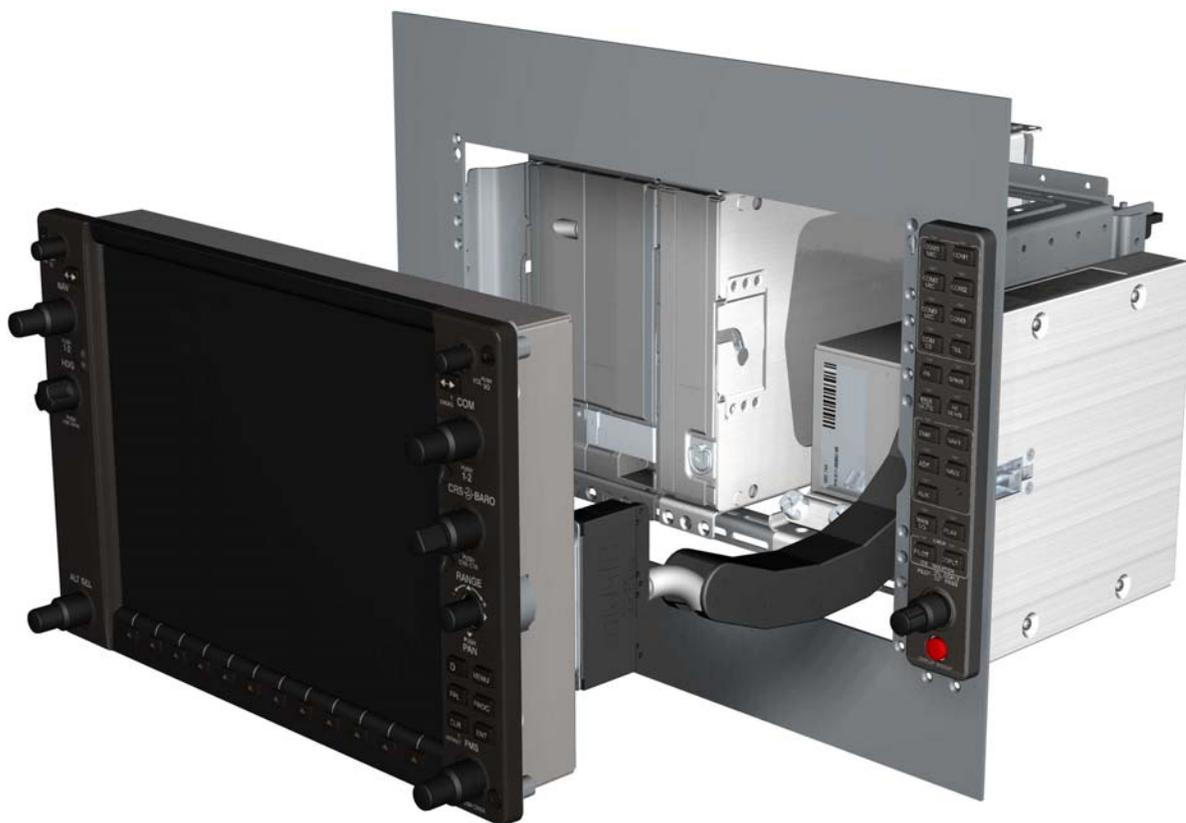


# **G1000 Nav III Line Maintenance Manual**

- **Cessna Skyhawk 172R**
- **Cessna Skyhawk 172S**
- **Cessna Skylane 182T**
- **Cessna Stationair 206H**
- **Cessna Turbo Skylane T182T**
- **Cessna Turbo Stationair T206H**



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Garmin International, Inc.  
1200 E. 151<sup>st</sup> Street  
Olathe, KS 66062 USA  
Telephone: 913-397-8200  
Aviation Panel-Mount Technical Support Line (Toll Free): 1-888-606-5482  
[www.garmin.com](http://www.garmin.com)

Garmin (Europe) Ltd.  
Liberty House, Bulls Copse Road, Hounslow Business Park  
Southampton, SO40 9RB, U.K.  
Telephone: +44 (0) 870 8501241

### **RECORD OF REVISIONS**

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B	12/15/04	Made minor changes to software loading procedure (Section 4)
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J	07/09/07	Updated Manual per System Software v563.03
K	07/16/07	Added Power Interrupt Tests to Section 6

### **DOCUMENT PAGINATION**

<b>Section</b>	<b>Pages</b>
Table of Contents	i-vi
Section 1	1-1 to 1-16
Section 2	2-1 to 2-88
Section 3	3-1 to 3-6
Section 4	4-1 to 4-50
Section 5	5-1 to 5-4
Section 6	6-1 to 6-6
Appendix A	A-1 to A-30
Appendix B	B-1 to B-31

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This manual was written for Cessna Nav III G1000 System Software version 0563.03 or later approved software. Some differences in operation may be observed when comparing the information in this manual to earlier or later software versions.

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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#### **WARNING**

The GDU 104X 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 [www.garmin.com/aboutGarmin/environment/disposal.jsp](http://www.garmin.com/aboutGarmin/environment/disposal.jsp).

#### **CAUTION**

The GDU 104X 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.

#### **CAUTION**

All G1000 screen shots used in this document are only intended to serve as a visual reference. All information depicted in screen shots, including software version and part numbers, is subject to change and may not be up to date.

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## TABLE OF CONTENTS

PARAGRAPH	PAGE
1 GENERAL DESCRIPTION.....	1-1
1.1 Introduction.....	1-1
1.2 LRU Description.....	1-2
1.3 G1000 Block Diagrams .....	1-5
1.4 User Interface.....	1-8
1.5 Recommended Tools .....	1-16
2 TROUBLESHOOTING.....	2-1
2.1 G1000 Alerting System .....	2-1
2.2 GDU 104X.....	2-18
2.3 GMA 1347 .....	2-37
2.4 GIA 63/GIA 63W .....	2-42
2.5 GRS 77/GMU 44 .....	2-54
2.6 GDC 74A .....	2-58
2.7 GEA 71 .....	2-60
2.8 GTX 33 .....	2-71
2.9 GDL 69/69A .....	2-72
2.10 GDL 90 .....	2-75
2.11 GFC 700 (BP 2007 and later only) .....	2-76
2.12 Backshell Connectors .....	2-85
3 EQUIPMENT REMOVAL & INSTALLATION .....	3-1
3.1 GDU 104X.....	3-1
3.2 GMA 1347 .....	3-1
3.3 GIA 63/GIA 63W .....	3-1
3.4 GRS 77/GMU 44 .....	3-2
3.5 GDC 74A .....	3-2
3.6 GEA 71 .....	3-2
3.7 GTX 33 .....	3-3
3.8 GDL 69/69A .....	3-3
3.9 GDL 90 .....	3-3
3.10 GSA 81 .....	3-3
3.11 GSM 85.....	3-4
3.12 Configuration Module.....	3-5
3.13 GEA 71 Backshell Thermocouple .....	3-6
4 UPLOADING SOFTWARE, CONFIGURING, & TESTING .....	4-1
4.1 GDU 104X.....	4-1
4.2 GMA 1347 .....	4-5
4.3 GIA 63/GIA 63W .....	4-8

---

4.4	GRS 77/GMU 44 .....	4-17
4.5	GDC 74A .....	4-30
4.6	GEA 71 .....	4-35
4.7	GTX 33 .....	4-39
4.8	GDL 69A .....	4-42
4.9	GDL 90 .....	4-44
4.10	GSA 81 .....	4-45
5	FINAL SYSTEM CHECKOUT .....	5-1
5.1	GPS Failure Test.....	5-1
5.2	GIA Failure Test .....	5-2
5.3	Display Failure Test.....	5-2
5.4	AHRS/Air Data Backup Path Test.....	5-3
5.5	Flight Test.....	5-3
6	PERIODIC MAINTENANCE .....	6-1
6.1	Introduction.....	6-1
6.2	GFC 700 Visual Inspection Procedure .....	6-3
6.3	GSA 81 Greasing Procedure.....	6-3
6.4	GSM Slip Clutch Checking and Adjustment Procedure.....	6-3
6.5	Category A Long Term Power Interrupt Annual Inspection Procedure .....	6-4
	APPENDIX A G1000 PINOUT LIST .....	A-1
A.1	GIA 63/GIA 63W .....	A-1
A.2	GDU 104X.....	A-12
A.3	GRS 77.....	A-14
A.4	GMU 44 .....	A-15
A.5	GDC 74A .....	A-16
A.6	GEA 71 .....	A-18
A.7	GMA 1347 .....	A-22
A.8	GTX 33 .....	A-26
A.9	GDL 69/69A .....	A-28
A.10	GSA 81 .....	A-30
	APPENDIX B G1000 SYSTEM SOFTWARE & CONFIGURATION .....	B-1
B.1	Initial Software & Configuration Overview .....	B-2
B.2	Final Configuration Items .....	B-22
B.3	Stormscope Configuration (if Equipped).....	B-23
B.4	Software/Configuration Troubleshooting .....	B-24
B.5	Aviation Database.....	B-26
B.6	TAWS Configuration.....	B-27
B.7	SD Card Use .....	B-29

---

## LIST OF FIGURES

FIGURE	PAGE
1-1 Typical Cessna Nav III G1000 System Interconnect.....	1-5
1-2 G1000 Flight Instrumentation Data Paths.....	1-6
1-3 G1000 Navigation/Communication Data Paths.....	1-7
1-4 GDU 104X Control Interface .....	1-8
1-5 GMA 1347 Control Interface.....	1-8
1-6 FMS Control Knob .....	1-9
1-7 G1000 Softkeys .....	1-10
1-8 Configuration Mode Navigation.....	1-10
1-9 G1000 Configuration Storage.....	1-13
1-10 GRS/GDC Configuration Storage .....	1-14
1-11 SET/ACTV Feature .....	1-15
1-12 Configuration Status .....	1-15
2-1 Red X'd Display Fields.....	2-1
2-2 Alerts & Annunciations .....	2-6
2-3 System Status Page (AUX Group).....	2-6
2-4 AFCS Annunciation Field .....	2-7
2-5 RS-232/ARINC 429 CONFIG Page .....	2-18
2-6 GDU STATUS Page.....	2-19
2-7 GDU TEST Page .....	2-21
2-8 DIAGNOSTICS Page.....	2-24
2-9 SERIAL/ETHERNET I/O Page.....	2-25
2-10 ALERT CONFIGURATION Page.....	2-26
2-11 AIRFRAME CONFIGURATION Page .....	2-26
2-12 GMA CONFIGURATION Page .....	2-37
2-13 GMA 1347 Data Paths.....	2-41
2-14 RS-232/ARINC 429.....	2-42
2-15 CAN/RS-485 CONFIGURATION Page .....	2-43
2-16 GIA I/O CONFIGURATION Page .....	2-44
2-17 COM SETUP Page .....	2-45
2-18 GIA STATUS Page .....	2-46
2-19 AHRS/AIR DATA INPUT Page.....	2-54
2-20 GRS 77 Data Paths .....	2-57
2-21 GDC 74A Data Paths.....	2-59
2-22 ENGINE DATA Page.....	2-60
2-23 GEA STATUS Page .....	2-61
2-24 GEA Configuration Page.....	2-62
2-25 GEA 71 DATA Paths .....	2-64
2-26 MFD AUX – SYSTEM STATUS Page .....	2-65
2-27 HSCM Offset Tool User Interface.....	2-66
2-28 CONFIGURATION UPLOAD Page (GDU software version 6.01 or earlier) .....	2-67

---

2-29 CONFIGURATION UPLOAD Page (GDU software version 7.01 or later).....	2-68
2-30 HSCM Offset Tool User Interface.....	2-69
2-31 Example Post-Calibration Email .....	2-70
2-32 GTX 33 Data Paths .....	2-71
2-33 GDL 69 Page .....	2-72
2-34 GDL 69 Data Paths .....	2-75
2-35 GFC CONFIGURATION Page.....	2-76
2-36 GFC STATUS Page.....	2-77
2-37 GIA 63/GIA 63W Backshell Connectors .....	2-85
2-38 GEA 71 Backshell Connectors .....	2-85
2-39 GMA 1347 Backshell Connectors .....	2-86
2-40 GTX 33 Backshell Connectors .....	2-86
2-41 GDU 104X Backshell Connector (P10001).....	2-86
2-42 GRS 77 Backshell Connector (P771) .....	2-86
2-43 GDC 74A Backshell Connector (P741).....	2-87
2-44 GDL 69/69A Backshell Connector (P691).....	2-87
2-45 GDL 90 Backshell Connectors .....	2-87
2-46 GSA 81 Connector (P801).....	2-87
4-1 Marker Beacon Symbology .....	4-7
4-2 Non-WAAS (GIA 63) System Status Page .....	4-8
4-3 WAAS (GIA 63W) System Status Page.....	4-9
4-4 System Upload Page .....	4-9
4-5 AUX-GPS STATUS Page .....	4-15
4-6 Pitch/Roll Offset .....	4-22
4-7 Magnetometer Calibration .....	4-23
4-8 Engine Run-Up .....	4-25
4-9 Magnetometer Interference.....	4-27
4-10 GEA CONFIGURATION .....	4-33
6-1 Backup Capacitor Test Selection.....	6-4
6-2 Upload Complete Window .....	6-5
6-3 BKUP CAPS Checkbox on GDU TEST Page.....	6-5
B-1 Software/Configuration Overview (GDU Software Version 6.01 and earlier).....	B-2

### **LIST OF TABLES**

TABLE	PAGE
4-1 GRS 77/GMU 44 Calibration .....	4-21
4-2 Example Magnetometer Interference Test Sequence .....	4-28
6-1 T206H Slip Clutch Settings .....	6-3
6-2 T182T Slip Clutch Settings.....	6-3

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# 1 GENERAL DESCRIPTION

## 1.1 Introduction

This manual is intended to be a non-airframe specific top level maintenance manual that provides basic troubleshooting, removal and replacement instructions, software and configuration instructions, and return to service information for the G1000 system. Field service of the G1000 is limited to replacing LRUs (Line Replaceable Unit).

The following outline describes the organization of this manual:

<u>Section 1:</u>	This section contains a brief description of each LRU and a basic overview of the G1000 system's normal, reversionary, and configuration modes. The configuration mode user interface is described along with a brief summary of configuration mode functionality.
<u>Section 2:</u>	This section contains basic troubleshooting instructions for the G1000.
<u>Section 3:</u>	This section contains basic removal and replacement instructions for G1000 LRUs.
<u>Section 4:</u>	This section contains basic instructions for uploading software, configuring, and testing the G1000.
<u>Section 5:</u>	This section contains a checkout of the G1000 system. Only G1000-specific elements are addressed.
<u>Section 6:</u>	This section contains basic periodic maintenance instructions for the G1000 system.
<u>Appendix A:</u>	This section contains a list of G1000 pinouts.
<u>Appendix B:</u>	The section serves as a complete reconfiguration of the G1000 system.

---

## 1.2 LRU Descriptions



**GDU 1040/1044B:** The GDU 104X display is the most visible portion of the G1000 system. The GDU 104X has a 10.4-inch LCD display with 1024 x 768 resolution. One is configured as a Primary Flight Display or PFD, the other is configured as the Multi-Function Display or MFD. The MFD shows navigation information and engine/airframe instrumentation. The PFD shows primary flight information, in place of traditional gyro systems. Both GDU 104Xs link and display all functions of the G1000 system during flight. The displays communicate with each other and the GIA 63/63W units through a High-Speed Data Bus (HSDB) Ethernet connection. The GDU 1044B provides autopilot controls.



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



**GIA 63/63W:** The GIA is the central 'Integrated Avionics Unit' (IAU) to the G1000 system. The GIA functions as a main communications hub, linking all LRUs with the PFD and MFD displays. The GIA contains the GPS receiver, VHF COM/NAV receivers, and system integration microprocessors. The GIA communicates directly with the GDU 104X displays using a HSDB Ethernet connection. Software and configuration settings are sent from the displays through the GIA to LRUs in the system. The GIA 63W contains a WAAS certified GPS receiver.



**GRS 77:** The GRS 77 is an attitude, heading, and reference, or AHRS, unit that provides aircraft attitude and flight characteristics information to the G1000 displays and GIAs. The unit contains advanced tilt sensors, accelerometers, and rate sensors. In addition, the GRS 77 interfaces with both the GDC 74A Air Data computer and the GMU 44 magnetometer. The GRS 77 also utilizes GPS signals sent from the GIA. Actual attitude and heading information is sent using ARINC 429 digital interface to both GDU 104Xs and GIAs.



**GMU 44:** The GMU 44 magnetometer senses magnetic field information. Data is sent to the GRS 77 ARHS for processing to determine aircraft magnetic heading. This unit receives power directly from the GRS 77 and communicates with the GRS 77 using RS-485 digital interface.



**GDC 74A:** The GDC 74A air data computer compiles information from the pitot/static system and various outside air temperature (OAT) and angle of attack (AOA) sensors. The GDC 74A is responsible to provide pressure altitude, airspeed, vertical speed, and OAT information to the G1000 system. The GDC 74A communicates with the GIA 63/GIA 63W, GDU 104X, and GRS 77 using ARINC 429 digital interface. Software and configuration settings are received through RS-232 digital interface with the GIA 63/GIA 63W.



**GEA 71:** The GEA 71 is a microprocessor-based LRU that is responsible for receiving/processing signals from engine and airframe sensors. Sensor examples include engine temperature and pressure sensors as well as fuel measurement and pressure sensors. The GEA 71 communicates directly with both GIAs using RS-485 digital interface. The GEA 71 can serve aircraft from basic single-engine platforms to sophisticated turbine propulsion systems. Software and configuration settings are received through RS-232 digital interface with the GIA.



**GTX 33:** Solid-state Mode-S transponder. Provides Modes A, C, and S functions. Control and operation is directed through the PFD. The transponder communicates with both GIAs through RS-232 digital interface. Software and configuration settings are received through RS-232 digital interface with the GIA.



**GDL 69/69A:** The GDL 69/69A is an XM Satellite Radio data link receiver that receives broadcast weather data. The GDL 69A is the same as the GDL 69 with the addition of XM Satellite Radio audio entertainment. Weather data and control of audio channel and volume is displayed on the GDU 104X MFD, via a High-Speed Data Bus (HSDB) Ethernet connection. The GDL 69A is also interfaced to the GMA 1347 Audio Panel for amplification and distribution of the audio signal.



**GDL 90** The GDL 90 is a remote-mounted product that contains a GPS/WAAS receiver and a Universal Access Transceiver. The GDL 90 will transmit “ownership” data via the UAT data link. It will receive data from other UAT-equipped aircraft as well as FIS-B weather – the received data may be output to an appropriate display.



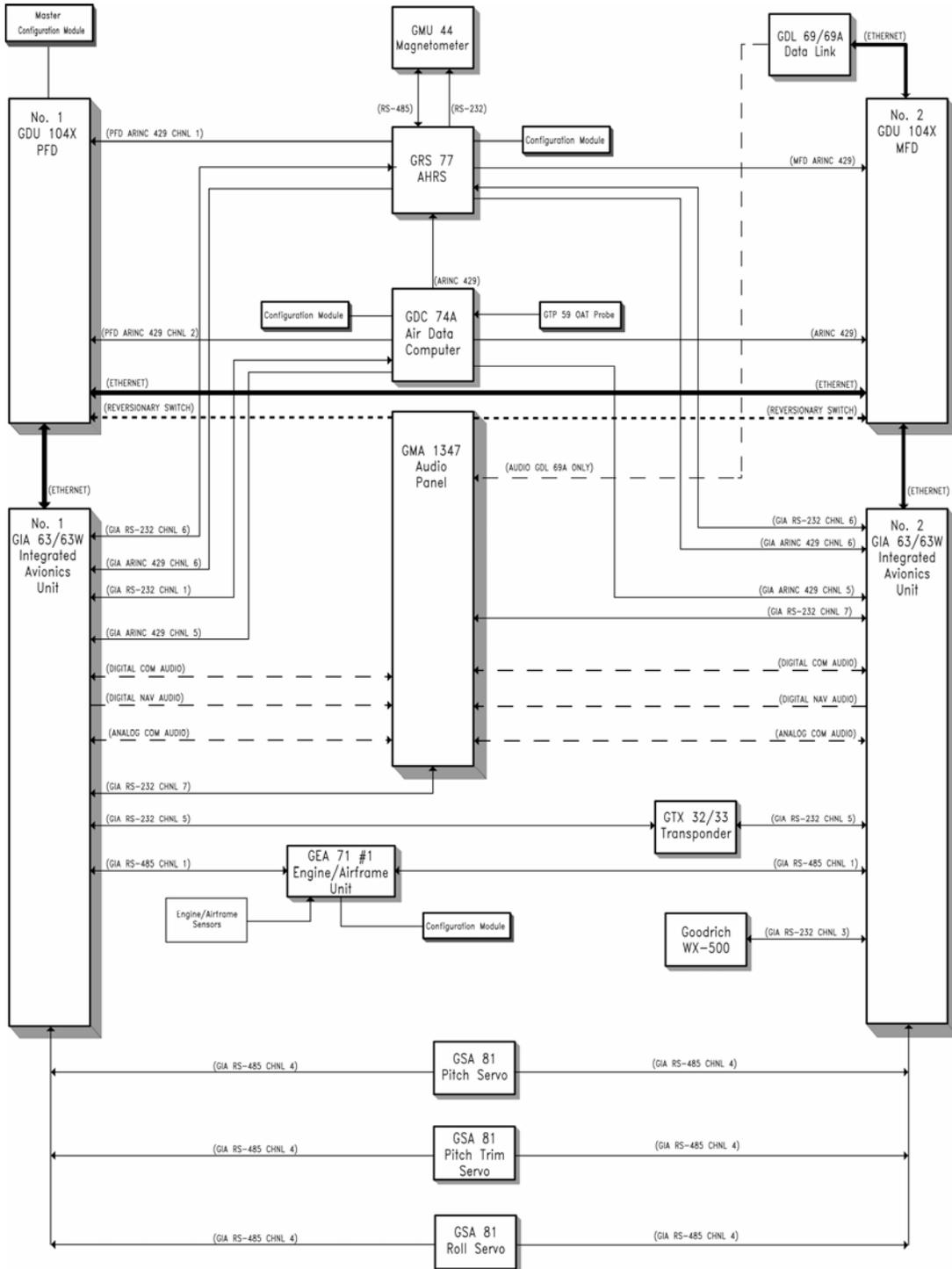
**GSA 81 & GSM 85:** The GSA 81 servo actuator is an electromechanical LRU that provides automatic control of pitch, roll, and pitch trim. It also provides manual electric trim functionality. The GSA 81 contains a motor-control and monitor circuit board, as well as a solenoid and a brushless DC motor. The GSA 81 receives serial RS-485 data packets from the GIA 63Ws.

The GSM 85 servo mount is mounted to the aircraft structure, via a custom mounting bracket, and is responsible for transferring the output torque of the GSA 81 servo actuator to the mechanical flight-control surface linkage.

### 1.3 G1000 Block Diagrams

#### 1.3.1 Typical System Interconnect

Figure 1-1 shows a typical Cessna Nav III G1000 system interconnect.



**Figure 1-1. Typical Cessna Nav III G1000 System Interconnect**

### 1.3.2 Flight Instrumentation

The GRS 77 AHRS, GDC 74A Air Data Computer, and GMU 44 Magnetometer are responsible for providing the G1000 system with flight instrumentation. Data consist of aircraft attitude, heading, altitude, airspeed, vertical speed, and outside air temperature information, all displayed on the PFD (data is displayed on the MFD in reversionary mode).

Primary data outputs from the GRS and GDC are sent directly to the PFD via ARINC 429. Secondary data paths connect the GRS to the MFD. Additional communications paths connect the GRS and GDC to both GIA units, providing quadruple redundant interface.

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

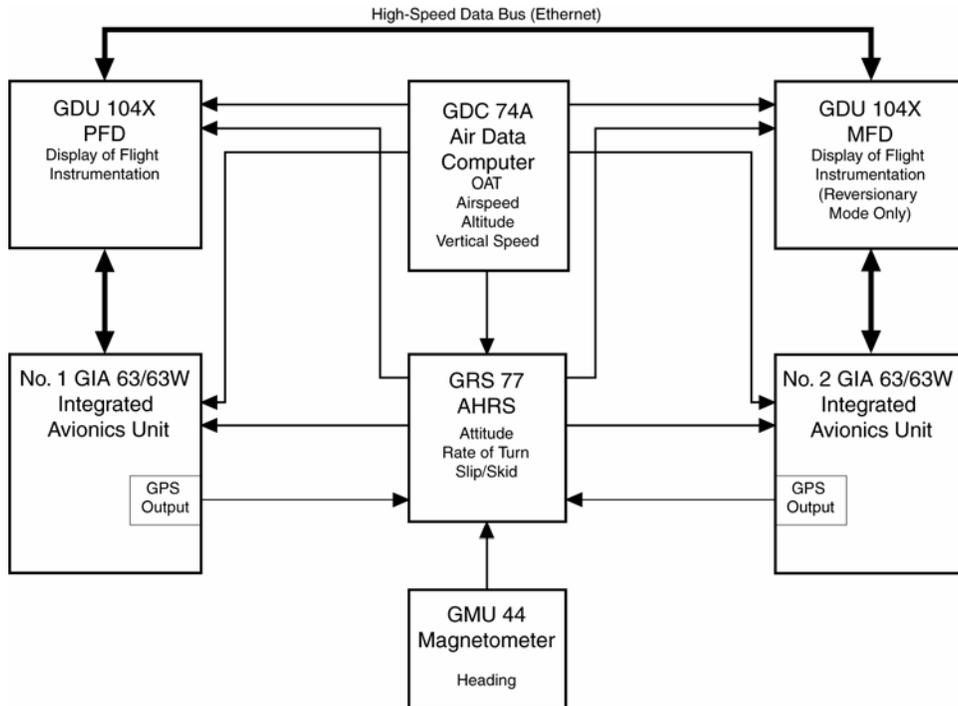


Figure 1-2. G1000 Flight Instrumentation Data Paths

### 1.3.3 Navigation/Communication Systems

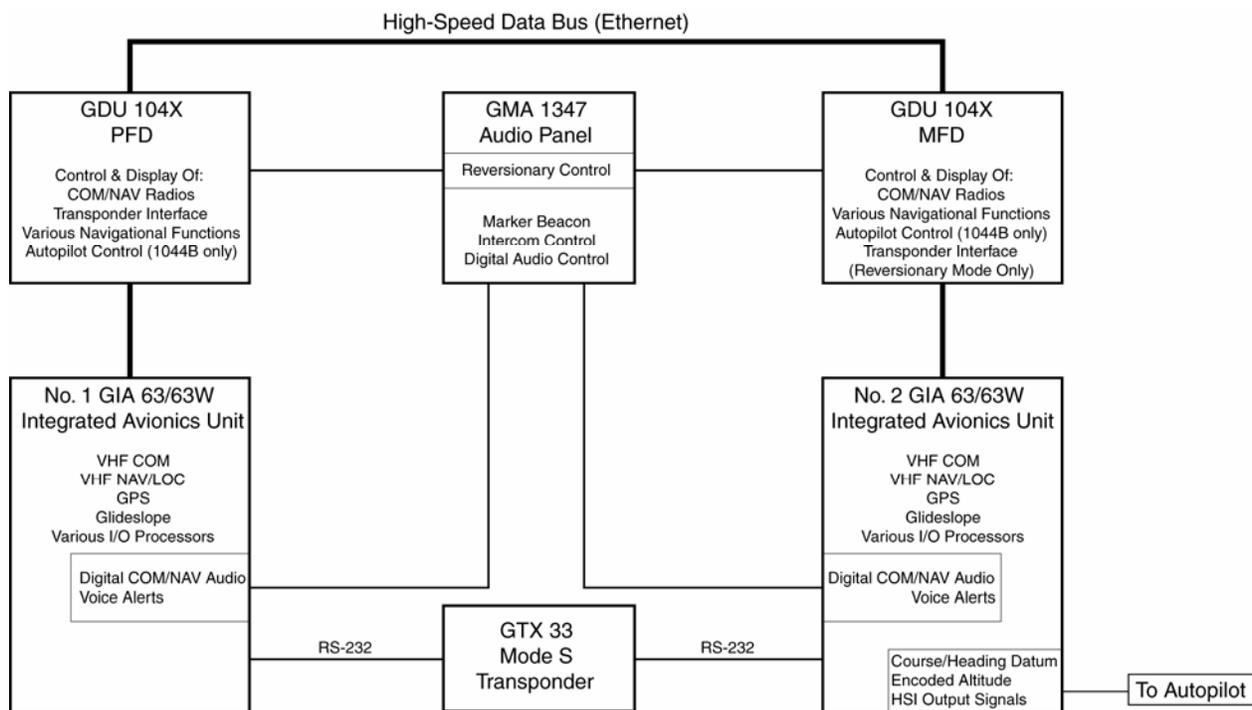
The GIAs contain VHF COM, VHF NAV, and GPS receivers. COM and NAV audio is sent via digital audio to the GMA 1347 Audio Panel.

GPS information is sent to the GRS 77 AHRS and both displays for processing.

The GTX 33 Mode S Transponder communicates with both GIAs. Transponder data is sent from the GIAs to the PFD.

The #2 GIA outputs analog HSI signals to the KAP 140 autopilot, if equipped. In the case of the GFC 700 both of the GIAs communicate to the servos through RS-485, see Figure 1-1.

The GMA 1347 Audio Panel controls audio selections and the display reversionary mode.

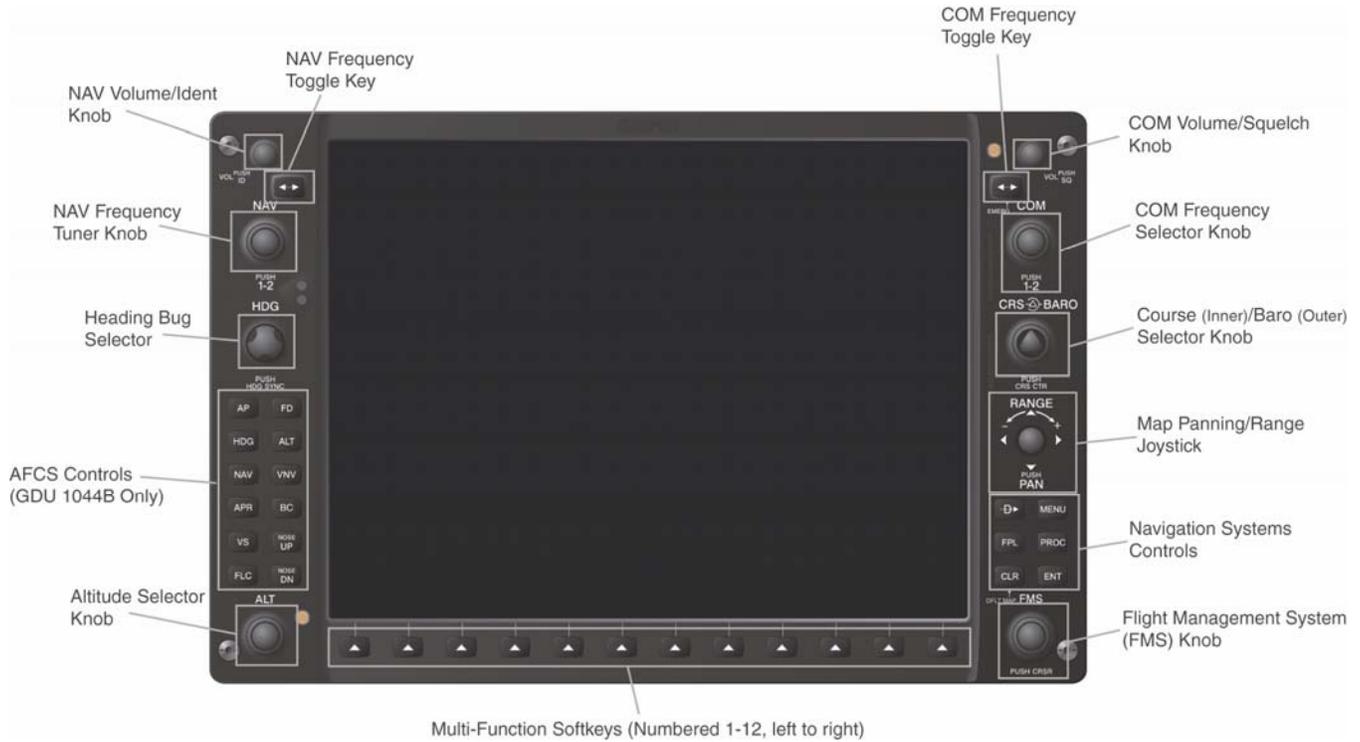


**Figure 1-3. G1000 Navigation/Communication Data Paths**

## 1.4 User Interface

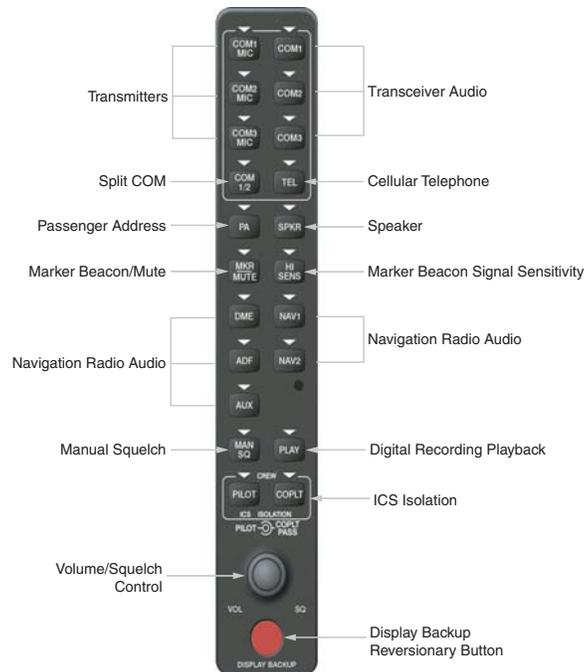
### 1.4.1 Control & Operation

All control and operation of G1000 equipment as normally used in flight occurs through the PFD, MFD or GMA 1347 audio panel. Figure 1-4 identifies various GDU 104X buttons. See the appropriate G1000 Nav III Cockpit Reference Guide, as well as the appropriate AFMS for more detail on control and operation of the G1000.



**Figure 1-4. GDU 104X Control Interface**

### 1.4.2 GMA 1347 Control



**Figure 1-5. GMA 1347 Control Interface**

### 1.4.3 Configuration Mode Operation

The configuration mode exists to provide the installer or technician with a means of configuring, checking, and calibrating various G1000 sub-systems. Troubleshooting/diagnostics information can also be derived from this mode.

To start the system in Configuration Mode:

1. Press and hold the ENT key on the PFD while applying power.
2. Release the ENT key after 'INITIALIZING SYSTEM' appears in the upper left corner of the PFD.
3. Power on the MFD in the same manner. It is best to have both displays in the same mode.

#### NOTE

Configuration settings for each G1000 LRU must be adjusted on the PFD.

### 1.4.4 FMS Cursor

The FMS knob is the primary control for the G1000 system. Operation is similar to the Garmin 400/500 Series units.

- To cycle through different configuration screens:
  - To change page groups:* Rotate the large FMS knob.
  - To change pages in a group:* Rotate the small FMS knob.
- To activate the cursor for a page, press the small FMS knob directly in, as one would push a regular button.
- 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 either brings up an options menu for the particular field, or in some cases allows the operator 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, deactivates the cursor. The CLR key may also be used to cancel a selection or deactivate the cursor.



Figure 1-6. FMS Control Knob

## 1.4.5 Softkeys

Some configuration pages have commands or selections that are activated by the GDU 104X softkeys. 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 1-7. G1000 Softkeys

## 1.4.6 Configuration Mode Overview

The following diagram shows the layout and organization of various configuration mode page groups and pages.

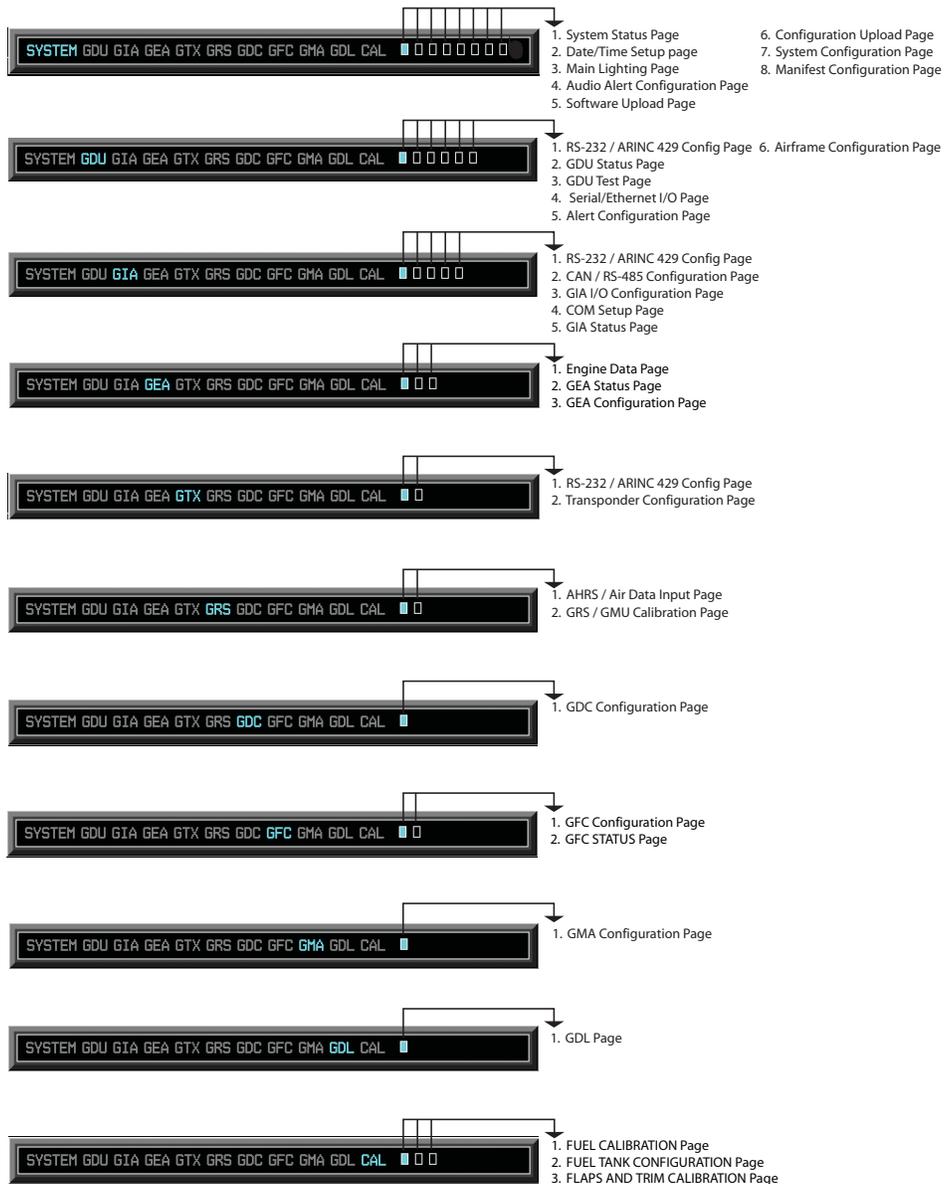


Figure 1-8. Configuration Mode Navigation

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### 1.4.7 Data Transmission Indicators

Several configuration screens utilize indicator light to show data and/or component status. Unless otherwise noted, the following applies to all such indicators:

- Green Light: Expected discrete data is successfully received and true, or status is good.
- Red Light: Expected discrete data is not received or is invalid, or status is bad.
- No Light (Black): No discrete data is expected, or it is received successfully and off, or status is not received or is invalid.

### 1.4.8 Configuration Page Protection

The configuration mode contains pages that display various settings that are critical to aircraft operation and safety. At these pages, the technician is unable to modify or change settings unless they are authorized and equipped to do so. However, most protected pages are viewable to allow technicians greater system awareness for troubleshooting.

### 1.4.9 G1000 Loader Card Interface

The G1000 Loader Card interface exists to provide a means of loading software and configuration files to the system. The G1000 Loader Card uses a 128 MB Secure Digital (SD) data card that contains all necessary files to load software and configuration settings to all G1000 LRUs.

Nearly all software and configuration parameters are pre-determined by Garmin and/or Cessna. During removal and replacement of LRUs, software and configuration files may need to be reloaded. To satisfy TC/STC requirements for a specific aircraft, it is critical that the technician use the correct G1000 Loader Card part number. Each Loader Card's part number defines all files found on the card for a specific G1000 installation.

Note that certain configuration settings, such as aircraft registration number ('N#') must be entered manually. A sample procedure for loading software and configuration settings can be found in Section 4 of this manual.

#### **CAUTION**

Always use caution when using G1000 Software Loader Cards during maintenance. The G1000 system 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 G1000 Software Loader Cards.

---

### 1.4.10 Configuration Files

A G1000 Loader Card typically contains the following configuration files:

- **AIRFRAME:** This file 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:** This file configures the G1000 Ethernet to communicate with a PFD, MFD, and GIAs.
- **MANIFEST:** This file loads a manifest of all software part numbers and versions associated with an approved system configuration.
- **MFD1:** This file configures the MFD serial/discrete communications and alerting system settings.
- **PFD1:** This file configures the PFD serial/discrete communications and alerting system settings.
- **GIA1/GIA2:** These files configure GIA1 and GIA 2 serial/discrete communications settings.
- **GMA1:** This file configures the GMA 1347 audio and serial communications settings.
- **GTX1:** This file configures the GTX transponder and serial communications settings.
- **GEA1:** This file configures GEA 71 engine/airframe parameters.
- **GDC1:** This file configures the GDC 74A air data values.
- **GDL69:** This file configures the GDL 69A serial communications settings
- **CALIBRATION:** This file configures calibration values for various analog sensors connected to the GEA (fuel quantity, fuel flow, etc.)
- **AUDIO:** This file configures all of the audio messages for the G1000 system. This includes both tones and voice messages that are utilized for alerts, cautions, and warnings.

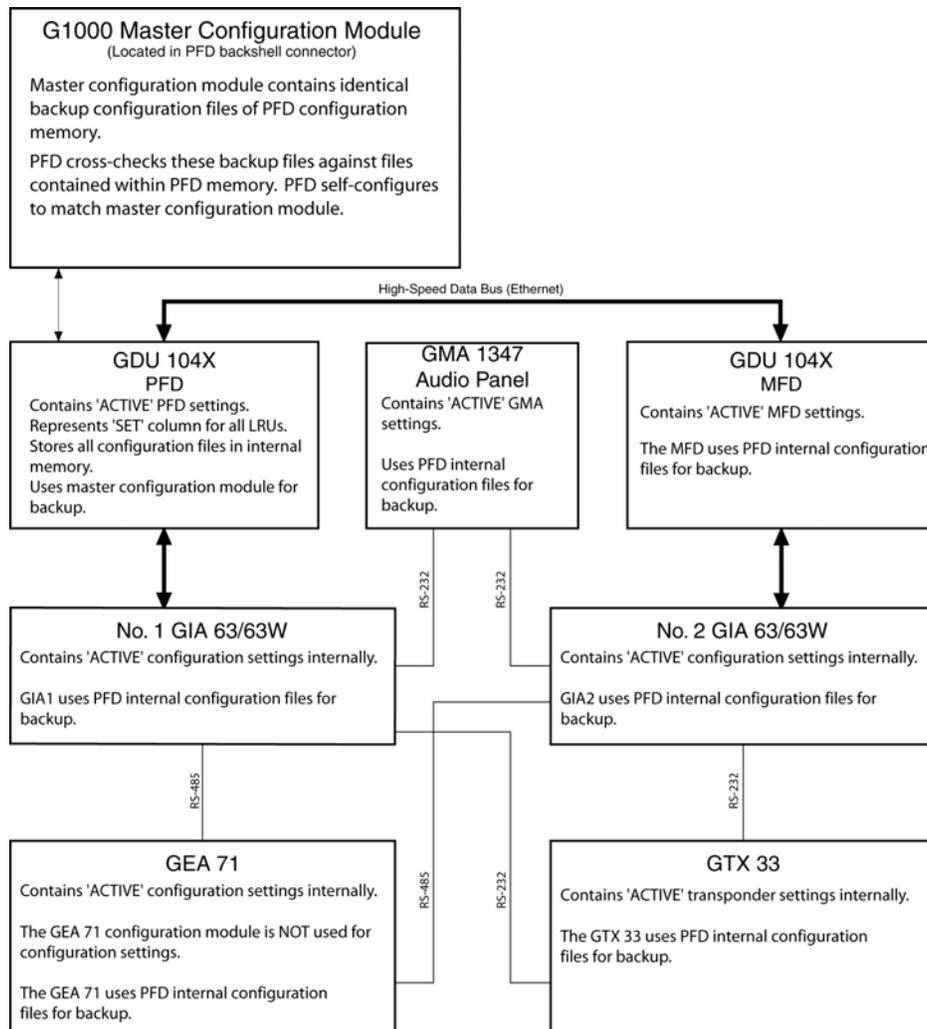
The above files are loaded during the configuration process. Each file is sent directly to the applicable LRU. The same file is also stored into PFD internal configuration memory and configuration module. If the PFD is replaced, the configuration module retains all configuration files in the aircraft.

<b>NOTE</b>
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The GRS 77 AHRS and GMU 44 Magnetometer do not utilize a configuration file. However, these LRUs do require several calibrations during installation and/or maintenance.

### 1.4.11 Configuration File Retention

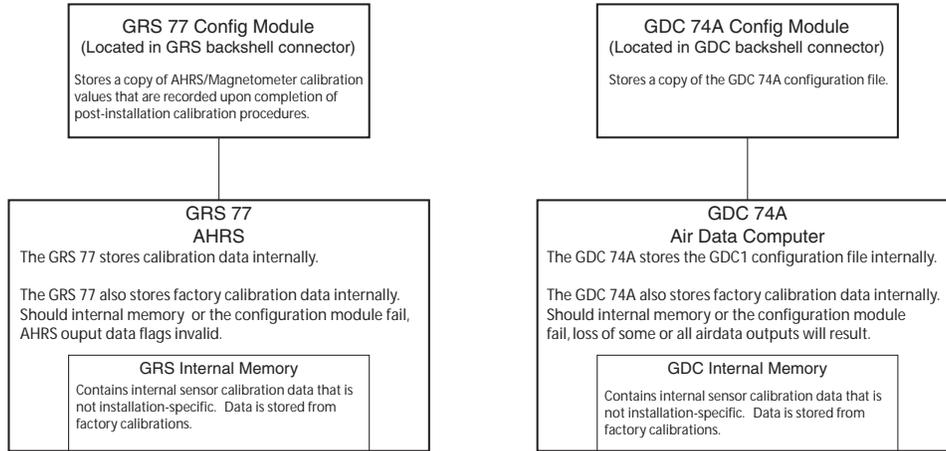
The G1000 system is designed to store all configuration settings in various places so that the configuration of the system is retained in the aircraft during maintenance. Since the G1000 Integrated Flight Deck is installed in a variety of aircraft, it is imperative that aircraft-specific data be retained at the aircraft level. Figures 1-9 and 1-10 show a block diagram of how a typical G1000 system stores configuration settings.



**Figure 1-9. G1000 Configuration Storage**

The GRS 77 and GDC 74A configuration modules function differently than the rest of the system. The GDC 74A'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 1-10. GRS/GDC Configuration Storage**

#### 1.4.12 SET>ACTV / ACTV>SET

Throughout various configuration mode pages, there are SET and ACTIVE columns for input/output settings and other parameters.

**SET:** Refers to a setting or group of settings that reside in the PFD's internal memory and/or master configuration module (See Figure 1-11).

**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** (read 'Set to Active') softkey: 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 LRU).
- **ACTV>SET** (read 'Active to Set') softkey: Causes the LRUs current settings to be copied to the master configuration module as SET items.

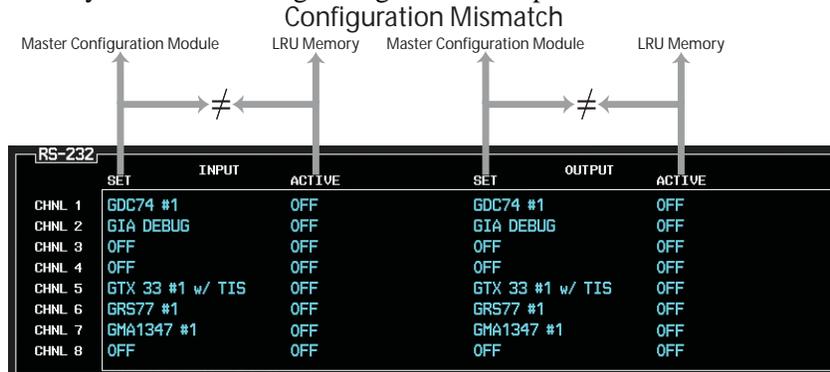
In the first example shown in Figure 1-11, the SET columns do not match the ACTIVE columns. The inequality between SET and ACTIVE indicates a configuration mismatch. By pressing the SET>ACTV softkey, this copies the SET column to the LRU unit's configuration memory. The settings then become the ACTIVE settings for the LRU being configured.

### 1.4.13 ACTV>SET Interface

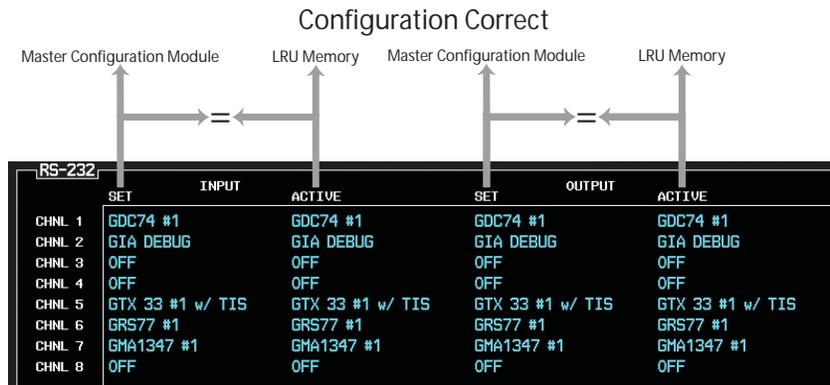
The only time ACTV>SET should be used is when the master configuration module fails and must be replaced. In this circumstance the ACTV>SET softkey may be used to reload correct configuration settings from previously installed LRUs. Should a LRU be replaced along with the master configuration module, the LRU needs to be reconfigured using the G1000 SW Loader Card.

**WARNING**

The ACTV>SET softkey must be used with caution! If an improperly configured unit is installed, this softkey causes the wrong configuration to replace the correct aircraft configuration!

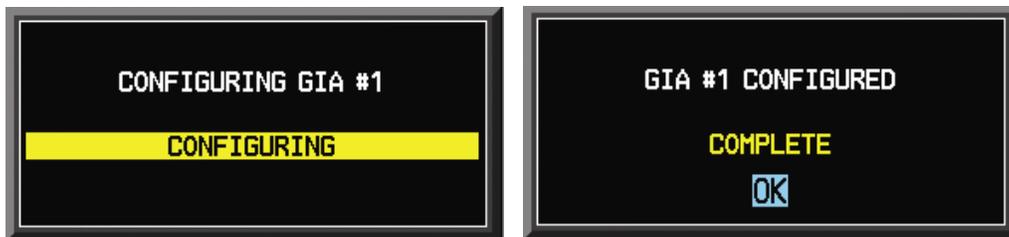


SET>ACTV Softkey



**Figure 1-11. SET/ACTV Feature**

In most cases, when a setting is changed, the newer setting will automatically be transferred to the appropriate LRU. The technician receives on-screen confirmation that the configuration is successful, as depicted in Figure 1-12. Likewise, if a configuration error is detected, it too is shown in similar fashion.



**Figure 1-12. Configuration Status**

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## 1.5 Recommended Tools

The following tools are needed to perform various maintenance tasks on G1000 equipment:

- Voltmeter capable of measuring 0-32 Volts DC
- #2 Phillips Screwdriver
- 3/32<sup>nd</sup> 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

## 2 TROUBLESHOOTING

Begin troubleshooting by determining the specific failure. Follow guidance for the appropriate LRU provided in this section. Reference applicable aircraft manufacturer provided wiring diagrams as an aid in troubleshooting.

### NOTE

See Section 3 for instructions on removing and replacing. Once an LRU is replaced, a software update and configuration may be required. See Section 4 for instructions on configuration and uploading software.

## 2.1 G1000 Alerting System

### 2.1.1 System Annunciations

A red X through a display field; such as Com frequencies, Nav frequencies, or engine data, indicates that display field is not receiving valid data. Figure 2-1 shows display fields that are not receiving valid data and their associated LRUs. See Section 2.1.1.1 for information on troubleshooting system annunciations.

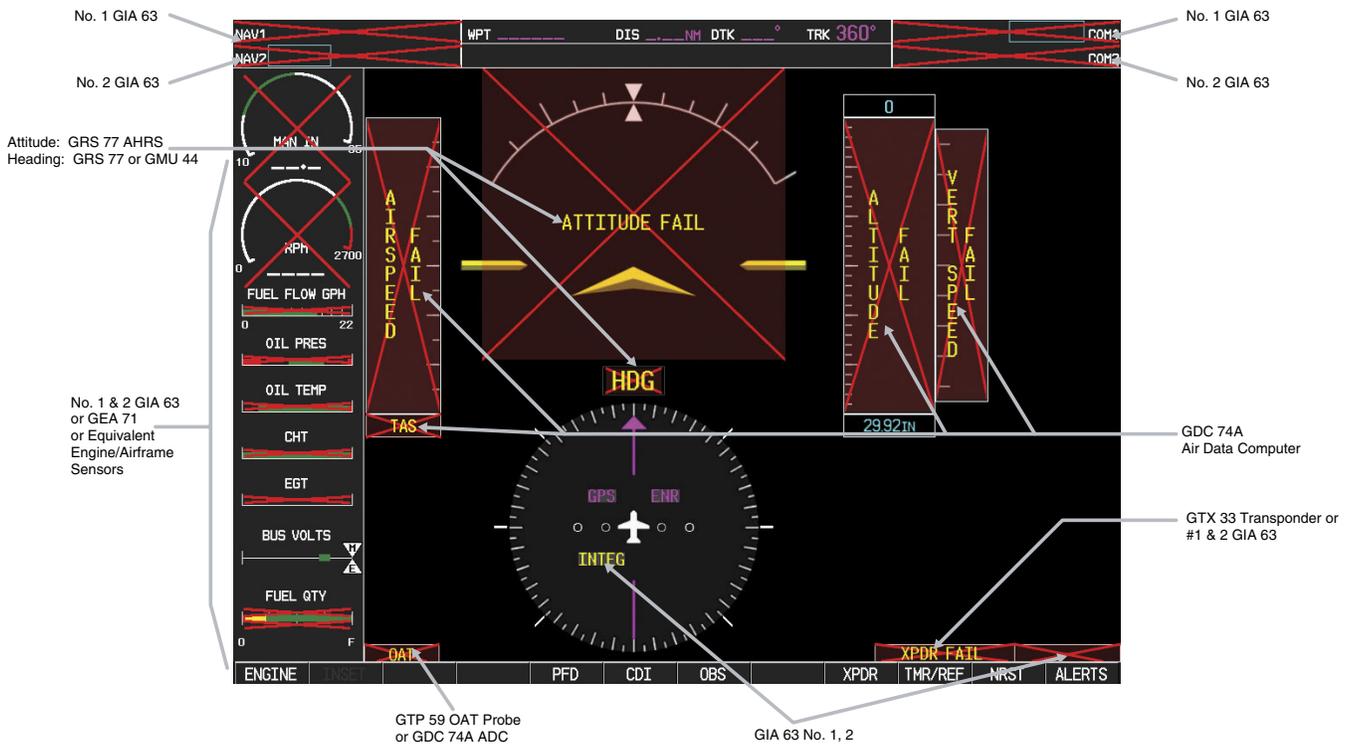
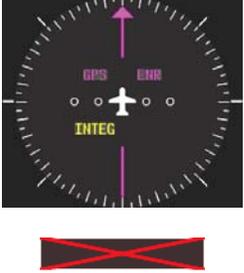
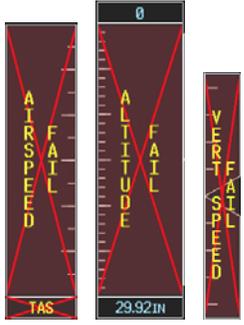


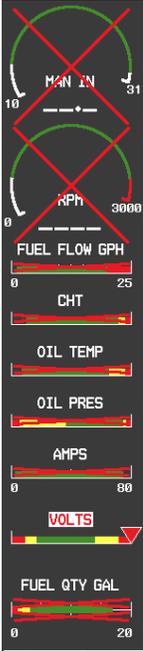
Figure 2-1. Red X'd Display Fields

### 2.1.1.1 System Annunciation Troubleshooting

Annunciation	Associated LRU	Solution
<p>NAV1 or COM1</p> 	GIA1	<ul style="list-style-type: none"> <li>• Check configuration settings for GIA1 and the PFD</li> <li>• Check Ethernet interconnect from GIA1 to the PFD</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows GIA1, replace GIA1.</li> <li>✓ If problem persists, replace PFD.</li> </ul> </li> </ul>
<p>NAV2 or COM2</p> 	GIA2	<ul style="list-style-type: none"> <li>• Check configuration settings for GIA2 and the MFD</li> <li>• Check Ethernet interconnect from GIA2 to the MFD</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows GIA2, replace the GIA2.</li> <li>✓ If problem persists, replace MFD.</li> </ul> </li> </ul>
<p>GPS INTEG or Time</p> 	GIA1 or 2	<ul style="list-style-type: none"> <li>• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.</li> <li>• Check GPS1 and GPS2 signal strength on AUX page 3</li> <li>• Check corresponding GPS antenna and cable</li> <li>• Check Ethernet interconnect between the PFD and GIA1 or MFD and GIA2 for faults.</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the GIA, replace the GIA.</li> <li>✓ If problem persists, replace the MFD or PFD.</li> </ul> </li> </ul>
<p>XPDR FAIL</p> 	GTX 33	<ul style="list-style-type: none"> <li>• Check GTX 33 configuration settings for GIA1 and GIA2</li> <li>• Perform a SET&gt;ACTV configuration reset on the GTX Config page, and verify the aircraft registration is present.</li> <li>• Replace the GTX 33</li> </ul>
<p>TAS, AIRSPEED FAIL, ALTITUDE FAIL, VERT SPEED FAIL</p> 	GDC 74A	<ul style="list-style-type: none"> <li>• Inspect GDC 74A pitot/static plumbing integrity.</li> <li>• Inspect pitot/static ports and associated equipment.</li> <li>• For TAS failure, also check GTP 59 probe.</li> <li>• Check GDC 74A configuration settings for the PFD, MFD, GIA1, and GIA2 <ul style="list-style-type: none"> <li>✓ If PFD, MFD, and GIA configuration settings are correct, replace the GDC configuration module.</li> <li>✓ If problem persists, replace the GDC 74A</li> </ul> </li> </ul>
<p>OAT and TAS</p> 	GTP 59	<ul style="list-style-type: none"> <li>• Check OAT probe wiring and connectors for faults.</li> <li>• Check GDC config module wiring for damage, replace if any is found.</li> <li>• Replace GDC config module</li> <li>• Replace GDC 74A with a known good unit: <ul style="list-style-type: none"> <li>✓ If problem persists, replace the GTP 59.</li> </ul> </li> </ul>

Annunciation	Associated LRU	Solution
<p>ATTITUDE FAIL</p>  <p>The image shows a dark rectangular graphic with a white heading 'ATTITUDE FAIL' at the top. Below the heading is a white semi-circular scale with tick marks. A white arrow points to the top of the scale. Below the scale are two horizontal white arrows pointing outwards. At the bottom center is a white upward-pointing arrow. The entire graphic is overlaid with a large red 'X'.</p>	<p>GRS 77</p>	<ul style="list-style-type: none"> <li>• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.</li> <li>• Cycle GRS 77 power to restart initialization.</li> <li>• Ensure GRS 77 connector is secure and proper wire harness strain relief is provided.</li> <li>• Ensure the GRS 77 is fastened down tightly in it's 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).</li> <li>• Ensure aircraft battery is mounted securely if located near the GRS 77.</li> <li>• 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.</li> <li>• Perform an Engine Run-Up Test to check if engine vibration is causing the GRS 77 to go offline.</li> <li>• Load configuration files to the PFD, MFD, GIA1, and GIA2.</li> <li>• Calibrate the GRS 77 (Pitch/Roll Offset and Magnetometer Calibration).</li> <li>• Replace GRS 77. <ul style="list-style-type: none"> <li>✓ If problem persists replace GRS 77 configuration module. See Section 3.4 for configuration instructions.</li> </ul> </li> <li>• Contact Garmin Aviation Product Support if condition continues after replacing the GRS 77 and config module for additional assistance.</li> </ul>

Annunciation	Associated LRU	Solution
<p>HDG FAIL</p> 	<p>GRS 77 &amp; GMU 44</p>	<ul style="list-style-type: none"> <li>• 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</li> <li>• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.</li> <li>• 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.</li> <li>• 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.</li> <li>• Ensure GRS 77 and GMU 44 connectors are secure.</li> <li>• Check the wiring and any inline connectors between the GRS and GMU for faults.</li> <li>• Recalibrate the GMU 44, see Section 4.4.5..2.</li> <li>• Load configuration files to the PFD, MFD, GIA1, and GIA2 <ul style="list-style-type: none"> <li>✓ If problem persists replace the GMU 44.</li> <li>✓ If problem persists, replace the GRS 77.</li> </ul> </li> </ul>

Annunciation	Associated LRU	Solution
<p>Engine/Airframe Sensors</p> 	<p>GEA 71</p>	<ul style="list-style-type: none"> <li>• Check for GEA related Alert messages on the PFD. Correct any Alerts concerning software or configuration errors by reloading software or configuration as noted.</li> <li>• Verify GEA internal power supply, configuration, and calibration status in configuration mode. <ul style="list-style-type: none"> <li>✓ Configuration and calibration boxes should be green. If they are red, replace the GEA 71.</li> <li>✓ With GDU software version 4.00 or higher, the INT PWR SUPPLY box should be green. If it is red, check for a shorted airframe sensor (reference Cessna wiring schematics for your aircraft type) by unplugging airframe sensors that receive power from the GEA one at a time until the INT PWR SUPPLY box turns green. The last sensor that was unplugged before the box turned green is the cause of the problem. Replace that sensor (reference Cessna Aircraft Maintenance Manual for instructions). Systems with GDU software versions less than 4.00 will display a red box, indicating proper operation. Troubleshoot in the same manner as for GDU software above 4.00 except the box color will behave oppositely.</li> </ul> </li> <li>• 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). Reference Section 2.7.1.2. <ul style="list-style-type: none"> <li>✓ If any voltages are dashed out, replace the GEA.</li> </ul> </li> <li>• Ensure the GEA is online (green checkmark on the AUX – SYSTEM STATUS page). <ul style="list-style-type: none"> <li>✓ If GEA is not online verify unit is receiving power at the rack connector.</li> <li>✓ Check the GIA/GEA interconnects for faults.</li> <li>✓ Reload configuration files to both GIA's and the GEA.</li> <li>✓ If problem persists, replace the GEA 71.</li> </ul> </li> <li>• For only Red-X of the EGT and CHT temperature readings, replace the GEA configuration module and backshell thermocouple. <ul style="list-style-type: none"> <li>✓ If problem persists, replace the GEA 71.</li> </ul> </li> </ul>

## 2.1.2 Messages & Annunciations



**Figure 2-2. Alerts & Annunciations**

In normal mode, the G1000 system presents a variety of system messages and/or annunciations to the operator and technician. System messages are normally presented on the PFD and can be viewed by pressing the ALERTS softkey. This section provides a listing of possible messages, alerts, and annunciations. Aircraft specific alerts are not covered in this manual.

## 2.1.3 System Status Page (MFD Normal Mode)



**Figure 2-3. System Status Page (AUX Group)**

The AUX – SYSTEM STATUS page on the MFD provides LRU health status when in normal mode.

## 2.1.4 AFCS System Troubleshooting

The information in this section specifically relates to the GFC 700. Should a problem be encountered during the operation of the GFC 700, the pilot and technician should first evaluate the overall status and condition of the G1000 system on the AUX – System Status page (on the MFD). Any alert messages, annunciations, or other abnormal behaviors should be noted in an effort to pinpoint the fault. More detailed system troubleshooting for a red AFCS or red PFT annunciator is contained in Section 2.11.

### 2.1.4.1 Annunciations and Alerts

The GFC 700 AFCS Annunciation field is located above the airspeed tape on the PFD as shown in Figure 2-4.



Figure 2-4. AFCS Annunciation Field

The following annunciations may appear in the AFCS Annunciation field:

Annunciation	Condition	Solutions
	AFCS System Failure	<ul style="list-style-type: none"> <li>• Ensure that the G1000 system is in proper working order. Check specifically for proper operation of the:               <ul style="list-style-type: none"> <li>• GIA 63W Integrated Avionics Unit</li> <li>• GRS 77 AHRS</li> <li>• GDC 74A Air Data Computer</li> <li>• All GSA 81 Servos</li> </ul> </li> <li>• Check that no red X's are present on the MFD and PFDs.</li> <li>• Check that there are no Alert messages present in the PFD Alert window. Correct any software or configuration errors noted.</li> <li>• Go to the AUX SYSTEM STATUS page on the MFD and verify that all LRUs have a 'green' check.</li> <li>• If the OAT and TAS is Red-X'd and the attitude indication is present, replace the GDC74 config module.               <ul style="list-style-type: none"> <li>✓ If the condition is still present, replace the config module wiring harness.</li> </ul> </li> <li>• See Section 2.10 for further troubleshooting.</li> </ul>
	Pitch Axis Failure	<ul style="list-style-type: none"> <li>• Check the AUX – SYSTEM STATUS page to see if the servo is online (green check).</li> </ul>
	Pitch Trim Axis Failure	<ul style="list-style-type: none"> <li>• Check that the affected servo is receiving power.</li> </ul>
	Roll Axis Failure	<ul style="list-style-type: none"> <li>• Check the servo wiring and connector.</li> <li>• Ensure PTRM switches are not stuck.</li> <li>• If failure condition still exists, remove and replace the affected servo.</li> </ul>
	Elevator Mistrim Down	<ul style="list-style-type: none"> <li>• If mistrim annunciations persist, check the Pitch Trim servo for proper operation. Verify that the servo is online at the AUX – SYSTEM STATUS page.</li> <li>• Check the Pitch Trim servo wiring and connector. Ensure the servo is receiving power.</li> </ul>
	Elevator Mis-Trim Up	<ul style="list-style-type: none"> <li>• Check the aircraft trim control rigging.</li> <li>• If mistrim condition still exists, remove and replace the affected servo.</li> </ul>
	Aileron Mistrim Right	<ul style="list-style-type: none"> <li>• Check for possible fuel imbalance.</li> <li>• Check aileron control rigging.</li> </ul>
	Aileron Mistrim Left	<ul style="list-style-type: none"> <li>• If mistrim condition still exists remove and replace the roll servo.</li> </ul>
	Pre-Flight Test	<ul style="list-style-type: none"> <li>• Reset servo power by cycling the circuit breaker.</li> <li>• See Section 2.10 for further troubleshooting.</li> </ul>

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### 2.1.5 Failed Path Messages (GDU Software Version 7.01 and later only)

The following message indicates there is a data path connected to the GDU (MFD or PFD) or the GIA 63/GIA 63W (1 or 2) that has failed

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

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

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

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

<b>NOTE</b>
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For GDU software version prior to 7.01, the data path boxes may not be present on the GDU and GIA config pages. Troubleshooting failed path messages will require manually checking the data lines using a continuity tester and may require swapping GDU's, GIA's or other units to determine if the fault lies in the unit or wiring. Garmin recommends following the troubleshooting instructions for the red data boxes below to help find the cause of the fault.

The box next to each channel indicates the current status of the channel per the below.

Red = data path is known to be failed  
Black = data path status is unknown  
Green = data path is known to be good

The applicable data paths can be verified by viewing the configuration mode pages listed below.

2.1.5.1 PFD RS-232 / ARINC 429 CONFIG Page

PFD1 ARINC 429

Channel	LRU	Indicator	Status
IN 1	GRS 77 #1		PFD1/GRS 77 data path is functioning correctly
			<p>PFD1/GRS 77 data path is not functioning correctly</p> <ul style="list-style-type: none"> <li>• Configure PFD1</li> <li>• Configure GRS 77</li> <li>• Check the PFD1/GRS 77 interconnect wiring for faults</li> <li>• Swap the PFD with the MFD to confirm if the problem is in the original PFD.                             <ul style="list-style-type: none"> <li>○ Replace original PFD if box turns green after swapping displays.</li> <li>○ Replace GRS 77 if problem remains.</li> </ul> </li> </ul>
			PFD1/GRS 77 data path functionality is unknown. Reload PFD configuration file.
IN 2	GDC 74 #1		PFD1/GDC 74 data path is functioning correctly
			<p>PFD1/GDC 74 data path is not functioning correctly</p> <ul style="list-style-type: none"> <li>• Reconfigure PFD1.</li> <li>• Reconfigure GDC 74A.</li> <li>• Check the PFD1/GDC 74 interconnect wiring for faults.</li> <li>• Swap the PFD with the MFD to confirm if the problem is in the original PFD.                             <ul style="list-style-type: none"> <li>○ Replace original PFD if box turns green after swapping displays.</li> <li>○ Replace GDC 74A if problem remains.</li> </ul> </li> </ul>
			PFD1/GDC 74 data path functionality is unknown. Reload PFD configuration file.

2.1.5.2 PFD RS-232 / ARINC 429 CONFIG Page

**MFD1 ARINC 429 Config**

Channel	LRU	Indicator	Status
IN 1	GRS 77 #1		MFD1/GRS 77 data path is functioning correctly.
			<p>MFD1/GRS 77 data path is not functioning correctly.</p> <ul style="list-style-type: none"> <li>• Reconfigure MFD1.</li> <li>• Reconfigure GRS 77.</li> <li>• Check the MFD1/GRS 77 interconnect wiring for faults.</li> <li>• Swap the MFD with the PFD to confirm if the problem is in the original MFD.                             <ul style="list-style-type: none"> <li>○ Replace original MFD if box turns green after swapping displays.</li> <li>○ Replace GRS 77 if problem remains.</li> </ul> </li> </ul>
			MFD1/GRS 77 data path functionality is unknown. Reload MFD configuration file.
IN 2	GDC 74 #1		MFD1/GDC 74 data path is functioning correctly.
			<p>MFD1/GDC 74 data path is not functioning correctly.</p> <ul style="list-style-type: none"> <li>• Reconfigure MFD1.</li> <li>• Reconfigure GDC 74A.</li> <li>• Check the MFD1/GDC 74 interconnect wiring for faults.</li> <li>• Swap the MFD with the PFD to confirm if the problem is in the original MFD.                             <ul style="list-style-type: none"> <li>○ Replace original MFD if box turns green after swapping displays.</li> <li>○ Replace GDC 74A if problem remains.</li> </ul> </li> </ul>
			MFD1/GDC 74 data path functionality is unknown. Reload MFD configuration file.

### 2.1.5.3 GIA RS-232 / ARINC 429 CONFIG Page

#### GIA1 RS-232

Channel	LRU	Indicator	Status
CHNL 1	GDC 74 #1		GIA1/GDC 74A #1 data path is functioning correctly
			GIA1/GDC 74A #1 data path is not functioning correctly. <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GDC 74A.</li> <li>• Check the GIA1/GDC 74A interconnect wiring for faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA. <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GDC 74A if problem remains.</li> </ul> </li> </ul>
			GIA1/GDC 74 data path functionality is unknown. Reload GIA1 configuration file.
CHNL 5	GTX 33 #1 w/TIS		GIA1/GTX 33 data path is functioning correctly
			GIA1/GTX 33 data path is not functioning correctly <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GTX 33.</li> <li>• Check the GIA1/GTX 33 interconnect wiring for faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA. <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> </ul> </li> <li>• Replace GTX 33 if problem remains.</li> </ul>
			GIA1/GTX 33 data path functionality is unknown. Reload GIA1 configuration file.
CHNL 6	GRS 77 #1		GIA1/GRS 77 data path is functioning correctly
			GIA1/GRS 77 data path is not functioning correctly. <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GRS 77.</li> <li>• Check the GIA1/GRS 77 interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA. <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GRS 77 if problem remains.</li> </ul> </li> </ul>
			GIA1/GRS 77 data path functionality is unknown. Reload GIA1 configuration file.

Channel	LRU	Indicator	Status
CHNL 7	GMA 1347 #1		GIA1/GMA 1347 data path is functioning correctly
			GIA1/GMA 1347 data path is not functioning correctly <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GMA 1347.</li> <li>• Check the GIA1/GMA 1347 interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA. <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GMA 1347 if problem remains.</li> </ul> </li> </ul>
			GIA1/GMA 1347 data path functionality is unknown. Reload GIA1 configuration file.

### GIA1 ARINC 429

Channel	LRU	Indicator	Status
IN 5	GDC 74 #1		GIA1/GDC 74A data path is functioning correctly.
			GIA1/GDC 74A data path is not functioning correctly. <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GDC 74A.</li> <li>• Check the GIA1/GDC 74A interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA. <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GDC 74A if problem remains.</li> </ul> </li> </ul>
			GIA1/GDC 74A data path functionality is unknown. Reload GIA1 configuration file.
IN 6	GRS 77 #1		GIA1/GRS 77 data path is functioning correctly.
			GIA1/GRS 77 data path is not functioning correctly. <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GRS 77.</li> <li>• Check the GIA1/ GRS 77 interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA. <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GRS 77 if problem remains.</li> </ul> </li> </ul>
			GIA1/GRS 77 data path functionality is unknown. Reload GIA1 configuration file.

**GIA2 RS-232**

Channel	LRU	Indicator	Status
CHNL 5	GTX 33 #1 w/TIS		GIA2/GTX 33 data path is functioning correctly.
			GIA2/GTX 33 data path is not functioning correctly. <ul style="list-style-type: none"> <li>• Reconfigure GIA2.</li> <li>• Reconfigure GTX 33.</li> <li>• Check the GIA2/GTX 33 interconnect for wiring faults</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.               <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GTX 33 if problem persists.</li> </ul> </li> </ul>
			GIA2/GTX 33 #1 data path functionality is unknown. Reload GIA2 configuration file.
CHNL 7	GMA 1347 #1		GIA2/GMA 1347 #1 data path is functioning correctly.
			GIA2/GMA 1347 #1 data path is not functioning correctly. <ul style="list-style-type: none"> <li>• Reconfigure GIA2.</li> <li>• Reconfigure GMA 1347.</li> <li>• Check the GIA2/GMA 1347 interconnect wiring for faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.               <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GMA 1347 if problem persists.</li> </ul> </li> </ul>
			GIA1/GMA 1347 data path functionality is unknown. Reload GIA2 configuration file.

**GIA2 ARINC 429**

Channel	LRU	Indicator	Status
IN 5	GDC 74 #1		GIA2/GDC 74 data path is functioning correctly.
			<p>GIA2/GDC 74 data path is not functioning correctly.</p> <ul style="list-style-type: none"> <li>• Reconfigure GIA2.</li> <li>• Reconfigure GDC 74.</li> <li>• Check the GIA2/GDC 74 interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.                             <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GDC 74 if problem persists.</li> </ul> </li> </ul>
			GIA2/GDC 74 #1 data path functionality is unknown. Reload GIA2 configuration file.
IN 6	GRS 77 #1		GIA2/GRS 77 data path is functioning correctly.
			<p>GIA2/GRS 77 data path is not functioning correctly.</p> <ul style="list-style-type: none"> <li>• Reconfigure GIA2.</li> <li>• Reconfigure GRS 77.</li> <li>• Check the GIA2/GRS 77 interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.                             <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GRS 77 if problem persists.</li> </ul> </li> </ul>
			GIA2/GRS 77 data path functionality is unknown. Reload GIA2 configuration file.

## 2.1.5.4 GIA CAN / RS-485 CONFIGURATION Page

### GIA1 RS-485

Channel	LRU	Indicator	Status
CHNL 1	GEA1		GIA1/GEA data path is functioning correctly.
			<p>GIA1/GEA data path is not functioning correctly.</p> <ul style="list-style-type: none"> <li>• Reconfigure GIA1.</li> <li>• Reconfigure GEA.</li> <li>• Check the GIA1/GEA interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.                             <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GEA if problem persists.</li> </ul> </li> </ul>
			GIA1/GEA data path functionality is unknown. Reload GIA1 configuration file.
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"> <li>• Reconfigure GIA1.</li> <li>• Reload GFC 700 Installation configuration files (if equipped).</li> <li>• Check the GIA1/GSA servo interconnects for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.                             <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Troubleshoot GSA servos to determine which one is causing the problem (ref section 2.10).</li> </ul> </li> </ul>
			GIA1/GFC 700 data path functionality is unknown. Reload GFC 700 Installation configuration files (if equipped).

**GIA2 RS-485**

Channel	LRU	Indicator	Status
CHNL 1	GEA1		GIA2/GEA data path is functioning correctly.
			<p>GIA2/GEA data path is not functioning correctly.</p> <ul style="list-style-type: none"> <li>• Reconfigure GIA2.</li> <li>• Reconfigure GEA.</li> <li>• Check the GIA2/GEA interconnect for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.                             <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Replace GEA if problem persists.</li> </ul> </li> </ul>
			GIA2/GEA data path functionality is unknown. Reload GIA2 configuration file.
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"> <li>• Reconfigure GIA2.</li> <li>• Reload GFC 700 Installation configuration files (if equipped).</li> <li>• Check the GIA2/GSA servo interconnects for wiring faults.</li> <li>• Swap the GIA's to confirm if the problem is in the original GIA.                             <ul style="list-style-type: none"> <li>○ Replace original GIA if box turns green after swapping units.</li> <li>○ Troubleshoot GSA servos to determine which one is causing the problem (ref section 2.10).</li> </ul> </li> </ul>
			GIA2/GFC 700 data path functionality is unknown. Reload GFC 700 Installation configuration files (if equipped).

## 2.2 GDU 104X

### 2.2.1 Configuration Pages

#### 2.2.1.1 RS-232/ARINC 429 CONFIG Page



Figure 2-5. RS-232/ARINC 429 CONFIG Page

Main ARINC 429 and RS-232 communications channels for the MFD and PFD(s) are shown at this page. All settings are pre-established for a particular installation and are loaded from the G1000 Loader Card. The 'MFD 1' and 'PFD 1' configuration files contain the settings shown at this page.

*If the **ACTIVE** column does not match the **SET** column, reload PFD/MFD configuration files from the loader card.*

#### **SELECT UNIT**

This window shows the currently selected GDU display.

#### **RS-232**

This window shows active RS-232 configuration settings for currently selected display.

#### **ARINC 429**

This window shows active ARINC 429 configuration settings for currently selected display.

## 2.2.1.2 GDU STATUS Page

GDU STATUS													
<b>STATUS</b>													
RAM	<input checked="" type="checkbox"/>	XILINX®	<input checked="" type="checkbox"/>	BASE MAP	<input checked="" type="checkbox"/>	ETHERNET 1	<input type="checkbox"/>	ETHERNET 2	<input type="checkbox"/>	ETHERNET 3	<input type="checkbox"/>	ETHERNET 4	<input type="checkbox"/>
RS-232 1	<input type="checkbox"/>	RS-232 2	<input type="checkbox"/>	IRDA	<input type="checkbox"/>								
<b>ANALOG</b>													
PHOTOCELL A	9472	CCFT CRNT 1	475	POWER - 1.3V	1232	POWER - 28V 1	2735						
PHOTOCELL B	9481	CCFT CRNT 2	457	POWER - 2.5V	2512	POWER - 28V 2	117						
BEZEL THERM	3435	LGHT BUS AC	4916	POWER - 3.3V	3300	INTRNL TEMP 1	4900						
		LGHT BUS DC	0			INTRNL TEMP 2	4950						
<b>DISCRETE</b>													
SYS ID 1	<input type="checkbox"/>	RVRSNRV MODE 1	<input type="checkbox"/>	TEST MODE SLCT	<input type="checkbox"/>	PULSE PER SEC 1	<input checked="" type="checkbox"/>						
SYS ID 2	<input type="checkbox"/>	RVRSNRV MODE 2	<input checked="" type="checkbox"/>	DEMO MODE SLCT	<input type="checkbox"/>	PULSE PER SEC 2	<input checked="" type="checkbox"/>						
SYS ID 3	<input type="checkbox"/>	SPARE INPUT	<input type="checkbox"/>										
<b>DISCRETE IN CONFIGURATION</b>													
	INPUT	DATA TYPE	ACTIVE	INVERTED	ACTIVE								
		SET		SET									
PFD 1	<input type="checkbox"/>	OFF	OFF	FALSE	FALSE								
PFD 2	<input type="checkbox"/>	OFF	OFF	FALSE	FALSE								
MFD 1	<input type="checkbox"/>	OFF	OFF	FALSE	FALSE								

**Figure 2-6. GDU STATUS Page**

This page shows various items related to the GDU 104X display and its operation. The technician can use this page to aid in the diagnosis and troubleshooting of the GDU 104X.

### **STATUS**

**RAM:** Indicates condition of GDU 104X RAM memory. *If it does not pass the unit may not initialize.*

**XILINX:** Indicates condition of GDU 104X XILINX processor. *If it does not pass the unit may not initialize.*

**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.*

**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.*

**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.*

**IRDA:** Indicates status of GDU 104X IrDA infrared port. *Used for Garmin testing, it is not activated at this time*

**ETHERNET 4:** Indicates status of GDU 104Xs Ethernet channel 4. *Used for Garmin testing, it is not activated at this time*

### **ANALOG**

**PHOTOCELL A, B:** Shows 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.*

**BEZEL THERM:** Shows the temperature of the GDU bezel, expressed in degrees Celsius. (Example: 2064 = 20.64 degrees Celsius)

**CCFT CRNT 1, 2:** Shows an indication of current flowing through the display backlight bulbs. *Number does not reflect actual current value and is not useful for troubleshooting.*

---

**LGHT BUS AC:** Shows the input value of the AC lighting bus, if enabled. *Disregard number if it is not used in the installation.*

**LGHT BUS DC:** Shows the input value of the DC lighting bus, if enabled. *Disregard number if not used in the installation.*

**POWER (1.3V, 2.5V, 3.3V, 28 V 1/2):** Shows 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.*

**INTRNL TEMP 1, 2:** Shows the internal temperature sensor values of the display, in degrees Celsius. (Example: 45267 = 45.267°C)

## **DISCRETE**

**SYS ID 1, 2, 3:** Shows 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. PFD #2 is not used in SEP aircraft.

<b>GDU System ID 1</b>	<b>GDU System ID 2</b>	<b>GDU System ID 3</b>	<b>Display Mode</b>
Black	Black	Green	MFD
Black	Black	Black	PFD #1
Green	Black	Black	PFD #2

**RVRSNRY MODE 1, 2:** Shows 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.

**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.*

**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.*

**PULSE PER SEC 1, 2:** Shows status of GPS time synchronization inputs (from GIA) to the GDU. *Used for Garmin testing, not useful for troubleshooting.*

## **DISCRETE IN CONFIGURATION**

The Discrete In field shows 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.

### 2.2.1.3 GDU TEST Page

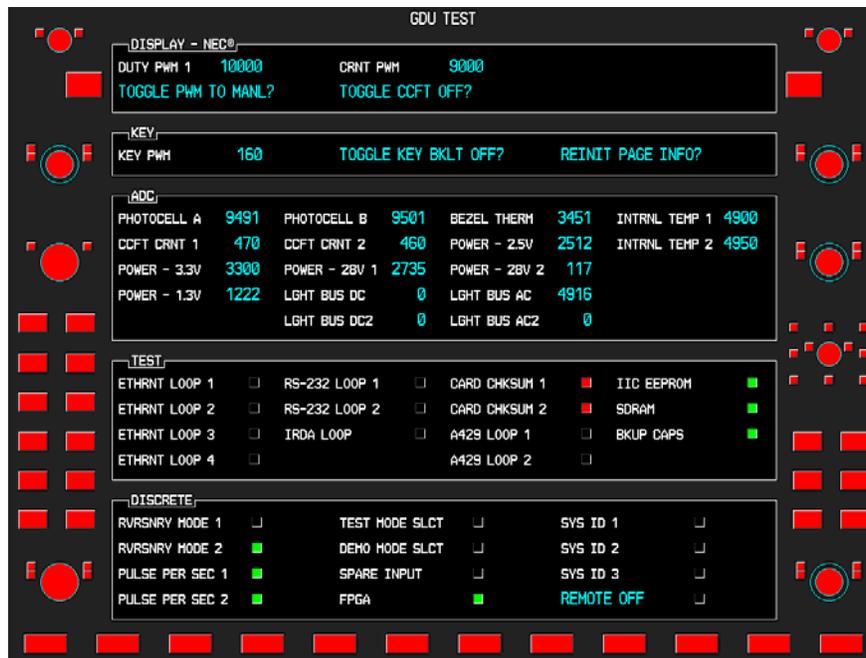


Figure 2-7. GDU TEST Page

The Test Page depicts a graphical layout of all buttons on the display in red. Each red graphical button turns green when the corresponding button is pressed, indicating that the button operates correctly. The Test Page also provides the following information regarding the display and associated systems.

#### DISPLAY

**DUTY PWM 1:** Shows 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:** Shows 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

**KEY PWM:** Shows the keypad pulse width modulation brightness value. Range is between 0 and 9999 and corresponds to the keypad brightness value shown. *Not useful for troubleshooting.*

**TOGGLE KEY BKLT OFF?:** Allows the technician to toggle the keyboard backlight off.

**REINIT PAGE INFO?:** Allows technician to re-initialize all information on the test page.

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## **ADC**

**PHOTOCELL A, B:** Shows 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.*

**BEZEL THERM:** Shows the temperature of the GDU bezel, expressed in degrees Celsius.

**CCFT CRNT 1, 2:** Shows an indication of current flowing through the display backlight bulbs. *Number does not reflect actual current value and is not useful for troubleshooting.*

**POWER (2.5V, 3.3V, 28 V 1, 2; 1.3V):** Shows 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.*

**LGHT BUS DC, AC:** Shows input value of AC and DC lighting bus inputs, depending on which is configured. Disregard number if not used in the installation.

**INTRNL TEMP 1, 2:** Shows the internal temperature of the GDU, expressed in degrees Celsius.

## **TEST**

**IIC EEPROM:** Shows the condition of the GDU configuration module EEPROM chip, located in the backshell 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.*

**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.*

**NAND, NOR FLASH, SDRAM:** Shows the condition of various GDU internal components.

**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.*

**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.*

**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.*

**IRDA:** Indicates status of GDU 104X IrDA infrared port. *Used for Garmin testing, it is not activated at this time.*

**BKUP CAPS:** Indicates status of the Backup Capacitor Test. A green box indicates the test passed, a red box indicates it failed.

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## **DISCRETE**

**RVRSNRY MODE 1, 2:** Shows 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.

**PULSE PER SEC 1, 2:** Shows status of GPS time synchronization inputs (from GIA 63/GIA 63W) to the GDU. *Used for Garmin testing, not useful for troubleshooting.*

**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.*

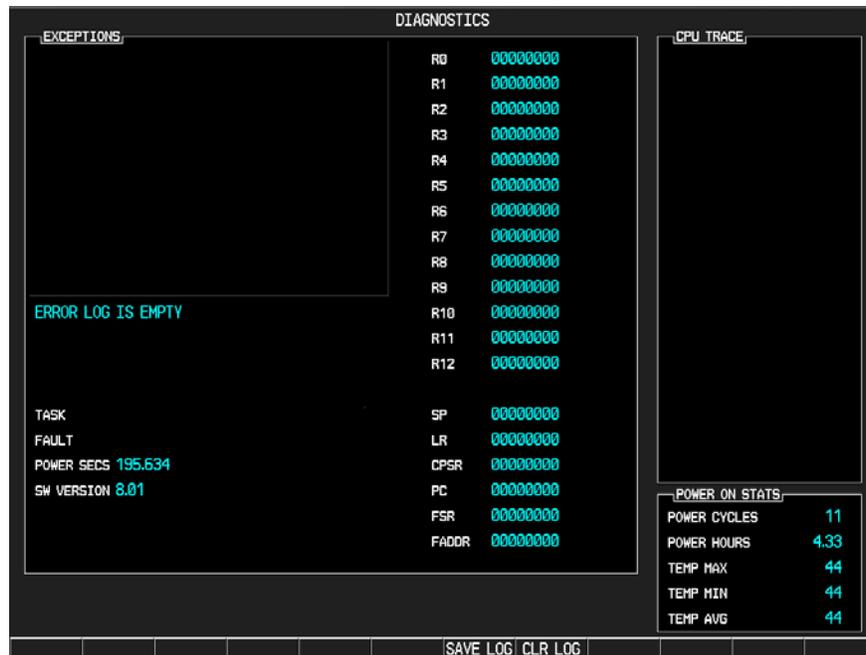
**FPGA:** Shows the condition of the GDU FPGA processor. *If it does not pass the unit may not initialize.*

**SYS ID 1, 2, 3:** Shows 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 SEP aircraft.*

<b>GDU System ID 1</b>	<b>GDU System ID 2</b>	<b>GDU System ID 3</b>	<b>Display Mode</b>
Black	Black	Green	MFD
Black	Black	Black	PFD #1
Green	Black	Black	PFD #2

**REMOTE OFF:** Allows the display to control power of a remote system. *Not used in any installation at this time.*

## 2.2.1.4 DIAGNOSTICS Page



**Figure 2-8. DIAGNOSTICS Page**

The DIAGNOSTICS Page is a “display only” page, this page is protected and cannot be changed.

## 2.2.1.5 SERIAL/ETHERNET I/O Page

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 2-9. SERIAL/ETHERNET I/O Page**

The SERIAL/ETHERNET I/O Page displays Ethernet communication statistics. If Ethernet communication issues are suspected, this page displays errors being logged as they occur. A couple of 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. Generally you should see a continually increasing number in the **RCV GOOD FRAMES** and **XMT GOOD FRAMES** to show Ethernet communications are ok. This page is protected and cannot be changed.

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

### 2.2.1.6 ALERT CONFIGURATION Page

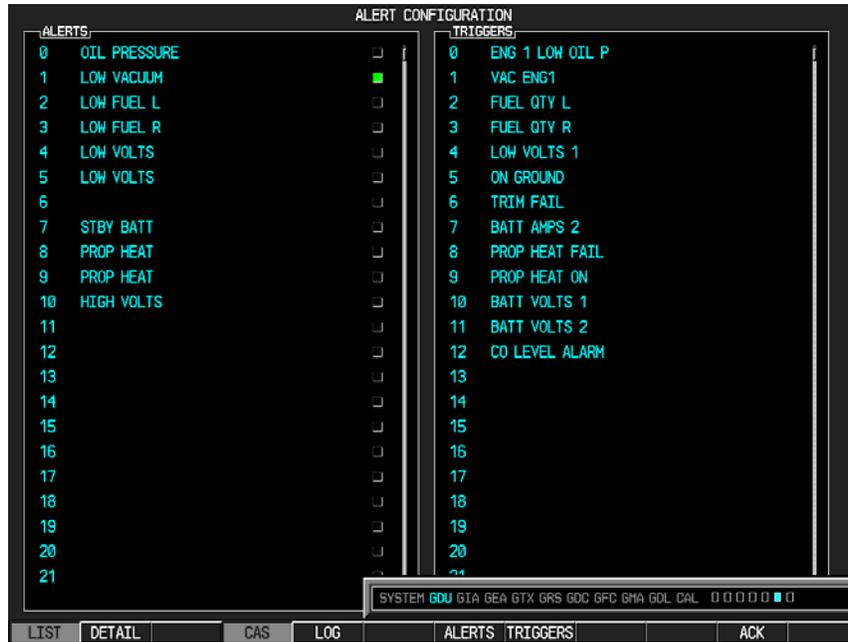


Figure 2-10. ALERT CONFIGURATION Page

The ALERT CONFIGURATION Page displays all available alerts and what triggers them. This page is protected and cannot be changed.

### 2.2.1.7 AIRFRAME CONFIGURATION Page

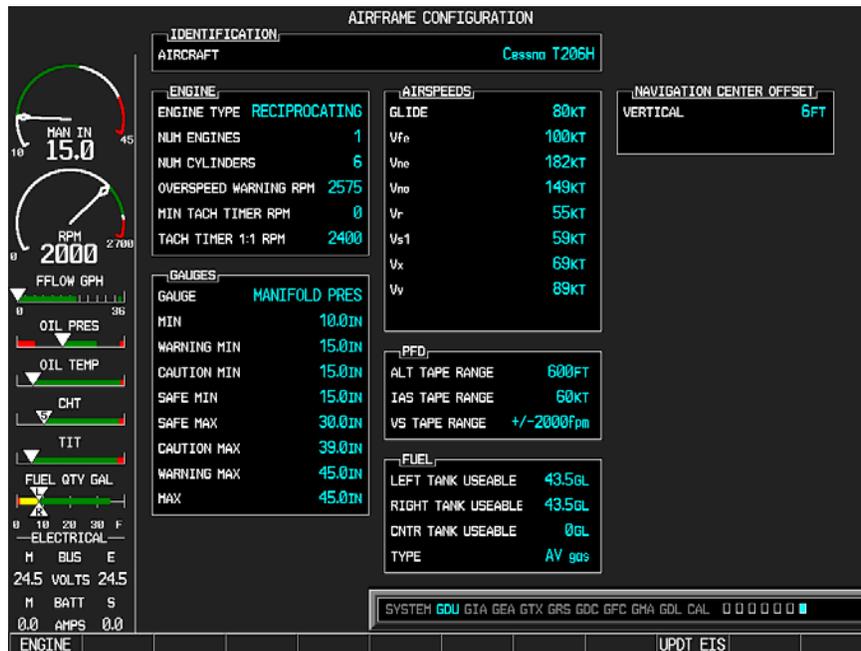


Figure 2-11. AIRFRAME CONFIGURATION Page

The AIRFRAME CONFIGURATION Page displays the airframe configuration parameters for instruments, airspeed bugs, and other items. This page is protected and cannot be changed.

## 2.2.2 Common Problems

Symptom	Recommended Action
Display is blank	<ul style="list-style-type: none"> <li>• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.</li> <li>• Cycle power. <ul style="list-style-type: none"> <li>✓ 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.</li> </ul> </li> </ul>
Display resets	<ul style="list-style-type: none"> <li>• Use a bright light to verify LCD is active. <ul style="list-style-type: none"> <li>✓ Adjust avionics dimmer control full clockwise.</li> <li>✓ <b>Manually</b> turn up backlight on the PFD and load configuration files to the PFD and MFD.</li> </ul> </li> <li>• Ensure slide lock is fully engaged with the locking tabs on the back of the unit. <ul style="list-style-type: none"> <li>✓ 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.</li> </ul> </li> </ul>
Display flickers	<ul style="list-style-type: none"> <li>• Ensure GDU is receiving power. If a circuit breaker is tripped, determine source of short before resetting breaker.</li> <li>• Ensure circuit breakers have not failed and power wire connections are secure.</li> <li>• Switch MFD and PFD. <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace the display. Please note the position it failed in (PFD or MFD).</li> <li>✓ If problem does not follow unit, troubleshoot aircraft wiring for fault.</li> </ul> </li> </ul>
SD card is stuck in GDU	<ul style="list-style-type: none"> <li>• DO NOT insert the screwdriver any length into the card slot.</li> <li>• DO NOT pry against the overlay.</li> <li>• DO NOT force the SD Card out.</li> <li>• Insert a small screwdriver in the groove on the side of the exposed end of the card to pull out the card.</li> <li>• Push the card in further to release the card locking mechanism.</li> <li>• Check SD Card for having more than one label. Two or more labels on the card will cause sticking. <ul style="list-style-type: none"> <li>✓ Remove all but one label.</li> </ul> </li> <li>• Ensure the SD card is from Toshiba or SanDisk. Use of other SD Cards is not recommended.</li> <li>• If card was inserted with the label facing to the right, do not attempt to remove. Return the unit to Garmin for repair</li> </ul>
Engine instruments are missing on the MFD	<ul style="list-style-type: none"> <li>• Clear user settings on each GDU by pressing and holding the CLR key while powering up each display. Leave the other display off while performing the clear operation. <ul style="list-style-type: none"> <li>✓ If problem persists, replace GDU.</li> </ul> </li> </ul>
Cannot navigate through pages on the MFD using the FMS knob	

Symptom	Recommended Action
A button/knob/joystick does not appear to function	<ul style="list-style-type: none"> <li>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. <ul style="list-style-type: none"> <li>✓ If problem is verified, replace GDU.</li> </ul> </li> </ul>
Terrain/topo does not display	<ul style="list-style-type: none"> <li>Ensure supplemental data cards are inserted correctly in the lower slots of both GDU's.</li> <li>Allow the system to verify the data on the cards for approximately five minutes after power-up. <ul style="list-style-type: none"> <li>✓ If the databases do not activate, reload the Terrain and Obstacle databases onto the SD Card or replace the card.</li> </ul> </li> </ul>
Display will not track photocell	<ul style="list-style-type: none"> <li>Go to the GDU TEST page in configuration mode. Cover and uncover the photocell and verify the PHOTOCELL A or PHOTOCELL B value changes. <ul style="list-style-type: none"> <li>✓ If problem persists, replace the display.</li> </ul> </li> </ul>
Keyboard will not track photocell	
Display will not track dimmer bus	<ul style="list-style-type: none"> <li>Check display lighting settings on the Main Lighting page (system group page 3)</li> <li>Check presence or integrity of pin 59 (J10001)</li> <li>Check dimmer bus to verify voltage (refer to the airframe specific maintenance manual for troubleshooting).</li> <li>Switch MFD and PFD: <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace the display.</li> </ul> </li> </ul>
Keyboard will not track dimmer bus	
Display delaminating	<ul style="list-style-type: none"> <li>Replace GDU, reference Garmin Service Bulletin 0527.</li> </ul>

### 2.2.3 Database and Software Alerts

Message	Cause	Solutions
MFD1 DB ERR – MFD1 aviation database error exists.	The MFD has encountered an error in the Jeppesen database.	<ul style="list-style-type: none"> <li>Reload Jeppesen database</li> <li>Replace MFD1</li> </ul>
PFD1 DB ERR – PFD1 aviation database error exists.	The PFD has encountered an error in the Jeppesen database.	<ul style="list-style-type: none"> <li>Reload Jeppesen database</li> <li>Replace the PFD</li> </ul>
MFD1 DB ERR – MFD1 basemap database error exists.	The MFD has encountered an error in the basemap database.	<ul style="list-style-type: none"> <li>Contact Garmin Technical Support for assistance.</li> </ul>
PFD1 DB ERR – PFD1 basemap database error exists.	The PFD has encountered an error in the basemap database.	
MFD1 DB ERR – MFD1 terrain database error exists.	The MFD has encountered an error in the terrain database.	<ul style="list-style-type: none"> <li>Confirm datacard is inserted properly.</li> <li>Reload Terrain database <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the MFD.</li> </ul> </li> </ul>

<b>Message</b>	<b>Cause</b>	<b>Solutions</b>
PFD1 DB ERR – PFD1 terrain database error exists.	The PFD has encountered an error in the terrain database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload Terrain database <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the PFD.</li> </ul> </li> </ul>
MFD1 DB ERR – MFD1 obstacle database error exists.	The MFD has encountered an error in the obstacle database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload obstacle database <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the MFD.</li> </ul> </li> </ul>
PFD1 DB ERR – PFD1 obstacle database error exists.	The PFD has encountered an error in the obstacle database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload obstacle database. <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the PFD.</li> </ul> </li> </ul>
MFD1 DB ERR – MFD1 airport terrain database error exists.	The MFD has encountered an error in the terrain database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload airport terrain database. <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the MFD.</li> </ul> </li> </ul>
PFD1 DB ERR – PFD1 airport terrain database error exists.	The PFD has encountered an error in the terrain database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload airport terrain database <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the PFD.</li> </ul> </li> </ul>
MFD1 DB ERR – MFD1 Safe Taxi database error exists.	The MFD has encountered an error in the Safe Taxi database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload Safe Taxi database <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the MFD.</li> </ul> </li> </ul>
PFD1 DB ERR – PFD1 Safe Taxi database error exists.	The PFD has encountered an error in the Safe Taxi database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload Safe Taxi database. <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the PFD.</li> </ul> </li> </ul>

<b>Message</b>	<b>Cause</b>	<b>Solutions</b>
MFD1 DB ERR – MFD1 Chartview database error exists.	The MFD has encountered an error in the Chartview database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload Chartview database. <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the MFD.</li> </ul> </li> </ul>
PFD1 DB ERR – MFD1 Chartview database error exists.	The PFD has encountered an error in the Chartview database.	<ul style="list-style-type: none"> <li>• Confirm datacard is inserted properly.</li> <li>• Reload Chartview database <ul style="list-style-type: none"> <li>✓ If unable, replace supplemental datacard.</li> <li>✓ If problem persists, replace the PFD.</li> </ul> </li> </ul>
DB MISMATCH – Aviation database version mismatch. Xtalk is off.	The G1000 has found the Jeppesen aviation database in the PFD and MFD do not match.	<ul style="list-style-type: none"> <li>• Load current Jeppesen database to both displays.</li> </ul>
DB MISMATCH – Aviation database type mismatch. Xtalk is off.	The G1000 has found the Jeppesen aviation database types do not match.	<ul style="list-style-type: none"> <li>• Load same type Jeppesen database to both displays.</li> </ul>
DB MISMATCH – Basemap database version mismatch. Xtalk is off.	The PFD and MFD have different basemap versions installed.	<ul style="list-style-type: none"> <li>• Contact Garmin Technical Support for assistance.</li> </ul>
DB MISMATCH – Terrain database version mismatch. Xtalk is off.	The PFD and MFD have different terrain database versions installed.	<ul style="list-style-type: none"> <li>• Insert two identical version Terrain database cards in the PFD and MFD.</li> </ul>
DB MISMATCH – Obstacle database version mismatch. Xtalk is off.	The PFD and MFD have different obstacle database versions installed.	<ul style="list-style-type: none"> <li>• Insert two identical version obstacle database cards in the PFD and MFD.</li> </ul>
DB MISMATCH – Terrain database type mismatch. Xtalk is off.	The PFD and MFD have different terrain database types installed.	<ul style="list-style-type: none"> <li>• Insert two identical version Terrain database cards in the PFD and MFD.</li> </ul>
SW MISMATCH – GDU software version mismatch. Xtalk is off.	The G1000 has found the PFD and MFD software versions do not match.	<ul style="list-style-type: none"> <li>• Load correct software version into both PFD and MFD.</li> </ul>
MANIFEST – PFD1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in the PFD.	<ul style="list-style-type: none"> <li>• Load correct software version.</li> </ul>
MANIFEST – MFD software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in MFD.	

Message	Cause	Solutions
CNFG MODULE – PFD1 configuration module is inoperative.	The PFD master configuration module has failed.	<ul style="list-style-type: none"> <li>• Check master configuration module connector and wiring for damage inside the GDU connector backshell. <ul style="list-style-type: none"> <li>✓ Replace master configuration module wiring and pins.</li> <li>✓ If problem persists, replace master configuration module.</li> </ul> </li> </ul> <p style="text-align: center;"><b>NOTE</b></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>

#### 2.2.4 GDU Cooling Alerts

Message	Cause	Solutions
MFD1 COOLING – has poor cooling. Reducing power usage.	MFD1 has exceeded it's operating temperature range.	<ul style="list-style-type: none"> <li>• Check cooling fan and wiring for proper operation (if applicable). <ul style="list-style-type: none"> <li>✓ If problem persists, replace the MFD.</li> <li>✓ If problem continues contact Garmin Aviation Product Support for assistance.</li> </ul> </li> </ul>
PFD1 COOLING – has poor cooling. Reducing power usage.	The PFD has exceeded it's operating temperature range.	<ul style="list-style-type: none"> <li>• Check cooling fan and wiring for proper operation (if applicable). <ul style="list-style-type: none"> <li>✓ If problem persists, replace the PFD.</li> <li>✓ If problem continues contact Garmin Aviation Product Support for assistance.</li> </ul> </li> </ul>

## 2.2.5 Key Alerts

Message	Cause	Solutions
MFD1 "key" KEYSTK – key is stuck.	The G1000 has determined a key is stuck on MFD1.	<ul style="list-style-type: none"> <li>Go to the GDU TEST page in configuration mode and verify key is stuck (if key is stuck the corresponding indicator will be green)</li> <li>Exercise suspected stuck key and reset GDU TEST page to see if indicator remains green without pressing the key. <ul style="list-style-type: none"> <li>✓ If problem persists replace the MFD</li> </ul> </li> </ul>
PFD1 "key" KEYSTK – key is stuck.	The G1000 has determined a key is stuck on the PFD.	<ul style="list-style-type: none"> <li>Go to the GDU TEST page in configuration mode and verify key is stuck (if key is stuck the corresponding indicator will be green)</li> <li>Exercise suspected stuck key and reset GDU TEST page to see if indicator remains green without pressing the key. <ul style="list-style-type: none"> <li>✓ If problem persists replace the PFD</li> </ul> </li> </ul>

## 2.2.6 Datacard Alerts

Message	Cause	Solutions
MFD1 CARD – data card has failed.	MFD1 can not read a datacard	<ul style="list-style-type: none"> <li>Remove and reinsert datacard multiple times to clean card contacts</li> <li>Replace with known good card to verify failed card <ul style="list-style-type: none"> <li>✓ If problem does not persist replace the datacard.</li> <li>✓ If problem persist replace MFD.</li> </ul> </li> </ul>
PFD1 CARD – data card has failed.	The PFD can not read a datacard.	<ul style="list-style-type: none"> <li>Remove and reinsert datacard multiple times to clean card contacts</li> <li>Replace with known good card to verify failed card <ul style="list-style-type: none"> <li>✓ If problem does not persist replace the datacard.</li> <li>✓ If problem persist replace PFD.</li> </ul> </li> </ul>

## 2.2.7 Miscellaneous Alerts

Message	Cause	Solutions
XTALK ERROR – A flight display cross talk error has occurred.	A communication error has occurred between the MFD and PFD.	<ul style="list-style-type: none"> <li>• Ensure a database error has not occurred               <ul style="list-style-type: none"> <li>✓ If a database error has occurred, correct error before proceeding.</li> </ul> </li> <li>• Check display Ethernet interconnect</li> <li>• Replace PFD1 with a known good unit, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem persists, replace MFD1.</li> <li>✓ If problem does not persist, replace PFD1.</li> </ul> </li> </ul>
SIMULATOR – Sim mode is active. Do not use for navigation.	The GDU 104X is in simulator mode.	<ul style="list-style-type: none"> <li>• Check wiring (pin 54 of P10001 should be empty)</li> <li>• Replace PFD1 with a known good unit, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem does not persist, replace original PFD1.</li> </ul> </li> </ul>
DATA LOST – Pilot stored data lost. Recheck settings.	Pilot stored data has been lost.	<ul style="list-style-type: none"> <li>• If the CLR key was held during a power cycle, disregard message.</li> <li>• Cycle power to PFD1:               <ul style="list-style-type: none"> <li>✓ Ensure CLR key is not stuck on the GDU TEST page.</li> <li>✓ If problem persists, replace PFD1.</li> </ul> </li> </ul>
MFD1 SERVICE – needs service. Return unit for repair.	The G1000 has determined MFD1 needs service.	<ul style="list-style-type: none"> <li>• Ensure the MFD connector is fully seated and locked</li> <li>• 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 &amp; 2 levels are above 50.               <ul style="list-style-type: none"> <li>✓ If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises.</li> <li>✓ If the CCFT level rises, disregard the message.</li> <li>✓ If the CCFT level does not rise, replace the MFD</li> </ul> </li> <li>• Replace the MFD</li> </ul>

Message	Cause	Solutions
<p>PFD1 SERVICE – needs service. Return unit for repair.</p>	<p>The G1000 has determined the PFD needs service.</p>	<ul style="list-style-type: none"> <li>• Ensure the PFD connector is fully seated and locked</li> <li>• 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 &amp; 2 levels are above 50. <ul style="list-style-type: none"> <li>✓ If the CCFT levels are not above 50, apply light to the photocell and observe if the CCFT level rises.</li> <li>✓ If the CCFT level rises, disregard the message.</li> <li>✓ If the CCFT level does not rise, replace the PFD</li> </ul> </li> <li>• Replace the PFD</li> <li>• If GDU software version is less than 6.01, check config module wiring for faults and replace if necessary. <ul style="list-style-type: none"> <li>✓ If issue continues, replace master config module.</li> </ul> </li> </ul> <p style="text-align: center;"><b>NOTE</b></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>

Message	Cause	Solutions
PFD1 CONFIG – PFD1 configuration error. Config service req'd.	The G1000 has detected a PFD configuration mismatch.	<ul style="list-style-type: none"> <li>• Reload PFD configuration files from SD Loader Card. Also load configuration files for optional equipment installed in the aircraft that contain a “PFD” configuration file..</li> <li>• Reload system configuration files by pressing the UPDT CFG softkey on the Configuration Upload Page in the System Page Group to load configuration files into the configuration module.</li> <li>✓ If message persists, check config module wiring for faults and replace if necessary.</li> <li>✓ If issue continues, replace master configuration module.</li> <li>✓ If problem persists, replace the PFD.</li> </ul> <p style="text-align: center;"><b>NOTE</b></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>
TAWS FAIL	A TAWS system failure has occurred.	<ul style="list-style-type: none"> <li>• If message occurred on the first power up after unlocking TAWS, cycle power to initialize TAWS.</li> <li>• Ensure each GDU contains a TAWS/TERRAIN data card</li> <li>• Ensure all GDUs are TAWS configured <ul style="list-style-type: none"> <li>✓ If all GDUs are not TAWS configured, reconfigure.</li> </ul> </li> <li>• Verify GIA #1 is online</li> <li>• Ensure an Airport Terrain, Obstacle, Terrain, Aviation Database, or GDU SW mismatch has not occurred <ul style="list-style-type: none"> <li>✓ If a mismatch has occurred, load correct database/software files or replace the terrain card.</li> </ul> </li> </ul>
TAWS TEST	TAWS system is currently being tested.	<ul style="list-style-type: none"> <li>• N/A – Test will be conducted up to two minutes</li> </ul>

<b>Message</b>	<b>Cause</b>	<b>Solutions</b>
TAWS INHB	TAWS system alerting is disabled	<ul style="list-style-type: none"> <li>• Enable TAWS system alerting by pressing the MENU button from the MAP – TAWS page.</li> </ul>
TAWS N/A	GPS system integrity not high enough to enable TAWS	<ul style="list-style-type: none"> <li>• Ensure valid GPS position is received from the AUX – GPS STATUS page</li> </ul>
TRAFFIC FAIL	Communication with the traffic device has failed	<ul style="list-style-type: none"> <li>• If a non-Garmin Traffic device is installed, refer to the manufacturer's maintenance manual to determine if it is operating correctly</li> <li>• Check GIA2-Traffic device wiring and connectors for faults</li> <li>• If using TIS from the GTX33 - <ul style="list-style-type: none"> <li>○ Check for any other GTX config error messages and correct</li> <li>○ Replace GTX33</li> </ul> </li> </ul>
HIGH VOLTS	Main (M) or Essential (E) Bus voltage has exceeded 32 volts.	<ul style="list-style-type: none"> <li>• Refer to airframe specific Pilot's Operating Handbook (POH)</li> </ul>
CO LVL HIGH	Unsafe carbon monoxide level reported by CO Guardian unit.	<ul style="list-style-type: none"> <li>• Refer to airframe specific Pilot's Operating Handbook (POH)</li> </ul>
PFD1 VOLTAGE – PFD1 has low voltage. Reducing power usage.	The PFD supply voltage is low.	<ul style="list-style-type: none"> <li>• Ensure the PFD rear connector is properly connected</li> <li>• Check wiring</li> </ul>
MFD1 VOLTAGE – MDF1 has low voltage. Reducing power usage.	The MFD supply voltage is low.	<ul style="list-style-type: none"> <li>• Ensure the MFD rear connector is properly connected</li> <li>• Check wiring</li> </ul>
CO DET SRVC – The carbon monoxide detector needs service.	The G1000 has determined the CO Guardian needs service.	<ul style="list-style-type: none"> <li>• Replace the CO Guardian</li> </ul>
CO DET FAIL – The carbon monoxide detector is inoperative.	The G1000 and CO Guardian are not communicating.	<ul style="list-style-type: none"> <li>• Check GIA/CO Guardian interconnect</li> <li>• Replace the CO Guardian</li> <li>• Replace the GIA</li> </ul>

## 2.3 GMA 1347

### 2.3.1 Configuration Pages

#### 2.3.1.1 GMA CONFIGURATION Page

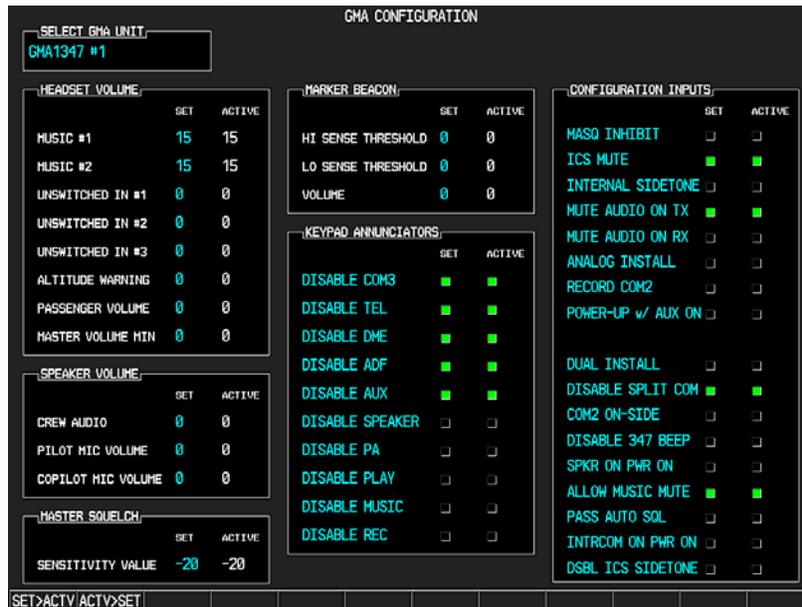


Figure 2-12. GMA CONFIGURATION Page

#### **SELECT GMA UNIT**

This window shows 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:* Not used in SEP installations.

*MASTER VOLUME MIN:* Not used in SEP installations.

#### **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**

*HI/LO SENSE THRESHOLD:* Sets Hi/Lo marker sensitivity thresholds, value is adjustable between  $-31$  and  $31$ .

*VOLUME:* Adjusts marker beacon volume, value is adjustable between  $-31$  and  $31$ .

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## **KEYPAD ANNUNCIATORS**

The following audio panel settings can be enabled or disabled:

**DISABLE COM3:** Disables COM3 button in situations where no COM3 is installed.

**DISABLE TEL:** Disables TEL button in situations where no telephone is installed.

**DISABLE DME:** Disables DME button for situations where no DME is installed.

**DISABLE ADF:** Disables ADF button for situations where no ADF is installed.

**DISABLE AUX:** Disables AUX button for situations where no auxiliary input is connected.

**DISABLE SPEAKER:** Disables SPEAKER button for situations where no speaker input is connected.

**DISABLE PA:** Disables PA button for situations where no PA input is connected.

**DISABLE PLAY:** Disables PLAY button for situations where no play input is connected.

**DISABLE MUSIC:** Disables music input.

**DISABLE REC:** Not used in SEP installations.

## **CONFIGURATION INPUTS**

The following audio panel settings can be enabled or disabled:

**MASQ INHIBIT:** Disable 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.

**ICS MUTE:** Mutes the MUSIC 1 channel during ICS activity.

**INTERNAL SIDETONE:** Causes the audio panel to provide COM sidetone in situations when the GIA radios do not provide sidetone.

**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.

**ANALOG INSTALL:** COM 1 and COM 2 are connected using the analog interfaces instead of the digital interface.

**RECORD COM 2:** During split-COM operation, the digital clearance recorder records COM 2 only and playback only on the co-pilot's channel.

**POWER-UP w/AUX ON:** Enables the GMA 1347 to always power up with the AUX channel enabled.

**DUAL INSTALL:** The audio panel is part of a dual-installation.

**DISABLE SPLIT COM:** Allows split-COM feature to be disabled for installations where split-COM operation is not desired.

**COM 2 ON-SIDE:** In a dual audio panel installation, this designates the unit as a 'right-hand/co-pilot' unit.

**DISABLE 347 BEEP:** Not used in SEP installations.

**SPKR ON PWR ON:** When green, automatically turns the speaker on when the audio panel is turned on.

**ALLOW MUSIC MUTE:** Enables the music mute toggle function for Music 1 using the MKR key.

**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.

**INTRCOM ON PWR ON:** Not used in SEP installations.

**DSBL ICS SIDETONE:** Not used in SEP installations.

### 2.3.2 Common Problems

Symptom	Recommended Action
Noise in Audio	<ul style="list-style-type: none"> <li>• Remove GMA and check for MOD 1 marking if below S/N 47100641. If MOD 1 is not marked, unit may be returned to Garmin for installation of Service Bulletin 0410.</li> <li>• On the MFD AUX – SYSTEM STATUS page, see if GIA63's are under S/N 46902653. If so, remove GIA63's from rack and check if MOD 1 has been installed. If not, units may be returned to Garmin for installation of Service Bulletin 0416.</li> </ul> <p>Most often the cause of the noise is external to the GMA. Try the following to locate the source of the noise before replacing the GMA:</p> <ul style="list-style-type: none"> <li>• Try a different pair of headsets. Noise cancelling headsets may pick up and/or generate more noise than standard headsets from their own circuitry.</li> <li>• Check for noise with engine turned off. <ul style="list-style-type: none"> <li>✓ If the noise is present only when the engine is running, check the alternator and/or ignition system as possible sources of noise (see applicable airframe specific maintenance manual).</li> </ul> </li> <li>• Check for noise as all electrical equipment is turned on and off (strobes, other radios, etc.). <ul style="list-style-type: none"> <li>✓ If the noise is identified from one electrical system or component refer to the applicable airframe specific maintenance manual.</li> </ul> </li> <li>• Ensure the NAV/COM squelch is not open.</li> <li>• Ensure the ADF and DME audio is not active.</li> <li>• Ensure the marker beacon audio is not active.</li> <li>• Ensure the ICS squelch is not open. <ul style="list-style-type: none"> <li>✓ Master squelch level can be adjusted on the GMA CONFIGURATION page for higher noise environments.</li> </ul> </li> <li>• Replace unit only after all possible external sources of noise are eliminated.</li> </ul>
Buttons Do Not Work.	<ul style="list-style-type: none"> <li>• 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 file and other config files for optional equipment installed in the aircraft (i.e. ADF, DME) from the loader card.</li> </ul>
COM Bleedover	<ul style="list-style-type: none"> <li>• 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.</li> <li>• On the MFD AUX – SYSTEM STATUS page, see if GIA's are under S/N 46905099. If so, remove GIA's from rack and check if MOD 3 has been installed. If not, units may be returned to Garmin for installation of Service Bulletin 0505.</li> </ul>
Speaker Cuts Out	<ul style="list-style-type: none"> <li>• 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.</li> </ul>

Symptom	Recommended Action
No COM Audio	<ul style="list-style-type: none"> <li>Verify the COM radios are not tuned to the same frequency and each volume adjusted to the same level. Reference Garmin Service Advisory 0535.</li> </ul>
Mic Audio Heard in Speaker	<ul style="list-style-type: none"> <li>Reduce ICS Volume</li> </ul>

### 2.3.3 GMA Alerts

Message	Cause	Solutions
MANIFEST – GMA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GMA 1347.	<ul style="list-style-type: none"> <li>Load correct software version.</li> </ul>
GMA1 SERVICE – GMA1 needs service. Return unit for repair.	The G1000 has determined GMA1 needs service.	<ul style="list-style-type: none"> <li>Replace GMA1</li> </ul>
GMA1 FAIL – GMA 1 is inoperative.	The G1000 has detected a failure in GMA1.	<ul style="list-style-type: none"> <li>Ensure GMA1 is receiving power</li> <li>Ensure both GIAs are receiving power</li> <li>Ensure all GDUs are receiving power</li> <li>Ensure the GMA/GIA RS-232 data lines are working properly</li> <li>Ensure the GIA/GDU Ethernet data lines are working properly</li> <li>✓ Replace GMA</li> </ul>
GMA1 CONFIG – GMA1 configuration error. Config service req'd.	The G1000 has detected a GMA configuration mismatch.	<ul style="list-style-type: none"> <li>Load GMA configuration file, see Section 4.2.2.</li> <li>✓ Replace GMA.</li> <li>✓ If problem persists, replace master configuration module, check config module wiring for faults and replace if necessary.</li> </ul> <p style="text-align: center;"><b>NOTE</b></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>

### 2.3.4 Backup Path Alerts

Message	Cause	Solutions
BACKUP PATH – Audio panel using backup data path.	The GMA 1347 is using a backup RS-232 data path.	✓ See Section 2.1.5.2 for troubleshooting.

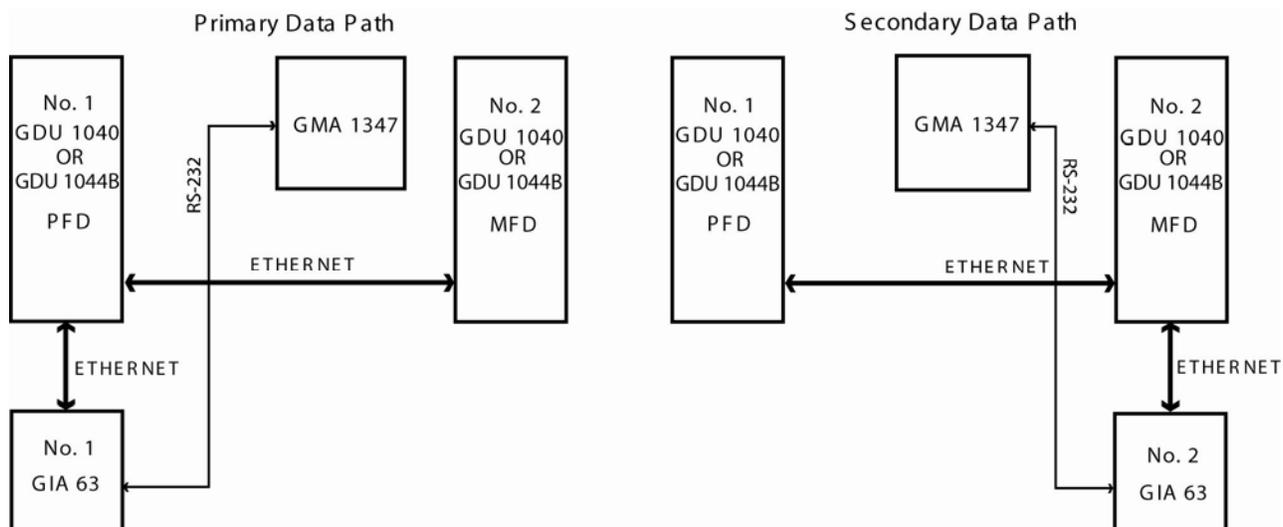


Figure 2-13. GMA 1347 Data Paths

## 2.4 GIA 63/63W

### 2.4.1 Configuration Pages

#### 2.4.1.1 RS-232/ARINC 429 Page

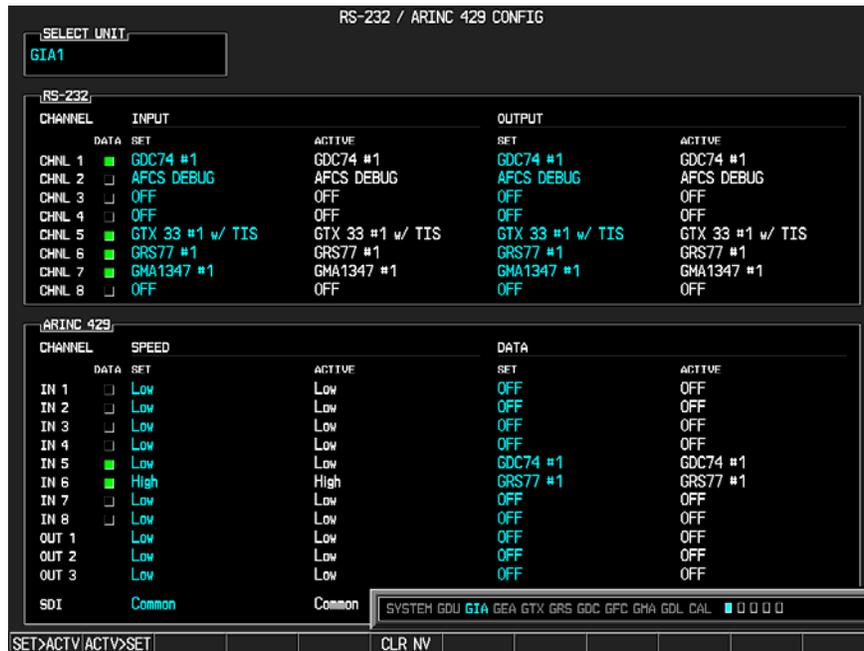


Figure 2-14. RS-232/ARINC 429

Main ARINC 429 and RS-232 communications channels for GIA 1 and GIA 2 are shown at 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.

#### **SELECT UNIT**

This window shows the currently selected GIA 63/GIA 63W unit.

#### **RS-232**

This window shows active RS-232 configuration settings for currently selected GIA.

#### **ARINC 429**

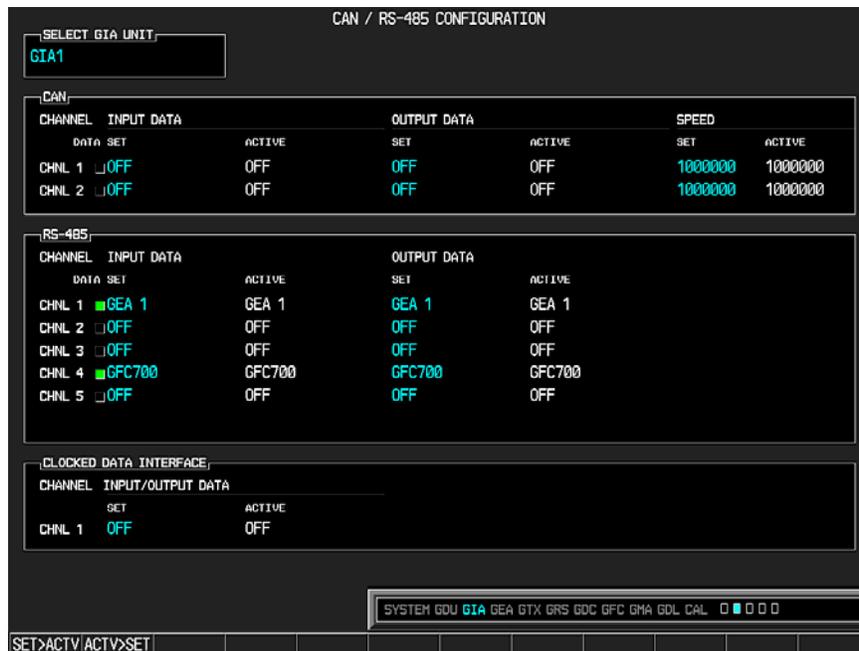
This window shows active ARINC 429 configuration settings for currently selected GIA.

#### **SOFTKEYS**

The following softkeys appear at this page:

- SET>ACTV: See Section 1.4.12 for description.
- ACTV>SET: See Section 1.4.12 for description.
- CLR NV: Clears all 'Active' settings from memory from the selected GIA 63/GIA 63W and restores default settings. *You will need to reload GIA and optional equipment configuration files if you clear the memory.*

## 2.4.1.2 CAN/RS-485 CONFIGURATION Page



**Figure 2-15. CAN/RS-485 CONFIGURATION Page**

This page shows 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 particular installation and are loaded from the appropriate G1000 Loader Card and should not be changed. The 'GIA 1' and 'GIA 2' configuration files contain the settings shown on this page.

### **SELECT GIA UNIT**

This window shows the currently selected GIA 63/GIA 63W.

### **CAN**

This window shows active Controller Area Network configuration settings for currently selected GIA.

### **RS-485**

This window shows active RS-485 configuration settings for currently selected GIA.

### **CLOCKED DATA INTERFACE**

This window shows active Clocked Data Interface settings, typically only used when interfacing to an external DME.

### **SOFTKEYS**

The following softkeys appear at this page:

- SET>ACTV: See Section 1.4.12 for description.
- ACTV>SET: See Section 1.4.12 for description.

### 2.4.1.3 GIA I/O CONFIGURATION Page

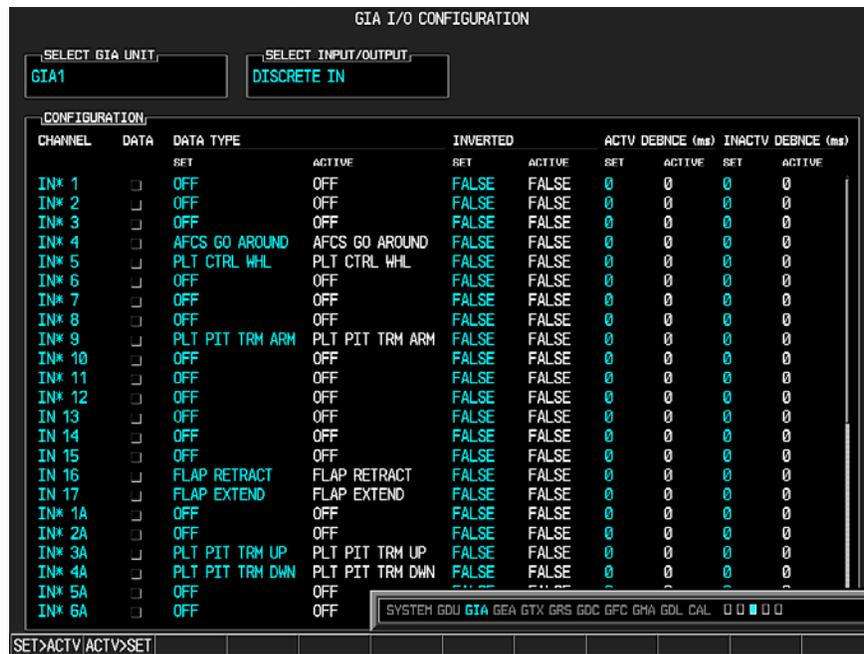


Figure 2-16. GIA I/O CONFIGURATION Page

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

#### **SELECT GIA UNIT**

This window shows the currently selected GIA 63/GIA 63W unit.

#### **SELECT INPUT/OUTPUT**

This window shows input/output type that is displayed for the currently selected GIA. Options include:

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

#### **CONFIGURATION**

This window shows 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 at this page:

- SET>ACTV: See Section 1.4.12 for description.
- ACTV>SET: See Section 1.4.12 for description.

## 2.4.1.4 COM SETUP Page



Figure 2-17. COM SETUP Page

### SELECT GIA UNIT

This window shows the currently selected GIA 63/GIA 63W.

### CALIBRATION

#### **CAUTION**

**Refer to Installation Bulletin 0537 when making changes on this page. Incorrectly making adjustments will disable the COM and require GIA replacement.**

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.

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.*

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.*

SIDETONE: Sets the sidetone audio output level. *May be set to any value between 0 (zero) and 63.*

MIC GAIN: Sets the headset microphone gain level. *May set to any value between 0 (zero) and 63.*

## 2.4.1.5 GIA STATUS Page

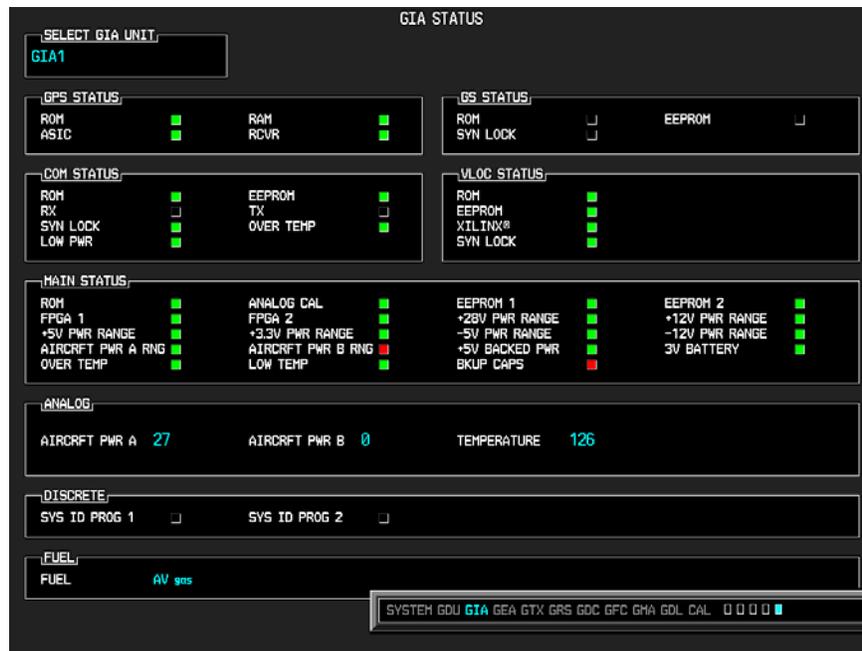


Figure 2-18. GIA STATUS Page

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

### **SELECT GIA UNIT**

This window shows the currently selected GIA 63/GIA 63W.

### **GPS STATUS**

**ROM, RAM, ASIC, RCVR:** Shows 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:** Shows 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:** Shows the condition of various COM transceiver hardware components.

**RX:** Shows whether or not the GIA 63/GIA 63W COM is currently receiving. (Green = Receiving)

**TX:** Shows 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)

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## **VLOC STATUS**

**ROM, XILINX, SYN LOCK, EEPROM:** Shows condition of various NAV receiver components. *These boxes should be green, a red box indicates an internal failure.*

## **MAIN STATUS**

**ROM, FPGA 1/3, EEPROM 1/2:** Shows the condition of various GIA 63/GIA 63W main board components. *These boxes should be green, a red box indicates an internal failure.*

**+5, +3.3, -5, +12/-12, +28 PWR RANGE:** Shows 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.*

**AIRCRAFT PWR A/B RNG:** Shows 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.*

**ANALOG CAL:** Shows the condition of the GIA calibration. (Green = Valid Analog Calibration)

**OVER TEMP:** Informs the technician of an over-temperature condition on the GIA 63/GIA 63W main board. (Red = Over-temperature, Green = Normal-temperature)

**LOW TEMP:** Informs the technician of a low temperature condition on the main board. (Red = Low-temperature, Green = Normal-temperature)

**BKUP CAPS:** Indicates status of the Backup Capacitor Test. A green box indicates the test passed, a red box indicates it failed.

## **ANALOG STATUS**

**AIRCRAFT PWR A, B:** Shows aircraft power input values, expressed in Volts DC. (Example: 2214 = 22.14 Vdc)

**TEMPERATURE:** Shows the internal temperature of GIA unit, expressed in degrees Fahrenheit. (Example: 12267 = 122.67°F)

## **DISCRETE**

**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 are not used in SEP aircraft.

<b>GIA System ID 1</b>	<b>GIA System ID 2</b>	<b>GIA Unit Number</b>
Black	Black	#1 GIA
Green	Black	#2 GIA
Black	Green	#3 GIA
Green	Green	#4 GIA

## **FUEL**

**FUEL:** This window shows the type of fuel to be used on the aircraft.

## 2.4.2 COM

Symptom	Recommended Action
Weak COM transmit power	<ul style="list-style-type: none"> <li>Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace GIA.</li> <li>✓ If problem does not follow unit, check COM antenna and cabling for faults.</li> </ul> </li> </ul>
Weak COM receiver	<ul style="list-style-type: none"> <li>Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace GIA.</li> <li>✓ If problem does not follow unit, check COM antenna and cabling for faults.</li> </ul> </li> </ul>
No COM sidetone	<ul style="list-style-type: none"> <li>Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace GIA.</li> <li>✓ If problem persists replace GMA 1347.</li> </ul> </li> </ul>
COM Bleedover	<ul style="list-style-type: none"> <li>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.</li> <li>On the MFD AUX – SYSTEM STATUS page, see if GIA’s are under S/N 46905099. If so, remove GIA’s from rack and check if MOD 3 has been installed. If not, units may be returned to Garmin for installation of Service Bulletin 0505.</li> </ul>

## 2.4.3 GPS

Symptom	Recommended Action
Will not acquire satellites	<ul style="list-style-type: none"> <li>Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.</li> <li>Check date and time on Date/Time Setup Page.               <ul style="list-style-type: none"> <li>✓ If date and time are incorrect, enter the correct date and time.</li> </ul> </li> <li>Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows unit, clear the GPS almanac by performing the following steps –                   <ul style="list-style-type: none"> <li>○ Using the PFD in config mode, go to the GIA RS-232/ARNIC 429 Config Page.</li> <li>○ At the top of the screen, select the GIA that can not acquire satellites (GIA1 or GIA2) and press the ENT key.</li> <li>○ Press the “CLR NV” softkey at the bottom of the screen.</li> <li>○ Select “OK” in the “Clear GIA nonvolatile memory?” pop-up window.</li> <li>○ Next reload GIA Audio and Config files from a loader card, see Section 4.3.3 and on for instructions. Be sure to reload the config files for any optional equipment installed on the aircraft that require the GIA config to be updated.</li> </ul> </li> </ul> </li> <li>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.               <ul style="list-style-type: none"> <li>✓ If clearing nonvolatile memory is unsuccessful and the GPS still can not acquire a position, replace the GIA.</li> </ul> </li> <li>If problem does not follow unit, check GPS antenna and cabling.</li> </ul>

#### 2.4.4 NAV

Symptom	Recommended Action
Weak NAV receiver	<ul style="list-style-type: none"> <li>• Set up a NAV/COM Ramp Test Set to radiate a test signal.</li> <li>• Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace GIA.</li> <li>✓ If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.</li> </ul> </li> </ul>

#### 2.4.5 G/S

Symptom	Recommended Action
Weak G/S receiver	<ul style="list-style-type: none"> <li>• Set up a NAV/COM Ramp Test Set to radiate a test signal.</li> <li>• Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows unit, replace GIA.</li> <li>✓ If problem does not follow unit, check NAV antenna, coupler, and cabling for faults.</li> </ul> </li> </ul>

#### 2.4.6 COM Related Alerts

Message	Cause	Solutions
COM1 SERVICE – COM1 needs service. Return unit for repair.	The G1000 has determined COM1 needs service.	<ul style="list-style-type: none"> <li>• Replace GIA1</li> </ul>
COM2 SERVICE – COM2 needs service. Return unit for repair.	The G1000 has determined COM2 needs service.	<ul style="list-style-type: none"> <li>• Replace GIA2</li> </ul>
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"> <li>• Press the push-to-talk switch(es) again to cycle its operation</li> <li>• Check push-to-talk switch(es) and wiring</li> <li>• Check GIA1/GMA 1347 interconnect</li> <li>• Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA1.</li> <li>✓ If problem persists replace the GMA 1347.</li> </ul> </li> </ul>
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"> <li>• Press the push-to-talk switch(s) again to cycle its operation</li> <li>• Check push-to-talk switch(s) and wiring</li> <li>• Check GIA2/GMA 1347 interconnect</li> <li>• Switch GIA1 and GIA2, to verify location of problem:               <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA2.</li> <li>✓ If problem persists replace the GMA 1347.</li> </ul> </li> </ul>

Message	Cause	Solutions
COM1 RMT XFR – COM1 remote transfer key is stuck.	The COM1 external remote transfer switch is stuck in the enabled (or “pressed”) state.	<ul style="list-style-type: none"> <li>• Press the COM1 external remote transfer switch again to cycle its operation</li> <li>• Check COM1 external remote transfer switch and wiring</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA1.</li> </ul> </li> </ul>
COM2 RMT XFR – COM2 remote transfer key is stuck.	The COM2 external remote transfer switch is stuck in the enabled (or “pressed”) state.	<ul style="list-style-type: none"> <li>• Press the COM2 external remote transfer switch again to cycle its operation</li> <li>• Check COM2 external remote transfer switch and wiring</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA2.</li> </ul> </li> </ul>
COM1 TEMP – COM1 over temp. Reducing transmitter power.	GIA1 COM has exceeded its operating temperature range.	<ul style="list-style-type: none"> <li>• Check fan, wiring and air tubing for proper operation (if applicable).</li> <li>• Replace GIA1.</li> <li>• If problem persists contact Garmin Aviation Product Support for assistance.</li> </ul>
COM2 TEMP – COM2 over temp. Reducing transmitter power.	GIA2 COM has exceeded its operating temperature range.	<ul style="list-style-type: none"> <li>• Check fan, wiring and air tubing for proper operation (if applicable).</li> <li>• Replace GIA2.</li> <li>• If problem persists contact Garmin Aviation Product Support for assistance.</li> </ul>

#### 2.4.7 NAV Related Alerts

Message	Cause	Solutions
NAV1 SERVICE – NAV1 needs service. Return unit for repair.	The G1000 has detected a failure in NAV1 receiver.	<ul style="list-style-type: none"> <li>• Replace GIA1</li> </ul>
NAV2 SERVICE – NAV2 needs service. Return unit for repair.	The G1000 has detected a failure in NAV2 receiver.	<ul style="list-style-type: none"> <li>• Replace GIA2</li> </ul>
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"> <li>• Press the NAV1 external remote transfer switch again to cycle its operation</li> <li>• Check NAV1 remote transfer switch and wiring</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA1.</li> </ul> </li> </ul>

Message	Cause	Solutions
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"> <li>• Press the NAV2 external remote transfer switch again to cycle its operation</li> <li>• Check NAV2 remote transfer switch and wiring</li> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA2.</li> </ul> </li> </ul>

#### 2.4.8 G/S Related Alerts

Message	Cause	Solutions
G/S1 SERVICE – G/S1 needs service. Return unit for repair.	The G1000 has detected a failure in G/S1 receiver.	<ul style="list-style-type: none"> <li>• Replace GIA1</li> </ul>
G/S2 SERVICE – G/S2 needs service. Return unit for repair.	The G1000 has detected a failure in G/S1 receiver.	<ul style="list-style-type: none"> <li>• Replace GIA2</li> </ul>
G/S1 FAIL – G/S1 is inoperative.	The G1000 has detected a failure in G/S1 receiver.	<ul style="list-style-type: none"> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA.</li> <li>✓ If problem does not follow unit, check G/S1 antenna and cabling.</li> </ul> </li> </ul>
G/S2 FAIL – G/S2 is inoperative.	The G1000 has detected a failure in G/S2 receiver.	<ul style="list-style-type: none"> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA.</li> <li>✓ If problem does not follow unit, check G/S2 antenna and cabling.</li> </ul> </li> </ul>

#### 2.4.9 GPS Related Alerts

**NOTE**

Before troubleshooting, ensure that no cell phones or devices using cell phone technology are turned on, even in a monitoring state, in the cabin.

Message	Cause	Solutions
GPS1 SERVICE – GPS1 needs service. Return unit for repair.	The G1000 has detected a failure in GPS1 receiver.	<ul style="list-style-type: none"> <li>• Replace GIA1</li> </ul>
GPS2 SERVICE – GPS2 needs service. Return unit for repair.	The G1000 has detected a failure in GPS2 receiver.	<ul style="list-style-type: none"> <li>• Replace GIA2</li> </ul>
GPS1 FAIL – GPS1 is inoperative.	The G1000 has detected a failure in GPS1 receiver.	<ul style="list-style-type: none"> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA1.</li> <li>✓ If problem does not follow the unit, check GPS1 antenna and cabling.</li> </ul> </li> </ul>

Message	Cause	Solutions
GPS2 FAIL – GPS2 is inoperative.	The G1000 has detected a failure in GPS2 receiver.	<ul style="list-style-type: none"> <li>• Switch GIA1 and GIA2, to verify location of problem: <ul style="list-style-type: none"> <li>✓ If problem follows the unit, replace GIA2.</li> <li>✓ If problem does not follow the unit, check GPS2 antenna and cabling.</li> <li>✓ If problem follows the unit, replace GIA2.</li> </ul> </li> </ul>

#### 2.4.10 GIA Cooling Alerts

Message	Cause	Solutions
GIA1 COOLING – GIA1 temperature too low.	GIA1 operating temperature is too low.	<ul style="list-style-type: none"> <li>• Allow unit to warm up</li> </ul>
GIA2 COOLING – GIA2 temperature too low.	GIA2 operating temperature is too low.	<ul style="list-style-type: none"> <li>• Allow unit to warm up</li> </ul>
GIA1 COOLING – GIA1 over temperature.	GIA1 has exceeded its operating temperature range.	<ul style="list-style-type: none"> <li>• Check fan, wiring and air tubing for proper operation (if applicable).</li> <li>• Replace GIA1.</li> <li>• If problem persists contact Garmin Aviation Product Support for assistance.</li> </ul>
GIA2 COOLING – GIA2 over temperature.	GIA2 has exceeded its operating temperature range.	<ul style="list-style-type: none"> <li>• Check fan, wiring and air tubing for proper operation (if applicable).</li> <li>• Replace GIA2.</li> <li>• If problem persists contact Garmin Aviation Product Support for assistance.</li> </ul>

#### 2.4.11 Other GIA Alerts

Message	Cause	Solutions
GIA1 CONFIG – GIA1 configuration error. Config service req'd.	The G1000 has detected a GIA configuration mismatch.	<ul style="list-style-type: none"> <li>• See Section 4.3 for GIA configuration instructions</li> <li>• If problem persists, replace master configuration module, check config module harness for faults and replace if necessary.</li> </ul> <p style="text-align: center;"><b>NOTE</b></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.		

Message	Cause	Solutions
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"> <li>• See Section 4.3 for GIA audio configuration instructions</li> <li>• If problem persists, replace master configuration module, check config module harness for faults and replace if necessary.</li> </ul> <p style="text-align: center;"><b><u>NOTE</u></b></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.		
MANIFEST – GIA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GIA 1.	<ul style="list-style-type: none"> <li>• Load correct software version.</li> </ul>
MANIFEST – GIA2 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GIA 2.	
GIA1 SERVICE – GIA 1 needs service. Return unit for repair.	The G1000 has detected a failure in GIA1.	<ul style="list-style-type: none"> <li>• Replace GIA1</li> </ul>
GIA2 SERVICE – GIA 2 needs service. Return unit for repair.	The G1000 has detected a failure in GIA2.	<ul style="list-style-type: none"> <li>• Replace GIA2</li> </ul>
HW MISMATCH – GIA hardware mismatch. GIA1 communication halted.	A GIA hardware mismatch has been detected.	<ul style="list-style-type: none"> <li>• Ensure both GIA units are either WAAS or non-WAAS as applicable. WAAS GIA's can not be installed in place of non-WAAS units (and vice-versa) without additional G1000 system hardware and software modifications.</li> </ul>
HW MISMATCH – GIA hardware mismatch. GIA 2 communication halted.	A GIA hardware mismatch has been detected.	

## 2.5 GRS 77/GMU 44

### 2.5.1 Configuration Pages

#### 2.5.1.1 AHRS/AIR DATA INPUT Page



**Figure 2-19. AHRS/AIR DATA INPUT Page**

This page shows real time data from the GRS 77 (AHRS 1) and GDC74A (Air Data1). The aircraft is not equipped with a second GRS 77 or GDC74A, so the AHRS 2 and Air Data 2 fields will remain blank. 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**

**THDG:** 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.

**XACC:** X Axis acceleration value, expressed in m/s<sup>2</sup>.

**YACC:** Y Axis acceleration value, expressed in m/s<sup>2</sup>.

**ZACC:** Z Axis acceleration value, expressed in m/s<sup>2</sup>.

#### **AIR DATA 1, 2**

**SAT:** Static Air Temperature measurement input from GDC 74A, expressed in degrees Celsius.

**IAS:** Indicated Air Speed measurement input from GDC 74A, expressed in knots.

**TAS:** True Air Speed measurement input from GDC 74A, expressed in knots.

**BALT:** Barometric corrected altitude input from GDC 74A, expressed in feet.

**DALT:** Density altitude input from GDC 74A, expressed in feet.

**PALT:** Pressure altitude input from GDC 74A, 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.

### 2.5.2 Common Problems

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

### 2.5.3 Common Alerts

Message	Cause	Solutions
AHRS TAS – AHRS not receiving airspeed.	The GRS 77 is not receiving airspeed information from the GDC 74A.	<ul style="list-style-type: none"> <li>• Check GRS/GDC interconnect</li> <li>• Replace the GDC 74A with a known good unit: <ul style="list-style-type: none"> <li>✓ If problem does not persist, replace the GRS 77.</li> </ul> </li> </ul>
AHRS GPS – AHRS using backup GPS source.	The GRS 77 is using a backup GPS source.	<ul style="list-style-type: none"> <li>• Ensure that a cell phone or a device using cell phone technology is not turned on (even in a monitoring state) in the cabin.</li> <li>• Check GPS status for GIA 1 and 2 on MFD - AUX GPS STATUS page. If one or both GPS receivers cannot acquire a position lock, see Section 2.4.3 for GPS troubleshooting.</li> <li>• See Section 2.1.5.2 for data path troubleshooting.</li> <li>• Replace the GRS 77.</li> </ul>
AHRS GPS – AHRS not receiving backup GPS information.	The GRS 77 is not receiving backup GPS information from either GIA 63/GIA 63W.	
AHRS GPS – AHRS operating exclusively in no-GPS mode.	The GRS 77 is operating in the absence of GPS.	
AHRS GPS – AHRS not receiving any GPS information.	The GRS 77 is not receiving GPS data from the GPS receivers.	
AHRS Service – AHRS magnetic field model needs updated.	The AHRS magnetic field model has expired.	
MANIFEST-GRS1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GRS 77 or the GMU 44.	<ul style="list-style-type: none"> <li>• Load correct software version in the GRS 77 and GMU 44.</li> </ul>

## 2.5.4 Backup Path Alerts

Message	Cause	Solutions
BACKUP PATH – AHRS using backup data path.	The PFD is using a backup ARINC 429 data path to receive AHRS data.	✓ See Section 2.1.5 for troubleshooting.

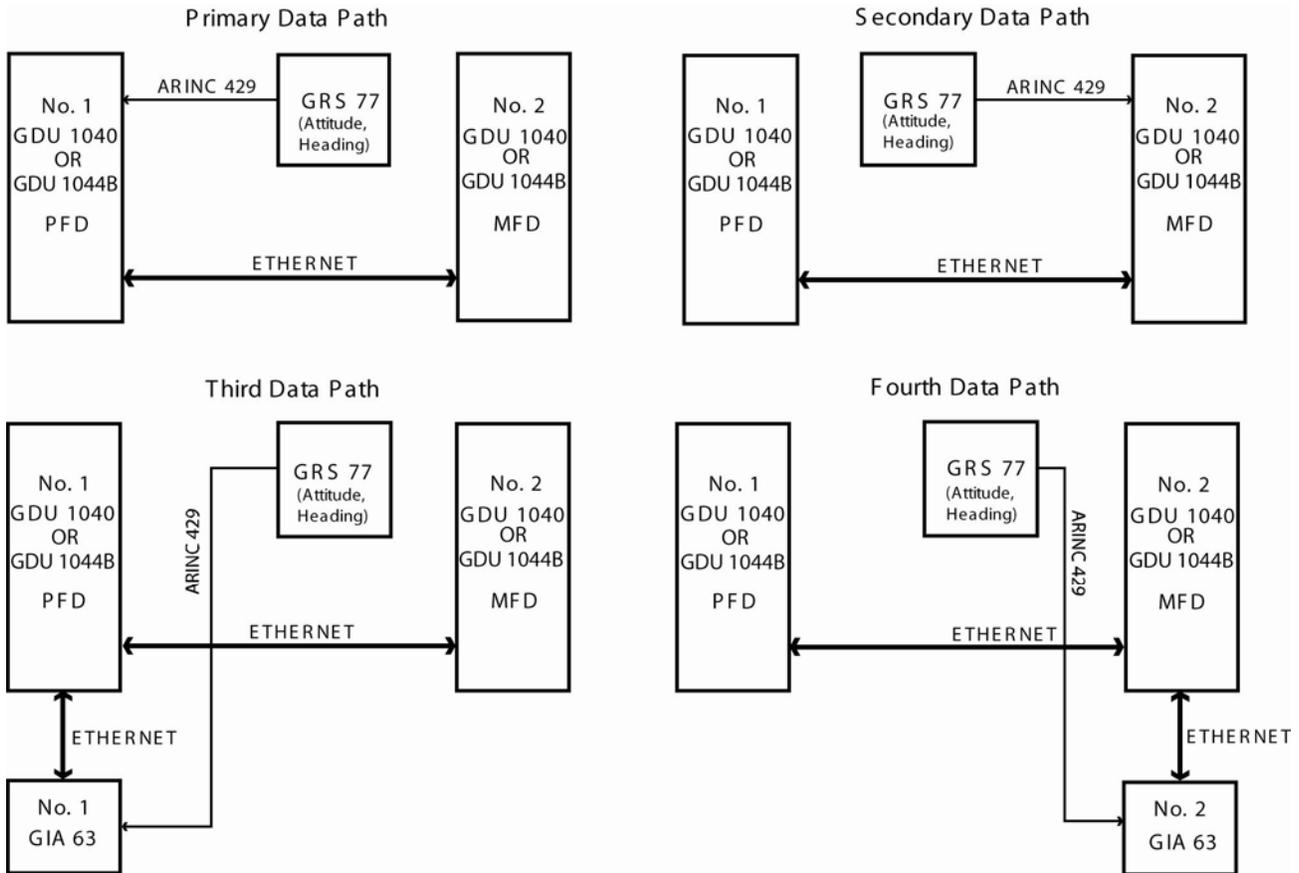


Figure 2-20. GRS 77 Data Paths

## 2.5.5 GMU Related Alerts

Message	Cause	Solutions
MANIFEST – GMU1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in the GMU 44.	<ul style="list-style-type: none"> <li>• Load correct software version in the GMU 44.</li> </ul>
HDG FAULT – A magnetometer fault has occurred.	A fault has occurred in the magnetometer.	<ul style="list-style-type: none"> <li>• Check GMU 44/GRS 77 interconnect for faults.</li> <li>• Replace the GMU 44.</li> <li>✓ If problem persists, replace the GRS 77.</li> </ul>

## 2.6 GDC 74A

### 2.6.1 Common Problems

Symptom	Recommended Action
Altitude is different than standby altimeter	<ul style="list-style-type: none"><li>• 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.</li><li>• Determine which instrument is outside limits and recalibrate or replace. The GDC is field adjustable, see Section 2.6.4. Note: Both units may individually be in spec but show a difference in altitude. Do not return the GDC to Garmin for service if not outside limits.</li></ul>
GDC Config file does not load.	<ul style="list-style-type: none"><li>• Replace GDC config module.<ul style="list-style-type: none"><li>✓ If problem persists, replace GDC config module wire harness.</li></ul></li></ul>

### 2.6.2 GDC 74A Related Alerts

Message	Cause	Solutions
MANIFEST – GDC1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in the GDC 74A.	<ul style="list-style-type: none"><li>• Load correct software version in the GDC74A.</li></ul>

### 2.6.3 Backup Path Alerts

Message	Cause	Solutions
BACKUP PATH – Airdata using backup data path.	The GDC 74A is using a backup ARINC 429 data path.	✓ See Section 2.1.5 for troubleshooting.

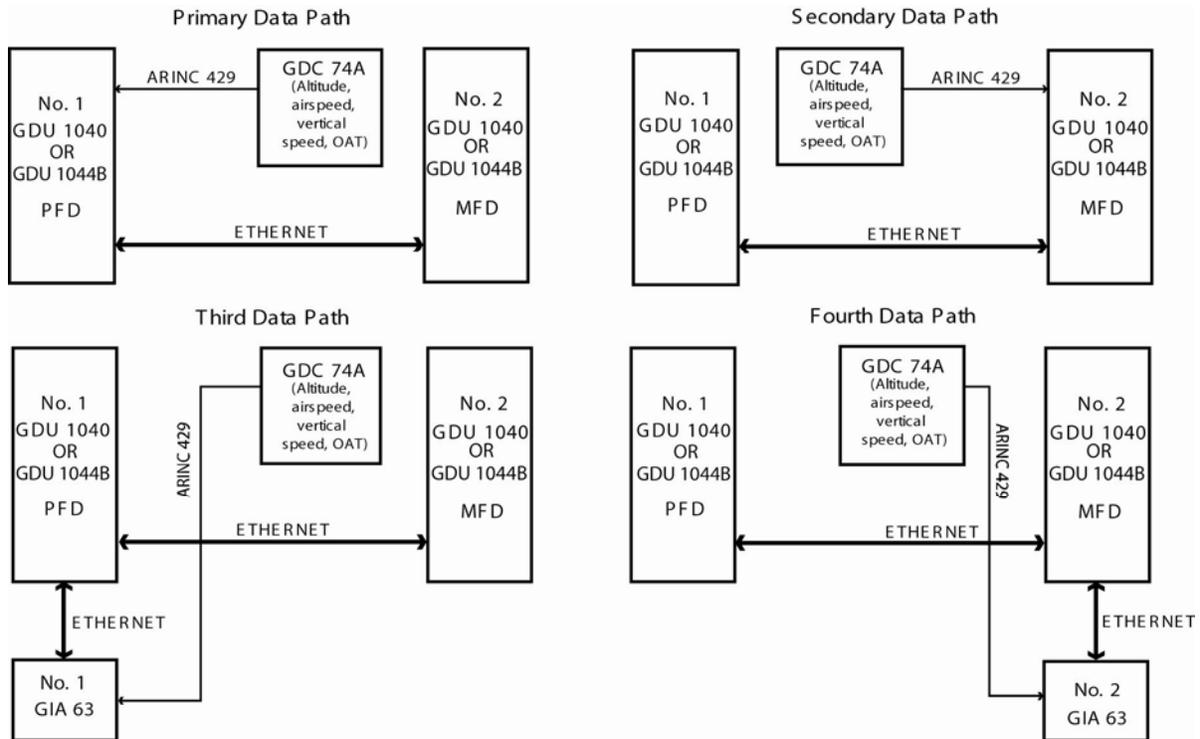


Figure 2-21. GDC 74A Data Paths

### 2.6.4 GDC 74(X) Field Calibration Utility

Use the GDC 74(X) Field Calibration Tool (T06-A0156-00) to adjust the calibration of GDC 74(X) units that have failed the 14 CFR Part 43 Appendix E tests due to altitude drift.

Both the GDC 74(X) Field Calibration Tool (software) and the GDC 74(X) Field Calibration Instructions (190-00303-82) can be downloaded from the Dealer Resource portion of the Garmin website at [www.garmin.com](http://www.garmin.com). First download the GDC 74(X) Field Calibration Instructions document, then use the steps listed in that document to download and run the GDC 74(X) Field Calibration Tool.

## 2.7 GEA 71

### 2.7.1 Configuration Pages

#### 2.7.1.1 ENGINE DATA Page

DATA		ENGINE 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 2-22. ENGINE DATA Page

The Engine Data page gives the technician real-time data showing current engine sensor readings. Items shown are typically used in most aircraft. There are no configurable parameters on this page.

#### **DATA**

ALT AMPS 1, 2: Alternator Amps measurement, expressed in amperes.

PROP D ICE CUR 1, 2: Propeller De-Ice current measurement, expressed in amperes.

AIRCRAFT PWR 1, 2: Aircraft power input measurement, expressed in volts DC.

BATT VOLTS 1, 2: Battery Voltage measurement, expressed in volts DC.

ENGINE HOURS: Shows engine time in hours, as measured by the engine tachometer input.

TACH SENSOR 1, 2: Tachometer sensor measurement, expressed in revolutions per minute (RPM).

D ICE PRESS: De-Ice system pressure measurement, expressed in pounds per square inch (PSI).

FUEL PRESS ENG 1, 2: Fuel Pressure measurement, expressed in pounds per square inch (PSI).

FUEL QTY RIGHT, LEFT: Fuel Quantity measurement, expressed in gallons (GL).

FUEL FLW ENG 1, 2: Fuel Flow measurement, expressed in gallons per hour (GL/HR).

MAP ENG 1, 2: Manifold Air Pressure sensor reading, expressed in inches/mercury ("Hg).

VAC ENG 1, 2: Vacuum measurement, expressed in inches/mercury ("Hg).

OP ENG 1, 2: Oil Pressure, expressed in pounds per square inch (PSI).

N1, N2, N3 ENG 1, 2: Compressor spool speeds, expressed in percent RPM. (Turbine aircraft only)

EGT ENG 1, 2 (1-6): Exhaust Gas Temperature, expressed in degrees Celsius.

ITT ENG 1, 2: Interstage Turbine Temperature, expressed in degrees Celsius. (Turbine aircraft only)

TIT ENG 1, 2: Turbine Intake Temperature, expressed in degrees Celsius. (Turbine aircraft only)

OT ENG 1, 2: Oil Temperature, expressed in degrees Celsius.

CHT ENG 1, 2 (1-6): Cylinder Head Temperature, expressed in degrees Celsius.

## 2.7.1.2 GEA STATUS Page



Figure 2-23. GEA STATUS Page

This page shows 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 window shows the currently selected GEA 71 engine/airframe unit.

### **STATUS**

#### **NOTE**

A green box indicates good working order. A red box indicates a problem, contact Garmin for assistance.

**CALIBRATE:** Shows status of GEA 71 calibration.

**CONFIG:** Shows status of GEA 71 configuration.

**INT PWR SUPPLY:** Shows 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 in Section 2.1.1.1.

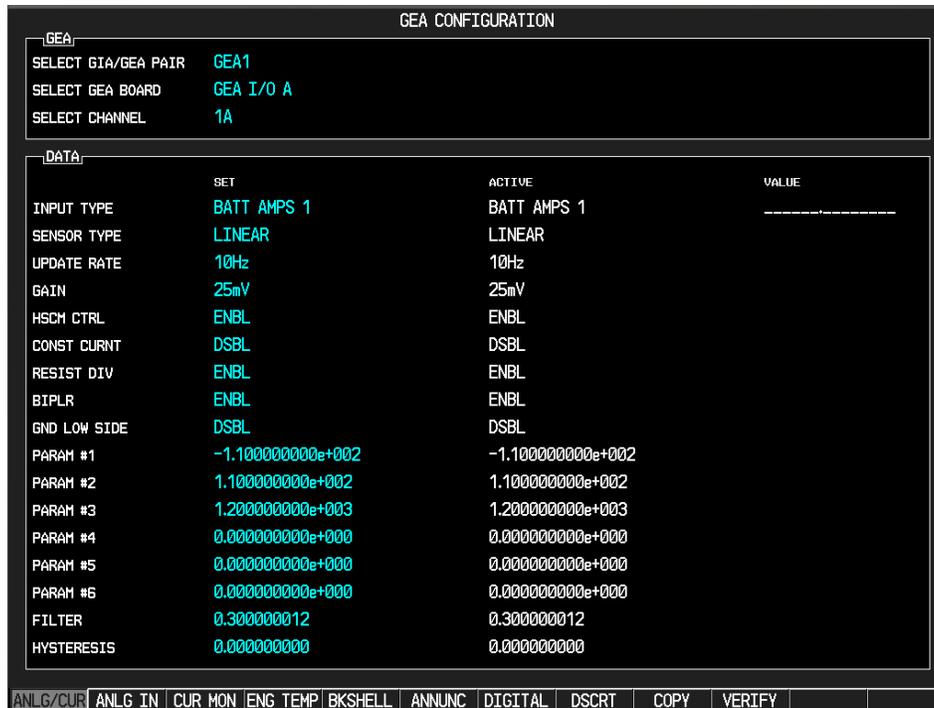
**EEPROM MAIN, A, B:** Shows status of internal EEPROM for main, I/O 'A' and I/O 'B' boards.

**RAM, ROM, XILINX:** Shows status of internal memory and FPGA.

**RS-485 1, 2:** Shows status of RS-485 I/O channels.

**COM CHANNEL:** Shows 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.*

### 2.7.1.3 GEA Configuration Page



**Figure 2-24. 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.

#### **CAUTION**

The data contained on this page is extremely critical to aircraft safety. Although the content can be viewed, the technician cannot make changes unless authorized and equipped to do so.

#### **GEA**

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

#### **DATA**

This window shows current configuration settings for the selected inputs/outputs in the GEA window.

#### **SOFTKEYS**

- ANLG/CRNT: Shows analog/current configuration settings.
- ANLG IN: Shows analog in configuration settings.
- CRNT MON: Shows current monitor configuration settings.
- ENG TEMP: Shows engine temperature sensor configuration settings.
- BKSHELL: Shows backshell thermocouple configuration settings.
- ANNUNC: Shows annunciation configuration settings.
- DIGITAL: Shows digital input configuration settings.
- DSCRT: Shows discrete input configuration settings.
- 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.

### 2.7.2 Common Problems

Symptom	Recommended Action
CHT, EGT, and TIT are red X'd (no other field is red X'd)	<ul style="list-style-type: none"> <li>• Ensure the GEA configuration module and thermocouple wiring and pins are not damaged.</li> <li>• Replace the GEA configuration module and thermocouple.</li> </ul>
One or more CHT, EGT, or TIT temperatures drop as electrical load increases	<ul style="list-style-type: none"> <li>• Check temperature probe(s) for shorts on the low side of the thermocouple (usually where bayonet is cramped).</li> <li>• Replace defective temperature probe(s).</li> </ul>
One or more CHT, EGT, or TIT temperatures drift up and flag	<ul style="list-style-type: none"> <li>• Check for an open temperature probe or open wiring and replace and/or correct.</li> </ul>
Fuel quantity flags intermittently	<ul style="list-style-type: none"> <li>• Check for an open in the wiring and connectors between the GEA, signal conditioner, and the sender (hi, low, or signal ground lines).</li> <li>• Check fuel sender for an open or dead spot.</li> </ul>
Engine instruments are missing on the MFD	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Discharged standby battery indication	<ul style="list-style-type: none"> <li>• Refer to Section 2.7.5 for the GEA 70 High Side Current Monitor Calibration Procedure.</li> </ul>

### 2.7.3 GEA 71 Related Alerts

Message	Cause	Solutions
GEA1 CONFIG – GEA1 configuration error. Config service req'd.	The G1000 has detected a GEA configuration mismatch.	<ul style="list-style-type: none"> <li>• See Section 4.6 for instructions on configuration.</li> <li>• If problem persists, replace master configuration module, check config module harness for faults and replace if necessary.</li> </ul> <p style="text-align: center;"><b>NOTE</b></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>
MANIFEST – GEA1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GEA 71.	<ul style="list-style-type: none"> <li>• Load correct software version.</li> </ul>

### 2.7.4 Backup Path Alerts

Message	Cause	Solutions
BACKUP PATH – EIS using backup data path.	The GEA 71 is using a backup RS-485 data path.	✓ See Section 2.1.5.2 for troubleshooting.

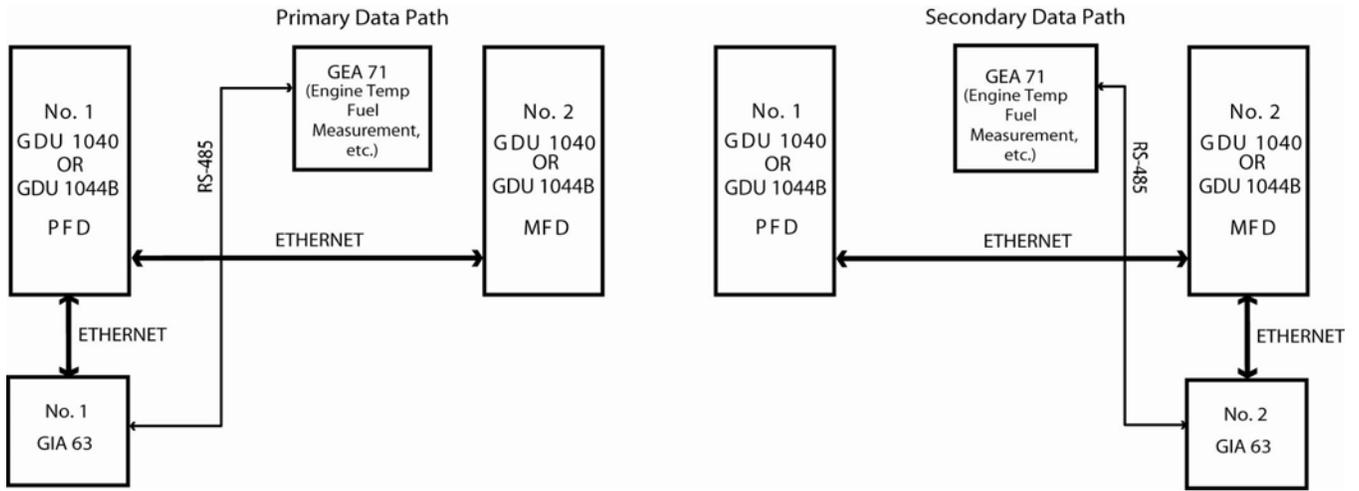


Figure 2-25. GEA 71 Data Paths

## 2.7.5 GEA 71 Standby Battery High-Side Current Monitor Calibration Procedure

### 2.7.5.1 Requirements

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

### 2.7.5.2 Procedure

#### 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 shows a minimum of 24 Volts.
5. Verify M BUS Volts shows 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:

8. Using the FMS knob navigate to the AUX-SYSTEM STATUS page as shown in Figure 2-36.
9. Record the GEA1 serial number. Also note the PFD1 or MFD1 software version for use later.
10. Press the ENGINE softkey.
11. Press the SYSTEM softkey.
12. Record the engine hours.



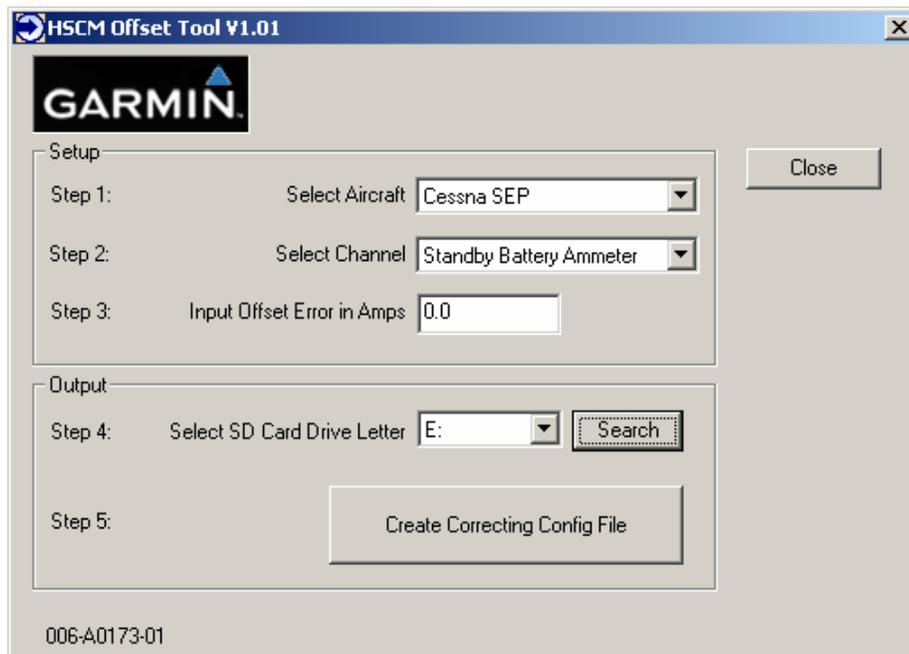
Figure 2-26. MFD AUX – SYSTEM STATUS PAGE

### **In the Aircraft:**

13. Set the STBY BATT CB to open.
14. 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.
15. Power down PFD1 and MFD1.
  - A. AVIONICS Switch (BUS 1 and BUS 2) – Off
  - B. MASTER Switch (BAT) – Off
  - C. STBY BATT Switch – Off

### **On the PC:**

16. Insert the SD Card into the card reader.
17. Run the HSCM.exe program (verify interface resembles Figure 2-27).



**Figure 2-27. HSCM Offset Tool User Interface**

18. Choose **Cessna SEP** in the **Select Aircraft** field.
19. **Standby Battery Ammeter** is the only selection available in the **Select Channel** field.
20. 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.*
21. Verify the drive letter of the SD card reader is selected in the **Select SD Card Drive Letter** field.
22. Press the **Create Correcting Config File** button.
23. Press **OK** to acknowledge the pop-up box. *A non-zero value will be used later in this procedure.*
24. Verify the pop-up box announces “Cessna SEP file written to drive” and press **OK** to acknowledge.
25. Press the **Close** button.
26. Remove the SD card from the card reader.

### **In the Aircraft:**

27. Insert the SD card into the upper card slot of the PFD.
28. Power up MFD1 and PFD1 in Configuration mode:
  - A. MASTER Switch (BAT) – On
  - B. AVIONICS Switch (BUS 1 and BUS 2) – On

---

**On the PFD:**

**GDU software version 6.01 or earlier**

- i. Using the FMS knob navigate to the CONFIGURATION UPLOAD page as shown in Figure 2-28.
- ii. Using the FMS knob select the **Cessna SEP – Offset Error Correction File** in the FILE field.
- iii. Using the FMS knob highlight GEA 1 in the SELECTION field.
- iv. Press the ENT key to start the configuration upload.



**Figure 2-28. CONFIGURATION UPLOAD Page (GDU software version 6.01 or earlier)**

GDU software version 7.01 or later

- i. Using the FMS knob navigate to the SYSTEM UPLOAD page as shown in Figure 2-29.
- ii. Using the FMS knob select the **Configuration Files** in the AIRFRAME field.
- iii. Using the FMS knob select the **Cessna SEP – Offset Error Correction File** in the FILE field.
- iv. Verify the configuration box is checked.
- v. Press the LOAD softkey.



**Figure 2-29. CONFIGURATION UPLOAD Page (GDU software version 7.01 or later)**

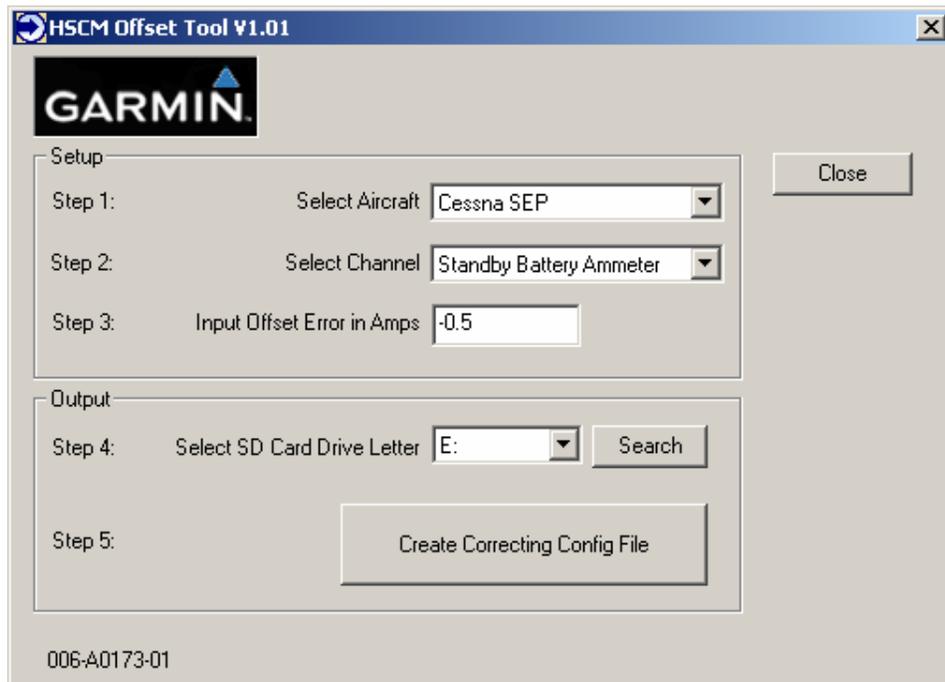
29. Power down PFD1 and MFD1.
  - A. AVIONICS Switch (BUS 1 and BUS 2) – Off
  - B. MASTER Switch (BAT) – Off
30. Remove the SD card from the PFD.
31. Power up MFD1 and PFD1 in Normal mode:
  - A. STBY BATT Switch – Arm
  - B. Ensure STBY BATT CB is open
  - C. MASTER Switch (BAT) – On
  - D. AVIONICS Switch (BUS 1 and BUS 2) – On
32. 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:**

33. Power down PFD1 and MFD1.
  - A. AVIONICS Switch (BUS 1 and BUS 2) – Off
  - B. MASTER Switch (BAT) – Off
  - C. STBY BATT Switch – Off

### **On the PC:**

34. Insert the SD Card into the card reader.
35. Run the HSCM.exe program (verify interface resembles Figure 2-30).



**Figure 2-30. HSCM Offset Tool User Interface**

36. Choose **CESSNA SEP** in the **Select Aircraft** field.
37. **Standby Battery Ammeter** is the only selection available in the **Select Channel** field.
38. Enter the value of **READING #2** in the **Input Offset Error in Amps** field.
39. Verify the drive letter of the SD card reader is selected in the **Select SD Card Drive Letter** field.
40. Press the **Create Correcting Config File** button.
41. Press **OK** to acknowledge the pop-up box.
42. Verify the pop-up box announces “Cessna SEP file written to drive” and press **OK** to acknowledge.
43. Press the **Close** button.
44. Remove the SD card from the card reader.

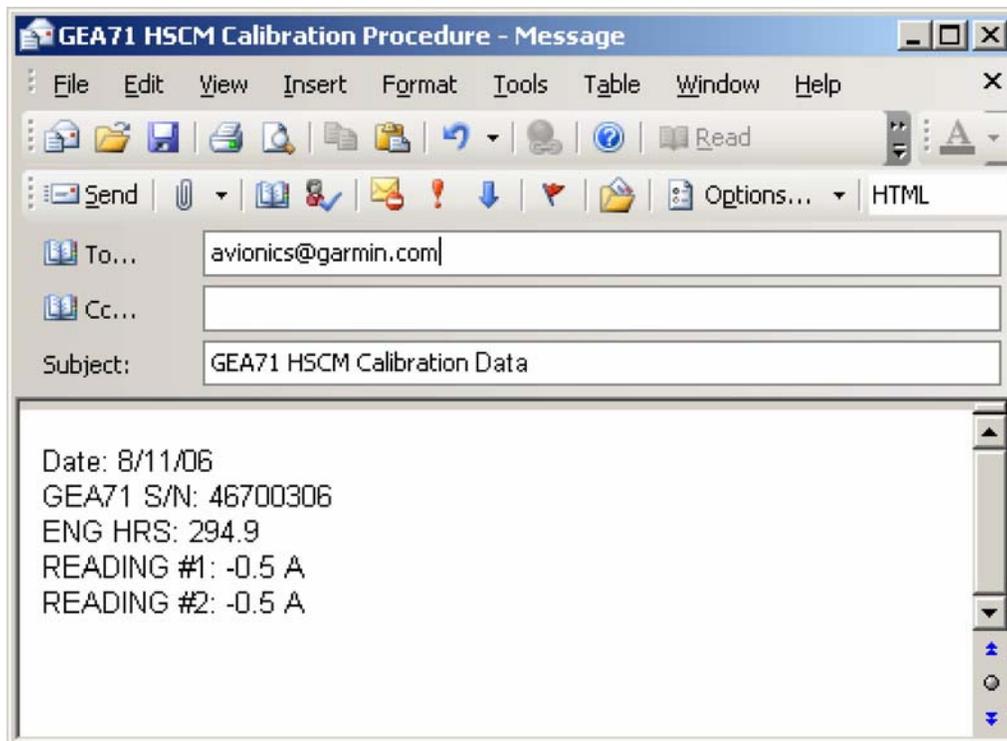
### **In the Aircraft:**

45. Insert the SD card into the upper card slot of the PFD.
46. Power up MFD1 and PFD1 in Configuration mode:
  - A. MASTER Switch (BAT) – On
  - B. AVIONICS Switch (BUS 1 and BUS 2) – On

---

### **On the PFD:**

47. Repeat the configuration upload as documented above.
48. Power down PFD1 and MFD1.
  - A. AVIONICS Switch (BUS 1 and BUS 2) – Off
  - B. MASTER Switch (BAT) – Off
49. Remove the SD card from the PFD.
50. Power up MFD1 and PFD1 in Normal mode:
  - A. STBY BATT Switch – Arm
  - B. Ensure STBY BATT CB is open
  - C. AVIONICS Switch (BUS 1 and BUS 2) – On
  - D. MASTER Switch (BAT) – On
51. 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.
52. Power down PFD1 and MFD1.
  - A. AVIONICS Switch (BUS 1 and BUS 2) – Off
  - B. MASTER Switch (BAT) – Off
53. Close the STBY BATT CB.
54. Turn the STBY BATT switch to off.
55. Email the date of calibration, GEA 71 serial number, engine hours, and value of READING #1 and READING #2 to [avionics@garmin.com](mailto:avionics@garmin.com). Please enter “GEA 71 HSCM Calibration Data” in the subject line, as shown in Figure 2-31.



**Figure 2-31. Example Post-Calibration Email**

## 2.8 GTX 33

### 2.8.1 Common Alerts

Message	Cause	Solutions
XPDR1 CONFIG – XPDR1 configuration error. Config service req'd.	The G1000 has detected a GTX 33 configuration mismatch.	<ul style="list-style-type: none"> <li>Perform a SET&gt;ACTV configuration reset on the GTX Config page and verify the aircraft registration is present.</li> <li>If error is still present, reload config files from a loader card. See section 4.7.2</li> <li>If problem persists, replace master configuration module, check config module harness for faults and replace if necessary.</li> </ul> <p style="text-align: center;"><b>NOTE</b></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>
MANIFEST – GTX1 software mismatch. Communication Halted.	The system has detected an incorrect software version loaded in GTX 33.	<ul style="list-style-type: none"> <li>Load correct software version in the GTX 33.</li> </ul>

### 2.8.2 Backup Path Alerts

Message	Cause	Solutions
BACKUP PATH – Transponder using backup data path.	The GTX 33 is using a backup RS-232 data path.	<ul style="list-style-type: none"> <li>✓ See Section 2.1.5.2 for troubleshooting.</li> </ul>

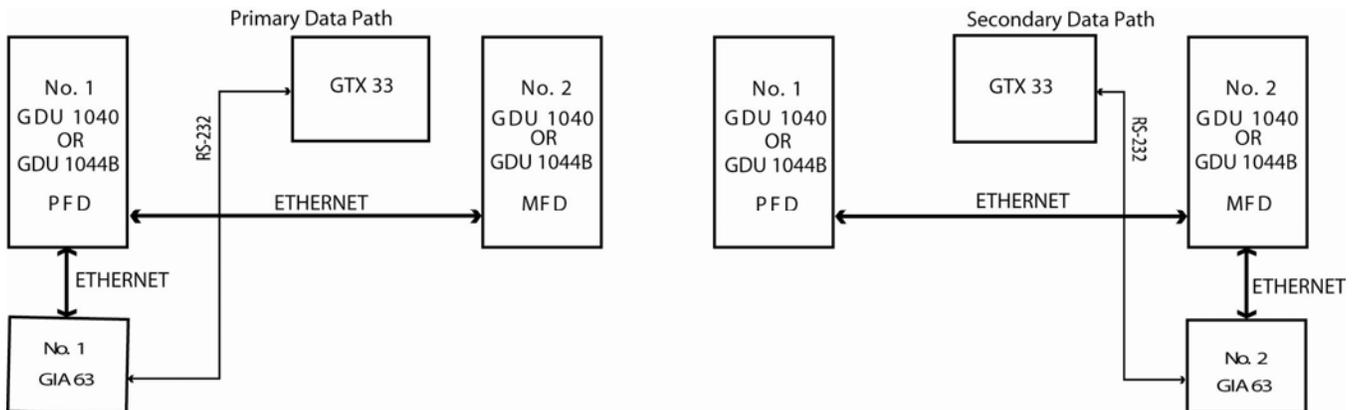


Figure 2-32. GTX 33 Data Paths

## 2.9 GDL 69/69A

### 2.9.1 Configuration Pages

#### 2.9.1.1 GDL 69 Page

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

SET>ACTV ACTV>SET

Figure 2-33. GDL 69 Page

**NOTE**

Refer to Service Bulletins 0538 and 0544 when troubleshooting a GDL 69/69A.

#### **CONFIGURATION**

**NOTE**

Configuration settings are not adjustable.

**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 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**

**ID:** Displays the identification number for the GDL 69/69A.

**ACTIVE:** Displays the active status for the GDL 69/69A.

**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)**

**QUALITY OF SERVICE:** Displays the quality of service for the GDL 69/69A.

**TERRESTRIAL ERROR STATUS:** Displays the terrestrial error status for the GDL 69/69A.

**SATELLITE 1 ERROR:** Displays the error status for satellite 1.

**SATELLITE 2 ERROR:** Displays the error status for satellite 2.

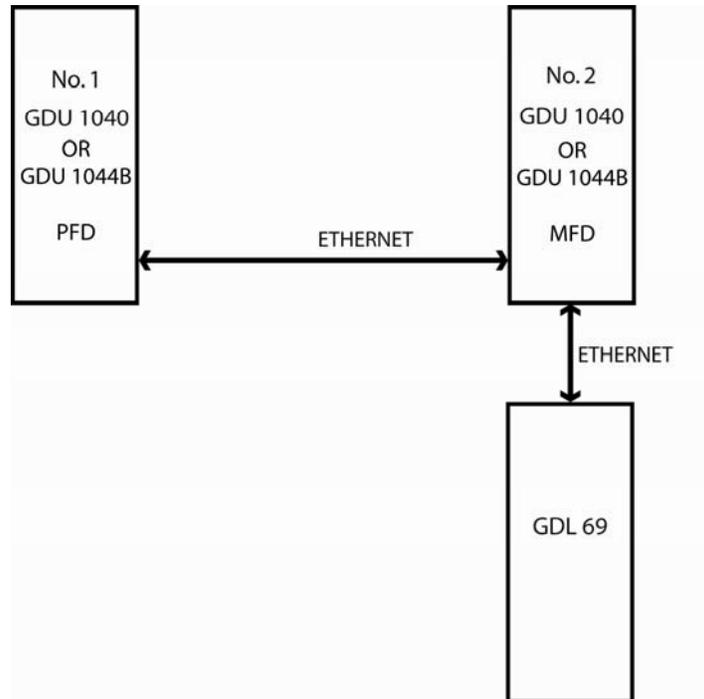
**TUNER STATUS:** Displays the tuner status for the GDL 69/69A.

## 2.9.2 Common Problems

Symptom	Recommended Action
<p>No XM audio is heard</p> <p>No XM weather information is displayed</p>	<ul style="list-style-type: none"> <li>• Ensure the following items are not preventing the audio panel from distributing XM audio (reference applicable G1000 Pilot's Guide): <ul style="list-style-type: none"> <li>✓ Verify the XM volume is not muted on the AUX – XM RADIO page on the MFD.</li> <li>✓ Verify no music sources are plugged into the AUX music input jack.</li> <li>✓ Verify the COM squelch is not open.</li> <li>✓ Verify the ICS squelch is not open.</li> <li>✓ Verify the marker beacon tones are not being received.</li> <li>✓ Verify the headphone (if equipped) volume is turned up.</li> </ul> </li> <li>• Go to the AUX – SYSTEM STATUS page on the MFD and ensure unit is online. <ul style="list-style-type: none"> <li>✓ If a red X is present, verify the unit is receiving power at the rack connector.</li> <li>✓ Check GDL software version for the following conditions – <ul style="list-style-type: none"> <li>✓ If 2.99 or less follow instructions in Garmin Service Advisory 0538 for reactivation.</li> <li>✓ If software version is 3.02 or less, see Service Advisory 0613 concerning storm cell limitation that could cause the GDL to stop sending data to the MFD.</li> </ul> </li> </ul> </li> <li>• Ensure there are no GDL alerts in the alert window. If there is an Alert for software or configuration error or mismatch, reload the file noted in the Alert.</li> <li>• Restart the PFD and MFD in configuration mode and go to the GDL page. <ul style="list-style-type: none"> <li>✓ Verify unit is active.</li> <li>✓ Verify the Signal number is “2” or “3”. If it is “0” or “1” check the GDL 69/69A antenna and cabling for faults. <ul style="list-style-type: none"> <li>✓ Reseat the GDL 69/69A to verify the coax connector is fully seated.</li> </ul> </li> <li>✓ If unit is not active, contact XM Customer service at 1-800-985-9200 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. <ul style="list-style-type: none"> <li>✓ Alternatively, you may also go to XM's website at <a href="http://www.xmradio.com/refresh/">http://www.xmradio.com/refresh/</a> and enter the radio ID's to have a refresh signal sent.</li> </ul> </li> <li>✓ 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.</li> <li>✓ 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.</li> <li>✓ If problem persists, replace the GDL 69/69A.</li> </ul> </li> </ul>

### 2.9.3 GDL 69/69A Related Alerts

Message	Cause	Solutions
GDL 69 FAIL – GDL 69 has failed.	The G1000 has detected a failure in the GDL 69/69A.	<ul style="list-style-type: none"> <li>• Check GDL 69/69A antenna and cabling</li> <li>• Check the GDL 69/69A and MFD interconnect</li> <li>• Replace GDL 69/69A</li> </ul>



**Figure 2-34. GDL 69 Data Paths**

### 2.10 GDL 90

Refer to the GDL 90 Installation Manual (560-1049-02) for troubleshooting information.

## 2.11 GFC 700 (BP 2007 and later only)

### 2.11.1 Configuration Pages

#### 2.11.1.1 GFC Configuration Page

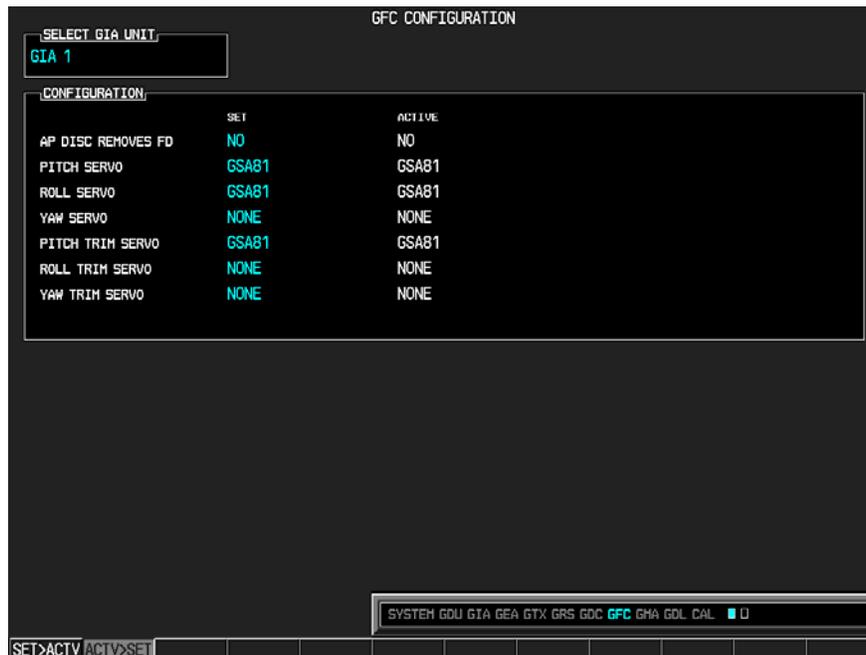


Figure 2-35. GFC CONFIGURATION Page

All settings are contained in the GFC configuration file.

#### CAUTION

The data contained on this page is extremely critical to aircraft safety.

#### **SELECT GIA UNIT**

This window shows the currently selected GIA.

#### **CONFIGURATION**

**AP DISC REMOVES FD:** Turns the autopilot disconnect removes flight director function on or off.

**PITCH SERVO:** Shows the currently selected pitch servo.

**ROLL SERVO:** Shows the currently selected roll servo.

**YAW SERVO:** Shows the currently selected yaw servo.

**PITCH TRIM SERVO:** Shows the currently selected pitch trim servo.

**ROLL TRIM SERVO:** Shows the currently selected roll trim servo.

**YAW TRIM SERVO:** Shows the currently selected yaw trim servo.

## 2.11.1.2 GFC Status Page

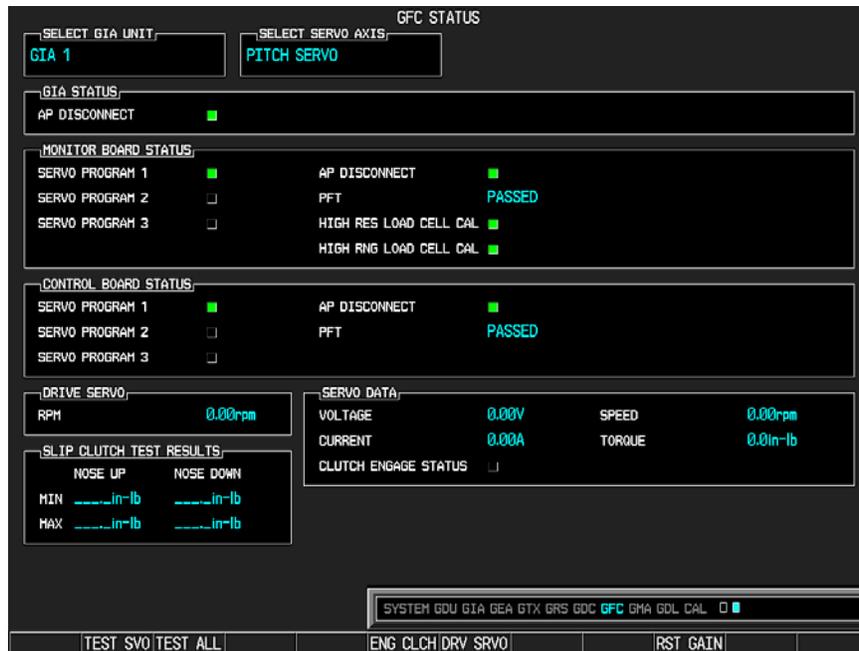


Figure 2-36. GFC STATUS Page

### **SELECT GIA UNIT**

This window shows the currently selected GIA.

### **SELECT SERVO AXIS**

This window shows the currently selected servo axis.

### **GIA STATUS**

**AP DISCONNECT:** Shows the condition of the autopilot disconnect. A green box indicates the AP disconnect connection to the GIA is actively receiving power. A black box indicates the AP disconnect switch is no longer receiving power.

### **MONITOR/CONTROL BOARD STATUS**

Shows the condition of various monitor board components.

**SERVO PROGRAM (1-3):** Servo program discreets 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:** A green box is displayed if the GSA AP Disconnect input is receiving power.

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

**HIGH RES & HIGH RNG LOAD CELL CAL:** Shows the condition of the high resolution and high range load cells on the monitor board. If box is black, return the servo to Garmin.

### **DRIVE SERVO**

Shows the revolutions per minute (RPM) of the drive servo.

### **SERVO DATA**

Shows various servo data such as: voltage, speed, current, torque, clutch settings. A green box indicates the servo clutch is engaged.

---

## **SLIP CLUTCH TEST RESULTS**

*Not activated at this time.*

### **2.11.2 GFC 700 Pre-Flight Test Sequence and Troubleshooting**

This section was created to help determine why the GFC 700 has failed the Pre-Flight Test indicated by the red PFT annunciation PFT, it defines the PFT sequence for the servos and the GFC 700 system and then provides troubleshooting information to help resolve failures.

There are 16 steps to the GFC 700 PFT. 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.

#### **To access the GIA and GSA Maintenance Logs, perform the following steps –**

1. Start the G1000 in Configuration mode.
2. Use the FMS knob on the PFD 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.
3. Choose 'GIA 1' or 'GIA 2' in the LRU window.
4. In the SERVO window, choose 'NONE' to view the GIA Maintenance Log, or choose a servo to view their logs.
5. Using the FMS knob, choose 'VIEW MAINTENANCE LOG' in the COMMAND window.
6. Press the ENT key.
7. 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 become corrupt.

*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>:

- AD TDM Comm Valid:** The specified mode has been disengaged because communication with the servos, via the Time Division Multiplexer protocol, has been lost.
- AP Pitch MET not stuck:** The specified mode has been disengaged due to a stuck pitch MET switch.

*Check the MET (trim) switches for proper identification.*

---

### 2.11.2.1 GIA Pre-Flight Test Steps

- **PFT Step 0: 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.*

- **PFT Step 1: 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.*

- **PFT Step 2: 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.*

- **PFT Step 3: 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.*

- **PFT Step 4: 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 74 are turned on and sending valid data.*

- **PFT Step 5: 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.*

- **PFT Step 6: 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.*

- **PFT Step 7: Verify cross GIA initialized**

This step checks to ensure the cross-side GIA is initialized.

*Cycle power on all servos and GIAs.*

*Ensure the PFD and MFD are turned on.*

- **PFT Step 8: Verify servo type**

This step checks to ensure the servos are correct type.

*Verify servos are correct type.*

---

- **PFT Step 9: 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.*

- **PFT Step 10: 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.*

- **PFT Step 11: Updating servo RTC**

This step sets the servo system time to the GIA system time.

- **PFT Step 12: Verify servo PFT status**

This step checks to ensure all servos have passed their own pre-flight test.

- **PFT Step 13: 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.*

- **PFT Step 14: 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.*

- **PFT Step 15: 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 PFD and MFD are turned on.*

- **PFT Step 16: PFT completed**

The pre-flight test is successfully completed.

- **PFT Step 17: PFT failed**

The pre-flight test has failed.

### 2.11.2.2 Servo Faults and 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.

---

### 2.11.2.2.1 Monitor Processor

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

- 2 – Pitch Servo
- 4 – Roll Servo
- 8 – Pitch Trim Servo

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

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.

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.

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**

<b>MONITOR PFT STEP</b>	<b>NOTES</b>
"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**

<b>MONITOR FAULT</b>	<b>NOTES</b>
"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

### 2.11.2.2.2 Control Processor

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

- 3 – Pitch Servo
- 5 – Roll Servo
- 9 – Pitch Trim Servo

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

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.

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.

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

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### 2.11.2.3 Downloading 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](mailto: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 PFD before turning on the displays.
2. Power up PFD and MFD in the configuration mode.
3. On the PFD 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 PFD. 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 either “GIA1” or “GIA2” in the LRU drop down menu and then press the ENT key to select it.
6. Servo Fault logs can be retrieved if needed by moving the cursor to the SERVO box and selecting the servo you need to access using the small FMS knob to activate the drop down list and press the ENT key. Be sure to download both the Monitor and Control Logs for that servo.
7. 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”.
8. Press the LG2CRD softkey to turn off the recording function.
9. Wait 1 minute for the system to save the data from the download to the SD card.
10. 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 Cessna or Garmin to help decipher the order of the error data.
11. Power down the G1000 System and remove the SD card.
12. Insert 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 data.
13. 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](mailto:avionics@garmin.com).

## 2.12 Backshell Connectors

The following figures depict the backshell connectors as viewed with the LRU removed.

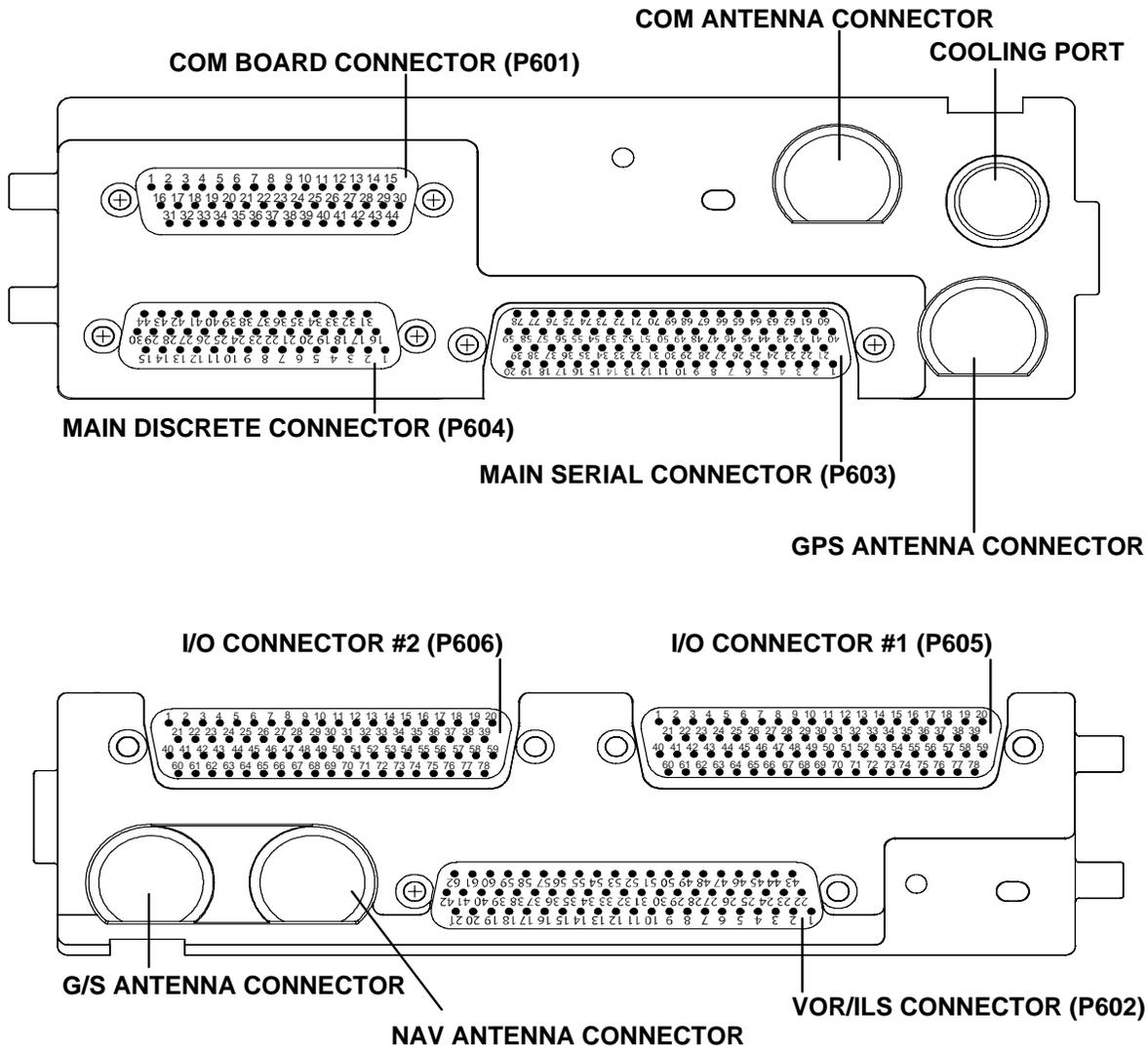


Figure 2-37. GIA 63/GIA 63W Backshell Connectors

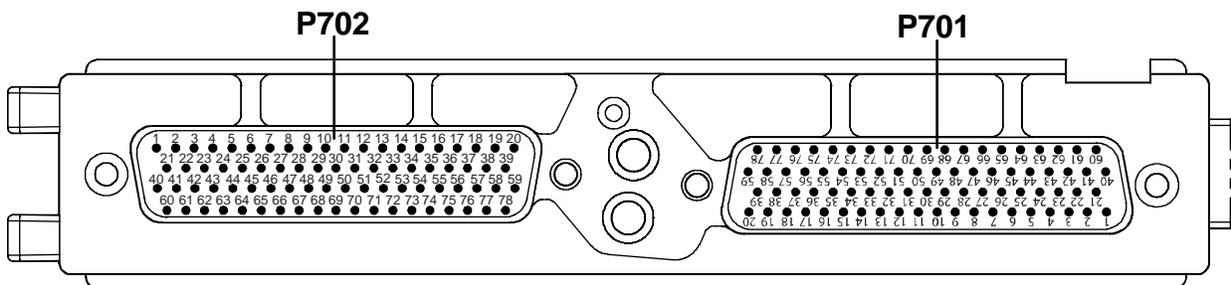


Figure 2-38. GEA 71 Backshell Connectors

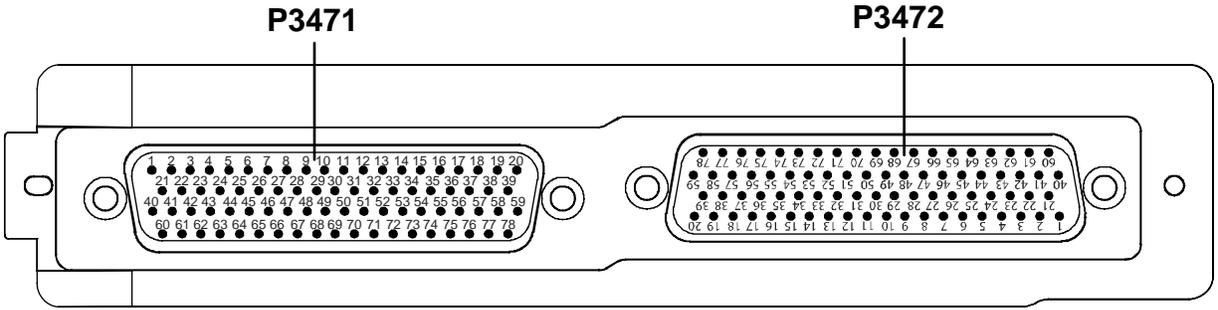


Figure 2-39. GMA 1347 Backshell Connectors

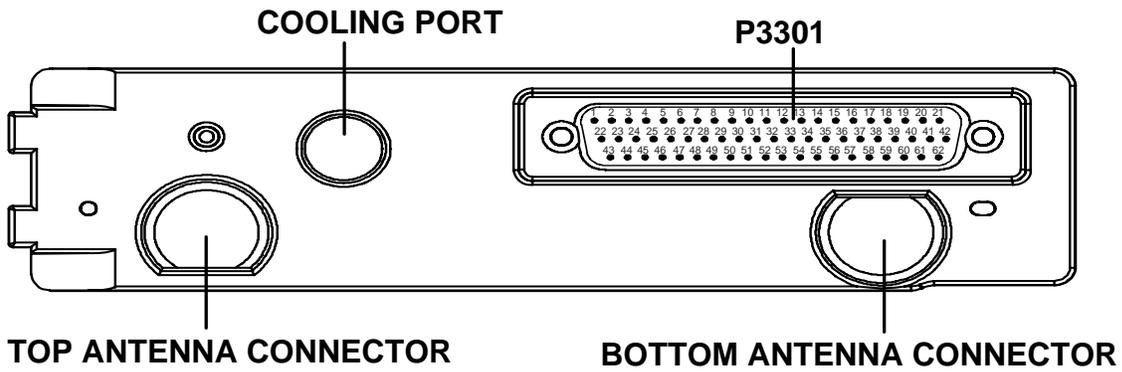


Figure 2-40. GTX 33 Backshell Connectors

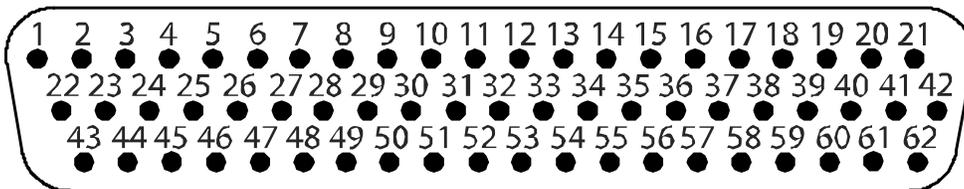


Figure 2-41. GDU 104X Backshell Connector (P10001)

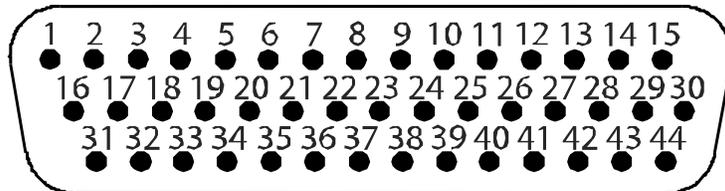
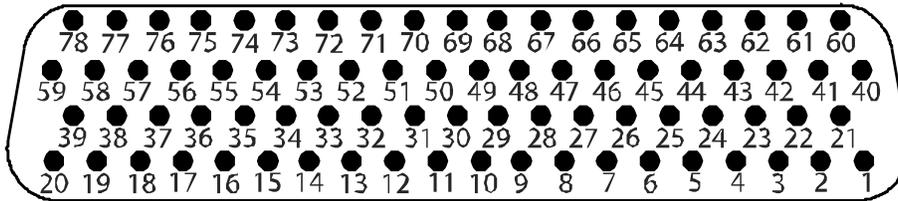
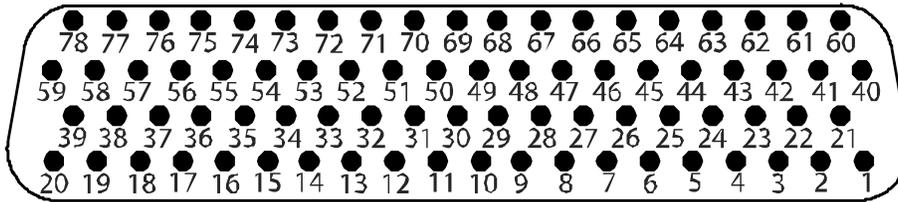


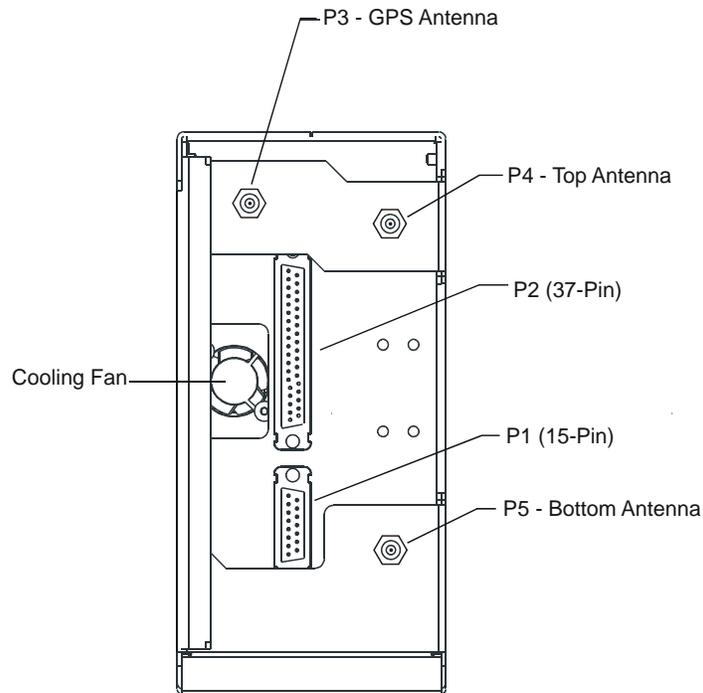
Figure 2-42. GRS 77 Backshell Connector (P771)



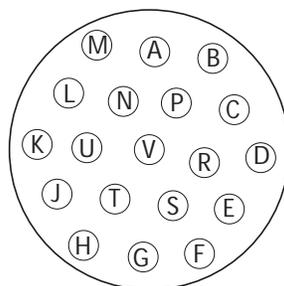
**Figure 2-43. GDC 74A Backshell Connector (P741)**



**Figure 2-44. GDL 69/69A Backshell Connector (P691)**



**Figure 2-45. GDL 90 Backshell Connectors**



**Figure 2-46. GSA 81 Connector (P801)**

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## 3 EQUIPMENT REMOVAL & INSTALLATION

### 3.1 GDU 104X

Removing:

1. Use a 3/32" hex drive tool to turn each of the four locking sockets ¼ turn counterclockwise until they reach their stops.
2. Disconnect backshell assembly from unit.
3. Remove and save terrain SD card.

Installing:

1. Inspect connector(s) for damaged pins.
2. Connect backshell assembly to unit.
3. Hold unit flush with the instrument panel, ensuring locking stud alignment marks are in the vertical position.
4. Use a 3/32" hex drive tool to turn each of the four locking sockets ¼ turn clockwise. This may require applying a small amount of forward pressure to engage the ¼ turn sockets.
5. Proceed to Section 4.1.

### 3.2 GMA 1347

Removing:

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

Installing:

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 prior to placing the unit in the rack.
3. Gently push unit into the rack to 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, avoiding excessive tightening.
5. Proceed to Section 4.2.

### 3.3 GIA 63/GIA 63W

Removing:

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

Installing:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack to engage the connectors.
3. Push the GIA lever down towards the bottom of the unit, avoiding the use of excessive force.
3. Lock the handle into the GIA body and tighten the Phillips screw.
4. Proceed to Section 4.3.

---

### **3.4 GRS 77/GMU 44**

#### **3.4.1 GRS 77**

Removing:

1. Disconnect backshell connector from unit.
2. Loosen four screws holding the unit to the mounting rack (Do not loosen mounting rack bolts).

Installing:

1. Inspect connector(s) for damaged pins.
2. Fasten unit to mounting rack.
3. Connect backshell assembly to unit.
4. Proceed to Section 4.4.

#### **3.4.2 GMU 44**

Removing:

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

Installing:

1. Inspect connector for damaged pins.
2. Connect cable and properly secure connector in a stationary fashion.
3. Fasten unit to the aircraft mounting rack.
4. Proceed to Section 4.4.

### **3.5 GDC 74A**

Removing:

1. Loosen two thumb screws that secure the unit to the mounting rack
2. Disconnect backshell assembly 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.

Installing:

1. Inspect connector(s) and pitot-static plumbing for damage.
2. Install Teflon tape or sealing compound to pitot-static plumbing
3. Connect backshell assembly and pitot-static plumbing to the unit.
4. Tighten two thumb screws that secure the unit to the mounting rack.
5. Proceed to Section 4.5.

### **3.6 GEA 71**

Removing:

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.

Installing:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack to 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. Proceed to Section 4.6.

---

### 3.7 GTX 33

#### Removing:

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.

#### Installing:

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. Proceed to Section 4.7.

### 3.8 GDL 69/69A

#### Removing:

1. Loosen the Phillips screw to unlock unit handle.
2. Pull the GDL 69/69A lever up towards the top of the unit. This disengages the locking stud with the dogleg slot.

#### Installing:

1. Inspect connector(s) for damaged pins.
2. Gently push unit into the rack to engage the connectors.
3. Push the GDL 69/69A 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 69/69A body and tighten the Phillips screw.
6. Proceed to Section 4.8.

### 3.9 GDL 90

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

### 3.10 GSA 81

#### Removing:

1. Disconnect the connector.
2. Use a socket or open-wrench to loosen and remove the servo attachment bolts.
3. Carefully remove the servo and place a protective cover on the output gear.
4. Place a protective cover over the GSM 85.

#### Installing:

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.
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. Proceed to Section 4.9.

---

### 3.11 GSM 85

#### Removing:

1. Remove the GSA 81 Servo according to Section 3.10.
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.

#### Installing:

1. Follow the installation instructions in the respective servo installation drawing.
2. If no other maintenance is to be performed, reinstall the servo(s) per Section 3.10.





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## 4 UPLOADING SOFTWARE, CONFIGURING, & TESTING

### CAUTION

**DO NOT ALLOW POWER TO BE REMOVED FROM THE SYSTEM WHEN LOADING SOFTWARE!** Connect a ground power unit to the aircraft for software loading. Do not rely solely on the aircraft batteries to prevent loss of power during the software loading process. 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.

### CAUTION

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

### CAUTION

Remove Supplemental Data Cards (010-00330-41 or 010-00330-42) 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.

### NOTE

Refer to the Cessna Maintenance Manual for approved software versions and part numbers.

### NOTE

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 reattempt the software load.

### 4.1 GDU 104X

#### 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.

*Continue to Section 4.1.3.*

#### Original Displays Installed in Opposite Locations for Troubleshooting

If the PFD and MFD are installed in opposite locations, no software or configuration loading is required.

*Continue to Section 4.1.3.*

#### New, Repaired, or Exchange Display(s) Installed

If a new, repaired, or exchange GDU is installed; the correct software, configuration and Jeppesen aviation database files must be loaded to the unit. See Section B.4 for aviation database update instructions. Retain Terrain SD card from the original display to reinstall in the new display after loading software.

*Continue to Section 4.1.1.*

---

## **Displays with GDU Backup Cap Test Software Installed**

If a GDU has had the GDU Backup Cap Test Software (006-B0380-15) installed (Section 6), the correct software files must be installed to return the GDU to the correct configuration. Reloading Jeppesen aviation database files are not necessary.

*Continue to Section 4.1.1.*

### **4.1.1 GDU Software**

1. Remove the Supplemental database card from the bottom slot of each GDU.
2. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of unit replaced.
3. Power on the MFD and PFD in Configuration mode.
4. Press the ENT key 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. Power off the MFD and PFD.
8. Power on the MFD and PFD in normal mode.
9. Power off the MFD and PFD.
10. Reinstall the Supplemental database card in the bottom slot of each GDU.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.1.2.*

### **4.1.2 GDU Configuration**

#### **GDU software version 6.01 and earlier**

No configuration is required. Configuration and lighting settings are automatically updated. However, the configuration procedure is provided for instances where re-loading the configuration files may be appropriate.

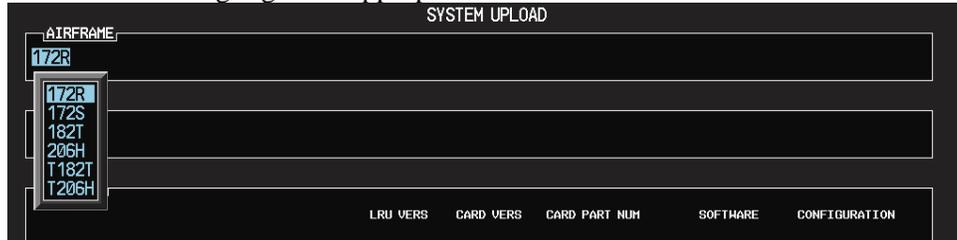
1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Power both MFD and PFD on in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘AIRFRAME’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. Highlight ‘SYSTEM’ in the SECTION field and repeat steps 8 through 10.
12. Highlight ‘MANIFEST’ in the SECTION field and repeat steps 8 through 10.
13. Highlight ‘MFD1’ in the SECTION field and repeat steps 8 through 10.
14. Highlight ‘PFD1’ in the SECTION field and repeat steps 8 through 10.
15. View the SUMMARY field and ensure that the load is ‘complete’, then de-activate the cursor.
16. Confirm correct software part number and software version on the SYSTEM STATUS page.
17. Some instances may require the user to re-enter the aircraft registration number. Refer to Section B.2.1 for instructions on aircraft registration number entry.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.1.3.*

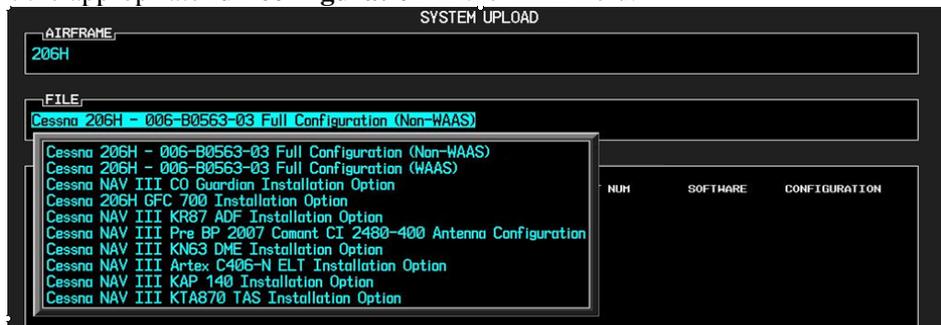
## GDU software version 7.01 and later

No configuration is required. Configuration and lighting settings are automatically updated. However, the configuration procedure is provided for instances where re-loading the configuration files may be appropriate.

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



### **CAUTION**

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.
10. Using the FMS knob select the following files:
  - Airframe
  - System
  - Manifest
  - MFD
  - PFD

### **NOTE**

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct part number and software version on the SYSTEM STATUS page.
13. Load additional config files for optional equipment installed in the aircraft (i.e. GFC700 autopilot) that list a PFD or MFD file in the PRODUCT window after the optional config file is selected.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.1.3.*

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### 4.1.3 GDU Testing

If the display is removed or replaced, the following checks are recommended. Start PFD and MFD in normal mode. Press the ENT key to acknowledge the agreement on the MFD. Allow the displays to initialize for approximately one minute. The GRS 77 and GDC 74A 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 PFD and MFD displays for the following:

1. Check that all COM/NAV display fields are valid in the top corners of the PFD and MFD.
2. Check that altitude, airspeed, vertical speed and OAT fields are valid on the PFD.
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 the GMA 1347. 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.

<b>NOTE</b>
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Insure Jeppesen aviation database is present. Refer to Section B.5 for aviation database update instructions.

*If no other maintenance is required, continue to Section 5.*

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## 4.2 GMA 1347

### **Original GMA 1347 Reinstalled**

No software or configuration loading is required if the original GMA 1347 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.

*Continue to Section 4.2.4*

### **New, Repaired, or Exchange GMA 1347 Installed**

If a new, repaired, or exchange GMA 1347 is installed, verify correct software version on the SYSTEM STATUS page.

If the correct software version is **not** installed:

*For installations with GDU software versions 6.01 (BP 2006) and earlier, continue to Section 4.2.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.2.3.*

If the correct software version is installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.2.2.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.2.3.*

#### **4.2.1 GMA Software (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Using the FMS knob go to the Software Upload page on the PFD.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GMA software.
7. Press the LRU softkey.
8. Rotate the small FMS knob to select the desired GMA path.
9. Press the LOAD softkey.
10. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
11. Confirm update completion and press the ENT key.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.2.2.*

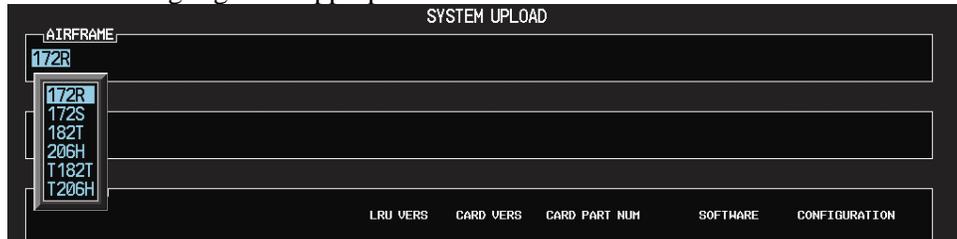
#### **4.2.2 GMA Configuration (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘GMA 1’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. View the SUMMARY field and ensure that the load is ‘complete’, then de-activate the cursor.
12. Verify the correct part number and software version on the SYSTEM STATUS page.

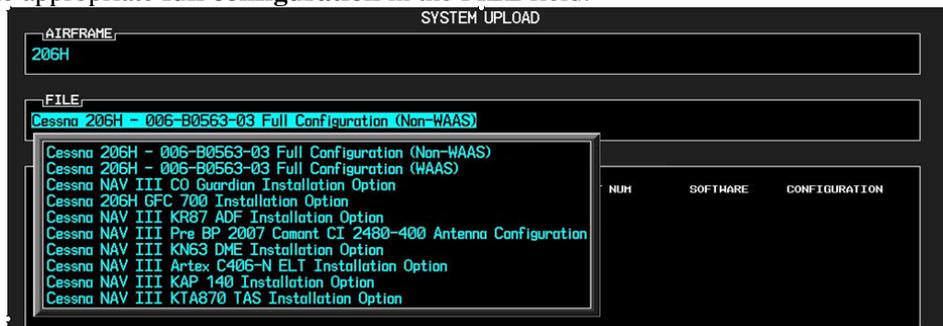
*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.2.4.*

### 4.2.3 GMA Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



#### CAUTION

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.
10. Using the FMS knob select the following files:
  - a. GMA software
  - b. GMA configuration

#### NOTE

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.2.4.*

## 4.2.4 GMA Testing

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

### 4.2.4.1 Intercom System (ICS) Check

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

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

### 4.2.4.2 Transceiver Operational Check

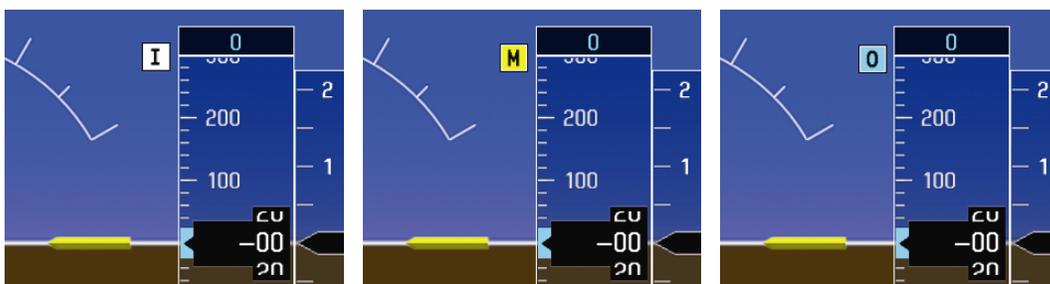
Perform a ramp test radio check by exercising the installed transceivers, microphone, microphone key and audio over the headphones and speaker. Verify that communications are clear and PTT operation is correct for each pilot position.

1. Select the audio source corresponding to each installed avionics unit (i.e. NAV1, NAV2, COM1, COM2) and check for audio over the headsets.
2. Press the SPKR key and verify that the selected audio is heard over the speaker, if installed.

### 4.2.4.3 Failsafe Operation Check

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

### 4.2.4.4 Marker Beacon Test



**Figure 4-1. 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 4-1. Operate the MKR MUTE key on the GMA 1347 and ensure that the audio signal is muted.

*If no other maintenance is required, continue to Section 5.*

### 4.3 GIA 63/63W

#### Original GIA 63/63W(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.

*Continue to Section 4.3.5.*

#### Original GIA 63/63W(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). However, the units must be reconfigured.

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.3.4.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.3.5.*

#### New, Repaired, or Exchange GIA 63/63W(s) Installed

If a new, repaired, or exchange GIA 63/GIA 63W is installed, verify correct software version on the SYSTEM STATUS page (for both main and GPS).

If the correct software version is **not** installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.3.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.3.5.*

If the correct software version is installed:

*For installation with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.3.3.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.3.5.*

#### **CAUTION**

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Reference Figures 4-2, 4-3, and 4-4 to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file.

The screenshot displays the SYSTEM STATUS page with the following sections:

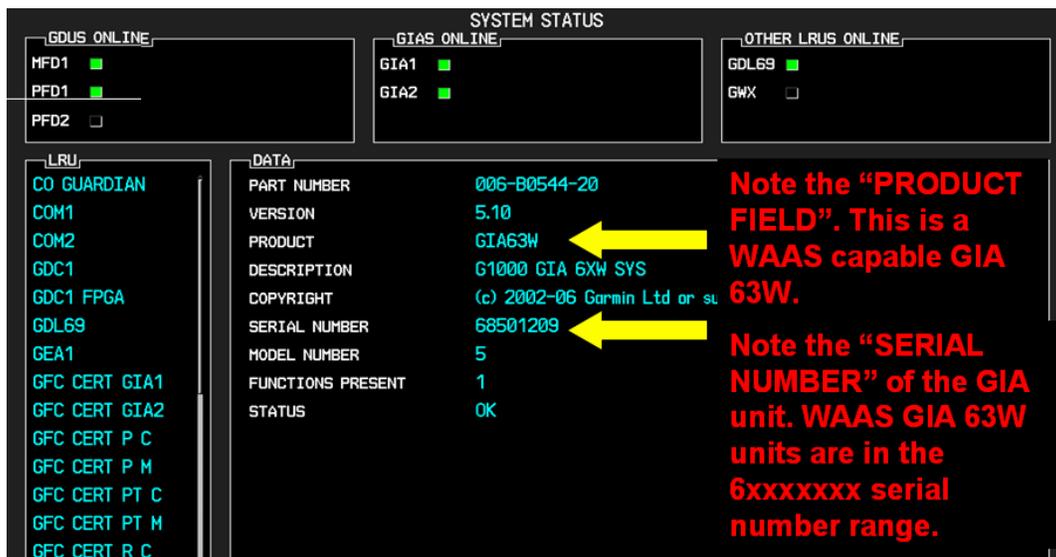
- GDUS ONLINE:** MFD1 (checked), PFD1 (checked), PFD2 (unchecked)
- GIAS ONLINE:** GIA1 (checked), GIA2 (checked)
- OTHER LRUS ONLINE:** GDL69 (checked), GWX (unchecked)
- LRU:** CO GUARDIAN, COM1, COM2, GDC1 - GIA1, GDC1 FPGA, GDL69, GEA1 - GIA1, GEA1 - GIA2, GIA1, GIA1 AUDIO, GIA2, GIA2 AUDIO, GMA1 - GIA1, GMA1 - GIA2, GMU1
- DATA:**

PART NUMBER	006-80190-30
VERSION	4.00
PRODUCT	GIA63
DESCRIPTION	G1000 GIA 6X SYS
COPYRIGHT	(c) 2002-05 Garmin Ltd or subs
SERIAL NUMBER	48104582
MODEL NUMBER	2
FUNCTIONS PRESENT	1
STATUS	ONLINE

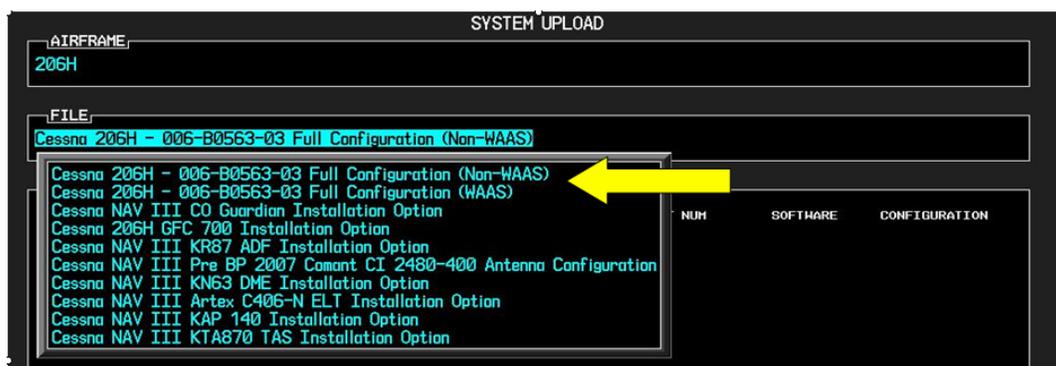
Red text annotations on the right side of the DATA section:

- Note the "PRODUCT" field. This is a non-WAAS GIA 63.
- Note the "SERIAL NUMBER" of the GIA unit. Non-WAAS GIA 63 units are in the 4xxxxxxx serial number range.

Figure 4-2. Non-WAAS (GIA 63) System Status Page



**Figure 4-3. WAAS (GIA 63W) System Status Page**



**Figure 4-4. System Upload Page**

Select the correct FILE to load (WAAS or Non-WAAS) as determined by the GIA installed in the aircraft. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

### 4.3.1 GIA Main Software (GDU software version 6.01 and earlier)

**NOTE**

If a new GIA 63 (Non-WAAS) has been installed (new serial number), the following procedure applies. Otherwise continue to 4.3.1.3. Non-WAAS GIA v4.01 (or later) boot block software must be installed prior to upgrading to software versions listed in this document. Boot Block software is available from the Cessna provided G1000 software CD-ROM.

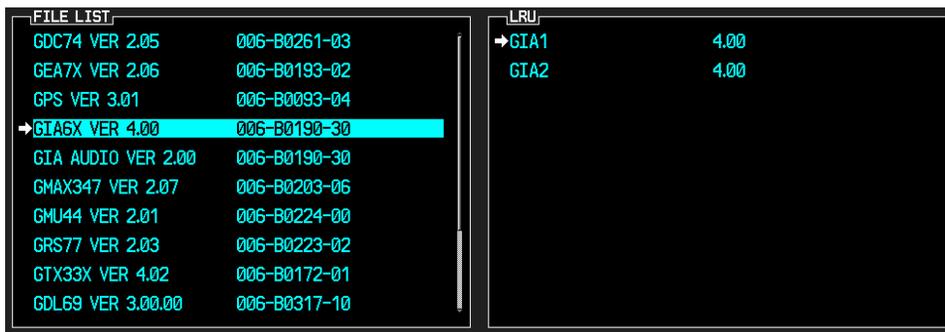
#### 4.3.1.1 Determining Current Boot Block

1. Ensure the G1000 is powered off.
2. Insert the airframe specific approved software loader card (containing GIA main software version 4.00 or later) into the top slot of the PFD.
3. While holding the ENT key on the PFD, restore power to the PFD.

4. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
5. Press the CLR key at the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
6. Repeat step 3 and 4 for the MFD.
7. Restore power to all remaining G1000 LRUs.
8. On the MFD use the FMS knob to highlight ‘GIA 1’ on the System Status page.



9. On the PFD use the FMS knob to turn to the Software Upload page.
10. Use the FMS knob to highlight GIA 6X software.



11. Press the LRU softkey and highlight ‘GIA 1’.
12. Press the ENT key to begin loading software.
13. The boot block version should now appear on the MFD.
14. If GIA main boot block version is 4.00 or earlier press the CANCEL softkey on the PFD and select ‘YES’ at the prompt. Continue to Section 4.3.1.2 for instructions on loading GIA main boot block version 4.01.

**NOTE**

If GIA main boot block version is 4.01, do not cancel the software upload.

15. Repeat steps 7 through 13 for GIA 2.

---

#### 4.3.1.2 Loading Boot Block Version 4.01

1. Remove power from the PFD only.

<b>NOTE</b>
-------------

If power is removed from the entire G1000 system GIA 2 may appear as GIA 1.

2. Insert the GIA 63 boot block version 4.01 loader card into the top slot of the PFD.
3. While holding the ENT key on the PFD, restore power to the PFD.
4. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
5. Use the FMS knob to turn to the Software Upload page on the PFD.
6. Verify 'GIA 6X Boot Block 4.01' appears in the File List.
7. Verify 'GIA 1' and 'GIA 2' appears in the LRU window.
8. Press the FMS knob to highlight 'GIA 6X Boot Block 4.01'.
9. Press the LOAD softkey.
10. Press the ENT key at the "BEGIN FILE UPLOAD?" prompt.

<b>CAUTION</b>
----------------

Do not turn power off or cancel the software upload while the boot block is loading.

11. Confirm update completion and press the ENT key.
12. On the MFD use the FMS knob to turn to the System Status page.
13. Highlight 'GIA 1'.
14. Verify 'G1000 GIA 6X SYS' is being reported in the description field.
15. Power down the G1000.
16. Remove the GIA 63 boot block version 4.01 loader card from the PFD.

#### 4.3.1.3 GIA Main Software

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the "Do you want to update system files?" prompt.
4. Rotate the small FMS knob to the SOFTWARE UPLOAD page.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GIA software.
7. Press the LOAD softkey.
8. Press the ENT key at the "BEGIN FILE UPLOAD?" prompt.
9. Confirm update completion and press the ENT key.
10. Confirm correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise Continue to Section 4.3.2.*

---

### 4.3.2 GIA GPS Software (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Rotate the small FMS knob to the SOFTWARE UPLOAD page.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GPS software.
7. Press the LOAD softkey.
8. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
9. Confirm update completion and press the ENT key.
10. Confirm correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.3.3.*

### 4.3.3 GIA Audio Software (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Rotate the small FMS knob to the SOFTWARE UPLOAD page.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GIA AUDIO software.
7. Press the LOAD softkey.
8. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
9. Confirm update completion and press the ENT key.
10. Confirm correct software part number and software version on the SYSTEM STATUS page.
11. If the AUDIO software load failed, load GIA Boot Block software per 4.3.1.2.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.3.4.*

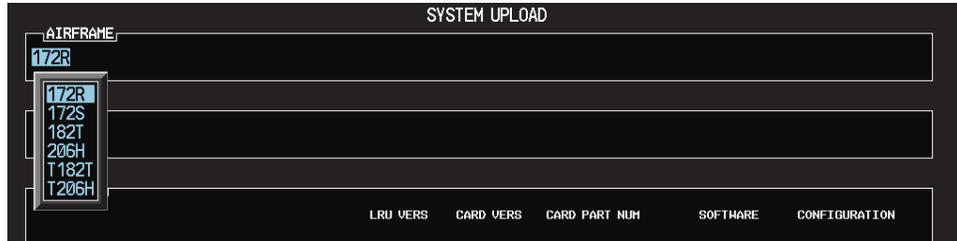
### 4.3.4 GIA Configuration (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘GIA 1’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. Highlight ‘GIA 2’ in the SECTION field and repeat Steps 7 through 9.
12. Highlight ‘AUDIO’ in the SECTION field and repeat Steps 7 through 9.
13. View the SUMMARY field and ensure that the load is ‘complete’, then de-activate the cursor.
14. Verify the correct part number and software version on the SYSTEM STATUS page.

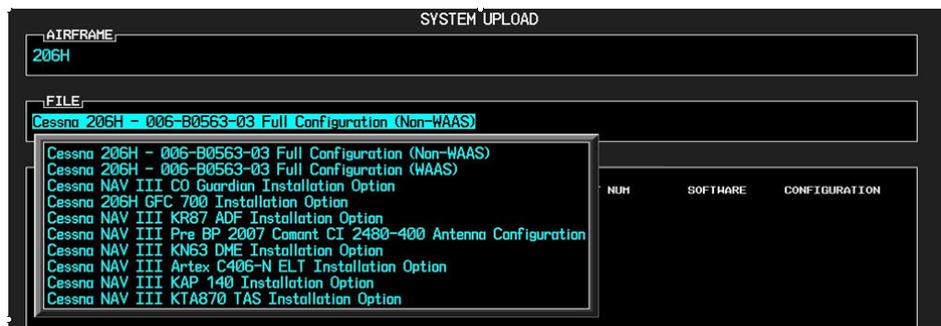
*Reference Section B.1.6 for configuring optional equipment. For software/configuration troubleshooting see Section B.4. For Stormscope configuration see Section 4.3.6, otherwise continue to Section 4.3.7.*

### 4.3.5 GIA Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



#### CAUTION

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

- 
8. Press the ENT key.
  9. Press the CLR ALL softkey.
  10. Using the FMS knob select the following files:

**If GIA #1 was replaced**

- GIA1 Software
- GPS1 Software
- GIA1 Configuration
- GIA Gains
- GIA Audio

**If GIA #2 was replaced**

- GIA2 Software
- GPS2 Software
- GIA2 Configuration
- GIA Gains
- GIA Audio

**If original GIA's are installed in opposite locations**

- GIA1 Configuration
- GIA2 Configuration

**NOTE**

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct part number and software version on the SYSTEM STATUS page.
13. If the AUDIO software load failed, load GIA Boot Block software per 4.3.1.2 and reattempt the GIA software and configuration load starting back at line item 1 above.

*For software/configuration troubleshooting see Section B.4. For Stormscope configuration see Section 4.3.6, otherwise continue to Section 4.3.7.*

#### **4.3.6 Stormscope Configuration (If Equipped)**

1. Select the GIA page group on the PFD. The GIA RS-232/ARINC 429 Configuration Page appears by default.
2. Select the appropriate GIA to be configured. Refer to aircraft-specific installation drawings to find out which GIA is used to communicate with the Stormscope (In some cases, both GIAs may be used as communication paths).
3. Activate the cursor and toggle to the appropriate GIA RS-232 input channel.
4. Use the FMS Knob to select 'WX-500' from the menu.
5. Acknowledge the selection by pressing the ENT key. Repeat Steps 2-5 for the opposite GIA, if required.
6. Configuration for the G1000-Stormscope interface is complete. Note that a new page group, labeled 'OTHER' appears. A Stormscope configuration page is now available in this page group to further configure the Stormscope. Refer to the WX-500 installation manual for information on Stormscope post-installation procedures.

*For software/configuration troubleshooting see Section B.4, otherwise Continue to Section 4.3.7.*

### 4.3.7 GIA Testing

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

#### 4.3.7.1 GPS Signal Acquisition Test

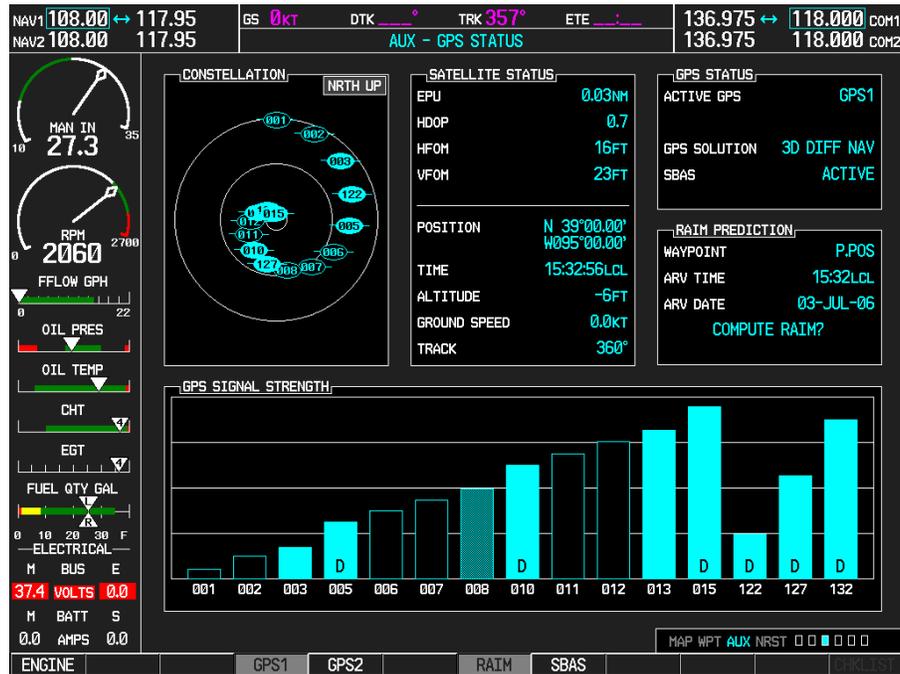


Figure 4-5. AUX-GPS STATUS Page

The GIA 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. This can be done on the DATE/TIME SETUP page in configuration mode.

Select the satellite status page on the MFD (3<sup>rd</sup> 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.

---

### 4.3.7.2 VHF COM Interference Test

This test must be conducted outside. Use of a GPS repeater inside a hangar may result in a failed test. Once the signal acquisition test from Section 4.3.5.1 has been completed successfully, perform the following steps:

1. On the MFD, monitor GPS signal strength bars on the 3<sup>rd</sup> 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 4<sup>th</sup> 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 3<sup>rd</sup> 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 4<sup>th</sup> AUX page and change the COM channel spacing back to 25kHz.

### 4.3.7.3 VOR/LOC/GS Test

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

*If no other maintenance is required, continue to Section 5.*

---

## 4.4 GRS 77/GMU 44

### **Original GRS 77 is 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.

*Continue to Section 4.4.3.*

### **New, Repaired, or Exchange GRS 77 is Installed**

If the GRS 77 was replaced with a new, repaired, or exchange unit, verify correct software version on the SYSTEM STATUS page.

If the correct software version is **not** installed:

*For installations with GDU software versions 6.01 (BP 2006) and earlier, continue to Section 4.4.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.4.3.*

If the correct software version is installed:

*Continue to Section 4.4.3.*

### **New GRS 77 Configuration Module is Installed**

If the GRS 77 configuration module was replaced, no software loading is required

*Continue to Section 4.4.5.*

### **Original GMU 44 is Reinstalled**

If the original GMU 44 is reinstalled, no software loading is required.

*Continue to Section 4.4.5.*

### **New, Repaired, or Exchange GMU 44 is Installed**

If the GMU 44 was replaced with a new, repaired, or exchange unit, verify correct software version on the SYSTEM STATUS page.

If the correct software version is **not** installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.4.2.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.4.4.*

If the correct software version is installed:

*Continue to Section 4.4.5.*

#### **4.4.1 GRS 77 Software (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Rotate the small FMS knob to the SOFTWARE UPLOAD page.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GRS software.
7. Press the LOAD softkey.
8. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
9. Confirm update completion and press the ENT key.
10. Confirm correct software part number and software version on the SYSTEM STATUS page.

For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.4.5.

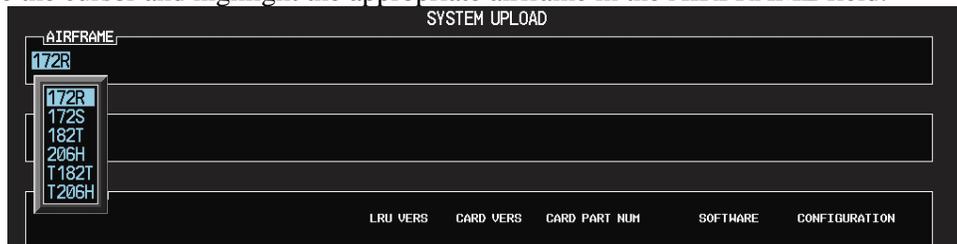
#### 4.4.2 GMU 44 Software (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Rotate the small FMS knob to the SOFTWARE UPLOAD page.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GMU software.
7. Press the LOAD softkey.
8. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
9. Confirm update completion and press the ENT key.
10. Confirm correct software part number and software version on the SYSTEM STATUS page.

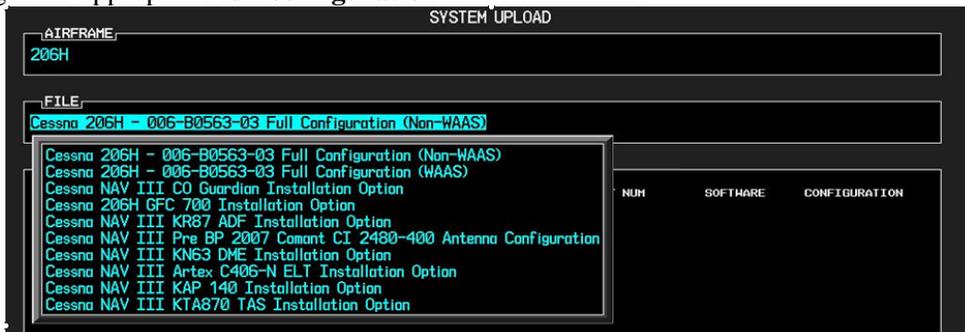
For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.4.5.

#### 4.4.3 GRS 77 Software (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



### CAUTION

Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty. Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.

---

10. Using the FMS knob select the following files:

- GRS Software

**NOTE**

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

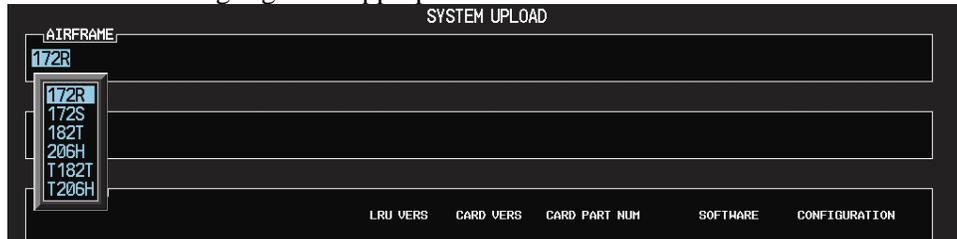
11. Once the desired files are selected press the LOAD softkey.

12. Verify the correct software part number and software version on the SYSTEM STATUS page.

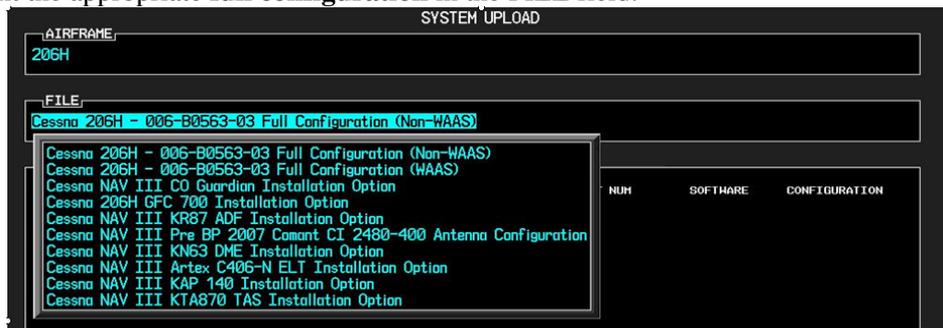
*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.4.5.*

#### 4.4.4 GMU 44 Software (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using FMS knob go to the SYSTEM UPLOAD page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



#### CAUTION

Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty. Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.
10. Using the FMS knob select the following files:
  - GMU Software

#### NOTE

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.4.5.*

#### 4.4.5 GRS/GMU Calibration

**NOTE**

G1000 Nav III System Software 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)
- Pitch/Roll Offset, Manual Entry (Procedure A2)
- Magnetometer Calibration, (Procedure B)
- Heading Offset Compensation, (Procedure C)
- Engine Run-Up Vibration Test, (Procedure D)
- Magnetometer Interference Test, (Procedure E)

**NOTE**

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

When ready to perform the procedures, shut the PFD and MFD off by pulling the PFD and MFD circuit breakers. Restart both 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.

Condition	Calibration Procedure Required		
	A1	B	D
Removed or replaced the GRS 77 without loosening mounting rack bolts	None Required Continue to Section 4.4.4		
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 Continue to Section 4.4.4		

**Table 4-1. GRS 77/GMU 44 Calibration**

#### 4.4.5.1 Procedure A1: Pitch/Roll Offset Calibration

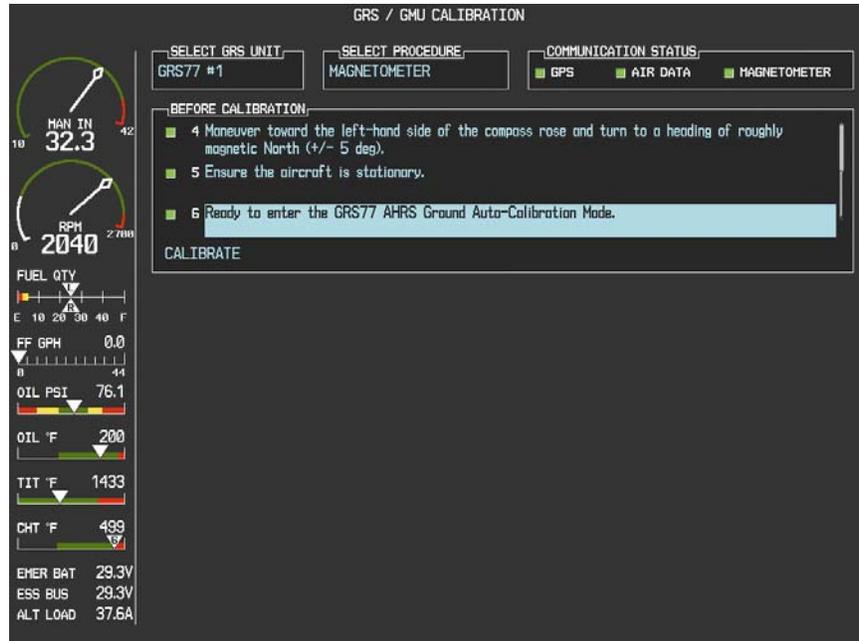


**Figure 4-6. Pitch/Roll Offset**

This first procedure must be carried out with the engine off.

1. Level the aircraft to 2° pitch nose up and wings level.
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 4-6.
  - b) This page is protected and requires a keystroke password to perform the calibration. Press the following softkeys in sequence:
    - i) softkey 9
    - ii) softkey 10
    - iii) softkey 11
    - iv) 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.
3. 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.
4. Press the ENT key on the PFD to conclude this procedure.

#### 4.4.5.2 Procedure B: Magnetometer Calibration

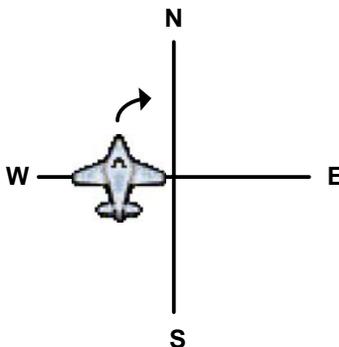


**Figure 4-7. Magnetometer Calibration**

Calibration Procedure B must be carried out on a calibrated compass rose (see G1000 Line Maintenance and Configuration Manual for a procedure to verify magnetic cleanliness of the 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:

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 display while applying power. Release the ENT key when the words INITIALIZING SYSTEM are displayed on each display.
  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:
    - i) softkey 9
    - ii) softkey 10
    - iii) softkey 11
    - iv) 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° (±5°) 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.

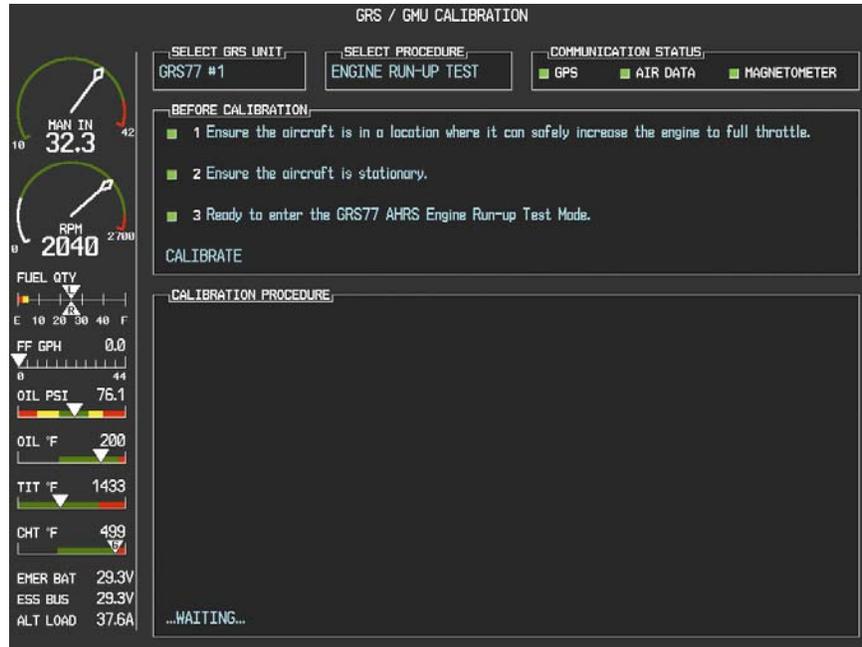
11. The PFD guides the operator to dwell at multiple headings around a complete circle.

**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 20 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 to conclude this procedure.

### 4.4.5.3 Procedure D: Engine Run-Up Vibration Test



**Figure 4-8. Engine Run-Up**

Calibration Procedures A1 and B are not required prior to this procedure.

1. Initiate the AHRS engine run-up vibration test procedure by performing the following steps:
  - a) Select the ENGINE RUN-UP TEST procedure and press the ENT key.
  - b) 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.
2. 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.
3. 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.
4. 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:

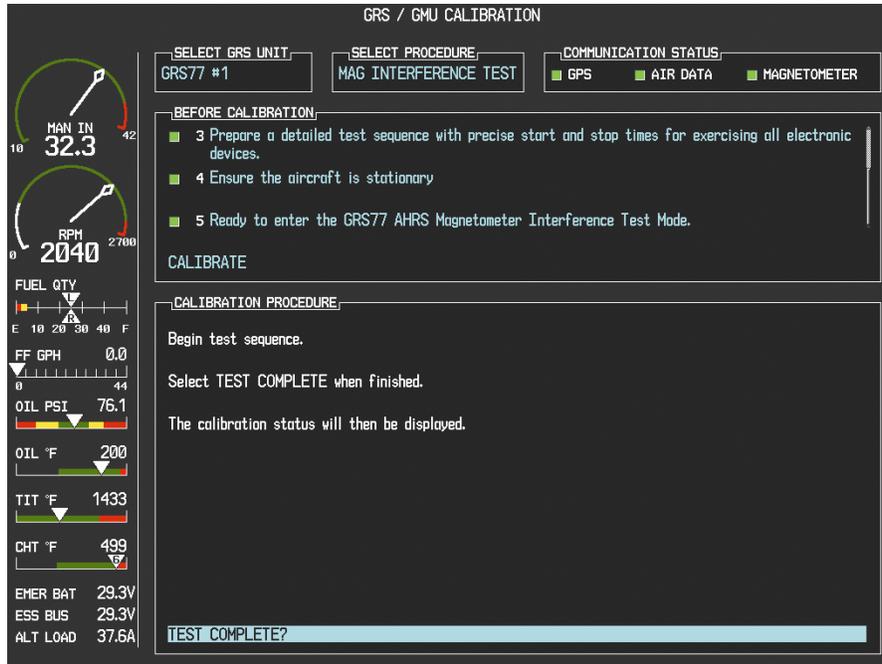
- a) Excessive flexibility of GRS77 and/or GMU44 mechanical mounting with respect to airframe.
- b) Vibrational motion of GRS77 and/or GMU44 caused by neighboring equipment and/or supports.
- c) Mounting of GRS77 at a location that is subject to severe vibrations (for example, close to an engine mount.)
- 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.

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

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.

#### 4.4.5.4 Procedure E: Magnetometer Interference Test



**Figure 4-9. Magnetometer Interference**

#### NOTE

Calibration Procedure E is required for initial installation verification and should be included as part of the certification data. Furthermore, Calibration Procedure E should be performed once every 12 months on at least one production aircraft for every airframe type or model equipped with the G1000 system. 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.

1. Initiate the AHRS magnetometer interference test procedure by performing the following steps:
  - a) Enter Configuration Mode and go to GRS/GMU Calibration page as shown in Figure 4-9.
  - b) This page is protected and requires a keystroke password to perform this test. Press the following softkeys in sequence:
    - i) softkey 9
    - ii) softkey 10
    - iii) softkey 11
    - iv) softkey 12
  - c) Select MAG INTERFERENCE TEST and press the ENT key.
  - d) Follow the checklist items displayed on the PFD, and press the ENT key as each one is completed or confirmed.

**NOTE**

The 3<sup>rd</sup> 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 4-2.

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

**Table 4-2. Example Magnetometer Interference Test Sequence**

- a) 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.

- 
2. The operator should carry out the actions called for in the prepared test sequence.

**NOTE**

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.

3. 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.
4. 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.

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

#### **4.4.6 Test**

Verify attitude and heading, on PFD in normal mode.

*If no other maintenance is required, continue to Section 5.*

---

## 4.5 GDC 74A

### **Original GDC 74A is Reinstalled**

No software or configuration loading is required if the original GDC 74A 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.

*Continue to Section 4.5.4.*

### **New, Repaired, or Exchange GDC 74A is Installed**

If a new, repaired, or exchange GDC 74A is installed, verify correct software version on the SYSTEM STATUS page.

If the correct software version is **not** installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.5.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.5.3.*

If the correct software version is installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.5.2.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.5.3.*

### **New GDC 74A Configuration Module is Installed**

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

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.5.2.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.5.3.*

<b>NOTE</b>
-------------

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

#### **4.5.1 GDC Software (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Rotate the small FMS knob to the SOFTWARE UPLOAD page.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GDC software.
7. Press the LOAD softkey.
8. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
9. Confirm update completion and press the ENT key.
10. Confirm correct software part number and software version on the SYSTEM STATUS page.
11. If configuration module is new, continue to Section 4.5.2, for configuration.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.5.4.*

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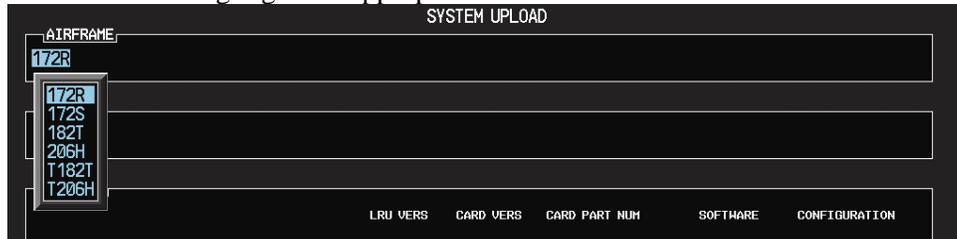
#### 4.5.2 GDC Configuration (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into the top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘GDC 1’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. View the SUMMARY field and ensure the load is ‘complete’, then de-activate the cursor.
12. Verify the correct part number and software version on the SYSTEM STATUS page.

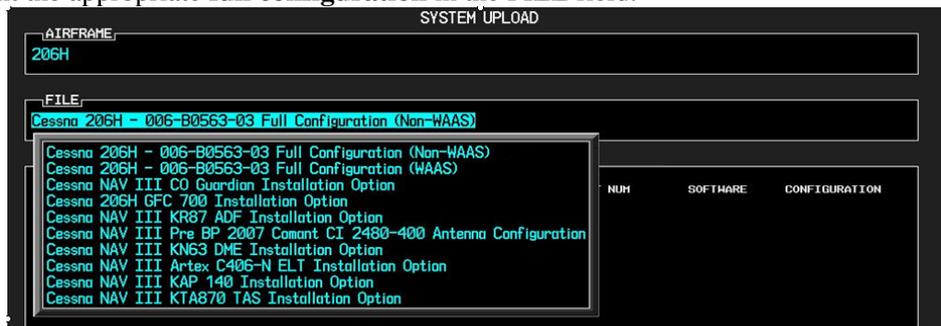
*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.5.4.*

### 4.5.3 GDC Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the SYSTEM UPLOAD page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



#### CAUTION

Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty. Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.
10. Using the FMS knob select the following files:

#### If a new GDC was installed

- GDC Software
- GDC Configuration

#### If a new GDC configuration module was installed

- GDC Configuration

#### NOTE

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.5.4.*

---

#### 4.5.4 GDC Testing

**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. The PFD 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:*

1. Start the G1000 system in normal mode.
2. Remove power to the PFD.
3. Turn the PFD on in Configuration mode by pressing and holding the ENT key on the PFD while applying power.
4. Release the ENT key after “INITIALIZING SYSTEM” appears in the upper left corner of the PFD.

**CAUTION**

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

5. Using the FMS knob on the PFD turn to the GRS page group. Use the B ALT field for all CFR Part 43 Appendix E tests for G1000 altitude.
6. Place the MFD in Reversionary mode by pressing the red “display backup” button on the GMA 1347 Audio Panel. Baro settings can then be read from the MFD for the CFR Part 43 Appendix E tests.

After completing the tests specified by § 91.411 and Part 43 Appendix E, return both the MFD and PFD 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.

##### 4.5.4.1 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 table below:

Calibrated air speed, knots	Allowed tolerance, ±knots
50	5.0
80	3.5
100	2.0
120	2.0
150	2.0

---

#### 4.5.4.2 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, $\pm$ feet/minute
2000	100
0	45
-2000	100

#### 4.5.4.3 OAT Probe Check

Check the outside air temperature (OAT) measurement shown on the PFD to ensure it reads ambient temperature.

*If no other maintenance is required, continue to Section 5.*

---

## 4.6 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.

*Continue to Section 4.6.4.*

### New, Repaired, or Exchange GEA 71 Installed

If a new, repaired, or exchange GEA 71 is installed, verify the correct software version on the SYSTEM STATUS page.

If the correct software version is **not** installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.6.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.6.3.*

If the correct software version is installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.6.2.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.6.3.*

#### **CAUTION**

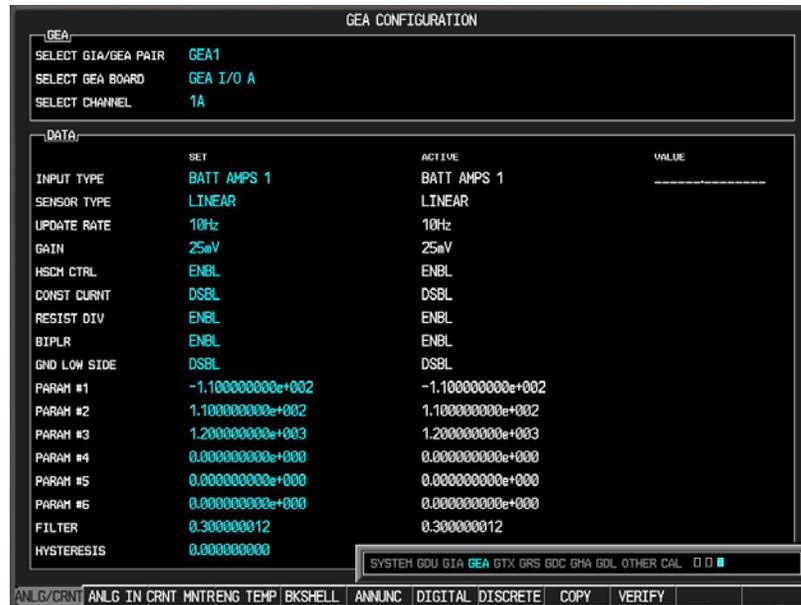
Do not cancel a software upload that is in progress. A canceled software upload may result in an unresponsive GEA 71.

#### **NOTE**

When replacing a GEA 71 LRU with GDU v6.01 installed, it is necessary to first verify the GEA configuration prior to continuing with any other software or configuration file installation. To verify the GEA configuration, the following steps should be conducted:

1. Insert the proper G1000 Nav III Loader Card into the top card slot of the PFD.
2. While holding the ENT key on PFD, apply power by closing the PFD circuit breaker.
3. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
4. Press the CLR key at the “Do you want to update system files?” prompt.
5. Turn the MFD on in the same manner.
6. On the PFD go to the GEA CONFIGURATION page using the FMS knob.

- Press softkeys 1, 2, 3, and 4 in that order to activate the VERIFY softkey.



**Figure 4-10. GEA CONFIGURATION**

- Press the VERIFY softkey to begin the manual verification.
- Following completion of the GEA verification, cycle power and restart the G1000 system.
- Continue loading software and configuration files for the GEA and any remaining LRUs as required.

---

#### **4.6.1 GEA Software (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Using the FMS knob go to the Software Upload page on the PFD.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GEA software.
7. Press the LRU softkey.
8. Rotate the small FMS knob to select the desired GEA path.
9. Press the LOAD softkey.
10. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
11. Confirm update completion and press the ENT key.
12. Confirm correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.6.2.*

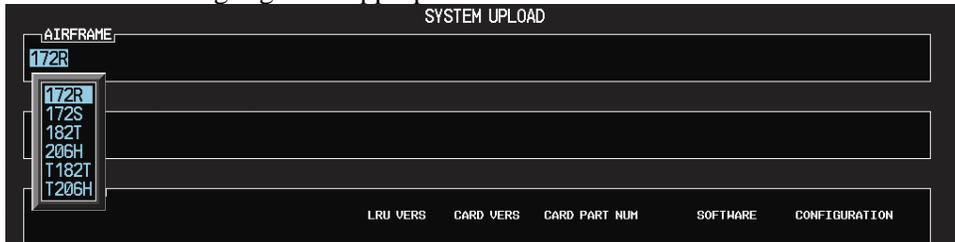
#### **4.6.2 GEA Configuration (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into the top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘GEA 1’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. Highlight ‘CALIBRATION’ in the SECTION field.
12. Repeat steps 7 through 9.
13. View the SUMMARY field and ensure the load is ‘complete’, then de-activate the cursor.
14. Verify the correct part number and software version on the SYSTEM STATUS page.

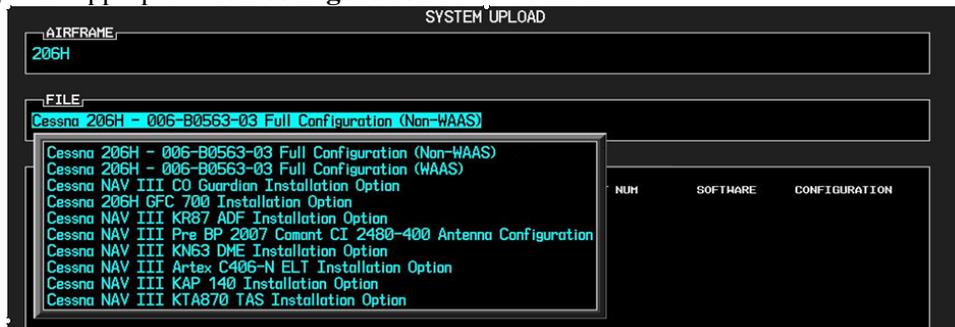
*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.6.4.*

### 4.6.3 GEA Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



#### CAUTION

Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty. Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.
10. Using the FMS knob select the following files:
  - GEA Software
  - GEA Configuration

#### NOTE

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.6.4.*

### 4.6.4 GEA 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.

*If no other maintenance is required, continue to Section 5.*

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## 4.7 GTX 33

### **Original GTX 33 Reinstalled**

No software or configuration loading is required if the original GTX 33 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.

*Continue to Section 4.7.4.*

### **New, Repaired, or Exchange GTX 33 is Installed**

If a new, repaired, or exchange GTX 33 is installed, verify the correct software version on the SYSTEM STATUS page.

If the correct software version is **not** installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.7.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.7.3.*

If the correct software version is installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.7.2.*

*For installation with GDU software version 7.01 (BP 2007) and later, continue to Section 4.7.3.*

<b>NOTE</b>
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If the PFD shows that an upload has stopped before reaching 100%, the G1000 will allow the installer to restart the upload procedure multiple times until a successful upload is accomplished. In some instances multiple software upload attempts may be required, if a previous load was cancelled or corrupt.

#### **4.7.1 GTX Software (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Using the FMS knob to the Software Upload page on the PFD.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GTX software.
7. Press the LRU softkey.
8. Rotate the small FMS knob to select the desired GTX path.
9. Press the LOAD softkey.
10. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
11. Confirm update completion and press the ENT key.
12. Confirm correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.7.2.*

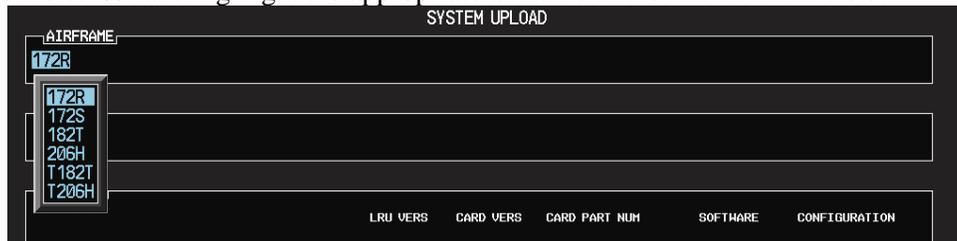
#### 4.7.2 GTX Configuration (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into the top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘GTX 1’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. View the SUMMARY field and ensure the load is ‘complete’, then de-activate the cursor.
12. Verify the correct part number and software version on the SYSTEM STATUS page.
13. Refer to Section B.2.1 for instructions on aircraft registration number entry.

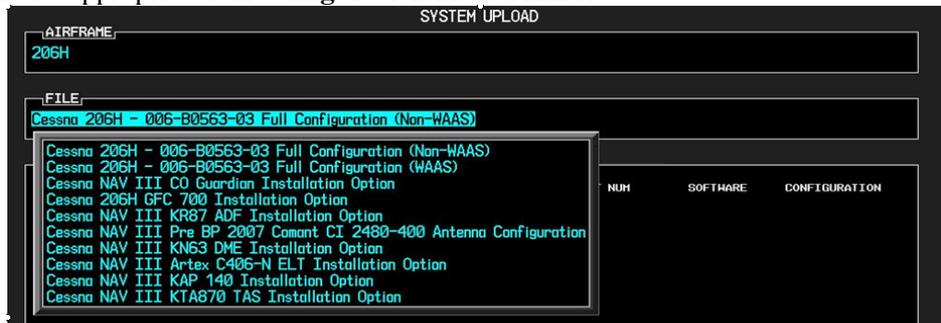
For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.7.4.

#### 4.7.3 GTX Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



#### CAUTION

Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty. Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

- 
8. Press the ENT key.
  9. Press the CLR ALL softkey.
  10. Using the FMS knob select the following files:
    - GTX Software
    - GTX Configuration

**NOTE**

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.
12. Verify the correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.7.4.*

#### **4.7.4 GTX 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. Ensure aircraft number is properly entered in configuration mode.

##### **4.7.4.1 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.

*If no other maintenance is required, continue to Section 5.*

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## 4.8 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.

*Continue to Section 4.8.3.*

### New, Repaired, or Exchange GDL 69A is Installed

If a new, repaired, or exchange GDL 69A is installed, verify the correct software version on the SYSTEM STATUS page.

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

If the correct software version is **not** installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.8.1.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.8.3.*

If the correct software version is installed:

*For installations with GDU software version 6.01 (BP 2006) and earlier, continue to Section 4.8.2.*

*For installations with GDU software version 7.01 (BP 2007) and later, continue to Section 4.8.3.*

#### **4.8.1 GDL Software (GDU software version 6.01 and earlier)**

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Apply system power, insuring both MFD and PFD are in Configuration Mode.
3. Press the CLR key at the “Do you want to update system files?” prompt.
4. Using the FMS knob go to the Software Upload page on the PFD.
5. Turn on the cursor by pressing the FMS knob.
6. Rotate the small FMS knob to select GDL software.
7. Press the LRU softkey.
8. Rotate the small FMS knob to select the desired GDL path.
9. Press the LOAD softkey.
10. Press the ENT key at the “BEGIN FILE UPLOAD?” prompt.
11. Confirm update completion and press the ENT key.
12. Confirm correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.8.2.*

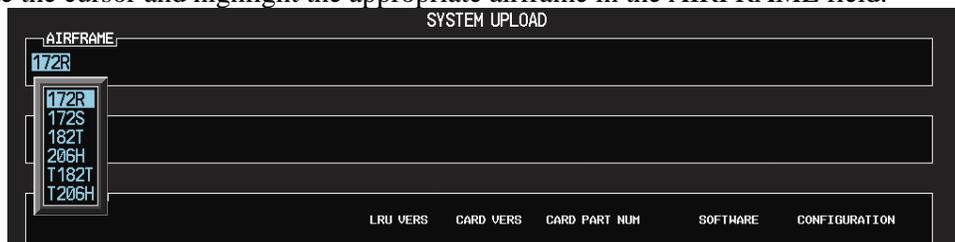
## 4.8.2 GDL Configuration (GDU software version 6.01 and earlier)

1. Insert the Nav III airframe specific G1000 Software Loader Card into the top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the Configuration Upload page on the PFD.
5. Activate the cursor and highlight the appropriate file in the FILE field.
6. Press the ENT key.
7. Highlight ‘GDL69’ in the SECTION field.
8. Press the LOAD softkey.
9. Select YES and press the ENT key to acknowledge the prompt.
10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the confirmation.
11. View the SUMMARY field and ensure the load is ‘complete’, then de-activate the cursor.
12. Verify the correct part number and software version on the SYSTEM STATUS page.

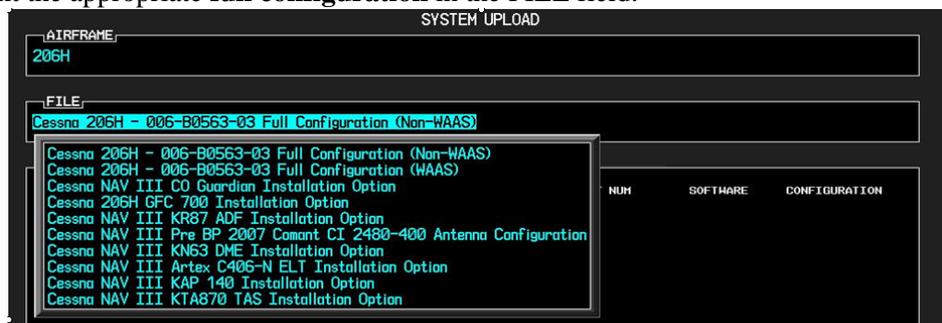
For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.8.5.

## 4.8.3 GDL Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **full configuration** in the FILE field.



### CAUTION

Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty. Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.

10. Using the FMS knob select the following files:

- GDL Software
- GDL Configuration

**NOTE**

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.

12. Verify the correct software part number and software version on the SYSTEM STATUS page.

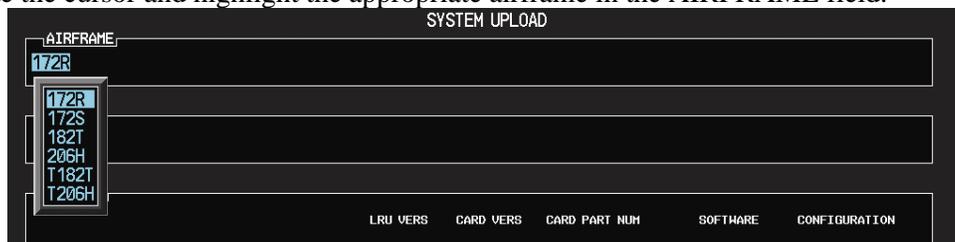
*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.8.4.*

#### 4.8.4 Pre Model Year 2007 Comant CI 2480-400 Antenna Configuration (GDU software version 7.01 and later)

Follow this procedure only if all of the following criteria has been met, otherwise continue to Section 4.8.5:

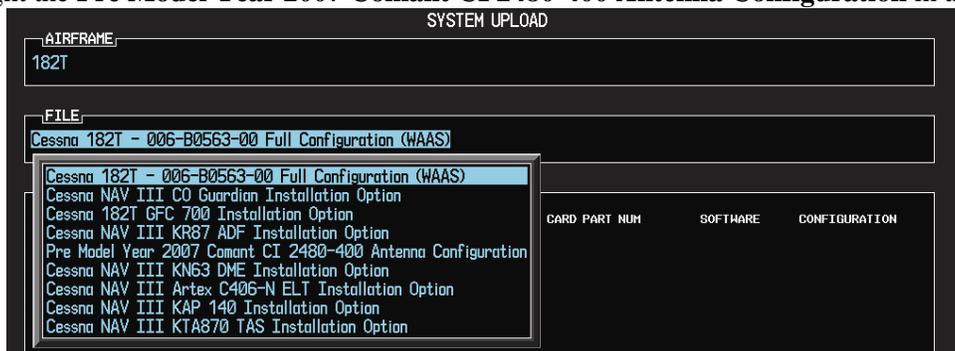
- Airplane was manufactured in or before 2006 (check registration)
- A Comant CI 2480-400 Antenna is installed
- GDU software version is 7.01 or later

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.

7. Highlight the **Pre Model Year 2007 Comant CI 2480-400 Antenna Configuration** in the FILE field.



8. Press the ENT key.

9. Press the LOAD softkey.

#### 4.8.5 GDL Testing

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

*If no other maintenance is required, continue to Section 5.*

#### 4.9 GDL 90

Refer to the GDL 90 Installation Manual (560-1049-02) for post installation configuration and checkout procedures.

## 4.10 GSA 81

### Original Servo(s) Reinstalled

If the removed servo(s) are re-installed in the same position, 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.

Continue to Section 4.9.2.

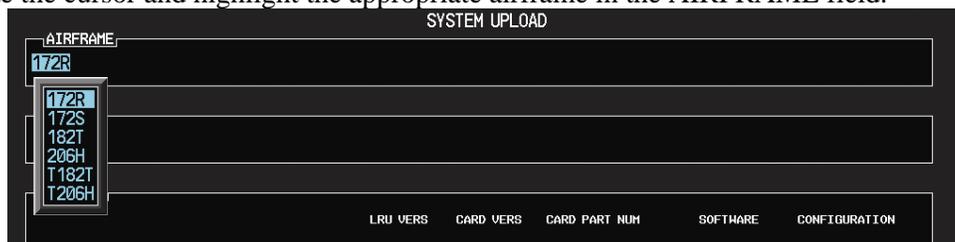
### New, Repaired, or Exchange Servo(s) Installed

If a new, repaired, or exchange GSA 81 servo is installed, the correct software files and certification gains must be loaded to the unit.

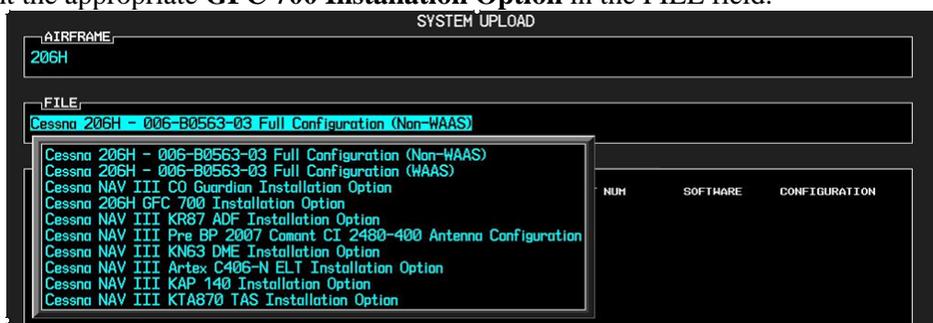
Continue to Section 4.9.1.

#### 4.10.1 GSA Software and Configuration (GDU software version 7.01 and later)

1. Insert the Nav III airframe specific G1000 Software Loader Card into top slot of the PFD.
2. Start the G1000 system in Configuration mode, if the system is not already in Configuration mode.
3. Press the CLR key at “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
4. Using the FMS knob go to the System Upload page on the PFD.
5. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



6. Press the ENT key.
7. Highlight the appropriate **GFC 700 Installation Option** in the FILE field.



### **CAUTION**

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

8. Press the ENT key.
9. Press the CLR ALL softkey.

---

10. Using the FMS knob select the following files:

- Pitch Trim Software
- Roll Software
- Pitch Software
- Pitch Trim Configuration
- Roll Configuration
- Pitch Configuration

**NOTE**

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

11. Once the desired files are selected press the LOAD softkey.

12. Verify the correct software part number and software version on the SYSTEM STATUS page.

*For software/configuration troubleshooting see Section B.4, otherwise continue to Section 4.9.2.*

#### 4.10.2 GSA 81 Testing

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

##### 4.10.2.1 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. Continue to Section 4.9.2.2.

**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/GMA audio interface.

---

#### 4.10.2.2 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.
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.
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 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.

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### 4.10.2.3 Autopilot Clutch Overpower Check

<b>NOTE</b>
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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 servo mount was not changed or serviced.

1. Engage the Autopilot by pressing the AP key.
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. 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.

### 4.10.2.4 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  $14 \pm 2$  seconds for each direction.

### 4.10.2.5 Autopilot Operation Checks

1. Push the HDG knob in to synchronize the heading bug to the present aircraft heading on the HSI.
2. Engage the Autopilot by pressing the AP key.
3. Select Heading mode by pressing the HDG key on the MFD. The command bars should be level and the control wheel should be stationary (very slow movement acceptable, due to the aircraft not being perfectly level).
4. Turn the HDG knob to the left and verify that the command bars move to the left and the control wheel turns to the left (counter-clockwise).
5. Turn the HDG knob to the right and verify that the command bars move to the right and the control wheel turns to the right (clockwise).
6. Push the CWS button and verify that "CWS" is annunciated in white on the PFD. Pull the control wheel to the middle of the pitch control range.
7. Release the CWS button. Verify that the Autopilot clutches re-engage and hold the wheel stationary.
8. Holding the control wheel lightly, turn the NOSE UP button to increase the pitch reference. Verify that the command bars move up approximately 1/2 degree and the control wheel begins moving aft.
9. Hold the control wheel and press the CWS button, re-synchronizing the pitch reference and re-centering the control wheel.
10. Release the CWS button and verify that servo clutches re-engage before releasing the control wheel.

- 
11. Press the NOSE DN button. Verify that the command bars command down and the control wheel begins moving forward.
  12. Hold the controls and press CWS to re-center the command bars and stop control wheel movement.
  13. With the Autopilot still engaged and the CWS button pressed, move the control wheel to its aft limit.
  14. Release the CWS button and apply continuous forward pressure, slowly moving the control wheel. After 1 or 2 seconds, the trim wheel should begin moving in a trim up direction.
  15. Grip the control wheel and press the CWS button. Trim motion should stop.
  16. Move the control wheel to the forward limit and release the CWS button.
  17. Slowly pull back on the control wheel. After a similar delay, the trim wheel should begin to trim down.
  18. Relieve pressure on the wheel and the trim motion should stop. Verify that the trim wheel is free to turn.
  19. Hold the control wheel and press the AP DISC switch to disconnect the autopilot.
  20. Engage VS mode by pressing the VS key. Verify the PFD display 'VS' in green and indicates a pitch reference of '0 FPM'.
  21. Press the FLC key and verify that "FLC" is annunciated on the PFD in green.
  22. Press the ALT key and verify that the "ALT" annunciation is displayed in green on the PFD.
  23. Press the FD key and verify that the mode annunciations and command bars are removed from the display.

*If no other maintenance is required, continue to Section 5.*

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## 5 FINAL SYSTEM CHECKOUT

This final checkout tests various secondary communications paths to ensure that the paths function correctly. Perform the following steps and verify the results of each test.

### 5.1 GPS Failure Test

Step	Desired Result
<p>Single GPS Failure Conditions:</p> <ol style="list-style-type: none"><li>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.</li><li>2. Check for desired results.</li><li>3. Remove shroud from the GIA 1 GPS antenna.</li><li>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.</li><li>5. Check for desired results.</li><li>6. Remove shroud from the GIA 2 GPS antenna.</li></ol>	<p>GPS Failure - For each of the specified GPS failure conditions, the following shall remain valid on the PFD throughout the procedure:</p> <ul style="list-style-type: none"><li>✓ Attitude and Heading from AHRS.</li><li>✓ Airspeed, Altitude, Vertical Speed, and OAT from Air Data Computer.</li><li>✓ GPS CDI remains valid on PFD.</li></ul>
<p>Dual GPS Failure Conditions:</p> <ol style="list-style-type: none"><li>1. Cover both GPS antennas. Verify loss of signal on MFD AUX page.</li><li>2. Check for desired results.</li><li>3. Remove shrouds from GPS antennas.</li><li>4. Allow both receivers to re-acquire satellite signals before continuing.</li></ol>	<p>Dual GPS Failure - For a dual GPS failure, the following shall occur:</p> <ul style="list-style-type: none"><li>✓ GPS CDI flags INTEG on PFD.</li><li>✓ Attitude and Heading remain valid from AHRS.</li><li>✓ Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer.</li></ul>

## 5.2 GIA Failure Test

Step	Desired Result
<p>Single GIA Failure Conditions:</p> <ol style="list-style-type: none"> <li>1. Remove power from GIA 1.</li> <li>2. Check for desired results.</li> <li>3. Restore power to GIA 1. Allow to re-acquire satellites.</li> <li>4. Remove power from GIA 2.</li> <li>5. Check for desired results.</li> <li>6. Restore power to GIA 2.</li> </ol>	<p>GIA 1 Failure - For a GIA 1 failure, only the following shall flag invalid:</p> <ul style="list-style-type: none"> <li>✓ COM/NAV 1 field.</li> <li>✓ NAV 1 CDI loses deviation bar.</li> </ul> <p>GIA 2 Power Failure - For a GIA 2 failure, only the following shall flag invalid:</p> <ul style="list-style-type: none"> <li>✓ COM/NAV 2 field.</li> <li>✓ NAV 2 CDI loses deviation bar.</li> </ul>
<p>Dual GIA Failure Conditions:</p> <ol style="list-style-type: none"> <li>1. Remove power from both GIA units.</li> <li>2. Check for desired results.</li> <li>3. Restore power to both GIA units.</li> </ol>	<p>Dual GIA Failure – For a dual GIA failure, only the following shall occur:</p> <ul style="list-style-type: none"> <li>✓ COM/NAV 1 &amp; COM/NAV 2 fields flag invalid.</li> <li>✓ GPS CDI flags INTEG on PFD.</li> <li>✓ NAV 1, 2 CDI loses deviation bar.</li> <li>✓ XPDR field flags invalid on PFD.</li> <li>✓ Engine Instrument field flags invalid on MFD.</li> <li>✓ All AHRS &amp; ADC fields valid.</li> </ul>

## 5.3 Display Failure Test

Step	Desired Result
<p>MFD Display Failure Conditions:</p> <ol style="list-style-type: none"> <li>1. Remove power from MFD.</li> <li>2. Check for desired results.</li> <li>3. Restore power to MFD.</li> </ol>	<p>The following shall occur when power is removed from the MFD:</p> <ul style="list-style-type: none"> <li>✓ PFD switches to reversion mode.</li> <li>✓ Attitude and Heading remain valid from AHRS.</li> <li>✓ Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer.</li> <li>✓ Engine Instrumentation appears on PFD.</li> <li>✓ COM/NAV 2 fields flag invalid.</li> </ul>
<p>PFD Display Failure Conditions:</p> <ol style="list-style-type: none"> <li>1. Remove power from PFD.</li> <li>2. Check for desired results.</li> <li>3. Restore power to PFD.</li> </ol>	<p>The following shall occur when power is removed from the PFD:</p> <ul style="list-style-type: none"> <li>✓ MFD switches to reversion mode.</li> <li>✓ Attitude and Heading remain valid from AHRS.</li> <li>✓ Airspeed, Altitude, Vertical Speed, and OAT remain valid from Air Data Computer.</li> <li>✓ MFD retains engine instrumentation.</li> <li>✓ COM/NAV 1 fields flag invalid.</li> </ul>

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## 5.4 AHRS/Air Data Backup Path Test

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

## 5.5 Flight Test

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

### 5.5.1 VHF COM Tests

To check the communications transceivers, maintain an appropriate altitude and contact a ground station facility at a range of at least 50 nautical miles. Contact a ground station that is in close proximity. Press the squelch disable button to defeat the automatic squelch feature and listen for any unusual electrical noise that would increase the squelch threshold. If possible, 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)

### 5.5.2 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)

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## 6 PERIODIC MAINTENANCE

### 6.1 Introduction

No component-level maintenance is required. Maintenance of the G1000 LRUs is 'on condition only', except for the following maintenance instructions and checks.

- a) Pitot/Static Leak Test

<b>NOTE</b>
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Per Garmin Service Advisory 0606, prior to the start of a pitot static test allow the GDC 74A to operate at least 15 minutes.

Perform a pitot/static leak test as described in Title 14 CFR §§ 91.411 and Part 43 Appendix E.

- b) Altimeter (GDC 74A & 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.

- c) Airspeed Function Test (GDC 74A & PFD)

Check for correct indication.

- d) Vertical Speed Indicator (GDC 74A & PFD)

Check for correct indication.

- e) GTX 33 Mode S Transponder

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

- 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, so long as the GRS 77 remains a Garmin-supported product. Otherwise maintenance of the GRS 77 is 'on condition' only.

- g) GSA 81 Servos

Conduct a visual inspection every 1000 hours or every annual, refer to Section 6.2.

Clean and apply grease to output gear every 1000 hours or 3 years, refer to Section 6.3.

- h) GSM 85 Servo Mount

Conduct a visual inspection and check slip clutches every 500 hours or 1 year, refer to Section 6.4.

- i) GDL 90

Refer to the GDL 90 Installation Manual (560-1049-02) for periodic maintenance information.

j) GDU 1040

For all units that comply with the mod status level listed in Table 6-1, maintenance of the GDU 1040 is “on condition” only.

For all units that do **not** comply with the mod status level listed in Table 6-1, perform the power interrupt annual inspection as described in Section 6.5.

Unit	Unit Part Number	Long Term Power Interrupt Category B (50 mS)* Mod Status
GDU 1040	011-00972-00	2
	011-00972-03	1
GDU 1044B	011-01274-00	1

\*Per RTCA DO-160D Section 16

**Table 6-1. Long Term Power Interrupt Category B (50 mS) Mod Status**

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## 6.2 GFC 700 Visual Inspection Procedure

1. Remove the access panels according to the Cessna Maintenance Manual.
2. Using a flashlight, inspect the servos, connectors, support structures, and control cables to ensure that no corrosion, chaffing, cracks, or other defects exist.
3. Have an assistant manually move the ailerons (for roll servo), elevators (for pitch servo), and elevator trim wheel (for pitch trim 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. If the condition of the cable is questionable, replace it with a new one. Check the tension of each servo control cable. Refer to the Cessna Maintenance Manual for cable tension specifications.
5. Inspect the GFC 700 system wiring and ensure no chaffing, wear, or other damage exists.
6. Replace the access panels if no other maintenance is to be performed.

## 6.3 GSA 81 Greasing Procedure

1. Remove each servo.
2. Remove excess grease build-up from the single servo output gear using a lint-free cloth.

### IMPORTANT

It is not necessary to remove all of the grease from the output gear, only the excess grease. **DO NOT USE SOLVENTS TO CLEAN THE OUTPUT GEAR!**

3. Using a brush or other applicator, apply a thin coat of grease to the servo output gear. Use Aeroshell 17 or equivalent (Synthetic Diester, Low Temp; Must meet MIL-G-21164D).
4. Re-install the servos.
5. Rotate control surfaces through their range of motion.

## 6.4 GSM Slip Clutch Checking and Adjustment Procedure

Refer to the Cessna Maintenance Manual for rigging and de-rigging instructions. For instructions on checking and adjusting the slip clutch refer to Section 3.3 of the GSA 8X/GSM 85(A) Installation Manual (P/N 190-00303-72). See Tables 6-2 and 6-3 for slip clutch settings. This adjustment requires the use of the Garmin servo adjustment fixture, P/N T10-00110-01.

Servo	Settings (in-lbs)	Tolerance (in-lbs)
Pitch	39	+/-5
Pitch Trim	64	+/-8
Roll	77	+/-9

**Table 6-2. T206H Slip Clutch Settings**

Servo	Settings (in-lbs)	Tolerance (in-lbs)
Pitch	35	+/-5
Pitch Trim	45	+/-6
Roll	55	+/-7

**Table 6-3. T182T Slip Clutch Settings**

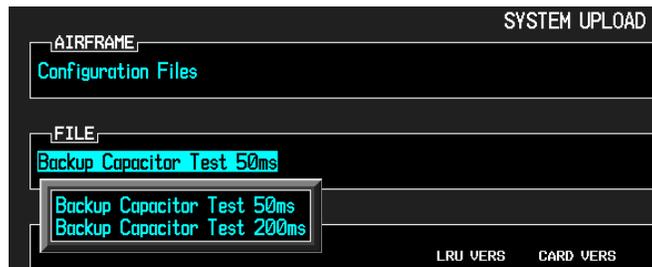
## 6.5 Category B Long Term Power Interrupt Annual Inspection Procedure

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:
  - a. Access the Dealer Resource portion of the Garmin website (www.garmin.com).
  - b. From the Technical Resource list, click on the “GDU Backup Cap Test Software (006-B0380-15)” link.
  - c. Extract the files onto a blank SD card.
2. 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
3. Insert the SD card containing the test software into the top slot of the MFD.

### NOTE

Loading “GDU Backup Cap Test Software (006-B0380-15)” to the GDUs temporarily changes the GDU software version to v7.10. It is required to return the system to the currently approved system software version and configuration following the Long Term Power Interrupt Test.

4. 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).
5. Press the ENT key at the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
6. Press the ENT key to confirm software update completion.
7. Remove the SD card from the MFD and insert into the top slot of the PFD (leave the MFD on in configuration mode).
8. 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).
9. Press the ENT key at the “DO YOU WANT TO UPDATE SYSTEM FILES?” prompt.
10. Press the ENT key to confirm software update completion.
11. Use the FMS knob to select the SYSTEM UPLOAD Page.
12. Select the configuration file “Backup Capacitor Test 50ms” from the SYSTEM UPLOAD Page (Figure 6-1).



**Figure 6-1. Backup Capacitor Test Selection**

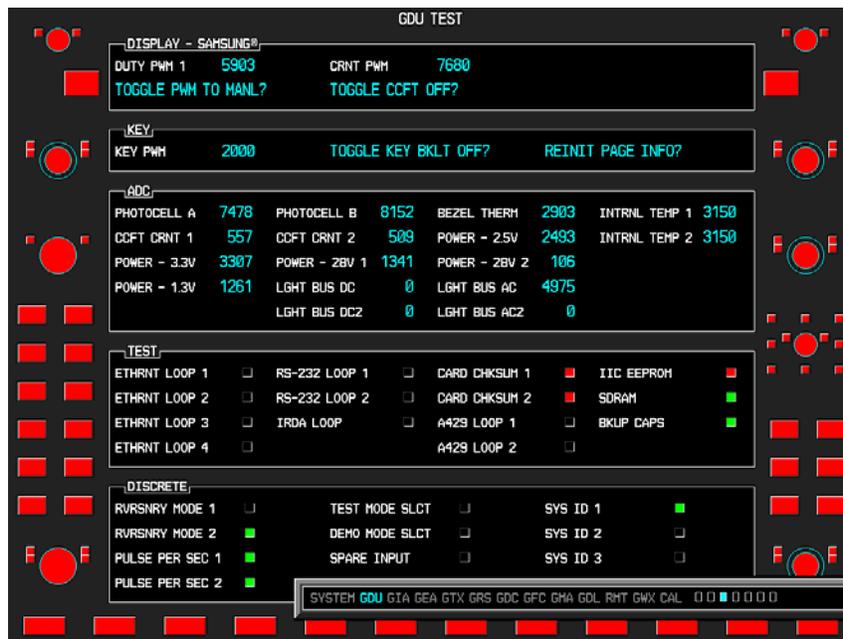
13. Press the ENT key to confirm the configuration file selection.
14. Press the LOAD softkey to load the configuration file.

- Press the ENT key to confirm upload completion (Figure 6-2).



**Figure 6-2. Upload Complete Window**

- Remove the SD card from the PFD.
- Remove power to all GDUs.
- Power on the MFD and PFD in normal mode, and leave on for at least 11 minutes.
- Remove power from the MFD and PFD.
- 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).
- Use the FMS knob to select the GDU TEST Page. Verify that the “BKUP CAPS” checkbox on the GDU TEST Page is green (Figure 6-3), for each GDU. If the “BKUP CAPS” checkbox is red return the GDU to Garmin for repair.



**Figure 6-3. BKUP CAPS Checkbox on GDU TEST Page**

- Backload the MFD and PFD to currently approved system software version and reconfigure per Section 4.1 “Displays with Power Interrupt Software Installed” of this manual.

**NOTE**

Loading test software 006-B0380-15 to the GDUs changes the GDU software version to v7.10. It is required to return the GDU to the currently approved system software version and configuration.

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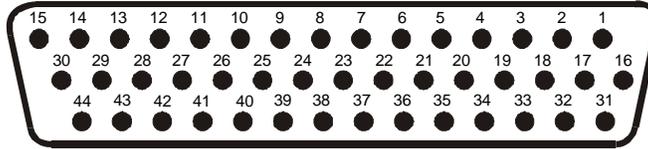
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## APPENDIX A G1000 PINOUT LIST

### A.1 GIA 63/63W

#### A.1.1 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	--
34	RESERVED	--
35	RESERVED	--
36	RESERVED	--
37	RESERVED	--
38	RESERVED	--

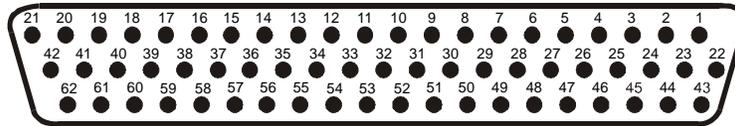
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**Connector P601, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
39	RESERVED	--
40	RESERVED	--
41	RESERVED	--
42	RESERVED	--
43	POWER GROUND	--
44	POWER GROUND	--

## A.1.2 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
42	PARALLEL DME 100 KHZ-D	Out
43	PARALLEL DME 50 KHZ	Out
44	SPARE	--

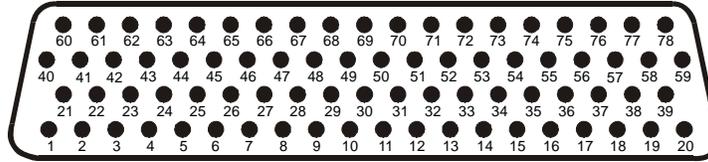
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**Connector P602, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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.1.3 P603 (Main Serial)

View of J603 connector looking at unit



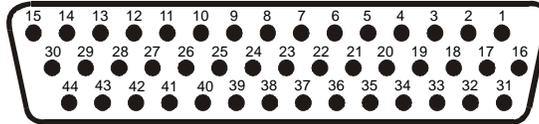
Pin	Pin Name	I/O
1	RESERVED	--
2	ETHERNET OUT A	Out
3	ETHERNET OUT B	Out
4	RS-485 4 A	I/O
5	RS-485 4 A	I/O
6	RS-485 4 B	I/O
7	RS-485 4 B	I/O
8	MAIN ARINC 429 IN 3 A	In
9	MAIN ARINC 429 IN 3 B	In
10	MAIN ARINC 429 IN 4 A	In
11	MAIN ARINC 429 IN 4 B	In
12	MAIN ARINC 429 IN 5 A	In
13	MAIN ARINC 429 IN 5 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.1.4 P604 (MAIN DISCRETE)

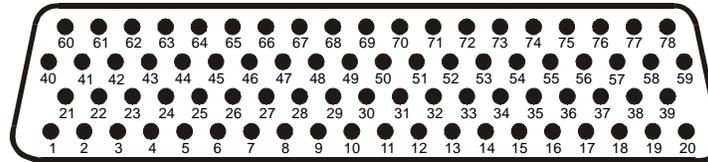
View of J604 connector looking at unit



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.1.5 P605 (I/O 1)

View of J605 connector looking at unit



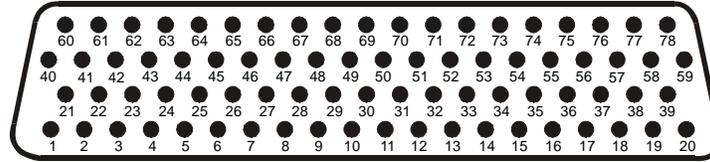
Pin	Pin Name	I/O
1	RADAR ALTIMETER DC HI	In
2	RADAR ALTIMETER DC LO	In
3	DISCRETE IN 18A	In
4	SPARE	--
5	SPARE	--
6	SPARE	--
7	SPARE	--
8	FLIGHT DIRECTOR PITCH +UP	In
9	FLIGHT DIRECTOR PITCH +DOWN	In
10	FLIGHT DIRECTOR ROLL +RIGHT	In
11	FLIGHT DIRECTOR ROLL +LEFT	In
12	DISCRETE IN 19A	In
13	POTENTIOMETER 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.1.6 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

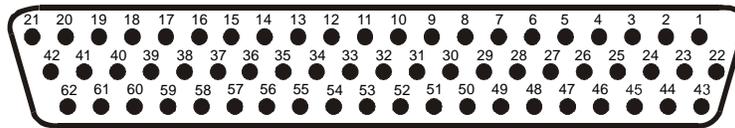
### Connector P606, continued

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.2 GDU 104X

### A.2.1 P10001

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	SIGNAL GROUND	--
21	SIGNAL GROUND	--
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	--

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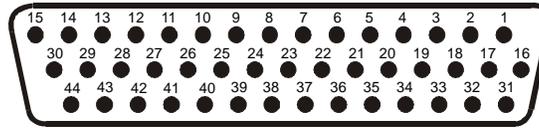
**Connector P10001, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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	UNIT 5 REMOTE POWER OFF	Out
49	UNIT 4 REMOTE POWER OFF	Out
50	UNIT 3 REMOTE POWER OFF	Out
51	UNIT 2 REMOTE POWER OFF	Out
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.3 GRS 77

### A.3.1 P771

View of J771 connector looking at unit



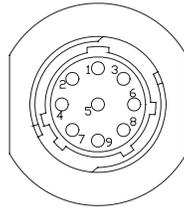
Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	AHRS SYSTEM ID PROGRAM* 1	In
3	AHRS SYSTEM ID PROGRAM* 2	In
4	RESERVED	--
5	SPARE	--
6	GPS 2 RS-232 IN	In
7	RESERVED	--
8	SPARE RS-232 IN 1	In
9	MAGNETOMETER POWER OUT	Out
10	MAGNETOMETER RS-232 OUT	Out
11	GPS 1 RS-232 IN	In
12	ARINC 429 OUT 3 A	Out
13	ARINC 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.4 GMU 44

### A.4.1 P441

View of J441 connector looking at pigtail

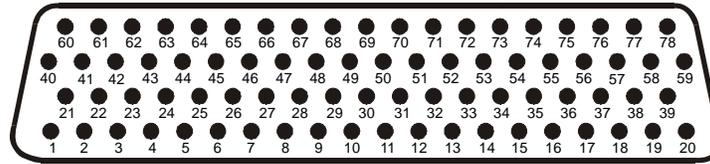


Pin	Pin Name	I/O
1	SIGNAL GROUND	--
2	RS-485 OUT B	Out
3	SIGNAL GROUND	--
4	RS-485 OUT A	Out
5	SPARE	--
6	POWER GROUND	--
7	SPARE	--
8	RS-232 IN	In
9	+12 VDC POWER	In

## A.5 GDC 74A

### A.5.1 P741

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

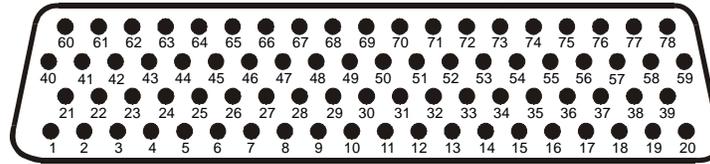
**Connector P741, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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.6 GEA 71

### A.6.1 P701

View of J701 connector looking at unit



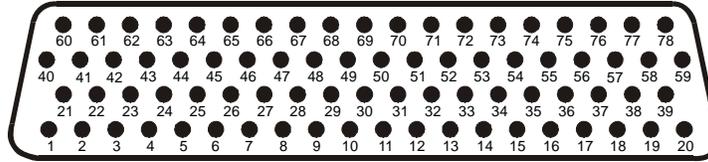
Pin	Pin Name	I/O
1	CONFIG MODULE GROUND	--
2	DIGITAL IN* 1	In
3	DIGITAL IN* 2	In
4	SIGNAL GROUND	--
5	RS-485 1 A	I/O
6	RS-485 1 B	I/O
7	RS-485 2 A	I/O
8	RS-485 2 B	I/O
9	GEA SYSTEM ID PROGRAM* 1	In
10	GEA SYSTEM ID PROGRAM* 2	In
11	TRANSDUCER POWER OUT LO (GROUND)	--
12	TRANSDUCER POWER OUT LO (GROUND)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

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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.6.2 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	--

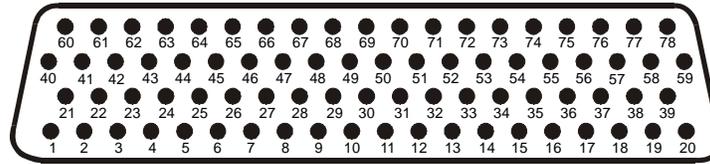
**Connector P702, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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.7 GMA 1347

### A.7.1 P3471

View of J3471 connector from back of unit



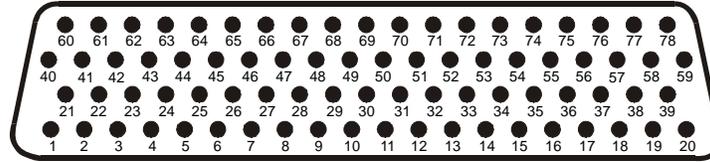
Pin	Pin Name	I/O
1	FAIL SAFE WARN AUDIO IN	In
2	SPARE	--
3	TEL RINGER AUDIO IN HI	In
4	TEL RINGER AUDIO IN LO	In
5	REMOTE PASS ICS OUT HI	Out
6	ON-SIDE NAV AUDIO IN HI	In
7	ON-SIDE COM AUDIO IN HI	In
8	ON-SIDE COM AUDIO LO	I/O
9	PILOT HEADSET AUDIO OUT LEFT	Out
10	PILOT HEADSET AUDIO OUT RIGHT	Out
11	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.7.2 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

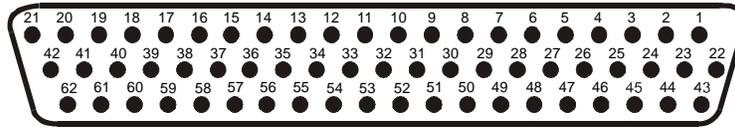
### Connector P3472, continued

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.8 GTX 33

### A.8.1 P3301

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

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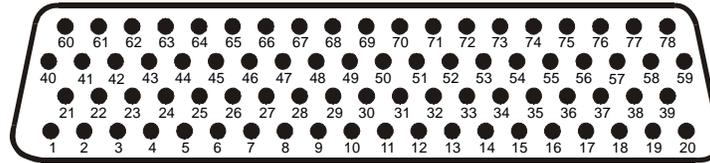
**Connector P3301, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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.9 GDL 69/69A

### A.9.1 P691

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	--

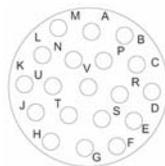
**Connector P691, continued**

<b>Pin</b>	<b>Pin Name</b>	<b>I/O</b>
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.10 GSA 81

### A.10.1 P801

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	--

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## APPENDIX B G1000 SYSTEM SOFTWARE & CONFIGURATION

The following information is intended to serve as an example for a complete reconfiguration of the G1000 system. *Software part numbers and software versions shown are not intended to be airframe specific. For actual software versions and part number refer to Page i.*

### CAUTION

**DO NOT ALLOW POWER TO BE REMOVED FROM THE SYSTEM WHEN LOADING SOFTWARE!** Connect a ground power unit to the aircraft for software loading. Do not rely solely on the aircraft batteries to prevent loss of power during the software loading process. 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.

### CAUTION

Remove Supplemental Data Cards (010-00330-41 or 010-00330-42) 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.

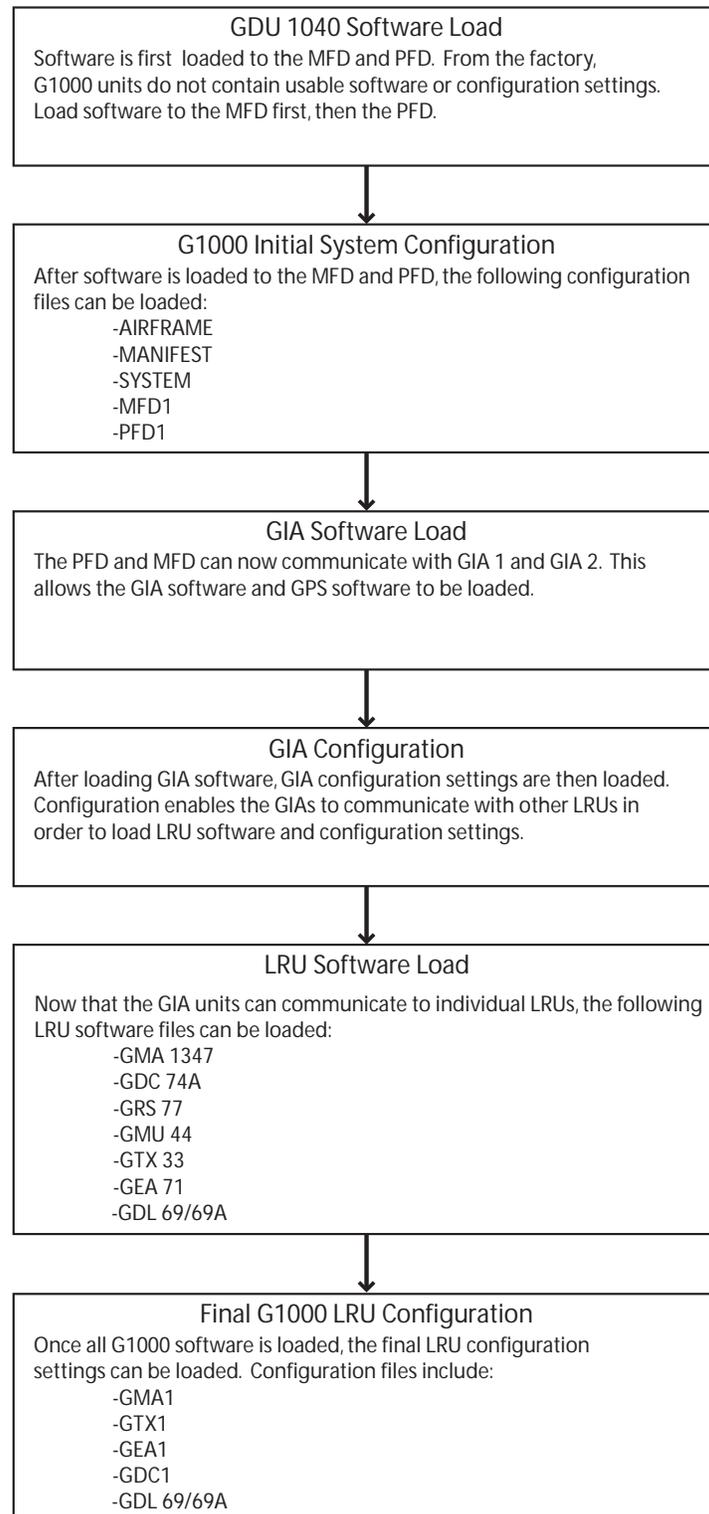
### NOTE

Refer to the Cessna Maintenance Manual for approved software versions and part numbers.

### NOTE

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 reattempt the software load.

## B.1 Initial Software & Configuration Overview



**Figure B-1. Software/Configuration Overview (GDU Software Version 6.01 and earlier)**

---

## B.1.1 MFD & PFD Software Load

1. Insert the airframe specific Software/Configuration loader card into the MFD top card slot.
2. While holding the ENT key on the MFD, restore power by closing the MFD circuit breaker.
3. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the MFD, release the ENT key.
4. Press the ENT key to acknowledge the following prompt:

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

5. The following screen is displayed.

```
DO YOU WANT TO UPDATE SYSTEM FILES?  
PRESS CLR FOR NO AND ENT FOR YES  
YOU HAVE 30 SECONDS BEFORE NO IS RETURNED  
UPDATING SYSTEM FILES. DO NOT TURN OFF POWER !!!  
THIS MAY TAKE UP TO 10 MINUTES
```

6. New software is loaded to the MFD. When complete, the MFD starts in configuration mode.
7. Remove power to the MFD by pulling the MFD circuit breaker.
8. Remove the Software/Configuration card loader from the MFD and insert it into the top card slot on the PFD. Repeat Steps 2 through 5 for the PFD.
9. When PFD update is complete, it starts in the configuration mode. Do not remove power.
10. While holding the ENT key on the MFD, restore power to the MFD by closing the MFD circuit breaker.

### NOTE

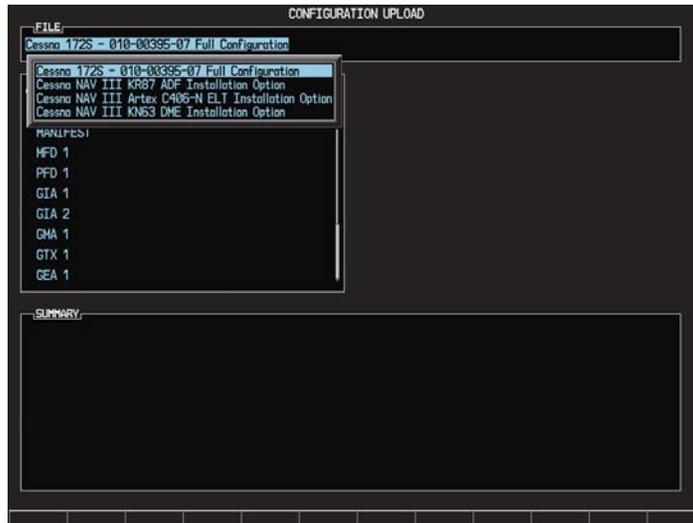
For the rest of the software/configuration procedure, do not operate the MFD while loading software or configuration unless specifically instructed to do so. A failed or cancelled load may result.

11. For systems using GDU software version 6.01 or earlier, continue the procedure at step B.1.2. For systems using GDU software version 7.01 or later, continue the procedure at step B.1.8.

## B.1.2 Initial G1000 Configuration

### Standard Configuration (GDU software version 6.01 and earlier)

When loading the standard (default) configuration for each airframe, the user should select the 'FULL CONFIGURATION' item listed in the drop-down menu. Selecting the 'FULL CONFIGURATION' populates the SECTION window with all of the individual configurable items. The user can then select each individual LRU to install the appropriate base configuration settings.



1. Go to the CONFIGURATION UPLOAD page using the FMS knob.
2. Activate the cursor and highlight the appropriate file in the FILE field.
3. Press the ENT key.
4. Highlight 'AIRFRAME' in the SECTION field.
5. Press the LOAD softkey.
6. Select YES and press the ENT key to acknowledge the following prompt:



7. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the following confirmation:



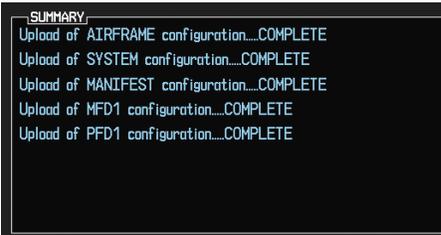
8. Highlight 'SYSTEM' in the SECTION field and repeat steps 5 through 7.
9. Highlight 'MANIFEST' in the SECTION field and repeat steps 5 through 7.

---

Highlight 'MFD1' in the SECTION field and repeat steps 5 through 7.

10. Highlight 'PFD1' in the SECTION field and repeat steps 5 through 7.

11. View the SUMMARY field and ensure that all items are 'complete', then de-activate the cursor:



```
SUMMARY
Upload of AIRFRAME configuration...COMPLETE
Upload of SYSTEM configuration...COMPLETE
Upload of MANIFEST configuration...COMPLETE
Upload of MFD1 configuration...COMPLETE
Upload of PFD1 configuration...COMPLETE
```

### B.1.3 GIA Software Upload (GDU software version 6.01 and earlier)

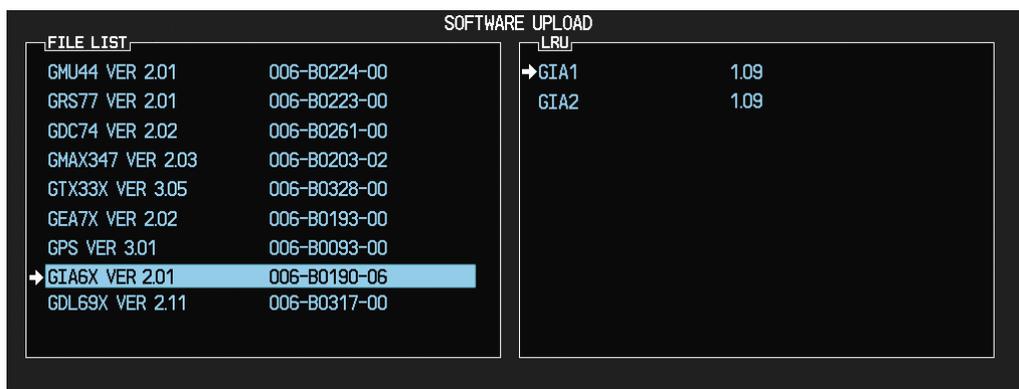
**NOTE**

GIA v4.01 (or later) boot block software must be installed prior to upgrading to software versions listed in this document. Refer to Section 4.3.1.1 for details on how to perform this update.

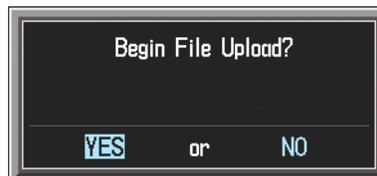
**NOTE**

The GIA software version number displayed in the LRU Section of the SOFTWARE UPLOAD Page does not refer to the boot block software version. Boot block software version can be verified by highlighting the appropriate LRU on the MFD MAIN SYSTEM STATUS Page during software uploads (“BBL” will be listed as the description).

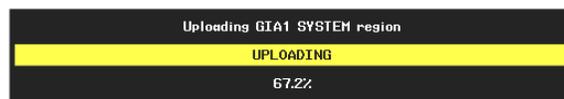
1. Go to the SOFTWARE UPLOAD page using the FMS knob.
2. Activate the cursor and select the GIA software file. Verify that GIA1 and GIA2 appear in the LRU field as shown:



3. Press the LOAD softkey.
4. Select YES and press the ENT key to acknowledge the following prompt:



5. The software for GIA1 begins to load. GIA2 software loads immediately after GIA1 software finishes loading. Monitor the upload status as it progresses:



6. After the files finish loading, press the ENT key to acknowledge the following prompt:



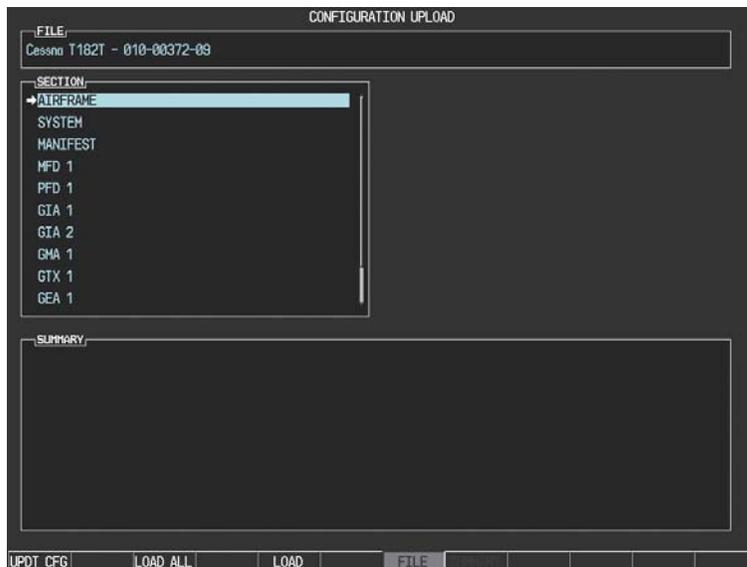
7. View the SUMMARY field and verify that both GIA1 and GIA2 software loading is complete.

---

```
SUMMARY
Upload of GIA1 SYSTEM region.....COMPLETED
Upload of GIA2 SYSTEM region.....COMPLETED
```

De-activate the cursor.

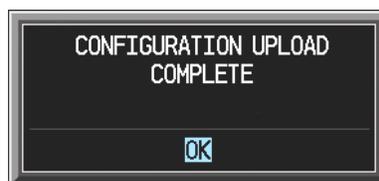
## B.1.4 GIA Configuration (GDU software version 6.01 and earlier)



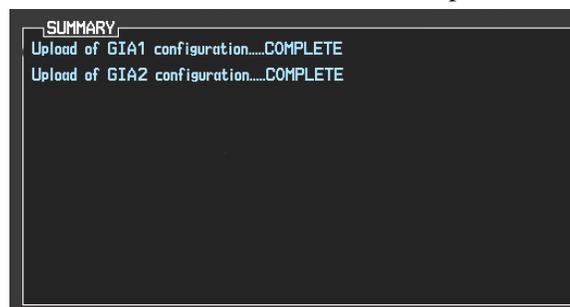
1. Go to the CONFIGURATION UPLOAD page using the FMS knob.
2. Activate the cursor and highlight the appropriate file in the FILE field.
3. Press the ENT key.
4. Highlight GIA1 in the SECTION field.
5. Press the LOAD softkey.
6. Select YES and press the ENT key to acknowledge the following prompt:



7. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the following confirmation:



8. Highlight GIA2 in the SECTION field and repeat Steps 5 through 7.
9. View the SUMMARY field and ensure that all items are 'complete':



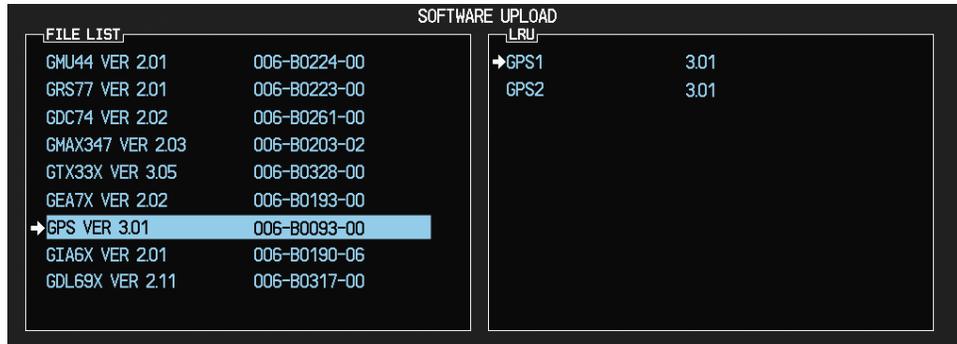
10. De-activate the cursor.

## B.1.5 Final LRU Software Load (GDU software version 6.01 and earlier)

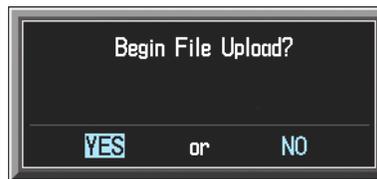
1. Go to the SOFTWARE UPLOAD page using the FMS knob.

### B.1.5.1 GPS Software (GDU software version 6.01 and earlier)

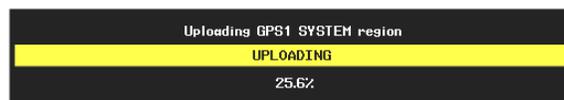
1. Activate the cursor and highlight the GPS file. Ensure that GPS1 and GPS2 appear in the LRU field as shown:



2. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for GPS1 begins to load. GPS2 software loads immediately after GPS1 software finishes loading. Monitor the upload status as it progresses:



5. After the files finish loading, press the ENT key to acknowledge the following prompt:



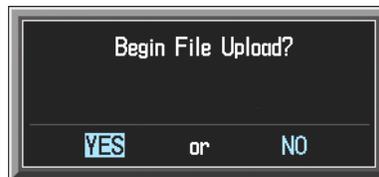
6. Check the SUMMARY field to ensure the load is 'COMPLETE'.

### B.1.5.2 GMA 1347 Audio Panel Software (GDU software version 6.01 and earlier)

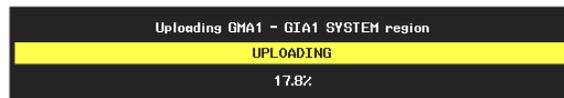
1. Highlight the GMA1347 file. Ensure that both paths to the GMA through GIA1 and GIA 2 appear in the LRU field as shown:



2. Press the LRU softkey. Select the GMA1 - GIA1 data path to load software. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GMA 1347 Audio Panel begins to load. Monitor the upload status as it progresses:



5. After the files finish loading, press the ENT key to acknowledge the following prompt:



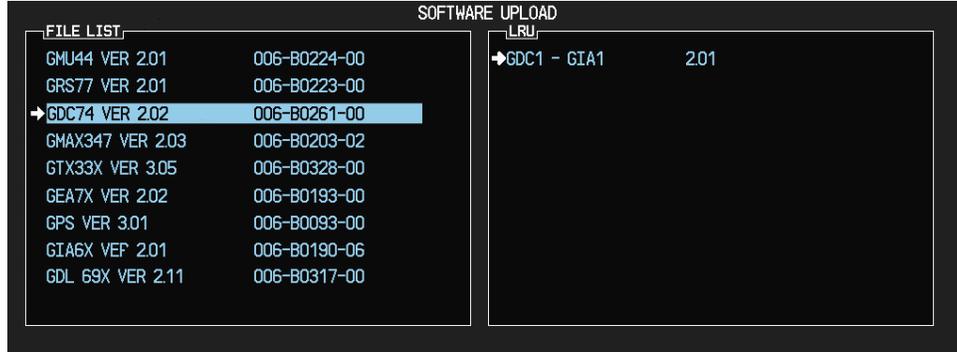
6. Check the SUMMARY field to ensure the load is 'COMPLETE'.

### B.1.5.3 GDC 74A Air Data Computer Software (GDU software version 6.01 and earlier)

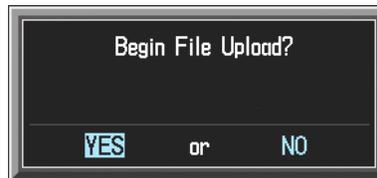
**NOTE**

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

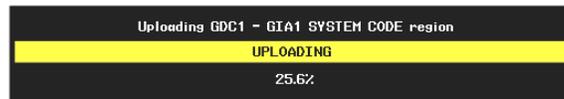
1. Highlight the GDC74 file. Ensure that GDC to GIA data path appears in the LRU field as shown:



2. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GDC 74A Air Data Computer begins to load. Monitor the upload status as it progresses:



5. After the files finish loading, press the ENT key to acknowledge the following prompt:



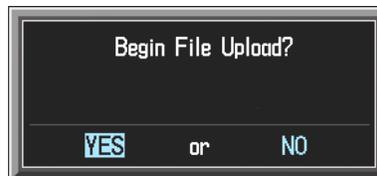
6. Check the SUMMARY field to ensure the load is 'COMPLETE'.

### B.1.5.4 GRS 77 AHRS Software (GDU software version 6.01 and earlier)

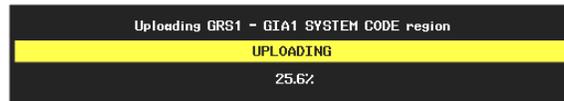
1. Highlight the GRS77 file. Ensure that the GRS to GIA data path appears in the LRU field as shown:



2. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GRS 77 AHRS begins to load. Monitor the upload status as it progresses:



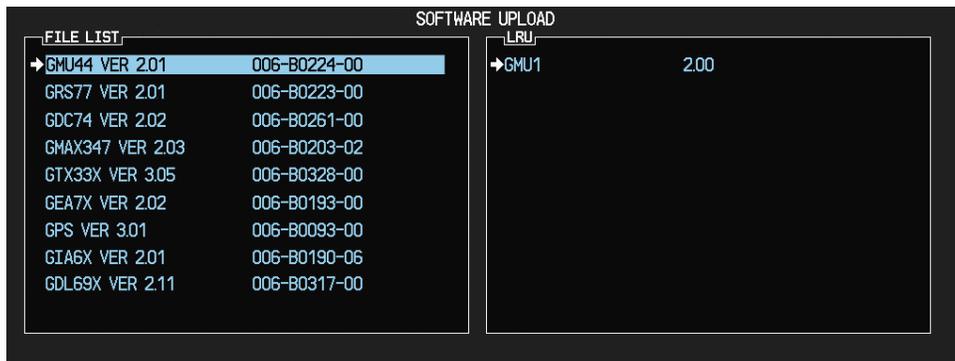
5. After the files finish loading, press the ENT key to acknowledge the following prompt:



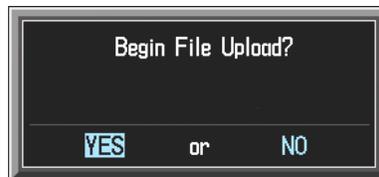
6. Check the SUMMARY field to ensure the load is 'COMPLETE'.

### B.1.5.5 GMU 44 Magnetometer Software (GDU software version 6.01 and earlier)

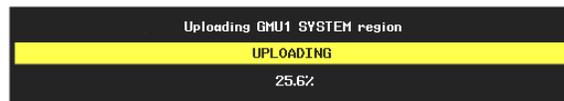
1. Highlight the GMU44 file. Ensure that GMU1 appears in the LRU field as shown:



2. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GMU 44 Magnetometer begins to load. Monitor the upload status as it progresses:



5. After the files finish loading, press the ENT key to acknowledge the following prompt:



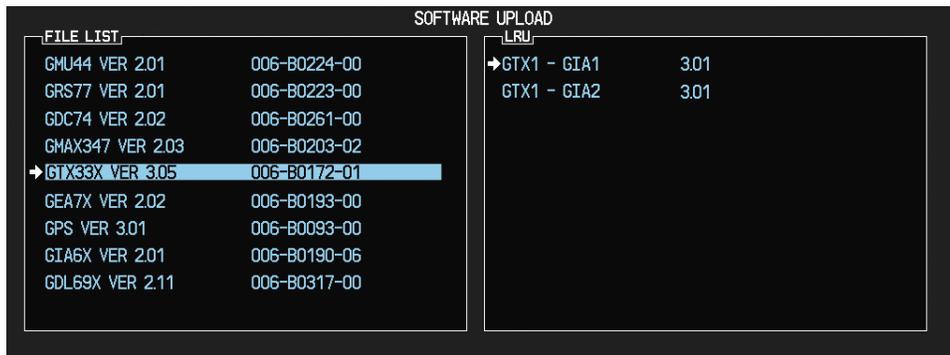
6. Check the SUMMARY field to ensure the load is 'COMPLETE'.

### B.1.5.6 GTX 33 Transponder Software (GDU software version 6.01 and earlier)

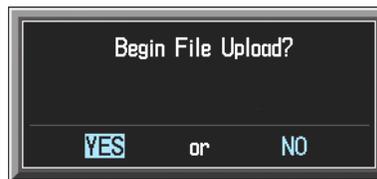
#### NOTE

If the PFD shows that an upload has stopped before reaching 100%, the G1000 will allow the installer to restart the upload procedure multiple times until a successful upload is accomplished. In some instances multiple software upload attempts may be required.

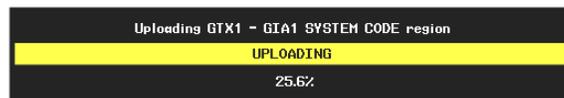
1. Highlight the file GTX33 file. Ensure that both paths to the GTX 33 through GIA1 and GIA 2 appear in the LRU field as shown:



2. Press the LRU softkey. Select the GTX1 - GIA1 data path to load software. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GTX 33 transponder begins to load. Monitor the upload status as it progresses:



5. After the files finish loading, press the ENT key to acknowledge the following prompt:



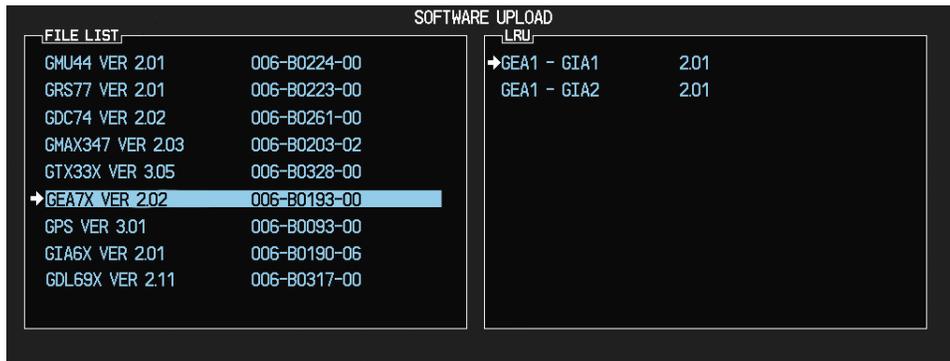
6. Check the SUMMARY field to ensure the load is 'COMPLETE'.

### B.1.5.7 GEA 71 Engine/Airframe Unit Software (GDU software version 6.01 and earlier)

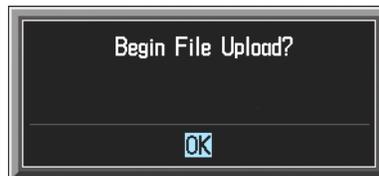
#### CAUTION

Do not cancel a software upload that is in progress. A canceled software upload may result in an unresponsive GEA 71.

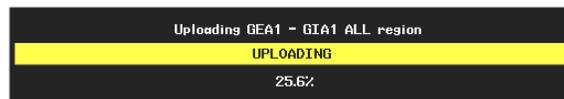
1. Highlight the GEA71 file. Ensure that both paths to the GEA 71 through GIA1 and GIA 2 appear in the LRU field as shown:



2. Press the LRU softkey. Select the GEA - GIA1 data path to load software. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GEA 71 Engine/Airframe Unit begins to load. Monitor the upload status as it progresses:



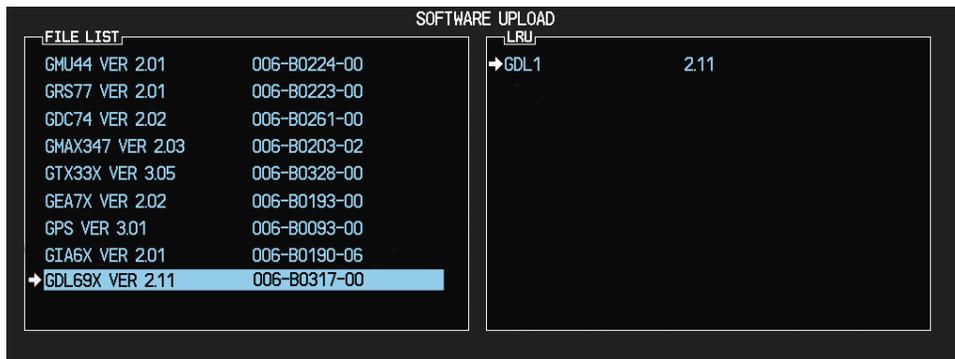
5. After the files finish loading, press the ENT key to acknowledge the following prompt:



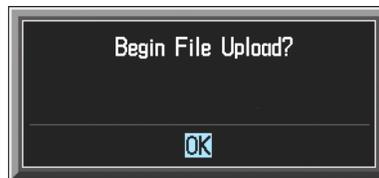
6. Check the SUMMARY field to ensure the all software loads are 'COMPLETE'.
7. De-activate the cursor.

### B.1.5.8 GDL 69/69A Data Link Unit Software (GDU software version 6.01 and earlier)

1. Highlight the GDL69 file. Ensure that GDL1 appears in the LRU field as shown:



2. Press the LOAD softkey.
3. Select YES and press the ENT key to acknowledge the following prompt:



4. The software for the GDL 69/69A Data Link Unit begins to load. Monitor the upload status as it progresses:

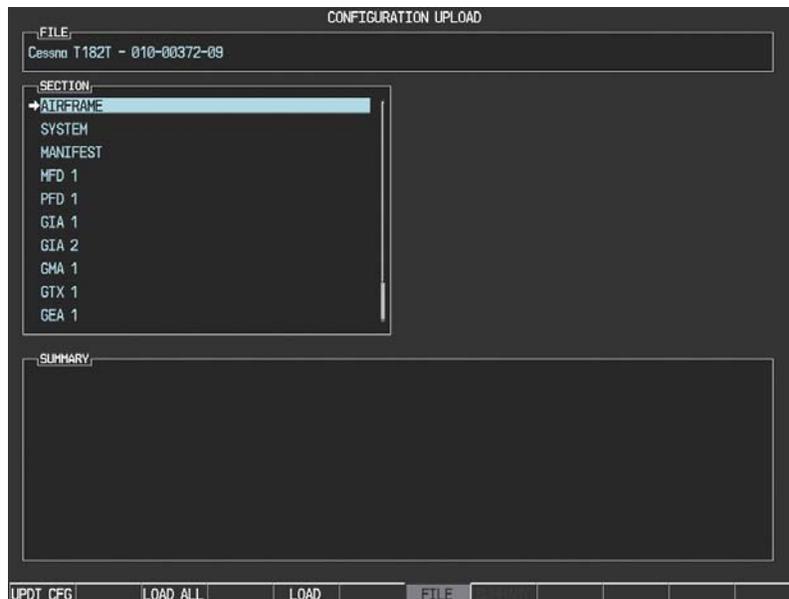


5. After the files finish loading, press the ENT key to acknowledge the following prompt:



6. Check the SUMMARY field to ensure the all software loads are 'COMPLETE'.
7. De-activate the cursor.

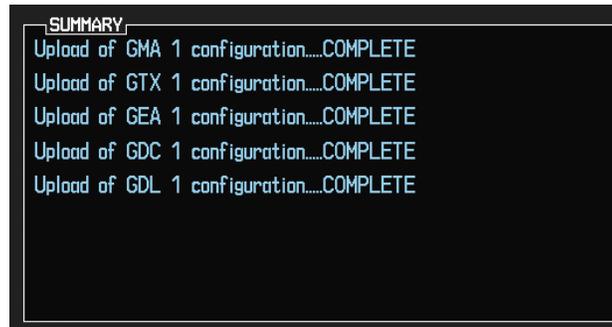
## B.1.6 Final LRU Configuration (GDU software version 6.01 and earlier)



1. Go to the CONFIGURATION UPLOAD page using the FMS knob.
2. Activate the cursor and highlight the appropriate file in the FILE field.
3. Press the ENT key.
4. Highlight the following LRUs in the SECTION field:
  - a) GMA1
    - i. Press the LOAD softkey.
    - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
    - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.
  - b) GTX1
    - i. Press the LOAD softkey.
    - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
    - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.
  - c) GEA1
    - i. Press the LOAD softkey.
    - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
    - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.
  - d) GDC1
    - i. Press the LOAD softkey.
    - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
    - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.
  - e) GDL1
    - i. Press the LOAD softkey.
    - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
    - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.

- 
- f) CALIBRATION
- i. Press the LOAD softkey.
  - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
  - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.
- g) AUDIO
- i. Press the LOAD softkey.
  - ii. Press the ENT key at the START CONFIGURATION UPLOAD prompt.
  - iii. Press the ENT key at the CONFIGURATION UPLOAD COMPLETE prompt.
  - iv.

5. Ensure that all Configuration files are 'Complete' in the SUMMARY field as shown:



```
SUMMARY
Upload of GMA 1 configuration...COMPLETE
Upload of GTX 1 configuration...COMPLETE
Upload of GEA 1 configuration...COMPLETE
Upload of GDC 1 configuration...COMPLETE
Upload of GDL 1 configuration...COMPLETE
```

### Optional Configuration

The following configuration options are now available for some G1000 equipped Nav III aircraft:

- KN63 DME
- KR87 ADF
- Artex C406-N ELT
- KTA870 TAS
- CO Guardian
- GDL 90
- KAP 140
- GFC 700

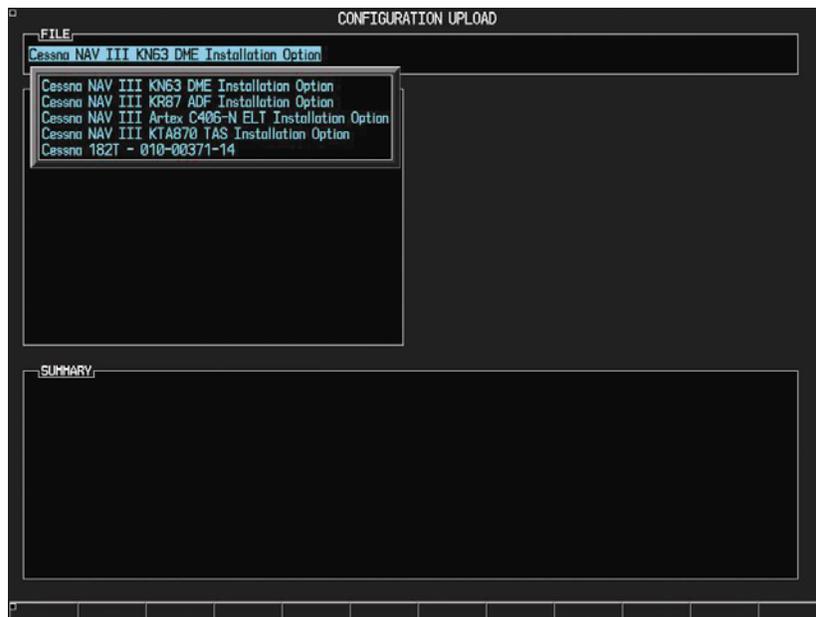
Once these optional systems are installed, follow the procedure below to configure the G1000.

#### **NOTE**

Ensure that the base airframe configuration option is selected and loaded first after a software upload, LRU replacement, or optional system installation. The optional system configuration (detailed below) will be overwritten by the base airframe configuration if the optional system configuration is completed first.

1. Insert the proper G1000 Nav III Loader Card into the top card slot of the PFD.
2. While holding the ENT key on PFD, apply power by closing the PFD circuit breaker.
3. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
4. Turn the MFD on in the same manner.

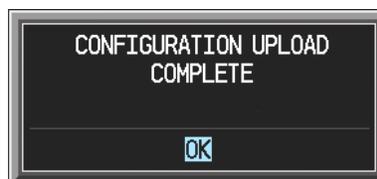
5. On the PFD go to the CONFIGURATION UPLOAD page using the FMS knob.
6. Activate the cursor and highlight the appropriate installation option in the FILE field.



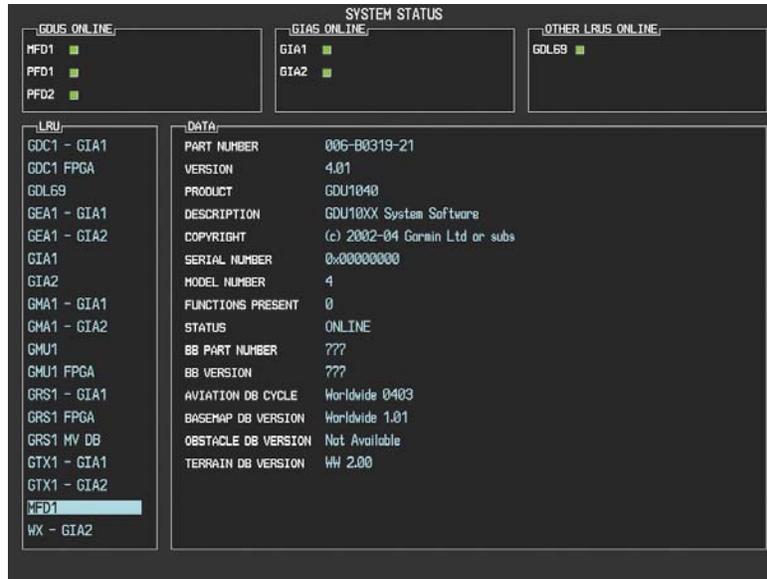
7. Press the ENT key.
8. Press the LOAD ALL softkey.
9. Select YES and press the ENT key to acknowledge the following prompt:



10. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the following confirmation:



## B.1.7 Software Load Confirmation



1. Go to the SYSTEM STATUS page using the FMS knob. Activate the cursor and toggle to the LRU window.
2. Highlight the specified items in the LRU window and verify the software part numbers and versions against the ones listed in the front of this manual.
3. De-activate the cursor.
4. Remove the airframe specific Card Loader from the PFD top slot and set aside.

### IMPORTANT

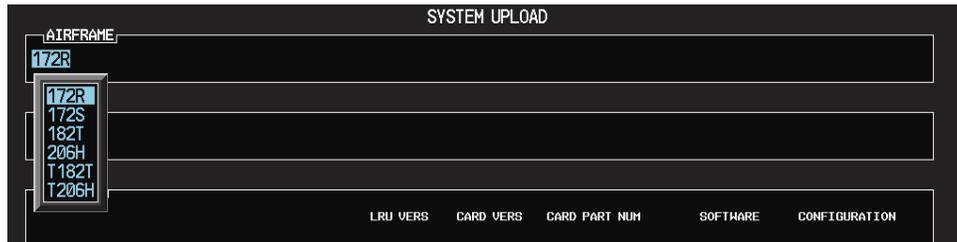
If any software version and/or part number does not match, or is not successfully loaded, do not continue with post-installation procedures. Troubleshoot and resolve the issue before continuing (see Section B.3).

LRU	SW OK	LRU	SW OK
PFD1	_____	GTX1 – GIA1	_____
MFD1	_____	GEA1 – GIA1	_____
GIA1	_____	GDC1 – GIA1	_____
GIA2	_____	GMU1	_____
COM1	_____	NAV1	_____
COM2	_____	NAV2	_____
GRS1 – GIA1	_____	GPS1	_____
GMA1 – GIA1	_____	GPS2	_____

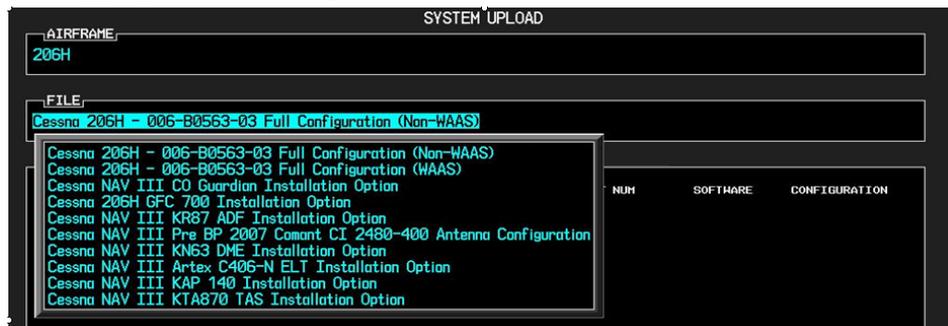
5. Proceed to Section B.2 Final Configuration Items

## B.1.8 G1000 Software and Configuration Upload (GDU Software version 7.01 and later)

1. Using the FMS knob go to the System Upload page on the PFD.
2. Activate the cursor and highlight the appropriate airframe in the AIRFRAME field.



3. Press the ENT key.
4. Highlight the appropriate **full configuration** in the FILE field.



### CAUTION

**Loading the wrong software into GIA63/63W units may cause an inoperable condition that is not covered by warranty.** Refer to Section 4.3 of this manual to identify which type of GIA 63 (WAAS or Non-WAAS) is installed in the aircraft, and how to choose the correct WAAS or Non-WAAS software file before loading GIA main software. Loading the incorrect software may make the GIA 63 or GIA 63W inoperable and necessitate returning the unit to Garmin for non-warranty repair. No warning appears if the wrong software is selected.

5. Press the ENT key.
6. Press the 'CHK ALL' softkey to select all loadable software and configuration files.

### NOTE

Pressing the ENT key will check and uncheck the highlighted software and configuration boxes.

7. Press the LOAD softkey.
8. Repeat steps 4 through 7 to load any other optional items.
9. When the upload is complete, press the ENT key to confirm.



10. Confirm that the software load was complete and accurate by following the instructions in Section B.1.7.

## B.2 Final Configuration Items

### B.2.1 Aircraft Registration Number Entry

	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

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 complete 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.

### B.3 Stormscope Configuration (If Equipped)

1. Select the GIA page group on the PFD. The GIA RS-232/ARINC 429 Configuration Page appears by default.
2. Select the appropriate GIA 63 to be configured. Refer to aircraft-specific installation drawings to find out which GIA is used to communicate with the Stormscope (In some cases, both GIAs may be used as communication paths).
3. Activate the cursor and toggle to the appropriate GIA RS-232 input channel.
4. Use the FMS Knob to select 'WX-500' from the menu.
5. Acknowledge the selection by pressing the ENT key. Repeat Steps 2-5 for the opposite GIA, if required.
6. Configuration for the G1000-Stormscope interface is complete. Note that a new page group, labeled 'OTHER' appears. A Stormscope configuration page is now available in this page group to further configure the Stormscope. Refer to the WX-500 installation manual for information on Stormscope post-installation procedures.



## B.4 Software/Configuration Troubleshooting

Problem	Solutions
<p>GDU 104X MFD or PFD displays do not power up</p>	<ul style="list-style-type: none"> <li>• Ensure that the criteria listed in B.4.1 are fulfilled for the applicable situation.</li> <li>• Ensure power is present at display backshell connector.</li> <li>• Replace display.</li> </ul>
<p>Software file load fails:</p> 	<ul style="list-style-type: none"> <li>• Ensure that criteria listed in B.4.1 are fulfilled for the applicable situation.</li> <li>• Ensure that LRU is reporting data on the System Status page (LRU is 'ONLINE'). Check data path wiring as needed.</li> <li>• Restart MFD &amp; PFD in Configuration Mode and retry software file load or try using a different card.</li> <li>• Ensure that the MFD is not touched during the loading process, unless explicitly instructed to do so.</li> <li>• Ensure that LRU part number is compatible with software version and Loader Card. Refer to approved post-installation and/or maintenance data.</li> <li>• Replace LRU.</li> </ul>
<p>Configuration file load fails:</p> 	<ul style="list-style-type: none"> <li>• Ensure that criteria listed in B.4.1 are fulfilled for the applicable situation.</li> <li>• Ensure that LRU is reporting data on the System Status page (LRU is 'ONLINE'). Check data path wiring as needed.</li> <li>• Restart MFD &amp; PFD in Configuration Mode and retry configuration file load or try using a different card.</li> <li>• Ensure that the MFD is not touched during the loading process, unless explicitly instructed to do so.</li> <li>• Ensure that LRU part number is compatible with software version and Loader Card. Refer to approved post-installation and/or maintenance data.</li> <li>• Replace LRU.</li> </ul>
<p>GIA1 to 'LRU' serial data path not working</p>	<ul style="list-style-type: none"> <li>• Ensure that criteria listed in B.4.1 are fulfilled for the applicable situation.</li> <li>• Ensure GIA1 and GIA2 are configured correctly.</li> <li>• Check wiring, connectors &amp; pins as needed.</li> </ul>
<p>Software File Mismatch Alert appears in lower right corner of PFD when started in normal mode:</p> 	<ul style="list-style-type: none"> <li>• Ensure that proper software file part number and version were loaded to LRU.</li> <li>• Ensure that LRU part number is compatible with software version and Loader Card. Refer to approved post-installation and/or maintenance data.</li> <li>• Reload 'MANIFEST' configuration file to the PFD.</li> </ul>

## B.4.1 System Communication Hierarchy

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

Desired Operation	Criteria for Success
Load Software to GDU 104X MFD or PFD Displays	<ul style="list-style-type: none"> <li>• G1000 SW Loader Card must be inserted in top slot for each display to be loaded.</li> <li>• CLR &amp; ENT keys must be held during power up of display.</li> <li>• Power only one display on at a time during software loading.</li> </ul>
Load AIRFRAME, SYSTEM, MFD1, PFD1, and MANIFEST configuration files to the MFD and PFD	<ul style="list-style-type: none"> <li>• G1000 SW Loader Card must be inserted in top slot of the PFD.</li> <li>• PFD and MFD must be powered on.</li> <li>• PFD and MFD must have correct software.</li> </ul>
Load Software/Configuration files to GIA 63/GIA 63Ws	<ul style="list-style-type: none"> <li>• G1000 SW Loader Card must be inserted in top slot of the PFD.</li> <li>• G1000 system must be powered on.</li> <li>• PFD and MFD must have correct software.</li> <li>• PFD and MFD must be successfully configured with AIRFRAME, SYSTEM, MFD1, and PFD1 configuration files.</li> </ul>
Load Software/Configuration files to: <ul style="list-style-type: none"> <li>- GMA 1347</li> <li>- GDC 74A</li> <li>- GEA 71</li> <li>- GRS 77 (software only)</li> <li>- GMU 44 (software only)</li> <li>- GTX 33</li> <li>- GDL 69A</li> </ul>	<ul style="list-style-type: none"> <li>• G1000 must be powered on.</li> <li>• Airframe specific card loader must be inserted into PFD top slot.</li> <li>• PFD and MFD must have correct software and configuration settings.</li> <li>• GIA 63/GIA 63Ws must have correct software.</li> <li>• GIA 63/GIA 63Ws must be successfully configured with GIA1 and GIA2 configuration files.</li> <li>• Data path from GIA1 to each LRU must be operational.</li> </ul>

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## B.5 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.

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
```

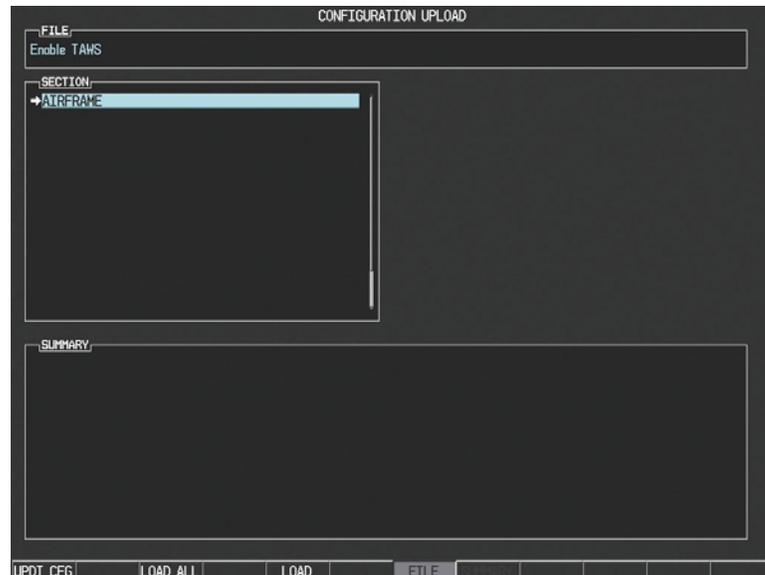
3. Press the ENT key to confirm the database update. The following prompt is displayed:

```
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. 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.

## B.6 TAWS Configuration

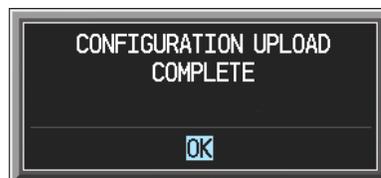
1. Insert the TAWS Enable card (010-00330-51) into the top card slot of the PFD.
2. While holding the ENT key on PFD, apply power by closing the PFD circuit breaker.
3. When the words **INITIALIZING SYSTEM** appear in the upper left corner of the PFD, release the ENT key.
4. Turn the MFD on in the same manner.



5. On the PFD go to 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 following prompt:



11. Monitor the status of the upload. When the upload is finished, press the ENT key to acknowledge the following confirmation:



- 
- View the SUMMARY field and ensure that all items are 'complete':



- De-activate the cursor.
- Cycle power to the PFD and MFD to reboot the system.
- Verify that the MAP – TERRAIN PROXIMITY page on the MFD has been renamed as the MAP – TAWS page.

**NOTE**

Due to time required for the GIA to exit configuration mode, power must be cycled to the PFD and MFD following the first bootup in normal mode (after exiting configuration mode). Failure to do so may result in an erroneous 'TAWS FAIL' message.

- Cycle power again to the PFD and MFD to reboot the system.
- Verify the unit successfully passes TAWS self test.

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## B.7 SD Card Use

### CAUTION

Use only blank SD cards to load Jeppesen Aviation Database into the GDUs. Do not copy the Jeppesen Aviation database (not including Chartview) onto 010-00330-41 or 010-00330-42 supplemental data cards to load into the GDUs. Doing so may corrupt the supplemental database cards making them unusable. Replacing corrupt cards is not covered under warranty.

### B.7.1 Jeppesen Databases

#### B.7.1.1 Aviation

The Jeppesen aviation database is updated on a 28-day cycle and is provided directly from Jeppesen. The Jeppesen aviation database may be installed from the Jeppesen supplied SD data card. After the Jeppesen aviation database is installed, the card may be removed after loading the update to each GDU.

##### Updating the Jeppesen aviation database:

1. With the G1000 System OFF, insert the SD card containing the aviation database update into the top card slot of the PFD to be updated (label of SD card facing left).
2. Turn the G1000 System ON. A prompt is displayed in the upper left corner.
3. Press the ENT key to start the database update.
4. After the update completes, the PFD starts in normal mode.
5. Turn the G1000 System OFF and remove the SD card.
6. Repeat steps 1 through 4 for the MFD. The MFD and PFD databases are now updated. Remove the SD card when finished.
7. Verify that the correct update cycle is loaded during startup of the MFD.

#### B.7.1.2 ChartView

The ChartView database is updated on a 14-day cycle and is provided directly from Jeppesen. If the ChartView database is not updated within 70 days of the expiration date, ChartView will no longer function. The ChartView database should be copied to the Garmin supplied Supplemental Data Card which will reside in the bottom card slot of the MFD.

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## **B.7.2 Other G1000 Databases**

The following G1000 databases are stored on Supplemental Data Cards provided by Garmin.

### **B.7.2.1 Terrain, Airport Terrain, and Obstacle**

G1000 topography, terrain, airport terrain, and obstacle data is stored on a Supplemental Data Card provided by Garmin. The obstacle database update cycle is every 56 days. The terrain and airport terrain database is updated less often, and on an irregular basis. Since these databases are not stored internally in the MFD or PFD, Supplemental Data Cards containing identical database versions must be kept in both displays to retain terrain and obstacle data. A Supplemental Data Card should be inserted into the bottom card slot of the PFD and MFD.

### **B.7.2.2 Expanded Basemap**

The expanded basemap database contains data for the topography and land features, such as rivers, lakes, and towns. It is updated only periodically, with no set schedule. There is no expiration date. This database is not stored internally in the MFD or PFD. Supplemental Data Cards containing identical database versions must be kept in both displays. A Supplemental Data Card should be inserted into the bottom card slot of the PFD and MFD.

### **B.7.2.3 Obstacle**

The obstacle database contains data for obstacles, such as towers, that pose a potential hazard to aircraft. Obstacles 200 feet and higher are included in the obstacle database. It is very important to note that not all obstacles are necessarily charted and therefore may not be contained in the obstacle database. This database is updated on a 56-day cycle. This database is not stored internally in the MFD or PFD. Supplemental Data Cards containing identical database versions must be kept in both displays. A Supplemental Data Card should be inserted into the bottom card slot of the PFD and MFD.

### **B.7.2.4 SafeTaxi**

The SafeTaxi database contains detailed airport diagrams for selected airports. These diagrams aid in following ground control instructions by accurately displaying the aircraft position on the map in relation to taxiways, ramps, runways, terminals, and services. This database is updated on a 56-day cycle. The SafeTaxi database should be copied to the Garmin supplied Supplemental Data Card which will reside in the bottom card slot of the MFD.

### **B.7.2.5 FliteCharts**

The FliteCharts database contains terminal procedure charts for the United States only. This database is updated on a 28-day cycle. If not updated within 180 days of the expiration date, FliteCharts will no longer be active. The FliteCharts database should be copied to the Garmin supplied Supplemental Data Card which will reside in the bottom card slot of the MFD.

### B.7.3 Updating Garmin Databases

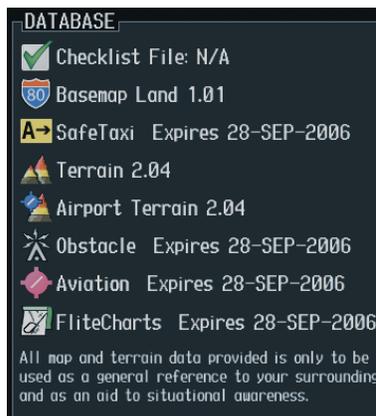
The Garmin database updates can be obtained by following the instructions detailed in the 'Aviation Databases' section of the Garmin website ([www.garmin.com](http://www.garmin.com)). Once the updated files have been downloaded from the website, a PC equipped with an appropriate SD card reader is used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

- Windows-compatible PC computer (Windows 2000 or XP recommended)
- SanDisk SD Card Reader, P/Ns SDDR-93 or SDDR-99 or equivalent card reader
- Updated database obtained from the Garmin website
- Existing 010-00330-41 and 010-00330-42 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) Apply power to the G1000 System. 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) Power down the G1000.