# 5RR-MFC-Series
# FlightMax Flight Situation Display
# Navigator, Charts, Lightning, and Traffic

*Release 4 Installation Manual*

*P/N: 600-0031 Revision 05*

*Avidyne Corporation, 55 Old Bedford Road, Lincoln, MA 01773*

*Sales and Service: 1 800 AVIDYNE*

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**AVIDYNE**

**FlightMax Flight Situation Display**

**INSTALLATION MANUAL**

# TABLE OF CONTENTS


**1. GENERAL INFORMATION 1**

1.1 EQUIPMENT DESCRIPTION ..... 1

1.2 TECHNICAL SPECIFICATIONS ..... 2

1.2.1 FSD Central Processing Unit ..... 2

1.2.2 CD / Data Loader ..... 3

**2. INSTALLATION INSTRUCTIONS 4**

2.1 GENERAL INFORMATION ..... 4

2.2 UNPACKING AND INSPECTION ..... 4

2.3 FlightMax FSD INSTALLATION ..... 5

2.3.1 Installation Considerations ..... 5

2.3.2 Mounting and Wiring the FSD ..... 5

2.4 CD / DATA LOADER INSTALLATION ..... 7

2.4.1 Installation Considerations ..... 7

2.4.2 Installation ..... 7

2.4.3 Custom Building Connector Cables ..... 8

**3. SYSTEM CHECKOUT 9**

3.1 PRELIMINARY TEST ..... 9

3.2 SOFTWARE CONFIGURATION CHECK ..... 10

3.2.1 The Setup Menu ..... 10

3.3 GPS SETUP AND CHECKOUT ..... 11

3.3.1 Communications Setup ..... 11

3.3.2 Communications Check ..... 12

3.4 LIGHTNING SENSOR SETUP AND CHECKOUT ..... 14

3.4.1 Serial Communications Setup ..... 14

3.4.2 Antenna Location Setup ..... 14

3.4.3 Stabilization Setup ..... 15

3.4.4 Serial Communications Check and Checkout ..... 15

3.5 CD / DATA LOADER SETUP AND CHECKOUT ..... 16

3.6 TRAFFIC SETUP AND CHECKOUT ..... 17

3.6.1 SkyWatch ..... 17

3.6.2 Ryan TCAD ..... 19

3.6.3 TCAS ..... 21

**4. FACTORY SERVICE POLICIES** **22**
4.1 HARDWARE LIMITED WARRANTY POLICY ..... 22
4.2 FACTORY ASSISTANCE BY TELEPHONE AND FAX ..... 22
4.3 GENERAL SERVICE PROCEDURES ..... 22
**APPENDIX A -** Environmental Qualification Form ..... 24
**APPENDIX B -** Mechanical Outline Drawing – FlightMax FSD ..... 26
**APPENDIX C -** Mechanical Outline Drawing, Low Profile Data Loader ..... 27
**APPENDIX D -** Attitude Limitations for FSD and Data Loader ..... 28
**APPENDIX E -** J5 Connector Pinout-digital Configuration ..... 29
**APPENDIX F -** Flight Manual Supplement Information ..... 30
**APPENDIX G -** Instructions For Continued Airworthiness ..... 31
**APPENDIX H -** STC Permission ..... 32
**APPENDIX I -** Wiring Diagram, FSD ..... 39
**APPENDIX J -** Wiring Diagram, FSD, ARINC 429 Interface ..... 40
**APPENDIX K -** Wiring Diagram, CD Loader ..... 41

## LIST OF FIGURES

Figure - 1 Connector Configurations ..... 6
Figure - 2 Low Profile CD / Data Loader Exploded View ..... 9
Figure - 3 Main Menu ..... 10
Figure - 4 Setup Menu ..... 10
Figure - 5 GPS Status Screen ..... 11
Figure - 6 GPS Setup Screen ..... 12
Figure - 7 Lightning Sensor Setup Screen ..... 14
Figure - 8 Lightning Sensor Properties Setup Screen ..... 15
Figure - 9 CD-ROM Properties Screen ..... 16
Figure - 10 Traffic ARINC Settings ..... 17
Figure - 11 Traffic (TAS) Self Test ..... 18
Figure - 12 DB9 Connection ..... 19
Figure - 13 Traffic TCAD Port Settings ..... 19
Figure - 14 Traffic TCAD Settings ..... 20

# 1. GENERAL INFORMATION

This manual contains information about the physical, mechanical, and electrical characteristics of the Avidyne FlightMax Flight Situation Display (FSD) with optional Data Loader, and provides installation instructions for the units. Follow the installation instructions carefully to obtain maximum performance from the FlightMax FSD.

This installation manual applies to Avidyne FSD's with software 530-0106

Prior to beginning the installation of the FSD carefully review all the installation instructions, the options selected, and any considerations particular to your installation such as unit location, location conflicts with already installed equipment, cooling, viewing area, ergonomic considerations, etc. It is best to carefully devise a comprehensive installation strategy prior to commencing installation.

Operating information is contained in the **User's Manual** which is supplied with the unit.

## 1.1 EQUIPMENT DESCRIPTION

The FlightMax FSD is a panel-mounted information processing and display system.

The FlightMax FSD system consists of the following components:

Avidyne FlightMax Flight Situation Display (FSD).

FSD installation kit including tray assembly, connectors, and hardware.

Optional CD / Data Loader unit used for database and charts updates.

Optional CD / Data Loader installation kit consisting of mounting tray, connectors, and hardware.

Optional cable connecting the FSD to the CD / Data Loader. This pre-wired cable may be purchased separately from Avidyne in several lengths.

User documentation including Users Manual, Installation Manuals, and Flight Manual Supplements.

## 1.2 TECHNICAL SPECIFICATIONS

### 1.2.1 FSD Central Processing Unit

#### Standard Features

| | |
|---|---|
| Display: | High Brightness Color Active Matrix LCD, sunlight readable (100fL) |
| Diagonal size: | 5 inches |
| Dimming range: | 500:1 |
| Resolution: | 320X234 (1/4 VGA) X 256 colors |
| Interfaces: | RS-232, CD-ROM |

#### Physical Characteristics

| | |
|---|---|
| Weight with tray: | 8.0 lbs. |
| Height: | 4.0 inches |
| Width: | 6.25 inches |
| Depth: | 12.0 inches |

#### Viewing Angle

| | |
|---|---|
| Vertical: | +30°, -10° |
| Horizontal: | 60° left and right of center |

#### Audio Output

| | |
|---|---|
| Configuration: | Single-ended left and right channel outputs |
| Power at full volume | 75mw (32 Ohm load). |

#### Audio Requirement

Intercoms that interface with the FSD must have a muting feature.

#### Electrical Requirements:

| | |
|---|---|
| Voltage: | 11-35 VDC, negative ground |
| Current: | Maximum 7.0 A at 14V, 3.5 A at 28V |

#### Cooling Requirement

Forced air required, 7 cfm at the unit. Standard 0.65” OD avionics cooling coupler on mounting tray.

#### Operating Limits

See APPENDIX A - Environmental Qualification Form

### 1.2.2 CD / Data Loader

#### Physical Characteristics

#### D98-00003 – Standard Height Data Loader

| | | |
|---|---|---|
| Weight (with mounting tray): | | 2.25 lbs. |
| Dimensions: | Height: | 1.75 inches |
| | Width: | 6.25 inches |
| | Depth: | 10.0 inches |

#### D98-00003-01 – Low Profile Data Loader

| | | |
|---|---|---|
| Weight (with mounting tray): | | 2.2 lbs. |
| Dimensions: | Height: | 1.25 inches |
| | Width: | 6.25 inches |
| | Depth: | 10.0 inches |

#### Electrical Requirements:

The CD / Data Loader drive draws power from the FSD through the single 36 pin connector connecting the two units.

#### Operating Limits

See APPENDIX A - Environmental Qualification Form

# 2. INSTALLATION INSTRUCTIONS

## 2.1 GENERAL INFORMATION

This section contains information for installing and wiring the FlightMax FSD. All installation procedures should follow the acceptable practices, methods, and techniques of avionics installations as described in various FAA Advisory Circulars.

## 2.2 UNPACKING AND INSPECTION

The shipping carton of the FlightMax FSD contains the following components and parts:

| | |
|---|---|
| D98-00001-4X | FlightMax Flight Situation Display (FSD). |
| D98-00002-02 | FSD installation kit including mounting tray assembly with cooling coupler, connectors, and hardware. |
| D98-00003-01 | Optional Low Form Factor CD / Data Loader. |
| D98-00004-01 | Optional Low Form Factor CD / Data Loader installation kit consisting of mounting tray, connectors, and hardware. |
| 800-00002-010 | Optional Digital Interface card if Digital Radar, TAS, or TCAS was ordered. |
| 100-0003-XXX | Optional cable connecting the FSD and CD / Data Loader. These may be purchased separately from Avidyne in three standard lengths, -018 18 inches, -060 60 inches, -120 120 inches. |
| 800-00002-006 | Analog I / F card if Analog Radar is installed. |
| 600-0032 | Users Manual |
| 600-0036 | RDR-150 / RDR-160 Radar Installation Manual Supplement (If analog radar option ordered) |
| 600-0030 | Digital Radar Installation Manual Supplement (If digital radar option ordered) |
| 600-0031 | FlightMax FSD Installation Manual |

Locate the labels on the bottom of the FSD and verify that the FSD has S / W 530-0106 Rev 01 or later. Verify that optional interfaces are installed.

Make sure that all the parts listed above were received and sustained no shipping damage. If there is evidence of shipping damage save the shipping carton and packing material to 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.

## 2.3 FlightMax FSD INSTALLATION

### 2.3.1 Installation Considerations

Prior to installing the FlightMax FSD you should carefully assess how you can accomplish the most effective positioning of the FSD and Data Loader given space availability, viewing angle, cooling, and wiring considerations. Prior to starting the installation you should develop an installation strategy by carefully reviewing *all* the installation instructions.

#### 2.3.1.1 Location and Viewing Angle

FlightMax is designed to be panel-mounted using the mounting tray supplied with the unit. Locate the FSD in a position on the panel where the pilot and co-pilot can both easily reach the knobs and controls to operate it and view it from a proper viewing angle. Viewing angle limits are:

- Vertical: Up+30°, Down -10°
- Horizontal: 60° left and right of center

The ideal place for the FSD is in the central avionics stack near the top of the panel.

#### 2.3.1.2 Cooling

The FSD requires forced air-cooling to operate within prescribed temperatures. The FSD cooling inlet is provided with a cooling coupler to allow hooking up forced air-cooling. A forced air cooling volume of 7 cfm is required at the coupler.

If the FSD is equipped with a temperature light on the face of the unit, the light is green within normal operating temperatures, yellow within a caution range of 5°C of maximum and red indicating an over-temperature condition. If the light is consistently red when the unit is in use, damage to the FSD may result.

### 2.3.2 Mounting and Wiring the FSD

In this installation process you have to accomplish the following tasks:

- Position and mount the FSD mounting tray
- Wire the sensors according to the installation instructions in section Section: 2.3.2.3
- Slide the FSD into the mounting tray
- Lock the unit in place with a size 3/32” Allen wrench. Note that the length of this wrench needs to be minimum 3.5 inches. If you need to remove the unit, unlock it with the Allen wrench and slide it out of the tray.

#### 2.3.2.1 Positioning and Mounting the FSD Mounting Tray

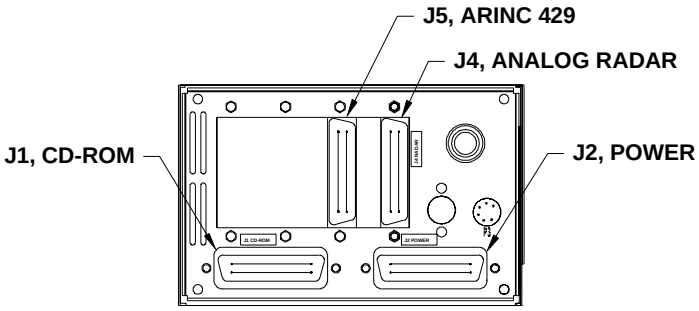
The FlightMax FSD comes with three or four identical connectors on the back of the unit depending upon options (Figure: 1).

If you prefer, you may remove the entire back plate of the mounting tray (by removing the four screws holding it in place) to facilitate wiring. Both the

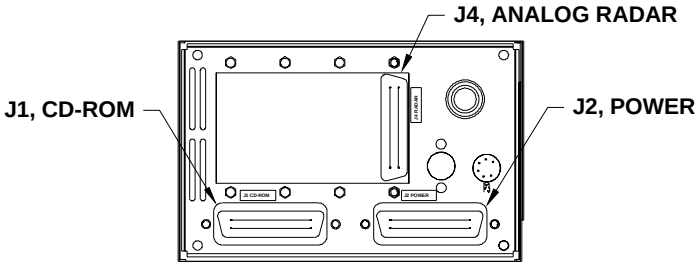
connector and the back plate can be easily installed or removed when the tray is mounted in place.

Next, position and mount the mounting tray in the selected location.

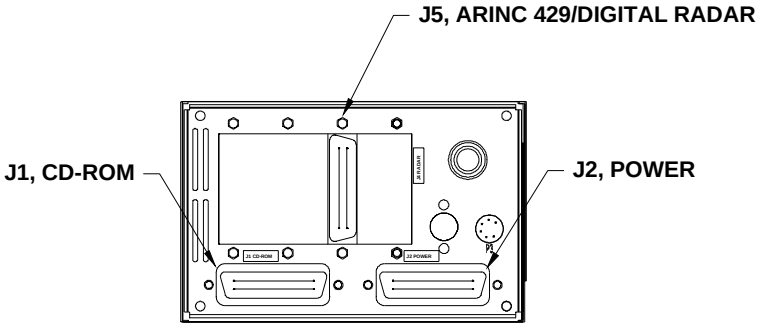
Note: Ensure that the mounting tray is installed at the proper depth in the panel to allow the connectors of the FSD to fully seat in the connectors of the mounting tray. Mounting trays with part number D98-00002-01 seat flush against the bezel. Standard mounting trays with part number D98-00002-02 have a .090" clearance between the bezel and mounting tray to allow for panel thickness as shown in APPENDIX B - Mechanical Outline Drawing – FlightMax FSD.




**Analog Radar and ARINC 429 Interface**




**Analog Radar Only**




**Digital Radar**
**and/or**
**ARINC 429 Interface**

**FIGURE 1: Connector Configurations**

#### 2.3.2.2 Sensor Interfaces

Refer to APPENDIX I - Wiring Diagram, FSD and APPENDIX J - Wiring Diagram, FSD, ARINC 429 Interface, for power and sensor wiring.

#### 2.3.2.3 Wiring external devices

**External GPS wiring** - GPS data may be taken from an RS232 output or ARINC 429 output. Refer to the wiring diagram in the appropriate appendix and the specific installation instructions on your particular GPS. If your GPS has the capability of sending ARINC 429 position data, and your FSD is equipped with a 429 interface option (see FIGURE 1: Connector Configurations), then position data may be taken from the ARINC 429 port. If the RS232 and ARINC 429 ports are both present, they both can be connected. Either port can be selected by the software during post installation setup.

**Lightning Sensor –** Refer to the wiring diagram in APPENDIX I - Wiring Diagram, FSD and the *WX-500 Installation Manual*. Connect RS232 port of the WX-500 to the RS232 port of the FSD as shown. Use shielded wiring, terminated at each end to chassis ground, for RS232 wiring.

**Traffic Sensors**

SkyWatch (SKY497) - Ensure TRC 497 software revision is 1.5 or later. Connect and configure as shown in APPENDIX J - Wiring Diagram, FSD, ARINC 429 Interface.

TCAD (Ryan 9900B) - Ensure software revision is 1.07 or later. Connect and configure as shown in APPENDIX I - Wiring Diagram, FSD.

TCAS (CASS 66) - Connect FSD as supplemental display only, as shown in APPENDIX J - Wiring Diagram, FSD, ARINC 429 Interface.

## 2.4 CD / DATA LOADER INSTALLATION

### 2.4.1 Installation Considerations

The primary consideration prior to installation is location. The CD / Data Loader may be mounted in any convenient location in the panel or remote location. However, in both instances, easy accessibility, mounting angle, and distance from the FSD are important factors. It is especially important to make sure that there is sufficient room for the disk tray to slide open unobstructed for loading and unloading disks. **In panel mounted installations ensure the open disk tray does not interfere with the yoke or other flight controls.**

Recommended maximum length of cable between FSD and Data Loader = 10 Feet.

Maximum angle from horizontal plane to ensure proper CD and door operation = 30 degrees.

### 2.4.2 Installation

Refer to Figure: 2. Install the tray in the aircraft panel with hardware appropriate for the aircraft's avionics stack. Mount one end of the 36 pin connector cable into the **J1** connector slot on the back of the CD / Data Loader

mounting tray. Mount the other end into the **J1** connector slot on the back of the FSD tray. Slide the CD / Data Loader into the tray and lock it in position with a size 3 / 32" Allen wrench (min. 3.5" long) to complete the installation.

Note: Ensure that the mounting tray is installed at the proper depth in the panel to allow the connector to fully seat in the connectors of the mounting tray. Mounting trays with part number D98-00004 seat flush against the bezel. Standard mounting trays with part number D98-00004-01 have a .090" clearance between the bezel and mounting tray to allow for panel thickness as shown in APPENDIX C - Mechanical Outline Drawing, Low Profile Data Loader.

The CD / Data loader and the FSD are connected by a connector cable. There are three sources for connector cables:

- Pre-wired cables of 18 in, 5 ft., and 10ft lengths from Avidyne (P / N 100-00003-018, 100-00003-060, and 100-00003-120)
- Pre-wire cables of custom length are available by special order from Wire Techniques (978-256-3396)
- You may custom build your own connector cables (see below).

FSD to CD cables greater than 10 feet in length should be avoided.

### 2.4.3 Custom Building Connector Cables

If you choose to custom build connector cables to connect the CD / Data Loader to the FSD, follow these specifications:

1. The connecting cable shall consist of 21 twisted pairs of signal wires and shall be double shielded (both braid and foil).
2. The cable shall be installed in accordance with AC 43.13-1A, AC 43.13-2A and all other appropriate requirements for aviation installations.
3. The minimum conductor size shall be 28 AWG.
4. The cable shield shall be connected to the connector backshell using a 360° concentric method. A pigtail type connection is not acceptable.
5. Each signal pair shall be twisted at least 36 turns / m.

The connector cable connects the **P1** connector on the FSD to the **P1** connector on the CD / Data Loader. Each of these connectors are 36 pin connectors. Following the specifications above, wire the connector cable according to the wiring diagram in APPENDIX K - Wiring Diagram, CD Loader.

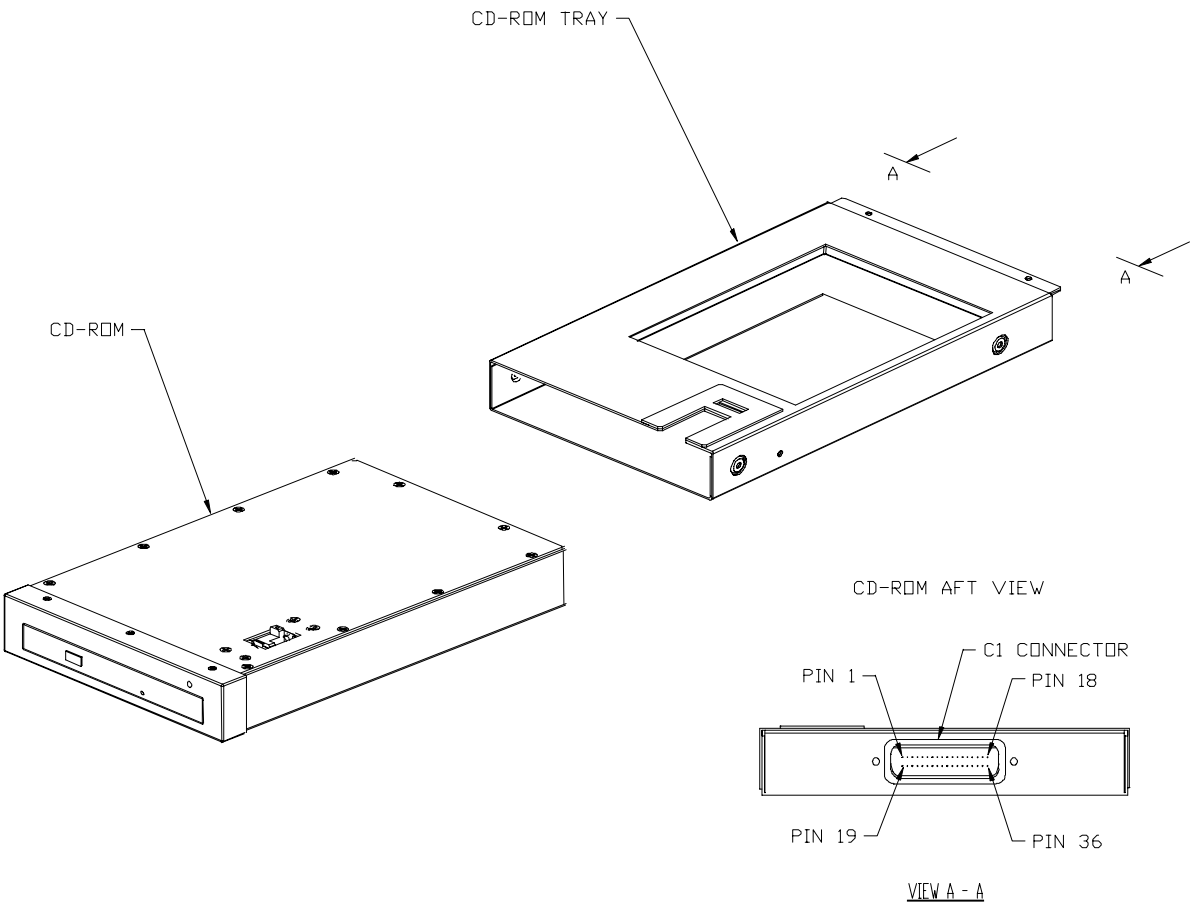



**FIGURE 2: Low Profile CD / Data Loader Exploded View**

# 3. SYSTEM CHECKOUT

## 3.1 PRELIMINARY TEST

Make sure that the FSD and the CD / Data Loader are all the way in their mounting trays, have been firmly locked into position with an Allen wrench, and are fully plugged into the connectors on the aft panel of their respective trays.

You are now ready to power up the FSD for post installation evaluation and configuration. **Carefully double-check all the wiring prior to initial power-up!**

Familiarize yourself with the *User's Manual* in order to be able to perform initial checkouts of system installations.

Turn on the FSD and the GPS unit. If equipped, the power indicator on the FSD will light and the LED on the CD / Data Loader will blink then stop. The system will go through several screens of power up self-test, boot, and application load. Once loaded, the main menu will display. After a programmable duration, the menu will disappear. To re-display the menu, press the "shift" or "menu" key.

## 3.2 SOFTWARE CONFIGURATION CHECK

The FlightMax FSD is offered with several functions including Charts, Lightning, Navigator, Traffic, and Radar. These functions are configured at the time of order. Confirm your configuration to the system ordered.

Refer to the screen below. From the main menu, each product is represented by a specific icon. If the product is not installed, the icon will be missing.

Please refer to the *Users Manual* on the operation of each of these products.

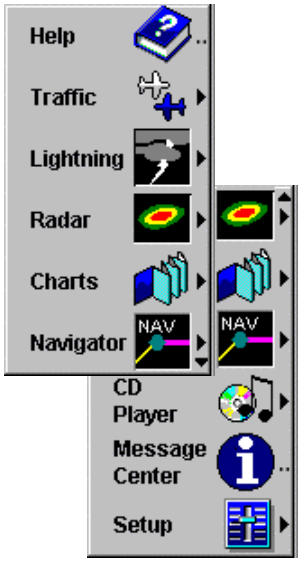



**FIGURE 3: Main Menu**

### 3.2.1 The Setup Menu

The SYSTEM→SETUP menu (Figure: 4) is used to configure the system. It is primarily used by the installer to integrate the FSD with the other avionic systems and to set up the FSD to the pilots personnel preferences. In addition, it contains a function that provides for an orderly shutdown of the FSD (see the Users Manual).

**FIGURE 4: Setup Menu**

## 3.3 GPS SETUP AND CHECKOUT

To configure the Avidyne FSD with the external GPS, the FSD must be configured properly. In addition, several manufacturers give options of data format and rates. To ensure correct operation, these must be configured properly.

### 3.3.1 Communications Setup

Refer to the installation of your specific GPS and determine its output parameters. Configure the FlightMax FSD as follows:

1. From the Main Menu, choose the following: Select SETUP from the Main Menu. The SETUP Menu appears.
2. Select DEVICES, and then select GPS. A configuration page appears, enabling you to set up the GPS (Figure: 5**)**.

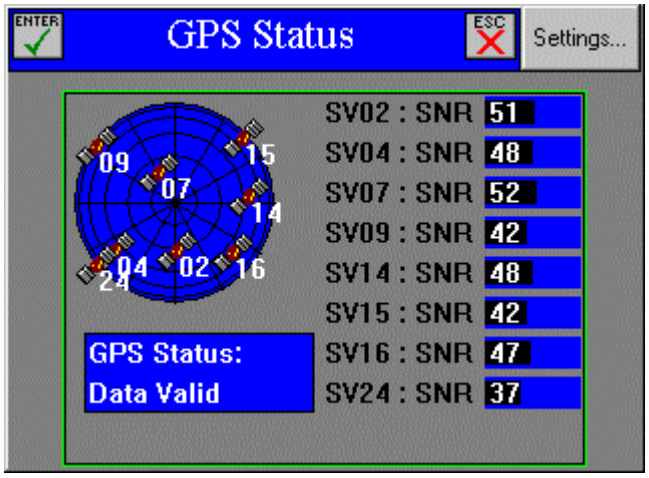



**FIGURE 5: GPS Status Screen**

Note: If the outer and inner control knobs are used while viewing the GPS Status page the entire FSD will lock up. All user inputs are ignored. The control knobs have no function on the GPS Status page, so they should never be used.
If the system is locked up, turn the unit off and power up again.
Avidyne urges all users, **NOT** to use the outer and inner control knobs while viewing the GPS Status page.

3. Select SETTINGS from the upper right hand corner. The Setup page appears (Figure: 6).
4. Highlight the Receiver item by scrolling to it with the large knob.
5. Scroll with the small knob to the appropriate receiver.
6. Set the Comm port and the Baud Rate items. Highlight Comm Port using the large knob and select the appropriate value using the small knob. Then highlight Baud Rate using the large knob and select the appropriate value using the small knob When the Receiver, Comm Port, and Baud rate items are all set to the desired values, press the Enter key to complete the setup procedure.

7. Once settings are correct, press escape to return to the previous screen. This will display the current satellite status as well as a message on the bottom of the screen. Note: Certain GPS's such as KLN-90 do not provide specific satellite data and this screen will be blank.

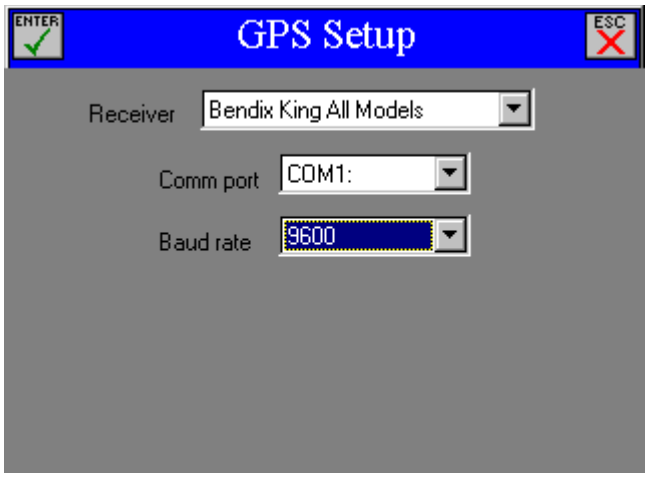



**FIGURE 6: GPS Setup Screen**

8. If your GPS is capable of ARINC 429 output and is wired according to APPENDIX J - Wiring Diagram, FSD, ARINC 429 Interface, select:

Receiver: ARINC 429

Comm port: ARINC 2

Baud rate: slow or fast, depending upon GPS output speed

### 3.3.2 Communications Check

Following the setup procedure, there will be messages displayed at the bottom of the screen as the GPS is connected. If the settings are correct, the message "NAV SOURCE RECONNECTING" will be displayed. As the data is being synchronized, there may be a brief message such as "NAV SOURCE DATA FORMAT ERROR". Once the data is correct (typically < 2seconds, this message will disappear. If there is an error, the following messages will remain on the bottom of the screen.

| Message | Meaning |
|---|---|
| Nav Source Not Responding | No RS232 GPS data is being received. Check wiring and Comm port setting. |
| Nav Source Position Data 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 it's "fix" or location. |
| Nav Source Data Format Error | Data is being received, however the Avidyne unit does not recognize the data as the format selected. May indicate a baud rate or receiver type error. |
| Nav Source port not selected | The COMM port setting in the GPS setup dialog is set to NONE. To correct this, choose the port to which the GPS is connected, typically COM1. |

**Notes on Garmin Installation.** Some Garmin units provide two outputs for GPS data. One is an "aviation" output. The other is an RS232 "plotting" output. The "aviation" output provides a "King" format 9600 baud output at a higher repetition rate and is the preferred output. Consult your specific Garmin GPS installation manual for full details.

**Notes on Northstar Installations.** Some Northstar units default RS232 communications is 1200 baud. Although this speed is accepted by the Avidyne unit, better performance is achieved by setting the output of the Northstar GPS to 9600 baud and setting the Avidyne accordingly. Many Northstar units have a hidden setup screen to change these 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.

**Notes on Trimble 2000A Installations.** Use the RS232 port to interface to the Avidyne unit. This is on serial port #2. Some systems have default settings to **not** send any serial data out. Change this through the setup screen. Choose 9600 baud, No Parity, 8 bits. This unit has a hidden setup screen documented in the installation manual to change these 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 loose configuration when the aircraft battery is discharged.

## 3.4 LIGHTNING SENSOR SETUP AND CHECKOUT

### 3.4.1 Serial Communications Setup

Refer to Figure: 8. The FlightMax FSD communicates to and from the WX-500 using RS232 communications. The factory default is set to RS232 port 2. The WX-500 should be installed and jumpered according to it's installation instructions.

If the FSD can not communicate with the lightning sensor, the message "Loss of Sensor Data" will appear. If this message is received, check wiring and power to the WX-500.

### 3.4.2 Antenna Location Setup

From the main menu, press:

SETUP→DEVICES→LIGHTNING

Refer to Figure: 7. Choose the following:

Sensor: WX-500

Operation Mode: Weather

Enable Heading Stabilization (Select)

Enable Lightning Ahead Warning (Select)

Antenna Mounted on Top (Select)

Note: The Antenna Mounted on Top setting must correspond with the jumper setting of the WX-500 and the physical mounting location of the antenna. If the check box is visible, the antenna location jumper on the WX-500 has never been set, has been changed, or the antenna location setting does not match the jumper setting on the WX-500. Choose the correct setting and when done, press enter. Note that once the antenna mounting location setting matches the WX-500, this box is no longer accessible (as shown)

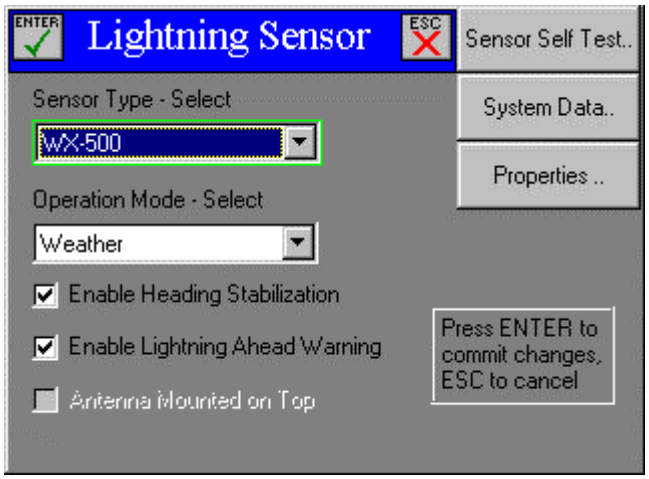



**FIGURE 7: Lightning Sensor Setup Screen**

Note: Occasionally when selecting the Noise Monitor mode from the Operation Mode - Select window, it will not initialize. If this happens, select Demo mode first and then select Noise Monitor.

### 3.4.3 Stabilization Setup

The best method of stabilization is syncro or stepper input to the WX-500. The next best method of stabilization is GPS, which is based on ground track. Whatever method is chosen, it must be wired and strapped properly on the WX-500 as well as setup on the Avidyne FSD. To set the stabilization method, from the main menu, choose:

SETUP→DEVICES→LIGHTNING→PROPERTIES

Select the heading stabilization, which corresponds to the method installed, as follows:

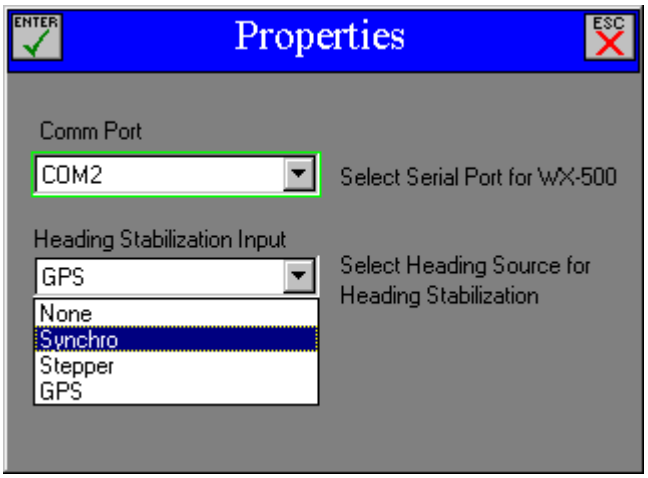



**FIGURE 8: Lightning Sensor Properties Setup Screen**

Press Enter twice to return to the main menu and save settings.

### 3.4.4 Serial Communications Check and Checkout

Check this communications from SETUP→DEVICES→LIGHTNING screen above by pressing the "SELF TEST" button. This will initiate a self test of the WX-500, receive and display the results.

Further information can be obtained from
SETUP→DEVICES→LIGHTNING→SYSTEM DATA

A "LOSS OF SENSOR DATA" indicates a fault in the RS232 communications between the WX-500 and the Avidyne unit. For details on other errors and parameters sent by the WX-500, refer to the WX-500 installation and users manual.

## 3.5 CD / DATA LOADER SETUP AND CHECKOUT

Refer to **Figure: 9.** To perform the initial checkout you will turn on the FSD and run a test of the CD / Data Loader as follows:

SETUP→DEVICES→CD-ROM

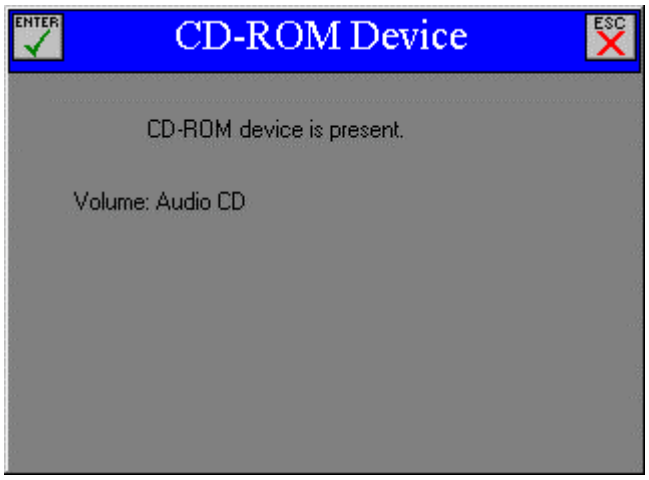



**FIGURE 9: CD-ROM Properties Screen**

The message “CD-ROM device is present” indicates the device is properly connected to the flight computer.

The volume indicates the volume name of the CD inserted. This varies with the specific CD installed. If no CD installed message will be “”

| Message | Meaning |
|---|---|
| “CD-ROM device is present”<br>“No disk is loaded” | Flight computer is communicating properly with the CD-ROM. The drive does not contain a CD-ROM. |
| “CD-ROM device is present”<br>“Volume: XXXXXXX” | Flight computer is communicating properly with the CD-ROM. A CD-ROM with name XXXXXXX is in the drive. |
| No CD-ROM device has been found | Flight computer is not communicating properly with the CD-ROM. Check wiring. |

## 3.6 TRAFFIC SETUP AND CHECKOUT

FlightMax is designed to work with three traffic awareness sensors:

- BF Goodrich Skywatch, Model SKY497
- Ryan TCAD, 9900B Series
- TCAS I (communicates via ARINC Characteristic 735-2)

To ensure correct operation of Traffic, the FSD must be configured properly. Follow the section applicable to your sensor.

### 3.6.1 SkyWatch

SkyWatch uses an ARINC 429 data connection between the TRC (Transmitter / Receiver Computer) and the FSD. To configure Skywatch perform the following:

From the main menu, press:

SETUP→DEVICES→TRAFFIC

Refer to Figure: 10. Choose the following:

ARINC port: Port 3

StormScope attached: Selectable. Checking this field means that you are using the WX 1000 display unit in addition to the FlightMax FSD to control SkyWatch. This disables control of Standby and Self Test buttons on the FSD.

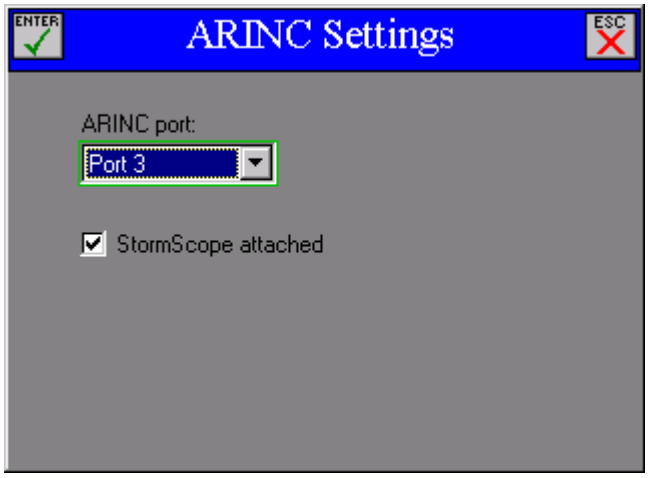



**FIGURE 10: Traffic ARINC Settings**

| Display Unit(s) | StormScope attached Field |
|---|---|
| FSD only | Not checked |
| FSD and WX 1000 display unit | Check |

### 3.6.1.1 Checkout

#### Self Test

If the WX 1000 is ***not*** installed and the FSD is being used as the sole display unit, the self test function is available as a menu item (Figure: 11).

SYSTEM→TRAFFIC→TEST

Self test can only be performed from the STANDBY mode and will return to the STANDBY mode upon successful completion of the self test.

If the self test fails, an error message is generated and displayed on the FSD screen. Refer to the SKY 497 Installation manual for explanations and fault isolation procedures.

Note: If the WX 1000 display unit is installed and the "StormScope attached" field is checked at the ARINC Settings page, the test function is not displayed on the FSD menu. Instead, invoke Self Test using the WX1000 display unit as explained in the Sky 497 Installation manual.

.

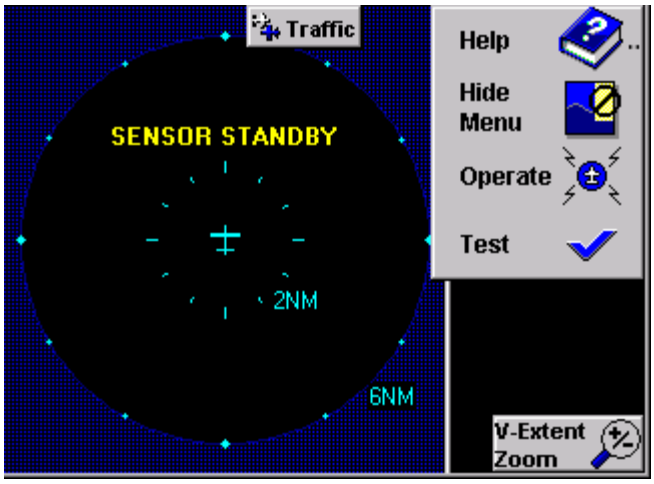



**FIGURE 11: Traffic (TAS) Self Test**

#### 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 FSD. To perform calibration and checkout, an external terminal or PC must be connected. Once this configuration is saved, ARINC 429 communications to the FSD 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 (Figure: 12) is needed for these setup procedures. Appendix D in the SKY 497 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.

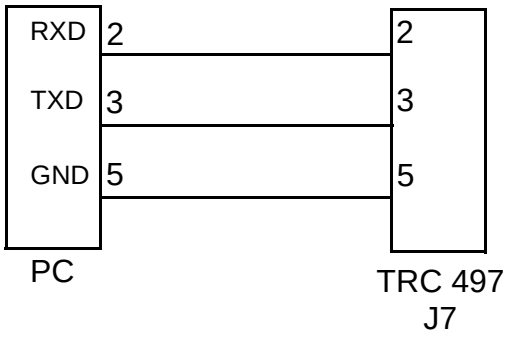



**FIGURE 12: DB9 Connection**

### 3.6.2 Ryan TCAD

TCAD uses a serial data connection between the sensor and the FSD. The standard connection is to COM 3. You configure this by selecting Comm... on the TCAD Settings page (Figure: 14). This brings you to the Port Settings page (Figure: 13).

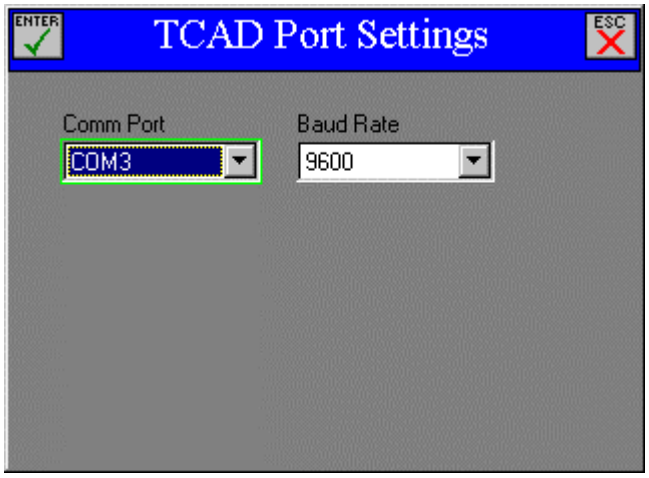



**FIGURE 13: Traffic TCAD Port Settings**

To configure TCAD perform the following:

From the main menu, press:

SETUP→DEVICES→TRAFFIC

Refer to Figure: 14. Shield range and height as well as audio settings are configured from this page.

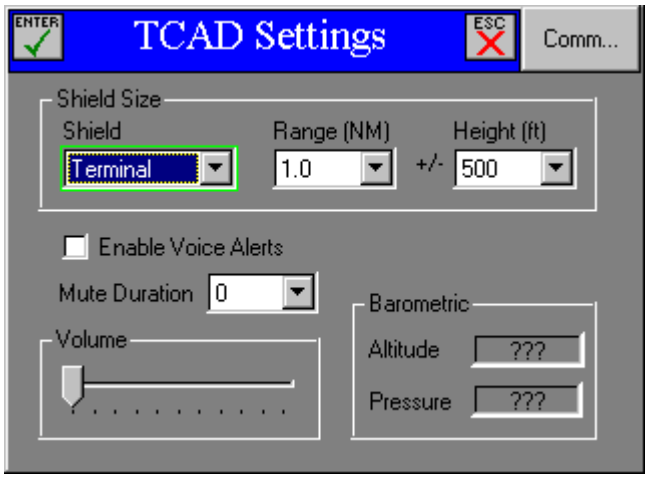



**FIGURE 14: Traffic TCAD Settings**

Check the Enable Voice Alerts box if you want to have audio alerts.

The system will generate a repetitive alert tone when a threat aircraft is within ±500 and 1.0iNM. The repetition rate increases when the threat aircraft is within ±300 feet and 0.7iNM. Enabling the Voice Alert means the last tone is replaced by the word “traffic”.

The mute function silences audible warnings for a specified duration. Select the Mute Duration pull down list to define the duration of the mute (0 to 240 seconds in 10 second intervals).

Select the shield you wish to modify from the Shield drop down menu. There are 3 shields that can be modified: Terminal, Standard, and Enroute.

Select the desired Range and Height from the respective drop down lists. The drop down lists contain the appropriate parameters for each shield. The following table gives the minimum and maximum values for the range and height of each shield.

| | Radius (iNM: 0.1) | | 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 |

#### 3.6.2.1 Dual Displays

When installing the FSD with the Ryan TCAD 9900B 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 for instructions.

#### 3.6.2.2 Checkout

The FSD does not display the TCAD self test function. If you wish to perform this test than 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 (FSD only) perform checkout procedures listed in the 9900 series Installation Manual, with the exception of the display test.

### 3.6.3 TCAS

The FSD will display TCAS data. It will not control any TCAS functions. Installation and checkout should be done as per the TCAS Installation manual

# 4. FACTORY SERVICE POLICIES

## 4.1 HARDWARE LIMITED WARRANTY POLICY

Avidyne Corporation, warrants the FSD hardware to be free from defects in materials and workmanship for a period of two (2) years from the date of installation by an authorized dealer.

This warranty covers repair and/or replacement at our option, of any parts found to be defective, provided such defects in our opinion are due to faulty material or workmanship and are not caused by tampering, abuse, or normal wear. The warranty does not include charges for removal, shipping and reinstallation.

**All warranties are F.O.B.**

**Avidyne Corp.**

**55 Old Bedford Road**

**Lincoln, MA 01773**

**Avidyne will not accept or pay for any charges for warranty work performed outside our factory without prior written consent.**

This warranty applies only to products in normal use. It does not apply to units or circuit boards defective due to improper installation, physical damage, tampering, lightning or other electrical discharge, units with altered serial numbers, or units repaired by unauthorized persons or in violation of Avidyne service procedures.

Avidyne, Inc. assumes no responsibility for any consequential losses of any nature with respect to any products or services sold, rendered, or delivered.

The foregoing are the only hardware warranties for the FSD, expressed or implied. No other hardware warranties exist. For Avidyne software products see the User's Manual.

## 4.2 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. We do not accept collect calls. 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 within one business day of receiving your fax.

## 4.3 GENERAL SERVICE PROCEDURES

Repair of the FSD 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. **Please note that Avidyne will not accept a unit returned to the factory without an RMA number**.

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 address shown in section 4.1. 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.

# APPENDIX A - Environmental Qualification Form

## RTCA/DO-160D
## ENVIRONMENTAL QUALIFICATION FORM

| | |
|---|---|
| NOMENCLATURE: | 5RR-MFC-XXX FLIGHT SITUATION DISPLAY |
| PART NO: | D98-00001-4X |
| TSO NUMBER | C113, C110A, C63c, C118, C147 |
| MANUFACTURER: | AVIDYNE CORPORATION |
| ADDRESS: | 55 OLD BEDFORD ROAD<br>LINCOLN, MA 01773 |

| CONDITIONS | RTCA/DO-160D PARA | CONDUCTED TEST CATEGORY |
|---|---|---|
| TEMPERATURE | 4.5 | A1 |
| INFLIGHT LOSS OF COOLING | 4.5.4 | V |
| ALTITUDE | 4.6.1 | B1 |
| DECOMPRESSION | 4.6.2 | B1 |
| OVERPRESSURE | 4.6.3 | B1 |
| 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 and B |
| EXPLOSION | 9.0 | X (Not Tested) |
| WATERPROOFNESS | 10.0 | X (Not Tested) |
| FLUIDS SUSCEPTIBILITY | 11.0 | X (Not Tested) |
| SAND AND DUST | 12.0 | X (Not Tested) |
| FUNGUS | 13.0 | X (Not Tested) |
| SALT SPRAY | 14.0 | X (Not Tested) |
| MAGNETIC EFFECT | 15.0 | Z |
| POWER INPUT | 16.0 | B |
| VOLTAGE SPIKE | 17.0 | B |
| AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY | 18.0 | B |
| INDUCED SIGNAL SUSCEPTIBILITY | 19.0 | A |
| RADIO FREQUENCY SUSCEPTIBILITY | 20.0 | U |
| EMISSION OF RADIO FREQUENCY ENERGY | 21.0 | M |
| LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY | 22.0 | X (Not Tested) |
| LIGHTNING DIRECT EFFECTS | 23.0 | X (Not Tested) |
| ICING | 24.0 | X (Not Tested) |
| ELECTROSTATIC DISCHARGE | 25.0 | X (Not Tested) |

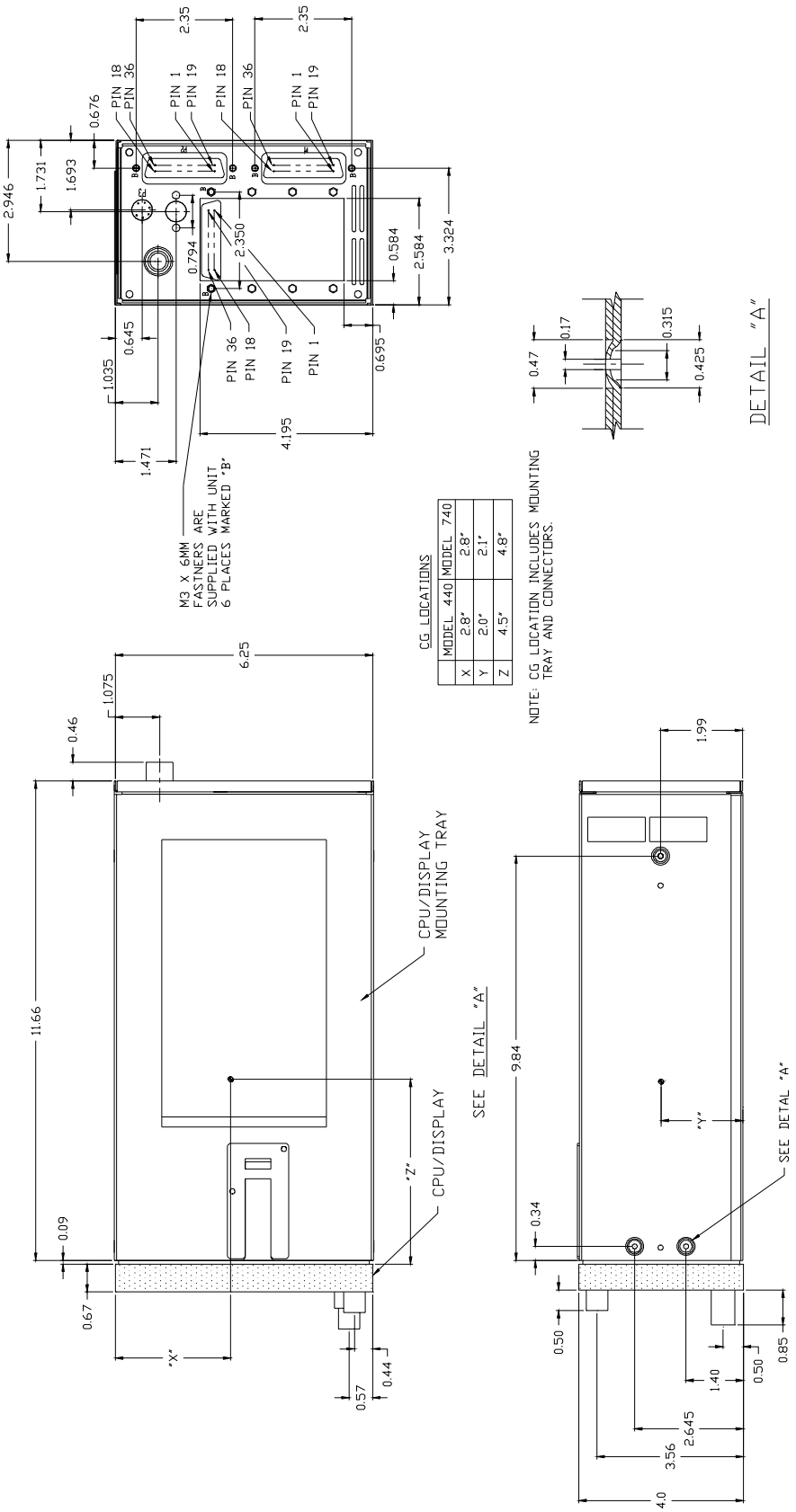
## RTCA/DO-160C

## ENVIRONMENTAL QUALIFICATION FORM

| | |
|---|---|
| NOMENCLATURE: | 5RR-MFC-XXX CD / DATA LOADER |
| PART NO: | D98-00003, D98-00003-01 |
| TSO NUMBER | C113 |
| MANUFACTURER: | AVIDYNE CORPORATION |
| ADDRESS: | 55 OLD BEDFORD ROAD<br>LINCOLN, MA 01773 |

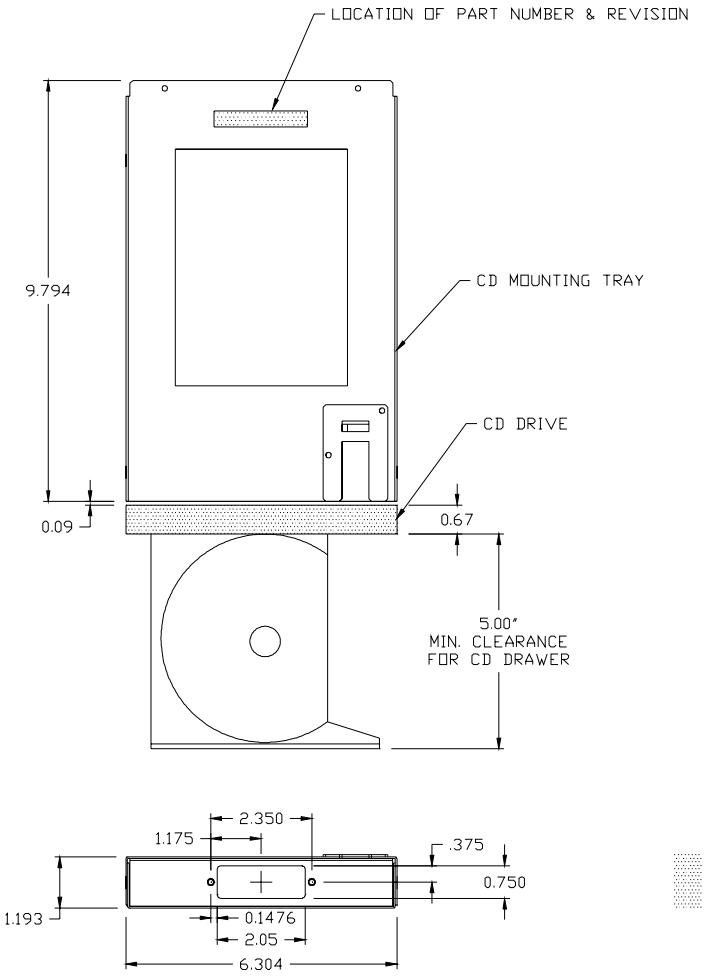
| CONDITIONS | RTCA/DO-160C PARA | CONDUCTED TEST CATEGORY |
|---|---|---|
| TEMPERATURE | 4.5 | A1 |
| INFLIGHT LOSS OF COOLING | 4.5.4 | - |
| ALTITUDE | 4.6.1 | A1 (Except Altitude 20,000 ft.) |
| DECOMPRESSION | 4.6.2 | A1 |
| OVERPRESSURE | 4.6.3 | A1 |
| TEMPERATURE VARIATION | 5.0 | B |
| HUMIDITY | 6.0 | A |
| OPERATIONAL SHOCK | 7.2 | Per Par. 7.2.1 Test Procedure |
| CRASH SAFETY | 7.3 | Per Par. 7.3.1 Test Procedure 1 |
| VIBRATION | 8.0 | X (Not Tested) |
| EXPLOSION | 9.0 | X (Not Tested) |
| WATERPROOFNESS | 10.0 | X (Not Tested) |
| FLUIDS SUSCEPTIBILITY | 11.0 | X (Not Tested) |
| SAND AND DUST | 12.0 | X (Not Tested) |
| FUNGUS | 13.0 | X (Not Tested) |
| SALT SPRAY | 14.0 | X (Not Tested) |
| MAGNETIC EFFECT | 15.0 | Z |
| POWER INPUT | 16.0 | B |
| VOLTAGE SPIKE | 17.0 | B |
| AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY | 18.0 | B |
| INDUCED SIGNAL SUSCEPTIBILITY | 19.0 | A |
| RADIO FREQUENCY SUSCEPTIBILITY | 20.0 | U |
| EMISSION OF RADIO FREQUENCY ENERGY | 21.0 | B |
| LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY | 22.0 | X (Not Tested) |
| LIGHTNING DIRECT EFFECTS | 23.0 | X (Not Tested) |
| ICING | 24.0 | X (Not Tested) |

# APPENDIX B - Mechanical Outline Drawing – FlightMax FSD



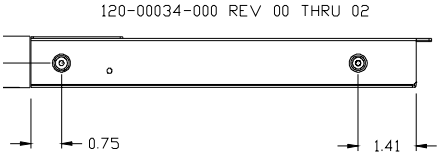

| | MODEL 440 | MODEL 740 |
|---|---|---|
| X | 2.8" | 2.8" |
| Y | 2.0" | 2.1" |
| Z | 4.5" | 4.8" |

# APPENDIX C - Mechanical Outline Drawing, Low Profile Data Loader

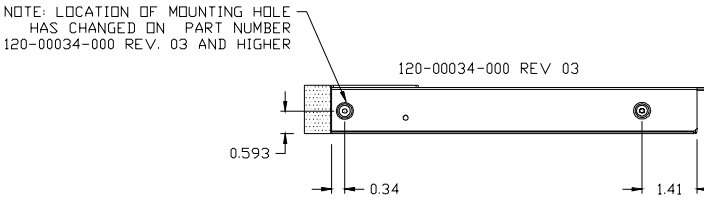



**Note:** Use the part and revision number to determine the location of the mounting holes (see below).

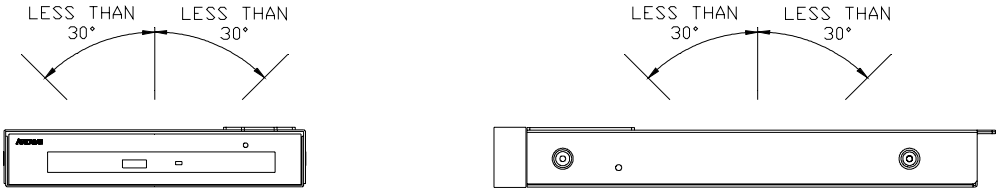
Location of Mounting Hole for P/N 120-00034-000 Rev. 00 thru 02



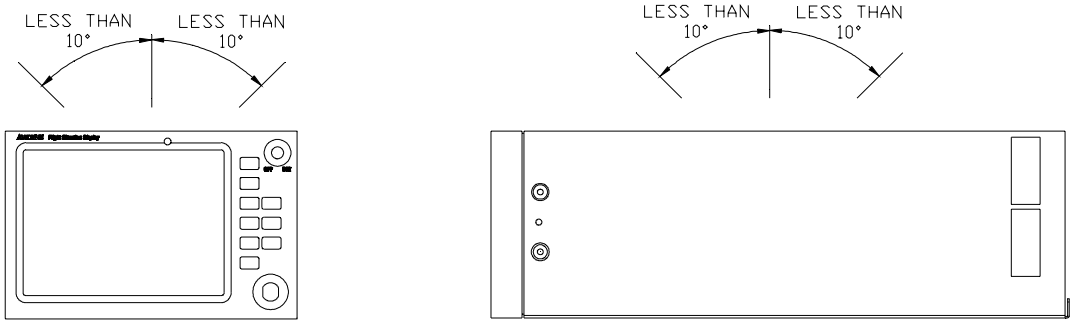

Location of Mounting Hole for P/N 120-00034-000 Rev. 03 or Higher



# APPENDIX D - Attitude Limitations for FSD and Data Loader




TILT OF THE CD DRIVE




TILT OF THE FSD

# APPENDIX E - J5 Connector Pinout-digital Configuration

| Connector J5 | | | | | |
|---|---|---|---|---|---|
| **Pin** | **Function** | **I/O** | **Pin** | **Function** | **I/O** |
| 1 | *RTON | O | 19 | GND | O |
| 2 | ARING453_OUTA | O | 20 | ARING453_OUTB | O |
| 3 | GND | O | 21 | GND | O |
| 4 | ARINC453_2_INA | I | 22 | ARINC453_2_INB | I |
| 5 | GND | O | 23 | GND | O |
| 6 | ARINC453_1_INA | I | 24 | ARINC453_1_INB | I |
| 7 | GND | O | 25 | GND | O |
| 8 | ARINC429_1_OUTA | O | 26 | ARINC429_1_OUTB | O |
| 9 | ARINC429_1_INA | I | 27 | ARINC429_1_INB | I |
| 10 | *TEST | O | 28 | GND | O |
| 11 | ARINC429_2_OUTA | O | 29 | ARINC429_2_OUTB | O |
| 12 | ARINC429_2_INA | I | 30 | ARINC429_2_INB | I |
| 13 | TTL02 | O | 31 | GND | O |
| 14 | ARINC429_3_OUTA | O | 32 | ARINC429_3_OUTB | O |
| 15 | ARINC429_3_INA | I | 33 | ARINC429_3_INB | I |
| 16 | TTL03 | O | 34 | GND | O |
| 17 | ARINC429_4_OUTA | O | 35 | ARINC429_4_OUTB | O |
| 18 | ARINC429_4_INA | I | 36 | ARINC429_4_INB | I |

# APPENDIX F - Flight Manual Supplement Information

A flight manual supplement should be created for each installation, using a sample document as a guideline. Electronic copies of the latest suggested sample or approved flight manual supplement are available upon request. Please consult Avidyne Technical Support or E-mail support@avidyne.com.

All non-applicable information and sections must be omitted. Variations to the configurations recommended in this document must be approved by the FAA on an individual basis.

These instructions are for reference only and should not be included as part of the flight manual supplement.

If known, the name of the FAA Aircraft Certification office manager should be typed directly beneath the signature line.

## APPENDIX G - Instructions For Continued Airworthiness

Maintenance of the 5RR-MFC-XXX Avidyne FlightMax Flight Situation Display (FSD) system is based on condition only. Periodic maintenance is not required.

## APPENDIX H - STC Permission

Avidyne Corporation hereby grants permission to all Aviation Authority approved installers to use data from STC SA00072BO, STC SA00117BO and amendments to modify aircraft.

Copies of the STC's and amendments follows:

United States Of America

Department of Transportation - Federal Aviation Administration

# Supplemental Type Certificate

*Number* SA00072BO

*This Certificate issued to* Avidyne Corporation
81 Hartwell Avenue
Lexington, MA 02173

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part* 3/23 *of the* Civil Air *Regulations.*

*Original Product Type Certificate Number :* 2A3

*Make :* Mooney Aircraft Corporation

*Model :* M20C, D, E, F, G, J, K, L, M, R

*Description of Type Design Change:*

Installation of Avidyne Corporation Model 5RR-MFC-XXX-( ) Multifunction Flight Computer with Avidyne Charts in accordance with Avidyne Corporation Top Level Drawing No. 5RR-MFC-XXX- ( ) Rev. 03, dated April 15, 1999, or later FAA-approved revision.

*Limitations and Conditions:*

Avidyne Corporation, Aircraft Flight Manual Supplement for Mooney Aircraft Company Models M20C, D, E, F, G, J, K, L, M, R, aircraft, Document No. 600-0005, Rev. 01, FAA-approved April 15, 1999, or later FAA-approved revision, is required with this modification.

(See continuation sheet 2 of 2)

The STC holder will provide each person it permits to use this certificate to alter the product written evidence of the agreement in a form acceptable to the Administrator.
*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the*

*Date of application :* February 24, 1997

*Date of issuance :* July 25, 1997

*Federal Aviation Administration.*

*Date reissued :*

*Date amended :* April 15, 1999

*By direction of the Administrator*

(*Signature*)

Ronald L. Vavruska
Manager
Boston Aircraft Certification Office

(*Title*)

*Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

FAA Form 8110-2(10-68) Page 1 of 2 *This certificate may be transferred in accordance with FAR 21.47.*

United States Of America

Department of Transportation - Federal Aviation Administration

# Supplemental Type Certificate

## (Continuation Sheet)

*Number* SA00072BO

Date of Issuance: July 25, 1997
Date Amended: April 15, 1999

*Limitations and Conditions* (Continued):

2. Avidyne Charts is an electronic aid to situational awareness designed to facilitate the use of approved navigational charts, not to replace them.

3. This approval should not be incorporated in any aircraft of this specific model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of the aircraft.

....END....

*Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

FAA Form 8110-2-1(10-69) Page 2 of 2 *This certificate may be transferred in accordance with FAR 21.47.*

United States Of America
Department of Transportation - Federal Aviation Administration

# Supplemental Type Certificate

*Number* SA00072BO

*This Certificate issued to* Avidyne Corporation
81 Hartwell Avenue
Lexington, Massachusetts 02173

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part* 3/23 *of the* Civil Air/Federal Aviation *Regulations.*

*Original Product Type Certificate Number :* 2A3

*Make :* Mooney Aircraft Corporation

*Model :* M20C, D, E, F, G, J, K, L, M, R

*Description of Type Design Change:*
Installation of Avidyne Corporation Model 5RR-MFC-3XX-( ) Multifunctional Flight Computer and Ryan International Corporation TCAD Model 9900B Traffic Alert and Collision Device in accordance with Avidyne 5RR-MFC-3XX-( ) Master Data List, Document No. 910-00004-000, Rev. 02, dated March 29, 2000, or later FAA approved revision.

*Limitations and Conditions:*
1. Avidyne Corporation, Aircraft Flight Manual Supplement for Mooney Aircraft Company Models M20C, D, E, F, G, J, K, L, M, R aircraft, Document No. 600-0052-00, Rev. (-), FAA approved March 29, 2000, or later FAA approved revision, is required with this modification.

(See STC Continued Sheet Page 2)

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application :* February 24, 1997

*Date of issuance :* July 25, 1997

*Date reissued :*

*Date amended :* April 15, 1999; March 29, 2000

*By direction of the Administrator*

Ronald L. Vavruska
(*Signature*)
Ronald L. Vavruska
Manager, Boston Aircraft Certification Office
(*Title*)

*Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

FAA Form 8110-2(10-68) Page 1 of 2 *This certificate may be transferred in accordance with FAR 21.47.*

United States Of America
Department of Transportation - Federal Aviation Administration

# Supplemental Type Certificate

## (Continuation Sheet)

*Number* SA00072BO
Date Amended: March 29, 2000

Limitations and Conditions (Cont'd)

2. Avidyne Charts is an electronic aid to situational awareness designed to facilitate the use of approved navigational charts, not to replace them.

3. This approval should not be incorporated in any aircraft of this specific model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of the aircraft.

....END....

*Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

United States Of America

Department of Transportation - Federal Aviation Administration

# Supplemental Type Certificate

*Number* SA00117BO

*This Certificate issued to* Avidyne Corporation
55 Old Bedford Road
Lincoln, Massachusetts 01773

*certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part* 3/23 *of the* Civil Air/Federal Aviation *Regulations.*

*Original Product Type Certificate Number :* 3A16

*Make :* Raytheon Aircraft Company

*Model :* 58

*Description of Type Design Change:*
Installation of Avidyne Corporation Model 5RR-MFC-3XX-( ) Multifunctional Flight Computer and BFGoodrich Aerospace SKY497 Skywatch Traffic Advisory System in accordance with Avidyne Corporation Top Level Drawing No. 5RR-MFC-XXX-( ), Rev. 14, dated August 9, 1999, or later FAA approved revisions.

*Limitations and Conditions:*
1. Avidyne Corporation, Aircraft Flight Manual Supplement for Raytheon Aircraft Company Model 58 aircraft, Document No. 600-0040-01, Rev. (-), FAA approved March 14, 2000, or later FAA approved revision, is required with this modification.

(See STC Continued Sheet Page 2)

If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

*This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.*

*Date of application :* June 3, 1999

*Date of issuance :* March 14, 2000

*Date reissued :*

*Date amended :*

*By direction of the Administrator*

(*Signature*)

Ronald L. Vavruska
Manager, Boston Aircraft Certification Office

(*Title*)

*Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

FAA Form 8110-2(10-68) Page 1 of 2 *This certificate may be transferred in accordance with FAR 21.47.*

United States Of America

Department of Transportation - Federal Aviation Administration

# Supplemental Type Certificate

## (Continuation Sheet)

*Number* SA00117BO

Limitations and Conditions (Cont'd)

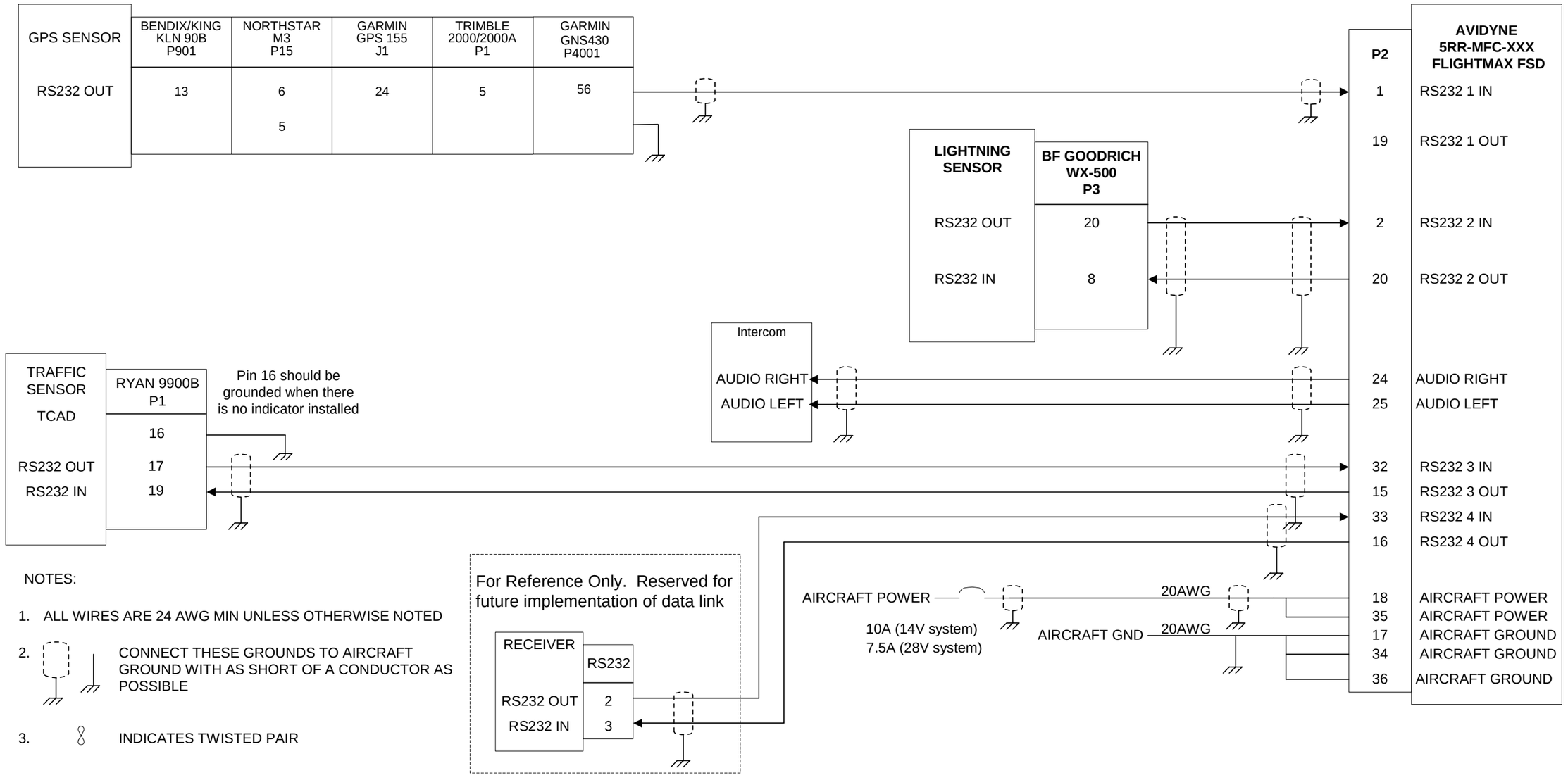
2. Avidyne Charts is an electronic aid to situational awareness designed to facilitate the use of approved navigational charts, not to replace them.

3. This approval should not be incorporated in any aircraft of this specific model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those previously incorporated approved modifications will not introduce any adverse effect upon the airworthiness of the aircraft.

....END....

*Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.*

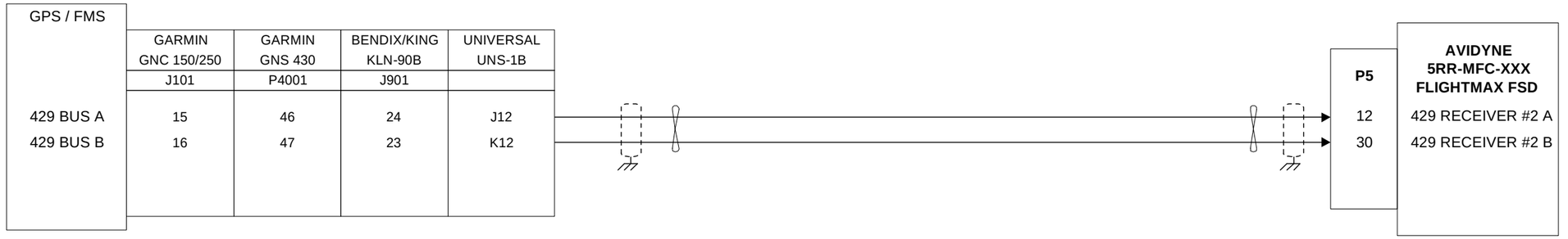
## APPENDIX I - Wiring Diagram, FSD



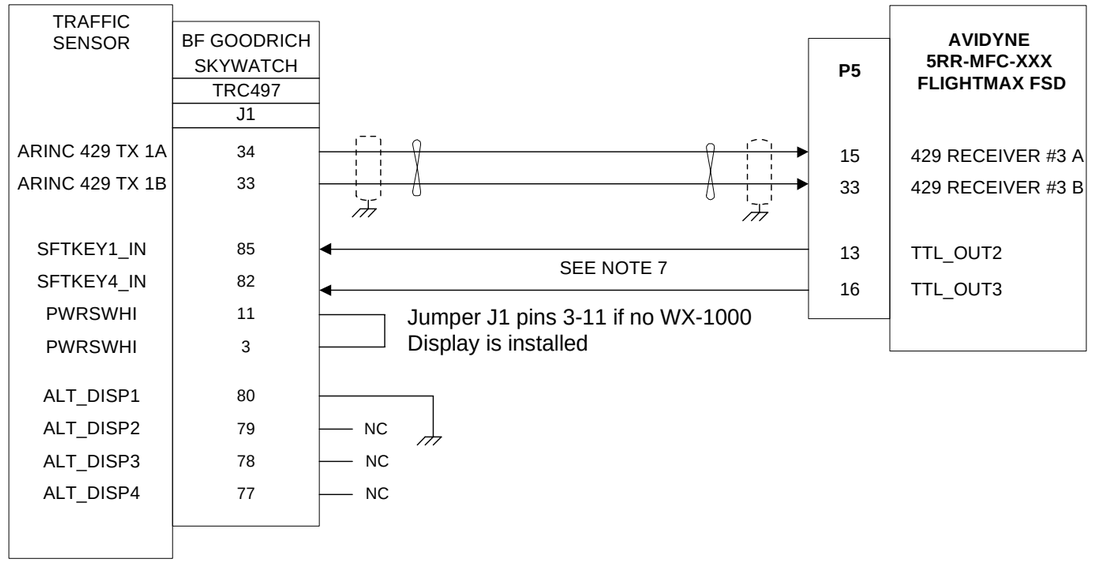

NOTES:

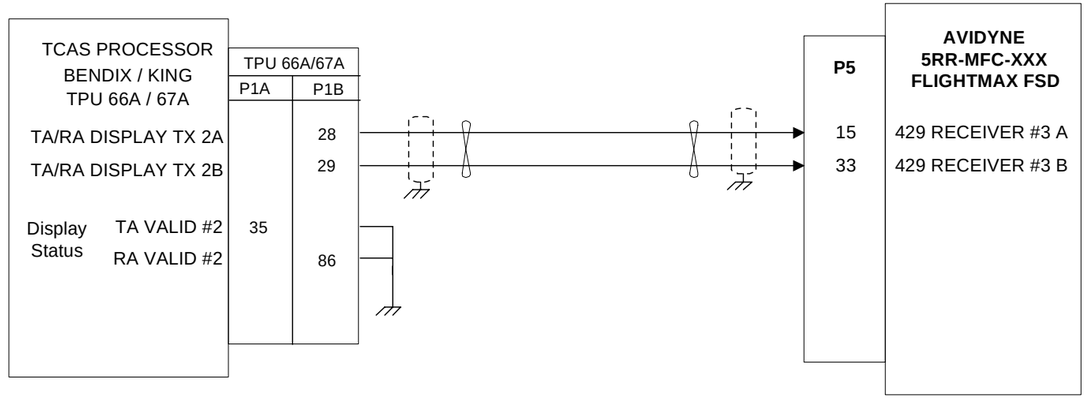
1. ALL WIRES ARE 24 AWG MIN UNLESS OTHERWISE NOTED
2. CONNECT THESE GROUNDS TO AIRCRAFT GROUND WITH AS SHORT OF A CONDUCTOR AS POSSIBLE
3. INDICATES TWISTED PAIR
4. REFER TO SENSOR INSTALLATION INSTRUCTIONS FOR SPECIFIC CONNECTION REQUIREMENTS

# APPENDIX J - Wiring Diagram, FSD, ARINC 429 Interface




**Note: This Diagram is to be used if the FSD is configured with the ARINC 429 interface (J5 present).**

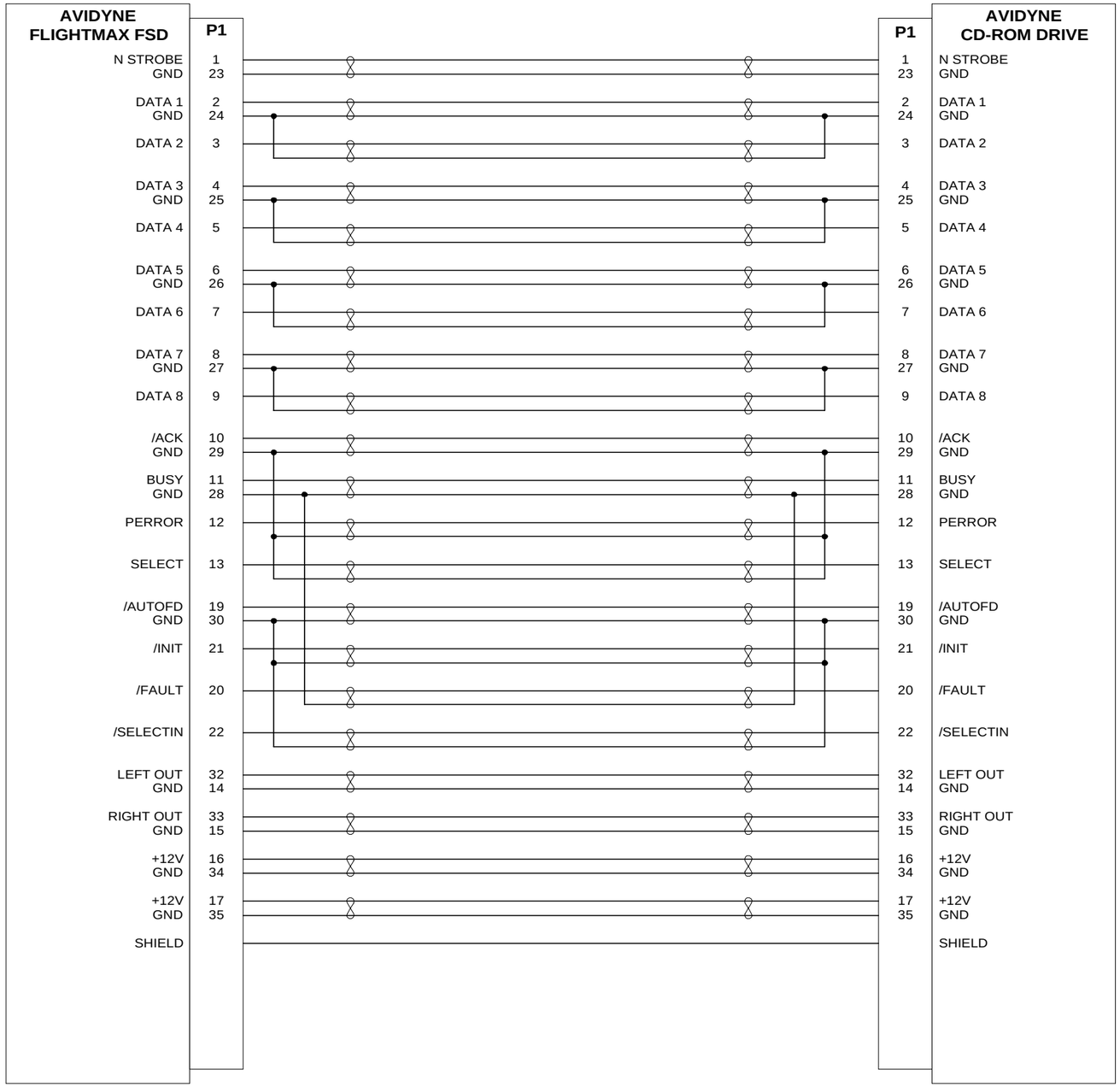



NOTES:

1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED
2. CONNECT THESE GROUNDS TO AIRCRAFT GROUND WITH AS SHORT OF A CONDUCTOR AS POSSIBLE
3. INDICATES TWISTED PAIR
4. A LOWER CASE LETTER IS DENOTED BY AN UNDERLINED UPPER CASE LETTER.
5. CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
6. REFER TO SPECIFIC SENSOR MANUFACTURERS INSTALLATION INSTRUCTIONS FOR SPECIFIC CONNECTION REQUIREMENTS
7. SFTKEYS ONLY TO BE CONNECTED IN INSTALLATIONS WHERE NO WX-1000 DISPLAY IS CONNECTED AND FSD IS USED TO CONTROL TRC497 TRAFFIC SENSOR

# APPENDIX K - Wiring Diagram, CD Loader




NOTES:

1. ALL WIRES ARE 28 AWG MIN UNLESS OTHERWISE NOTED
2. THE COMPLETED CABLE SHALL BE SHIELDED WITH SHIELD ATTACHED TO THE CONNECTOR BACKSHELL USING A 360 DEGREE CONCENTRIC METHOD.
3. ⌇ INDICATES TWISTED PAIR

THIS CABLE IS AVAILABLE PRE-MADE FROM AVIDYNE UNDER PART NUMBER:

100-0003-018 (18 INCH)
100-0003-060 (60 INCH)