GARMIN

GMX 200 MAINTENANCE MANUAL

(Board-Level Repair)

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RECORD OF REVISIONS

Revision	Revision Date	Description	ECO #
A	7/11/07	Initial Release	-----

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. Do not replace components inside the equipment when potentially lethal voltages are present. Turn off system power before making or breaking electrical connections. Regard any exposed connector, terminal board, or circuit board as a possible shock hazard. Components which retain a charge shall be discharged only when such grounding does not result in equipment damage. If a test connection to energized equipment is required, make the test equipment ground connection before probing the voltage or signal to be tested.

DO NOT SERVICE ALONE

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

INFORMATION SUBJECT TO EXPORT CONTROL LAWS

This document may contain information which is subject to the Export Administration Regulations ("EAR") issued by the United States Department of Commerce (15 CFR, Chapter VII, Subchapter C) and which may not be exported, released, or disclosed to foreign nationals inside or outside of the United States without first obtaining an export license. A violation of the EAR may be subject to a penalty of up to 10 years imprisonment and a fine of up to US $1,000,000 under Section 2410 of the Export Administration Act of 1979. Include this notice with any reproduced portion of this document.

WARNING

This product, its packaging, and its components contain chemicals known to the State of California to cause cancer, birth defects, or reproductive harm. This Notice is being provided in accordance with California's Proposition 65. If you have any questions or would like additional information, please refer to our web site at www.garmin.com/prop65.

NOTE

The GMX 200 lens is coated with a special anti-reflective coating that is very sensitive to skin oils, waxes and abrasive cleaners. CLEANERS CONTAINING AMMONIA WILL HARM THE ANTI-REFLECTIVE COATING. It is very important to clean the lens using a clean, lint-free cloth and an eyeglass lens cleaner that is specified as safe for anti-reflective coatings.

NOTE

Repair centers operated by Garmin Ltd. or its subsidiaries are authorized to perform component-level repairs (consistent with individual repair center's capabilities) to Garmin products. Repair centers operated by Garmin Ltd. or its subsidiaries are authorized to use Garmin proprietary documentation as references during any component-level repairs performed.

NOTE

The GMX 200 contains static sensitive devices. Proper precautions must be taken to prevent damage to the unit caused by ESD. Troubleshooting, testing, assembly and disassembly should only be performed at an approved ESD workstation.

GMX 200 HARDWARE MOD LEVEL HISTORY

The following table identifies hardware modification levels for the GMX 200. In the table, Mod Levels are listed with the associated service bulletin number, service bulletin date, and the purpose of the modification. The table is current at the time of publication of this manual (see date on front cover) and is subject to change without notice. Authorized Garmin Sales and Service Centers are encouraged to access the most up-to-date bulletin and advisory information on the Garmin Dealer Resource web site at www.garmin.com using their Garmin-provided user name and password.

Mod Level	Service Bulletin Number	Service Bulletin Date	Purpose of Modification
1	0627	November 21, 2006	Minor color changes to the display and hardware change to address unit resets

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SECTION 1
INTRODUCTION

This manual provides board-level maintenance information for all models of the Garmin GMX 200 Multi Function Display (MFD).

1.1 SCOPE

This Maintenance Manual is written for field shops not equipped with Garmin ATE (Automated Test Equipment) and not having Garmin proprietary documentation as references. Component level repair is outside of the scope of this document. When any troubleshooting, testing, or repair falls outside the scope of the information found in this manual, the unit needs to be sent to Garmin for repair (see Paragraph 1.3).

1.2 FIELD SHOP REPAIR

Due to extensive calibration requirements, Garmin recommends limiting field repair to replacing the assemblies listed below. To assist in identifying these replaceable parts, a complete Illustrated Parts List is provided in Section 6. Repairing a GMX 200 consists of removing and replacing the following:

- Main Board (P/N 011-00996-00)
- I/O Board (for all six models; P/N 011-01007-00)
- SD Card Board (P/N 019-01000-00)
- Display Head Assembly (P/N 011-01280-00; Black) (-10; Gray)
- Cooling Fans (P/N 371-00004-01)
- Faceplate (P/N 145-00858-XX)
- Keypads (P/N 414-00100-00, overlay vertical and P/N 414-00101-00, overlay horizontal)
- CompactFlash™ Card(s) (P/Ns 011-01549-FA, 011-01550-FA, 011-01551-FA, 011-01552-FA)

All repairs can be made at the bench with the appropriate replacement spare. Faulty assemblies listed above, or a complete unit can be returned to Garmin for repair. After a unit has been repaired at the bench, it must be tested before being returned to service (Section 5). For information pertaining to spares stocking (suggested quantities, etc.) contact:

Garmin International, Inc.
1200 E. 151st Street
Olathe, Kansas 66062 U.S.A.
orders@avionics.com

1.3 FACTORY REPAIR

When failures of assemblies not listed in this manual occur, the unit must be sent back to the factory for service. A Return Merchandise Authorization (RMA) number must be requested from Garmin before product is returned. Product returned without an RMA will be refused and returned at the expense of the service center or distributor. Products with RMA numbers assigned may be sent to the following address:

Garmin International, Inc.
Factory Repair
1200 E. 151st St.
RMA Number: _____
Dock Door #1
Olathe, KS 66062

1.4 WARRANTY INFORMATION

Warranty statements and claims, product registration, and detailed return for repair information is covered in detail in the document titled "Aviation Warranty Policies and Procedures" (P/N M02-60069-00) available from Garmin.

SECTION 2
UNIT DESCRIPTION

The GMX 200 is a Multi-Function Display (MFD) capable of displaying moving maps, terrain awareness, obstructions, VFR/IFR charting functions, and weather information. When used in conjunction with the Garmin GDL 69A, the GMX 200 also provides audio entertainment. The GMX 200 can also serve as a control and display interface to the Garmin GWX 68 Airborne Weather Radar.

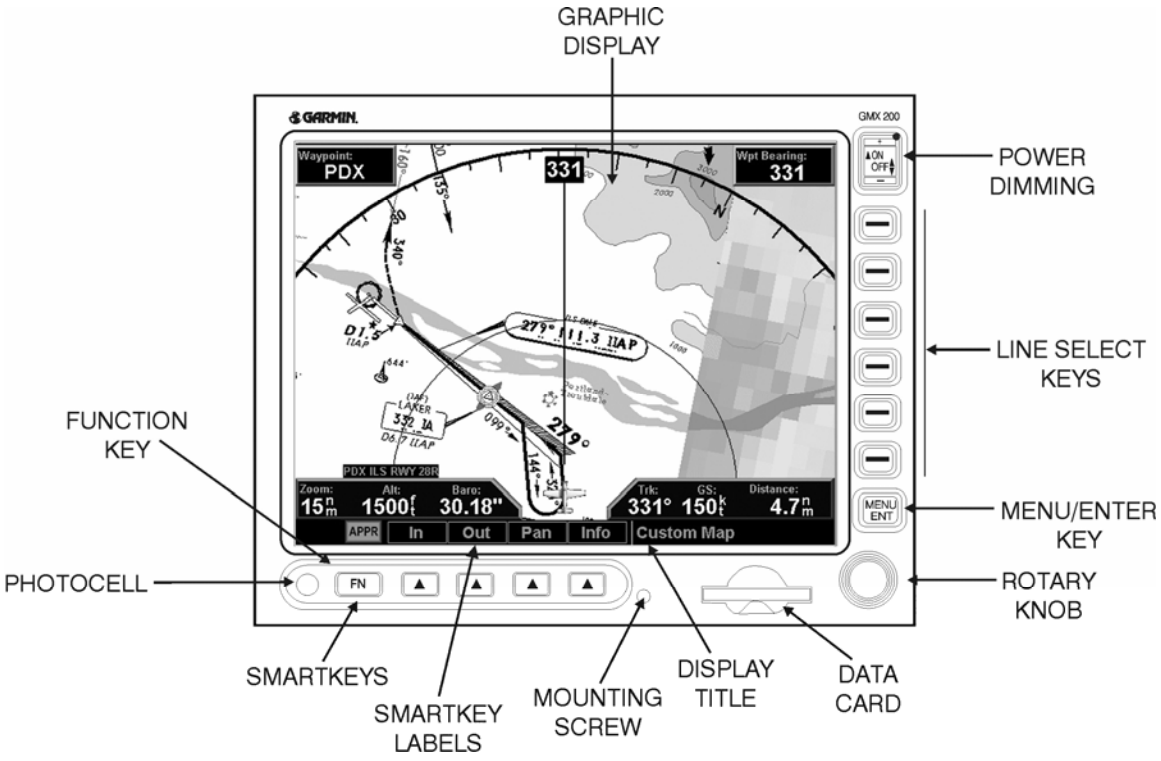


Figure 2-1. GMX 200 Front Bezel

The GMX 200 includes two model groups: the standard and I/O models, listed in Table 2-1. The GMX 200 I/O models include additional interface capabilities that allow the connection of a weather radar sensor, TAWS sensor, ARINC 429 traffic sensor, Ryan TCAD (RS-232 interface) and a Garmin GTX 330 Mode S Transponder (for TIS). A Secure Digital (SD) card stores NAV data and the obstacle database. An internal CompactFlash™ Card stores the application software, terrain and hydrography, boundaries, and roads (base map) databases.

Model Name	Part Number	Bezel Color
GMX 200	011-01271-00	Black
GMX 200	011-01271-10	Gray
GMX 200 I/O Traffic	011-01465-00	Black
GMX 200 I/O Traffic	011-01465-10	Gray
GMX 200 I/O Radar/TAWS	011-01466-00	Black
GMX 200 I/O Radar/TAWS	011-01466-10	Gray
GMX 200 I/O Traffic/Radar	011-01467-00	Black
GMX 200 I/O Traffic/Radar	011-01467-10	Gray

Table 2-1. GMX 200 Model Names and Part Numbers

The six I/O models all use the same hardware and are differentiated by "feature enable" file(s) (one for traffic, one for radar/TAWS) on the internal CF card. The same operating system and application software are used on all eight models. The GMX 200 supports enabling or disabling certain features through settings in the configuration module (e.g., functions, port assignments).

2.1 BLOCK DIAGRAM

Figure 2-2 shows the functional block diagram for the GMX 200 (CPU Board is the Main Board).

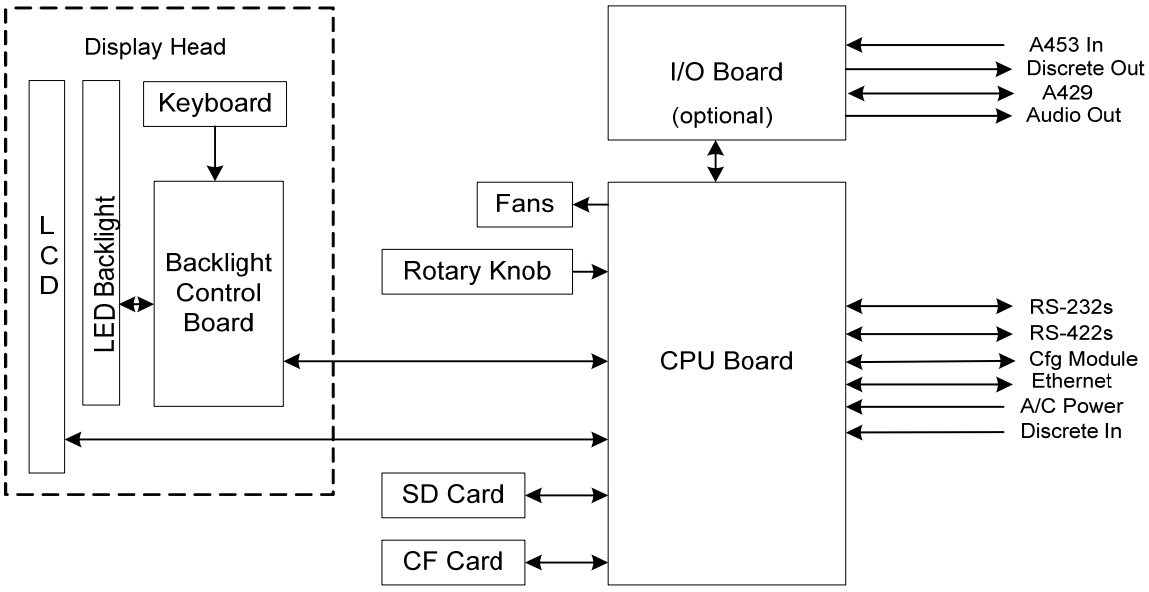


Figure 2-2. GMX 200 Block Diagram

- **Main (CPU) Board**: The main board containing primary CPU, memory, and graphics controller.

- **I/O Board:** Optional board that contains avionics interfaces such as ARINC 429, etc.

- **Display Head:** This contains the LCD display, backlight system, keypad interface, and the CPU power control. All of the display head control functions are performed by a Philips LPC213x Microcontroller. There is no LCD graphics hardware on the display board. The graphics processor is located on the Pentium board and the data signals to the LCD display are connected directly to the LCD.

NOTE

The backlight used to illuminate the display is achieved by coordination of the photocell on the Keyboard, the LED Board, and the Display Board. Red, green, and blue LEDs and the control circuitry are used to generate a white backlight. In order to maintain the desired white, the Display Head is calibrated at the factory. Any alteration to the Display Head such as moving the Display Board, replacing the Display Board, replacing the LCD Flex Cable, adjusting the Shroud over the LEDs, or other mechanical adjustments invalidates the Display Head's calibration. If any of these events occur, the Display Head must be returned to the factory for re-calibration. The only repair that can be made to the Display Head is the replacement of the cosmetic Faceplate and Keypads.

2.2 PERIODIC MAINTENANCE

The GMX 200 does not require any regular maintenance.

2.3 INTERFACE DESCRIPTION

Detailed interface information for the GMX 200 is found in the Installation Manual (190-00607-04). Figure 2-3 shows the basic interface capability of the unit.

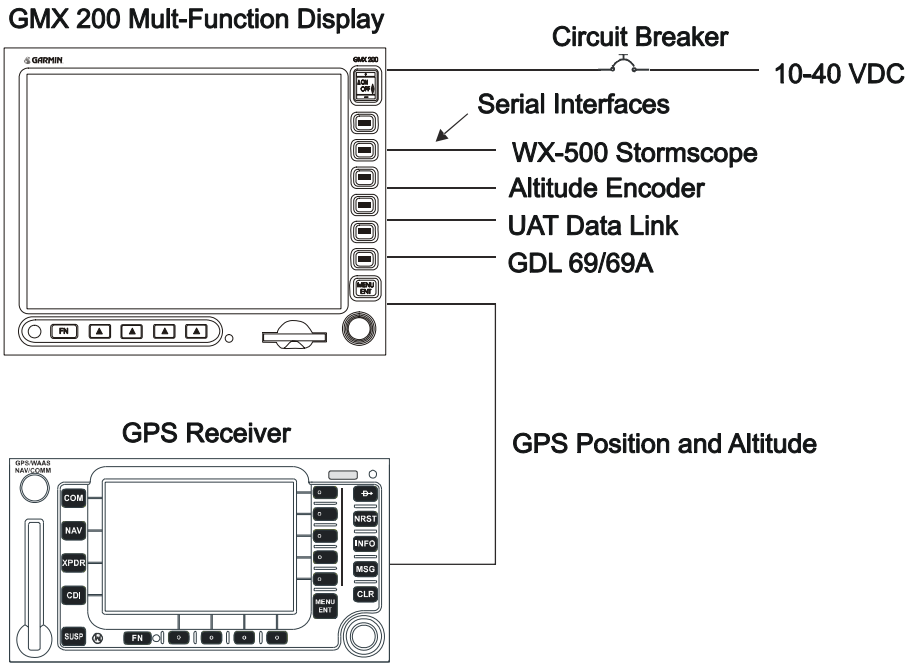


Figure 2-3. GMX 200 Interface Capability

2.4 SPECIFICATIONS

Complete specifications for the GMX 200 are listed in the GMX 200 Installation Manual (P/N 190-00607-04) and are not duplicated here. Environmental qualifications are listed in the Environmental Qualification Form (P/N 005-00315-20).

SECTION 3
TESTING AND TROUBLESHOOTING

This section tells how to troubleshoot/test the GMX 200 in order to isolate a faulty, replaceable assembly listed below:

- Main Board
- I/O Board
- SD Card Board
- Display Head Assembly
- Cooling Fans
- Faceplate (cosmetic only)
- Keypads
- CompactFlash™ Card

The tests listed in this section serve as troubleshooting procedures. Section 5 contains the return to service procedures.

3.1 SERVICE BULLETINS

Service Bulletins may be issued for the GMX 200 for either software or hardware changes. The Service Bulletin will indicate if the change can be made in the field or if the unit must be returned to Garmin. The service technician is responsible for checking all service bulletins issued against the GMX 200 model being repaired. Refer to the table located on page ii for the Service Bulletin List. The service center can also view all GMX 200 Service Bulletins on the Garmin Website ("Dealers Only" link).

3.2 HARDWARE AND SOFTWARE ENHANCEMENTS

Check for the proper version of installed software. The hardware must be checked and verified for each GMX 200 being repaired.

3.3 REQUIRED EQUIPMENT

The test equipment found in a standard avionics repair shop can be used to repair the GMX 200. Any special equipment, cables, or test panels used to test the unit are designed and fabricated by the field shop.

3.4 STANDARDS AND TOLERANCES

All specification tolerances and load impedances are understood to be ±5% unless otherwise specified.

3.4.1 Standard Input Voltage

During testing, the GMX 200 must be powered with an input voltage of +28VDC ± 1VDC unless otherwise specified (see paragraph 3.6.2).

3.4.2 Standard Loads

- RS-232 Outputs:
  One standard load for RS 232 outputs is 3KΩ in parallel with 10 nF.

- RS-422 Output:
  One standard load for the RS-422 output is 100 ohms in parallel with 4.7 nF.

3.5 TEST POINTS

Figures 3-1 and 3-2 show all of the test points listed in this section to aid in troubleshooting and testing. Although the test points are used in an automated process at the factory to test individual boards during production, there is enough surface space (in most cases) to allow for the placement of multimeter leads and oscilloscope probes.

Some disassembly may be necessary in order to access certain test points (see Section 4). Extender Boards or Extender Cables may be created by the field shop in order for the boards to be removed in order to access certain test points. In addition to the test points used for testing, there are a number of visual tests which are described in this section.

3.6 TEST SETUP

Specific test setups are the responsibility of the field shop. Rear connector drawings and pinout lists are provided in this section to aid in creating the test setup. The minimum setup consists of a power supply and harness with power and ground and the configuration module.

3.6.1 Configuration Module

The GMX 200 stores installation-specific configuration information in an Aircraft Configuration Module (located in the backshell of P2001 as part of installation). This eliminates the need to set up aircraft specific configuration items again when a new GMX 200 is installed. A Configuration Module (order kit part number 011-00979-02) must be installed in the test harness as part of the test setup. Detailed information regarding the Configuration Module (including pinout information) is described in the GMX 200 Installation Manual, P/N 190-00607-04.

3.6.2 Input Power

The GMX 200 will accept input power from 9 to 33 VDC. Both sets of power inputs must be connected (see paragraph 3.14.1 for connector pinout information) .

- J2001-1 Aircraft Power
- J2001-16 Aircraft Power
- J2001-2 Power Ground
- J2001-12 Power Ground

3.7 MAIN BOARD TESTS (Figure 3-2)

3.7.1 Power Indicator LEDs

Visually check that all five power LEDs are lit (Marked +PS_BL, +5V, 3.3V, VTT, VRM).

- Verify that all power LEDs are lit to indicate power supply operation.

Pass/Fail	

3.7.2 Status LEDs

D1400 (Power Good): Should be lit.

Pass/Fail	

D1000 (Boot Status): This LED will flash during boot and then go steady if the memory test passed. This takes about 10 seconds.

Pass/Fail	

D1402, D1403: These LEDs should start flashing the following pattern after about 2 seconds following power up: Both on – one on – both on.

Pass/Fail	

3.7.3 Board Current Draw

Do not perform this test at the unit level. Perform this test only at the board level. Measure the board current draw with 28VDC input with the display head disconnected. This may be done by disconnecting the ribbon cable between the Main Board (J1902) and the Display Head and removing the I/O board if present. The current should be measured after 10 seconds when the board software has booted and the current has stabilized.

- The typical current draw is 400mA with 28VDC input. It should fall between 300 and 500mA.

Pass/Fail	

3.7.4 Ramp Generator Frequency

Measure on I1700 pin 2. If it is measured on TP1702 (RAMP), the probe will add additional capacitance that will shift the frequency down.

- Verify a frequency of 290 kHz ± 30 kHz.

Pass/Fail	

3.7.5 Internal Power Supplies

Measure the DC voltages at the indicated test points. *I1706 pin 4 must be grounded to disable the +12V boost supply when measuring this voltage.

Voltage	Test Point	Nominal Voltage	Tolerance
+1.10V_VCORE	TP1803	1.100 VDC	± 0.015 VDC
+1.25V_VTT	TP1802	1.250 VDC	± 0.050 VDC
+1.5V_VCMOS	TP1804	1.500 VDC	± 0.050 VDC
+1.8V	TP1801	1.820 VDC	± 0.050 VDC
+2.5V	TP1805	2.500 VDC	± 0.125 VDC
+3.3V	TP1800	3.330 VDC	± 0.100 VDC
+5V	TP1707	5.000 VDC	± 0.150 VDC
+12V_PS	TP1705	12.410 VDC	± 0.250 VDC
+12V_PS	TP1705	*10.810 VDC	± 0.250 VDC
+12V_BL	TP1700	12.05 VDC	± 0.50 VDC
+23.5V	TP1708	+23.500V_PS	± 1.500 VDC
+32V	TP1706	+32.610 VDC	± 1.500 VDC

*I1706 pin 4 must be grounded to disable the +12V boost supply measuring +12V_PS.

Pass/Fail	

3.7.6 +5V Power Supply Current Limit

Add an additional load of 2.5A to +5V output (TP1707) and monitor the voltage.

- Verify that it maintains +5.00V ± 0.15V DC.

Pass/Fail	

Add an additional load of 4.5A to +5V output (TP1707) and monitor the voltage.

- Verify that the voltage drops below regulation with the additional 4.5A load.

Pass/Fail	

3.7.7 +3.3V Power Supply Current Limit

Add an additional load of 1A to +3.3V output (TP1800) and monitor the voltage.

- Verify that it maintains +3.30V ± 0.10V DC.

Pass/Fail	

Add an additional load of 3A to +3.3V output (TP1800) and monitor the voltage.

- Verify that the voltage drops below regulation with the additional 3A load.

Pass/Fail	

3.7.8 +1.8V Power Supply Current Limit

Add an additional load of 1A to +1.8V output (TP1801) and monitor the voltage.

- Verify that it maintains +1.800V ± 0.050V DC.

Pass/Fail	

Add an additional load of 3A to +1.8V output (TP1801) and monitor the voltage.

- Verify that the voltage drops below regulation with the additional 3A load.

Pass/Fail	

3.7.9 +1.10V_VCORE Power Supply Current

Add an additional load of 3A to VCORE output (TP1803) and monitor the voltage.

- Verify that it maintains +1.10V_VCORE ± 0.10V DC. Do not short to test upper limit.

Pass/Fail	

3.7.10 +12V_BL Power Supply Current Limit

Add an additional 2.5A load to +12V_BL output (TP1700) and monitor the voltage.

- Verfiy that it maintains +12.05V ± 0.50V DC.

Pass/Fail	

Add an additional load of 4A to +12V_BL output (TP1700) and monitor the voltage.

- Verify that it drops below regulation with an additional 4A load.

Pass/Fail	

3.7.11 Low Voltage Operation

Start at the nominal input voltage (28VDC) and lower it to 6.5VDC.

- Verify that the +5V supply stays within regulation. The backlight voltage (+12V_BL) will go out of regulation when the input voltage is below 12V. Maintain operation at an input voltage of 6.5 VDC.

Pass/Fail	

3.7.12 Power Fail Interrupt Detector

Decrease unit input voltage to 8.5 VDC.

- Verify that I1700-14 is low (≤ 0.5 VDC). Power Fail signal is low (≤ 0.5 VDC) when the unit input voltage is 8.5 VDC.

Pass/Fail	

Decrease unit input voltage to 7.0 VDC.

- Verify that I1700-14 goes high (≥ 2.5 VDC). Power Fail signal is high (≥ 2.5 VDC) when the unit input voltage is 7.0 VDC.

Pass/Fail	

3.7.13 Boost Supply Disable

Decrease unit input voltage to 8.5 VDC.

- Verify that I1700-1 is high (≥ 2.5 VDC). ~BOOST_DISABLE is high (≥ 2.5 VDC) when the unit input voltage is 8.5 VDC.

Pass/Fail	

- Verify that I1700-1 goes low (≤ 0.5 VDC). Decrease unit input voltage to 7.0 VDC. ~BOOST_DISABLE is low (≤ 0.5 VDC) when the unit input voltage is 7.0 VDC.

Pass/Fail	

3.7.14 25MHz Ethernet Controller Clock

Measure frequency and duty cycle on 25MHz CLK test point (A1502).

- Verify a Frequency of 25MHz ± 1250 Hz and a duty cycle of 45 to 55%.

Pass/Fail	

3.7.15 Power Holdup

Decrease unit input voltage to 10.0 ± 0.1VDC. Monitor the +5V supply.

- Verify that at 10.0 VDC input, the +5V power supply stays within regulation for a minimum of 200ms when the input power is removed.

Pass/Fail	

3.8 I/O BOARD TESTS (Figure 3-3)

3.8.1 Power Indicators

Apply power to the unit.

- Verify that Power Indicator LEDs (D21, D25, D26, D27) are lit to indicate power supply operation

Pass/Fail	

3.8.2 +5 Volt Current Draw

Apply +5 +/- 0.1V to J7, pin +5V_B3(35). Ground J7, GNC_B1(33). Measure the current draw.

- Verify that the +5 Volt current draw does not exceed 320 mA.

Pass/Fail	

3.8.3 +5 Volt Input Supply Voltage

Measure the voltage between the +5V and GND1/GND2 test points.

- Verify that the +5 Volt input supply voltage is +5.0 +/-0.1V.

Pass/Fail	

3.8.4 +3.3 Volt Supply Voltage

Measure the voltage between the +3_V and GND1/GND2 test points.

- Verify that the +3.3 Volt input supply voltage is +3.30 +/-0.07V.

Pass/Fail	

3.8.5 +12 Volt Supply Voltage

Measure the voltage between the +12V and GND1/GND2 test points.

- Verify that the +12 Volt input supply voltage is +12.00 +/-0.36V.

Pass/Fail	

3.8.6 -12 Volt Supply Voltage

Measure the voltage between the -12V and GND1/GND2 test points.

- Verify that the -12 Volt input supply voltage is -12.00 +/-0.36V.

Pass/Fail	

3.8.7 4.096 Volt Reference Voltage

Measure the voltage between the VREF_4V1 and GND1/GND2 test points.

- Verify that the 4.096 Volt reference voltage is +4.096 +/-0.016V.

Pass/Fail	

3.8.8 20MHz Oscillator Frequency

Measure the oscillator frequency at Y1, pin 3 with a high impedance probe.

- Verify that the 20MHZ oscillator frequency is 20MHz +/-3KHz.

Pass/Fail	

3.8.9 Watchdog Functionality

Ground I44, pin 6 for more than 1.6 seconds.

- Verify the FPGAs have initiated or completed a configuration cycle. This may be done by verifying the Init_Done pin on either FPGA (I26, pin 94 or I27, pin 94).

Pass/Fail	

- Verify that the FPGAs start the reconfiguration cycle when I44, pin 6 is grounded for more than 1.6 seconds.

Pass/Fail	

3.8.10 +8.2 Volt Reference Voltage

Measure the voltage between U21, pin 1 and the GND1/GND2 test point.

- Verify that the +8.2 Volt reference voltage is +8.192 +/-0.116V.

Pass/Fail	

3.8.11 Power Supply Interrupt Detector

Apply 28V to J1, pin 51 (AV_PWR), then lower the voltage to 21.2V.

- Verify IRQ 10 remains low. Verify that the I/O board detects the loss of external aircraft power (28V).

Pass/Fail	

Lower the voltage to 17.0V.

- Verify that the IRQ 10 goes high.

If the board is being tested as standalone device, a 10K pull-up resistor on the output of U6, pin 14 to 5V is required to test this circuit.

Pass/Fail	

3.8.12 Low Voltage Reset Circuit

Apply 5V to +5V_B3 (35), then lower the voltage to 4.5V.

- Verfiy that the low voltage (<5V) causes the I/O board to reset.

Pass/Fail	

Apply +8V to Discrete_in_4, Discrete_in_5, Discrete_in_6, Discrete_in_7, and Discrete_in_8.

- Measure the voltage at nets Disc4_TTL, Disc5_TTL, Disc6_TTL, Disc7_TTL, and Disc8_TTL.

Pass/Fail	

3.8.13 Discrete Outputs

Toggle the discrete outputs.

DISCRETE_0_OUT	J1, pin 43	Ground/Open Circuit
DISCRETE_1_OUT	J1, pin 18	Ground/Open Circuit
DISCRETE_2_OUT	J1, pin 58	Ground/Open Circuit

- Verify that each output is toggled.

Pass/Fail	

3.9 SD CARD TEST

The SD Card Board is visually tested at the board level. Do not remove or replace the SD Card board until its failure has been verified. The probability of this board failing is very low due to the component count and technology (all passive components). The amount of work to remove or replace this board is quite large (all boards must be removed from the chassis to gain access).

To troubleshoot this board at the unit level, insert a known good SD Card into the SD Card slot and power up the unit. If the unit fails to boot up in the normal amount of time (approximately 35 – 40 seconds) or checks for the navigation or obstacle databases fail, the board is considered failed.

Pass/Fail	

3.10 DISPLAY HEAD ASSEMBLY TESTS

No tests (except the visual tests listed below) exist for the Display Head Assembly. Replace the Display Head Assembly if any of the following visual tests fail.

- Verify proper backlighting brightness.
- Verify proper photocell operation.
- Verify proper keyboard backing brightness.
- Verify proper display head keyboard operation.
- Verify stuck pixel presence.
- Verify LCD operation.

Pass/Fail	

3.11 COOLING FAN TEST

Turn both fans on. Obtain the RPM value for both fans. Values may be obtained by accessing the SYS/HW INFO Page.

- Verify that the fans turn at a rate between 7,500 RPM and 9,000 RPM under ambient conditions of temperature and air pressure.

Pass/Fail	

3.12 FACEPLATE

There are no tests for the Faceplate. Visually inspect the faceplate for cosmetic defects or damage.

Pass/Fail	

- Replace the Faceplate to repair cosmetic defects.

3.13 CF CARD TEST

1. Insert a known good SD Card into the database slot on the front of the unit.
2. Turn the unit on. If the unit boots to Start-up Screen, the CF is working properly, If the unit does not boot up properly, it may be due to a faulty CF Card, Main Board or SD Card Board. It is more probable to have a faulty Main Board than a faulty CF Card or SD Card Board.
3. To determine if the CF Card is faulty, insert it into a known good unit.
4. Turn the unit on and check to see if it boots to the startup screen.

Pass/Fail	

3.14 KEYBOARD TEST

1. Press each Select Key along the bottom and verify unit responds.
2. Press FN and MAP keys to display MAP function. Press the MENU/ENT Key followed by each of the Menu Option (vertical) Keys and verify unit responds.
    - Keyboard failure requires the replacement of the Display Head Assembly.

Pass/Fail	

3.15 ROTARY ENCODER TEST

1. Display the MAP Page and rotate the encoder in both directions. Zoom scale should increase and decrease.

2. Press Rotary Encoder Pushbutton. PAN function should activate/deactivate with each press.

    - Encoder failure requires the replacement of the Display Head Assembly.

Pass/Fail	

3.16 KEYPADS

There are no tests for the Keypads. Visually inspect for cosmetic defects or damage. Replace keypads to repair cosmetic defect or damage.

Pass/Fail	

3.17 REAR CONNECTOR DRAWINGS (J2001, J2002)

Connector drawings with pinouts are provided in this section to help perform test and troubleshooting procedures.

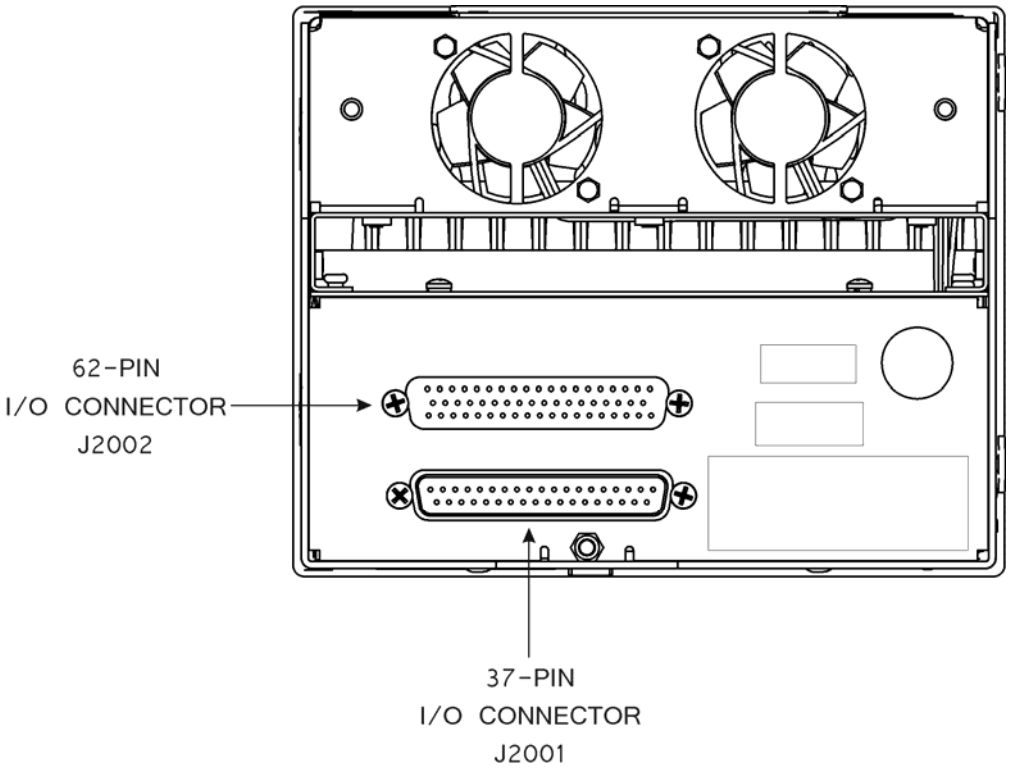
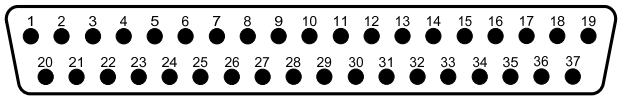


Figure 3-1. Rear Connector Location

3.17.1 Pin Out List – J2001

View of J2001 connector from back of unit:

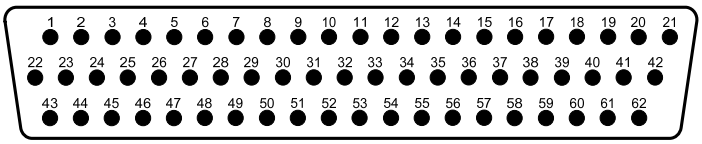


Pin #	I/O	Pin Name	Description
1	I	AIRCRAFT POWER	Main Aircraft Power Input (+10 to +30 VDC)
2	I	AIRCRAFT GROUND	Main Aircraft Power Ground
3	I	SERIAL GROUND 2	RS232 Signal Ground
4	I	RS232 IN 1	RS232 port 1 serial data input
5	O	RS232 OUT 1	RS232 port 1 serial data output
6	O	RS232 OUT 3	RS232 port 3 serial data output
7	I	RS232 IN 3	RS232 port 3 serial data output
8	O	RS422 OUT 4 +	RS422 port 4 data out + (when enabled)
9	O	PORT 4 CONFIG HI (+5VDC)	For configuring port 4 as RS232 or RS422
10	O	RS422 OUT 4 -	RS422 port 4 data out - (when enabled)
11	I	RS422 IN 4 +	RS422 port 4 data in + (when enabled)
12	I	AIRCRAFT GROUND	Main Aircraft Power Ground
13	-	RESERVED	Do not connect
14	-	RESERVED	Do not connect
15	-	RESERVED	Do not connect
16	I	AIRCRAFT POWER	Main Aircraft Power Input (+10 to +30 VDC)
17	O	CONFIG MOD CLK	Configuration module clock
18	I	RS232 IN 5	RS232 port 5 serial data input
19	I/O	CONFIG MOD DATA	Configuration module data
20	I	PORT 4 CONFIG LO (GND)	For configuring port 4 as RS232 or RS422
21	I	RS232 IN 2	RS232 port 2 serial data input
22	O	RS232 OUT 2	RS232 port 2 serial data output
23	I	SERIAL GROUND 1	RS232 signal ground
24	O	CONFIG MOD PWR OUT	Configuration module power
25	I	SERIAL GROUND 3	RS232 Signal Ground
26	I	RS422 IN 4 -	RS422 port 4 data in - (when enabled)
27	O	CONFIG MOD GND	Configuration module ground
28	I	RS232 OUT 4	RS232 port 4 data output (when enabled)
29	I	RS232 IN 4	RS232 port 4 data input (when enabled)
30	-	RESERVED	Do not connect
31	-	RESERVED	Do not connect
32	-	RESERVED	Do not connect
33	-	RESERVED	Do not connect
34	-	RESERVED	Do not connect
35	O	RS232 OUT 5	RS232 port 5 serial data output
36	-	RESERVED	Do not connect
37	I	SERIAL GROUND 4/5	RS232 signal ground

Table 3-1. Pin Out List – J2001

3.17.2 Pin Out List – J2002

View of J1 connector from back of unit:



Pin #	I/O	Pin Name	Description
1	-	RESERVED	Do not connect
2	-	RESERVED	Do not connect
3	-	RESERVED	Do not connect
4	-	RESERVED	Do not connect
5	O	DISCRETE OUT 1	Discrete Out 1 *(Weather Radar)*
6	O	DISCRETE OUT 2	Discrete Out 2 *(Traffic)*
7	O	DISCRETE OUT 3	Discrete Out 3 *(Traffic)*
8	I	RESERVED	Do not connect
9	-	RESERVED	Do not connect
10	-	RESERVED	Do not connect
11	-	RESERVED	Do not connect
12	-	RESERVED	Do not connect
13	-	RESERVED	Do not connect
14	-	RESERVED	Do not connect
15	-	RESERVED	Do not connect
16	-	RESERVED	Do not connect
17	O	429 OUT 1B	ARINC 429 Output 1B *(TAWS)*
18	O	429 OUT 1A	ARINC 429 Output 1A *(TAWS)*
19	I	453/708 IN 1B	ARINC 453/708 Input 1B *(Weather Radar)*
20	I	RESERVED	Do not connect
21	I	453/708 IN 2A	ARINC 453/708 Input 2A *(TAWS)*
22	-	RESERVED	Do not connect
23	-	RESERVED	Do not connect
24	-	RESERVED	Do not connect
25	-	RESERVED	Do not connect
26	-	RESERVED	Do not connect
27	-	RESERVED	Do not connect
28	-	RESERVED	Do not connect
29	-	RESERVED	Do not connect
30	-	RESERVED	Do not connect
31	-	RESERVED	Do not connect
32	-	RESERVED	Do not connect
33	-	RESERVED	Do not connect
34	-	RESERVED	Do not connect
35	-	RESERVED	Do not connect
36	-	RESERVED	Do not connect
37	-	RESERVED	Do not connect
38	-	RESERVED	Do not connect

39	-	RESERVED	Do not connect
40	I	453/708 IN 1A	ARINC 452/708 Input 1A *(Weather Radar)*
41	-	RESERVED	Do not connect
42	I	453/708 IN 2B	ARINC 453/708 Input 2B *(TAWS)*
43	-	RESERVED	Do not connect
44	-	RESERVED	Do not connect
45	-	RESERVED	Do not connect
46	-	RESERVED	Do not connect
47	-	RESERVED	Do not connect
48	-	RESERVED	Do not connect
49	-	RESERVED	Do not connect
50	-	RESERVED	Do not connect
51	-	RESERVED	Do not connect
52	O	429 OUT 2A	ARINC 429 Output 2A *(Weather Radar)*
53	O	429 OUT 2B	ARINC 429 Output 2B *(Weather Radar)*
54	-	RESERVED	Do not connect
55	-	RESERVED	Do not connect
56	-	RESERVED	Do not connect
57	-	RESERVED	Do not connect
58	I	429 IN 1B	ARINC 429 Input 1B *(Traffic)*
59	I	429 IN 1A	ARINC 429 Input 1A *(Traffic)*
60	-	RESERVED	Do not connect
61	I	429 IN 2A	ARINC 429 Input 2A *(TAWS)*
62	I	429 IN 2B	ARINC 429 Input 2B *(TAWS)*

Table 3-2. Pin Out List – J2002

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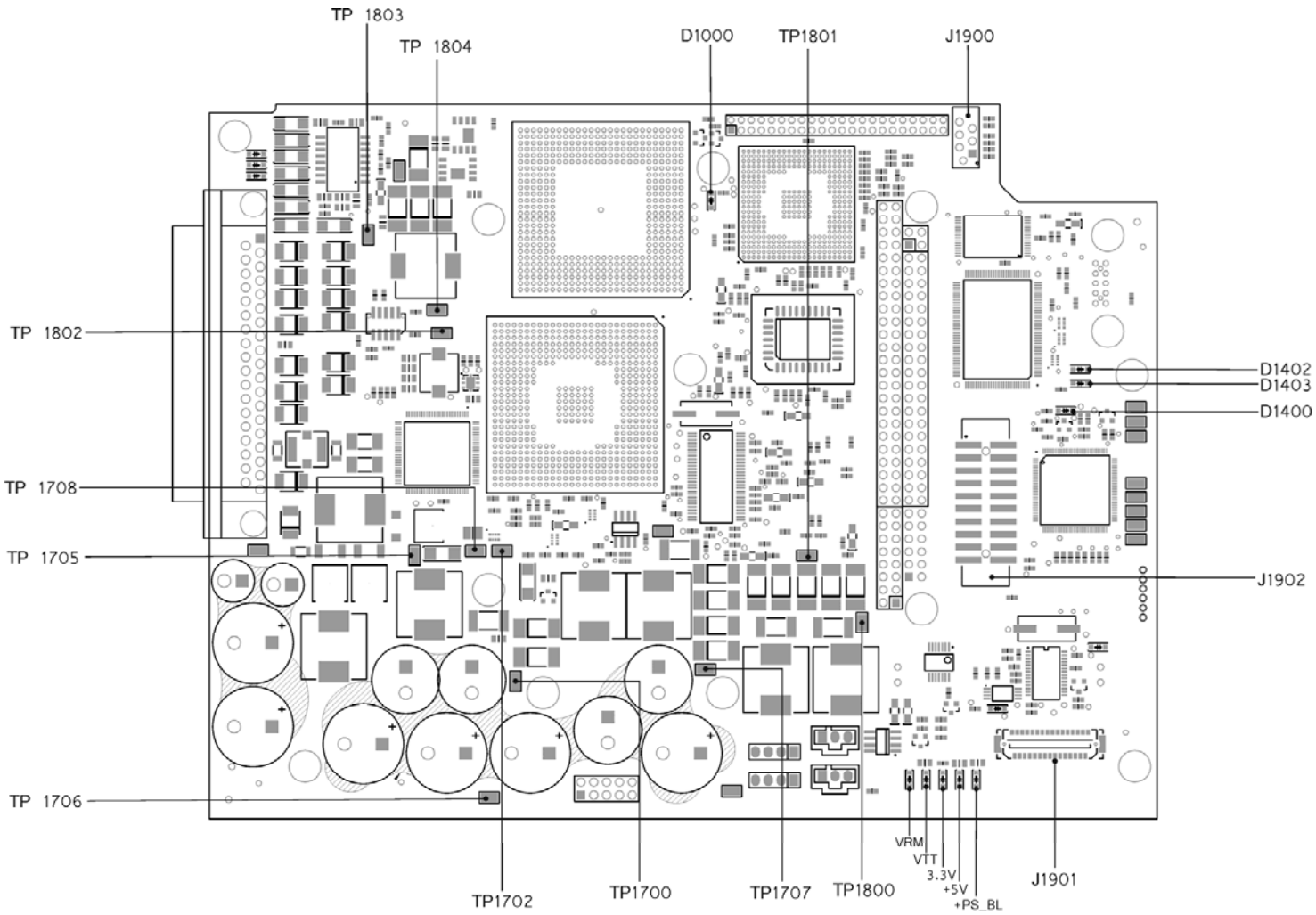

Figure 3-2. Main Board Test Points (Top Side View)

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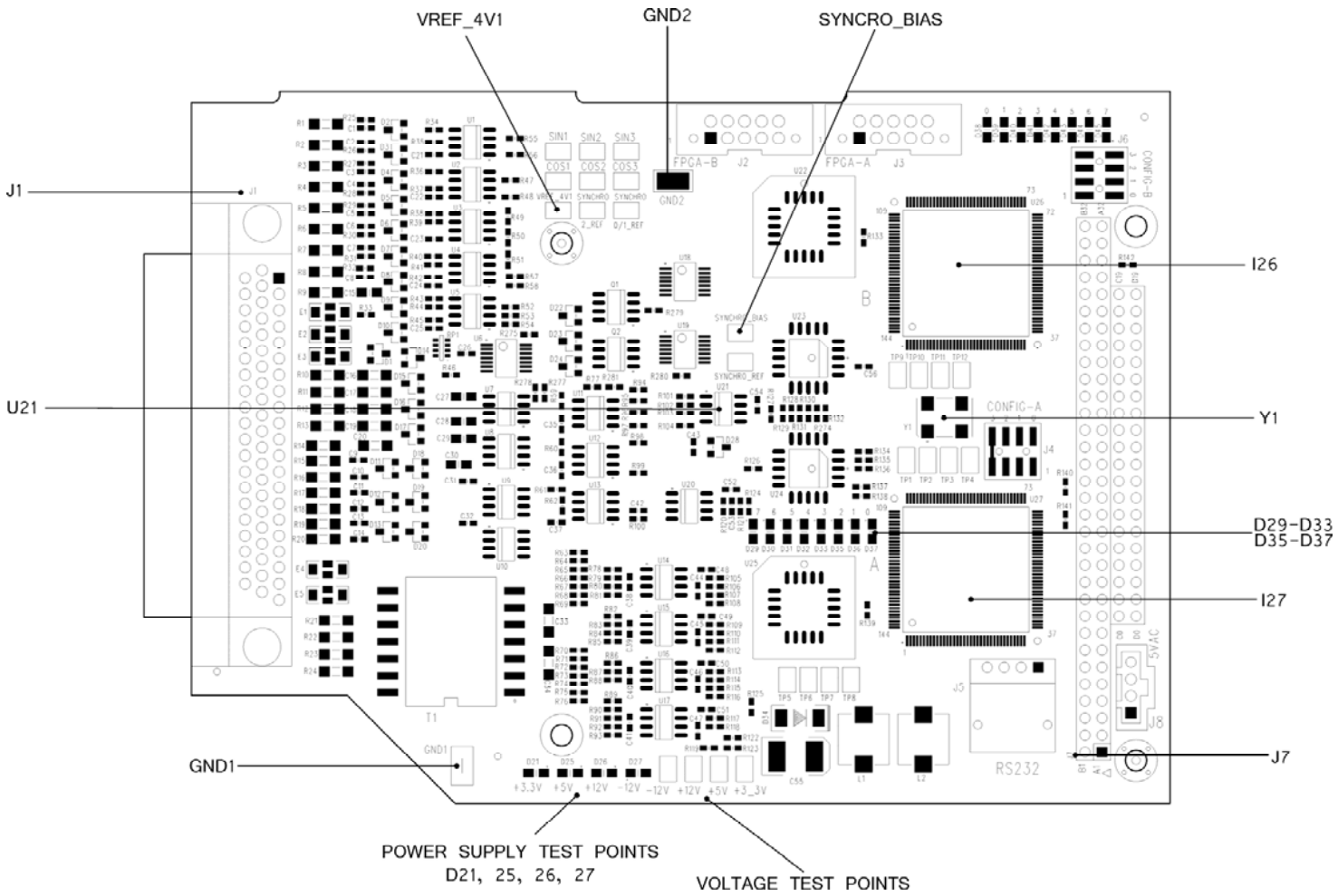

Figure 3-3. I/O Board Test Points (Top Side View)

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SECTION 4
DISASSEMBLY AND ASSEMBLY

Use the procedures in this section to remove and replace faulty parts from the GMX 200. References to figure and item numbers in the Illustrated Parts List (IPL) in Section 6 will aid in disassembly and assembly. Before disassembly, use the test procedures given in Section 3 to identify the faulty part. Disassemble only to the extent necessary to remove the following:

- Main Board (P/N 011-00996-00)
- I/O Board (for all six models; P/N 011-01007-00)
- SD Card Board (P/N 019-01000-00)
- Display Head Assembly (P/N 011-01280-00)
- Cooling Fans (P/N 371-00004-01)
- Faceplate (P/N 145-00858-XX)
- Keypads (P/N 414-00100-00, overlay vertical and P/N 414-00101-00, overlay horizontal)
- CompactFlash™ Card(s) (P/Ns 011-01549-FA, 011-01550-FA, 011-01551-FA, 011-01552-FA)

4.1 TOOLS

Standard avionics shop tools are used to remove and replace faulty parts.

4.2 INSPECTION

Inspection can reveal faults even before troubleshooting and can prevent unnecessary time spent in fault isolation. Perform the following procedure to inspect a fully assembled GMX 200:

1. Verify that all screws are secure and in place.
2. Verify that the display face is clean.
3. Verify that the unit's external surfaces have no dents, scratches, etc.
4. Inspect for broken or bent pins on J2001 and J2002.

Perform the following procedure to inspect the internal portion of the GMX 200:

1. Inspect internal areas for obvious shorts, burned areas, or corrosion.
2. Inspect for charred, loose, or damaged components.
3. Inspect wires and cables for breaks in insulation or tears.

4.3 CLEANING

The front bezel, keypad, and display can be cleaned with a soft cotton cloth dampened with clean water. DO NOT use any chemical-cleaning agents. Care should be taken to avoid scratching the surface of the display. The GMX 200 uses a lens coated with a special anti-reflective coating that is very sensitive to skin oils, waxes and abrasive cleaners.

4.4 PROCEDURES

The disassembly and assembly procedures in this section are written for a GMX 200 I/O Unit. The I/O unit is identical to the standard unit except for the addition of the I/O Board. Since the I/O unit and the standard unit are very similar, the disassembly and assembly procedure information for the standard unit is not repeated. An assembly drawing and parts list for the standard unit is included for reference (Figure 6-2).

4.4.1 Disassembly (Figures 6-1 and 6-2)

4.4.1.1 Removing Cover and Air Duct

1. Remove ten Cover Screws (14) attaching Cover (5) and Air Duct (7) to Chassis (8).
2. Remove Cover (5) and Air Duct (7) from unit.
3. Detach Fan Leads from Main Board (2) (J1400, J1401 on Main Board).

4.4.1.2 Removing the Cooling Fans

1. Remove three Screws (14) attaching Cover (5) to Air Duct (7).
2. Remove four Wafer Head Screws (15) attaching Fans (25) to Cover (5) and remove Fans.

4.4.1.3 Removing the I/O Board

1. Perform steps listed in 4.4.1.1.
2. Remove two Screws (14) attaching 62-pin I/O Board Connector to Chassis Back (6).
3. Remove two Screws (14) attaching 37-pin Main Board Connector to the Chassis Back (6).
4. Remove six Screws (14) attaching Chassis Back (6) to Chassis (8).
5. Remove Chassis Back (6), Mounting Rod (10), and Flat Washer (17). Flat Washer should be threaded on Rod.
6. Remove four Screws (11 and 13) attaching I/O Board (3) to Main Board (2).
7. Lift I/O Board off of Main Board Connector and remove I/O board.

4.4.1.4 Removing the Display Head Assembly

Initial production units have the Rotary Switch mounted to the Chassis but in later production units the Rotary Switch is mounted to the Display Head Assembly. A screw on the side of the chassis located near the two vertical slots for the rotary encoder identifies initial production Display Heads. Later production units do not have this screw and have one slot in the horizontal orientation (see Figures 4-1 and 4-2). To avoid possible interchangeability issues, earlier Display Head Assemblies will not be shipped as replacement items. Send any initial production units back to Garmin for repair.

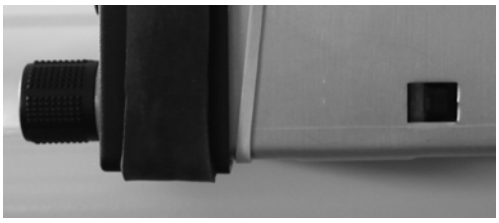

Figure 4-1. Later Production Units

Figure 4-2. Initial Production Units

1. Perform steps listed in 4.4.1.1.
2. Remove five Screws attaching Display Head Assembly (1) to Chassis (8).
3. Disconnect Ribbon Cable (24) from Main Board (J1902). Replace cable (24) if damaged.
4. Disconnect Flex Cable from Main Board (J1901). Special care must be taken to avoid ripping the Flex Cable. Display Heads with ripped or torn Flex Cables must be sent to Garmin for repair and recalibration.
5. Disconnect Rotary Encoder Cable from Main Board (J1900).
6. Remove Display Head Assembly from Chassis by rotating the left side (opposite the Rotary Switch) of Display Head forward.

4.4.1.5 Removing the Main Board

1. Perform the steps listed in Sections 4.4.4.1 and 4.4.1.3. For standard units, perform the steps listed in Sections 4.4.1.1 and 4.4.1.4.
2. Remove Foil Label from left side of unit.
3. Remove CompactFlash Card.
4. Remove seven Heat Sink Screws (14) attaching Heat Sink (9) to Chassis (8).
5. Remove two Screws attaching Heat Sink (9) to Main Board (2).
6. Remove Heat Sink from Main Board and Chassis.
7. Discard Thermal Pads (20 and 21).
8. Remove three Chassis Standoffs (18) (these Standoffs are replaced by Screws in the standard unit).
9. Remove four Screws attaching Main Board to Chassis (11).
10. Remove Main Board (2).
11. Discard the two Thermal Pads (22).

4.4.1.6 Removing the SD Card

1. Perform the steps listed in Sections 4.4.1.1, 4.4.1.3, 4.4.1.4 and 4.4.1.5.
2. Remove two Screws (14) attaching SD Card Board (4) to Chassis (8).
3. Remove SD Card Board (4).

4.4.1.7 Removing the Faceplate

1. Remove two Screws on right side of Display Head (1).
2. Remove two Screws under Display Head.
3. Slide Faceplate down and lift from Display Head (1).

4.4.1.8 Removing the Keypads

1. Remove two Screws on right side of Display Head (1).
2. Remove two Screws under Display Head.
3. Slide Faceplate down and lift from Display Head (1).
4. Remove the Keypads from the Faceplate.

4.4.1.9 Removing the CompactFlash Card

1. Remove Aluminum Foil Label (26) from Chassis (8).
2. Extract the CompactFlash Cards (29, 30, 31) from the unit.

4.4.2 Assembly

Observe the torque value given below when assembling the unit, except where noted.

THREAD	IN/LB	TOLERANCE
4-40	8	±1

4.4.2.1 Installing the SD Card Board

1. Place SD Card Board (4) onto Chassis (8) with proper alignment over screw holes.
2. Install two Screws (14) into SD Card Board (4) attaching SD Card (4) to Chassis (8).

4.4.2.2 Installing the Main Board

NOTE

Chassis Thermal Pads (22) cannot be reused.

1. Remove lining from one side of Thermal Pads (22) and apply Pads to raised landings on Chassis (8). Remove lining from top of Thermal Pads (22).
2. Place Main Board in Chassis with proper alignment over screw holes. Carefully attach Main Board Connector to SD Card PCB Assy Connector J1903 – Do Not Bend.

NOTE

Heat Sink Thermal Pads (20 and 21) cannot be reused.

3. Apply new Thermal Pads (20 and 21) to Heat sink (9).
4. Apply uniform, thin layer of Thermal Grease (23) to Heat Sink (9). Perimeter weeping is acceptable.
5. Attach Heat Sink (9) to Main Board using two Screws (12).
6. Install seven Screws (14) to attach the heat Sink (9) to Chassis (8) side. See Figure 4-3 for torque sequence.
7. Install three Chassis Standoffs (18) into Main Board (2) (skip this step for standard units).
8. Install four Screws (11) into Main Board attaching Main Board to Chassis. Install seven Screws (11) into Main Board if the unit is a standard unit.

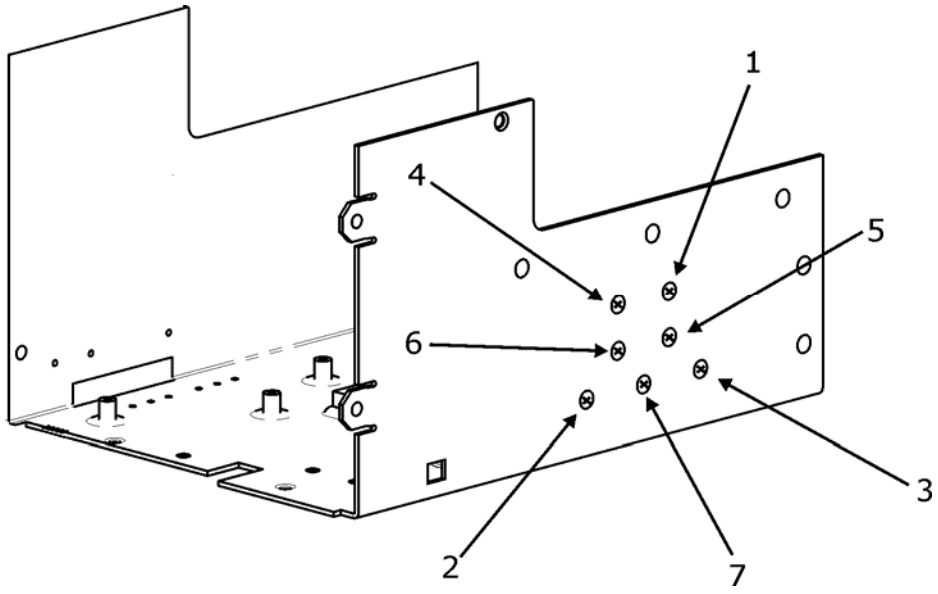

Figure 4-3. Heat Sink Torquing Sequence

4.4.2.3 Installing the I/O Board

1. Place I/O Board (3) over Main Board (2) , attaching Connector (J7) on I/O Board (3) to J1909 and J1910 on the Main Board (2).
2. Install one Screw (13) into I/O Board.
3. Install remaining three Screws (11).
4. If Display Head (1) was not removed earlier, insert Mounting Rod (10) under Main Board. Verify Washer (17) is threaded onto Mounting Rod (10).
5. Attach Chassis Back (6) to Chassis using six Screws (14). See Figure 4-4 for torque sequence. Insert Chassis Back Tab into Chassis Slot, then rotate Chassis Back into Chassis.
6. Install four Screws (14) attaching 62-pin I/O Board Connector and 37-pin Main Board Connector to Chassis Back (6) following the correct torque pattern.

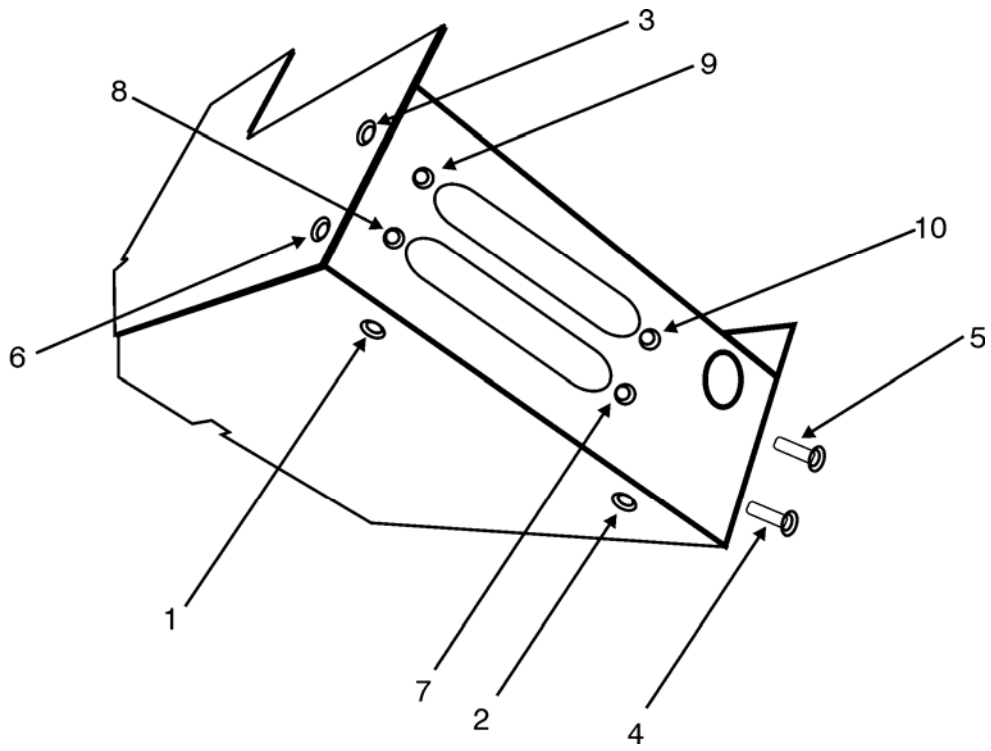

Figure 4-4. Chassis Back Torquing Sequence

4.4.2.4 Installing the Display Head Assembly

1. Verify Washer (17) is threaded onto Mounting Rod (10).
2. Slide Mounting Rod (10) under Main Board (2) and insert into hole in Chassis Back (6).
3. Hold Mounting Rod thru Back Chassis hole.
4. Hold Display Head Assembly (1) up to the Chassis (8). Insert the Rotary Switch side in first and engage Boss on the Rotary Switch into the slot in Chassis (8).
5. While squeezing the top of the Chassis (8), rotate the Display Head Assembly (1) into Chassis (8). Be careful not to damage the LCD Flex Cable. The Display Head Assembly (1) must be returned to Garmin for repair and recalibration if the Flex Cable is damaged.
6. Install five Screws and attach Display Head Assembly (1) to Chassis (8).
7. Connect LCD Flex Cable to J1901 on Main Board (2).
8. Connect Ribbon Cable (24) to the Main Board Connector (J1902).
9. Connect Rotary Switch Cable to J1900 on Main Board (2).

4.4.2.5 Installing the Cooling Fans

1. Attach Fans (25) to Cover (5) using four Wafer Head Screws (15)
2. Attach Cover (5) to Air Duct (7) using three Screws (14).

4.4.2.6 Installing Fans, Cover, and Duct to Chassis

1. Attach Fan Power leads to Connectors (J1400 and J1401) on Main Board (2).
2. Place Cover Assembly (5, 2, 5, 7) onto Chassis (8) and slide forward until holes line up. Cover slides under Display Assembly Bezel. Verify that Fan Cables are not crimped between Cover Assembly (5, 7, 2, 5) and Chassis (8).
3. Install ten Screws (14) to attach Cover Assembly (5,7,2,5) to Chassis (8).

4.8.2.7 Installing the Faceplate

NOTE

Some Faceplates have a metal coating applied on the inside to provide ESD protection. These Faceplates must be replaced with Faceplates that are also coated. If a replacement Faceplate with the coating is not available, reinstall the original Faceplate.

1. Insert the Keypads into the Faceplate.
2. Place the Faceplate over the Keyboard. Slide the faceplate up to engage the tabs into the Display Head Assembly Bezel.
3. Install the four Screws that attach the Faceplate to the Bezel. The two Six-Lobe Screws are used underneath the Faceplate. Seat Six-Lobe Screws in counterbore, then torque to 3.0 in-lb., ±0.5 in-lb. The two countersunk Screws are used on the side of the Faceplate.

4.8.2.8 Installing the CompactFlash Card

1. Insert the CompactFlash Card (29, 30, 31) into the Connector on Main Board (2) via the slot in Chassis (8).
2. Complete the Return-to-Service procedure in Section 5.
3. Apply a new Aluminum Foil Label (26) over the slot in between the dimples on Chassis (8) when the return to service test is completed.

SECTION 5
RETURN TO SERVICE TESTS

Replacement Boards come from the factory tested and known good. This section contains a return to service test which is limited to basic tests that verify the proper operation of a reassembled unit. Specific performance need not be verified. I/O pins do not need to be verified either since the connectors are hard mounted to the boards and tested at the factory. Perform the tests listed in this section once a unit has been fully reassembled.

5.1 TEST SETUP AND EQUIPMENT

Use a Power Harness with Configuration Module installed (described in the Test Setup Section 3.6). The Configuration Module should be configured to have all functions enabled and a Traffic or Radar Sensor installed.

5.2 RETURN TO SERVICE TESTS

Insert a known-good SD Card (010-10820-00, or -01) into the front slot with the unit turned off. Turn the unit on. All tests are performed with the unit on. Perform each test listed in Table 5-1.

TEST	PASS	FAIL
Verify unit boots to Startup Screen		
Verify Software Version on Startup Screen and update if necessary		
Verify self-tests pass		
Verify the Traffic or Radar Sensor Data Flag appears. Flag appearance indicates Main Board is communicating with I/O Board		
Cover Photocell and verify Screen Backlight dims		
Remove Cover from Photocell and verify Backlight Brightens		
Press Brightness Up Arrow Key and verify Backlight Brightens		
Press Brightness Down Arrow Key and verify Backlight Dims		
Verify Key Backlighting is functional behind all the Buttons and Rotary Knob (may need to shadow the unit from bright light)		
The following tests verify many aspects of the unit, including that the LCD Flex Cable, Ribbon Cable and Rotary Encoder Cable were connected properly		
Press FN Key and verify unit responds		
Press each of the Select Keys across the bottom and verify unit responds		
Press FN and Select Keys to display the MAP Function		
Press the Menu Key, followed by each of the Menu Option Keys and verify unit responds		
When out of the Menu Mode, press the Rotary Knob and verify unit responds		
Rotate the Rotary Knob and verify unit responds		
Press the FN and Select Keys to display the SYS Function		
Press the TEST Select Key, followed by the Test Pattern 1 Key. Verify the expected pattern is displayed. Refer to the System Test Pages in the Pilot's Guide.		
Press the MENU/ENT Key followed by the Next Page Key		
Press the Test Pattern 2 Key. Verify the expected pattern is displayed. This test verifies LCD functionality and that the LCD Cable was connected properly. Refer to the System Test Pages in the Pilot's Guide.		
Press the MENU/ENT Key, followed by the fourth select key (unlabeled) repeatedly until the label HW INFO appears		
Press the HW INFO key and verify Fan RPM (in upper left window)		

Table 5-1. Return To Service Tests

SECTION 6
ILLUSTRATED PARTS LIST

The part numbers listed in this section of the manual are given to aid in assembly and disassembly of the unit. Part numbers are listed for all parts that can be ordered from Garmin. For orderable part information including availability, see the Garmin Aviation Distributor Service Parts Price List or contact Garmin directly as indicated in Section 1.

6.1 GMX 200 I/O UNIT (011-01281-00 BLACK, -10 GRAY)

REFRERENCE	PART NUMBER	ITEM	QTY
1	S011-01280-00	Sub-Assy,Display Head,GMX 200	1
2	S012-00996-00	PCB Assy,GMX 200 Main Board	1
3	S012-01007-00	PCB Assy,I/O BD,GMX 200	1
4	S019-01000-00	PCB,Assy,SD Card,GMX 200	1
5	S115-00750-00	SMP,Cover,GMX 200	1
6	----------	SMP,Chassis Back,GMX 200	1
7	S115-00752-00	SMP,Air Duct,GMX 200	1
8	S115-00153-10	SMP,Chassis, GMX 200, Bracket MOD	1
9	S125-00122-00	DCP,CPU Heat Sink	1
10	S211-00117-00	Mounting Rod,GMX 200	1
11	S211-00130-08	Screw,PHP,Splitlock,4-40x.250	9
12	S211-60234-12	Screw,4-40x.500,PHP,SS/P,w/NYL	2
13	S211-60234-20	Screw,4-40x1.00,PHP,SS/P,w/NYL	1
14	S211-66204-06	Screw,4-40x.187,FLHP82UC,SS/P	33
15	S211-00126-00	Screw,4-40x.250,6 Lobe (T-10) Wafer Head,SS/BO	4
16	S211-66304-07	Screw,4-40x.218,FLHP82UC,SS/BO	4
17	S212-20048-00	Wshr,Flat,Non-Std,SS,ID.128	1
18	S214-00023-07	Stdoff,M/F,Hex,4-40,.19SS/P	3
19	S249-00211-00	Tape,Die Cut Aluminium,.625 Diameter	2
20	S250-00113-03	Thermal Pad,0.7x0.7	1

21	S250-00138-00	High Thermally Conductive Pad,L=.500,W=.343,T=2mm	1
22	S250-00139-00	Thermally Conductive Pad 2.3 W/mK, L=.758, W=.758, T=5mm	2
23	S290-00032-00	Grease,Thermally Conductive,Silicone	0
24	S325-00199-01	Rbn Ca Stp,.100 Ctrs,2x10x3	1
25	S371-00004-01	Fan,40x40x20mm,12VDC,1.6W,w/Connectors	1
26	S249-00211-01	Tape, Die Cut Aluminum, 1.00 x 2.00	1
27	S145-00858-03	PMP, Face Plate Black, w/o Cu-Ni, w/artwork	1
28	S14800858-13	PMP, Face Plate Gray, w/o Cu-Ni, w/artwork	1
29	S011-01550-FA	Sub-Assy, GMX 200 I/O Traffic CF Card, Factory	1
30	S011-01551-FA	Sub-Assy, GMX 200 I/O Radar/TAWS CF Card, Factory	1
31	S011-01552-FA	Sub-Assy, GMX 200 I/O Traffic/Radar CF Card, Factory	1

6.2 GMX 200 Standard Unit (011-01271-00 Black, -10 Gray)

REFERENCE	PART NUMBER	ITEM	QTY
2	S011-01280-00	Sub-Assy,Display Head,GMX 200	1
3	S012-00996-00	PCB Assy,GMX 200 Main Board	1
4	S019-01000-00	PCB,Assy,SD Card,GMX 200	1
5	S115-00750-00	SMP, Cover	1
6	----------	SMP,Chassis Back,GMX 200	1
7	S115-00752-00	SMP,Air Duct,GMX 200	1
8	S115-00753-01	SMP,Chassis, GMX 200,Bracket MOD	1
9	S115-00768-03	SMP,Plate,D-Sub Cover,37Pin,GMX	1
10	S125-00122-00	DCP,CPU Heat Sink	1
11	--------	Lbl,S/N,GMX 200,Blk TSO	1
12	--------	Lbl,Royalty Agreement,Applicable	1
13	--------	Lbl,Applicable Royalty Agrmnt	1
14	S211-00117-00	Mounting Rod,GMX 200	1
15	S211-00130-08	Screw,PHP,Splitlock,4-40x.250	9
16	S211-60234-12	Screw,4-40x.500,PHP,SS/P,w/NYY	2
17	S211-60234-20	Screw,4-40x1.00,PHP,SS/P,w/NYL	1
18	S211-66204-06	Screw,4-40x.187,FLHP82UC,SS/P	33
19	S211-00126-00	Screw,4-40x.250,6 Lobe (T-10) Wafer Head,SS/BO	4
20	S211-66304-07	Screw,4-40x.218,FLHP82UC,SS/BO	4
21	S211-20048-00	Wshr,Flat,Non-Std,SS,ID.128	1
22	S249-00211-00	Tape,Die Cut Aluminium,.625 Diameter	2
23	S249-00211-01	Tape,Die Cut Aluminium,1.00x2 Diameter	1
24	S250-00113-03	Thermal Pad,0.7x0.7	1

25	S250-00138-00	High Thermally Conductive Pad,L=.500,W=.343,T=2mm	1
26	S250-00139-00	Thermally Conductive Pad 2.3 W/mK, L=.758, W=.758, T=5mm	2
27	S290-00032-00	Grease,Thermally Conductive,Silicone	0
28	S325-00199-01	Rbn Ca Stp,.100 Ctrs,2x10x3	1
29	S371-00004-01	Fan,40x40x20mm,12VDC,1.6W,w/Connectors	1
30	S011-01549-FA	Sub-Assy,GMX 200 Standard CF Card,Fctry	1
31	S145-00858-03	PMP, Face Plate Black, w/o Cu-Ni, w/artwork	1
32	S145-00858-13	PMP, Face Plate Gray, w/o Cu-Ni, w/artwork	1

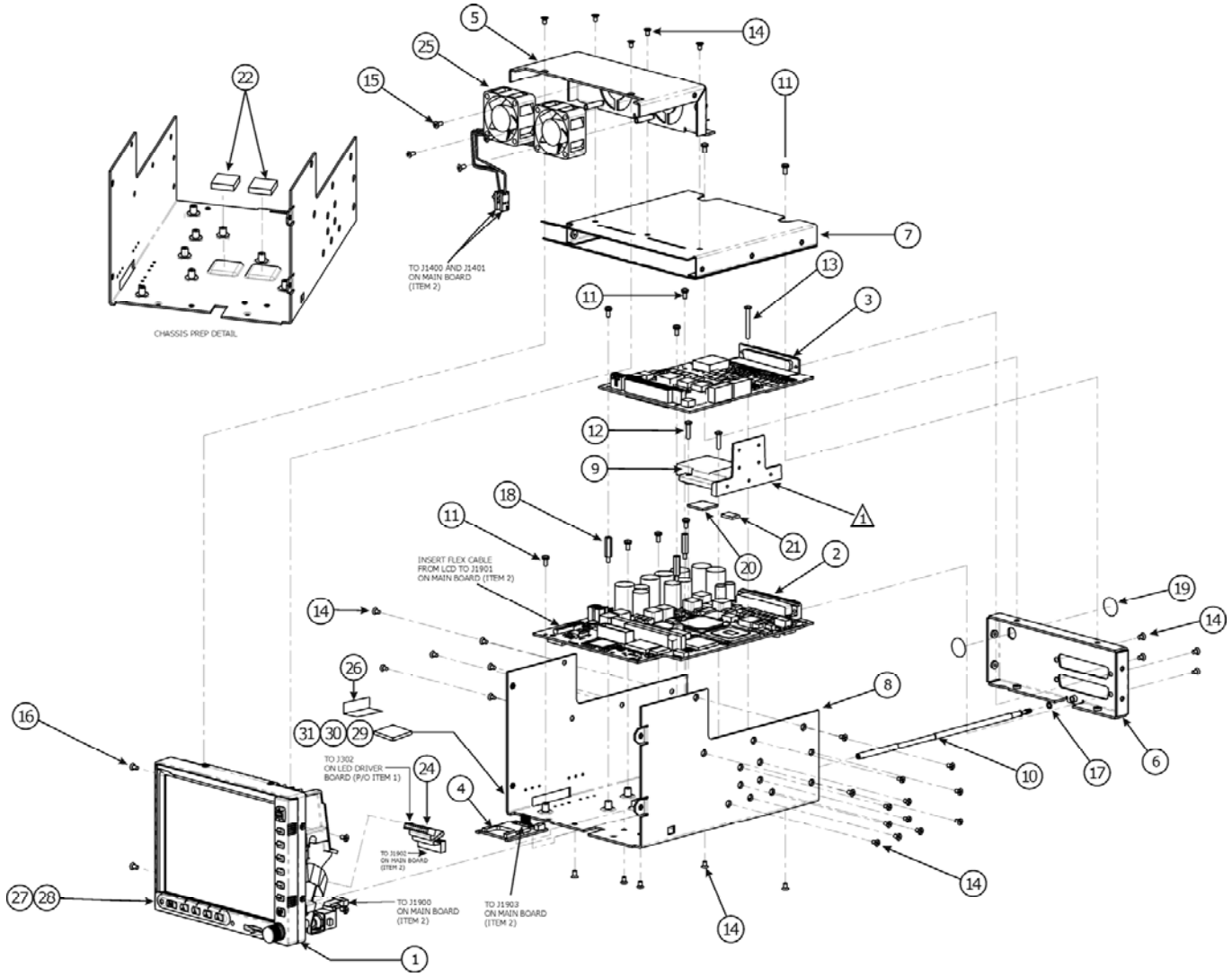

Figure 6-1. GMX 200 Assembly Drawing (I/O Unit)

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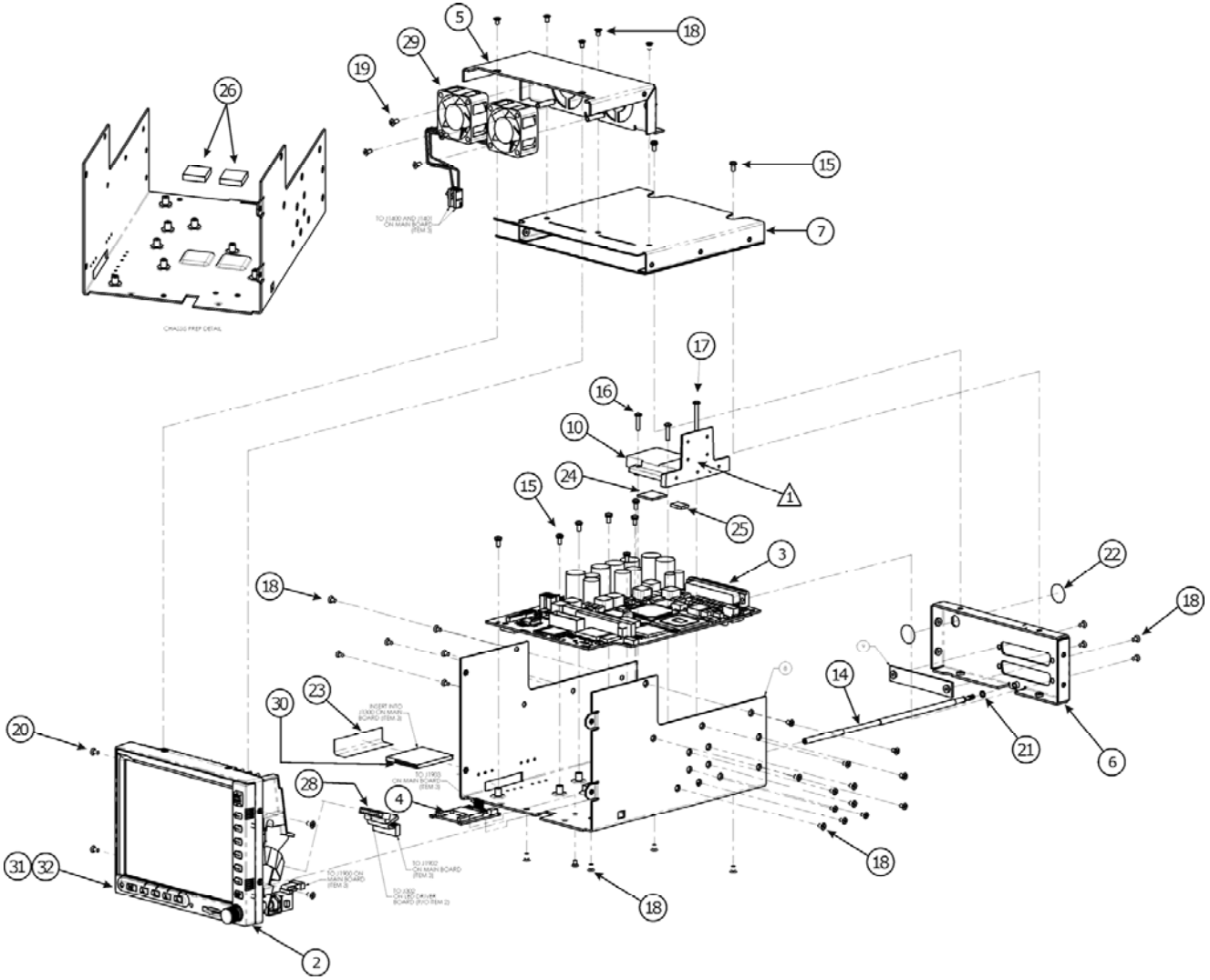

Figure 6-2. GMX 200 Assembly Drawing (Standard Unit)

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