



FlightMax

Installation Manual

700-00004-XXX-()

700-00030-XXX-()

Model EX3000 Series MFD

EX5000 Series MFD

P/N 600-00073

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1 About the EX3000/EX5000 MFD

The Avidyne Multi-Function Display, or MFD, is a single unit computer system mounted in an aircraft instrument panel in the pilot's view that interfaces to various aircraft avionics. The MFD increases pilot situational awareness and enhances flight safety by providing supplementary navigation, traffic, terrain, airspace, weather, engine, and approach chart information.

The EX3000/EX5000-Series MFDs are intended for use as a supplementary situational awareness device. The EX3000/EX5000 contains software developed in accordance with RTCA/DO-178B Level D requirements.

This section contains the following information:

- Section 1.1, "Standard Functionality" on page 1
- Section 1.2, "Optional Functionality" on page 1

A complete FlightMax EX3000 or EX5000-Series Multi-Function Display system consists of the following components:

- Avidyne FlightMax EX3000 or EX5000-Series Multi-Function Display (MFD).
- System installation kit, including MFD assembly and necessary connectors.
- User documentation including *Pilot's Guide*, *Installation Manual*, and *Instructions for Continued Airworthiness*.

The EX3000 is available with a standard interface, while the EX5000 has a number of optional features, as described in Section 1.2.

1.1 Standard Functionality

MFD standard functionality available on the EX3000 and EX5000:

- A GPS interface to provide position, velocity, and flight plan data to the MFD.
- The MFD displays the current aircraft position and active flight plan graphically overlaid on the moving map comprised of terrain, geo-political boundaries, airspace, nav aids, airports, airways, and obstacles.
- The MFD displays the current active flight plan in textual format.

1.2 Optional Functionality

The following features are optional for the EX3000 and EX5000. However, they may not be available for all aircraft:

- **External traffic detection system**—Allows the MFD to display a pictorial representation of nearby transponder-equipped aircraft overlaid on the moving map display.
- **External lightning detection system**—Allows the MFD to present a visual display of lightning strikes or cells overlaid on the moving map display.
- **External Engine Data Acquisition Unit (DAU) or Sensor Interface Unit (SIU) (EX5000 only)**—Allows the MFD to display the aircraft engine gauges, temperatures, pressures, % horsepower, fuel totalizer information, electrical information, percent power calculation, and provides engine leaning assistance;. Available for software part numbers for 530-00170-000 and -002.
- **External Mini Data Acquisition Unit (Mini-DAU)**— Allows the MFD to display rudder trim, generator and alternate current, and bus voltage.
- **Digital Broadcast Datalink transceiver**—Allows the MFD to display strategic weather and airspace information in graphical and textual formats.

The following features are optional for the EX5000. However, they may not be available for all aircraft:

- **External Terrain Awareness and Warning System (TAWS)**—Allows the MFD to display EGPWS terrain image data on a TAWS page.
- **External Digital Narrowcast Datalink transceiver**—Allows the MFD to display strategic weather and use Multilink to send messages to a user on the ground.
- **Terminal and Procedure Chart Data (CMax™ Charts)**—Optional charts available from Jeppesen Sanderson, Inc. provide terminal and procedure charts at the touch of a button.
- **External Digital Radar Receiver/Transmitter**—Allows the MFD to display radar image data on a radar page or overlaid on the moving map display.

2 General Information

This section contains the following information:

- Section 2.1, “Equipment Description” on page 4
- Section 3, “MFD Technical Specifications ” on page 6
- Section 3.1, “Configuration Options” on page 7

This manual contains information about the physical, mechanical, electrical characteristics, and installation instructions for part numbers:

- 700-00004-XXX-()
- 700-00030-XXX-()

which includes the following products:

- EX3000-Series Multi-Function Displays (MFD)
- EX5000-Series MFD

This manual applies to EX3000-Series and EX5000-Series MFDs with software listed in Table 6, “MFD Parts, Components, and Software,” on page 12.

➔ To obtain maximum performance from the MFD, follow the installation instructions carefully.

MFD operating information is contained in the FlightMax EX3000-Series and EX5000-Series MFD Pilot's Guide, which is supplied with the MFD. The specific *Pilot's Guide* part number applicable to each software part number is shown in Table 6.

➔ Avidyne strongly recommends that avionics installers review the *Pilot's Guide* before operating the MFD.

The current version is available on the web at www.avidyne.com.

Note: The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in aircraft. The article may be installed only if the installation is performed in accordance with Part 43 or the applicable airworthiness requirements.



Caution: AC 20-68B, Recommended Radiation Safety, sets forth recommended radiation safety precautions to be taken by personnel when operating airborne weather radar on the ground. Dangers from ground operation of airborne weather radar include the possibility of human body damage and ignition of combustible material by radiated energy. The full text of this FAA Advisory Circular may be found on the web at http://faa.gov/RegulatoryAdvisory/ac_index.htm.

2.1 Equipment Description

The EX5000 MFD is a panel-mounted, multi-function display, available as follows:

- The 700-00004-XXX-() MFD is available in two display orientations:
 - Landscape
 - Portrait

In all configurations, part number 700-00004 has the following attributes:

- Two control knobs.
 - Four ARINC 429 ports. Each port can be individually set to transmit (TX) or receive (RX).
 - Two ARINC 453 ports, both set to receive (RX)
- The 700-00030-XXX-() MFD with dual-concentric knobs is available only in landscape format.

In all configurations, part number 700-00030 has the following attributes:

- Two dual-concentric knobs (that is, four knobs). Dual-concentric knobs are required for Radar installations.
- Eight ARINC 429 ports. Four ports are set to transmit (TX) and four ports to receive (RX).
- Two ARINC 453 ports, both set to receive (RX)

Note: For clarity, most unit and display illustrations in this guide are shown in landscape orientation. Unless otherwise specified, all information is applicable to both viewing orientations.

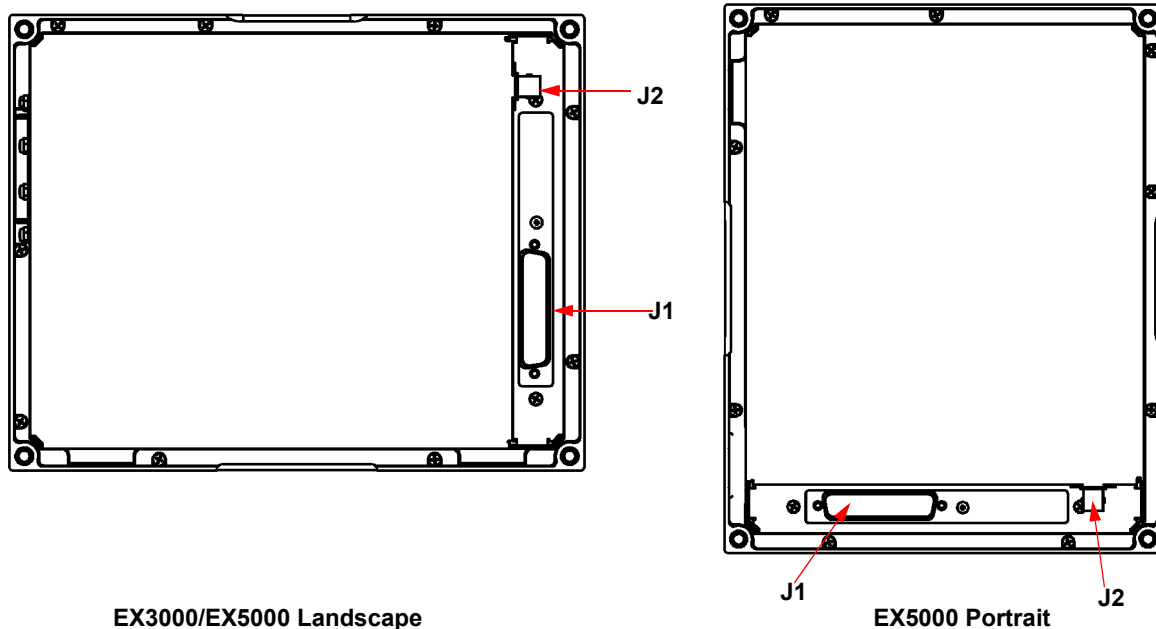


Figure 1: Multi-Function Display Landscape and Portrait Rear Views

The MFD system consists of the following components:

- Multi-Function Display (MFD), (see Table 6, “MFD Parts, Components, and Software,” on page 12 for part numbers).

- EX3000 MFD, comes with standard interfaces only
- EX5000 MFD, comes with standard and optional interfaces
- Dataloader, including interconnect cable (available separately.)
- User documentation including the appropriate *MFD Pilot's Guide* and *Installation Manual* (optional).

3 MFD Technical Specifications

Table 1: MFD Technical Specifications

Standard Features	
Display	High Brightness Color Active Matrix LCD, sunlight readable
Diagonal size	10.4 inches
Resolution	SVGA 800 X 600
Interfaces	RS-232, USB
Optional Interfaces	
EX5000-Series only	ARINC 429, ARINC 453, and TTL
Physical Characteristics	
Weight	
■ 700-00004-001/002/007/008/009/010	6.4 lbs
■ 700-00004-004/005/006	7.6 lbs (with Narrowcast)
■ 700-00030-005	
■ 700-00004-104	7.6 lbs (with Narrowcast)
CG from Instrument Panel	
■ 700-00004-001/002/007/008/009/010	1.60 inches (Portrait)
■ 700-00004-004/005/006	
■ 700-00030-005	
■ 700-00004-104	1.06 inches (Landscape)
Height (inches)	
	Landscape: 8.50
	Portrait: 11.0
Width (inches)	
	Landscape: 10.7
	Portrait: 7.8
Depth (inches)	
■ 700-00004-001/002	4.3 inches (3.7 inches behind the panel)
■ 700-00004-004/005/006/007/008/ 009/010/104	5.2 inches (4.6 inches behind the panel)
■ 700-00030-005	
Electrical Requirements	
Voltage	18-35 VDC, negative ground
Current	
■ 700-00004-001/002/007/008/009/010	Maximum 3.5 A at 28V
■ 700-00004-004/005/006/104	Maximum 4.0 A at 28V
■ 700-00030-005	
Cooling Requirement	Unrestricted airflow to the top and bottom of the landscape chassis or both sides of portrait chassis.
Operating Limits	See <i>Appendix A: Environmental Qualification Data</i>
TSOs	See Table 24, "TSOs by Software Part Number," on page 75.
ETSOs	Table 25, "ETSOs by Part Number," on page 75.

3.1 Configuration Options

To support the many sensor types encountered in the typical aircraft installation, the installer must configure the EX5000 for the sensor type and select the correct port configuration. Table 1 lists sensor options and their associated port configurations. This data may be used when executing Maintenance Mode sensor setup utilities. Port selection must match the aircraft wiring. Default port assignments must match the wiring instructions given in Appendices E through Q. Refer to Appendix F for configurations with dual GPS/FMS inputs.

When the MFD is used in conjunction with a digital radar system, ARINC 429 TX port 3 and ARINC 453 RX port 1 are default settings, which are not selectable via the procedures contained in this document. Table 3, "Main Connector (P1) Pin Assignments," on page 9 provides a cross reference between port assignments and functional use.

Table 2: Sensor Port Configuration Options

Sensor Type	Sensor Option	Port Type	System Type	Port Configuration
Engines	DAU	ARINC 429	Meggitt DAU	Speed: High
	SIU	RS-232	Avidyne SIU	Baud: 9600
		RS-232	Avidyne DAU	Baud: 9200
GPS/FMS	GAMA 429 Format	ARINC 429	Garmin GPS 155XL, GNC 300XL	Speed: Low
			Garmin GPS 400/500	Speed: Low
			Garmin GNC 420	Speed: Low
			Garmin GNS 430/530 (GAMA 429 Graphics w/INT)	Speed: Low
			Bendix/King KLN-90B	Speed: High
			Universal UNS-1B	Speed: High
	King/Aviation Format	RS-232	Honeywell GNS-XLS	Baud: 9600
			Garmin GNS 430/530	Baud: 9600
			Bendix/King KLN-90B	Baud: 9600
			Trimble 2000, 2101	Baud: 9600
	Northstar Format	RS-232	Northstar M3	Baud: 9600
			NMEA 0183 Format	RS-232
Traffic	<i>Not Installed</i>			
	TCAD	RS-232	Ryan 9900B, 9900BX	
	TAS	ARINC 429	L3 Skywatch, Skywatch HP	
	TAS	ARINC 429	Honeywell KTA-870, KMH-880	
	TIS-G	ARINC 429	Garmin GTX330	
Broadcast Datalink	<i>Not Installed</i>			
	XM Radio	RS-232	Heads Up Technologies XMD076	
Narrowcast Datalink	<i>Not Installed</i>			
	See page 19.	RS-232	Internal	
Lightning	<i>Not Installed</i>			
	WX-500	RS-232	WX500	
Radar	Allied Signal ART-2000	ARINC 429/ ARINC 453	N/A	

Table 2: Sensor Port Configuration Options (Continued)

Sensor Type	Sensor Option	Port Type	System Type	Port Configuration
TAWS	<i>Not Installed</i>			
	Honeywell EGPWS	ARINC 429/ ARINC 453	Honeywell EGPWS	
Map Heading {Source}	GPS/FMS	N/A	N/A	
	Traffic			
	Stormscope			
	None (use GPS Track)			

Table 3: Main Connector (P1) Pin Assignments

Pin	Function	Suggested	Your Setup	Pin	Function	Suggested	Your Setup
1	DISCRETE OUT 1			40	28 VDC		
2	RESERVED			41	28 VDC		
3	RESERVED			42	28 VDC		
4	GND			43	ARINC 429 TX1 A		
5	ARINC 429 RX1 A	GPS1		44	RESERVED		
6	ARINC 429 TX2 A			45	ARINC 429 RX2 A	TRAFFIC	
7	DISCRETE OUT 2			46	ARINC 429 TX3 A	RADAR	
8	ARINC 429 RX3 A			47	DISCRETE OUT 3		
9	ARINC 429 TX4 A	TAWS		48	ARINC 429 RX4 A		
10	RS232 TX1			49	RS232 TX3	WX-500	
11	RS232 RX1	GPS1		50	RS232 RX3	WX-500	
12	RS232 RTN1	GPS1		51	RS232 RTN3	WX-500	
13	RESERVED			52	RESERVED		
14	DISCRETE OUT 4			53	RESERVED		
15	GND			54	RESERVED		
16	RESERVED			55	ARINC 453 TX3 A	(UNUSED)	
17	RESERVED			56	ARINC 453 RX2 A	TAWS	
18	DIMMING			57	GND		
19	RESERVED			58	ARINC 453 TX3 B	(UNUSED)	
20	GND			59	ARINC 453 RX2 B	TAWS	
21	RESERVED			60	PWR GND		
22	RESERVED			61	PWR GND		
23	RESERVED			62	PWR GND		
24	RESERVED			63	ARINC 429 TX1 B		
25	ARINC 429 RX1 B	GPS1		64	RESERVED		
26	ARINC 429 TX2 B			65	ARINC 429 RX2 B	TRAFFIC	
27	RESERVED			66	ARINC 429 TX3 B	RADAR	
28	ARINC 429 RX3 B			67	RESERVED		
29	ARINC 429 TX4 B	TAWS		68	ARINC 429 RX4 B		
30	RS232 TX2	TCAD		69	RS232 TX4	XM, GPS2	
31	RS232 RX2	TCAD		70	RS232 RX4	XM, GPS2	
32	RS232 RTN2	TCAD		71	RS232 RTN4	XM, GPS2	
33	RESERVED			72	RESERVED		
34	RESERVED			73	RESERVED		
35	RESERVED			74	RESERVED		
36	GND			75	ARINC 453 RX1 A	RADAR	
37	GND			76	RESERVED		
38	RESERVED			77	RESERVED		
39	RESERVED			78	ARINC 453 RX1 B	RADAR	

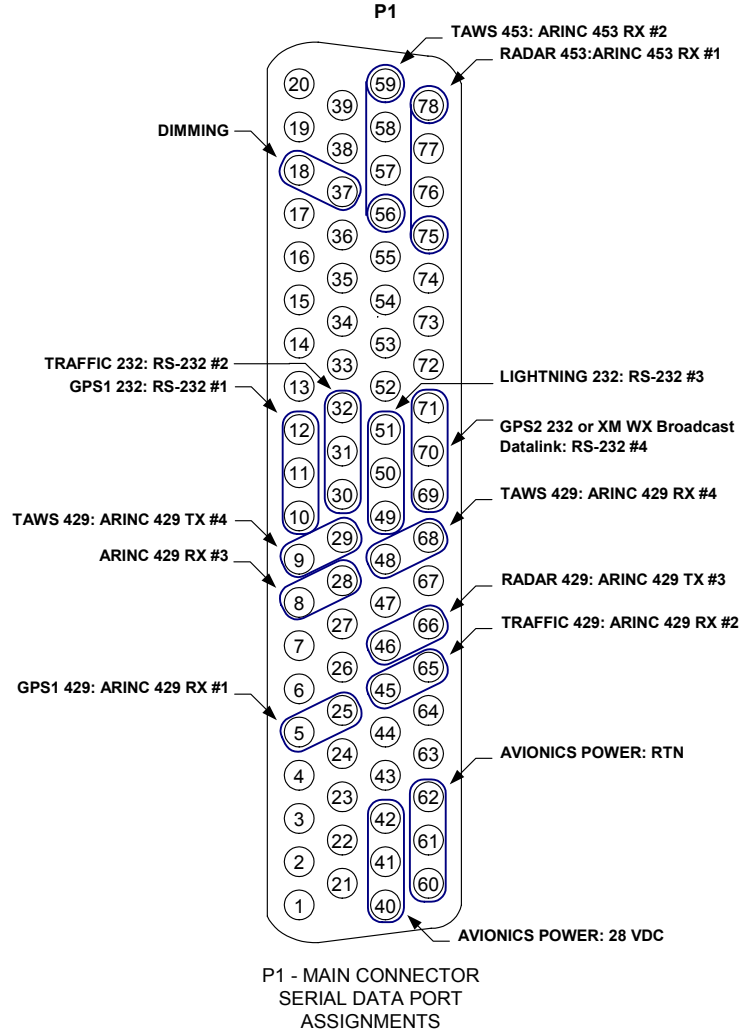
Table 4: Port Pinout Cross-Reference

ARINC 429					ARINC 453			
700-0004 Ports	700-00030 Ports	Signal	Suggested Pin	Your Setup	Port	Signal	Suggested Pin	Your Setup
1	1	TX A	43		1	RX A	RX A	
		TX B	63			RX B	RX B	
		RX A	5		2	RX A	RX A	
		RX B	25			RX B	RX B	
2	2	TX A	6					
		TX B	26					
		RX A	45					
		RX B	65					
3	3	TX A	46					
		TX B	66					
		RX A	8					
		RX B	28					
4	4	TX A	9					
		TX B	29					
		RX A	48					
		RX B	68					

Table 5: RS-232 Port Pinout Cross-Reference

RS-232 Ports			
Port	Signal	Suggested Pin	Your Setup
1	TX	10	
	RX	11	
	RTN	12	
2	TX	30	
	RX	31	
	RTN	32	
3	TX	49	
	RX	50	
	RTN	51	
4	TX	69	
	RX	70	
	RTN	71	

➔ Note that the connector assignments are suggested, but not required. If you use different pin assignments, be sure to document the changes.



- NOTES:
1. AVAILABLE FOR GPS2 WHEN TRAFFIC 429: ARINC 429 RX #2
PORT IS NOT WIRED
 2. AVAILABLE FOR GPS2 WHEN TAWS 429: ARINC 429 TX #4
PORT IS NOT WIRED

Figure 2: Main Connector Sample Port Assignments

4 Unpacking the MFD

Your shipping carton for the MFD contains one of following configurations:

Table 6: MFD Parts, Components, and Software

Part Number	Description	Aircraft	Pilot's Guide Part Number	Software Part Number
700-00004-005	EX3000 Landscape Multi-Function Display (MFD)	Cirrus SRV, SR20, SR22	600-00072	530-00117-000
				530-00130-000
			600-00108-000	530-00162-000
700-00004-006	EX5000 Landscape MFD ■ ARINC 429 Databus ■ Internal Datalink Transceiver (Narrowcast)	■ Cirrus SRV, SR20, SR22 ■ Diamond DA40 ■ Piper PA28, PA32	600-00072	530-00117-000
				530-00130-000
			600-00076	530-00132-000
			600-00101-000	530-00126-000
			600-00105-000	530-00137-000
				530-00137-001
600-00108-000	530-00170-002			
600-00108-000	530-00148-000			
700-00004-007	■ EX3000 Landscape MFD	■ Cirrus SRV, SR20, SR22	600-00108-000	530-00162-000
700-00004-008	EX5000 Landscape MFD ■ ARINC 429 Databus	■ Cirrus SRV, SR20, SR22	600-00108-000	530-00162-000
700-00004-009	■ EX3000 Landscape MFD	Aftermarket installations	600-00108-001	530-00162-001
700-00004-010	EX5000 Landscape MFD ■ ARINC 429 Databus	Aftermarket installations	600-00108-001	530-00162-001
700-00004-104	EX5000 Portrait MFD ■ ARINC 429 Databus ■ Internal Datalink Transceiver (Narrowcast)	■ Lancair Columbia 350, 400	600-00102-000	530-00129-000 530-00162-002
		■ Aftermarket installations	600-00102-001	530-00119-000
700-00030-005	EX5000 Landscape MFD ■ ARINC 429 Databus ■ Internal Datalink Transceiver (Narrowcast) ■ Radar	Piper PA46	600-00121-000	530-00170-000
600-00073	EX3000/EX5000 MFD Installation Manual	All		All

➔ Ensure that all the parts were received and sustained no shipping damage.

If damage occurs during shipping, the damaged shipping carton and packing material will help substantiate your claim to the shipping company. Retain the original shipping carton and packing material in case you need to ship the unit for service..



Do not open the MFD cover in any manner and do not remove the internal Compact Flash memory card, unless the operation is being conducted by authorized personnel using an approved Avidyne Service Bulletin. Otherwise, the Compact Flash memory or MFD may be damaged.

5 Installation Planning

This section contains the following information:

- Section 5.1, “Location and Viewing Angle” on page 13
- Section 5.2, “Cooling” on page 13
- Section 5.3, “Mounting the MFD” on page 13
- Section 5.4, “Electrical and Sensor Interfaces” on page 15
- Section 5.5, “Electrical Load Analysis” on page 17
- Section 5.6, “Datalink Antenna Installation Considerations” on page 17
- Section 5.4.2, “Weight and Balance” on page 16
- Section 5.7, “Wiring External Devices” on page 19

This section contains information for installing and wiring the MFD. All installation procedures should follow the acceptable practices, methods, and techniques of avionics installations as described in FAA Advisory Circulars. Use appropriate appendices for guidance with MFD dimensions and panel cutout requirements.

Installations not identified in applicable STCs may require additional substantiation. See Appendix D: *STC Permission* for information pertaining to STCs. Referring to an STC may assist in securing installation approval.

5.1 Location and Viewing Angle

The MFD is designed to be panel-mounted. Locate the MFD in a position on the panel where the pilot and co-pilot can both easily reach the knobs and controls to operate and view it from the proper viewing angle.

5.2 Cooling

The MFD uses two internal fans; an inlet and outlet fan, to provide adequate cooling.

- ➔ Be sure that there are at least 2 inches of clearance, top and bottom, to allow for proper air circulation.

5.3 Mounting the MFD

Before installing the MFD, carefully assess how you can most effectively position the MFD given space availability, viewing angle, and wiring considerations. Before starting the installation, develop an installation strategy by carefully reviewing all the installation instructions. The unique requirements of your aircraft will determine the specifics of the installation.

- To install the MFD, make a cutout hole in the cockpit panel:
 - For a Landscape MFD, see Appendix H: *Landscape Cutout Dimensions*. The Landscape MFD is held in place by four Dzus ¼-turn fasteners.
 - For a Portrait MFD, see Appendix I: *Portrait Cutout Dimensions*. The Portrait MFD is held in place by four captive 10-32 screws.

The fasteners require a panel thickness of 0.080" for proper engagement. Hole patterns and placements are illustrated in the corresponding appendices.



Do not exceed the recommended panel thickness, or the MFD may not fully seat. If communication between the MFD and any of the sensor interfaces is not established, ensure that the MFD is fully seated, and then check all sensor connections.

- ➔ A low resistance (0.5 Ohm) ground path must be established between the MFD chassis and airframe ground.

5.4 Electrical and Sensor Interfaces

28-volt DC electrical power must be supplied to the MFD. In aircraft with a 28-volt system, the MFD is usually connected to a non-essential avionics bus. Non-28-volt systems can use a regulated +28 VDC converter. The MFD does not have an on/off switch and will start as soon as power is applied. The MFD may be wired to the aircraft dimming bus to control front panel LED brightness via the cockpit panel brightness control. The MFD uses a single 78 pin High Density, D-sub connector for all power and electrical interfaces (See Figure 1, “Multi-Function Display Landscape and Portrait Rear Views,” on page 4).

5.4.1 Wiring Notes

Table 7: Electrical and Sensor Interface Wiring

Designation	Vendor	Part #	Description
P1	Positronic	DD78F10G00	78-Pin High Density Female D-Sub Connector
P2	Delta Electronics	4205-018-N995	50 Ohm Right Angle Plug BNC Connector

- **Power**—P1- input: 5 A @ 28 vdc.
 - Use 20 AWG for lengths greater than 3ft.
 - Use 22 AWG for P2 high-density sockets. Circuit breaker: 7.5 amp recommended.
 - For 14 vdc A/C, use 14 to 28 vdc converter (KGS Electronics RB-125, Ameri-King AK550-6 or similar with TSO-C71, output 5 A min. @ 28 vdc.)
- **Dimming**—P1-input—Use 22 AWG, connect to a/c instrument dimming bus. Supports any range 0-28 vdc. Connection to dimming-bus ground reference required.
- **ARINC 429**—P1-wire—Use 22 AWG twisted shielded pair, MS22759/18-22-2 or equivalent. Connect shield to P1 connector metallic backshell grounding screw with solder or crimp ring terminal.
- **ARINC 453**—P1-wire—Use 22 AWG twisted double shielded pair (Quadrax), (Bendix/King p/n 024-00064-0000) or equivalent.
 - Connect outer shield to P1 connector metallic backshell grounding screw with solder or crimp terminal ring.
 - Connect inner and outer shield to sensor connector metallic backshell grounding screw with solder or crimp terminal ring.
- **RS-232**—P2-wire—Use 22 AWG shielded triple, MS22759/18-22-3 or equivalent.
 - Connect a dedicated RS-232 signal ground from the sensor to the MFD.
 - Connect shield to P1 connector metallic backshell grounding screw with solder or crimp ring terminal.
- **Narrowcast Datalink Antenna**—J2-coax cable—Use M17/128-RG400, (Thermax/CDT p/n RGS-400) high temperature, 50 ohm, stranded core with 0.038 o.d., or equivalent
 - Terminate antenna end with BNC series plug connector.
 - See mechanical installation notes.
- **Shield Terminations**—Make shield termination as close as feasible to the protected signal wire terminations.

For more information, see Appendix J: *Wiring Diagram – Power, Dimming Bus, and Exceedance Horn* and Appendix L: *Wiring Diagram – Broadcast Datalink, Narrowcast Datalink, and Lightning Sensor*.


5.4.2 Weight and Balance

An aircraft Weight and Balance calculation is required as part of installation approval process.

For information about weight and balance, see Table 1, "MFD Technical Specifications," on page 6.

For technical drawings, including center of gravity, see the appropriate appendix:

- Appendix E: *Landscape EX5000 Dimensions*
- Appendix F: *Landscape EX5000 with Integrated Datalink Dimensions*
- Appendix G: *Portrait EX5000 Dimensions*

 Follow the guidelines as established in AC 43.13-1B, Chapter 10, Section 2.

5.5 Electrical Load Analysis

Before installing the MFD, perform an electrical load analysis that is specific to the aircraft. This analysis should be in accordance with AC 43.13-1B, Chapter 11.

For the EX3000/EX5000, use the following values to support the analysis:

- **28 VDC Nominal Load**—2 A
- **28 VDC Maximum Load**—5 A

Ensure that the power input to the MFD is circuit-protected in accordance with the guidelines of AC 43.13-1B, Chapter 11, Section 2.

➔ A 7.5 amp circuit breaker is recommend for use with the MFD.

5.6 Datalink Antenna Installation Considerations

For the EX3000 and EX5000, Avidyne's two-way Narrowcast Datalink system utilizes a built-in ORBCOMM transceiver to provide weather data tailored for the aircraft's current flight plan.

The EX5000 additionally supports the XMD076 XM WX Receiver from Heads Up Technologies, which is a Broadcast Datalink system. The EX5000 can operate with two different Datalink systems simultaneously. With both Narrowcast and Broadcast Datalink systems installed, the EX5000 can provide Avidyne's unique Multilink features, which include text messaging, flight tracking, and enhanced weather coverage.

The Narrowcast datalink system is designed to work with a VHF antenna covering the band from 137 MHz to 151Mhz. If an existing comm antenna is in the preferred location for a datalink antenna, consider using the Avidyne DC50 Datalink Coupler and replacing the existing comm antenna with a combined VHF/datalink antenna. Please contact Avidyne for details.

The Broadcast datalink system operates in the S-band at 2.3 GHz. Several types of combination antennas are available in addition to the standalone XM antenna. Contact Heads Up Technologies or Comant, Inc. for details on the available antennas.

5.6.1 Narrowcast Antenna Details

To improve Narrowcast reception performance and minimize potential damage to the EX5000 Narrowcast datalink transceiver, an antenna design with a DC-short between the antenna center conductor and shield termination is required. The following commercially available antennas satisfy this requirement:

Manufacturer	P/N	Application
Comant	CI 177-4	Max 210 kts indicated at 10,000 ft.
	CI 248-30	Max 210 kts indicated at 10,000 ft.
	CI 108-1	Max 600 kts TAS at 35,000 ft.
	CI 211-1	Max 600 kts TAS at 35,000 ft.
Sensor Systems	S65-8280-10	Max 600 kts TAS

➔ Refer to manufacturers for detailed performance specifications and aircraft applicability

Due to the low signal levels inherent with satellite communications, adhere to the following guidelines and recommended practices:

- Mount the Narrowcast antenna on the aircraft top-side, as high on the fuselage as practical. Mount the antenna no closer than 36 inches to other transmitters. Relocation of other less location-sensitive transmitters may be necessary to achieve optimal datalink performance.

- On radar-equipped aircraft mount the antenna as far aft as possible, but no closer than 36 inches from vertical obstructions (ex. vertical stabilizer). Reflected radar energy may cause damage to the datalink transceiver.
- Install in accordance with the applicable portions of AC43.13 and antenna manufacturer instructions.

For more information, see Appendix S: *Narrowcast Datalink Antenna Mounting*.



This Installation Manual does not contain approved data for type-specific aircraft antenna installations.

5.6.2 Broadcast Antenna Details

- Mount the antenna no closer than 36 inches to VHF-Comm transmitters of 15 Watts or less. For more powerful transmitting antennas, separation should be a minimum of 48 inches.
- If an XM/VHF-Comm combo antenna is being installed and is replacing the operation of an existing approved antenna installation, the existing separations are acceptable. SATCOM antennas transmit at 40 Watts and should be separated by the largest distance possible. This distance must be a minimum of 36 inches.
- When routing the XM antenna cable, the maximum possible separation from transmitter antenna feed cables must be considered, especially with SATCOM and other high power transmitters. Antenna feed cables of VHF transmitters of 15 Watts or less should require only a minimal separation.
- Receive-only antennas such as GPS and ADF do not produce interference and require little separation. The XM antenna should be placed as close as possible to these types of antennas to gain separation from transmitters.



For further details, including installation pre-testing, please refer to the Heads Up Technologies *XMD076 XM WX Receiver Installation Manual*, document number XMD076-3.

5.7 Wiring External Devices

5.7.1 GPS and FMS Wiring

GPS data may be received via a GAMA 429 Graphics interface (EX5000 only) or a RS-232 interface. See the appropriate wiring diagram and the specific installation instructions for your particular GPS. For more information, see Section 6.6, “Traffic Sensor Setup ” on page 36.

Note: For the EX5000, Avidyne recommends using an GAMA 429 Graphics connection for FMS/ GPS. The GAMA 429 Graphics input can contain heading data, necessary for overlay capabilities as well as approach procedures and the display of curved segments. For more information, see Section 6.4.1, “GAMA 429 Graphics Setup (EX5000 only)” on page 27.

5.7.2 Dual GPS Setup with GAMA 429 (EX5000 only)

The EX5000 can receive information from two GAMA 429 Graphics capable GPS units. Connect the GPS according to the wiring diagram in Appendix K: *Wiring Diagram – GPS/FMS*.

Select a different ARINC port for GPS 2.

5.7.3 Broadcast Datalink Receiver Wiring

See the wiring diagram in Appendix L: *Wiring Diagram – Broadcast Datalink, Narrowcast Datalink, and Lightning Sensor* and the *HeadsUp XMD076 Installation Manual*. Connect the RS-232 port of the Datalink receiver to any of the available RS-232 ports of the MFD as shown. (RS232 #4 is the default assignment, but not mandatory.) Use shielded wiring, terminated at each end to chassis ground. Contact Heads Up Technologies at www.heads-up.com for information on the *HeadsUp XMD076 Broadcast Datalink Receiver*.

5.7.4 Narrowcast Datalink Antenna

For MFDs with internal Narrowcast Datalink transceivers, see the wiring diagram in Appendix L: *Wiring Diagram – Broadcast Datalink, Narrowcast Datalink, and Lightning Sensor*. Connect MFD J1 with an approved ORBCOMM Datalink antenna using RG-400U double-shielded coax cable MFD as shown. Contact www.Comant.com for a broad selection of ORBCOMM antennas and multi-system antennas.

5.7.5 Lightning Sensor Wiring

See the wiring diagram in Appendix L: *Wiring Diagram – Broadcast Datalink, Narrowcast Datalink, and Lightning Sensor* and the *WX-500 Installation Manual*. Connect the RS-232 port of the WX-500 to any of the available RS-232 ports of the MFD as shown. Use shielded wiring, terminated at each end to chassis ground. Connect the WX-500 jumpers for correct stabilization source and antenna position. These settings will be also be set in the MFD and must agree.



Caution: It is extremely important that you perform noise mapping and ensure that the proper grounds have been installed and checked after the Lightning interface is installed. Ensure that the Goodrich WX-500 is installed and set up according to its installation instructions. Excessive noise can produce erroneous lightning strikes.

5.7.6 Traffic Sensor Wiring

The MFD supports a number of different traffic sensors. Be sure to follow the instructions for the specific traffic sensor installed on the aircraft. For configuration information for all traffic sensors, see Appendix M: *Wiring Diagram – Traffic Sensors*.

- **TAS** (L-3 SkyWatch: SKY497, TRC497 and TRC899)—If using a TRC 497, ensure the software revision is 1.6 or later. Connect data and TTL control lines and configure as shown in Appendix M: *Wiring Diagram – Traffic Sensors*. Use shielded wiring and terminate as shown.
- **TAS/IHAS** (Bendix/King Honeywell: KTA 870)—Connect data lines and configure as shown in Appendix M: *Wiring Diagram – Traffic Sensors*. Use shielded wiring and terminate as shown.

- **TCAD** (Ryan: 9900B and 9900BX)—Connect aircraft power to the Ryan TCAD sensor as described in the Ryan Installation manual. Connect and configure as shown in Appendix M: *Wiring Diagram – Traffic Sensors*. Use shielded wiring and terminated as shown.

Note: Ensure the Ryan TCAD software revision is 1.07 or later.

- **TIS** (Garmin: GTX-330, GTX-330D)—Ensure the Garmin software revision is 3.03 or higher. Connect data lines and configure as shown in Appendix M: *Wiring Diagram – Traffic Sensors*. Use shielded wiring and terminate as shown.

Wire power to the Garmin GTX -330 transponder as directed in the *Garmin Installation Manual*.

Note: The MFD does not provide power to the GTX sensor. TIS uses an ARINC 429 data connection between the transponder and the MFD. Make this connection after consulting the wiring diagrams in the appendix of this document and the GTX-330 installation manual.

5.7.7 TAWS Wiring

(Honeywell: KGP 560) – Ensure the Honeywell KGP 560 has part number 965-1198-005. Connect as shown in Appendix N: *Wiring Diagram – TAWS*.

The GPWS software must support KC Picture Bus (KCPB) Phase 2. See the Honeywell GPWS documentation for applicable software configurations. If the GPWS interface is operating properly, there will be no system status messages.

5.7.8 Map Configuration

Wiring for Map can be done in a number of different ways, depending on the aircraft configuration and options. After you determine the appropriate configuration

Configuring Map Heading from a GPS/FMS

The MFD can receive heading from an GPS/FMS via an ARINC 429 bus. The source of heading is usually a gyro transmitting synchro or stepper to SkyWatch or StormScope sensor connected to the GPS/FMS, as illustrated in Figure 3.

See Appendix K: *Wiring Diagram – GPS/FMS* for the correct pinouts to the MFD.

When checking the GPS/FMS connection to the EX5000, the GPS/FMS must have a valid position fix (latitude/longitude).

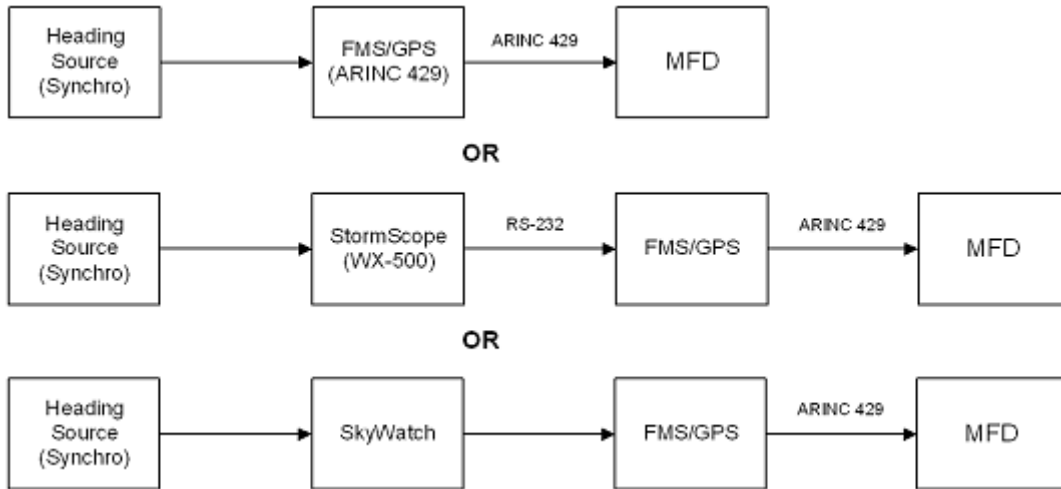


Figure 3: Heading Configuration with GPS/FMS

Configuring Map Heading from StormScope

The MFD is capable of receiving heading data from the WX-500 StormScope via RS-232. Configure the MFD as shown in Figure 4:

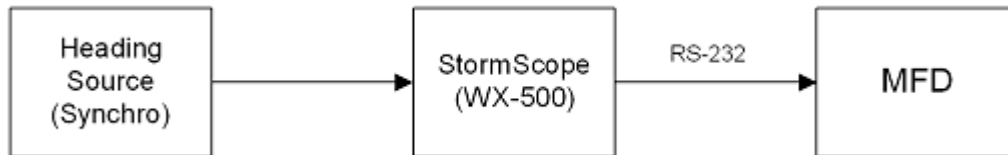


Figure 4: Heading Configuration with StormScope

Configuring Map Heading from TAS (Traffic)

The EX5000 is capable of receiving heading data from a TAS system. Configure the MFD as shown in Figure 5. See Appendix M: *Wiring Diagram – Traffic Sensors* for the correct pin outs to the MFD.



Figure 5: Heading Configuration with SkyWatch

5.7.9 Radar Sensor Wiring

See Appendix O: *Wiring Diagram – Radar Sensor* for the wiring diagram.

6 MFD Feature Setup and Checkout

This section contains the following information:

- Section 6.1, “Preliminary Test” on page 22.
- Section 6.2, “Optional MFD Function Activation Utilities” on page 24
- Section 6.3, “Using the Maintenance Mode Page” on page 25
- Section 6.4, “GPS/FMS Navigators Setup” on page 27
- Section 6.5, “Lightning Sensor Setup” on page 33
- Section 6.6, “Traffic Sensor Setup ” on page 36
- Section 6.7, “TAWS Setup (Optional)” on page 42
- Section 6.8, “Radar Sensor (700-00030-005 EX5000 only)” on page 44
- Section 6.9, “Engine Instruments Setup” on page 53
- Section 6.10, “Aircraft Setup” on page 57
- Section 6.11, “Map Setup” on page 62

6.1 Preliminary Test

- Power up the MFD for post installation evaluation and configuration. To do so:
 1. Turn on the MFD by applying power to the aircraft electrical bus supplying the MFD.

Note: Read the appropriate *Pilot's Guide* for explanations of various functions.

2. The green LED control lights behind all the front panel controls should light up.
3. After the initial power up, the software will load and go through several checks. During this startup sequence the screen displays the text “Initializing-Please Wait...”.
4. The startup sequence is finished when the “Press any bezel key to Continue...” message displays.

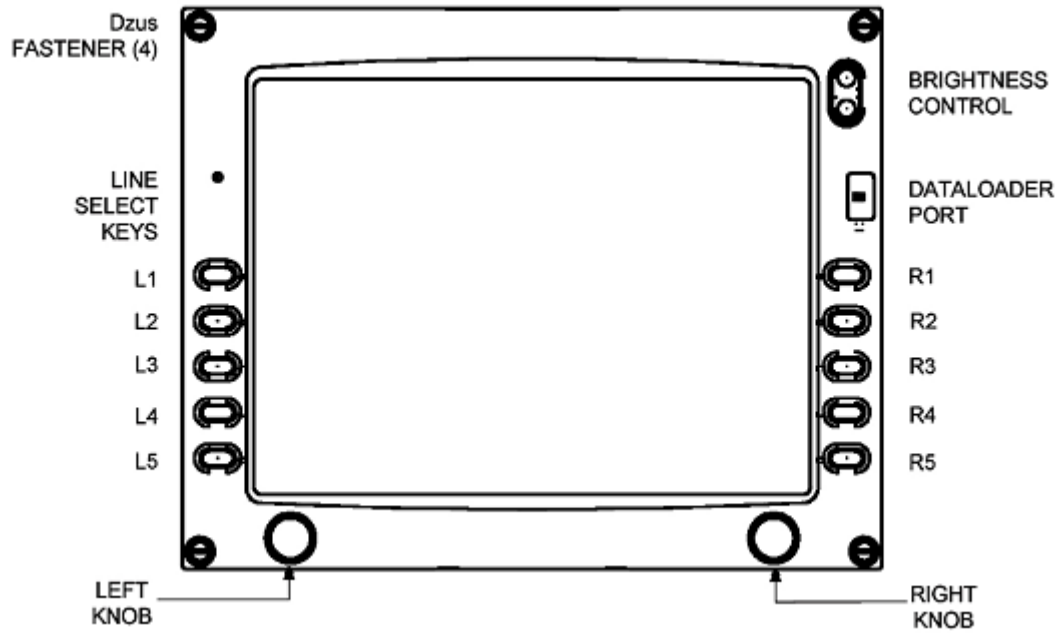





Figure 6: EX3000/EX5000 Landscape Front View

6.2 Optional MFD Function Activation Utilities

Avidyne provides the ability to install certain optional functionality using single-use activation utility disks. This section describes the installation procedure for these utilities.

Note: These utilities are for use for software part number 530-00162-() and 530-00170-() only.

-  The Activation Utilities are available for use only by avionics repair facilities performing MFD installations, MFD software upgrades, and MFD function activation on installed MFD software.
-  To activate the CMax, TAWS, and Broadcast Datalink, MFD functions:
1. Obtain the Activation Utility disk for each feature you want to install from Avidyne or an authorized aircraft manufacturer:
 - **MFD Single-Use CMax Activation Utility**—See Avidyne Service Bulletin 601-00004-035. This utility activates the MFD CMax™ function. This utility is for use in FAA-approved aircraft repair stations only. This utility is for use for software part numbers 530-00162-() and 530-00170-() only.
 - **MFD Single-Use TAWS Activation Utility**—See Avidyne Service Bulletin 601-00004-037. This utility activates the MFD TAWS function. This utility is for use in FAA-approved aircraft repair stations only. This utility is for use for software part numbers 530-00162-() and 530-00170-() only.
 - **MFD Single-Use Broadcast Activation Utility**—See Avidyne Service Bulletin 601-00004-036. This utility activates the MFD Broadcast Datalink function. This utility is for use in FAA-approved aircraft repair stations only. This utility is for use for software part numbers 530-00162-() and 530-00170-() only.

These utility disks can be run only once to activate a single function on an MFD. After a single use they will not run on an MFD.
 2. Follow the instructions in the accompanying service bulletin for each Activation Utility.
-  After activation, the utility disks may be erased and reused for any purpose.

Note: For Piper PA-28 aircraft only; if the EMax™ utility has been deactivated, using the Factory Defaults from the Data Block Edit Page adds two erroneous lines to the bottom of the left data block which read:

Deice Vacuum ---.

To avoid confusion, manually remove these data block entries. For more information, see the *Piper PA-28 /PA-32 Pilot's Guide*, 600-00105-000.

6.3 Using the Maintenance Mode Page

The MFD Maintenance Mode Page contains the setup pages for each function.

- To start using the Maintenance Mode Page, apply power to all the sensors that interface with the MFD, including the GPS, the Lightning and Traffic sensors, Engine interface unit, and TAWS sensor.

6.3.1 Entering Maintenance Mode

- To access Maintenance Mode, press the buttons from the Aux or Setup Page as follows:
 1. Turn on the MFD by applying power to the aircraft
The system will begin its normal start up sequence
 2. At the prompt, "Press any bezel key to continue", press any button.
 3. Rotate the left knob clockwise until the Aux or Setup Page displays.
 4. Simultaneously press and hold buttons L1 (top left) and L3 (3rd down on the left) (See Figure 6 on page 23) for at least 5 seconds.

The Maintenance Mode Page displays:

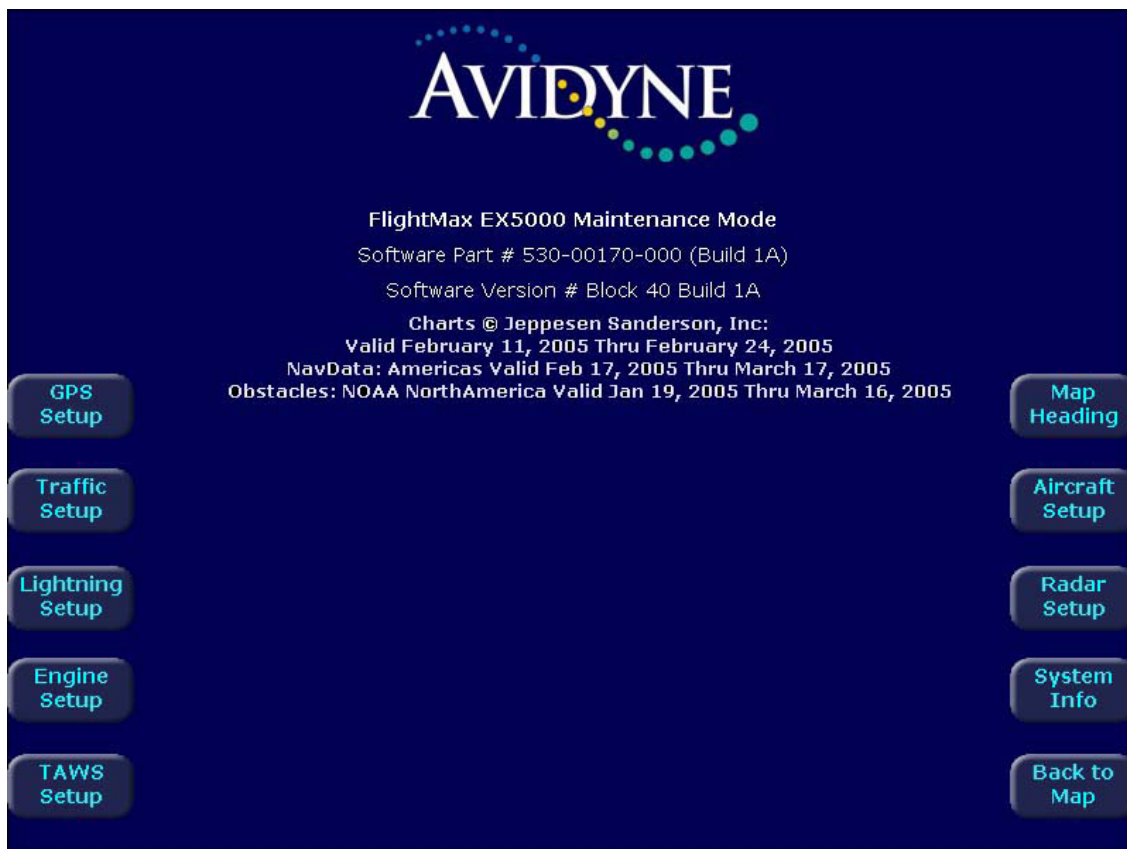


Figure 7: Maintenance Mode Page

6.3.2 Working in Maintenance Mode

As shown in Figure 7, the Maintenance Mode Page contains setup buttons for the EX5000 features. When you select a Setup feature, the appropriate page displays. From the Setup page, the following options will always be available:

- **Select Knob**—Rotate to change the highlighted parameter box.

- **Change Knob**—Rotate to select a parameter to modify from the highlighted box.
 - **Save**—Store any setup changes made since entering the page and return to the Maintenance Mode Main page.
 - **Cancel**—Return to the Maintenance Mode Main page without saving your changes
- ▶ When working in Maintenance Mode:
1. After making changes to each setup page press *Save* to save your changes and return to the main menu.
To exit without saving your changes, press *Cancel*.
 2. Changes in the setup pages do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.
- ➔ Avidyne suggests that you restart the system after you make changes to each setup page.
If no changes were made, press *Back to Map* to exit Maintenance Mode.

6.4 GPS/FMS Navigators Setup

The MFD can interface with several types of GPS/FMS systems. Table 9 on page 31 lists most of the GPS/FMS systems that interface with the MFD. Table 9 includes information about data formats available and GPS configurations.

Note: Use the matrix as a general guideline only. GPS manufacturers are constantly improving and upgrading their products. Always see the Installation Manuals that come with the GPS/FMS to confirm configuration and setup parameters.

There are two data formats that the MFD uses to interface with the GPS:

- GAMA 429
- RS-232

Some GPSs can only output in one format, while others are capable of outputs in either format. EX3000 MFDs support RS-232 interfaces only.

EX5000 MFDs support both GAMA 429 and RS-232. However, GAMA 429 Graphics is the only data format from the GPS capable of providing heading information if the GPS is being used as the heading source (see Section 6.11, “Map Setup” on page 62 for a complete explanation on setting up the various heading configurations within the MFD).

6.4.1 GAMA 429 Graphics Setup (EX5000 only)

If your GPS is capable of GAMA 429 Graphics output, use the wiring diagram in Appendix K: *Wiring Diagram – GPS/FMS* when installing the MFD.

Note: Using a 429 graphics output allows for the display of curved flight segments and approach data, if that data is available.

► To setup a GAMA 429-capable GPS:

1. From the Maintenance Mode Page, press *GPS Setup*. The GPS Setup Page displays:

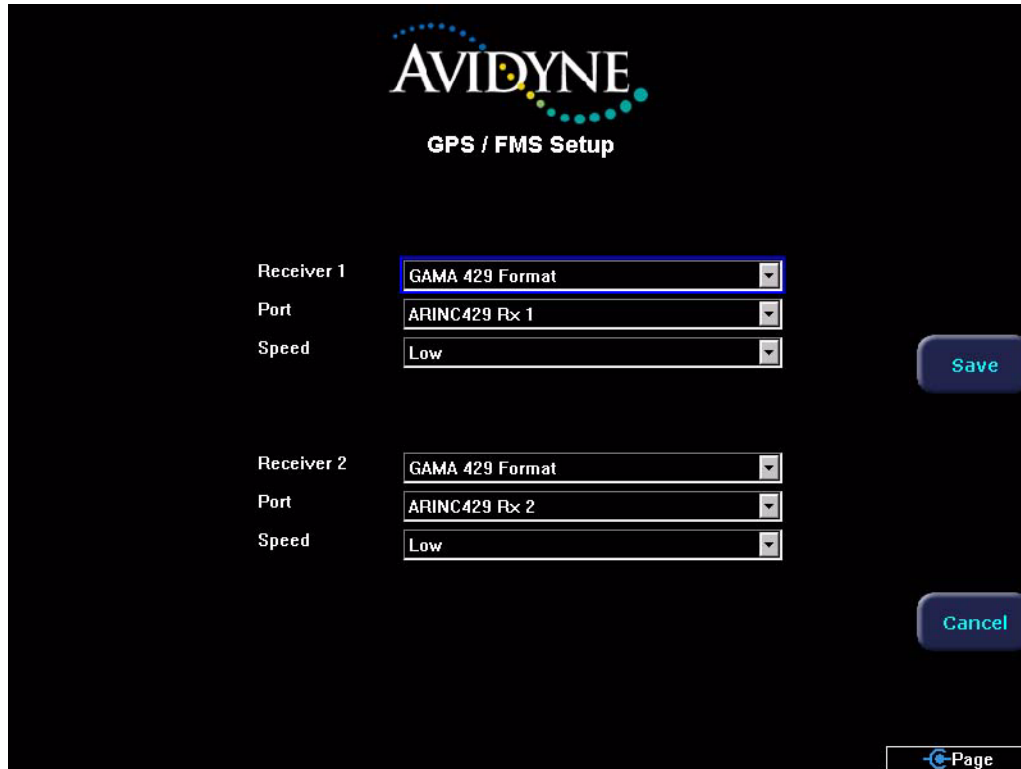


Figure 8: GPS Setup, GAMA 429

2. Configure the following:

- **Receiver**—Select GAMA 429 Graphics Format.
- **Port**— Select ARINC1.

Note: Selecting Port=None indicates that a GPS is not connected to the MFD. In this case, the MFD software does not expect GPS input.

- **Speed**—There are two speeds available, High and Low. See Table 9, “GPS/FMS Manufacturer’s Matrix,” on page 31 to determine the correct speed for your system.
3. When you are done, press *Save* to save your changes. Press *Cancel* to exit without saving changes.
 4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.4.2 Dual GPS Setup with GAMA 429 (EX5000 only)

The EX5000 can receive information from two GAMA 429 Graphics capable GPS units. Connect the GPS according to the wiring diagram in Appendix K: *Wiring Diagram – GPS/FMS*, using a different ARINC port for GPS2. Follow the setup instructions in Section 6.4.1.

6.4.3 RS-232 Setup

If your GPS uses an RS-232 configuration, use Appendix K: *Wiring Diagram – GPS/FMS* for wiring information.

Note: An RS-232 interface does not provide for heading data from the GPS/FMS.

► To set up the MFD for the RS-232 Interface:

1. From the Maintenance Mode Page, press *GPS Setup*. The GPS Setup Page displays.
2. Configure the interface as follows:
 - **Receiver**—Select the receiver-type for your GPS/FMS system. Determine the RS-232 output format using Table 9, “GPS/FMS Manufacturer’s Matrix,” on page 31 or your GPS/FMS Installation manual. Select one of the following RS-232 formats:
 - ◆ NMEA 0183
 - ◆ King/Aviation Format
 - ◆ Northstar Format
 - **Port**—Select RS232 1, or as wired.
 - **Baud**—Select the highest-possible baud rate for your GPS/FMS system. See the appropriate GPS/FMS Installation manual or see Table 9, “GPS/FMS Manufacturer’s Matrix,” on page 31 to determine for the maximum speed. The following speeds are available: 1200, 2400, 4800, 9600, 19200, or 38400.

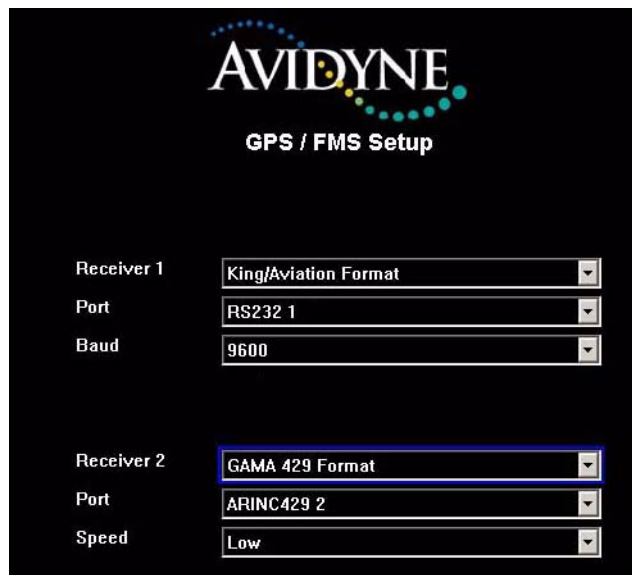


Figure 9: Dual GPS Setup, RS-232

3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.4.4 Dual GPS Setup with RS-232

The MFD can interface with two RS-232 GPS units, or with a combination of one RS-232 GPS unit along with one ARINC 429-capable GPS unit. Connect the MFD ports as appropriate, using Appendix K: *Wiring Diagram – GPS/FMS*. Follow the set up instructions in Section 6.4.1 and Section 6.4.3.

6.4.5 GPS/FMS Communications Check (Messages)

After the MFD has been restarted, any of the following messages may appear in the main viewing screen or in the message bar and Aux or Setup Page.

Table 8: GPS/FMS Communications Messages

Message	Meaning
Nav Source: Is Not Communicating	No RS-232 or ARINC 429 GPS data is being received. Check wiring and COM port setting.
Nav Source: Data is Not Valid	Data is being received from the external GPS. However, insufficient information is available to determine position. Aircraft could be in the hanger or the GPS may not have determined its “fix” or location.
Nav Source: Data is Valid	The MFD is receiving valid position data from the GPS/FMS.
Nav Source: Data Format Error	Data is being received, however the MFD does not recognize the data as the format selected. May indicate a baud rate or receiver type error.
Nav Source: No Port selected	The RS232 port setting in the GPS setup dialog is set to NONE. To correct this, choose the port to which the GPS is connected, typically RS232 1.
Nav Source: Reconnecting	This message is displayed when data between the MFD and the GPS is being synchronized.
Nav Source: Can't Open Port	Another device is configured for the same port. Check the Setup page for all devices. Typically the GPS/FMS is configured for Port1 (for RS-232) or ARINC1 (for ARINC 429). If a second GPS/FMS is being used it is configured for Port2 or ARINC2.
Heading Data is Not Valid	Heading data is no longer available from the GPS/FMS. Will only appear if the GPS/FMS is being used as your heading source.
Heading Data is Valid	Heading data has been restored.

6.4.6 GPS/FMS Manufacturer's Matrix

Table 9: GPS/FMS Manufacturer's Matrix

GPS/FMS	RS232	RS-232 Formats	ARINC 429	Baud/Data Rate	Heading Output	GPS/FMS Configuration	DME ARC
KLN-89B	Yes	King/Aviation	No	Serial – 9600	No		Flight Plan ends at entry point
KLN-90B	Yes	King/Aviation	Yes	Serial – 9600 ARINC – Low	ARINC only		Flight Plan ends at entry point
NorthStar M1, M2, or M3	Yes	NorthStar	No	1200 or 9600	No	The Northstar default baud rate is 1200. Better performance and extended data is achieved by setting it to 9600 (1200 will work). See the NorthStar manual to change the baud rate	
Trimble 2000, 2101	Yes	King/Aviation	Some models	9600	Not Available	Use RS-232 port 2 No Parity, 8 bits	Sends multiple waypoints around arc
Garmin 150, 250	Yes	King/Aviation	150- No 250-No	Serial – 9600 ARINC – Low	ARINC only	For the 250 DO NOT use the W/O GAMA mode, use the EFIS mode. If using the NMEA format use the 2nd channel.	
Garmin 155, 165	Yes	King/Aviation	No	9600	No		
Garmin 400 Series	Yes	King/Aviation	Yes	Serial – 9600 ARINC – Low	ARINC only	For RS-232 operation, set the Garmin to Aviation Output. With ARINC 429 operation use GAMA with Graphics	With RS-232 the arc is depicted as a straight line.
Garmin 500 Series	Yes	King/Aviation	Yes	Serial – 9600 ARINC – Low	ARINC only	For RS-232 operation, set the Garmin to Aviation Output. With ARINC 429 operation use GAMA with Graphics	With RS-232 the arc is depicted as a straight line.

Table 9: GPS/FMS Manufacturer’s Matrix (Continued)

GPS/FMS	RS232	RS-232 Formats	ARINC 429	Baud/Data Rate	Heading Output	GPS/FMS Configuration	DME ARC
Universal UNS-1B	No		Yes	ARINC – High	Yes		
Honeywell GNS-XLS	No		Yes	ARINC – High or Low	Yes	For GNS-XLS Configuration Programming set as follows: GAMA ARINC 329 Bus Data Set= 1. Basic EFIS DME Arc Style=1. Arc as Gap	The arc is depicted as a gap
Morrow Apollo GX-50	Yes	King/Aviation	No	9600	No	Use the Moving Map format.	

6.4.7 GPS/FMS Installation-Specific Issues

- **Garmin Installation**—Some Garmin units provide two RS-232 formats for GPS data. One is an “aviation” format. The other is an RS232 “plotting” format. The “aviation” format provides a “King” format 9600 baud output at a higher repetition rate and is the preferred RS-232 output. Consult the specific Garmin GPS installation manual for full details.
- **Northstar Installations**—Many Northstar units have a hidden setup screen to change configuration parameters to make it difficult to change in flight. See the Northstar installation manual for the specific codes to enter to set this up correctly.
- **Trimble 2000A Installations**—This unit has a hidden setup screen documented in the installation manual to change configuration parameters to make it difficult to change in flight. See the Trimble Installation manual for the specific codes to enter.



Trimble units have been observed to sometimes lose configuration when the aircraft battery is discharged

6.5 Lightning Sensor Setup

The MFD supports the WX-500 lightning sensor from L-3 Communications.

Table 10 describes the configuration options.

Table 10: Lighting Sensor Configuration Options

Option	Values	Notes
Operating Mode	Weather	Normal operating mode.
	Noise Monitor	Supports noise mapping tests.
	Demo	Used to learn lightning operations.
Stab Type	Synchro to WX-500	The WX-500 will use the synchro supplied heading data connected directly to the WX500.
	Stepper to WX-500	The WX-500 will use stepper data from a remote compass system.
	Use Map Heading/Track	The WX-500 will use orientation information supplied by the EX5000 based on the Map Heading configuration, described in Section 6.11, "Map Setup" on page 62.
Enable Lightning Ahead Warning?	Check/Clear	When checked, the EX5000 issues lightning ahead warning messages.
Antenna on Top?	Check/Clear	Check if the lightning sensor antenna is located on top of the aircraft and must correspond with the WX-500 jumper settings.

6.5.1 Lightning Sensor Setup

► To configure Lightning:

1. From the Maintenance Mode Page, select Lightning Setup. The Lightning Setup Page displays:



Figure 10: Lightning Setup Page

2. Set the following options:

- **Sensor**—Select between the lightning sensor and a simulation program. The normal selection is WX-500. The simulation setting is used in conjunction with the demo mode to simulate lightning operations on the ground.

- **Operating Mode**—The normal operating mode is weather. Demo is used in conjunction with demo mode to simulate lightning operations. Noise Monitor mode is used during noise mapping tests. See the WX-500 installation manual for testing procedures.
- **Port**—Set the MFD RS-232 port that is connected to the WX-500 to match the aircraft wiring.
- **Stab Type**—Select the source of stabilization for use by the WX-500. Stabilization aids in correctly positioning strikes when the aircraft is turning. The choices are:
 - ◆ **Synchro to WX500**—a remote compass system that generates and transmits synchro signals received by the WX-500. This heading data can also be used by the MFD to orient the map.
 - ◆ **Stepper**—a remote compass system that generates and transmits stepper signals received by the WX-500. This heading data can also be used by the MFD to orient the map. See the Map Heading Setup section.
 - ◆ **Use Map Heading/Track**—The WX-500 receives heading or track data from the MFD via RS232. Heading will be sent from the MFD only if GPS/FMS is the heading source via ARINC 429.

The best method of stabilization is a heading source (synchro or stepper input to the WX-500 or Map Heading). The next best method is Track. The wiring and WX-500 jumpers must agree with the setup on the MFD.

- **Enable Lightning Ahead Warning?**—Enables display of the Lightning Ahead warning message in the message bar when checked and disables it when not checked.
- **Antenna on Top?**—Indicates that the sensor antenna is mounted on top of your aircraft when checked and that it is mounted on the bottom of your aircraft when not checked.

Note: The antenna position setting and stabilization source agree with the WX-500 jumper setting and the physical mounting location of the antenna.

3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

In addition to the settings on the Lightning Setup Page, the following buttons may be available:

- **WX-500 Diags**—Allows access to the WX-500 diagnostic modes. See the *WX-500 Installation Manual* for information about how to verify WX-500 software versions, wiring configurations, antenna environment, and fault log (not available on all software releases).
- **Self Test**—Runs the WX-500 Self Test and reports Pass or Fail. See the *WX-500 Installation Manual* for information about testing and the interpretation of the results (not available on all software releases).

6.5.2 Lightning Sensor Checkout


After the MFD has been restarted, any of the following messages may appear in the main viewing screen or the message bar and Setup page.

Table 11: Lightning Sensor Messages

Message	Meaning
Lightning Sensor is Operating Normally	Verifies that strike data to the MFD is valid.
Lightning Sensor in Demo Mode	Demo mode has been selected as the operating mode from the Lightning Setup Page.
Lightning Sensor is in Noise-Monitor Mode	Noise-Monitor mode has been selected as the operating mode from the Lightning Setup Page.
Lightning Sensor in Test Mode	Test mode has been selected as the operating mode from the Lightning Setup Page.
Lightning Sensor ERROR	The sensor system has reported an error that may mean current data is incomplete or erroneous. The error may clear.
Lightning Sensor has FAILED	The sensor system has reported an error that may mean current data is incomplete or erroneous. The error will not clear until power is removed from and reapplied to the sensor system.
Lightning Sensor is Not Communicating	Communication between the Lightning sensor to the MFD has been lost. The wiring may be incorrect, the MFD setup may not match the wiring or the sensor may have an error.
Lightning Ahead	The Lightning Ahead option has been checked on the Lightning Setup page. Displayed when a Lightning Ahead condition exists.
Lightning Heading Source Failed	Heading data is no longer available from the WX-500. Strike data may still be valid. Will only appear if the WX-500 is used as the heading source.
Lightning Heading Source OK	Heading data has been restored.
Stuck mic-PLEASE CHECK	Check your COM transmitters for indication of a stuck mike.
Lightning Antenna Location Changed	There may be an inconsistency between the antenna location jumper setting and the software configuration. This message should only appear during installation.

Lightning Sensor Noise Mode

When operating the Lightning sensor in Noise Monitor mode, the Lightning button on the Map page will display “Noise” as the current Lightning state.

 Do not press the button in this state, or it may suppress lightning display unnecessarily.

See the operating guide for the Lightning Sensor for more information.

If no lightning strikes are shown at all during noise testing, press the button until it says Display Off, then press once more to return to the proper Noise mode display.

6.6 Traffic Sensor Setup



The EX5000 only supports the listed Traffic sensors. If a traffic sensor not on the supported list is connected to the MFD some of the data may display but its accuracy and traffic sensor control functions may be incorrect or inoperable. Display of traffic sensor data is not a guaranty of correct traffic sensor installation and configuration.

The aircraft should be equipped with one of the following Traffic Sensors. Follow the setup instructions for the appropriate sensor:

- For TAS, see Section 6.6.1, “TAS (SkyWatch & Bendix/King) Setup” on page 37.
- For TCAD, see Section 6.6.4, “TCAD Setup” on page 38.
- For TIS, Section 6.6.7, “TIS Setup” on page 40.

Table 12 describes the system configuration options (option availability depends on the EX5000 configuration ordered):

Table 12: Traffic Setup Configuration Options

System	Option	Values	Notes
TAS	External Controller?	Check/Clear	Check this box if a dedicated external Skywatch controller is installed. With this box checked the EX5000 does not initiate Skywatch standby or Self Test functions.
TCAD	Shields	Terminal Standard Enroute	
	Range	Terminal	0.5 – 1.5 nm
		Standard	1 – 3 nm
		Enroute	2 – 15 nm
	Height	Terminal	200 – 1000 ft.
		Standard	500 – 1500 ft.
Enroute		1000 – 2000 ft.	
TIS-G	None		

6.6.1 TAS (SkyWatch & Bendix/King) Setup

SkyWatch uses an ARINC 429 data connection between the TRC (Transmitter/Receiver Computer) and the MFD.

► To set up the TAS Traffic Sensor:

1. From the Maintenance Mode Page, select Traffic Setup. The Traffic Setup Page displays:



Figure 11: TAS selection on Traffic Setup Page

2. Set the following options:

- **Sensor**—TAS
- **Port**—Select the MFD ARINC 429 port to which the TAS sensor is wired.
- **TAS Type**—Skywatch or Bendix/King.

Note: Check the wiring considerations discussed in Section 5.7.6, “Traffic Sensor Wiring” on page 19.

- **External Controller?** (SkyWatch only)—If this box is checked, control of Standby/Operate and Self Test functions is not performed by the MFD but by the SkyWatch display or a GPS. Only one device may control the Standby/Operate and the Self Test functions; therefore they are not available on the MFD when the External Controller box is selected.

3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*. If needed, see Table 14, “Traffic Messages,” on page 41.

6.6.2 TAS (SkyWatch) Checkout

For TAS (SkyWatch), Self Test can only be performed from STANDBY mode and will return to STANDBY mode upon successful completion of the Self Test.

➤ To perform a Self Test:

1. With Traffic in Stand By, rotate the left knob and select the Setup Page.
2. Select Traffic Self Test. The following actions occur:
 - The Map Page displays.
 - The Sensor Status indicates that the sensor is in “Test” and a Traffic test pattern appears on the display.

If the Self Test fails, an error message is generated and displayed on the MFD screen. See the *SKY497 Installation Manual* for explanations and fault isolation procedures.

➤ To test the Sky497 installation:

1. Use the alternate display procedure described in Appendix E of the *SKY497 Installation Manual*. A terminal device using a RS-232 serial data cable is needed for these setup procedures.
2. See Appendix D in the *SKY497 Installation Manual* for information about configuring the terminal device. Any computer with RS-232 terminal emulation software (e.g., Procomm, HyperTerminal, etc.) may be used as the terminal device.

6.6.3 TAS (Bendix/King) Checkout

- To test the TAS (Bendix/King) installation, verify correct communication by monitoring the Message List on the Setup page for the following message: “Traffic Sensor Operating Normally”.

Note: The MFD does not command the KTA870 in Self Test mode. Use the KTA870 control panel if installed. See the *KTA870 Installation Manual* for fault isolation procedures.

6.6.4 TCAD Setup

The MFD optionally supports Ryan 9900B and 9900BX TCAD sensors.

Note: The MFD does not provide power to the Ryan sensor. TCAD is interfaced to the MFD via RS232.

- ▶ To set up the TCAD Traffic Sensor:

1. From the Maintenance Mode Page, select Traffic Setup. The Traffic Setup Page displays:

Figure 12: TCAD selection on Traffic Setup Page

2. Set the following options:

- **Sensor**—TCAD.
- **Port**— Select the MFD RS232 port to which the TCAD sensor is wired.
- **TCAD Type**—Select either 9900B or 9900BX, corresponding to the installed TCAD sensor unit.
- **TCAD Shields**—When interfaced with the TCAD 9900B, you can set shield sizes for Terminal, Standard, and Enroute. See Table 13 in this manual for settings.

Note: TCAD Shield sizes are only adjustable with the TCAD 9900B.

Some software versions do not allow you to select TCAD type. If the option is not available, all TCAD sensors will use the shield size settings described in Figure 13 on page 40.

- ▶ See the *Ryan TCAD 9900-Series Installation Manual* for wiring procedures and information about shields.

- **Range**—Sets the horizontal range of the shield. The range is in nautical miles and can be set for a value between 0.0 and 10nm, in 0.1nm increments
 - **Height**—Sets the vertical distance in feet with a value between 0 and 5000 ft. in 100 ft. increments
3. Select each shield you want to configure from the Shield drop down menu.
 4. Select the Range and Height for that shield from the drop-down lists.

Table 13 provides the suggested minimum and maximum values for the range and height of each shield.

Table 13: TCAD Shield Settings

	Range (NM: 0.5)		Height (feet: 100)	
	Min	Max	Min	Max
Terminal	0.5	1.5	200	1000
Standard	1.0	3.0	500	1500
Enroute	2.0	6.0	1000	2000

Note: The Max range values shown above are the largest values that the TCAD processor will accept. Choosing larger values than those shown will cause the processor to default to smaller shield sizes and is not recommended.

5. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
6. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*. If needed, see Table 14, “Traffic Messages,” on page 41.

6.6.5 TCAD Dual Display Setup

When installing the MFD with the Ryan TCAD display unit, see the *Ryan TCAD 9900-Series Installation Manual* for wiring procedures. See Figure 2-15 Wiring Diagram for Dual Displays and Section 7 in the Ryan manual for instructions.

6.6.6 TCAD Checkout

The MFD does not display the TCAD Self Test function. To perform this test, use the Ryan TCAD display unit.

- On installations with the TCAD 9900 display unit, follow the checkout procedures shown in the *Ryan TCAD 9900-Series Installation Manual*.
- On installations without the TCAD 9900 display unit (MFD only), follow the checkout procedures shown in the *Ryan TCAD 9900-Series Installation Manual* with the exception of the display test.

6.6.7 TIS Setup

The EX5000 optionally supports the display of traffic information from a Garmin GTX-330 TIS-capable Mode-S transponder.

Note: This option is available on 530-00148-000, 530-00162-() and 530-00170-() software. This sensor is not supported by the EX3000.

► To set up the TIS Traffic Sensor:

1. From the Maintenance Mode Page, select Traffic Setup. The Traffic Setup Page displays:

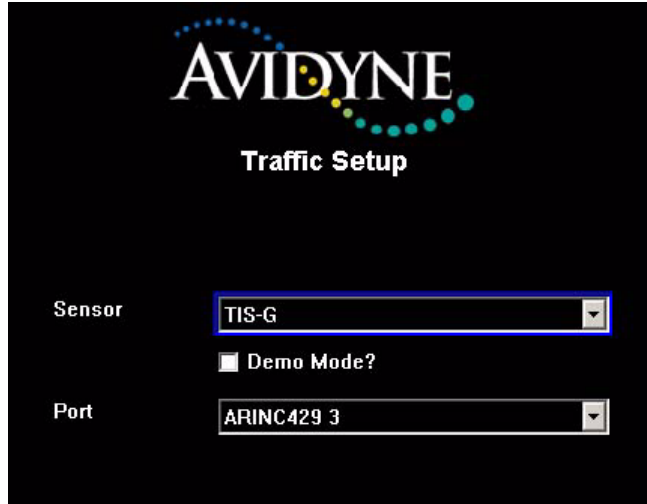


Figure 13: TIS selection on Traffic Setup Page

2. Set the following options:
 - **Sensor**—TIS-G
 - **Port**—Select the MFD ARINC 429 port to which the TIS transponder is wired.
3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*. If needed, see Table 14, “Traffic Messages,” on page 41.

6.6.8 TIS Checkout

Use a TIS transponder test set to test the combined installation of GTX-330 and the EX5000. If no test set is available, conduct operations in an area that supports TIS data and verify that data is received and traffic is displayed.

6.6.9 Traffic Communications Check (Messages)

After the MFD has been restarted, any of the following messages may appear in the main viewing screen or the message bar and Setup page.

Table 14: Traffic Messages

Message	Meaning
Traffic Sensor is Not Communicating	Traffic data is not being received.
Traffic Sensor is in Stand-By (TAS/TIS)	The traffic sensor has been placed in Standby mode.
Traffic Sensor is in Self-Test (TAS)	The traffic sensor has been placed in Self-Test mode.
Traffic Sensor is Operating Normally	Verification that Traffic data is valid.
TCAD Altitude Unavailable (TCAD)	Occurs when altitude data has been lost from the TCAD sensor.
Traffic Sensor has Failed	The traffic sensor has reported an internal fault, or the RS-232 ports are not configured correctly (TCAD).

Note: After completing all configuration procedures, confirm that the MFD is configured for the correct Traffic sensor.

6.7 TAWS Setup (Optional)

The MFD can interface to the Honeywell Bendix/King EGPWS systems with Phase 2 or later software.

6.7.1 TAWS Setup

► To configure the TAWS interface:

1. From the Maintenance Mode Page, select TAWS Setup. The TAWS Setup Page displays:

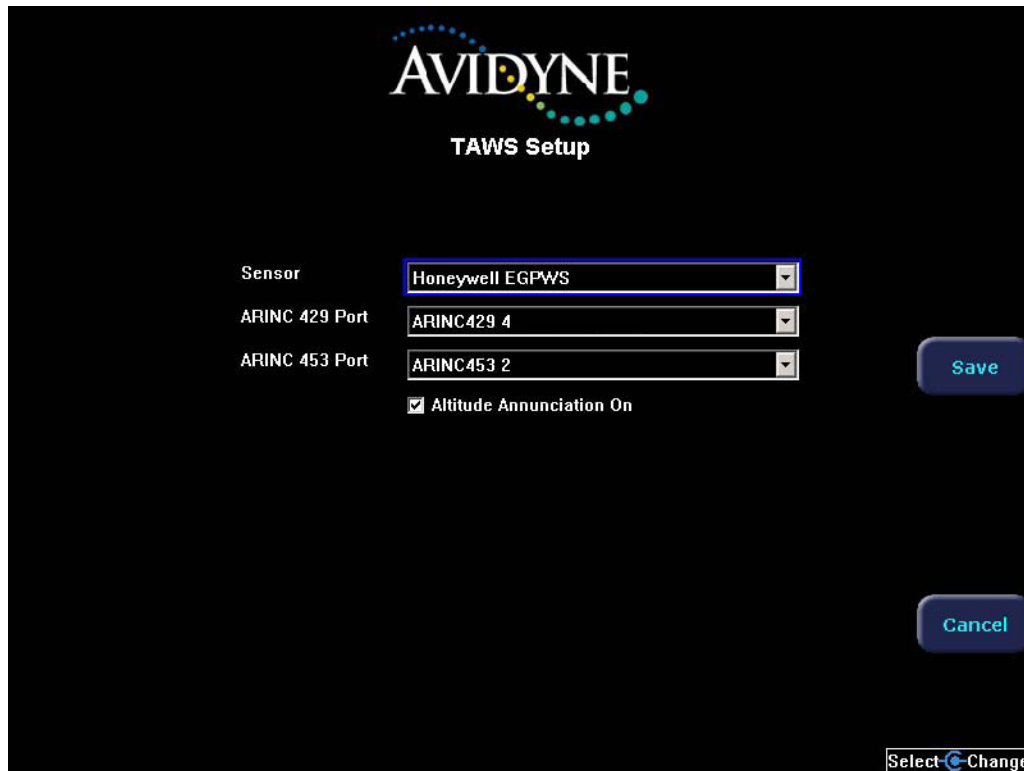


Figure 14: TAWS Sensor Setup Page

2. Set the following options:
 - **Sensor**—Honeywell EGPWS
 - **ARINC 429 Port**—ARINC 429 4 – TAWS Default
 - **ARINC 453 Port**—ARINC 453 2 – TAWS Default
 - **Altitude Annunciation On**—Select this feature to permit a visual annunciation of GPS altitude on the TAWS display. If selected, a checkmark displays.
3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

TAWS Checkout

► To test the TAWS installation:

1. From the Maintenance Mode Page, select TAWS Setup.
2. Perform a functional test of the EGPWS system in accordance with manufacturer's instructions. See the *MFD Pilot Guide* for display operation.

3. If the Self Test fails, an error message is generated and displayed on the MFD display. See the *EGPWS System Installation Manual* for explanations and fault isolation procedures.

6.7.2 TAWS Communications Check (Messages)

If there is a communication or data error between the TAWS sensor and the MFD, one of the following messages will display on the bottom of the screen.

Table 15: TAWS Error Messages

Message	Meaning/Action
TAWS Failed	An incorrect system configuration or failure in one of the system components has occurred. <ul style="list-style-type: none"> ■ Verify that the sensor is turned on and valid. ■ Verify system wiring.
TAWS Initializing	If message does not clear within 60 seconds, communication between the MFD and the Terrain sensor has not been established. <ul style="list-style-type: none"> ■ Verify that the sensor is turned on and valid. ■ Verify system wiring. ■ See terrain sensor Installation and User's Manual for troubleshooting guidance.
TAWS Not Communicating	Indicates that the MFD is not receiving data from the Terrain sensor. <ul style="list-style-type: none"> ■ Verify that the sensor is turned on and valid. ■ Verify system wiring. ■ See TAWS sensor Installation and User's Manual for troubleshooting guidance.
TAWS Display Unavailable	The TAWS Sensor has declared itself inoperative. <ul style="list-style-type: none"> ■ Verify system wiring. ■ Verify that the sensor inputs to the TAWS are turned on and valid. ■ See TAWS sensor Installation and User's Manual for troubleshooting guidance.
TAWS Sensor Self-Test	The TAWS Sensor is performing a Self-Test. The message will remain until the self-test is finished. <ul style="list-style-type: none"> ■ Verify that the "Self-Test" mode has been not been selected at the separate TAWS control panel. ■ Verify system wiring. ■ See TAWS sensor Installation and User's Manual for troubleshooting guidance.
TAWS Inhibited	The TAWS sensor is in the "Inhibited" mode. <ul style="list-style-type: none"> ■ Verify that the "Inhibit" mode has been not been selected at the separate TAWS control panel. ■ See TAWS sensor Installation and User's Manual for troubleshooting guidance.

Note: If the GPWS interface is operating properly, there will be no system status messages.

6.8 Radar Sensor (700-00030-005 EX5000 only)

Radar support is provided by the Bendix/King RDR-2000 Radar system, including the AlliedSignal ART-2000 sensor, and is an option available only on the 700-00030-005 EX5000. Radar is supported only by software part numbers 530-00170-000 and 530-00170-001.

The RDR-2000 supports the following features:

- Target Alert
- Vertical Profile
- Auto-Tilt (supported by Avidyne software)
- Beam Altitude display
- Beam Width display
- Bearing Line
- Hold (Freeze)
- Startup/Standby Tilt Parking
- Roll Trim Adjust
- Azimuth Lines other than 0
- Tilt Settings $\pm 15^\circ$
- Supported Scan Arcs— 90° , 100°
- Supported Range Values—10, 20, 40, 80, 160, 240
- Stabilization with Stability On/Off Control
- 4 Colors
- Multiple Indicators

► To set up radar support:

1. From the Maintenance Mode Page, select Radar Setup. The Radar Setup Page displays:

AVIDYNE
Radar Setup

Sensor: AlliedSignal ART-2000

ARINC 429 Port: ARINC429 1

ARINC 453 Port: ARINC453 1

Save

Select Radar Sensor Type and, if necessary, Ports
Then Save and Restart the System to Enable the Radar function.
Once the system has re-started, return to Maintenance Mode and select 'Radar Setup' to complete Radar installation

Cancel

Select Change

Figure 15: Radar Setup Page

2. From the Radar Setup Page, select the radar sensor installed on this aircraft.
3. Press *Save* to return to the Maintenance Mode Page
4. From the Maintenance Mode Page, press *Restart System*.
5. Re-enter Maintenance Mode and select the Radar Setup Page again.
6. Select the following options to finish the installation:
 - ARINC 429 Port—ARINC 429 Tx1
 - ARINC 453 Port—ARINC 453 1
7. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
8. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

Table 16 describes the configuration options offered by the ART-2000 sensor. For more information, see the Bendix-King *Radar Installation and Operations Manual*.

Table 16: ART-2000 Sensor Configuration Options

Option	Value	Notes
Park Position	Last position	Set the park/startup position for the radar antenna tilt angle.
	Full up	
	Centered	
	Full down	
Beam Width	0.0 ^o – 19.5 ^o	Defines the Width and Height of the radar sweep graphical depiction on the EX5000 radar display. Typical beam widths are provided below.
Beam Height	0.0 ^o – 19.5 ^o	
Enable Gain Control	Check/Clear	Enables R/T variable gain control to be commanded from the EX5000.
Enable VP	Check/Clear	When checked, enables Radar Vertical Profile mode.
Enable Auto-Tilt Control	Check/Clear	When checked, enables Radar auto-tilt mode.
Primary Indicator (1)	Check/Clear	When checked, enables EX5000 control of radar functions.
Disable Stabilization	Check/Clear	Disables EX5000 display of the “Stab Off” annunciation
Enable Automatic Standby	Check/Clear	When checked, enables the EX5000 to auto-command the radar to standby when ground is sensed to be below 20 kts.


Table 17 describes beam width information.

Table 17: Beam Width Information

Antenna Width	Generic Beam Width	Bendix/King Radars
10"	10°	10°
12"	8°	8°
18"	5°	5.6°

6.8.1 RADAR System Calibration

Calibrating the Radar R/T unit requires access to the Radar Calibration Page on the FlightMax EX5000 unit. This section explains how to access the calibration page and complete the radar calibration.

-  Perform radar R/T calibration according to the procedures and specifications for the specific unit installed in the aircraft.

Calibration can be performed after the Radar has been installed, setup and checked out per the radar manufacturer’s instructions.

-  To calibrate the system:

1. From the Maintenance Mode Page, select *Setup Radar*.
2. From the Radar Setup page, access the Calibration Mode
3. Perform the calibration according to the specifications in the R/T unit's Installation Manual.
4. Press Enter to accept the new values.
5. When you are done, press *Save* from the Radar Setup Page. Press *Cancel* to exit without saving changes.
6. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

Calibrating the AlliedSignal (Bendix/King) 2000 Radar Sensor

This section describes Post-Installation System Configuration and Calibration of the Bendix/King RDR-2000 Radar System using the EX5000 and replaces specific sections of the Bendix/King *Installation Manual* that describe configuration and calibration using the Bendix/King IN-182A Indicator.

- To configure and calibrate the system, follow the original Bendix/King Installation Manual substituting the following two sections with the instructions provided herein:
 - 2.4.1 CONFIGURATION PROCEDURE USING RADAR INDICATOR
 - 2.4.4.1 Stabilization Calibration with Radar Indicator

Note: If the EX5000 is replacing the indicator of currently installed and previously calibrated RDR 2000 Series Radar, this procedure may not be necessary. The calibration values are contained in the configuration module of the R/T and should remain valid. Avidyne recommends that you check the calibration values after the Avidyne unit has been installed to ensure that nothing has changed.

Bendix/King Installation Manual Replacement Section 1

2.4.1 CONFIGURATION PROCEDURE USING RADAR INDICATOR

The R/T Configuration Module must be configured using the Allied Signal KPA 900 Configuration Module Programmer Kit (Part Number 050-03311-0000) in conjunction with a personal computer. See the configuration module user data for detailed setup instructions. Follow the instructions for the programmer.

2.4.1.1 Antenna Clearance Check

Complete the Antenna Clearance Check by performing the following steps:

- A.** Set the radar Function to SBY.
- B.** Set the radar Mode to GND.
- C.** Reduce the gain until the gain indicator shows the minimum setting.
- D.** Set the Antenna Tilt to full UP (U 15.0).
- E.** Set Range to 240 NM.
- F.** Set Function to TEST.
- G.** Set the radar mode to GND
- H.** Reduce the gain until the gain indicator in the upper left shows the minimum setting.
- I.** Set the Antenna Tilt to Full UP (U 15.0)
- J.** Set the Range to 240 NM
- K.** Navigate to the SETUP page and enter the Maintenance Mode.
- L.** Press *Radar Setup*.
- M.** Press *Calibration* to display the RT CALIBRATION DATA page. Upon display of the RT CALIBRATION DATA page with the system in calibration mode, all fault fields will flash briefly. This verifies that the system is in calibration mode.
- N.** Adjust the gain to obtain a value of -26.5 to -28 in the GAIN POT /2 field. This will initiate the antenna clearance scan. The antenna will move to each of the extreme positions to determine that there is no interference with antenna movement and all scan motors are working properly.

Bendix/King Installation Manual Replacement Section 2

2.4.4.1 Stabilization Calibration with Radar Indicator

- A. Set the radar Function to SBY.
- B. Set the radar Mode to GND.
- C. Reduce the gain until the gain indicator in the upper right shows the minimum setting.
- D. Set the Antenna Tilt to full UP (U 15.0).
- E. Set Range to 240 NM.

Note: Failure to perform steps A to E will prevent the ART from entering calibration mode. If more than one radar indicator is installed in the system, all but one indicator must be in the OFF or SBY position in order for the system to enter the calibration mode.

- F. Enter the Maintenance Mode
- G. Press *Radar Setup*
- H. Press *Calibration* to display the RT CALIBRATION DATA page. See figure 2-5 in the Bendix/King Installation Manual. Upon display of the RT CALIBRATION DATA page with the system in calibration mode, all fault fields will flash briefly. Adjust Roll Trim with the outer knob to 0°.
- I. If desired, copy all displayed values to a note pad in case there is a need to recall a value that is accidentally changed.
- J. 400 Hz REF GAIN
If an ARINC 429 gyro is being used, proceed to Step N.
 - 1. Set the tilt table to 0 Deg. pitch and roll.
 - 2. Use the GAIN controls to set the GAIN POT /2 setting between -28 and -30.
 - 3. Adjust the TILT SETTING with the inner knob between 5 and 10 UP to increment the 400 HZ REF field to 0.0 ±1.0 Deg. (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching the desired setting, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.
 - 4. Proceed to step K

Note: If the 400 Hz REF field is zero (0), and will not change when the TILT knob is adjusted, check that the correct gyro has been selected when programming the Configuration Module.

- K. PITCH GAIN
 - 1. Set the tilt table for 10 Deg. pitch up.
 - 2. Adjust the GAIN buttons for a GAIN POT setting between -24.5 and -26.5.
 - 3. Adjust the TILT SETTING between 5 and 10 UP to increment the PITCH ANGLE field to 10.0 ±1.0 Deg. (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching the desired setting, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.

4. Set for 10 Deg. PITCH DOWN. Repeat steps 2 and 3.
5. Set the tilt table to 0 Deg. pitch and roll.
6. Proceed to step M.

L. PITCH OFFSET

1. Adjust the GAIN controls for a GAIN POT setting between -17.5 and -19.5 .
2. Check that the tilt table is set for 0 Deg. pitch.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the PITCH ANGLE field to 0.0 ± 1.0 Deg. (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching $0 \text{ Deg.} \pm 1.0^\circ$, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.
4. Set the tilt table to 10 Deg. pitch up. The value should be $10.0U \pm 1.0^\circ$. If the value is out of range, repeat Step L.
5. Set the tilt table to 10 Deg. pitch down. The value should be $10.0D \pm 1.0^\circ$. If the value is out of range, repeat Step L.
6. Set the tilt table to 0 Deg. pitch. The value should be $0.0 \pm 1.0^\circ$. If the value is out of range, repeat Step M.
7. Proceed to Step N.

M. AHRS ARINC 429 PITCH OFFSET

1. Adjust the GAIN buttons for a GAIN POT setting between -10.5 and -12.5 .
2. Check that the tilt table is set for 0 Deg. pitch.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the PITCH ANGLE field to 0.0 ± 1.0 Deg (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching $0 \text{ Deg.} \pm 1.0^\circ$, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.
4. Set the tilt table to 10 Deg. pitch up. The value should be $10.0U \pm 1.0^\circ$. If the value is out of range, repeat Steps 1, 2 and 3 of this section.
5. Set the tilt table to 10 Deg. pitch down. The value should be $10.0D \pm 1.0^\circ$. If the value is out of range, repeat Steps 1, 2, 3 and 4 of this section.
6. Set the tilt table to 0 Deg. pitch. The value should be $0.0 \pm 1.0^\circ$.
7. Proceed to Step P.

N. ROLL GAIN

1. Set the tilt table for 10 Deg. roll right.
2. Adjust the GAIN buttons for a GAIN POT setting between -21.0 and -23.0 .
3. Adjust the TILT SETTING between 5 and 10 UP to increment the ROLL ANGLE field to 10.0 ± 1.0 Deg. (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching the desired setting, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.

4. Set the tilt table for 10 Deg. roll left. Repeat Steps 2 and 3 of this section.
5. Set the tilt table for 0 Deg. pitch and roll.
6. Proceed to Step O.

O. ROLL OFFSET

1. Adjust the GAIN buttons for a GAIN POT setting between -14.0 and -16.0 .
2. Check that the tilt table is set for 0 Deg. roll.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the ROLL ANGLE field to 0.0 ± 1.0 Deg. (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching $0 \text{ Deg.} \pm 1.0^\circ$, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.
4. Set the tilt table to 10 Deg. roll right. The value should be $10.0R \pm 1.0^\circ$. If the value is out of range, repeat Step N.
5. Set the tilt table to 10 Deg. roll left. The value should be $10.0L \pm 1.0^\circ$. If the value is out of range, repeat Step N.
6. Set the tilt table to 0 Deg. roll. The value should be $0.0 \pm 1.0^\circ$. If the value is out of range, repeat Step O.
7. Proceed to Step P.

P. AHRS ARINC 429 ROLL OFFSET

1. Adjust the GAIN controls for a GAIN POT setting between -7.0 and -9.0 .
2. Check that the tilt table is set for 0 Deg. roll.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the ROLL ANGLE field to 0.0 ± 1.0 Deg. (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching $0 \text{ Deg.} \pm 1.0^\circ$, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.
4. Set the tilt table to 10 Deg. roll right. The value should be $10.0R \pm 1.0^\circ$. If the value is out of range, repeat Step P.
5. Set the tilt table to 10 Deg. roll left. The value should be $10.0L \pm 1.0^\circ$. If the value is out of range, repeat Step P.
6. Set the tilt table to 0 Deg. roll. The value should be $0.0 \pm 1.0^\circ$.
7. Proceed to Step Q.

Q. SAVE CONFIGURATION

1. Adjust the GAIN controls for a GAIN POT setting between -3.5 and -5.5 .
2. Set the TILT SETTING to 15.0D. The fault fields will flash indicating the save procedure is beginning. If the save procedure is successful, the GYRO fault will disappear and the azimuth count will step.
3. If the GYRO fault remains, set TILT to 0 and repeat step 2 of this section.

Bendix/King Replacement Sections END

6.8.2 Roll Trim Adjustment

► To adjust the Roll Trim Adjustment:

1. From the Maintenance Mode Page, select *Setup Radar*.
2. From the Radar Setup page, select *Roll Trim*.
3. The Roll Trim value appears on the Radar screen and can be modified by the Roll Trim control knob.
4. When you are done, press *Back* to save the new Roll Trim setting and return to the Radar Setup Page.
5. Press *Save* from the Radar Setup Page. Press *Cancel* to exit without saving changes.
6. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.8.3 RADAR Checkout

Perform a functional test of the RADAR system in accordance with manufacturers instructions. See the *MFD Pilot Guide* for display operation.

6.8.4 RADAR Sensor Communications Troubleshooting

If there is a communication or data error between the RADAR sensor and the MFD, one of the following messages will display on the bottom of the screen.

Table 18: Radar Sensor Error Messages

<i>Message</i>	<i>Meaning/Action</i>
Radar Sensor Data Is Invalid	Data received from the RADAR sensor system can not be used by the EX5000 <ul style="list-style-type: none"> ■ Cycle power on the EX5000. ■ See RADAR Sensor Installation and User's Manual for troubleshooting guidance.
Radar Sensor Has Failed	The RADAR sensor system has reported an error. <ul style="list-style-type: none"> ■ Check R/T configuration module error log. ■ See the RADAR Sensor Installation and User's Manual for troubleshooting guidance.
Radar Sensor Is Not Communicating	Communication of return data from the RADAR sensor to the MFD has been lost. <ul style="list-style-type: none"> ■ Verify that the RADAR sensor is turned on and valid. ■ Verify that the EX5000 is properly seat in its tray. ■ Verify system wiring.
Invalid GPS Data and Radar is ON	The RADAR is ON and the EX5000 has no ground speed data available from the GPS/FMS. <ul style="list-style-type: none"> ■ Verify the GPS/FMS is ON and valid. ■ Verify system wiring. ■ See the RADAR Sensor Installation and User's Manual for troubleshooting guidance.
Radar Automatic Standby Disabled	The RADAR is ON, the EX5000 RADAR automatic standby mode is disabled, and the EX5000 has no ground speed data available from the GPS/FMS. <ul style="list-style-type: none"> ■ Verify the GPS/FMS is ON and valid. ■ Verify system wiring. ■ See the RADAR Sensor Installation and User's Manual for troubleshooting guidance.

6.9 Engine Instruments Setup

The MFD supports engine display on Cirrus, Diamond, Lancair, and Piper Aircraft by receiving data via RS232 and/or ARINC429 from an engine sensor interface unit specifically designed for each aircraft. Not all display functions are available on all aircraft. For wiring information, see Appendix P: *Wiring Diagram – Engine Sensors*.



Only activate the Engine Instruments Setup for those aircraft specifically included under Avidyne Service Bulletin, STC, or TC authorization. Do not set up the MFD Engine Sensor interface for any unapproved aircraft installation.

6.9.1 Engine Instruments Setup

➤ To set up the Engine Sensor:

1. From the Maintenance Mode Page, select Engine Setup. The Engine Instruments Setup Page displays:

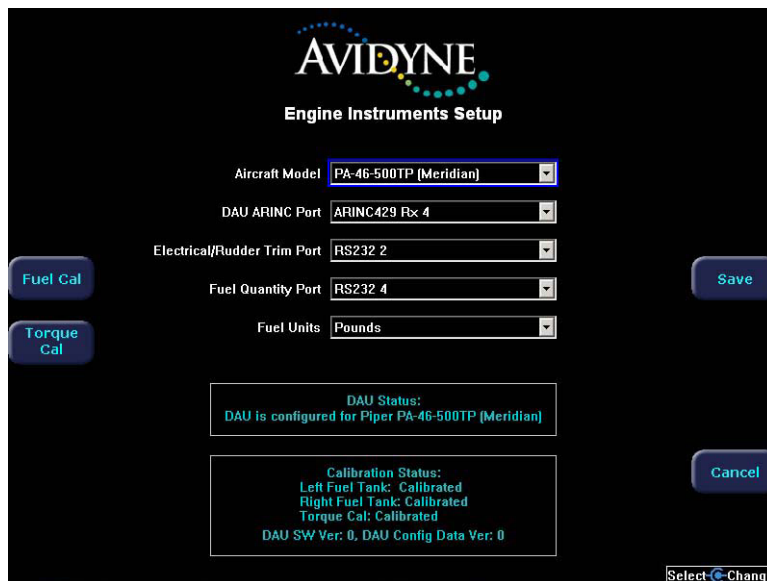


Figure 16: Engine Setup Page

2. Depending on the aircraft type and model, you may need to select the sensor type installed in this airplane, which will be one of:
 - Avidyne SIU
 - Vision DPU
 - Avidyne DAU



Not all aircraft require that you select the select the sensor type.

3. Select the model of this plane from the Aircraft Model pull-down list.



Ensure that you select the airplane type and model that matches this aircraft. Selecting the wrong model can result in displaying inaccurate data.

4. Depending on the aircraft type and model, the appropriate options are displayed. These options may include the following:

- **Port**—If this option is available, select the MFD RS232 port to which the Engine interface unit is wired.
- **DAU ARINC Port**—Select the ARINC port to which the Engine interface unit is wired.
- **Electrical/Rudder Trim Port**—Select the RS232 port from which electrical and rudder trim information will be received.
- **Fuel Quantity Port**—Select the RS232 port from which fuel quantity will be received.
- **Fuel Units**—Select whether to display fuel information in English or metric units.
- **Vacuum System Installed (Optional)**—If the MFD software version supports a display of vacuum system pressure on the Engine Page, a checkbox displays on the Engine Setup page. *If a vacuum system with compatible vacuum pressure sensor is installed in the aircraft, select this checkbox and use the knob to check the box.*
- **Electrical (Optional)**—If this option is available, select the type of electrical system: Single Bus, Single Alternator; Single Bus, Dual Alternator; or Dual Bus, Dual Alternator. (Note that not all selections are available with all aircraft.)
- **Voltage (Optional)**—If this option is available, select 14V or 28V, as appropriate, for the aircraft installation. Only determines Engine Page display ranges for electrical system information.

5. When instructed, proceed to the Aircraft Setup Page to complete the Engine Setup.

Note: Upon completion of all configuration procedures, confirm that the MFD is communicating properly with the corresponding engine interface unit. This can be verified after the Engine Sensor setup is completed.

The MFD uses an RS-232 data connection to receive data from the Engine Sensor Unit. An ARINC 429 connection is also used for specific aircraft.

Note: The data box at the bottom of the page shows the configuration of the SIU/DAU and whether data is being properly received.

If the Engine Setup settings do not match with the configuration settings of the SIU/DAU, you will see a yellow annunciation alerting you to recheck configuration of this page and/or the configuration settings of the SIU/DAU.

If the SIU/DAU was off or not properly connected when you entered the Engine Setup page, but subsequently was properly selected and operating correctly, the Engine Setup Page status box may not be properly refreshed to reflect this.

Confirm that the correct Engine Setup options are selected, press *Save*, and restart the MFD. After restarting, confirm that the MFD is properly receiving the engine data from the SIU/DAU.

Note: Under certain circumstances, the Engine Page may continue to indicate normal DAU communication even when communication is lost between the MFD and DAU. Additionally, the calibration buttons remain on the page, even though they are inactive.

If this occurs, exit the Engine Page. When you reselect the Engine Page, the appropriate status messages will display.

Fuel Quantity Calibration (Optional)

Fuel quantity indicator calibration is used to compensate for aircraft-to-aircraft variations in the fuel quantities reported by the Engine Data Acquisition Unit (DAU). If available, select the *Fuel Cal* button from the Engine Instruments Setup Page.

Note: This option is not available on all aircraft. This option is only available with software part numbers 530-00137-000, 530-00137-001, 530-00170-000, and 530-00170-002.

➔ The fuel quantity indicator can only be calibrated if the DAU is communicating with the MFD and sending valid fuel quantity data. If the DAU is not communicating with the MFD, a DAU failure screen is displayed when the Fuel Cal Page is selected. In this case, the only available selection is to exit the page.

The Fuel Quantity Indicator Calibration Page displays the current fuel quantity indicator calibration values. Different options are available depending on the state of the fuel quantity indicator calibration. The three states of the fuel quantity indicator calibration are:

1. Not Calibrated
2. Calibration Underway
3. Calibrated

➤ To calibrate fuel quantity for 530-00137-() and most 530-00170-() software:

1. From the Engine Instruments Setup Page, select *Fuel Cal*.
2. From the Not Calibrated state, select *Begin Cal*.
 - The state of fuel calibration changes to Underway and the fuel quantity indicator can be calibrated.
 - If you press *Exit*, the Engine Instruments Setup Page displays with the calibration state unchanged.
3. Use the right knob to select the current calibration point. The selected calibration point is highlighted and the value displayed is the current reported quantity from the DAU. A message at the bottom of the screen prompts you to add the appropriate amount of fuel. Then press *Accept Value* once the value reported from the DAU has stabilized.

If the DAU reported value is not within 2 gallons of the test point value, the value is not accepted and the message "DAU Reported Fuel Quantity Out Of Tolerance" is displayed. Recalibrate the current calibration point.

If you cannot correctly calibrate the fuel quantity, inspect the fuel tank and fuel level sensor for problems.

4. Repeat this process for all the calibration points.
5. To pause the calibration process and turn off power to the MFD, press *Save* to save the interim calibration values.
6. Once all points have been calibrated, press *Calibration Complete*. The calibration factors are computed and applied to DAU reported fuel quantity.
7. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
8. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

Other options from the Underway state are to *Restore Last Cal* and *Clear Cal*:

- Press *Restore Last Cal* to restore the calibration values from the last completed calibration. The calibration state is change to Calibrated.
- Press *Clear Cal* to clear all calibration values. The state changes to Not Calibrated.

An *Are You Sure?* prompt gives you the chance to reconsider the decision to either restore or clear the fuel calculations.

➔ Pressing *Cancel* from the Underway state causes the current calibration session to end without saving any interim calibration values.

Note: For the fuel calibration procedure for the 530-00170-000 software, see the Piper Process Specification document PPS60185.

Torque Calibration (Optional)

For some aircraft, the MFD provides an interface to the Torque Calibration feature. If this feature is available, the *Torque Cal* button displays.

For information about using the Torque Calibration feature, see the factory procedures for the aircraft.

6.9.2 Engine Sensor Checkout

After restarting the MFD, view the Engine page to verify data communication. Operate the aircraft engine to confirm correct operation of all sensors.

➔ The Percent Power function will not operate correctly on some models until the Aircraft Setup has been completed.

6.10 Aircraft Setup

The options on the Aircraft Setup Page depend on the aircraft model and selected options for that aircraft. These options may include:

- Auxiliary Data
- Narrowcast Datalink
- Broadcast Datalink
- Long Range Tanks
- Checklists
- Dimming Bus

Note: The available options are dependent on the aircraft model and additional purchased features. Your aircraft will not have all options available.

► To configure the Aircraft Setup Page:

1. From Maintenance Mode, select Aircraft Setup. The Aircraft Setup Page displays:

Figure 17: Aircraft Setup Page with Datalink

2. Set the options that appear on the Aircraft Setup Page. These options will vary depending on the aircraft model and optional features selected.

Aircraft Setup options are described in the following sections:

- Section 6.10.1, “Auxiliary Data Setup” on page 58
- Section 6.10.2, “Narrowcast Datalink Setup” on page 58
- Section 6.10.3, “Broadcast Datalink Setup” on page 59
- Section 6.10.4, “Long Range Tanks Setup” on page 60
- Section 6.10.5, “Checklists Setup” on page 60
- Section 6.10.6, “Dimming Bus Setup” on page 60

3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.10.1 Auxiliary Data Setup

On some aircraft, you can optionally configure the MFD to receive pressure altitude and outside air data (OAT) from the PFD via a ARINC 429 interface.

If Aux Data is available, configure it as follows:

- **Aux Data**—Select Avidyne PFD. This allows the MFD to receive ARINC 429 data from the PFD for input to the % Power calculations.
- **Port**—Select the MFD ARINC port to which the PFD is wired.

Auxiliary Data Checkout

After the MFD has been restarted, any of the following messages may appear in the message bar on any page and in the message list on the Setup page.

Table 19: Auxiliary Data Messages

Message	Meaning
PFD is Operating Normally	Verifies that pressure altitude and OAT data received by the MFD is valid.
PFD is Not Communicating	Pressure altitude or OAT data are not being received by the MFD.

6.10.2 Narrowcast Datalink Setup

If Narrowcast Datalink is supported for this aircraft, the Narrowcast pull-down will be available.

Configure Narrowcast as follows:

- **Narrowcast**—Quake SC. This enables the Datalink functionality and communication with the internal Datalink transceiver.
- **Port**—RS232 port 6, or as wired.

Narrowcast Datalink Checkout

- To check the Narrowcast installation:

1. From the Maintenance Mode Page, select System Info. The System Info Page displays:

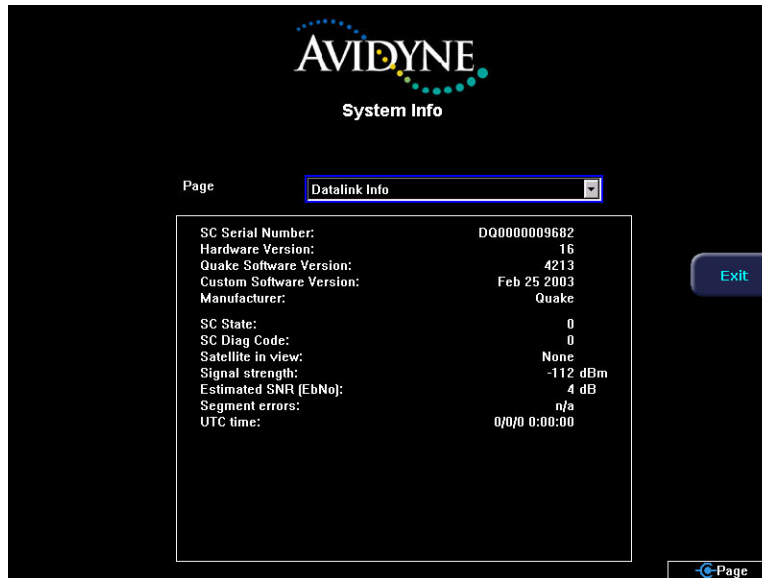


Figure 18: System Info—Datalink Page

2. From the System Info Page, select Datalink Info if necessary.
3. Verify the presence of SC Serial Number and version information on this screen.

When the Narrowcast Datalink function is enabled, and the proper port is selected on the Aircraft Setup Page, the EX5000 is pre-configured for Datalink operation.

- To finish the checkout process, see Section 7.5, “Narrowcast Datalink Satellite Reception Confirmation” on page 67.

6.10.3 Broadcast Datalink Setup

On some aircraft, the MFD supports the Heads Up XMD076 XM data receiver. If XM is available and an XM receiver has been installed on this aircraft, the Broadcast pull-down will be available.

Configure Broadcast as follows:

- **Broadcast**—XM Radio. This enables the Datalink functionality and communication with the satellite data receiver.
- **Port**—Select the RS-232 port wired to the XM receiver.

Broadcast Datalink Checkout

- To check the Broadcast Datalink Installation:

1. Power up the MFD and XM Receiver and select the Trip Page.
2. From the Trip Page, press *Display* to view Broadcast Status (down pointing arrow). If the MFD reports a Receiver ID, the receiver is communicating with the MFD and the RS-232 wiring is correct.
3. Position the aircraft in an area open to the sky.
4. Check the Signal Quality, as displayed on the lower half of the Trip Page.

- **Good**—Confirms the receiver is detecting the satellite signals.
- **Marginal or Weak**—May require repositioning the aircraft to better location.
- **None**—Indicates a bad antenna, cable, connection or receiver.

For more information, see the *XMD076 XM Receiver Installation Manual and Activation Instructions* from Heads Up Technologies or contact Heads Up Technologies at service@heads-up.com or www.heads-up.com.

5. After restarting the MFD, either of the following messages may appear in the message bar on any page and in the message list on the Aux or Setup Page.

Table 20: Broadcast Datalink Messages

Message	Meaning
Broadcast is Operating Normally	Verifies that the MFD is communicating with the XM Receiver
Broadcast is Not Communicating. (After 5 minutes of no communication).	The MFD is not communicating with the XM Receiver. Check power and signal wiring.

➔ Make a note of the Receiver ID for the aircraft owner, who will need it to begin Broadcast Datalink service.

➔ To finish the checkout process, see Section 7.6, “Broadcast Datalink Satellite Reception Confirmation” on page 68.

6.10.4 Long Range Tanks Setup

Some aircraft are equipped with long range fuel tanks. If the Long Range Fuel Tanks feature is available on this aircraft, the **Long Range Tanks Installed?** checkbox will be available from the Aircraft Setup Page.

Check **Long Range Tanks Installed?** to allow the MFD to track long range fuel usage.

6.10.5 Checklists Setup

Some aircraft models support the Checklists feature. If Checklists are available for this aircraft, the Checklist pull-down will be available from the Aircraft Setup Page.

Use the Checklist pull-down to select the appropriate aircraft and serial number range. Checklists are only available for aircraft listed in the Checklist pull-down.



Caution: The checklist function is only authorized for use specifically with the aircraft types that are listed on the Aircraft Setup page. **Do not select any aircraft type that does not match the installation aircraft.** If the installation aircraft type is not listed as a checklist option on the Aircraft Setup page, then the checklist function is not available for that aircraft. **Selecting an inappropriate aircraft type can lead to incorrect operation of the aircraft by the pilot.**

Note: This option is only available with software part numbers 530-00117-000, 530-00130-000, 530-00148-000, 530-00162-000, and 530-00162-002.

6.10.6 Dimming Bus Setup

On all aircraft, you can configure the LEDs on the bezel to better match the other cockpit instrument lights on the aircraft dimming bus.

► To set the dimming bus:

1. Highlight the Brightest dimming voltage selection. An additional button, *Set Voltage*, appears below the Save button.
2. Adjust the Airplane dimming bus (usually a knob) to the full bright level. Monitor the dimming bus voltage on the MFD below the selection boxes. When at full bright, press *Set Voltage* to update the highlighted field.
3. Highlight the Darkest dimming voltage selection and adjust the airplane dimming bus to a level so that the other cockpit instruments are at their lowest brightness level.
4. Press *Set Voltage* again to update the Darkest dimming voltage field.

Dimming Bus Checkout

Restart the MFD. Adjust the aircraft dimming bus and verify that the MFD bezel LEDs match the rest of the cockpit instrument lamps and lights.

6.11 Map Setup

The MFD can overlay Traffic intruders and Lightning strikes on the Map pages. To utilize this feature, configure Map Heading with the appropriate source of heading or ground track to match the aircraft wiring. For more information about wiring, see Figure 3, Figure 4, and Figure 5 on page 21.

The MFD can receive heading data transmitted from one of the following sources:

- GPS/FMS (via 429) capable of providing heading information (EX5000 only)
- L-3 StormScope (via RS -232)
- TAS L-3 SkyWatch (must have 1.6 software level or higher) (EX5000 only)

The MFD can receive aircraft ground track from one of the following sources.

- GPS/FMS (via 429), (EX5000 only)
- GPS (via RS-232)

6.11.1 Setup with GPS/FMS as Heading Source (EX5000 only)

➤ To configure the MFD with the GPS/FMS as a heading source:

1. From the Maintenance Mode Page, select GPS Setup.
2. Ensure that GAMA 429 GPS has been selected in the GPS Setup.
3. Return to the Maintenance Mode Page and select Map Setup.
4. Set the following option:

Map Heading—GPS/FMS

5. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
6. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.11.2 Setup with StormScope as Heading Source

➤ To configure the MFD with the StormScope as a heading source:

1. From the Maintenance Mode Page, select Lightning Setup.
2. Ensure that StormScope is configured for Synchro or Stepper Stabilization in the Lightning Setup Page.
3. Return to the Maintenance Mode Page and select Map Setup.
4. Set the following option:

Map Heading—StormScope

5. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
6. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.11.3 Setup with Traffic (TAS) as Heading Source (EX5000 only)

➤ To configure the MFD with the Traffic as a heading source:

1. From the Maintenance Mode Page, select Traffic Setup.
2. Ensure that TAS is selected as the traffic sensor in the Traffic Setup Page.
3. Return to the Maintenance Mode Page and select Map Setup.

4. Set the following option:
Map Heading—Traffic (TAS)
5. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
6. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.



If SkyWatch is used as the heading source, the SkyWatch software level must be 1.6 or higher. SkyWatch software levels lower than 1.5 can cause the heading to be off by a significant factor.

6.11.4 Map Orientation with Track

If Heading information is unavailable, Track data can be used for Map, Lightning, and Traffic overlays. Track data comes from the GPS/FMS. Track is the actual direction the aircraft is moving relative to the earth's surface.

Note: Avidyne recommends using a Heading reference for the overlay feature. Only use Track if Heading is not available. Track does not compensate for the “crab” angle of the aircraft.

- To configure the MFD with GPS track in place of a heading source:

1. From the Maintenance Mode Page, select Map Setup. The Map Setup Page displays:

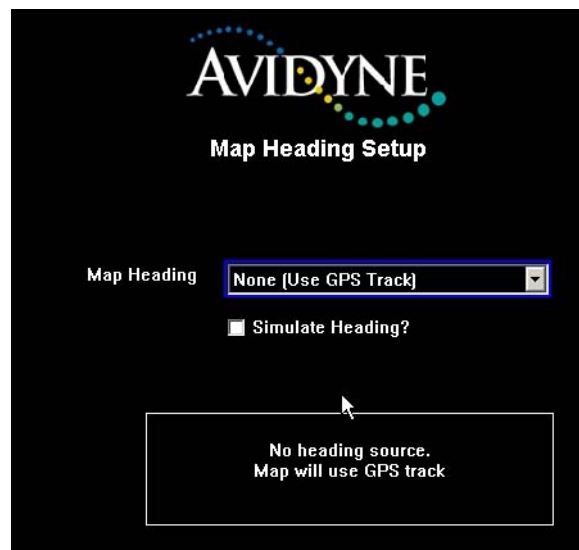


Figure 19: Map Setup Page for Track

2. Set the following option:
Map Heading—None (Use GPS Track)
3. When you are done, press *Save*. Press *Cancel* to exit without saving changes.
4. Changes do not take effect until the MFD has been restarted. From the Maintenance Mode Page, press *Restart System*.

6.11.5 Map Heading/Track Status

- To check the operational status of your heading or track:
1. Return the MFD to normal operation, that is, save all changes and restart the MFD. The GPS/FMS must be on and locked onto a valid position. The selected heading source (GPS, StormScope, SkyWatch, must be on and operational.
 2. From the Map Page, look for the following:
 - **Heading**—The box at the top center of the Map display should contain the letters HDG and the value should match the aircraft compass system.
 - **Track**—The box at the top center of the Map display should contain the letters TRK and an appropriate value.



Fault Conditions: The loss of Heading will cause the Center and Forward views of Map to be oriented to Track and the Heading indicator at the top of the Map Page will switch to a Track indicator. Loss of Heading and Track will cause the Heading indicator to display 3 dash lines. The airplane symbol will be replaced by a white “+” sign and the map will be in a north up orientation.

7 Post-Installation Check

After installing the MFD, you need to perform a post-installation check to ensure that all components are working properly.

This section contains the following information:

- Section 7.1, “System Info Pages” on page 65
- Section 7.2, “EMI Check” on page 67
- Section 7.3, “Lightning Sensor Strike Test” on page 67
- Section 7.4, “Traffic Test” on page 67
- Section 7.5, “Narrowcast Datalink Satellite Reception Confirmation” on page 67
- Section 7.6, “Broadcast Datalink Satellite Reception Confirmation” on page 68
- Section 7.7, “Magnetic Compass Swing” on page 69

7.1 System Info Pages

Avidyne provides three System Info pages to help you determine if system settings are correct and functioning.

7.1.1 System Info Datalink Page

The Datalink Page provides information about your Narrowcast and Broadcast set up, as well as UTC time and other information.

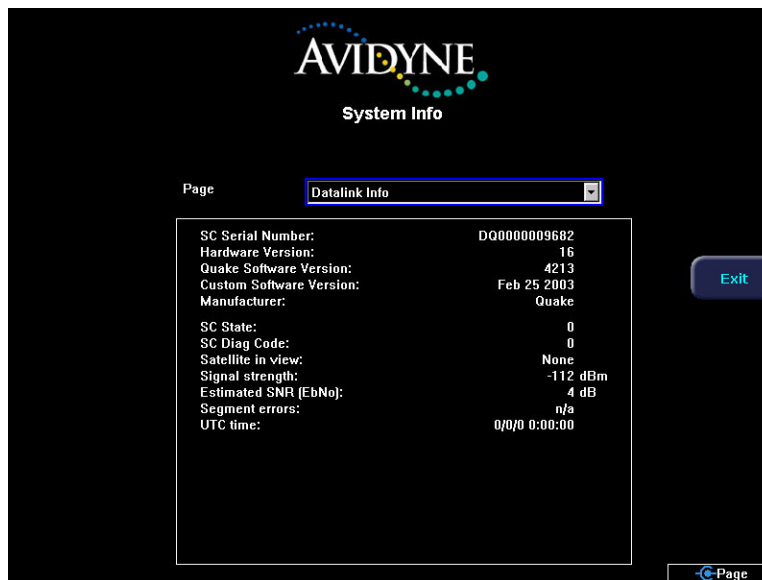


Figure 20: System Info—Datalink Page

7.1.2 System Info Platform Page

The Platform Page provides information about the hardware platform and settings of your MFD.

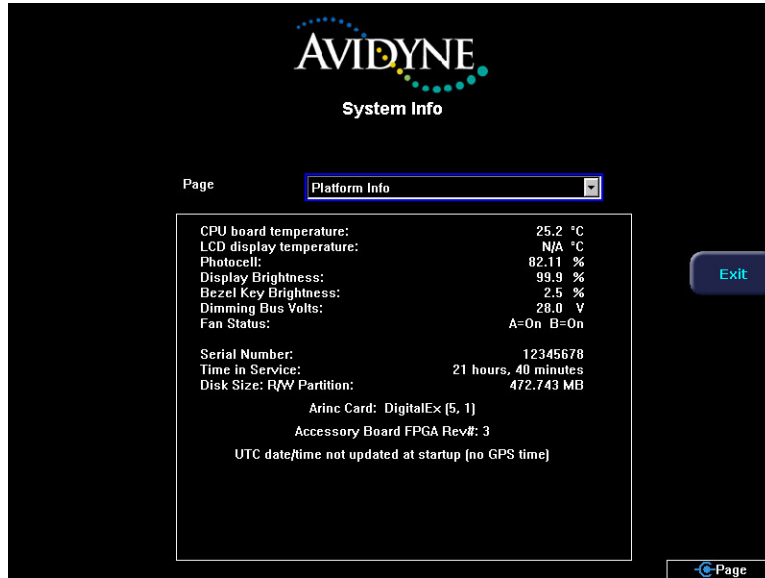


Figure 21: System Info—Platform Page

7.1.3 System Info Port Page

The Port Page displays the ports selected for various features during the setup process.

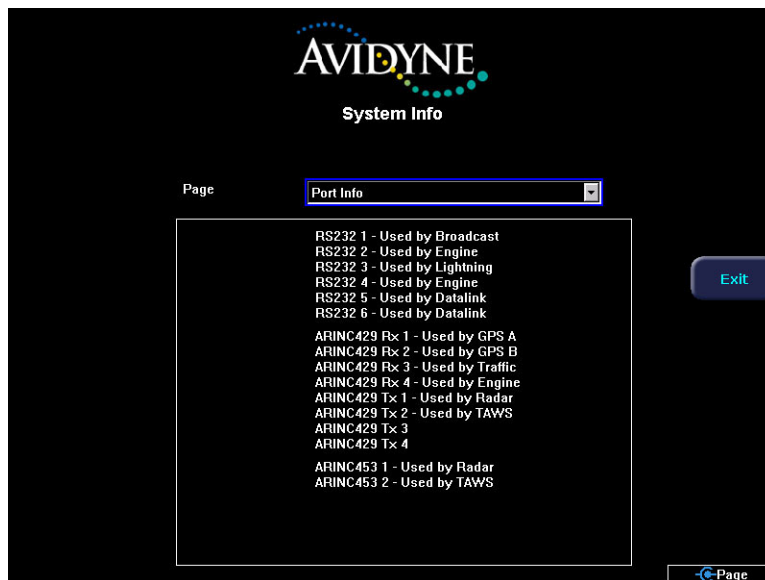


Figure 22: System Info—Port Page

7.2 EMI Check

Verify that no interference is noted through the use of the MFD on other systems in the aircraft. The operation of the MFD should not result in Nav flags, constant location lightning strikes on the WX-500 sensor, noise on COM channels, or other phenomena.

- **COM Radios**—Scan through radio channels to ensure there is no interference caused by the MFD. Check random frequencies from 118.00 MHz through 136.975 MHz as well as your local ground and tower frequencies to ensure there is no break in squelch due to the installation.
- **GPS**—Ensure that correct position is displayed and that there is no change in satellite signal strength with the MFD powered off.
- **Autopilot**—Ensure that autopilot Self Test passes OK with the MFD powered on.
- **Other Instruments**—Verify there is no adverse effect on other instruments with the MFD powered on.

7.3 Lightning Sensor Strike Test

After the Lightning Sensor has been installed and set up, as discussed in Section 6.5, “Lightning Sensor Setup” on page 33, *Lightning Strike Test* will be available from the Maintenance Mode Page.

➤ *To perform the Lightning Strike Test:*

1. Press *Lightning Strike Test* from the Maintenance Mode Page.
2. The MFD will switch to the Map page and display a single strike at 15 mile range and 45 degrees relative bearing. If it does not, there may be an inconsistency with the heading source, wiring, or MFD setup.

7.4 Traffic Test

After completing all configuration procedures, confirm that the MFD is configured for the correct Traffic sensor.

7.5 Narrowcast Datalink Satellite Reception Confirmation

The ORBCOMM satellite network transmits very low power VHF signals that the EX5000 must receive. If the antenna is not properly installed or if there is excessive electromagnetic interference (such as a nearby radio transmitter, ground power cart, or inadequately grounded avionics), the system will not achieve successful reception.

➤ *To assess system performance.*

1. Bring the aircraft to an area with the clearest view of the sky to the horizon.
2. Monitor the Datalink Info table (shown in Figure 18), for a few minutes (up to 5) under each of the following conditions:
 - Other Avionics OFF
 - Avionics ON
 - Engines at idle
 - Engines at takeoff power.

3. With a satellite in view, the signal strength and quality should peak above the following values:

Maintenance Mode, System Info, Datalink/ Narrowcast Info	Trip Page, Narrowcast Status
Signal strength > -118 dBm (-130 is lowest, -100 is highest)	Signal Strength > 4, (scale of 1-10)
Estimated SNR (EbNo) > 10 dB	Signal Quality > 4, (scale of 1-10)
Segment errors = Less than 10%	Message Quality = 10, (scale of 1-10)

4. If the expected reception levels are not achieved, check for possible causes and solutions:

Possible Cause	Possible Solution
The antenna field of view is obstructed.	The antenna field of view is obstructed.
There is a local source of electromagnetic interference:	<ul style="list-style-type: none"> ■ Try shutting off any nearby sources (such as VHF radios, alternators, magnetos, ground power cart). ■ Relocate the aircraft away from potential nearby sources. ■ Check electrical connections and grounds. ■ There is poor satellite coverage. Try again after fifteen minutes. ■ Check the antenna and cable for proper installation. ■ Check the connection between the antenna and its ground plane.

See www.avidyne.com for additional information.

7.6 Broadcast Datalink Satellite Reception Confirmation

The broadcast satellite network transmits signals that are received by an external Datalink receiver, which sends the information on to the MFD through a serial connection. If the Datalink antenna is not properly installed, or if there is excessive electromagnetic interference (such as a nearby radio transmitter or inadequately grounded electronics), the system will not achieve consistent reception.

➤ To assess system performance.

1. Bring the aircraft to an area that has as few obstacles to line-of-sight viewing to the southern horizon as possible.
2. Select the Trip page on the MFD.
3. Press *Display* until Broadcast (down-pointing arrow) Status is selected.
4. The Signal Quality will be reported as Good, Marginal, Weak, or None. If the Broadcast Receiver is working, the antenna and cabling are correct, and the aircraft is in view of at least one Broadcast datalink satellite, the Signal Quality will be “Good” and the Receiver ID will be reported.

5. If the Signal Quality is not reported as Good, check for possible causes and solutions:

Possible Cause	Possible Solution
The antenna field of view is obstructed.	Try moving or rotating the aircraft. Note: If rotation works, the antenna location on the aircraft may not be optimal
There is a local source of electromagnetic interference.	<ul style="list-style-type: none"> ■ Try shutting off any nearby sources (such as VHF radios, alternators and magnetos). ■ Relocate the aircraft away from potential nearby sources. ■ Check electrical connections to ensure there is no improper grounding. ■ The antenna and cable are not properly installed. ■ The antenna may not be properly connected to the ground plane. ■ The cable may not be properly connected to the antenna or the EX5000.

See www.avidyne.com for additional information.

7.7 Magnetic Compass Swing

After installation and EMI checks are complete, perform a magnetic compass “swing” in accordance with the aircraft installation manual for updating the heading correction card in accordance with 14 CFR 23.1327 and 23.1547.

8 MFD Data Updates

This section contains the following information:

- Section 8.1, “Map NavData Database Updates” on page 70
- Section 8.2, “Chart Database Updates” on page 71

8.1 Map NavData Database Updates

The Map NavData database may be updated periodically with data purchased from Jeppesen. See www.jeppesen.com for details.

All MFD units are shipped with the latest database pre-loaded. There are two places to check the expiration date or version number:

- The Startup Screen
- The Setup Page

Updates are performed with an optional Dataloader that connects to the Dataloader (USB) port on the front of the MFD (See Figure 6, “EX3000/EX5000 Landscape Front View,” on page 23). The Dataloader is a self-powered USB Zip 100 or Zip 250 Drive by Iomega. Obtain one from a computer or office supply store. Avidyne stocks these as P/N 200-00029-000 or 200-00048-000.

➤ To perform a database update:

1. Turn power OFF to the MFD.
2. Connect one end of the interconnect cable to the Dataloader and the other end to the MFD data port on the front panel of the MFD.

➡ Ensure that the Dataloader is supported and not dangling by the cable. This may cause an intermittent connection, which will result in an unsuccessful data update.

3. Apply power to the MFD.
4. Wait for the FlightMax logo to appear on a black background and insert the data disk into the Dataloader drive.
5. The Dataloader screen is displayed.

➡ If the regular MFD startup screen with the “Press Any Bezel Key” message is displayed, the Dataloader was not detected by the MFD. Check the connection between the Dataloader and the MFD. Press the button on the Dataloader to eject the disk. Restart this procedure at step 1.

6. Press the “Proceed” button. Do not turn off the MFD or disconnect the interconnect cable during a data load.

The data load is complete when the “Press Any Bezel Key” message is displayed.

7. Remove the Dataloader and interconnect cable and store in a safe place.

8.2 Chart Database Updates

The database of terminal procedure charts must be updated periodically with data purchased via subscription from Jeppesen at www.jeppesen.com.

MFD units are shipped without pre-loaded chart data. The pilot must obtain a valid subscription from Jeppesen.

Once a valid Jeppesen subscription serial number has been obtained, visit www.myAvidyne.com to obtain an Avidyne Key number, which will allow use of that subscription on a certain MFD. The user will have to register their MFD with myAvidyne.com if they have not already done so. Both the Jeppesen subscription number and the Avidyne Key number are required to complete a chart data load.

The expiration date of the chart data is displayed in two places:

- Startup Screen
- Setup Page

Load the updates via an optional Dataloader that connects to the Dataloader (USB) port on the front of the MFD (See Figure 6, "EX3000/EX5000 Landscape Front View," on page 23).

Once the user has both a Jeppesen subscription number and Avidyne Key number, they can run the Avidyne Data Extractor program on their PC to extract their chart data from the Jeppesen CD-ROM and save it onto a disk in the Avidyne Dataloader device. The Avidyne Dataloader is then ready to complete the chart update.

Note: For more information on running Avidyne Data Extractor, consult Avidyne 600-00114-000, *Avidyne CMax Data Update Guide*

➤ To perform a chart data update

1. Turn power OFF to the MFD.
2. Install the data disk into the Dataloader drive.
3. Connect one end of the interconnect cable to the Dataloader and the other end to the MFD data port on the front panel of the MFD.

➔ Ensure that the Dataloader is supported and not dangling by the cable. This could cause an intermittent connection, which will result in an unsuccessful data update.

4. Turn ON the MFD. The Dataloader screen displays.

➔ If the regular MFD startup screen with the "Press Any Bezel Key" message is displayed, the Dataloader was not detected by the MFD. Check the connection between the Dataloader and the MFD.

5. Press the "Proceed" button. Do not turn off the MFD or disconnect the interconnect cable during a data load.

The data load is complete when the normal startup screen with the "Press Any Bezel Key" message is displayed.

6. Remove the Dataloader and interconnect cable and store in a safe place.

9 Factory Service Policies

9.1 Factory Assistance by Telephone and Fax

Please call our customer service representatives for assistance in service or installation. Call 1-888-723-7592 between 8:00 AM and 7:00 PM Eastern Time, Monday through Friday. Have the serial number of the unit available when you call, along with as many details of the nature of the problem as possible. If you prefer, you may also fax us at (781)-402-7599 24 hours a day. We will respond by fax or telephone as soon as possible.

9.2 General Service Procedures

Repair of the MFD is performed at the factory. Factory service includes a complete checkout and recalibration. The only costs for factory repair of a unit still under warranty are the shipping charges, unit removal, and re-installation.

Prior to returning a unit for service, call the factory and obtain a Return Merchandise Authorization (RMA) number.

Avidyne Technical Support at 1-800-AVIDYNE

E-mail: support@avidyne.com

Securely pack the unit in the original Avidyne shipping carton, write the RMA number on the outside of the carton, and return it to the following address:

Avidyne Corporation
55 Old Bedford Road
Lincoln, MA 01773

Include your name, complete shipping address, daytime telephone number, a complete description of the problem, and the desired return date and shipping method. If the original shipping carton or other suitable foam packed is not available, contact Avidyne to arrange for packaging materials. Avidyne will not be responsible for damage that occurs due to poorly packaged returns.

Appendix A: Environmental Qualification Data

RTCA/DO-160D Environmental Qualification Form

NOMENCLATURE: MFD

PART NO: 700-00004-XXX ()

MANUFACTURER: AVIDYNE CORPORATION

ADDRESS: 55 OLD BEDFORD ROAD, LINCOLN MA. 01773

Table 21: RTCA/DO-160D Environmental Qualification Form Part No. 700-00004-XXX ()

Conditions	RTCA/DO-160D PARA	Conducted Test Category
LOW TEMPERATURE	4.5.1	B1 (-20°C)
HIGH TEMPERATURE	4.5.2 & 4.5.3	B1 (+55°C) ¹
INFLIGHT LOSS OF COOLING	4.5.4	V
ALTITUDE	4.6.1	B1
DECOMPRESSION	4.6.2	X (No Test Performed)
OVERPRESSURE	4.6.3	X (No Test Performed)
TEMPERATURE VARIATION	5.0	B
HUMIDITY	6.0	A
OPERATIONAL SHOCK	7.2	B
CRASH SAFETY	7.3	B
VIBRATION	8.0	Cat. S Curves M
EXPLOSION	9.0	X (No Test Performed)
WATERPROOFNESS	10.0	X (No Test Performed)
FLUIDS SUSCEPTIBILITY	11.0	X (No Test Performed)
SAND AND DUST	12.0	X (No Test Performed)
FUNGUS	13.0	X (No Test Performed)
SALT SPRAY	14.0	X (No Test Performed)
MAGNETIC EFFECT	15.0	Z
POWER INPUT	16.0	B
VOLTAGE SPIKE	17.0	B
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	Z
INDUCED SIGNAL SUSCEPTIBILITY	19.0	A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	V
EMISSION OF RADIO FREQUENCY ENERGY	21.0	M
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	A3E3
LIGHTNING DIRECT EFFECTS	23.0	X (No Test Performed)
ICING	24.0	X (No Test Performed)
ELECTROSTATIC DISCHARGE	25.0	A

1. Short-time operating high temperature is +55°C

RTCA/DO-160D Environmental Qualification Form

NOMENCLATURE: MFD
 PART NO: 700-00030-005
 MANUFACTURER: AVIDYNE CORPORATION
 ADDRESS: 55 OLD BEDFORD ROAD, LINCOLN MA. 01773

Table 22: RTCA/DO-160D Environmental Qualification Form Part No. 700-00030-005

Conditions	RTCA/DO-160D PARA	Conducted Test Category
LOW TEMPERATURE	4.5.1	C1
HIGH TEMPERATURE	4.5.2 & 4.5.3	C1
INFLIGHT LOSS OF COOLING	4.5.4	V
ALTITUDE	4.6.1	C1
DECOMPRESSION	4.6.2	C1
OVERPRESSURE	4.6.3	C1
TEMPERATURE VARIATION	5.0	B
HUMIDITY	6.0	A
OPERATIONAL SHOCK	7.2	B
CRASH SAFETY	7.3	B
VIBRATION	8.0	Cat. S Curves M
EXPLOSION	9.0	X (No Test Performed)
WATERPROOFNESS	10.0	X (No Test Performed)
FLUIDS SUSCEPTIBILITY	11.0	X (No Test Performed)
SAND AND DUST	12.0	X (No Test Performed)
FUNGUS	13.0	X (No Test Performed)
SALT SPRAY	14.0	X (No Test Performed)
MAGNETIC EFFECT	15.0	Z
POWER INPUT	16.0	B
VOLTAGE SPIKE	17.0	B
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	Z
INDUCED SIGNAL SUSCEPTIBILITY	19.0	A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	V
EMISSION OF RADIO FREQUENCY ENERGY	21.0	M
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	A3E3
LIGHTNING DIRECT EFFECTS	23.0	X (No Test Performed)
ICING	24.0	X (No Test Performed)
ELECTROSTATIC DISCHARGE	25.0	A

Appendix B: Authorized TSOs and ETSOs

Table 23: TSO and ETSO Descriptions

TSO#	ETSO#	Meaning
TSO-C43c	ETSO-C43c	Temperature Instruments
TSO-C44b	ETSO-C44b	Fuel Flowmeters
TSO-C45a	ETSO-C45a	Manifold Pressure Instruments
TSO-C47	ETSO-C47	Pressure Instruments - Fuel, Oil, and Hydraulic (Reciprocating Engine Powered Aircraft)
TSO-C49b	ETSO-C49b	Electric Tachometer: Magnetic Drag (RPM)
TSO-C55	ETSO-C55	Fuel and Oil Quantity Instruments (Reciprocating Engine Aircraft)
TSO-C63c		Airborne Weather and Ground Mapping Pulsed Radars
TSO-C110a	ETSO-C110a	Airborne Passive Thunderstorm Detection Equipment
TSO-C113	ETSO-C113	Airborne Multipurpose Electronic Displays
TSO-C147	ETSO-C147	Traffic Advisory System (TAS) Airborne Equipment

Table 24: TSOs by Software Part Number

Part #	TSO#
530-00117-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C110a, TSO-C113, TSO-C147
530-00126-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C55, TSO-C110a, TSO-C113, TSO-C147
530-00130-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C110a, TSO-C113, TSO-C147
530-00132-000	TSO-C43c, TSO-C44b, TSO-C45, TSO-C47, TSO-C49b, TSO-C55, TSO-C110a, TSO-C113, TSO-C147
530-00137-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C55, TSO-C110a, TSO-C113, TSO-C147
530-00137-001	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C110a, TSO-C113, TSO-C147
530-00148-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C110a, TSO-C113, TSO-C147
530-00162-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C110a, TSO-C113, TSO-C147
530-00162-001	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C110a, TSO-C113, TSO-C147
530-00162-002	TSO-C110a, TSO-C113, TSO-C147
530-00170-000	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C55, TSO-C63c, TSO-C110a, TSO-C113, TSO-C147
530-00170-002	TSO-C43c, TSO-C44b, TSO-C45a, TSO-C47, TSO-C49b, TSO-C55, TSO-C110a, TSO-C113, TSO-C147

Table 25: ETSOs by Part Number

Part #	ETSO#
530-00137-000	ETSO-C43c, ETSO-C44b, ETSO-C45a, ETSO-C47, ETSO-C49b, ETSO-C55, ETSO-C110a, ETSO-C113, ETSO-C147
530-00137-001	ETSO-C43c, ETSO-C44b, ETSO-C45a, ETSO-C47, ETSO-C49b, ETSO-C55, ETSO-C110a, ETSO-C113, ETSO-C147

Appendix C: *Flight Manual Supplement Information*

A flight manual supplement should be created for each installation, using Avidyne's FAA approved AFMS as a guideline. Hard and electronic copies are available by any of the following means:

Calling Avidyne Technical Support at 1-800-AVIDYNE

E-mail: techsupport@avidyne.com

Web: www.avidyne.com

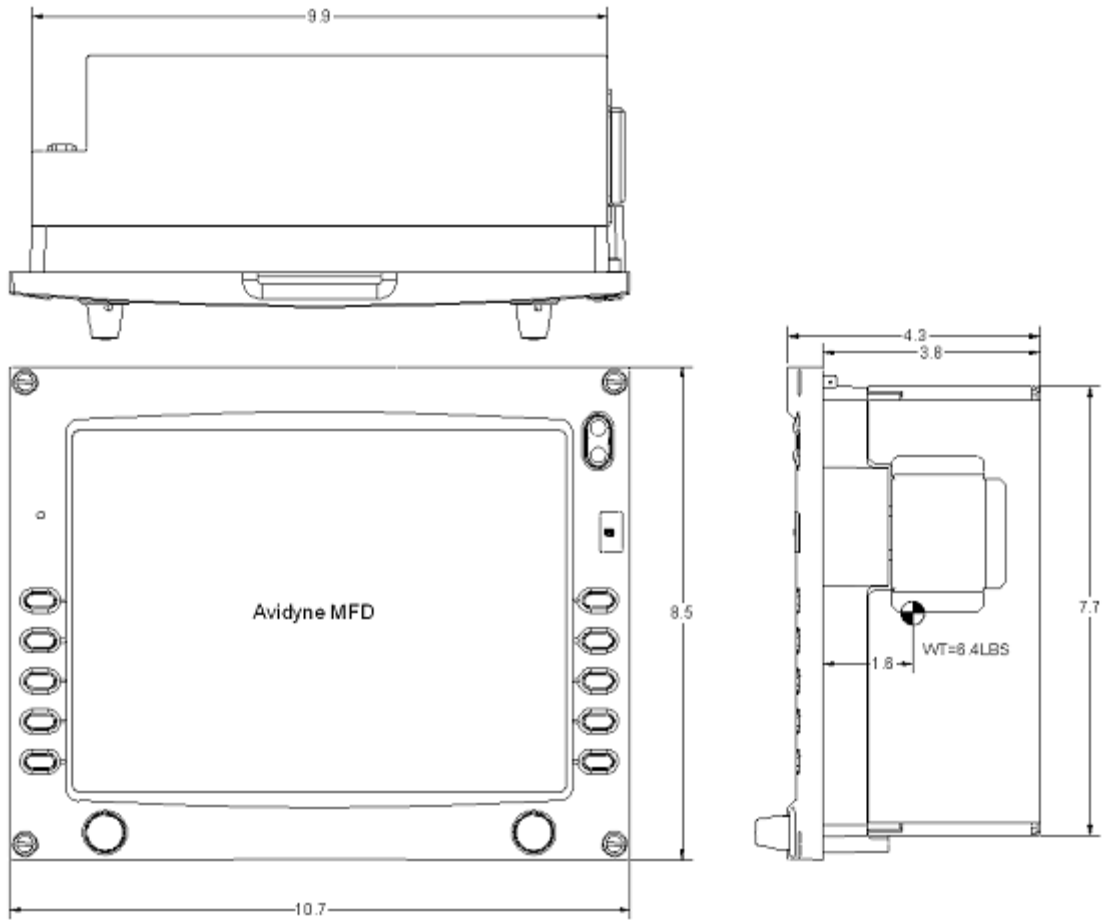
Appendix D: STC Permission

Avidyne Corporation hereby grants permission to all National Aviation Authority (FAA, CAA, JAA) approved installers to use data from all STCs and amendments Avidyne has received to modify aircraft. Copies of the STCs and amendments are available upon request or at the Avidyne web site Technical Publication page.

Appendix E: Landscape EX5000 Dimensions

Dimensions for the:

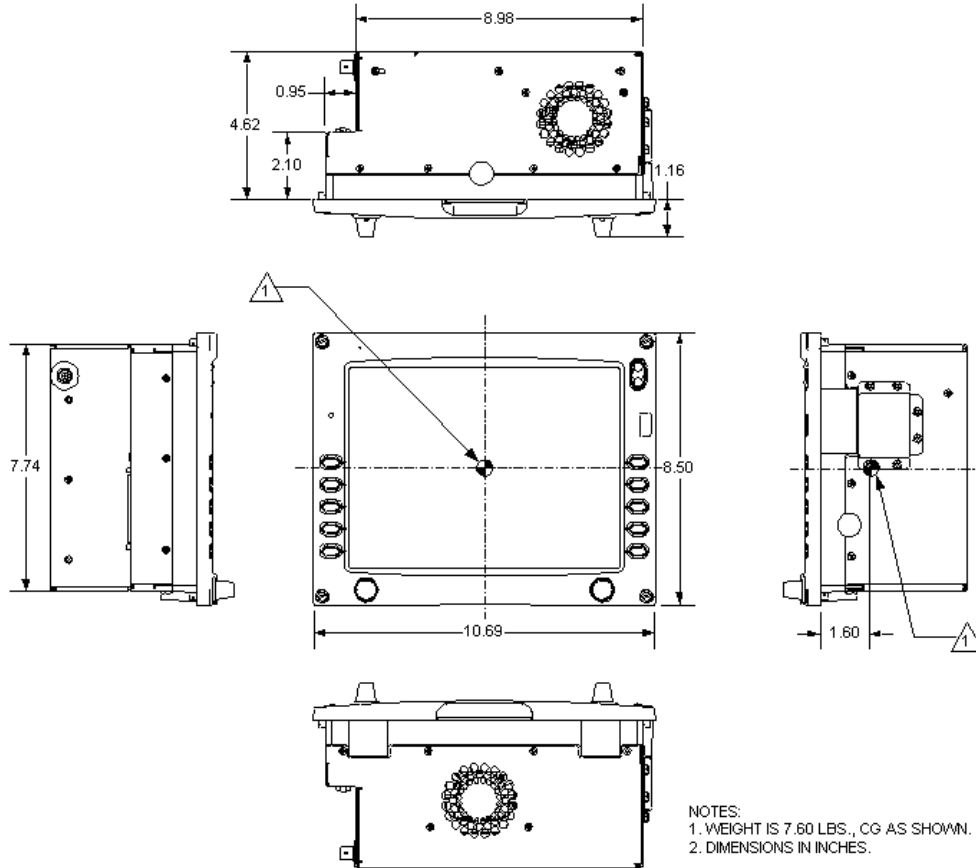
- EX5000 (700-00004-002)
- EX3000 (700-00004-001)



Appendix F: Landscape EX5000 with Integrated Datalink Dimensions

Dimensions for the:

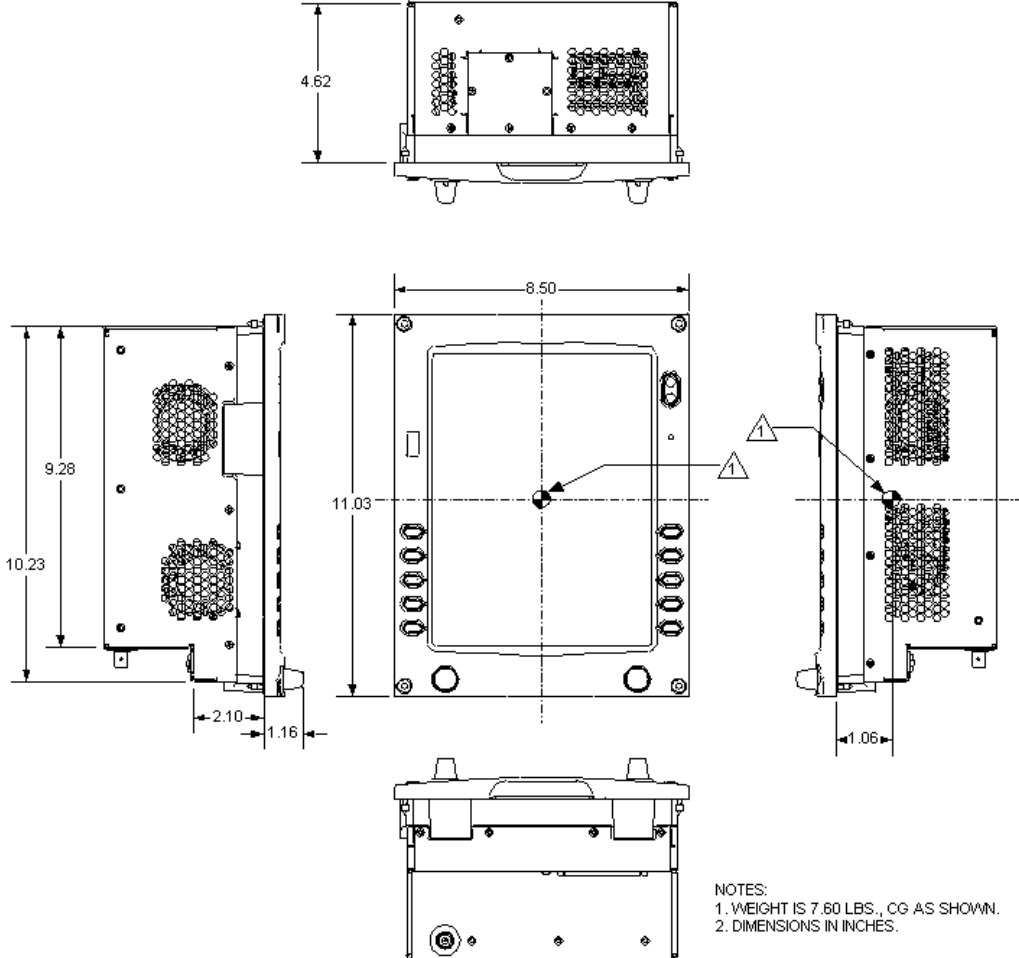
- EX5000 (700-00004-004 & -006, 700-00030-005)
- EX3000 (700-00004-003 & -005)



Note: Dimensions for EX5000 (700-00004-008), EX3000 (700-00004-007) are identical as shown, but without BNC connector J1.

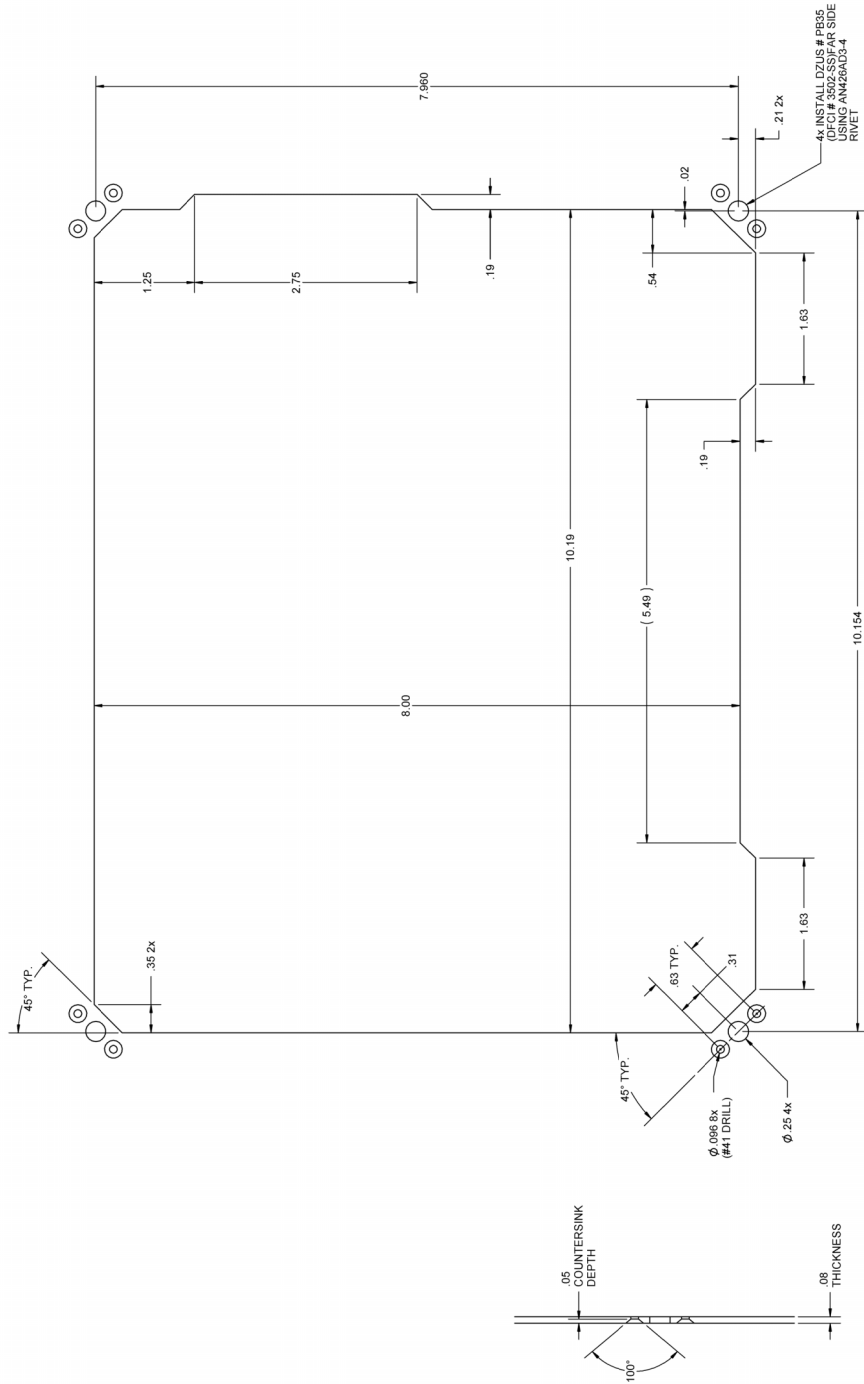
Appendix G: Portrait EX5000 Dimensions

Dimensions for the EX5000 (700-00004-104)

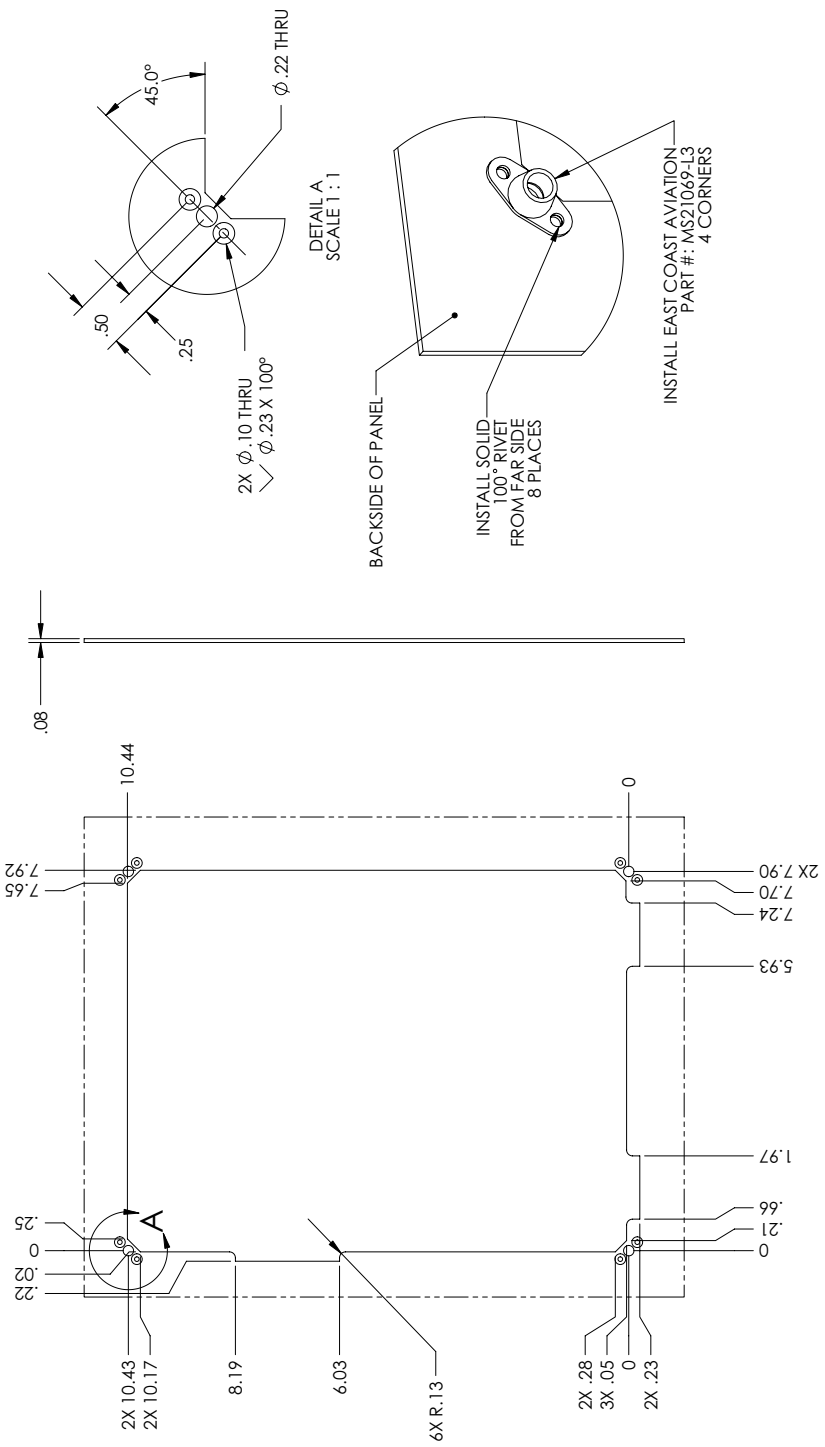


NOTES:
1. WEIGHT IS 7.60 LBS., CG AS SHOWN.
2. DIMENSIONS IN INCHES.

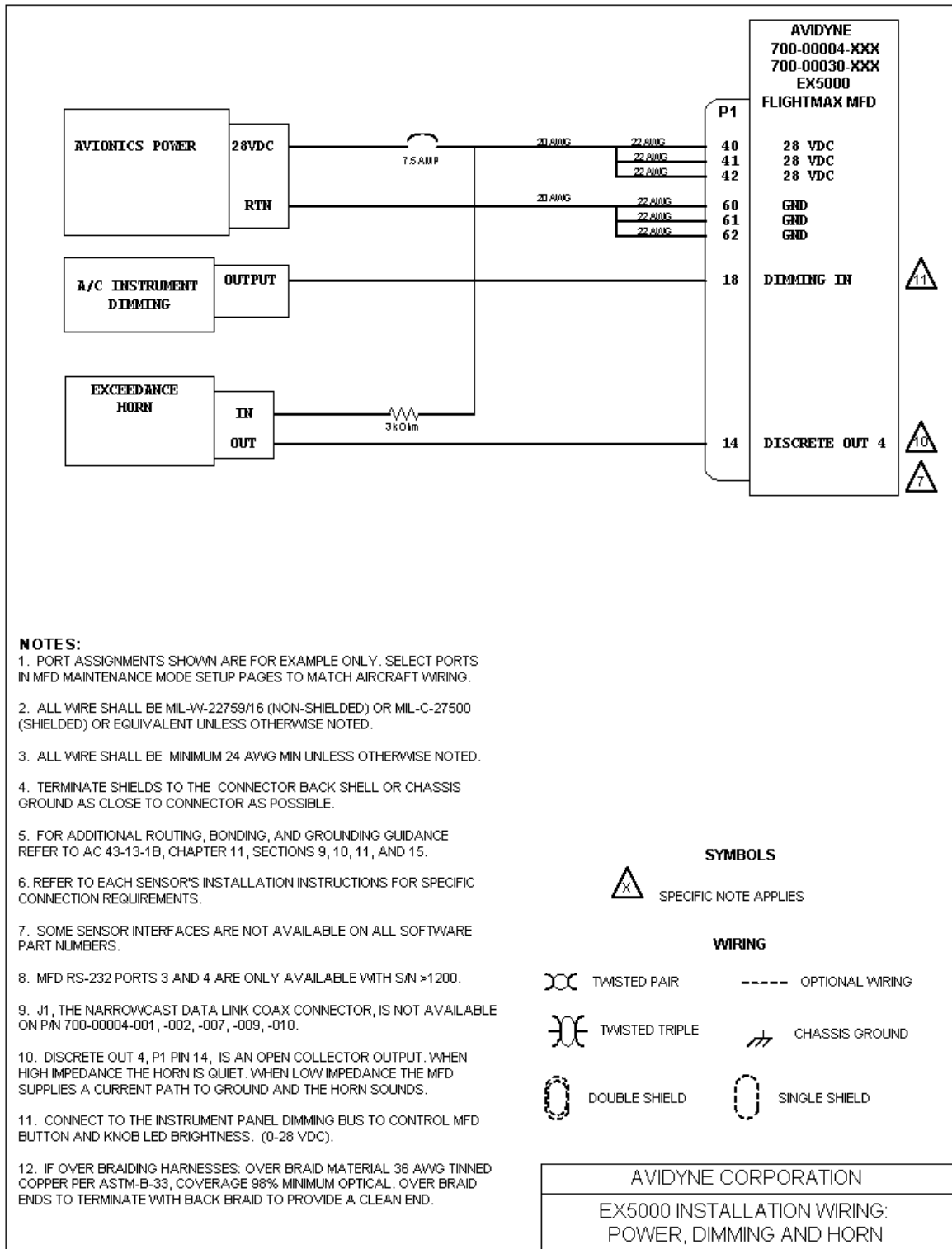
Appendix H: Landscape Cutout Dimensions



Appendix I: Portrait Cutout Dimensions

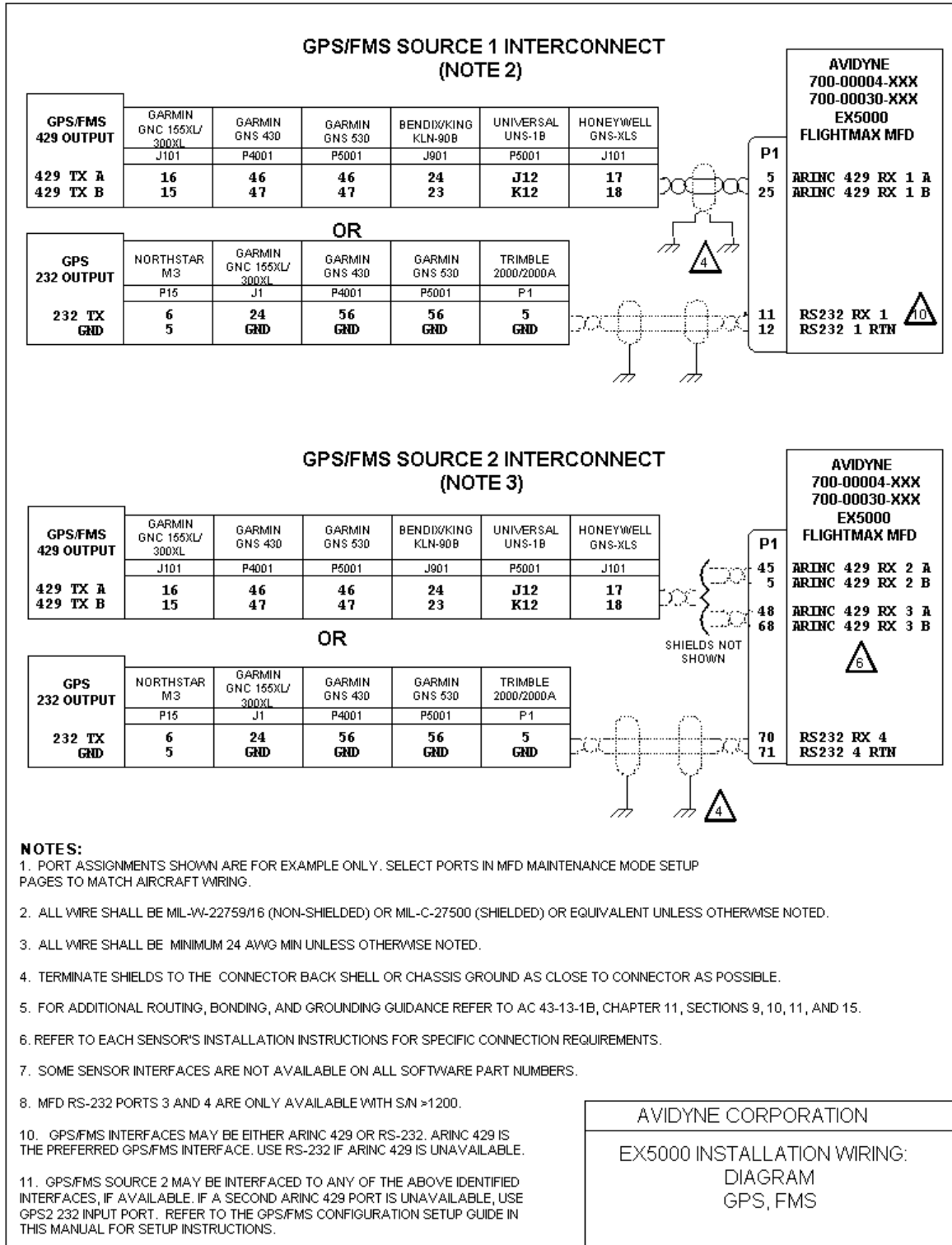


Appendix J: Wiring Diagram – Power, Dimming Bus, and Exceedance Horn

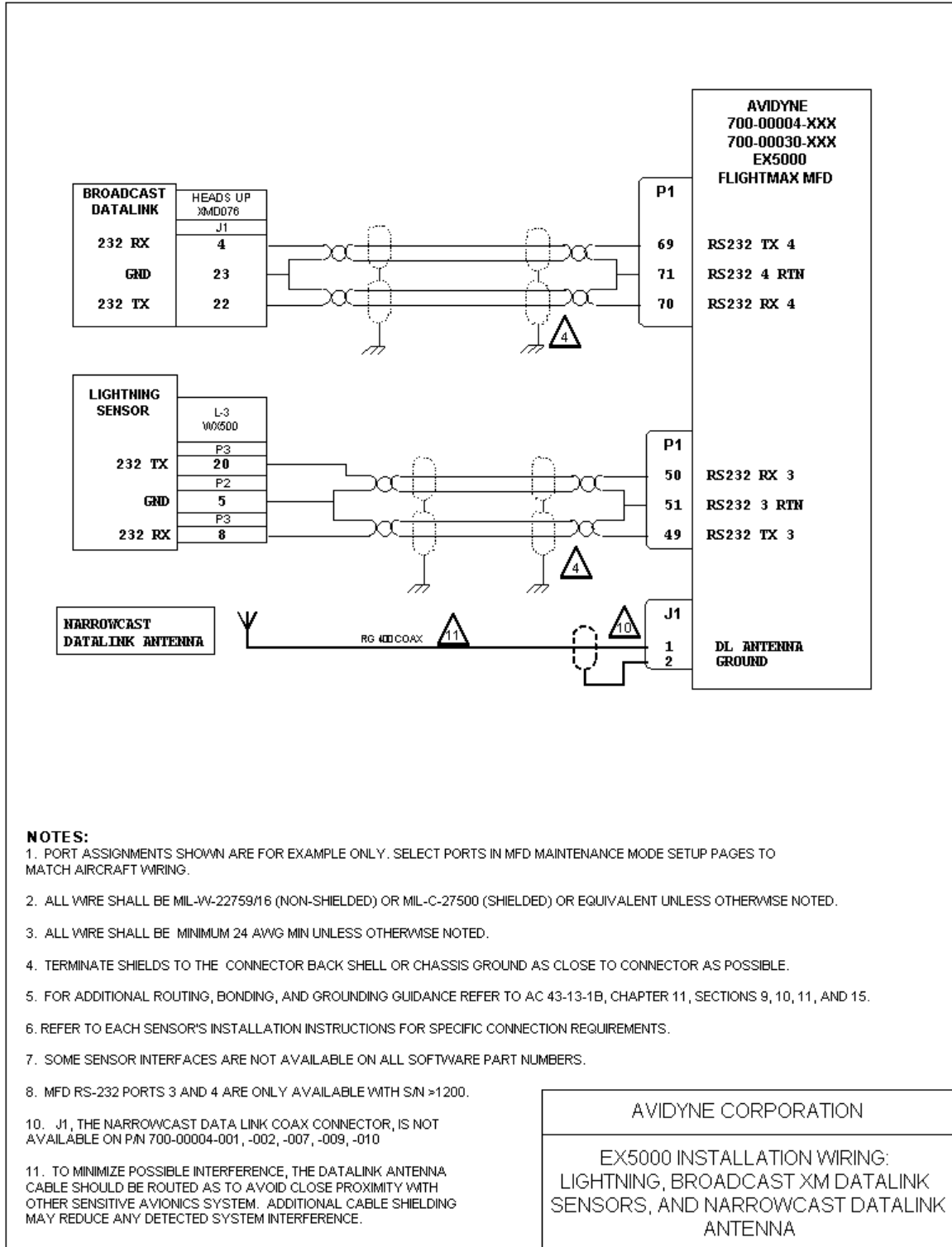


Note: Port assignments shown are nominal assignments. You can select ports as required in Maintenance Mode setup pages, as long as sensors are wired to the corresponding pins.

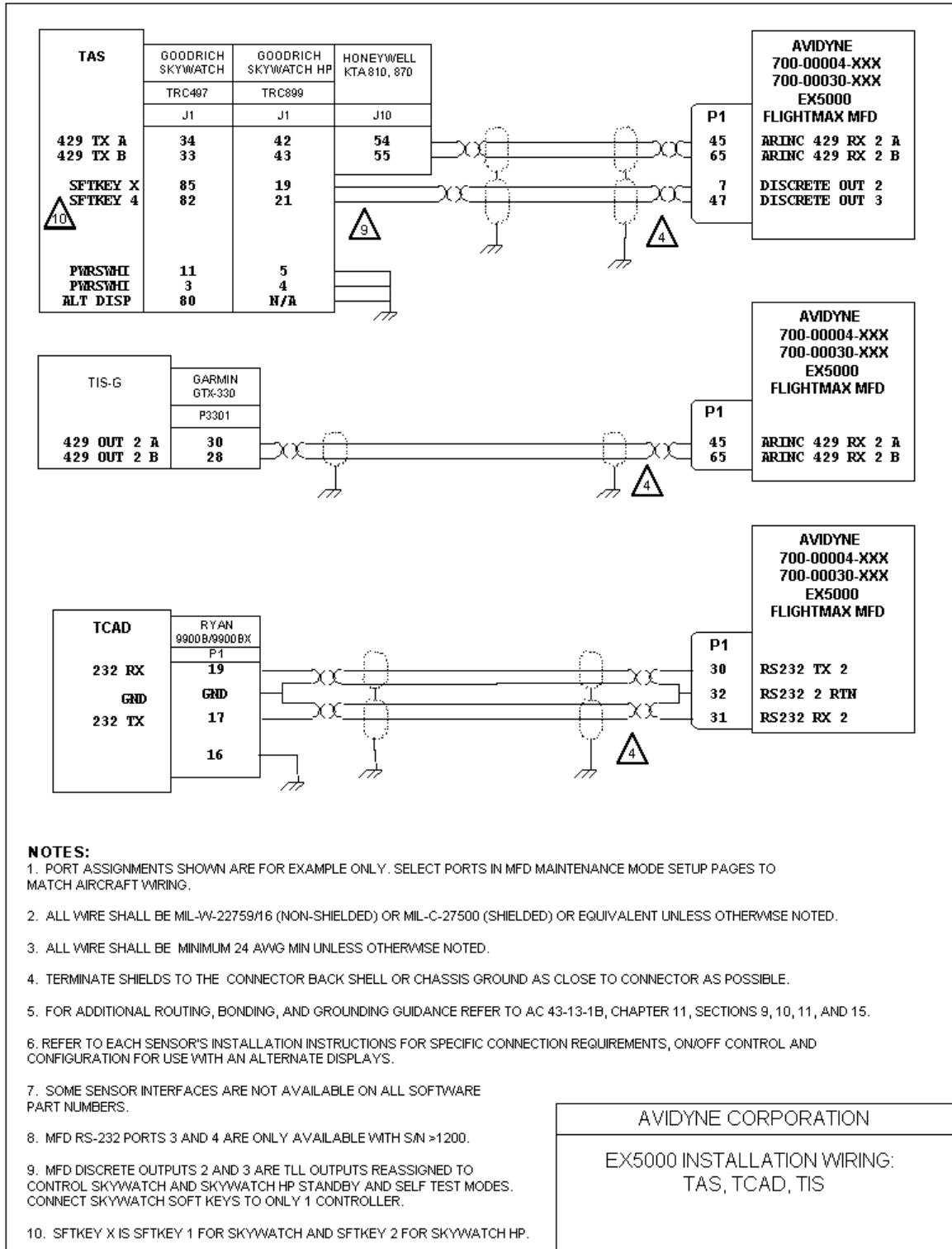
Appendix K: Wiring Diagram – GPS/FMS



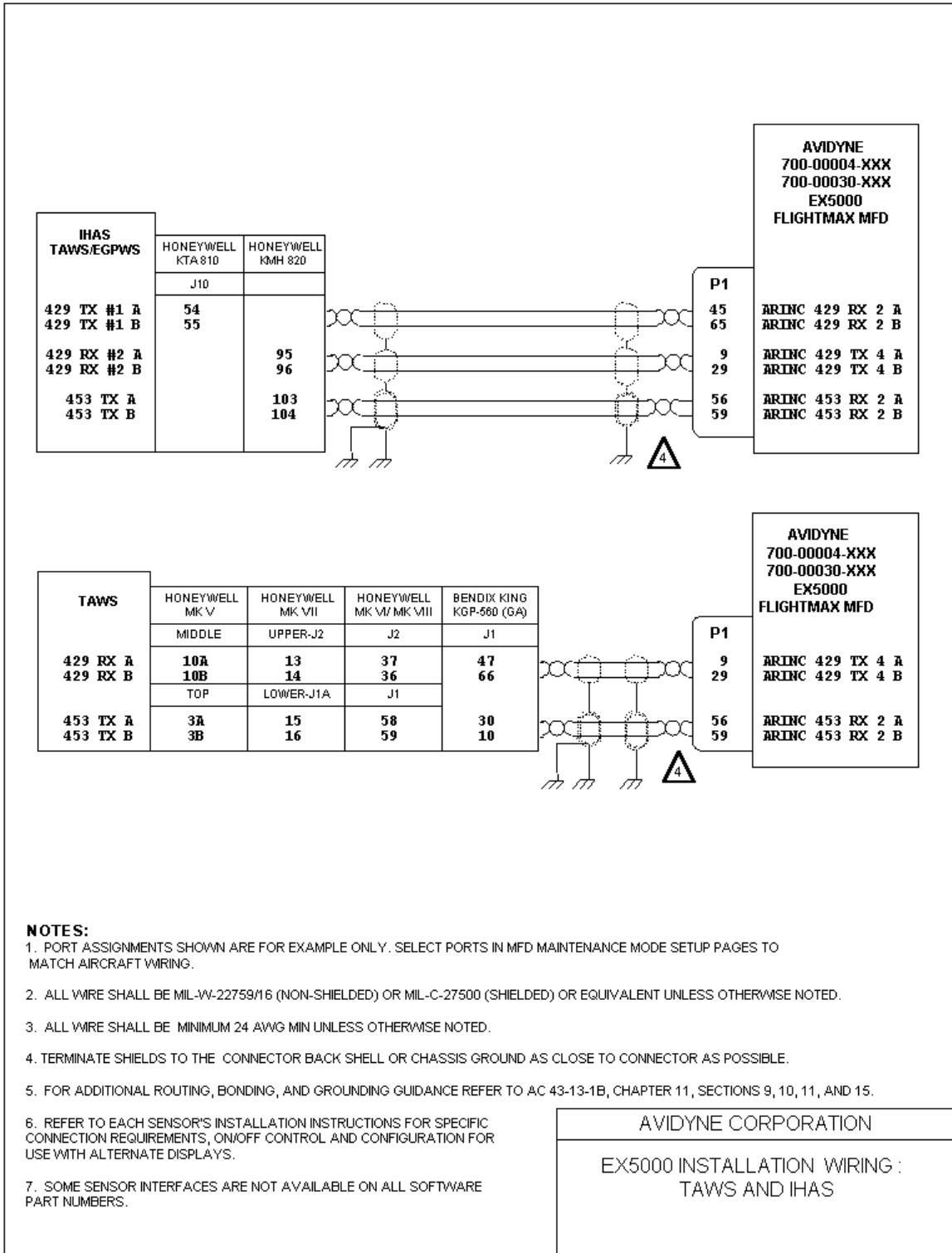
Appendix L: Wiring Diagram – Broadcast Datalink, Narrowcast Datalink, and Lightning Sensor



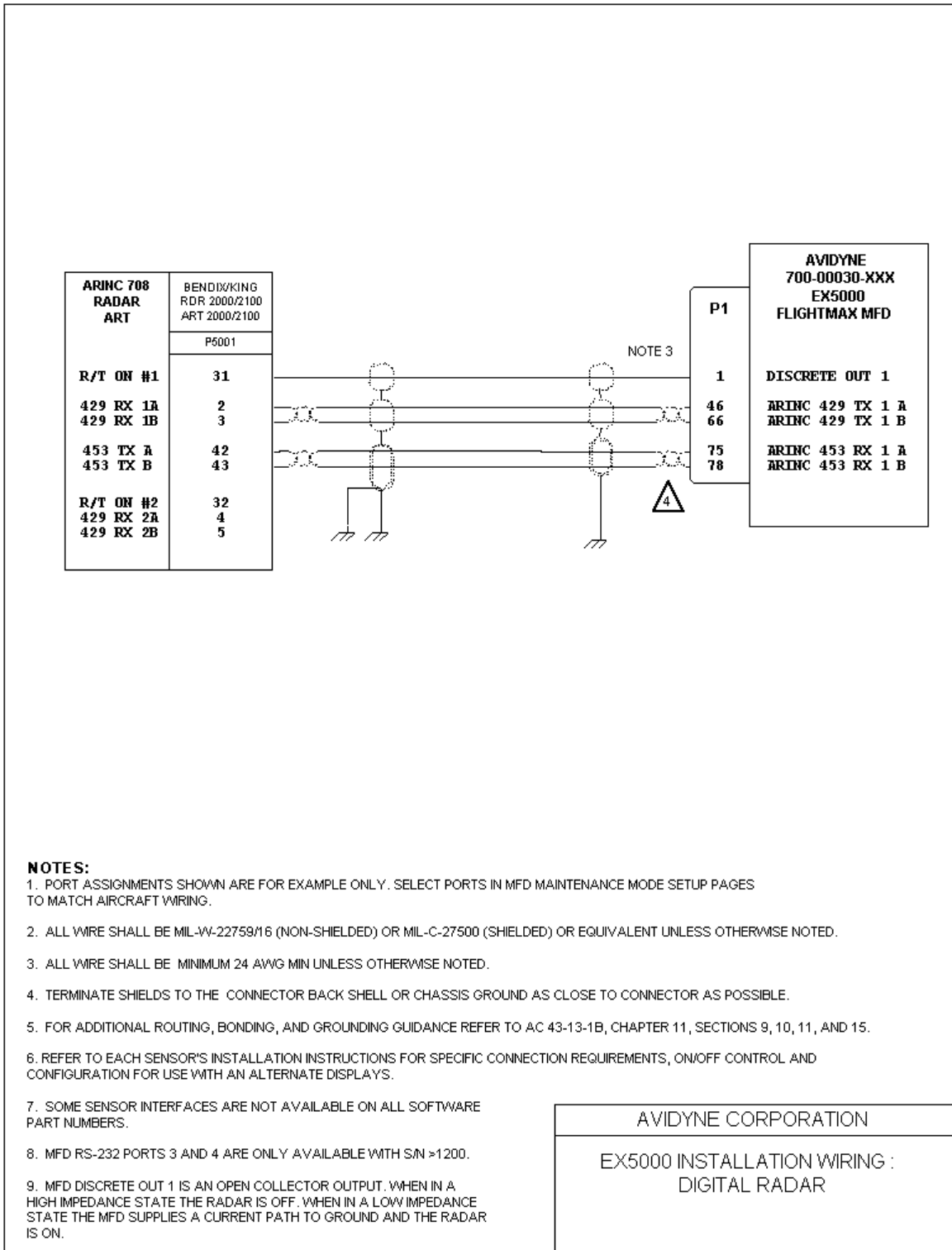
Appendix M: Wiring Diagram – Traffic Sensors



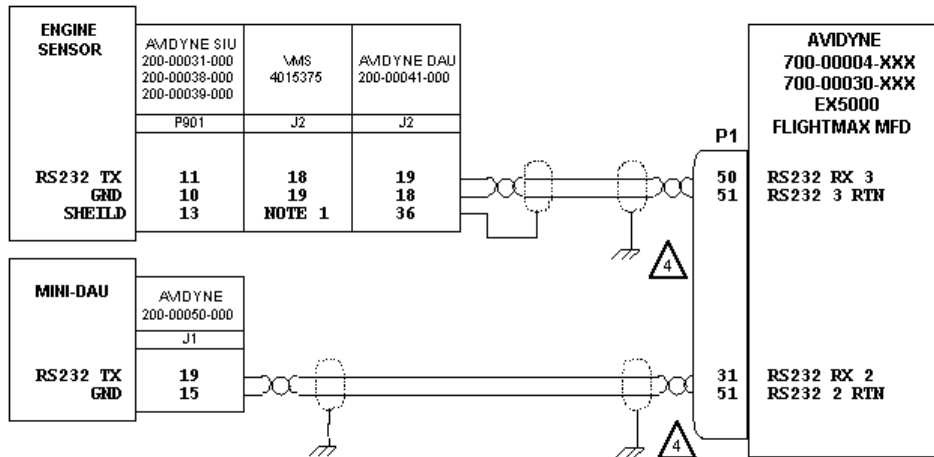
Appendix N: Wiring Diagram – TAWS



Appendix O: Wiring Diagram – Radar Sensor



Appendix P: Wiring Diagram – Engine Sensors

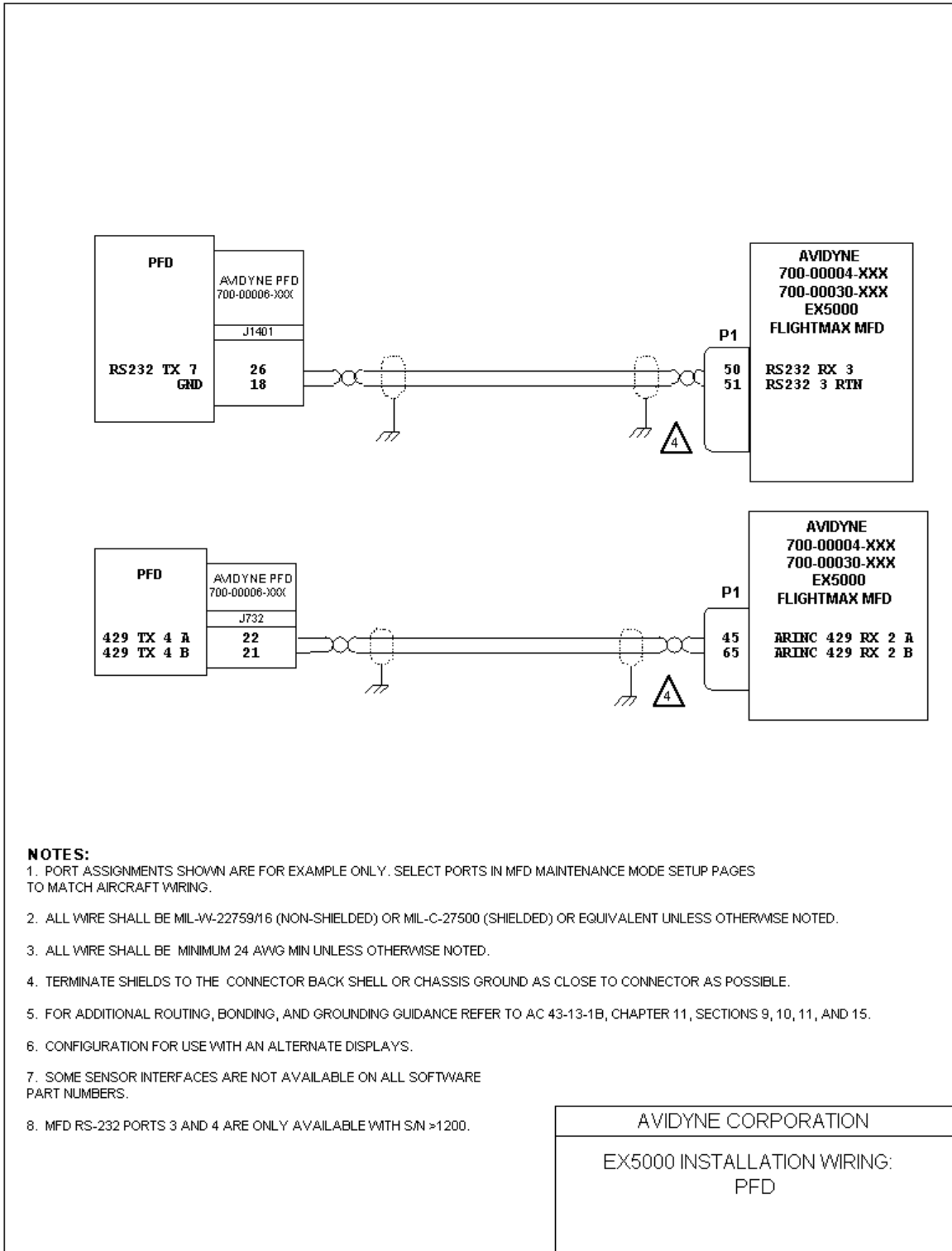


NOTES:

1. PORT ASSIGNMENTS SHOWN ARE FOR EXAMPLE ONLY. SELECT PORTS IN MFD MAINTENANCE MODE SETUP PAGES TO MATCH AIRCRAFT WIRING.
2. ALL WIRE SHALL BE MIL-W-22759/16 (NON-SHIELDED) OR MIL-C-27500 (SHIELDED) OR EQUIVALENT UNLESS OTHERWISE NOTED.
3. ALL WIRE SHALL BE MINIMUM 24 AWG MIN UNLESS OTHERWISE NOTED.
4. TERMINATE SHIELDS TO THE CONNECTOR BACK SHELL OR CHASSIS GROUND AS CLOSE TO CONNECTOR AS POSSIBLE.
5. FOR ADDITIONAL ROUTING, BONDING, AND GROUNDING GUIDANCE REFER TO AC 43-13-1B, CHAPTER 11, SECTIONS 9, 10, 11, AND 15.
5. REFER TO EACH SENSOR'S INSTALLATION INSTRUCTIONS FOR SPECIFIC CONNECTION REQUIREMENTS, ON/OFF CONTROL AND CONFIGURATION FOR USE WITH AN ALTERNATE DISPLAYS.
7. SOME SENSOR INTERFACES ARE NOT AVAILABLE ON ALL SOFTWARE PART NUMBERS.
8. MFD RS-232 PORTS 3 AND 4 ARE ONLY AVAILABLE WITH S/N >1200.

AVIDYNE CORPORATION
EX5000 INSTALLATION WIRING: ENGINE SENSORS

Appendix Q: Wiring Diagram – Primary Flight Display (PFD)



Appendix R: 3rd Party Avionics System Interconnect

Note: Sensor assignments shown are nominal assignments. You can select ports as required in Maintenance Mode Setup pages (for example, ARINC 429 RX1 is usually used for GPS1. However, if you wire a different sensor to pins 5 & 25, that sensor should be set up for port ARINC1 on the corresponding Setup Page, and GPS1 should use a different port selection.).

Table 26: P1 Pin Assignments

Pin	Pin Name	I/O
5	GPS1 (GPS A) ARINC 429 RX 1A	I
25	GPS1 (GPS A) ARINC 429 RX 1B	I
24	Shield	I
45	GPS2 (GPS B) ARINC 429 RX 2A	I
65	GPS2 (GPS B) ARINC 429 RX 2B	I
23	Shield	I
50	RS-232 IN (nominally WX-500)	I
49	RS-232 OUT (nominally WX-500)	O
51	RS-232 GND	I
8	ARINC 429 RX 3A (nominally TRAFFIC)	I
28	ARINC 429 RX 3B (nominally TRAFFIC)	I
4	Shield	I
7	TRAFFIC Command Discrete	O
47	TRAFFIC Command Discrete	O
9	ARINC 429 TX 4A (nominally TAWS)	O
29	ARINC 429 TX 4B (nominally TAWS)	O
22	Shield	I
56	ARINC 453 RX 2A (nominally TAWS)	I
59	ARINC 453 RX 2B (nominally TAWS)	I
67	Shield	I

Table 27: GPS ARINC429 Receive Messages (GAMA Communication Protocol)

Label	Message
310	PPOS LAT
311	PPOS LON
312	GS
313	TRK
147G	MAGVAR
074G	DATA RECORD HEADER
075G	ACTIVE WPT TO/FROM
113G	CHECKSUM
300G	STATION INFO
303	MSG INFO
304G	MSG CHARS 1-3
305G	MSG CHARS 4-6
306G	WPT LAT
307G	WPT LON
330	CONIC ARC INBOUND CRS
331	CONIC ARC RADIUS
332	CONIC ARC CRS CHANGE
125	UTC TIME

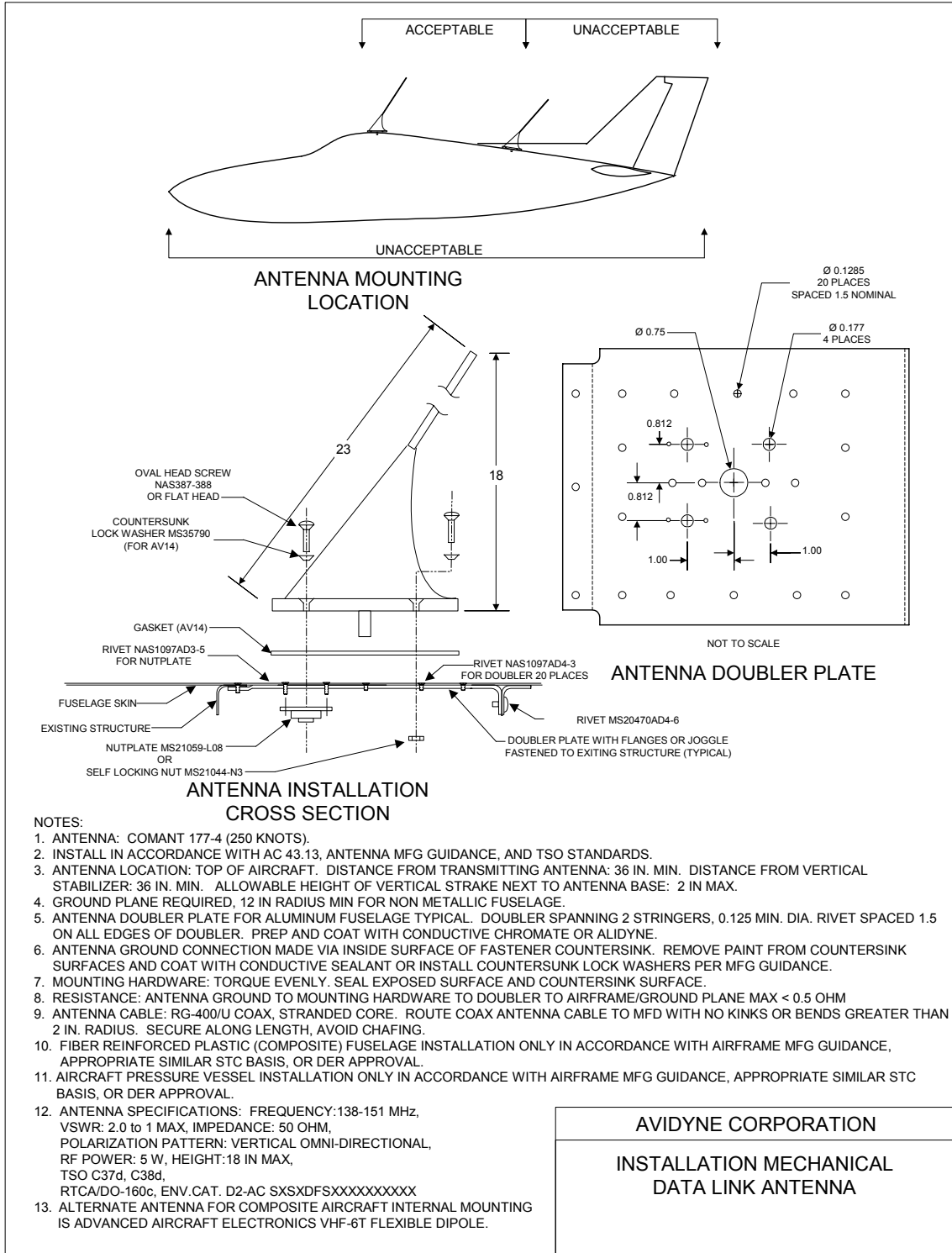
Table 28: Traffic ARINC 429 Messages (ARINC 735A communication protocol)

Label	Message
013	DITS Control
015	Altitude Select Limits
016	DITS Control
203	Own Aircraft Altitude
270	Vertical Resolution Advisory
274	TCAS SL, RI
320	Own Aircraft Heading
350	TCAS Faults Summary
357	Intruder Files
377	Equipment Identifier

Table 29: TAWS ARINC 429 Transmit Messages

Label	Message
011	Query Response
012	Key Press/Display Mode
271	Range Data

Appendix S: Narrowcast Datalink Antenna Mounting



AVIDYNE CORPORATION

**INSTALLATION MECHANICAL
DATA LINK ANTENNA**

Appendix T: *Narrowcast Datalink Antenna Coupler Installation*

The Datalink installation can also be done using a shared antenna for both VHF voice communications and Datalink, using the Avidyne DC50 antenna coupler, part number 700-00015-000.

The Datalink Coupler is a Radio Frequency (RF) device that allows two transceivers (a VHF communications radio and a Datalink radio) to share a single wide-band VHF antenna. The coupler contains filters that allow the signals intended for the comm to reach the VHF comm port, while routing the ORBCOMM Datalink frequencies to the ORBCOMM datalink port.

For information on installing the 700-00015-000 antenna coupler, see the DC50 installation manual, (document 600-00082-000, *Antenna Combiner Installation Manual*), available from Avidyne.