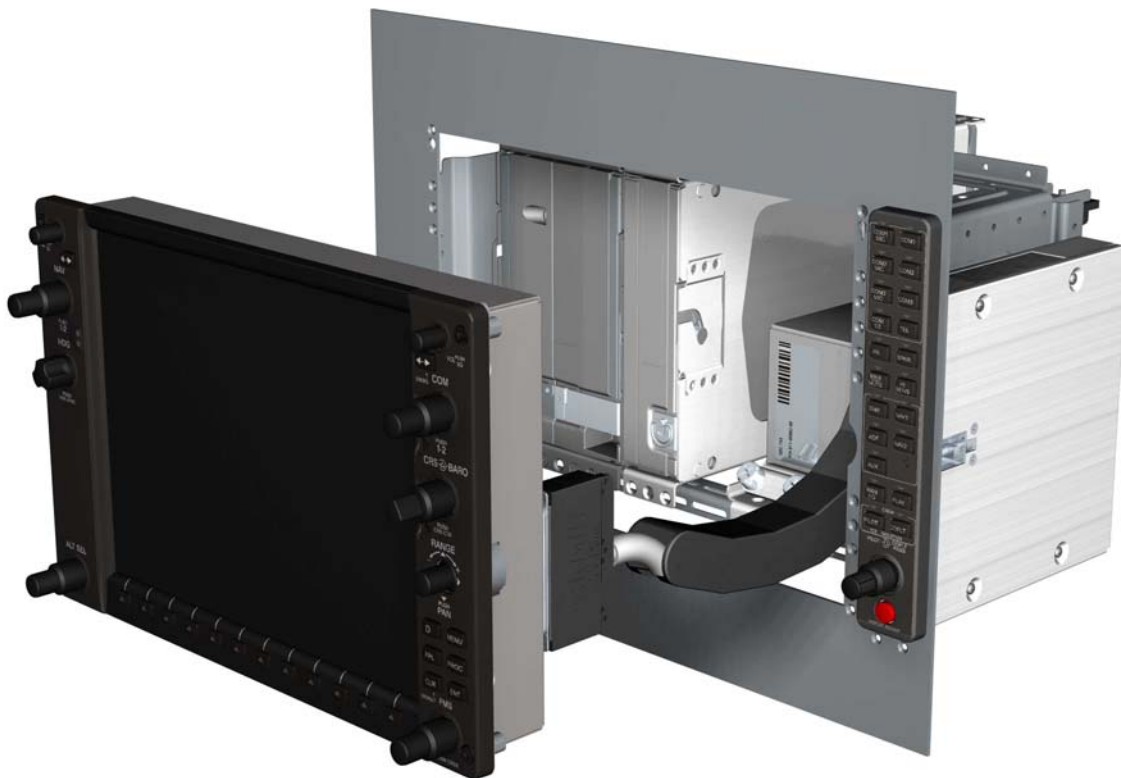


G1000 SYSTEM MAINTENANCE MANUAL **(LJ/VLJ AIRCRAFT)**



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DOCUMENT PAGINATION

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This manual reflects the operation and configuration of GDU software version 9.00.

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.

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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 1xxx 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 1xxx 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 content in this manual is nonspecific and is not associated to any particular aircraft configuration. All display screen shots serve as examples only.

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 provides maintenance information for the Garmin G1000 Integrated Flight Deck installed and configured for VLJ and LJ (very light and light jet) aircraft. Troubleshooting, LRU replacement, uploading and configuring software, and return to service testing procedures are included.

1.1 SCOPE

This manual is general in scope and is intended to be used only as a guideline. Consult OEM maintenance documentation for the most current and exact maintenance information for a specific aircraft. This manual presumes familiarity with the basic operating procedures covered in the G1000 Pilot's Guide and Cockpit Reference Guide (CRG).

1.2 MANUAL ORGANIZATION

The following is a brief description of each section in the manual.

Section 1—Introduction

This section discusses the scope of the manual content and describes manual organization.

Section 2—System Overview

This section gives an overview of the G1000 System.

Section 3—LRU Descriptions

This section describes each G1000 LRU.

Section 4—Configuration Mode

This section explains the configuration mode and the role it plays in troubleshooting. It also contains limited user interface information.

Section 5—Troubleshooting

This section contains troubleshooting procedures which can help isolate a defective LRU.

Section 6—Replacement Procedures

This section lists procedures needed to replace a defective LRU.

Section 7—LRU Software Installation and Testing

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

Section 8—Return To Service Testing

This section describes return to service tests.

Section 9—Periodic Maintenance

This section contains periodic maintenance procedures.

Section 10—System Reconfiguration

This section explains how to completely reconfigure the system should it become necessary.

Appendix A—Connector Pin Assignments

This appendix illustrates and lists the names of G1000 connector pins.

SECTION 2

SYSTEM OVERVIEW

This section describes the major subsystems of the G1000. Because G1000 configurations vary depending on specific aircraft, this section is only a guideline. Refer to the OEM maintenance documentation for aircraft specific system information.

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. The 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 quadruple redundant capability.

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 (Figure 2-1).

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

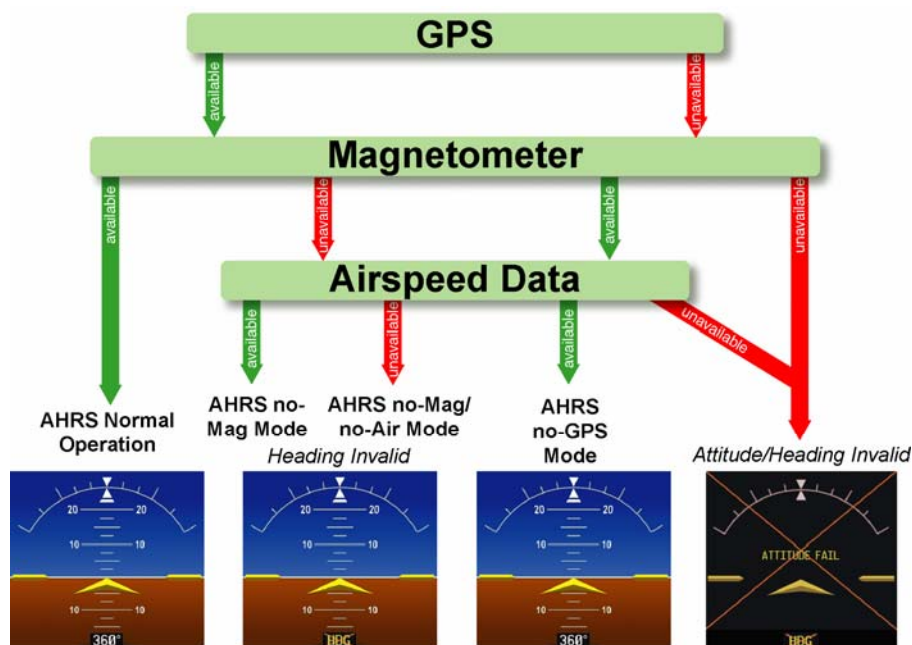


Figure 2-1. GRS 77 Block Diagram

Figure 2-2 shows a top-level G1000 interconnect block diagram.

NOTE

The block diagrams shown in this section are not aircraft specific. Refer to the OEM maintenance documentation for aircraft specific diagrams.

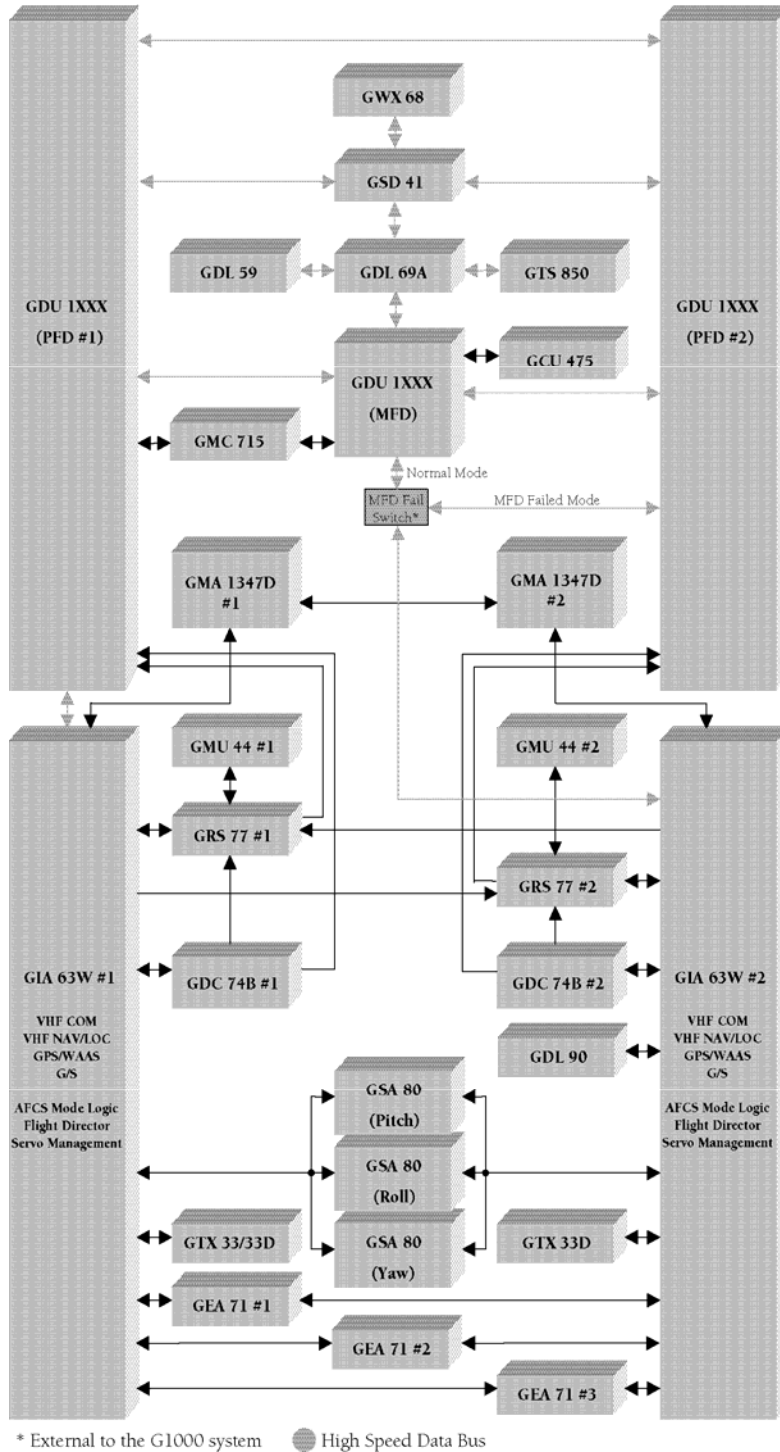


Figure 2-2. G1000 Top-Level Interconnect Block Diagram

Figure 2-3 shows a G1000 flight instruments block diagram.

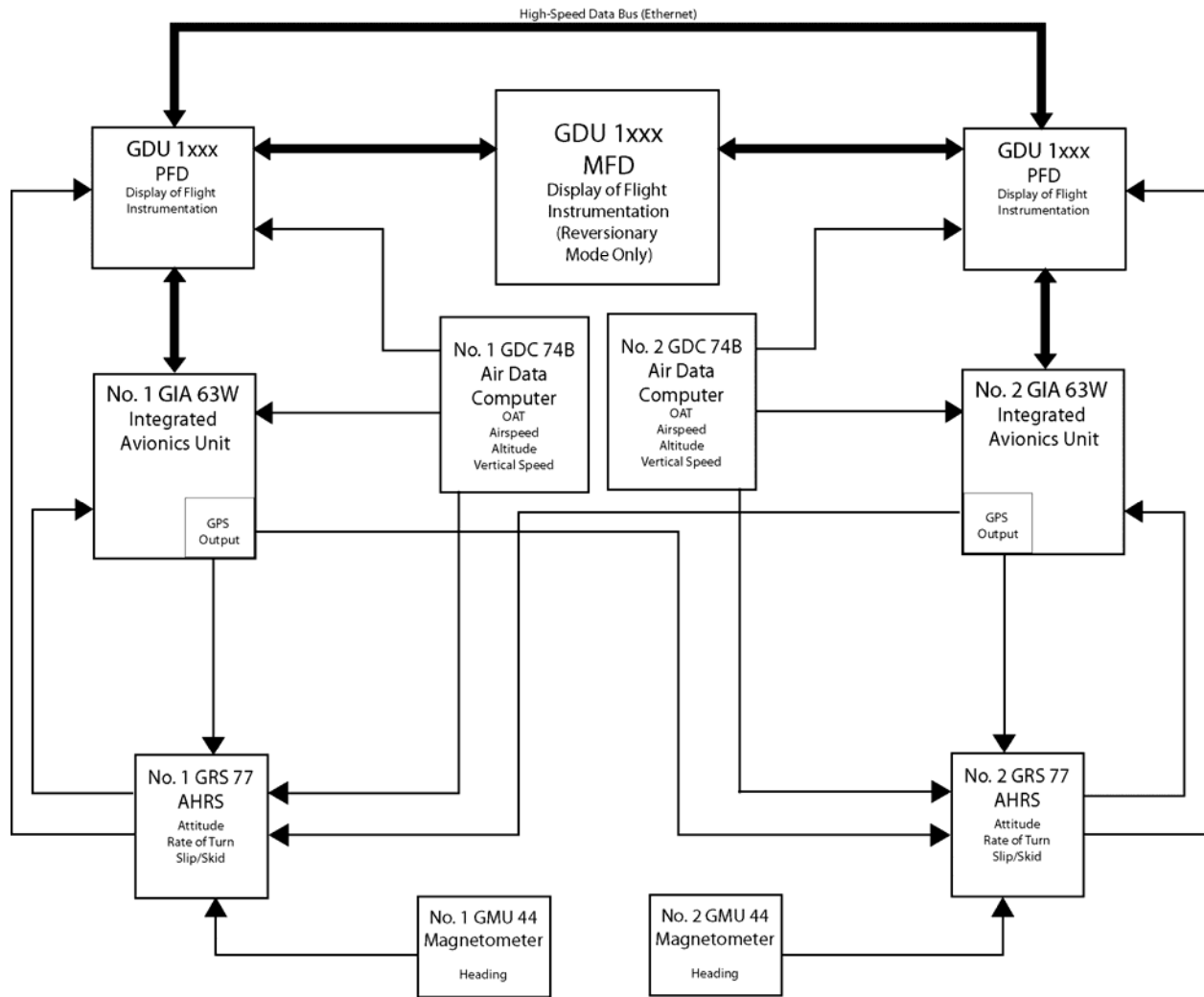


Figure 2-3. G1000 Flight Instrumentation Data Paths

2.2 NAVIGATION AND COMMUNICATION SYSTEMS

The GIA 63W LRUs contain 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.

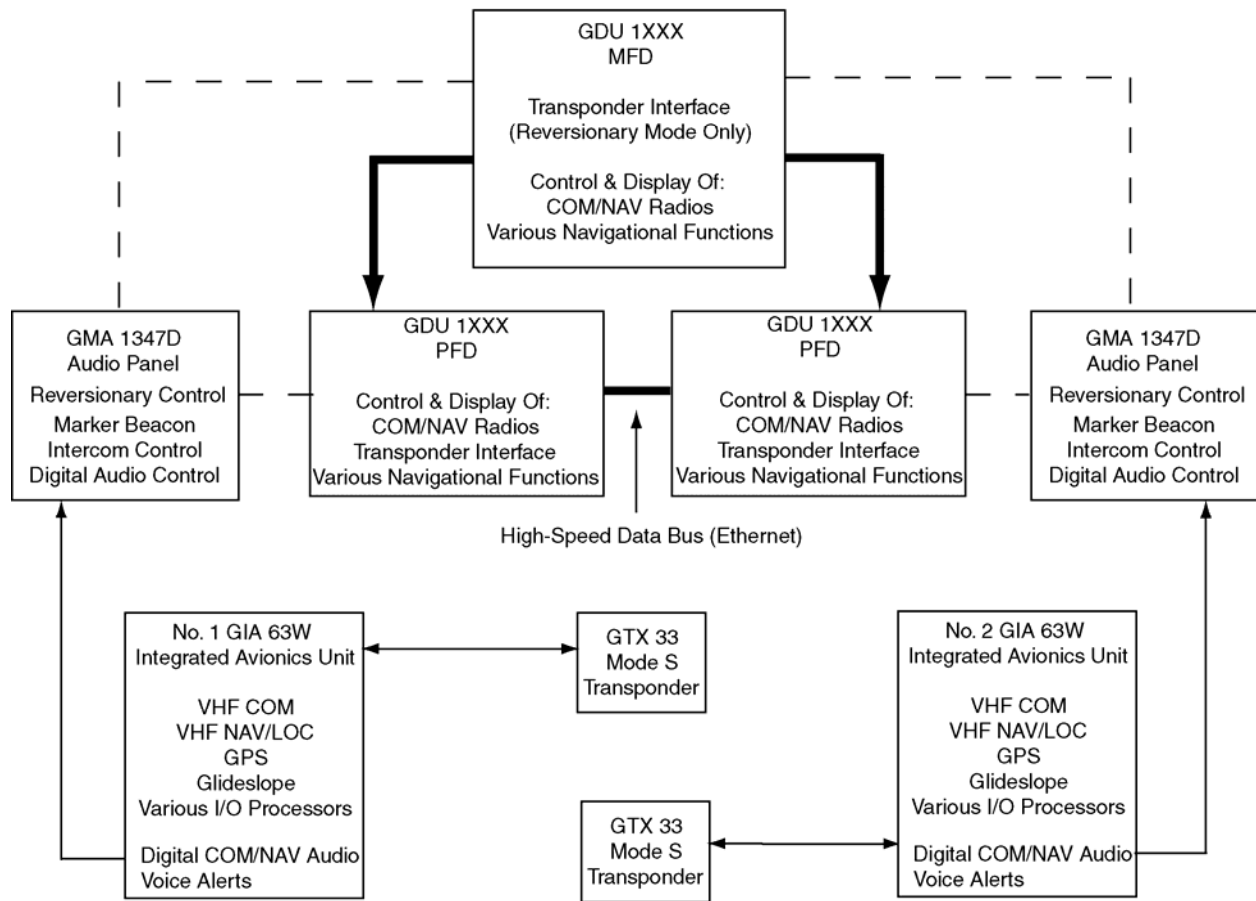


Figure 2-4. G1000 Navigation/Communication Data Paths

2.3 GFC 700 INTERCONNECT

Figure 2-5 shows a GFC 700 Autopilot interconnect block diagram.

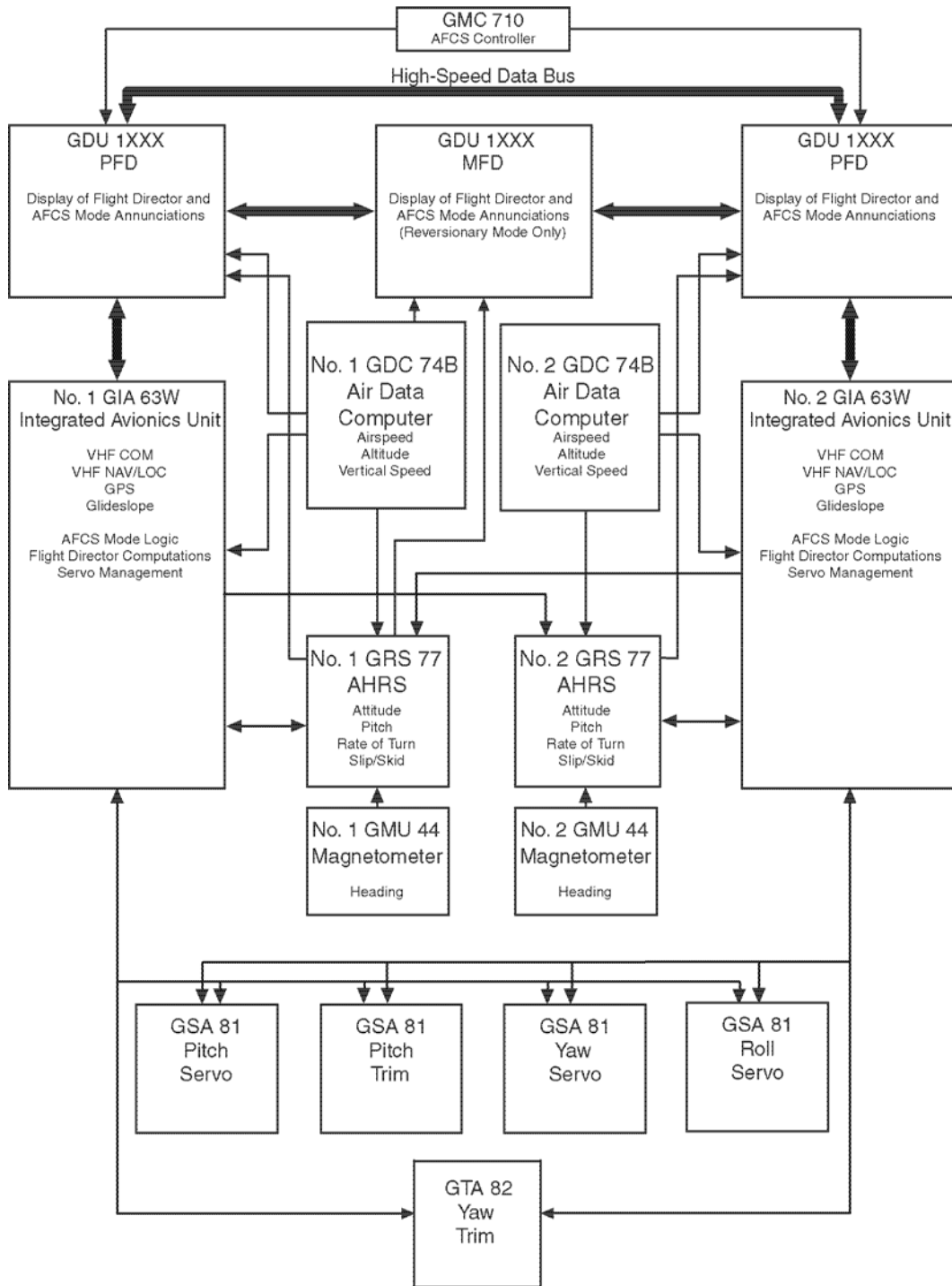


Figure 2-5. GFC 700 Autopilot Interconnect Block Diagram

2.4 GDU 1xxx OVERVIEW

The GDU 1xxx provides display and control interface for the G1000 and functions interchangeably as a PFD or an MFD. Typical VLJ/LJ installations involve 3 GDUs and optional remote control devices. In a 3 GDU configuration, two PFDs (PFD1 and PFD2) and one MFD comprise the primary control and display interface.



Figure 2-6 Three Display Installation (Example)

2.4.1 GDU Communication

HSDB

The GDU communicates directly with other GDUs and other LRUs via a High Speed Data Bus (HSDB). These other LRUs include integrated avionics units, serial data concentrators, data link receivers, and weather radars. In the G1000 System, 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 1xxx 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) via its monitoring of an aircraft dimming bus, through a light detection sensor (photocell), or manually.

Uploading and Configuring Software

The GDU's SD Card slots are used to upload and configure software for the G1000. 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

Certain databases are stored internally in each GDU. These databases include the basemap database and the navigation database. Other databases are stored on a SD Card that remains 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 one-time activation via a uniquely programmed SD card.

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SECTION 3

EQUIPMENT DESCRIPTION

This section describes the G1000 Line Replaceable Units (LRUs) that could be configured VLJ/LJ aircraft. Not all of the LRUs described in this section are necessarily 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 Display

The GDU 1500 consists of a 15-inch LCD display 1024 x 768 resolution. The GDU 1500 is configured as a Multi Function Display. The MFD shows 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. The GDU 1500 also communicates with the GCU 475 via RS-232 digital interface.

3.1.2 GDU 1040A



Figure 3-2. GDU 1040A Display

In certain VLJ configurations, each 1040A is configured as a PFD that features 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 VLJ configurations three GDU 1240As are utilized. Each unit 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.

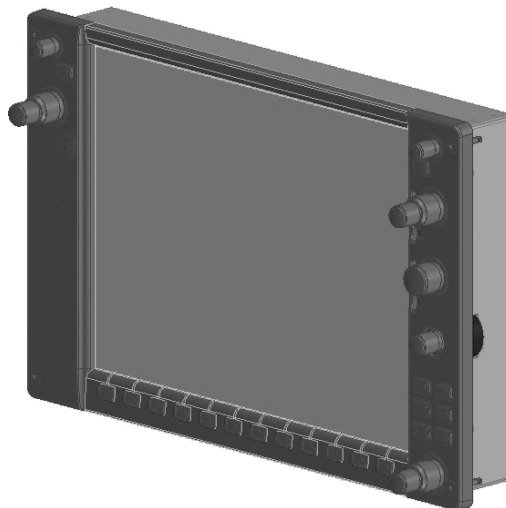


Figure 3-3. GDU 1240A Display

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 usually configured for operation.

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 system. It functions as the main communication hub, linking all LRUs (except GIA #2) 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 (AHRIS)



Figure 3-6. GRS 77 AHRIS Unit

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

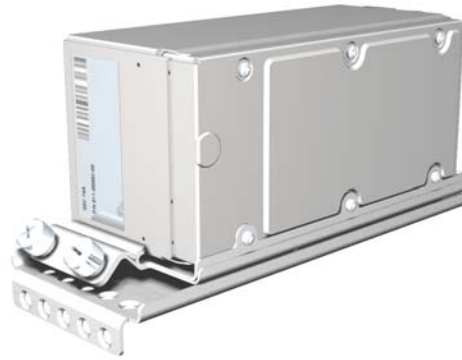


Figure 3-8. GDC 74B Air Data Computer

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 system, 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. This LRU communicates with both GIA 63Ws using an RS-485 digital interface.

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 provides real-time weather information to the G1000 MFD (and, indirectly, to the inset map of the PFD) as well as 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 capability.

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 pitch, roll, and yaw. These units interface with each GIA 63W. The GSM 85(A) servo gearbox is responsible for transferring the output torque of the GSA 80 servo actuator to the mechanical flight-control surface linkage.

3.11 GWX 68 WEATHER RADAR

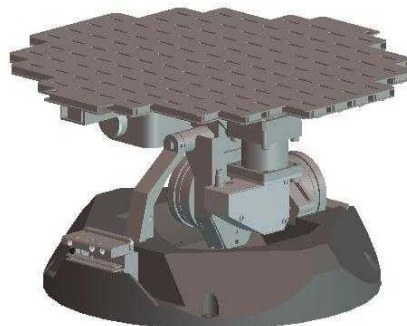


Figure 3-13. GWX 68 Weather Radar

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 measurement which is used by the GDC 74A. Communication interface to the G1000 is through the GDC 74A/B.

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, and only one transponder can be active at a time. Each transponder communicates with the on-side GIA 63W through an RS-232 digital interface.

3.14 GCU 475 MFD CONTROL UNIT



Figure 3-16. GCU 475 MFD Control Unit

In certain VLJ aircraft configurations 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

In certain VLJ aircraft configurations the GMC 715 provides the controls for the GFC 700 AFCS through an RS-232 digital interface allowing communication with both PFDs.

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 system. Communication is through the High Speed Data Bus.

3.17 GRC10/GRT10

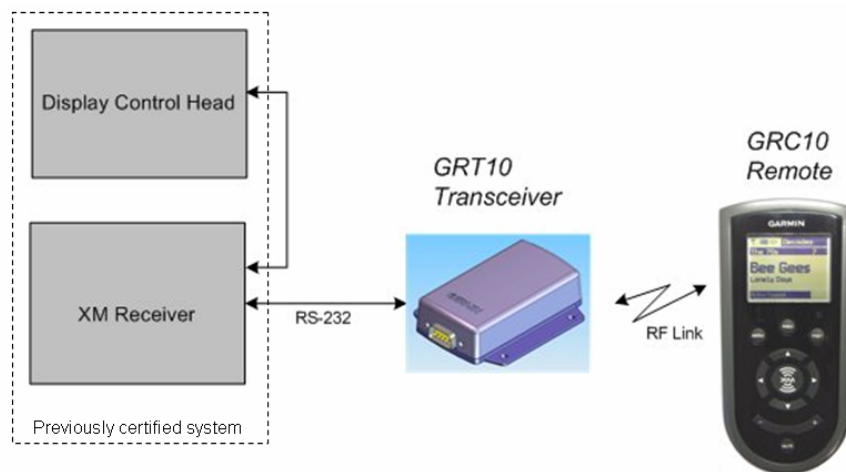


Figure 3-19. GRT 10 Remote Controller and GRC 10 Wireless Transceiver

3.17.1 GRC 10 XM Remote Control

The GRC 10 remote control allows passenger interface with the GDL XM radio without inputs from the pilot or co-pilot. It's use does not prevent XM radio channel selection via the MFD though it's use disables the volume and mute selections on the MFD.

3.17.2 GRT 10 XM Wireless Transceiver

The GRT 10 wireless transceiver operating at 2.4GHZ 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 aircraft’s flight crew to control the Garmin G1000 Flight Management System (FMS). The GCU 477 has 40 alphanumeric keys, 15 special function keys, one dual rotary encoder, and one joystick encoder. The GCU 477 sends data over an RS-232 serial connection to the G1000 that informs the CDU (Control Display Unit) when the manual interface controls are operated by the user.

3.19 GSR56/GDL59

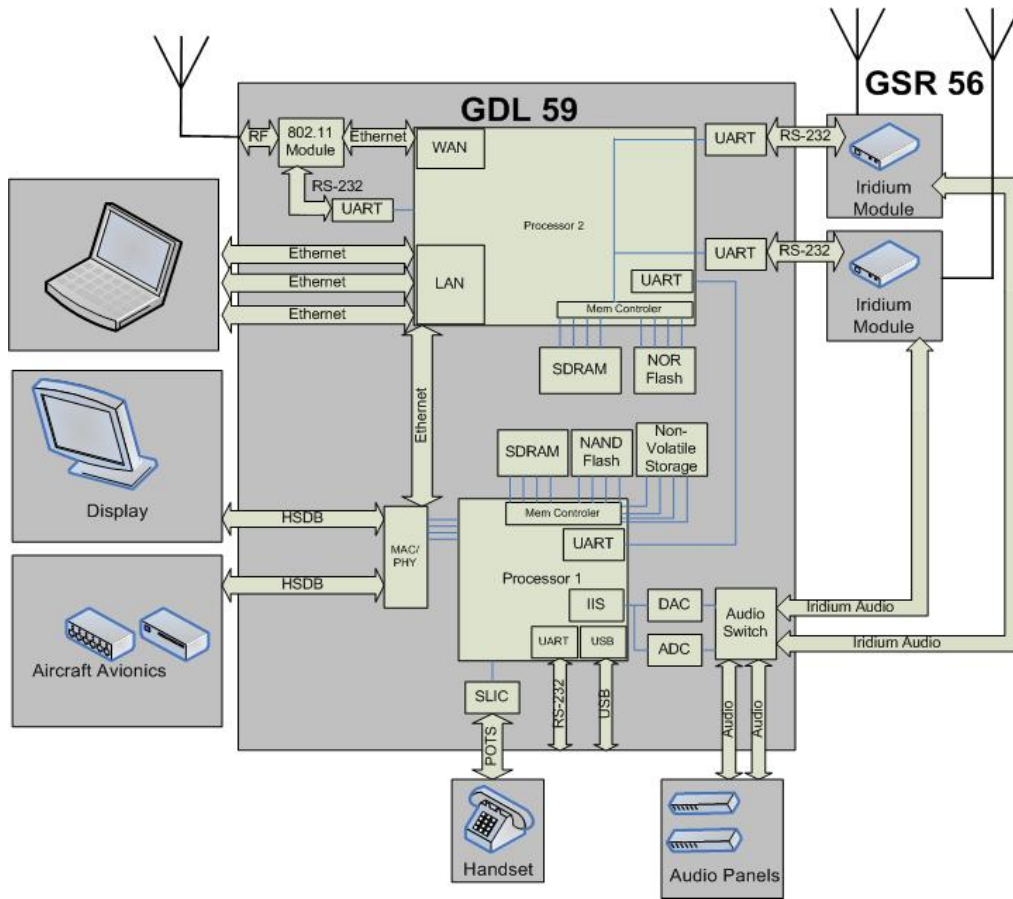


Figure 3-21. GDL 59 System Level Block Diagram

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 will provide communications service through an 802.11 RF link when on the ground. The GDL 59 can also provide a flight data logger function. When paired with the GSR 56 Iridium data link, the GDL 59 can provide in-flight voice calling and short burst data communications to ground based networks. The GDL 59 has various connection options to aircraft audio panels, a Plain Old Telephone Service (POTS) handset, aircraft avionics through High Speed Data Bus (HSDB), and zero, one or two GSR 56 Iridium satellite modules, as shown in Figure 3-21. 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.

SECTION 4

CONFIGURATION MODE

This section describes the configuration mode of operation. This section presumes basic familiarity with the operation of the G1000.

4.1 INTRODUCTION

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

To enter configuration mode:

1. Press and hold the ENT key on the PFD while applying power. Release the ENT key after 'INITIALIZING SYSTEM' is displayed in the upper left corner of the PFD.
2. Repeat step 1 for PFD 2 (if installed). The System Status Page (Figure 4-1) is displayed on the MFD and the PFD.
3. Press the 12th softkey on GDU 1xxx that does not have an ENT key to enter Config Mode.

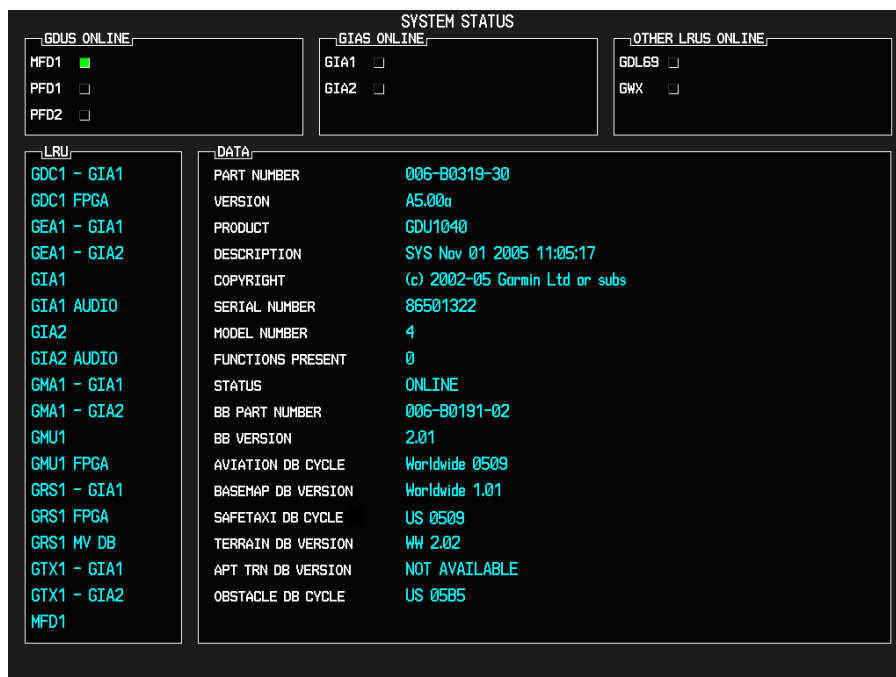


Figure 4-1. System Status Page (Configuration Mode)

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 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 placed in configuration mode, the large and small FMS knob is used to cycle through the different configuration pages, to change page groups, and to change pages in a group. The FMS knob is also used to perform the following:

- To activate the cursor press the small FMS knob.
- To cycle the cursor through different data fields rotate the large FMS knob.
- To change the contents of a highlighted data field rotate the small FMS knob. This action displays an options menu for the particular field, or in some cases, allows the user to enter data for the field.
- To confirm a selection press the ENT key.

To cancel a selection, press the small FMS knob. 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 into 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. Basically, 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).

It is very important that the technician 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

Ensure that the G1000 system is powered off before inserting the 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 aviation database and system software updates as well as terrain database storage.

To install an SD card:

Insert the SD card in the SD card slot, pushing the card in until the spring latch engages. The front of the card should remain 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 (example)

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	

4.4 CONFIGURATION FILES

NOTE

The GRS 77 AHRS and GMU 44 Magnetometer LRUs do not use configuration files. However, these LRUs 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 system including tones and voice messages.

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 imperative 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.

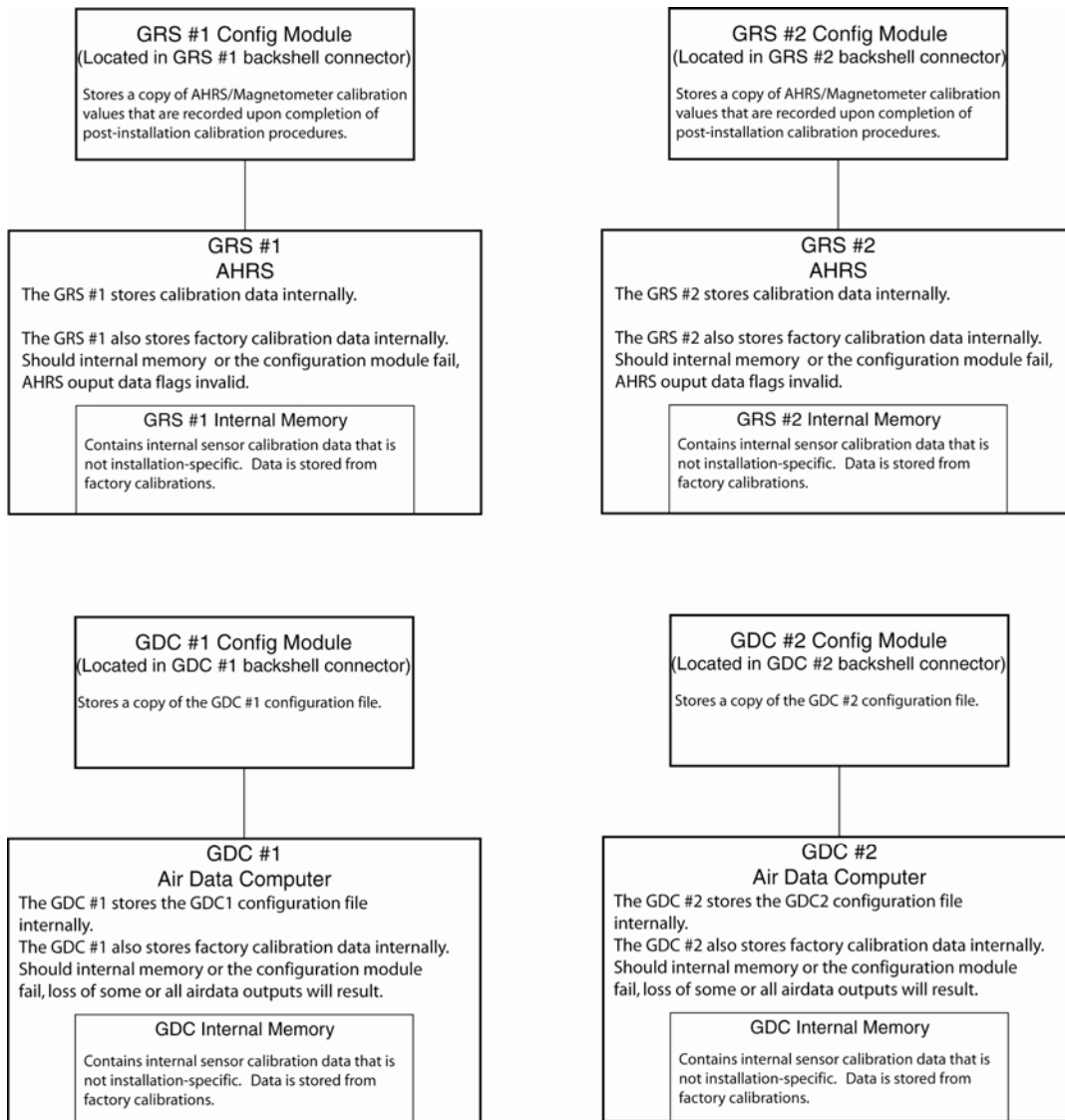


Figure 4-4. GRS/GDC Configuration File Storage (3 Display)

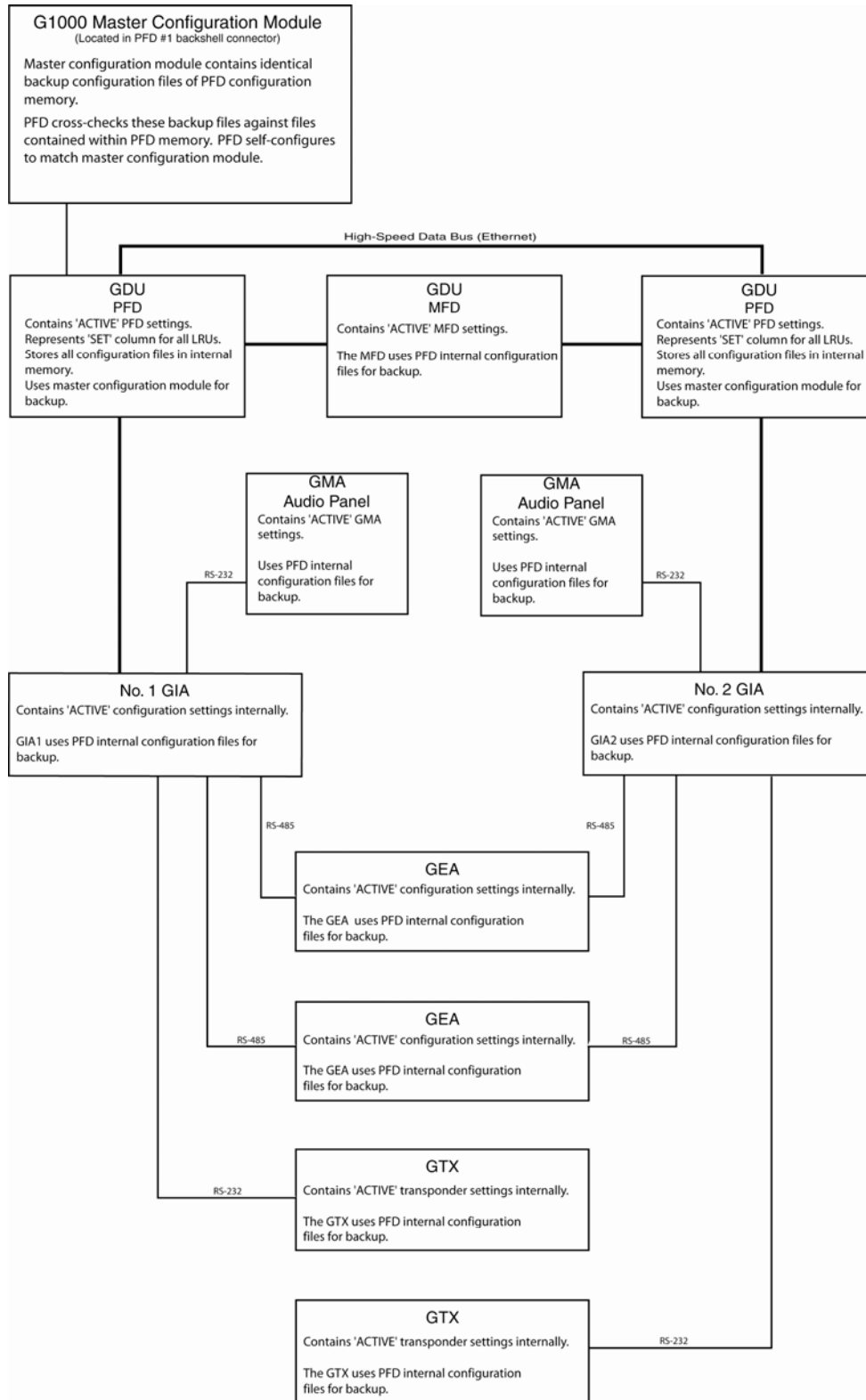


Figure 4-5. System Configuration File Storage (3 Display)

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).

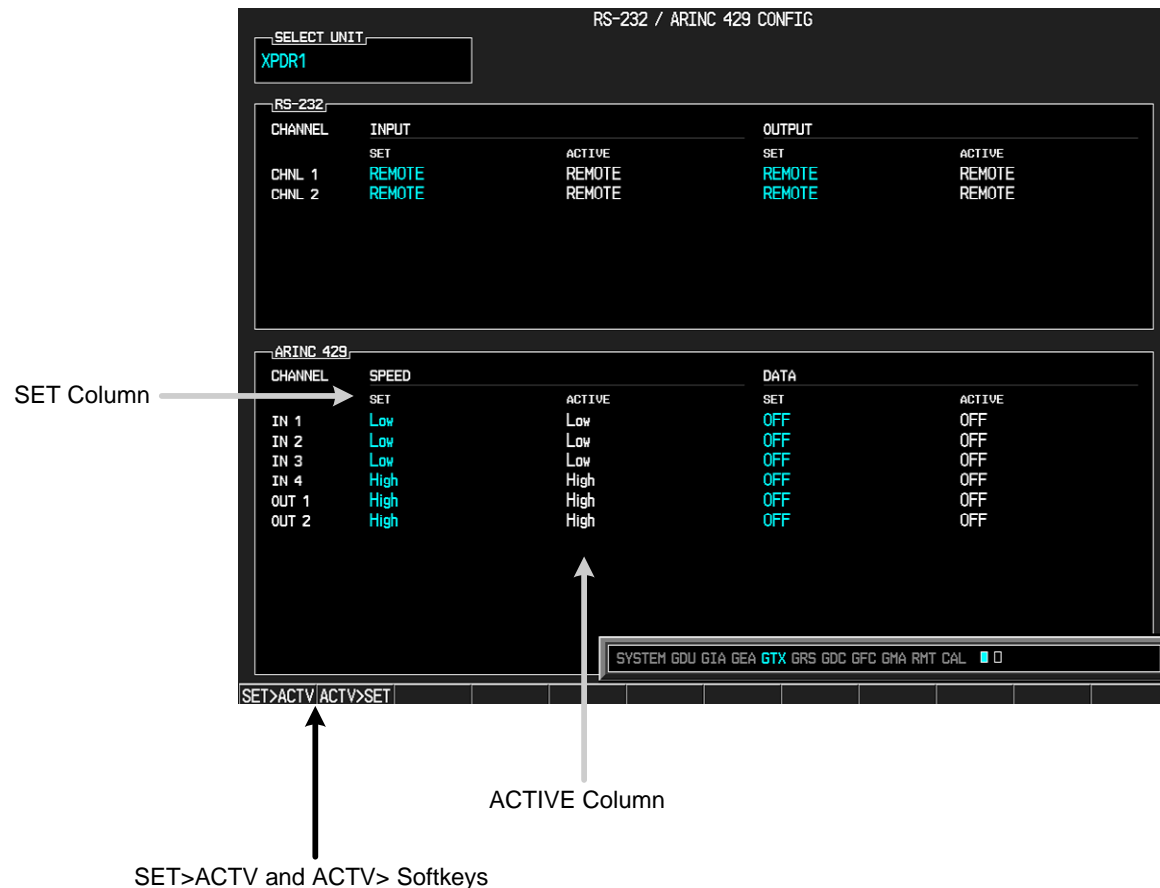


Figure 4-6. SET and ACTIVE Softkeys and Columns

4.5.1 SET and ACTIVE Softkeys

When troubleshooting the system the technician can look for inequalities (configuration mismatch) between SET and ACTIVE columns. Certain problems can 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 for 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 the wrong configuration to replace the correct one.

SET—refers to a setting or group of settings that reside in the PFD’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 by using the following two softkeys:

SET>ACTV (Set to Active)—allows the installer 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 the technician receives on-screen prompts and/or confirmation similar to those shown in Figure 4-7.

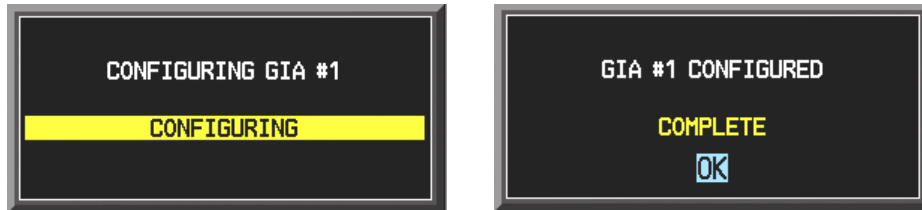


Figure 4-7. Configuration Status Prompts

4.7 DATA TRANSMISSION INDICATORS

Several configuration pages use an indicator light system to show discrete (ON/OFF) data and/or hardware component status. Unless otherwise noted, the following applies to all configuration page status indicators:

- Green—expected data is successfully received and is ON. A green light can also indicate that the parameter/component is working correctly.
- Red—expected data is not received. A red light can also indicate that a parameter/component is invalid.
- Black—expected data is successfully received and is OFF, or no data is expected. A black light can also indicate that the parameter/component is not responding.



Figure 4-8. Data Transmission Indicators

A blank ACTIVE column displays the loss of communication between the display and a specific LRU (Figure 4-9).

RS-232		ACTIVE		ACTIVE	
CHANNEL	INPUT		SET	OUTPUT	
CHNL 1	GDC74 #1			GDC74 #1	
CHNL 2	GIA DEBUG			GIA DEBUG	
CHNL 3	OFF			OFF	
CHNL 4	OFF			OFF	
CHNL 5	GTX 33 #1 w/ TIS			GTX 33 #1 w/ TIS	
CHNL 6	GRS77 #1			GRS77 #1	
CHNL 7	GMA1347 #1			GMA1347 #1	
CHNL 8	OFF			OFF	

Figure 4-9. Loss of Communication

Blank Page

SECTION 5

TROUBLESHOOTING

This section contains LRU troubleshooting methods and procedures which are designed to help isolate a defective LRU. The procedures and methods do not pertain to any specific aircraft configuration.

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 a unit or units 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).

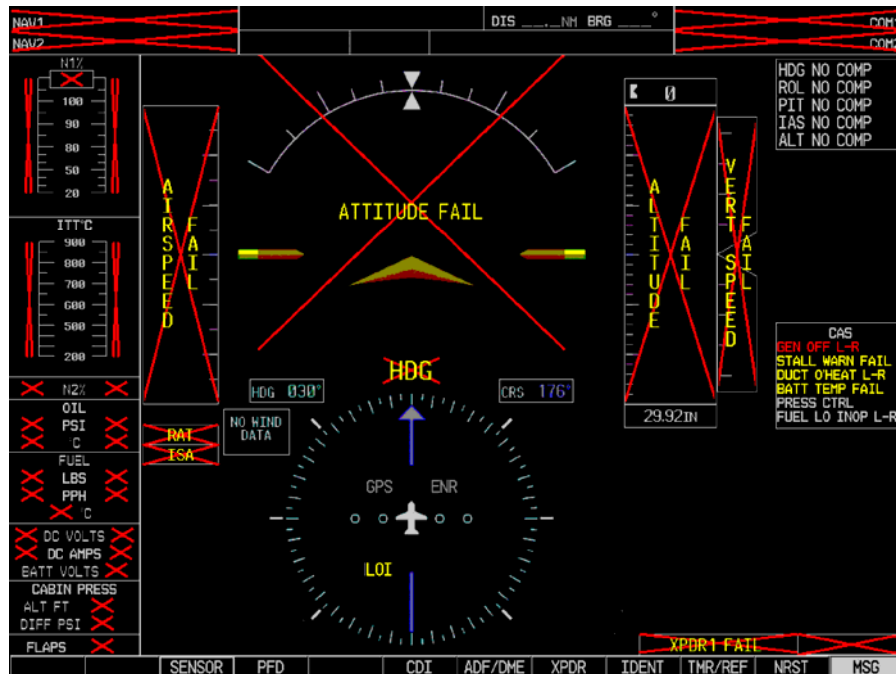


Figure 5-1. LRU Failure Annunciations

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
<p>NAV1 or COM1</p>  	<p>GIA1</p>	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – 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.
<p>NAV2 or COM2</p>  	<p>GIA2</p>	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – 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)


<p>GPS INTEG or Time</p> 	<p>GIA1 or 2</p>	<ul style="list-style-type: none"> • 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.
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Table 5-1. (continued)


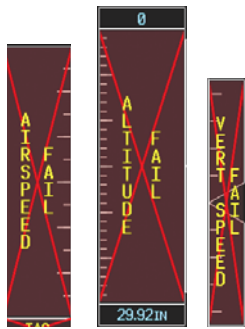


<p>XPDR FAIL</p> 	<p>GTX 33 or 33D</p>	<ul style="list-style-type: none"> • Check PFD1 Alert Window for GIA1/2 and GTX 33 configuration, software or failed data path error messages. Correct any errors before proceeding. • Perform a SET>ACTV configuration reset on the GTX Transponder Configuration page 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.
<p>AIRSPEED FAIL ALTITUDE FAIL VERT SPEED FAIL</p>  <p>ISA</p> 	<p>GDC 74B</p>	<ul style="list-style-type: none"> • 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.
<p>OAT and TAS</p> 	<p>GTP 59</p>	<ul style="list-style-type: none"> • 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)


<p style="text-align: center;">ATTITUDE FAIL</p>  <p style="text-align: center;">ATTITUDE FAIL</p>	<p>GRS 77</p>	<ul style="list-style-type: none"> • 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 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). • 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 if condition continues after replacing the GRS 77 and config module for additional assistance.
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Table 5-1. (continued)


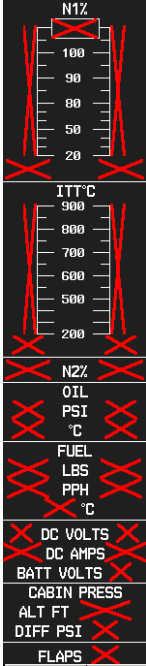
Annunciation	Associated LRU	Recommended Actions
<p style="text-align: center;">HDG FAIL </p>	<p style="text-align: center;">GRS 77 & GMU 44</p>	<ul style="list-style-type: none"> • Check PFD1 Alert Window for PFD1/2, MFD or GRS configuration, software or failed data path error messages. Correct any errors 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 44 for faults. • Recalibrate the GMU 44. • Replace the GMU 44. • If problem persists, replace the GRS 77.

Table 5-1. (continued)

<p>Engine/Airframe Sensors</p> 	<p>GEA 71 & GIA 63W</p>	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
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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.

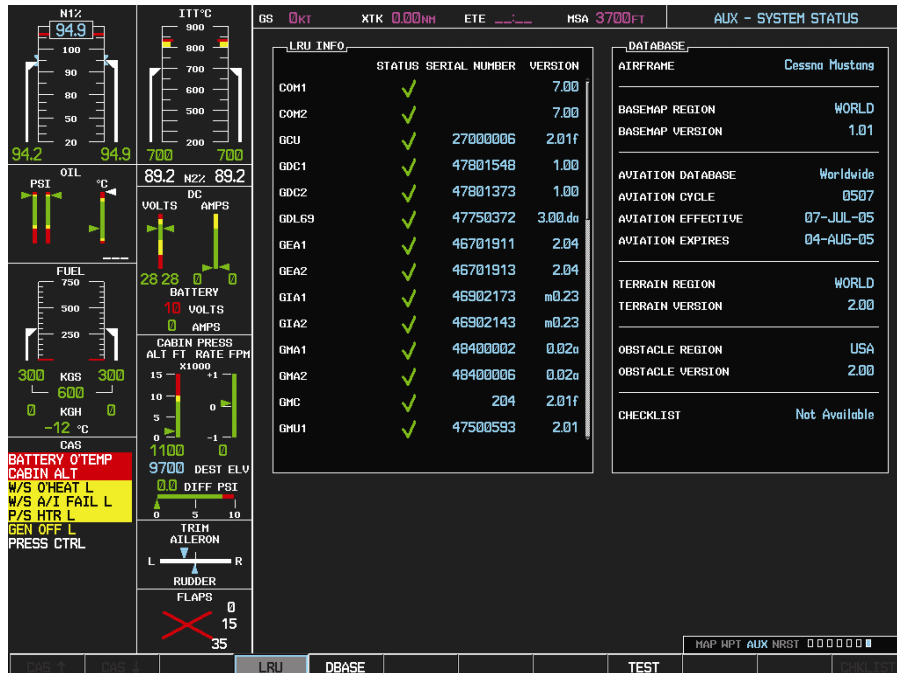


Figure 5-2. System Status Page (AUX Group)

5.1.4 Data Path Failure Messages

In addition to LRU failure annunciations, data path messages can also be used to help identify a faulty LRU. The following message indicates that a data path connected to the GDU (MFD or PFD) or the GIA 63/GIA 63W (1 or 2) has failed.

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

The failed path message is triggered by the timeout of a digital channel. The channels that are checked are displayed on these configuration pages:

1. Main GDU RS-232/ARINC 429 Configuration Page (PFD1/2, and MFD) (Figure 5-3).
2. GIA RS-232/ARINC 429 Configuration Page (GIA1 and GIA2) (Figure 5-4).
3. GIA RS-485 Configuration Page (GIA1 and GIA2) (Figure 5-5).

Once the failed path message is displayed, it remains on the list of messages until the next power cycle.

5.1.5 Configuration Page Data Path Indications

In addition to the failure messages, the data path can be checked by observing the indication boxes on the Main and GIA Configuration Pages. The status of the channel is indicated by the following colors:

- Red = data path has failed
- Black = data path status is unknown
- Green = data path is good

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

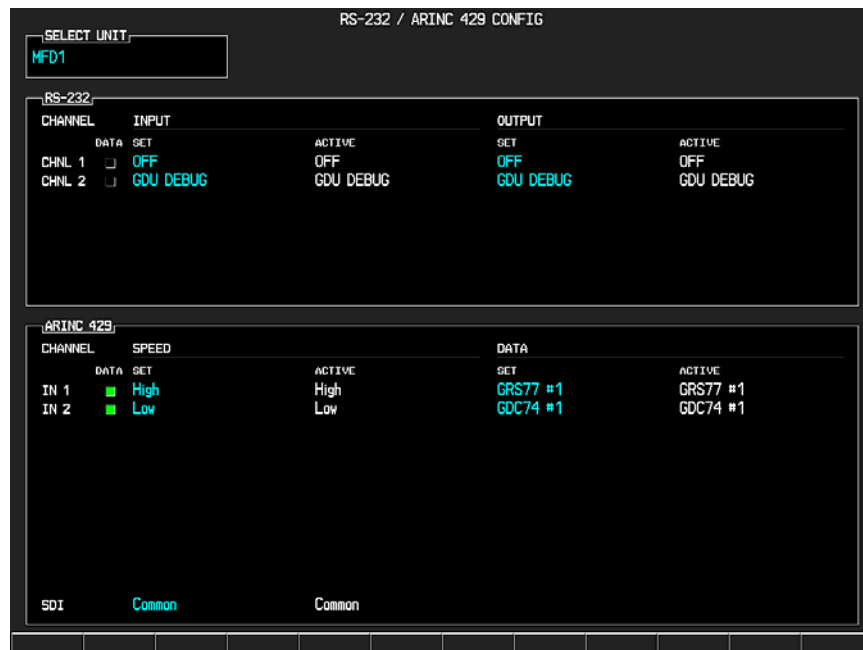














Figure 5-3. Main RS-232/ARINC 429 Configuration Page




The Main 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. These tables serve as examples only.




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.
			<p>PFD1/GMC 710 or GMC 715 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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
			<p>PFD1/GRS 77 #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – Replace original GRS1 if box turns green after swapping units. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD1. <ul style="list-style-type: none"> – 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
			<p>PFD1/GDC 74B #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
			<p>PFD2/GMC 710 or GMC 715 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.
			<p>PFD2/GRS 77 #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – Replace original GRS2 if box turns green after swapping units. • Swap PFD1 and PFD2 to confirm if the problem is in the original PFD2. <ul style="list-style-type: none"> – 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.
			<p>PFD2/GDC 74B #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
			<p>MFD/GRS 77 #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – Replace original MFD if box turns green after swapping displays. • Check the MFD/GRS 77 #1 interconnect wiring and unit connector pins for faults. <ul style="list-style-type: none"> a. Replace GRS 77 #1.
			MFD/GRS 77 #1 data path functionally is unknown. Reload MFD configuration file.








IN 2	GDC 74B #1		MFD/GDC 74B #1 data path is functioning correctly
			<p>MFD/GDC 74B #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.




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




RS-232 / ARINC 429 CONFIG									
SELECT UNIT									
GIA1									
RS-232									
CHANNEL	INPUT			OUTPUT					
	DATA	SET	ACTIVE	SET	ACTIVE				
CHNL 1	<input type="checkbox"/>	GDC74 #1	GDC74 #1	GDC74 #1	GDC74 #1	GDC74 #1			
CHNL 2	<input type="checkbox"/>	OFF	OFF	GRS77 #2	GRS77 #2				
CHNL 3	<input type="checkbox"/>	AFCS DEBUG	AFCS DEBUG	AFCS DEBUG	AFCS DEBUG				
CHNL 4	<input type="checkbox"/>	OFF	OFF	OFF	OFF				
CHNL 5	<input type="checkbox"/>	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS	GTX 33 #1 w/ TIS				
CHNL 6	<input type="checkbox"/>	GRS77 #1	GRS77 #1	GRS77 #1	GRS77 #1				
CHNL 7	<input type="checkbox"/>	GMA1347 #1	GMA1347 #1	GMA1347 #1	GMA1347 #1				
CHNL 8	<input type="checkbox"/>	GIA DEBUG	GIA DEBUG	GIA DEBUG	GIA DEBUG				
ARINC 429									
CHANNEL	SPEED			DATA					
	DATA	SET	ACTIVE	SET	ACTIVE				
IN 1	<input type="checkbox"/>	Low	Low	OFF	OFF				
IN 2	<input type="checkbox"/>	Low	Low	OFF	OFF				
IN 3	<input type="checkbox"/>	Low	Low	OFF	OFF				
IN 4	<input type="checkbox"/>	Low	Low	OFF	OFF				
IN 5	<input type="checkbox"/>	Low	Low	GDC74 #1	GDC74 #1				
IN 6	<input type="checkbox"/>	High	High	GRS77 #1	GRS77 #1				
IN 7	<input type="checkbox"/>	Low	Low	OFF	OFF				
IN 8	<input type="checkbox"/>	Low	Low	OFF	OFF				
OUT 1		High	High	IESI OUT	IESI OUT				
OUT 2		High	High	DATA LOGGER	DATA LOGGER				
OUT 3		Low	Low	EMBR GP OUT	EMBR GP OUT				
SDI		LNAV 1	LNAV 1						
SET>ACTV ACTV>SET CLR NV									




Figure 5-4. 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. These tables serve as examples only.





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.
			<p>GIA1/GDC 74B #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
			<p>GIA1/GTX 33 #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
			<p>GIA1/GRS 77 #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.




CHNL 7	GMA 1347D #1		GIA1/GMA 1347D #1 data path is functioning correctly.
			<p>GIA1/GMA 1347D #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.
			<p>GIA1/GDC 74B #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.




IN 6	GRS 77 #1		GIA1/GRS 77 #1 data path is functioning correctly.
			<p>GIA1/GRS 77 #1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – Replace original GRS1 if box turns green after swapping units. • Check the GIA1/GRS 77 #1 interconnect wiring and unit connector pins for faults. <ul style="list-style-type: none"> 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.
			<p>GIA2/GDC 74B #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.

CHNL 5	GTX 33/33D #2 w/TIS		GIA2/GTX 33 #2 data path is functioning correctly.
			<p>GIA2/GTX 33 #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
			<p>GIA2/GRS 77 #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – Replace original GRS2 if box turns green after swapping units. • Check the GIA2/GRS 77 #2 interconnect wiring and unit connector pins for faults. <ul style="list-style-type: none"> a. Replace GRS 77 #2.
			GIA2/GRS 77 #2 data path functionality is unknown. Reload GIA2 configuration files.

CHNL 7	GMA 1347D #2		GIA2/GMA 1347D #2 data path is functioning correctly.
			<p>GIA2/GMA 1347D #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.
			<p>GIA2/GDC 74B #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.

IN 6	GRS 77 #2		GIA2/GRS 77 #2 data path is functioning correctly.
			<p>GIA2/GRS 77 #2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.

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

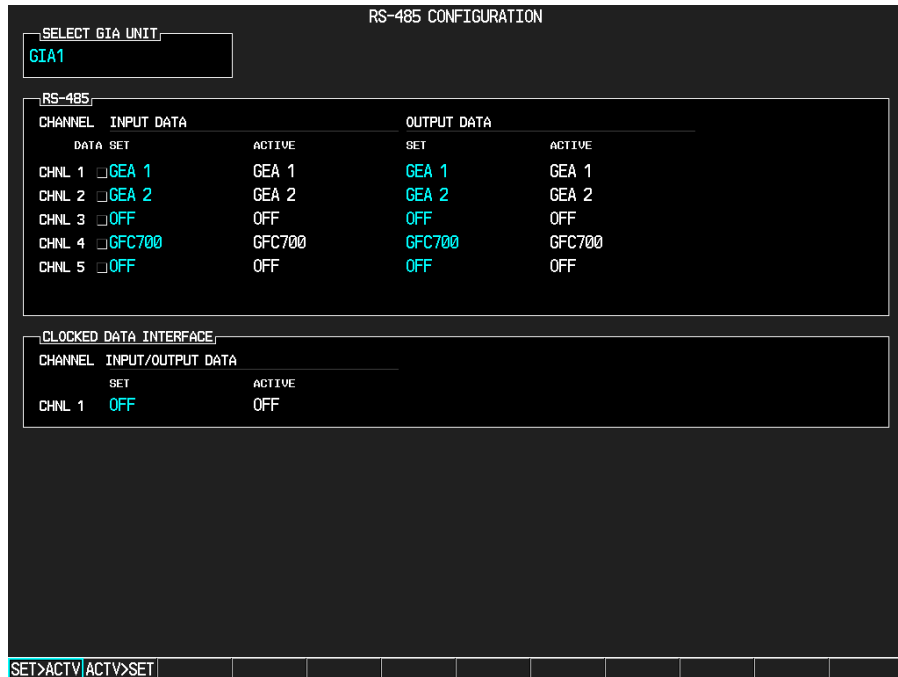














Figure 5-5. GIA RS-485 Configuration Page







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. These tables serve as examples only.

SELECT UNIT—GIA1 RS-485 WINDOW			
Channel	LRU	Indicator	Status/Recommended Actions
CHNL 1	GEA1		GIA1/GEA1 data path is functioning correctly.
			<p>GIA1/GEA1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.

CHNL 2	GEA2		GIA1/GEA2 data path is functioning correctly.
			<p>GIA1/GEA2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.
			<p>GIA1/GFC 700 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.
			<p>GIA2/GEA1 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.
			<p>GIA2/GEA2 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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. <ul style="list-style-type: none"> – 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.
			<p>GIA2/GFC 700 data path is not functioning correctly.</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.

5.1.6 Advisory Messages

In Normal Mode of operation the G1000 system displays a variety of system messages and/or annunciations to the operator and technician (Figure 5-6). System messages are normally presented on the PFD and can be viewed by pressing the MSG softkey. This section provides a listing of possible messages, alerts, and annunciations. Aircraft specific alerts are not covered in this manual. 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 5-6. Advisory Messages

5.1.6.1 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.	<ol style="list-style-type: none"> 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.

5.1.6.2 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.	<ul style="list-style-type: none"> a. Select the GDU Test Page and verify key is stuck (if key is stuck the corresponding indicator will be green). b. Exercise suspected stuck key and reset GDU Test Page to see if indicator remains green without pressing the key. c. 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.	

5.1.6.3 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.	a. Reload aviation database into the display. b. 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.	<ul style="list-style-type: none"> • Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. <ul style="list-style-type: none"> – 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 datacards 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.	

MFD DB ERR – MFD terrain database error exists.	The MFD has encountered an error in the terrain database.	<ul style="list-style-type: none"> • Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. <ul style="list-style-type: none"> – 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 datacards 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.	<ul style="list-style-type: none"> • Confirm supplemental data card is inserted fully in the bottom slot of the display. • Move the datacard to the top slot of the display. <ul style="list-style-type: none"> – 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 datacards 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.	

MFD DB ERR – MFD ChartView database error.	The MFD has encountered an error in the ChartView database.	<ul style="list-style-type: none"> • Confirm supplemental data card is inserted fully in the bottom slot of the display.
MFD DB ERR – MFD Terminal Procs database error exists.	The MFD has encountered an error in the Terminal Procedures database.	<ul style="list-style-type: none"> • Move the datacard to the top slot of the display. <ul style="list-style-type: none"> – 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 datacards as a set to keep the database cycles the same and prevent database mismatch errors. • Replace MFD.
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
<p>CNFG MODULE – PFD1 configuration module is inoperative.</p>	<p>The PFD master configuration module has failed.</p>	<ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>

5.1.6.4 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.	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – If problem follows the unit, replace GIA2. – If problem persists replace GMA 1347 #2.
COM1 TEMP – COM1 over temp. Reducing transmitter power.	The G1000 has detected an over temperature in COM1.	<ol style="list-style-type: none"> a. Check fan, wiring and air tubing for proper operation (if applicable). b. Replace cooling fan if unable to determine if operating correctly. c. Replace GIA1. d. 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.	<ol style="list-style-type: none"> a. Check fan, wiring and air tubing for proper operation (if applicable). b. Replace cooling fan if unable to determine if operating correctly. c. Replace GIA2. d. If problem persists contact Garmin Aviation Product Support for assistance.

5.1.6.5 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.	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – If problem follows the unit, replace GIA2.

5.1.6.6 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.	<ul style="list-style-type: none"> • Switch GIA1 and GIA2 to verify location of problem: <ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> • Switch GIA1 and GIA2 to verify location of problem: <ul style="list-style-type: none"> – If problem follows the unit, replace GIA. – If problem does not follow unit, check G/S2 antenna and cabling.

5.1.6.7 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.	<ul style="list-style-type: none"> • Switch GIA1 and GIA2, to verify location of problem. <ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> • Switch GIA1 and GIA2, to verify location of problem. <ul style="list-style-type: none"> – 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.	<ul style="list-style-type: none"> a. Verify the area the aircraft was traveling through did not have loss of GPS coverage. FAA NOTAMs may be issued for periods of outages. b. 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.). c. Check GPS antenna and cabling.

5.1.6.8 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.	<ul style="list-style-type: none"> a. Check fan, wiring and air tubing for proper operation (if applicable). b. Replace cooling fan if unable to determine if operating correctly. c. Replace GIA1. d. If problem persists contact Garmin Aviation Product Support for assistance.
GIA2 COOLING – GIA2 over temperature.	GIA2 has exceeded its operating temperature range.	<ul style="list-style-type: none"> a. Check fan, wiring and air tubing for proper operation (if applicable). b. Replace cooling fan if unable to determine if operating correctly. c. Replace GIA2. d. If problem persists contact Garmin Aviation Product Support for assistance.

5.1.6.9 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.	<ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>
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.	<ul style="list-style-type: none"> • Reload GIA Audio software and configuration files. • Replace master configuration module, check config module harness for faults and replace if necessary. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>
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.

5.1.6.10 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 datapath using Section 5.1.5.

5.1.6.11 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.	<ul style="list-style-type: none"> a. Check GRS #1/GDC 74B #1 interconnect. b. Replace the GDC 74B #1 c. 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.	<ul style="list-style-type: none"> a. Check GRS #2/GDC 74B #2 interconnect b. Replace the GDC 74B #2 c. If problem persists, replace the GRS 77 #2

AHRS1 GPS – AHRS1 using backup GPS source.	GRS 77 #1 is using a backup GPS source.	<ul style="list-style-type: none"> • Troubleshoot the possible loss of either GPS receiver per Section 5.1.2.1, GPS INTEG or Time failure. • Replace the GRS 77.
AHRS1 GPS – AHRS1 not receiving backup GPS information.	GRS 77 #1 is not receiving backup GPS information from either 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 either 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 datapath using Section 5.1.5.

5.1.6.12 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.	<ul style="list-style-type: none"> a. Check GMU 44/GRS 77 interconnect for faults. b. Replace GMU 44 #1 c. If problem persists, replace GRS 77 #1
HDG FAULT – AHRS2 magnetometer fault has occurred.	A fault has occurred in GMU 44 #2.	<ul style="list-style-type: none"> a. Check GMU 44/GRS 77 interconnect for faults. b. Replace GMU 44 #2 c. If problem persists, replace GRS 77 #2

5.1.6.13 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.	<ul style="list-style-type: none"> • 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. <p style="text-align: center;">NOTE</p> <p>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 System 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.</p>
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 datapath using Section 5.1.5.

5.1.6.14 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.	<ul style="list-style-type: none"> • Ensure GMA 1347D #1, both GIAs and all GDUs are receiving power. • Troubleshoot for a failed datapath using Section 5.1.5. • Replace GMA 1347D #1.
GMA2 FAIL – GMA 2 is inoperative.	The G1000 has detected a failure in GMA 1347D #2.	<ul style="list-style-type: none"> • Ensure 1347D #2, both GIAs and all GDUs are receiving power. • Troubleshoot for a failed datapath using Section 5.1.5. • Replace GMA 1347D #2.

Advisory Message	Possible Cause	Recommended Actions
<p>GMA1 CONFIG – GMA1 configuration error. Config service req'd.</p>	<p>The G1000 has detected a GMA 1347D #1 configuration mismatch.</p>	<ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>
<p>GMA2 CONFIG – GMA2 configuration error. Config service req'd.</p>	<p>The G1000 has detected a GMA 1347D #2 configuration mismatch.</p>	<ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>

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.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Troubleshoot for a failed datapath using Section 5.1.5.

5.1.6.15 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.	a. Load GMC configuration files, b. Replace GMC. c. 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 System 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.

5.1.6.16 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.	a. Load GCU configuration files, b. Replace GCU. c. 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 System 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.

5.1.6.17 GWX 68 Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
GWX CONFIG – GWX configuration error. Config service req'd.	The G1000 has detected a GWX 68 configuration mismatch.	a. Load GWX configuration files. b. Replace GWX. c. 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 System 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.
GWX FAIL – GWX is inoperative.	The G1000 has detected a failure in the GWX 68.	a. Check Ethernet connection between the GWX and GDL69A for faults. b. Replace the GWX 68.
GWX SERVICE – Needs service. Return unit for repair.	The G1000 has detected a failure in GWX 68.	Replace the GWX 68.
MANIFEST – GWX software mismatch. Communication halted.	The system has detected an incorrect software version loaded in the GWX 68.	Load correct software version.

5.1.6.18 Miscellaneous Advisory Messages

Advisory Message	Possible Cause	Recommended Actions
<p>XTALK ERROR – A flight display cross talk error has occurred.</p>	<p>A communication error has occurred between the MFD and PFDs.</p>	<ul style="list-style-type: none"> a. Ensure a database error has not occurred (identified in the ADVISORY MESSAGES window on the PFD). b. If a database error has occurred, correct error before proceeding. c. Check display Ethernet interconnect wiring. d. Replace PFD1 with a known good unit, to verify location of problem. e. If problem persists, reinstall original PFD1 and replace PFD2. f. If problem persists, reinstall PFD2 and replace MFD.
<p>SIMULATOR – Sim mode is active. Do not use for navigation.</p>	<p>The G1000 is in simulator mode.</p>	<ul style="list-style-type: none"> a. Check wiring (pin 54 in all GDU connectors should be empty). b. Replace PFD1 with a known good unit, to verify location of problem. c. If problem persists, reinstall original PFD1 and replace PFD2. d. If problem persists, reinstall PFD2 and replace MFD.
<p>DATA LOST – Pilot stored data lost. Recheck settings.</p>	<p>Pilot stored data has been lost.</p>	<ul style="list-style-type: none"> a. If the CLR key was held during a power cycle, disregard message. b. Cycle power to PFD1 and Ensure CLR key is not stuck on the GDU TEST page. c. If problem persists, replace PFD1.

Advisory Message	Possible Cause	Recommended Actions
<p>MFD SERVICE – needs service. Return unit for repair.</p>	<p>The G1000 has determined the MFD needs service.</p>	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – If the CCFT level rises, disregard the message. – If the CCFT level does not rise, replace the MFD. • Replace the MFD.
<p>PFD1 SERVICE – needs service. Return unit for repair.</p>	<p>The G1000 has determined PFD #1 needs service.</p>	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – If the CCFT level rises, disregard the message. – If the CCFT level does not rise, replace the PFD. • Replace the PFD.

Advisory Message	Possible Cause	Recommended Actions
<p>PFD2 SERVICE – needs service. Return unit for repair.</p>	<p>The G1000 has determined PFD #2 needs service.</p>	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – If the CCFT level rises, disregard the message. – If the CCFT level does not rise, replace the PFD • Replace the PFD.

<p>PFD1 CONFIG – PFD1 configuration error. Config service req'd.</p>	<p>The G1000 has detected a PFD #1 configuration mismatch.</p>	<ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>
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<p>PFD2 CONFIG – PFD2 configuration error. Config service req'd.</p>	<p>The G1000 has detected a PFD #2 configuration mismatch.</p>	<ul style="list-style-type: none"> • 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. <p style="text-align: center;"><u>NOTE</u></p> <p>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 System 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.</p>
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Advisory Message	Possible Cause	Recommended Actions
MFD CONFIG – MFD configuration error. Config service req'd.	The G1000 has detected a MFD configuration mismatch.	<ul style="list-style-type: none"> • 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. <p style="text-align: center;">NOTE</p> <p>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 System 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.</p>
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.	<ul style="list-style-type: none"> • 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.

5.1.6.19 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.	<ul style="list-style-type: none"> • Replace GDL 69/69A. • Check GDL 69/69A antenna and cabling.

5.1.6.20 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.	a. Perform a SET>ACTV configuration reset on the GTX Config page and verify the aircraft registration is present. b. If error is still present, reload config files from a loader card. c. 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 System 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.	<ul style="list-style-type: none"> • Troubleshoot for a failed datapath using Section 5.1.5. • Replace GTX 33D #1
XPDR2 FAIL – XPDR is inoperative.	GTX 33/33D #2 is not responding.	<ul style="list-style-type: none"> • Troubleshoot for a failed datapath using Section 5.1.5. • 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 datapath using Section 5.1.5.

5.1.7 Common Problems

5.1.7.1 GDU

Symptom	Recommended Actions
<ul style="list-style-type: none"> • Display will not track photocell • Keyboard will not track photocell 	<ul style="list-style-type: none"> • 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 PHOTOCCELL A or PHOTOCCELL B value changes. If values do not change, replace the display.
<ul style="list-style-type: none"> • Display will not track dimmer bus • Keyboard will not track dimmer bus 	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • Display is blank • Display resets • Display flickers 	<ol style="list-style-type: none"> a. Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. b. 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. c. Use a bright light to verify LCD is active. d. Adjust avionics dimmer control full clockwise. e. Manually turn up backlight on the PFD and load configuration files to the GDU. f. 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. g. Ensure GDU is receiving power and ground. If a circuit breaker is tripped, determine source of short before resetting breaker. h. Ensure circuit breakers have not failed and power wire connections are secure. i. Swap PFD1 and PFD2. If problem follows unit, replace the display.

Symptom	Recommended Actions
SD card is stuck in GDU	<ul style="list-style-type: none"> • 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	<p>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.</p>
Terrain/Obstacle/Safetaxi does not display	<ol style="list-style-type: none"> a. Ensure supplemental data cards are inserted correctly in the lower slots of all three GDU's. b. Allow the system to verify the data on the cards for approximately five minutes after power-up. c. If a database does not activate, reload the problem database onto the SD Card or replace the card. You may need to replace all datacards as a set to keep the database cycles the same and prevent database mismatch errors.

5.1.7.2 GIA 63W

Symptom	Recommended Actions
Weak COM transmit power	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 sidetone	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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.

5.1.7.3 WAAS GPS

Symptom	Recommended Actions
Will not acquire satellites	<ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> – Using the PFD in config mode, go to the GIA RS-232/ARNIC 429 Config Page. At the top of the screen, select the GIA that can not 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 can not acquire a position, replace the GIA. • Check GPS antenna and cabling.

5.1.7.4 NAV

Symptom	Recommended Actions
Weak NAV receiver	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – If problem follows unit, replace GIA. – If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.

5.1.7.5 Glideslope

Symptom	Recommended Actions
Weak G/S Receiver	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> – If problem follows unit, replace GIA. – If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.

5.1.7.6 GDC 74B

Symptom	Recommended Actions
Altitude is different than standby altimeter	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Replace GDC 74B config module. • If problem persists, replace GDC 74B config module wire harness.

5.1.7.7 AHRS

Symptom	Recommended Actions
AHRS does not complete initialization	<ul style="list-style-type: none"> a. Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. b. 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. c. Calibrate the GRS 77. d. Check GRS 77 configuration module wiring for damage. e. Check GRS 77 connector for bent pins. If no damage can be found, replace GRS 77 configuration module. f. If problem persists, replace the GRS 77.
Attitude appears unstable	<ul style="list-style-type: none"> a. Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin. b. Ensure the four GRS 77 mounting screws are tight. Finger tight is not sufficient, a screwdriver must be used to verify. c. 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). d. Ensure GRS 77 connector is securely fastened and proper strain relief is provided. e. Remove GRS 77 connector and verify there are no bent pins. f. Replace the GRS 77. g. Contact Garmin for further troubleshooting if required.

5.1.7.8 GEA

Symptom	Recommended Actions
CHT, EGT, and TIT are red X'd (no other field is red X'd)	<ol style="list-style-type: none"> a. Ensure the GEA configuration module and thermocouple wiring and pins are not damaged. b. Replace the GEA configuration module and thermocouple.
One or more CHT, EGT, or TIT temperatures drop as electrical load increases	<ul style="list-style-type: none"> • Check temperature probe(s) for shorts on the low side of the thermocouple (usually where bayonet is crimped). • Replace temperature probe(s).
One or more CHT, EGT, or TIT temperatures drift up and flag	Check for an open temperature probe or open wiring and replace and/or correct.
Fuel quantity flags intermittently	<ul style="list-style-type: none"> • 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.
Discharged standby battery indication	Perform the GEA 70 High Side Current Monitor Calibration Procedure.

5.1.7.9 GMA 1347D

Symptom	Recommended Actions
Noise in Audio	<p>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:</p> <ul style="list-style-type: none"> • 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.	<p>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.</p>
COM Bleed over	<p>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.</p>
Speaker Cuts Out	<p>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.</p>
Mic Audio Heard in Speaker	<p>Reduce ICS Volume.</p>

5.1.7.10 XM

Symptom	Recommended Actions
<p>No XM audio is heard No XM weather information is displayed</p>	<p>a. Ensure the following items are not preventing the audio panel from distributing XM audio (reference applicable G1000 Pilot's Guide):</p> <ul style="list-style-type: none"> • 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. <p>b. 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.</p> <p>c. If problem persists, replace the GDL 69/69A.</p>

5.1.8 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.

5.1.8.1 GDL 69 Page

NOTE

Configuration settings are not adjustable on the GDL 69 Page.

GDL69		
CONFIGURATION		
SELECT GDL ANTENNA	SET	ACTIVE
ANTENNA GAIN (LOWER dB)	Comant CI 2580-410	
CABLE LOSS INCLUDING INLINE ATTENUATORS IF USED (NOMINAL dB)	25.00	
	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 5-7. 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.

5.1.8.2 GDL 90

Refer to the GDL 90 Installation Manual for troubleshooting information.

5.1.8.3 GMA 1347 Configuration Page



Figure 5-8. 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. 02 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

5.1.8.4 AHRS/Air Data Input Configuration Page



Figure 5-9. 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/s².
- Y ACC—Y Axis acceleration value, expressed in m/s².
- Z ACC—Z Axis acceleration value, expressed in m/s².

AIR DATA 1, 2:

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

5.1.8.5 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	60°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 5-10. Engine Data Page

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

DATA:

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

5.1.8.6 GEA Status Page

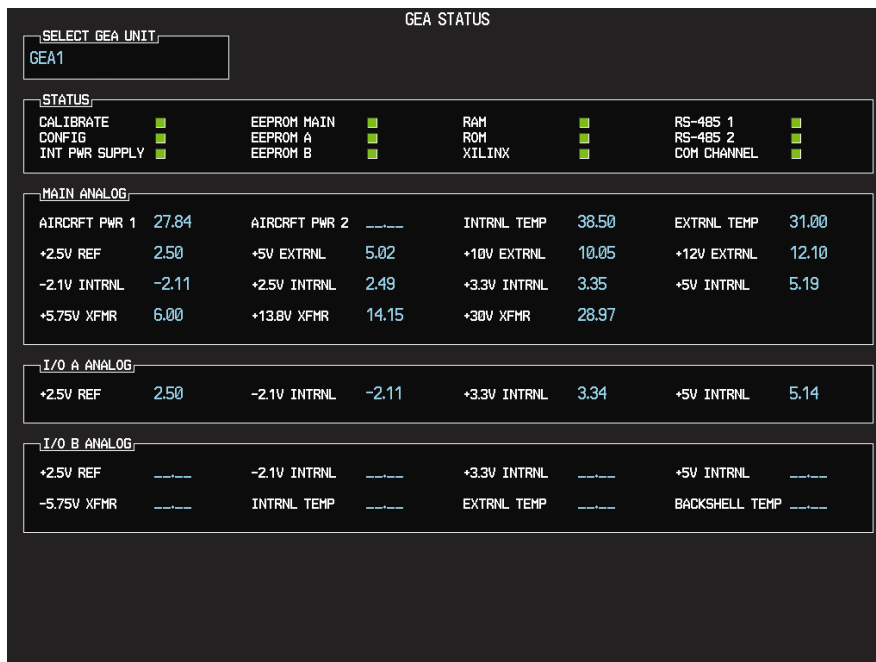


Figure 5-11. GEA Status Page

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.

5.1.8.7 GEA Configuration Page

CAUTION

The data contained on the GEA Configuration Page (Figure 5-18) is extremely critical to aircraft safety. Although the content can be viewed, the technician cannot make changes unless authorized and equipped to do so.

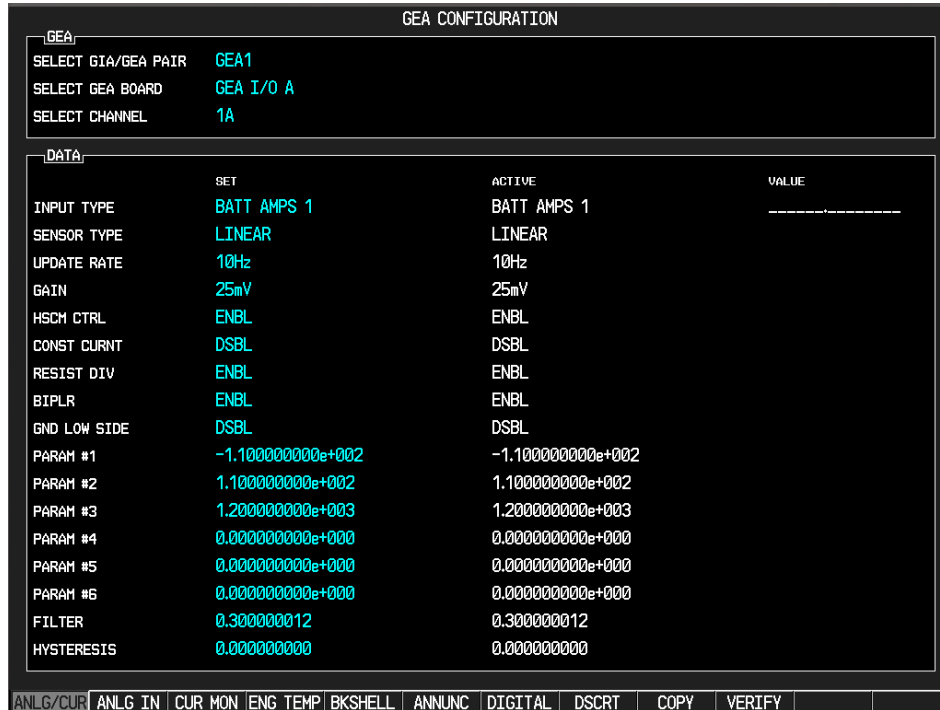


Figure 5-12. GEA Configuration Page

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:

- a. ANLG/CRNT—Displays analog/current configuration settings.
- b. ANLG IN—Displays analog in configuration settings.
- c. CRNT MON—Displays current monitor configuration settings.
- d. ENG TEMP—Displays engine temperature sensor configuration settings.

- e. BKSHELL—Displays backplate thermocouple configuration settings.
- f. 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.

5.1.8.8 GDU Status Page

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

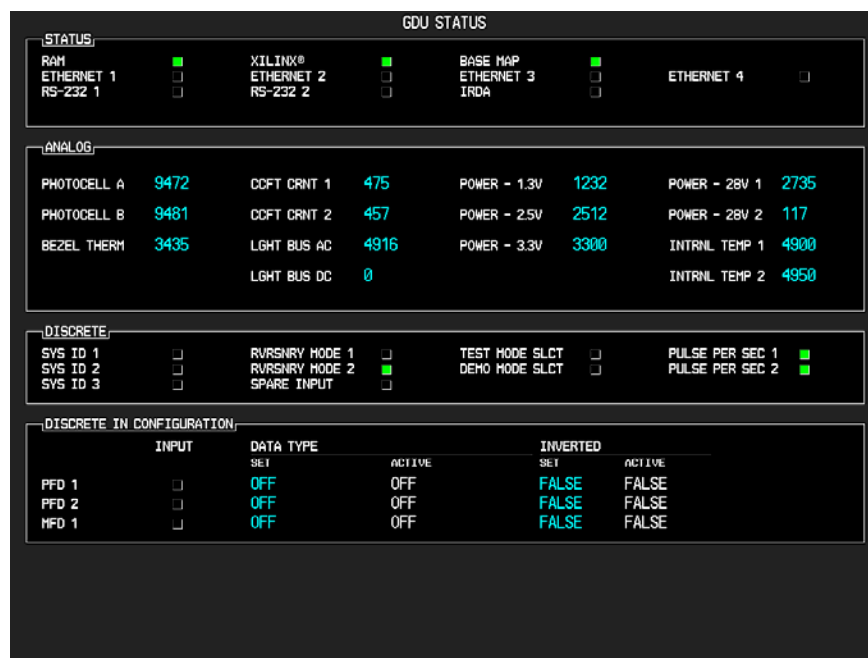


Figure 5-13. GDU Status Page

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. 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. (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.

5.1.8.9 GDU Test Page

The GDU Test Page (Figure 5-14) 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.

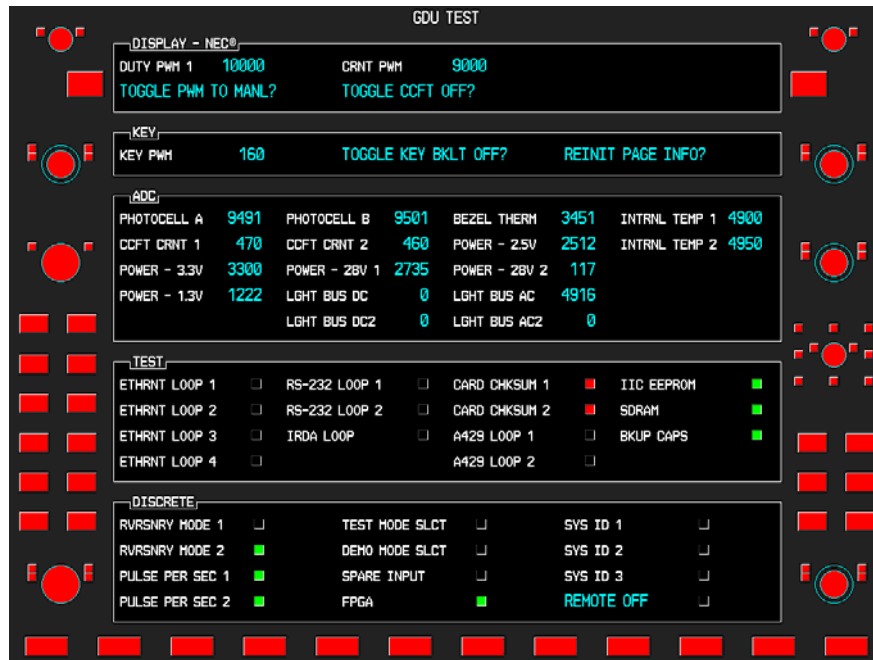


Figure 5-14. GDU Test Page

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:

- a. 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.
- b. TOGGLE KEY BKLT OFF?—Allows the technician to toggle the keyboard backlight off.
- c. REINIT PAGE INFO?—Allows technician to re-initialize all information on the test page.

'ADC' 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.
- 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 certian aircraft.
- f. REMOTE OFF—Allows the display to control power of a remote system. Not used in any installation at this time.

5.1.8.10 Diagnostics Page

Information on the Diagnostics Page is protected and cannot be changed.

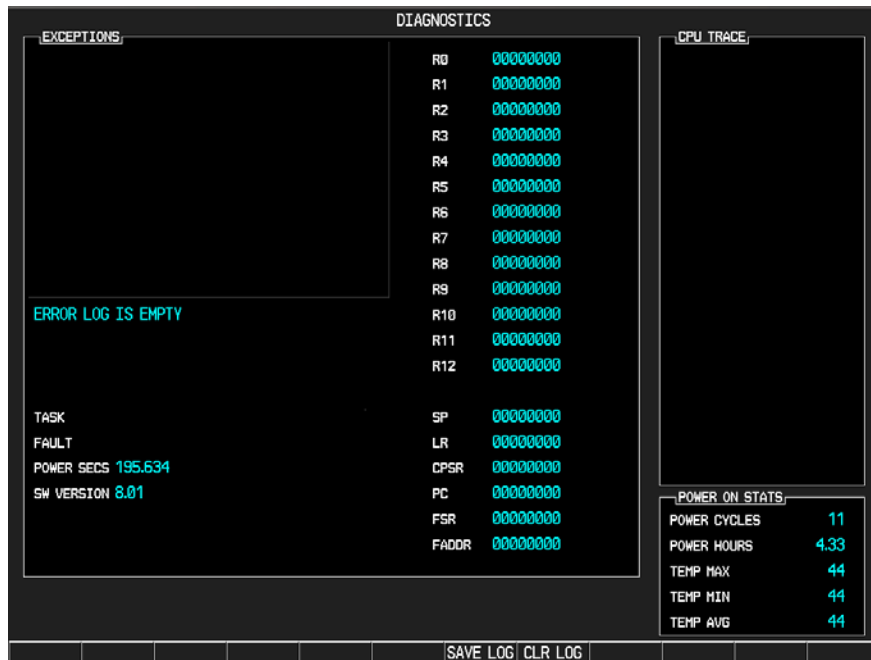


Figure 5-15. Diagnostics Page

5.1.8.11 Serial/Ethernet I/O Page

The Serial/Ethernet I/O Page displays Ethernet communication statistics (Figure 5-16). 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 5-16. Serial/Ethernet I/O Page

5.1.8.12 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.

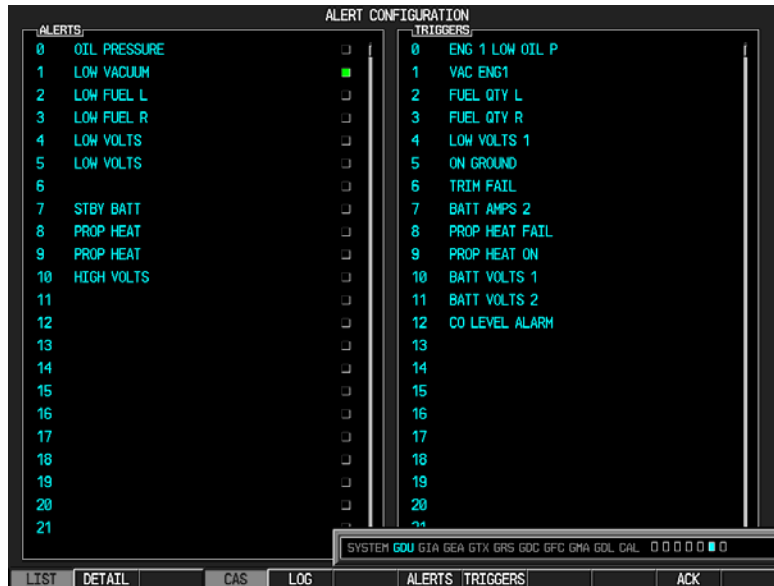


Figure 5-17. Alert Configuration Page

5.1.8.13 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.

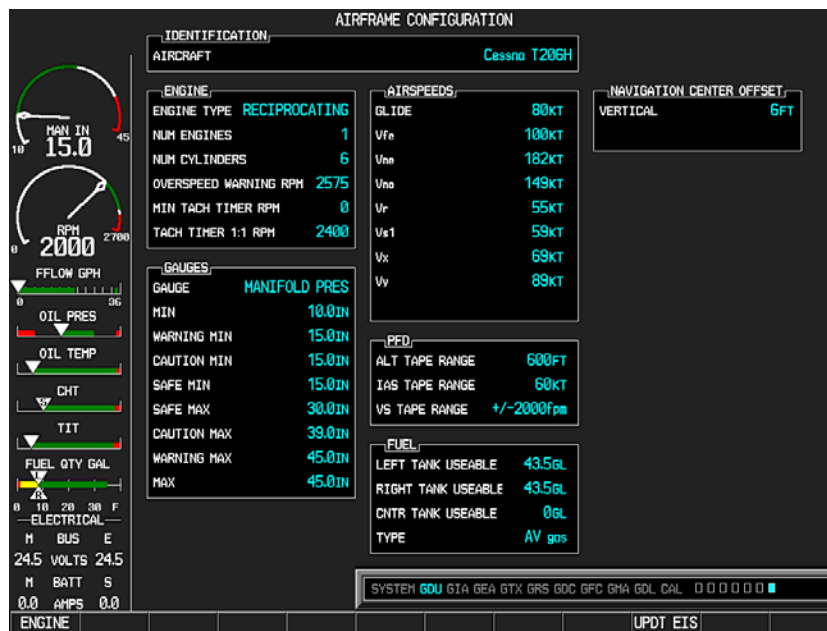


Figure 5-18. Airframe Configuration Page

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

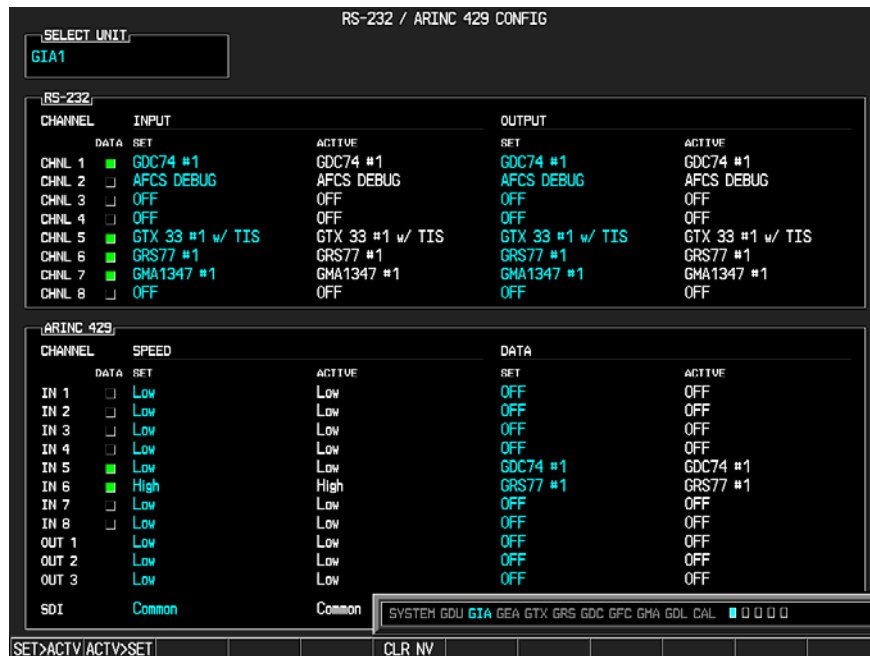


Figure 5-19. RS-232/ARINC 429 Configuration Page

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:

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

Softkeys:

The following softkeys are displayed on this page:

- a. SET>ACTV—See configuration section for description.
- b. ACTV>SET—See configuration section for description.
- c. 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.

5.1.8.15 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.

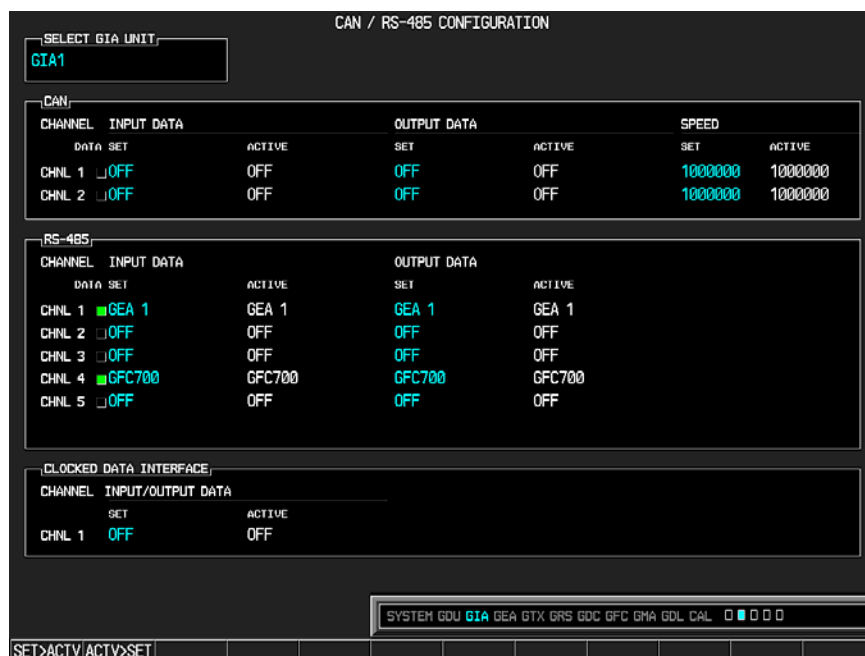


Figure 5-20. CAN/RS-485 Configuration Page

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.

5.1.8.16 GIA I/O Configuration Page

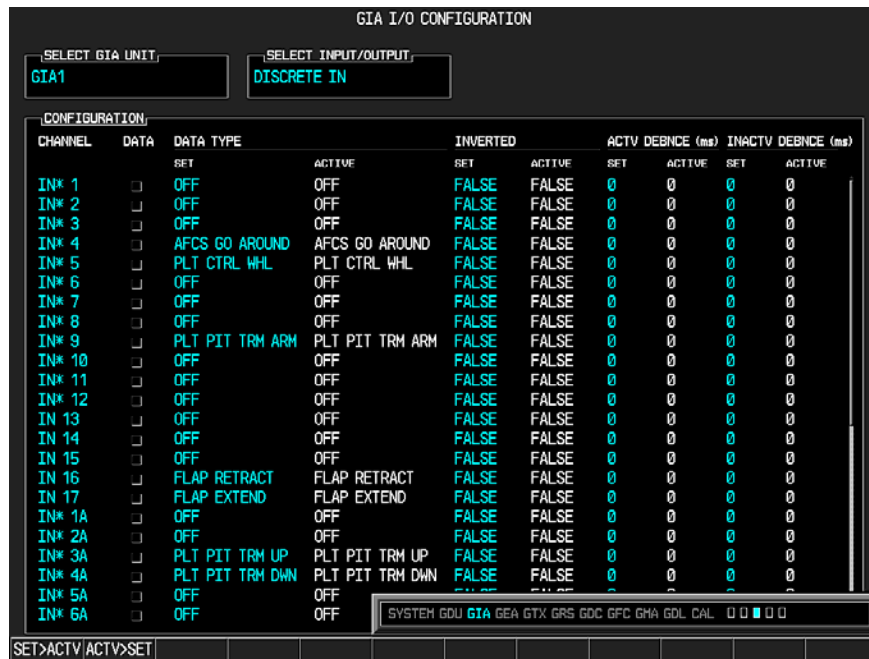


Figure 5-21. GIA I/O Configuration Page

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:

- a. Discrete In
- b. Discrete Out
- c. Analog In
- d. 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.

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

5.1.8.17 COM Setup Page



Figure 5-22. 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 sidetone 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.

5.1.8.18 GIA Status Page

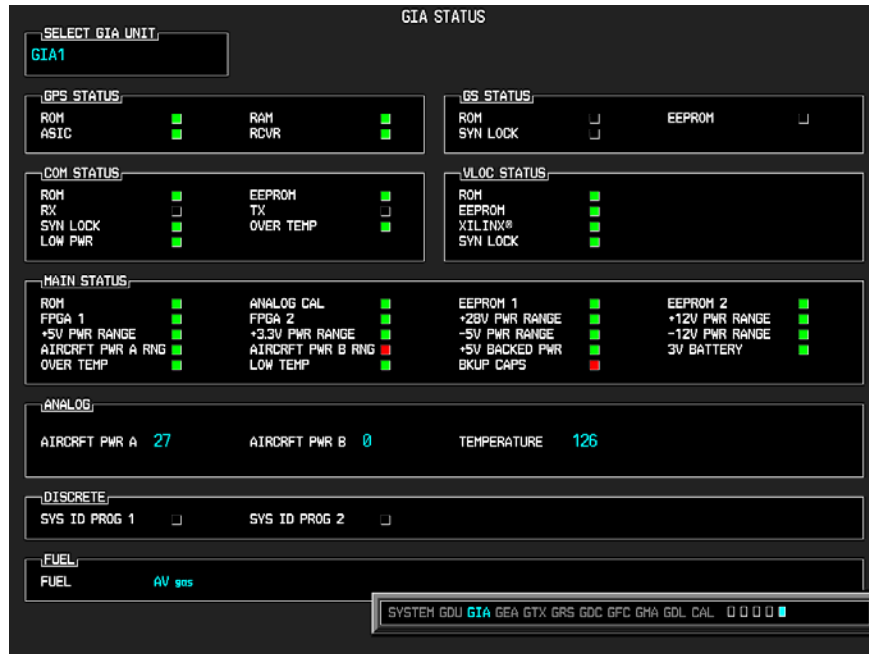


Figure 5-23. GIA Status Page

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)

- i. 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 TROUBLESHOOTING THE GFC 700 AUTOPILOT

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

5.1.9.1 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.

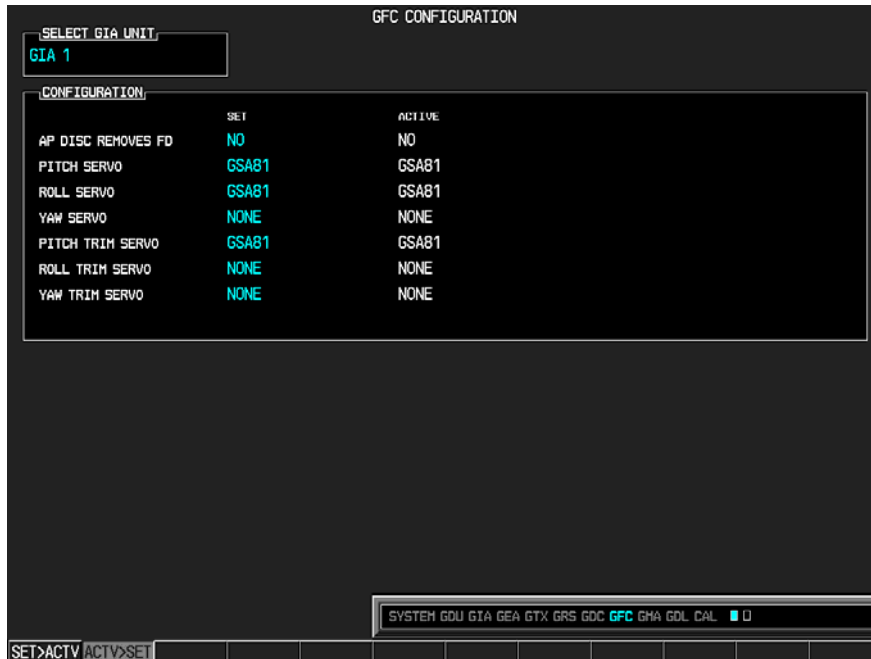


Figure 5-24. GFC Configuration Page

‘SELECT GIA UNIT’—This box displays the currently selected GIA.

‘CONFIGURATION’—This box displays the following:

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

5.1.9.2 GFC Status Page

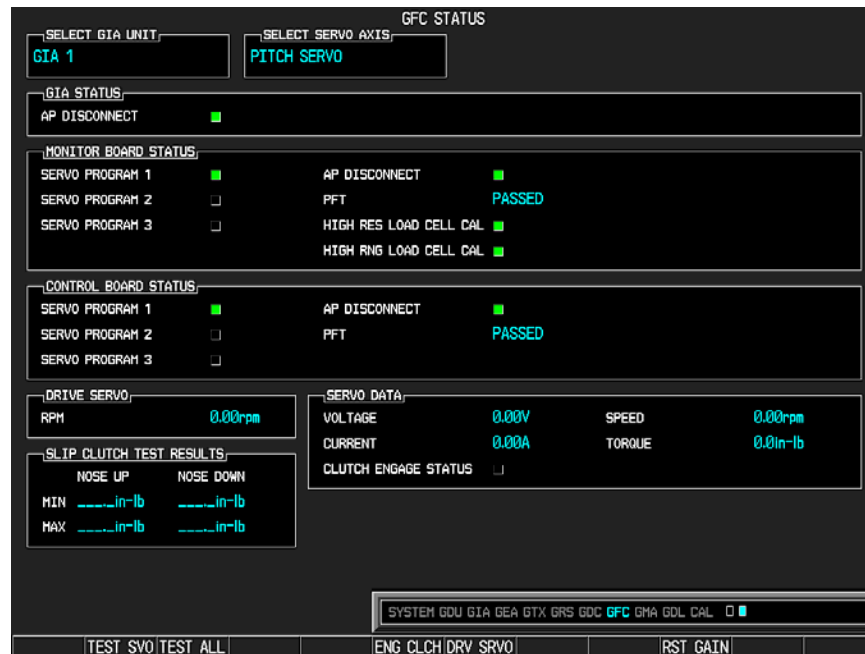


Figure 5-25. GFC Status Page

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 discrettes 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.

5.1.9.3 GFC 700 Annunciations












The GFC 700 AFCS Annunciation field is located above the airspeed tape on the PFD as shown in Figure 5-32.



Figure 5-26. GFC 700 Annunciation Field

Table 5-2 lists the annunciations may appear in the AFCS annunciation field.

Table 5-2. AFCS Annunciations

Condition	Annunciation	Recommended Actions
Pitch Failure		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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 per Section 5.1.9.6 and review for failure information. • If the OAT and TAS is Red-X'd and the attitude indication is present, troubleshoot per Section 5.1.2.1.
Emergency Descent Mode		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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		<ul style="list-style-type: none"> • 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		

Preflight Test	PFT	<ul style="list-style-type: none"> • 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.
	PFT	

5.1.9.4 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 system 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.

5.1.9.4.1 GFC Pre-Flight Testing 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.

5.1.9.5 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

5.1.9.6 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 System 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 500mA)
- 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 2-33). The cable is not available from Garmin.

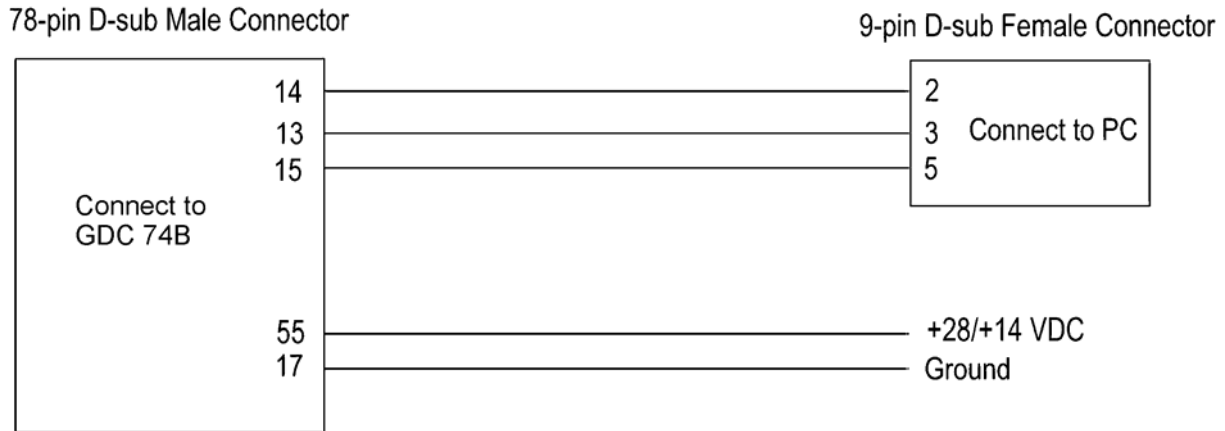


Figure 5-27. GDC 74B PC Interface Cable

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 5-33).
3. Connect the interface cable to the power supply (Figure 5-33).
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.

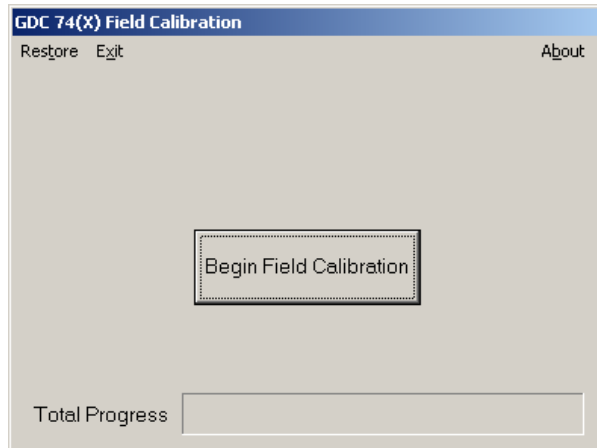


Figure 5-28. GDC 74B Field Calibration Utility, Main Page

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

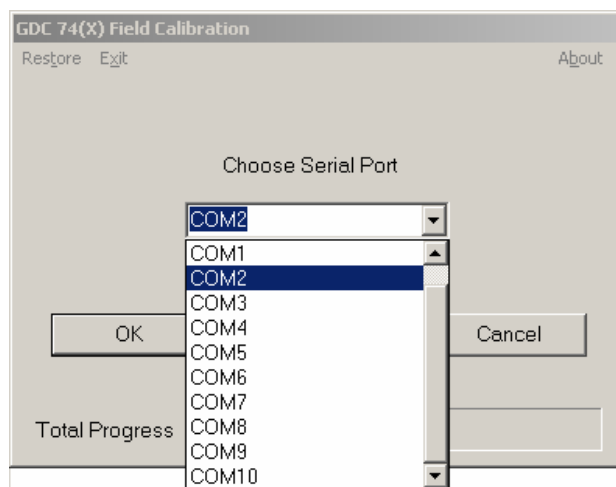


Figure 5-29. Serial Port Pull-Down List

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 5-36) 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 5-37) appears. Click 'OK' to program the new calibration to the GDC 74B unit.

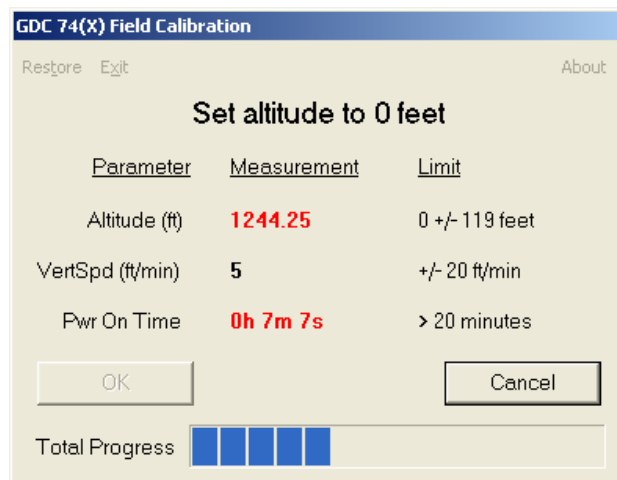


Figure 5-30. '0 Feet' Calibration Screen

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.

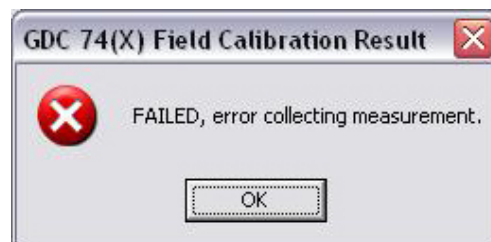


Figure 5-31. 'Calibration Failed' Screen

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.

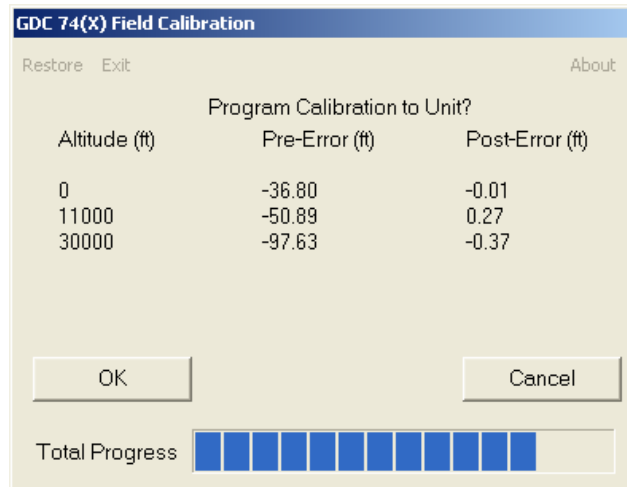


Figure 5-32. 'Program Calibration to Unit' Screen

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

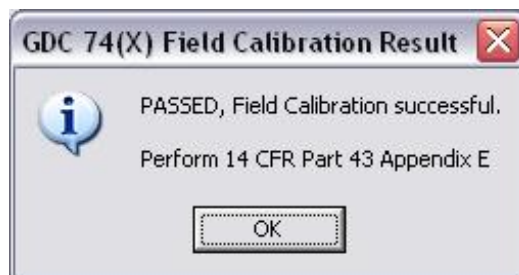


Figure 5-33. 'Field Calibration Result' Screen

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'.

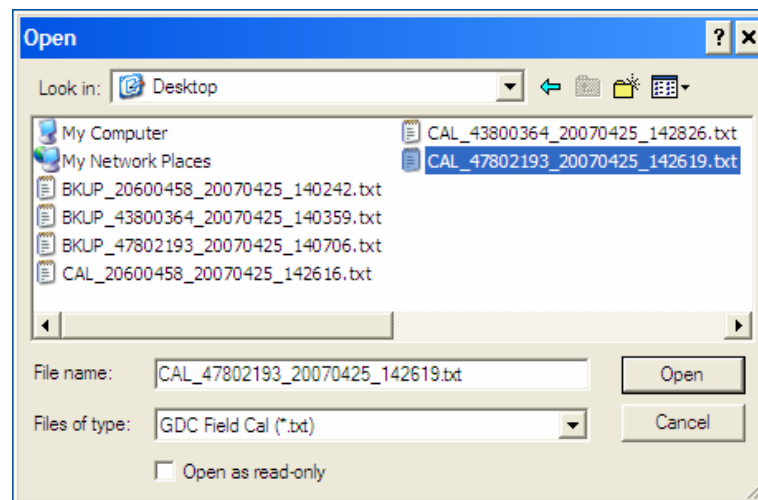


Figure 5-34. Calibration Files Screen

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 5-35.

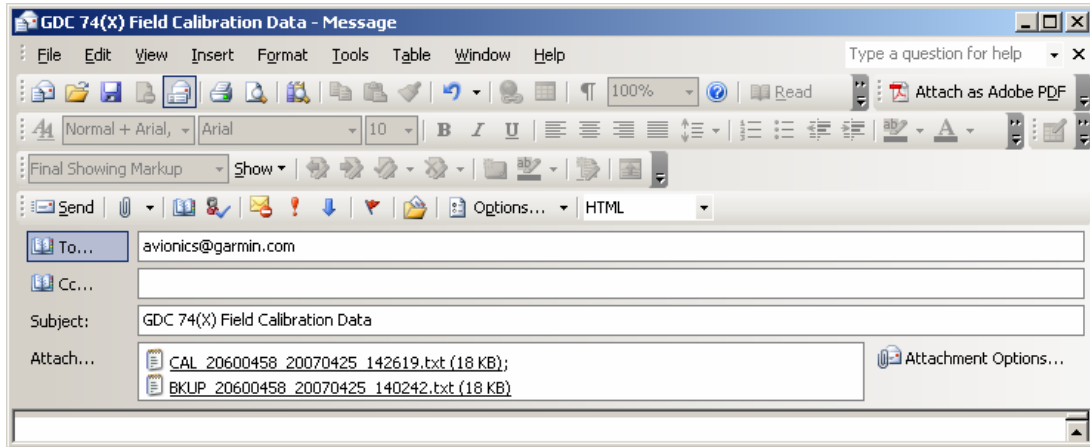


Figure 5-35. Post-Calibration Email Example

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.

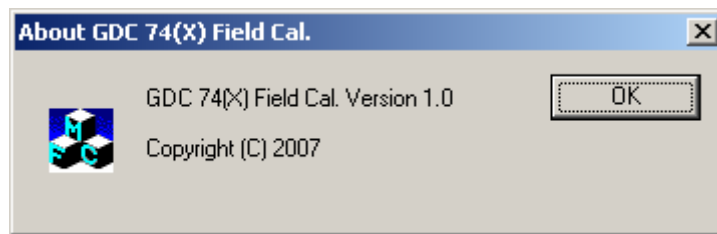


Figure 5-36. The 'About' Screen

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. The following items are required to perform the calibration:

1. Windows-compatible PC (Windows 2000 or XP recommended)
2. SanDisk SD Card Reader, P/N SDDR-93 or SDDR-99 or equivalent card reader
3. Blank SD Card
4. HSCM Offset Tool (HSCM.exe, Garmin P/N 006-A0173-01) obtained from the dealer section of Garmin’s website.

In the Aircraft:

1. Apply power to the aircraft using an external 28 volt cart.
2. Arm the STBY BATT Switch and verify the PFD comes on.
3. Verify no red X’s appear on the engine indicators.
4. Verify BUS E Volts displays a minimum of 24 Volts.
5. Verify M BUS Volts displays 1.5 volts or less.
6. Turn the MASTER Switch (BAT) on.
7. Turn the AVIONICS Switch (BUS 1 and 2) on and verify the MFD comes on.

On the MFD:

1. Using the FMS knob, select the AUX-SYSTEM STATUS page as shown in Figure 5-43.
2. Record the GEA1 serial number. Also note the PFD1 or MFD software version for use later.
3. Press the ENGINE softkey.
4. Press the SYSTEM softkey.
5. Record the engine hours.

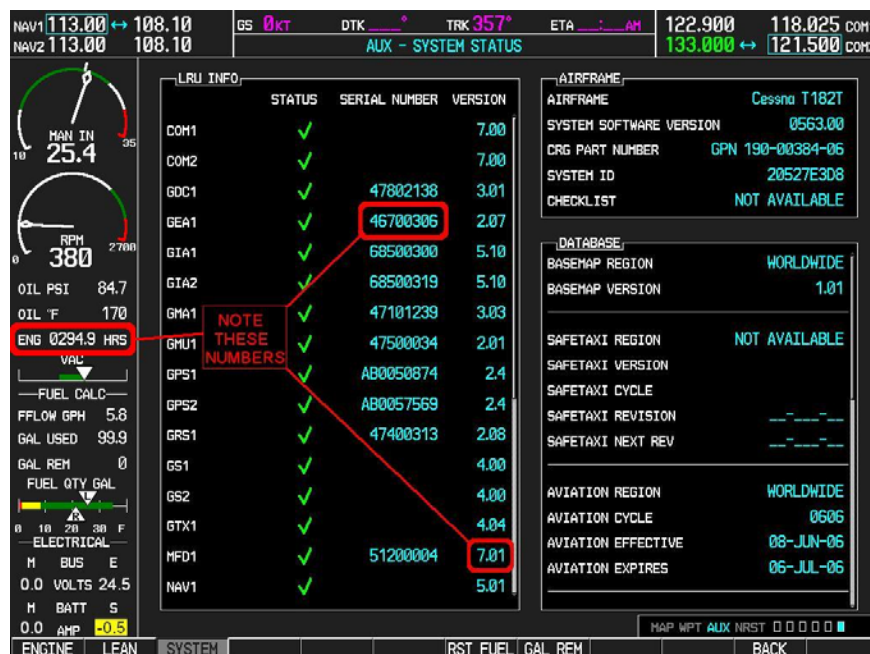


Figure 5-37. AUX – System Status Page (MFD)

In the Aircraft:

1. Set the STBY BATT CB to OPEN.
2. Record the BATT S current (in Amps) from the bottom right corner of the EIS strip. Label this reading as READING #1 and ensure proper sign (+ or -). If reading is greater the +1 Amp or less the -1 Amp, Garmin recommends replacing the GEA 71.
3. Power down PFD1 and MFD.
 - a. AVIONICS Switch (BUS 1 and BUS 2) – Off
 - b. MASTER Switch (BAT) – Off
 - c. STBY BATT Switch – Off

On the PC:

1. Insert the SD Card into the card reader.
2. Run the HSCM.exe program (verify interface resembles Figure 5-44).

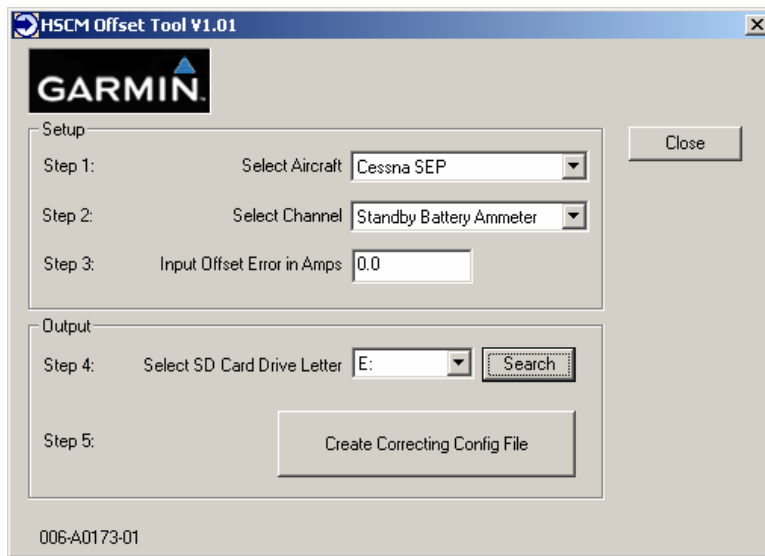


Figure 5-38. HSCM Offset Tool User Interface Display

6. Choose the applicable aircraft in the 'Select Aircraft' field. 'Standby Battery Ammeter' is the only selection available in the Select Channel field.
7. Enter 0.0 in the Input Offset Error in Amps field. *This step will reset any previous calibrations to zero before performing the actual calibration.*
8. Verify the drive letter of the SD card reader is selected in the Select SD Card Drive Letter field.
9. Press the 'Create Correcting Config File' button.
10. Press OK to acknowledge the pop-up box. *A non-zero value will be used later in this procedure.*
11. Verify the pop-up box announces “XXX AIRCRAFT file written to drive” and press OK to acknowledge.
12. Press the Close button.

13. Remove the SD card from the card reader.

In the Aircraft:

1. Insert the SD card into the upper card slot of the PFD.
2. Power up MFD and PFD1 in configuration mode:
 - MASTER Switch (BAT) – On
 - AVIONICS Switch (BUS 1 and BUS 2) – On
3. Select the SYSTEM UPLOAD page as shown in Figure 5-xx.
4. Using the FMS knob select the Configuration Files in the AIRFRAME field.
5. Select the Offset Error Correction File in the FILE field.
6. Verify the configuration box is checked.
7. Press the LOAD softkey.



Figure 5-39. Configuration Upload Page

8. Power down PFD1 and MFD.
9. AVIONICS Switch (BUS 1 and BUS 2) – Off
10. MASTER Switch (BAT) – Off
11. Remove the SD card from the PFD.
12. Power up MFD and PFD1 in Normal mode:
13. STBY BATT Switch – Arm
14. Ensure STBY BATT CB is open
15. MASTER Switch (BAT) – On
16. AVIONICS Switch (BUS 1 and BUS 2) – On
17. Record the BATT S current (in Amps) from the bottom right corner of the EIS strip. Label this reading as READING #2 and ensure proper sign (+ or -).

In the Aircraft:

1. Power down PFD1 and MFD:
 - AVIONICS Switch (BUS 1 and BUS 2) – Off
 - MASTER Switch (BAT) – Off
 - STBY BATT Switch – Off

On the PC:

1. Insert the SD Card into the card reader.
2. Run the HSCM.exe program (verify interface resembles Figure 5-40).

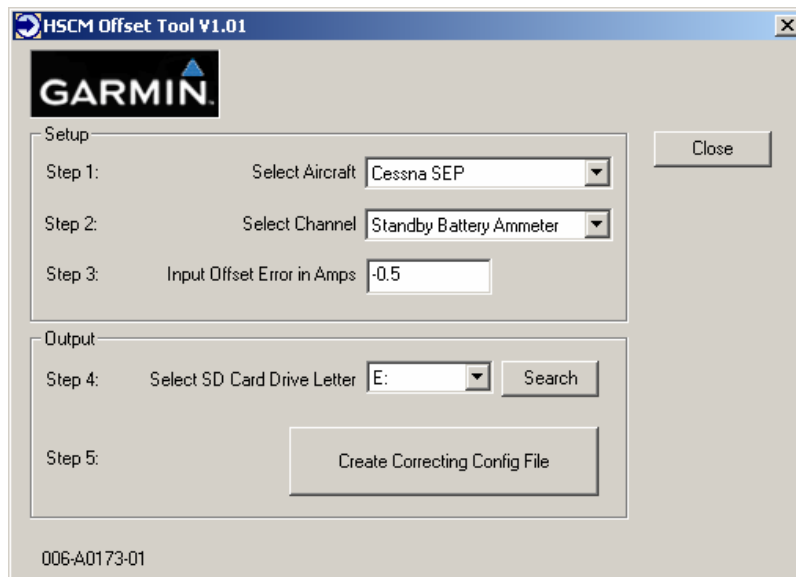


Figure 5-40. HSCM Offset Tool User Interface Display

3. Select the name of the applicable aircraft in the Select Aircraft field. Standby Battery Ammeter is the only selection available in the Select Channel field.
4. Enter the value of READING #2 in the Input Offset Error in Amps field.
5. Verify the drive letter of the SD card reader is selected in the Select SD Card Drive Letter field.
6. Press the Create Correcting Config File button.
7. Press OK to acknowledge the pop-up box.
8. Verify the pop-up box announces “aircraft name file written to drive” and press OK to acknowledge.
9. Press the Close button.
10. Remove the SD card from the card reader.

In the Aircraft:

1. Insert the SD card into the upper card slot of the PFD.
2. Power up MFD and PFD1 in Configuration mode:
 - MASTER Switch (BAT) – On

- AVIONICS Switch (BUS 1 and BUS 2) – On

On the PFD:

1. Repeat the configuration upload as documented above.
2. Power down PFD1 and MFD.
3. AVIONICS Switch (BUS 1 and BUS 2) – Off
4. MASTER Switch (BAT) – Off
5. Remove the SD card from the PFD.
6. Power up MFD and PFD1 in Normal mode:
7. STBY BATT Switch – Arm
8. Ensure STBY BATT CB is open
9. AVIONICS Switch (BUS 1 and BUS 2) – On
10. MASTER Switch (BAT) – On
11. Verify the BATT S current indication on the bottom corner of the EIS strip reads 0.0 Amps. If the BATT S current indication does not read 0.0, repeat procedure ensuring all steps have been followed. If the BATT S current indication still does not read 0.0, return the GEA 71 to Garmin for servicing.
12. Power down PFD1 and MFD.
13. AVIONICS Switch (BUS 1 and BUS 2) – Off
14. MASTER Switch (BAT) – Off
15. Close the STBY BATT CB.
16. Turn the STBY BATT switch to off.
17. Email the date of calibration, GEA 71 serial number, engine hours, and value of READING #1 and READING #2 to avionics@garmin.com. Please enter “GEA 71 HSCM Calibration Data” in the subject line, as shown in Figure 5-41.

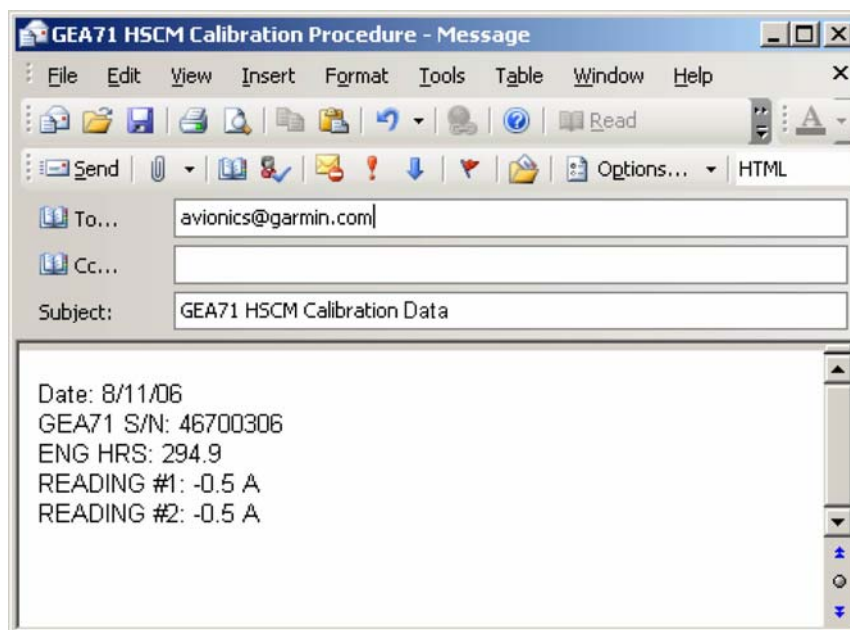


Figure 5-41. Post-Calibration Email Example

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.

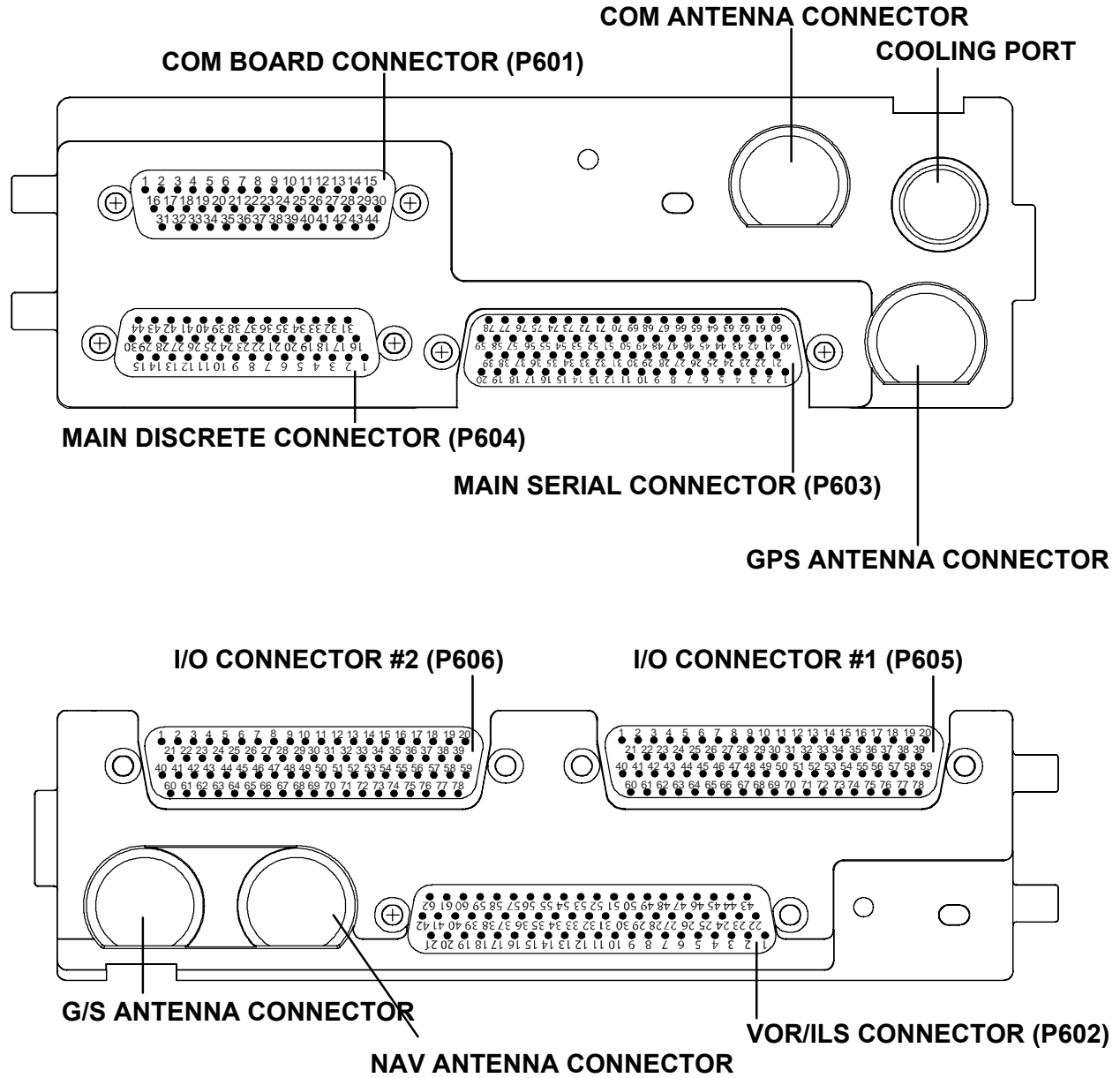


Figure 5-42. GIA 63W Backplate Connectors

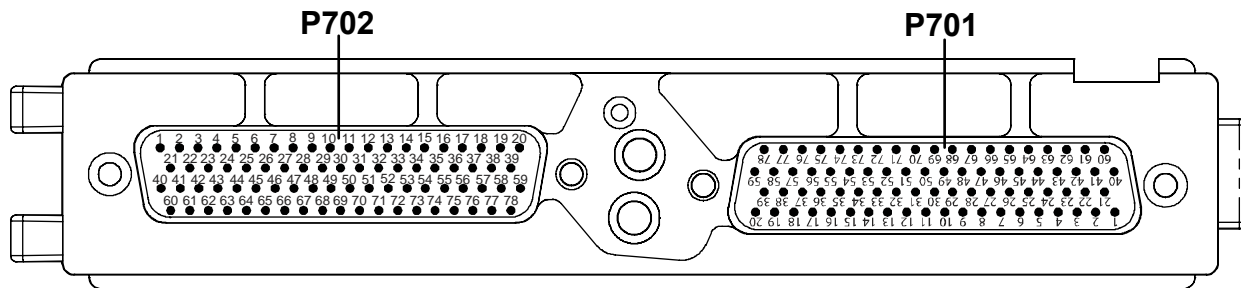


Figure 5-43. GEA 71 Backplate Connectors

NOTE

The GSD 41 Backplate is similar to the GEA 71 Backplate (Figure 5-49). The only difference is the Keyplate (Figure 5-44). The GSD 41 Backplate contains the "B" Keyplate, the GEA 71 Backplate contains the "A" Keyplate. Refer to Figures 5-59 and 5-60, the GSD 41 Installation Manual (P/N 190-00303-00), and the G1000 System Installation Manual (190-00303-00) for more information.

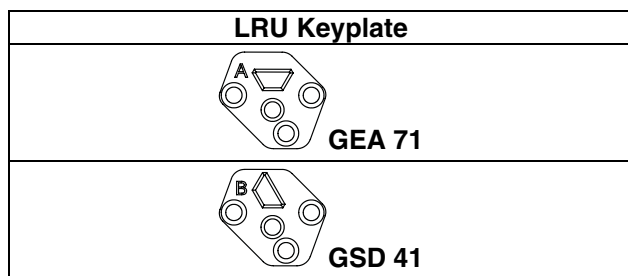


Figure 5-44. GSD 41 Keyplate Information

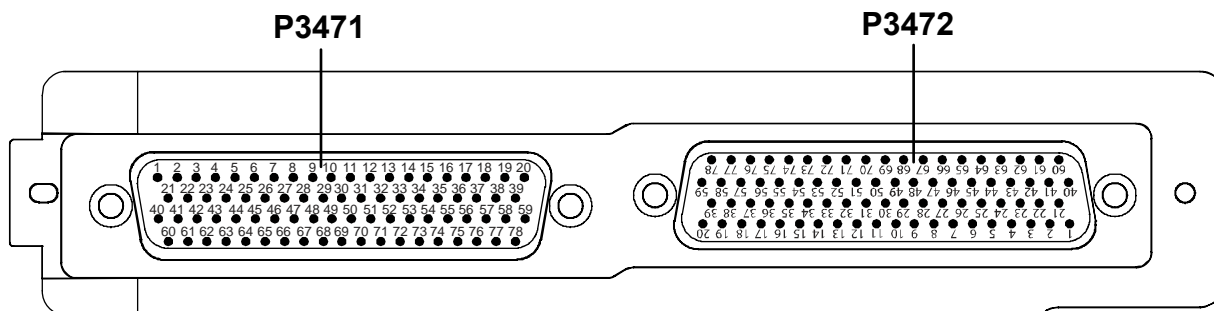


Figure 5-45. GMA 1347D Backplate Connectors

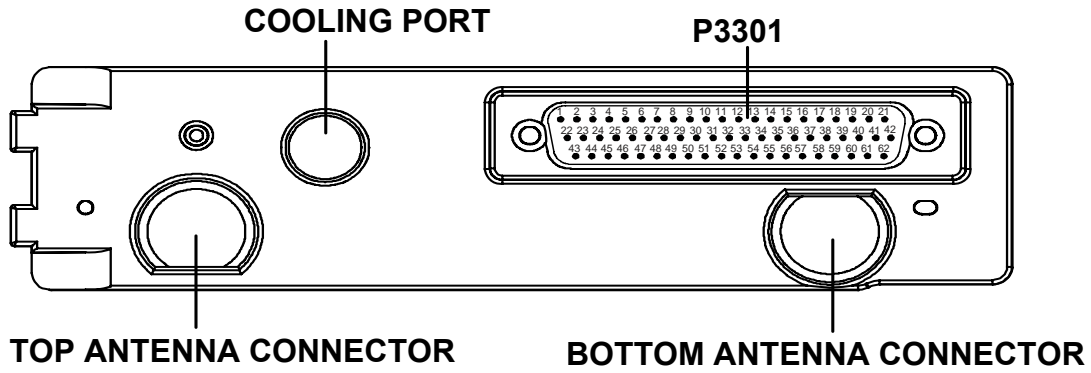


Figure 5-46. GTX 33/33D Backplate Connectors

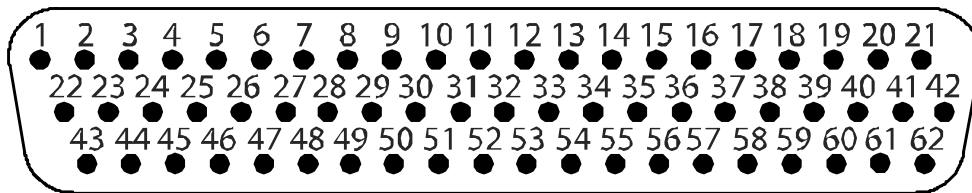


Figure 5-47. GDU 1040A/1500 Backplate Connector (P10001)

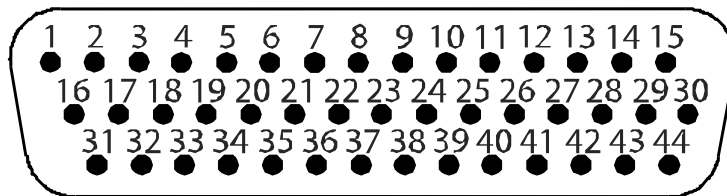


Figure 5-48. GRS 77 Backplate Connector (P771)

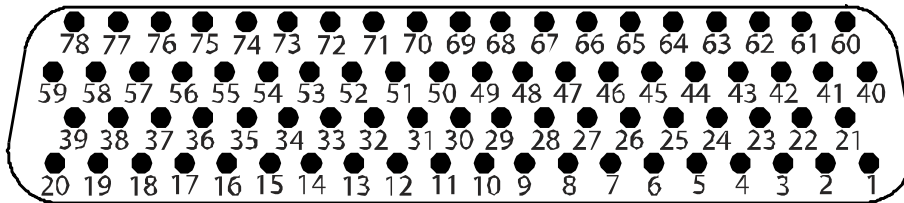


Figure 5-49. GDC 74B Backplate Connector (P741)

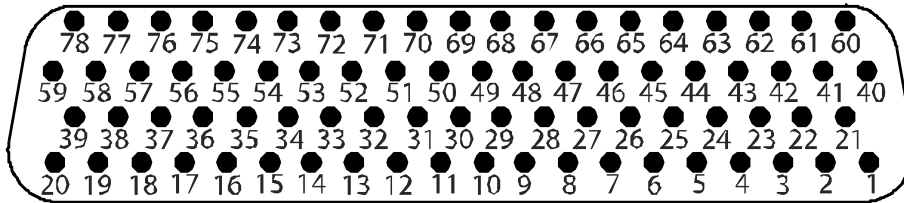


Figure 5-50. GDL 69A Backplate Connector (P691)

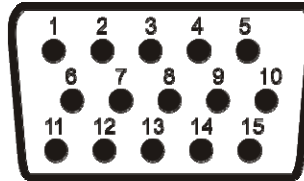


Figure 5-51. GCU 475 Backplate Connector (P4751)

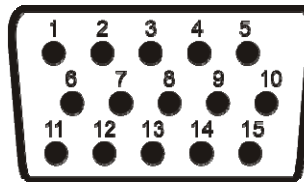


Figure 5-52. GMC 710 or GMC 715 Backplate Connector (P7101)

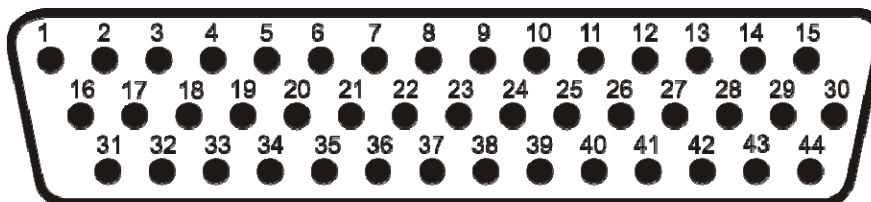


Figure 5-53. GWX 68 Backplate Connector (P400)

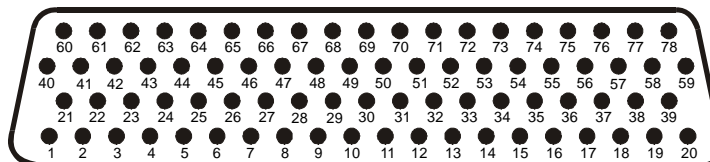


Figure 5-54. GSD 41 Backplate Connector (P411)

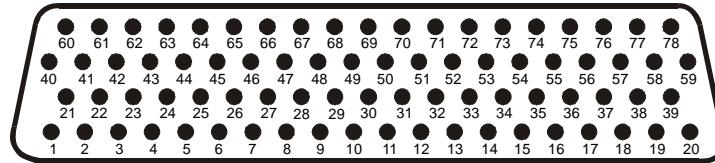


Figure 5-55. GSD 41 Backplate Connector (P412)

SECTION 6

REPLACEMENT PROCEDURES

This section contains replacement procedures for a defective LRU. Replacement of an LRU is on condition of failure. **Verify the LRU software part number and version against the software configuration listed in the required equipment list before removing any LRU.**

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

1. Start the system in configuration mode.
2. The System Status Page (Figure 6-1) shows 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 last software version loaded and verify 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)

6.1 GDU 1xxx

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. Remove the GDU connector from the back of the GDU.
3. Remove and save any SD cards.

To install:

1. Inspect connector(s) for damaged pins.
2. Attach GDU connector into the back of the GDU. **Locking tabs must be engaged on both ends of the connector.**
3. Hold the GDU 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).

6.2 GMA 1347D

To remove:

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 connector(s) for damaged pins.
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 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.

6.3 GIA 63/GIA 63W

To remove:

1. Loosen Phillips screw and 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 unit out of the rack.

To install:

1. Inspect connector(s) for damaged pins.

2. Gently push 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 the lever fails to go down, adjust backplate while engaging unit.
5. Lock the handle into the GIA body and tighten the Phillips screw.

6.4 GRS 77

To remove:

1. Remove the connector from the GRS 77.
2. Loosen four screws holding the unit to the mounting rack (do not loosen mounting rack bolts).

To install:

1. Inspect connector(s) for damaged pins.
2. Fasten unit to mounting rack.
3. Attach connector to the back of the unit. **Verify locking tabs are engaged on both ends of the connector.**

6.5 GMU 44

To remove:

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

To install:

1. Inspect connector for damaged pins.
2. Connect cable making sure it is properly secured.
3. Fasten unit to the aircraft mounting rack.

6.6 GDC 74B

To remove:

1. Loosen two thumb screws securing unit to the mounting rack.
2. Remove connector and pitot-static plumbing from unit.
3. Remove all Teflon tape or sealing compound. **Take care not to allow Teflon tape or sealing compound to fall inside unit.**

To install:

1. Inspect connector(s) and pitot-static plumbing for damage.
2. Install Teflon tape or sealing compound to pitot-static plumbing.
3. Attach connector and pitot-static plumbing to the unit. **Verify locking tabs are engaged on both ends of the connector.**
4. Tighten two thumb screws that secure unit to the mounting rack.

6.7 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 unit out of the rack.

To install:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack and engage the connectors.
3. Push the GEA 71 lever down towards the bottom of the unit avoiding the use of excessive force.
4. If lever fails to go down, adjust backplate while engaging unit.
5. Lock the handle into the GEA 71 body and tighten the Phillips screw.

6.8 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 unit out of the rack.

To install:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack to engage the connectors.
3. Push the GTX 33 lever down towards the bottom of the unit, avoiding the use of excessive force.
4. If lever fails to go down, adjust backplate while engaging unit.
5. Lock the handle into the GTX 33 body and tighten the Phillips screw.

6.9 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 unit out of rack.

To install:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack and engage the connectors.
3. Push the GDL lever down towards the bottom of the unit avoiding the use of excessive force.
4. If lever fails to go down, adjust backplate while engaging unit.
5. Lock the handle into the GDL body and tighten the Phillips screw.

6.10 GDL 90

Refer to the applicable aircraft maintenance manual for removal and installation information.

6.11 GSA 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 or 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.
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.

6.12 GSM 85(A)

To remove:

1. Remove the GSA 81 Servo according to Section 6.10.
2. 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:

Follow the installation instructions in the respective servo installation drawing. If no other maintenance is to be performed, reinstall the servo(s).

6.13 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.

To install:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack to engage the connectors.
3. Push the GSD 41 lever down towards the bottom of the unit avoiding the use of excessive force. If lever fails to go down, adjust backplate while engaging unit.
4. Lock the handle into the GSD 41 body and tighten the Phillips screw.

6.14 GRT 10

To remove:

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

To install:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack and engage the connectors.
3. Push the GRT lever down towards the bottom of the unit avoiding the use of excessive force.
4. If lever fails to go down, adjust backplate while engaging unit.
5. Lock the handle into the GRT body and tighten the Phillips screw.

6.15 GDL59/GSR 56

Refer to the GDL 59 Installation Manual for removal and replacement information (190-00836-00).

6.16 GCU 475/477

The GCU 47X can be integrated into a variety of airframes. Each airframe installation may vary. Refer to the GCU 47X Installation Manual (P/N 190-00303-75) for installation and removal information.

6.17 GMC 710/715

The GMC 7XX can be integrated into a variety of airframes. Each airframe installation may vary. Refer to the GCU 77X Installation Manual (P/N 190-00303-70) for installation and removal information.

6.18 GWX 68

The GWX 68 is located behind the Radome. To expose the GWX 68 Weather Radar RT unit, remove the screws holding the Radome per aircraft manufacturers instructions. **Be careful not to scratch or damage the Radome.**

To remove:

1. Remove the connector on top of the unit
2. Remove the four mounting bolts. Note shims or washers behind each mounting bolt location.

To install:

1. Place the same shims or washers in the same location.
2. Install the bolts.
3. Install the connector.

If the GWX 68 unit is removed and reinstalled, verify GWX 68 unit operation after reinstallation. And, if any work has been done on the aircraft that could affect the system wiring or any interconnected equipment, verify the GWX 68 unit operation.

To verify the operation of the GWX 68, monitor the multi-function display weather depiction page and look for display of weather data. The unit must be checked for clearance in all extreme positions. The wiring harness must be 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.

Special care must be exercised to avoid any contact between any 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.

6.19 GTA 82

To remove:

1. Remove four screws securing the GTA 82 adapter to the panel. Refer to aircraft installation drawings for exact location of the Trim Adapter.
2. Disconnect servo connector.
3. Remove unit.

To install:

1. Set unit in place.
2. Install four screws. Do not over-tighten.
3. Connect servo connector.
4. Load software, load certification gains and test the GTA 82.

6.20 CONFIGURATION MODULE

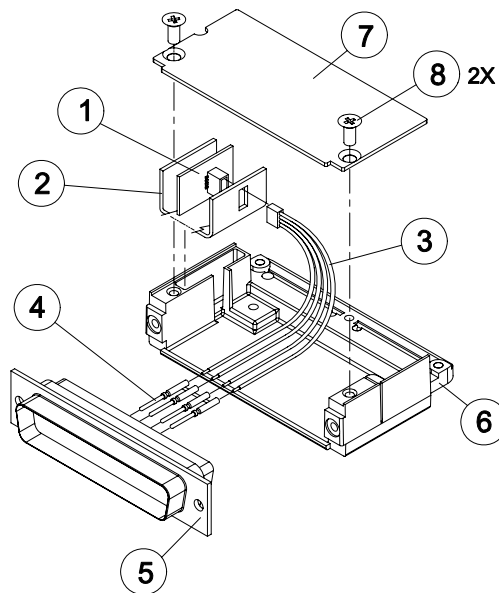


Figure 6-2. Configuration Module

To remove:

1. Remove two screws (item 8) from cover (item 7) and remove cover.
2. Unplug connector from configuration module (item 1).
3. Remove configuration module.

To install:

1. Inspect connector for damaged pins.
2. Place configuration module (item 1) in position.
3. Insert connector into configuration module (item 1).
4. If GRS 77 AHRS configuration module is replaced, proceed to Section 6.6.
5. If GDC 74 configuration module is replaced, proceed to Section 6.5.
6. If master configuration module is replaced:
7. Turn the PFD on in configuration mode (press and hold the ENT key while powering up the unit).
8. Go to the configuration upload page in the system page group.
9. Press the UPDT CFG softkey.
10. If the PFD and master configuration module are replaced, proceed to Section 9.

If the master configuration module is replaced, the G1000 system ID number will change. The Terrain, TAWS unlock, Chartview/Jeppview/FlightCharts 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.

6.21 GEA 71 BACKSHELL THERMOCOUPLE

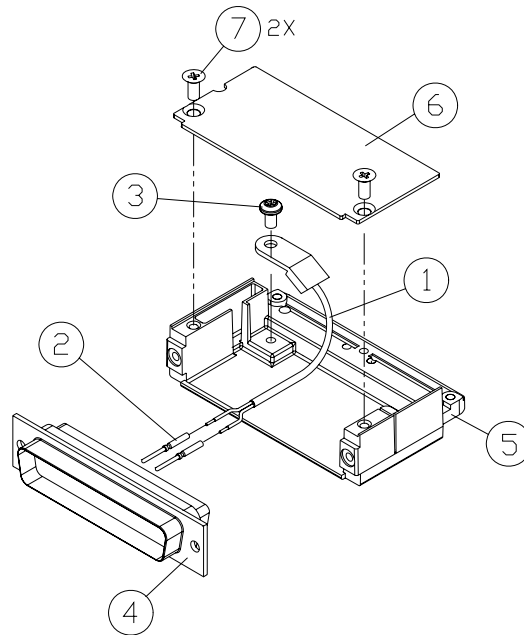


Figure 6-3. GEA 71 Backshell Thermocouple

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

To install:

1. Crimp pins (item 2) onto each of the thermocouples wires (item 1). Ensure that pre-stripped wire length is 1/8" prior to crimping.
2. Insert newly crimped pins and wires into the appropriate connector housing location (item 6).
3. Place 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).
4. Fasten thermocouple tightly to backshell using the provided screw (item 6).
5. Fasten cover (item 6) to backshell using the provided screw (item 7).

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SECTION 7

SOFTWARE INSTALLATION AND TESTING

This section describes how to upload software and configuration files to a replacement LRU. Section 10 explains how to completely reinstall software for the first time after the upload which took place at the time of the original G1000 installation (refer to the installation manual for detailed information).

Before starting a software upload take the following steps:

1. Remove Supplemental Database Cards from the lower slot of all displays before loading software into any unit. Not removing the cards may corrupt them. Replacing corrupted database cards are not covered under warranty. Approved software versions and part numbers can be found in the OEM Maintenance Manual.
2. Garmin recommends the use of SanDisk brand SD cards to load G1000 software and configuration files. If another brand of card is used, and software loading problems occur, replace the card with a SanDisk brand card and reattempt the software load.
3. Connect a ground power unit to the aircraft for software loading. Do not rely on only the aircraft batteries to prevent loss of power during the software loading process. Do not allow power to be removed from the system when loading software. Remove power only when told to do so by the procedure. As a general rule all displays should be in the same mode (configuration or normal), unless instructed differently.

NOTE

Pressing the ENT key will check and uncheck the highlighted configuration box.

7.1 UPLOAD OVERVIEW

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 reinsertion later 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. Unless otherwise specified, insert the G1000 Software Loader Card into the top slot of PFD1.
3. Start the G1000 in configuration mode. Press the NO softkey at the “Do you want to update system files?” prompt.
4. Select the System Upload Page on PFD1 using the FMS knob.
5. Activate the cursor and highlight the appropriate aircraft in the AIRFRAME field.
6. Press the ENT key.
7. Highlight the appropriate aircraft base configuration in the FILE field.
8. Press the ENT key. Press the CLR ALL softkey.
9. Using the FMS knob select the desired software and configuration files to upload.
10. Once the desired files are selected, press the LOAD softkey. After the software and configuration files are loaded, 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.

7.1.1 System Upload Page Softkeys

The following softkeys are available on the System Upload Page:

- CHK ALL – checks all software and configuration files.
- CHK SW – checks all software files.
- CHK CFG – checks all configuration files.
- CLR ALL – clears all checked files.
- LOAD – loads all checked files.

7.1.2 GDU 1xxx

Original Display Reinstalled:

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 as their software and configuration files are deleted during the repair testing process.

Original PFD Displays Installed in Opposite Locations for Troubleshooting:

If the MFD or PFD1 and PFD2 are installed in opposite locations for troubleshooting, no software or configuration loading is required.

New or Repaired Display(s) Installed:

If a new or repaired GDU is installed, the correct software files and Jeppesen aviation database files must be loaded to the unit. See Section 10 for aviation database update instructions.

7.1.2.1 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 may be identified later for reinsertion in the MFD when software and configuration loading are complete. It might contain a FliteChart or Chartview database which is only used in the MFD.
2. Insert the G1000 Software Loader Card into top slot of unit replaced.
3. Power PFD1, PFD2, and the MFD on in configuration mode.
4. Press the YES softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
5. Confirm update completion.
6. Confirm correct software part number and software version on the SYSTEM STATUS page.

7.1.2.2 GDU Configuration

1. Insert the G1000 software loader card into top slot of PFD1.
2. Power PFD1, PFD2, and the MFD on in configuration mode.
3. Press the NO softkey at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. On PFD1, select the system upload page using the FMS knob.
5. Activate the cursor and highlight the appropriate aircraft in the AIRFRAME field.
6. Press the ENT key.
7. Highlight the appropriate aircraft base configuration file in the FILE field.
8. Press the ENT key.
9. Press the CLR ALL softkey.
10. Using the FMS knob highlight the AIRFRAME configuration box and press the ENT key.
11. Press the ENT key to select the SYSTEM, MANIFEST, MFD, PFD1, and PFD2 configuration box.
12. Press the LOAD softkey.
13. View the SUMMARY field and ensure that the load is ‘complete’, then de-activate the cursor.
14. Confirm correct software part number and software version on the SYSTEM STATUS page.
15. After the software and configuration files are loaded, unlock options (TAWS, ChartView, etc.) using the unlock card in the aircraft. Also, config files for optional equipment must be loaded in order for the options to be activated.
16. 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.

7.1.2.3 GDU Testing

If the display is removed or replaced, the following checks are recommended. Start all displays in normal mode. Press the YES softkey to acknowledge the agreement on the MFD. Allow the displays to initialize for approximately one minute. The GRS 77 and GDC 74Bs require longer initialization periods than do the other LRUs. During startup, this causes the attitude, airspeed, and altitude fields to be invalid during the first ~40-60 seconds of PFD power-up.

Check the PFD1/2 and MFD displays for the following:

1. Check that all COM/NAV display fields are valid in the top corners of both PFDs.
2. Check that altitude, airspeed, vertical speed and OAT fields are valid on both PFDs.
3. Check that attitude and heading are valid (unless an AHRS calibration is required).
4. Check that the engine instrument fields are valid on the MFD.
5. Push the red display reversion button on both GMA 1347D #1 and #2. Verify both displays enter reversionary mode (both should have valid altitude, airspeed, vertical speed, and engine instruments).
6. De-activate reversionary mode by pushing the red reversion button.

NOTE

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

7.1.3 GIA 63W**Original GIA 63W(s) Reinstalled:**

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 as their software and configuration files are deleted during the repair testing process.

Original GIA 63W(s) Installed in Opposite Locations for Troubleshooting:

No software loading is required if the original GIA units are installed in opposite locations (GIA1 and GIA2 in opposite unit racks) for troubleshooting. However, the units must be reconfigured.

1. Place all displays in configuration mode.
2. Select the GIA page group on PFD1. With GIA1 displayed in the 'Select Unit' box, press the SET>ACTV softkey.
3. Press ENT to select OK in the 'Activate Parameter Settings' box.
4. Press ENT to select OK when GIA1 configuration is complete. Select GIA2 in the 'Select Unit' box.
5. Repeat steps for GIA2.

Load the following files:

- GIA1 Configuration
- GIA2 Configuration
- GIA Gains
- GIA1/2 Files for optional equipment installed on the aircraft (i.e. ADF, HF radio, TAS, etc.).

New or Repaired GIA 63W(s) Installed:

If a new or repaired GIA is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

- GIA1 Software
- GIA2 Software
- GPS1 Software
- GPS2 Software
- GIA1 Configuration
- GIA2 Configuration
- GIA Gains
- GIA Audio
- GIA1/2 Files for optional equipment installed on the aircraft (i.e. ADF, HF radio, TAS, etc.).

7.1.3.1 GIA Testing

If unit is removed or replaced the following tests are recommended:

GPS Signal Acquisition Test

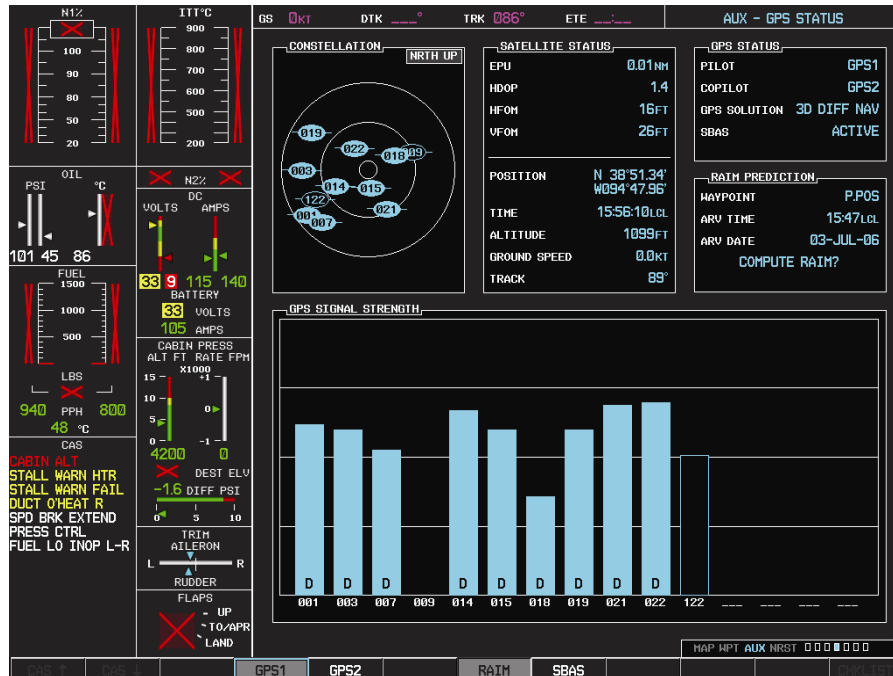


Figure 7-1. AUX-GPS Status Page (Example)

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.

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. Verify that both receivers show 3D Navigation on the MFD.

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 GPS "INTEG" flag is out of view (see Figure 2-1).
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 "INTEG" flag does not come into view 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. On the MFD, select the 4th AUX page.
11. Under the COM CONFIG field, change the COM channel spacing from 25 kHz to 8.33 kHz.
12. Go back to the 3rd AUX page.
13. Select 121.185 MHz on the No. 1 COM transceiver (GIA1).
14. Transmit for a period of 35 seconds while monitoring GPS 1 signal strength levels.
15. During the transmit period, verify that the GPS "INTEG" flag does not come into view on the PFD and verify that GPS 1 does not lose a 3-D navigation solution on the MFD.
16. Repeat steps 14 and 15 while monitoring the GPS 2 (GIA2) signal levels on the MFD.
17. Repeat steps 14 through 16 for each of the following frequencies:
 - 121.190 MHz
 - 130.285 MHz
 - 131.290 MHz
18. Repeat steps 14 through 17 for the No. 2 COM transceiver (GIA2).
19. On the MFD, select the 4th AUX page and change the COM channel spacing back to 25kHz.

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

7.1.4 GMA 1347D

Original GMA 1347D Reinstalled:

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

Original GMAs Installed in Opposite Locations for Troubleshooting:

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

Load the following files:

- GMA1 Configuration
- GMA2 Configuration
- GMA1/2 Files for optional equipment installed on the aircraft (i.e. ADF, HF radio, etc.).

New or Repaired GMA 1347D Installed:

If a new or repaired GMA 1347D is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

- GMA1 Software
- GMA2 Software
- GMA1 Configuration
- GMA2 Configuration
- GMA1/2 Files for optional equipment installed on the aircraft (i.e. ADF, HF radio, etc.).

GMA Testing

If unit is removed or replaced the following tests are recommended:

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.

Plug in headsets at each ICS position.

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

Transceiver Operational Check

Perform a ramp test radio check by exercising the installed transceivers, microphone, microphone key and audio over the headphones and speaker. Verify that communications are clear and PTT operation is correct for each pilot position.

Select the audio source corresponding to each installed avionics unit (i.e. NAV1, NAV2, COM1, COM2) and check for audio over the headsets.

- Press the SPKR key and verify that the selected audio is heard over the speaker.

Failsafe Operation Check

GMA 1347D #1:

Turn the GMA 1347D #1 off by pulling the GMA 1347D #1 circuit breaker. This directs all COM 1 phone audio, MIC audio and MIC key to the pilot's position.

1. Check the failsafe operation by exercising 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.
2. Close the GMA 1347D #1 circuit breaker to continue testing.

GMA 1347D #2:

Turn the GMA 1347D #2 off by pulling the GMA 1347D #2 circuit breaker. This directs all COM 2 phone audio, MIC audio and MIC key to the co-pilot's position.

1. Check the failsafe operation by exercising 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.
2. Close the GMA 1347D #2 circuit breaker to continue testing.

Marker Beacon Test

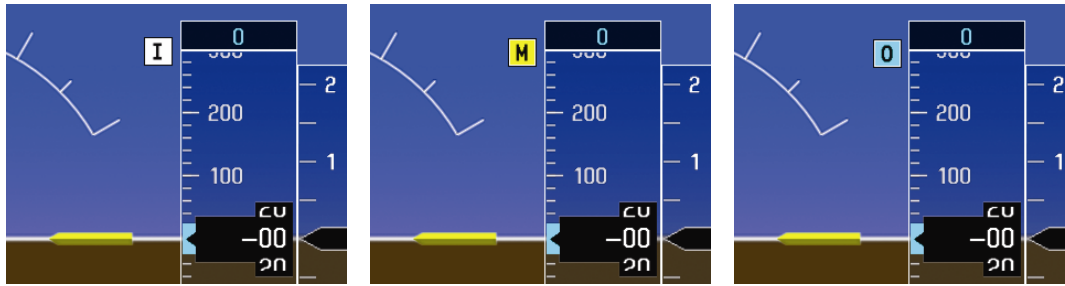


Figure 7-2. Marker Beacon Symbology

Using a ramp tester, simulate the outer marker, middle marker and inner marker signals by following the test equipment manufacturer's instructions. Verify that each marker audio signal is present over the headphones and speaker. 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 7-1. Operate the MKR MUTE key on the GMA 1347D and ensure that the audio signal is muted.

7.1.5 GRS 77/GMU 44

Original GRS 77 Reinstalled:

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

Original GRS 77s Installed in Opposite Locations for Troubleshooting:

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.

New or Repaired GRS 77 Installed:

If a new or repaired GRS 77 is installed, load the following file after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

GRS Software

New GRS 77 Configuration Module Installed:

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

Original GMU 44 Reinstalled:

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

Original GMU 44s Installed in Opposite Locations for Troubleshooting:

No software loading is required if the original GMU units are installed in opposite locations (GMU #1 and GMU #2 in opposite unit racks) for troubleshooting. However, the Magnetometer Calibration Procedure is required.

New or Repaired GMU 44 Installed:

If a new or repaired GMU 44 is installed, load the following file after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

GMU Software

GRS/GMU Calibration

System Software for certain VLJ 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.

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)

- a. Pitch/Roll Offset, Manual Entry (Procedure A2)
- b. Magnetometer Calibration, (Procedure B)

- c. Heading Offset Compensation, (Procedure C)
- d. Engine Run-Up Vibration Test, (Procedure D)
- e. Magnetometer Interference Test, (Procedure E)

NOTE

Procedures A2 and C are not required and should not be performed on certain aircraft.

When ready to perform the procedures, shut both PFDs and MFD off 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 (same serial number)	None Required		

Procedure A1: Pitch/Roll Offset Calibration

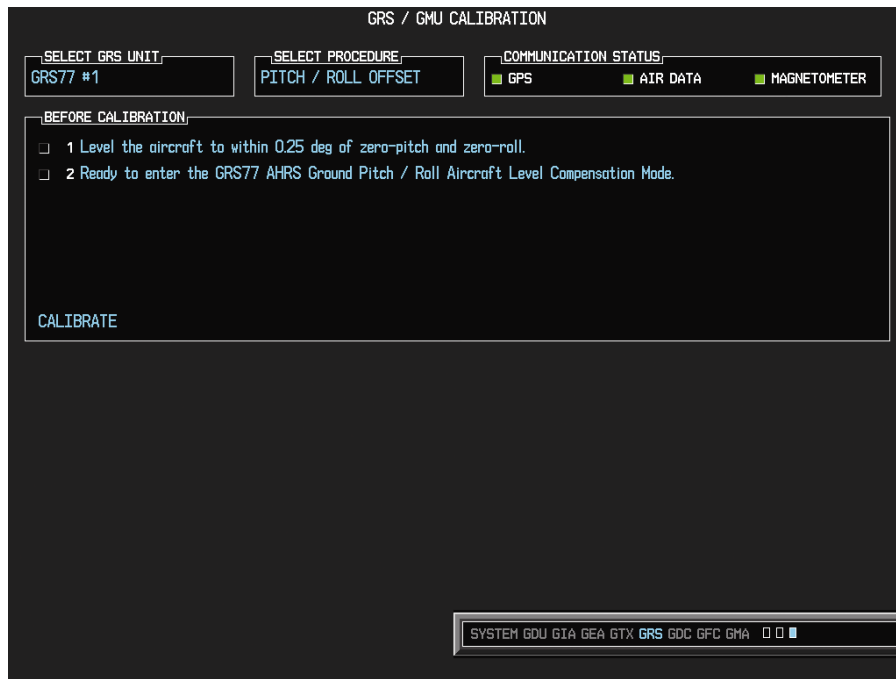


Figure 7-3. Pitch/Roll Offset

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.
2. Initiate the AHRS Ground Pitch/Roll Aircraft Level compensation mode by performing the following steps:
 - a. Enter Configuration Mode and go to GRS/GMU CALIBRATION page as shown in Figure 7-3.
 - b. This page is protected and requires a keystroke password to perform the calibration. Press the following softkeys in sequence:
 1. Softkey 9
 2. Softkey 10
 3. Softkey 11
 4. Softkey 12

- c. Ensure that the No. 1 GRS 77 is selected.
- d. Select PITCH/ROLL OFFSET, then press the ENT key.
- e. 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.
- f. 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.
- g. 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.
- h. Press the ENT key on the PFD. Repeat steps 1 through 4 for GRS 77 #2.

Procedure B: Magnetometer Calibration

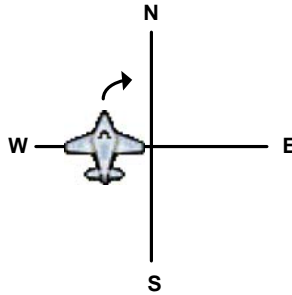


Figure 7-4. Magnetometer Calibration

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. Calibration Procedure B must be carried out on a calibrated compass rose 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 magnetically clean compass rose. 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 to be performed.

See figure below:



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

NOTE

This procedure provides instructions for calibrating both GRS 77 magnetometer's separately. It is acceptable to calibrate both GRS 77 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.

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.

11. 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.”

12. Repeat the turn-and-stop process until the PFD instructs the operator that a successful calibration is complete.
13. Press the ENT key on the PFD.
14. Repeat steps 1 through 13 for GRS 77 #2.

Procedure D: Engine Run-Up Vibration Test

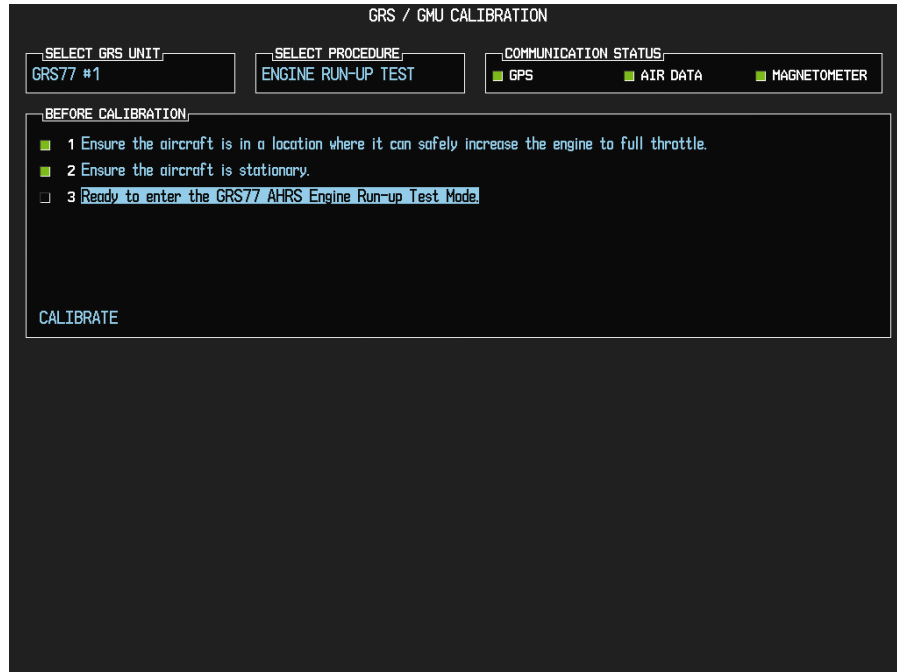


Figure 7-5. Engine Run-Up

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. 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. 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:

- a. Excessive flexibility of GRS77 and/or GMU44 mechanical mounting with respect to airframe.
- b. Vibrational motion of GRS77 and/or GMU44 caused by neighboring equipment and/or supports.
- c. Mounting of GRS77 at a location that is subject to severe vibrations (for example, close to an engine mount.)
- d. Mounting screws and other hardware for GRS77 and/or GMU44 not firmly attached.
- e. Absence of mounting supports recommended by the aircraft manufacturer.
- f. GRS77 connector not firmly attached to unit.
- g. Cabling leading to GRS77 or GMU44 not firmly secured to supporting structure.
- h. 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.

1. Press the ENT key on the PFD.
2. Repeat steps 1 through 6 for GRS 77 #2.

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.

Procedure E: Magnetometer Interference Test

This procedure validates that no electronic device is interfering with the operation of the GMU 44 magnetometer which directly impacts 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.

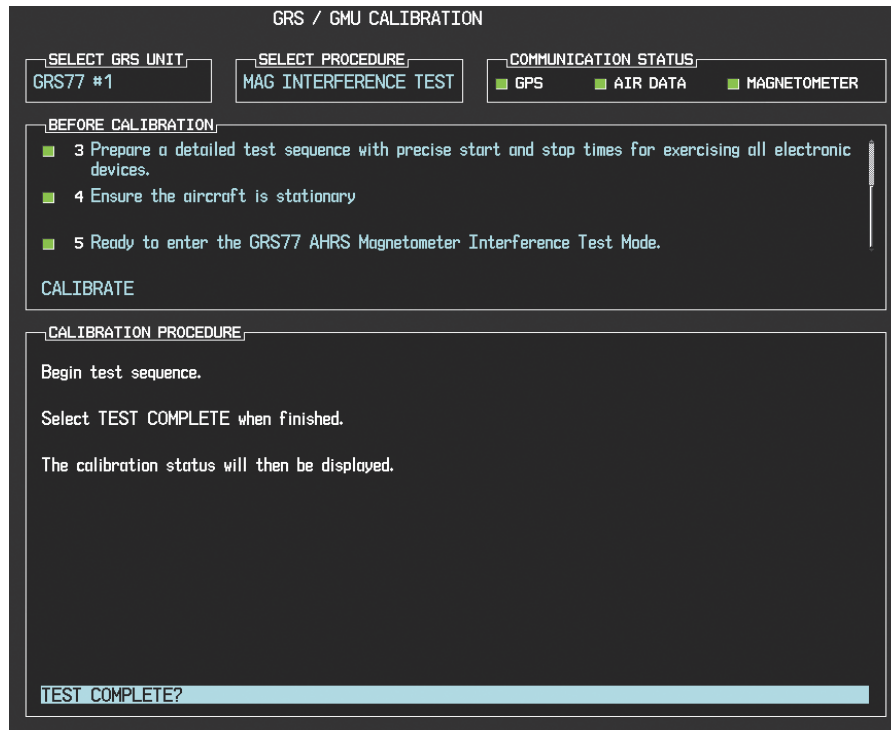


Figure 7-6. Magnetometer Interference

1. Enter Configuration Mode and go to GRS/GMU Calibration page as shown in Figure 7-6.
2. This page is protected and requires a keystroke password to perform this test. Press the following softkeys in sequence: 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 exercising 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 (example)

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)
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.

NOTE

Two common reasons for a failed magnetometer interference test are: 1) new equipment is installed in close proximity to the GMU 44 magnetometer, and 2) 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.

Press the ENT key on the PFD to conclude this procedure.

Test

Verify attitude and heading, on PFD in normal mode.

7.1.6 GDC 74B

Original GDC 74B Reinstalled:

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

Original GDC 74B(s) Installed in Opposite Locations for Troubleshooting:

If the original GDC 74B #1 and GDC 74B #2 are installed in opposite locations for troubleshooting, configuration loading is required. Load the following files:

GDC1 Configuration

- GDC2 Configuration

New or Repaired GDC 74B Installed:

If a new or repaired GDC 74B is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

GDC1 Software

- GDC2 Software
- GDC1 Configuration
- GDC2 Configuration

New GDC 74B Configuration Module Installed:

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

Load the following files:

- GDC1 Configuration
- GDC2 Configuration

NOTE

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

7.1.6.1 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 pitot and static ports together, using either the pressure control system or external plumbing, so long as the leak specification of step 5 is met.

NOTE

Allow the unit to warm up for 15 minutes before performing the following tests.

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. PFD1 must be in Configuration mode and the MFD must be in Reversionary mode for performing the tests as outlined in Part 43 Appendix E.

To prepare the G1000 System for Part 43 Appendix E testing:

Start the G1000 system in normal mode.

1. Remove power to PFD1.
2. Turn PFD1 on in Configuration mode by pressing and holding the ENT key on PFD1 while applying power.
3. Release the ENT key after "INITIALIZING SYSTEM" appears in the upper left corner of PFD1.

NOTE

Configuration mode contains certain pages and settings that are critical to aircraft operation and safety. These pages are protected and cannot be modified. However, most protected pages are viewable to allow system awareness for troubleshooting.

Using the FMS knob on PFD1 turn to the GRS page group. Use the B ALT field for all CFR Part 43 Appendix E tests for G1000 altitude.

4. Place the MFD in Reversionary mode by pressing the red “display backup” button on the GMA 1347D Audio Panel #1. The baro setting can then be read from the MFD for CFR Part 43 Appendix E tests.

NOTE

The baro setting on the MFD is controlled by PFD1. The baro setting will apply to both GDC 74B #1 and GDC 74B #2 regardless of the GDC 74B selected on the MFD. The copilot’s display can be ignored.

After completing the tests specified by § 91.411 and Part 43 Appendix E, return both the MFD and PFD1 to normal mode.

NOTE

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

Pitot/Static Airspeed Test

1. Command air data test set (ADTS) to simulate air speeds shown in the table below.
2. Wait for ADTS to report that target values have been achieved.
3. Verify that computed air speeds shown on the PFD are within the tolerances specified in the OEM maintenance documentation.

Static Port Vertical Speed (Rate of Climb) Test

1. Command ADTS to change the altitude at the rates shown in the table below.
2. Wait for ADTS to report that target rates have been achieved.
3. Verify that the Rate of Climb reported by the Vertical Speed field on the PFD is within the tolerances specified in the table below:

Vertical Speed, feet/minute	Allowed tolerance, ±feet/minute
2000	100
0	45
-2000	100

7.1.7 GEA 71

Original GEA 71 Reinstalled:

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

Original GEA 71s Installed in Opposite Locations for Troubleshooting:

No software loading or configuration is required if the original GEA units are installed in opposite locations (GEA #1 and GEA #2 in opposite unit racks) for troubleshooting. Load the GEA1 and GEA2 Configuration files.

New or Repaired GEA 71 Installed:

If a new or repaired GEA 71 is installed, load the following files after removing the Supplemental Database cards from the bottom slots of each display:

- GEA1 Software
- GEA2 Software
- GEA1 Configuration
- GEA2 Configuration

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. Reinstall all the cards after the software and configuration file loads are complete.

7.1.7.1 GEA 71 Testing

If unit is removed or replaced the following tests are recommended:

Each GEA 71 sensor input must be checked with the aircraft engine off. Verify all engine information systems are valid on the MFD, and no GEA 71 related alerts appear on the PFD. Exercise and test all discrete, analog, and/or digital inputs and check for appropriate responses.

7.1.8 GTX 33/33D

Original GTX Reinstalled:

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

New or Repaired GTX Installed:

If a new or repaired GTX is installed, load the following files after removing 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 in the MFD. Reinstall all the cards after the software and configuration file loads are complete.

GTX1 Software

- GTX2 Software
- GTX1 Configuration
- GTX2 Configuration

After loading software and configuration files, turn to the Transponder Configuration page and enter the Registration (Address) and Flight ID numbers.

7.1.8.1 GTX 33/33D Testing

If unit is removed or replaced the following tests are recommended:

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

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. Refer to Title 14 CFR Part 43 Appendix F for testing criteria.

7.1.9 GDL 69A

Original GDL 69A Reinstalled:

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

New or Repaired GDL 69A Installed:

If a new or repaired GDL 69A is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

- GDL Software
- GDL Configuration
- If a GA37 Antenna is installed, load the optional GA37 Antenna file.

NOTE

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

7.1.9.1 GDL 69A Testing

Verify the desired services are activated on the AUX-XM page.

7.1.10 GSA 80/81

Original Servo(s) Reinstalled:

If the removed servo(s) are re-installed (same serial numbers), no software loading is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process.

New or Repaired Servo(s) Installed:

If a new or repaired GSA 80/81 servo is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

GSA Pitch

- GSA Pitch TR
- GSA Roll
- GSA Yaw
- GSA Pitch Gains
- GSA Pitch TR Gains
- GSA Roll Gains
- GSA Yaw Gains

7.1.10.1 GSA 80/81 Testing

The following procedure will verify the proper operation of the GFC 700 AFCS. The technical performing these checks must be thoroughly familiar with the GDC 700, refer to the applicable Garmin G1000 Cockpit Reference Guide.

Autopilot Pre-Flight Test

NOTE

The autopilot pre-flight test will run on every full autopilot power-on.

1. After powering up the system in normal mode, open the AP SERVOS circuit breaker and rest. The AFCS will re-initiate the pre-flight test.

NOTE

A red AFCS annunciation will be displayed until both GIAs, the AHRS, and the autopilot servos are online.

2. Verify that a white 'PFT' annunciation is displayed on the PFD.
3. Upon successful completion of the test approximately 10 to 15 seconds, the autopilot disconnect aural alert will sound and the annunciation will clear.

NOTE

If the 'PFT' annunciation turns red, the test has failed and additional troubleshooting will have to be performed prior to continuing the test.

4. 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. Engage the autopilot by pressing the AP key on the GMC 710.
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 will be heard and a flashing amber "AP" and "YD" will be 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" will be 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 will be replaced by a green "AP." The autopilot should hold the control wheel in its present attitude.
10. Press the AP DISC switch. The autopilot should command a normal disengagement. A single disconnect tone will be heard and a flashing amber "AP" will be visible on the PFD.
11. Verify the control yoke is free in pitch and roll axes.
12. Engage the autopilot again by pressing the AP key on the GMC 710.
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 pre-flight 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 710 twice to deactivate the Go Around mode and reset the flight director. Green “PIT” and “ROL” annunciations and the flight director command bars will be 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 710.
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

1. Run MET in one direction until it runs against the stop.
2. Using a stop watch or equivalent device, time the trim speed from one end of travel to the opposite stop. The elapsed time should measure 20 ± 5 seconds for each direction.

Autopilot Operation Checks

Push the HDG knob in to synchronize the heading bug to the present aircraft heading on the HSI.

1. Engage the Autopilot and Yaw Damper by pressing the AP key on the GMC 710.
2. 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).

3. 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).
4. 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).
5. 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.
6. Release the CWS button. Verify that the Autopilot clutches re-engage and hold the wheel stationary.
7. Holding the control wheel lightly, turn the NOSE UP wheel on the GMC 710, to increase the pitch reference. Verify that the command bars move up approximately 1/2 degree and the control wheel begins moving aft.
8. Hold the control wheel and press the CWS button, re-synchronizing the pitch reference and re-centering the control wheel.
9. Release the CWS button and verify that servo clutches re-engage before releasing the control wheel.
10. Turn the NOSE DN wheel on the GMC 710. Verify that the command bars command down and the control wheel begins moving forward.
11. Hold the controls and press CWS to re-center the command bars and stop control wheel movement.
12. With the Autopilot still engaged and the CWS button pressed, move the control wheel to its aft limit.
13. 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.
14. Grip the control wheel and press the CWS button. Trim motion should stop.
15. Move the control wheel to the forward limit and release the CWS button.
16. Slowly pull back on the control wheel. After a similar delay, the trim wheel should begin to trim down.
17. Relieve pressure on the wheel and the trim motion should stop. Verify that the trim wheel is free to turn.
18. Hold the control wheel and press the AP DISC switch to disconnect the autopilot.
19. Engage VS mode by pressing the VS key on the GMC 710. Verify the PFD display ‘VS’ in green and indicates a pitch reference of ‘0 FPM’.
20. Press the FLC key on the GMC 710 and verify that “FLC” is annunciated on the PFD in green.
21. Press the ALT key on the GMC 710 and verify that the “ALT” annunciation is displayed in green on the PFD.
22. Press the FD key and verify that the mode annunciations and command bars are removed from the display.
23. Press the YD key and verify that the “YD” annunciation is displayed in green on the PFD.

24. Press the rudder pedals and verify that the yaw servo is resisting movement of the rudder pedals.
25. Press the AP DISC button and verify that a flashing yellow “YD” annunciation is displayed on the PFD.
26. Verify that the rudder pedals move freely.

7.1.11 GCU 475 or GCU 477

Original GCU 475 or GCU 477 Reinstalled:

If the GCU 475 or GCU 477 that was removed is re-installed (same serial number), no software loading or configuration is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process.

New or Repaired GCU 475 or GCU 477 Installed:

If a new or repaired GCU 475 or GCU 477 is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

- GCU Software
- GCU Configuration

7.1.11.1 GCU 475 or GCU 477 Testing

Testing consists of performing a basic operational check.

7.1.12 GMC 710 or GMC 715

Original GMC 710 or GMC 715 Reinstalled:

If the removed GMC 710 or GMC 715 is re-installed (same serial number), no software loading or configuration is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process.

New or Repaired GMC 710 or GMC 715 Installed:

If a new or repaired GMC 710 or GMC 715 is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

- GMC Software
- GMC Configuration

7.1.12.1 GMC 710 or GMC 715 Testing

Perform a basic operation check on the GMC 710.

7.1.13 GWX 68

Original GWX 68 Reinstalled:

If the removed GWX 68 is re-installed (same serial number), no software loading or configuration is required. This does not include units that were returned for repair as their software and configuration files are deleted during the repair testing process.

New or Repaired GWX 68 Installed:

If a new or repaired GWX 68 is installed, load the following files after removing 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. Reinstall all the cards after the software and configuration file loads are complete.

- GWX Software
- GWX Configuration

7.1.13.1 GWX 68 Testing

Operation of the GWX 68 Weather Radar is accomplished using the MFD/GCU 475. Refer to the applicable G1000 Cockpit Reference Guide for basic operation. Perform a basic operation check on the weather radar.

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.

G1000/GWX 68 Pitch and Roll Trim Adjustments

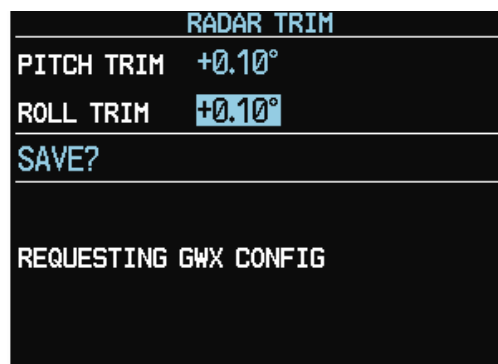


Figure 7-7. Radar Trim Window

The following procedure assumes the correct configuration data files have been loaded and the G1000 is in normal operating mode.

1. On the PFD press the following softkey sequence: 11, 11, 1, 1, 2.
2. The Radar Trim window will now appear (see Figure 7-7).
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 ± 4.00°. 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.

SECTION 8

RETURN TO SERVICE TESTING

The return to service test procedures described in this section check various secondary communications 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 any G1000 LRU.

1. Start the G1000 system 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.

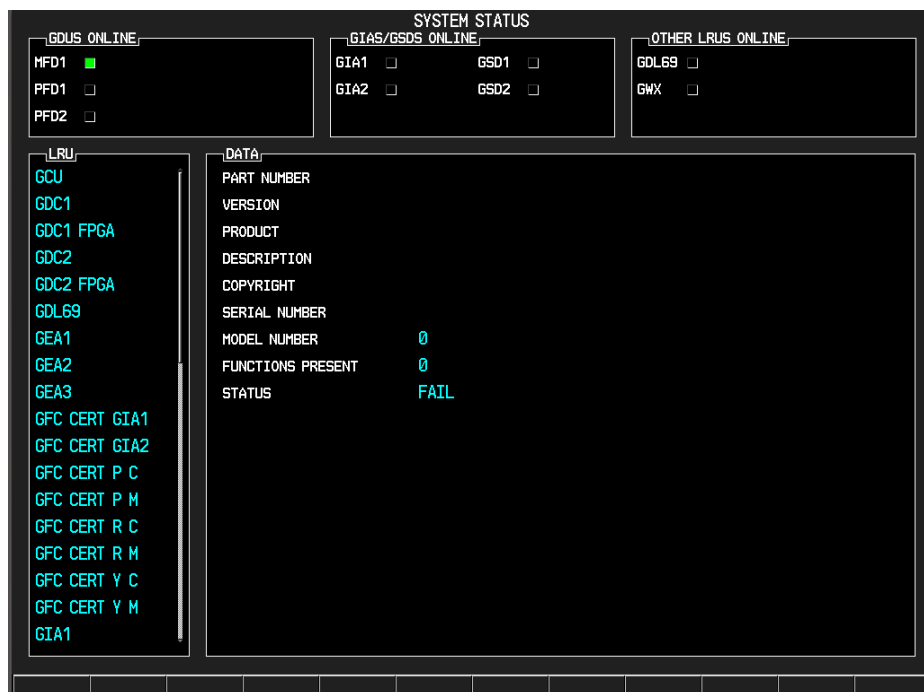


Figure 8-1. System Status Page (Configuration Mode)

8.1 WAAS GPS TEST

TEST	DESIRED RESULT
<p>Single GPS Failure Conditions:</p> <ol style="list-style-type: none"> 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. 	<p>GPS Failure - For each of the specified GPS failure conditions, the following should remain valid on the PFD throughout the procedure:</p> <ol style="list-style-type: none"> a. Attitude and Heading from AHRS. b. Airspeed, Altitude, Vertical Speed, and OAT from Air Data Computer. c. GPS CDI remains valid on PFD. d. "BOTH ON GPS1" or "BOTH ON GPS2" reversionary sensor annunciations appear on both PFDs.
<p>Dual GPS Failure Conditions:</p> <ol style="list-style-type: none"> 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 re-acquire satellite signals before continuing. 	<p>Dual GPS Failure - For a dual GPS failure, the following will occur:</p> <ol style="list-style-type: none"> a. GPS CDI flags INTEG on PFD. b. Attitude and Heading remain valid from AHRS. c. Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer.

8.2 GIA TEST

TEST	DESIRED RESULT
<p>Single GIA Failure Conditions:</p> <ol style="list-style-type: none"> 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. 	<p>GIA 1 Failure - For a GIA 1 failure, only the following should flag invalid:</p> <ol style="list-style-type: none"> a. COM/NAV 1 field. b. NAV 1 CDI loses deviation bar. c. GIA 2 Power Failure - For a GIA 2 failure, only the following should flag invalid: <ul style="list-style-type: none"> • COM/NAV 2 field. • NAV 2 CDI loses deviation bar.
<p>Dual GIA Failure Conditions:</p> <ol style="list-style-type: none"> 1. Remove power from both GIA units. 2. Check for desired results. 3. Restore power to both GIA units. 	<p>Dual GIA Failure – For a dual GIA failure, only the following should occur:</p> <ol style="list-style-type: none"> a. COM/NAV 1 & COM/NAV 2 fields flag invalid. b. GPS CDI flags INTEG on PFD. c. NAV 1, 2 CDI loses deviation bar. d. XPDR field flags invalid on PFD. e. Engine Instrument field flags invalid on MFD. f. All AHRS & ADC fields valid.

8.3 DISPLAY TEST

TEST	DESIRED RESULT
<p>MFD Display Failure Conditions:</p> <ol style="list-style-type: none"> 1. Open MFD CB. 2. Verify desired results. 3. Close MFD CB. 	<p>The following shall occur when power is removed from the MFD:</p> <ol style="list-style-type: none"> a. MFD goes blank. b. All PFD1 and 2 primary flight information is retained. c. 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. d. XPDR 1/2 fields remain valid and XPDRs can be adjusted via PFD softkeys.
<p>PFD2 Display Failure Conditions:</p> <ol style="list-style-type: none"> 1. Open PFD 2 CB. 2. Verify desired results. 3. Close PFD 2 CB. 	<p>The following shall occur when power is removed from PFD2:</p> <ol style="list-style-type: none"> a. PFD2 goes blank. b. PFD1 and MFD remain in normal display formats. The following illuminate on PFD1: <ul style="list-style-type: none"> • 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 c. GMA2 Fail – GMA2 is inoperative. d. XPDR2 Fail – XPDR2 is Inoperative.
<p>PFD1 Display Failure Conditions:</p> <ol style="list-style-type: none"> 1. Open PFD 1 PRI and PFD1 SEC circuit breakers. 2. Verify desired results. 3. Close PFD 1 PRI and PFD1 SEC circuit breakers. 	<p>The following shall occur when power is removed from PFD1:</p> <ol style="list-style-type: none"> a. PFD1 goes blank. b. PFD2 and MFD remain in normal display formats. The following illuminate on PFD2: <ul style="list-style-type: none"> • 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 c. GMA1 Fail – GMA1 is inoperative. d. 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: a. MFD switches to reversion mode. b. Attitude and Heading remain valid from AHRS. c. Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer. d. Engine Instrumentation flags invalid. e. 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: a. MFD switches to reversion mode. b. Attitude and Heading remain valid from AHRS. c. Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer. d. Engine Instrumentation flags invalid. e. 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 extents 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 MAINTENANCE RECORDS

After conducting the function check flight in accordance with the Airplane Maintenance Manual, the aircraft may be returned to service. 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.

SECTION 9

PERIODIC MAINTENANCE

This section contains periodic maintenance procedures for the G1000. Removal and replacement of an LRU is on condition of failure. The procedures in this section do not pertain to any specific aircraft configuration. For actual aircraft maintenance requirements refer to the OEM approved aircraft maintenance documentation.

9.1 SERVICE TIMER

The G1000 stores an airframe time-in-service timer and displays this time on the MFD EIS window. To access the timer, press the ENGINE softkey, then press the SYSTEM softkey. Airframe total time in service is determined by on-ground and off-ground states within the G1000. When the aircraft is determined to be airborne, the timer starts.

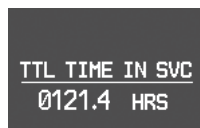


Figure 9-1. Total Time In Service

9.2 MAINTENANCE INTERVALS

Refer to the OEM maintenance documentation for maintenance tasks that are required to be performed at certain intervals.

9.3 RECOMMENDED TOOLS

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

- Voltmeter capable of measuring 0-32 Volts DC
- 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 for Mode S transponder equipped aircraft
- 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 (T01-00110-01)

9.4 GENERAL MAINTENANCE PROCEDURES

Pitot/Static Leak Test

Before starting the pitot static test, allow the GDC 74B to operate at least 15 minutes according to Garmin Service Advisory 0608. Perform a pitot/static leak test as described in Title 14 CFR §§ 91.411 and Part 43 Appendix E.

Altimeter (GDC 74B & PFD)

Per 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 74(X) are not susceptible to these types of errors. Refer to section 9.9.

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 and 91.413 as well as Part 43 Appendix F.

GRS 77 Earth Magnetic Field Updates

The GRS 77 utilizes 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 for periodic maintenance information (P/N 560-1049-02).

GSA 8(X) Servos

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

GSM 85(A) Servo Gearbox

Conduct a visual inspection and check slip clutches once every 12 months.

9.5 GFC 700 VISUAL INSPECTION PROCEDURE

1. Remove the access panels according to OEM maintenance documentation.
2. Inspect the servos, connectors, support structures, and control cables to ensure that no corrosion, chaffing, cracks, or other defects 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. Ensure there is no binding in the control cabling, and that the capstan pulleys rotate freely.
4. Check the servo control cables to ensure 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 ensure no chaffing, wear, or other damage exists.

NOTE

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

9.6 GSA 8(X) GREASING PROCEDURE

NOTE

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.

1. Remove each servo.
2. Remove excess grease build-up from the single servo output gear using a lint-free cloth.
3. Apply a thin coat of grease to the servo output gear using a brush or other applicator (see note above).
4. Re-install the servos.
5. Rotate control surfaces through their range of motion to ensure freedom of movement.

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

Refer to the OEM Maintenance documentation for rigging and de-rigging 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.

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

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, as well as 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, these values will be lost. The test values are not lost when changing configuration mode pages on PFD1.

NOTE

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

NOTE

Refer to Section 5 for a detailed explanation of the GFC Status Page (Figure 9-2).



Figure 9-2. 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 (Figure 9-x). 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:
 - a. CLUTCH [PIT/ROL/YAW] PASS
 - b. 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 per the in Section 9.7.
16. Record whether the test result (pass or fail, from the CAS messages displayed on the MFD) and the clutch measurement values (from PFD1) in Table 9-2, or in appropriate aircraft maintenance records.
17. Repeat this 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) Units 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) Units 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) Units 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) Units 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

9.8.1 Abnormal Test Message Prompts

The following prompts may be displayed indicating an abnormality encountered during testing. Use the following guidelines to troubleshoot the problem.

Message Prompt	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.	<ol style="list-style-type: none"> 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.	<ol style="list-style-type: none"> 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	<p>The servo detected an average torque value which fell below 70% of the established mechanical torque limit after detecting that the stop was reached.</p> <p>Likely causes include a low slip clutch setting or a disturbance in the controls before reaching the stop.</p>	Repeat test again. 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)	<ol style="list-style-type: none"> Repeat test again. If the same result is received, remove servo mount and check/set clutch on stand.

TEST SPEED FAIL	Servo has not responded to the test initialization command.	<ul style="list-style-type: none"> a. Repeat test again. b. If message does not clear, troubleshoot the servo and it's wiring for the source of the failure. c. 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 test.
AIRBORNE STATUS	The G1000 system has detected airborne status, (determined by true airspeed) and has cancelled the test.	<ul style="list-style-type: none"> a. Verify the ADC is online. b. Check pitot/static system is free of obstructions and plumbing kinks. c. Repeat test.

9.9 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	$x \leq 40$	No Action
	$40 < x \leq 120$	Use Field Calibration Tool
	$120 < x$	Replace Unit
35,000	$x \leq 40$	No Action
	$40 < x \leq 120$	Use Field Calibration Tool
	$120 < x$	Return Unit to Garmin
41,000	$x \leq 40$	No Action
	$40 < x \leq 120$	Use Field Calibration Tool
	$120 < x$	Return Unit to Garmin

9.10 CATEGORY B LONG TERM POWER INTERRUPT ANNUAL INSPECTION PROCEDURE

NOTE

Loading “GDU Backup Cap Test Software” (006-B0380-15) to the GDUs temporarily changes the GDU software version. It is required to return the system to the currently approved system software version and configuration following the Long Term Power Interrupt Test.

1. Before beginning the Category B Long Term Power Interrupt Annual Inspection Procedure, the test software “GDU Backup Cap Test Software (006-B0380-15)” must be downloaded from the Garmin website:
2. Access the Dealer Resource portion of the Garmin website (www.garmin.com).
3. From the Technical Resource list, click on the “GDU Backup Cap Test Software (006-B0380-15)” link. Extract the files onto a blank SD card.
4. Remove the Supplemental Data Card from the lower slot of the GDU before loading any software. Supplemental Data Cards left inserted can become corrupt, making them unusable. Replacing corrupt cards is not covered under warranty.
5. Insert the SD card containing the test software into the top slot of the MFD.
6. Power the MFD on 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).
7. Press the ENT key at the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
8. Press the ENT key to confirm software update completion.
9. Remove the SD card from the MFD and insert into the top slot of the PFD (leave the MFD on in configuration mode).

10. Power the PFD on 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).
11. Press the ENT key at the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
12. Press the ENT key to confirm software update completion.
13. Use the FMS knob to select the SYSTEM UPLOAD Page.
14. Select the configuration file “Backup Capacitor Test 50ms” from the SYSTEM UPLOAD Page.
15. Press the ENT key to confirm the configuration file selection.
16. Press the LOAD softkey to load the configuration file. Press the ENT key to confirm upload completion.
17. Remove the SD card from the PFD.
18. Remove power to all GDUs.
19. Power on the MFD and PFD in normal mode, and leave on for a minimum of eleven minutes.
20. Remove power from the MFD and PFD.
21. Turn on the MFD and PFD 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).
22. 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.
23. Backload the MFD and PFD to currently approved system software version and reconfigure the system.

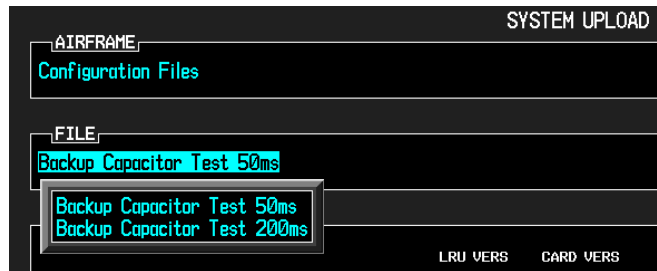


Figure 9-3. System Upload Page



Figure 9-4. Upload 'Complete' Window

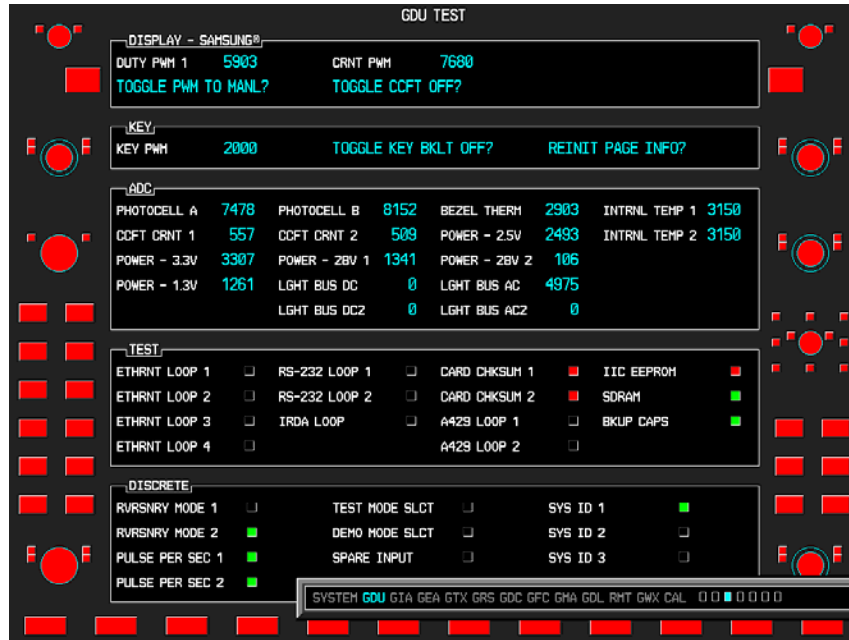


Figure 9-5 BKUP CAPS Checkbox on GDU TEST Page

Blank Page

SECTION 10

SYSTEM RECONFIGURATION

The initial G1000 software upload and configuration took place at the time of installation as described in the installation manual. Section seven explained how to upload, configure, and test software for a replacement LRU. The information in this section is a general example on how to completely reconfigure the G1000 when it becomes necessary. Software part numbers and software versions are not listed in this section. For actual software versions and part numbers refer to OEM maintenance documentation. The screen shots in the remaining sections serve only as examples. They will vary depending on the specific configuration involved.

NOTE

Do not remove power from the G1000 during software loading. Do not rely solely on the aircraft batteries to prevent loss of power during the software loading process, connect a ground power unit to the aircraft. All GDUs should be in the same mode (configuration or normal), unless instructed differently by the procedure. Remove power only when instructed by the procedure.

Perform these preliminary steps before uploading software:

1. Remove supplemental data cards from the lower slot of the GDUs before loading any software. Supplemental data cards left inserted can become corrupt making them unusable. Replacing corrupt cards is not covered under warranty.
2. Refer to the appropriate OEM maintenance documentation for approved software versions and part numbers.
3. Garmin recommends the use of SanDisk or Toshiba SD cards to load G1000 software and configuration files. If software loading problems occur when using another brand of card, replace the card with a SanDisk or Toshiba card and try the upload procedure again.

10.1 MFD & PFD UPLOAD PROCEDURE

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 loading is complete. It contains a FliteChart or Chartview database which is only used by the MFD.
2. While holding the ENT key on PFD2, restore power by closing the PFD2 circuit breaker.
3. When the words 'INITIALIZING SYSTEM' appear in the upper left corner of PFD2, release the ENT key. Press the YES softkey to acknowledge the Initializing Prompt. New software is loaded to PFD2. When complete, PFD2 starts in configuration mode.
4. Remove power to PFD2 by pulling the PFD2 circuit breaker.
5. Remove the Software/Configuration card loader from PFD2 and insert it into the top card slot on the MFD. Repeat Steps 2 through 5 for the MFD. When MFD update is complete, it starts in the configuration mode. Remove power to the MFD by pulling the MFD circuit breaker.

6. Remove the Software/Configuration card loader from the MFD and insert it into the top card slot on PFD1. Repeat Steps 2 through 5 for PFD1.
7. Restore power to the MFD by closing the MFD circuit breaker while holding down softkey 12.

NOTE

Do not operate the MFD while loading software or configuration during the rest of the procedure unless specifically instructed to do so. A failed or cancelled load could result.

10.2 INITIAL G1000 SOFTWARE UPLOAD

1. Select the SYSTEM UPLOAD Page using the FMS knob.
2. Activate the cursor and highlight the correct airframe in the AIRFRAME field.
3. Press the ENT key.
4. Highlight the '[Proper Aircraft] Base Configuration' 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.

10.3 SOFTWARE LOAD CONFIRMATION

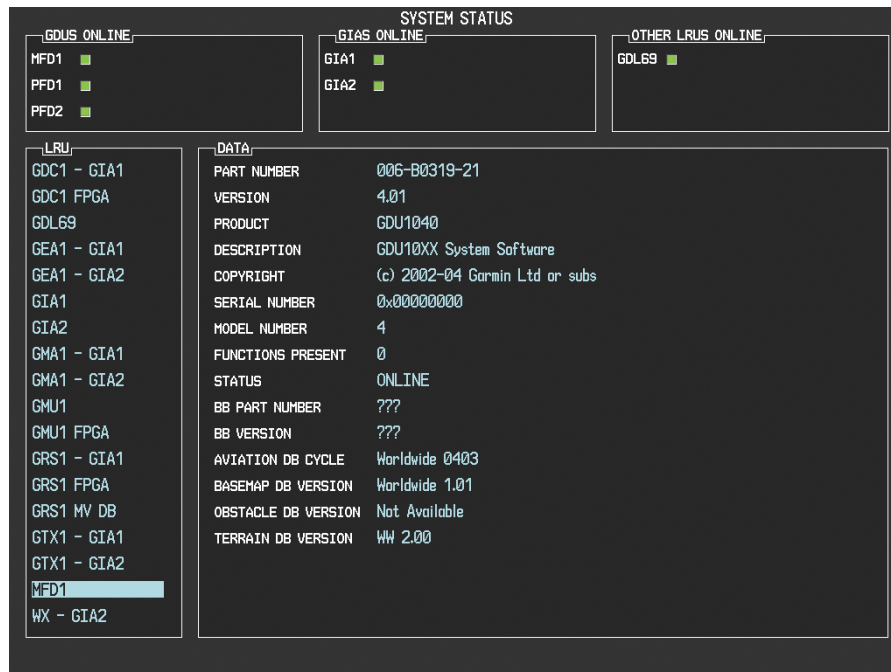


Figure 10-1. System Status Page

1. Select the System Status Page (Figure 10-1).
2. Highlight the specified items in the LRU window and verify the software part numbers and versions against the ones listed in the required equipment list.
3. De-activate the cursor.

4. Remove the airframe specific card loader from the top slot of the PFD. 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.

A table similar to one below can be used as a checklist. Check off the items after the correct part number has been confirmed.

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	_____
GRS1-GIA1	_____	GMU2	_____
GRS2-GIA2	_____	NAV1	_____
GMA1-GIA1	_____	NAV2	_____
GMA2-GIA2	_____	GPS1	_____
GMC-PFD1	_____	GPS2	_____
GWX	_____	GDL	_____
CERT GAINS	_____	GSA	_____

10.4 FINAL CONFIGURATION ITEMS

10.4.1 Aircraft Registration Number Entry

TRANSPONDER CONFIGURATION

SELECT TRANSPONDER
XPDR1

CONFIGURATION

	SET	ACTIVE
ADDRESS TYPE	US TAIL	US TAIL
ADDRESS	N58GA	N58GA
FLIGHT ID TYPE	SAME AS TAIL	SAME AS TAIL
FLIGHT ID	N58GA	N58GA
AIRCRAFT WEIGHT	< 15,500 LBS	< 15,500 LBS
MAX AIRSPEED	<= 150 KTS	<= 150 KTS
VFR CODE	1200	1200

SET>ACTV|ACTV>SET

Figure 10-2. Transponder Configuration Page

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. Activate the cursor and highlight the 'ADDRESS' field. Use the small/large FMS knobs to enter the aircraft registration number.
4. Once the correct registration number is entered, press the ENT key. The transponder is configured:



5. The transponder then alerts the technician of the completed configuration:






6. 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 '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.

10.5 SOFTWARE/CONFIGURATION TROUBLESHOOTING

Problem	Recommended Actions
<p>MFD or PFD displays do not power up</p>	<ol style="list-style-type: none"> 1. Ensure power is present at display Backshell connector. 2. Replace display.
<p>Software file load fails:</p> 	<ol style="list-style-type: none"> 1. Ensure that criteria listed in section 10.6 are fulfilled for the applicable situation. 2. Ensure that LRU is reporting data on the System Status page (LRU is 'ONLINE'). Check data path wiring as needed. 3. Restart MFD & PFD in Configuration Mode and retry software file load or try using a different card. 4. Ensure that the MFD is not touched during the loading process, unless explicitly instructed to do so. 5. Ensure that LRU part number is compatible with software version and Loader Card. Refer to approved post-installation and/or maintenance data. 6. Replace LRU.
<p>Configuration file load fails:</p> 	<ol style="list-style-type: none"> 1. Ensure that criteria listed in section 10.6 are fulfilled for the applicable situation. 2. Ensure that LRU is reporting data on the System Status page (LRU is 'ONLINE'). Check data path wiring as needed. 3. Restart MFD & PFD in Configuration Mode and retry configuration file load or try using a different card. 4. 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. 5. Replace LRU.
<p>Software File Mismatch Alert appears in lower right corner of PFD when started in normal mode:</p> 	<ol style="list-style-type: none"> 1. Ensure that proper software file part number and version were loaded to LRU. 2. Ensure that LRU part number is compatible with software version and Loader Card. Refer to approved post-installation and/or maintenance data. 3. Reload 'MANIFEST' configuration file to the PFD.
<p>Optional Equipment (ADF, TAS, radar altimeter, WX500, etc.) does not work.</p>	<ol style="list-style-type: none"> 1. Load optional config file to enable G1000 to interface with the optional unit. See Section 4 for optional equipment installation instructions. 2. If optional equipment still does not operate, reference optional equipment documentation for further troubleshooting.

10.6 SYSTEM COMMUNICATION HIERARCHY

The following criteria must be satisfied to be able to perform these desired options:

Desired Operation	Requirements
Load Software to GDU 1xxx MFD or PFD Displays	<ol style="list-style-type: none"> a. G1000 SW Loader Card must be inserted in top slot for each display to be loaded. b. CLR & ENT keys must be held during power up of display. c. Power only one display on at a time during software loading.
Load AIRFRAME, SYSTEM, MFD1, PFD1, and MANIFEST configuration files to the MFD and PFD	<ol style="list-style-type: none"> a. G1000 SW Loader Card must be inserted in top slot of the PFD. b. PFD and MFD must be powered on. c. PFD and MFD must have correct software.
Load Software/Configuration files to GIA 63/GIA 63Ws	<ol style="list-style-type: none"> a. G1000 SW Loader Card must be inserted in top slot of the PFD. b. G1000 system must be powered on. c. PFD and MFD must have correct software. d. PFD and MFD must be successfully configured with AIRFRAME, SYSTEM, MFD1, and PFD1 configuration files.
Load Software/Configuration files to: <ul style="list-style-type: none"> - GMA 1347 - GDC 74A - GEA 71 - GRS 77 (software only) - GMU 44 (software only) - GTX 33 - GDL 69A 	<ol style="list-style-type: none"> a. G1000 must be powered on. b. Airframe specific card loader must be inserted into PFD top slot. c. PFD and MFD must have correct software and configuration settings. d. GIA 63/GIA 63Ws must have correct software. e. GIA 63/GIA 63Ws must be successfully configured with GIA1 and GIA2 configuration files. f. Data path from GIA1 to each LRU must be operational.

10.7 AVIATION DATABASE

Jeppesen aviation databases are released every 28 days, and are provided directly to the pilot by Jeppesen. Updates must be loaded to both the MFD and PFD using an aviation database update SD Card, provided by Jeppesen. The card reader downloads the aviation database files and stores them in PFD and MFD internal memory.

NOTE

The display downloads the aviation database and stores it internally. The aviation database SD Card is not required to remain in the display after the update.

NOTE

Do not use supplemental database cards to load the Jeppesen database.

To update the Jeppesen aviation database:

1. With the G1000 system off, insert the aviation database update SD Card into the top card slot of the PFD.
2. Turn the G1000 system on. The following prompt is displayed in the upper left corner of the PFD:

```
DO YOU WANT TO UPDATE THE AVIATION DATABASE?
PRESS CLR FOR NO AND ENT FOR YES
YOU HAVE 30 SECONDS BEFORE NO IS RETURNED
```

3. Press the ENT key to confirm the database update. The following prompt is displayed:

```
DO YOU WANT TO UPDATE THE AVIATION DATABASE?
PRESS CLR FOR NO AND ENT FOR YES
YOU HAVE 30 SECONDS BEFORE NO IS RETURNED
UPDATING AVIATION DATABASE
.
UPDATED 1 FILES SUCCESSFULLY!
```

4. After the update completes, the PFD starts in normal mode. Remove the aviation database update SD Card from the PFD.
5. Power the G1000 system down.
6. Repeat steps 1 through 4 for the MFD and PFD2. The MFD and PFD aviation databases are now updated.
7. Confirm that the correct update cycle and version is loaded during startup of the MFD.

10.8 TAWS CONFIGURATION

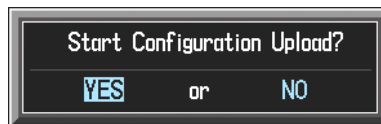
1. Insert the TAWS Enable Card into the top card slot of the PFD1.
2. While holding the ENT key on PFD1, apply power by closing the PFD1 circuit breaker.
3. When 'INITIALIZING SYSTEM' displays in the upper left corner of the PFD, release the ENT key.
4. Turn the MFD and PFD2 on in the same manner.
5. On the PFD1 select the CONFIGURATION UPLOAD Page using the FMS knob.
6. Activate the cursor and highlight the 'Enable TAWS file' in the FILE field.
7. Press the ENT key.
8. Highlight AIRFRAME in the SECTION field.
9. Press the LOAD softkey.
10. Select YES and press the ENT key to acknowledge the prompt.
11. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
12. View the SUMMARY field and ensure that all items are complete.
13. De-activate the cursor.
14. Cycle power to the PFD1/2 and MFD to reboot the system.
15. Verify that the MAP – TERRAIN PROXIMITY page on the MFD has been renamed as the MAP – TAWS Page. Due to time required for the GIA to exit configuration mode, power must be cycled to the PFD1/2 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 PFD1/2 and MFD to reboot the system.
17. Verify the unit successfully passes TAWS self-test.

10.9 CHARTVIEW CONFIGURATION

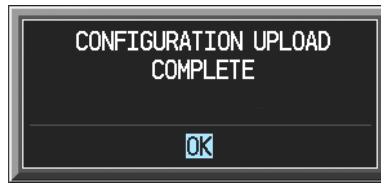
1. Insert the ChartView Enable card into the top card slot of the PFD1.
2. While holding the ENT key on PFD1, apply power by closing the PFD1 circuit breaker.
3. When the words 'INITIALIZING SYSTEM' appear in the upper left corner of the PFD1, release the ENT key.
4. Turn the MFD and PFD2 on in the same manner.
5. On the PFD1 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. De-activate the cursor.
14. Cycle power to the PFD1/2 and MFD to reboot the system.
15. Use the FMS Knob to display the AUX- System Status Page.
16. Activate the cursor and press the DBASE softkey to move the cursor to the Database window. 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.

10.10 SD CARD USE

Use only blank SD cards to load Jeppesen aviation database into the displays. Do not copy the Jeppesen database (not including Chart View) onto supplemental data cards. Doing so may corrupt the cards making them unusable. Replacing corrupt cards is not covered under warranty.

10.10.1 Jeppesen Chart View

The Chart View database is updated on a fourteen day cycle and is provided directly from Jeppesen. If the Chart View database is not updated within seventy days of the expiration date, Chart View will no longer function. The Chart View database should be copied to the Garmin supplied supplemental data card which resides in the bottom card slot of the MFD.

10.10.2 Miscellaneous G1000 Databases

The following G1000 databases are stored on supplemental data cards provided by Garmin.

Terrain, Airport Terrain, and Obstacle

The G1000 topography, terrain, airport terrain, and obstacle data is updated 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 is 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 on 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 is 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 database. It is very important to note that not all obstacles are necessarily charted and therefore may not be contained in the database. The database is updated every 56 days. 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 is 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 every 56 days. The SafeTaxi database should be copied to the Garmin supplied supplemental data card which resides in the bottom card slot of the MFD.

FliteCharts

The FliteCharts database contains terminal procedure charts for the United States. This database is updated every 28 days. If it is 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.

10.11 UPDATING GARMIN DATABASES

The Garmin database updates can be obtained by following the instructions detailed in the 'Aviation Databases' section of the Garmin website (www.garmin.com). Once the updated files have been downloaded from the website, a PC equipped with an appropriate SD card reader can be used to unpack and program the new databases onto the existing supplemental data cards. Equipment required to perform the update is as follows:

- Windows-compatible PC (Windows 2000 or XP recommended).
- SanDisk SD Card Reader, P/Ns SDDR-93 or SDDR-99 or equivalent card reader.
- Updated database obtained from the Garmin website.
- Existing supplemental database SD cards from both PFD and MFD.

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. After the data has been copied to the appropriate data cards, perform the following steps:

1. Insert one SD card in the bottom card slot of the MFD and one in the bottom card of the PFD. The SD card containing the ChartView or FliteCharts database must be inserted into the bottom slot on the MFD.
2. Turn the G1000 on. View the MFD power-up splash screen. Check that the databases are initialized and displayed on the splash screen. When updating the terrain and FliteCharts databases, an 'in progress' message may be seen. If this message is present, wait for the system to finish loading before verifying the correct databases are initialized, then proceed to step 3.
3. Acknowledge the Power-up Page agreement by pressing the ENT Key or the right most softkey.
4. Turn the large FMS Knob to select the AUX Page group on the MFD.
5. Turn the small FMS Knob to select the System Status Page.
6. Press the DBASE Softkey to place the cursor in the 'Database' box.
7. Turn either FMS Knob to scroll through the database list and check that all databases are current and there are no errors.
8. Turn the G1000 off.

Blank Page

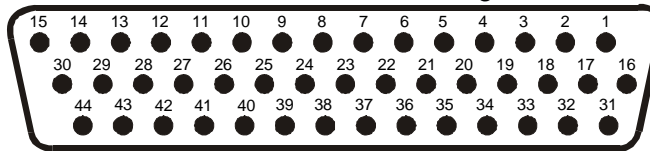
APPENDIX A

CONNECTOR PIN ASSIGNMENTS

The tables in this section provide generic connector pinout information for the G1000.

A.1 P601 (COM)

View of J601 connector looking at unit

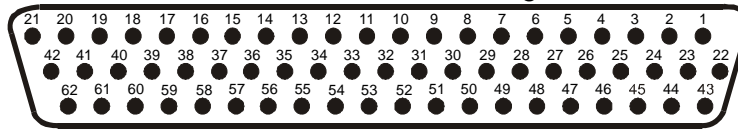


Pin	Pin Name	I/O
1	RESERVED (UNSQUELCHED AUDIO TEST)	--
2	RESERVED	--
3	RESERVED	--
4	COM MIC KEY*	In
5	INTERCOM MIC IN HI	In
6	INTERCOM MIC IN LO (GROUND)	--
7	COM MIC AUDIO IN HI	In
8	COM MIC AUDIO IN LO (GROUND)	--
9	COM 500Ω AUDIO OUT HI	Out
10	COM 500Ω AUDIO OUT LO (GROUND)	--
11	TRANSMIT INTERLOCK*	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	RESERVED	--
24	SPARE	--
25	RESERVED	--
26	SPARE	--
27	RESERVED	--
28	RESERVED	--
29	RESERVED	--
30	POWER GROUND	--
31	POWER GROUND	--
32	RESERVED	--
33	RESERVED	--

Connector P601 continued		
34	RESERVED	--
35	RESERVED	--
36	RESERVED	--
37	RESERVED	--
38	RESERVED	--
39	RESERVED	--
40	RESERVED	--
41	RESERVED	--
42	RESERVED	--
43	POWER GROUND	--
44	POWER GROUND	--

A.2 P602 (VOR/ILS)

View of J602 connector looking at unit

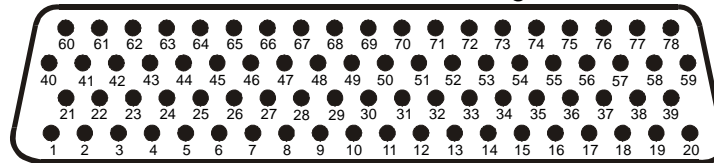


Pin	Pin Name	I/O
1	VOR/LOC +TO	Out
2	VOR/LOC +FROM (VOR/LOC COMMON)	--
3	VOR/LOC +FLAG	Out
4	VOR/LOC -FLAG (VOR/LOC COMMON)	--
5	VOR/LOC +LEFT	Out
6	VOR/LOC +RIGHT (VOR/LOC COMMON)	--
7	RESERVED (VOR/LOC IF AGC)	--
8	VOR/LOC COMPOSITE OUT	Out
9	VOR OBS ROTOR C	Out
10	VOR OBS ROTOR H (GROUND)	--
11	VOR 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	--
31	RESERVED	--
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

Connector P602 continued		
42	PARALLEL DME 100 KHZ-D	Out
43	PARALLEL DME 50 KHZ	Out
44	SPARE	--
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	SPARE	--
59	VOR/LOC DIGITAL AUDIO OUT	Out
60	SIGNAL GROUND	--
61	POWER GROUND	--
62	POWER GROUND	--

A.3 P603 (Main Serial)

View of J603 connector looking at unit

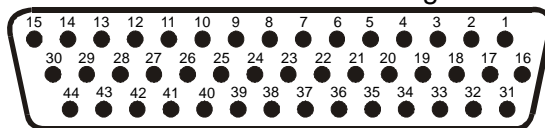


Pin	Pin Name	I/O
1	RESERVED	--
2	ETHERNET OUT A	Out
3	ETHERNET OUT B	Out
4	RS-485 4 A	I/O
5	RS-485 4 A	I/O
6	RS-485 4 B	I/O
7	RS-485 4 B	I/O
8	MAIN ARINC 429 IN 3 A	In
9	MAIN ARINC 429 IN 3 B	In
10	MAIN ARINC 429 IN 4 A	In
11	MAIN ARINC 429 IN 4 B	In
12	MAIN ARINC 429 IN 5 A	In
13	MAIN ARINC 429 IN 5 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

Connector P603 continued		
Pin	Pin Name	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
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	--

A.4 P604 (MAIN DISCRETE)

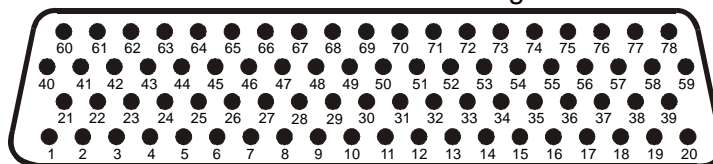
View of J604 connector looking at unit



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	AFCS 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

A.5 P605 (I/O #1)

View of J605 connector looking at unit



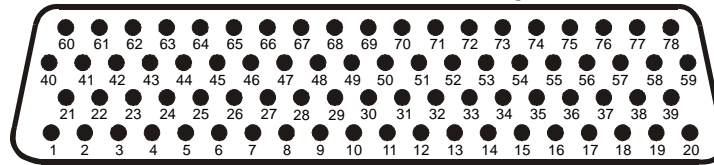
Pin	Pin Name	I/O
1	RADAR ALTIMETER DC HI	In
2	RADAR ALTIMETER DC LO	In
3	DISCRETE IN 18A	In
4	SPARE	--
5	SPARE	--
6	SPARE	--
7	SPARE	--
8	FLIGHT DIRECTOR PITCH +UP	In
9	FLIGHT DIRECTOR PITCH +DOWN	In
10	FLIGHT DIRECTOR ROLL +RIGHT	In
11	FLIGHT DIRECTOR ROLL +LEFT	In
12	DISCRETE IN 19A	In
13	POTENTIOMETER 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

Connector P605 continued

Pin	Pin Name	I/O
37	DISCRETE IN* 1A	In
38	DISCRETE IN* 2A	In
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	--

A.6 P606 (I/O #2)

View of J606 connector looking at unit

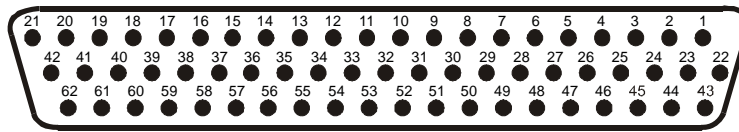


Pin	Pin Name	I/O
1	26 VAC VERTICAL GYRO REF HI	In
2	26 VAC VERTICAL GYRO REF LO	In
3	26 VAC ADF REF HI	In
4	26 VAC ADF REF LO	In
5	26 VAC AFCS REF HI	In
6	26 VAC AFCS REF LO	In
7	DIRECTIONAL GYRO MOTOR A	In
8	DIRECTIONAL GYRO MOTOR B	In
9	SIGNAL GROUND	--
10	ADF X/COS	In
11	ADF Y/SIN	In
12	ADF Z (GROUND)	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

Connector P606 continued		
Pin	Pin Name	I/O
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
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	Out
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.7 P10001 (GDU 1XXX)

View of J10001 connector from back of unit

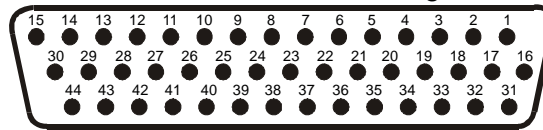


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	Out
2	ETHERNET OUT 1 A	Out
3	ETHERNET OUT 1 B	Out
4	ETHERNET IN 1 A	In
5	ETHERNET IN 1 B	In
6	ETHERNET OUT 2 A	Out
7	ETHERNET OUT 2 B	Out
8	ETHERNET IN 2 A	In
9	ETHERNET IN 2 B	In
10	ETHERNET OUT 3 A	Out
11	ETHERNET OUT 3 B	Out
12	ETHERNET IN 3 A	In
13	ETHERNET 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	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	--

Connector P10001 continued		
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	RESERVED	--
49	RESERVED	--
50	RESERVED	--
51	RESERVED	--
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 HI	In
60	LIGHTING BUS LO	In
61	RESERVED	--
62	RESERVED	--

A.8 P771 (GRS 77)

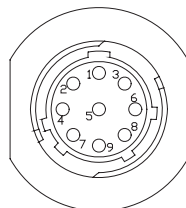
View of J771 connector looking at unit



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.9 P441 (GMU 44)

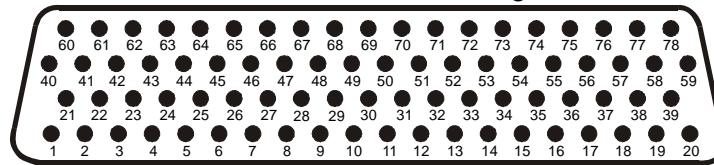
View of J441 connector looking at pigtail



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.10 P741 (GDC 74A)

View of J741 connector looking at unit

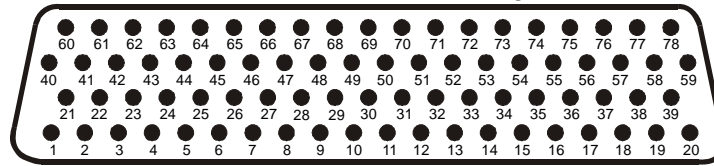


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	OAT PROBE POWER OUT	Out
3	OAT PROBE IN HI	In
4	OAT PROBE IN LO	In
5	SIGNAL GROUND	--
6	ADC SYSTEM ID PROGRAM* 1	In
7	SIGNAL GROUND	--
8	DISCRETE IN* 6	In
9	SIGNAL GROUND	--
10	RS-232 IN 1	In
11	RS-232 OUT 1	Out
12	SIGNAL GROUND	--
13	RS-232 IN 2	In
14	RS-232 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

Connector P741 continued		
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.11 P701 (GEA 71)

View of J701 connector looking at unit

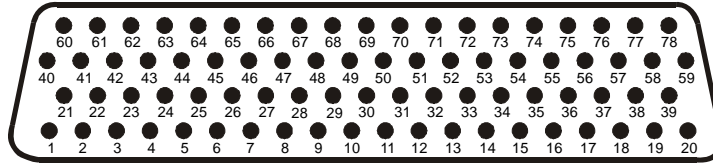


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	DIGITAL IN* 1	In
3	DIGITAL IN* 2	In
4	SIGNAL GROUND	--
5	RS-485 1 A	I/O
6	RS-485 1 B	I/O
7	RS-485 2 A	I/O
8	RS-485 2 B	I/O
9	GEA SYSTEM ID PROGRAM* 1	In
10	GEA SYSTEM ID PROGRAM* 2	In
11	TRANSDUCER POWER OUT LO (GROUND)	--
12	TRANSDUCER POWER OUT LO (GROUND)	--
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

Connector P701 continued		
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	--

A.12 P702

View of J702 connector looking at unit

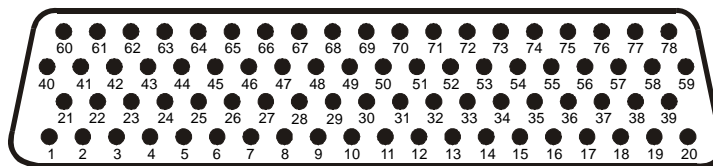


Pin	Pin Name	I/O
1	ANNUNCIATE* 1A	Out
2	ANNUNCIATE* 2A	Out
3	ANNUNCIATE* 3A	Out
4	ANNUNCIATE* 4A	Out
5	ANNUNCIATE* 5A	Out
6	ANNUNCIATE* 6A	Out
7	ANNUNCIATE* 7A	Out
8	ANNUNCIATE* 8A	Out
9	ANNUNCIATE* 9A	Out
10	ANNUNCIATE* 10A	Out
11	TRANSDUCER POWER OUT LO (GROUND)	--
12	TRANSDUCER POWER OUT LO (GROUND)	--
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	--

Connector P702 continued		
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.13 P3471 (GMA 1347)

View of J3471 connector from back of unit

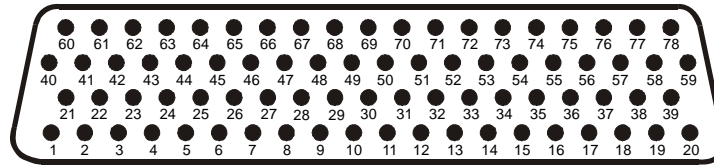


Pin	Pin Name	I/O
1	FAIL SAFE WARN AUDIO IN	In
2	SPARE	--
3	TEL RINGER AUDIO IN HI	In
4	TEL RINGER AUDIO IN LO	In
5	REMOTE PASS ICS OUT HI	Out
6	ON-SIDE NAV AUDIO IN HI	In
7	ON-SIDE COM AUDIO IN HI	In
8	ON-SIDE COM AUDIO LO	I/O
9	PILOT HEADSET AUDIO OUT LEFT	Out
10	PILOT HEADSET AUDIO OUT RIGHT	Out
11	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 IN 1 LEFT	In
18	MUSIC IN 1 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

Connector P3471 continued		
Pin	Pin Name	I/O
37	MUSIC IN 1 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	COCKPIT VOICE RECORDER LO	Out
54	ALTITUDE WARN AUDIO IN HI	In
55	ALTITUDE WARN AUDIO IN LO	In
56	MUSIC IN 2 LEFT	In
57	MUSIC IN 2 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 CREW 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 VOICE RECORDER OUT HI	Out
73	COPILOT VOICE RECORDER OUT HI	Out
74	AUX AUDIO IN HI	In
75	AUX AUDIO IN LO	In
76	MUSIC IN 2 LO	In
77	COM 3 MIC AUDIO OUT HI	Out
78	COM 3 MIC KEY*	Out

A.14 P3472

View of J3472 connector from back of unit

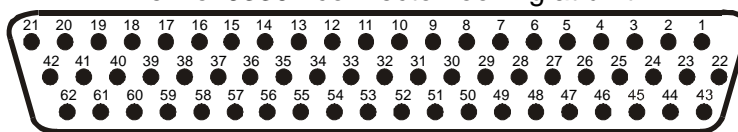


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	MASQ INHIBIT*	In
3	PROGRAM GROUND	--
4	RECORDER PLAY*	In
5	PROGRAM GROUND	--
6	RS-232 OUT 1	Out
7	RS-232 IN 1	In
8	ON-SIDE COM MIC DIGITAL AUDIO OUT	Out
9	ON-SIDE COM DIGITAL AUDIO IN	In
10	ANALOG INSTALLATION SELECT*	In
11	PROGRAM GROUND	--
12	VOICE ALERT 1 SELECT HI	In
13	VOICE ALERT 2 SELECT HI	In
14	POWER GROUND	--
15	COM 2 ON-SIDE SELECT*	In
16	POWER GROUND	--
17	COM SWAP*	In
18	PROGRAM GROUND	--
19	ETHERNET IN B	In
20	RESERVED	--
21	CONFIG MODULE POWER OUT	Out
22	INTERNAL SIDETONE SELECT*	In
23	PROGRAM GROUND	--
24	RECORDER OFF SELECT*	In
25	PROGRAM GROUND	--
26	AUX SOURCE SELECT*	In
27	GMA REMOTE POWER OFF	In
28	ON-SIDE NAV DIGITAL AUDIO IN	In
29	VOICE ALERT DIGITAL AUDIO IN	In
30	AIRCRAFT POWER 2	In
31	VOICE ALERT 3 SELECT HI	In
32	AIRCRAFT POWER 2	In
33	VOICE ALERT 4 SELECT HI	In
34	MIDDLE MARKER SENSE	Out
35	ETHERNET OUT B	Out
36	REVERSIONARY MODE 1	Out
37	REVERSIONARY MODE COMMON 1	Out

Connector P3472 continued		
Pin	Pin Name	I/O
38	RS-232 OUT 2	Out
39	RS-232 IN 2	In
40	CONFIG MODULE DATA	I/O
41	SPEAKER AUDIO OUT LO	Out
42	SPEAKER AUDIO OUT HI	Out
43	MUTE AUDIO ON TX SELECT*	In
44	PROGRAM GROUND	--
45	MUTE AUDIO ON RX SELECT*	In
46	PROGRAM GROUND	--
47	CROSS-SIDE COM MIC DIGITAL AUDIO OUT	Out
48	CROSS-SIDE COM DIGITAL AUDIO IN	In
49	CROSS-SIDE DIGITAL AUDIO CLOCK OUT	Out
50	CROSS-SIDE DIGITAL AUDIO CLOCK IN	In
51	14 V LIGHTING HI	In
52	28 V LIGHTING HI	In
53	AIRCRAFT POWER 1	In
54	VOICE ALERT 5 SELECT HI	In
55	AIRCRAFT POWER 1	In
56	REVERSIONARY MODE 2	Out
57	REVERSIONARY MODE COMMON 2	Out
58	DUAL AUDIO INSTALLATION SELECT*	In
59	MARKER ANTENNA LO	In
60	CONFIG MODULE CLOCK	Out
61	SPARE	--
62	ON-SIDE/CROSS-SIDE* COM RECORD	In
63	SERIAL CONFIG SELECT*	In
64	PA MUTE* OUT	Out
65	TEL DISCRETE RINGER*	In
66	ICS MUTE INHIBIT*	In
67	PROGRAM GROUND	--
68	CROSS-SIDE NAV DIGITAL AUDIO IN	In
69	POWER GROUND	--
70	ETHERNET OUT A	Out
71	POWER GROUND	--
72	ETHERNET IN A	In
73	VOICE ALERT 6 SELECT HI	In
74	AIRWAY/INNER MARKER EXT LAMP OUT	Out
75	MIDDLE MARKER EXT LAMP OUT	Out
76	OUTER MARKER EXT LAMP OUT	Out
77	SHARED MODE SELECT*	In
78	MARKER ANTENNA HI	In

A.15 P3301 (GTX 33)

View of J3301 connector looking at unit

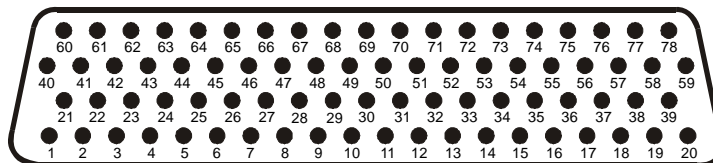


Pin	Pin Name	I/O
1	RESERVED	--
2	ALTITUDE A1	In
3	ALTITUDE C2	In
4	ALTITUDE A2	In
5	ALTITUDE A4	In
6	ALTITUDE C4	In
7	ALTITUDE B1	In
8	ALTITUDE C1	In
9	ALTITUDE B2	In
10	ALTITUDE B4	In
11	ALTITUDE D4	In
12	EXTERNAL IDENT SELECT*	In
13	EXTERNAL STANDBY SELECT*	In
14	NOT USED	In
15	AUDIO OUT HI	Out
16	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
42	AIRCRAFT POWER 1	In

Connector P3301 continued		
Pin	Pin Name	I/O
43	POWER GROUND	--
44	CURRENT TEMPERATURE PROBE IN	In
45	NOT USED	In
46	XPDR SYSTEM ID PROGRAM*	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.16 P691 (GDL 69/69A)

View of J691 connector from back of unit

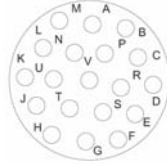


Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	Out
2	RS-232 OUT 2	Out
3	RS-232 OUT 3	Out
4	SIGNAL GROUND	--
5	RS-232 IN 2	In
6	RS-232 IN 3	In
7	RS-232 IN 1	In
8	RS-232 OUT 1	Out
9	DATA LINK SYSTEM ID PROGRAM 1	In
10	DATA LINK SYSTEM ID PROGRAM 2	In
11	SIGNAL GROUND	--
12	SPARE	--
13	SIGNAL GROUND	--
14	SPARE	--
15	SPARE	--
16	SPARE	--
17	AUDIO OUT LO	Out
18	AUDIO OUT RIGHT	Out
19	AUDIO OUT LEFT	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
38	SPARE	--
39	SIGNAL GROUND	--
40	CONFIG MODULE DATA	I/O
41	SPARE	--
42	SPARE	--

Connector P691 continued		
Pin	Pin Name	I/O
43	SPARE	--
44	SPARE	--
45	SPARE	--
46	SPARE	--
47	SPARE	--
48	SPARE	--
49	SPARE	--
50	SPARE	--
51	SPARE	--
52	LINE OUT LO	Out
53	LINE OUT RIGHT	Out
54	LINE OUT LEFT	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 SUPPRESSION HI 1	--
62	AUDIO SUPPRESSION HI 2	--
63	AUDIO SUPPRESSION HI 3	--
64	AUDIO SUPPRESSION LO 1	--
65	AUDIO SUPPRESSION LO 2	--
66	AUDIO SUPPRESSION LO 3	--
67	DISCRETE IN 2	In
68	DISCRETE IN 1	In
69	TEST ENABLE	In
70	AUDIO MUTE	In
71	CHANNEL UP (+)	In
72	CHANNEL DOWN (-)	In
73	VOLUME UP (+)	In
74	VOLUME DOWN (-)	In
75	SIGNAL GROUND	--
76	SPARE	--
77	DATA LINK REMOTE POWER OFF	In
78	POWER GROUND	In

A.17 P801 (GSA 81)

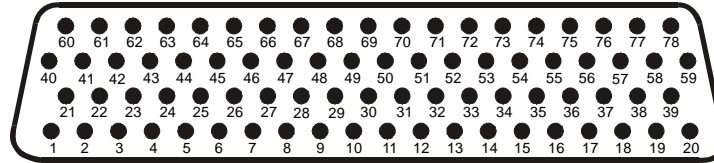
View of J801 connector looking at unit



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.18 P411 (GSD 41)

View of J411 connector from back of unit



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

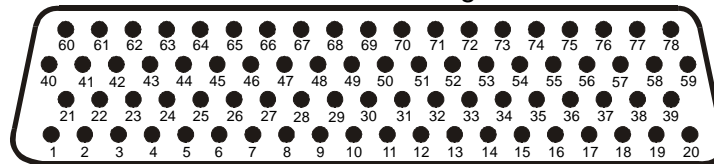
* Denotes Active Low (Ground to activate)

Connector P411 continued		
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

* Denotes Active Low (Ground to activate)

A.19 P412 Connector (GSD 41)

View of J412 connector looking at rear of unit.



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

* Denotes Active Low (Ground to activate)

Connector P412 continued		
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

* Denotes Active Low (Ground to activate)