FlightMax

Models: 450, 650, 750, 850, and 950

Installation Manual

Software Release 5.1
P/N 600-0067
Rev 07

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REVISION RECORD

Documentation Part Number: 600-0067

Date	Revision No.	Description
Sep. 7, 2000	00	Production Release
Sep. 22, 2000	01	Per ECO 00-112
Sep.26, 2000	02	Per ECO 00-104
Oct. 4, 2000	03	Per ECO 00-123
Oct. 6, 2000	04	Per ECO 00-126
Oct. 12, 2000	05	Per ECO 00-127
Oct. 16, 2000	06	Per ECO 00-128
May 18, 2001	07	Per ECO 01-052

Avidyne Installation Manual
Contents

Part One 1

Map
Charts
Lightning
Traffic
GroundProx

General Information 3

Equipment Description 3
Unit Designator Explanation 3
Technical Specifications 4
FSD Unit 4
CD Data Loader 5

Installation Instructions 6

General Information 6
Unpacking and Inspection 6
FlightMax FSD Installation 8
Installation Considerations 8
Mounting and Wiring the FSD 8
CD Data Loader Installation 11
Installation Considerations 11
Installation 11
Custom Building Connector Cables 12
Portable CD-ROM Setup 13

System Setup and Checkout 15

Preliminary Test 15
Maintenance Mode 16
Settings 16
Date/Time 17
Devices 17
Configure 18
Confirm Changes 18
GPS/FMS Interface, Setup and Checkout 19
RS-232 Setup 19
ARINC 429 Setup 20
Communications Check 21
GPS/FMS Manufacturer Matrix 22
Heading and Track 24

Heading Configuration 24
FMS/GPS as Heading Source 25
StormScope as Heading Source 26
Traffic (TAS or TCAS) as Heading Source 27
Alternative Heading Configurations 28
Track Configuration 29
Charts and Map Data Setup 30
Lightning Sensor Setup and Checkout 31
Serial Communications Setup 31
Lightning Sensor Configuration 31
Maintenance Pages 32
Performing a Strike Test 33
Serial Communications Check and Checkout 33
Traffic Setup and Checkout 34
SkyWatch (TAS) 35
Ryan TCAD 37
TCAS I and II 39
GroundProx Setup and Checkout 41
Communications Check 42
CD Data Loader Setup and Checkout 43
Software Configuration Check 44
The System Menu 44

Part Two **45**
Radar

General Information **47**
Maintenance Mode 48
Beam Width 49

Setup and Checkout for RT-131A (with AT-133A or DA-144A) and ART-161A **50**
Equipment Description 50
Technical Specifications 51
Unpacking and Inspection 52
Installation Instructions 52
New Install of Radar with Avidyne FlightMax FSD 52
Avidyne FlightMax FSD Install with Pre-existing Radar 52
Post Installation Check 53

Setup and Checkout for RT-131A (with 1203A), RT-1201A and RT-1301A/B **57**
Equipment Description 57
Technical Specifications 58

Unpacking and Inspection 59
Installation Instructions 59
New Install of Radar with Avidyne FlightMax FSD 59
Avidyne FlightMax FSD Install with Pre-existing Radar 59
Post Installation Check 60

Setup and Checkout for Collins WXT-250A and WXT-250B 65

Equipment Description 65
Technical Specifications 66
Unpacking and Inspection 68
Installation Instructions 68
New Install of Radar with Avidyne FlightMax FSD 68
Avidyne FlightMax FSD Install with Pre-existing Radar 68
Post Installation Check 69

Setup and Checkout for Digital R/T's (RS-181X, RS-8XX, ART-2XXX, RTA-8XX) 74

Equipment Description 74
Technical Specifications 75
Unpacking and Inspection 75
Installation Instructions 76
Replacing Radar Indicator with Avidyne FlightMax FSD 76
Connecting Avidyne FSD as Secondary Radar Display 76
Post Installation Check 76
Digital Radar Calibrations 81
Calibration with Bendix/King RDS-8X Series Radars 81
Calibration with AlliedSignal (Bendix/King) 2XXX Series Radars 82
Procedure 82

Part Three 89

Policies
Appendices

Factory Service Policies 91

Hardware Limited Warranty Policy 91
Factory Assistance by Telephone and Fax 91
General Service Procedures 92
Appendix A Environmental Qualification Forms 93
Appendix B Mechanical Outline Drawing-FlightMax FSD 95
Appendix C Mechanical Outline Drawing-Data Loader 96
Appendix D Attitude Limitations for FSD and Data Loader 97
Appendix E J5 Connector Pinouts-Digital Configuration 98
Appendix F Flight Manual Supplement Information 99
Appendix G STC Permission 109

Appendix H Instructions For Continued Airworthiness 118
Appendix I AC 20-68B Recommended Radiation Safety 119
Appendix J Wiring Diagram, FSD 121
Appendix K Wiring Diagram, FSD, ARINC 429 Interface 122
Appendix L Wiring Diagram, FSD, ARINC 429 Interface, Continued 123
Appendix M Wiring Diagram, CD Data Loader 124
Appendix N RT-131A (with AT-133A or DA-144A), ART-161A Wiring Diagram, Using Avidyne Adapter Cable 125
Appendix O RT-131A (with AT-133A or DA-144A), ART-161A Wiring Diagram, Direct Connection to R/T 126
Appendix P Digital Radar Wiring Diagram, Using FSD as Sole Radar Indicator... 127
Appendix Q Digital Radar Wiring Diagram, Using FSD as Secondary Indicator ... 128
Appendix R Collins Digital Radar Wiring Diagram 129
Appendix S Collins Radar Interface 130
Appendix T RT-1201A/131A (with DA-1203A) Wiring Diagram, Using Avidyne Adapter Cable 131
Appendix U RT-1301A/B Wiring Diagram, Using Avidyne Adapter Cable 132
Appendix V RT-1201A/131A and RT-1301A/B Wiring Diagram, Direct Connection to R/T 133

List of Illustrations

Figure - 1 Connector Configurations 9
Figure - 2 CD Data Loader Exploded View 12
Figure - 3 FSD Tray 13
Figure - 4 Panel Mount Cable for CD-ROM 14
Figure - 5 CD-ROM Interface Cable 14
Figure - 6 Maintenance Mode Page 16
Figure - 7 System Settings Page 16
Figure - 8 Date and Time Page 17
Figure - 9 Devices Menu 17
Figure - 10 Field Configuration 18
Figure - 11 GPS Status and Setup Pages 19
Figure - 12 Map Heading Source Page 24
Figure - 13 GPS Setup Page and the Map Heading Source Page 25
Figure - 14 Lightning Properties and the Map Heading Source 26
Figure - 15 ARINC Settings and the Map Heading Source 27
Figure - 16 GPS Setup and Map Heading Source for Track 29
Figure - 17 Lightning Sensor Setup 31

Figure - 18 System Data Page 32
Figure - 19 Lightning Properties Page 33
Figure - 20 Traffic Setup Page 34
Figure - 21 ARINC Settings 35
Figure - 22 Self Test 35
Figure - 23 DB9 Connection 36
Figure - 24 TCAD Settings 37
Figure - 25 Port Settings 37
Figure - 26 TCAS I Settings 39
Figure - 27 GroundProx Sensors 41
Figure - 28 CD-ROM Properties Screen 43
Figure - 29 Main Menu 44
Figure - 30 System Menu 44
Figure - 31 Beam Width Settings 49
Figure - 32 Radar Beam Illumination 49
Figure - 33 Radar Sensor Setup 53
Figure - 34 Typical Test Pattern 53
Figure - 35 Tilt Setting 54
Figure - 36 Typical Ground Display 54
Figure - 37 Typical Test Pattern Display 55
Figure - 38 Radar Sensor Setup 60
Figure - 39 Radar Settings 60
Figure - 40 Typical Test Pattern 61
Figure - 41 Tilt Setting 61
Figure - 42 Typical Ground Display 62
Figure - 43 Typical Test Pattern Display 63
Figure - 44 Radar Sensor Setup 69
Figure - 45 Radar Settings 69
Figure - 46 Typical Test Pattern 70
Figure - 47 Tilt Setting 70
Figure - 48 Typical Ground Display 71
Figure - 49 Typical Test Pattern Display 72
Figure - 50 Radar Sensor Setup 76
Figure - 51 Radar Settings 77
Figure - 52 Typical Test Pattern Display 77
Figure - 53 Tilt Setting 78
Figure - 54 Typical Ground Display 78
Figure - 55 Typical Test Pattern Display 79

Part One

Map

Charts

Lightning

Traffic

GroundProx

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 these units. Follow the installation instructions carefully to obtain maximum performance from the FlightMax FSD.

This installation manual applies to Avidyne FSD's with software P/N 530-0109 or 530-0110.

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 Pilot's Guide which is supplied with the unit.

Equipment Description

The FlightMax FSD is a panel-mounted, multi-function display.

The FlightMax FSD system consists of the following components:

- Avidyne FlightMax Flight Situation Display (FSD).
- FSD installation kit including tray assembly, and connectors.
- Optional CD Data Loader unit used for database and charts updates.
- Optional CD Data Loader installation kit consisting of mounting tray, and connectors.
- Optional cable connecting the FSD to the CD Data Loader. This pre-wired cable may be purchased separately from Avidyne in several lengths.
- Optional Radar cables connecting the FSD to the Radar R/T. These cables provide a connection to the pre-existing wiring.
- User documentation including Pilot's Guide, Installation Manual, and Flight Manual Supplements.

Unit Designator Explanation

The top level unit designator for the FlightMax series is:

5RR-MFC-XXX-( )

- 5 - refers to the 5" display screen size
- RR - Radio Rack
- MFC - Multi Function Computer
- XXX - a 3 digit number, the first digit refers to the software release level, the last two digits refer to the hardware configuration.
- ( ) - any modification designator would be indicated here.

All top level drawings with designators and part numbers are kept on file with the Boston FAA office.

Technical Specifications

FSD Unit

Specification	Description/Requirement
Standard Features	
Display	High Brightness Color Active Matrix LCD, sunlight readable (150fL)
Diagonal size	5.0 inches
Dimming range	1000:1
Resolution	320X234 pixels X 65535colors
Interfaces	RS-232, CD-ROM, ARINC 429, ARINC 453 and TTL
Physical Characteristics	
Weight with tray	8.0 lbs (FMX 450, 650, 750), 6.75 lbs (FMX 850, 950)
Height	4.0 inches
Width	6.25 inches
Depth	12.0 inches
Viewing Angle	
Vertical	+30°, -10°
Horizontal	60° left and right of center
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 Forms	

CD Data Loader

Specification	Description/Requirement
Physical Characteristics	
D98-00003-01 – Data Loader	
Weight (with mounting tray)	2.2 lbs.
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 Forms	

Installation Instructions

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.

Note:

> If an applicable STC does not exist for installation in Part 23 Commuter, Part 25, Part 27, or Part 29 aircraft, approval must be obtained from the FAA Aircraft Certification Office.

Unpacking and Inspection

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

Part Number	Description
D98-00001-5X	FlightMax Flight Situation Display (FSD).
D98-00002-02	FSD installation kit including mounting tray assembly with cooling coupler, and connectors.
D98-00003-01	Optional CD Data Loader.
D98-00004-01	Optional CD Data Loader installation kit consisting of mounting tray, and connectors.
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.
600-0053	Pilot's Guide.
600-0067	FlightMax FSD Installation Manual.

Part Number	Radar Interface Options
800-00002-010	Digital Interface card (RDS-8X, RDR-2X00) with ARINC 429.
800-00002-020	RDR 150/160 Analog Radar card with ARINC 429.
800-00002-040	WXR 2XX Collins Analog Radar card with ARINC 429.
800-00002-060	RDR 1100/1200 Analog Radar card with ARINC 429.
800-00002-080	RDR 1300 Analog Radar card with ARINC 429.

Locate the labels on the bottom of the FSD and verify that the FSD has S/W 530-0109 Rev 00 or later, or 530-0110 Rev 00 or higher. Verify that optional interfaces are installed. Table 1 lists the current software levels.

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.

Table 1: Software Revision Levels

Part Number	Rev.	Software Level
530-0109	00	Release 5.0.0
530-0109	01	Release 5.0.0
530-0109	02	Release 5.0.1
530-0109	03	Release 5.0.2
530-0109	04	Release 5.1
530-0110	00	Release 5.0.0
530-0110	01	Release 5.0.1
530-0110	02	Release 5.0.2
530-0110	03	Release 5.1

FlightMax FSD Installation

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.

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 and view it from the proper viewing angle.

Viewing angle limits are:

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

Cooling

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

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 Wiring external devices
- 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 a minimum of 3.5 inches. If you need to remove the unit, unlock it with the Allen wrench and slide it out of the tray.

Positioning and Mounting the FSD

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 which hold it in place) to facilitate wiring. Both the connectors and the back plate can be installed or removed when the tray is mounted in place.

Next, position and mount the tray in the selected location. Units with part numbers D98-00001-50 can be mounted at any angle. Units with part number D98-00001-55 have mounting angle limitations.

Refer to APPENDIX D - Attitude Limitations for FSD and Data Loader

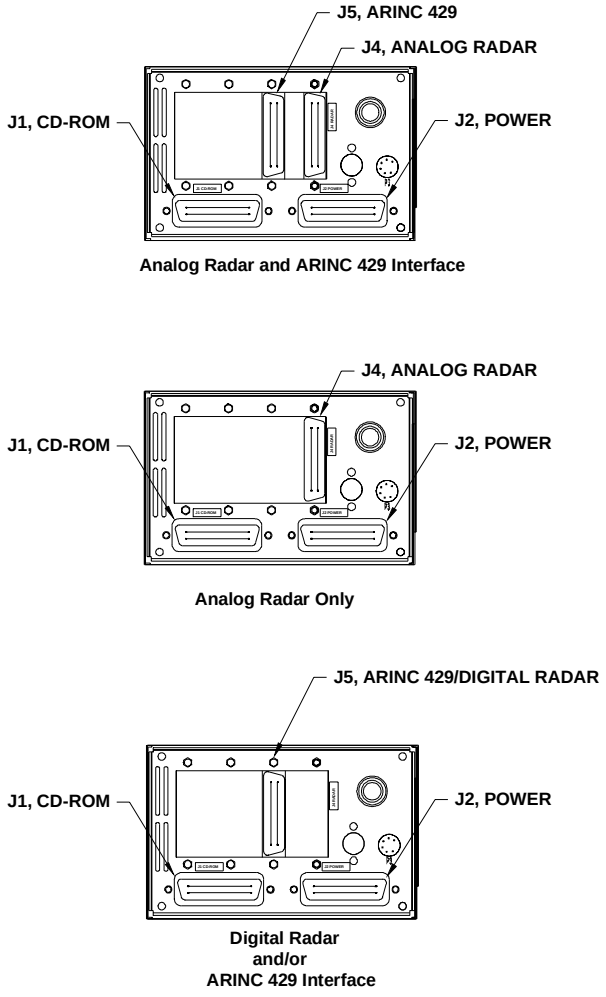


FIGURE 1: Connector Configurations

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. 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.

CAUTION

Probably the number one issue with a new installation is that the FSD is not fully seated in it's mounting tray and all connectors are not fully connected. It is extremely important that the panel thickness is not exceeded. If communication between the FSD and any of it's sensor interfaces is not established, check all connections.

Sensor Interfaces

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

Wiring external devices

External GPS and FMS 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.

Note: Avidyne recommends using an ARINC 429 connection for FMS/GPS interface. The ARINC 429 output can contain heading data, necessary for overlay capabilities.

Lightning Sensor – Refer to the wiring diagram in APPENDIX J 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 the TRC 497 software revision is 1.6 or later. Connect and configure as shown in APPENDIX K - Wiring Diagram, FSD, ARINC 429 Interface.

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

TCAS I or II - Connect FSD as supplemental display only, as shown in APPENDIX K - Wiring Diagram, FSD, ARINC 429 Interface or APPENDIX L - Wiring Diagram, FSD, ARINC 429 Interface, Continued.

GroundProx - Ensure Honeywell software is KCPB phase 1 or higher. Connect and configure as shown in APPENDIX L - Wiring Diagram, FSD, ARINC 429 Interface, Continued.

All radar interfaces are covered in Part Two Radar section.

CD Data Loader Installation

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.

CAUTION

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. (refer to APPENDIX D - Attitude Limitations for FSD and Data Loader).

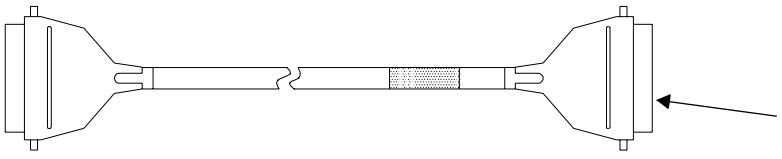
Installation

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. 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-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 10 ft. lengths from Avidyne (P/N 100-00003-018, 100-00003-060, and 100-00003-120)



- Pre-wired cables of custom length are available by special order from Wire Techniques (978-256-3396)
- You may custom build your own connector cables (see next page).

FSD to CD cables greater than 10 feet in length are not acceptable.

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 M - Wiring Diagram, CD Data Loader.

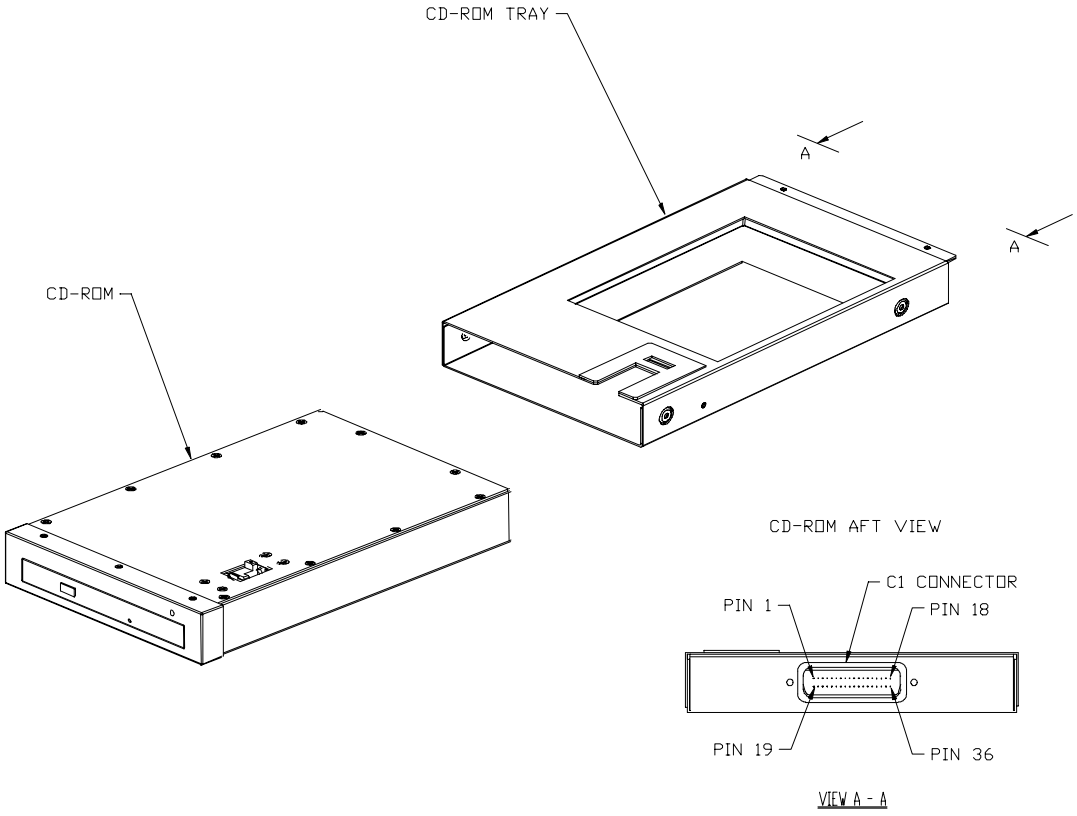


FIGURE 2: CD Data Loader Exploded View

Portable CD-ROM Setup

Some customers may not want to permanently install the CD-ROM in the cockpit panel. For easier connections between the CD-ROM and FSD, Avidyne can provide installers with inter-connecting cables for a portable panel mount connection. Contact Avidyne sales (1-800-AVIDYNE) and request the following part numbers:

- 100-00070-XXX (036 or 072 for 36 or 72 inches) - Cable connection from the FSD to the panel.
- 100-00071-000 - Cable connection from the CD-ROM to the panel connection

To configure the system for a portable setup, you will need to determine where to mount the panel connector. Then perform the following steps:

1. Remove the FSD from the Mounting Tray.
2. Remove the Tray from the cockpit panel, if already installed.
3. Remove connector J1 at the back of the tray (see Figure 3).
4. Install the P1 end of cable 100-00070-XXX (Figure 4) into the J1 slot on the tray.
5. Install the tray into the cockpit panel and feed the cable with the P2 end to the cockpit panel.
6. Mount P2 into a predetermined opening in the panel.
7. The Dust cover for the connector end should be installed under one of the screw slots of P2.

CD-ROM Interface Cable, p/n 100-00071-000 (Figure 5), is used to connect the CD-ROM to the FSD through the panel mounted connector. Attach the P1 end of the CD-ROM Interface Cable to the back of the CD-ROM and attach the P2 end of the same cable to the panel mounted connector.

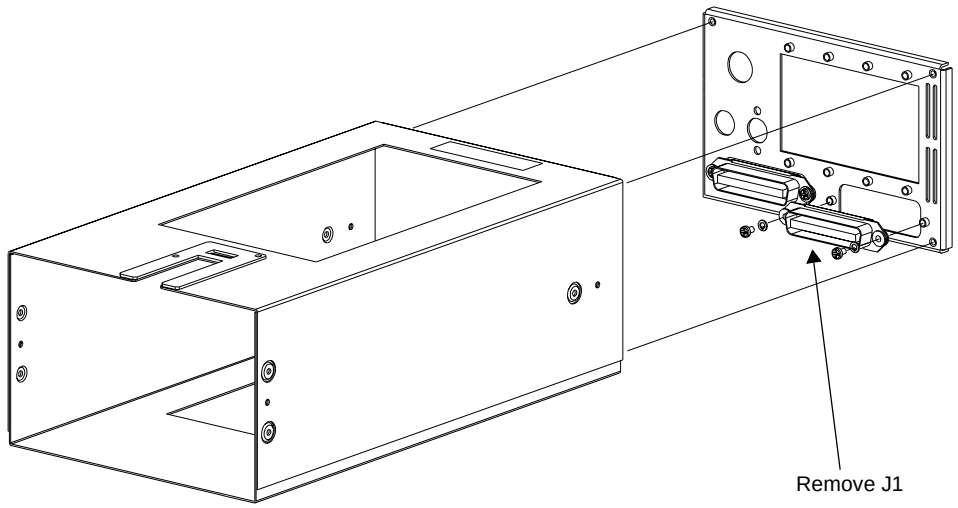


FIGURE 3: FSD Tray

Both cables (100-00070-XXX and 100-00071-000) are wired straight through, pin to pin:

Pin1 P1=Pin1 P2 on the same cable and cable to cable.

For signal name and pin location see APPENDIX M - Wiring Diagram, CD Data Loader

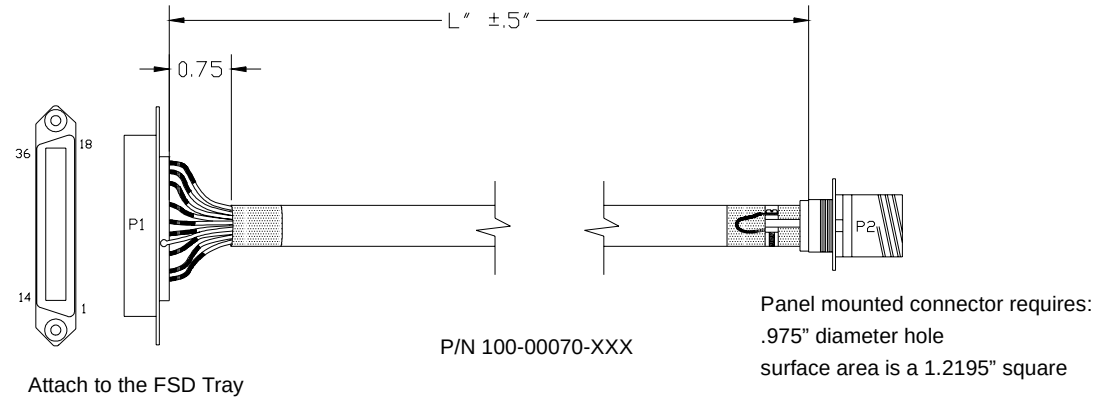


FIGURE 4: Panel Mount Cable for CD-ROM

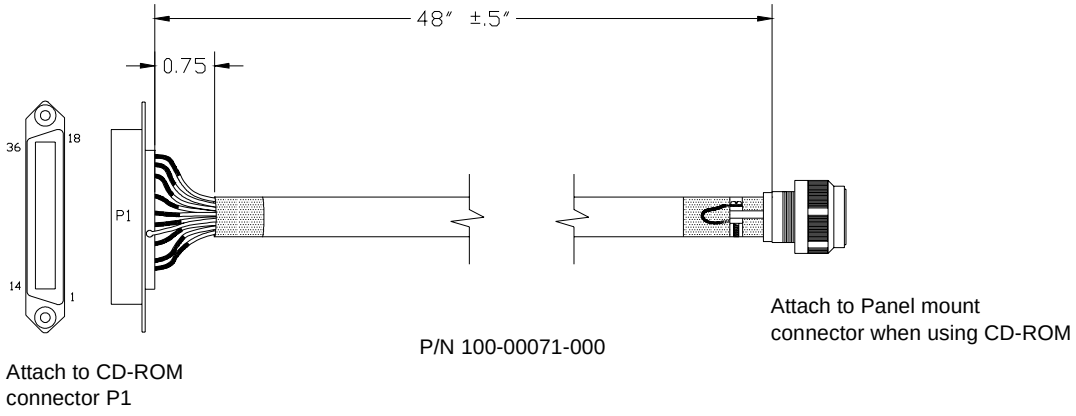


FIGURE 5: CD-ROM Interface Cable

System Setup and Checkout

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.

Familiarize yourself with the *Pilot's Guide* for explanations of the various functions.

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 and self-tests. Once loaded, the Map display should come up along with the main menu. After a programmable duration, the menu will disappear. To re-display the menu, press the **MENU** key.

If the unit powered up successfully, SHUT it off. To configure the FSD the installer has to access the Maintenance Mode which is only accessible during the power up sequence. Keep all related sensors on, including the GPS.

CAUTION

Avidyne recommends NOT shutting OFF the FSD during start up. System self tests and checks are performed at this time. The start up sequence is completed when the blue screen with the Avidyne logo appears.

Occasionally the software may perform a self test called Autocheck. This check may occur at anytime, including startup. If Autocheck occurs during startup, it can be recognized by a screen full of white text on a blue background. This check can take anywhere from a few seconds to several minutes. Do not shut the FSD OFF while Autocheck is running.

Maintenance Mode

To match an FSD to a customer's particular configuration requires access to the Maintenance Mode. This mode contains the various configuration pages for each function. Maintenance Mode can only be accessed at system startup, it is not available during normal operation.

Turn the unit on.

The system will go through its normal start up sequence.

FIGURE 6: Maintenance Mode Page

As soon as the screen with the Avidyne logo and blue background appears, press the bottom line select key and the ENTER key simultaneously.

Hold both keys down until the Maintenance Mode screen and menu appears. Release the keys when the Maintenance Mode page appears (if "Press Enter to Continue" appears, than Maintenance Mode was not accessed, start over).

This could take approximately 10-15 seconds

A logo with bright yellow lettering, indicating that you are in FlightMax Maintenance Mode will appear, along with the Maintenance Mode menu (refer to Figure 6).

Press these two keys

Settings

The following parameters are defined at the Settings page (refer to Figure 7).

Help always First - A check in this box will place HELP at the top of all menus. Normally it appears at the bottom of any menu.

Show menu label, hide after - A check in this box defines when the label text will disappear from a menu (anywhere from 1 second to 10 minutes or never). No check means text will never be displayed.

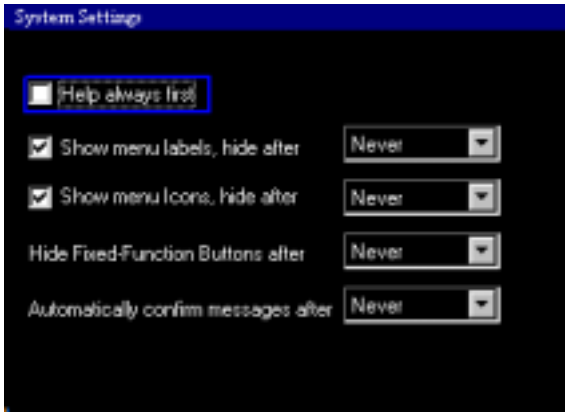


FIGURE 7: System Settings Page

Show menu Icons, hide after - A check in this box defines when the icons will disappear from a menu (anywhere from 1 second to 10 minutes or never). No check means icons will never be displayed.

Note: Either the Show Menu, Show Icon, or both must be checked. The system will not permit you to remove the checks from both boxes at the same time.

Hide Fixed-Function Buttons after - Defines when the fixed function buttons (in Map) will disappear from the screen (anywhere from 1 second to 10 minutes or never).

Automatically confirm messages after - Defines the time interval when low priority messages (local/informational) are automatically confirmed. Selecting “Never” indicates manual confirmation of low priority messages (the pilot has to press the ENTER button to confirm those messages). All medium, high and urgent priority messages are always confirmed manually by the pilot.

Date/Time

The following parameters are defined at the Date/Time page (refer to Figure 8):

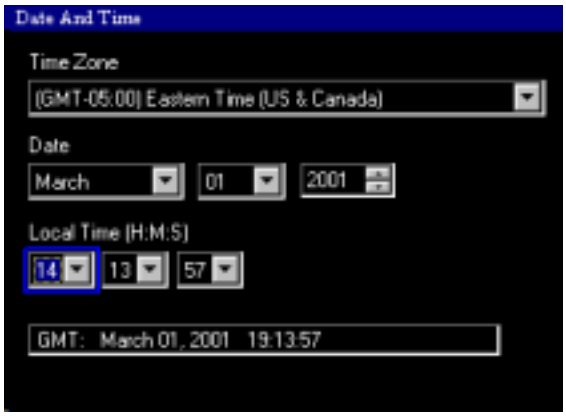


FIGURE 8: Date and Time Page

Time Zone - Sets the time zone, in hourly increments, plus or minus 12 hours from Greenwich Mean Time (GMT). The Time Zone setting will automatically account for any daylight savings time. Changing the Time Zone will automatically change the local time to the correct time. GMT will remain the same.

Date - Sets the current date for month, day and year.

Local Time - Sets the current local time in hours, minutes and seconds. Local time uses the 24 hour clock. Normally the local time should not have to change. The local time is set to current EST before the unit leaves the factory. The installer should set the Time Zone to get the correct local time. If the Local Time is reset, the GMT will be adjusted accordingly.

GMT - Greenwich Mean Time is displayed in this field along with the current date at GMT.

Devices

The Devices menu (refer to Figure 9) provides access to the configuration pages for each function. This is the same menu that was available in previous versions of software, only now it must be reached via the Maintenance Mode. The functions that are available on this menu are selected at the Configure page (Field Configuration).

Most of the configuration procedures in this manual start at this menu.

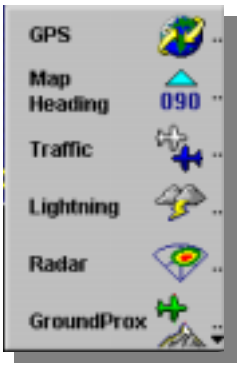


FIGURE 9: Devices Menu

Configure

Selecting Configure provides access to the Field Configuration page. From this page, installers can turn functions ON or OFF, based on a customer's desired configuration. Information specific to this unit is also displayed here.

Using the outer and inner knobs, select the appropriate functions that match the customer's configuration by placing a check mark in the box. The selected functions will be available to the user. Changes will not take affect until the the system has been restarted (use the Confirm Changes option on the Maintenance Mode menu to restart).

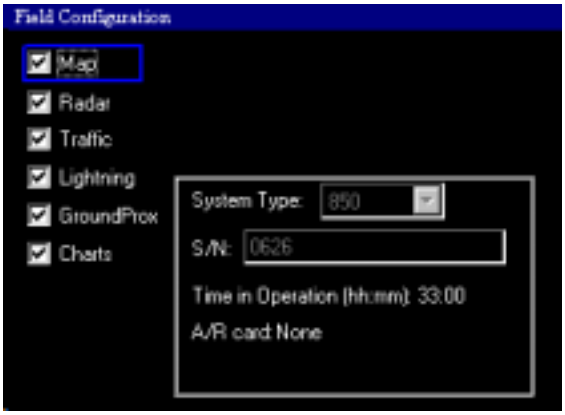


FIGURE 10: Field Configuration

Note: It should be emphasized that turning a function on doesn't necessarily provide a customer with that function. The appropriate sensor must be present. Turning on Lightning for a customer who doesn't have a WX-500 Stormscope will not enable Lightning capabilities. This page has been made available to installers, so they can easily turn on a function when customers add new avionics to their aircraft.

The Field Configuration page also provides information about your particular serial number. The system type is identified. The unit serial number (also available on the bottom of the unit) is displayed. The system also keeps track of the number of hours of operation. The type of radar card (if applicable) is also displayed. Placing this information on the display makes it easier to identify any unit. It avoids having to remove the unit from the tray to find this information. This information cannot be changed by the installer.

Confirm Changes

Selecting this menu item takes you to the Confirm Changes page. This page provides instructions for confirming all the parameters created while in the Maintenance Mode. Pressing the ENTER key from this page will restart the system. This is necessary for ensuring that all parameters are accepted by the FlightMax software. The confirmation restart should be done after all parameters, including all the function configurations, have been set. Once the restart is completed the system will start up in the normal operating mode.

Pressing the ESC key will abort the restart and take you out of this page and back into the Maintenance Mode, to make any other modifications you need to make. Changes that were made since the initial power up will remain in effect. Pressing ESC does not undo any settings that were changed or set during this session.

If power is lost prior to confirming changes, some or all changes may be lost.

CAUTION

Never remove power to the unit while a restart is in progress. This may cause the system to lock up or cause data to be lost.

GPS/FMS Interface, Setup and Checkout

To configure the Avidyne FSD with an external GPS or FMS, 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. Avidyne has provided a GPS/FMS Matrix on page 22 that lists most of the GPS/FMS's that interface with the FlightMax FSD. The matrix includes information about data formats available and GPS configurations.

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

There are two major data formats that the FSD uses to interface with the GPS: RS-232 or ARINC 429. Some GPS's can only output in one format, while others are capable of outputs in either format. The FSD can be configured to work with either format. However, ARINC 429 is the only data format from the GPS capable of providing heading information if the GPS is being used as the heading source for radar overlay capabilities in Map (refer to Heading Configuration section on page 24 for a complete explanation on setting up the various Heading configurations within the FSD).

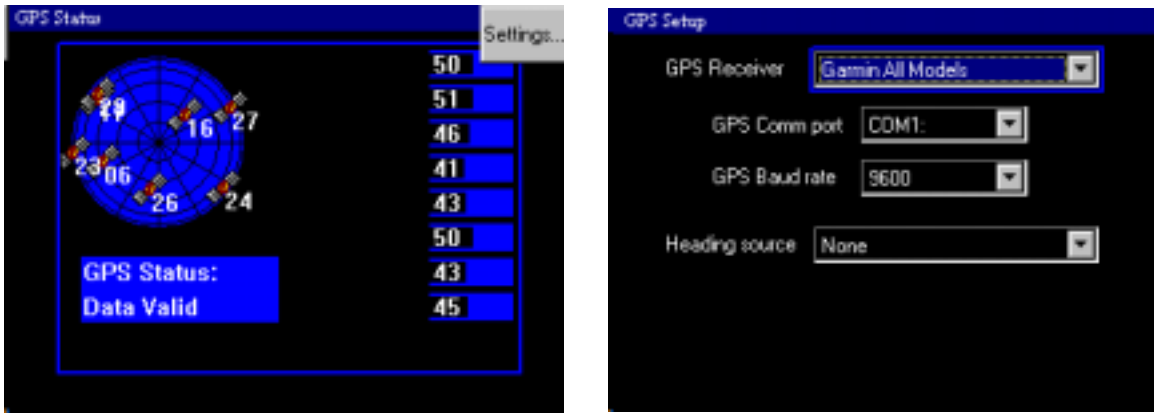


FIGURE 11: GPS Status and Setup Pages (RS-232)

RS-232 Setup

Refer to the installation of your specific GPS and determine its output parameters. Wire the FSD according to APPENDIX J - Wiring Diagram, FSD, and configure the FSD as follows:

1. From the MAINTENANCE MODE, choose the following: SYSTEM→DEVICE→GPS.
2. The GPS STATUS page appears (Figure 11).
3. Select SETTINGS, this will bring up the GPS SETUP page.
4. Highlight the Receiver window by scrolling to it with the large knob.
5. Use the small knob to scroll 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.
7. For the RS-232 configurations the Heading Source should be None (The FSD cannot read Heading information from RS-232).

Note: It is important to set the Heading Source to NONE if the FSD is using an RS-232 GPS interface. Setting this parameter to ARINC 429 will cause a loss of Heading to the FSD from the other Heading source (Stormscope or SkyWatch).

8. When the Receiver, Comm Port, Baud rate and Heading source items are all set to the desired values, press the Enter key to complete the setup procedure.

   This will return you to the previous screen (GPS Status page). 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 series do not provide specific satellite data and this screen (Figure 11) will be blank.

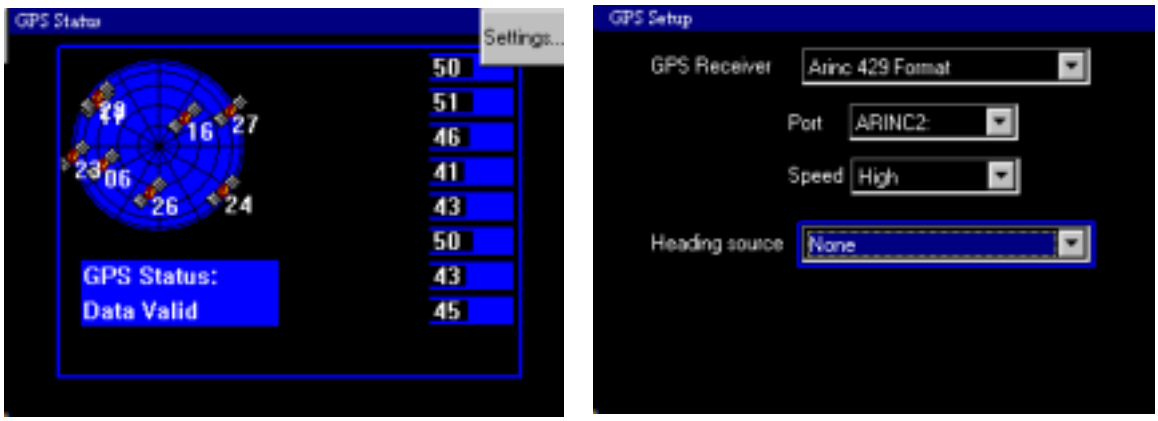


FIGURE 12: GPS Status and Setup Pages (ARINC 429)

ARINC 429 Setup

If your GPS is capable of ARINC 429 output and is wired according to APPENDIX K - Wiring Diagram, FSD, ARINC 429 Interface, do the following:

1. From the MAINTENANCE MODE, choose the following: SYSTEM→DEVICE→GPS.
2. The GPS STATUS page appears (Figure 12).
3. Select SETTINGS, this will bring up the GPS SETUP page (Figure 12).
4. Highlight the Receiver window by scrolling to it with the large knob.
5. Use the small knob to scroll to ARINC 429 (this is for all Manufacturers).
6. The Port should default to: ARINC 2.
7. Select the Baud rate: slow or fast, depending upon GPS output speed.

8. If the GPS/FMS is being used as the Heading Source, then select ARINC 429, if not, select None.
9. When the Receiver, Comm Port, Baud rate and Heading source items are all set to the desired values, press the Enter key to complete the setup procedure.

   This will return you to the previous screen (GPS Status page). This will display the current satellite status as well as a message on the bottom of the screen.

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 < 2 seconds), 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 RS 232 or ARINC 429 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 FlightMax 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.

GPS/FMS Manufacturer Matrix

FMS/GPS	RS-232	ARINC 429	BAUD RATE	HEADING OUTPUT	UNAVAILABLE INFORMATION	GPS/FMS CONFIGURATION	DME ARC
KLN-89B	Yes	No	Serial - 9600	No	Satellite data may be missing on GPS Setup page.		Flight Plan terminates at entry point
KLN-90B	Yes	Yes	Serial - 9600 ARINC - Slow	ARINC only	Satellite data may be missing on GPS Setup page.		Flight Plan terminates at entry point
NorthStar M1, M2, or M3	Yes	No	1200 to 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	Some models	9600	If ARINC 429 is available		Use RS-232 port 2 No Parity, 8 bits	Sends multiple waypoints around arc
Garmin 150, 250	Yes	Yes (not for 150)		ARINC only		For the 250 DO NOT use the W/O GAMA mode, use the EFIS mode. If using the NEMA format use the 2nd channel.	
Garmin 155, 165	Yes	No		No			
Garmin 430	Yes	Yes		ARINC only	Doesn't put out true airspeed.	For RS-232 operation, set the Garmin to Aviation Output For ARINC operation, the Garmin software level should be 2.14 or greater and the output should be set for GAMA output. DO NOT use the GAMA with Graphics output.	With ARINC 429 the arc is treated as a gap. With RS-232 the arc is treated as a straight line.

FMS/GPS	RS-232	ARINC 429	BAUD RATE	HEADING OUTPUT	UNAVAILABLE INFORMATION	GPS/FMS CONFIGURATION	DME ARC
Garmin 530	Yes	Yes		ARINC only	Doesn't put out true airspeed.	For RS-232 operation, set the Garmin to Aviation Output For ARINC operation, the Garmin software level should be 2.14 or greater and the output should be set for GAMA output. DO NOT use the GAMA with Graphics output.	With ARINC 429 the arc is treated as a gap. With RS-232 the arc is treated as a straight line.
Universal UNS-1B	No	Yes	ARINC - High	Yes			Treats arc as a gap
HoneyWell GNS-XLS	No	Yes	ARINC - High or Low	Yes		For GNS-XLS Configuration Programming set as follows: GAMA ARINC 429 Bus Data Set = 1. Basic EFIS DME Arc Style = 1. Arc as Gap	Treats arc as a gap
II Morrow Apollo GX-50	Yes	No	9600	No		Use the Moving Map format. Extended format is OK for Avidyne FlightMax units with Release 5 software or greater.	

Note: 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 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 loose configuration when the aircraft battery is discharged.

Heading and Track

The Avidyne FSD has the capacity to overlay Radar, Traffic and Lightning information while viewing Map. To utilize this feature, Map requires Heading or Track information. This is necessary for correct placement of radar, traffic and/or lightning data on the Map display. Accurate Radar placement requires heading information. Lightning and Traffic placement require either heading or track information.

Heading information is ultimately derived from the aircraft's compass system. The FlightMax FSD does not take Heading directly from this system (e.g. synchro). Heading is taken from other sources (FMS/GPS, Stormscope or Skywatch/TCAS) that receive heading inputs.

Track is the actual direction the aircraft is moving relative to the earths surface. Track information is obtained from the FMS/GPS.

Heading Configuration

The FSD can receive heading data from one of following sources:

- BF Goodrich SkyWatch (via 429) with 1.6 software level or higher and any TCAS system capable of receiving and providing heading information
- BF Goodrich StormScope (via RS -232)
- FMS/GPS (via 429) capable of providing heading information.
- or None, if no heading source is available

The FSD can also receive heading data from a FMS/GPS that has a SkyWatch or Stormscope connected to it.

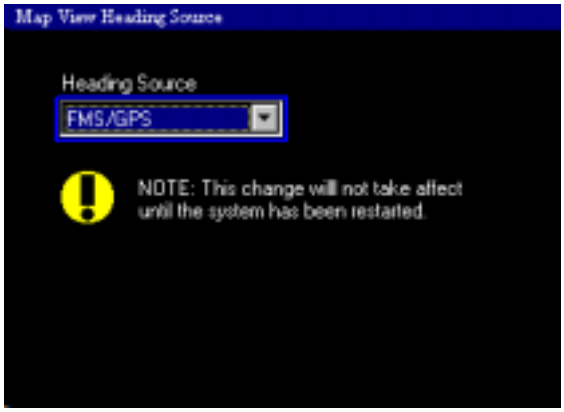


FIGURE 13: Map Heading Source Page

The heading source is configured at the Map Heading source page. (Figure 13) which is accessed from MAINTENANCE MODE:
SYSTEM→DEVICES→MAP HEADING

Select Heading Source with the outer knob. Use the inner knob to select the heading source used on your system: FMS/GPS, StormScope, SkyWatch/TCAS or none.

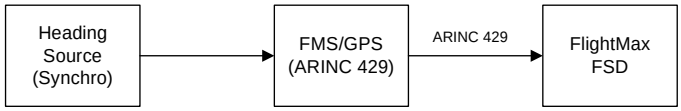
Press **Enter** then select Confirm Changes from Maintenance Mode menu to restart the unit. Changes will not take affect until the FSD has been restarted.

Note: A Heading source is required for the Radar overlay to work in FlightMax Map. If there is no heading source, Map will function in the Track mode with Traffic and Lightning as the only overlays available (provided traffic and lightning sensors are connected to the system).

The remaining procedures in this section explain how to configure any of the four possible heading sources to the FSD.

Note: Prior to setting up heading you need a valid position (lat/lon) from the GPS/FMS.

FMS/GPS as Heading Source



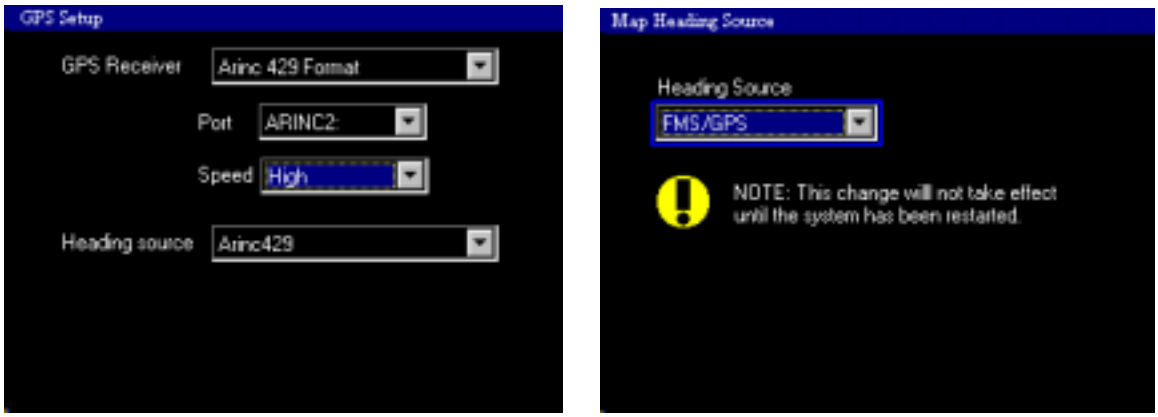


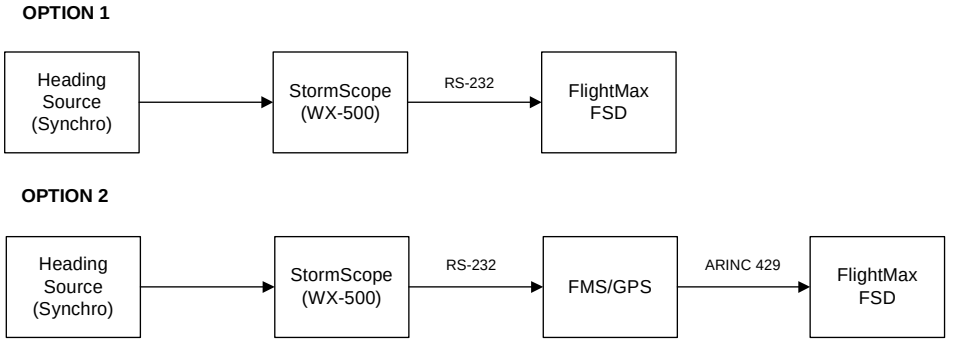
FIGURE 14: GPS Setup Page and the Map Heading Source Page

FlightMax is capable of receiving heading data from the ARINC 429 bus. Configure the FSD as shown in the block diagram. Refer to APPENDIX K - Wiring Diagram, FSD, ARINC 429 Interface for the correct pinouts to the FSD.

To configure the FSD do the following:

1. From the MAINTENANCE MODE select:
   SYSTEM→DEVICES→GPS→SETTINGS (Figure 14)
2. Select the type of GPS receiver, the port (normally Port 2), and the speed (High or Low).
3. Select ARINC 429 for the Heading Source being used by the GPS.
4. Press **Enter** after all parameters have been entered.
5. Use the **Enter** button to return to the DEVICES menu and select Map Heading, this will bring up the Map View Heading Source page (Figure 14).
6. Select Heading Source with the outer knob.
7. Using the inner knob, select FMS/GPS.
8. Press **Enter** to return to the Devices menu, then select Confirm Changes from Maintenance Mode menu to restart the unit. Changes will not take affect until the FSD has been restarted.

StormScope as Heading Source



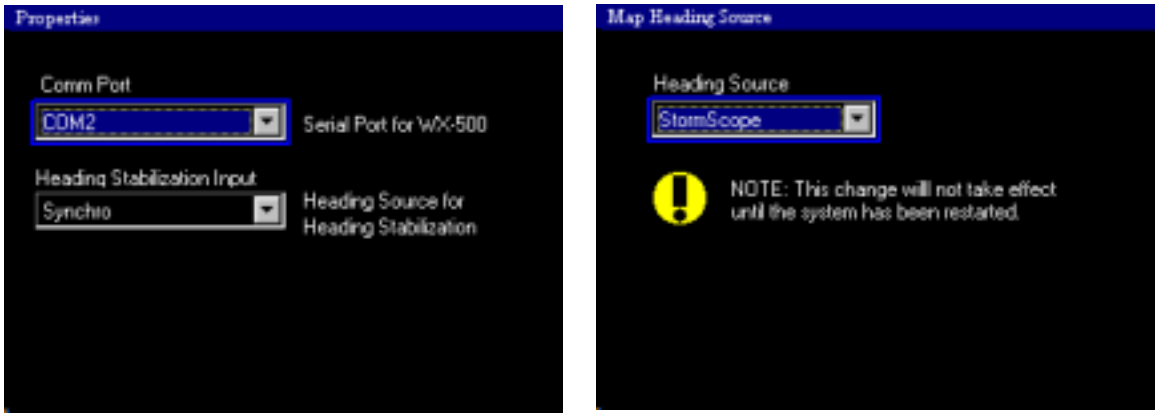


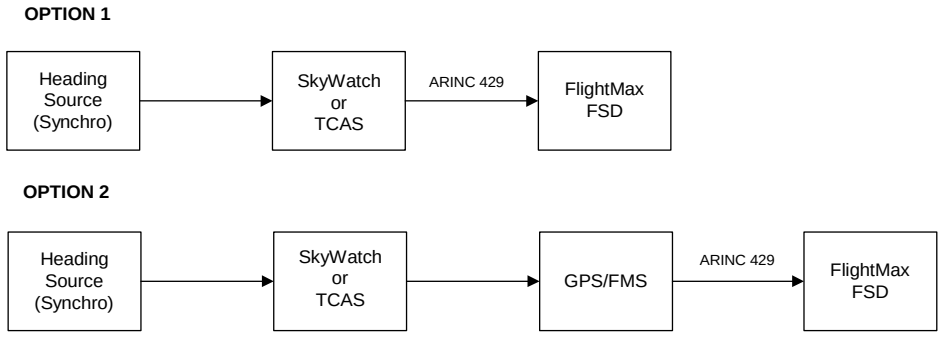
FIGURE 15: Lightning Properties and the Map Heading Source

FlightMax is capable of receiving heading data from the WX-500 StormScope. Configure the FSD as shown in the block diagram. Option 1 shows the configuration with a StormScope connected directly to the FSD. Option 2 shows the configuration with the StormScope connected to a FMS/GPS, which then provides heading data to the FlightMax via a 429 connection. Refer to APPENDIX J - Wiring Diagram, FSD for the correct pinouts to the FSD.

To configure the FSD do the following:

1. From the MAINTENANCE MODE select: SYSTEM→DEVICES→LIGHTNING→PROPERTIES (Figure 15).
2. Select the correct Comm Port (normally Port 2).
3. Select Synchro for the heading source.
4. Press **Enter** after all parameters have been entered.
5. Use the **Enter** button to return to the DEVICES menu and select MAP HEADING (Figure 13).
6. Select Heading Source with the outer knob.
7. Using the inner knob, select StormScope.
8. Press **Enter** to return to the Devices menu, then select Confirm Changes from Maintenance Mode menu to restart the unit. Changes will not take affect until the FSD has been restarted.

Traffic (TAS or TCAS) as Heading Source



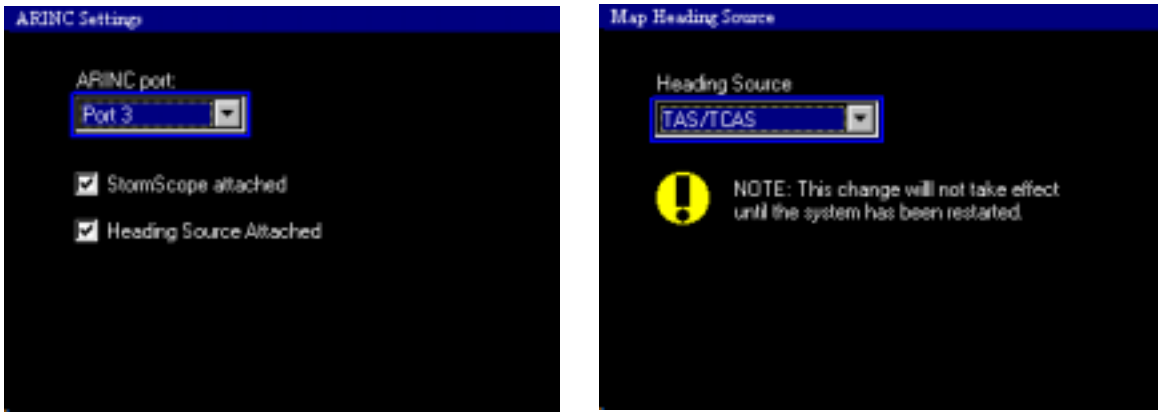


FIGURE 16: ARINC Settings and the Map Heading Source

FlightMax is capable of receiving heading data from a BF Goodrich SKY 497 SkyWatch or TCAS I or II system. Configure the FSD as shown in the block diagram. Option 1 shows the configuration with a the traffic sensor connected directly to the FSD via a 429 connection. Option 2 shows the configuration with the sensor connected to a FMS/GPS, which then provides heading data to the FlightMax via a 429 connection. Refer to APPENDIX K - Wiring Diagram, FSD, ARINC 429 Interface for the correct pinouts to the FSD.

To configure the FSD do the following:

1. From the MAINTENANCE MODE select: SYSTEM→DEVICES→TRAFFIC
2. Press **Enter** from the TRAFFIC page to get to the ARINC Settings page (see Figure 16) or TCAS Settings page (see Figure 27).
3. Select if a heading source is attached.

Note: If the 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.

4. Press **Enter** after all other parameters have been entered.

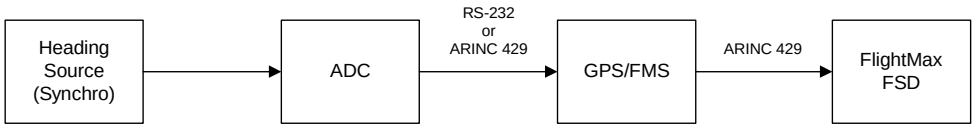
5. Use the Escape button to return to the DEVICES menu and select MAP (Figure 16).
6. Select Heading Source with the outer knob.
7. Using the inner knob, select TAS/TCAS.
8. Press **Enter** to return to the Devices menu, then select Confirm Changes from Maintenance Mode menu to restart the unit. Changes will not take affect until the FSD has been restarted.

Alternative Heading Configurations

Using an Air Data Computer (ADC)

Some customers may require an Air Data Computer, like the Shadin ADC-200, ADC-2000 or the Digi-Data to convert their syncro output to either RS-232, or ARINC 429. The heading output from the ADC must go directly to a GPS capable of putting out ARINC 429 data. The FlightMax FSD can read Heading information from the 429 output of the GPS.

If an ADC is used, configure it as shown below and follow the setup and checkout procedures for the FMS/GPS (see FMS/GPS as Heading Source section on page 25).



Track Configuration

If Heading information is unavailable, Track data can be used for the Lightning and Traffic overlays. Track data comes from the GPS/FMS.

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.

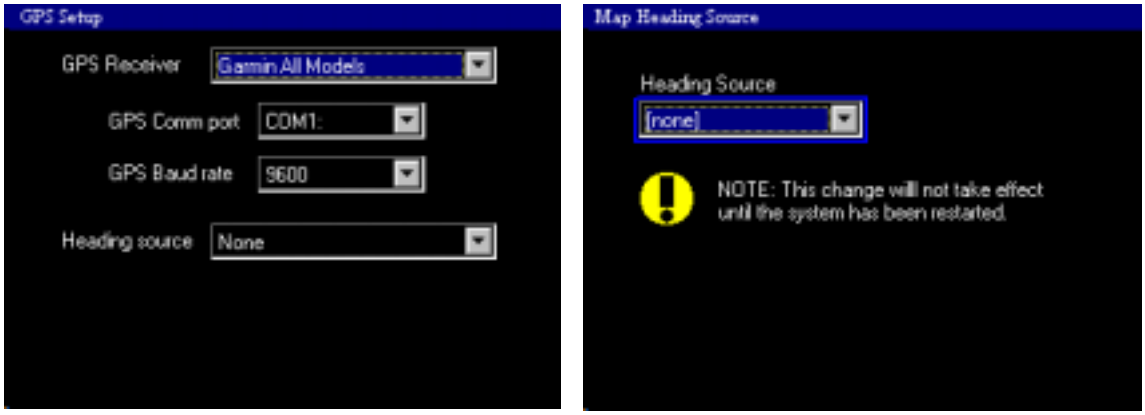


FIGURE 17: GPS Setup and Map Heading Source for Track

Note: Radar requires Heading information, not Track for the Map overlay.

To receive track data do the following:

1. From the MAINTENANCE MODE select:
   SYSTEM→DEVICES→GPS→SETTINGS (see Figure 17)
2. Select NONE for the Heading Source being used by the GPS.
3. Press **Enter** and continue to use the Enter button to return to the DEVICES menu and select Map Heading, this will bring up the Map View Heading Source page (Figure 17).
4. Select NONE for the Heading Source.
5. Press **Enter** to return to the Devices menu, then select Confirm Changes from Maintenance Mode menu to restart the unit. Changes will not take affect until the FSD has been restarted.

Charts and Map Data Setup

The Map and Charts (optional) database must be updated periodically. Systems with the Charts option are identified with software P/N 530-0110.

All FSD units are shipped with the latest database and with the data pre-loaded.

Updates are available on CD, and can be purchased either singularly or by subscription. Contact Avidyne at 1-800-AVIDYNE for more information.

To perform a data update, simply insert the CD into the Data Loader immediately after power up. The system will automatically check the database to see what needs to be updated and will update it. Follow the screen prompts to complete the data load. The CD's may be loaded in any sequence, but all CD's must be loaded to update the entire database. Refer to the Pilot's Guide for more information (in the General Operating Procedures and Charts sections) on how to load CD's and update the database.

Note: Do not turn off the FSD during a data load. Wait until the Map screen is displayed.

Lightning Sensor Setup and Checkout

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 BF Goodrich WX-500 has been installed and setup according to it's installation instructions. Erroneous lightning strikes may be displayed if there is excessive noise.

Serial Communications Setup

The FlightMax FSD communicates to and from the WX-500 using RS232 communications. Refer to APPENDIX J - Wiring Diagram, FSD for the correct pin outs. The factory default comm port is set to RS232 port 2 (refer to Figure 20). 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.

Lightning Sensor Configuration

To configure FlightMax Lightning access MAINTENANCE MODE and select:

SYSTEM→DEVICE→LIGHTNING SENSOR (Refer to Figure 18).

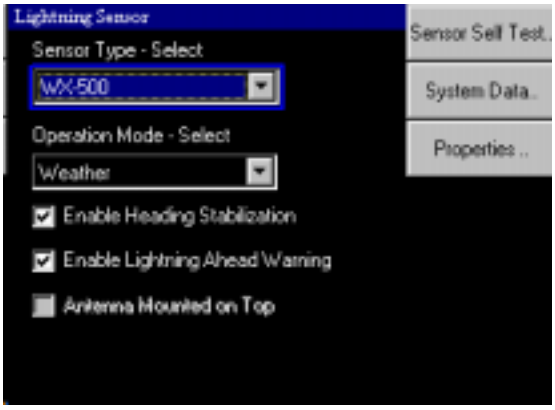


FIGURE 18: Lightning Sensor Setup

Sensor Type

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 practice Lightning operations on the ground.

Operation Mode-Select

The normal operating mode is weather. Demo is used to learn Lightning operations. Noise Monitor mode is used during noise mapping tests. Refer to the WX-500 manual for testing procedures.

Note: If the Noise Monitor mode will not initialize after selection, select Demo mode first and then select Noise Monitor.

Heading Stabilization

Enables heading stabilization when checked and disables it when not checked. The heading stabilization source is selected in the PROPERTIES page, described in the Properties Page section.

Lightning Ahead Warning

Enables display of the Lightning Ahead warning message in the message bar when checked and disables it when not checked.

Antenna Mounted 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. This parameter is normally unavailable for change after initial setup.

Antenna Location Setup

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. Then restart the system (turn it off and turn it on again). Note that once the antenna mounting location setting matches the WX-500, this box is no longer accessible (as shown).

Maintenance Pages

Self Test

Use SELF TEST to manually initiate the self test functions of the WX-500. The responses of the WX-500 are displayed as they are received.

Automatic self tests are performed at power up. Errors discovered during automatic self test are reported to the FSD and are available on the SYSTEM DATA pages.

System Data

Select SYSTEM DATA to gain access to four pages of system data reflecting details of the WX-500's status. Use the Decode key to translate the data into messages. Refer to the WX-500 manual for explanations of data.

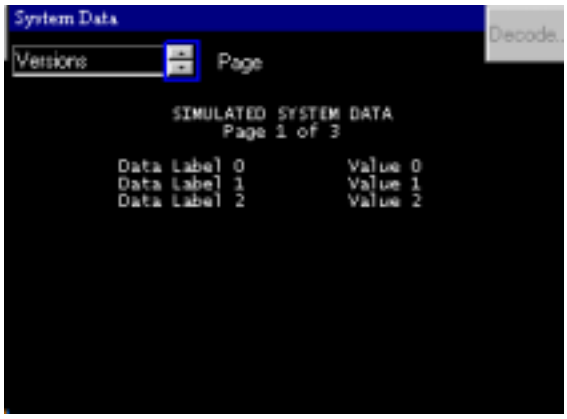


FIGURE 19: System Data Page

Properties Page

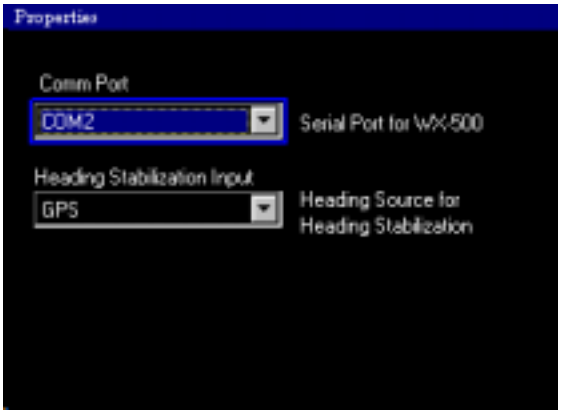


FIGURE 20: Lightning Properties Page

The PROPERTIES page provides access to two system configuration parameters.

Comm Port - selects which communication port your sensor is connected to. Normally port 2.

Heading stabilization Input - defines what type of stabilization is being used if Heading stabilization has been checked on the Lightning configuration page.

The choices are:

- None: no stabilization.
- Synchro: uses a remote compass system.
- Stepper: uses a remote compass system.
- GPS Ground Track: generates a track stabilized display.

Stabilization Setup

The best method of stabilization is syncro or stepper input to the WX-500. The next best method 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, select Properties from the Lightning Sensor page.

Select the heading stabilization, which corresponds to your setup, as shown in Figure 20.

Press Enter to save settings and return to the previous menu.

Performing a Strike Test

Strike tests can be performed while on the ground or in flight to check system operation.

1. In Lightning's main menu, select SETTINGS→STRIKE TEST.
   Strikes should appear within the box at regular intervals (2-3 seconds). Occasional strikes outside the box do not constitute failures.

Note: The Lightning SETTINGS menu is normally accessed during non Maintenance Mode operation. It can also be accessed from Maintenance Mode by pressing the ESCAPE key when the Maintenance Mode menu is displayed. Select Lightning.

2. Repeat to return to normal operation.

Serial Communications Check and Checkout

Check the com link between the WX-500 and the FSD by selecting "SELF TEST" from the Lightning Sensor page. This will initiate a self test of the WX-500, receive and display the results. Check the results on the System Data page.

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.

Traffic Setup and Checkout

FlightMax is designed to work with four types of traffic awareness sensors:

- BF Goodrich Skywatch (TAS), Model SKY497
- Ryan TCAD 9900B
- TCAS I
- TCAS II

To configure FlightMax Traffic access MAINTENANCE MODE and select:

SYSTEM→DEVICE→TRAFFIC
(Refer to Figure 21).

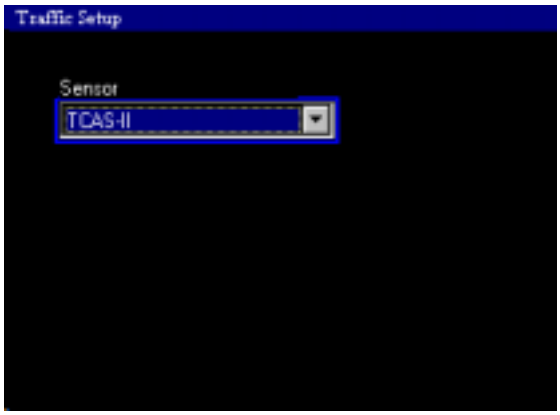


FIGURE 21: Traffic Setup Page

This brings up the Traffic Setup page. Depending on how your unit was configured at the factory you will have a choice between two sensors (TAS or TCAD) or all four sensors (TAS, TCAD, TCAS I or TCAS II). Select the correct sensor for your system and press ENTER.

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

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

TCAD uses a serial RS-232 connection to the FSD, the other sensors (TAS, TCAS I and TCAS II) connect to the FSD using an ARINC 429 data format . If TCAD is the actual sensor and the FSD is configured for one of the ARINC 429 sensors or vice versa, Traffic will not work. You will get a “Sensor Fail” error message.

However, if any ARINC 429 sensor is configured incorrectly with another ARINC 429 type sensor, traffic information will be displayed but the range, control functions or type of traffic (TA or RA) may be wrong. Because traffic is displayed, it is possible that the installer will assume that Traffic was configured correctly.

To confirm the correct configuration, access the Info page when the FSD is returned to “normal” (out of Maintenance Mode) operations.

MAIN MENU→SYSTEM→INFO

A list of all the available functions including the type of Traffic sensor that the system was configured for is displayed on this page.

You can also confirm that the system was configured correctly by viewing the Traffic Data page. The sensor type is displayed in the upper right hand corner.

SkyWatch (TAS)

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

From the Maintenance Mode, select:

SYSTEM→DEVICES→TRAFFIC→ARINC SETTINGS (press Enter to bring up this page).

Refer to Figure 22. Choose the following:

ARINC port: Port 3

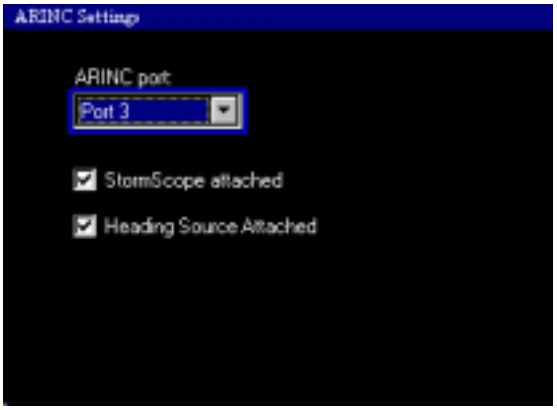


FIGURE 22: ARINC Settings

StormScope attached - 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 the Standby and Self Test functions on the FSD.

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

Heading Source Attached - Checking this field indicates that heading data is being supplied to the TRC and is available to the FSD. Heading information is necessary for the radar overlay feature in Map to work. Skywatch is one of the options available as a heading source.

SkyWatch 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 23).

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.

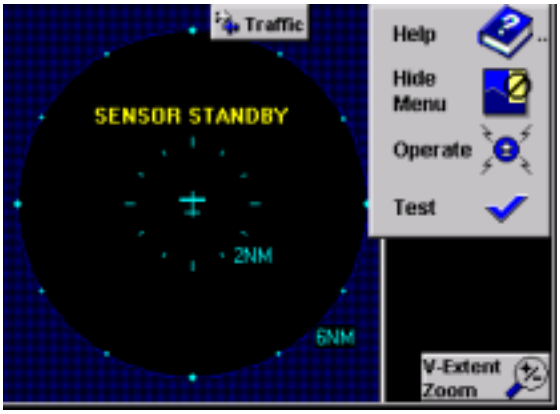


FIGURE 23: Self Test

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 WX-1000 display unit as explained in the Sky 497 Installation manual.

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 24) 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.

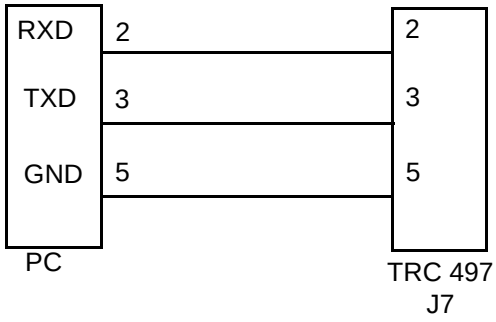


FIGURE 24: DB9 Connection

Ryan TCAD

FIGURE 25: TCAD Settings

Provide power to the Ryan TCAD sensor per the Ryan Installation manual. The FSD does NOT provide power to the Ryan sensor. TCAD uses a serial data connection between the sensor and the FSD.

To configure TCAD perform the following:

From the Maintenance Mode select:

SYSTEM→DEVICES→TRAFFIC→TCAD SETTINGS (press Enter to bring up this page).

To configure the port setting and baud rate, select Comm... on the TCAD Settings page (Figure 25). This brings you to the Port Settings page (Figure 26). The standard connection is to COM 3 with a baud rate of 9600. Press enter to accept the configuration, this will return you to the TCAD Settings page.

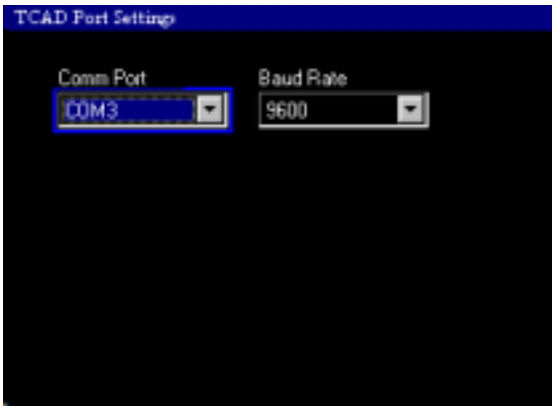


FIGURE 26: Port Settings

Refer to Figure 25. Shield range and height as well as audio settings are configured from the TCAD Settings page.

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 ft. 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

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 in the Ryan manual for instructions.

TCAD 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.

TCAS I and II

The FSD receives TCAS data via the ARINC 429 connection as shown in APPENDIX K - Wiring Diagram, FSD, ARINC 429 Interface. Currently, the FSD will interface with Honeywell Collins or BF Goodrich TCAS units. Installation and checkout of the TCAS should be done as per the TCAS Installation manual.

The FSD will display both TCAS I or TCAS II data. To configure either TCAS I or II, access the Traffic Setup page (refer to Figure 21) from the Maintenance Mode Devices Menu.

SYSTEM→DEVICES→TRAFFIC→TRAFFIC SETUP.

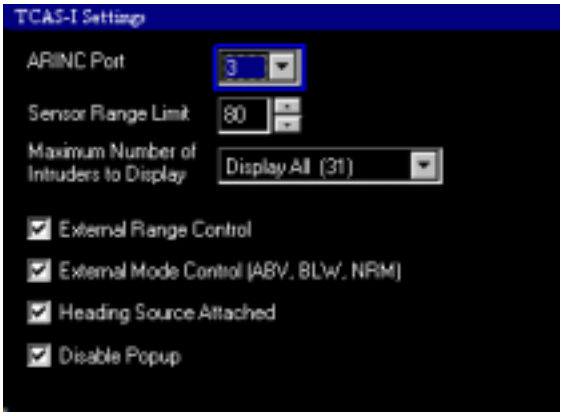


FIGURE 27: TCAS I Settings

Select the appropriate traffic sensor (TCAS I or II), then press ENTER, this will bring up the TCAS I or II Settings page (refer to Figure 27). Both pages are identical except for one difference in the Disable Popup text for TCAS II.

ARINC Port - Selects the ARINC port for TCAS data, normally port 3.

Sensor Range Limit - Sets the displayed range limit (in Nm) for the TCAS sensor. The range limit can be set anywhere from 5 to 120nm.

The Sensor Range Limit sets the displayed range limit on the FSD, the actual limit for sensing traffic is determined by the TCAS sensor. The Sensor Range Limit must be set to match your specific TCAS sensor limit.

If your sensor has a range limit of 40nm and the Sensor Range Limit is set for 80nm, traffic will never be displayed between 40nm and 80nm. As soon as the traffic moves within 40nm it will be displayed.

It is important that installers know the range limit of their particular TCAS sensor and set the Sensor Range Limit to that value.

Maximum Number of Intruders to Display - Sets the maximum number of intruders for display. The choices are the minimum (8), the maximum (31) or specified by the sensor (the configuration of the TCAS sensor determines the maximum number of intruders sent to the display).

External Range Control - A check mark in this box indicates that range control is from an external device (a mechanical switch, wired into the sensor). The external switch controls the range setting on the FSD display. If this box is checked and there is NO external device, the FSD will display the current range from the TCAS sensor. There is no FSD control for changing the range.

No check mark means the range setting is controlled internally by the FSD. Use the inner control knob on the front panel to change range settings.

It is the installers responsibility to determine if the TCAS sensor range will be controlled externally or internally.

External Mode Control (ABV, BLW, NRM) - A check mark in this box indicates that altitude mode control is from an external device (a mechanical switch, wired into the sensor). The external switch controls the altitude mode on the FSD display. If this box is checked and there is NO external device, the FSD will display the current altitude mode from the TCAS sensor and remain in that mode. There is no FSD control for changing the altitude mode.

No check mark means the altitude mode setting is controlled internally by the FSD. Use the outer control knob on the front panel to change the mode settings.

It is the installers responsibility to determine if the TCAS altitude mode will be controlled externally or internally.

Heading Source Attached - Checking this field indicates that heading data is being supplied to the TCAS sensor and is available to the FSD. Heading information is necessary for the radar overlay feature in Map to work. TCAS is one of the options available as a heading source.

Disable Popup - a check mark in this box will disable the popup feature, where the TCAS display is automatically displayed while viewing another function when a TA or RA appears. Leaving this box blank ensures the Traffic display will always come up whenever a TA or RA is generated.

Note: The BFG 791 setup should be configured as follows:

CD 605 type 1
display arinc735 type2

GroundProx Setup and Checkout

GroundProx supports the following Honeywell, Inc., (formerly AlliedSignal Aerospace) EGPWS models with the listed software levels (or higher). Honeywell describes two levels of software available for their EGPWS models: “KCPB phase 1” and “KCPB phase 2” level software. The FSD supports both, however, Phase 2 level software contains more functionality.

EGPWS model	KCPB Phase 1 s/w level	KCPB Phase 2 s/w level
MK V	210	212
MK VI	001	003
MK VII	210	212
MK VIII	001	003
MK XXII	N/A	001
GA	N/A	001

The EGPWS contains a feature called “Peaks Mode”, which is supported by the FSD. This is activated by strapping connections at the Sensor. Refer to the appropriate EGPWS Installation manual for the procedure.

GroundProx uses an ARINC 429 and 453, receive and transmit data connection between the EGPWS and the FSD. To configure GroundProx perform the following:

From the Maintenance Mode, select:

SYSTEM→DEVICES→GROUNDPROX

Refer to Figure 28. Choose the appropriate sensor type. Press Enter to accept the changes.

Note: Any changes made to the GroundProx configuration requires a power restart to the FSD and the EGPWS (especially units with Phase 1 software).

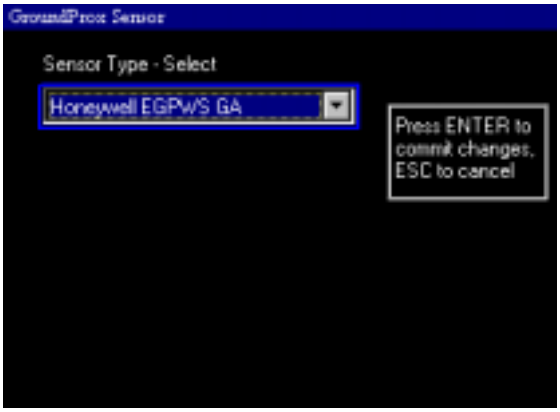


FIGURE 28: GroundProx Sensors

Communications Check

Following the setup procedure, there will be messages displayed across, and at the bottom of the screen as the EGPWS is connected. If the settings are correct, the message “DISPLAY INITIALIZING” will be displayed. As communication is established this message will disappear and the screen will display terrain data. If there is an error, the following error messages may be displayed.

Message	Meaning
SENSOR OFF	Indicates that the EGPWS sensor is powered down or incorrectly attached to the FSD. The terrain display becomes a dark magenta.
DISPLAY INITIALIZING	Normal display during startup. If this message remains on screen, it indicates the wiring between the EGPWS and the FSD is incorrect.
SENSOR UNAVAILABLE	If the EGPWS declares itself inoperative at any time during its communication with the GroundProx it displays this message. A possible cause would be if the EGPWS was not receiving its input signals from other sensors, like the GPS, altimeter, etc.
SENSOR FAILED	If the GroundProx detects errors in the data transmission from the EGPWS equipment, or if the EGPWS fails to transmit certain expected data to the FSD in a timely manner, this error message is displayed. Check the EGPWS sensor.
DISPLAY FAILED	If the GroundProx application determines through its own means of self-verification that it is not operating properly, it displays this message. Contact Avidyne.
SENSOR SELF-TEST	When the EGPWS is performing a Self-Test it indicates this to the GroundProx by transmitting a distinctive terrain test pattern for display. The words “Self-Test” are displayed over the test pattern. The message will remain until the self test is finished.
IMPROPER CONFIGURATION	Under certain circumstances GroundProx may determine that the FSD is improperly configured with respect to the GroundProx function and there is no point in attempting to communicate with the EGPWS. This may occur, for example, if GroundProx is unable to successfully open the ARINC 453 or 429 channels, possibly because there is no Radar card present, or the ports assigned to GroundProx are in use by another application, or the Radar drivers are not executing. This may also occur if the EGPWS reports that it is a model that is not supported. While in Improper Configuration mode, GroundProx ignores all inputs from the user or the EGPWS. Contact your installer or Avidyne for assistance.

CD Data Loader Setup and Checkout

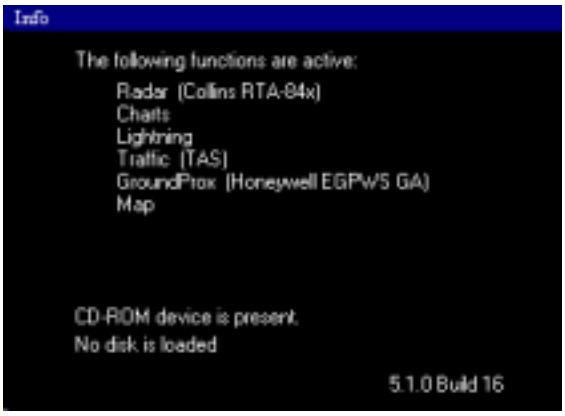


FIGURE 29: CD-ROM Properties Screen

Refer to Figure 29**.**

To perform the initial checkout, turn on the FSD and after Map comes up press escape to bring up the main system menu. Select:

SYSTEM→INFO

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 is installed the message will be one of the following:

Message	Meaning
“CD-ROM device is present” “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” “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.

Software Configuration Check

Once the FSD has been configured, the software should be checked to confirm that the unit is configured correctly. Restart the unit and bring it up in normal operating mode. When the startup sequence is finished and Map is displayed, press ESCAPE to bring up the Main menu.

Refer to Figure 30. From the main menu, each function is represented by a specific icon. If the function is not installed, the icon will be missing. If the icon is present but “grayed out”, it indicates the function is loaded and turned on within the software, but there is a disconnect between the device associated with that function and the Avidyne. An example of this would be connecting a radar R/T that doesn’t work with the radar card installed in your Avidyne unit.

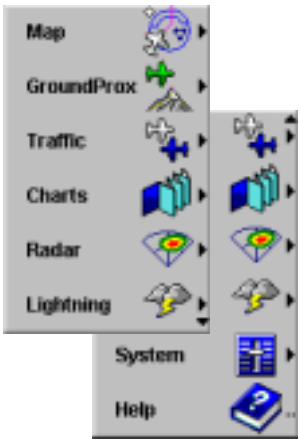


FIGURE 30: Main Menu

Please refer to the *Pilot’s Guide* on the operation of each of these functions.

Note: Figure 30 represents a Main Menu with all possible functions available. Depending on how your system is configured, will determine what functions are available on your Main Menu

The System Menu

The MAIN MENU→SYSTEM menu (Figure 31) provides access to certain system settings. The operator can make changes to some system operating parameters and set up the FSD to his or her personnel preferences. Basic information about the systems configuration is also available.

Configuring the Settings and Date and Time are covered in the Maintenance Mode section on page 16.

FIGURE 31: System Menu

Part Two

Radar

General Information

This section contains information about the physical, mechanical, and electrical characteristics of the Avidyne FlightMax Flight Situation Display Radar interface and provides installation instructions for the unit. Because the FSD interfaces with several radar R/T's there are specific installation instructions for each type of radar interface. Please refer to the installation instructions for your particular radar.

Table 1 lists the radars that interface with the FSD and the various features supported by FlightMax

Analog R/T's

Table 2: Analog Radar Feature Matrix

	Bendix King						Collins		
	RT-131A	RT-131A (RDR-1100)	ART-161A	RT1201A	RT-1301A/B		WXT-250A	WXT-250B (200 miles)	WXT-250B (250 miles)
Azimuth Lines other than 0°					±15° ±30°		±30°	±30°	±30°
Tilt Settings	±15°	±15°	±15°	±15°	±15°		±15°	±15°	±15°
Target Alert							•	•	•
Automatic Range Limit/PAC Alert								•	•
Vertical Profile (VP)									
Roll Trim Adjust		•		•	•				
Auto-Tilt									
Stab on/off		•		•	•		•	•	•
Stabilization		•		•	•		•	•	•
Multiple Indicators									
# of colors	3	3	3	3	3		3	3 or 4	3 or 4
Scan Arcs supported	90°	60° 120°	90°	60° 120°	60° 120°		120°	120°	120°
Range Values	5, 10, 20, 40, 80, 160	10, 20, 40, 80, 160 240	5, 10, 20, 40, 80, 160	10, 20, 40, 80, 160, 240	10, 20, 40, 80, 160, 240		10, 25, 50, 100, 250	10, 25, 50, 100, 200	10, 25, 50, 100, 250

Digital R/T's (ARINC 453 Interface)

Table 3: Digital Radar Feature Matrix

	Bendix King									Collins		
	RS-811A	RS-181A	RS-181A-VP	RS-841A	RS-841A-VP	RS-861A	RS-861A-VP	ART-2000	ART-2100	RTA-800	RTA-84X	RTA-85X
Azimuth Lines other than 0°										15° 30°	15° 30°	15° 30°
Tilt Settings	±15°	±15°	±15°	±15°	±15°		±15°	±15°	±15°	±15°	±15°	±15°
Target Alert								•	•	•	•	•
Automatic Range Limit/PAC Alert						•	•		•	•	•	•
Vertical Profile (VP)			•		•		•	•	•			
Roll Trim Adjust	•	•	•	•	•	•	•	•	•			
Auto-Tilt						•	•		•	•	•	•
Stab on/off	•	•	•					•	•	•	•	•
Stabilization	•	•	•	•	•	•	•	•	•	•	•	•
Multiple Indicators	•	•	•	•	•	•	•	•	•	•	•	•
# of colors	4	4	4	4	4	5	5	4	5	5	5	5
Turb Mode												•
GCS										•	•	•
Slave Mode										•	•	•
Scan Arcs supported	90°	90°	90°	120°	120°	120°	120°	90° or 100°	90°, 100° 120°	120°	120°	120°
Range Values	10 20 40 80 16 240	10 20 40 80 160 240	10 20 40 80 160 240	5 10 20 40 80 160 240 320	5 10 20 40 80 160 240 320	5 10 20 40 80 160 240 320	5, 10 20 40 80 160 240 320	10 20 40 80 160 240	5 10 20 40 80 160 240 320	Range Pairs 2.5 -5 5 - 10 12.5 - 25 25 - 50 50 - 100 100 - 200 150 - 300		

Maintenance Mode

Radar Setup and Checkout procedures require access to Maintenance Mode configuration pages as well as the Radar operating screens. Radar and Lightning have direct access to the Function screens from Maintenance Mode. Information on how to use Maintenance Mode can be found in Part One, Maintenance Mode section on page 16.

Beam Width

FlightMax Radar supports a graphical depiction of radar beam width on the display screen for all radars supported by FlightMax. This depiction consists of a moving wedge that follows the sweep of the radar antenna and is sized to represent the actual beam width. The display is visible in forward view and VP mode, and can be turned on or off from the MAIN MENU→RADAR→SETTINGS submenu.

The actual beam widths of the installed sensor and antenna, both horizontal and vertical, are separately and manually entered from the Maintenance Mode: SYSTEM→DEVICES→RADAR→SETTINGS (Figure: 31). The width values are normally found in your radar's Users Manual. Figure: 32 depicts the shape of the radar beam and provides a simple formula for converting degrees to feet at a particular distance (which can be used to estimate beam width at a particular distance). Antenna beam widths are listed in the Table below for Bendix/King and Collins radars as well as generic widths in cases where the beam width is not known.

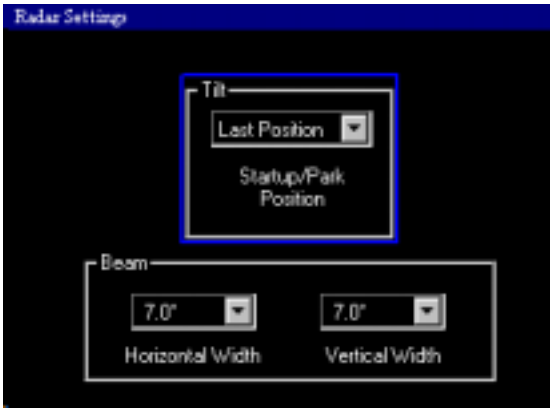


FIGURE 31: Beam Width Settings

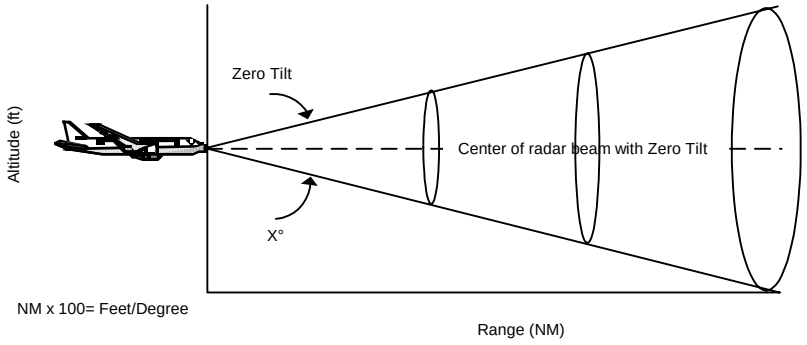


FIGURE 32: Radar Beam Illumination

Antenna Width	Generic Beam Width	Bendix/King Radars	Collins Radars
10”	10°	10°	9.5°
12”	8°	8°	8°
18”	5°	5.6°	6°
24”	4°		
28”	3.5°		
30”	3°		

Setup and Checkout for RT-131A (with AT-133A or DA-144A) and ART-161A

WARNING

This unit connects to a device which generates microwave radiation. Do not operate until you have read and carefully followed all safety precautions and instructions in the users and installation manuals.

Maintain prescribed safe distance when standing in front of a radiating antenna.

Never expose eyes or any part of the body to an unterminated wave guide. Reference APPENDIX I - AC 20-68B Recommended Radiation Safety for further information.

Equipment Description

This section applies to Avidyne FSD's with Analog Radar interface 800-00002-006 or 800-00002-0020 with the software listed in Table 1 in Part One.

Locate the lables on the bottom of the FSD and verify the correct software is loaded. Also verify correct radar interface is installed.

The FlightMax FSD Radar interface consists of the following components:

Part Number	Description
800-00002-006 or 800-00002-0020	Avidyne Radar interface card and software with ART-161A and RT-131A with DA144 phase array flat antenna support.
	Avidyne Radar interface card and software with ART-161A and RT-131A with DA144 phase array flat antenna support and SkyWatch interface
100-00017-XXX	Optional RDR-150 (-000) or RDR-160 (-001) retrofit adapter cable which allows connection to existing wiring.
600-0059	Radar section of the User's Manual.

Technical Specifications

Radar Interface Control Specifications:

The RDR-150/160 interface option provides the FlightMax FSD with the ability to control and depict radar data through the interface described.

SIGNAL NAME	TYPE OF CIRCUIT	CHARACTERISTICS
RT ON/OFF	Open collector output from FSD	When Low, RT is ON (Scanning)
Trigger	Digital output from FSD	8us pulse every 10ms to trigger magnetron
Gain Adjust	Analog output from FSD	Adjusts gain in ground map mode. –-12.5V to 0.7V (RT-131) Up to Down 0V to 6.5V (RT-161A) Up to Down
Data 1 2	TTL	Digital echo output from RT
Test	Open Collector output from FSD.	0V Sets R/T to Test mode
Azimuth drive	TTL	Output from FSD for scanning
Azdrive +/- 90	TTL	Output from FSD for scanning
Tilt adj	Analog output from FSD	Tilt Low to Tilt High: 0 to 15V AT161A, AT133A (Parabolic) 15V to 0V AT133A (Inverted Parabolic) –15 to +15 DA-144A (Phase Array)
Data shield	GND	
Trigger shield	GND	
ART-IND GND	GND	
Video Integration	Open collector output from FSD (RT-131 only)	Varies voltage to RT based on Range setting 13.6V (160nm), 6.8V (80nm) 0V (40nm)

Unpacking and Inspection

The FSD with Analog Radar option consists of the following components and parts:

- FSD with radar card 800-00002-006 or 800-00002-020 installed
- FSD mounting tray with J4 radar interface connector installed.
- Radar supplement (part of Pilot's Guide)
- Optional RDR-150 or RDR-160 interface cable.

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.

Locate the labels on the bottom of the FSD and verify that the correct software is loaded: S/W 530-0109 or 530-0110 is loaded. Also verify that the correct Radar option is installed: 800-0002-006 or 800-0002-020.

Installation Instructions

New Install of Radar with Avidyne FlightMax FSD

Install and calibrate radar antenna receiver/transmitter (ART) according to manufacturer's specifications. Do not install indicator.

Connect FlightMax FSD directly to the radar ART as shown in APPENDIX O - Radar Wiring Diagram, Direct Connection To R/T.

Avidyne FlightMax FSD Install with Pre-existing Radar

Remove existing radar indicator and mounting tray.

Inspect wire harness and circular connector for any visible damage or excessive wear.

If you ordered an indicator adapter cable, connect it to the existing circular connector the circular connector on the adapter cable. Then connect the 36 pin connector from the adapter cable to the FlightMax mounting tray as shown.

If you have not ordered an indicator adapter cable, you have the option of creating your own as shown in the installation diagram or you can cut off the existing circular connector and wire it directly to the 36 pin P4 connector in the FSD mounting tray. Follow the wiring diagram in the APPENDIX N - RT-131A (with AT-133A or DA-144A), ART-161A Wiring Diagram, Using Avidyne Adapter Cable, of this document. Follow appropriate FAA wiring guidance.

Post Installation Check

WARNING

Tests involving radiation of microwave energy by the radar antenna must not be made in the vicinity of refueling operations or when personnel are standing directly in front of the radar antenna or in a hanger,. RF energy is generated in all modes except standby and test. Do not allow personnel within 15 feet of area being scanned by antenna when system is transmitting.

Visual Inspection

Check all cables to make sure they are electrically and mechanically secure.

Radar Sensor Setup

Turn the FlightMax FSD on in Maintenance Mode and select:

SYSTEM→DEVICES→RADAR

Using the knobs, select the appropriate Sensor Type as shown in Figure: 33.

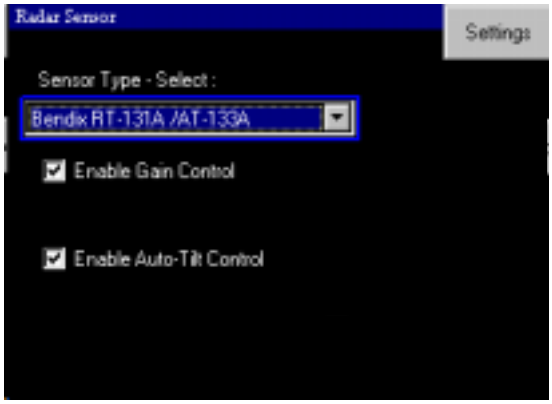


FIGURE 33: Radar Sensor Setup

Functional Tests

Turn power on radar ART. Enable the internal test mode of the ART by selecting the following:

RADAR→FUNCTION→TEST

Check the FSD display. The test pattern should appear within 8 seconds after the test mode was invoked. Set the range to 40 miles. This will cause the ART to send a test signal to the FSD. Ensure the pattern displayed is as shown in Figure: 18. The test pattern should display five colored bands; starting with the closest band to the origin, the bands will be green, yellow, red, yellow, and green. The red band represents the most intense level.

Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

Set tilt control to the 0 position using the outer (large) knob.

Check that the antenna drive assembly scans within its 90º azimuth range, and that update on the indicator moves in sync and in the same direction as the antenna scan.

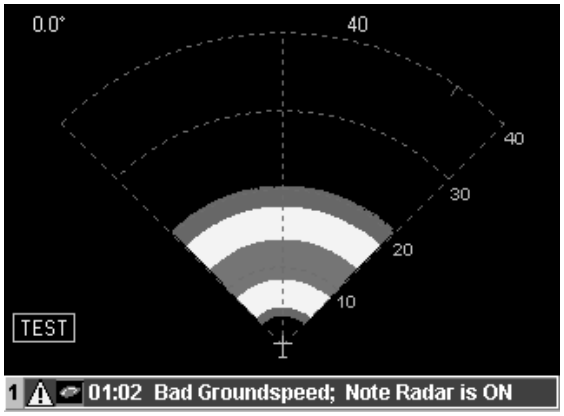


FIGURE 34: Typical Test Pattern

Note: The ART-161A and AT-133A antenna scan is 50º mechanically, but 90º electrically.

Tilt Check

Push the RADAR→FUNCTION→STANDBY

Adjust the tilt control to +5, +10, and +15 checking that the antenna tilts smoothly and without interference. For a DA-144A array antenna, +15 shall move the array to its maximum upward position. For an AT-133A antenna and ART-161, setting the TILT control to +15 shall move the "feed horn" to its maximum downward position.

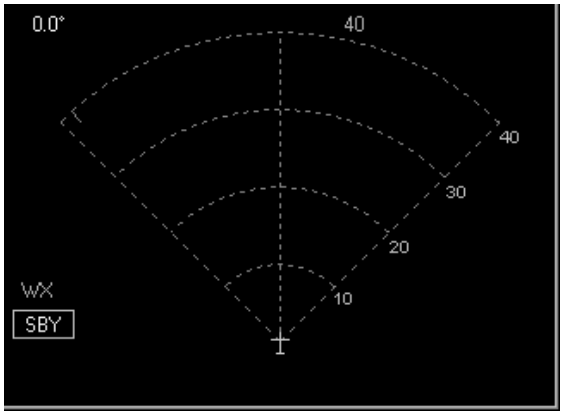


FIGURE 35: Tilt Setting

Adjust the tilt control to -5, -10, -15 checking that the antenna tilts smoothly and without interference. For a DA-144A array antenna, -15 shall move the array to its maximum downward position. For an AT-133A antenna and ART-161, setting the TILT control to -15 shall move the "feed horn" to its maximum upward position.

Set the TILT control to 0 and ensure the antenna is at its 0º reference mark. Refer to the appropriate Bendix installation instructions on adjustment procedures.

RF Operation check

WARNING

Whenever the function switch is in the ON position, RF energy is being radiated. Do not allow personnel to stand within 15 feet of the area being scanned by the antenna. Tests involving the radiation of RF energy must not be made in the vicinity of refueling operation. Always use test, or standby positions as applicable.

Enter standby mode by selecting the following from the top menu.

RADAR→FUNCTION→STANDBY

Allow system to stabilize for at least 2 minutes. Energize the radar by selecting:

RADAR→FUNCTION→RADAR ON

The radar will begin to scan and may pick up some echoes on the ground. Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

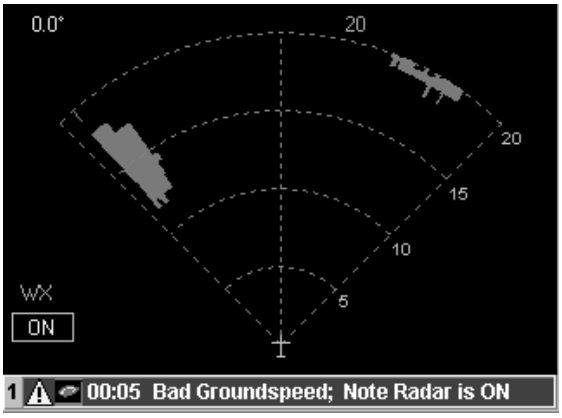


FIGURE 36: Typical Ground Display

Ensure the HOLD function is disengaged.

Check for target reflections of local weather (if any) by indexing the range to each range position while tilting the antenna upward above the horizon using the TILT control.

Select the three range positions. Note that the corresponding range and range mark intervals appear in the alphanumeric area of the display.

Set function to STANDBY by selecting:

RADAR→FUNCTION→STANDBY

Interference Check

Operate the system in all functions and check that this does not affect other electronic equipment in the aircraft.

Operate the system on all functions and check that it is not affected by any of the functions of the other electronic or electrical equipment in the aircraft.

Upon successful completion of the post installation test, install the radome.

Preflight Check

Set the radar to WX TEST mode by selecting:

RADAR→FUNCTION→TEST

RADAR→MODE→WX

Using the appropriate knob, set the range to 40 miles

The test pattern should appear on the indicator screen as shown. The test pattern should display five colored bands; starting with the closest band to the origin, the bands will be green, yellow, red, yellow, and green. The red band represents the most intense level. All range marks will be visible.

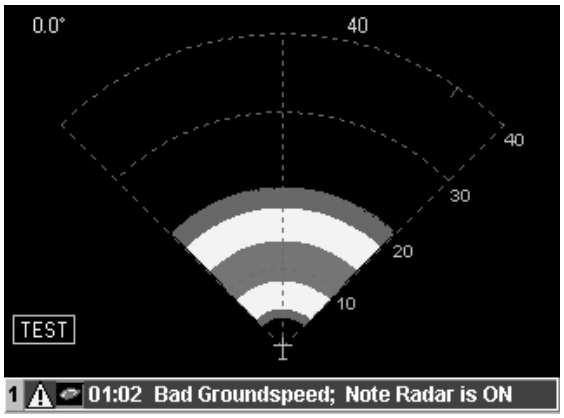


FIGURE 37: Typical Test Pattern Display

The update action may be observed as a small cursor sweeping back and forth across the top of the radar display indicating that the antenna is scanning the full 90º.

RADAR→FUNCTION→WXA

The display should look identical to the WX test mode except the red band should flash.

Return mode to Standby WX by selecting:

RADAR→MODE→WX

RADAR→FUNCTION→STANDBY

Taxi the aircraft to a clear ahead area where metal building, aircraft, etc. are not in the line of sight. Turn the radar ON by selecting:

RADAR→FUNCTION→ON

Set the indicator to 40-mile range.

Adjust TILT control up in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display. At 15º, no ground targets should appear on the display.

Repeat TILT control adjustment to check remaining ranges.

Set function to STANDBY prior to taxi maneuvers.

Flight Check

During take-off or during prolonged aircraft maneuvers, the display will be inaccurate. Set the function to:

RADAR→FUNCTION→TEST

Check to ensure the 5 colored bands are correct.

Set mode to WXA mode. Check that the red band on the test pattern flashes.

Turn on the radar by selecting:

RADAR→FUNCTION→ON

During flight Adjust TILT control in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display.

Check ground map mode by selecting:

RADAR→MODE→GROUNDMAP

At 15º, no ground targets should appear on the display.

Adjust the TILT control down in small increments until a picture develops of ground features. Adjust gain up or down to adjust resolution of returns.

Setup and Checkout for RT-131A (with 1203A), RT-1201A and RT-1301A/B

WARNING

This unit connects to a device which generates microwave radiation. Do not operate until you have read and carefully followed all safety precautions and instructions in the users and installation manuals.

Maintain prescribed safe distance when standing in front of a radiating antenna.

Never expose eyes or any part of the body to an unterminated wave guide. Reference APPENDIX I - AC 20-68B Recommended Radiation Safety for further information.

Equipment Description

This section applies to Avidyne FSD's with Analog Radar interface 800-00002-050, -060, -070, or -080 with the software listed in Table 1 in Part One.

Locate the lables on the bottom of the FSD and verify the correct software is loaded. Also verify correct radar interface is installed.

The FlightMax FSD Radar interface consists of the following components:

Part Number	Description
800-00002-050 or 800-00002-060	Avidyne Radar interface card and software with RT-1201A and RT-1301A with DA1203A antenna support.
	Avidyne Radar interface card and software with RT-1201A and RT-1301A with DA1203A antenna support and SkyWatch interface
800-00002-070 or 800-00002-080	Avidyne Radar interface card and software with RT-1301B with DA1203A antenna support.
	Avidyne Radar interface card and software with RT-1301B with DA1203A antenna support and SkyWatch interface
100-00017-XXX	Optional Analog Radar retrofit adapter cable which allows connection to existing wiring, (-002) for the RT-1301A/B and (-003) for the RT-1201A.
600-0066	Radar section of the User's Manual.

Technical Specifications

Radar Interface Control Specifications:

The RT-1201A and RT1301A/B interface option provides the FlightMax FSD with the ability to control and depict radar data through the interface described.

SIGNAL NAME	RT-1201A	RT1301A/B
RT ON/OFF	Gnd closure to RT Active low, 5mA	Gnd closure to RT Active low, 2.8mA
Trigger	Digital output from FSD 8us pulse every 10ms	TTL 30us pulse (2V threshold at RT)
Gain Hi	+5V bias from RT (Gnd bias on later models)	Gain Hi to Lo is fixed at 3900 ohms for Test, Wx, WxA modes
Gain Lo	-.27V (older models) +5V for later models	see above
Video Integration	0V for 10, 20, 40nm 6.2V for 80nm 12.4 for 160, 240nm	N/A (replaced by M3 signal)
Data 1, 2	TTL from R/T	0-8V Gray code from R/T
Test	Gnd closure to RT Active low, 3mA	N/A (replaced by M1 signal)
M1	N/A	TTL from FSD (2V threshold at RT)
M2	N/A	TTL from FSD (2V threshold at RT)
M3	N/A	TTL from FSD (2V threshold at RT)
Roll Trim Hi and Lo	2500 ohm pot from Hi to Lo	2500 ohm pot from Hi to Lo
BoreSight	Gnd closure from antenna, active low	Gnd closure from antenna, active low
Azimuth drive	TTL (1200 ohm) output to antenna	
Azdrive +/- 90	TTL (1200 ohm) output to antenna	
Tilt Hi	Connects to top of 10K pot, and to 2.7K res to tilt adj gnd	Connects to top of 10K pot, and to 10K res to tilt adj gnd
Tilt Lo	Connects to bottom of 10K pot, and to 2.7K res to tilt adj gnd	Connects to bottom of 10K pot, and to 10K res to tilt adj gnd
Stab Disable	Gnd closure to antenna, active low	Gnd closure to antenna, active low

Unpacking and Inspection

The FSD with Analog Radar option consists of the following components and parts:

- FSD with radar card 800-00002-050, -060, -070, or -080 is installed
- FSD mounting tray with J4 radar interface connector installed.
- Radar supplement (part of Pilot's Guide)
- Optional Analog Radar interface cable.

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.

Locate the labels on the bottom of the FSD and verify that the correct software is loaded (see Table 1 in Part One). Also verify that the correct Radar option is installed:
800-00002-050, -060, -070, or -080.

Installation Instructions

New Install of Radar with Avidyne FlightMax FSD

Install and calibrate radar antenna receiver/transmitter (ART) according to manufacturer's specifications. Do not install indicator.

Connect FlightMax FSD directly to the radar ART as shown in APPENDIX V - RT-1201A/131A and RT-1301A/B Wiring Diagram, Direct Connection to R/T.

Avidyne FlightMax FSD Install with Pre-existing Radar

Remove existing radar indicator and mounting tray.

Inspect wire harness and circular connector for any visible damage or excessive wear.

If you ordered an indicator adapter cable, connect it to the existing circular connector the circular connector on the adapter cable. Then connect the 36 pin connector from the adapter cable to the FlightMax mounting tray as shown.

If you have not ordered an indicator adapter cable, you have the option of creating your own as shown in the installation diagram or you can cut off the existing circular connector and wire it directly to the 36 pin P4 connector in the FSD mounting tray. Follow the wiring diagram in APPENDIX U - RT-1301A/B Wiring Diagram, Using Avidyne Adapter Cable, of this document. Follow appropriate FAA wiring guidance.

Post Installation Check

WARNING

Tests involving radiation of microwave energy by the radar antenna must not be made in the vicinity of refueling operations or when personnel are standing directly in front of the radar antenna or in a hanger,. RF energy is generated in all modes except standby and test. Do not allow personnel within 15 feet of area being scanned by antenna when system is transmitting.

Visual Inspection

Check all cables to make sure they are electrically and mechanically secure.

Radar Sensor Setup

Turn the FlightMax FSD on in Maintenance Mode and select:

SYSTEM→DEVICES→RADAR

Using the knobs, select the appropriate Sensor Type as shown in Figure: 38.

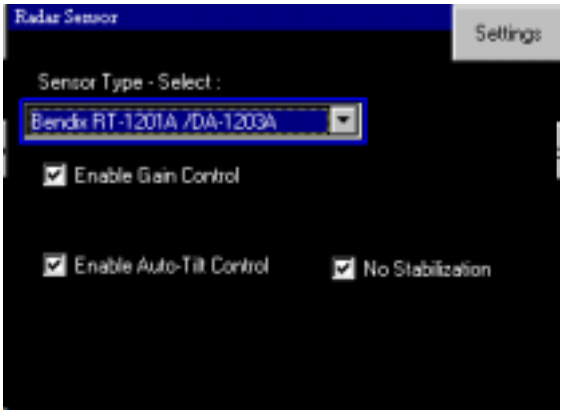


FIGURE 38: Radar Sensor Setup

Enable Gain Control - Enables the Variable Gain

Enable Auto Tilt Control - Enables the Auto Tilt mode in Radars that support this mode.

No Stabilization - A check mark in this box will prevent the “Stab Off” annunciation from appearing on the screen when stabilization is not activated.

Settings - Press the line select key next to the Settings button to bring up the Radar Settings page (refer to Figure: 39).

Tilt - use the tilt setting to define the antenna tilt position at startup. There are four options: Last position, Full up, Centered (0°), and full down.

Beam Horizontal/Vertical Width - These two dialog boxes define the arc width of the radar sweep. The vertical box is for antennas equipped with the vertical profile option (see Table 3, “Digital Radar Feature Matrix,” on page 48). The width of the moving wedge is selectable from a range of 0° to 30° in half degree increments.

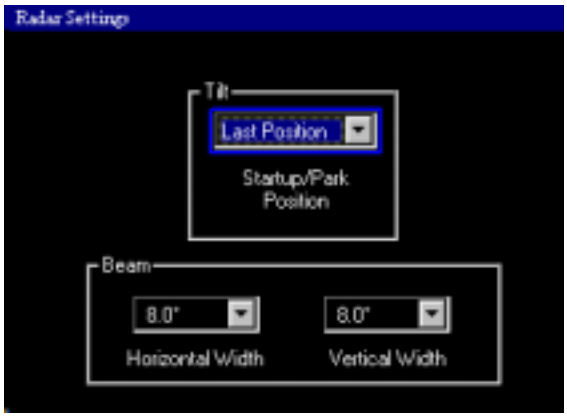


FIGURE 39: Radar Settings

Functional Tests

Turn power on radar ART. Enable the internal test mode of the ART by selecting the following:

RADAR→FUNCTION→TEST

Check the FSD display. The test pattern should appear within 8 seconds after the test mode was invoked. Set the range to 80 miles. This will cause the ART to send a test signal to the FSD. Ensure the pattern displayed is as shown in Figure: 40. The test pattern should display three colored bands; starting with the closest band to the origin, the bands will be green, yellow, and red. The red band represents the most intense level.

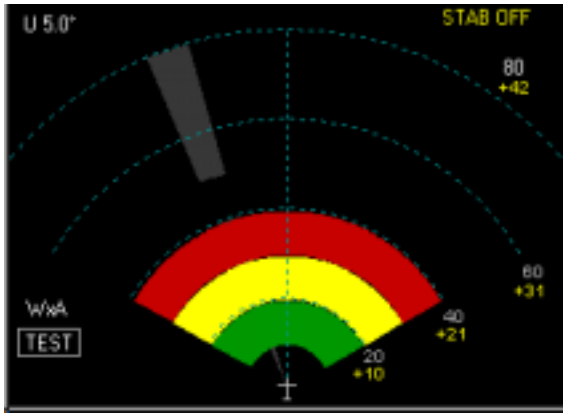


FIGURE 40: Typical Test Pattern

Since the ground speed is zero, there will be a message warning indicating low ground speed (it will be displayed across the bottom of the screen). This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

Set tilt control to the 0 position using the outer knob.

Check that the antenna drive assembly scans within its 120º azimuth range, and that update on the indicator moves in sync and in the same direction as the antenna scan.

Tilt Check

From the system main menu, select RADAR→FUNCTION→STANDBY

Adjust the tilt control (use the inner knob) to the up (the screen annunciation will be U XX) position 0 to 15 checking that the antenna tilts smoothly and without interference. Adjust the tilt control to the down (the screen annunciation will be D XX) position, 0 to 15 checking that the antenna tilts smoothly and without interference.

Set the TILT control to 0 and ensure the antenna is at its 0º reference mark. Refer to the appropriate Bendix installation instructions on adjustment procedures.

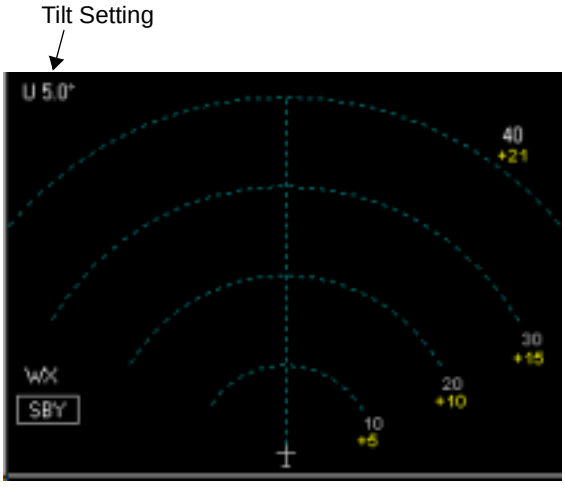


FIGURE 41: Tilt Setting

RF Operation check

WARNING

Whenever the function switch is in the ON position, RF energy is being radiated. Do not allow personnel to stand within 15 feet of the area being scanned by the antenna. Tests involving the radiation of RF energy must not be made in the vicinity of refueling operation. Always use test, or standby positions as applicable.

Enter standby mode by selecting the following from the system main menu.

RADAR→FUNCTION→STANDBY

Allow system to stabilize for at least 2 minutes. Energize the radar by selecting:

RADAR→FUNCTION→RADAR ON

The radar will begin to scan and may pick up some echoes on the ground. Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

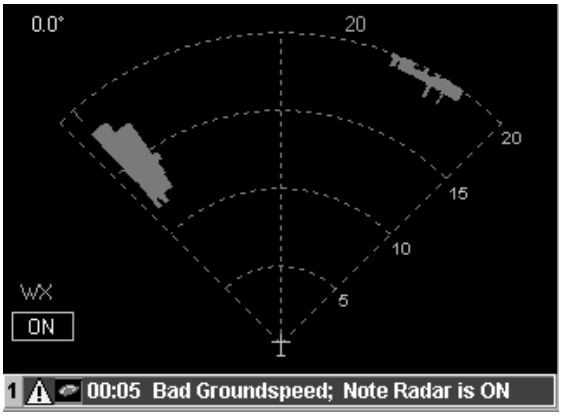


FIGURE 42: Typical Ground Display

Ensure the HOLD function is disengaged.

Check for target reflections of local weather (if any) by indexing the range to each range position while tilting the antenna upward above the horizon using the TILT control.

Select all the range positions. Note that the corresponding range and range mark intervals appear in the alphanumeric area of the display.

Set function to STANDBY by selecting:

RADAR→FUNCTION→STANDBY

Interference Check

Operate the system in all functions and check that this does not affect other electronic equipment in the aircraft.

Operate the system on all functions and check that it is not affected by any of the functions of the other electronic or electrical equipment in the aircraft.

Upon successful completion of the post installation test, install the radome.

Preflight Check

Set the radar to WX TEST mode by selecting:

RADAR→FUNCTION→TEST

RADAR→MODE→WX

Using the outer knob, set the range to 80 miles

The test pattern should appear on the indicator screen as shown. The test pattern should display four colored bands; starting with the closest band to the origin, the bands will be green, yellow, and red. The red band represents the most intense level. All range marks will be visible.

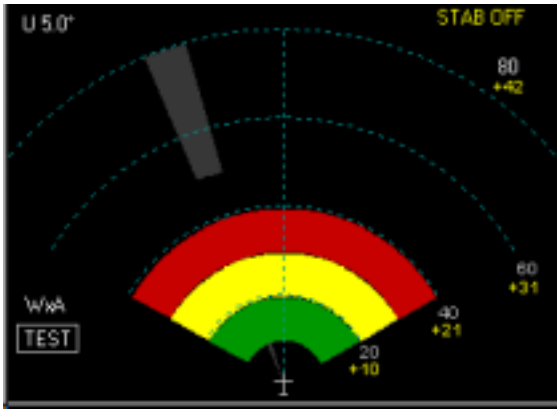


FIGURE 43: Typical Test Pattern Display

The update action may be observed as a small cursor sweeping back and forth across the top of the radar display indicating that the antenna is scanning the full 120º.

RADAR→FUNCTION→WXA

The display should look identical to the WX test mode except the red band should flash.

Return mode to Standby WX by selecting:

RADAR→MODE→WX

RADAR→FUNCTION→STANDBY

Taxi the aircraft to a clear ahead area where metal building, aircraft, etc. are not in the line of sight. Turn the radar ON by selecting:

RADAR→FUNCTION→ON

Set the indicator to 80-mile range.

Adjust TILT control up in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display. At 15º, no ground targets should appear on the display.

Repeat TILT control adjustment to check remaining ranges.

Set function to STANDBY prior to taxi maneuvers.

Flight Check

During take-off or during prolonged aircraft maneuvers, the display will be inaccurate. Set the function to:

RADAR→FUNCTION→TEST

Check to ensure the 4 colored bands are correct.

Set mode to WXA mode. Check that the red band on the test pattern flashes.

Turn on the radar by selecting:

RADAR→FUNCTION→ON

During flight Adjust TILT control in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display.

Check ground map mode by selecting:

RADAR→MODE→GROUNDMAP

At 15º, no ground targets should appear on the display.

Adjust the TILT control down in small increments until a picture develops of ground features. Adjust gain up or down to adjust resolution of returns.

Adjust Roll Trim

Adjust the Roll Trim by selecting:

RADAR→SETTINGS→ADJUST ROLL TRIM

Adjust the Roll Trim with the Outer Knob.

Refer to the appropriate Bendix/King Users manual on how to obtain proper trim.

A Roll Trim Adjust annunciation appears on the screen, in the upper right hand corner. Once this parameter has been set it will be maintained from use to use.

When Adjust Roll Trim is selected, the Bearing Line function is deactivated.

Setup and Checkout for Collins WXT-250A and WXT-250B

WARNING

This unit connects to a device which generates microwave radiation. Do not operate until you have read and carefully followed all safety precautions and instructions in the users and installation manuals.

Maintain prescribed safe distance when standing in front of a radiating antenna.

Never expose eyes or any part of the body to an unterminated wave guide. Reference APPENDIX I - AC 20-68B Recommended Radiation Safety for further information.

Equipment Description

This section applies to Avidyne FSD's with Analog Radar interface 800-00002-0030 or 800-00002-0040 with the software listed in Table 1 in Part One.

Locate the lables on the bottom of the FSD and verify the correct software is loaded. Also verify correct radar interface is installed.

The FlightMax FSD Radar interface consists of the following components:

Part Number	Description
800-00002-0030 or 800-00002-0040	Avidyne Radar interface card and software with WXT-250A/B with ANT-310/312/318 antenna support.
	Avidyne Radar interface card and software with WXT-250A/B with ANT-310/312/318 antenna support and SkyWatch interface.
100-00069-000	Optional Analog Radar retrofit adapter cable which allows connection to existing wiring.
600-0065	Radar section of the User's Manual.

Technical Specifications

Radar Interface Control Specifications:

The Collins WXT-250A/B interface option provides the FlightMax FSD with the ability to control and depict radar data through the interface described.

SIGNAL NAME	WXT-250A	WXT-250B
RT ON/OFF	Closure to CTL Common, active closed to RT	Closure to CTL Common, active closed to RT
RT STBY	Closure to CTL Common, active closed to RT	Closure to CTL Common, active closed to RT
Mod Timing	TTL output, 120Hz, 12uS, active High to RT	TTL output, 120Hz, 12.4uS, active High to RT
Gain -6db, -12db, -18db, -24db	TTL output, active High for -6db, -12db, -18db, -24db to RT	TTL output, active High for -6db, -12db, -18db, -24db to RT
Video1	TTL input, mds or greater, active low from RT	TTL input, mds or greater, active low from RT
Video2	TTL in, mds +9db, active low from RT	TTL in, mds +9db, active low from RT
Video3	TTL in, mds +16db, active low from RT f	TTL in, mds +16db, active low from RT f
Test	TTL output, with 1K pull-up, active high for test mode to RT	TTL output, with 1K pull-up, active high for test mode to RT
Fault	TTL input, diode protected, active low from RT	TTL input, diode protected, active low from RT
Stab Disable	Gnd closure, active low, XX mA to antenna.	Gnd closure, active low, XX mA to antenna.
L/S #	TTL output, high = (NOT map AND 15nm) or (NOT map AND 30nm) or 60nm or 120nm or 240nm, low = 5nm or 10nm or (map AND 15nm) or (map AND 30nm) to RT	TTL output, high = (NOT map AND 25nm) or 50nm or 100nm or 250nm, low = 10nm or (map AND 25nm) or (map AND 25nm) to RT
STC Enable	TTL output, high = (NOT map modes) AND NOT (5nm or 10nm), low = (map modes) OR (5nm OR 10nm) to RT	TTL output, active high, always active.
A	TTL output, 60Hz square wave, to antenna	TTL output, 60Hz square wave, to antenna

SIGNAL NAME	WXT-250A	WXT-250B
B	TTL output, 30Hz square wave. to antenna. Left-to-Right when B's edges align with rising edges of A. Right-to-Left when B's edges align with falling edges of A. To antenna.	TTL output, 30Hz square wave. to antenna. Left-to-Right when B's edges align with rising edges of A. Right-to-Left when B's edges align with falling edges of A. To antenna.
Ant Tilt Hi	Top of 5K pot, 8VAC inverse of Tilt Lo. Lo to Hi=16VAC. Form antenna.	Top of 10K pot, 8VAC inverse of Tilt Lo. Lo to Hi=16VAC. Form antenna.
Ant Tilt Lo	Bottom of 5K pot, 8VAC inverse of Tilt Lo. Lo to Hi=16VAC. Form antenna.	Bottom of 10K pot, 8VAC inverse of Tilt Lo. Lo to Hi=16VAC. Form antenna.
Ant Tilt Control	Wiper of 5K pot, to antenna.	Wiper of 10K pot, to antenna.

Unpacking and Inspection

The FSD with Analog Radar option consists of the following components and parts:

- FSD with radar card 800-00002-030 or 800-00002-040 installed
- FSD mounting tray with J4 radar interface connector installed.
- Radar supplement (part of Pilot's Guide)
- Optional Analog Radar interface cable.

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.

Locate the labels on the bottom of the FSD and verify that the correct software is loaded (see Table 1 in Part One). Also verify that the correct Radar option is installed:
800-0002-030 or 800-0002-040.

Installation Instructions

New Install of Radar with Avidyne FlightMax FSD

Install and calibrate radar antenna receiver/transmitter (ART) according to manufacturer's specifications. Do not install indicator.

Connect FlightMax FSD directly to the radar ART as shown in APPENDIX S - Collins Radar Interface.

Avidyne FlightMax FSD Install with Pre-existing Radar

Remove existing radar indicator and mounting tray.

Inspect wire harness and circular connector for any visible damage or excessive wear.

If you ordered an indicator adapter cable, connect it to the existing circular connector the circular connector on the adapter cable. Then connect the 36 pin connector from the adapter cable to the FlightMax mounting tray as shown.

If you have not ordered an indicator adapter cable, you have the option of creating your own as shown in the installation diagram or you can cut off the existing circular connector and wire it directly to the 36 pin P4 connector in the FSD mounting tray. Follow the wiring diagram in APPENDIX S - Collins Radar Interface, of this document. Follow appropriate FAA wiring guidance.

Post Installation Check

WARNING

Tests involving radiation of microwave energy by the radar antenna must not be made in the vicinity of refueling operations or when personnel are standing directly in front of the radar antenna or in a hanger,. RF energy is generated in all modes except standby and test. Do not allow personnel within 15 feet of area being scanned by antenna when system is transmitting.

Visual Inspection

Check all cables to make sure they are electrically and mechanically secure.

Radar Sensor Setup

Turn the FlightMax FSD on in Maintenance Mode and select:

SYSTEM→DEVICES→RADAR

Using the knobs, select the appropriate Sensor Type as shown in Figure: 44.

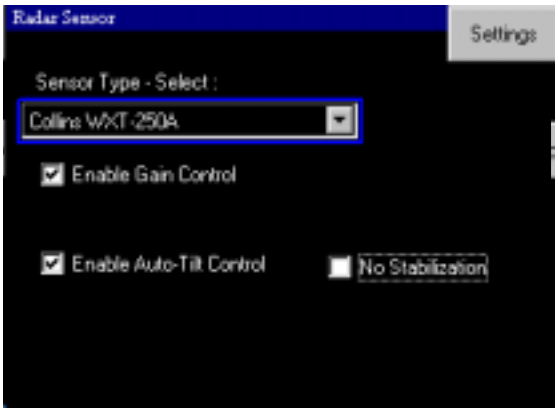


FIGURE 44: Radar Sensor Setup

Enable Gain Control - Enables the Variable Gain

Enable Auto Tilt Control - Enables the Auto Tilt mode in Radars that support this mode.

No Stabilization - A check mark in this box will prevent the “Stab Off” annunciation from appearing on the screen when stabilization is not activated.

Settings - Press the line select key next to the Settings button to bring up the Radar Settings page (refer to Figure: 39).

Tilt - use the tilt setting to define the antenna tilt position at startup. There are four options: Last position, Full up, Centered (0°), and full down.

Beam Horizontal/Vertical Width - These two dialog boxes define the arc width of the radar sweep. The vertical box is for antennas equipped with the vertical profile option (see Table 3, “Digital Radar Feature Matrix,” on page 48). The width of the moving wedge is selectable from a range of 0° to 30° in half degree increments.

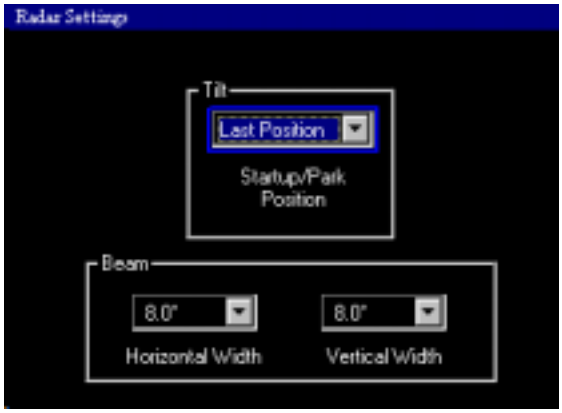


FIGURE 45: Radar Settings

Functional Tests

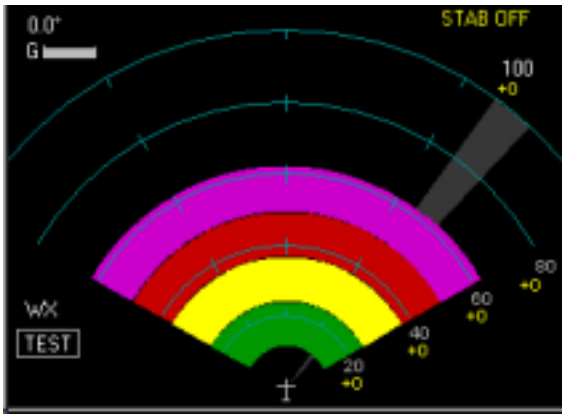


FIGURE 46: Typical Test Pattern

Turn power on radar ART. Enable the internal test mode of the ART by selecting the following:

RADAR→FUNCTION→TEST

Check the FSD display. The test pattern should appear within 8 seconds after the test mode was invoked. Set the range to 40 miles. This will cause the ART to send a test signal to the FSD. Ensure the pattern displayed is as shown in Figure: 46. The test pattern should display four colored bands; starting with the closest band to the origin, the bands will be green, yellow, red, and magenta. The magenta band represents the most intense level.

Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

Set tilt control to the 0 position using the outer (large) knob.

Check that the antenna drive assembly scans within its 120º azimuth range, and that update on the indicator moves in sync and in the same direction as the antenna scan.

Tilt Check

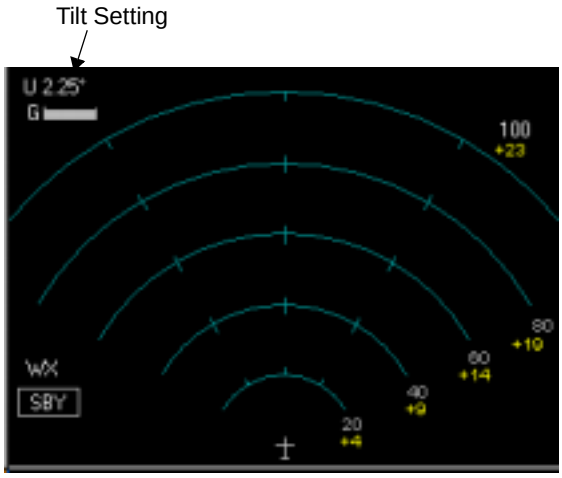


FIGURE 47: Tilt Setting

Push the RADAR→FUNCTION→STANDBY

Adjust the tilt control (use the inner knob) to the up (the screen annunciation will be U XX) position, 0 to 15 checking that the antenna tilts smoothly and without interference. Adjust the tilt control to the down (the screen annunciation will be D XX) position, 0 to 15 checking that the antenna tilts smoothly and without interference.

Set the TILT control to 0 and ensure the antenna is at its 0º reference mark. Refer to the appropriate Collins installation instructions on adjustment procedures.

Set the TILT control to 0 and ensure the antenna is at its 0º reference mark. Refer to the appropriate Collins installation instructions on adjustment procedures.

RF Operation check

WARNING

Whenever the function switch is in the ON position, RF energy is being radiated. Do not allow personnel to stand within 15 feet of the area being scanned by the antenna. Tests involving the radiation of RF energy must not be made in the vicinity of refueling operation. Always use test, or standby positions as applicable.

Enter standby mode by selecting the following from the top menu.

RADAR→FUNCTION→STANDBY

Allow system to stabilize for at least 2 minutes. Energize the radar by selecting:

RADAR→FUNCTION→RADAR ON

The radar will begin to scan and may pick up some echoes on the ground. Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

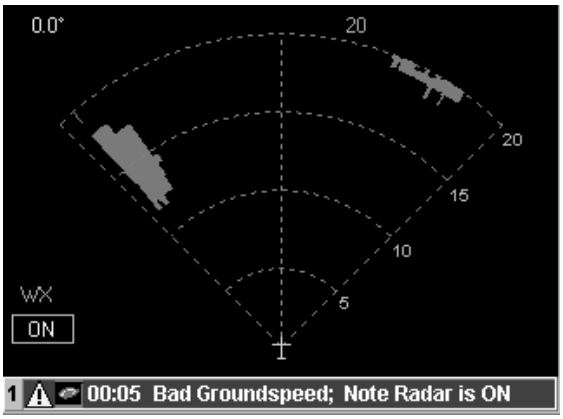


FIGURE 48: Typical Ground Display

Ensure the HOLD function is disengaged.

Check for target reflections of local weather (if any) by indexing the range to each range position while tilting the antenna upward above the horizon using the TILT control.

Select all the range positions. Note that the corresponding range and range mark intervals appear in the alphanumeric area of the display.

Set function to STANDBY by selecting:

RADAR→FUNCTION→STANDBY

Interference Check

Operate the system in all functions and check that this does not affect other electronic equipment in the aircraft.

Operate the system on all functions and check that it is not affected by any of the functions of the other electronic or electrical equipment in the aircraft.

Upon successful completion of the post installation test, install the radome.

Preflight Check

Set the radar to WX TEST mode by selecting:

RADAR→FUNCTION→TEST

RADAR→MODE→WX

Using the appropriate knob, set the range to 100 miles

The test pattern should appear on the indicator screen as shown. The test pattern should display four colored bands; starting with the closest band to the origin, the bands will be green, yellow, red, and magenta. The red and magenta bands represent the most intense level. All range marks will be visible.

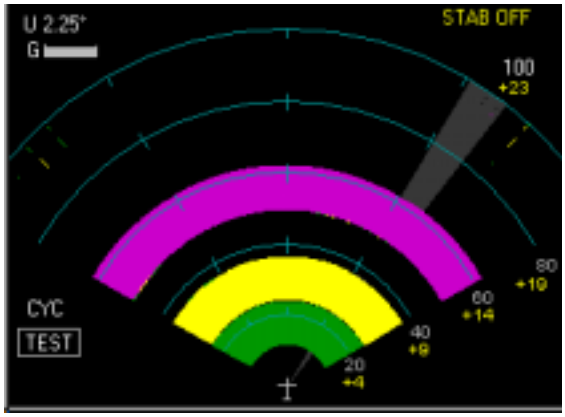


FIGURE 49: Typical Test Pattern Display

The update action may be observed as a small cursor sweeping back and forth across the top of the radar display indicating that the antenna is scanning the full 120º.

RADAR→FUNCTION→CYC

The display should look identical to the WX test mode except the red band should flash.

Return mode to Standby WX by selecting:

RADAR→MODE→WX

RADAR→FUNCTION→STANDBY

Taxi the aircraft to a clear ahead area where metal building, aircraft, etc. are not in the line of sight. Turn the radar ON by selecting:

RADAR→FUNCTION→ON

Set the indicator to 100-mile range.

Adjust TILT control up in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display. At 15º, no ground targets should appear on the display.

Repeat TILT control adjustment to check remaining ranges.

Set function to STANDBY prior to taxi maneuvers.

Flight Check

During take-off or during prolonged aircraft maneuvers, the display will be inaccurate. Set the function to:

RADAR→FUNCTION→TEST

Check to ensure the 4 colored bands are correct.

Set mode to CYC mode. Check that the red band on the test pattern flashes.

Turn on the radar by selecting:

RADAR→FUNCTION→ON

During flight Adjust TILT control in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display.

Check ground map mode by selecting:

RADAR→MODE→GROUNDMAP

At 15º, no ground targets should appear on the display.

Adjust the TILT control down in small increments until a picture develops of ground features. Adjust gain up or down to adjust resolution of returns.

Setup and Checkout for Digital R/T's (RS-181X, RS-8XX, ART-2XXX, RTA-8XX)

WARNING

This unit connects to a device which generates microwave radiation. Do not operate until you have read and carefully followed all safety precautions and instructions in the users and installation manuals.

Maintain prescribed safe distance when standing in front of a radiating antenna.

Never expose eyes or any part of the body to an unterminated wave guide. Reference APPENDIX I - AC 20-68B Recommended Radiation Safety for further information.

Equipment Description

This section applies to Avidyne FSD's with Digital Radar interface 800-00002-010 with the software listed in Table 1 in Part One.

Locate the lables on the bottom of the FSD and verify the correct software is loaded. Also verify correct radar interface is installed.

The FlightMax FSD Radar interface consists of the following components:

Part Number	Description
800-00002-010	Avidyne Radar interface card and software installed in the FSD.
D98-00002-02	Mounting tray with J5 connector for radar interconnect.
100-00018-XXX	Optional retrofit adapter cable which allows connection to existing wiring.
600-0060	Digital Radar of the User's Manual.

Technical Specifications

Radar Interface Control Specifications:

The digital radar interface option provides the FSD with the ability to control and depict radar data through the interface described.

SIGNAL NAME	TYPE OF CIRCUIT	CHARACTERISTICS
RT *ON/OFF	Open collector output from FSD	When Low, RT is ON (Scanning)
453 Data Bus A, B In	Differential Arinc 453 Data Bus	Receives radar data from ART
429 Transmit 1A, 1B	Differential Arinc 429 Control Bus	Transmits radar control information to ART

Unpacking and Inspection

Open packages and ensure all items ordered have been delivered. Also, inspect all items for possible damage which may have occurred during shipment. If shipping damage is noted, retain all packaging and contact the carrier immediately.

The FSD with radar option consists of the following components and parts:

- FSD with radar card installed
- FSD mounting tray with J5 radar interface connector installed.
- Radar supplement (part of Pilot's Guide).
- Optional radar interface cable.

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.

Installation Instructions

Replacing Radar Indicator with Avidyne FlightMax FSD

Antenna receiver/transmitter (ART) should be installed and calibrated according to manufacturer's specifications.

Remove existing radar indicator and mounting tray.

Inspect wire harness and circular connector for any visible damage or excessive wear.

Connect FlightMax FSD directly to the radar ART as shown in APPENDIX P - Radar Wiring Diagram, Using FSD as Sole Radar Indicator.

Connecting Avidyne FSD as Secondary Radar Display

The secondary Avidyne FSD should be connected as shown in APPENDIX Q - Radar Wiring Diagram, Using FSD as Secondary Indicator.

Post Installation Check

WARNING

Tests involving radiation of microwave energy by the radar antenna must not be made in the vicinity of refueling operations or when personnel are standing directly in front of the radar antenna or in a hanger. RF energy is generated in all modes except standby and test. Do not allow personnel within 15 feet of area being scanned by antenna when system is transmitting.

Visual Inspection

Check all cables to make sure they are electrically and mechanically secure.

Radar Sensor Setup

Turn the FlightMax FSD on in Maintenance Mode and select:

SYSTEM→DEVICES→RADAR

Using the knobs, select the appropriate Sensor Type as shown.

Enable Gain Control - Enables the Variable Gain

Enable Vertical Profile - Enables the Vertical Profile mode in Radars that support this mode (not displayed for Collins digital radars)

Enable Auto Tilt Control - Enables the Auto Tilt mode in Radars that support this mode.

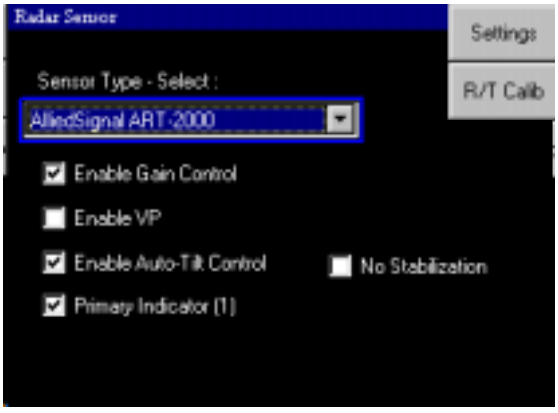


FIGURE 50: Radar Sensor Setup

Primary Indicator (1) - When checked defines Indicator as primary display for use in FSD only display.

When unchecked defines radar operation for dual indicators. The FSD functions as a second radar display.

No Stabilization - A check mark in this box will prevent the “Stab Off” annunciation from appearing on the screen when stabilization is not activated.

Settings - Press the line select key next to the Settings button to bring up the Radar Settings page (refer to Figure: 39).

Tilt - use the tilt setting to define the antenna tilt position at startup. There are four options: Last position, Full up, Centered (0°), and full down.

Beam Horizontal/Vertical Width - These two dialog boxes define the arc width of the radar sweep. The vertical box is for antennas equipped with the vertical profile option (see Table 3, “Digital Radar Feature Matrix,” on page 48). The width of the moving wedge is selectable from a range of 0° to 30° in half degree increments.

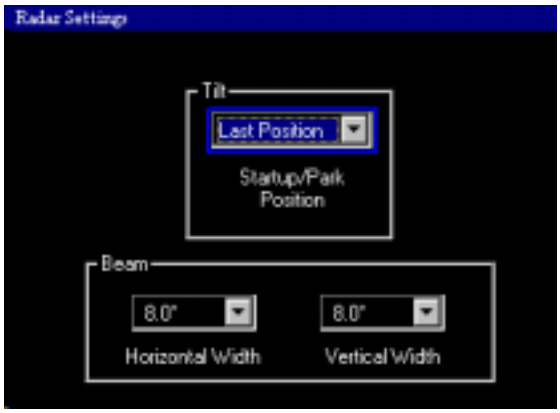


FIGURE 51: Radar Settings

Functional Tests

Turn power on radar ART. Enable the internal test mode of the ART by running the following:

RADAR→FUNCTION→TEST

Check the FSD display. The test pattern should appear within 8 seconds after the test mode was invoked. Set the range to 40 miles. This will cause the ART to send a test signal to the FSD. Ensure the pattern displayed is as shown. The test pattern should display five colored bands; starting with the closest band to the origin, the bands will be green, yellow, red, and magenta. The magenta band represents the most intense level.

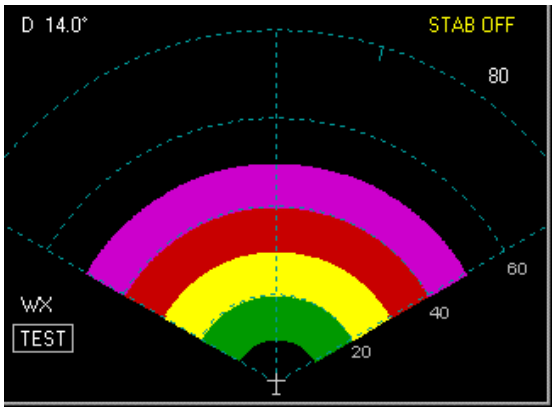


FIGURE 52: Typical Test Pattern Display

Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

Set tilt control to the 0 position using the outer (large) knob.

Check that the antenna drive assembly scans.

Tilt Check

Select RADAR→FUNCTION→STANDBY

Adjust the tilt control to +5, +10, and +15 checking that the antenna tilts smoothly and without interference.

Adjust the tilt control to -5, -10, -15 checking that the antenna tilts smoothly and without interference.

Set the TILT control to 0 and ensure the antenna is at its 0º reference mark. Refer to the appropriate Bendix installation instructions on adjustment procedures.

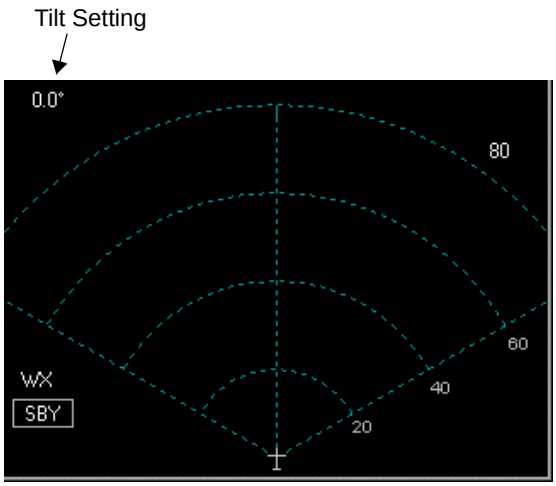


FIGURE 53: Tilt Setting

RF Operation check

WARNING

Whenever the function switch is in the ON position, RF energy is being radiated. Do not allow personnel to stand within 15 feet of the area being scanned by the antenna. Tests involving the radiation of RF energy must not be made in the vicinity of refueling operation. Always use test, or standby positions as applicable.

Enter standby mode by selecting the following from the top menu.

RADAR→FUNCTION→STANDBY

Allow system to stabilize for at least 2 minutes. Energize the radar by selecting:

RADAR→FUNCTION→RADAR ON

The radar will begin to scan and may pick up some echoes on the ground. Since the ground speed is zero, there will be a message warning indicating low ground speed. This is an additional cautionary message to remind the user that the radar is on while the plane is not moving.

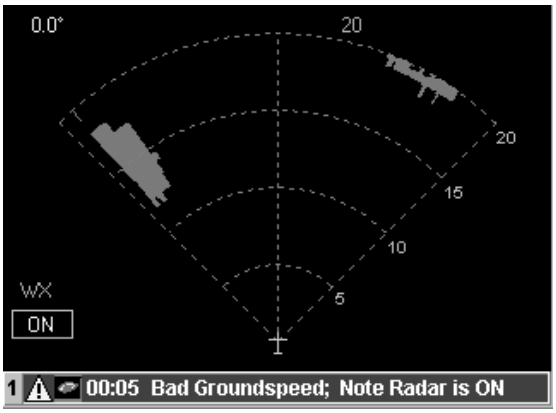


FIGURE 54: Typical Ground Display

Interference check

Operate the system in all functions and check that this does not affect other electronic equipment in the aircraft.

Operate the system on all functions and check that it is not affected by any of the functions of the other electronic or electrical equipment in the aircraft.

Upon successful completion of the post installation test, install the radome.

Preflight Check

Set the radar to WX TEST mode by selecting:

RADAR→FUNCTION→TEST

RADAR→MODE→WX

Using the appropriate knob, set the range to 40 miles

The test pattern should appear on the indicator screen as shown. The test pattern should display five colored bands; starting with the closest band to the origin, the bands will be green, yellow, red, and magenta. The magenta band represents the most intense level. All range marks will be visible.

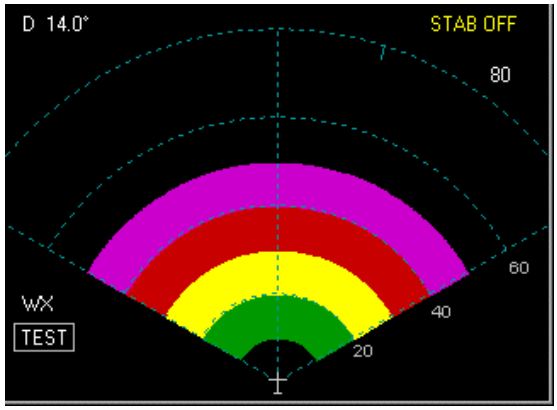


FIGURE 55: Typical Test Pattern Display

The update action may be observed as a small cursor sweeping back and forth across the top of the radar display indicating that the antenna is scanning through its full sweep.

RADAR→FUNCTION→WXA

The display should look identical to the WX test mode except the red band should flash.

Return mode to Standby WX by selecting:

RADAR→MODE→WX

RADAR→FUNCTION→STANDBY

Taxi the aircraft to a clear ahead area where metal building, aircraft, etc. are not in the line of sight. Turn the radar ON by selecting:

RADAR→FUNCTION→ON

Set the indicator to 40-mile range.

Adjust TILT control up in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display. At 15º, no ground targets should appear on the display.

Repeat TILT control adjustment to check remaining ranges.

Set function to STANDBY prior to taxi maneuvers.

Flight Check

During take-off or during prolonged aircraft maneuvers, the display will be inaccurate. Set the function to:

RADAR→FUNCTION→TEST

Check to ensure the 5 colored bands are correct.

Set mode to WXA mode. Check that the red band on the test pattern flashes.

Turn on the radar by selecting:

RADAR→FUNCTION→ON

During flight Adjust TILT control in small increments until a clear picture develops of any local weather, Close in ground targets may also appear in the display.

Check ground map mode by selecting:

RADAR→MODE→GROUNDMAP

At 15º, no ground targets should appear on the display.

Adjust the TILT control down in small increments until a picture develops of ground features. Adjust gain up or down to adjust resolution of returns.

Digital Radar Calibrations

Calibration with Bendix/King RDS-8X Series Radars

Calibration of the Radar R/T unit requires access to the radar calibration page on the FlightMax FSD unit. This section explains how to access the calibration page and complete the radar calibration. Calibration of the radar R/T should be performed according to the procedures and specifications for the specific unit installed in the aircraft.

Calibration can be performed after the FSD has been installed and the radar has been set up according to the Digital Radar Setup and Checkout section starting on page 74.

Note: For customers upgrading from an ALREADY CALIBRATED BENDIX/KING INDICATOR do the following:
In order to avoid recalibration of the R/T after installation of the Avidyne FlightMax FSD it is suggested that the installer activate the Maintenance Page of the original Bendix/King indicator BEFORE IT IS REMOVED and write down the value for 'Roll Trim'. This value will later be entered in the Avidyne Radar application, maintaining the existing calibration.

Procedure

1. Bring the FlightMax FSD up in Maintenance Mode.
2. Radar calibration is done from the Test Mode. To place the unit into Test Mode, from the Main menu, select
   RADAR→FUNCTION→TEST
3. Access the Calibration page. From the Main menu, select
   SYSTEM→DEVICES→RADAR
4. Using the top line select key, select **R/T Calib** in the upper right hand corner. This will bring up the Calibration page.

5. If the radar unit has **NOT** been calibrated, perform the calibration according to the specifications in the R/T unit's manual. As indicated on the calibration page, use the FSD outer knob to perform tilt adjustments, the inner knob to perform roll trim adjustments, and the Gain UP and Gain DOWN soft keys to make gain adjustments.
6. Press Enter to accept new values.

If the radar R/T was already calibrated prior to FSD installation, enter the roll trim value that was previously written down, using the inner knob. Press Enter to accept the new values.

Calibration with AlliedSignal (Bendix/King) 2XXX Series Radars

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

This section describes Post-Installation System Configuration and Calibration of the Bendix/King RDR-2000 and RDR-2100 Radar Systems using the Avidyne FlightMax and replaces specific sections of the Installation Manual that originally described such configuration and calibration using the Bendix/King IN-182A Indicator. To use it, simply refer to the included sections instead of the original Installation Manual sections when those sections are reached in the installation/ calibration procedure. For installation tasks other than those described in these sections the original Installation Manual should be used.

The replacement sections that follow use the titles and numbering schemes used in the original Bendix/King Installation manuals.

Two replacement sections follow:

2.4.1, CONFIGURATION PROCEDURE USING RADAR INDICATOR

2.4.4.1, STABILIZATION CALIBRATION WITH RADAR INDICATOR.

Procedure

2.4.1 CONFIGURATION PROCEDURE USING RADAR INDICATOR

If the system is installed in a radar indicator installation, the Configuration Module must be configured for the specific installation using the KPA 900 Configuration Module Programmer Kit (Part Number 050-03311-0000) in conjunction with a personal computer. Follow the instructions for the programmer.

The following steps are performed by utilizing the GAIN buttons, the RANGE (inner) knob, the TILT (outer) knob, the FUNCTION menu selections and the MODE menu selections of the Avidyne FlightMax.

Note: When in calibration mode or other installation modes you must dismiss any blue message bars that appear across the bottom of the screen by pressing the ENTER key for *each* message. If all messages are not dismissed the knobs and keys may not work during the calibration procedure.

2.4.1.1 Antenna Clearance Check

Enter the maintenance mode and complete the Antenna Clearance Check by performing the following steps.

A. Set the radar Function to SBY from the FUNCTION menu.

B. Set the radar Mode to GND from the MODE menu.

C. From the main menu press the GAIN DOWN button until the gain indicator in the upper left shows the minimum setting.
D. Set the Antenna Tilt to full UP (U 15.0) with the outer knob.
E. Set Range to 240 NM with the inner knob.
F. Set Function to TEST from the FUNCTION menu.
G. Navigate to the MAIN menu and press SYSTEM, then DEVICES, and then RADAR.
H. Press the R/T CALIB button to display the RT CALIBRATION DATA page. See figure 2-2 in the Bendix/King Installation Manual. Upon display of the RT CALIBRATION DATA page with the system in calibration mode, all fault fields will flash briefly. This verifies calibration mode is entered. XMITTER should be the only fault that might be displayed. If other faults are shown, further investigation is necessary.
I. Press the GAIN UP/DOWN buttons to obtain a value of –26.5 to –28 in the GAIN POT /2 field. This will initiate the antenna clearance scan. The antenna will move to each of the extreme positions to determine that there is no interference with antenna movement and all scan motors are working properly.

2.4.4.1 STABILIZATION CALIBRATION WITH FLIGHTMAX

The following procedure assumes that both analog and ARINC 429 stabilization inputs are present. If one or the other inputs is not available, that particular option need not be calibrated.

The following procedures are performed by utilizing the GAIN buttons, the RANGE/ROLL TRIM (inner) knob, the TILT (outer) knob, the FUNCTION menu selections and the MODE menu selections of the Avidyne FlightMax.

Note: When in calibration mode or other installation modes you must dismiss any blue message bars that appear across the bottom of the screen by pressing the ENTER key for *each* message. If all messages are not dismissed the knobs and keys may not work during the calibration procedure.

Enter the maintenance mode and complete the Antenna Clearance Check by performing the following steps.

A. Set the radar Function to SBY from the FUNCTION menu.

B. Set the radar Mode to GND from the MODE menu.

C. From the main menu press the GAIN DOWN button until the gain indicator in the upper left shows the minimum setting.

D. Set the Antenna Tilt to full UP (U 15.0) with the outer knob.

E. Set Range to 240 NM with the inner knob.

F. Set Function to TEST from the FUNCTION menu.

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

G. Navigate to the MAIN menu and press SYSTEM, then DEVICES, and then RADAR.

H. Press the R/T CALIB button to display the RT CALIBRATION DATA page. See figure 2-5 in the Bendix/King Installation Manual. Upon display of the RT CALIBRATION DATA page with the system in calibration mode, all fault fields will flash briefly. No faults should be displayed when the fields stop flashing. Adjust Roll Trim with the inner knob to 0°.

I. If desired, copy all displayed values to a note pad in case there is a need to recall a value that is accidently changed.

J. 400 Hz REF GAIN
If an ARINC 429 gyro is being used, proceed to Step M.

1. Set the tilt table to 0° pitch and roll.
2. Use the GAIN buttons to set the GAIN POT /2 setting between –28 and –30.
3. Adjust the TILT SETTING with the outer knob between 5 and 10 UP to increment the 400 HZ REF field to 0.0 ±1.0° (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching the desired setting,

quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.

4. Proceed to step K.

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

K. PITCH GAIN

1. Set the tilt table for 10° pitch up.
2. Adjust the GAIN buttons for a GAIN POT setting between –24.5 and –26.5.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the PITCH ANGLE field to 10.0 ±1.0° (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching the desired setting, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/ King Installation Manual.
4. Set for 10° PITCH DOWN. Repeat steps 2 and 3.
5. Set the tilt table to 0° pitch and roll.
6. Proceed to step L.

L. PITCH OFFSET

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

M. AHRS ARINC 429 PITCH OFFSET

1. Adjust the GAIN buttons for a GAIN POT setting between –10.5 and –12.5.
2. Check that the tilt table is set for 0° pitch.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the PITCH ANGLE field to 0.0 ±1.0° (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching 0° ±1.0°, quickly adjust the TILT

SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.

4. Set the tilt table to 10° pitch up. The value should be 10.0U ±1.0°. If the value is out of range, repeat Steps 1, 2 and 3 of this section.
5. Set the tilt table to 10° pitch down. The value should be 10.0D ±1.0°. If the value is out of range, repeat Steps 1, 2, 3 and 4 of this section.
6. Set the tilt table to 0° pitch. The value should be 0.0 ±1.0°.
7. Proceed to Step P.

N. ROLL GAIN

1. Set the tilt table for 10° roll right.
2. Adjust the GAIN buttons for a GAIN POT setting between –21.0 and –23.0.
3. Adjust the TILT SETTING between 5 and 10 UP to increment the ROLL ANGLE field to 10.0 ±1.0° (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching the desired setting, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/ King Installation Manual.
4. Set the tilt table for 10° roll left. Repeat Steps 2 and 3 of this section.
5. Set the tilt table for 0° pitch and roll.
6. Proceed to Step O.

O. ROLL OFFSET

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

P. AHRS ARINC 429 ROLL OFFSET

1. Adjust the GAIN buttons for a GAIN POT setting between –7.0 and –9.0.
2. Check that the tilt table is set for 0° roll.

3. Adjust the TILT SETTING between 5 and 10 UP to increment the ROLL ANGLE field to 0.0 ±1.0° (adjusting the TILT SETTING between 5 and 10 DOWN will decrement the numbers). Upon reaching 0° ±1.0°, quickly adjust the TILT SETTING to above 10 to lock in the setting. See figure 2-11 in the Bendix/King Installation Manual.
4. Set the tilt table to 10° roll right. The value should be 10.0R ±1.0°. If the value is out of range, repeat Step P.
5. Set the tilt table to 10° roll left. The value should be 10.0L ±1.0°. If the value is out of range, repeat Step P.
6. Set the tilt table to 0° roll. The value should be 0.0 ±1.0°.
7. Proceed to Step Q.

Q. SAVE CONFIGURATION

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

ROLL TRIM ADJUSTMENT

For procedures that require the Roll Trim to be adjusted, the installer will find the Roll Trim selection on the Radar SETTINGS menu. When selected, the outer knob controls Roll Trim instead of TILT, and the Roll Trim value appears on the Radar screen. When all setting of the Roll Trim has been accomplished, save the new setting by returning to the SETTINGS menu and deselecting Roll Trim.

Part Three

Policies

Appendices

Factory Service Policies

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 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.

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.

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.

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 Forms

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, LINCOLN, MA 01773

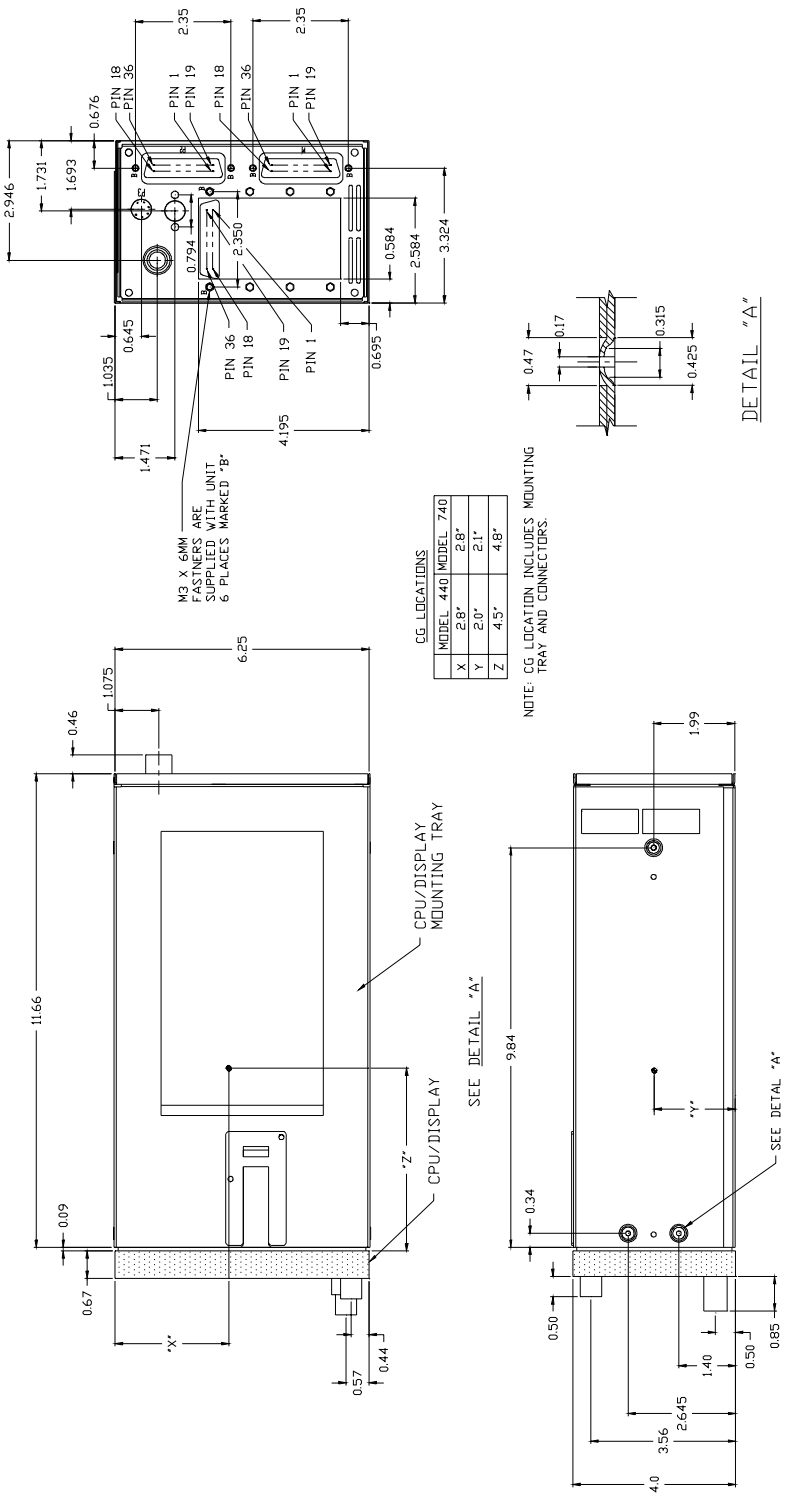
CONDITIONS	RTCA/DO-160D PARA	CONDUCTED TEST CATEGORY
TEMPERATURE	4.5	A1 Hard Disk Drive C1 Flash Disk Drive
INFLIGHT LOSS OF COOLING	4.5.4	V
ALTITUDE	4.6.1	B1 Hard Disk Drive, 25,000ft. C1 Flash Disk Drive 35,000ft.
DECOMPRESSION	4.6.2	B1
OVERPRESSURE	4.6.3	B1
TEMPERATURE VARIATION	5.0	B
HUMIDITY	6.0	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	V
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

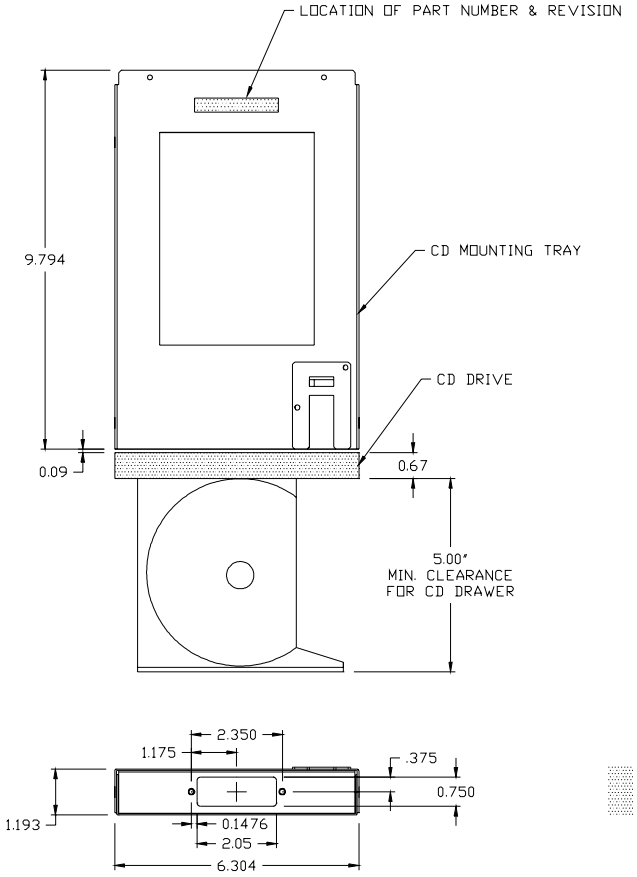
NOMENCLATURE:	5RR-MFC-XXX CD/DATA LOADER
PART NO:	D98-00003-01
TSO NUMBER	C113
MANUFACTURER:	AVIDYNE CORPORATION
ADDRESS:	55 OLD BEDFORD ROAD LINCOLN, MA 01773

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	V
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

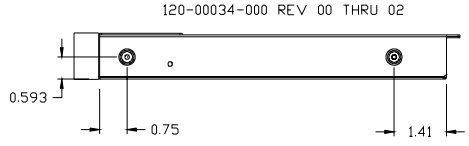


APPENDIX C - Mechanical Outline Drawing-Data Loader

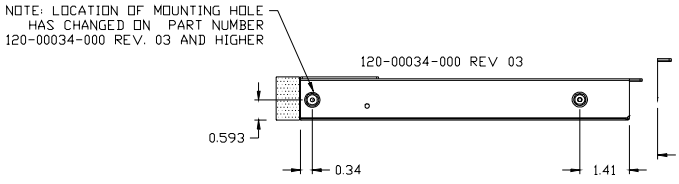


Note: Use the part and revision number to determine the location of the mounting holes (see below).

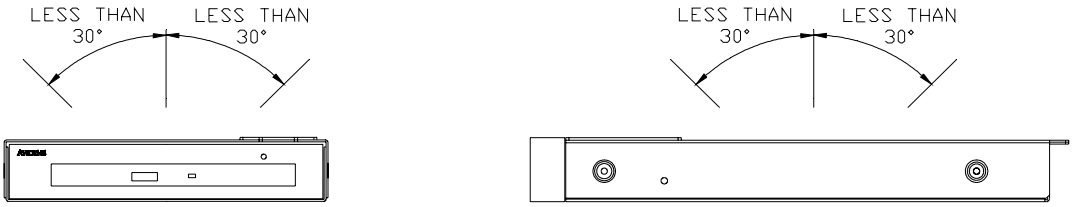
Location of Mounting Hole for P/N 120-00034-000 Rev. 00 thru 02



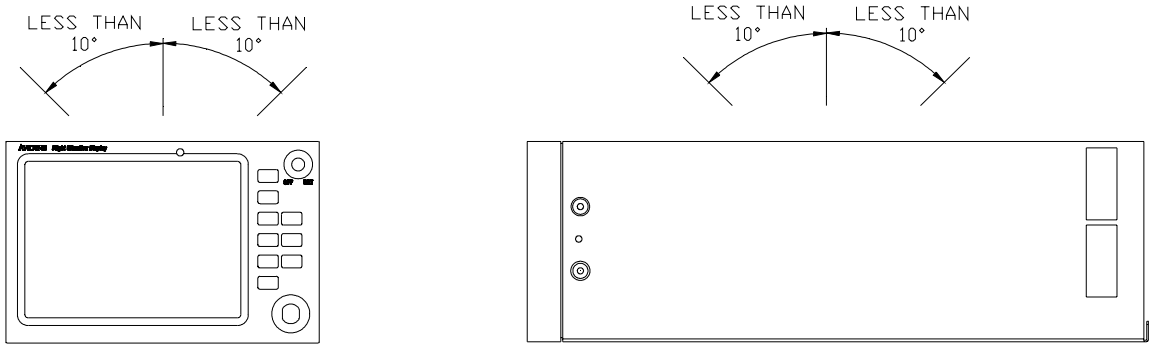
Location of Mounting Hole for P/N 120-00034-000 Rev. 03 or Higher



APPENDIX D - Attitude Limitations for FSD and Data Loader



TILT OF THE CD DRIVE



TILT OF THE FSD

Note: Attitude limitations only apply to FSD's with p/n D98-00001-4X and p/n D98-00001-55

FSD units with p/n D98-00001-50 series have no attitude limitations.

APPENDIX E - J5 Connector Pinouts-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 Avidyne's FAA approved FMS as a guideline. Hard and electronic copies are available by any of the following means:

- Calling Avidyne Technical Support at 1-888-723-7592
- E-mail: support@avidyne.com.
- Web: www.avidyne.com

The sample FMS covers all possible configurations of the FlightMax FSD. Page 3 of the sample FMS contains a checklist that can be checked to indicate which functions are applicable to the specific unit being installed. This eliminates editing the sample FMS to a specific configuration.

The following items would change from the sample FMS:

- Aircraft type
- The FMS should be in accordance with FAA form 337 Dated_____
- Change the FAA Approved name and address to the installers local ACO
- Eliminate the Rev. A from the Revision Table

Sample FMS

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FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR RAYTHEON AIRCRAFT CO. MODEL 58

WITH

AVIDYNE FLIGHTMAX 5RR-MFC-XXX-()
FLIGHT SITUATION DISPLAY (FSD)
WITH
SOFTWARE RELEASE 5

REG. NO. _____

SER. NO. _____

This supplement must be attached to the applicable FAA Approved Airplane Flight Manual when an Avidyne FlightMax 5RR-MFC-4XX-() is installed in accordance with STC SA00117BO. The information contained herein supplements or supersedes the basic manual only in those areas listed. For limitations and procedures not contained in this supplement consult the basic Airplane Flight Manual.

FAA APPROVED: _____
Robert G. Mann, Manager
Boston Aircraft Certification Office
Federal Aviation Administration
Burlington, MA.

FAA APPROVED
Date: MAR 29 2001

Page 1 of 9
P/N 600-0040 – 01

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LOG OF REVISIONS

Revision Number	Revised Pages	Description of Revisions	FAA Approval	Date
(-)	ALL	Initial Release		
A	ALL	Incorporates MFC5 Added GroundProx		3-29-01

A vertical black line in the margin shows revised portions of affected pages.

FAA APPROVED
Date: MAR 29 2001

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SECTION I – GENERAL

Avidyne FlightMax 5RR-MFC-4XX-() FSD functions consist of FlightMax Map, FlightMax Traffic, FlightMax Radar, FlightMax GroundProx, FlightMax Charts, FlightMax Lightning, and FlightMax CD Player.

In this installation, the following FlightMax features are activated:

☒Map	☐Traffic	☐Lightning
☐Radar	☐GroundProx	☐Charts
☐CD Player.		

FLIGHTMAX MAP

FlightMax Map is a moving map display that combines external sensor data and navigation data into a single display. The overlay functions are limited to the operating parameters of their respective sensors (see Radar, Traffic, and Lightning, as applicable).

FlightMax Map displays real-time navigation data such as distance and bearing to waypoints and nearby airports, cross-track error against a planned route of flight, and estimated time of arrival at a destination. This information is displayed in data blocks overlaid onto the moving map. Map can display a terrain or political boundary map which can be combined with navigational information as well as other data from Radar and Traffic sensors. The amount of detail and layers is controlled by the pilot.

FlightMax Map obtains position data such as latitude/longitude, ground track and speed from a separately installed and approved Global Positioning System (GPS) receiver or Flight Management System (FMS). The characteristics and approved uses of the GPS/FMS receiver from which it gets its data determine, in part, the ways that Map is used in flight. In addition to basic position data, most GPS/FMS receivers also send flight plan information, navigation data, and supplemental data such as satellite status.

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All flight plans are from the external navigational data source (GPS/FMS). When a flight plan is active, it is depicted on the map. The appropriate navigational information is also displayed. The operating mode of the GPS receiver constrains how Map may be used.

FLIGHTMAX CHARTS

FlightMax Charts, if activated, is a moving map display. Interfaced with an on-board, external GPS, FlightMax Charts shows aircraft position on a 3 by 4 inch display. FlightMax Charts gives access to digitized versions of VFR and IFR ENROUTE charts. Depending on what digital charts the user has loaded, the digitized VFR charts consist of the Sectional, WAC, and TAC charts. The three layers of charts smoothly transition from one scale to another as the display is zoomed in and out. The IFR charts are digitized versions of NOAA IFR LOW AND HIGH ALTITUDE ENROUTE charts.

FLIGHTMAX RADAR

FlightMax Radar, if activated, is an interface, control and display system for airborne weather radar systems. It duplicates the weather display functions of the original equipment indicators. FlightMax Radar does *not* support the accessory functions of these indicators, such as flight plan overlay from Bendix RNAV units, checklist presentation, etc. In some cases, similar functionality is available through other FlightMax options.

FLIGHTMAX TRAFFIC

FlightMax Traffic, if activated, displays traffic awareness data gathered by the BF Goodrich Skywatch airborne traffic sensor. Before operating FlightMax Traffic, consult the Pilot's Guide. It contains information essential to the proper use and interpretation of the displays presented by FlightMax Traffic.

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FLIGHTMAX GROUNDPROX

FlightMax GroundProx, if activated, is a display interfaced to a Honeywell EGPWS system. It provides pilots with a color visual depiction of terrain/obstacles along and below the airplane's lateral and vertical flight path. FlightMax GroundProx presents terrain data on the FSD display. The terrain display is color-coded so as to indicate the varying relative altitudes and threat levels of the adjacent terrain.

Operation of the EGPWS itself, including all aural alerts, is completely independent of the display functions provided by the GroundProx Display. Power to the EGPWS is separate from the FSD.

Terrain/obstacle alert conditions are visually annunciated on the display. Urgent and immediate terrain situations are indicated in the message bar, even if another function is currently displayed.

Failure conditions, such as loss of communication with the EGPWS, are also annunciated on the display.

GroundProx terrain and object position is derived from Honeywell EGPWS internal sensor signals.

FLIGHTMAX LIGHTNING

FlightMax Lightning, if activated, displays weather avoidance data gathered by an airborne thunderstorm sensor, the BF Goodrich Avionics Systems Stormscope WX-500 Weather Mapping System. Proper use of FlightMax Lightning and the WX-500 can improve the pilot's ability to maintain a safe distance from thunderstorms. Before operating FlightMax Lightning, the Stormscope WX-500 Pilot's Guide should be read and understood. It contains information essential to the proper use and interpretation of the displays presented by FlightMax Lightning.

Airborne thunderstorm sensors detect the electrical discharge associated with lightning, which is sent to the FSD for display.

FlightMax Lightning gives access to all of the functions of the thunderstorm sensor. It provides display functions that will show the reported location of

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thunderstorms with respect to the aircraft. If a GPS navigator is reporting aircraft position to the FSD or a remote compass is reporting aircraft heading to the thunderstorm sensor, Lightning will adjust the displayed position of recorded lightning strikes.
Since lightning and thunderstorms are always associated with hazardous weather conditions, including extreme turbulence, heavy precipitation and damaging hail, avoidance of areas where lightning is present will increase the likelihood of avoiding these hazards.

FLIGHTMAX CD PLAYER

The FlightMax CD Player application, if activated, allows the pilot to play ordinary music CDs over the aircraft's intercom. The user can start, stop, and pause the playing of a CD, can skip to the next or previous track on a CD, and can control volume and balance. CD Player displays status information to the operator, such as current track, elapsed playing time, volume and balance setting, and CD Player status.

DATABASE UPDATES

FlightMax Map is intended for use as an enhanced human interface to a variety of certified GPS receivers. As with certified receivers, the database of FlightMax Map must be kept current.

It is the pilot's responsibility to insure that current navigation and chart data is loaded in the system. An **Expired** warning will be displayed on system start-up. The warning can only be removed by updating the data. Subscription and data loading instructions are given in the Pilot's Guide.

SYSTEM CONFIGURATION

The FlightMax Flight Situation Display consists of the items that follow:

A. An integrated central processing unit and display screen (CPU/display)
B. Optional CD-ROM and floppy drive unit (CD-ROM/floppy).
C. Pilot's Guide

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Additional information is shown in the Pilot's Guide.

SECTION II – LIMITATIONS

General – Applicable to all installations

1. The Avidyne FlightMax Flight Situation Display integrates with separately approved sensor installations. Adherence to limitations in appropriate installation AFM supplements is mandatory.
2. The Avidyne FlightMax Pilot's Guide P/N 600-0053 Revision 00, or later appropriate revision, must be available to the pilot during all flight operations.
3. Use of FlightMax Map during IFR flight requires an IFR approved GPS receiver and installation, operated in accordance with it's applicable limitations.
4. FlightMax Map does not provide terrain data above 75 degrees north latitude or below 75 degrees south latitude.
5. Navigation is not to be predicated on the use of FlightMax Map, which is to be used only as an aid to situational awareness.
6. Under no circumstances should the FlightMax Map terrain color representations be used as a basis for terrain avoidance.
7. Loading or updating data with the CD-ROM is not to be accomplished while airborne.

Applicable if FlightMax Charts is activated

8. Use of FlightMax Charts during IFR flight requires an IFR approved GPS receiver and installation, operated in accordance with it's applicable limitations.
9. Navigation is not to be predicated on the use of FlightMax Charts, which is to be used only as an aid to situational awareness.

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Applicable if FlightMax Traffic is activated

10. Traffic information shown on the FlightMax Traffic display is provided to the pilot as an aid to visually acquiring traffic. Pilots should maneuver their aircraft based only on ATC guidance or positive visual acquisition of the conflicting traffic. Maneuver should be consistent with ATC instructions. No maneuvers should be made based only on a Traffic Advisory. ATC should be contacted for resolution of the traffic conflict.
11. If the pilot is advised by ATC to disable the transponder altitude reporting, FlightMax Traffic and the traffic sensor must be turned off.
12. The traffic sensor can only detect aircraft that are transponder equipped.

Applicable if FlightMax GroundProx is activated

13. The FlightMax must be operating for proper operation of EGPWS self-test.
14. Terrain avoidance is to be predicated on the independent EGPWS indicators and aural alerts; these take precedence over FlightMax GroundProx alert messages.
15. Navigation must not be predicated upon the use of the GroundProx display. The GroundProx display is intended to serve as a situational awareness tool only, and may not provide the accuracy and/or fidelity on which to solely base terrain or obstacle avoidance maneuvering decisions.

SECTION III - EMERGENCY PROCEDURES

No Change

SECTION IV - NORMAL PROCEDURES

Normal operating procedures for FSD functions are in the Avidyne FlightMax Pilot's Guide.

The system is protected by a clearly labeled circuit breaker.

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Lincoln, MA 01773

SECTION V through X

No Change

FAA APPROVED
Date: MAR 29 2001

APPENDIX G - STC Permission

Avidyne Corporation hereby grants permission to all National Aviation Authority (FAA, CAA, JAA) 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 Federal Aviation Administration.

Date of application : February 24, 1997

Date of issuance : July 25, 1997

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 reissued :

Date of issuance : July 25, 1997

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

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 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.

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 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-XXX-( ) Multifunctional Flight Computer with or without the BFGoodrich Aerospace SKY497 Skywatch Traffic Advisory System in accordance with Avidyne Corporation Master Document List, Document No. 910-00001-000, Rev. 07, dated March 27, 2001, 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. A, FAA-approved March 29, 2001, 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 : March 29, 2001

By direction of the Administrator

(*Signature*)

Robert G. Mann
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 FlightMax 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 H - 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 I - AC 20-68B Recommended Radiation Safety

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C.

1. **PURPOSE**. This circular sets forth recommended radiation safety precautions to be taken by personnel when operating airborne weather radar on the ground.
2. **CANCELLATION**. AC20-68, dated April 11, 1975, is cancelled.
3. **RELATED READING MATERIAL**.
   a. Barnes and Taylor, Radiation Hazard and Protection (London: George Newnes Limited, 1963), p.211.
   b. U.S. Department of Health, Education and Welfare, Public Health Service, Consumer Protection and Environmental Health Service, "Environmental health microwaves, ultraviolet radiation and radiation from lasers and television receivers - An Annotated Bibliography," FS 2.300: RH-35, Washington, U.S. Government Printing Office, pp. 56-57.
   c. Mumford. W.W., "Some technical aspects of microwave radiation hazards," Proceedings of the IRE, Washington, U.S. Government Printing Office, February 1961, pp. 427-447.
4. **BACKGROUND.** Dangers from ground operation of airborne weather radar include the possibility of human body damage and ignition of combustible material by radiated energy. Low tolerance parts of the body include the eyes and testes.
5. **PRECAUTIONS.** Management and supervisory personnel should establish procedures for advising personnel of dangers from operating airborne weather radars on the ground. Precautionary signs should be displayed in affected areas to alert personnel of ground testing.
   a. **General**.

(1) Airborne weather radar should be operated on the ground only by qualified personnel.

(2) Installed airborne radar should not be operated while the aircraft is in a hangar or other enclosure unless the radar transmitter is not operating, or the energy is directed toward an absorption shield which dissipates the radio frequency energy. Otherwise, radiation within the enclosure can be reflected throughout the area.

   c. **Body Damage.** To prevent possible human body damage, the following precautions should be taken.

(1) Personal should never stand nearby and in front of a radar antenna which is transmitting. When the antenna is not scanning, the danger increases.

(2) A recommended safe distance from operating airborne weather radars should be established. A safe distance can be determined by using the equation in Appendix 1 or the graphs of figures 1 and 2. This criterion is now accepted by many industrial organizations and is based on limiting exposure of humans to an average power density not greater than 10 milliwatts per square centimeter.

(3) Personnel should be advised to avoid the end of an open waveguide unless the radar is turned off.

(4) Personnel should be advised to avoid looking into the waveguide, or into the open end of a coaxial connector or line connector to a radar transmitter output, as severe eye damage may result.

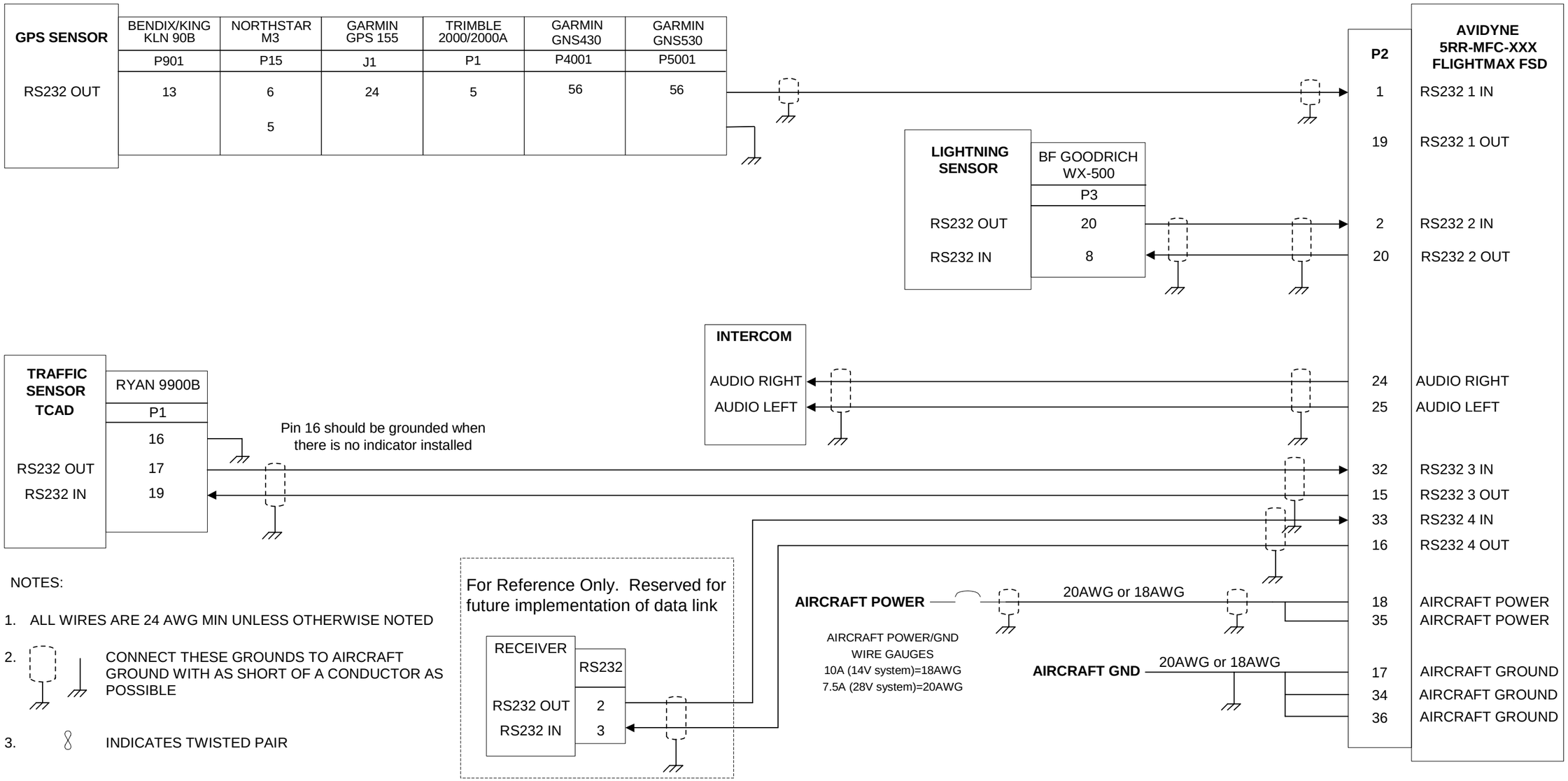
(5) Personnel should be advised that when high power radar transmitters are operated out of their protective cases, X-rays may be emitted. Stray X-rays may emanate from the glass envelope type pulser, oscillator, clipper, or rectifier tubes, as well as magnetrons.

f. **Combustible Materials.** To prevent possible fuel ignition, an installed airborne weather radar should not be operated while an aircraft is being refueled or defueled.

M.C. BEARD

Director of Airworthiness

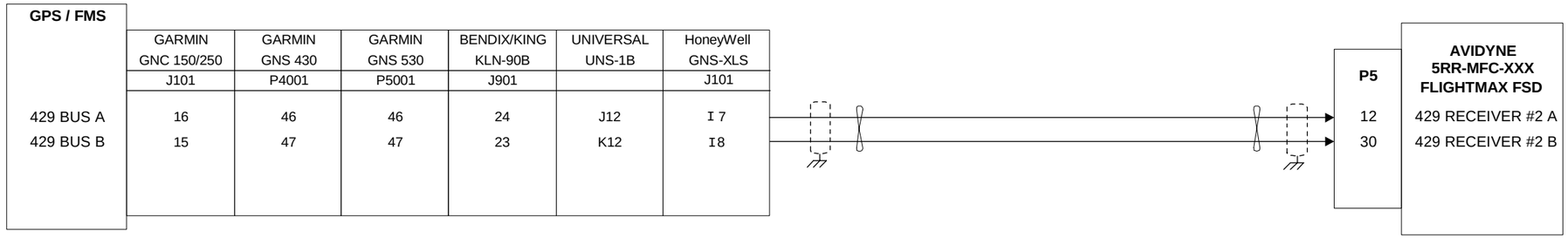
APPENDIX J - Wiring Diagram, FSD



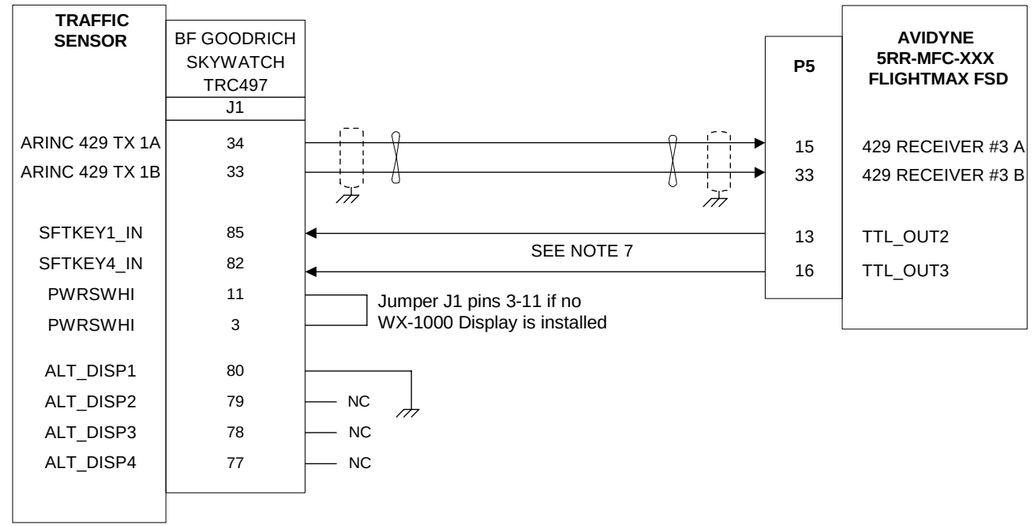
NOTES:

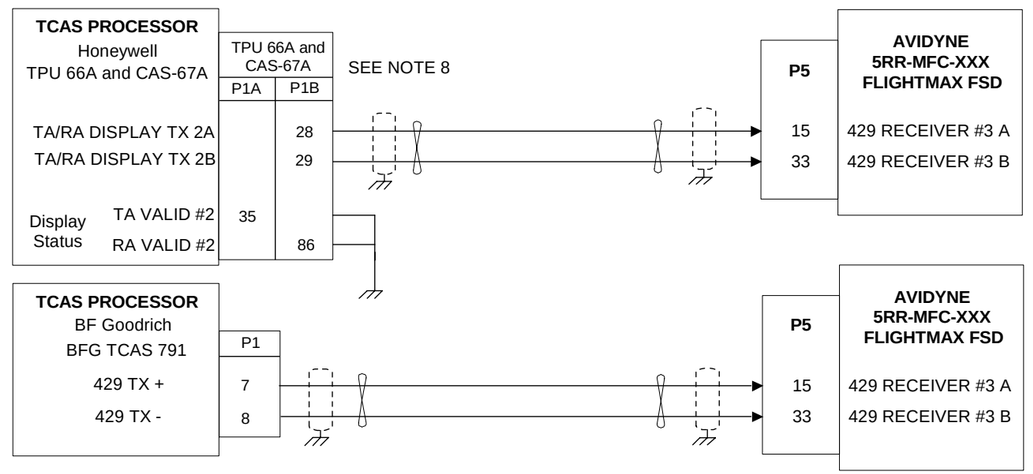
1. ALL WIRES ARE 24 AWG MIN UNLESS OTHERWISE NOTED
2. CONNECT THESE GROUNDS TO AIRCRAFT GROUND WITH AS SHORT OF A CONDUCTOR AS POSSIBLE
3. INDICATES TWISTED PAIR
4. REFER TO SENSOR INSTALLATION INSTRUCTIONS FOR SPECIFIC CONNECTION REQUIREMENTS

APPENDIX K - 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).

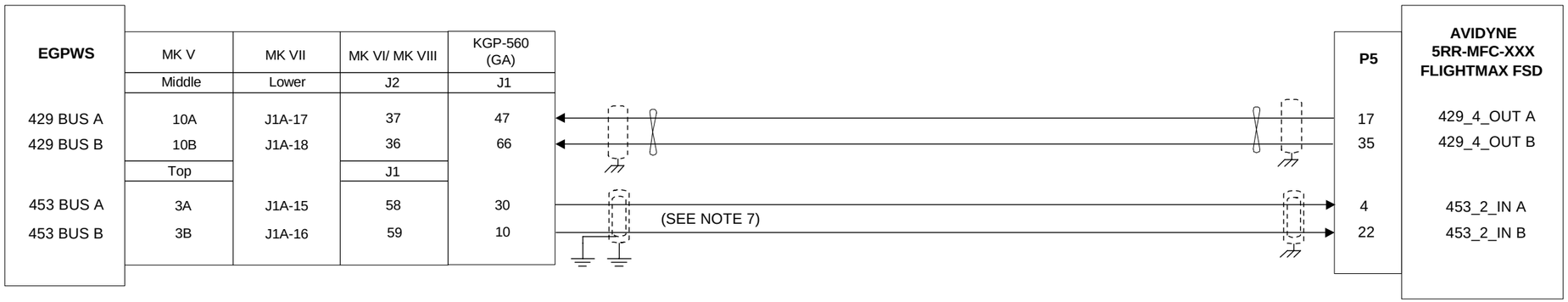


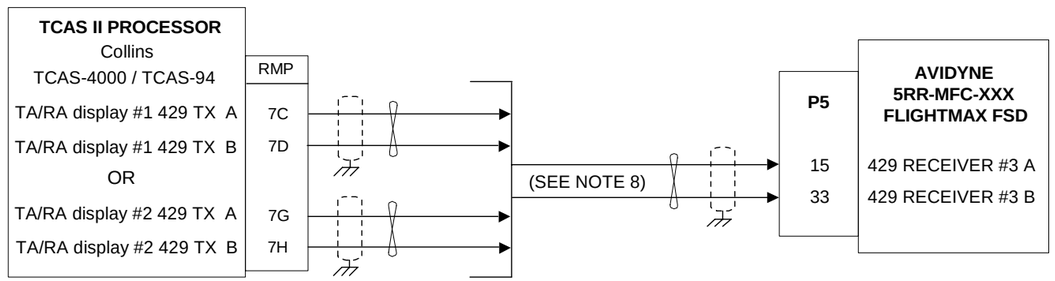


NOTES:

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
8. THE WIRING FOR THE TPU-66A AND THE CAS-67A IS THE SAME THE FLIGHTMAX FSD SHOULD ONLY BE USED AS A SUPPLEMENTAL DISPLAY

APPENDIX L - Wiring Diagram, FSD, ARINC 429 Interface, Continued

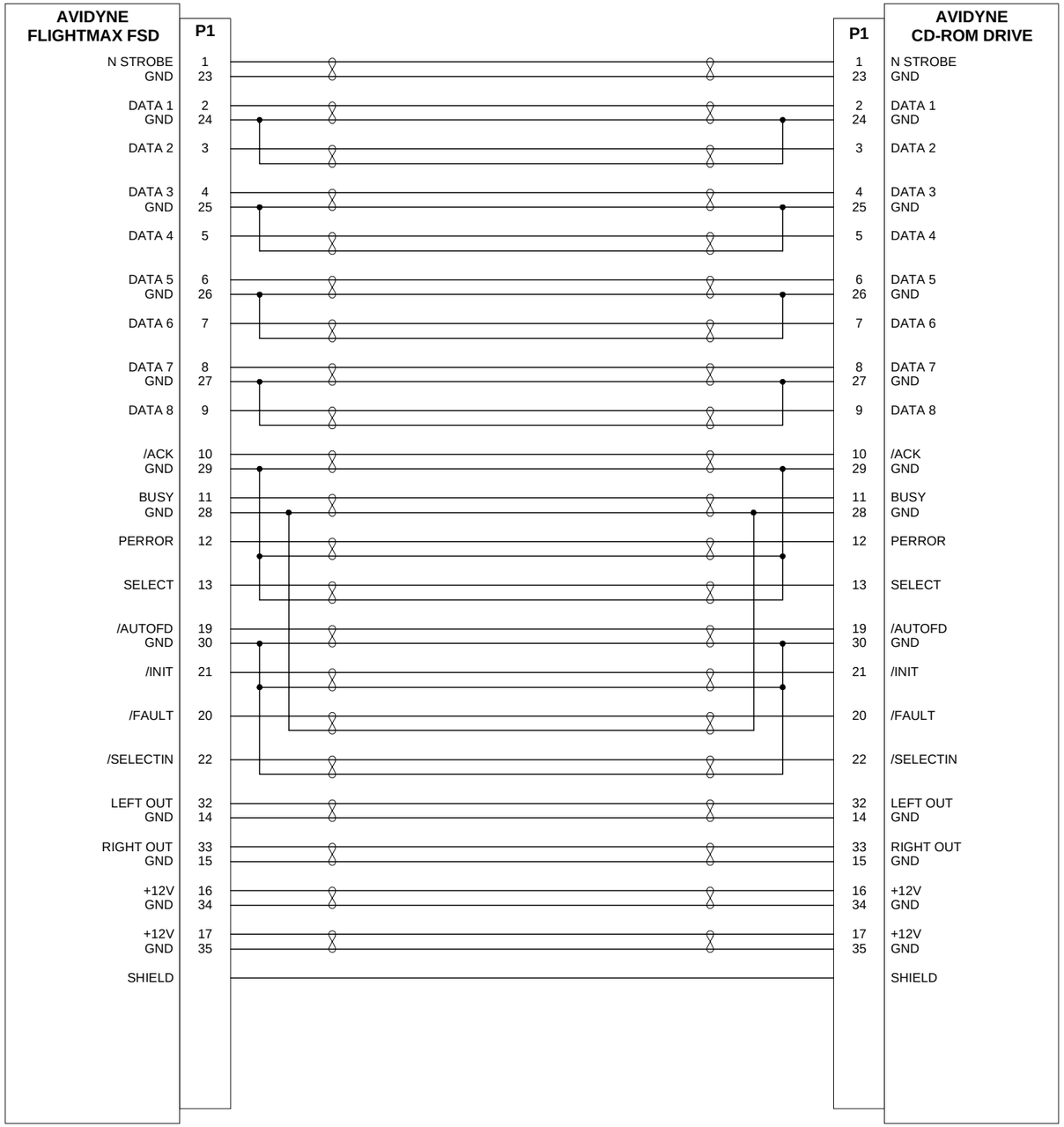




NOTES:

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. 453 DATA BUS: AT ART, BOTH SHIELDS ARE GROUNDED TO CONNECTOR SHELL. AT INDICATOR, OUTER SHIELD ONLY IS GROUNDED TO AIRCRAFT GROUND AS SHOWN. USE QUADRAX CABLE - NON PVC JACKET BENDIX KING P/N 024-00064-0000 OR EQUIVALENT.
8. USE THE OUTPUT FROM EITHER DISPLAY #1 OR DISPLAY #2 . THE FLIGHTMAX FSD SHOULD ONLY BE USED AS A SUPPLEMENTAL DISPLAY.

APPENDIX M - Wiring Diagram, CD Data Loader



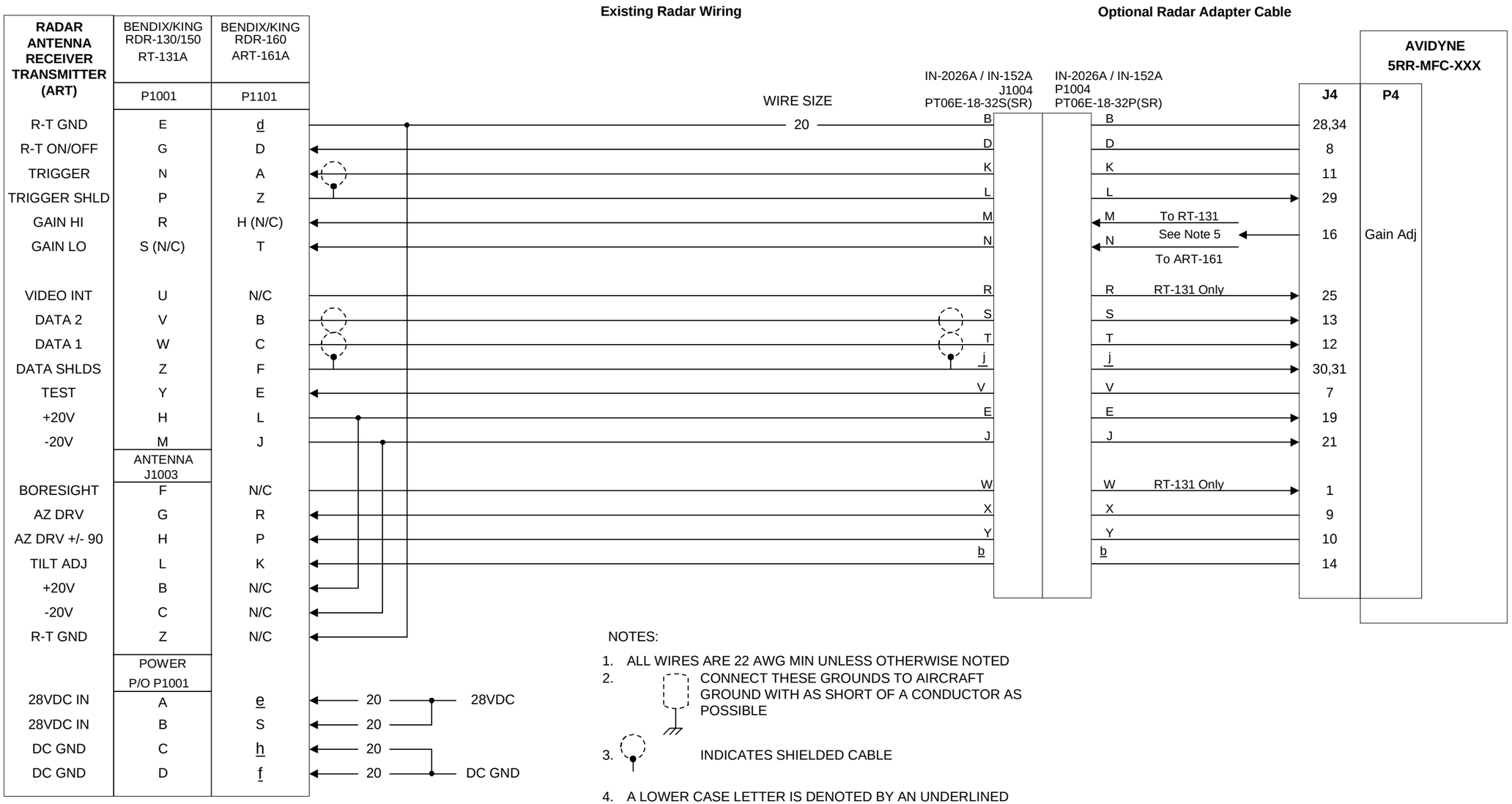
NOTES:

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)

APPENDIX N - RT-131A (with AT-133A or DA-144A), ART-161A Wiring Diagram, Using Avidyne Adapter Cable

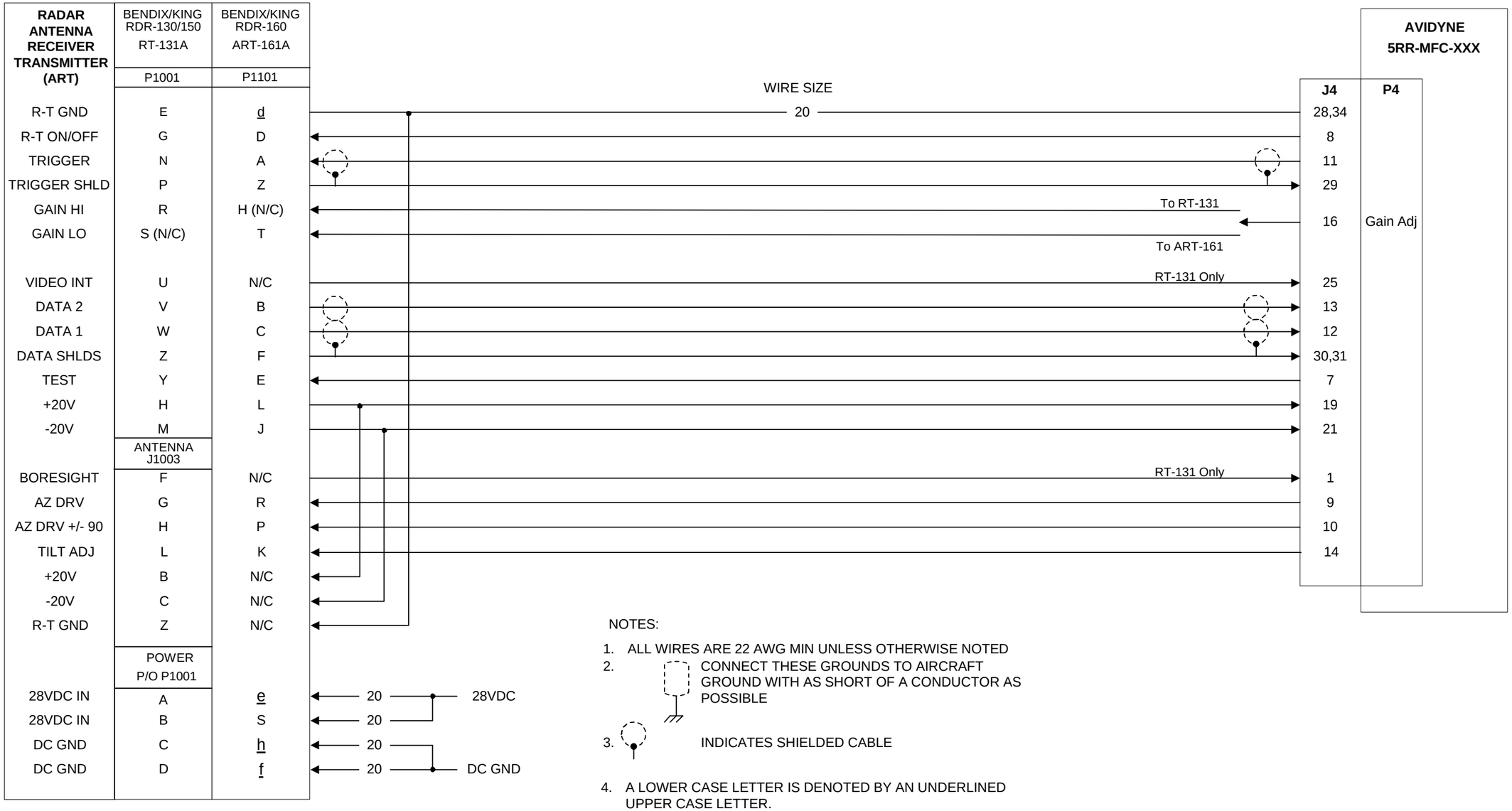


NOTES:

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 SHIELDED CABLE
4. A LOWER CASE LETTER IS DENOTED BY AN UNDERLINED UPPER CASE LETTER.
5. GAIN-ADJUST FROM FSD IS CONNECTED TO GAIN-HI ON RT-131A AND GAIN-LO ON ART-161A. THIS IS ACCOMPLISHED BY USING THE APPROPRIATE ADAPTER CABLE.

   FOR RT-131A USE 100-00017-000
   FOR RT-161A USE 100-00017-001

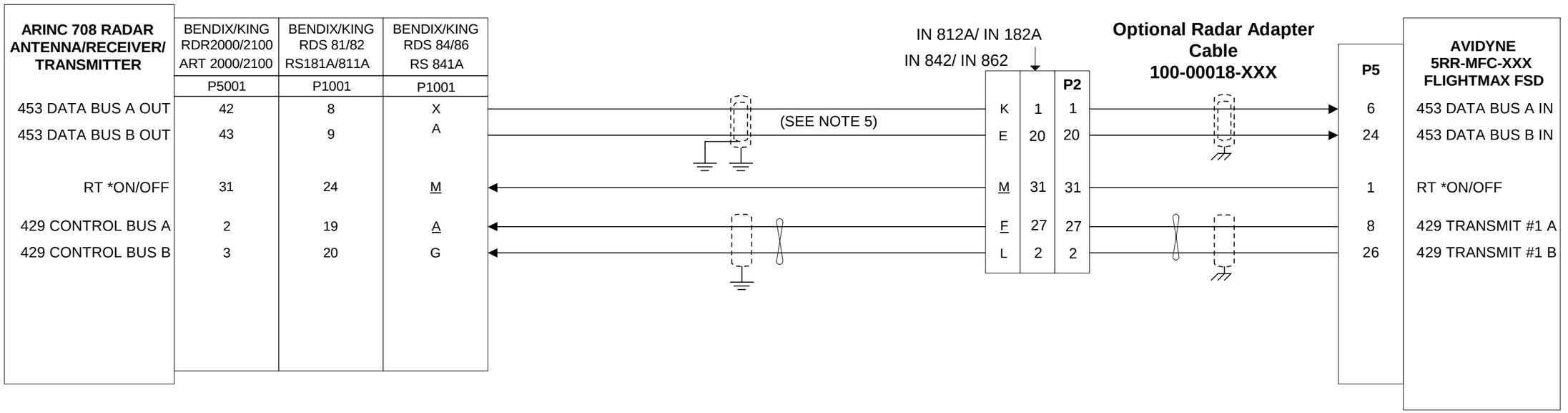
APPENDIX O - RT-131A (with AT-133A or DA-144A), ART-161A Wiring Diagram, Direct Connection to R/T



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 SHIELDED CABLE
4. A LOWER CASE LETTER IS DENOTED BY AN UNDERLINED UPPER CASE LETTER.

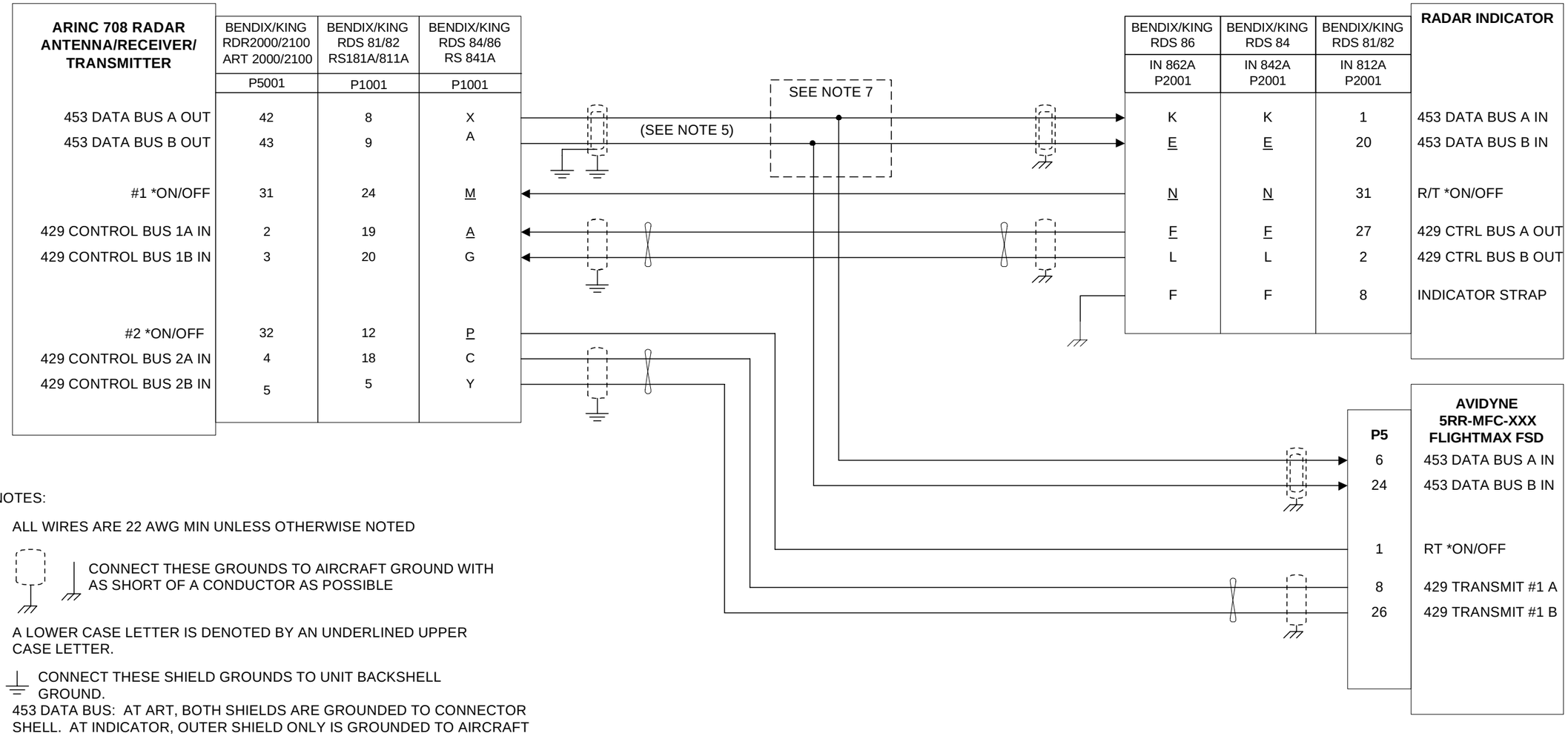
APPENDIX P - Digital Radar Wiring Diagram, Using FSD as Sole Radar Indicator



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. A LOWER CASE LETTER IS DENOTED BY AN UNDERLINED UPPER CASE LETTER.
4. CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
5. 453 DATA BUS: AT ART, BOTH SHIELDS ARE GROUNDED TO CONNECTOR SHELL. AT INDICATOR, OUTER SHIELD ONLY IS GROUNDED TO AIRCRAFT GROUND AS SHOWN. USE QUADRAX CABLE - NON PVC JACKET BENDIX KING P/N 024-00064-0000 OR EQUIVALENT.
6. INTERFACE SHOWN IS CONNECTION TO AVIDYNE FSD ONLY. REFER TO RADAR MANUFACTURER'S SPECIFIC INSTALLATION INSTRUCTIONS FOR COMPLETE INTERCONNECTION OF RADAR SYSTEM.
7. DENOTES TWISTED PAIR

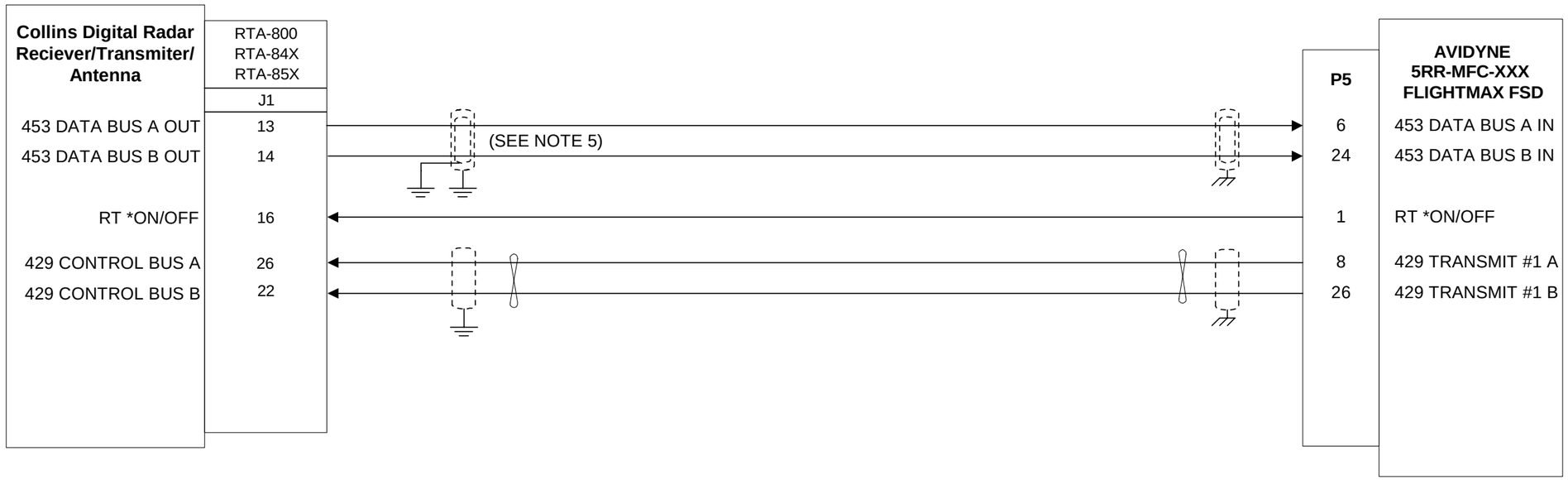
APPENDIX Q - Digital Radar Wiring Diagram, Using FSD as Secondary Indicator



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. A LOWER CASE LETTER IS DENOTED BY AN UNDERLINED UPPER CASE LETTER.
4. CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
5. 453 DATA BUS: AT ART, BOTH SHIELDS ARE GROUNDED TO CONNECTOR SHELL. AT INDICATOR, OUTER SHIELD ONLY IS GROUNDED TO AIRCRAFT GROUND AS SHOWN. USE QUADRAX CABLE - NON PVC JACKET BENDIX KING P/N 024-00064-0000 OR EQUIVALENT.
6. INTERFACE SHOWN IS CONNECTION TO AVIDYNE FSD ONLY. REFER TO RADAR MANUFACTURER'S SPECIFIC INSTALLATION INSTRUCTIONS FOR COMPLETE INTERCONNECTION OF RADAR SYSTEM.
7. THESE CONNECTIONS TO BE MADE WITHIN A UNIT BACKSHELL.
8. DENOTES TWISTED PAIR

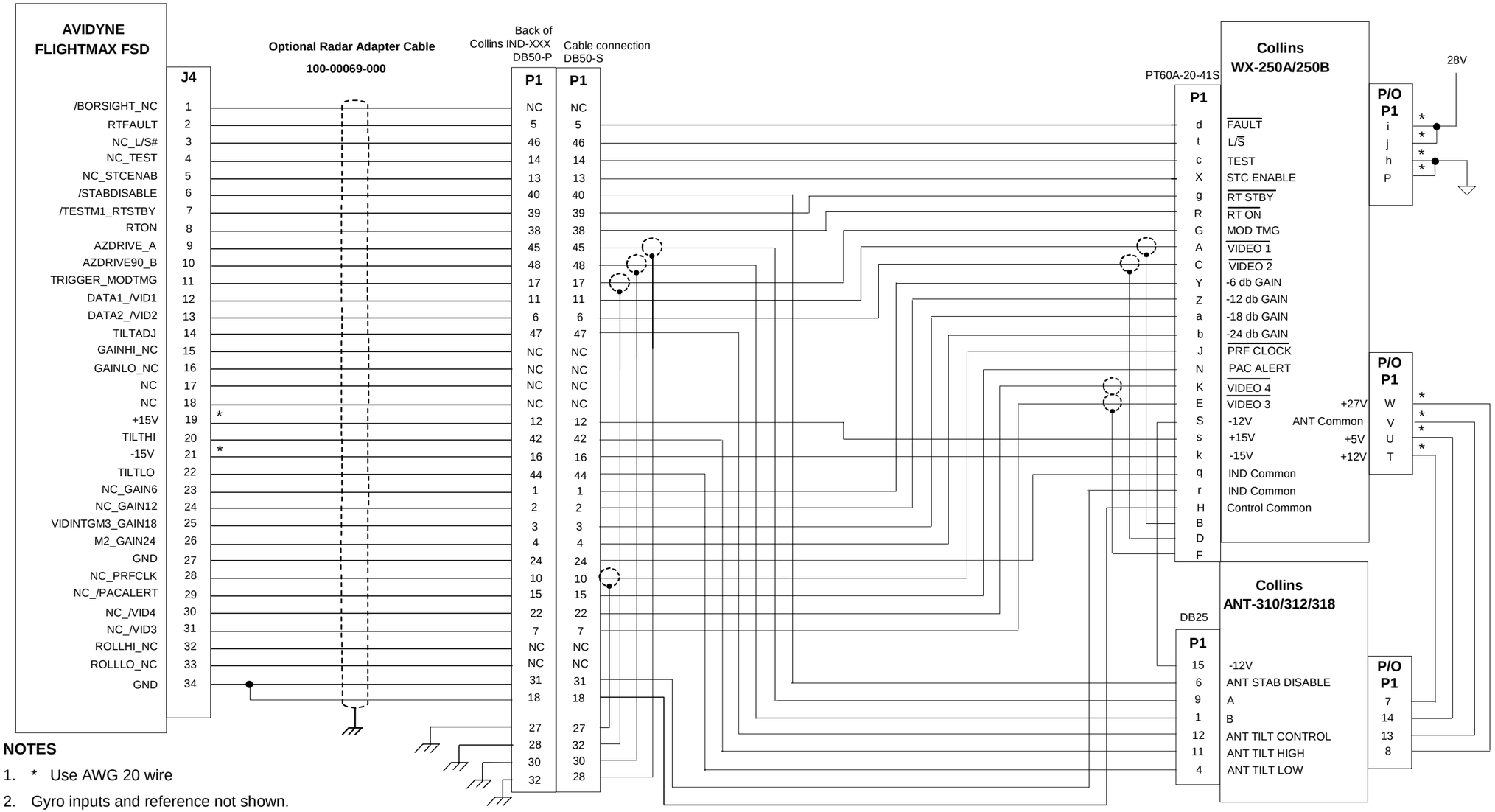
APPENDIX R - Collins Digital Radar Wiring Diagram



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. A LOWER CASE LETTER IS DENOTED BY AN UNDERLINED UPPER CASE LETTER.
4. CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
5. 453 DATA BUS: AT ART, BOTH SHIELDS ARE GROUNDED TO CONNECTOR SHELL. AT INDICATOR, OUTER SHIELD ONLY IS GROUNDED TO AIRCRAFT GROUND AS SHOWN. USE QUADRAX CABLE - NON PVC JACKET BENDIX KING P/N 024-00064-0000 OR EQUIVALENT.
6. INTERFACE SHOWN IS CONNECTION TO AVIDYNE FSD ONLY. REFER TO RADAR MANUFACTURER'S SPECIFIC INSTALLATION INSTRUCTIONS FOR COMPLETE INTERCONNECTION OF RADAR SYSTEM.
7. DENOTES TWISTED PAIR

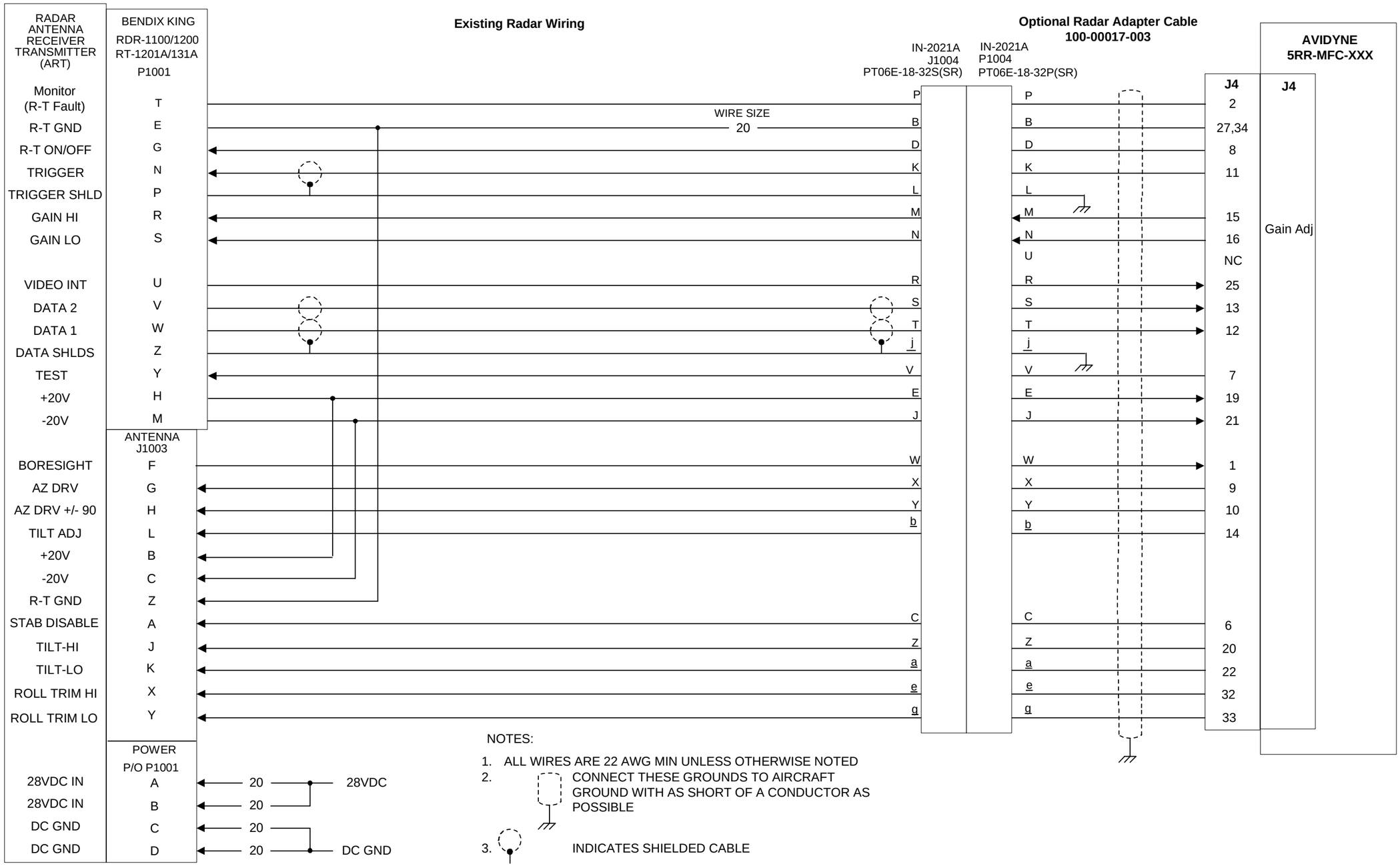
APPENDIX S - Collins Radar Interface



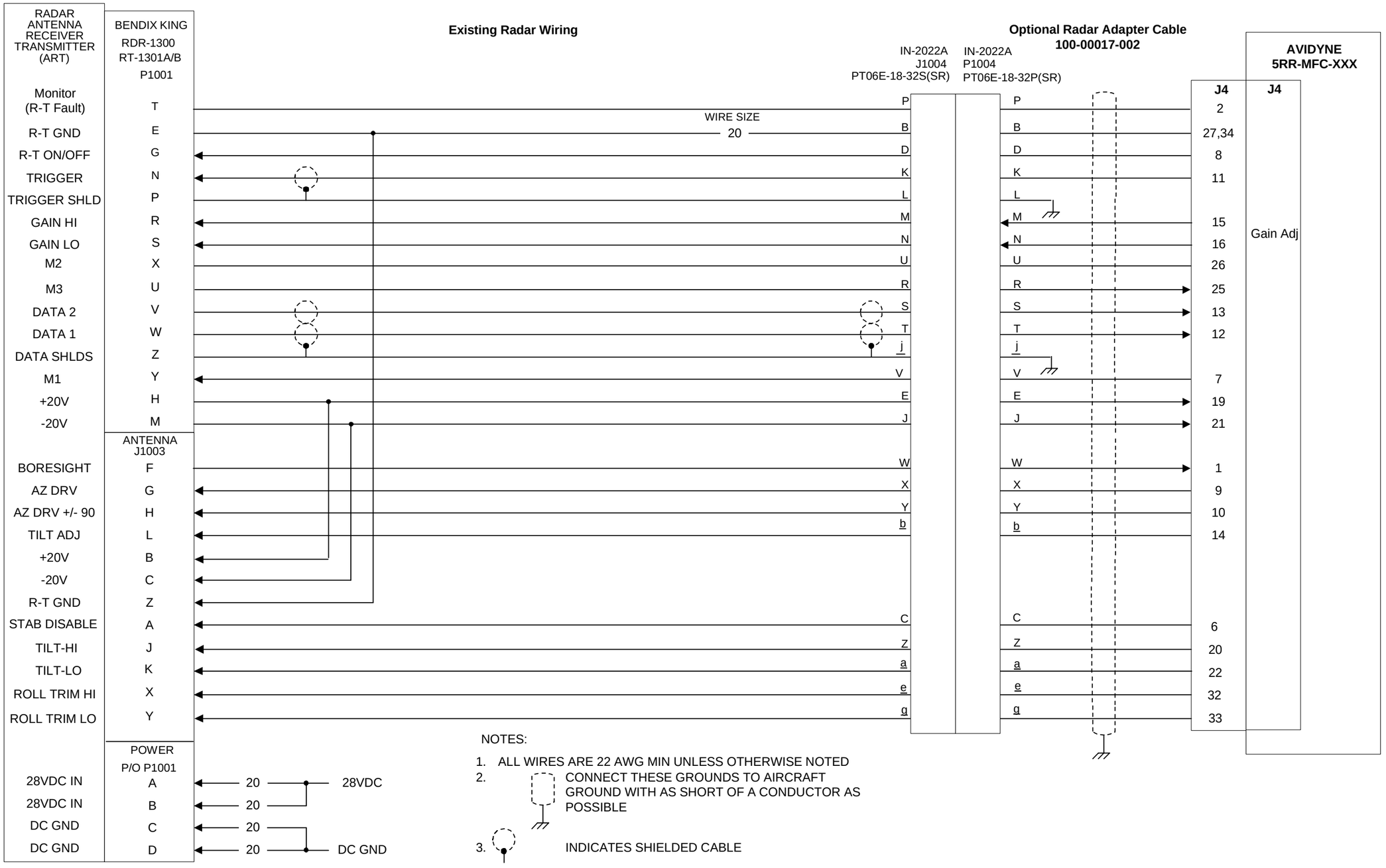
NOTES

1. * Use AWG 20 wire
2. Gyro inputs and reference not shown.
3. If junction box is used for interconnect wiring, all cable shields must be isolated from each other and from aircraft ground.
4. Recommended cable length is 6 meters (20 ft.) or less.
5. Refer to R/T manufactures manual to verify R/T wiring.

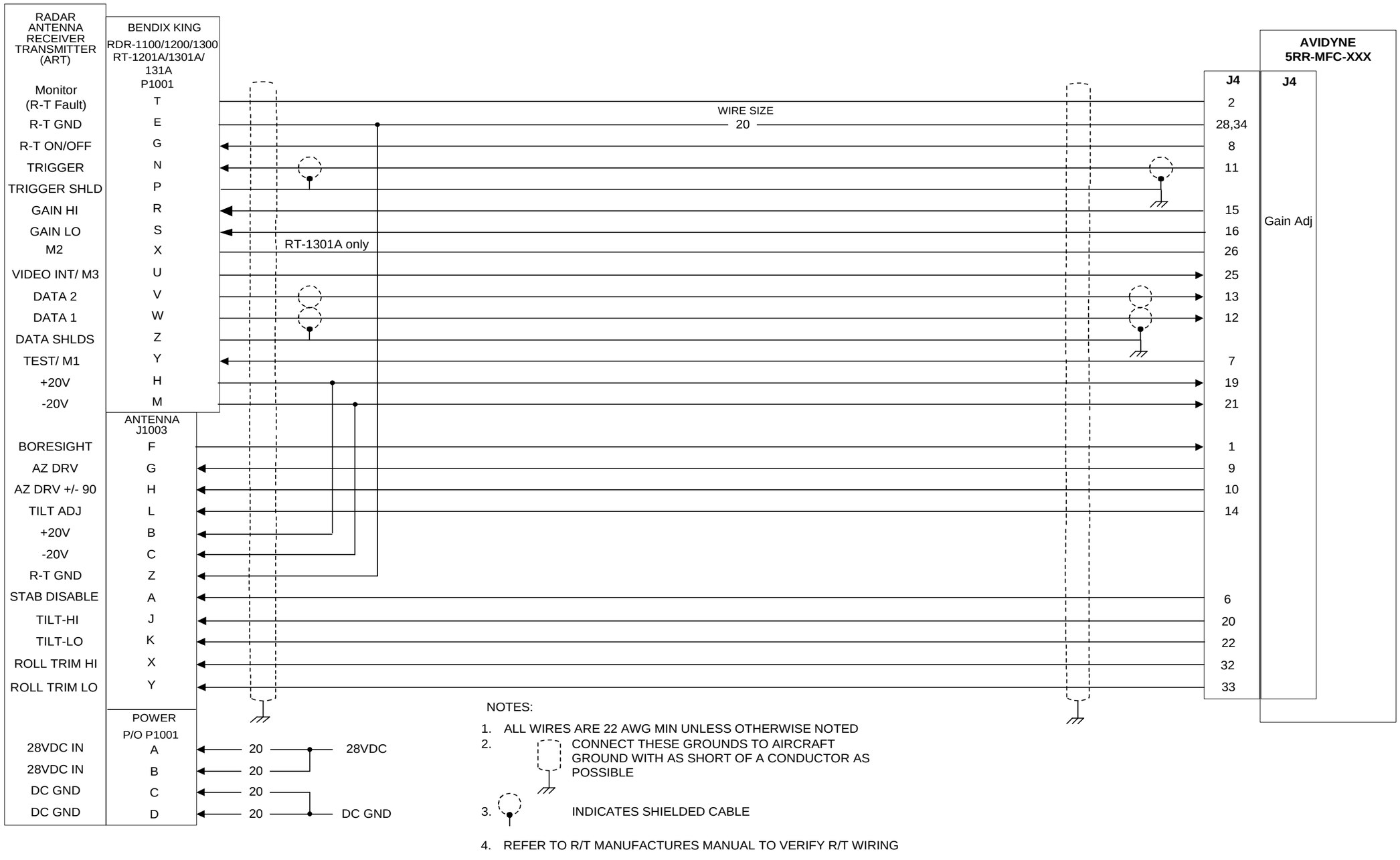
APPENDIX T - RT-1201A/131A (with DA-1203A) Wiring Diagram, Using Avidyne Adapter Cable



APPENDIX U - RT-1301A/B Wiring Diagram, Using Avidyne Adapter Cable



APPENDIX V - RT-1201A/131A and RT-1301A/B Wiring Diagram, Direct Connection to R/T



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 SHIELDED CABLE
4. REFER TO R/T MANUFACTURES MANUAL TO VERIFY R/T WIRING