWX 68 Weather Radar is accomplished using the MFD/GCU 47X controls. Refer to the applicable G1000 Cockpit Reference Guide for basic operation. Perform a basic operation check on the weather radar. Electronic adjustments to align the radar to the airframe may be made per the adjustment Section.

NOTE

Before energizing the equipment, be sure microwave radiation safety precautions including both fuel and personnel safety considerations have been observed. These include clearing all personnel to an area beyond the maximum permissible exposure level (MPEL) boundary. The MPEL for the GWX 68 is eleven feet.

7.13.4 G1000/GWX 68 Pitch and Roll Trim Adjustments



Figure 7-10. Radar Trim Window

The following procedure assumes the correct configuration data files have been loaded and the G1000 is in normal operating mode. This procedure may be used in flight to correct “radar painting heavy left/right” pilot squawks and to electronically align the radar to the airframe.

1. On the PFD press the following softkey sequence: 11, 11, 1, 1, 2.
2. The Radar Trim window will now appear (see Figure 7-10).
3. Use the FMS knob to highlight and adjust the pitch and roll trim. Pitch and roll trim can be adjusted in 0.05° degree increments, between $\pm 4.00^\circ$. As you change a value the window will display ‘Configuring GWX’ then ‘GWX Configured’. The resulting radar returns can be viewed on the MFD.
4. Use the FMS knob to highlight ‘SAVE?’ and press the ENT key. The GWX 68 will now restart.

7.14 GSD 41 Data Concentrator

7.14.1 Reinstalling an Original GSD 41

If the GSD 41 that was removed is reinstalled (same serial number), no software loading or configuration is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.14.2 Installing a New, Repaired, or Exchanged GSD 41

If a new, repaired or exchanged GSD 41 is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor, rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GSD 1 – software and configuration files
10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates PASS in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.

13. Load configuration files for optional equipment (i.e. ADF, DME, GWX Radar, WX500, KTA810 TAS, KRA405B RA, etc.) that list GSD 1 in them. These must be loaded in order for the optional equipment to function correctly with the G1000.
14. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.14.3 GSD 41 Testing

Verify the unit is online by checking the PFD1 ALERT window for GSD error messages when the system is powered on in normal mode.

7.15 GDL 59 DATA COLLECTION AND COMMUNICATION UNIT

7.15.1 Reinstalling an Original GDL 59

If the GDL 59 that was removed is reinstalled (same serial number), no software loading or configuration is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.15.2 Installing a New, Repaired or Exchanged GDL 59

If a new, repaired or exchanged GDL 59 is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor, rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GDL59 – software and configuration files
 - GDL59 ROUTER – software file
 - GDL59 ROUTER FILE SYSTEM – software file

NOTE

The GDL 59 may be considered optional equipment. The files for GDL 59 may be included in an Option file that you will need to select from the FILE box.

10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates ☐ **PASS** in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.15.3 GDL 59 Testing

Perform a basic operational check to verify the unit is online by checking the PFD1 ALERT window for GDL error messages when the system is powered on in normal mode.

7.16 GTS 8XX TCAS

7.16.1 Reinstalling an Original GTS 8XX

If the GTS unit that was removed is reinstalled (same serial number), no software loading or configuration is required. This does not include units that were returned for repair since their software and configuration files were deleted during repair.

7.16.2 Installing a New, Repaired, or Exchanged GTS 8XX

If a new, repaired or exchanged GTS unit is installed the correct software and configuration files must be loaded.

1. Remove the supplemental database cards from the bottom slots of each display. Note which supplemental database card was removed from the MFD so it can be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place the Software Loading card in the top slot of PFD1.
3. Apply system power and place all displays in configuration mode.
4. On PFD1, press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. After the SYSTEM STATUS page appears on PFD1, use the small FMS knob to turn to the SYSTEM UPLOAD page.
6. Activate the cursor, rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model option in the AIRFRAME field pop-up box and press the ENT key.
7. Once an airframe type is selected the cursor moves to the FILE window. Rotate the small FMS knob to activate the pop-up box. Highlight the correct aircraft model “Base Configuration” option file and press the ENT key.
8. Press the CLR ALL softkey at the bottom of the screen.
9. Using the FMS knob and ENT key, select the following files:
 - GTS – software and configuration files

NOTE

The GTS 8XX may be considered optional equipment. The files for GTS 8XX may be included in an Option file that you will need to select from the FILE box.

10. Once the files are selected press the LOAD softkey.
11. When the upload is complete, press the ENT key to select OK in the upload complete window.



12. Verify that each column indicates  in green when the loading process has finished and inspect the SUMMARY window as well to ensure that the load is successful.
13. After the software and configuration files are loaded, turn off the system and remove the software loader card. Reinsert the supplemental database cards in the bottom slot of each display. Be sure to insert the card removed from the MFD back into the MFD.

7.16.3 GTS Testing

Perform a basic operational check to verify the unit is online by checking the PFD1 ALERT window for GTS error messages when the system is powered on in normal mode. Refer to Section 5 for troubleshooting advisory messages.

SECTION 8

RETURN TO SERVICE TESTING

The procedures in this section check various secondary communication paths to ensure that the paths are functioning correctly. Verify the LRU software part number and version against those listed on the required equipment list after reinstalling an LRU.

1. Start the G1000 in configuration mode. The system status page displays a list of LRUs in the LRU window (Figure 8-1).
2. Activate the cursor and highlight the LRU window.
3. Use the FMS knob to scroll through the list in the window and select the displayed LRUs.
4. The software part number and version is displayed in the data window. Compare this to the software configuration shown in the required equipment list. It is important that the software versions be checked and validated according to the listed versions in the required equipment list. Software configuration is a critical part of the G1000 operation and must be verified before returning an aircraft to service.

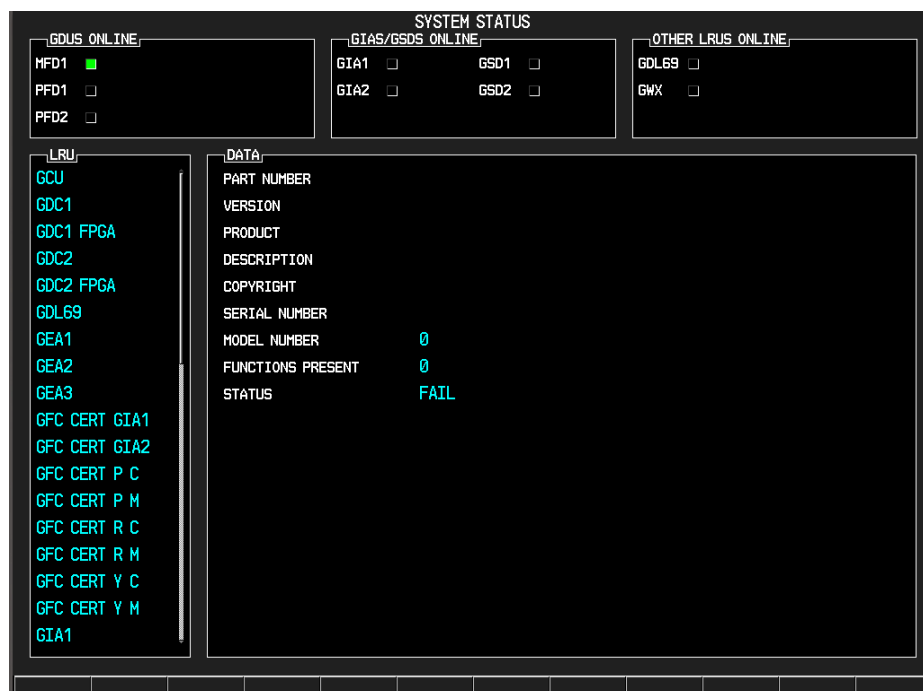


Figure 8-1. System Status Page (Configuration Mode)

8.1 WAAS GPS TEST

TEST	DESIRED RESULT
Single GPS Failure Conditions: 1. Place a metal shroud (sufficient enough to block a GPS signal) over the GPS antenna for GIA 1 to prevent signal reception. Verify loss of signal on MFD AUX page. 2. Check for desired results. 3. Remove shroud from the GIA 1 GPS antenna. 4. Place a metal shroud (sufficient enough to block a GPS signal) over the GPS antenna for GIA 2 to prevent signal reception. Verify loss of signal on MFD AUX page. 5. Check for desired results. 6. Remove shroud from the GIA 2 GPS antenna.	GPS Failure - For each of the specified GPS failure conditions, the following should remain valid on the PFD throughout the procedure: • Attitude and Heading from AHRS. • Airspeed, Altitude, Vertical Speed, and OAT from Air Data Computer. • GPS CDI remains valid on PFD. • "BOTH ON GPS1" or "BOTH ON GPS2" reversionary sensor annunciations appear on both PFDs.
Dual GPS Failure Conditions: 1. Cover both GPS antennas. Verify loss of signal on MFD AUX page. 2. Check for desired results. 3. Remove shrouds from GPS antennas. 4. Allow both receivers to reacquire satellite signals before continuing.	Dual GPS Failure - For a dual GPS failure, the following will occur: • GPS CDI flags INTEG on PFD. • Attitude and Heading remain valid from AHRS. • Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer.

8.2 GIA TEST

TEST	DESIRED RESULT
Single GIA Failure Conditions: 1. Remove power from GIA 1. 2. Check for desired results. 3. Restore power to GIA 1. Allow to re-acquire satellites. 4. Remove power from GIA 2. 5. Check for desired results. 6. Restore power to GIA 2.	GIA 1 Failure - For a GIA 1 failure, only the following should flag invalid: • COM/NAV 1 field. • NAV 1 CDI loses deviation bar. • GIA 2 Power Failure - For a GIA 2 failure, only the following should flag invalid: • COM/NAV 2 field. • NAV 2 CDI loses deviation bar.
Dual GIA Failure Conditions: 1. Remove power from both GIA units. 2. Check for desired results. 3. Restore power to both GIA units.	Dual GIA Failure – For a dual GIA failure, only the following should occur: • COM/NAV 1 & COM/NAV 2 fields flag invalid. • GPS CDI flags INTEG on PFD. • NAV 1, 2 CDI loses deviation bar. • XPDR field flags invalid on PFD. • Engine Instrument field flags invalid on MFD. • All AHRS & ADC fields valid.

8.3 DISPLAY TEST

TEST	DESIRED RESULT
MFD Display Failure Conditions: 1. Open MFD CB. 2. Verify desired results. 3. Close MFD CB.	The following shall occur when power is removed from the MFD: • MFD goes blank. • All PFD1 and 2 primary flight information is retained. • The COM 1/2 and NAV 1/2 tuning fields remain valid and can be tuned by rotating the tuning knobs on PFD1 and PFD2. • XPDR 1/2 fields remain valid and XPDRs can adjusted via PFD softkeys.
PFD2 Display Failure Conditions: 1. Open PFD 2 CB. 2. Verify desired results. 3. Close PFD 2 CB.	The following shall occur when power is removed from PFD2: • PFD2 goes blank. • PFD1 and MFD remain in normal display formats. The following illuminate on PFD1: • HDG NO COMP illuminates on PFD1 • ROLL NO COMP illuminates on PFD1 • PIT NO COMP illuminates on PFD1 • IAS NO COMP illuminates on PFD1 • ALT NO COMP illuminates on PFD1 • GMA2 Fail – GMA2 is inoperative. • XPDR2 Fail – XPDR2 is Inoperative.
PFD1 Display Failure Conditions: 1. Open PFD 1 PRI and PFD1 SEC circuit breakers. 2. Verify desired results. 3. Close PFD 1 PRI and PFD1 SEC circuit breakers.	The following shall occur when power is removed from PFD1: • PFD1 goes blank. • PFD2 and MFD remain in normal display formats. The following illuminate on PFD2: • HDG NO COMP illuminates on PFD2 • ROLL NO COMP illuminates on PFD2 • PIT NO COMP illuminates on PFD2 • IAS NO COMP illuminates on PFD2 • ALT NO COMP illuminates on PFD2 • GMA1 Fail – GMA1 is inoperative. • XPDR1 Fail – XPDR1 is Inoperative.

8.4 AHRS/AIR DATA BACKUP PATH TEST

TEST	DESIRED RESULT
Secondary AHRS/ADC path check: 1. Remove power from PFD1. 2. Remove power from GIA2. 3. Check for desired results. 4. Restore power to the PFD and GIA2.	The following should occur on the MFD when power is removed from the PFD1 and GIA2: • MFD switches to reversion mode. • Attitude and Heading remain valid from AHRS. • Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer. • Engine Instrumentation flags invalid. • All COM & NAV fields flag invalid.
Secondary AHRS/ADC path check: 1. Remove power from PFD2. 2. Remove power from GIA2. 3. Check for desired results. 4. Restore power to the PFD and GIA2.	The following should occur on the MFD when power is removed from the PFD2 and GIA2: • MFD switches to reversion mode. • Attitude and Heading remain valid from AHRS. • Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer. • Engine Instrumentation flags invalid. • All COM & NAV fields flag invalid.

8.5 FLIGHT TEST

A flight test is recommended after the installation is complete to ensure satisfactory performance of G1000.

8.6 VHF COM TESTS

Verify the communications capability on both the high and low ends of the VHF COM spectrum. It may be required by the governing regulatory agency to verify operation of the COM transmitter and receiver at the limits of the ground facility's service volume (FAA AC 23-8A).

8.7 VOR/ILS TESTS

Select a VOR channel within a 40 nautical mile range. Listen to the VOR audio and verify that no electrical interference such as magneto noise is present. Check the tone identifier filter operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT/RIGHT, TO/FROM flag indications on the CDI. Check the VOR accuracy. It may be required by the governing regulatory agency to verify operation of the VOR receiver at the extents of a ground facility's service volume (FAA AC 23-8A).

8.8 GTS 8XX TESTS

Perform the following test to verify GTS 8XX operational and surveillance functions. Use a ramp tester such as a TIC TR220 or equivalent to perform the tests.

To select a scenario that will properly converge and intercept the GTS 8XX, the GTS 8XX must be in ground test mode. To enable ground test mode, the aircraft must be on the ground and the GTS 8XX must be in normal system mode and in standby.

Position the test set directional antenna with a clear line of sight to the GTS 8XX antenna at 90 degrees. With the GTS 8XX powered up and in Standby mode indicated on the CDTI, cycle the GTS 8XX to 'Operate'.

Select the following:

- Set the intruder type as ATCRBS.
- Intruder Start Distance: 10 nm.
- Intruder Start Altitude: 50,000 ft.
- Vertical Speed: 0 fpm.
- Velocity: 360 kts.

Initiate the intruder scenario and observe the following:

- Traffic should be acquired at approximately 10 NM at 90 degree bearing and co-altitude. Observe intruder closes on own aircraft at a rate of 0.1 NM/sec.
- The intruder should transition from Other Traffic (displayed as an open diamond with 00 displayed above), to proximate traffic (displayed as a filled white diamond with 00 displayed above), to a Traffic Advisory (TA) alarm.
- The appropriate TA symbology (yellow filled circle with 00 displayed above, and an audio annunciation of "Traffic! 3 O'clock! At Altitude! 3 Miles!"), displayed when the intruder approaches within 3 NM.

8.9 MAINTENANCE RECORDS

The aircraft may be returned to service after conducting the function check flight in accordance with the airplane maintenance manual. Record the following information in appropriate aircraft maintenance logs:

- Part number of the loader card used to perform software loading or software updates.
- Any other applicable information related to the maintenance work performed on the aircraft.

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SECTION 9

PERIODIC MAINTENANCE

This section contains basic periodic maintenance procedures for the G1000. *The procedures are not specific to any particular aircraft. Refer to the OEM approved aircraft maintenance documentation for exact aircraft maintenance requirements.*

9.1 MAINTENANCE INTERVALS

Refer to the OEM maintenance documentation for interval based maintenance requirements.

9.2 RECOMMENDED TOOLS

The following tools are used to perform the maintenance tasks described in this section:

- Voltmeter capable of measuring 0-32 vdc
- Phillips screwdriver
- 3/32nd inch hex tool
- Digital level with 0.25 degrees of accuracy capability
- VHF NAV/COM/ILS ramp tester
- Transponder ramp tester including Mode S capability
- Air data test set (ADTS) capable of simulating altitude up to the aircraft's service ceiling
- GPS indoor repeater (if outside GPS signals cannot be acquired)
- Headset/microphone
- Servo mount test stand (P/N T01-00110-01)

9.3 GENERAL MAINTENANCE PROCEDURES

Pitot/Static Leak Test

Perform a pitot/static leak test described in Title 14 CFR §§ 91.411 and Part 43 Appendix E. Allow the GDC 74B to operate at least 15 minutes before starting the test (refer to Garmin Service Advisory 0608).

Altimeter (GDC 74B & PFD)

According to Part 43 Appendix E, paragraph (b)(2), Garmin specifies a test procedure equivalent to Part 43 Appendix E, paragraph (b)(1) with two exceptions: the tests of sub-paragraphs (iv) (Friction) and (vi) (Barometric Scale Error) are not applicable because the digital outputs of the GDC 74B are not subject to these errors.

Airspeed Function Test (GDC 74B & PFD)

Check for correct indication.

Vertical Speed Indicator (GDC 74B & PFD)

Check for correct indication.

GTX 33 Mode S Transponder

Test according to Title 14 CFR §§ 91.411, 91.413 and Part 43 Appendix F.

GRS 77 Earth Magnetic Field Updates

The GRS 77 uses an earth magnetic field model which is updated once every five years. The update is expected to be available from Garmin by July 1 of each of the following years: 2005, 2010, 2015, and every five years thereafter, as long as the GRS 77 remains a Garmin supported product. Otherwise maintenance of the GRS 77 is on condition of failure only.

GDL 90

Refer to the GDL 90 Installation Manual (P/N 560-1049-02) for periodic maintenance instructions.

GSA 8(X) Servos

Conduct a visual inspection every 1000 hours or every annual. Clean and apply grease to the output gear every 1000 hours or every 3 years.

GSM 85(A) Servo Gearbox

Conduct a visual inspection and check slip clutches every 500 hours or once a year.

9.4 GFC 700 VISUAL INSPECTION PROCEDURE

1. Remove the access panels according to OEM maintenance documentation instructions.
2. Inspect the servos, connectors, support structures, and control cables to ensure that no corrosion, chaffing, cracks, or other faults exist.
3. Manually move the ailerons (for roll servo), elevators (for pitch servo), elevator trim wheel (for pitch trim servo), and rudder pedals (for yaw servo) from stop to stop and observe the servo, capstan, and control surface rigging. Make sure there is no binding in the control cabling, and that the capstan pulleys freely rotate.
4. Check the servo control cables to make sure no fraying, corrosion, or other damage exists. Replace the cable if the condition is questionable. Check the tension of each servo control cable. Refer to the OEM maintenance documentation for cable tension specifications.
5. Inspect the GFC 700 system wiring to make sure no chaffing, wear, or other damage exists.

NOTE

Clean and apply grease (Aeroshell 33MS is preferred), or Aeroshell 17 to the output gear every 1000 hours or 3 years, whichever comes first.

9.5 GSA 8(X) GREASING PROCEDURE

1. Remove each servo.
2. Remove excess grease build up from the single servo output gear using a lint-free cloth.
IMPORTANT: It is not necessary to remove all of the grease from the output gear, only the excess grease. DO NOT USE SOLVENTS TO CLEAN THE OUTPUT GEAR.
3. Apply a thin coat of Aeroshell 33MS grease to the servo output gear using a brush or other applicator.
4. Reinstall the servos.
5. Rotate control surfaces through their range of motion.

9.6 GSM 85(A) SLIP CLUTCH CHECKING AND ADJUSTMENT PROCEDURE

Refer to the OEM maintenance documentation for rigging and derigging instructions. For instructions on checking and adjusting the slip clutch, refer to the GSA 8X/GSM 85(A) Installation Manual (190-00303-72). This adjustment requires the use of the Garmin servo adjustment fixture P/N T10-00110-01.

9.7 GSM 85(A) SERVO GEARBOX SEMI-AUTOMATED SLIP CLUTCH TEST PROCEDURE

NOTE

Perform the test at temperatures between 50° F and 120° F.

NOTE

All G1000 and GFC 700 equipment must be installed and operational to perform the semi-automated slip clutch test procedure.

The semi-automated slip clutch test procedure is to be used as a baseline only. Aircraft-specific customization will be required based on the actual number and configuration of GSM 85(A) gearboxes installed and the appropriate minimum and maximum allowable torque thresholds for each axis. Refer to the OEM maintenance documentation for aircraft specific procedures. The purpose of the test is to verify that the pitch, roll, yaw, and pitch trim of the GSM 85(A) slip clutches are within acceptable limits. The test also verifies servo load cell integrity.

NOTE

The displayed test results are not stored in G1000 memory. If power is cycled, the test results will be lost. The test values are not lost when changing configuration mode pages on PFD1.

NOTE

Refer to section 5 for a detailed explanation of the GFC Status Page (Figure 9-1).

GFC STATUS			
SELECT GIA UNIT GIA 1		SELECT SERVO AXIS PITCH SERVO	
GIA STATUS AP DISCONNECT ☒			
MONITOR BOARD STATUS			
SERVO PROGRAM 1	☒	AP DISCONNECT	☒
SERVO PROGRAM 2	☐	PFT	PASSED
SERVO PROGRAM 3	☐	HIGH RES LOAD CELL CAL	☒
		HIGH RING LOAD CELL CAL	☒
CONTROL BOARD STATUS			
SERVO PROGRAM 1	☒	AP DISCONNECT	☒
SERVO PROGRAM 2	☐	PFT	PASSED
SERVO PROGRAM 3	☐		
DRIVE SERVO RPM 0.00rpm		SERVO DATA	
		VOLTAGE 0.00V	SPEED 0.00rpm
		CURRENT 0.00A	TORQUE 0.00in-lb
SLIP CLUTCH TEST RESULTS		CLUTCH ENGAGE STATUS ☐	
NOSE UP	NOSE DOWN		
MIN ---in-lb	---in-lb		
MAX ---in-lb	---in-lb		
TEST SVO TEST ALL		ENG CLCH DRV SRVO RST GAIN	

Figure 9-1. GFC Status Page

NOTE

Once the test starts the servo will begin to drive. If, for any reason, the test must be stopped, firmly grasp the aircraft control being moved and press the red AP DISC switch on the aircraft control stick.

1. Start PFD1 in configuration mode.
2. Start the MFD and PFD2 in normal mode.
3. Press the red reversionary button on the left-side GMA 1347 to force the MFD into reversionary mode.
4. Select the GFC STATUS configuration page (GFC Page Group) on PFD1 using the FMS knob. Observe the MFD and acknowledge any flashing CAS messages.
5. Select the desired servo on the GFC status page.
6. Verify that the PFT status field on the GFC status page displays PASSED.
7. Pin in place the aircraft control to be checked by following the OEM's instructions.
8. Press the TEST SVO softkey.
9. Highlight YES and press the ENT key. The test begins a 50 second data collection period, where the servo is commanded to drive at ~2.5 rpm while the servo load cell measures clutch torque. During the test, the MFD will display the CAS message "CLUTCH [PIT/ROL/YAW] PROG" indicating the test for the stated axis is in progress.
10. Monitor the CURRENT field and verify that the current displayed is greater than zero.
11. After the data is collected and processed, the test displays the min and max torque readings of the first direction on the PFD. The servo immediately reverses direction and performs the test in the opposite direction.
12. At the completion of the test, the MFD will display one of the following CAS messages:
 - CLUTCH [PIT/ROL/YAW] PASS
 - CLUTCH [PIT/ROL/YAW] FAIL
13. Press the red AP DISC button to relieve any control tension.
14. Press the ENT key to acknowledge the COMPLETE prompt on the PFD.
15. If the CAS message CLUTCH [PIT/ROL/YAW] PASS is displayed, the test has passed. If the CAS message CLUTCH [PIT/ROL/YAW] FAIL is displayed, the servo must be removed from the aircraft and tested/adjusted according to section 9.7.
16. Record pass or fail from the CAS messages displayed on the MFD and the clutch measurement values (from PFD1) in Table 9-1, or in appropriate aircraft maintenance records.
17. Repeat the procedure for each servo axis.

NOTE

The min and max torque values displayed on the GFC status page should not be used to determine whether or not the test passed. Only the appearance of the CAS message 'CLUTCH [PIT/ROL/YAW] PASS' on the MFD should be relied on as an indication that the test passed in a given axis.

Table 9-1. Test Results

Axis	Direction	Min Measured Torque (in-lbs)	Max Measured Torque (in-lbs)	Min Allowed Torque (in-lbs)	Max Allowed Torque (in-lbs)	Pass or Fail
Pitch	Up			TBD	TBD	
	Down					
Roll	Left			TBD	TBD	
	Right					
Yaw	Left			TBD	TBD	
	Right					

Min/Max Test Threshold Determination

In order to account for individual GSA 8X load cell measurement tolerance, as well as possible GSM 85(A) slip clutch variation over temperature, specific minimum and maximum torque limits must be established for each axis. To establish these thresholds, Garmin has developed a procedure that yields a 99% confidence level based on a significant sample size of fielded and production units. These thresholds vary based on whether the applicable GSM 85(A) contains either a ball bearing or a bronze bearing on its output shaft, and also whether or not the GSM 85(A) has an idler pulley.

In order to establish appropriate thresholds for the semi-automated check, Garmin has examined data from its factory, field inspections of slip clutch, and extensive lab tests and life tests. As part of that evaluation, Garmin considered both GSA 8X load cell variation, GSM 85(A) slip clutch tolerance over temperature, and friction differences between ball and bronze bearings among other things. Based on that data, the calculations below can be used to calculate the semi-automated slip clutch test tolerances based on a given nominal slip clutch setting.

It should be noted that if specific axes are considered not load critical, increased tolerance at the low end could be utilized beyond that recommended below. If it is desired to take advantage of this in order to reduce removals, Garmin should be contacted to determine if this can be accomplished and if flight test data exists to substantiate such a reduction.

GSM 85(A) with Ball Bearing, no Idler Pulley

This determination method is applicable to the following GSM 85(A) part numbers:

- 011-01436-() (except -07 and -08)
- 011-00894-01
- 011-00894-04
- 011-00894-05
- 011-00894-06
- 011-00894-09
- 011-00894-11
- 011-00894-14

The allowable limits of the test results can be determined as follows:

- Upper limit = Nominal Slip Clutch Setting * 1.120
- Lower limit = Nominal Slip Clutch Setting * 0.942

GSM 85(A) with Ball Bearing, with Idler Pulley

This determination method is applicable to the following GSM 85(A) part numbers:

- 011-01436-07
- 011-01436-08
- 011-00894-12

The allowable limits of the test results can be determined as follows:

- Upper limit = Nominal Slip Clutch Setting * 1.030
- Lower limit = Nominal Slip Clutch Setting * 0.867

GSM 85(A) with Bronze Bearing, no Idler Pulley

This determination method is applicable to the following GSM 85(A) part numbers:

- 011-00894-00
- 011-00894-07
- 011-00894-08
- 011-00894-10

The allowable limits of the test results can be determined as follows:

- Upper limit = Nominal Slip Clutch Setting * 1.181
- Lower limit = Nominal Slip Clutch Setting * 1.036

GSM 85(A) with Bronze Bearing, with Idler Pulley

This determination method is applicable to the following GSM 85(A) part numbers:

- 011-00894-02

The allowable limits of the test results can be determined as follows:

- Upper limit = Nominal Slip Clutch Setting * 1.087
- Lower limit = Nominal Slip Clutch Setting * 0.953

9.7.1 Abnormal Test Messages

The following prompts possibly will be displayed indicating an abnormality encountered during testing. Troubleshoot the problem using the information given in the table below.

Message	Probable Cause	Action
STOP NOT REACHED	The servo did not detect a torque value which exceeded 70% of the established mechanical torque limit within 1 minute of starting the test. A low slip clutch setting is the probable cause.	• Repeat test. • If the same result is received, remove servo mount and check/set clutch on stand.
SERVO TORQUE TOO HIGH	The servo detected an average torque value which exceeded 130% of the established mechanical torque limit. Probable causes include a high slip clutch setting, or excess friction encountered during the control surface travel.	• Engage the autopilot for the axis which reported torque too high. Manually operate the controls and verify that the clutch can be overridden. If the clutch can slip, repeat the test again. Otherwise remove the servo mount and reset the clutch. • Check control friction against aircraft maintenance specifications. • If the same result is received on retest, remove servo mount and check/set clutch on stand.
SERVO TORQUE TOO LOW	The servo detected an average torque value which fell below 70% of the established mechanical torque limit after detecting that the stop was reached. Likely causes include a low slip clutch setting or a disturbance in the controls before reaching the stop.	Repeat test. If the same result is received, remove servo mount and check/set clutch on stand.
INVALID SERVO SPEED	The servo is unable to maintain the required ~2.5 RPM during the test (Speed drops below 2 RPM or exceeds 3 RPM)	Repeat test. If the same result is received, remove servo mount and check/set clutch on stand.

Message	Probable Cause	Action
TEST SPEED FAIL	Servo has not responded to the test initialization command.	- Repeat test. - If message does not clear, troubleshoot the servo and it's wiring for the source of the failure. - Repeat test when the source of the servo failure has been corrected.
SERVO TEST TIMED OUT	Servo not responding for over 60 seconds during testing.	
SERVO DATA TIMED OUT	The servo has failed to transmit load cell sensor status.	
LOAD CELL INVALID	A special test monitor has detected an inequality between motor torque and load cell torque greater than the specified threshold. An out-of-calibration load cell may be the cause.	Replace servo motor and repeat the test.
AIRBORNE STATUS	The G1000 has detected airborne status, (determined by true airspeed) and has cancelled the test.	- Verify the ADC is online. - Check pitot/static system is free of obstructions and plumbing kinks. - Repeat test.

9.8 GDC 74B RVSM ALTITUDE INSPECTION

Operation with the GDC 74B at RVSM altitudes requires an accuracy inspection every 12 months. Refer to the GDC 74B Field Calibration Tool Instructions if recalibration is required. The table below provides the criteria and associated action for altitude inspection.

Table 9-2. GDC 74B RVSM Altitude Inspection Criteria

Inspection Pressure-Altitude (ft)	Error, x (ft) at Inspection	Action for Associated Error
29,000	$x < 40$	No Action
	$40 < x < 120$	Use Field Calibration Tool
	$120 < x$	Replace
35,000	$x < 40$	No Action
	$40 < x < 120$	Use Field Calibration Tool
	$120 < x$	Return to Garmin
41,000	$x < 40$	No Action
	$40 < x < 120$	Use Field Calibration Tool
	$120 < x$	Return to Garmin

9.9 CATEGORY B LONG TERM POWER INTERRUPT ANNUAL INSPECTION PROCEDURE

1. Start the G1000 in normal mode, and leave on for a minimum of eleven minutes.
2. Remove power from the MFD and PFDs.
3. Place the MFD and PFDs in configuration mode by holding down the ENT key while applying power (release the ENT key when the words “INITIALIZING SYSTEM” appear on the display).
4. Use the FMS knob to select the GDU TEST Page. Verify that the “BKUP CAPS” checkbox on the GDU TEST Page is green for each GDU. If the “BKUP CAPS” checkbox is red, return the GDU to Garmin for repair.

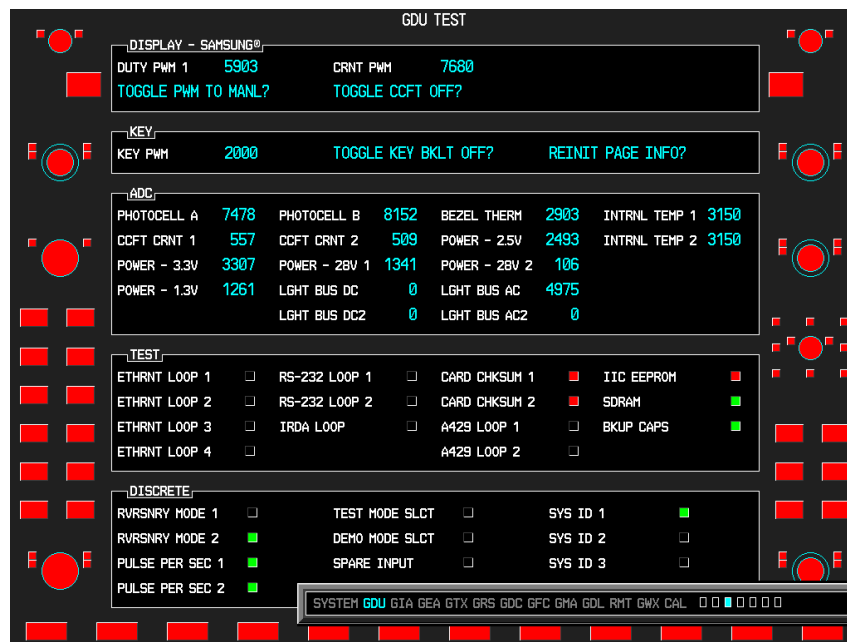


Figure 9-2. BKUP CAPS Checkbox on GDU TEST Page

SECTION 10

RECONFIGURING THE G1000

The initial G1000 software upload and configuration took place at the time of installation. Section 7 explains how to upload, configure, and test software for a replacement LRU. The information in this section is an example on how to completely reconfigure the G1000. The procedures in this section are for reference only and must be tailored for specific aircraft installations.

NOTE

Software part numbers and software versions are not listed in this section, for actual software versions and part numbers refer to OEM maintenance documentation. *Reconfigure only after talking with Garmin Field Service to see if there is an alternate solution to a problem. Reconfiguration is a last resort when all other troubleshooting efforts have been exhausted.*

This section is organized as follows:

- G1000 Reconfiguration Overview
- G1000 Reconfiguration Procedure
 - MFD and PFD Software Load
 - System Software Upload
 - Main Loader Card Options
 - Enable/Unlock Card Options
 - Terrain-Synthetic Vision (SVT)
 - TAWS
 - ChartView
 - TCAS II
 - Final Configuration Items
 - Aircraft Registration Number Entry
- Software Load Confirmation
- Navigation Databases
- Other G1000 Databases
- Software/Configuration Troubleshooting

10.1 G1000 RECONFIGURATION OVERVIEW

Figure 10-1 illustrates the software/configuration sequence.

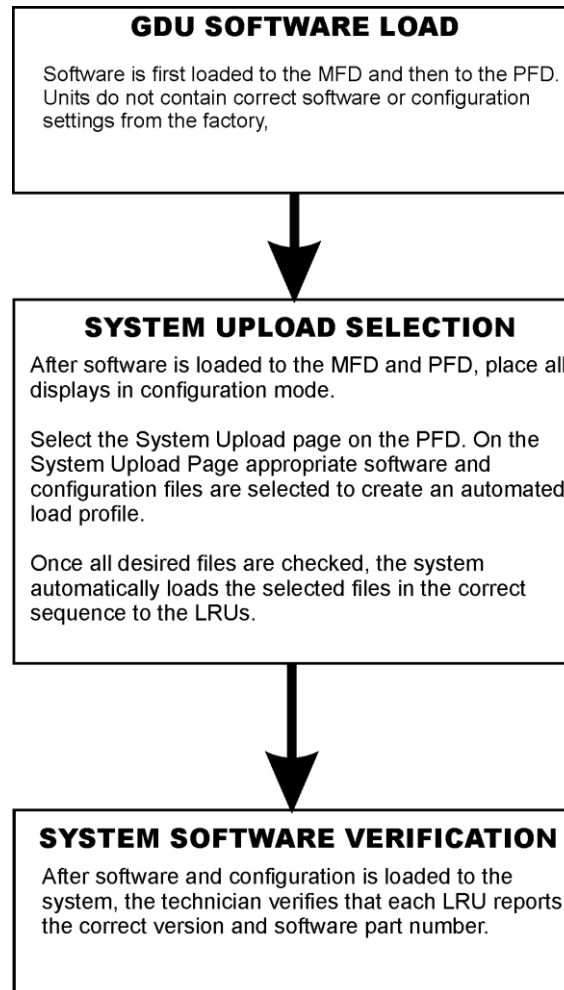


Figure 10-1. Software/Configuration Loading Sequence

10.2 G1000 RECONFIGURATION PROCEDURE

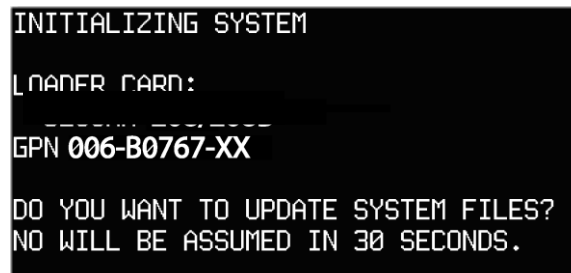
NOTES

Do not rely on only the aircraft batteries to prevent loss of power during the software loading process. Connect a ground power unit to the aircraft. **DO NOT REMOVE POWER FROM THE SYSTEM WHEN LOADING SOFTWARE.** As a general rule, all displays should be in the same mode (configuration or normal), unless instructed differently.

Remove supplemental database cards from the lower slot of all displays before loading software. Not removing the cards may corrupt them. Replacing corrupted database cards are not covered under warranty. Garmin recommends using SanDisk cards to load system software and configuration files. If software loading problems occur when using another brand of card, replace the card with a SanDisk card and attempt the upload procedure again.

10.2.1 Loading MFD and PFD Software

1. Remove the supplemental database cards from the bottom slots of each display. Note which card was removed from the MFD so it may be identified later for reinsertion in the MFD when software and configuration loading is complete. It contains a FliteChart or ChartView database which is only used by the MFD.
2. Place loader card in top slot of display.
3. While holding the ENT key on PFD #2, restore power by closing the PFD #2 circuit breaker.
4. When the words **INITIALIZING SYSTEM** appear in the upper left corner of PFD #2, release the ENT key. The software loader card should be inserted before applying power.
5. Press the YES softkey to acknowledge the following prompt:



```
INITIALIZING SYSTEM
LOADER CARD:
-----
GPN 006-B0767-XX
DO YOU WANT TO UPDATE SYSTEM FILES?
NO WILL BE ASSUMED IN 30 SECONDS.
```

The following screen is displayed:

```

INITIALIZING SYSTEM
LOADER CARD:
GPN-006-B0767-XX
DO YOU WANT TO UPDATE SYSTEM FILES?
NO WILL BE ASSUMED IN 30 SECONDS.
UPDATING SYSTEM FILES, PLEASE WAIT.
.....
*****
UPDATED 90 FILES SUCCESSFULLY!
PRESS ANY KEY TO CONTINUE.
CONTINUING IN 10 SECONDS.
  
```

6. New software is loaded to PFD #2. When complete, PFD #2 starts in configuration mode.
7. Remove power to PFD #2 by pulling the PFD #2 circuit breaker.
8. Remove the software/configuration card loader from PFD #2 and insert it into the top card slot on the MFD. Repeat Steps 2 through 5 for the MFD, using the MFD to hold softkey 12 key down.
9. When MFD update is complete, it starts in the configuration mode.
10. Remove power to the MFD by pulling the MFD circuit breaker.
11. Remove the software/configuration card loader from the MFD and insert it into the top card slot on PFD #1. Repeat Steps 2 through 5 for PFD #1.
12. While holding down softkey 12 on the MFD, restore power to the MFD by closing the MFD circuit breaker.
13. While holding down the ENT key on PFD2, restore power to PFD2 by closing the PFD2 circuit breaker.

NOTE

For the rest of the software/configuration procedure, do not operate the MFD while loading software or configuration unless specifically instructed to do so. A failed or cancelled load may result.

10.2.2 Initial Loading

1. Select the SYSTEM UPLOAD page using the FMS knob.
2. Activate the cursor and highlight the aircraft in the AIRFRAME field.
3. Press the ENT key.
4. Highlight the appropriate airframe in the FILE field.
5. Press the ENT key.
6. Press the 'CHK ALL' softkey to select all loadable software and configuration files.
7. Press the 'LOAD' softkey.
8. Optional equipment configuration files such as ADF, TAS, etc. must be loaded to enable the optional equipment. If the optional equipment configuration files are not loaded, the optional equipment will not operate with the G1000.

10.2.3 Configuring Optional Systems

This section describes the steps that must be completed in order to configure the system with optional equipment.

NOTE

If the configuration for an optional system is inadvertently loaded for a system that is NOT installed, the aircraft configuration files must be reloaded. For example, if the ADF option is loaded, and the aircraft is not equipped with an ADF, the default configuration files must be reloaded. All optional systems must be reconfigured after reloading the default configuration files.

NOTE

The DME and ELT options are included in the baseline and do not require any extra step beyond loading baseline software and configuration.

Follow the procedure below the if aircraft being updated is equipped with the options listed below. Skip this procedure if the aircraft is not equipped with these options. **The same procedure is used for all of the options.**

Options need to be reloaded on top of the baseline if applicable.

Loading Procedure

1. Activate the cursor and rotate the FMS knob once to activate the AIRFRAME menu on the System Upload page.
2. Select 'Options' from the AIRFRAME window and press ENT.
3. Select the desired option from the FILE window, and press ENT.
4. Press the LOAD softkey.
5. Monitor the status of the upload. When the upload is finished, press ENT to acknowledge.
6. View the SUMMARY field and ensure that all items are complete. Verify that PASS appears in green at the check boxes.

The following options need to be reloaded from enable/unlock cards:

- SVT
- TAWS
- ChartView
- TCAS II

NOTE

SD/Unlock card part numbers are not listed in this manual. For part numbers refer to aircraft maintenance documentation.

10.2.3.1 Configuring Terrain — Synthetic Vision (SVT)

The Garmin Synthetic Vision feature requires GDU software version 9.01 or later to be installed prior to activation.

- *Database Cards:*

The Garmin synthetic vision feature requires 9 arc-second high resolution terrain databases to function. Each G1000 display must be equipped with the card installed in the lower slot.

- *SVS Unlock Card:*

The SVS unlock card is required to activate the SVS feature for G1000 installations.

NOTE

When the SVS option is enabled for the first time (normally at the OEM factory), the G1000 writes its unique system ID to the physical card and locks the files to this unique ID. This prevents the SVS unlock card from ever being used to activate the SVS feature in other G1000 systems. The unlock card is forever tied to the specific aircraft in which it was used for the first time. This card must be kept with the aircraft for situations where SVS must be re-activated.

NOTE

SVS does not need to be enabled on each display — only PFD1 as with TAWS and ChartView. The other displays need to be in configuration mode.

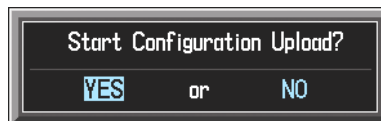
1. Insert SVS card into the top slot of PFD1.
2. While holding the ENT key on PFD1, apply power by closing PFD1 circuit breaker.
3. When the words 'INITIALIZING SYSTEM' appear in the upper left corner of the PFD, release the ENT key.
4. Repeat steps 2 and 3 for the MFD and PFD2.
5. On the PFD, select the system upload page using the FMS knob.
6. Activate the cursor. Use the small FMS knob to select configuration files in the airframe field and press the ENT key.
7. Highlight the FILE field. Use the small FMS knob to select the 'Enable Synthetic Vision' option and press the ENT key. Once the option is selected, the configuration files in the PRODUCT field will be displayed. All files should be checked. If not, press the CHK ALL softkey.
8. Press the LOAD softkey. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the upload complete confirmation.
9. View the summary field and ensure that the item is 'complete'.
10. De-activate the cursor.
11. Cycle power to all displays and reboot the system.

10.2.3.2 Configuring TAWS

1. Insert the TAWS enable card into the top card slot of the PFD1.
2. While holding the ENT key on PFD1, apply power by closing the PFD1 circuit breaker.
3. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
4. Repeat steps 2 and 3 for the MFD and PFD2 (no card required in these displays).
5. On the PFD go to the system upload page using the FMS knob.



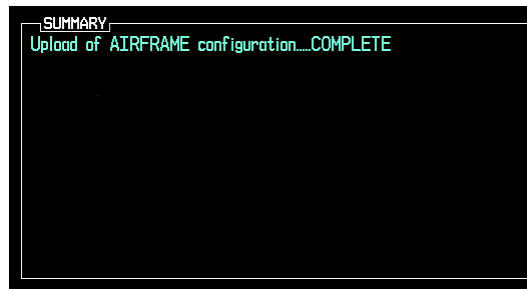
6. Activate the cursor and select 'Enable TAWS' in the FILE field.
7. Press the ENT key.
8. Highlight 'airframe' in the 'product' field.
9. Press the LOAD softkey.
10. Select YES and press the ENT key to acknowledge the following prompt:



11. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the following confirmation:



12. View the summary field to ensure that all items are 'complete':



13. Deactivate the cursor and remove the unlock card from PFD1.
14. Cycle power to all the displays and reboot the system.
15. Verify that the MAP – TERRAIN PROXIMITY page on the MFD has been renamed as the MAP – TAWS page.

NOTE

Due to the time required for the GIA to exit configuration mode, power must be cycled to the PFD and MFD following the first boot up in normal mode (after exiting configuration mode). Failure to do so may result in an erroneous 'TAWS FAIL' message.

16. Cycle power again to the PFD and MFD to reboot the system.
17. Verify the unit successfully passes TAWS self test.

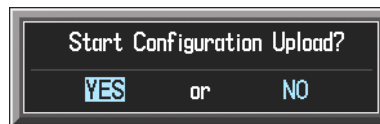
10.2.3.3 Configuring ChartView

The ChartView database is updated on a 14-day cycle and is provided directly from Jeppesen. If the ChartView database is not updated within 70 days of the expiration date, ChartView will no longer function. The ChartView database should be copied to the Garmin supplied supplemental data card which will reside in the bottom card slot of the MFD.

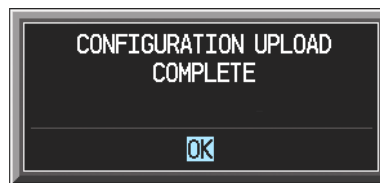
1. Insert the ChartView enable card (010-00330-50) into the top card slot of the PFD1.
2. While holding the ENT key on PFD1, apply power by closing PFD1 circuit breaker.
3. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
4. Repeat Steps 2 and 3 for MFD and PFD2 (no card required in these displays).
5. On the PFD go to the system upload page using the FMS knob.



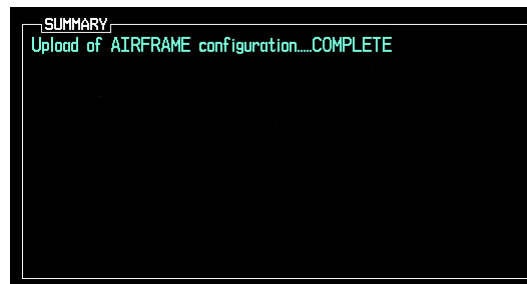
6. Activate the cursor and select "Enable ChartView" in the FILE field.
7. Press the ENT key.
8. Highlight AIRFRAME in the PRODUCT field.
9. Press the LOAD softkey.
10. Select YES and press the ENT key to acknowledge the following prompt:



11. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the following confirmation:



12. View the summary field and ensure that all items are 'complete':



13. Deactivate the cursor.
14. Cycle power to all displays to reboot the system.
15. Use the FMS Knob on the MFD to display the AUX-System Status Page.
16. Activate the cursor and press the DBASE softkey to move the cursor to the database window.
17. Scroll down to the chart window, and verify that the displayed information is correct.

NOTE

The initial boot up after activating ChartView may require several minutes to display the information in the chart window on the AUX-System Status Page.

10.2.4 Final Configuration Items

Aircraft Registration Number Entry

TRANSPONDER CONFIGURATION			
CONFIGURATION	SET	XPDR 1 ACTIVE	XPDR 2 ACTIVE
VFR CODE	1200	1200	1200
AIRCRAFT WEIGHT	< 15,500 LBS	< 15,500 LBS	< 15,500 LBS
MAX AIRSPEED	<= 600 KTS	<= 600 KTS	<= 600 KTS
ADDRESS TYPE	US TAIL	US TAIL	US TAIL
MODE S ADDRESS	N	N	N
FLIGHT ID TYPE	PFD ENTRY	PFD ENTRY	PFD ENTRY
FLIGHT ID	N	N	N
ENHANCED SURVEIL	ENABLED	ENABLED	ENABLED

NOTE: Changing the transponder mode S address will update the GTS mode S address.

SET>ACTV ACT1>SET ACT2>SET

1. Select the GTX page group, then select the transponder configuration page using the small FMS knob on the PFD.
2. Ensure that the 'ADDRESS TYPE' is 'US TAIL' under the 'SET' and 'ACTIVE' columns.
3. The default setting for 'FLIGHT ID TYPE' is 'PFD ENTRY' (see figure above) under the 'SET' and 'ACTIVE' columns. Refer to the aircraft Pilot's Guide for instructions on entering a flight ID from the PFD.
4. Activate the cursor and highlight the 'FLIGHT ID' field. Use the small/large FMS knob to enter the aircraft registration number.
5. Once the correct registration number is entered, press the ENT key.
6. The transponder is configuring:



The transponder alerts the technician of complete configuration:



7. Press the ENT key on the PFD and deactivate the cursor.

NOTE

To enter a non-US Mode-S registration number set the 'ADDRESS TYPE' to 'HEX ID' and enter the Mode-S registration number in the 'MODE S ADDRESS' field. Ensure the 'FLIGHT ID TYPE' is set to 'CONFIG ENTRY' or 'PFD ENTRY'. The CONFIG ENTRY allows the aircraft registration/ID number to be entered once and stored in memory by entering the registration/ID number in the 'FLIGHT ID' field. PFD ENTRY allows the pilot to enter the registration/ID number from the PFD, via the 'TMR/REF' softkey.

10.2.5 Navigation Databases

NOTE

The Jeppesen aviation navigation database is now referred to as the 'navigation database'. Previously this database had been referred to as the 'aviation database'.

The G1000 uses Secure Digital (SD™) cards to load and store various types of data. For basic flight operations, SD cards are required for database storage as well as Jeppesen navigation and Jeppesen ChartView database updates. Not all SD cards are compatible with the G1000. Use only SD cards supplied by Garmin or the aircraft manufacturer

NOTE

Use only blank SD cards to load the navigation database into the GDUs. Do not copy the navigation database (not including ChartView) onto 010-00330-42 (or-43) supplemental data cards to load into the GDUs. Doing so may corrupt the supplemental database cards making them unusable. Replacing corrupt cards is not covered under warranty.

Information regarding the various databases may be viewed on the AUX-System Status Page:

17.95	AUX - SYSTEM STATUS	136.975	118.000 COM2																																																																				
LRU INFO <table> <thead> <tr> <th></th><th>STATUS</th><th>SERIAL NUMBER</th><th>VERSION</th></tr> </thead> <tbody> <tr><td>COM1</td><td>✓</td><td></td><td>7.00</td></tr> <tr><td>COM2</td><td>✓</td><td></td><td>7.00</td></tr> <tr><td>GCU</td><td>✓</td><td>27000006</td><td>2.02d</td></tr> <tr><td>GDC1</td><td>✓</td><td>47801548</td><td>1.05</td></tr> <tr><td>GDC2</td><td>✓</td><td>47801373</td><td>1.05</td></tr> <tr><td>GDL69</td><td>✓</td><td>47750372</td><td>3.02.00</td></tr> <tr><td>GEA1</td><td>✓</td><td>46701911</td><td>2.07</td></tr> <tr><td>GEA2</td><td>✓</td><td>46701913</td><td>2.07</td></tr> <tr><td>GIA1</td><td>✓</td><td>FFFFFFFFF</td><td>1.02</td></tr> <tr><td>GIA2</td><td>✓</td><td>68500319</td><td>1.02</td></tr> <tr><td>GMA1</td><td>✓</td><td>48400000</td><td>3.01</td></tr> <tr><td>GMA2</td><td>✓</td><td>48400001</td><td>3.01</td></tr> <tr><td>GMC</td><td>✓</td><td></td><td>2.02d</td></tr> <tr><td>GMU1</td><td>✓</td><td>47500593</td><td>2.01</td></tr> <tr><td>GMU2</td><td>✓</td><td>47500607</td><td>2.01</td></tr> <tr><td>GPS1</td><td>✓</td><td>AB0062149</td><td>2.3</td></tr> </tbody> </table>			STATUS	SERIAL NUMBER	VERSION	COM1	✓		7.00	COM2	✓		7.00	GCU	✓	27000006	2.02d	GDC1	✓	47801548	1.05	GDC2	✓	47801373	1.05	GDL69	✓	47750372	3.02.00	GEA1	✓	46701911	2.07	GEA2	✓	46701913	2.07	GIA1	✓	FFFFFFFFF	1.02	GIA2	✓	68500319	1.02	GMA1	✓	48400000	3.01	GMA2	✓	48400001	3.01	GMC	✓		2.02d	GMU1	✓	47500593	2.01	GMU2	✓	47500607	2.01	GPS1	✓	AB0062149	2.3	AIRFRAME AIRFRAME SYS SOFTWARE VERSION CONFIGURATION ID CRG PART NUMBER SYSTEM ID CHECKLIST	
	STATUS	SERIAL NUMBER	VERSION																																																																				
COM1	✓		7.00																																																																				
COM2	✓		7.00																																																																				
GCU	✓	27000006	2.02d																																																																				
GDC1	✓	47801548	1.05																																																																				
GDC2	✓	47801373	1.05																																																																				
GDL69	✓	47750372	3.02.00																																																																				
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GIA2	✓	68500319	1.02																																																																				
GMA1	✓	48400000	3.01																																																																				
GMA2	✓	48400001	3.01																																																																				
GMC	✓		2.02d																																																																				
GMU1	✓	47500593	2.01																																																																				
GMU2	✓	47500607	2.01																																																																				
GPS1	✓	AB0062149	2.3																																																																				
		MFD1 DATABASE TERRAIN - BOTTOM CARD REGION WORLDWIDE-9 VERSION 2.04 CYCLE 08T2 Copyright 2008 Garmin Ltd. or its subsidiaries AIRPORT TERRAIN - BOTTOM CARD REGION WORLDWIDE VERSION 2.04 CYCLE 08A2 Copyright 2008 Garmin Ltd. or its subsidiaries OBSTACLE - BOTTOM CARD REGION US/EUROPE VERSION 2.08																																																																					
	LRU	ARFRM	MFD1 DB																																																																				

Display Database Selection Softkey

The display database selection softkey (figure below) is used to place the cursor in the database window. Upon first press of the display database selection softkey, the softkey will change to a selected state (black text on gray background) and the cursor will appear in the database window. At this point the user can scroll through all databases in the database window to view status information. If the display database selection softkey is pressed repeatedly, the softkey will switch between PFD1 and MFD1. Database status information in the database window will reflect the database of the selected PFD or MFD.

A rectangular button with a black background and white text that reads "MFD1 DB".

Unselected

A rectangular button with a gray background and black text that reads "MFD1 DB".

MFD1 DB Selected

A rectangular button with a gray background and black text that reads "PFD1 DB".

PFD1 DB Selected

Garmin Databases

The following databases are stored on supplemental data cards provided by Garmin:

- Expanded basemap
- Terrain
- Airport terrain
- Obstacle
- SafeTaxi
- FliteCharts
- Airport Directory (AOPA)

After subscribing to the desired database product updates, these updated databases are copied to the supplemental data card which will reside in the bottom card slot of the PFD and MFD (the card that contains the FliteCharts or ChartView database resides in the MFD). The figure below illustrates the correct location of the supplemental data cards and their respective databases. Since these databases are not stored internally in the displays, these supplemental data cards must remain in the bottom card slot of each display.



The basemap database 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.

The terrain database contains the terrain mapping data. The airport terrain database contains increased resolution terrain data around airports. These databases are updated periodically and have no expiration date. The obstacle database 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.

NOTE

The data contained in the terrain and obstacle databases comes from government agencies. Garmin accurately processes and cross-validates the data, but cannot guarantee the accuracy and completeness of the data.

The AOPA airport directory provides data on airports and heliports throughout the U.S., and offers detailed information for over 5,300 U. S. airports, along with the names and phone numbers of thousands of FBOs. This database is updated four times per year and has no expiration date.

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. The FliteCharts database contains procedure charts for the United States only. This database is updated on a 28-day cycle. If not updated within 180 days of the expiration date, FliteCharts will no longer function.

10.2.6 Obtaining Garmin Database Updates

The Garmin database updates can be obtained by following the instructions detailed in the 'Aviation Databases' section of the Garmin website (fly.garmin.com). Once the updated files have been downloaded from the website, a PC equipped with an appropriate SD card reader is used to unpack and copy the new databases onto the appropriate supplemental data cards. Equipment required to perform the update is as follows:

- Windows-compatible PC computer (Windows 2000 or XP recommended)
- SD Card Reader: SanDisk SDDR-93, SanDisk SDDR-99, Verbatim #96504, or equivalent
- Updated database obtained from the Garmin website
- Existing supplemental database SD card (010-00330-41, -42, or -43) from the MFD. The supplemental data card from the MFD should be used because all databases (except the active navigation database) are required to reside on this card.

10.2.7 Jeppesen Databases

The Jeppesen navigation database is updated on a 28-day cycle. The ChartView database is updated on a 14-day cycle. If the ChartView database is not updated within 70 days of the expiration date, ChartView will no longer function. Both of these databases are provided directly from Jeppesen.

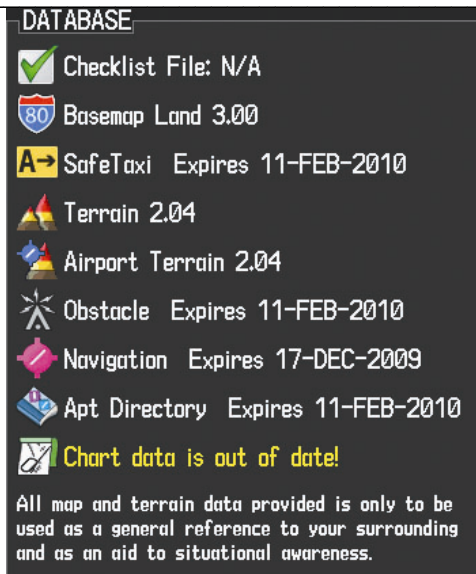
The ChartView database should be copied to the Supplemental Data Card which will reside in the bottom card slot on the MFD. The navigation database is loaded from the Jeppesen or user supplied SD data card. Contact Jeppesen (www.jeppesen.com) for subscription and update information. The navigation database is loaded from an SD card inserted into the top card slot of each display. The database is copied from the SD card in the top card slot to the display's internal memory.

10.2.8 Loading Updated Databases

In some cases it may be necessary to obtain an unlock code from Garmin in order to make the database product functional. It may also be necessary to have the system configured by a Garmin authorized service facility in order to use some database features.

Loading the Garmin database updates:

1. With G1000 power OFF, remove the SD card from the bottom card slot of each display.
2. Using a personal computer, update the Garmin databases on each SD card. FliteCharts or ChartView databases are copied to the MFD SD card.
3. After all database cards are updated, insert each database SD card into the bottom card slot of the appropriate display.
4. Apply power to the G1000, check that the databases are initialized and displayed on the power-up screen (figure below).



5. Acknowledge the power-up page agreement by pressing the ENT key or the right most softkey.
6. Turn the large FMS knob to select the AUX page group on the MFD.
7. Turn the small FMS knob to select the system status page.
8. Press the display database selection softkey to show database information for each display (MFD1 DB, PFD1 DB). Verify the correct database cycle information is shown for each database for each display.

Loading the Jeppesen Navigation Database

NOTE

Loading the Jeppesen navigation database prior to its effective date will result in the expiration date on the power-up screen and the effective date on the AUX-System Status Page being displayed in yellow.

1. Copy the new navigation database to an SD card obtained from Garmin, or the aircraft manufacturer.
2. With the G1000 off, insert the SD card containing the new navigation database version into the top card slot of the MFD (label of SD card facing left).
3. Turn on the G1000. A prompt similar to the figure below is displayed:

```
DO YOU WANT TO UPDATE THE ACTIVE NAVIGATION DATABASE?
SELECTING YES WILL OVERWRITE THE ACTIVE NAVIGATION DATABASE.
FROM          TO
REGION:       WORLDWIDE    WORLDWIDE
CYCLE:        0912         0913
EFFECTIVE:    19-NOV-2009   17-DEC-2009
EXPIRES:      17-DEC-2009   14-JAN-2010

NO WILL BE ASSUMED IN 28 SECONDS.
UPDATING NAVIGATION DATABASE, PLEASE WAIT.
```

4. Press the YES softkey to update the navigation database in the MFD.
5. After the update completes, the display starts in normal mode.

6. Turn the G1000 OFF and remove the SD card from the top card slot.
7. Repeat steps 2 through 6 for the PFD.
8. Apply power to the system and press the ENT key to acknowledge the startup screen.
9. Turn the large FMS knob to select the AUX Page group on the MFD.
10. Turn the small FMS knob to select the system status page.
11. Press the display database selection softkey to show navigation database information for each display (MFD1 DB, PFD1 DB) as seen for the MFD in figure below.

MFD1 DATABASE	
NAVIGATION - INTERNAL	
REGION	WORLDWIDE
CYCLE	0913
EFFECTIVE	17-DEC-09
EXPIRES	14-JAN-10
Copyright 2009. Jeppesen Sanderson, Inc.	
BASEMAP - BOTTOM CARD	
REGION	WORLDWIDE
VERSION	3.00
GARMIN LTD. AND ITS SUBSIDIARIES 2008	
SAFETAXI - BOTTOM CARD	
REGION	US
VERSION	2.25

10.2.9 Other G1000 Databases

Terrain/Obstacle/SafeTaxi®/FliteCharts® Database Cards

There is no unlock card required for Garmin FliteCharts®. A single cycle of Garmin FliteCharts® is loaded on the database cards when they are manufactured at Garmin. Additional FliteChart® database updates are obtained directly from Garmin's web site and are updated on a periodic basis. The system automatically detects the FliteChart® databases and activates the display feature. Once Jepp ChartView is unlocked the system will make use of the Jepp data and will not display FliteChart® data or version.

1. Remove power from the PFD and MFD using the respectively labeled breakers.
2. Remove the software loader card from PFD 1.
3. Insert two Terrain/Obstacle/SafeTaxi®/FliteChart® database cards into the bottom slots of the MFD and PFD1, respectively. Refer to the appropriate aircraft drawing for correct database card part numbers.

Terrain, Airport Terrain, And Obstacle

G1000 topography, terrain, airport terrain, and obstacle data is stored on a supplemental data card provided by Garmin. The obstacle database update cycle is every 56 days. The terrain and airport terrain database is updated less often, and on an irregular basis. Since these databases are not stored internally in the MFD or PFD, supplemental data cards containing identical database versions must be kept in both displays to retain terrain and obstacle data. A supplemental data card should be inserted into the bottom card slot of the PFD and MFD.

Expanded Basemap

The expanded basemap database 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. This database is not stored internally in the MFD or PFD. Supplemental data cards containing identical database versions must be kept in both displays. A supplemental data card should be inserted into the bottom card slot of the PFD and MFD.

Obstacle

The obstacle database 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. This database is not stored internally in the MFD or PFD. Supplemental data cards containing identical database versions must be kept in both displays. A supplemental data card should be inserted into the bottom card slot of the PFD and MFD.

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. The SafeTaxi database should be copied to the Garmin supplied card which will reside in the bottom card slot of the MFD.

FliteCharts

The FliteCharts database contains terminal procedure charts for the United States only. This database is updated on a 28-day cycle. If not updated within 180 days of the expiration date, FliteCharts will no longer be active. The FliteCharts database should be copied to the Garmin supplied supplemental data card which will reside in the bottom card slot of the MFD.

AOPA Airport Directory Database

The Aircraft Owners and Pilots Association (AOPA) airport directory database offers detailed information regarding services, hours of operation, lodging options, and more. This information is viewed on the airport information page by selecting the INFO softkey until INFO-2 is displayed. The AOPA airport directory database is revised four times per year. Check fly.garmin.com for the current database. The airport directory is always available for use after the expiration date. When turning on the system, the power-up page indicates whether the databases are current, out of date, or not available. The AOPA airport directory database should be copied to the Garmin supplied supplemental data card which will reside in the bottom card slot of the MFD.

10.3 CONFIRMING THE SOFTWARE LOAD

1. Select the system status page using the FMS knob and activate the cursor.
2. Highlight the specified items in the LRU window and verify the software part numbers and versions against the ones listed in the front of this manual.
3. De-activate the cursor.
4. Remove card loader from the PFD top slot and set aside.

NOTE

If any software version and/or part number does not match, or is not successfully loaded, do not continue with post-installation procedures. Troubleshoot and resolve the issue before continuing (see Section 10.4).

NOTE

The table below can be used as a checklist. Check off the items after the correct part number has been confirmed.

NOTE

If any software version and/or part number does not match, or is not successfully loaded, do not continue with post-installation procedures. Troubleshoot and resolve the issue before continuing.

LRU	SW OK	LRU	SW OK
PFD1	_____	GTX1 – GIA1	_____
PFD2	_____	GTX2 – GIA2	_____
MFD1	_____	GEA1 – GIA1	_____
GIA1	_____	GEA2 – GIA2	_____
GIA2	_____	GDC1 – GIA1	_____
COM1	_____	GDC2 – GIA2	_____
COM2	_____	GMU1	_____
COM2	_____	GMU2	_____
GRS1 – GIA1	_____	NAV1	_____
GRS2 – GIA2	_____	NAV2	_____
GMA1 – GIA1	_____	GPS1	_____
GMA2 – GIA2	_____	GPS2	_____
GMC – PFD1	_____	GDL	_____
GCU	_____	GWX	_____
GSA	_____	Cert Gains	_____
GSD	_____		

10.4 SOFTWARE/CONFIGURATION TROUBLESHOOTING

10.4.1 System Communication Hierarchy

The following criteria must be satisfied to be able to perform the following desired options. Perform the troubleshooting steps described in the following tables if the criteria is not met.

Desired Operation	Criteria for Success
Load Software to MFD or PFD Displays	- Loader card must be inserted in top slot for each display to be loaded. - CLR & ENT softkey 12 for the MFD must be held during power up of display. - Power only one display on at a time during software loading.
Load AIRFRAME, SYSTEM, MFD1, PFD1, PFD2, and MANIFEST configuration files	- Loader card must be inserted in top slot of PFD #1. - PFDs and MFD must be powered on. - PFDs and MFD must have correct software.
Load Software/Configuration files to GIA 63Ws	- Loader card must be inserted in top slot of PFD #1. - G1000 must be powered on. - PFDs and MFD must have correct software. - PFD and MFD must be successfully configured with AIRFRAME, SYSTEM, MFD1, PFD1, and PFD2 configuration files.
Load Software/Configuration files to: - GMA 1347 - GDC 74A 1&2 - GEA 71 - GRS 77 (software only) 1&2 - GMU 44 (software only) 1&2 - GTX 33, 1 and 2 - GSA 80/81 - GMC 710 - GWX 68 - GDL 69A	- G1000 must be powered on. - Specific card loader must be inserted into PFD #1 top slot. - PFDs and MFD must have correct software and configuration settings. - GIA 63Ws must have correct software. - GIA 63Ws must be successfully configured with GIA1 and GIA2 configuration files. - Data paths to each LRU must be operational.

Problem	Solutions
MFD or PFD displays do not power up	• Ensure power is present at display backshell connector. • Replace display.
Software file load fails: 	• Ensure that LRU is reporting data on the system status page (LRU is 'ONLINE'). Check data path wiring as needed. • Restart MFD & PFD in configuration mode and retry software file load or try using a different card. • Ensure that the MFD is not touched during the loading process, unless explicitly instructed to do so. • Ensure that LRU part number is compatible with software version and loader card. Refer to approved post-installation and/or maintenance data. • Replace LRU.
Configuration file load fails: 	• Ensure that LRU is reporting data on the system status page (LRU is 'ONLINE'). Check data path wiring as needed. • Restart MFD & PFD in configuration mode and retry configuration file load or try using a different card. • Ensure that the MFD is not touched during the loading process, unless explicitly instructed to do so. • Ensure that LRU part number is compatible with software version and loader card. Refer to approved post-installation and/or maintenance data. • Replace LRU.

Problem	Solutions
Software File Mismatch Alert appears in lower right corner of PFD when started in normal mode: 	• Ensure that proper software file part number and version were loaded to LRU. • Ensure that LRU part number is compatible with software version and loader card. Refer to approved post-installation and/or maintenance data. • Reload 'MANIFEST' configuration file to the PFD.
Optional Equipment (ADF, TAS, radar altimeter, WX500, etc.) does not work.	• Load optional config file to enable G1000 to interface with the optional unit. • If optional equipment still does not operate, reference optional equipment documentation for further troubleshooting.
"SYN VIS" softkey does not appear on PFD softkey tier.	• Verify that the PFD and MFD software versions are shown to be 9.01 or above by checking the AUX – system status page on the MFD. • Reactivate the SVS/Pathways feature.
3D terrain presentation does not appear on PFD.	• Verify that P/N 010-00442-43 terrain data cards are installed in the lower slot of the PFD and MFD. • Resolve any alert messages. • Verify that the G1000 AHRS, and heading data are valid on the PFD. • Verify that a valid GPS 3D position solution is being received. • If a terrain database update has just been performed, allow the system time to initialize and verify the data. When the databases have been verified, the current database cycle and version are reported on the MFD AUX – system status page.

Table B-1 provides SVT specific alert messages which may appear in the alerts window on the PFD (press the ALERTS softkey on the PFD to view the alerts window):

Table 10-1. SVT Related Alert Messages

Failure Message	Cause	Solution
SVS – SVS DISABLED: Out of available terrain region.	SVS is disabled because the aircraft exceeded the boundaries of the loaded terrain database.	Ensure that operations are within the required geographic area.
SVS – SVS DISABLED: Terrain DB resolution too low	SVS is disabled because a 9 arc-second or better database is not currently loaded.	• Ensure the P/N 010-00330-43 terrain cards are installed in the lower slot of each display. • If terrain data has been recently updated, ensure that the correct 9 arc-second databases were used.

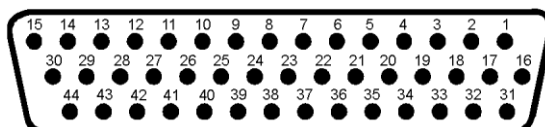
APPENDIX A

LRU CONNECTOR PINS

NOTE

In this section, an asterisk (*) notation is used for signals that are active low (ground to activate). On installation wiring diagrams, the more traditional overline symbology is used. For example, the discrete input shown as “TRANSMIT INTERLOCK*” in this document is shown as “TRANSMIT INTERLOCK” on installation wiring diagrams. Connector illustrations are shown from the perspective of looking at the unit. The pin lists described in this section are an example only. Refer to approved airframe documentation for specific connector documentation.

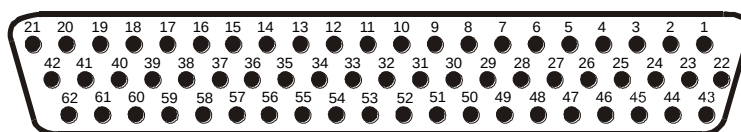
A.1 GIA 63/W P601 (COM)



Pin	Pin Name	I/O
1	RESERVED (UNSQUELCHED AUDIO TEST)	--
2	RESERVED	--
3	RESERVED	--
4	COM MIC KEY*	In
5	INTERCOM MIC IN HI	In
6	INTERCOM MIC IN LO (GROUND)	--
7	COM MIC AUDIO IN HI	In
8	COM MIC AUDIO IN LO (GROUND)	--
9	COM 500Ω AUDIO OUT HI	Out
10	COM 500Ω AUDIO OUT LO (GROUND)	--
11	TRANSMIT INTERLOCK* (ANALOG ONLY)	In
12	COM REMOTE TRANSFER*	In
13	COM DIGITAL AUDIO OUT	Out
14	COM MIC DIGITAL AUDIO IN	In
15	SIGNAL GROUND	--
16	COM REMOTE POWER OFF	In
17	AIRCRAFT POWER 1	In
18	SPARE	--
19	AIRCRAFT POWER 1	In
20	SPARE	--
21	AIRCRAFT POWER 1	In
22	SPARE	--
23	AIRCRAFT POWER 2	In
24	SPARE	--
25	AIRCRAFT POWER 2	In

Pin	Pin Name	I/O
26	SPARE	--
27	AIRCRAFT POWER 2	In
28	RESERVED	--
29	RESERVED	--
30	POWER GROUND	--
31	POWER GROUND	--
32	RESERVED	--
33	RESERVED	--
34	RESERVED	--
35	RESERVED	--
36	RESERVED	--
37	RESERVED	--
38	RESERVED	--
39	RESERVED	--
40	RESERVED	--
41	RESERVED	--
42	RESERVED	--
43	POWER GROUND	--
44	POWER GROUND	--

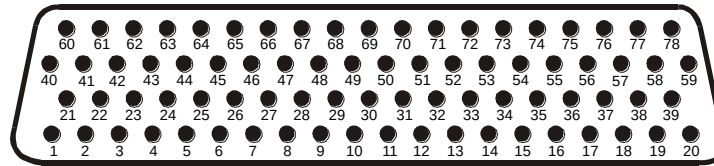
P602 (VOR/ILS)



Pin	Pin Name	I/O
1	VOR/LOC +TO	Out
2	VOR/LOC +FROM (VOR/LOC COMMON)	--
3	VOR/LOC +FLAG	Out
4	VOR/LOC -FLAG (VOR/LOC COMMON)	--
5	VOR/LOC +LEFT	Out
6	VOR/LOC +RIGHT (VOR/LOC COMMON)	--
7	RESERVED (VOR/LOC IF AGC)	--
8	VOR/LOC COMPOSITE OUT	Out
9	VOR OBS ROTOR C	Out
10	VOR OBS ROTOR H (GROUND)	--
11	VOR OBS STATOR E (VOR/LOC COMMON)	--
12	VOR OBS STATOR F	In
13	VOR OBS STATOR D	In
14	VOR OBS STATOR G (VOR/LOC COMMON)	--
15	VOR/LOC SUPERFLAG	Out
16	VOR/LOC 500Ω AUDIO OUT HI	Out
17	VOR/LOC 500Ω AUDIO OUT LO	--
18	KING SERIAL DME CLOCK	Out
19	KING SERIAL DME DATA	Out
20	KING SERIAL RNAV REQUEST	In
21	KING SERIAL RNAV* MODE	In
22	SIGNAL GROUND	--
23	VOR/ILS ARINC 429 OUT B	Out
24	VOR/ILS ARINC 429 OUT A	Out
25	VOR OBI CLOCK	Out
26	VOR OBI SYNC	Out
27	VOR OBI DATA	Out
28	VOR/ILS REMOTE TRANSFER*	In
29	ILS ENERGIZE*	Out
30	RESERVED (AIRCRAFT POWER)	--
31	RESERVED (AIRCRAFT POWER)	--
32	GLIDESLOPE +FLAG	Out
33	PARALLEL DME 1 MHZ-D	Out
34	GLIDESLOPE +UP	Out
35	VOR/ILS ARINC 429 IN B	In
36	VOR/ILS ARINC 429 IN A	In
37	PARALLEL DME 100 KHZ-A	Out
38	GLIDESLOPE SUPERFLAG	Out
39	PARALLEL DME 100 KHZ-B	Out
40	PARALLEL DME 100 KHZ-C	Out
41	DME COMMON	In
42	PARALLEL DME 100 KHZ-D	Out
43	PARALLEL DME 50 KHZ	Out

Pin	Pin Name	I/O
44	KING SERIAL DME REQUEST	I/O
45	PARALLEL DME 1 MHZ-A	Out
46	PARALLEL DME 1 MHZ-B	Out
47	PARALLEL DME 1 MHZ-C	Out
48	RESERVED	--
49	SIGNAL GROUND	--
50	RESERVED	--
51	SPARE	--
52	SPARE	--
53	GLIDESLOPE --FLAG (GLIDESLOPE COMMON)	--
54	PARALLEL DME 100 KHZ-E	Out
55	GLIDESLOPE +DOWN (GLIDESLOPE COMMON)	--
56	PARALLEL DME 1 MHZ-E	Out
57	RESERVED	--
58	GLIDESLOPE COMPOSITE OUT	Out
59	VOR/LOC DIGITAL AUDIO OUT	Out
60	SIGNAL GROUND	--
61	POWER GROUND	--
62	POWER GROUND	--

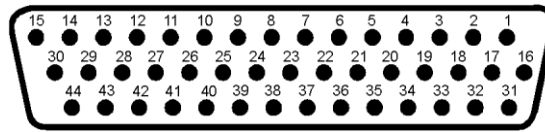
P603 (Main Serial)



Pin	Pin Name	I/O
1	RESERVED	--
2	ETHERNET OUT A	Out
3	ETHERNET OUT B	Out
4	RS-485 4 A	I/O
5	RS-485 4 A	I/O
6	RS-485 4 B	I/O
7	RS-485 4 B	I/O
8	MAIN ARINC 429 IN 3 A	In
9	MAIN ARINC 429 IN 3 B	In
10	MAIN ARINC 429 IN 4 A	In
11	MAIN ARINC 429 IN 4 B	In
12	MAIN ARINC 429 IN 5 A	In
13	MAIN ARINC 429 IN 5 B	In
14	MAIN ARINC 429 IN 6 A	In
15	MAIN ARINC 429 IN 6 B	In
16	MAIN ARINC 429 IN 7 A	In
17	MAIN ARINC 429 IN 7 B	In
18	MAIN ARINC 429 IN 8 A	In
19	MAIN ARINC 429 IN 8 B	In
20	CAN BUS 1 HI	I/O
21	RESERVED	--
22	CAN BUS 1 LO	I/O
23	RS-485 1 A	I/O
24	RS-485 1 B	I/O
25	RS-485 2 A	I/O
26	RS-485 2 B	I/O
27	RS-485 3 A/RS-422 IN A	I/O
28	RS-485 3 B/RS-422 IN B	I/O
29	MAIN ARINC 429 IN 1 A	In
30	CAN BUS 2 LO	I/O
31	MAIN ARINC 429 IN 1 B	In
32	CAN BUS 2 HI	I/O
33	MAIN ARINC 429 IN 2 A	In
34	CAN BUS 1 TERMINATION	--
35	MAIN ARINC 429 IN 2 B	In
36	RS-485 5 A/RS-422 OUT A	I/O
37	RS-485 5 B/RS-422 OUT B	I/O
38	RESERVED	--
39	CAN BUS 2 TERMINATION	--
40	RESERVED	--
41	MAIN RS-232 IN 1	In
42	SIGNAL GROUND	--
43	MAIN RS-232 OUT 1	Out

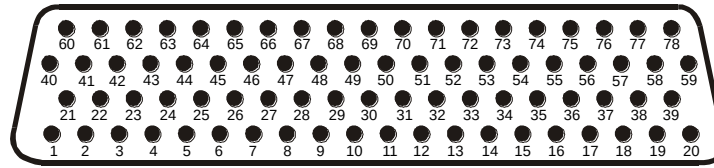
Pin	Pin Name	I/O
44	MAIN RS-232 IN 2	In
45	SIGNAL GROUND	--
46	MAIN RS-232 OUT 2	Out
47	MAIN RS-232 IN 3	In
48	SIGNAL GROUND	--
49	MAIN RS-232 OUT 3	Out
50	MAIN RS-232 IN 4	In
51	SIGNAL GROUND	--
52	MAIN RS-232 OUT 4	Out
53	MAIN RS-232 IN 5	In
54	SIGNAL GROUND	--
55	MAIN RS-232 OUT 5	Out
56	MAIN RS-232 IN 6	In
57	SIGNAL GROUND	--
58	MAIN RS-232 OUT 6	Out
59	MAIN RS-232 IN 7	In
60	RESERVED	--
61	SIGNAL GROUND	--
62	MAIN RS-232 OUT 7	Out
63	MAIN RS-232 IN 8	In
64	SIGNAL GROUND	--
65	MAIN RS-232 OUT 8	Out
66	RESERVED	--
67	GPS PPS OUT	Out
68	RESERVED	--
69	VOICE ALERT DIGITAL AUDIO OUT	Out
70	MAIN ARINC 429 OUT 1 B	Out
71	MAIN ARINC 429 OUT 1 A	Out
72	MAIN ARINC 429 OUT 2 B	Out
73	MAIN ARINC 429 OUT 2 A	Out
74	MAIN ARINC 429 OUT 3 B	Out
75	MAIN ARINC 429 OUT 3 A	Out
76	ETHERNET IN A	In
77	ETHERNET IN B	In
78	RESERVED	--

P604 (Main Discrete)



Pin	Pin Name	I/O
1	ANNUNCIATE* 22	Out
2	VOICE ALERT 500Ω AUDIO OUT HI	Out
3	VOICE ALERT 500Ω AUDIO OUT LO (GROUND)	--
4	DISCRETE IN 13	In
5	DISCRETE IN 14	In
6	ANNUNCIATE* 1	Out
7	DISCRETE IN* 1	In
8	DISCRETE IN* 2	In
9	DISCRETE IN* 3	In
10	DISCRETE IN 15	In
11	AP DISCONNECT IN	In
12	DISCRETE IN* 4	In
13	DISCRETE IN* 5	In
14	DISCRETE IN* 6	In
15	DISCRETE IN 16	In
16	DISCRETE IN 17	In
17	DISCRETE IN* 7	In
18	DISCRETE IN* 8	In
19	DISCRETE IN* 9	In
20	DISCRETE IN* 10	In
21	DISCRETE IN* 11	In
22	GIA SYSTEM ID PROGRAM* 1	In
23	GIA SYSTEM ID PROGRAM* 2	In
24	DISCRETE IN* 12	In
25	ANNUNCIATE* 2	Out
26	ANNUNCIATE* 3	Out
27	ANNUNCIATE* 4	Out
28	ANNUNCIATE* 5	Out
29	ANNUNCIATE* 6	Out
30	ANNUNCIATE* 7	Out
31	ANNUNCIATE* 8	Out
32	ANNUNCIATE* 9	Out
33	ANNUNCIATE* 10	Out
34	ANNUNCIATE* 11	Out
35	ANNUNCIATE* 12	Out
36	ANNUNCIATE* 13	Out
37	ANNUNCIATE* 14	Out
38	ANNUNCIATE* 15	Out
39	ANNUNCIATE* 16	Out
40	ANNUNCIATE* 17	Out
41	ANNUNCIATE* 18	Out
42	ANNUNCIATE* 19	Out
43	ANNUNCIATE* 20	Out
44	ANNUNCIATE* 21	Out

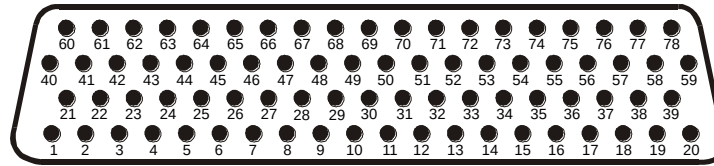
P605 (I/O #1)



Pin	Pin Name	I/O
1	RADAR ALTIMETER DC HI	In
2	RADAR ALTIMETER DC LO	In
3	DISCRETE IN 18A	In
4	SPARE	--
5	SPARE	--
6	SPARE	--
7	SPARE	--
8	FLIGHT DIRECTOR PITCH +UP	In
9	FLIGHT DIRECTOR PITCH +DOWN	In
10	FLIGHT DIRECTOR ROLL +RIGHT	In
11	FLIGHT DIRECTOR ROLL +LEFT	In
12	DISCRETE IN 19A	In
13	POTENTIOMETER SIGNAL IN	In
14	POTENTIOMETER REF IN HI	In
15	POTENTIOMETER REF IN LO	In
16	DISCRETE IN 20A	In
17	MAIN LATERAL DEVIATION +LEFT	Out
18	MAIN LATERAL DEVIATION +RIGHT (MAIN COMMON)	Out
19	MAIN LATERAL +FLAG	Out
20	MAIN LATERAL –FLAG (MAIN COMMON)	Out
21	SPARE	--
22	SPARE	--
23	MAIN VERTICAL DEVIATION +UP	Out
24	MAIN VERTICAL DEVIATION +DOWN (MAIN COMMON)	Out
25	MAIN VERTICAL +FLAG	Out
26	MAIN VERTICAL –FLAG (MAIN COMMON)	Out
27	SPARE	--
28	SPARE	--
29	AIRCRAFT POWER 1	In
30	POTENTIOMETER SIGNAL OUT	Out
31	AIRCRAFT POWER 1	In
32	POTENTIOMETER REF OUT HI	Out
33	AIRCRAFT POWER 2	In
34	POTENTIOMETER REF OUT LO (GROUND)	Out
35	AIRCRAFT POWER 2	In
36	GIA REMOTE POWER OFF	In
37	DISCRETE IN* 1A	In
38	DISCRETE IN* 2A	In

Pin	Pin Name	I/O
39	DISCRETE IN* 3A	In
40	DISCRETE IN* 4A	In
41	DISCRETE IN* 5A	In
42	DISCRETE IN* 6A	In
43	DISCRETE IN* 7A	In
44	DISCRETE IN* 8A	In
45	DISCRETE IN* 9A	In
46	DISCRETE IN* 10A	In
47	DISCRETE OUT* 1A	Out
48	SIGNAL GROUND	--
49	DISCRETE IN* 11A	In
50	DISCRETE IN 21A	In
51	DISCRETE IN 22A	In
52	DISCRETE IN* 12A	In
53	DISCRETE IN* 13A	In
54	DISCRETE IN* 14A	In
55	DISCRETE IN* 15A	In
56	OUTER MARKER LAMP IN	In
57	MIDDLE MARKER LAMP IN	In
58	AIRWAY/INNER MARKER LAMP IN	In
59	DISCRETE IN* 16A	In
60	DISCRETE IN 23A	In
61	SIGNAL GROUND	--
62	MAIN LATERAL SUPERFLAG	Out
63	MAIN VERTICAL SUPERFLAG	Out
64	SUPERFLAG 4A	Out
65	SPARE	--
66	SPARE	--
67	SUPERFLAG 1A	Out
68	DISCRETE OUT* 2A	Out
69	DISCRETE OUT* 3A	Out
70	DISCRETE OUT* 4A	Out
71	ANNUNCIATE* 1A	Out
72	ANNUNCIATE* 2A	Out
73	DISCRETE IN* 17A	In
74	DISCRETE IN 24A	In
75	SUPERFLAG 2A	Out
76	POWER GROUND	--
77	SUPERFLAG 3A	Out
78	POWER GROUND	--

P606 (I/O #2)

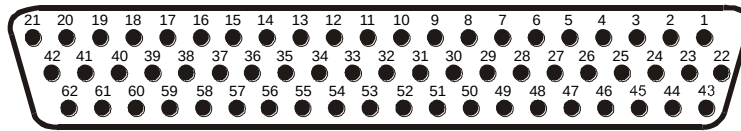


Pin	Pin Name	I/O
1	26 VAC VERTICAL GYRO REF HI	In
2	26 VAC VERTICAL GYRO REF LO	In
3	26 VAC ADF REF HI	In
4	26 VAC ADF REF LO	In
5	26 VAC AFCS REF HI	In
6	26 VAC AFCS REF LO	In
7	DIRECTIONAL GYRO MOTOR A	In
8	DIRECTIONAL GYRO MOTOR B	In
9	SIGNAL GROUND	--
10	ADF X/COS	In
11	ADF Y/SIN	In
12	ADF Z (GROUND)	In
13	SIGNAL GROUND	--
14	HEADING X	In
15	HEADING Y	In
16	HEADING Z (GROUND)	In
17	SIGNAL GROUND	--
18	PITCH ATTITUDE X	In
19	PITCH ATTITUDE Y	In
20	PITCH ATTITUDE Z (GROUND)	In
21	ROLL ATTITUDE X	In
22	ROLL ATTITUDE Y	In
23	ROLL ATTITUDE Z (GROUND)	In
24	SIGNAL GROUND	--
25	SPARE	--
26	SPARE	--
27	SPARE	--
28	SPARE	--
29	RESERVED	--
30	SIGNAL GROUND	--
31	RESERVED	--
32	ADF DC REF IN	In
33	RESERVED	--
34	ANALOG ROLL STEERING HI	Out
35	RESERVED	--
36	ANALOG ROLL STEERING LO (GROUND)	Out
37	HEADING BOOTSTRAP OUT X	Out
38	HEADING BOOTSTRAP OUT Y	Out
39	HEADING BOOTSTRAP OUT Z (GROUND)	Out
40	AC ROLL ATTITUDE OUT HI	Out
41	AC ROLL ATTITUDE OUT LO (GROUND)	Out
42	AC PITCH ATTITUDE OUT HI	Out
43	AC PITCH ATTITUDE OUT LO (GROUND)	Out
44	YAW RATE +RIGHT	Out

Pin	Pin Name	I/O
45	YAW RATE +LEFT (GROUND)	Out
46	HEADING DATUM HI	Out
47	HEADING DATUM LO (GROUND)	Out
48	COURSE DATUM HI	Out
49	COURSE DATUM LO (GROUND)	Out
50	SIGNAL GROUND	--
51	26 VAC DIRECTIONAL GYRO REF HI	In
52	26 VAC DIRECTIONAL GYRO REF LO	In
53	REMOTE ANNUNCIATE CLOCK	In
54	REMOTE ANNUNCIATE DATA	In
55	REMOTE ANNUNCIATE SYNC	In
56	MAIN OBI CLOCK	Out
57	MAIN OBI DATA	Out
58	MAIN OBI SYNC	Out
59	MAIN KING SERIAL DME DATA	I/O
60	MAIN KING SERIAL DME CLOCK	I/O
61	MAIN KING SERIAL DME HOLD* OUT	Out
62	MAIN KING SERIAL DME REQUEST	I/O
63	MAIN KING SERIAL DME ON* OUT	Out
64	MAIN KING SERIAL RNAV REQUEST	In
65	RESERVED	--
66	RESERVED	--
67	DISCRETE OUT* 1B	Out
68	DISCRETE OUT* 2B	Out
69	DISCRETE OUT* 3B	Out
70	DISCRETE OUT* 4B	Out
71	DISCRETE OUT* 5B	Out
72	DISCRETE OUT* 6B	Out
73	DISCRETE OUT* 7B	Out
74	DISCRETE OUT* 8B	Out
75	DISCRETE OUT* 9B	Out
76	RESERVED	--
77	DISCRETE OUT* 10B	Out
78	RESERVED	--

A.2 GDU 10XX/1500

P10001

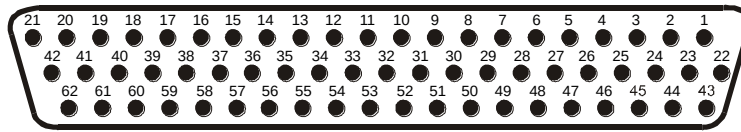


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	ETHERNET OUT 1 A	Out
3	ETHERNET OUT 1 B	Out
4	ETHERNET IN 1 A	In
5	ETHERNET IN 1 B	In
6	ETHERNET OUT 2 A	Out
7	ETHERNET OUT 2 B	Out
8	ETHERNET IN 2 A	In
9	ETHERNET IN 2 B	In
10	ETHERNET OUT 3 A	Out
11	ETHERNET OUT 3 B	Out
12	ETHERNET IN 3 A	In
13	ETHERNET IN 3 B	In
14	FAN MONITOR VALID*	In
15	REVERSIONARY MODE SELECT 2	In
16	ARINC 429 IN 2 A	In
17	ARINC 429 IN 2 B	In
18	ARINC 429 IN 1 A	In
19	ARINC 429 IN 1 B	In
20	RESERVED	--
21	RESERVED	--
22	CONFIG MODULE DATA	I/O
23	CONFIG MODULE POWER OUT	Out
24	RESERVED	--
25	RESERVED	--
26	SIGNAL GROUND	--
27	POWER GROUND	--
28	RESERVED	--
29	POWER GROUND	--
30	SIGNAL GROUND	--
31	POWER GROUND	--
32	SIGNAL GROUND	--
33	POWER GROUND	--
34	SIGNAL GROUND	--
35	AIRCRAFT POWER 1	In
36	SIGNAL GROUND	--
37	AIRCRAFT POWER 1	In
38	SIGNAL GROUND	--
39	AIRCRAFT POWER 2	In
40	SIGNAL GROUND	--
41	AIRCRAFT POWER 2	In
42	SIGNAL GROUND	--
43	CONFIG MODULE CLOCK	Out

Pin	Pin Name	I/O
44	RS-232 OUT 1	Out
45	RS-232 IN 1	In
46	RS-232 OUT 2	Out
47	RS-232 IN 2	In
48	UNIT 5 REMOTE POWER OFF	--
49	UNIT 4 REMOTE POWER OFF	--
50	UNIT 3 REMOTE POWER OFF	--
51	UNIT 2 REMOTE POWER OFF	--
52	UNIT 1 REMOTE POWER OFF	Out
53	RESERVED	--
54	DEMO MODE SELECT*	In
55	CDU SYSTEM ID PROGRAM* 1	In
56	CDU SYSTEM ID PROGRAM* 2	In
57	CDU SYSTEM ID PROGRAM* 3	In
58	REVERSIONARY MODE SELECT 1	In
59	LIGHTING BUS 1 HI	In
60	LIGHTING BUS 1 LO	In
61	RESERVED	--
62	RESERVED	--

A.3 GDU 10XX/1500 (Ethernet/Video Upgrade)

P10001

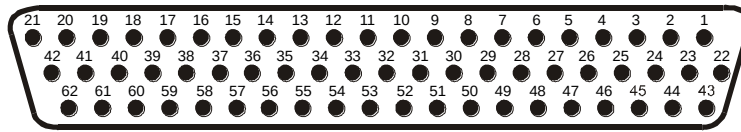


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	Out
2	ETHERNET OUT 1 A	Out
3	ETHERNET OUT 1 B	Out
4	ETHERNET IN 1 A	In
5	ETHERNET IN 1 B	In
6	ETHERNET OUT 2 A	Out
7	ETHERNET OUT 2 B	Out
8	ETHERNET IN 2 A	In
9	ETHERNET IN 2 B	In
10	ETHERNET OUT 3 A	Out
11	ETHERNET OUT 3 B	Out
12	ETHERNET IN 3 A	In
13	ETHERNET IN 3 B	In
14	FAN MONITOR VALID*	In
15	REVERSIONARY MODE SELECT 2	In
16	ARINC 429 IN 2 A	In
17	ARINC 429 IN 2 B	In
18	ARINC 429 IN 1 A	In
19	ARINC 429 IN 1 B	In
20	LIGHTING BUS 2 HI	In
21	LIGHTING BUS 2 LO	In
22	CONFIG MODULE DATA	I/O
23	CONFIG MODULE POWER OUT	Out
24	RESERVED	--
25	RESERVED	--
26	SIGNAL GROUND	--
27	POWER GROUND	--
28	COMPOSITE VIDEO IN 1 HI	In
29	POWER GROUND	--
30	SIGNAL GROUND	--
31	POWER GROUND	--
32	SIGNAL GROUND	--
33	POWER GROUND	--
34	SIGNAL GROUND	--
35	AIRCRAFT POWER 1	In
36	SIGNAL GROUND	--
37	AIRCRAFT POWER 1	In
38	SIGNAL GROUND	--
39	AIRCRAFT POWER 2	In
40	SIGNAL GROUND	--
41	AIRCRAFT POWER 2	In
42	SIGNAL GROUND	--

Pin	Pin Name	I/O
43	CONFIG MODULE CLOCK	Out
44	RS-232 OUT 1	Out
45	RS-232 IN 1	In
46	RS-232 OUT 2	Out
47	RS-232 IN 2	In
48	ETHERNET OUT 4 A	Out
49	ETHERNET OUT 4 B	Out
50	ETHERNET IN 4 A	In
51	ETHERNET IN 4 B	In
52	UNIT 1 REMOTE POWER OFF	Out
53	RESERVED	--
54	DEMO MODE SELECT*	In
55	CDU SYSTEM ID PROGRAM* 1	In
56	CDU SYSTEM ID PROGRAM* 2	In
57	CDU SYSTEM ID PROGRAM* 3	In
58	REVERSIONARY MODE SELECT 1	In
59	LIGHTING BUS 1 HI	In
60	LIGHTING BUS 1 LO	In
61	RESERVED	--
62	COMPOSITE VIDEO IN 2 HI	In

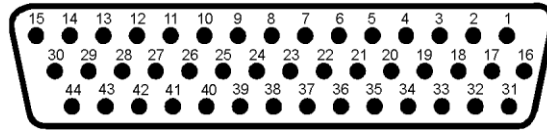
A.4 GDU 12XX

P12001



Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	ETHERNET OUT 1 A	Out
3	ETHERNET OUT 1 B	Out
4	ETHERNET IN 1 A	In
5	ETHERNET IN 1 B	In
6	ETHERNET OUT 2 A	Out
7	ETHERNET OUT 2 B	Out
8	ETHERNET IN 2 A	In
9	ETHERNET IN 2 B	In
10	ETHERNET OUT 3 A	Out
11	ETHERNET OUT 3 B	Out
12	ETHERNET IN 3 A	In
13	ETHERNET IN 3 B	In
14	SPARE DISCRETE IN*	In
15	REVERSIONARY MODE SELECT 2	In
16	ARINC 429 IN 2 A	In
17	ARINC 429 IN 2 B	In
18	ARINC 429 IN 1 A	In
19	ARINC 429 IN 1 B	In
20	LIGHTING BUS 2 HI	In
21	LIGHTING BUS 2 LO	In
22	CONFIG MODULE DATA	I/O
23	CONFIG MODULE POWER OUT	Out
24	RESERVED	--
25	RESERVED	--
26	SIGNAL GROUND	--
27	POWER GROUND	--
28	COMPOSITE VIDEO IN 1 HI	In
29	POWER GROUND	--
30	SIGNAL GROUND	--
31	POWER GROUND	--
32	SIGNAL GROUND	--
33	POWER GROUND	--
34	SIGNAL GROUND	--
35	AIRCRAFT POWER 1	In
36	SIGNAL GROUND	--
37	AIRCRAFT POWER 1	In
38	SIGNAL GROUND	--
39	AIRCRAFT POWER 2	In
40	SIGNAL GROUND	--
41	AIRCRAFT POWER 2	In
42	SIGNAL GROUND	--

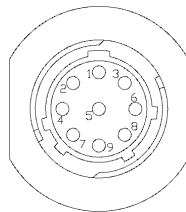
Pin	Pin Name	I/O
43	CONFIG MODULE CLOCK	Out
44	RS-232 OUT 1	Out
45	RS-232 IN 1	In
46	RS-232 OUT 2	Out
47	RS-232 IN 2	In
48	ETHERNET OUT 4 A	Out
49	ETHERNET OUT 4 B	Out
50	ETHERNET IN 4 A	In
51	ETHERNET IN 4 B	In
52	UNIT 1 REMOTE POWER OFF	Out
53	RESERVED	--
54	DEMO MODE SELECT*	In
55	CDU SYSTEM ID PROGRAM* 1	In
56	CDU SYSTEM ID PROGRAM* 2	In
57	CDU SYSTEM ID PROGRAM* 3	In
58	REVERSIONARY MODE SELECT 1	In
59	LIGHTING BUS 1 HI	In
60	LIGHTING BUS 1 LO	In
61	RESERVED	--
62	COMPOSITE VIDEO IN 2 HI	In



Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	AHRS SYSTEM ID PROGRAM* 1	In
3	AHRS SYSTEM ID PROGRAM* 2	In
4	RESERVED	--
5	SPARE	--
6	GPS 2 RS-232 IN	In
7	RESERVED	--
8	SPARE RS-232 IN 1	In
9	MAGNETOMETER POWER OUT	Out
10	MAGNETOMETER RS-232 OUT	Out
11	GPS 1 RS-232 IN	In
12	ARINC 429 OUT 3 A	Out
13	ARINC 429 OUT 2 A	Out
14	ARINC 429 OUT 1 A	Out
15	ARINC 429 IN 1 A	In
16	CONFIG MODULE DATA	I/O
17	CONFIG MODULE POWER OUT	Out
18	AIRCRAFT POWER 1	In
19	ARINC 429 OUT 3 B	Out
20	AIRCRAFT POWER 2	In
21	GPS 2 RS-232 OUT	Out
22	POWER GROUND	--
23	SPARE RS-232 OUT 1	Out
24	POWER GROUND	--
25	MAGNETOMETER RS-485 IN A	In
26	GPS 1 RS-232 OUT	Out
27	ARINC 429 OUT 3 B	Out
28	ARINC 429 OUT 2 B	Out
29	ARINC 429 OUT 1 B	Out
30	ARINC 429 IN 1 B	In
31	CONFIG MODULE CLOCK	Out
32	SPARE	--
33	ARINC 429 OUT 3 A	Out
34	SPARE	--
35	SIGNAL GROUND	--
36	SPARE	--
37	SIGNAL GROUND	--
38	SIGNAL GROUND	--
39	MAGNETOMETER RS-485 IN B	In
40	MAGNETOMETER GROUND	--
41	SIGNAL GROUND	--
42	SIGNAL GROUND	--
43	SIGNAL GROUND	--
44	SIGNAL GROUND	--

A.6 GMU 44

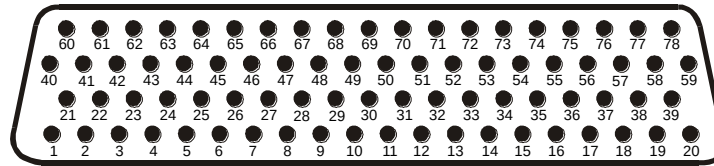
P441



Pin	Pin Name	I/O
1	SIGNAL GROUND	--
2	RS-485 OUT B	Out
3	SIGNAL GROUND	--
4	RS-485 OUT A	Out
5	SPARE	--
6	POWER GROUND	--
7	SPARE	--
8	RS-232 IN	In
9	+12 VDC POWER	In

A.7 GDC 74A/B

P741

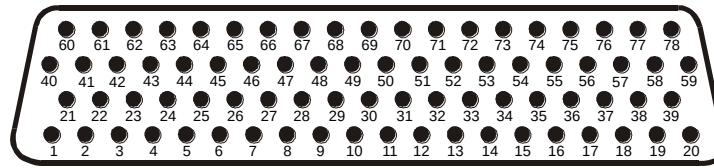


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	OAT PROBE POWER OUT	Out
3	OAT PROBE IN HI	In
4	OAT PROBE IN LO	In
5	SIGNAL GROUND	--
6	ADC SYSTEM ID PROGRAM* 1	In
7	SIGNAL GROUND	--
8	DISCRETE IN* 6	In
9	SIGNAL GROUND	--
10	RS-232 IN 1	In
11	RS-232 OUT 1	Out
12	SIGNAL GROUND	--
13	RS-232 IN 2	In
14	RS-232 OUT 2	Out
15	SIGNAL GROUND	--
16	RESERVED	--
17	POWER GROUND	--
18	POWER GROUND	--
19	POWER GROUND	--
20	POWER GROUND	--
21	CONFIG MODULE POWER OUT	Out
22	SPARE	--
23	ARINC 429 IN 1 A	In
24	ARINC 429 IN 1 B	In
25	SIGNAL GROUND	--
26	ARINC 429 OUT 1 A	Out
27	ARINC 429 OUT 1 B	Out
28	SIGNAL GROUND	--
29	ARINC 429 OUT 2 A	Out
30	ARINC 429 OUT 2 B	Out
31	SIGNAL GROUND	--
32	ARINC 429 OUT 3 A	Out
33	ARINC 429 OUT 3 B	Out
34	SIGNAL GROUND	--
35	ARINC 429 IN 2 A	In
36	ARINC 429 IN 2 B	In

Pin	Pin Name	I/O
37	SIGNAL GROUND	--
38	SPARE	--
39	SPARE	--
40	CONFIG MODULE DATA	I/O
41	ARINC 429 OUT 1 A	Out
42	ARINC 429 OUT 1 B	Out
43	SIGNAL GROUND	--
44	ARINC 429 OUT 2 A	Out
45	ARINC 429 OUT 2 B	Out
46	SIGNAL GROUND	--
47	ARINC 429 OUT 3 A	Out
48	ARINC 429 OUT 3 B	Out
49	SIGNAL GROUND	--
50	DISCRETE IN 7	In
51	SIGNAL GROUND	--
52	DISCRETE IN 8	In
53	SIGNAL GROUND	--
54	SPARE	--
55	AIRCRAFT POWER 1	In
56	SPARE	--
57	SPARE	--
58	AIRCRAFT POWER 2	In
59	SPARE	--
60	CONFIG MODULE CLOCK	Out
61	DISCRETE IN* 1	In
62	SIGNAL GROUND	--
63	DISCRETE IN* 2	In
64	SIGNAL GROUND	--
65	DISCRETE IN* 3	In
66	SIGNAL GROUND	--
67	DISCRETE IN* 4	In
68	SIGNAL GROUND	--
69	DISCRETE IN* 5	In
70	SIGNAL GROUND	--
71	ADC SYSTEM ID PROGRAM* 2	In
72	SIGNAL GROUND	--
73	ARINC 429 IN 3 A	In
74	ARINC 429 IN 3 B	In
75	SIGNAL GROUND	--
76	ARINC 429 IN 4 A	In
77	ARINC 429 IN 4 B	In
78	SIGNAL GROUND	--

A.8 GEA 71

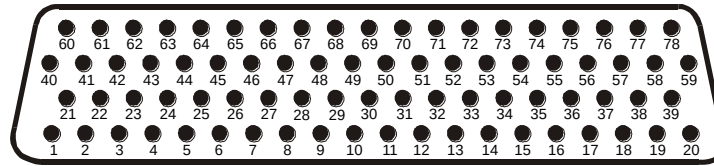
P701



Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	DIGITAL IN* 1	In
3	DIGITAL IN* 2	In
4	SIGNAL GROUND	--
5	RS-485 1 A	I/O
6	RS-485 1 B	I/O
7	RS-485 2 A	I/O
8	RS-485 2 B	I/O
9	GEA SYSTEM ID PROGRAM* 1	In
10	GEA SYSTEM ID PROGRAM* 2	In
11	TRANSDUCER POWER OUT LO (GROUND)	--
12	TRANSDUCER POWER OUT LO (GROUND)	--
13	TRANSDUCER POWER OUT LO (GROUND)	--
14	+10 VDC TRANSDUCER POWER OUT	Out
15	+5 VDC TRANSDUCER POWER OUT	Out
16	+12 VDC TRANSDUCER POWER OUT	Out
17	ENGINE TEMP ANALOG IN 6 HI	In
18	ENGINE TEMP ANALOG IN 6 LO	In
19	SIGNAL GROUND	--
20	POWER GROUND	--
21	CONFIG MODULE POWER OUT	Out
22	ANALOG IN 1 HI	In
23	ANALOG IN 1 LO	In
24	ANALOG IN 2 HI	In
25	ANALOG IN 2 LO	In
26	ENGINE TEMP ANALOG IN 1 HI	In
27	ENGINE TEMP ANALOG IN 1 LO	In
28	ENGINE TEMP ANALOG IN 2 HI	In
29	ENGINE TEMP ANALOG IN 2 LO	In
30	ENGINE TEMP ANALOG IN 3 HI	In
31	ENGINE TEMP ANALOG IN 3 LO	In
32	SIGNAL GROUND	--
33	ENGINE TEMP ANALOG IN 4 HI	In
34	ENGINE TEMP ANALOG IN 4 LO	In
35	AIRCRAFT POWER 1	In
36	ENGINE TEMP ANALOG IN 5 HI	In
37	AIRCRAFT POWER 2	In
38	ENGINE TEMP ANALOG IN 5 LO	In

Pin	Pin Name	I/O
39	SIGNAL GROUND	--
40	CONFIG MODULE DATA	I/O
41	DIGITAL IN* 3	In
42	ANALOG IN 3 HI	In
43	ANALOG IN 3 LO	In
44	ANALOG IN 4 HI	In
45	ANALOG IN 4 LO	In
46	ANALOG IN 5 HI	In
47	ANALOG IN 5 LO	In
48	ENGINE TEMP ANALOG IN 7 HI	In
49	ENGINE TEMP ANALOG IN 7 LO	In
50	ENGINE TEMP ANALOG IN 8 HI	In
51	ENGINE TEMP ANALOG IN 8 LO	In
52	ENGINE TEMP ANALOG IN 9 HI	In
53	ENGINE TEMP ANALOG IN 9 LO	In
54	ENGINE TEMP ANALOG IN 10 HI	In
55	ENGINE TEMP ANALOG IN 10 LO	In
56	ENGINE TEMP ANALOG IN 11 HI	In
57	ENGINE TEMP ANALOG IN 11 LO	In
58	ENGINE TEMP ANALOG IN 12 HI	In
59	ENGINE TEMP ANALOG IN 12 LO	In
60	CONFIG MODULE CLOCK	Out
61	DIGITAL IN* 4	In
62	ANALOG IN 6 HI	In
63	ANALOG IN 6 LO	In
64	ANALOG IN 7 HI	In
65	ANALOG IN 7 LO	In
66	ANALOG IN 8 HI	In
67	ANALOG IN 8 LO	In
68	THERMOCOUPLE REF IN HI	In
69	THERMOCOUPLE REF IN LO	In
70	DISCRETE IN* 1	In
71	DISCRETE IN* 2	In
72	ANALOG IN 9 HI	In
73	ANALOG IN 9 LO	In
74	ANALOG IN 10 HI	In
75	ANALOG IN 10 LO	In
76	DISCRETE IN* 3	In
77	GEA REMOTE POWER OFF	In
78	POWER GROUND	--

P702

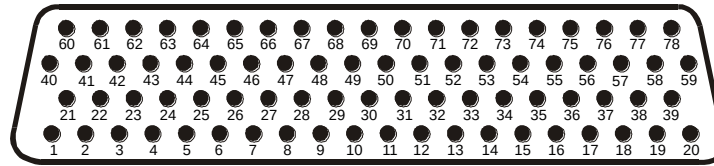


Pin	Pin Name	I/O
1	ANNUNCIATE* 1A	Out
2	ANNUNCIATE* 2A	Out
3	ANNUNCIATE* 3A	Out
4	ANNUNCIATE* 4A	Out
5	ANNUNCIATE* 5A	Out
6	ANNUNCIATE* 6A	Out
7	ANNUNCIATE* 7A	Out
8	ANNUNCIATE* 8A	Out
9	ANNUNCIATE* 9A	Out
10	ANNUNCIATE* 10A	Out
11	TRANSDUCER POWER OUT LO (GROUND)	--
12	TRANSDUCER POWER OUT LO (GROUND)	--
13	TRANSDUCER POWER OUT LO (GROUND)	--
14	+10 VDC TRANSDUCER POWER OUT A	Out
15	+5 VDC TRANSDUCER POWER OUT A	Out
16	+12 VDC TRANSDUCER POWER OUT A	Out
17	ANNUNCIATE* 11A	Out
18	ANNUNCIATE* 12A	Out
19	ANNUNCIATE* 13A	Out
20	ANNUNCIATE* 14A	Out
21	ANNUNCIATE* 15A	Out
22	ANNUNCIATE* 16A	Out
23	ANNUNCIATE* 17A	Out
24	ANNUNCIATE* 18A	Out
25	DISCRETE IN* 11A	In
26	DISCRETE IN* 12A	In
27	DISCRETE IN* 13A	In
28	DISCRETE IN* 14A	In
29	DISCRETE IN* 15A	In
30	DISCRETE IN* 16A	In
31	SIGNAL GROUND	--
32	SIGNAL GROUND	--
33	SIGNAL GROUND	--
34	SIGNAL GROUND	--
35	SIGNAL GROUND	--
36	SIGNAL GROUND	--
37	SIGNAL GROUND	--
38	SIGNAL GROUND	--
39	SIGNAL GROUND	--

Pin	Pin Name	I/O
40	DISCRETE IN* 17A	In
41	DISCRETE IN* 18A	In
42	DISCRETE IN* 19A	In
43	DISCRETE IN* 20A	In
44	ANALOG/CURRENT MONITOR IN 1A HI	In
45	ANALOG/CURRENT MONITOR IN 1A LO	In
46	ANALOG/CURRENT MONITOR IN 2A HI	In
47	ANALOG/CURRENT MONITOR IN 2A LO	In
48	ANALOG/CURRENT MONITOR IN 3A HI	In
49	ANALOG/CURRENT MONITOR IN 3A LO	In
50	ANALOG/CURRENT MONITOR IN 4A HI	In
51	ANALOG/CURRENT MONITOR IN 4A LO	In
52	ANALOG IN 1A HI	In
53	ANALOG IN 1A LO	In
54	ANALOG IN 2A HI	In
55	ANALOG IN 2A LO	In
56	ANALOG IN 3A HI	In
57	ANALOG IN 3A LO	In
58	ANALOG IN 4A HI	In
59	ANALOG IN 4A LO	In
60	DISCRETE IN* 1A	In
61	DISCRETE IN* 2A	In
62	DISCRETE IN* 3A	In
63	DISCRETE IN* 4A	In
64	DISCRETE IN* 5A	In
65	DISCRETE IN* 6A	In
66	DISCRETE IN* 7A	In
67	DIGITAL IN* 5A	In
68	DIGITAL IN* 6A	In
69	DIGITAL IN* 7A	In
70	DIGITAL IN* 8A	In
71	DISCRETE IN* 8A	In
72	DISCRETE IN* 9A	In
73	DISCRETE IN* 10A	In
74	DIGITAL IN* 1A	In
75	DIGITAL IN* 2A	In
76	DIGITAL IN* 3A	In
77	DIGITAL IN* 4A	In
78	SIGNAL GROUND	--

A.9 GMA 1347/D

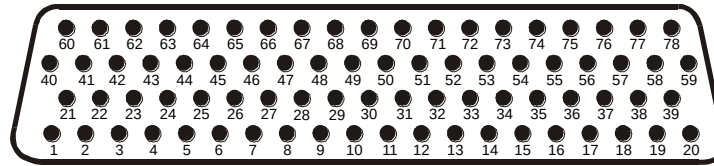
P3471



Pin	Pin Name	I/O
1	FAIL SAFE PILOT SUMMED AUDIO OUT HI (GMA 1347D) FAIL SAFE WARN AUDIO IN (GMA 1347)	Out In
2	OXYGEN MASK MIC SELECT* (GMA 1347D) RESERVED (GMA 1347)	In --
3	TEL RINGER AUDIO IN HI	In
4	TEL RINGER AUDIO IN LO	In
5	REMOTE PASS ICS OUT HI	Out
6	ON-SIDE NAV AUDIO IN HI	In
7	ON-SIDE COM AUDIO IN HI	In
8	ON-SIDE COM AUDIO LO	I/O
9	PILOT HEADSET AUDIO OUT LEFT	Out
10	PILOT HEADSET AUDIO OUT RIGHT	Out
11	PILOT HEADSET AUDIO OUT LO	Out
12	CROSS-SIDE COM AUDIO IN HI	In
13	CROSS-SIDE COM AUDIO LO	I/O
14	CROSS-SIDE NAV AUDIO IN HI	In
15	DME AUDIO IN HI	In
16	DME AUDIO IN LO	In
17	MUSIC 1 IN LEFT	In
18	MUSIC 1 IN RIGHT	In
19	UNSWITCHED AUDIO IN 1 HI	In
20	UNSWITCHED AUDIO IN 2 HI	In
21	REMOTE CREW ICS AUDIO IN HI	In
22	REMOTE CREW ICS AUDIO IN LO	In
23	TEL MIC AUDIO OUT HI	Out
24	PASS ICS KEY*	In
25	ON-SIDE NAV AUDIO IN LO	In
26	ON-SIDE COM MIC AUDIO OUT HI	Out
27	ON-SIDE COM MIC KEY*	Out
28	PILOT MIC AUDIO IN HI	In
29	PILOT MIC KEY* IN	In
30	PILOT MIC IN LO	In
31	PILOT ICS KEY*	In
32	CROSS-SIDE COM MIC AUDIO OUT HI	Out
33	CROSS-SIDE COM MIC KEY*	Out
34	CROSS-SIDE NAV AUDIO IN LO	In
35	ADF AUDIO IN HI	In
36	ADF AUDIO IN LO	In

Pin	Pin Name	I/O
37	MUSIC 1 IN LO	In
38	UNSWITCHED AUDIO IN 3 HI	In
39	UNSWITCHED AUDIO IN LO	In
40	REMOTE PASS ICS AUDIO IN HI	In
41	REMOTE PASS ICS AUDIO IN LO	In
42	TEL AUDIO IN HI	In
43	TEL AUDIO IN LO	In
44	PASS 3 MIC AUDIO IN HI	In
45	PASS 3 MIC AUDIO IN LO	In
46	PASS 1 MIC AUDIO IN HI	In
47	PASS 1 MIC AUDIO IN LO	In
48	PASS HEADSET AUDIO OUT LO	Out
49	COPILOT MIC AUDIO IN HI	In
50	COPILOT MIC KEY* IN	In
51	COPILOT MIC IN LO	In
52	COPILOT ICS KEY*	In
53	SUMMED AUDIO OUT LO	--
54	ALTITUDE WARN AUDIO IN HI	In
55	ALTITUDE WARN AUDIO IN LO	In
56	MUSIC 2 IN LEFT	In
57	MUSIC 2 IN RIGHT	In
58	COM 3 AUDIO IN HI	In
59	COM 3 AUDIO LO	I/O
60	REMOTE CREW ICS OUT HI	Out
61	REMOTE ICS OUT LO	Out
62	TEL MIC AUDIO OUT LO	Out
63	PASS 4 MIC AUDIO IN HI	In
64	PASS 4 MIC AUDIO IN LO	In
65	PASS 2 MIC AUDIO IN HI	In
66	PASS 2 MIC AUDIO IN LO	In
67	PASS HEADSET AUDIO OUT LEFT	Out
68	PASS HEADSET AUDIO OUT RIGHT	Out
69	COPILOT HEADSET AUDIO OUT LEFT	Out
70	COPILOT HEADSET AUDIO OUT RIGHT	Out
71	COPILOT HEADSET AUDIO OUT LO	Out
72	PILOT SUMMED AUDIO OUT HI	Out
73	COPILOT SUMMED AUDIO OUT HI	Out
74	AUX AUDIO IN HI	In
75	AUX AUDIO IN LO	In
76	MUSIC 2 IN LO	In
77	COM 3 MIC AUDIO OUT HI	Out
78	COM 3 MIC KEY*	Out

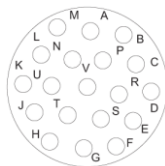
P3472



Pin	Pin Name	I/O
1	RESERVED	--
2	RESERVED	--
3	PROGRAM GROUND	--
4	RECORDER PLAY* (GMA 1347) RESERVED (GMA 1347D)	In --
5	PROGRAM GROUND	--
6	RS-232 OUT 1	Out
7	RS-232 IN 1	In
8	ON-SIDE COM MIC DIGITAL AUDIO OUT	Out
9	ON-SIDE COM DIGITAL AUDIO IN	In
10	RESERVED	--
11	PROGRAM GROUND	--
12	RESERVED	--
13	RESERVED	--
14	POWER GROUND	--
15	RESERVED	--
16	POWER GROUND	--
17	COM SWAP*	In
18	PROGRAM GROUND	--
19	RESERVED	--
20	RESERVED	--
21	RESERVED	--
22	RESERVED	--
23	PROGRAM GROUND	--
24	RECORDER OFF SELECT* (GMA 1347/1347D -20) RESERVED (GMA 1347D -00)	In --
25	PROGRAM GROUND	--
26	RESERVED	--
27	GMA REMOTE POWER OFF	In
28	ON-SIDE NAV DIGITAL AUDIO IN	In
29	VOICE ALERT DIGITAL AUDIO IN (GMA 1347) ON-SIDE VOICE ALERT DIGITAL AUDIO IN (GMA 1347D)	In In
30	AIRCRAFT POWER 2	In
31	RESERVED	--
32	AIRCRAFT POWER 2	In
33	RESERVED	--
34	MIDDLE MARKER SENSE	Out
35	RESERVED	--
36	REVERSIONARY MODE 1	Out
37	REVERSIONARY MODE COMMON 1	--

Pin	Pin Name	I/O
38	RS-232 OUT 2	Out
39	RS-232 IN 2	In
40	RESERVED	--
41	SPEAKER AUDIO OUT LO	Out
42	SPEAKER AUDIO OUT HI	Out
43	RESERVED	--
44	PROGRAM GROUND	--
45	RESERVED	--
46	PROGRAM GROUND	--
47	CROSS-SIDE COM MIC DIGITAL AUDIO OUT	Out
48	CROSS-SIDE COM DIGITAL AUDIO IN	In
49	SECONDARY DIGITAL AUDIO CLOCK OUT	Out
50	SECONDARY DIGITAL AUDIO CLOCK IN	In
51	14 V LIGHTING HI	In
52	28 V LIGHTING HI	In
53	AIRCRAFT POWER 1	In
54	RESERVED	--
55	AIRCRAFT POWER 1	In
56	REVERSIONARY MODE 2	Out
57	REVERSIONARY MODE COMMON 2	--
58	RESERVED	--
59	MARKER ANTENNA LO	In
60	RESERVED	--
61	CROSS-SIDE VOICE ALERT DIGITAL AUDIO IN (GMA 1347D) RESERVED (GMA 1347)	In
62	RESERVED	--
63	RESERVED	--
64	PA MUTE* OUT	Out
65	RESERVED	--
66	RESERVED	--
67	PROGRAM GROUND	--
68	CROSS-SIDE NAV DIGITAL AUDIO IN	In
69	POWER GROUND	--
70	RESERVED	--
71	POWER GROUND	--
72	RESERVED	--
73	RESERVED	--
74	CABIN CALL EXT LAMP OUT (GMA 1347D -20) AIRWAY/INNER MARKER EXT LAMP OUT (GMA 1347/1347D -00)	Out Out
75	MIDDLE MARKER EXT LAMP OUT	Out
76	OUTER MARKER EXT LAMP OUT	Out
77	COCKPIT CALL SELECT* (GMA 1347D -20) RESERVED (GMA 1347/1347D -00)	In --
78	MARKER ANTENNA HI	In

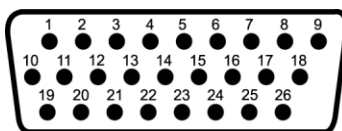
P841



Pin	Pin Name	I/O
A	SPARE	--
B	SPARE	--
C	SPARE	--
D	SPARE	--
E	RS-485 2 B	I/O
F	SERVO PROGRAM 3	In
G	SERVO PROGRAM 2	In
H	SERVO PROGRAM 1	In
J	RS-485 1 A	I/O
K	SPARE	--
L	SPARE	--
M	SPARE	--
N	AIRCRAFT POWER	In
P	AP DISCONNECT	In
R	PROGRAM GROUND	
S	RS-485 2 A	I/O
T	RS-485 1 B	I/O
U	PROGRAM GROUND	
V	POWER GROUND	--

A.11 GTA 82

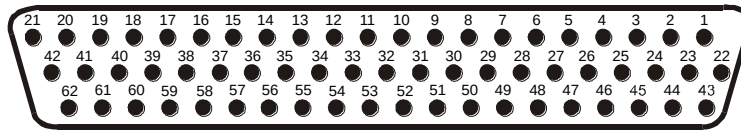
P821



Pin	Pin Name	I/O
1	MANUAL TRIM CW*	In
2	AIRCRAFT POWER	In
3	POWER GROUND	--
4	SERVO ENABLE 1	In
5	AP DISCONNECT	In
6	SERVO PROGRAM 1	In
7	SERVO PROGRAM 2	In
8	SERVO PROGRAM 3	In
9	MOTOR CW	Out
10	MANUAL TRIM ARM*	In
11	MANUAL TRIM CCW*	In
12	RESERVED	--
13	RESERVED	--
14	RESERVED	--
15	RESERVED	--
16	PROGRAM GROUND	--
17	PROGRAM GROUND	--
18	MOTOR COMMON	Out
19	MANUAL TRIM ENABLE*	In

A.12 GTX 33/D

P3301

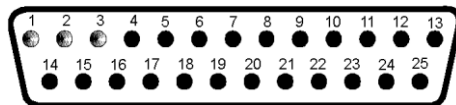


Pin	Pin Name	I/O
1	RESERVED	--
2	ALTITUDE A1	In
3	ALTITUDE C2	In
4	ALTITUDE A2	In
5	ALTITUDE A4	In
6	ALTITUDE C4	In
7	ALTITUDE B1	In
8	ALTITUDE C1	In
9	ALTITUDE B2	In
10	ALTITUDE B4	In
11	ALTITUDE D4	In
12	EXTERNAL IDENT SELECT*	In
13	EXTERNAL STANDBY SELECT*	In
14	NOT USED	In
15	AUDIO OUT HI	Out
16	AUDIO OUT LO	Out
17	SQUAT SWITCH IN	In
18	RESERVED	--
19	ALTITUDE ALERT ANNUNCIATE*	Out
20	RESERVED	--
21	AIRCRAFT POWER 1	In
22	RS-232 IN 1	In
23	RS-232 OUT 1	Out
24	RS-232 IN 2	In
25	RS-232 OUT 2	Out
26	ARINC 429 IN 3 A	In
27	POWER GROUND	--
28	ARINC 429 OUT 2 B	Out
29	ARINC 429 IN 3 B	In
30	ARINC 429 OUT 2 A	Out
31	EXTERNAL SUPPRESSION I/O	I/O
32	ARINC 429 IN 1 A	In
33	ARINC 429 IN 2 A	In
34	ARINC 429 OUT 1 B	Out
35	ARINC 429 IN 1 B	In
36	ARINC 429 IN 2 B	In
37	ARINC 429 OUT 1 A	Out
38	RESERVED	--
39	RESERVED	--
40	SPARE	--
41	CURRENT TEMPERATURE PROBE OUT	Out

Pin	Pin Name	I/O
42	AIRCRAFT POWER 1	In
43	POWER GROUND	--
44	CURRENT TEMPERATURE PROBE IN	In
45	NOT USED	In
46	TIS CONNECT SELECT*	In
47	AUDIO MUTE SELECT*	In
48	ARINC 429 IN 4 A	In
49	ARINC 429 IN 4 B	In
50	ALTITUDE COMMON (GROUND)	In
51	SIGNAL GROUND	--
52	RESERVED	--
53	RESERVED	--
54	XPDR REMOTE POWER OFF	In
55	NOT USED	--
56	AIRCRAFT POWER 2	In
57	NOT USED	--
58	SIGNAL GROUND	--
59	NOT USED	--
60	AIRCRAFT POWER 2	In
61	NOT USED	--
62	SWITCHED POWER OUT	Out

A.13 GTX 32

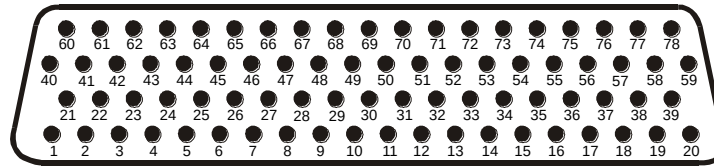
P3271



Pin	Pin Name	I/O
1	XPDR REMOTE POWER OFF	In
2	RS-232 IN 2	In
3	ALTITUDE A1	In
4	ALTITUDE C2	In
5	ALTITUDE A2	In
6	ALTITUDE A4	In
7	ALTITUDE C4	In
8	EXTERNAL IDENT SELECT*	In
9	ALTITUDE B1	In
10	ALTITUDE C1	In
11	ALTITUDE B2	In
12	ALTITUDE B4	In
13	POWER GROUND	--
14	SWITCHED POWER OUT	Out
15	AIRCRAFT POWER 1	In
16	EXTERNAL STANDBY SELECT*	In
17	EXTERNAL SUPPRESSION I/O	I/O
18	ALTITUDE D4	In
19	RS-232 IN 1	In
20	RS-232 OUT 1	Out
21	RESERVED	--
22	SQUAT SWITCH	In
23	AIRCRAFT POWER 2	In
24	RS-232 OUT 2	Out
25	SIGNAL GROUND	--

A.14 GDL 69/69A

P691

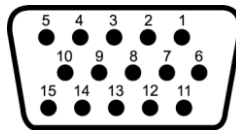


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	RS-232 OUT 2	Out
3	RS-232 OUT 3	Out
4	SIGNAL GROUND	--
5	RS-232 IN 2	In
6	RS-232 IN 3	In
7	RESERVED	--
8	RESERVED	--
9	DATA LINK SYSTEM ID PROGRAM* 1	In
10	DATA LINK SYSTEM ID PROGRAM* 2	In
11	SIGNAL GROUND	--
12	SPARE	--
13	SIGNAL GROUND	--
14	SPARE	--
15	SPARE	--
16	SPARE	--
17	AUDIO OUT 1 LO (SPARE FOR GDL 69)	Out
18	AUDIO OUT 1 RIGHT (SPARE FOR GDL 69)	Out
19	AUDIO OUT 1 LEFT (SPARE FOR GDL 69)	Out
20	POWER GROUND	--
21	CONFIG MODULE POWER OUT	Out
22	ETHERNET IN 1 B	In
23	ETHERNET IN 1 A	In
24	ETHERNET OUT 1 B	Out
25	ETHERNET OUT 1 A	Out
26	ETHERNET IN 2 B	In
27	ETHERNET IN 2 A	In
28	ETHERNET OUT 2 B	Out
29	ETHERNET OUT 2 A	Out
30	ETHERNET IN 3 B	In
31	ETHERNET IN 3 A	In
32	ETHERNET OUT 3 B	Out
33	ETHERNET OUT 3 A	Out
34	SPARE	--
35	AIRCRAFT POWER 1	In
36	SPARE	--
37	AIRCRAFT POWER 2	In

Pin	Pin Name	I/O
38	SPARE	--
39	SIGNAL GROUND	--
40	CONFIG MODULE DATA	I/O
41	SPARE	--
42	SPARE	--
43	SPARE	--
44	SPARE	--
45	SPARE	--
46	SPARE	--
47	SPARE	--
48	SPARE	--
49	SPARE	--
50	SPARE	--
51	SPARE	--
52	(LINE) AUDIO OUT 2 LO (SPARE FOR GDL 69)	Out
53	(LINE) AUDIO OUT 2 RIGHT (SPARE FOR GDL 69)	Out
54	(LINE) AUDIO OUT 2 LEFT (SPARE FOR GDL 69)	Out
55	SPARE	--
56	ETHERNET IN 4 B	In
57	ETHERNET IN 4 A	In
58	ETHERNET OUT 4 B	Out
59	ETHERNET OUT 4 A	Out
60	CONFIG MODULE CLOCK	Out
61	AUDIO MUTE SELECT 1 (SPARE FOR GDL 69)	In
62	AUDIO MUTE SELECT 2 (SPARE FOR GDL 69)	In
63	AUDIO MUTE SELECT 3 (SPARE FOR GDL 69)	In
64	AUDIO MUTE SELECT* 4 (SPARE FOR GDL 69)	In
65	AUDIO MUTE SELECT* 5 (SPARE FOR GDL 69)	In
66	AUDIO MUTE SELECT* 6 (SPARE FOR GDL 69)	In
67	DISCRETE IN* 2	In
68	DISCRETE IN* 1	In
69	RESERVED	--
70	AUDIO MUTE*	In
71	CHANNEL INCREMENT*	In
72	CHANNEL DECREMENT*	In
73	VOLUME INCREMENT*	In
74	VOLUME DECREMENT*	In
75	SIGNAL GROUND	--
76	SPARE	--
77	DATA LINK REMOTE POWER OFF	In
78	POWER GROUND	--

A.15 GMC 705/710/715

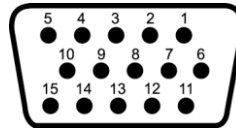
P7101



Pin	Pin Name	I/O
1	RS-232 OUT 1	Out
2	RS-232 IN 1	In
3	RS-232 OUT 2	Out
4	RS-232 IN 2	In
5	POWER GROUND	--
6	SIGNAL GROUND	--
7	AIRCRAFT POWER 1	In
8	SIGNAL GROUND	--
9	AIRCRAFT POWER 2	In
10	CONTROL UNIT REMOTE POWER OFF	In
11	LIGHTING BUS HI	In
12	LIGHTING BUS LO	In
13	RESERVED	--
14	RESERVED	--
15	POWER GROUND	--

A.16 GCU 475/476/477/478

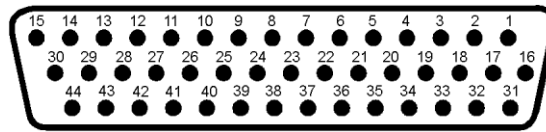
P4751



Pin	Pin Name	I/O
1	RS-232 OUT 1	Out
2	RS-232 IN 1	In
3	RS-232 OUT 2	Out
4	RS-232 IN 2	In
5	POWER GROUND	--
6	SIGNAL GROUND	--
7	AIRCRAFT POWER 1	In
8	SIGNAL GROUND	--
9	AIRCRAFT POWER 2	In
10	CONTROL UNIT REMOTE POWER OFF	In
11	LIGHTING BUS HI	In
12	LIGHTING BUS LO	In
13	RESERVED	--
14	RESERVED	--
15	POWER GROUND	--

A.17 GWX 68

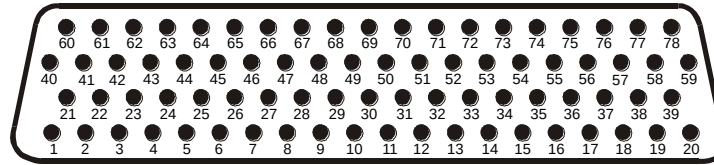
P400



Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	RESERVED	--
3	RESERVED	--
4	ARINC 453 OUT A	Out
5	ARINC 453 OUT B	Out
6	RESERVED	--
7	AIRCRAFT POWER 1	In
8	RESERVED	--
9	AIRCRAFT POWER 1	In
10	AIRCRAFT POWER 2	In
11	RESERVED	--
12	AIRCRAFT POWER 2	In
13	POWER GROUND	--
14	RESERVED	--
15	POWER GROUND	--
16	CONFIG MODULE DATA	I/O
17	CONFIG MODULE POWER	Out
18	ROLL ATTITUDE HI	In
19	ROLL ATTITUDE LO	In
20	26 VAC GYRO REF LO	In
21	26 VAC GYRO REF HI	In
22	ARINC 429 IN 2 A	In
23	ARINC 429 IN 2 B	In
24	RESERVED	--
25	RESERVED	--
26	RESERVED	--
27	RESERVED	--
28	RESERVED	--
29	RESERVED	--
30	RESERVED	--
31	CONFIG MODULE CLOCK	Out
32	PITCH ATTITUDE HI	In
33	PITCH ATTITUDE LO	In
34	ETHERNET IN A	In
35	ETHERNET IN B	In
36	ETHERNET OUT A	Out
37	ETHERNET OUT B	Out
38	ARINC 429 IN 1 A	In
39	ARINC 429 IN 1 B	In
40	RESERVED	--
41	RESERVED	--
42	RESERVED	--
43	RESERVED	--
44	RADAR REMOTE POWER OFF	In

A.18 GTS 8XX

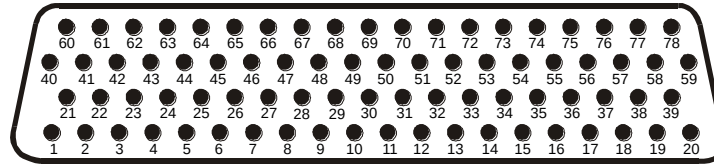
P8001



Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	RS-232 OUT 1	Out
3	RS-232 IN 1	In
4	SIGNAL GROUND	--
5	RS-232 OUT 2	Out
6	RS-232 IN 2	In
7	SIGNAL GROUND	--
8	RS-232 OUT 3	Out
9	RS-232 IN 3	In
10	SIGNAL GROUND	--
11	RS-232 OUT 4	Out
12	RS-232 IN 4	In
13	SIGNAL GROUND	--
14	ARINC 429 OUT 1 A	Out
15	ARINC 429 OUT 1 B	Out
16	ARINC 429 IN 1 A	In
17	ARINC 429 IN 1 B	In
18	SIGNAL GROUND	--
19	GPS PPS 1 IN	In
20	SIGNAL GROUND	--
21	CONFIG MODULE POWER OUT	Out
22	SIGNAL GROUND	--
23	ARINC 429 OUT 2 A	Out
24	ARINC 429 OUT 2 B	Out
25	ARINC 429 IN 2 A	In
26	ARINC 429 IN 2 B	In
27	SIGNAL GROUND	--
28	ARINC 429 OUT 3 A	Out
29	ARINC 429 OUT 3 B	Out
30	ARINC 429 IN 3 A	In
31	ARINC 429 IN 3 B	In
32	SIGNAL GROUND	--
33	ARINC 429 OUT 4 A	Out
34	ARINC 429 OUT 4 B	Out
35	ARINC 429 IN 4 A	In
36	ARINC 429 IN 4 B	In

Pin	Pin Name	I/O
37	RS-422 IN A	In
38	RS-422 IN B	In
39	SIGNAL GROUND	--
40	CONFIG MODULE DATA	I/O
41	SIGNAL GROUND	--
42	ARINC 429 OUT 5 A	Out
43	ARINC 429 OUT 5 B	Out
44	ARINC 429 IN 5 A	In
45	ARINC 429 IN 5 B	In
46	SIGNAL GROUND	--
47	ARINC 429 OUT 6 A	Out
48	ARINC 429 OUT 6 B	Out
49	ARINC 429 IN 6 A	In
50	ARINC 429 IN 6 B	In
51	SIGNAL GROUND	--
52	ETHERNET OUT A	Out
53	ETHERNET OUT B	Out
54	ETHERNET IN A	In
55	ETHERNET IN B	In
56	SIGNAL GROUND	--
57	RS-422 OUT A	Out
58	RS-422 OUT B	Out
59	SIGNAL GROUND	--
60	CONFIG MODULE CLOCK	Out
61	TOP PA/LNA DATA RS-422 OUT A	Out
62	TOP PA/LNA DATA RS-422 OUT B	Out
63	TOP PA/LNA DATA RS-422 IN A	In
64	TOP PA/LNA DATA RS-422 IN B	In
65	RESERVED	--
66	RESERVED	--
67	RESERVED	--
68	RESERVED	--
69	SPARE	--
70	SPARE	--
71	SPARE	--
72	SPARE	--
73	GPS PPS IN 2 HI	In
74	GPS PPS IN 2 LO	In
75	USB VBUS POWER	In
76	USB DATA HI	I/O
77	USB DATA LO	I/O
78	USB GROUND	--

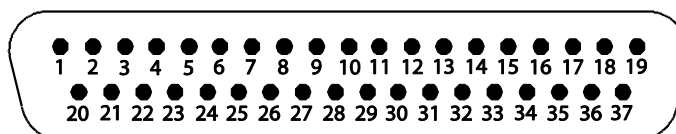
P8002



Pin	Pin Name	I/O
1	SIGNAL GROUND	--
2	RESERVED	--
3	RESERVED	--
4	RESERVED	--
5	SIGNAL GROUND	--
6	AIR/GROUND*	In
7	SPARE	--
8	TRAFFIC DISPLAY 1 STATUS VALID*	In
9	TRAFFIC DISPLAY 2 STATUS VALID*	In
10	GEAR DOWN AND LOCKED*	In
11	TA INHIBIT* 1	In
12	TA INHIBIT* 2	In
13	RESERVED	--
14	SELF TEST INHIBIT PROGRAM*	In
15	TA INTRUDER DISPLAY LIMIT 16 PROGRAM*	In
16	TA INTRUDER DISPLAY LIMIT 8 PROGRAM*	In
17	TA INTRUDER DISPLAY LIMIT 4 PROGRAM*	In
18	TA INTRUDER DISPLAY LIMIT 2 PROGRAM*	In
19	TA INTRUDER DISPLAY LIMIT 1 PROGRAM*	In
20	RESERVED	--
21	SIGNAL GROUND	--
22	RESERVED	--
23	RESERVED	--
24	RESERVED	--
25	RESERVED	--
26	RESERVED	--
27	RESERVED	--
28	RESERVED	--
29	RESERVED	--
30	RESERVED	--
31	RESERVED	--
32	RESERVED	--
33	RESERVED	--
34	RESERVED	--
35	RESERVED	--
36	RESERVED	--

Pin	Pin Name	I/O
37	RESERVED	--
38	RESERVED	--
39	SIGNAL GROUND	--
40	SIGNAL GROUND	--
41	HEADING X HI	In
42	HEADING X LO (GROUND)	--
43	SIGNAL GROUND	--
44	HEADING Y HI	In
45	HEADING Y LO (GROUND)	--
46	SIGNAL GROUND	--
47	SPARE	--
48	EXTERNAL SUPPRESSION I/O	I/O
49	SIGNAL GROUND	--
50	TA DISPLAY ENABLE*	Out
51	AURAL TA ALERT*	Out
52	SPARE	--
53	VISUAL TA ALERT*	Out
54	TRAFFIC SYSTEM STATUS VALID*	Out
55	RESERVED	--
56	RESERVED	--
57	SIGNAL GROUND	--
58	ALERT AUDIO OUT HI	Out
59	ALERT AUDIO OUT LO	Out
60	HEADING Z HI (GROUND)	In
61	HEADING Z LO (GROUND)	--
62	SIGNAL GROUND	--
63	26 VAC HEADING REF HI	In
64	26 VAC HEADING REF LO	In
65	SIGNAL GROUND	--
66	SPARE	--
67	SPARE	--
68	HEADING VALID	In
69	HEADING VALID*	In
70	SIGNAL GROUND	--
71	ANALOG RADAR ALTIMETER HI	In
72	ANALOG RADAR ALTIMETER LO	In
73	SIGNAL GROUND	--
74	SELF TEST INITIALIZE SELECT*	In
75	TRAFFIC OPERATE/STANDBY*	In
76	ANALOG RADAR ALTIMETER VALID	In
77	SPARE	--
78	SIGNAL GROUND	--

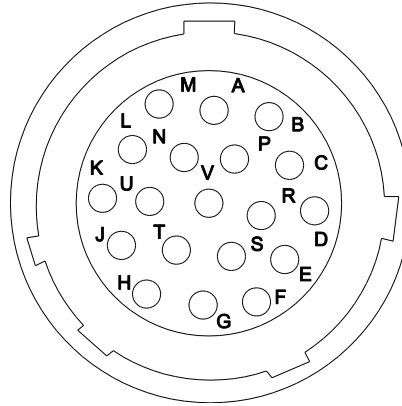
P8003



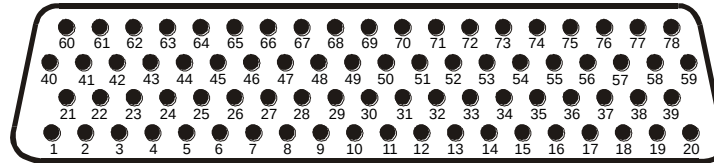
Pin	Pin Name	I/O
1	POWER GROUND	--
2	AIRCRAFT POWER 1	In
3	AIRCRAFT POWER 1	In
4	AIRCRAFT POWER 2	In
5	AIRCRAFT POWER 2	In
6	POWER GROUND	--
7	+6 VDC PA/LNA POWER OUT	Out
8	+6 VDC PA/LNA POWER OUT	Out
9	RESERVED	--
10	RESERVED	--
11	POWER GROUND	--
12	+35 VDC PA/LNA POWER OUT	Out
13	+35 VDC PA/LNA POWER OUT	Out
14	POWER GROUND	--
15	-5 VDC PA/LNA POWER OUT	Out
16	-5 VDC PA/LNA POWER OUT	Out
17	POWER GROUND	--
18	TRAFFIC SYSTEM REMOTE POWER ON*	In
19	POWER GROUND	--
20	POWER GROUND	--
21	POWER GROUND	--
22	POWER GROUND	--
23	POWER GROUND	--
24	POWER GROUND	--
25	POWER GROUND	--
26	POWER GROUND	--
27	POWER GROUND	--
28	POWER GROUND	--
29	POWER GROUND	--
30	POWER GROUND	--
31	POWER GROUND	--
32	POWER GROUND	--
33	POWER GROUND	--
34	POWER GROUND	--
35	POWER GROUND	--
36	TRAFFIC SYSTEM REMOTE POWER OFF	In
37	POWER GROUND	--

A.19 GPA 65 PA/LNA Module

P651



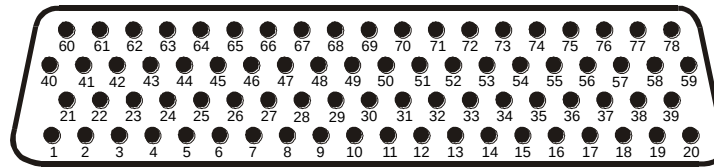
Pin	Pin Name	I/O
A	POWER GROUND	--
B	+35 VDC POWER IN	In
C	POWER GROUND	--
D	RESERVED	--
E	-5 VDC POWER IN	In
F	PA/LNA DATA RS-422 OUT B	Out
G	PA/LNA DATA RS-422 OUT A	Out
H	PA/LNA DATA RS-422 IN B	In
J	PA/LNA DATA RS-422 IN A	In
K	POWER GROUND	--
L	+6 VDC POWER IN	In
M	+35 VDC POWER IN	In
N	RESERVED	--
P	+6 VDC POWER IN	In
R	RESERVED	--
S	-5 VDC POWER IN	In
T	RESERVED	--
U	RESERVED	--
V	RESERVED	--



Pin	Pin Name	I/O
1	RESERVED	--
2	ETHERNET IN 1 B	In
3	ETHERNET IN 1 A	In
4	ETHERNET OUT 1 B	Out
5	ETHERNET OUT 1 A	Out
6	ETHERNET IN 2 B	In
7	ETHERNET IN 2 A	In
8	ETHERNET OUT 2 B	Out
9	ETHERNET OUT 2 A	Out
10	ETHERNET IN 3 B	In
11	ETHERNET IN 3 A	In
12	ETHERNET OUT 3 B	Out
13	ETHERNET OUT 3 A	Out
14	ETHERNET IN 4 B	In
15	ETHERNET IN 4 A	In
16	ETHERNET OUT 4 B	Out
17	ETHERNET OUT 4 A	Out
18	DISCRETE IN* 1	In
19	DISCRETE IN* 2	In
20	DISCRETE IN* 3	In
21	RESERVED	--
22	MAIN1 ARINC 429 IN 1 A	In
23	MAIN1 ARINC 429 IN 1 B	In
24	MAIN1 ARINC 429 IN 2 A	In
25	MAIN1 ARINC 429 IN 2 B	In
26	MAIN1 ARINC 429 IN 3 A	In
27	MAIN1 ARINC 429 IN 3 B	In
28	MAIN1 ARINC 429 IN 4 A	In
29	MAIN1 ARINC 429 IN 4 B	In
30	MAIN1 ARINC 429 IN 5 A	In
31	MAIN1 ARINC 429 IN 5 B	In
32	MAIN1 ARINC 429 IN 6 A	In
33	MAIN1 ARINC 429 IN 6 B	In
34	MAIN1 ARINC 429 IN 7 A	In
35	MAIN1 ARINC 429 IN 7 B	In
36	MAIN1 ARINC 429 IN 8 A	In
37	MAIN1 ARINC 429 IN 8 B	In
38	DISCRETE IN* 4	In

Pin	Pin Name	I/O
39	DISCRETE IN* 5	In
40	RESERVED	--
41	DISCRETE IN* 6	In
42	DISCRETE IN* 7	In
43	DISCRETE IN* 8	In
44	DISCRETE IN* 9	In
45	DISCRETE IN* 10	In
46	POWER GROUND	--
47	POWER GROUND	--
48	SIGNAL GROUND	--
49	SIGNAL GROUND	--
50	SIGNAL GROUND	--
51	DISCRETE IN* 11	In
52	DISCRETE IN* 12	In
53	DISCRETE IN* 13	In
54	DISCRETE IN* 14	In
55	DISCRETE IN* 15	In
56	DISCRETE IN* 16	In
57	DISCRETE IN* 17	In
58	DISCRETE IN* 18	In
59	DISCRETE IN* 19	In
60	RESERVED	--
61	DISCRETE IN* 20	In
62	DISCRETE IN* 21	In
63	DISCRETE IN* 22	In
64	DISCRETE IN* 23	In
65	DISCRETE IN* 24	In
66	MAIN1 ARINC 429 OUT 4 A	Out
67	MAIN1 ARINC 429 OUT 4 B	Out
68	AIRCRAFT POWER 1	In
69	GSD SYSTEM ID PROGRAM* 1	In
70	GSD SYSTEM ID PROGRAM* 2	In
71	AIRCRAFT POWER 2	In
72	MAIN1 ARINC 429 OUT 1 A	Out
73	MAIN1 ARINC 429 OUT 1 B	Out
74	MAIN1 ARINC 429 OUT 2 A	Out
75	MAIN1 ARINC 429 OUT 2 B	Out
76	MAIN1 ARINC 429 OUT 3 A	Out
77	MAIN1 ARINC 429 OUT 3 B	Out
78	GSD REMOTE POWER OFF	In

P412



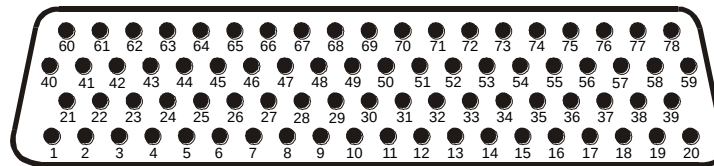
Pin	Pin Name	I/O
1	MAIN2 RS-485/RS-422 1 A	I/O
2	MAIN2 RS-485/RS-422 1 B	I/O
3	MAIN2 RS-485/RS-422 2 A	I/O
4	MAIN2 RS-485/RS-422 2 B	I/O
5	MAIN2 RS-485/RS-422 3 A	I/O
6	MAIN2 RS-485/RS-422 3 B	I/O
7	MAIN2 RS-485/RS-422 4 A	I/O
8	MAIN2 RS-485/RS-422 4 B	I/O
9	MAIN2 RS-485/RS-422 5 A	I/O
10	MAIN2 RS-485/RS-422 5 B	I/O
11	MAIN2 RS-485/RS-422 6 A	I/O
12	MAIN2 RS-485/RS-422 6 B	I/O
13	MAIN2 RS-485/RS-422 7 A	I/O
14	MAIN2 RS-485/RS-422 7 B	I/O
15	MAIN2 RS-485/RS-422 8 A	I/O
16	MAIN2 RS-485/RS-422 8 B	I/O
17	MAIN2 RS-485/RS-422 9 A	I/O
18	MAIN2 RS-485/RS-422 9 B	I/O
19	MAIN2 RS-485/RS-422 10 A	I/O
20	MAIN2 RS-485/RS-422 10 B	I/O
21	MAIN2 RS-485/RS-422 11 A	I/O
22	MAIN2 RS-485/RS-422 11 B	I/O
23	MAIN2 RS-485/RS-422 12 A	I/O
24	MAIN2 RS-485/RS-422 12 B	I/O
25	MAIN2 RS-485/RS-422 13 A	I/O
26	MAIN2 RS-485/RS-422 13 B	I/O
27	MAIN2 RS-485/RS-422 14 A	I/O
28	MAIN2 RS-485/RS-422 14 B	I/O
29	MAIN2 ARINC 429 OUT 4 A	Out
30	MAIN2 ARINC 429 OUT 4 B	Out
31	DISCRETE IN* 20A	In
32	DISCRETE IN* 21A	In
33	DISCRETE IN* 1A	In
34	DISCRETE IN* 2A	In
35	DISCRETE IN* 3A	In
36	DISCRETE IN* 4A	In
37	DISCRETE IN* 5A	In
38	DISCRETE IN* 6A	In
39	DISCRETE IN* 7A	In

Pin	Pin Name	I/O
40	DISCRETE IN 8A	In
41	DISCRETE IN 9A	In
42	DISCRETE IN 10A	In
43	DISCRETE IN 11A	In
44	DISCRETE IN 12A	In
45	DISCRETE IN 13A	In
46	DISCRETE IN 14A	In
47	DISCRETE IN 15A	In
48	SIGNAL GROUND	--
49	SIGNAL GROUND	--
50	SIGNAL GROUND	--
51	MAIN2 ARINC 429 IN 1 A	In
52	MAIN2 ARINC 429 IN 1 B	In
53	MAIN2 ARINC 429 IN 2 A	In
54	MAIN2 ARINC 429 IN 2 B	In
55	MAIN2 ARINC 429 IN 3 A	In
56	MAIN2 ARINC 429 IN 3 B	In
57	MAIN2 ARINC 429 IN 4 A	In
58	MAIN2 ARINC 429 IN 4 B	In
59	DISCRETE IN 16A	In
60	MAIN2 ARINC 429 IN 5 A	In
61	MAIN2 ARINC 429 IN 5 B	In
62	MAIN2 ARINC 429 IN 6 A	In
63	MAIN2 ARINC 429 IN 6 B	In
64	MAIN2 ARINC 429 IN 7 A	In
65	MAIN2 ARINC 429 IN 7 B	In
66	MAIN2 ARINC 429 OUT 1 A	Out
67	MAIN2 ARINC 429 OUT 1 B	Out
68	DISCRETE IN 17A	In
69	MAIN2 ARINC 429 OUT 2 A	Out
70	MAIN2 ARINC 429 OUT 2 B	Out
71	DISCRETE IN 18A	In
72	MAIN2 ARINC 429 OUT 3 A	Out
73	MAIN2 ARINC 429 OUT 3 B	Out
74	MAIN2 ARINC 717 IN 1 A	In
75	MAIN2 ARINC 717 IN 1 B	In
76	MAIN2 ARINC 717 OUT 1 A	Out
77	MAIN2 ARINC 717 OUT 1 B	Out
78	DISCRETE IN 19A	In

Pin	Pin Name	I/O
1	SPARE	--
2	RS-232 OUT	Out
3	RS-232 IN	In
4	SIGNAL GROUND	--
5	SPARE	--
6	SPARE	--
7	POWER GROUND	--
8	AIRCRAFT POWER	In
9	VOLUME LOCK ENABLE*	In

A.22 GDL 59

P591



Pin	Pin Name	I/O
1	USER ETHERNET OUT 5 A	Out
2	USER ETHERNET IN 5 A	In
3	AVIONICS ETHERNET OUT 2 A	Out
4	AVIONICS ETHERNET IN 2 A	In
5	USER ETHERNET OUT 3 A	Out
6	USER ETHERNET IN 3 A	In
7	USER ETHERNET OUT 4 A	Out
8	USER ETHERNET IN 4 A	In
9	AVIONICS ETHERNET OUT 1 A	Out
10	AVIONICS ETHERNET IN 1 A	In
11	SIGNAL GROUND	--
12	SPARE	--
13	IRIDIUM AUDIO IN 2 HI	In
14	IRIDIUM AUDIO OUT 2 HI	Out
15	IRIDIUM AUDIO IN 1 HI	In
16	IRIDIUM AUDIO OUT 1 HI	Out
17	AUDIO SYSTEM 2 AUDIO IN HI	In
18	AUDIO SYSTEM 2 AUDIO OUT HI	Out
19	AUDIO SYSTEM 1 AUDIO IN HI	In
20	AUDIO SYSTEM 1 AUDIO OUT HI	Out
21	USER ETHERNET OUT 5 B	Out
22	USER ETHERNET IN 5 B	In
23	AVIONICS ETHERNET OUT 2 B	Out
24	AVIONICS ETHERNET IN 2 B	In
25	USER ETHERNET OUT 3 B	Out
26	USER ETHERNET IN 3 B	In
27	USER ETHERNET OUT 4 B	Out
28	USER ETHERNET IN 4 B	In
29	AVIONICS ETHERNET OUT 1 B	Out
30	AVIONICS ETHERNET IN 1 B	In
31	SIGNAL GROUND	--
32	IRIDIUM AUDIO IN 2 LO	In
33	IRIDIUM AUDIO OUT 2 LO	Out
34	IRIDIUM AUDIO IN 1 LO	In
35	IRIDIUM AUDIO OUT 1 LO	Out
36	AUDIO SYSTEM 2 AUDIO IN LO	In

Pin	Pin Name	I/O
37	AUDIO SYSTEM 2 AUDIO OUT LO	Out
38	AUDIO SYSTEM 1 AUDIO IN LO	In
39	AUDIO SYSTEM 1 AUDIO OUT LO	Out
40	RESERVED (USB DATA HI)	--
41	RESERVED	--
42	RESERVED	--
43	RESERVED	--
44	SIGNAL GROUND	--
45	SIGNAL GROUND	--
46	SIGNAL GROUND	--
47	RESERVED	--
48	AIRCRAFT POWER 2	In
49	AIRCRAFT POWER 2	In
50	RESERVED	--
51	SIGNAL GROUND	--
52	POWER GROUND	--
53	POWER GROUND	--
54	POWER GROUND	--
55	POWER GROUND	--
56	IRIDIUM 1 STATUS DISCRETE* IN	In
57	SPARE	--
58	RESERVED	--
59	POTS HANDSET RING	I/O
60	RESERVED	--
61	RESERVED	--
62	RESERVED	--
63	RS-232 OUT 1	Out
64	RS-232 IN 1	In
65	RS-232 OUT 2	Out
66	RS-232 IN 2	In
67	RS-232 OUT 3	Out
68	RS-232 IN 3	In
69	RESERVED	--
70	RESERVED	--
71	AIRCRAFT POWER 1	In
72	AIRCRAFT POWER 1	In
73	IRIDIUM 1 REMOTE POWER ON*	Out
74	IRIDIUM 2 REMOTE POWER ON*	Out
75	DATA LINK REMOTE POWER OFF	In
76	IRIDIUM 2 STATUS DISCRETE* IN	In
77	RESERVED	--
78	POTS HANDSET TIP	I/O

A.23 GSR 56

P561

Pin	Pin Name	I/O
1	AUDIO OUT HI	Out
2	AUDIO OUT LO	Out
3	POWER GROUND	--
4	AUDIO IN HI	In
5	AUDIO IN LO	In
6	POWER GROUND	--
7	RESERVED	--
8	RESERVED	--
9	RESERVED	--
10	RESERVED	--
11	SIGNAL GROUND	--
12	RS-232 OUT	Out
13	RS-232 IN	In
14	SIGNAL GROUND	--
15	RESERVED	--
16	IRIDIUM REMOTE POWER ON*	In
17	POWER GROUND	--
18	RESERVED	--
19	POWER GROUND	--
20	RESERVED	--
21	HEATER POWER	In
22	HEATER 1 HI	--
23	POWER GROUND	--
24	SPARE	--
25	RESERVED	--
26	RESERVED	--
27	RESERVED	--
28	RESERVED	--
29	RESERVED	--
30	RESERVED	--
31	STATUS DISCRETE* OUT	Out
32	AIRCRAFT POWER 1	In
33	AIRCRAFT POWER 1	In
34	AIRCRAFT POWER 2	In
35	AIRCRAFT POWER 2	In
36	HEATER POWER	In
37	HEATER 2 HI	--
38	HEATER 1 LO	--
39	RESERVED	--
40	RESERVED	--

Pin	Pin Name	I/O
41	RESERVED	--
42	RESERVED	--
43	SIGNAL GROUND	--
44	RESERVED	--

A.24 GDU 37X

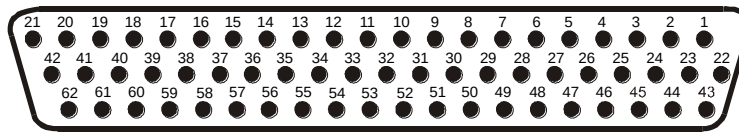
P3701

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	SPARE	--
7	SPARE	--
8	SPARE	--
9	CDU SYSTEM ID PROGRAM* 2	In
10	CDU SYSTEM ID PROGRAM* 1	In
11	RS-422 OUT A	Out
12	RS-422 OUT B	Out
13	RS-232 OUT 3	Out
14	RS-232 IN 2	In
15	POWER GROUND	--
16	POWER GROUND	--
17	CONFIG MODULE POWER OUT	Out
18	MONO AUDIO OUT LO	--
19	STEREO AUDIO OUT RIGHT	Out
20	STEREO AUDIO OUT LO	--
21	SPARE	--
22	SPARE	--
23	SPARE	--
24	SPARE	--
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	--

Pin	Pin Name	I/O
37	SIGNAL GROUND	--
38	SPARE	--
39	SPARE	--
40	SPARE	--
41	SPARE	--
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

A.25 GSU 73

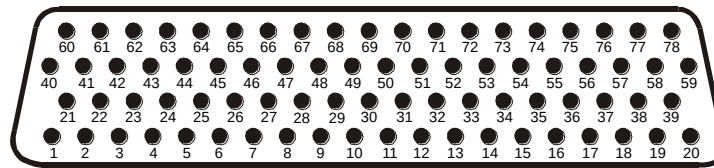
P731



Pin	Pin Name	I/O
1	MAGNETOMETER RS-485 IN B	In
2	MAGNETOMETER RS-485 IN A	In
3	SIGNAL GROUND	--
4	GSU SYSTEM ID PROGRAM* 1	In
5	GSU SYSTEM ID PROGRAM* 2	In
6	RESERVED	--
7	CAN BUS HI	I/O
8	CAN BUS LO	I/O
9	DISCRETE IN* 1	In
10	DISCRETE IN* 2	In
11	DISCRETE IN* 3	In
12	DISCRETE IN* 4	In
13	DISCRETE OUT* 1	Out
14	DISCRETE OUT* 2	Out
15	MAGNETOMETER RS-232 OUT	Out
16	RS-232 IN 2	In
17	RS-232 OUT 2	Out
18	RS-232 IN 3	In
19	RS-232 OUT 3	Out
20	ARINC 429 OUT 1 A	Out
21	ARINC 429 OUT 1 B	Out
22	ARINC 429 OUT 2 A	Out
23	ARINC 429 OUT 2 B	Out
24	SIGNAL GROUND	--
25	ARINC 429 IN 1 A	In
26	ARINC 429 IN 1 B	In
27	ARINC 429 IN 2 A	In
28	ARINC 429 IN 2 B	In
29	CAN BUS TERMINATION	--
30	ARINC 429 IN 3 A	In
31	ARINC 429 IN 3 B	In
32	ARINC 429 IN 4 A	In
33	ARINC 429 IN 4 B	In
34	SIGNAL GROUND	--
35	SIGNAL GROUND	--
36	SIGNAL GROUND	--
37	SIGNAL GROUND	--
38	MAGNETOMETER POWER OUT	Out

Pin	Pin Name	I/O
39	MAGNETOMETER GROUND	--
40	SIGNAL GROUND	--
41	SPARE	--
42	SPARE	--
43	SIGNAL GROUND	--
44	SPARE	--
45	SPARE	--
46	SPARE	--
47	AIRCRAFT POWER 1	In
48	SPARE	--
49	AIRCRAFT POWER 2	In
50	SPARE	--
51	SPARE	--
52	SPARE	--
53	SIGNAL GROUND	--
54	SIGNAL GROUND	--
55	SPARE	--
56	SPARE	--
57	SPARE	--
58	SIGNAL GROUND	--
59	POWER GROUND	--
60	SIGNAL GROUND	--
61	POWER GROUND	--
62	SPARE	--

P732



Pin	Pin Name	I/O
1	ANALOG IN 2 LO	In
2	ANALOG IN 3 HI	In
3	ANALOG IN 8 LO	In
4	ANALOG IN 9 LO	In
5	ANALOG IN 14 LO	In
6	ANALOG IN 17 LO	In
7	ANALOG IN 24 LO	In
8	ANALOG IN 23 LO	In
9	THERMOCOUPLE REF IN LO	In
10	THERMOCOUPLE REF IN HI	In
11	ANALOG IN 20 LO	In
12	ANALOG IN 19 LO	In
13	ANALOG IN 6 LO	In
14	ANALOG IN 12 LO	In
15	OAT PROBE IN HI	In
16	OAT PROBE POWER OUT	Out
17	FREQUENCY COUNTER IN* 1	In
18	SIGNAL GROUND	--
19	FREQUENCY COUNTER IN* 2	In
20	CONFIG MODULE CLOCK	Out
21	ANALOG IN 2 HI	In
22	ANALOG IN 3 LO	In
23	ANALOG IN 8 HI	In
24	ANALOG IN 9 HI	In
25	ANALOG IN 14 HI	In
26	ANALOG IN 16 HI	In
27	ANALOG IN 24 HI	In
28	ANALOG IN 23 HI	In
29	ANALOG IN 11 LO	In
30	ANALOG IN 11 HI	In
31	ANALOG IN 20 HI	In
32	ANALOG IN 19 HI	In
33	ANALOG IN 6 HI	In
34	ANALOG IN 12 HI	In
35	OAT PROBE IN LO	In
36	FREQUENCY COUNTER IN* 3	In
37	SIGNAL GROUND	--
38	FREQUENCY COUNTER IN* 4	In
39	CONFIG MODULE DATA	I/O

Pin	Pin Name	I/O
40	ANALOG IN 4 LO	In
41	ANALOG IN 1 LO	In
42	ANALOG IN 10 LO	In
43	ANALOG IN 7 LO	In
44	ANALOG IN 15 LO	In
45	ANALOG IN 16 LO	In
46	ANALOG IN 25 LO	In
47	ANALOG IN 22 HI	In
48	ANALOG/CURRENT MONITOR IN 2 HI	In
49	ANALOG IN 21 LO	In
50	ANALOG/CURRENT MONITOR IN 1 LO	In
51	ANALOG IN 18 LO	In
52	ANALOG IN 13 LO	In
53	ANALOG IN 5 LO	In
54	SPARE	--
55	+12 VDC TRANSDUCER POWER OUT	Out
56	TRANSDUCER POWER OUT LO (GROUND)	--
57	TRANSDUCER POWER OUT LO (GROUND)	--
58	+10 VDC TRANSDUCER POWER OUT	Out
59	CONFIG MODULE POWER OUT	Out
60	ANALOG IN 4 HI	In
61	ANALOG IN 1 HI	In
62	ANALOG IN 10 HI	In
63	ANALOG IN 7 HI	In
64	ANALOG IN 15 HI	In
65	ANALOG IN 17 HI	In
66	ANALOG IN 25 HI	In
67	ANALOG IN 22 LO	In
68	ANALOG/CURRENT MONITOR IN 2 LO	In
69	ANALOG IN 21 HI	In
70	ANALOG/CURRENT MONITOR IN 1 HI	In
71	ANALOG IN 18 HI	In
72	ANALOG IN 13 HI	In
73	ANALOG IN 5 HI	In
74	TRANSDUCER POWER OUT LO (GROUND)	--
75	+5 VDC TRANSDUCER POWER OUT	Out
76	RESERVED	--
77	RESERVED	--
78	CONFIG MODULE GROUND	--