



Installation
Manual
P/N 600-00073 Rev 15



FlightMax

Installation Manual

700-00004-XXX-()

Model EX3000 Series MFD

EX5000 Series MFD

P/N 600-00073

Rev 15



Revision Table

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The latest revision of the FlightMax EX5000-Series MFD Installation Manual is made available to authorized Avidyne dealers on the web at www.avidyne.com.

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1 General Information

This manual contains information about the physical, mechanical, electrical characteristics, and installation instructions for the Avidyne FlightMax EX3000-Series and EX5000-Series Multi-Function Displays (MFD's), Avidyne part number 700-00004-XXX-(). This manual applies to EX3000-Series and EX5000-Series MFD's with software listed in Section 2.1 of this manual. Follow the installation instructions carefully to obtain maximum performance from the MFD.

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 defined in Section 2.1 of this manual. It is recommended that avionics installers review the Pilot's Guide before operating the MFD. The most current version is available to installers 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.

1.1 Equipment Description

The MFD is a panel-mounted, multi-function display. The MFD is available in two display orientations:

- Landscape
- Portrait

Electrically, both units are identical.

NOTE: For clarity, all unit and display illustrations in the Installation Manual are shown in landscape orientation. All information is applicable to both viewing orientations.

The MFD system consists of the following components:

- Multi-Function Display (MFD), (see the table in section 2.1 for part number descriptions)
 - EX3000 MFD, comes with standard interfaces only
 - EX5000 MFD, comes with standard and optional interfaces only
- MFD installation kit including connectors.
- Data Loader including interconnect cable
- User documentation including Pilot's Guide, Installation Manual, and Flight Manual Supplement.



MFD Characteristics

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
Options	
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
700-00004-004/005/006/104	7.6 lbs
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)
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
Cooling Requirement	Unrestricted airflow to the top and bottom of the landscape chassis or both sides of portrait chassis.
Operating Limits	See APPENDIX A - <i>Environmental Qualification Data</i>
TSO's	TSO-C110a, TSO-C113, TSO-C147, TSO-C43c ³ , TSO-C44b ³ , TSO-C45a ³ , TSO-C47 ³ , TSO-C49b ³ , TSO-C55 ^{1, 3}
ETSO's²	ETSO-C110a, ETSO-C113, ETSO-C147, ETSO-C43c, ETSO-C44b, ETSO-C45a, ETSO-C47, ETSO-C49b, ETSO-C55

¹TSO applicable to software part number 530-00126-000, 530-00132-000, and 530-00137-000 only

²ETSO's applicable to software part number 530-00137-000 only

³TSO's not applicable to software part numbers 530-00162-001 only



2 Installation

2.1 Unpacking and Inspection

The shipping carton of the MFD contains the following components and parts:

Part Number	Description	Pilot's Guide Part Number	Software Part Number	Software Revision
700-00004-005	EX3000 Landscape Multi-Function Display (MFD)	600-00072	530-00117-000	02
			530-00130-000	00
		600-00108-000	530-00162-000	00
700-00004-006	EX5000 Landscape Multi-Function Display (MFD), with ARINC 429, with internal Datalink transceiver	600-00076	530-00132-000	00
		600-00101-000	530-00126-000	02
		600-00105-000	530-00137-000	02
			530-00137-001	02
		600-00072	530-00117-000	02
			530-00130-000	00
600-00108-000	530-00148-000	01		
	530-00162-000	00		
700-00004-007	EX3000 Landscape Multi-Function Display (MFD), without internal Datalink transceiver	600-00108-000	530-00162-000	00
700-00004-008	EX5000 Landscape Multi-Function Display (MFD), with ARINC 429, without internal Datalink transceiver	600-00108-000	530-00162-000	00
700-00004-009	EX3000 Landscape Multi-Function Display (MFD), without internal Datalink transceiver	600-00108-001	530-00162-001	00
700-00004-010	EX5000 Landscape Multi-Function Display (MFD), with ARINC 429, without internal Datalink transceiver	600-00108-001	530-00162-001	00
700-00004-104	EX5000 Portrait Multi-Function Display (MFD) with ARINC 429 and with internal Datalink transceiver,	600-00102-000	530-00129-000	03
600-00073	MFD Installation Manual (Optional)		all	

Make sure that all the parts listed above were received and sustained no shipping damage. 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.

During system checkout verify the software part number and revision.

NOTE: 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.

2.2 Considerations

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 STC's may require additional substantiation. Refer to APPENDIX C for information pertaining to STCs. Reference to an STC may assist in securing installation approval.

2.2.1 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.

2.2.2 Cooling

The MFD uses two internal fans; an inlet and outlet fan, which provide adequate cooling. The MFD should have approximately 2 inches clearance, top and bottom to allow for proper air circulation.

2.2.3 Positioning and Mounting the MFD

Prior to installing the MFD, you should carefully assess how you can accomplish the most effective positioning of the MFD given space availability, viewing angle, and wiring considerations. Prior to starting the installation, you should 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, a cutout hole must be made in the cockpit panel. Refer to APPENDIX H – *Landscape Cutout Dimensions* or APPENDIX I – *Portrait Cutout Dimensions*.

The MFD is held in place by four Dzus ¼ turn fasteners (Landscape) or by four captive 10-32 screws (Portrait). These require a panel thickness of 0.080" for proper engagement. Hole patterns and placements are illustrated in the corresponding appendices.

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

2.2.4 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).

Refer to APPENDIX J – *Wiring Diagram, Power, Dimming Bus, DL antenna, and RS-232 Interfaces* and APPENDIX K – *Wiring Diagram 2, ARINC 429 Interface*.

2.2.5 Wiring external devices

2.2.5.1 GPS and FMS

GPS data may be received via a GAMA 429 Graphics interface (EX5000 only) or a RS-232 interface. Refer to the wiring diagram in the appropriate appendix and the specific installation instructions for your particular GPS.

NOTE: For 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. This is explained in detail in the System Setup and Checkout section.

2.2.5.2 Broadcast Datalink Receiver

Refer to the wiring diagram in APPENDIX J – *Wiring Diagram, Power, Dimming Bus, DL antenna, and RS-232 Interfaces* 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*.

2.2.5.3 Narrowcast Datalink Antenna

For MFDs with internal narrowcast datalink transceivers, refer to the wiring diagram in APPENDIX J – *Wiring Diagram, Power, Dimming Bus, DL antenna, and RS-232 Interfaces*. 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.

2.2.5.4 Lightning Sensor

Refer to the wiring diagram in APPENDIX J – *Wiring Diagram, Power, Dimming Bus, DL antenna, and RS-232 Interfaces* 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 WX500 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 noise mapping has been performed and the proper grounds have been installed and checked after the Lightning interface is installed. Ensure that the Goodrich WX-500 has been installed and setup according to its installation instructions. Erroneous lightning strikes may be displayed if there is excessive noise.

2.2.5.5 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 K – *Wiring Diagram 2, ARINC 429 Interface*. Use shielded wiring and terminate as shown.

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 K – *Wiring Diagram 2, ARINC 429 Interface*. Use shielded wiring and terminate as shown.

TAS/IHAS (Bendix/King Honeywell: KTA 870) - Connect data lines and configure as shown in APPENDIX K – *Wiring Diagram 2, ARINC 429 Interface*. Use shielded wiring and terminate as shown.

TCAD (Ryan: 9900B and 9900BX) - Ensure the Ryan TCAD software revision is 1.07 or later. Connect and configure as shown to APPENDIX J – *Wiring Diagram, Power, Dimming Bus, DL antenna, and RS-232 Interfaces*. Use shielded wiring and terminated as shown.

2.2.5.6 TAWS

(Honeywell: KGP 560) – Ensure the Honeywell KGP 560 has part number 965-1198-005. Connect as shown in APPENDIX K – *Wiring Diagram 2, ARINC 429 Interface*.

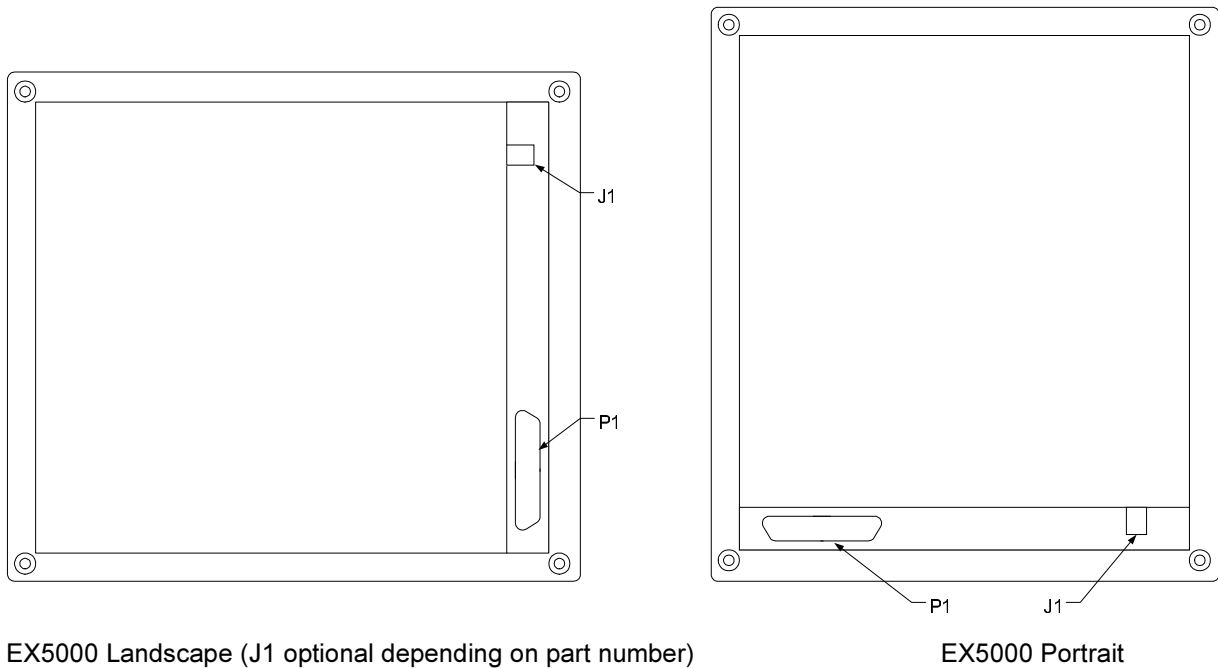


Figure 1 EX5000 Landscape and Portrait Rear Views

3 MFD Setup and Checkout

3.1 Preliminary Test

Power up the MFD for post installation evaluation and configuration. Turn on the MFD by applying power to the aircraft electrical bus supplying the MFD.

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

The green LED control lights behind all the front panel controls should light up.

After the initial power up, the software will load and go through several checks. During this startup sequence the screen will display the text "Initializing-Please Wait..."

The startup sequence is finished when the text "Press any bezel key to Continue..." is displayed.

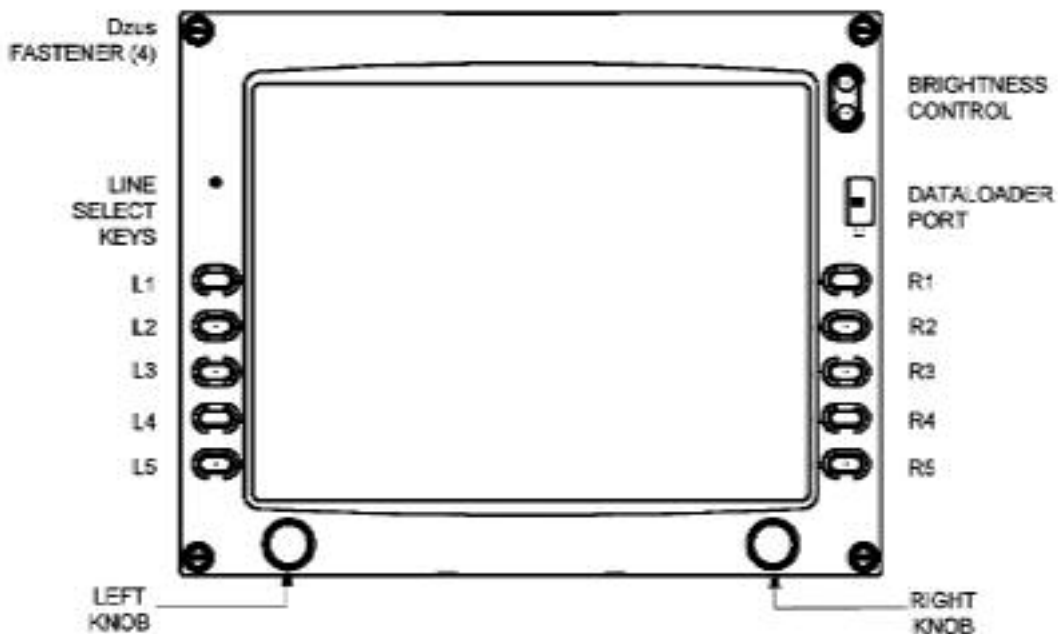


Figure 2 EX5000 Landscape Front View

3.2 MFD Function Activation Utilities (Optional)

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

Broadcast Datalink, CMAX, and TAWS MFD functions must be activated using one of the MFD utilities listed below. Aircraft OEM's will use the MFD OEM Setup Utility. Aircraft repair stations will use the MFD Single Use Activation Utilities.

3.2.1 MFD OEM Setup Utility

This utility can be used to activate the MFD Broadcast Datalink, CMAX, and/or TAWS functions. This utility allows the installer to set the MFD software S/N, which is required for the customer to load CMAX data, and logs MFD S/N and activation configurations for record keeping. This utility is for use in OEM aircraft manufacturing facilities only. This utility is for use for software part number 530-00162- () only.

Kit P/N	Utility P/N	Service Bulletin
850-00013-020	570-00021-000	610-00004-034

Instructions for Use

1. Turn power OFF to the MFD.
2. Record the MFD S/N. It is located on the top of the MFD just forward of the instrument panel. Secure the MFD to the instrument panel.
3. Obtain a copy of the MFD functions ordered by the customer of that aircraft.
4. Install the utility disk into the Data Loader drive.
5. Connect one end of the interconnect cable to the Data Loader and the other end to the MFD data port on the front panel of the MFD.
6. Apply power to the MFD. The utility screen is displayed.

NOTE: If the regular MFD startup screen with the “Press Any Bezel Key” message is displayed, the Data Loader was not detected by the MFD. Check the connection between the Data Loader and the MFD.



Figure 3 OEM Setup Utility

7. Verify the MFD S/N displayed by the utility. If it does not agree with the S/N on the label on top of the MFD, enter the correct S/N using the MFD controls.
8. Enter the date, the aircraft serial number, and the installer’s identification code.
9. Activate the functions ordered by the customer.
10. Press the “Save” button. Do not turn off the MFD or disconnect the interconnect cable during activation.
11. Activation is complete when the “Press Any Bezel Key” message is displayed.



3.2.2 MFD Single-Use Activation Utility Instructions for Use

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

The following procedure is used by avionics repair facilities performing MFD installations, MFD software upgrades, and MFD function activation on installed MFD software. Use this procedure for running CMax, TAWS, or Broadcast activation utilities. Obtain the individual activation utilities from Avidyne or an authorized aircraft manufacturer. 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. After activation these disk utility disks may be erased and reused for any purpose.

Procedure:

1. Turn power OFF to the MFD.
2. Install the utility disk into the Data Loader drive.
3. Connect one end of the interconnect cable to the Data Loader and the other end to the MFD data port on the front panel of the MFD.
4. Apply power to the MFD.
5. The utility screen is displayed.

NOTE: If the regular MFD startup screen with the “Press Any Bezel Key” message is displayed, the Data Loader was not detected by the MFD. Check the connection between the Data Loader and the MFD.

6. Press the “Proceed” button. Do not turn off the MFD or disconnect the interconnect cable during a data load.
7. Function activation is complete when the “Press Any Bezel Key” message is displayed.

3.2.3 MFD Single-Use CMAX Activation Utility

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 number 530-00162- () only.

Kit P/N	Utility P/N	Service Bulletin
850-00013-022	570-00022-000	610-00004-035

3.2.4 MFD Single-Use TAWS Activation Utility

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 number 530-00162- () only.

Kit P/N	Utility P/N	Service Bulletin
850-00013-024	570-00024-000	601-00004-037

3.2.5 MFD Single-Use Broadcast Activation Utility

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 number 530-00162- () only.

Kit P/N	Utility P/N	Service Buletin
850-00013-023	570-00023-000	610-00004-036

3.3 Maintenance Mode

Apply power to all the sensors that interface with the MFD, including: the GPS, the Lightning sensor and the Traffic sensor, Engine interface unit, and TAWS sensor. MFD Maintenance Mode contains the setup pages for each function. Access Maintenance Mode by pressing the line select keys in a specific manner from the Setup Page as follows:

1. Turn on the MFD by applying power to the aircraft
2. The system will begin its normal start up sequence
3. At the prompt, "Press any bezel key to continue", press a line select key
4. Rotate the left knob clockwise until the Setup Page is displayed
5. Simultaneously press and hold the top left (L1), and 3rd down from the top left (L3), Line Select keys for at least 5 seconds (See Figure 4 Maintenance Mode Page).
6. A blue background "Maintenance Page" will appear

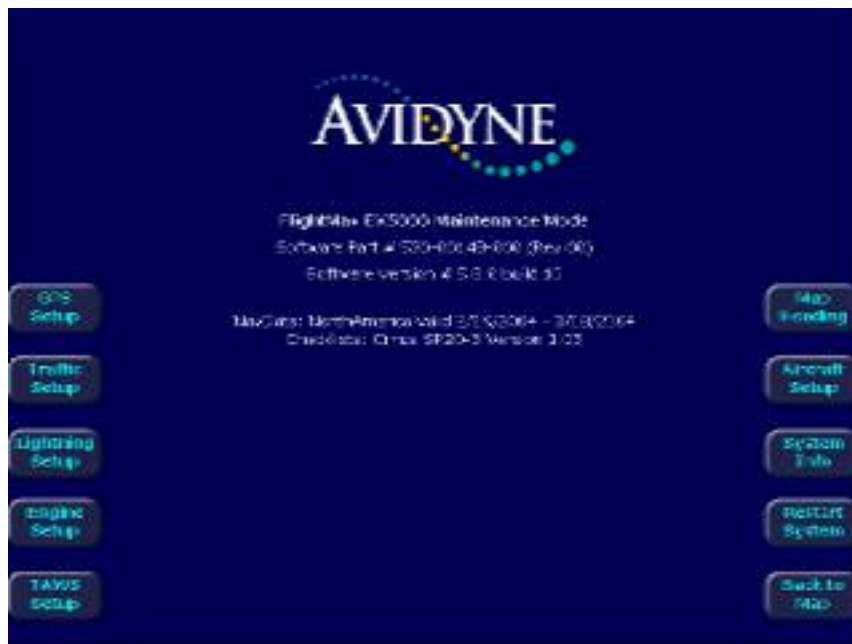


Figure 4 Maintenance Mode Page

NOTE: After changes are made in each setup page press the Save key to save and exit each setup page. Press Cancel if you decide not to keep the changes. After all changes are made in Maintenance Mode, the system must be restarted. Press Restart System. Changes will not take affect until the MFD has been restarted. If no changes were made the Back to Map key exits Maintenance Mode.

3.4 FMS/GPS Navigators

The MFD is capable of interfacing with several FMS/GPS's. There is a FMS/GPS Matrix on page 20 that lists most of the FMS/GPS's that interface with the MFD. The matrix includes information about data formats available and GPS configurations.

NOTE: Installers should use the matrix as a general guideline only. GPS manufacturers are constantly improving and upgrading their products. Installers should always refer to the Installation manuals that come with their FMS/GPS to confirm configuration and setup parameters.

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

- GAMA 429
- RS-232

Some GPS's can only output in one format, while others are capable of outputs in either format. EX3000 MFD's support RS-232 interfaces only. EX5000 MFD's support 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 (refer to Map Setup and Checkout section on page 35 for a complete explanation on setting up the various heading configurations within the MFD).

3.4.1 GAMA 429 Graphics Setup (EX5000 only)

NOTE: Using 429 will allow for the display of curved segments and approach data, if that data is available.

If your GPS is capable of GAMA 429 Graphics output, wire it according to APPENDIX K – Wiring Diagram 2, ARINC 429 Interface, and configure the following:

Receiver: Select GAMA 429 Graphics Format.

Port: There are 4 ARINC ports, the FMS/GPS is normally connected to ARINC1. Selecting None indicates that a GPS is not connected to the MFD and the software will not look for one.

Speed: There are two speeds available, High and Low.

When the Receiver, Port, and Speed are set to the desired values, press the Save button. Press Cancel if you decide not to keep the changes you made. Changes will not take affect until the MFD has been restarted.

3.4.2 Dual GPS setup with GAMA 429 (EX5000 only)

The EX5000 has the capability of receiving information from two GAMA 429 Graphics capable GPS units. The GPS should be connected according to the wiring diagram in the appropriate appendix.

3.4.3 RS-232 Setup

NOTE: Using an RS-232 interface does not provide for heading data from the FMS/GPS.

Wire the MFD according to APPENDIX J – Wiring Diagram, Power, Dimming Bus, DL antenna, and RS-232 Interfaces, and configure the following:



Figure 5 GPS Setup, GAMA 429

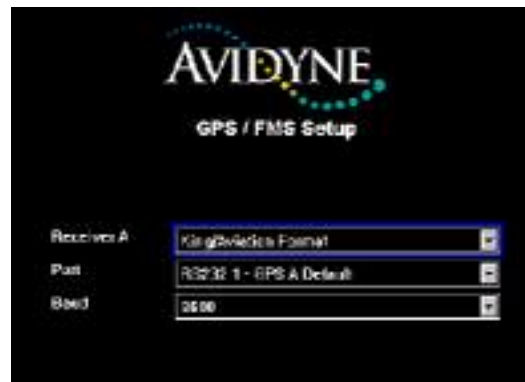


Figure 6 GPS Setup, RS-232

Receiver: Use the FMS/GPS Manufacturer Matrix section on page 20 or refer to your FMS/GPS Installation manual to determine the RS-232 output format of your receiver. Choose from the following RS-232 formats: NMEA 0183, King/Aviation Format, or Northstar Format.

Port: There are 4 RS232 ports; the FMS/GPS is normally connected to RS232 1.

Baud: Choose the proper baud rate. Refer to the FMS/GPS Installation manual or see “FMS/GPS Manufacturer Matrix” on page 20 for the maximum speed. The following speeds are available: 1200, 2400, 4800, 9600, 19200, or 38400.

When the Receiver, Port, and Baud rate are all set to the desired values, press the Save key to save and complete the setup procedure. Press Cancel if you decide not to keep the changes you made. Changes will not take affect until the MFD has been restarted.



3.4.4 FMS/GPS 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.

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 FMS/GPS.
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 FMS/GPS is configured for Port1 (for RS-232) or ARINC1 (for ARINC 429). If a second FMS/GPS is being used it is configured for Port2 or ARINC2.
Heading Data is Not Valid	Heading data is no longer available from the FMS/GPS. Will only appear if the FMS/GPS is being used as your heading source.
Heading Data is Valid	Heading data has been restored.

3.4.5 FMS/GPS Manufacturer Matrix

FMS/GPS	RS232	RS-232 FORMATS	ARINC 429	BAUD/DATA RATE	HEADING OUTPUT	FMS/GPS 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). Refer to 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.

FMS/GPS	RS232	RS-232 FORMATS	ARINC 429	BAUD/DATA RATE	HEADING OUTPUT	FMS/GPS CONFIGURATION	DME ARC
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.
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
II Morrow Apollo GX-50	Yes	King/Aviation	No	9600	No	Use the Moving Map format.	

NOTE: 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.

NOTE: Northstar Installations. Many Northstar units have a hidden setup screen to change configuration parameters to make it difficult to change in flight. Carefully refer to the Northstar installation manual for the specific codes to enter to set this up correctly.

NOTE: 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. Carefully refer to 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

3.5 Lightning Sensor

The MFD supports the WX500 lightning sensor from L-3 Communicaitons.

3.5.1 Lightning Sensor Setup

To configure Lightning, access Maintenance Mode and select Lightning Setup (Refer to Figure 7).

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. Refer to the WX-500 installation manual for testing procedures.

Port: Set the MFD RS232 port that is connected to the WX500 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:** a remote compass system that generates and transmits synchro signals received by the WX500. This heading data can also be used by the MFD to orient the map. See the Map Heading Setup section.
- **Stepper:** a remote compass system that generates and transmits stepper signals received by the WX500. 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 WX500 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.

WX500 Diags: Allows access to the WX-500 diagnostic modes. Follow the guidance in the WX-500 installation manual 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. Follow the guidance in the WX-500 installation manual to understand the testing and the interpretation of the results. (not available on all software releases)



Figure 7 Lightning Setup Page

3.5.2 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.

Message	Meaning
Lightning Sensor is Operating Normally	Verification 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.

Message	Meaning
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 being used as your 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.

3.5.2.1 Lightning Sensor Strike Test

Select the Setup page and press the Lightning Strike Test button. The MFD will switch to the Map page and display a single strike at 15 mile range and 45 degrees relative bearing. If not there may be an inconsistency with the heading source, wiring, or MFD setup.

3.6 Traffic Sensors

NOTE: Only the listed Traffic sensors are supported. If a non-listed traffic sensor 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.

Access Maintenance Mode and select Traffic Setup. Follow instructions for TAS, TCAD, or TIS setup.

3.6.1 TAS (SkyWatch & Bendix/King) Setup

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

Sensor – Select TAS

Port- Select the MFD ARINC 429 port to which the TAS sensor is wired.

TAS Type- Select Skywatch or Bendix/King

External Controller? (SkyWatch only) - A check in this box indicates that 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 thus they are NOT available on the MFD with external controller checked.

Heading Available? - Checking this field indicates that heading data is supplied to the TAS sensor via synchro, stepper or ARINC 429 and is available to the MFD.

3.6.2 TAS (SkyWatch) Checkout

Self test can only be performed from the STANDBY mode and will return to the STANDBY mode upon successful completion of the self test. To perform a Self test do the following:

1. With Traffic in Stand By, rotate the left knob and select the Setup page.
2. Select Traffic Self Test.
3. The Map page will pop up.
4. 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. Refer to the SKY497 Installation manual for explanations and fault isolation procedures.

Installation checkout - Once J1-80 (ALT_DISP1) is strapped to ground, the Setup/Calibration menu is no longer available through the WX-1000 display or MFD. To perform calibration and checkout, an external terminal or PC must be connected. Once this configuration is saved, ARINC 429 communications to the MFD will begin.

Use the alternate display procedure (Appendix E) in the SKY 497 Installation manual. A terminal device using a RS-232 serial data cable is needed for these setup procedures. Appendix D in the SKY497 Installation manual explains how to configure the terminal device. Any computer with RS-232 terminal emulation software (e.g., Procomm, HyperTerminal, etc.) may be used as the terminal device.



Figure 8 TAS selection on Traffic Setup Page

3.6.3 TAS (Bendix/King) Checkout

Verify correct communication by monitoring the Message List on the Setup page for normal message “Traffic Sensor Operating Normally”. The MFD does not command the KTA870 into Self test mode. Use the KTA870 control panel if installed. Refer to the KTA870 Installation Manual for fault isolation procedures.

3.6.4 TCAD (Optional) Setup

The MFD supports Ryan 9900B and 9900BX TCAD sensors. Connect aircraft power to the Ryan TCAD sensor per the Ryan Installation manual. The MFD does NOT provide power to the Ryan sensor. TCAD is interfaced to the MFD via RS232.

Sensor: Select TCAD

Port: Select the MFD RS232 port to which the TCAD sensor is wired.

TCAD Shields: There are 3 shields that can be set: Terminal, Standard, and Enroute

Range: Sets the 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

Select the shield you wish to configure from the Shield drop down menu. Select the desired Range and Height from the respective drop down lists. The following table gives the suggested minimum and maximum values for the range and height of each shield.

	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 (15 BX)	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.

3.6.5 TCAD Dual Display Setup

When installing the MFD with the Ryan TCAD display unit, refer to the Ryan TCAD 9900 series Installation manual for wiring procedures. Reference Figure 2-15 Wiring Diagram for Dual Displays and Section 7 in the Ryan manual for instructions.

3.6.6 TCAD Checkout

The MFD does not display the TCAD self test function. If you wish to perform this test, then you must use the Ryan TCAD display unit.

On installations with the TCAD 9900 display unit, follow the checkout procedures given in the 9900 series Installation Manual.

On installations without the TCAD 9900 display unit (MFD only), perform checkout procedures listed in the 9900 series Installation Manual, with the exception of the display test.



Figure 9 TCAD selection on Traffic Setup Page

3.6.7 TIS (Optional) Setup

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

Note: This option is available on 530-00129-000, 530-00148-000, and 530-00162-() software. This sensor is not supported by the EX3000.

Wire power to the Garmin GTX -330 transponder per the Garmin Installation manual. 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.

On the EX5000 Traffic Setup Page:

Sensor: Select TIS-G

Port: Select the MFD ARINC 429 port to which the TIS transponder is wired.



Figure 10 TIS selection on Traffic Setup Page

3.6.8 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 supporting TIS data and verify that data is received and traffic is displayed.

3.6.9 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.

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: Upon completion of all configuration procedures, installers should confirm that the MFD is configured for the correct Traffic sensor.

3.7 TAWS (Optional)

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

3.7.1 Taws Setup

To configure the MFD to interface to the TAWS, access Maintenance Mode and select TAWS Setup.

Sensor: Select “Honeywell EGPWS”

ARINC 429 Port: Select “ARINC 429 4 – TAWS Default”

ARINC 453 Port: Select “ARINC 453 2 – TAWS Default”

Altitude Annunciation On: Selection of this feature will permit a visual annunciation of GPS altitude on the TAWS display. A check mark in the adjacent box will appear if selection is desired.

Upon completion of these settings, select “Save” and restart the MFD.

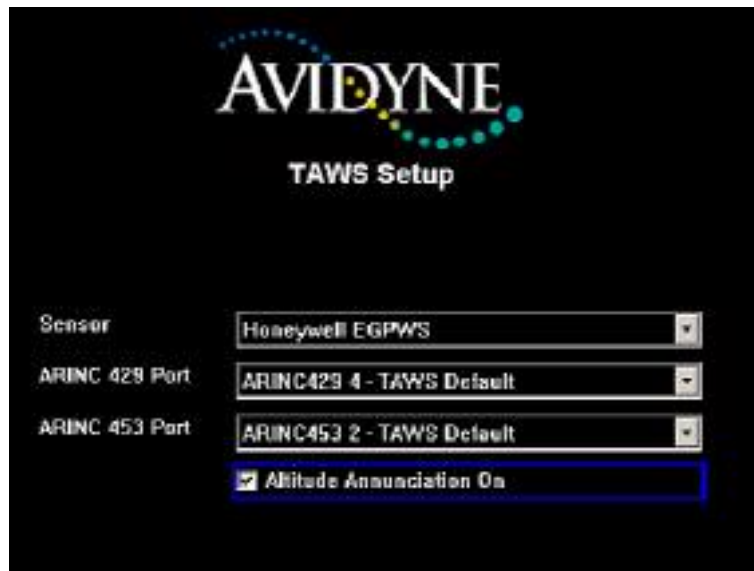


Figure 11 TAWS Sensor Setup Page

3.7.2 TAWS Checkout

Set the MFD to the TAWS page and perform a functional test of the GPWS system in accordance with manufacturer’s instructions. Refer to the MFD Pilot Guide for display operation.

The GPWS software must support KC Picture Bus (KCPB) Phase 2. Consult the Honeywell GPWS documentation for applicable software configurations. Proper operation of the GPWS interface is noted by the absence of any system status messages. If the self-test fails, an error message is generated and displayed on the MFD display. Refer to the EGPWS system installation manual for explanations and fault isolation procedures.

3.7.3 TAWS Communications Check (Messages)

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

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. ○ Refer to terrain sensor installation and user's manual to troubleshoot.
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. ○ Refer to TAWS sensor installation and user's manual to troubleshoot.
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. ○ Refer to TAWS sensor installation and user's manual to troubleshoot.
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. ○ Refer to TAWS sensor installation and user's manual to troubleshoot.
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. ○ Refer to TAWS sensor installation and user's manual to troubleshoot.

3.8 Engine Sensor

The MFD supports engine display on Cirrus, Diamond, Lancair, and Piper Aircraft by receiving data via RS232 from an engine sensor interface unit specifically designed for each aircraft. Not all display functions are available on all aircraft.

3.8.1 Engine Sensor Setup

To configure the MFD for interface with the optional Avidyne Engine Sensor Interface Unit (SIU), Data Acquisition Unit (DAU) or a Vision System DPU access Maintenance Mode and select Engine Setup (See Figures 11 & 12). Highlight each configuration item and select the appropriate MFD settings as shown below. When instructed proceed to the Aircraft Setup Page to complete the Engine Instruments page setup.



Figure 12 Engine Setup Page
with Fuel Cal



Figure 13 Engine Setup Page
with Electrical

NOTE: Upon completion of all configuration procedures, installers should confirm that the MFD is communicating properly with the corresponding engine interface unit. This can be verified following the sensor setup procedure.

NOTE: Figures 11 & 12 depict representative Engine Instruments Setup pages. This page will contain different selectable options depending on MFD software configuration installed.

The MFD uses an RS-232 data connection to receive data from the Engine Sensor Unit.

Sensor Type - Select “Avidyne SIU”, “Vision DPU”, or “Avidyne DAU” as appropriate

Port – Select the MFD RS232 port to which the Engine interface unit is wired

Aircraft Model- Use the appropriate selection from the Aircraft Model pull down list

Vacuum System Installed (Optional) - If the MFD software version supports a display of vacuum system pressure on the Engine Page, a checkbox will also be displayed on the Engine Setup page. Select this checkbox and use the knob to check the box, if a vacuum system with compatible vacuum pressure sensor is installed in the aircraft.

Electrical (Optional) – Select Single Bus, Single Alternator; Single Bus, Dual Alternator; or Dual Bus, Dual Alternator. (Note that some selections are not available with some aircraft.)

NOTE: The data box at the bottom of the page shows the configuration of the SIU 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 the Engine Setup page was entered, but subsequently is properly selected and operating correctly, the Engine Setup Page status box may not be properly refreshed to reflect this. The installer should confirm the correct Engine Setup options are selected, press Save, and restart the MFD. Confirm after restart that the MFD is properly receiving the engine data from the SIU/DAU.

3.8.1.1 Fuel Quantity Calibration (Optional)

Note: Option not available on all aircraft. This option only available with software part number 530-00137-000 and 530-00137-001.

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).

The fuel quantity indicator calibration is accessed from the Engine Setup page. Provided the DAU is communicating with the MFD and sending valid fuel quantity data, the fuel quantity indicator calibration may be accomplished. If the DAU is not communicating with the MFD, a DAU failure screen is displayed when the fuel cal page is selected. The only operator selection available in that situation is to exit the page.

The fuel quantity indicator calibration page provides a display of 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; and (3) Calibrated.

Procedure:

1. From the Not Calibrated state, the operator may "Begin Cal" or "Exit" the fuel calibration page.
2. If the operator chooses "Begin Cal", the state of fuel calibration changes to Underway and the fuel quantity indicator can be calibrated.
 - a. If "Exit" is pressed, the operator is returned to the Engine Setup page with the calibration state remains in the previous state.
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 the operator to add the appropriate amount of fuel and then to select "Accept Value" once the value reported from the SIU has stabilized.
 - a. If the SIU reported value is not within 2 gallons of the test point value, a message "DAU Reported Fuel Quantity Out Of Tolerance" will be presented and the value will not be accepted.
4. This process is then repeated for all the calibration points.
 - a. If the operator needs to pause the calibration process and turn off power to the MFD, the "Save" button is used to save the interim calibration values.
5. Once all points have been calibrated, the operator presses "Calibration Complete" to cause calibration factors to be computed and applied to DAU reported fuel quantity.
6. Other options from the Underway state are to "Restore Last Cal" and "Clear Cal".
 - a. Pressing "Restore Last Cal" causes the calibration values from the last completed calibration to be restored and the state to change to Calibrated.

- b. Pressing “Clear Cal” causes all calibration values to be cleared and the state to change to Not Calibrated. An “Are You Sure?” prompt will give the operator a chance to reconsider the decision to either “Restore Last Cal” or “Clear Cal”.

NOTE: Pressing “Cancel” from the Underway state causes the current calibration session to be aborted with any unsaved interim calibration values being discarded.

3.8.2 Engine Sensor Checkout

After the MFD has been restarted, view the Engine page to verify data communication. Operate the aircraft engine to confirm correct operation of all sensors. Aircraft Setup (below) will have to be completed for Percent Power function to correctly operate on some models.

3.9 Auxiliary Data (Optional)

The MFD may be configured to receive pressure altitude and outside air data from the PFD via a ARINC 429 interface.

Note: Option not available on all aircraft.

3.9.1 Auxiliary Data Setup

To configure the MFD for Aux Data access Maintenance Mode and select Aircraft Setup.

Aux Data– Select ‘Avidyne PFD’. This action will result in the receipt of ARINC 429 data from the PFD for input to the % Power calculations.

Port – Select MFD ARINC port to which the PFD is wired.

Once settings are made, press the “Save” button to return to the Maintenance Mode screen and restart the MFD by pressing “Restart System”. After restart, proceed with system checkout.



Figure 14 Aircraft Setup Page with Datalink and Long Range Tanks

3.9.2 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.

Message	Meaning
PFD is Operating Normally	Verification 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

3.10 Long Range Tanks Setup (Optional)

Note: Option not available on all aircraft. This option only available with software part number 530-00126-000

Select the Aircraft Setup Page (See figure 13) and check the box next to “**Long Range Tanks Installed?**” if long-range fuel tanks installed. This action will result in the display of additional fuel quantity indications.

3.11 Dimming Bus Setup

The LEDs on the bezel may be configured to better match the other cockpit instrument lights on the aircraft dimming bus. To configure the MFD LED dimming, access the maintenance mode then select Aircraft Setup (See Figures 13 and 18).

Highlight the Brightest dimming voltage selection, notice an additional button, “Set Voltage,” appears below the “Save” button. 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 the “Set Voltage” button to update the highlighted field.

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. At this point press the “Set Voltage” button and the Darkest dimming voltage field is updated.

3.11.1 Dimming Bus Checkout

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

3.12 Checklists Installation (Optional)

Note: Option not available on all aircraft. This option only available with software part number 530-00117-000, 530-00130-000, 530-00148-000, and 530-00162-000. The Checklist function is also available on software part number 530-00129-000, Revision 03 and higher.

In Maintenance Mode select the Aircraft Setup Page (See figure 14).

Aircraft – Select appropriate aircraft and serial number range, if applicable.

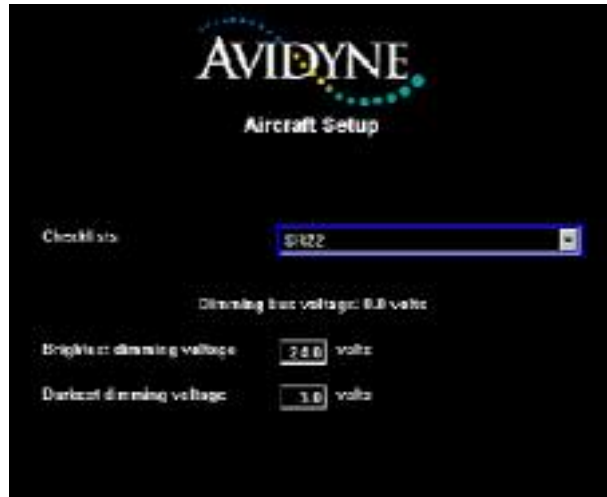


Figure 15 Aircraft Setup Page with Checklist and Dimming Bus Setting

3.13 Map Setup and Checkout

The MFD has the capacity to overlay Traffic intruders and Lightning strikes on the Map. To utilize this feature configure Map Heading with the appropriate source of heading or ground track to match the aircraft wiring.

The MFD is capable of receiving heading data transmitted from one of 3 sources:

- FMS/GPS (via 429) capable of providing heading information, (EX5000 only)
- Goodrich 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 2 sources.

- FMS/GPS (via 429), (EX5000 only)
- GPS (via SR-332)

3.13.1 FMS/GPS as Heading Source (EX5000 only)

The MFD can receive heading from an FMS/GPS 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 FMS/GPS. Figure 16 illustrates some examples. Refer to APPENDIX K – *Wiring Diagram 2, ARINC 429 Interface* for the correct pinouts to the MFD.

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

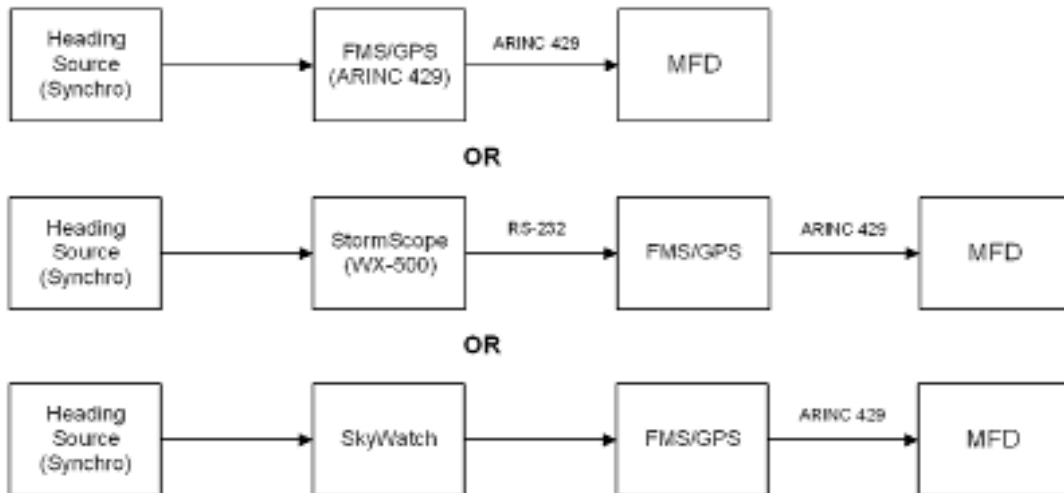


Figure 16 Heading Configuration with FMS/GPS

To configure the MFD with the FMS/GPS as a heading source access the Maintenance Mode and ensure a GAMA 429 GPS has been selected in the GPS Setup. Next select Map Setup.

Map Heading - Select FMS/GPS

Press Save, which will return you to the Maintenance Mode page. Restart the MFD. Press Cancel if you decide not to keep the changes you made.

NOTE: Changes made in Maintenance Mode will not take affect until the system has been restarted.

3.13.2 StormScope as Heading Source

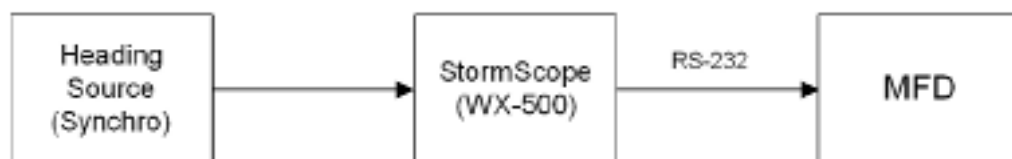


Figure 17 Heading Configuration with StormScope

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

To configure the MFD with the StormScope as a heading source access the Maintenance Mode and ensure the StormScope is configured for Synchro or Stepper Stabilization in the Lightning Set page (See Figure 6). Next select Map Setup (See Figure 15).

Map Heading - StormScope

Press Save, which will return you to the Maintenance Mode page. Restart the MFD. Press Cancel if you decide not to keep the changes you made.

3.13.3 Traffic (TAS) as Heading Source (EX5000 only)



Figure 18 Heading Configuration with SkyWatch

The EX5000 is capable of receiving heading data from a TAS system. Configure the MFD as shown in the block diagram. Refer to APPENDIX K for the correct pin outs to the MFD.

To configure the MFD with the TAS as a heading source access the Maintenance Mode and the Sensor is TAS in the Traffic Set page. Next select Map Setup.

Map Heading – Traffic (TAS)

Press Save, which will return you to the Maintenance Mode page. Restart the MFD. Press Cancel if you decide not to keep the changes you made.

NOTE: If SkyWatch is being used as the heading source, the software level for the SkyWatch must be 1.6 or higher. Software levels 1.5 or lower will cause the heading to be off by a factor of 8x.

3.13.4 Map Orientation with Track

If Heading information is unavailable, Track data can be used for the Lightning and Traffic overlays. Track data comes from the FMS/GPS. 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. Track should only be used if Heading is not available. Track does not compensate for the "crab" angle of the aircraft.

To configure the MFD with the GPS/FMS as a track source access the Maintenance Mode and select Map Setup.

Map Heading – None (Use GPS Track)

Press Save, which will return you to the Maintenance Mode page. Restart the MFD. Press Cancel if you decide not to keep the changes you made.



Figure 19 Map Setup Page for Track

3.13.5 Map Heading/Track Status

To check the operational status of your heading or track, return the MFD to normal operation. This means saving all changes and restarting the system. The FMS/GPS must be on and locked onto a valid position. Observe 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.

3.14 Datalink (Optional)

Note: Option not available on all models. MFDs may be equipped with no Datalink, either Narrowcast or Broadcast datalink, or both Datalink types.

To configure the MFD for Datalink access Maintenance Mode and select Aircraft Setup.

3.14.1 Narrowcast Datalink Setup

Confirm that the datalink setup fields on the Aircraft Setup page are configured for:

Datalink – Select “Quake SC”. This will enable the datalink functionality communication with the internal Datalink transceiver.

Port – Should only be set to RS232 port 6, the Datalink Default.

3.14.2 Broadcast Datalink Setup

The MFD supports the Heads Up XMD076 XM data receiver.

Confirm that the datalink setup fields on the Aircraft Setup page are configured for:

Broadcast– Select “XM Radio”. This will enable the datalink functionality and communication with the satellite data receiver.

Port – Should be set to the serial port used for the satellite receiver, nominally RS232 4.

Save settings and restart MFD.

3.14.3 Narrowcast Datalink Checkout

Access the MFD Maintenance Mode. Select System Info. Select Datalink Info.

When the optional narrowcast datalink function is enabled, and the proper port is selected on the Aircraft Setup maintenance mode page, the EX5000 is pre-configured for datalink operation. Accessing the Datalink Info page from the System Info utility, which is entered from the Maintenance Mode menu, gives details of the configuration.

Figure 20 depicts the **Datalink Info** page. Verify the presence of SC Serial Number and version information on this screen.



Figure 20 Narrowcast Datalink Info Page

3.14.4 Narrowcast Datalink Satellite Reception Confirmation

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. The following steps may be taken to assess system performance.

- Bring the aircraft to an area with the clearest view of the sky to the horizon.
- From Datalink Info table (see Figure 20), monitor for up to five minutes under the following conditions; other avionics off, avionics on, engines at idle, engines at takeoff power. 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 (2 arrows) Status
"Signal strength" is greater than -118 dBm (-130 is lowest, -100 is highest)	Signal Strength > 4, (scale of 1-10)
"Estimated SNR (EbNo)" is greater than 10 dB	Signal Quality > 4, (scale of 1-10)
"Segment errors: less than 10%	Message Quality = 10, (scale of 1-10)

If the above reception levels are not achieved the following cause and corrective actions may apply.

- The antenna field of view is obstructed. Try moving the aircraft.
- There is a local source of electromagnetic interference.
 - Try shutting off any nearby sources (such as VHF radios, alternators, magnetos, ground power cart).
 - Relocated 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.

Consult www.avidyne.com for any additional guidance.

3.14.5 Broadcast Datalink Checkout

Start the MFD and select the Trip page. Press the Display button 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.

Position the aircraft in an area open to the sky. A Signal Quality of Good confirms the receiver is detecting the satellite signals. A Signal Quality of Marginal or Weak may require repositioning the aircraft to better location. A Signal Quality of None is an indication of a bad antenna, cable, connection or receiver.

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.

Message	Meaning
Broadcast is Operating Normally	Verification that the MFD is communicating with the Broadcast receiver
Broadcast is Not Communicating (After 5 minutes of no communication)	Pressure altitude or OAT data are not being received by the MFD

3.14.6 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. The following steps may be taken to assess system performance.

- Bring the aircraft to an area that has as few obstacles to line-of-sight viewing to the southern horizon as possible.
- Select the Trip page on the MFD.
- Press the Display button until Broadcast (down-pointing arrow) Status is selected.
- 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.
- Make note of the Receiver ID for the aircraft owner, who will need it to begin Broadcast datalink service.

If the Signal Quality is not reported as Good, the following cause and corrective actions may apply.

- 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.
 - 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.

Consult www.avidyne.com for any additional guidance.

3.15 Post Installation Check

3.15.1 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.

3.15.2 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.

4 MFD Data Updates

4.1 Map NavData Database Updates

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

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 available via an optional Data Loader that connects to the Data Loader (USB) port on the front of the MFD (See Figure 2).

4.1.1 To perform a data update

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

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

4. Apply power to the MFD.
5. The Data Loader screen is displayed.

NOTE: If the regular MFD startup screen with the "Press Any Bezel Key" message is displayed, the Data Loader was not detected by the MFD. Check the connection between the Data Loader and the MFD. Cycle power to the MFD.

6. Press the "Proceed" button. Do not turn off the MFD or disconnect the interconnect cable during a data load.
7. The data load is complete when the "Press Any Bezel Key" message is displayed.
8. Remove the Data Loader and interconnect cable and store in a safe place.

4.2 Chart Database Updates

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

MFD units are shipped without any chart data pre-loaded. It is up to the user to obtain a valid subscription from Jeppesen. Once the user has a valid Jeppesen subscription serial number, they should 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](http://www.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.

There are two places to check the expiration date of the chart data:

- The Startup Screen
- The Setup Page

Updates are loaded via an optional Data Loader that connects to the Data Loader (USB) port on the front of the MFD (See Figure 2).

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*

4.2.1 To perform a chart data update

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

NOTE: Ensure that the Data Loader is supported and not dangling by the cable. This could cause an intermittent connection, which will result in an unsuccessful data update. Cycle power to the MFD.

4. Apply power to the MFD.
5. The Data Loader screen is displayed.

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

6. Press the "Proceed" button. Do not turn off the MFD or disconnect the interconnect cable during a data load.
7. The data load is complete when the normal startup screen with the "Press Any Bezel Key" message is displayed.
8. Remove the Data Loader and interconnect cable and store in a safe place.



5 Factory Service Policies

5.1.1 Factory Assistance by Telephone and Fax

Please feel free to 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. Please 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.

5.1.2 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, which occurs due to poorly packaged returns.



6 Appendices

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

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



APPENDIX B - *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:

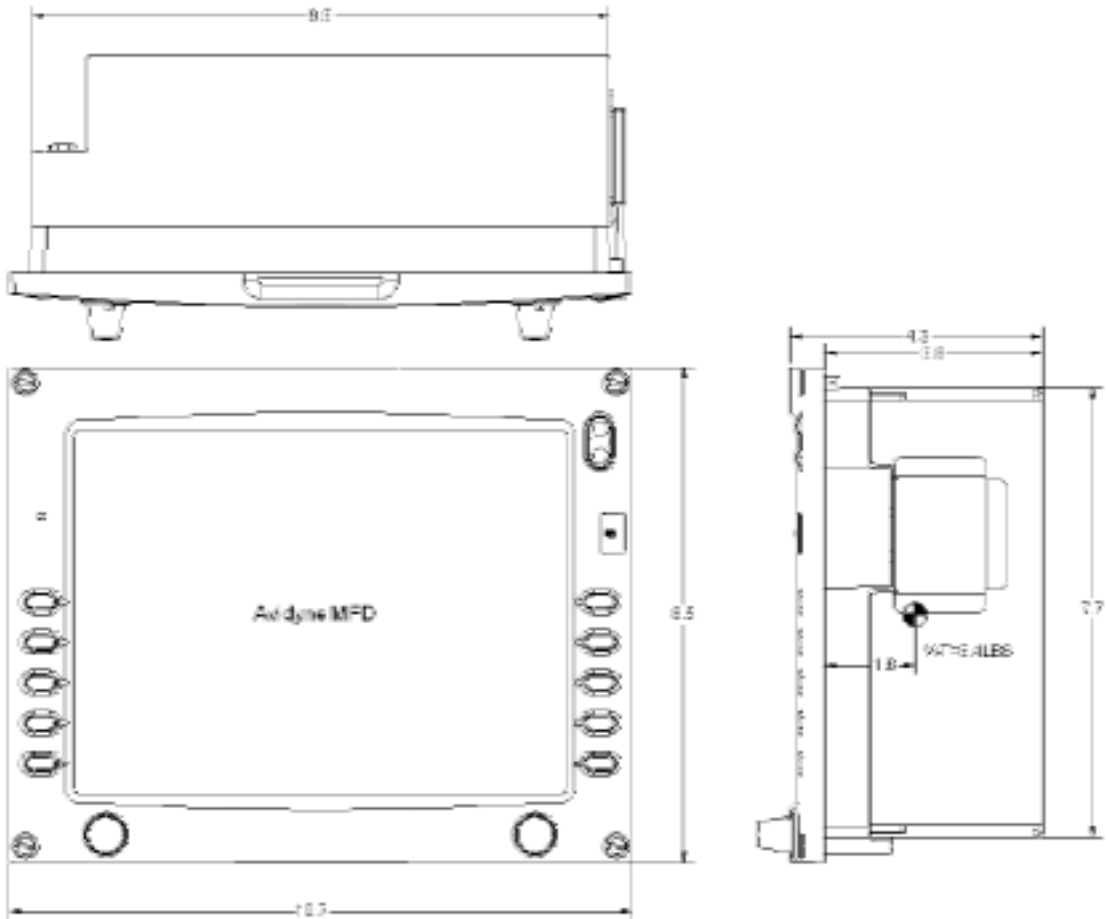
- Calling Avidyne Technical Support at 1-800-AVIDYNE
- E-mail: techsupport@avidyne.com
- Web: www.avidyne.com



APPENDIX C - STC Permission

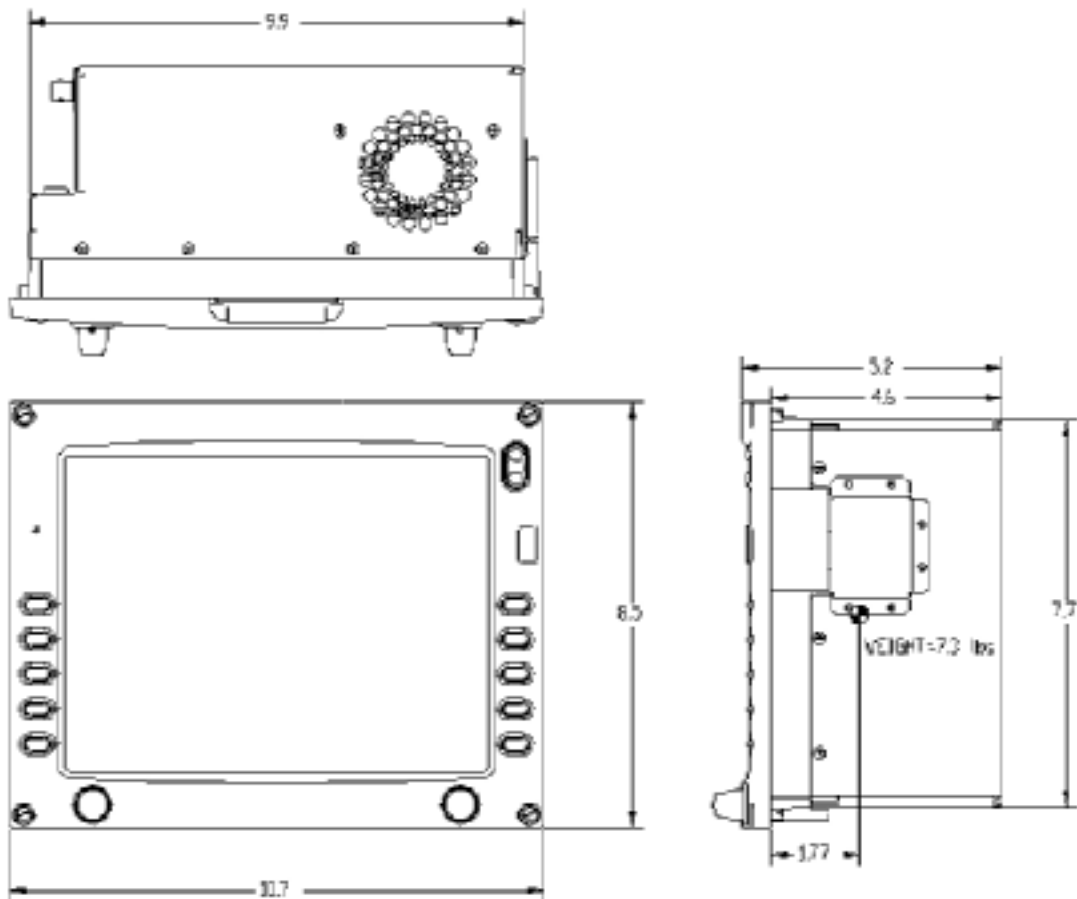
Avidyne Corporation hereby grants permission to all National Aviation Authority (FAA, CAA, JAA) approved installers to use data from all STC's and amendments Avidyne has received to modify aircraft. Copies of the STC's and amendments are available upon request or at the Avidyne web site Technical Publication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

APPENDIX D – Landscape EX5000 Dimensions
EX5000 (700-00004-002), EX3000 (700-00004-001)



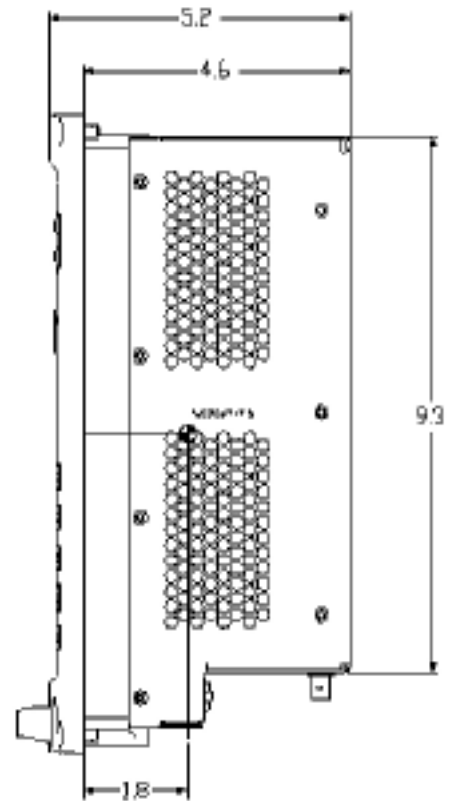
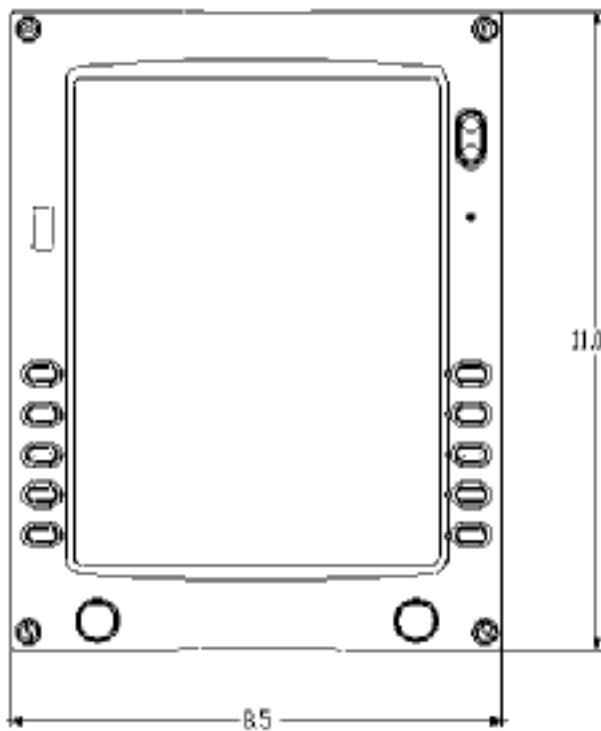
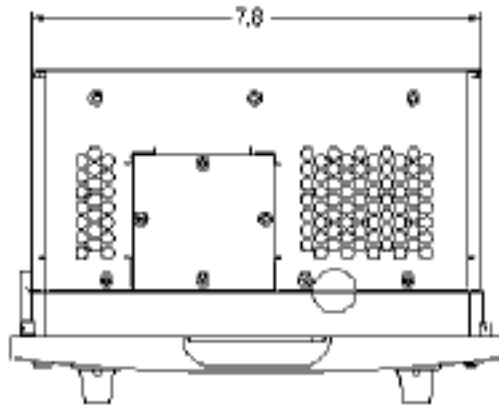
APPENDIX E - Landscape EX5000 with Integrated Datalink Dimensions

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



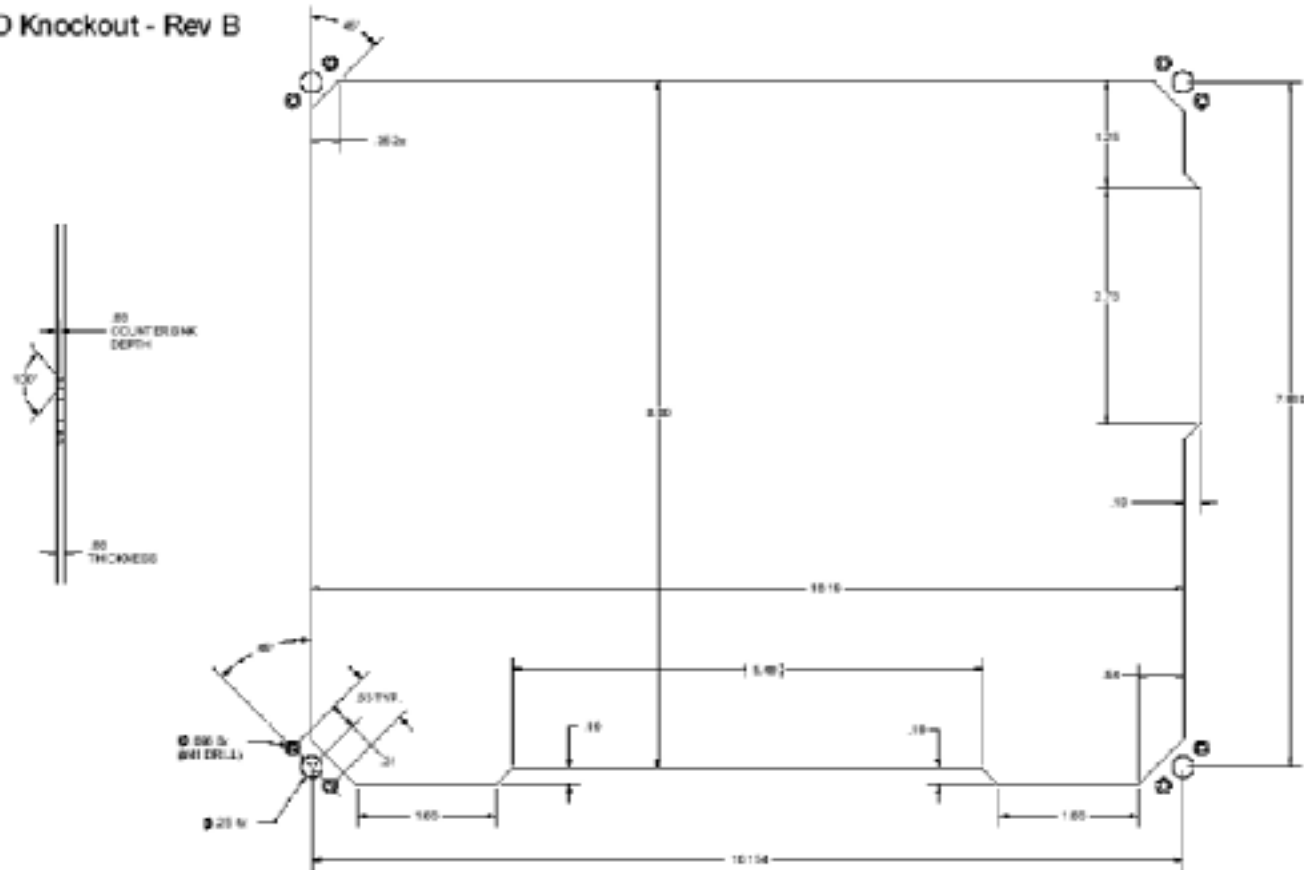
NOTE: Dimensions for EX5000 (700-00004-008), EX3000 (700-00004-007) are identical as shown, but without BNC connector J1.

APPENDIX G - Portrait EX5000 Dimensions
EX5000 (700-00004-104)

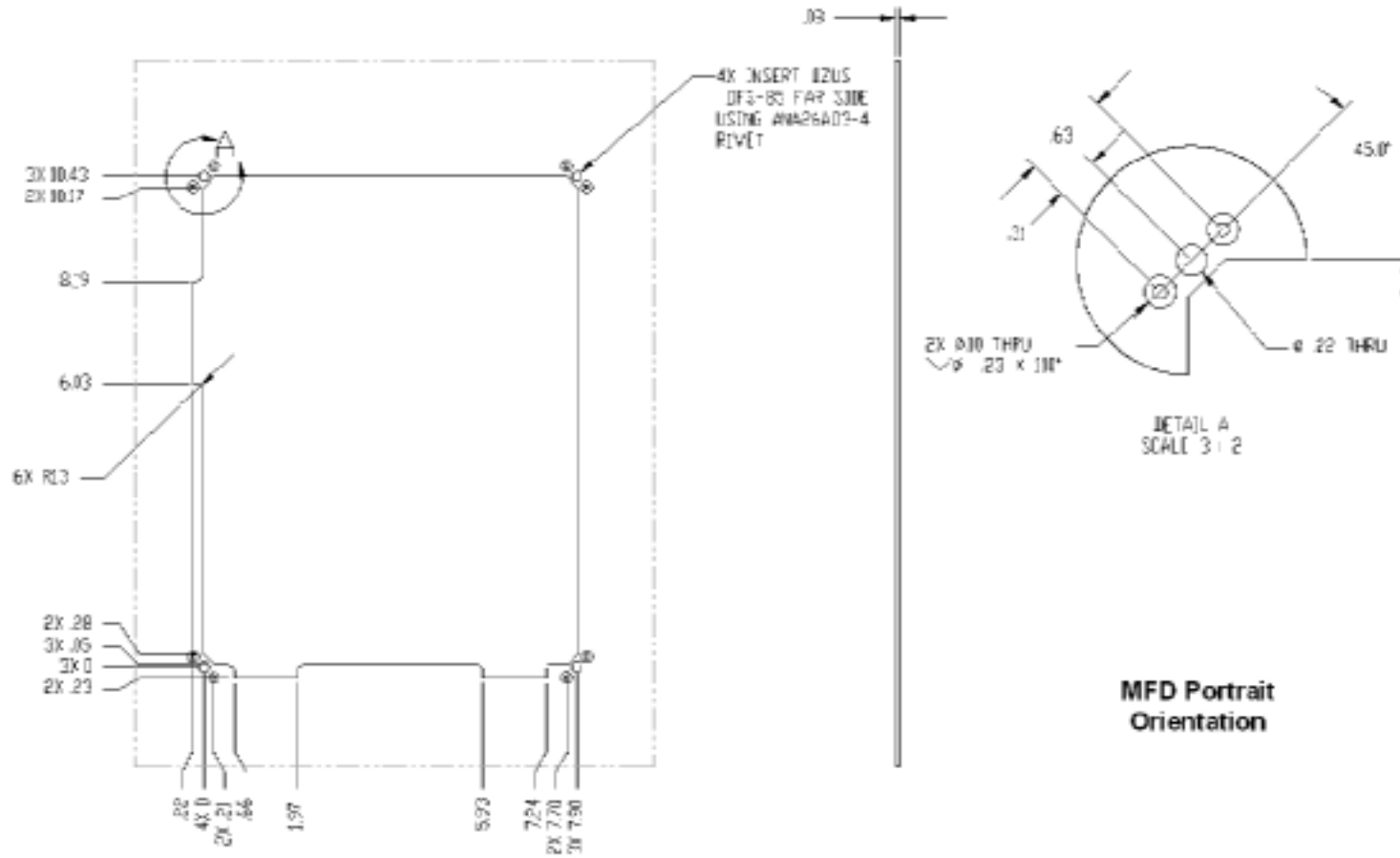


APPENDIX H - Landscape Cutout Dimensions

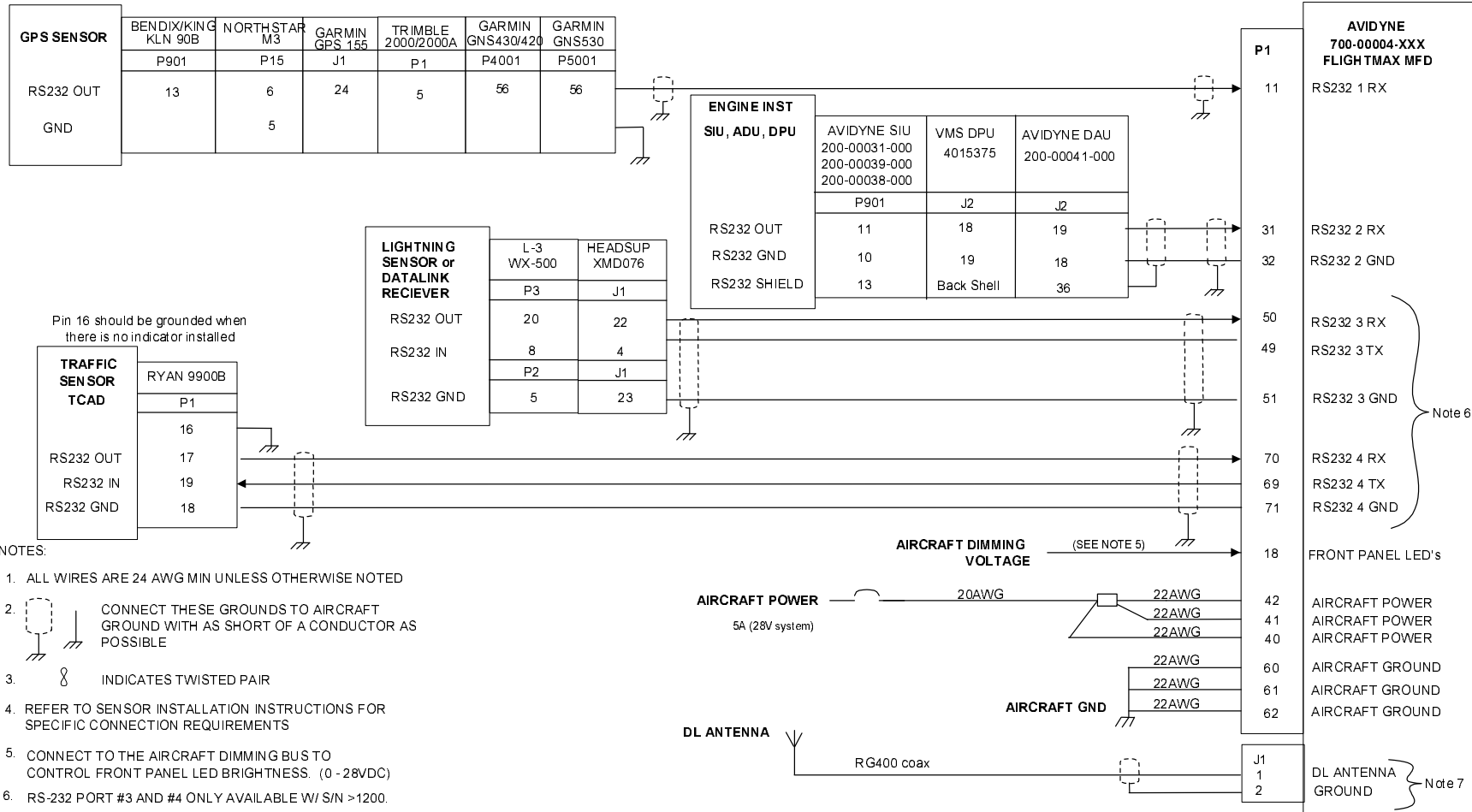
MFD Knockout - Rev B



APPENDIX I - Portrait Cutout Dimensions

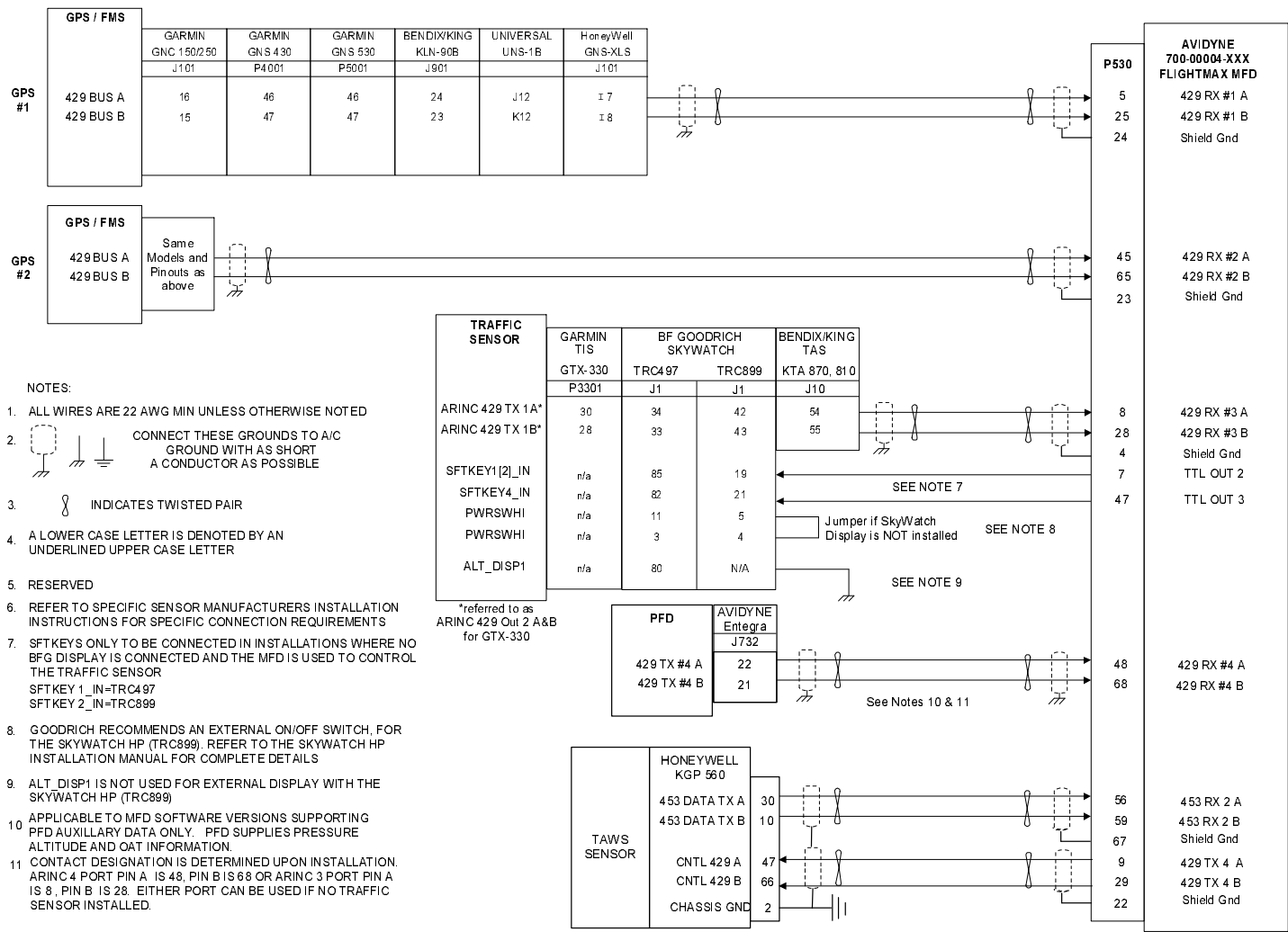


APPENDIX J – Wiring Diagram Power, Dimming Bus, DL antenna, and RS-232 Interfaces



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

APPENDIX K - Wiring Diagram 2, ARINC 429 Interface



APPENDIX L – 3rd Party Avionics System Interconnect

Note: Sensor assignments shown are nominal assignments. Installer can select ports as required in Maintenance Mode setup pages. (i.e. ARINC 429 RX1 is usually used for GPS1. However, if the installer wires 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 1 J530 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	GPS 2 (GPS B) ARINC 429 RX 2A	I
65	GPS 2 (GPS B) ARINC 429 RX 2B	I
23	Shield	I
50	RS-232 IN (nominally WX500)	I
49	RS-232 OUT (nominally WX500)	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 2 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

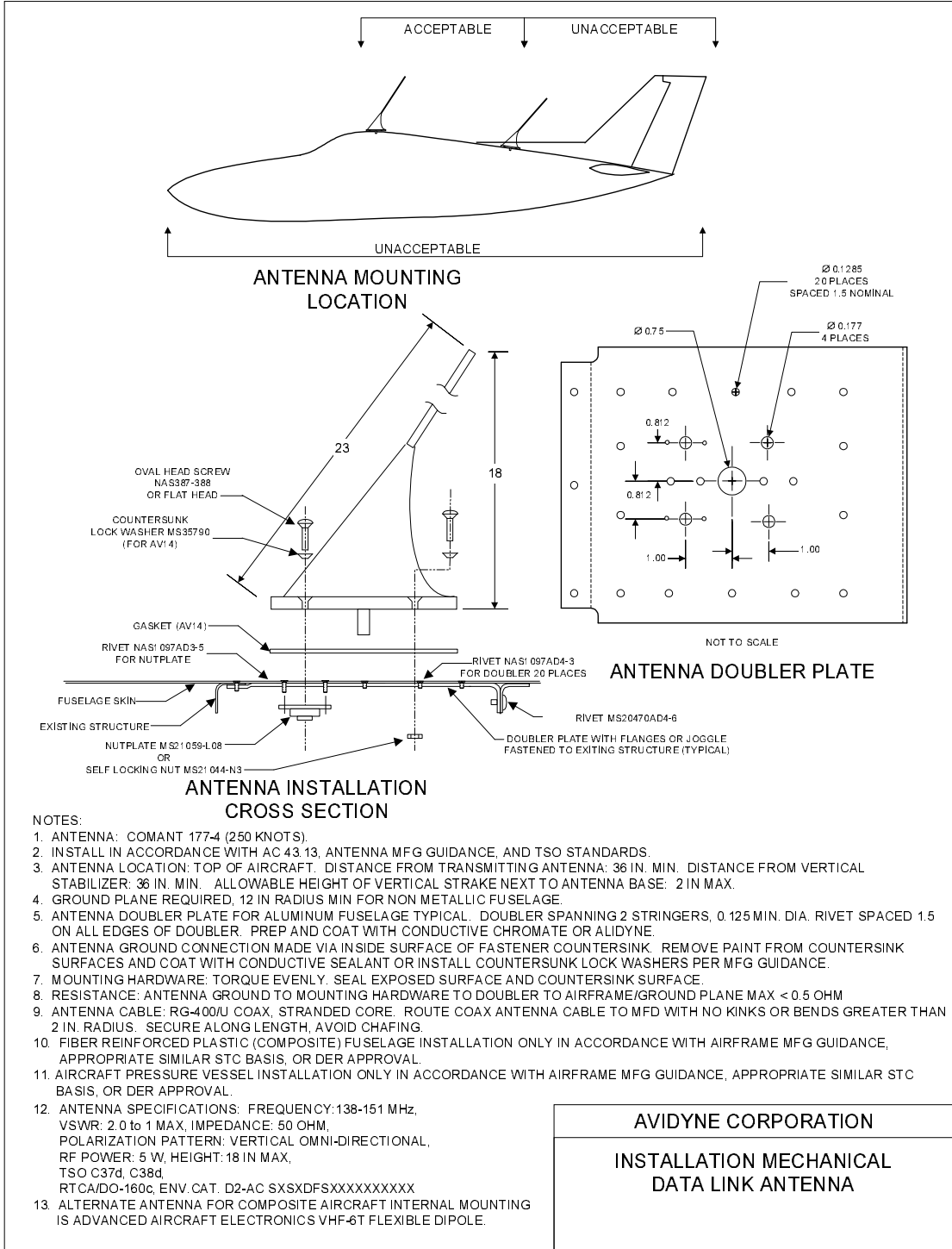
**Table 3 Traffic ARINC 429 Messages
(ARINC 735A communication protocol)**

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 4 TAWS ARINC 429 Transmit Messages

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

APPENDIX M – Narrowcast Datalink Antenna Mounting



AVIDYNE CORPORATION

**INSTALLATION MECHANICAL
DATA LINK ANTENNA**



APPENDIX N – 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 the installation of the 700-00015-000 antenna coupler, refer to the DC50 installation manual, (document 600-00082-000, Antenna Combiner Installation Manual), available from Avidyne.