AVIDYNE

Envision EXP5000

Primary Flight Display Installation Manual

700-00006-000 PFD

For Release 7.1 and later

Document P/N 600-00141-010 REV 6

Document Revisions

Date	Revision No.	Description
July 22, 2008	Rev. 00	Initial release per ECO-08-257. Single-PFD Envision EXP5000 installation manual.
September 24, 2008	Rev. 01	Release per ECO-08-382.
October 2, 2008	Rev. 02	Release per ECO-08-399. Revise check out procedures and add references to Star Aviation test procedures.
May 29, 2009	Rev. 03	Release per ECO-09-302. Clarify Sec 1 on applicability of AML STC
September 30, 2009	Rev. 04	Release per ECO-09-443. Add additional AML STC information in Sec 1.
October 16, 2009	Rev. 05	Release per ECO-09-469. Adding additional autopilot information for AML STC.
September 11, 2012	Rev. 06	Release per ECO-12-213. PFD SW Release 8.0.6 support

This document is applicable to:

PFD Software Part Number: 530-00200-( )

PFD Hardware Part Number: 700-00006-000

Magnetometer/OAT Sensor Hardware Part Number 700-00011-000

Magnetometer/OAT Sensor Software Part Number: 530-00124-000.

The latest installation manuals are available to authorized Avidyne dealers on the web at www.avidyne.com.

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Table of Contents

List of Tables

List of Figures

1 General Information

This manual contains FAA approved instructions for installation of the Avidyne Envision EXP5000 PFD and Magnetometer/OAT Sensor in 14 CFR Part 23 Class I and II aircraft, as defined in AC 23.1309-1C, when used in conjunction with the documents listed in Table 8, “Required Documents,” on page 8. This manual may also be used as a guide for installation of the Avidyne Envision EXP5000 PFD and Magnetometer/OAT Sensor in Class III aircraft listed on the AML (see AML R34-0447 for additional documents required for installation under the STC). Installation of the EXP5000 PFD into Class III aircraft not listed on the AML, or any 14 CFR Part 23 Class IV airplanes, 14 CFR Part 25 airplanes, or 14 CFR Part 27/29 rotorcraft, is not authorized under this STC.

This document supports the installation of one EXP5000 Primary Flight Display (PFD) and associated magnetometer and OAT sensors in an aircraft containing the following components:

EX5000 Multi Function Display (MFD) (Optional)

One or two GPS: Garmin GNS430/530 series, and possibly a secondary GNC420 series.

One of the following autopilots (Optional):

S-Tec 55X

S-Tec 65

ADF (Optional)

Radar altimeter (Optional)

Section 2.5, “Pre-Modification Planning” on page 10 lists the prerequisites for installation of the EXP5000 in Class I aircraft. Follow the installation instructions carefully to obtain maximum performance from the EXP5000 system.

This installation manual applies to the following Avidyne part numbers:

PFD software Release 7.1 and later: 530-00200-000 (With RVSM)

PFD software Release 7.1 and later: 530-00200-001 (No RVSM)

PFD hardware part number: 700-00006-000

Magnetometer/OAT sensor hardware part number: 700-00011-000

Magnetometer/OAT sensor software part number: 530-00124-000

For operating information, see the *Pilot Guide*, which is supplied with the EXP5000.

1.1 Equipment Description

The EXP5000 system consists of the following components:

EXP5000 PFD which is a panel-mounted, Primary Flight Display (PFD)

Magnetometer and OAT Sensor including pigtail cable

Pilot Guide

Installation Manual

1.2 Technical Specification

1.2.1 PFD Unit

Table 1: PFD Technical Specifications

Specification	Description/Requirement
Standard Features	
Display	High Brightness Sunlight Readable Color Active Matrix LCD
Diagonal size	10.4 inches
Resolution	SVGA 800 X 600
Interfaces	ARINC 429 (to GPS/VHF navigators), TTL and Analog (to Autopilot)
Minimum Viewing Angle	±60 degrees horizontal and +45/-15 degrees vertical
Physical Characteristics	
Weight	12.40 lbs
Height	8.5 inches
Width	10.7 inches
Depth	9.4 inches
Electrical Requirements	
Voltage	18-32 VDC, negative ground
Current	3.0 Amps Max @ 28 VDC
Dimming Bus	0-28VDC
Cooling Requirement	No special venting required. Maintain at least 2 inch clearance on top and bottom of PFD to permit adequate air flow
TSOs	See Section 1.3, “TSO Information” on page 3.

1.2.2 Magnetometer/OAT Sensor

Table 2: Magnetometer/OAT Sensor Technical Specifications

Specification	Description/Requirement
Standard Features	
Interfaces	RS-422 (to/from PFD)
Physical Characteristics	
Weight	0.52 lbs
Height	2.53 inches
Width	3.75 inches
Depth	3.75 inches
Electrical Requirements	
Voltage	24 VDC supplied by PFD
Current	Included in PFD value
Cooling Requirement	None
TSO	TSO-C6d

1.3 TSO Information

This section covers information regarding TSOs applicable to the PFD and Magnetometer/OAT Sensor. The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those installing this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.

Table 3 lists the TSOs authorized for PFDs with software part number 530-00200-( ).

Table 3: TSOs Applicable to PFDs with 530-00200-( ) Software

TSO#	Description	Type/ Categories	Ranges
TSO-C2d	AIRSPEED INSTRUMENTS	Type B	Airspeed Indicating Range is 20 to 300 KIAS
TSO-C3e	TURN AND SLIP INSTRUMENT	Type II	Turn Error - Category A
TSO-C4c	BANK AND PITCH INSTRUMENTS		
TSO-C6e	DIRECTION INSTRUMENT, MAGNETIC (GYROSCOPICALLY STABILIZED)		
TSO-C8e	VERTICAL VELOCITY INSTRUMENTS (RATE-OF-CLIMB)	Type B	Vertical Velocity Indicating Range is -4000 FPM to +4000 FPM
TSO-C10b	ALTIMETER, PRESSURE ACTUATED, SENSITIVE TYPE		Altitude Indicating Range is -1000 ft. to 35000 ft.
TSO-C34e	ILS GLIDE SLOPE RECEIVING EQUIPMENT OPERATING WITHIN RADIO FREQUENCY RANGE 328.6-335.4 MHz (DISPLAY)		
TSO-C36e	ILS LOCALIZER RECEIVING EQUIPMENT OPERATING WITHIN RADIO FREQUENCY RANGE OF 108-112 MHz (DISPLAY)		
TSO-C40c	VOR RECEIVING EQUIPMENT OPERATING WITHIN RADIO FREQUENCY RANGE OF 108-117.95 MHz (Display)		
TSO-C43c	TEMPERATURE INSTRUMENTS	Class IIIc	
TSO-C44c	FUEL FLOWMETERS		
TSO-C45b	MANIFOLD PRESSURE INSTRUMENTS		
TSO-C46a	MAXIMUM ALLOWABLE AIRSPEED INDICATOR SYSTEMS		
TSO-C47a	PRESSURE INSTRUMENTS - FUEL, OIL, AND HYDRAULIC		
TSO-C49b	ELECTRIC TACHOMETER: MAGNETIC DRAG (INDICATOR AND GENERATOR)		
TSO-C52b	FLIGHT DIRECTOR EQUIPMENT		

Table 3: TSOs Applicable to PFDs with 530-00200-( ) Software

TSO#	Description	Type/ Categories	Ranges
TSO-C55a	FUEL AND OIL QUANTITY INSTRUMENTS (RECIPROCATING ENGINE AIRCRAFT)		
TSO-C88b	AUTOMATIC PRESSURE ALTITUDE REPORTING CODE GENERATING EQUIPMENT		
TSO-C106	AIR DATA COMPUTER		
TSO-C113	AIRBORNE MULTIPURPOSE ELECTRONIC DISPLAYS		
TSO-C146b	STAND-ALONEAIRBORNE NAVIGATION EQUIPMENT USING THE GLOBAL POSITIONING SYSTEM (GPS) AUGMENTED BY THE WIDE AREA AUGMENTATION SYSTEM (WAAS)		

Table 4 lists the TSOs authorized, except where noted, for Magnetometer/OAT Sensor with software part number 530-00124-000.

Table 4: TSO Authorizations for Magnetometer/OAT Sensor

TSO#	Description	Type/ Categories	Ranges
TSO-C6D	DIRECTION INSTRUMENT, MAGNETIC (GYROSCOPICALLY STABILIZED)		

For some of the functions for which TSO approval has been granted, the PFD only provides part of the functionality covered by the TSO. Table 5 below lists those partial function TSOs along with the portion of the TSO functionality provided by the PFD.

Table 5: Partial Function TSOs

TSO#	Function Performed by PFD
C34e	Display function only
C36e	Display function only
C40c	Display function only
C44c	Display function only
C45b	Display function only
C46a	Display function only
C47a	Display function only
C49b	Display function only
C52b	Display function only
C55a	Display function only
C146b	Display function only

The PFD performs some functions that are not covered by TSOs. It is the installer's responsibility to ensure that when the PFD is installed, it will meet the required minimum performance standards for those functions. Those functions performed by the PFD but not covered by TSO are listed in Table 6.

Table 6: Function Not Covered byTSOs

Non-TSO Functions
Display of Vspeed labels

Table 7 lists the TSO deviations that have been granted for the applicable TSOs.

Note: Engine TSOs are not applicable to Envision (Aftermarket) installations.

Table 7: TSO Deviations Granted for the Applicable TSOs

TSO	Function
TSO-C2d - Airspeed Indicator	Airspeed indicator not labeled.
TSO-C10b - Altimeter	Airspeed is indicated with a tape instead of a dial Airspeed indication is presented over the ADI horizon instead of over a black background. The Altimeter indicator is not labeled. The PFD is environmentally qualified using the conditions and procedures of DO-160D or DO-160e instead of those prescribed in AS392c.
TSO-C44b/C44c – Fuel Flow meters	A digital readout is used instead of a dial. Fuel flow is presented over the ADI horizon instead of over a black background. The PFD is environmentally qualified using the conditions and procedures of DO-160d or DO-160e instead of those prescribed in AS407c.
TSO-C45a/C45b – Manifold Pressure Instruments	The manifold pressure gauge is labeled "MAP" instead of "Manifold Pressure" or "Manif Press". Digits change from white to yellow or red when the parameter is in the caution or warning range.
TSO-C47/C47a – Fuel, Oil and Hydraulic Pressure Instruments	The PFD is environmentally qualified using the conditions and procedures of DO-160D or DO-160e instead of those prescribed in AS408b(c). Digits change from white to yellow or red when the parameter is in the caution or warning range.
TSO-C49b - Tachometer	Digits from white to yellow or red when the parameter is in caution or warning range. Gradations are every 100 RPM instead of every 50 RPM as would be required by AS404b

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2 Installation Instructions

2.1 General Information

This section contains information for installing and wiring the PFD and Magnetometer/OAT Sensor. All installation procedures should follow the acceptable practices, methods, and techniques of avionics installations as described in FAA Advisory Circulars.

2.2 Unpacking and Inspection

The PFD shipping carton should contain the following:

Part Number	Description
700-00006-000	Envision Primary Flight Display (PFD) configured with the following options: S-TEC 55X or generic autopilot support 0-28 VDC Dimming Bus support Single PFD support
700-00011-000	Magnetometer/OAT probe with interconnect cable
600-00141-010	*Envision EXP5000 Installation Manual* (this document)
600-00157-000	*Envision EXP5000 Pilot Guide*

Note: The software part number is displayed on the Initialization Display window, described in the *Avidyne Pilot's Guide* for your aircraft, as well as on the System Setup Main window, described in Section 3.1, "Accessing the Setup Pages" on page 17.

Note: Envision is an aftermarket version of the Entegra system which is installed as a retrofit to existing aircraft.

Make sure that all of 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.

During system setup in Section 3.2, "System Page" on page 18, verify that the software listed below (or later) is installed in the PFD or Magnetometer/OAT sensor:

Software Number
530-00200-( ) Release 7.1 (PFD)
530-00124-000 (Magnetometer/OAT Sensor)

2.3 Additional Documents

The documents listed in Table 8 are required for installation in Class I and II aircraft. Reference AML R34-0447 for documents required for Class III aircraft.

Table 8: Required Documents

Document	Title
E34-0115	Engineering Order (Structures)
R34-0443	Instructions for Continued Airworthiness for Avidyne EXP5000 PFD with Magnetometer / OAT Sensor on Part 23 Airplanes
R34-0446	AFM Supplement for Installation of Avidyne EXP5000 PFD with Magnetometer / OAT Sensor on Part 23 Airplanes
R34-0444	Master Data List
R34-0447	Approved Model List (AML)

2.4 Parts Required But Not Supplied

Table 9: Parts Required But Not Supplied

Item	Part Number	Description	Vendor	Remarks	Qty
1	QQB575R36TXXXX	OVERBRAID	WIRE & CABLE, INC.	SEE NOTE 5, 6	AR
2	WX5	CABLE, STORMSCOPE	DALLAS AVIONICS	SEE NOTE 5, 7	AR
3	MS3126F12-10S	CONNECTOR (P734)	AMPHENOL		1
4	M22579/16-22-9	AWG 22 WIRE, UNSHIELDED	QPL	SEE NOTE 5, 7	AR
5	M22759/16-16-9	AWG 16 WIRE, UNSHIELDED	QPL	SEE NOTE 5, 7	AR
6	M27500-22TG3T14	CABLE, SHIELDED TWISTED THREE CORE	QPL	SEE NOTE 5, 7	AR
7	M27500-22TG2T14	CABLE, SHIELDED, TWISTED TWO CORE	QPL	SEE NOTE 5, 7	AR
8	M27500-22TG1T14	CABLE, SHIELDED, SINGLE	QPL	SEE NOTE 5, 7	AR
9	M39029/58-360	CONTACT, SIZE 22 PIN HD	QPL	SEE NOTE 4, 5	15
10	M39029/63-368	CONTACT, SIZE 20 SOCKET HD	QPL	SEE NOTE 4, 5	41
11	582-10A2B0C1F4L5N1	SWITCH (S570) & CONNECTOR (P570)	AVIONICS INT'L SUPPLY	"A/P ON" SEE NOTE 2, 5	1
12	582-10A2B0C1F4L5N2	SWITCH (S569) & CONNECTOR (P569)	AVIONICS INT'L SUPPLY	"F/D ON, A/P OFF" SEE NOTE 3, 5	1
13	27E894	RELAY SOCKET (P567, P735)	TYCO	SEE NOTE 5	2
14	RD9M10JVL0	CONNECTOR (J566)	POSITRONIC	SEE NOTE 5	1
15	RD9F10JV3X	CONNECTOR (P566)	POSITRONIC	SEE NOTE 5	1

Table 9: Parts Required But Not Supplied

Item	Part Number	Description	Vendor	Remarks	Qty
16	D-436-38	SPLICE	RAYCHEM	SEE NOTE 5	AR
17	D-150-0175	SPLICE, SHIELDED	RAYCHEM	SEE NOTE 5	3
18	704-15K36	DIODE, TRANSIENT SUPPRESSOR	MICROSEMI	SEE NOTE 1, 5	2
19	MS25036-107	TERMINAL RING, #6 AWG 14-16	QPL	SEE NOTE 5	2
20	M83519/2-8	SOLDER SLEEVE W/ PIGTAIL	QPL	SEE NOTE 5	41
21	M83519/2-7	SOLDER SLEEVE W/ PIGTAIL	QPL	SEE NOTE 5	4
22	M22759/16-20-9	AWG 20 WIRE, UNSHIELDED	QPL	SEE NOTE 5, 7	AR
23	KHS-17D11-24	RELAY	TYCO	SEE NOTE 5	2
24	20C297	RELAY CLIP	TYCO	SEE NOTE 5	2
25	MS25036-148	TERMINAL RING, #4	QPL	SEE NOTE 5	36
26	M23053/5-109-4	HEAT SHRINK	QPL	SEE NOTE 5	AR
27	D-436-37	SPLICE	RAYCHEM	SEE NOTE 5	AR
28	164164-1	PIN, SIZE 16, GROUNDING	TYCO	SEE NOTE 4, 5	2
29	1.5KE16CA	DIODE, TRANSIENT SUPPRESSOR	DIODES, INC.	SEE NOTE 1, 5	4
30	1N4001	DIODE	DIODES, INC.	SEE NOTE 1, 5	1
31	2TC2-10	CIRCUIT BREAKER, 10A	KLIXON	SEE NOTE 5	2
32	DD26F10GE0	CONNECTOR (P1401)	POSITRONIC	SEE NOTE 5	1

Note 1: Install heat shrink sleeving marked with equipment number over.
Note 2: Full P/N 582-10A2B0C1F4L5N1(G) P11,12 AP ON (Eaton)
Note 3: Full P/N 582-10A2B0C1F4L5N2(AA) P11,16 FD ON/AP OFF (Eaton)
Note 4: Contacts required for insertion into existing connector.
Note 5: Or equivalent part(s).
Note 6: Alt P/N AA59569AXXXX, where XXXX is the size. Size as required.
Note 7: Cut wire to length as required.

2.5 Pre-Modification Planning

2.5.1 Pre-Modification Checklist

Complete Table 10 to ensure that the aircraft to be modified is a candidate for installation of the EXP5000 PFD using the AML-STC. All rows must PASS in order to use the AML-STC as the certification basis for the EXP5000 installation.

Table 10: Pre-Modification Checklist

Item	Criteria	Pass
1	Is the aircraft to be modified listed on the Approved Model List (AML R34-0447)?	
2	Does the aircraft have sufficient electrical capacity to meet the electrical requirements in Table 1?	
3	Is there a location to mount two PFD circuit breakers that would be accessible to the pilot while seated?	
4	Is there an acceptable location to install the following standby instruments[1] in the pilot's field of view? See Section 2.6.2.1, "Location and Viewing Angle" on page 13. 1) Altimeter P/N 15035-01102 (alt. 15035-01106)[2] 2) Attitude Indicator P/N 4200-11 (alt. 4200-10)[3] 3) Airspeed Indicator P/N 25025-0177	
5	Does the aircraft have a compatible GPS#1 receiver (Garmin GNS430/530 series) or will one be installed?	
6	Does the aircraft have a compatible GPS#2 receiver (Garmin GNS430/530 series or GNC420 series) or will one be installed? - Optional; N/A if no GPS #2 interface.	
7	Is the aircraft equipped with a compatible autopilot (S-TEC 55X or 65) or will one be installed? - Optional; N/A if no Autopilot interface.	
8	Is there an acceptable location to mount the Magnetometer / OAT Sensor?	

1. *Manufacturer is Mid-Continent Instruments, 16320 Stagg Street, Van Nuys, CA 91406, 1-800-345-7599*
2. *P/N 15035-01102 has left hand knob. P/N 15035-01106 has right hand knob.*
3. *P/N 4200-10 has traditional airplane symbol; 4200-11 has delta wing airplane symbol.*

2.5.2 Requirements and Limitations

14 CFR 23.1311(a)(5) requires that independent secondary instruments be installed for Attitude, Altitude, Airspeed and magnetic direction indicator "whiskey compass" when an Electronic Display (e.g. EXP5000) is used as the primary instrument.

Part 23 aircraft that have no existing attitude indicator must install a standby attitude indicator as required by 14 CFR 23.1311(a)(5) even though the aircraft operates under VFR rules as per 91.205(b). Any deviation from this regulation requires separate FAA approval.

The existing outside air temperature probe (if installed) and magnetic direction indicator "whiskey compass" may not be removed during the installation of the Envision system.

2.5.2.1 Pneumatic Standby Instruments

The standby altitude and airspeed indicators should be connected to pitot and static lines that are independent of the PFD, if available.

2.5.2.2 Electric Standby Instruments

The standby attitude indicator should be connected to a power source independent of the aircraft's primary electrical power, such as an essential or emergency bus.

2.5.3 Electrical Load Analysis

Perform an electrical load analysis to verify that the aircraft complies with 14 CFR 23.1351(a). This can be accomplished by adding the loads in Table 11 to the aircraft's total electrical load for each affected bus. The resulting net electrical load for each bus must not exceed 85% of the aircraft's rated capacity for that bus.

Also, you must evaluate any change to electrical loads for functions essential to safe flight and landing to ensure that the 30 minute emergency power operation requirements of 14 CFR 23.1353(h) are met.

Table 11: 28 VDC Electrical Loads

Component	Bus #1 (Amps)	Bus #2 (Amps)
EXP5000 PFD[1]	3.0	3.0
Magnetometer / OAT Sensor	(incl. w/ PFD)	(incl. w/ PFD)
Removed Equipment[2]		
Total Change		

1. *The load shown for each bus is the load when power is received only from that bus. When power is received from both busses simultaneously, the sum of the loads is equal to the maximum load for one bus alone.*
2. *Show electrical load removed as negative value.*

2.6 Installing the Envision EXP5000 PFD

2.6.1 Installation Planning

Before installing the PFD, carefully assess the most effective positioning of the PFD based on space availability, viewing angle, cooling, and wiring considerations as described in Section 2.6.2, “Mechanical Installation” on page 13. Before you start, plan your installation by carefully reviewing all installation documentation, including mechanical and electrical instructions.

Avidyne recommends that you install the PFD with the MFD (if equipped) uninstalled to provide better access. Install the pitot and static lines after the PFD has been installed into the panel to avoid kinking the hoses.

See Appendix B: *Envision 700-00006-000 PFD Dimensions* , on page 48 for guidance with PFD dimensions and panel cutout requirements.

Locate the magnetometer a minimum of 3 feet away from electromagnetic field generating disturbances. These can be produced by equipment with current-carrying wiring such as motors, pumps, and strobe lights.

Install the OAT probe in a zone 3 lightning area (an area not subject to lightning attachment) as described in SAE ARP5414, “Aircraft Lightning Zoning”, dated December 1999. Place the OAT sensor underneath the wing in a free-air stream.

The PFD contains software developed in accordance with DO-178B Level B and C requirements. The Magnetometer contains software developed in accordance with DO-178B Level B (Rev. 01 or later) or Level C (Rev 00) requirements.

Perform the structural aspects of the installation in accordance with engineering order E34-0115 and AC43.13-2A, Chapter 1.

The PFD must be installed in conjunction with standby instruments as listed in Table 10. These instruments must have sensing and display of altitude, airspeed, attitude and heading independent of the PFD.

The secondary attitude indicator shall be powered (electrically or pneumatically) separately from the PFD in event of loss of primary power source to the PFD.

If you remove or replace a PFD, you must follow the full setup procedure described in Section 3, “System Setup” on page 17 for the new PFD.

2.6.2 Mechanical Installation

2.6.2.1 Location and Viewing Angle

The PFD is designed to be panel-mounted and held in place by four captive 10-32 screws. A standard 1/4" wide slotted screwdriver is required. Install each screw with 30 +/– 0.5in-lb. of torque. Locate the PFD in the panel so that the pilot can easily reach all knobs and controls.

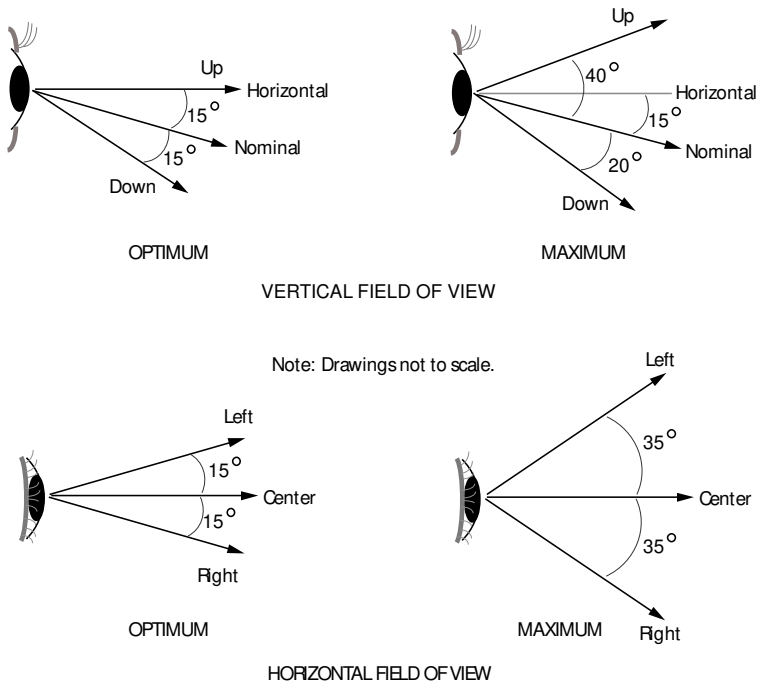

Figure 1: Pilot's Field of View

Locate the PFD and secondary instruments (airspeed indicator, altimeter, and attitude indicator) in the pilot's primary field of view. The pilot's primary field of view is shown in Figure 1 as measured from the centerline of the pilot's seat forward, with the seat adjusted for the pilot's nominal eye position.

Keep the following in mind:

Other avionics required for approved flight operations, relocated as a result of this installation, must remain readily accessible to the pilot.

The panel assembly must include placard content equivalent to that existing prior to the modification.

After installing the PFD, you must perform an aircraft-specific electrical load analysis to assure adequate generating system margins (15%) as described in Section 2.5.3, "Electrical Load Analysis" on page 11.

2.6.2.2 Cooling

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

2.6.2.3 Mounting the PFD

Reference engineering order E34-0115 for structural installation instructions.

2.6.2.4 Pitot-Static Interface

The PFD connects directly to the aircraft pitot-static system. Reference drawing D34-1147.Use the following pressure connectors:

Quantity	Part Number	Description	Supplier
2	PMC1703	3/16” tube ID, barb style, quick clip, Acetal	Colder Products

The Pitot (Pt) and Static (Ps) connections on the PFD are marked accordingly. In addition, the Pt connector on the PFD is color-coded red. It is recommended that the aircraft pitot connector also be color coded red to help assure proper connection. The installer must assure that the pitot and static connectors are fully seated. This is indicated by the engagement of the connector mounted locking bracket.

Pitot-static pneumatic lines must be installed so as to provide positive drainage (inhibit water entrapment at the low point(s) of the tubing runs).

2.6.3 Electrical Installation

2.6.3.1 PFD Connectors

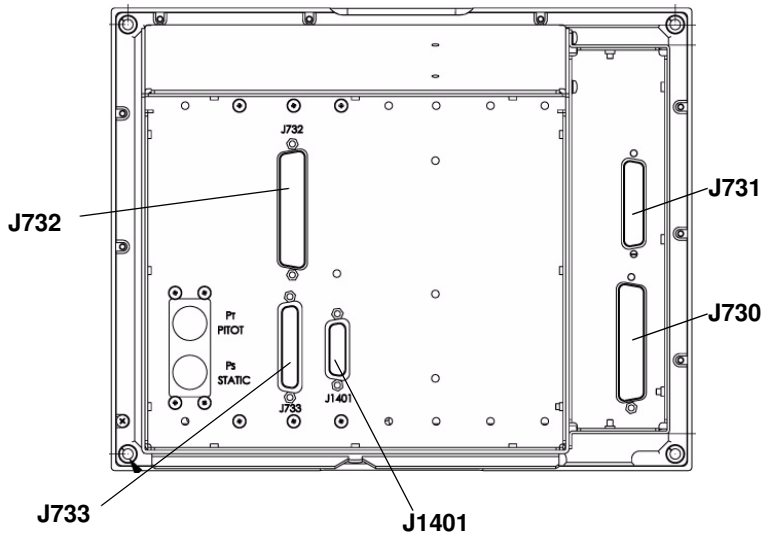

Figure 2: PFD Connectors

Table 12: PFD Connectors

Connector #	Function	Connector Type
J1401	PFD-MFD Interconnect	Positronics ODD26M5R8N00
J730	Power and Magnetometer	Positronics CBD36W4M55R8N00
J731	Backup Power	Positronics CBD9W4M55R8N00
J732	System Interconnect	Positronics ODD78M5R8N00
J733	System Interconnect	Positronics ODD44M5R8N00
PS	Pitot Static	Colder Products MC4202
PT	Pitot	Colder Products MC4202

2.6.3.2 Electrical and Sensor Interfaces

Power to the PFD is provided directly from the aircraft, there is no on/off switch. The PFD primary voltage is nominally 28 VDC. The PFD should be wired to the aircraft dimming bus (if equipped) to control the bezel button backlight brightness via the cockpit panel brightness control.

Wiring aspects of the design, including wire type and size selection must conform to Advisory Circular AC 43.13-1B, Section 5, *Electrical Wire Rating.* Wire conforming to MIL-W-22759/16 or MIL-C-27500 satisfies the burn requirements stated in 14 CFR 23.1359.

2.6.3.3 Wiring Interface

Ensure that all avionics, as appropriate to your aircraft, are connected to the PFD in accordance with the wiring diagrams in Appendix E: *PFD Wiring Diagrams*, on page 52.

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3 System Setup

This section discusses the setup procedures for software release 7.1.X, part number 530-00200-( )

Note: After making any configuration changes, you must cycle power to the PFD.

3.1 Accessing the Setup Pages

You will use the System Setup and Information pages to set up the EXP5000.

Before accessing the System Setup and Information pages, start all the sensors that interface with the PFD, including the GPS and the autopilot.

3.1.1 Accessing the System Setup and Information Pages

To access the System and Information Pages:

1. Turn on the PFD by applying power to the aircraft via the battery switch.

   The system will begin its normal start up sequence.

2. Simultaneously press and hold the top left (*L1*) and third down (*L3*) buttons until the countdown timer in the lower left corner of the display indicates zero seconds (See Figure 3, PFD Controls).

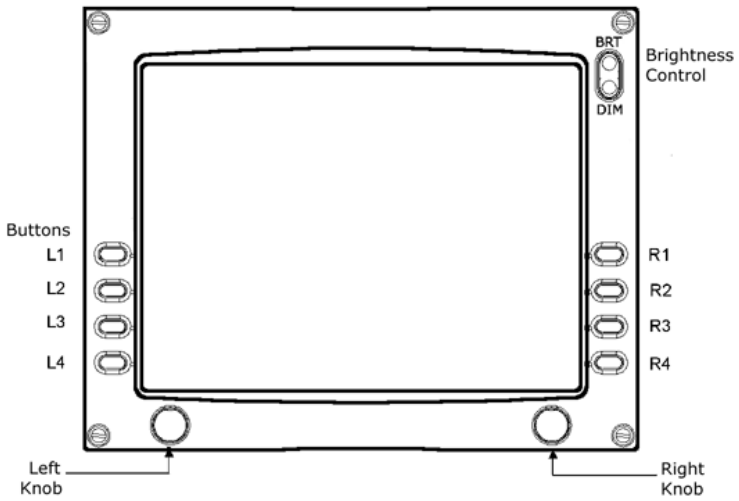

Figure 3: PFD Controls

3. When the countdown clock next to the *L4* button indicates 0, the System Page displays.

   The tabs at the bottom of the page indicate the available System Setup and Information Pages, which you can access by turning the left knob. The tab for the current page is highlighted with a green border. The System Setup and Information Pages are:

   System Page, page 18

   Avionics Page, page 23

   Display Format/Units Page, page 27

   Calibration Page, page 29

Logging Page and System Info Pages—Used by qualified Avidyne Service Technicians to diagnose problems with the PFD. Not discussed in this installation manual.

3.2 System Page

Figure 4: System Page

The System Page provides summary information about the PFD and its current setup. The information on the System Page depends on the your aircraft and PFD software version.

Depending on the PFD software version, the following minimum information is displayed:

PFD Serial Number (or Serial Number)

S/W Version ID — Verify that software Release 7.1 or later is installed.

Aircraft Make — For Envision installations, the Aircraft Make is *Aftermarket*. This value cannot be changed.

Model — For Envision installations, the aircraft Model is *Aftermarket*. This value cannot be changed.

Pitch Offset — Corrects for small instrument panel pitch angle offsets.

Avionics — Lists the avionics and sensors with which the PFD is configured to operate.

The default ASI (airspeed) configurations also display. These values must be changed or set from the *Airspeed Indicator Configuration* page as described in Section 3.2.2, “Configuring the ASI (Airspeed Indicator)” on page 20.

The buttons on the System Page are:

A/C Model—For Envision installations, the aircraft Model is *Aftermarket*. This value cannot be changed.

Back to PFD—Saves your changes and returns you to the flight state of the PFD display. This button is available on all System Setup and Information Pages. Always power cycle the PFD after making changes and returning Back to PFD.

Configure ASI (Airspeed Indicator)—Allows you to change the factory default V-Speed indications. For Envision installations, allows you to set the V-Speeds for the aircraft.

3.2.1 Adjusting the Pitch Offset

Adjusting Pitch Offset corrects for small differences in pitch angle (± 5°) between the instrument panel and the aircraft angle of attack.

Note: You must perform the IRU Calibration (Section 3.6.1, “Calibrating the IRU” on page 30) BEFORE you adjust the Pitch Offset.

To calibrate the pitch offset:

1. On the *System* page, select the **Pitch Offset** parameter.
2. Press, hold, and rotate the right knob to select the desired pitch offset.
3. Press **Back to PFD** to save the pitch offset changes.
4. If needed, repeat until the pitch offset is satisfactory.

The default setting for pitch offset is the nominal instrument panel pitch angle. To reset the offset to default, press the right knob.

3.2.2 Configuring the ASI (Airspeed Indicator)

For most aircraft, the Airspeed Indicator Configuration page displays the current factory defaults. The ASI displays the V-Speeds and other important information.

Note: If you make changes to the VSpeeds, **follow the procedure below exactly**. Any deviation may cause the VSpeed edits not to be saved, which may result in inaccurate indications on the Airspeed Indicator.

To configure the ASI:

1. Before you enter the Airspeed Indicator Configuration page, cycle power to the PFD and then open the *System Configuration Page* as described in Section 3.1.1, “Accessing the System Setup and Information Pages” on page 17.
2. Press **Configure ASI**. The *Airspeed Indicator Configuration* page opens:

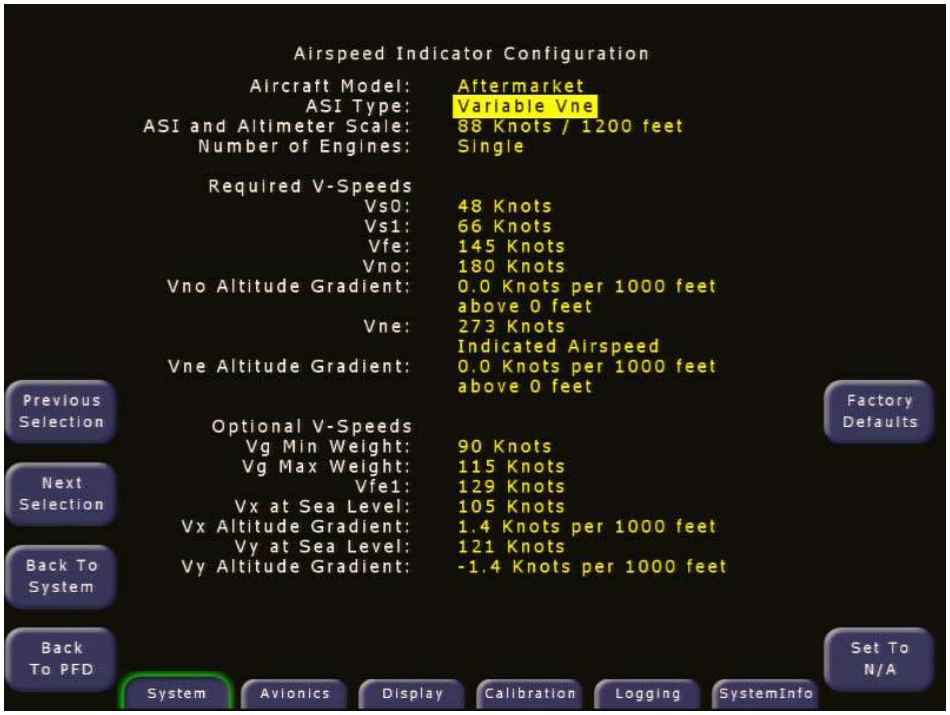

Figure 5: Airspeed Indicator Configuration Page

3. Enter the following information, which can be found in the *Pilot Operating Handbook* or in the *Airspeed Configuration Data Document* (if available) for the specific aircraft (and model, if applicable):

   ASI Type— Select from: Fixed V_{MO}, V_{MO}/ M_{MO}, Fixed V_{NE}, or Variable V_{NE}.

   Number of Engines—Select *Single*,*Twin or Inline Twin*.

   ASI and Altimeter Scale—Select the airspeed and altimeter scale as appropriate for the aircraft performance type:

   Normal Range Aircraft—44 knots/440 feet

   Extended Range Aircraft—88 knots/1200 feet

Note: Setting the airspeed and altimeter automatically sets the vertical speed scale, even though vertical speed does not display on the Airspeed Indicator Configuration page.

– When set to *44 knots /440 feet*, the vertical speed scale is ±2000 fpm.
– When set to *88 knots /1200 feet*, the vertical speed scale is ±3000 fpm.

Note: GAMA 12 - *Recommended Practices and Guidelines for an Integrated Cockpit /Flight Deck in a 14 CFR Part 23 (or equivalent) Airplane* recommends that "the range visible on the airspeed tape must be appropriate to airplane performance; but should not be less than ±15 percent of V_{NE} or V_{MO}, as appropriate." For example, if V_{NE} is 200 kts, the band should show a range of 60 kts. Reference Pilot Operating Handbook for aircraft's V_{NE} or V_{MO} value.

Required V-Speeds—The required V-Speeds applicable to your aircraft model and ASI type display under the Required V-Speeds. Table 13 displays the V-Speeds required for each type of ASI. Enter the values for your aircraft in the last column.

Table 13: Required V-Speeds

V-Speed	Speed Definition	Fixed V_{MO}	V_{MO}/ M_{MO}	Fixed V_{NE}	Variable V_{NE}	Twin	Inline Twin	Your Values
V_{FE}	Maximum Flap Extended							
V_{MC}	Minimum Control							
V_{MO}	Maximum Operating							
V_{NE}	Never Exceed							
V_{NO}	Maximum Structural Cruise							
V_{S0}	Stall (Full flap)							
V_{S1}	Stall (No flap)							
V_{YSE}	Best Rate Of Climb, Single Engine							
M_{MO}	Maximum Operating Mach Number							
$V_{MO}SF$	Altitude Dependent Speed gradient on V_{MO}							
$V_{NE}SF$	V_{NE} Altitude Gradient							
$V_{NO}SF$	V_{NO} Altitude Gradient							
$V_{NE}Alt$	V_{NE} Altitude Cutoff							
$V_{NO}Alt$	V_{NO} Altitude Cutoff							

Optional V-Speeds—The optional V-Speeds applicable to your aircraft model and ASI type display under the Optional V-Speeds. Table 14 displays the V-Speeds that may display for each type of ASI. Enter the values for your aircraft in the last column.

Table 14: Optional V-Speeds

V-Speed	Speed Definition	Fixed V_{MO}	V_{MO}/ M_{MO}	Fixed V_{NE}	Variable V_{NE}	Twin	Inline Twin	Your Values
V_G Min Weight	Best Glide at Min Weight							
V_G Max Weight	Best Glide at Max Weight							
V_{Fe1}	Maximum Speed for First Flap Setting							
V_X at Sea Level	Best Angle Of Climb							
V_Y at Sea Level	Best Rate Of Climb							
V_X Altitude Gradient	V_X Density Altitude Gradient							
V_Y Altitude Gradient	V_Y Density Altitude Gradient							

Note: After a power cycle, you need to verify that you have correctly entered the appropriate V-Speeds for the aircraft. The PFD does validate some V-Speeds; if it finds an invalid V-Speed, an error displays (as shown in Figure 5, “Airspeed Indicator Configuration Page,” on page 20).

4. Use the buttons and knobs on the Airspeed Indicator Configuration Page as follows:

   Previous Selection—Moves the cursor up to the previous item in the selection list. Use the right knob to change the value for that selection.

   Next Selection—Moves the cursor down to the next item in the selection list. Use the right knob to change the value for that selection.

   Back to System—Returns to the System Page. Note that your changes are not saved until you press ***Back to PFD***.

   Back to PFD—Saves your changes and returns you to the flight state of the PFD display.

   Factory Defaults—For aircraft that come with factory settings in place, returns the V-Speeds to the original configuration.

   Set as N/A—For optional V-Speeds only, use *Set as N/A* to make the selected speed unavailable (not available) to the pilot. In this case, the V-Speed will not appear on the PFD airspeed tape.

   Right knob—To change a value, use the right knob to change the value to the value specified for the aircraft in the *Airspeed Configuration Data Guide.*

5. When you are done, press **Back to PFD** *to* save your changes and power cycle the PFD.

6. If you made any changes to the VSpeeds, select the System Page after the power cycle, and verify that any changes you made to the VSpeeds are listed in the VSpeeds section of the System Page (in the right-hand column). If they do not display as expected, repeat steps 1 through 5. The VSpeeds should agree with the values entered in Table 13 & Table 14.

3.3 Avionics Page

To set up the avionics for the PFD:

1. Rotate the left knob to select the Avionics Page:

Figure 6: Avionics Page, Release 7.1 and Later

The avionics on the aircraft are shown. Make sure that the information on this page matches the installed avionics on your aircraft.

You can adjust the following:

GPS 1 or **2**—Select the GPS source, or Not Installed.

VHF 1 or **2**—Select the VHF source, or Not Installed.

Autopilot—Select the autopilot installed, or Not Installed. Use Generic for S-Tec System 65 autopilots.

Air Data Source—Select the air data source: Internal, or External on ARINC...

Note: Selecting **Internal** causes the PFD to use the built-in air data card. Selecting **External** causes the PFD to read air data over the ARINC 429 channel. The External option is available only for 530-00200-000 and -100. All RVSM installations must use -000 or -100 software and must select the External air data source.

OAT Source—Select the OAT source: ADC (Air Data Computer), or None.

In some installations using the internal air data sensors, the OAT probe on the magnetometer is mounted inside the aircraft and will not provide accurate temperature readings. If an accurate OAT source is not available, the OAT Source must be set to None. This is especially critical on aircraft certified for flight into known icing.

Note: If the OAT source is None, the OAT will not be displayed on the PFD.

ADF—Select the ADF type or Not Installed. The ADF types are defined as follows:

KR87 on ARINC Rx 5 - Selects the King KR87 ADF. Using this selection, the PFD displays only the ADF bearing in the Nav display.

DFS43A on ARINC Rx 5 - Selects the Chelton DFS 43A Direction Finder System. Using this selection, the PFD expects to receive both bearing and channel frequency data and displays both in the Nav display.

Radar Altimeter—Select radar altimeter or Not Installed.

Use the following buttons and knobs to select parameters, make changes, and apply changes:

Previous Selection—Moves the cursor up to the previous item in the selection list. Use the right knob to change the value for that selection.

Next Selection—Moves the cursor down to the next item in the selection list. Use the right knob to change the value for that selection.

Back to PFD—Saves your changes and returns you to the flight state of the PFD display.

Right knob—Use the right knob to change the value to the next enabled value.

Back to PFD—Saves your changes and returns to the PFD flight state.

Note: PFD features and functions change as a result of the avionics selections.

2. On the Avionics Page, make any avionics changes as needed.
3. When you are finished, press **Back to PFD** *to* save your changes, power cycle the PFD, and continue to the next procedure.

After selecting the avionics, configure the GNS units for your aircraft as described in Section 3.4, “Configuring the GNS Unit” on page 25.

3.4 Configuring the GNS Unit

You must also configure the Garmin 420/430/530 GNS unit to communicate with the PFD after selecting the avionics as discussed in Section 3.3, “Avionics Page” on page 23.

Note: See the *Users Guide* for your GNS unit for detailed operating information.

Note: Except where specified, instructions that reference Garmin 420/430/530 also apply to the WAAS-capable Garmin 420W,430W, and 530W units.

Note: EXP5000 PFDs with software part numbers other than 530-00183-000 Rev 02 or 530-00194-XXX Rev 00 are not approved for use with WAAS capable navigators.

To configure the Garmin 420/430//530-series:

1. On the GPS unit, enter Maintenance Mode:
   a. If needed, turn OFF the GPS unit.
   b. Press **ENT** while turning the unit ON.
   c. The GPS unit will go through a self-test. Continue to press **ENT** until the self-test completes.
2. Press **ENT** twice to display the MAIN ARINC 429 CONFIG Page. Configure the GPS unit as follows:

Table 15: Main ARINC 429 Configuration Page

Field	GNS Unit in slot #1	GNS Unit in slot #2 (if installed)
IN 1	Low, Sandel EHSI	Low, Sandel EHSI
IN 2	Low, OFF	Low, OFF
Out	Low, GAMA 429 Graphics	Low, GAMA 429 Graphics
SDI	LNAV1	LNAV2
VNAV	Enable Labels (430W/530W)	Enable Labels (430W/530W)

Note: Even with VNAV labels enabled, software prior to Release 7 (530-00194-( )) will not give vertical guidance.

3. Turn the right inner knob until the MAIN RS232 CONFIG Page displays. Configure the GNS unit as follows:

Table 16: Main RS232 Configuration Page

Field	GNS-430 + “W” in slot #1		GNS-430 + “W” in slot #2 (if installed)	
	Input	Output	Input	Output
CHNL 1	Off[1]	Aviation	Off[1]	Aviation
CHNL 2	Off[1]	Off[1]	Off[1]	Off [1]
CHNL 3	Crossfill[2]	Crossfill[2]	Off [1]	Off [1]
CHNL 4	Off[1]	Off [1]	Off [1]	Off [1]

1. Unless other equipment is installed (i.e., Stormscope)

2. Applies when dual GNS units are installed, otherwise ignore.

4. For GNS-430/530 and "W" Units only (for GNC-420 units, go to step 5):

a. Turn the right inner knob until the MAIN INPUTS 2 Page displays.

Verify that CDI = GPS.

b. Turn the right inner knob until the MAIN DISCRETE OUTPUTS Page displays.

Verify that Discrete Toggle = APR.

c. Turn the right inner knob until the VOR/LOC/GS ARINC 429 CONFIG Page displays.

d. Configure the GNS-430/530 unit as follows:

Table 17: VOR/LOC/GS ARINC 429 Configuration Page

Field	GNS-430/530 in slot #1	GNS-430/530 in slot #2 (if installed)
Speed	Low - Low	Low – Low
IN 2	VOR/ILS1	VOR/ILS2
DME Mode	Directed Freq. 1	Directed Freq. 2

5. Cycle the power, then start the unit up normally (that is, not in Maintenance Mode).

6. Use the right knobs to view the Aux/Setup 1 Page.

7. Verify that Mag Var = Magnetic.

Note: Ensure that the GPS unit lighting is configured appropriately and that night lighting is balanced with the PFD, other avionics and aircraft systems.

Note: The 400W/500W series navigators have the ability to use Baro-corrected Altitude, which the PFD outputs. To do this, set the "IN1" field on the MAIN ARINC 429 CONFIG page to EFIS/ Airdata. However, doing this will remove the ability to switch Nav source from the PFD.

3.5 Display Format/Units Page

To set EXP5000 display options:

1. Scroll the left knob to the Display tab.
2. The Display Format/Units Page displays:

3. Select the display options you want as follows:

Table 18: Display Page Options

Button	Options	Default	Description
Trim Ann	Hide, Show	Hide	(S-TEC 55X only) If set to Hide, suppresses the TRIM autopilot annunciation. Owners of aircraft equipped with Auto-Trim may prefer this option set to Hide.
A/P Annun	Hide, Show	Hide	(S-TEC 55X only) If set to Hide, suppresses the SOFT, CAP, and DSBL autopilot annunciations.
V-Speeds	Hide, Show	Hide	If set to Hide, suppresses the V-Speed labels (V_G, V_Y, etc.).
Baro Units	In-Hg, Mb, hPa	In-Hg	Sets the units used for the baro setting display.
Fuel Units (if available)	English, Metric	English	Determines the units used for the display of fuel flow and fuel quantity. Not available for all aircraft.

Table 18: Display Page Options

Button	Options	Default	Description
Horiz Marks	Hide, Show	Hide	If set to Hide, suppresses the horizon heading reference marks (N, NE, E, etc.).
ARS	Delta, W	Delta	Determines the type of Aircraft Reference Symbol (ARS) displayed on the ADI. If W is selected, Flight Director command bars will not be displayed.  **Delta ARS**  **W ARS**
Back to PFD			Saves your changes and returns to the PFD flight state.

Note: For aircraft equipped with Flight Director, setting the ARS display to the flying W suppresses the Flight Director command bars. Avidyne suggests that you only set the flying W ARS symbol for non-Flight Director equipped aircraft.

4. When you are done, press **Back to PFD** or use the left knob to select another System Setup page.

3.6 Calibration Page

To calibrate the EXP5000:

1. Rotate the left knob to open the *Calibration* page.
2. The Calibration Page displays:

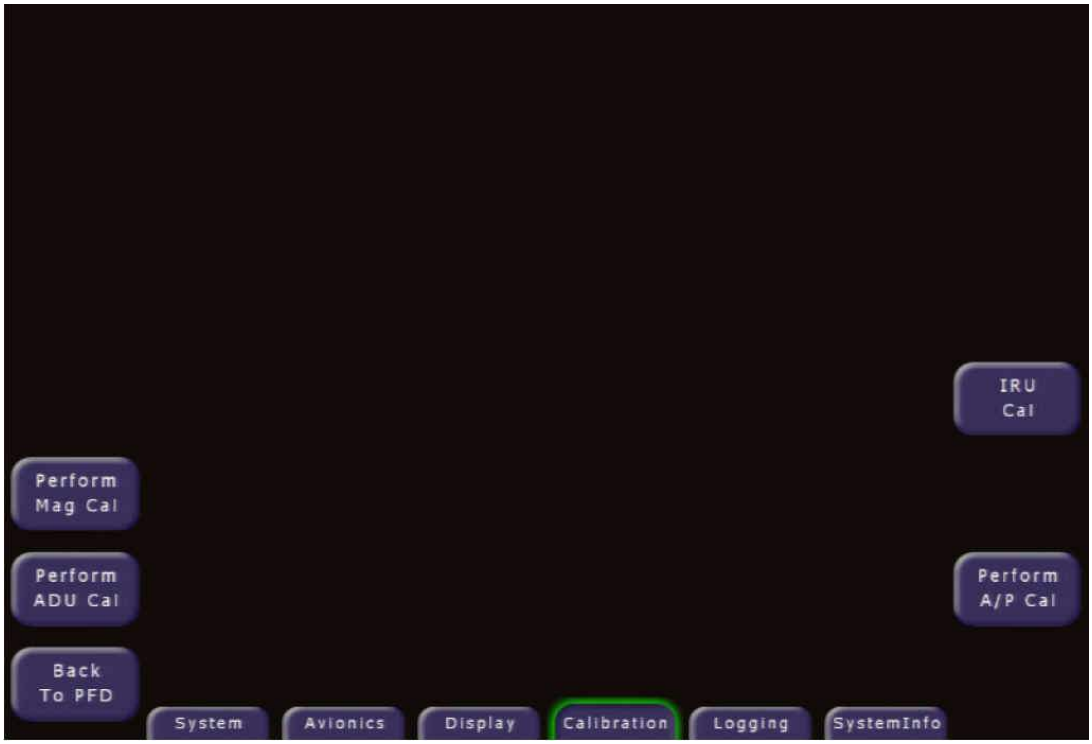

Figure 7: Calibration Page

3. Select the button for each item to calibrate. The selections are:

   IRU Cal — Calibrate the IRU as described in Section 3.6.1, “Calibrating the IRU” on page 30.

   Mag Cal — Calibrate the magnetometer as described in Section 3.6.2, “Calibrating the Magnetometer” on page 31.

   Mag Cal and A/P Cal must be performed on the aircraft after the EXP5000 is installed.

   Perform A/P Cal—Described in Section 4.3, “Inflight Setup and Checkout” on page 40.

   Perform ADU Cal — Calibrate the Air Data Unit (ADU) as described in Section 3.6.3, “Calibrating the ADU” on page 34.

4. When you are finished with the calibrations, press **Back to PFD** or use the left knob to select another System Setup page.

3.6.1 Calibrating the IRU

For Envision installations, you may need to enter the IRU pitch and roll values manually. The default value is zero degrees in pitch and roll. Ensure that the aircraft is level before checking instrument panel offset angles. If the panel angles of the Envision installation are different, you can enter them on the IRU Calibration page:

Figure 8: IRU Calibration Page

To use the *IRU Calibration* Page, follow the directions on the page and press **Back to PFD** when you are done.

3.6.2 Calibrating the Magnetometer

Note: Calibrate the IRU before you calibrate the magnetometer.

Approximate duration:	30 minutes (assuming airplane is free to rotate 360° without magnetic disturbances)
Required equipment:	Installed PFD Installed magnetometer Aircraft wet compass with current compass correction card
Recommended personnel:	2 avionics technicians: One in the aircraft to monitor procedure and push required line select keys on the PFD. One outside of the aircraft to precisely align the aircraft to each of 12 calibration points.

Note: The aircraft can be manually moved or taxied to each calibration point.

1. Make sure that:

   The calibration procedure is done in a known magnetically clean area at least 200 ft. from metal structures of any kind and not above areas that may have underground fuel tanks or steel rebar in the concrete ramp. Avidyne suggests using an approved compass rose for this procedure.

   Aircraft doors are closed.

   Flaps are in retracted position.

   The airplane is reasonably level.

2. Turn battery switch to on. Consider attaching an external power cart until ready for step 5 unless you are performing this calibration with the engine running and alternator(s) on. All other aircraft equipment shall be operating.
3. Allow the PFD to align (approximately 3 minutes) until the ADAHRS countdown timer expires and is removed from the display.
4. Wait in the aligned state for an additional 10 minutes.
5. Enter System Setup as described in Section 3.1, “Accessing the Setup Pages” on page 17 and use the left knob to scroll to the Calibration Tab.
6. Press **Perform Mag Cal**.

   The Magnetometer Calibration Page displays as shown in Figure 9, “ Initial Magnetometer Calibration Page,” on page 32.

7. Manually align or taxi the aircraft such that the centerline of the airplane is on magnetic north (360° ± 1° or less) heading as indicated by the aircraft wet compass. It is critical that you take the time you need to fine-tune each calibration point.
8. Follow the directions on the Magnetometer Calibration Page (press ***Calibrate Heading*** and wait until “Done” displays.
9. Repeat the procedure to align the centerline of the airplane on consecutive 30° headings (12 total calibration points) as indicated by the aircraft wet compass by manually repositioning or taxiing the aircraft as required. Continue following the directions of the Magnetometer Calibration Page until complete (see Figure 9 and Figure 10).

Note: On the last heading calibration point (330°), it may take up to a minute for "Done" to display.

If any of the 12 calibration points display ***Failed*** rather than ***Done***, press **Redo Previous** to "undo" the previous step and repeat the calibration.

Figure 9: Initial Magnetometer Calibration Page

Figure 10: Final Magnetometer Calibration Page

Note: If you stop the calibration process (for example, by exiting the Magnetometer Calibration Page or shutting off power to the PFD) before completion, you will lose the stored calibration parameters. You will need to rerun the calibration from the beginning.

10. After the last heading point of 330° is calibrated, the PFD will display the message: "Mag Cal Complete: Return to PFD. Cycle Power". After this message appears, press **Back To PFD** and then **wait at least 10 seconds** before powering off the PFD. Then, with the PFD powered down, **wait at least 60 seconds** before powering up the PFD.
11. Wait for the PFD to completely initialize, approximately 3 minutes.
12. **Post Calibration Verification:** Align the centerline of the airplane with consecutive 90° headings (90, 180, 270, 360) as indicated by the aircraft wet compass with current compass correction card or compass rose:

    Verify that the PFD heading display is within ± 4° of the compass.

The calibration is now complete.

The next section describes how to calibrate the ADU.

3.6.3 Calibrating the ADU

If an out of tolerance condition is observed when conducting air data testing described in Part 43 Appendix E, the error may be corrected by recalibrating the ADU

To calibrate the ADU:

1. Connect an air data test set to the aircraft as instructed by the test set manufacturer.

Connect the air data test set as per the aircraft manufacturer's specifications. Connecting it incorrectly may damage the instruments!

2. Set the air data test set altitude to 10000 (Ten Thousand) feet MSL and the indicated airspeed (IAS) to 100 Knots.
3. Wait two minutes for the test setup to stabilize.
4. On the PFD, on the *Calibration Page* (Section 3.6, "Calibration Page" on page 29), press **Perform ADU Cal** to open the *ADU Calibration Page* (Figure 11).

Figure 11: Calibrating the ADU

5. On the *ADU Calibration Page*, press **Calibrate**.

   Wait while the calibration runs. When the ADU calibration completed, you will be prompted that it has completed successfully with the message: "ADU Cal Complete. Return to PFD."

Note: The PFD will not correct for deviations that exceed 75 feet altitude or 4 Knots IAS. If you see the message: "ADU Cal Failed. Measured data too far out of specification to recalibrate", contact Avidyne Technical Support.

Note: If you see the message, "ADU Cal Failed. No valid response received from Air Data Unit. Return to PFD.", reboot the PFD, wait 2 minutes for the air data to stabilize, and re-run the ADU Calibration. If it fails again, contact Avidyne Technical Support.

6. Press **Back to PFD**.
7. Re-run the air data test described in Part 43 Appendix E and verify that the ADU calibration corrected any error.

Note: If the deviation is not corrected, contact Avidyne Technical Support.

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4 Post-Installation Checks

This section applies to all current releases of the EXP5000, listed in Section 1, “General Information” on page 1. During the post-installation check you need to verify the items that apply to the aircraft:

Note: If you made any configuration changes on the Setup Pages, you must cycle power to the PFD before starting the post-installation check.

4.1 Ground Checks

Perform the ground checks as described in the following sections:

4.1.1 GPS NAV-COMM Checks

4.1.1.1 Dual GPS-NAV-COMM (2 x GNS 430/530) Combination

To begin the check, press **Nav** until *GPS1* displays. Check that the GNS 430/530 1 *CDI* button displays *GPS*. As you press the buttons listed in Table 19, check that the PFD *Nav* button and GNS-430/530 display the expected values as detailed in Table 19.

Table 19: Dual GPS Nav/Comm Check

Step	Instrument	Button to Press	PFD Nav Display	Display GNS	GNS CDI Display
1	PFD	Nav	GPS1	GNS 1	GPS
2	GNS-430 1	CDI	VLOC1		VLOC
3	GNS-430 1	CDI	GPS1		GPS
4	PFD	Nav	VLOC1		VLOC
5	PFD	Nav	GPS2	GNS 2	GPS
6	GNS-430 2	CDI	VLOC2		VLOC
7	GNS-430 2	Nav	GPS2		GPS
8	PFD	Nav	VLOC2		VLOC

4.1.1.2 Single GPS-NAV-COM, Single GPS Combination (1 x GNS-430/530, 1 x GNC-420)

To begin the check, press **Nav** until *GPS1* displays. Check that the GNS-430 1 *CDI* button displays *GPS*. As you press the buttons listed in Table 20, check that the PFD *Nav* button and GNS-430/530 display the expected values as detailed in Table 20.

Table 20: GPS Nav/Comm Check (1 x GNS 430W/530W, 1 x GNC-420)

Step	Instrument	Button to Press	PFD Nav Display	Display GNS	GNS CDI Display
1	PFD	Nav	GPS1	GNS 1	GPS
2	GNS-430 1	CDI	VLOC1		VLOC
3	GNS-430 1	CDI	GPS1		GPS
4	PFD	Nav	VLOC1		VLOC
5	PFD	Nav	GPS2	GNS 2	GPS

4.1.1.3 GPS CDI/HDI/VDI

Power on the GPS unit and enter the Instrument Panel Self-Test page. Verify that the PFD displays the correct information based on Table 21.

Table 21: GPS Navigation Integration Test

Instrument	Self-Test Value
CDI	Half-scale left deflection, TO indicator
VDI	Half-scale up
HDI	Half-scale left
Annunciators	MSG, WPT, GPS INTEG displayed
Bearing to Wpt (RMI)	135°
DTK	150°
Distance To Go	10 NM
Time To Go	4 min.
Active Waypoint	GARMN
Groundspeed	150 kts

4.1.1.4 Single GPS-COMM Configuration (1 x GNC-420), 4XXW and 530W

1. **4XXW, 530W, and GNS-430 1 *OBS* button**—Press once and observe that the OBS label is present on the GNC-420 and that the left knob on the PFD is now labeled either “DTK SET/CENTER”
(SW PN 530-00183-( )) or “CRS SET/CENTER” (SW PN 530-00177-( )).
2. **4XX, 530W, and GNS-430 1 *OBS* button**—Press once and observe that the OBS label is not displayed on the GNC-420 and that the left knob on the PFD has no label.

Note: These tests demonstrate two-way communication between the PFD and both GNS-430 units.

4.1.2 Pitot-Static Leak Check

Perform a pitot-static leak check anytime the pitot-static ports are disconnected from (and then reconnected to) the PFD. Ensure that you perform the pitot-static leak check in accordance with the specific Aircraft Maintenance Manual.

4.1.3 Magnetic Compass Swing

Perform a magnetic compass “swing” in accordance with the appropriate aircraft documentation for updating the heading correction card in accordance with 14 CFR 23.1327 and 23.1547.

4.1.4 Star Aviation Ground Tests

Perform the Star Aviation ground tests in accordance with the *Ground Functional/EMI Test Procedure*, Star Aviation document number: P34-0024.

Note: An FAA representative is not required.

4.2 Cleaning the EXP5000 Screen

If the EXP5000 screen should become dirty due to fingerprints or dust, clean the screen using the following materials and methods:

A clean, soft lint free cloth such as 3M Ultra-Brite Cloth # 2011 or similar.

A cleaning solution composed of de-ionized water or isopropyl alcohol (IPA).

Always apply the cleaning solution directly onto the cloth. **Never** spray cleaner directly onto the screen.

Note: Use caution when using IPA as it is flammable.
Using any other chemicals or materials voids the warranty.

The EXP5000 screen is made of a plastic film that is vulnerable to scratches, damage by sharp articles or improper cleaners. Use care when cleaning.

4.3 Inflight Setup and Checkout

Note: For S-Tec 55X or 65, ensure that the autopilot is configured as a KCS-55-compatible unit. See S-Tec documentation for details.

Perform all in flight tests and calibrations as described in the following sections:

Autopilot Roll Centering Adjustment (S-Tec 55X or 65), page 40

Autopilot Checkout, page 40

Star Aviation In-Flight Tests, page 41

4.3.1 Autopilot Roll Centering Adjustment (S-Tec 55X or 65)

For S-Tec 55X or 65, before you perform the autopilot checkout, perform the Roll Centering Adjustment as described in the Troubleshooting Guide provided with the autopilot. For example:

For S-Tec 55X, S-Tec PN 87248

For S-Tec 65, S-Tec PN 87259

4.3.2 Autopilot Checkout

Note: The Roll Centering adjustment must be performed before you perform the autopilot checkout and calibration.

Follow this procedure to check out the autopilot connection to the PFD.

Note: Perform this procedure in-flight in smooth air.

To check out and calibrate the autopilot while in flight for FD-Enabled PFDs:

1. Engage the Autopilot and Flight director (for FD-enabled aircraft).
2. Engage the HDG and ALT modes and allow the aircraft to stabilize on the heading. The Heading Bug and flight director may be offset from the lubber line by several degrees.
3. Turn OFF all GPS and NAV systems.
4. Enter the System Setup mode on the PFD . To do this, simultaneously press and hold the top left button and third button down until the countdown timer in the lower left corner of the display goes to zero and the System page opens. For more info, see Section 3.1, “Accessing the Setup Pages” on page 17.
5. Turn ON all GPS and NAV systems.
6. Open to Calibration Page by turning the left knob.
7. Select *Perform A/P Cal*.
8. Select *Sync HDG*. The autopilot should immediately command the aircraft to turn toward the Heading Bug.

9. Select *Back to PFD*.

10. Verify that the HDG mode accurately tracks the Heading Bug.

11. If the aircraft has an FD, verify that the FD Steering Command Bars are above the ARS (aircraft reference symbol) with no gap between the two.

12. Engage the NAV mode (without GPSS) on the autopilot.

13. Verify that the NAV mode accurately tracks a flight plan (you will need to enter a flight plan or waypoint).

Autopilot calibration is now complete.

If the autopilot does not track the Heading Bug or NAV mode correctly, repeat the steps in this procedure.

4.3.3 Star Aviation In-Flight Tests

Perform Star Aviation flight tests in accordance with *Flight Operation/EMI Test Procedure*, Star Aviation document number: P34-0023.

Note: An FAA representative is not required.

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5 Factory Service Policies

5.1 Technical Support

Avidyne's web site contains information that may assist the operator and installer with questions or problems with their Envision Primary Flight Display.

www.avidyne.com

Technical support questions may be submitted, 24 hours per day, via the following.

Email: techsupport@avidyne.com
Fax: 781-402-7599
Voice: 888-723-7592

An Avidyne Technical Support Representative will respond as soon as possible. Avidyne business hours are:

Monday through Thursday: 8:00 AM to 8:30 PM Eastern Time

Friday: 8:00 AM to 5:30 PM Eastern Time

Please include the part number, revision number and serial number of the unit in all correspondences. For problem reporting, please provide as many details associated with the problem as possible.

5.2 General Service Procedures

Repair of the Primary Flight Display and Magnetometer/OAT Sensor Assembly are performed at the factory, and includes a complete checkout and recalibration.

Prior to returning a unit for service, contact Avidyne at 888-723-7592 to 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 provided by the Avidyne Customer Service Representative.

Include your name, complete shipping address, daytime telephone number, a complete description of the problem, the desired return date, and shipping method.

If the original shipping carton or other suitable foam packing is not available, contact Avidyne to arrange for packaging materials. Avidyne is not responsible for damage due to poorly packaged returns.

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Appendix A: Environmental Qualification Forms

PFD RTCA/DO-160E ENVIRONMENTAL QUALIFICATION FORM
NOMENCLATURE: PFD
PART NO: 700-00006-000
MANUFACTURER: AVIDYNE CORPORATION
ADDRESS: 55 OLD BEDFORD ROAD, LINCOLN, MA 01773

Table 22: DO-160E ENVIRONMENTAL QUALIFICATION TESTS

Conditions	RTCA/DO-160D Section	Conducted Test Category
Low Temp	4.5.1	Equipment qualified to Category C1
High Temp	4.5.2 & 4.5.3	Equipment qualified to Category C1
In-Flight Loss of Cooling	4.5.4	Equipment qualified to Category W
Altitude	4.6.1	Equipment qualified to Category C1
Decompression	4.6.2	Equipment qualified to Category A
Overpressure	4.6.3	Equipment qualified to Category A
Temperature Variation	5.0	Equipment qualified to Category B
Humidity	6.0	Equipment qualified to Category A
Operational Shocks & Crash Safety	7.0	Equipment qualified to Category B
Vibration	8.0	Equipment qualified to Category S, Curve M
Explosion Proofness	9.0	Equipment identified as Category X, no test performed
Waterproofness	10.0	Equipment identified as Category X, no test performed
Fluids Susceptibility	11.0	Equipment identified as Category X, no test performed
Sand and Dust	12.0	Equipment identified as Category X, no test performed
Fungus Resistance	13.0	Equipment identified as Category X, no test performed
Salt Spray	14.0	Equipment identified as Category X, no test performed
Magnetic Effects	15.0	Equipment Class qualified to Z
Power Input	16.0	Equipment qualified to Category B (except Engine Start Undervoltage)
Voltage Spike	17.0	Equipment to be qualified to Category A
Audio Frequency Conducted Susceptibility	18.0	Equipment qualified to Category B
Induced Signal Susceptibility	19.0	Equipment qualified to Category ZC
Radio Frequency Susceptibility	20.0	Equipment qualified to Category W (conducted), Category Q (radiated)
Emission of Radio Frequency Energy	21.0	Equipment qualified to Category M
Lightning Induced Transient Susceptibility	22.0	Equipment qualified to level ZZZZZ
Lightning Direct Effects	23.0	Equipment identified as Category X, no test performed
Icing	24.0	Equipment identified as Category X, no test performed
Electrostatic Discharge	25.0	Equipment qualified to Category A
Fire/Flammability	26	Equipment identified as Category X, no test performed

PFD RTCA/DO-160D ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE: PFD
PART NO: 700-00006-000
MANUFACTURER: AVIDYNE CORPORATION
ADDRESS: 55 OLD BEDFORD ROAD, LINCOLN, MA 01773

Table 23: DO-160D ENVIRONMENTAL QUALIFICATION TESTS

Conditions	RTCA/DO-160D Section	Conducted Test Category
Low Temp	4.5.1	Equipment qualified to Category [(A1), (C1)]
High Temp	4.5.2 & 4.5.3	Equipment qualified to Category [(A1), (C1)]
In-Flight Loss of Cooling	4.5.4	Equipment qualified to Category W
Altitude	4.6.1	Equipment qualified to Category [(A1), (C1)]
Decompression	4.6.2	Equipment qualified to Category [(A1), (C1)]
Overpressure	4.6.3	Equipment qualified to Category [(A1), (C1)]
Temperature Variation	5.0	Equipment qualified to Category B
Humidity	6.0	Equipment qualified to Category A
Operational Shocks & Crash Safety	7.0	Equipment qualified to Category B
Vibration	8.0	Equipment qualified to Category S, Curve M
Explosion Proofness	9.0	Equipment identified as Category X, no test performed
Waterproofness	10.0	Equipment identified as Category X, no test performed
Fluids Susceptibility	11.0	Equipment identified as Category X, no test performed
Sand and Dust	12.0	Equipment identified as Category X, no test performed
Fungus Resistance	13.0	Equipment identified as Category X, no test performed
Salt Spray	14.0	Equipment identified as Category X, no test performed
Magnetic Effects	15.0	Equipment Class qualified to Z
Power Input	16.0	Equipment qualified to Category B (except Engine Start Undervoltage)
Voltage Spike	17.0	Equipment to be qualified to Category A
Audio Frequency Conducted Susceptibility	18.0	Equipment qualified to Category B
Induced Signal Susceptibility	19.0	Equipment qualified to Category Z
Radio Frequency Susceptibility	20.0	Equipment qualified to Category W (conducted)/Q (radiated)
Emission of Radio Frequency Energy	21.0	Equipment qualified to Category M
Lightning Induced Transient Susceptibility	22.0	Equipment qualified to level ZZZZ
Lightning Direct Effects	23.0	Equipment identified as Category X, no test performed
Icing	24.0	Equipment identified as Category X, no test performed
Electrostatic Discharge	25.0	Equipment qualified to Category A

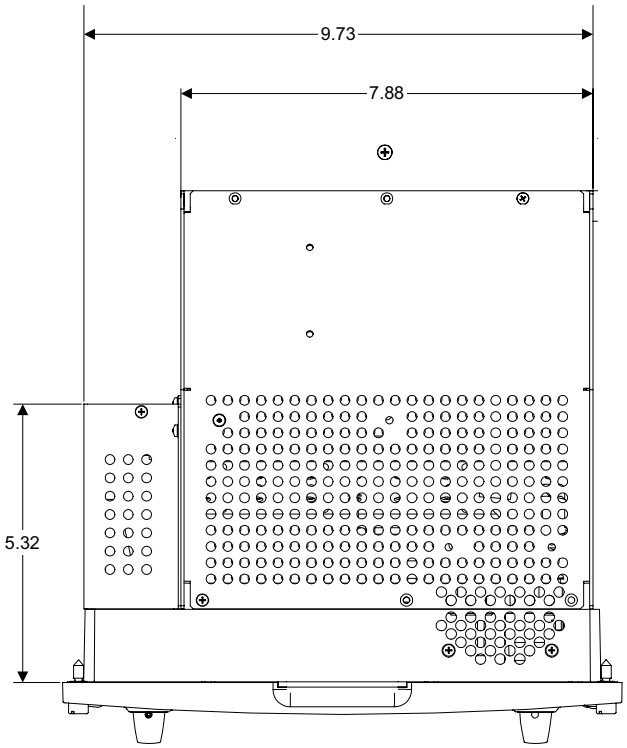
NOMENCLATURE: MAGNETOMETER/OAT SENSOR
PART NO: 700-00011-000
MANUFACTURER: AVIDYNE CORPORATION
ADDRESS: 55 OLD BEDFORD ROAD, LINCOLN, MA 01773

Table 24: MAGNETOMETER/OAT SENSOR RTCA/DO-160D ENVIRONMENTAL QUALIFICATION FORM

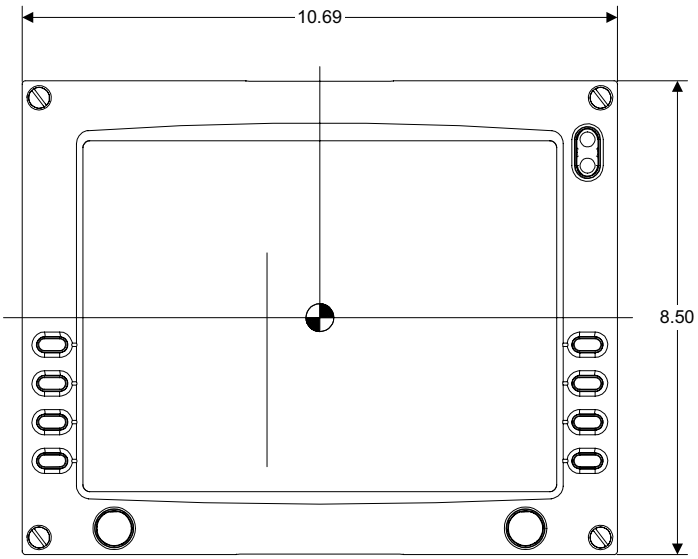
Conditions	RTCA DO-160D Section	Conducted Test Category
Low Temp	4.5.1	Equipment qualified to Category B2
High Temp	4.5.2 & 4.5.3	Equipment qualified to Category B2
In-Flight Loss of Cooling	4.5.4	Equipment identified as Category X, no test performed
Altitude	4.6.1	Equipment qualified to Category B2
Decompression	4.6.2	Equipment qualified to Category B2
Overpressure	4.6.3	Equipment qualified to Category B2
Temperature Variation	5.0	Equipment qualified to Category B
Humidity	6.0	Equipment qualified to Category B
Operational Shocks & Crash Safety	7.0	Equipment qualified to Category D
Vibration	8.0	Equipment qualified to Category S, Curve M
Explosion Proofness	9.0	Equipment qualified to Category E
Waterproofness	10.0	Equipment identified as Category X, no test performed
Fluids Susceptibility	11.0	Equipment identified as Category X, no test performed
Sand and Dust	12.0	Equipment identified as Category X, no test performed
Fungus Resistance	13.0	Equipment identified as Category X, no test performed
Salt Spray	14.0	Equipment identified as Category X, no test performed
Magnetic Effects	15.0	Equipment qualified to Category C
Power Input	16.0	Equipment qualified to Category B (except Engine Start Undervoltage)
Voltage Spike	17.0	Equipment qualified to Category A
Audio Frequency Conducted Susceptibility	18.0	Equipment qualified to Category B
Induced Signal Susceptibility	19.0	Equipment qualified to Category Z
Radio Frequency Susceptibility	20.0	Magnetometer qualified to Category W (conducted)/Q (radiated), OAT Sensor qualified to R and T
Emission of Radio Frequency Energy	21.0	Equipment qualified to Category H
Lightning Induced Transient Susceptibility	22.0	Equipment qualified to level ZZZZ
Lightning Direct Effects	23.0	Equipment identified as Category X, no test performed
Icing	24.0	Equipment identified as Category X, no test performed
Electrostatic Discharge	25.0	Equipment qualified to Category A

Appendix B: Envision 700-00006-000 PFD Dimensions

B.1 700-00006-000 PFD Front and Top Dimensions



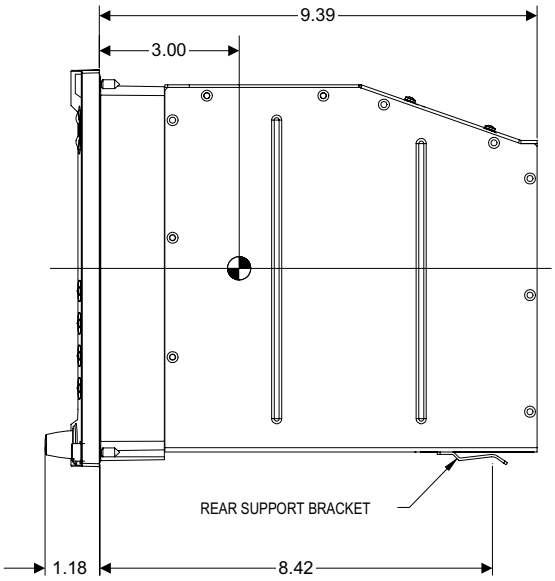
Top View



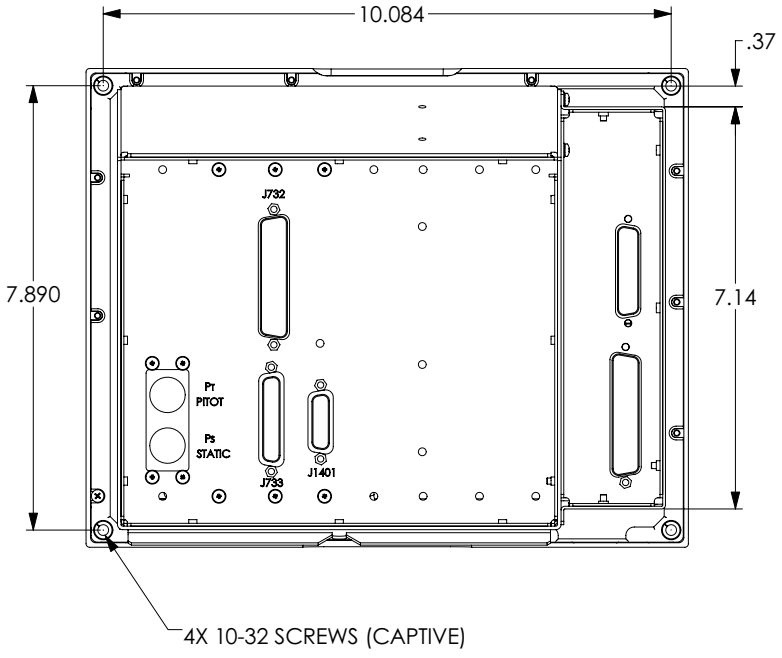
Front View

Figure 12: PFD 700-00006-000 Top and Front View

B.2 700-00006-000 PFD Right and Rear Dimensions



Right View



Rear View

Figure 13: PFD 700-00006-000 Right and Rear View

Appendix C: Magnetometer/OAT Sensor Dimensions

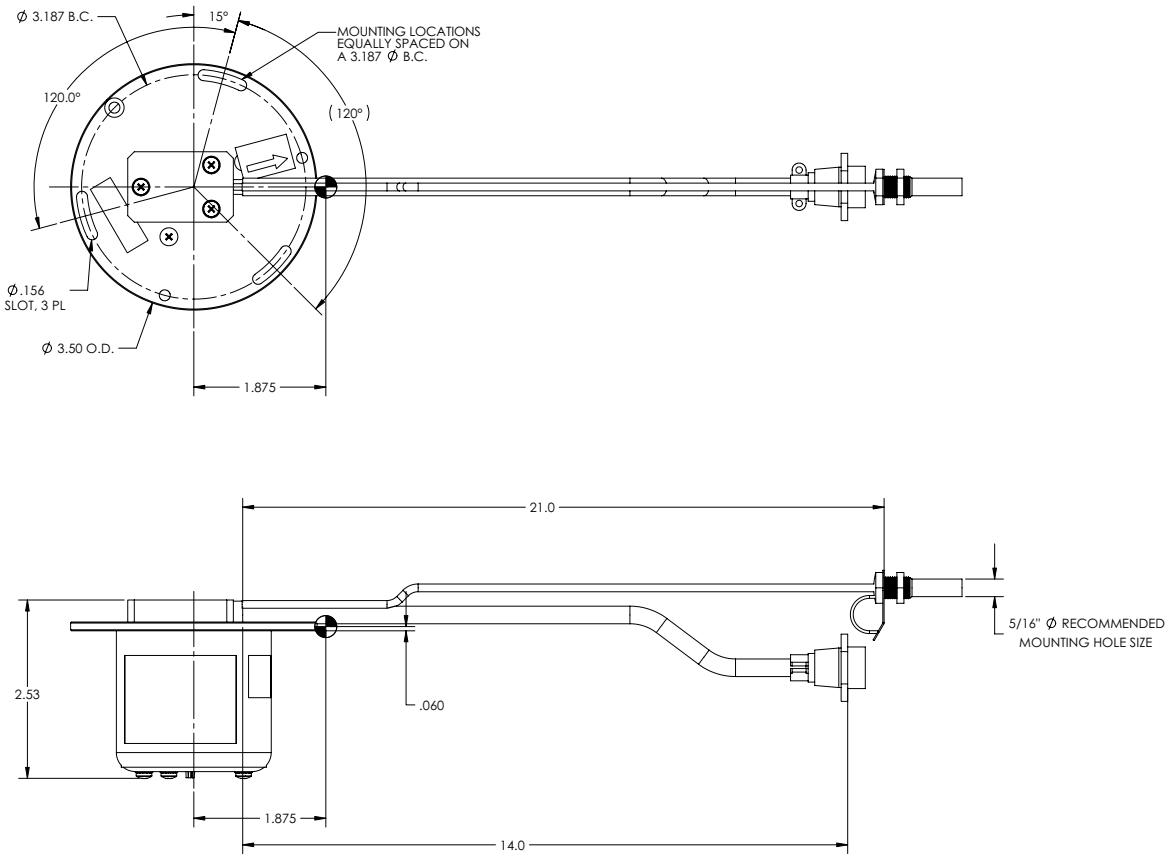


Figure 14: 700-00011-000 Magnetometer/OAT Sensor Dimensions

1. ARROW INDICATES FORWARD INSTALLATION DIRECTION
2. CG SHOWN AS CABLES ARE SHOWN
3. INSTALL OAT PROBE WITH NUT AND WASHER PROVIDED WITH ASSEMBLY AND LOCATE IN FREE AIR STREAM
4. MOUNT MAGNETOMETER WITH BRASS HARDWARE AS FOLLOWS:

   SCREWS: MS51957-28, QTY 3

   WASHERS: AN960C6, QTY 3

   LOCK NUTS: MS21044C06, QTY 3
5. OAT SENSOR AND MAGNETOMETER SHALL BE PHYSICALLY ISOLATED FROM AIRCRAFT GROUND. UNITS RECEIVE CHASSIS GROUNDING THROUGH WIRING HARNESS

Appendix D: PFD Cutout Dimensions

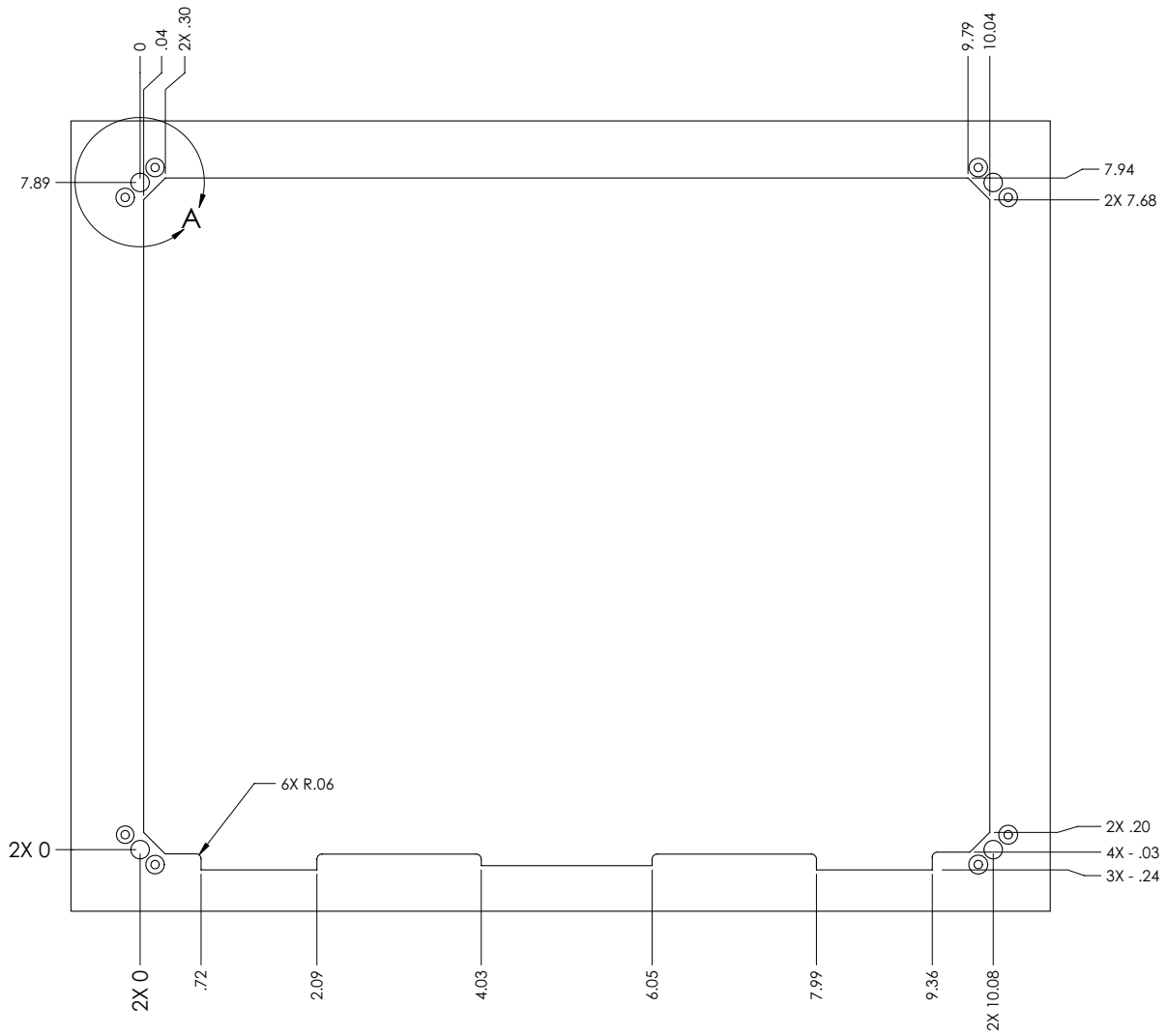


Figure 15: PFD Cutout Dimensions (Landscape)

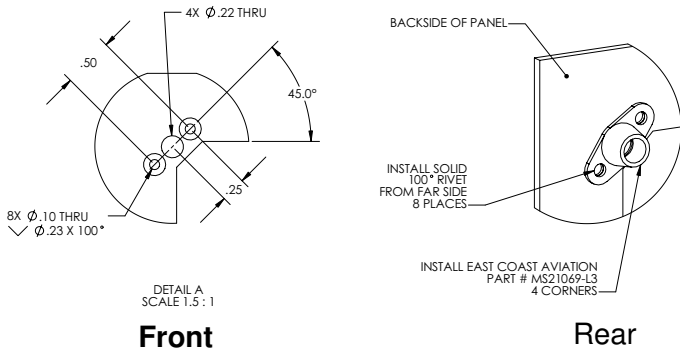


Figure 16: Detail A—Corner Detail

Appendix E: PFD Wiring Diagrams

E.1 Key to Electrical Symols

The following symbols are used in the wiring diagrams that follow.

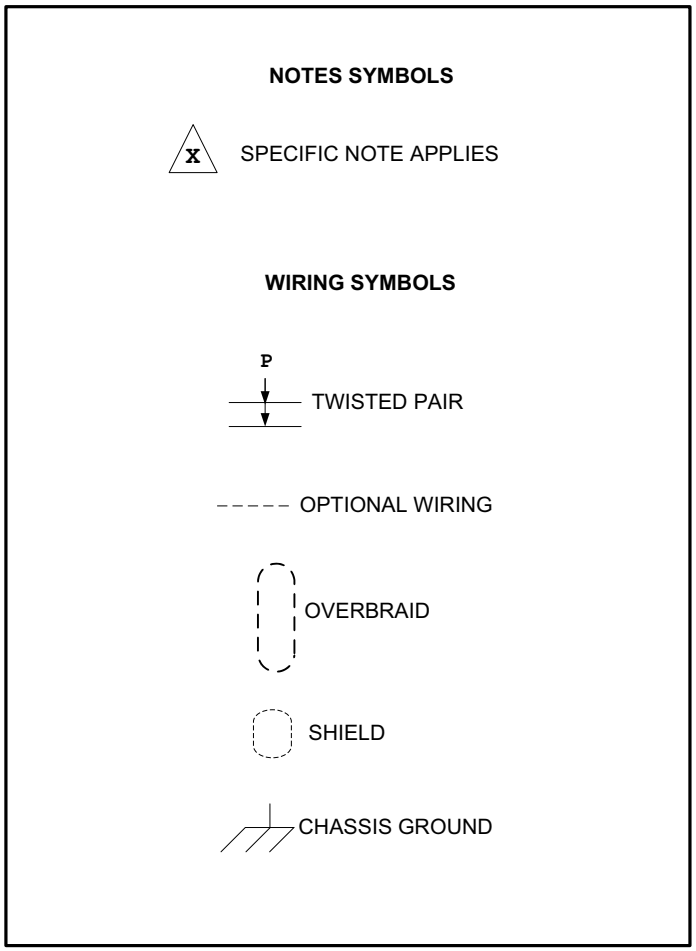
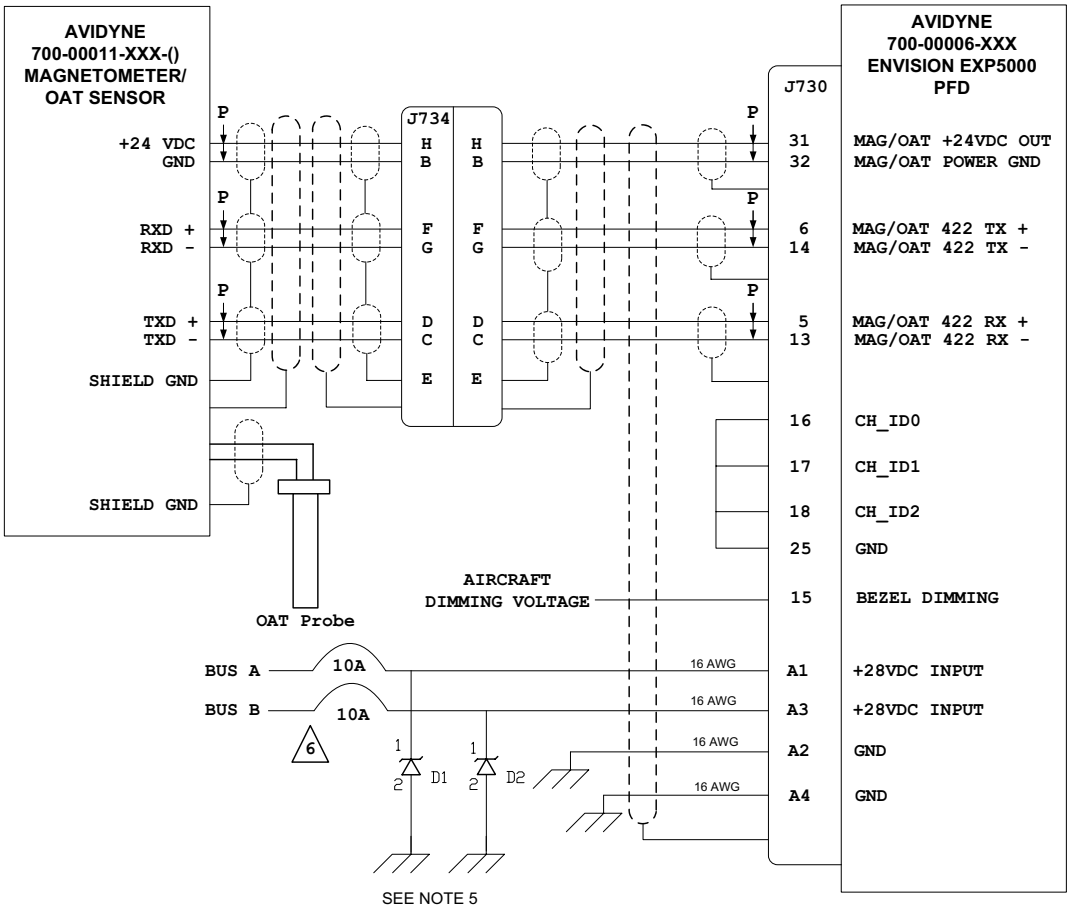


Figure 17: Key to Electrical Symbols

E.2 PFD Magnetometer, OAT, Power, and Lighting Interconnect



NOTES:

1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

2. J734 MATING CONNECTOR PART NUMBER: MS3126F12-10S

3. J730 MATING CONNECTOR PART NUMBER: CBC36W4F120000 (connector) / D50000GE0-1023.5 (backshell) (POSITRONICS)

4. OVERBRAID SPECIFICATION:
   MATERIAL: 36 AWG TINNED COPPER PER ASTM-B-33
   COVERAGE: 90% OPTICAL
   RECOMMENDED: PART NUMBER: A-A-59569A-XXXX
   (XXXX INDICATES DIAMETER) OR EQUIV.
   SUPPLIER: CONTINENTAL CORDAGE

5. D1 AND D2 VOLTAGE SUPPRESSOR PART NUMBER 704-15K36 (MICROSEMI)

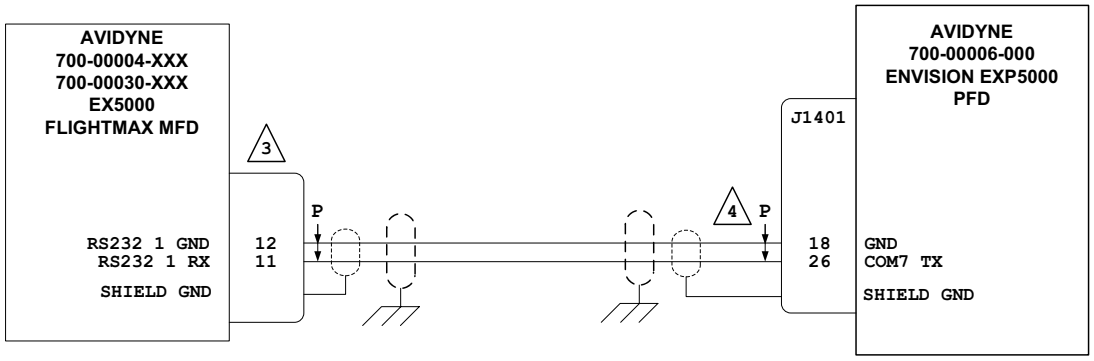
6. BUS B POWER INPUT AND D2 VOLTAGE SUPPRESSOR TO BE INSTALLED IN DUAL VOLTAGE BUS AIRCRAFT

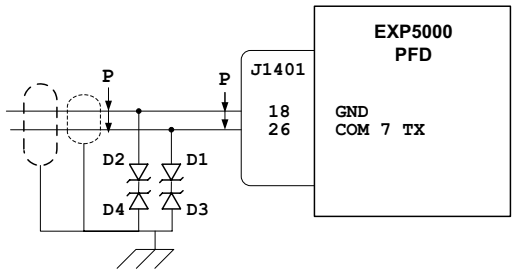
AVIDYNE CORPORATION

Power, Lighting, and Magnetometer Interconnect.

Figure 18: PFD Magnetometer, OAT, Power, and Lighting Interconnect

E.3 MFD Interconnect – RS232





DETAIL A

NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

2. OVERBRAID SPECIFICATION:
MATERIAL: 36 AWG TINNED COPPER PER ASTM-B-33
COVERAGE: 90% OPTICAL
RECOMMENDED OVERBRAID: PART NUMBER: A-A-59569A-XXXX (XXXX INDICATES DIAMETER) OR EQUIV.
SUPPLIER: CONTINENTAL CORDAGE

3. REFER TO EX5000 INSTALLATION MANUAL 600-00073 FOR WIRING INFORMATION

4. TRANSIENT SUPPRESSOR DIODES ARE REQUIRED ON J1401 PINS 8, 9, 18, 25, AND 26. USE DIODE PN 704-15K36 (MICROSEMI). WIRE AS SHOWN IN DETAIL A.

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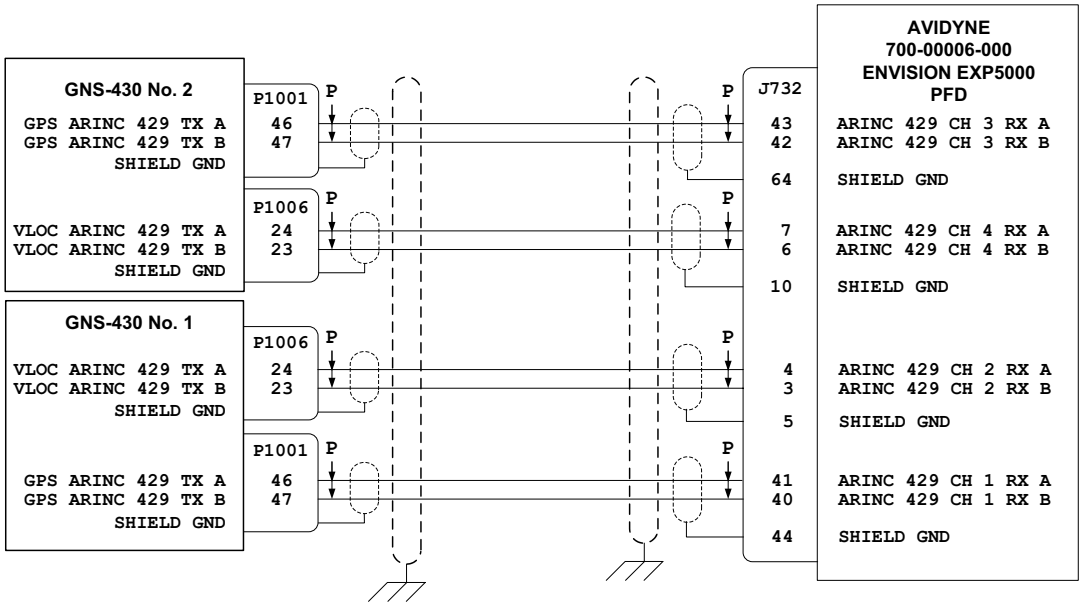
MFD Interconnect - RS232

Figure 19: MFD Interconnect – RS232

E.4 PFD Interconnect with GNS-430/GNS-430W/GNC-420



NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

2. REFER TO GNS-430 INSTALLATION INSTRUCTIONS FOR CONNECTOR PART NUMBERS

3. OVERBRAID SPECIFICATION:
   MATERIAL: 36 AWG TINNED COPPER PER ASTM-B-33
   COVERAGE: 90% OPTICAL
   RECOMMENDED OVERBRAID: PART NUMBER: A-A-59569A-XXXX
   (XXXX INDICATES DIAMETER) OR EQUIV.
   SUPPLIER: CONTINENTAL CORDAGE

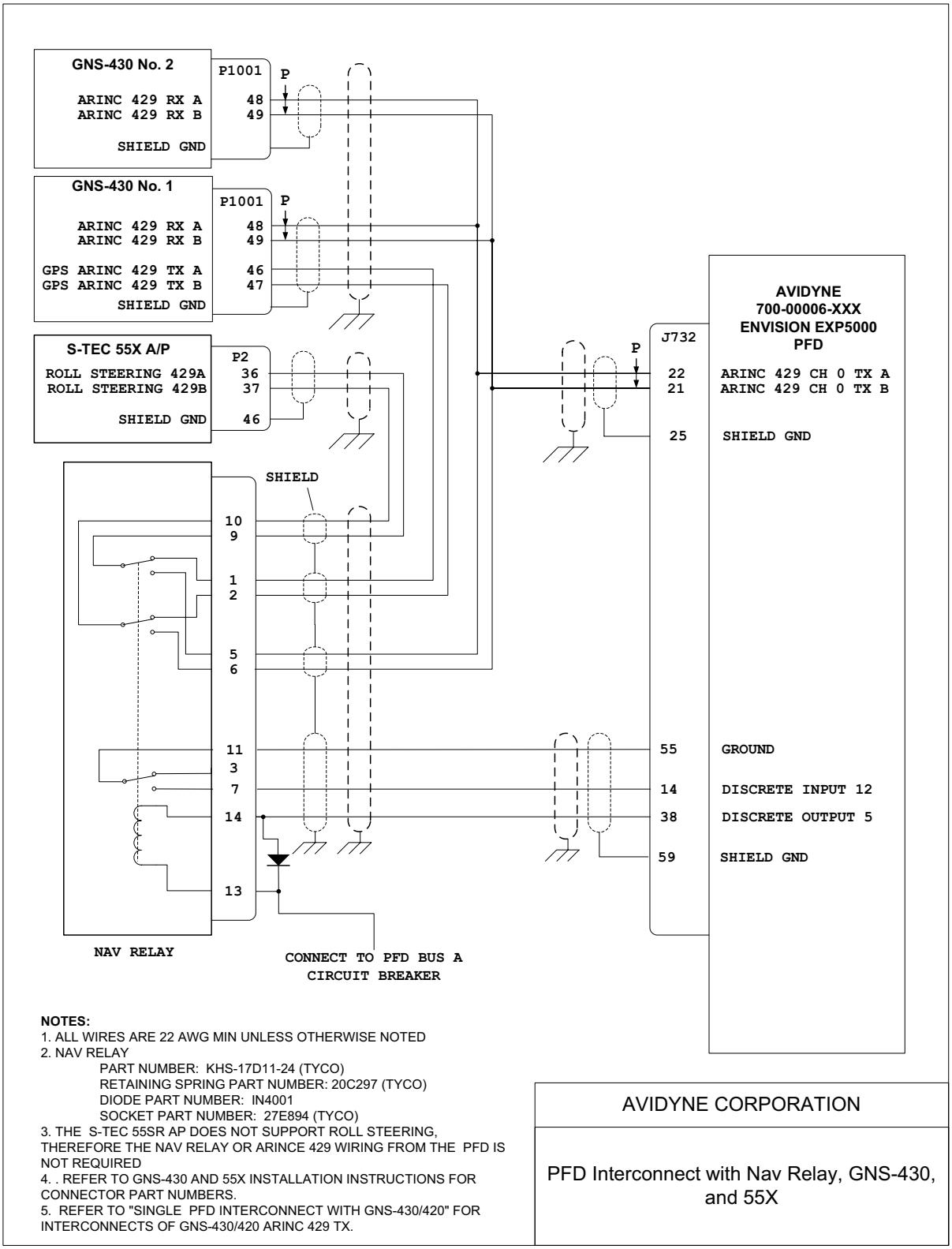
4. WHEN INSTALLING GNC-420'S PFD ARINC 429 CHANNELS 2 AND 4 ARE NOT USED

AVIDYNE CORPORATION

PFD Interconnect with
GNS-430/GNC-420

Figure 20: PFD Interconnect with GNS-430/430W/GNC-420

E.5 PFD Interconnect with Nav Relay, GNS-430/430W, and S-TEC 55X



NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED
2. NAV RELAY
   PART NUMBER: KHS-17D11-24 (TYCO)
   RETAINING SPRING PART NUMBER: 20C297 (TYCO)
   DIODE PART NUMBER: IN4001
   SOCKET PART NUMBER: 27E894 (TYCO)
3. THE S-TEC 55SR AP DOES NOT SUPPORT ROLL STEERING, THEREFORE THE NAV RELAY OR ARINCE 429 WIRING FROM THE PFD IS NOT REQUIRED
4. . REFER TO GNS-430 AND 55X INSTALLATION INSTRUCTIONS FOR CONNECTOR PART NUMBERS.
5. REFER TO "SINGLE PFD INTERCONNECT WITH GNS-430/420" FOR INTERCONNECTS OF GNS-430/420 ARINC 429 TX.

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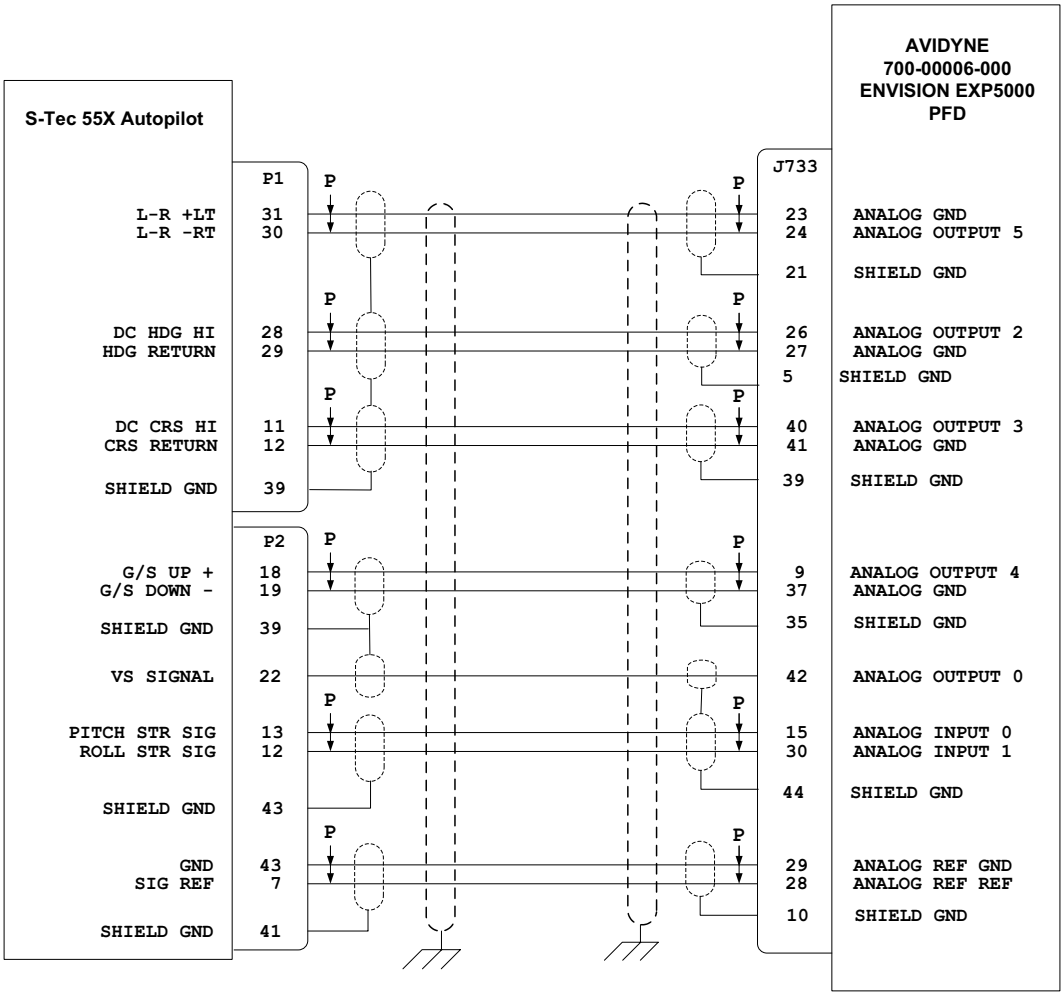
PFD Interconnect with Nav Relay, GNS-430, and 55X

Figure 21: PFD Interconnect with Nav Relay, GNS-430/430W, and S-TEC 55X

E.6 S-TEC 55X Analog Signal Interconnect



NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

2. J733 MATING CONNECTOR PART NUMBER:DD44F10GE0 (POSITRONICS)

3. REFER TO 55X INSTALLATION INSTRUCTIONS FOR CONNECTOR PART NUMBERS

4. 55X MUST BE CONFIGURED TO INTERFACE TO KCS-55A (DC) HEADING SYSTEM

AVIDYNE CORPORATION

S-TEC 55X Analog Signal Interconnect

Figure 22: S-TEC 55X Analog Signal Interconnect

E.7 S-TEC 55X Digital/Discrete Signal Interconnect

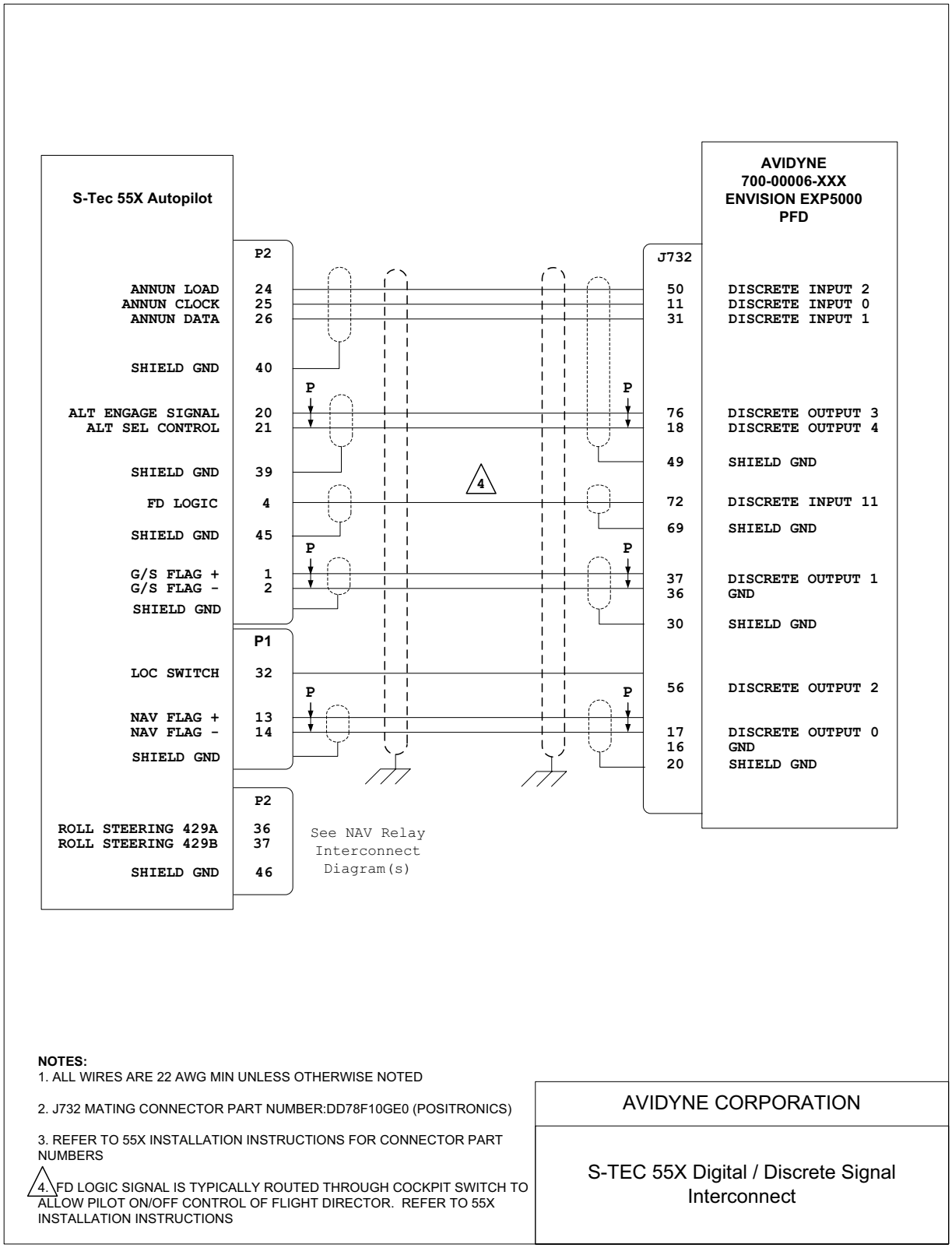


Figure 23: S-TEC 55X Digital/Discrete Signal Interconnect

E.8 Autopilot / Flight Director Relay, S-TEC 55X

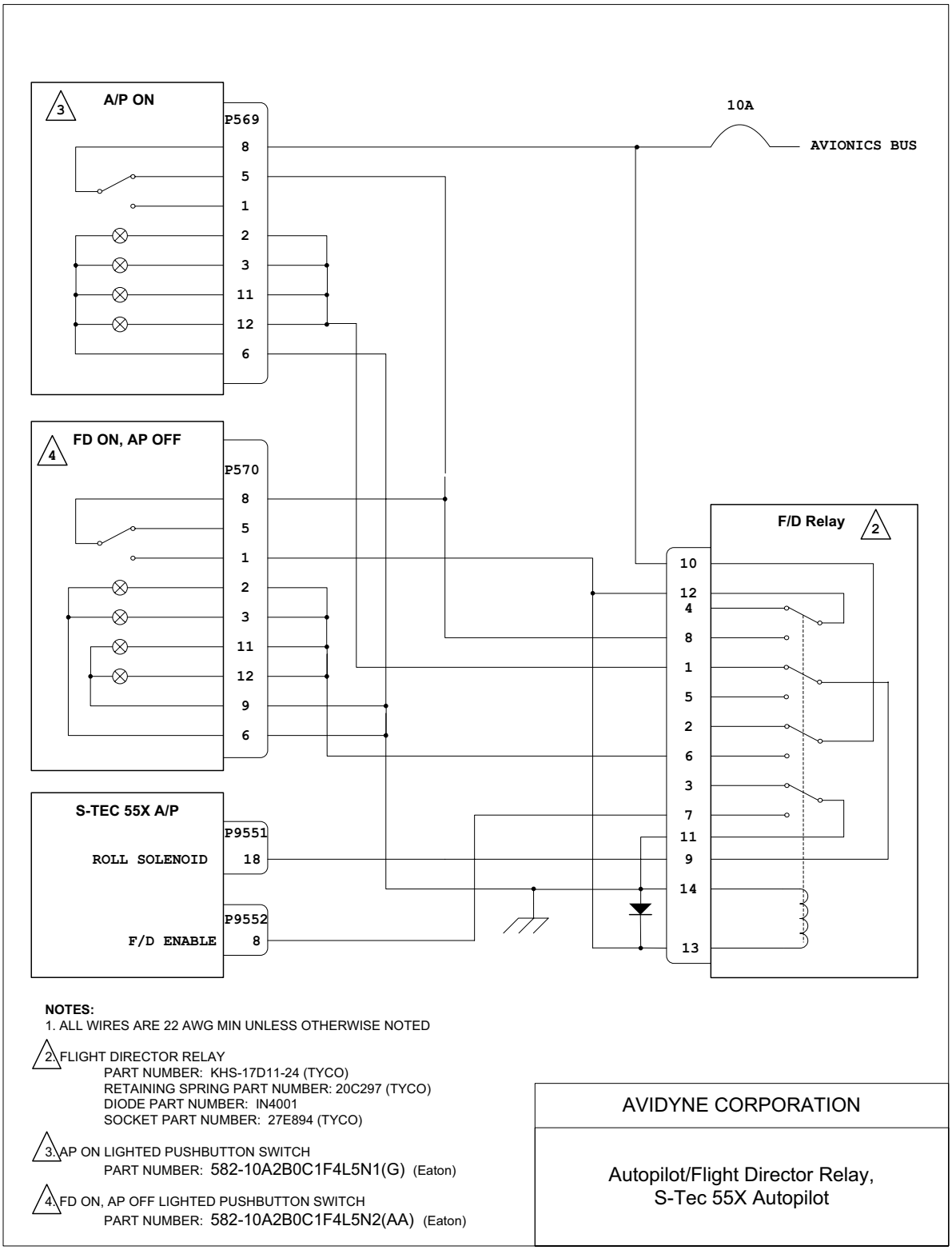
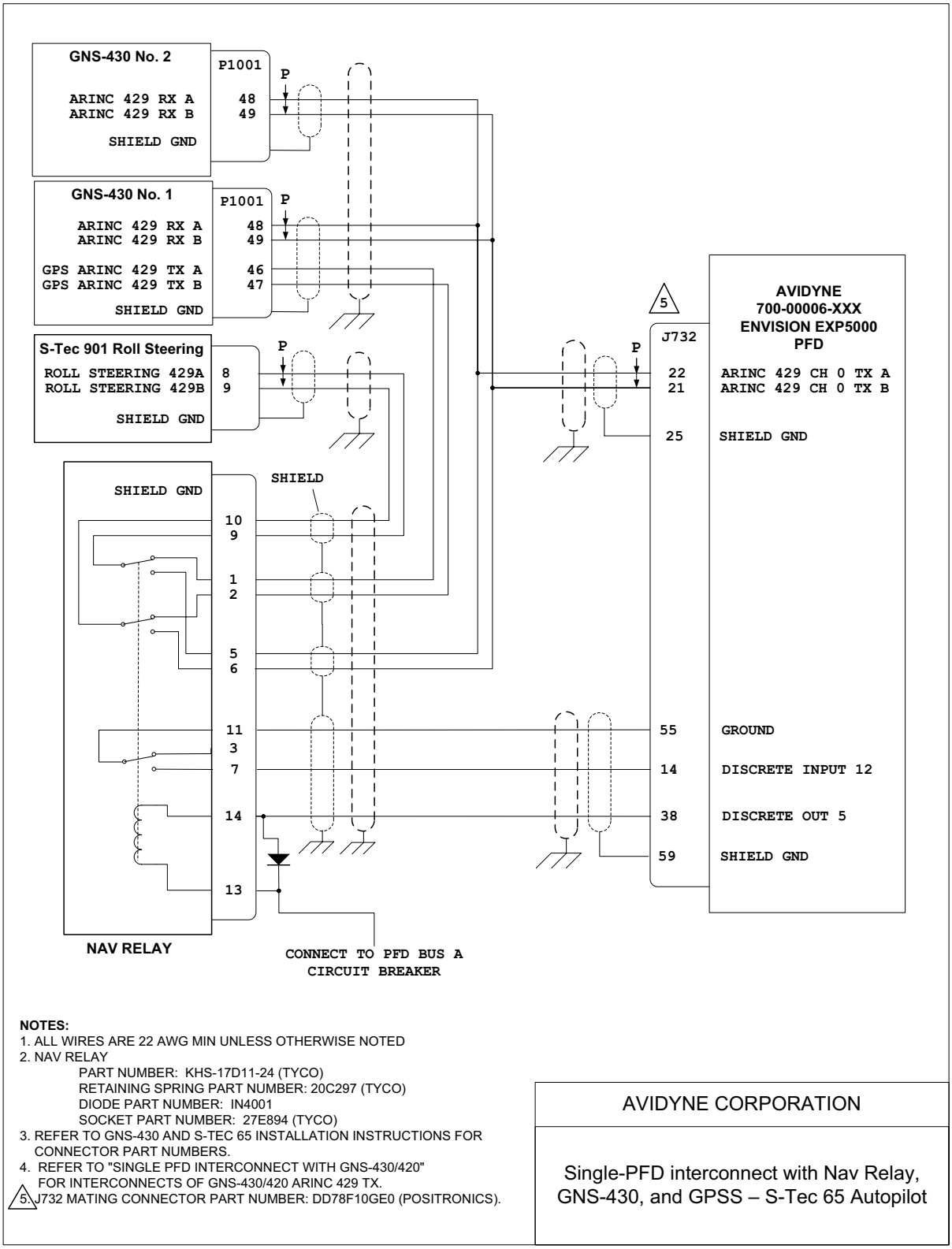


Figure 24: Autopilot / Flight Director Relay, S-TEC 55X

E.9 PFD Interconnect with Nav Relay, GNS-430/430W, and S-TEC 65 Autopilot



NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED
2. NAV RELAY
   PART NUMBER: KHS-17D11-24 (TYCO)
   RETAINING SPRING PART NUMBER: 20C297 (TYCO)
   DIODE PART NUMBER: IN4001
   SOCKET PART NUMBER: 27E894 (TYCO)
3. REFER TO GNS-430 AND S-TEC 65 INSTALLATION INSTRUCTIONS FOR CONNECTOR PART NUMBERS.
4. REFER TO "SINGLE PFD INTERCONNECT WITH GNS-430/420" FOR INTERCONNECTS OF GNS-430/420 ARINC 429 TX.
5. J732 MATING CONNECTOR PART NUMBER: DD78F10GE0 (POSITRONICS).

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Single-PFD interconnect with Nav Relay, GNS-430, and GPSS – S-Tec 65 Autopilot

Figure 25: PFD Interconnect with Nav Relay, GNS-430/430W, and S-TEC 65 Autopilot

E.10 Analog Signal Interconnect - S-TEC 65 Autopilot

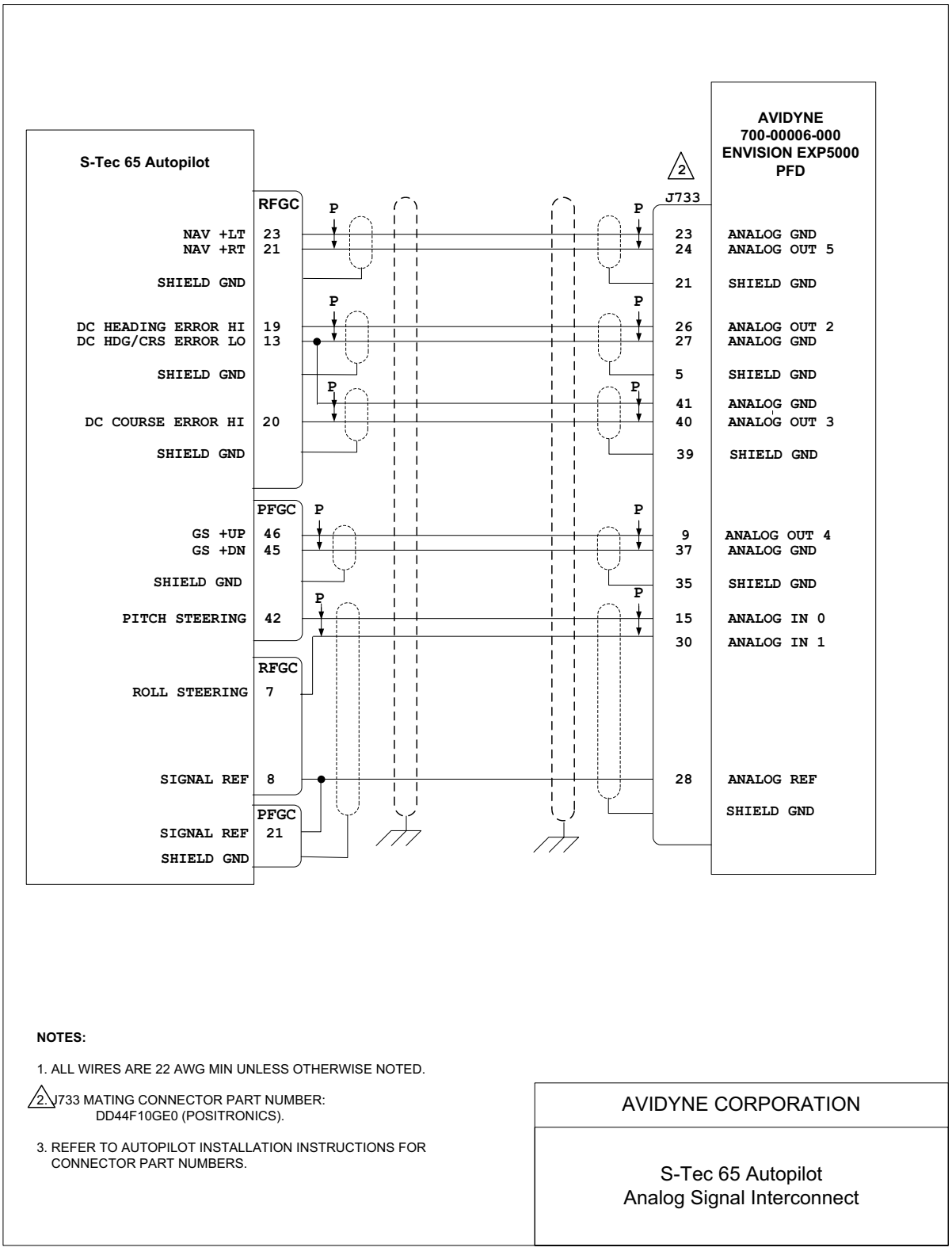


Figure 26: Analog Signal Interconnect - S-TEC 65 Autopilot

E.11 Discrete Signal Interconnect - S-TEC 65 Autopilot

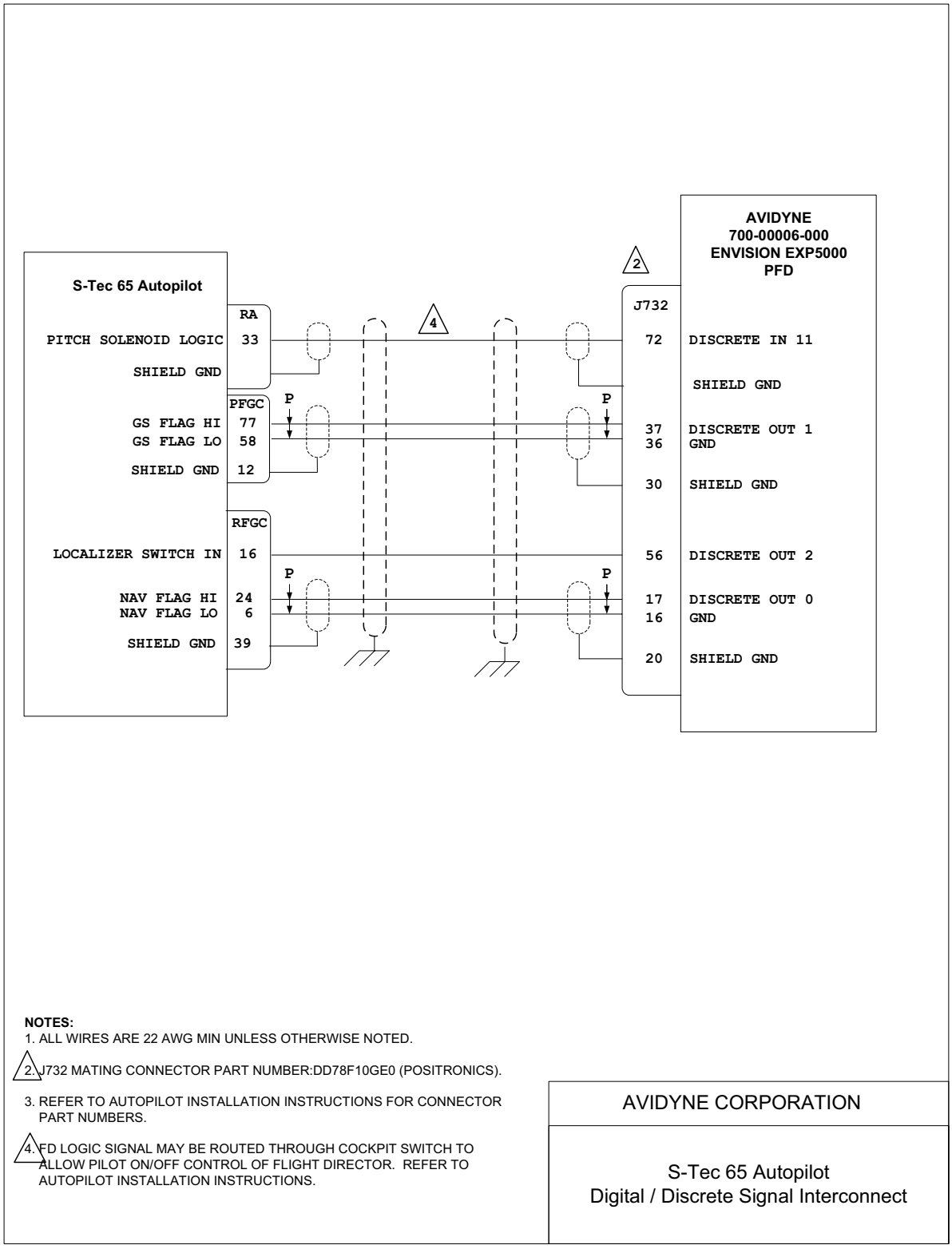
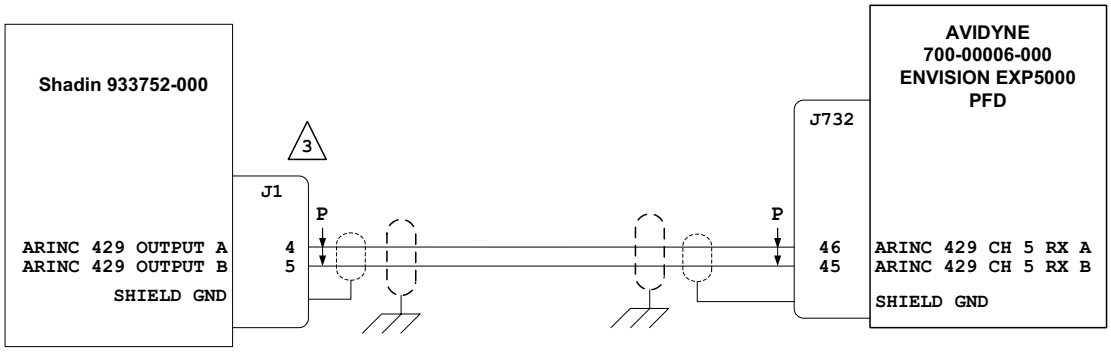


Figure 27: Discrete Signal Interconnect - S-TEC 65 Autopilot

E.12 ADF Interconnect with Shadin Converter



NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

2. OVERBRAID SPECIFICATION:
   MATERIAL: 36 AWG TINNED COPPER PER ASTM-B-33
   COVERAGE: 90% OPTICAL
   RECOMMENDED OVERBRAID: PART NUMBER: A-A-59569A-XXXX (XXXX INDICATES DIAMETER) OR EQUIV.
   SUPPLIER: CONTINENTAL CORDAGE

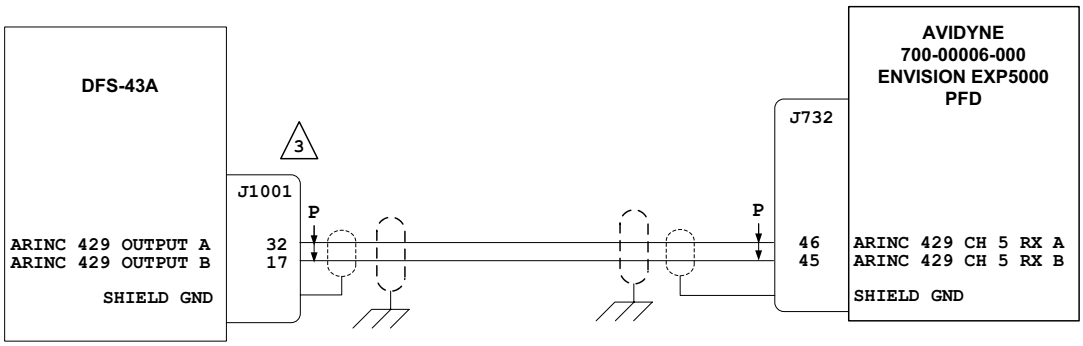
3. REFER TO SHADIN 933752-000 INSTALLATION MANUAL FOR WIRING INFORMATION RELATED TO THE INTERFACE TO THE KR-87 ADF. CONFIGURE SHADIN CONVERTER TO OUTPUT SDI BITS = 01.

AVIDYNE CORPORATION

ADF Interconnect With Shadin Converter

Figure 28: ADF Interconnect with Shadin Converter

E.13 ADF Interconnect with DFS-43A



NOTES:
1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

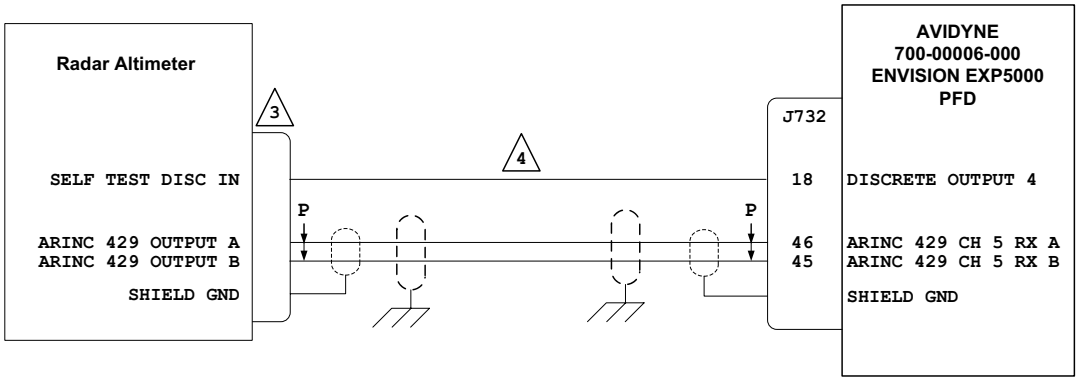
2. OVERBRAID SPECIFICATION:
   MATERIAL: 36 AWG TINNED COPPER PER ASTM-B-33
   COVERAGE: 90% OPTICAL
   RECOMMENDED OVERBRAID: PART NUMBER: A-A-59569A-XXXX (XXXX INDICATES DIAMETER) OR EQUIV.
   SUPPLIER: CONTINENTAL CORDAGE

3. REFER TO DFS-43A INSTALLATION MANUAL FOR ADDITIONAL WIRING INFORMATION ON THE DFS-43A.

AVIDYNE CORPORATION
ADF Interconnect With DFS-43A

Figure 29: ADF Interconnect with DFS-43A

E.14 Radar Altimeter Interconnect



NOTES:

1. ALL WIRES ARE 22 AWG MIN UNLESS OTHERWISE NOTED

2. OVERBRAID SPECIFICATION:
   MATERIAL: 36 AWG TINNED COPPER PER ASTM-B-33
   COVERAGE: 90% OPTICAL
   RECOMMENDED OVERBRAID: PART NUMBER: A-A-59569A-XXXX (XXXX INDICATES DIAMETER) OR EQUIV.
   SUPPLIER: CONTINENTAL CORDAGE

3. REFER TO RAD ALT INSTALLATION MANUAL FOR ADDITIONAL WIRING INFORMATION.

4. IF INSTALLING A S-TEC KRA 405B RADAR ALTIMETER, A ZENER DIODE MUST BE PLACED BETWEEN PFD PIN 18 AND RAD ALT PIN U. REFER TO STC DRAWING.
   S-TEC P/N: 30D02
   MFD P/N: 1N4733A
   DESCRIPTION: DIODE, ZENER. 5.6V, 1W
   MFG: ON SEMICONDUCTOR

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Radar Altimeter Interconnect

Figure 30: Radar Altimeter Interconnect

E.15 System Interconnect, Garmin 430s

Table 25: J732 Pin Assignments

Pin	Pin Name	I/O
22	ARINC 429 CH 0 TX A	O
21	ARINC 429 CH 0 TX B	O
25	Shield	I
41	ARINC 429 CH 1 RX A	I
40	ARINC 429 CH 1 RX B	I
44	Shield	I
4	ARINC 429 CH 2 RX A	I
3	ARINC 429 CH 2 RX B	I
5	Shield	I
43	ARINC 429 CH 3 RX A	I
42	ARINC 429 CH 3 RX B	I
64	Shield	I
7	ARINC 429 CH 4 RX A	I
6	ARINC 429 CH 4 RX B	I
10	Shield	I

Table 26: CH 0 (PFD Transmit ARINC 429 Messages) P/N 700-00006-003

Label	Equip #	Message	Transmit Interval	To
100G	25	SELECTED COURSE	320 to 480 ms	GPS1 or GPS 2 as addressed
121	02	HORZ CMD	62.5 to 125 ms	Autopilot
161	006/0038	DENSITY ALTITUDE (same as Pressure Altitude)	320 to 480 ms	EX5000 MFD
203	006/0038	PRESSURE ALTITUDE	62.5 to 125 ms	EX5000 MFD
204		Baro-Corrected Altitude	62.5 to 125 ms	GPS1/GPS2
210		True Airspeed	62.5 to 125 ms	Autopilot
211	002/063/006// 01A/0381	OAT	250 to 500 ms	EX5000 MFD
235	006/0038	BARO SETTING	62.5 to 125 ms	EX5000 MFD
312	02	GS	62.5 to 125 ms	Autopilot
320	02	MAG HDG	25 to 50 ms	GPS1/GPS2/MFD
206	006	Computed Airspeed	62.5 to 125 ms	External Display
212	006	Altitude Rate	62.5 to 125 ms	External Display
324	005	Pitch	25 to 50 ms	External Display
325	005	Roll	25 to 50 ms	External Display
332	005	Laternal Acceleration	62.5 to 125 ms	External Display
335	005	Heading Rate	25 to 50 ms	External Display

Note: ARINC channels 0-5 are low speed. Channels 6 and 7 are high speed.

Table 27: CH 1/CH3 (GNS430 GPS ARINC429 Messages)

Label	Message
074G	DATA RECORD HEADER
075G	ACTIVE WPT TO/FROM
100G	SELECTED COURSE
113G	CHECKSUM
114	DESIRED TRACK
115	BRG
116G	XTK
117G	VERTICAL DEVIATION
121	HORZ CMD
125	GMT
147G	MAGVAR
251G	DTG
260	DATE
261G	GPS DISCRETE
275G	LRN STATUS
300G	STATION INFO
303	MSG INFO
304G	MSG CHARS 1-3
305G	MSG CHARS 4-6
306G	WPT LAT
307G	WPT LON
310	PPOS LAT
311	PPOS LAT
312	GS
313	TRK
326G	LAT SCALE FACTOR
327	VERTICAL SCALE FACTOR
330	CONIC ARC INBOUND CRS
331	CONIC ARC RADIUS
332	CONIC ARC CRS CHANGE

Note: ARINC channels 0-5 are low speed. Channels 6 and 7 are high speed.

Table 28: CH 2/CH4 (GNS430 VHF ARINC429 Messages)

Label	Message
034G	FREQ
173	LOC DEV
174	GS DEV
222	VOR RADIAL

Appendix F: System Interconnect, S-TEC 55X

Table 29: S-Tec 55 or 55X System Interconnect (See Figure 21 through Figure 24)

A/P Mode & Signal	Wiring Source	Wiring Destination	Data Description
Heading – Heading Bug	PFD: P733-26 Analog Out 2 P733-27 Analog Gnd	Autopilot: P551-28 DC HDG HI P551-29 HDG RTN	Mag Heading is combined with Heading Bug to create Heading Datum. Heading datum to the autopilot is the difference between the Heading Bug and current mag heading. If the Heading Bug and mag heading are the same, the heading datum is 0.0 VDC. As the Heading Bug moves right of center, the voltage increases at 550 mVDC / degree. As the Heading Bug moves left of center, the voltage decreases at 550 mVDC. The voltage limits at ± 25 degrees. This emulates the Bendix-King KCS-55(A) heading system.
Nav – Course Pointer	PFD: P733-40 Analog Out 3 P733-41 Analog Gnd	Autopilot: P551-11 DC CRS HI P551-12 CRS RTN	Mag Heading is combined with Course Pointer to create Course Datum. Course datum to the autopilot is the difference between the course pointer and current mag heading. If the course pointer and the mag heading are the same, the course datum is 0.0 VDC. As the course pointer moves right of center, the voltage increases at 210 mVDC / degree. As the course pointer moves left of center, the voltage decreases at 210 mVDC / degree. The voltage limits at ± 60 degrees. This emulates the Bendix-King KCS-55(A) heading system.
Nav – CDI	PFD: P733-24 Analog Out 5 P733-23 Analog Gnd	Autopilot: P551-30 L-R +RT P551-31 L-R +LT	The PFD transmits a DC analog signal to the autopilot that represents a course deviation. The input at the autopilot is differential and the PFD transmits the course deviation on the + side and connects signal ground on the – side. Full scale deflection is ± 150 mVDC where positive means the needle is right of center as measured from the + signal to the – signal. The course deviation is 1.0 degree per 15 mVDC so full scale deflection at 150 mVDC is 10 degree error. The PFD transmits the same DC analog signal for localizer deviation as it does for VOR course deviation. The autopilot interprets the CDI needle the same way as with the VOR source except with higher gain settings. Localizer deviation is measured in DDM or Difference in Depth of Modulation which is the relative signal strengths of the 90 Hz modulation left lobe and 150 Hz modulation right lobe. +0.155 DDM is full scale deflection right of center and –0.155 DDM is full scale deflection left of center.
Nav – CDI Flag	PFD: P732-17 Discrete Out 0 P732-16 Gnd	Autopilot: P551-13 Nav Flag + P551-14 Nav Flag -	The PFD transmits a discrete level DC signal to the autopilot that represents validity of CDI. The discrete must be greater than 200 mVDC for the autopilot to interpret the CDI as valid for navigational use. A ground on this signal means the CDI is not valid. These states come from electromechanical indicators where a voltage was necessary to pull the flag out of view. The PFD actually transmits a signal that is either near +5VDC or ground.

Table 29: S-Tec 55 or 55X System Interconnect (Continued)(See Figure 21 through Figure 24)

A/P Mode & Signal	Wiring Source	Wiring Destination	Data Description
Nav – ILS Active	PFD P732-56 Discrete Out 2	Autopilot: P551-32 Loc Switch	The Loc Active signal is an open collector discrete output from the PFD to the autopilot. When grounded, it indicates that the CDI is a localizer and causes the autopilot to use high gain settings for closer and more aggressive course tracking. When high impedance, it indicates that the CDI is a VOR and causes the autopilot to use lower gain settings.
Approach – G/S	PFD: P733-9 Analog Out 4 P733-37 Analog Gnd	Autopilot: P552-18 G/S +UP P552-19 G/S +DN	The PFD transmits a DC analog signal for vertical deviation. Glideslope deviation is measured in DDM or Difference in Depth of Modulation which is the relative signal strengths of the 90 Hz modulation top lobe and 150 Hz modulation bottom lobe. +0.175 DDM is full scale deflection above center and –0.175 DDM is full scale below center.
Approach – G/S Flag	PFD: P732-37 Discrete Out 1 P732-36 Gnd	Autopilot: P552-1 G/S Flag + P552-2 G/S Flag -	The PFD transmits a discrete level DC signal to the autopilot that represents validity of G/S. The discrete must be greater than 200 mVDC for the autopilot to interpret the G/S as valid for navigational use. A ground on this signal means the G/S is not valid. These states come from electromechanical indicators where a voltage was necessary to pull the flag out of view. The PFD actually transmits a signal that is either near +5VDC or ground.
Altitude Hold – Alt Engage	PFD: P732-76 Discrete Out 3	Autopilot: P552-20 Alt engage	The PFD normally holds this signal at ground. When the PFD wants to tell the autopilot to hold current altitude, it pulses the signal high. The discrete output is an open collector type but a pullup to +5VDC in the autopilot biases it during the OC high impedance. The pulse width is approximately 1 second to allow monitoring with a voltmeter. The minimum and maximum pulse width allowable by the autopilot is not known.
Vertical Speed – VS Cmd	PFD: P733-42 Analog Out 0	Autopilot: P552-22 VS Signal	The PFD remotely commands a vertical rate to the autopilot with the DC analog VS Cmd signal. VS Cmd is centered on +5VDC indicating 0 fpm. VS Cmd increases 130 mV for each 100 fpm increase in vertical speed commanded up to a limit of 1600 fpm. VS Cmd decreases 130 mV for each 100 fpm decrease in vertical speed commanded down to a limit of –1600 fpm.
Remote ASA – Alt Sel Ctrl	PFD: P732-18 Discrete Out 4	Autopilot: P552-21 Alt Sel Ctl	The PFD acts as a remote STEC altitude selector alerter (ASA) and indicates to the autopilot that a remote ASA has control of vertical speed and altitude capture by holding this discrete signal low. The discrete output is an open collector type but a pullup to +5VDC in the autopilot biases it during the OC high impedance state.
GPSS[1]	PFD: P732-32 A429 CH0 TX A P732-21 A429 CH0 TX B	Autopilot: P552-36 Roll Steer 429 A P552-37 Roll Steer 429 B	Available on S-TEC 55X Only. PFD transmits messages 100G, 121, 320. Autopilot listens to message 121 for GPS Roll Steering. Autopilot ignores SDI bits but will only use messages with valid SSM

Table 29: S-Tec 55 or 55X System Interconnect (Continued)(See Figure 21 through Figure 24)

A/P Mode & Signal	Wiring Source	Wiring Destination	Data Description
All Modes Annunciator	PFD: P732-11 Discrete Input 0 P732-31 Discrete Input 1 P732-50 Discrete Input 2	Autopilot: P552-25 Annun Clk P552-26 Annun Data P552-24 Annun Load	The annunciator data from the autopilot to the PFD is a proprietary serial 3 wire clocked data containing 17 bits. The autopilot drives the signals with open collector outputs. Pullups to +5VDC are in the MPIO.
GPSS – Relay Control	PFD: P732-38 Discrete Output 5	Autopilot: AP Relay coil low side	Open collector output is grounded to energize GPSS relay.
FD-Flag	Autopilot: P2-4 FD-Flag	PFD: P732-72 DIS_INPUT 11	10 VDC = Flight Director ON 0 VDC = Flight Director OFF
Flight Director – Pitch	Autopilot: P1-13 P-STR-OUT	PFD: P733-15 ANALOG_IN0	Measured relative to SIG REF. Scale factor is 425mVDC per degree, positive voltage relative to SIG REF means pitch down.
Flight Director - Roll	Autopilot: P1-50 R-STR-OUT	PFD: P733-30 ANALOG_IN1	Measured relative to SIG REF. Scale factor is 25mVDC per degree, positive voltage relative to SIG REF means roll left.

1. *GPSS is available on S-TEC 55X only.*

Note: ARINC channels 0-5 are low speed. Channels 6 and 7 are high speed.

Table 30: CH7 Transmit (ADAHRS and GPSS/Nav Messages) P/N 700-00006-000/-002

Name	Label	Format	Transmit Interval
Pressure Altitude	203	ARINC 429 BNR	100 to 167 ms
Magnetic Heading	320	ARINC 429 BNR	25 to 40 ms
Pitch Angle	324	ARINC 429 BNR	25 to 40 ms
Roll Angle	325	ARINC 429 BNR	25 to 40 ms

Table 31: CH7 Transmit (ADAHRS and GPSS/Nav Messages) P/N 700-0006-003

Name	Label	Format	Transmit Interval
Selected Course	100	ARINC 429 BNR	167 to 333 ms
Roll Steering	121	ARINC 429 BNR	50 to 100 ms
Greenwich Mean Time	125	ARINC 429 BCD	100 to 200 ms
Pressure Altitude	203	ARINC 429 BNR	100 to 167 ms [1]
Baro Corrected Altitude	204	ARINC 429 BNR	100 to 167 ms [1]
Indicated Airspeed	206	ARINC 429 BNR	100 to 167 ms [1]
True Airspeed	210	ARINC 429 BNR	62.5 to 125 ms
Vertical Speed	212	ARINC 429 BNR	100 to 167 ms [1]
Date	260	ARINC 429 BCD	100 to 167 ms
Ground Speed	312	ARINC 429 BNR	25 to 50 ms
Magnetic Heading	320	ARINC 429 BNR	25 to 40 ms
Pitch Angle	324	ARINC 429 BNR	25 to 40 ms [1]
Roll Angle	325	ARINC 429 BNR	25 to 40 ms [1]
Body Pitch Rate	326	ARINC 429 BNR	25 to 40 ms [1]
Body Roll Rate	327	ARINC 429 BNR	25 to 40 ms [1]
Body Yaw Rate	330	ARINC 429 BNR	25 to 40 ms [1]
Body Lateral Acceleration	332	ARINC 429 BNR	25 to 40 ms [1]
Body Normal Acceleration	333	ARINC 429 BNR	25 to 40 ms [1]

[1] The transmit interval does not comply with the ARINC specification.

Appendix G: System Interconnect, S-Tec 65 Autopilot

Table 32: S-Tec 65 Autopilot System Interconnect (See Figure 25 through Figure 27)

A/P Mode & Signal	Wiring Source	Wiring Destination	Data Description
Heading – Heading Bug	PFD P733-26 ANALOG OUT 2 PFD P733-27 ANALOG GND	RFGC Pin 19: DC Hdg Error HI RFGC Pin 23: DC Hdg Error LO	Mag Heading is combined with Heading Bug to create Heading Datum. Heading datum to the autopilot is the difference between the Heading Bug and current mag heading. If the Heading Bug and mag heading are the same, the heading datum is 0.0 VDC. As the Heading Bug moves right of center, the voltage increases at 550 mVDC / degree. As the Heading Bug moves left of center, the voltage decreases at 550 mVDC. The voltage limits at ± 25 degrees. This emulates the Bendix-King KCS-55(A) heading system.
Nav – Course Pointer	PFD P733-40 ANALOG OUT 3 PFD P733-41 ANALOG GND	RFGC Pin 20: DC Crs Error HI RFGC: Gnd	Mag Heading is combined with Course Pointer to create Course Datum. Course datum to the autopilot is the difference between the course pointer and current mag heading. If the course pointer and the mag heading are the same, the course datum is 0.0 VDC. As the course pointer moves right of center, the voltage increases at 210 mVDC / degree. As the course pointer moves left of center, the voltage decreases at 210 mVDC / degree. The voltage limits at ± 60 degrees. This emulates the Bendix-King KCS-55(A) heading system.
Approach – Glideslope	PFD P733-9 ANALOG OUT 4 PFD P733-37 ANALOG GND	PFGC Pin 46: GS +UP PFGC Pin 45: GS +DN	The PFD transmits a DC analog signal for vertical deviation. Glideslope deviation is measured in DDM or Difference in Depth of Modulation which is the relative signal strengths of the 90 Hz modulation top lobe and 150 Hz modulation bottom lobe. +0.175 DDM is full scale deflection above center and –0.175 DDM is full scale below center.
Nav – CDI	PFD P733-24 ANALOG OUT 5 PFD P733-23 ANALOG GND	RFGC Pin 21: NAV +RT RFGC Pin 23: NAV +LT	The PFD transmits a DC analog signal to the autopilot that represents a course deviation. The input at the autopilot is differential and the PFD transmits the course deviation on the + side and connects signal ground on the – side. Full scale deflection is ± 150 mVDC where positive means the needle is right of center as measured from the + signal to the – signal. The course deviation is 1.0 degree per 15 mVDC so full scale deflection at 150 mVDC is 10 degree error. The PFD transmits the same DC analog signal for localizer deviation as it does for VOR course deviation. The autopilot interprets the CDI needle the same way as with the VOR source except with higher gain settings. Localizer deviation is measured in DDM or Difference in Depth of Modulation which is the relative signal strengths of the 90 Hz modulation left lobe and 150 Hz modulation right lobe. +0.155 DDM is full scale deflection right of center and –0.155 DDM is full scale deflection left of center.
Flight Director – Pitch	PFGC Pin 42: Pitch Steering	PFD P733-15 ANALOG IN 0	Provides FD pitch signal to the PFD. The PFD uses this signal to display the pitch of the FD bar. This signal is measured relative to Analog Ref or Signal Ref.
Fight Director - Roll	RFGC Pin 7: Roll Steering	PFD P733-30 ANALOG IN 1	Provides FD roll signal to the PFD. The PFD uses this signal to control the FD bar roll. This signal is measured relative to Analog Ref or Signal Ref.

Table 32: S-Tec 65 Autopilot System Interconnect (See Figure 25 through Figure 27) (Continued)

A/P Mode & Signal	Wiring Source	Wiring Destination	Data Description
Nav – CDI Flag	PFD P732-17 DISCRETE OUT 0 PFD P732-16 GND	RFGC Pin 24: NAV FLAG HI RFGC Pin 6: NAV FLAG LO	The PFD transmits a discrete level DC signal to the autopilot that represents validity of CDI. The discrete must be greater than 200 mVDC for the autopilot to interpret the CDI as valid for navigational use. A ground on this signal means the CDI is not valid. These states come from electromechanical indicators where a voltage was necessary to pull the flag out of view. The PFD actually transmits a signal that is either near +5VDC or ground.
Approach – Glideslope Flag	PFD P732-37 DISCRETE OUT 1 PFD P732-36 GND	PFGC Pin 77: GS FLAG HI PFGC Pin 58: GS FLAG LO	The PFD transmits a discrete level DC signal to the autopilot that represents validity of G/S. The discrete must be greater than 200 mVDC for the autopilot to interpret the G/S as valid for navigational use. A ground on this signal means the G/S is not valid. These states come from electromechanical indicators where a voltage was necessary to pull the flag out of view. The PFD transmits a signal that is either near +5VDC or ground.
Nav – ILS Active	PFD P732-56 DISCRETE OUT 2	RFGC Pin 16: Loc Switch IN	The Loc Active signal is an open collector discrete output from the PFD to the autopilot. When grounded, it indicates that the CDI is a localizer and causes the autopilot to use high gain settings for closer and more aggressive course tracking. When high impedance, it indicates that the CDI is a VOR and causes the autopilot to use lower gain settings.
GPSS – Relay Control	PFD P732-38 DISCRETE OUT 5	GPSS RELAY LOW SIDE	Open collector output is grounded to energize GPSS relay.
GPSS	PFD P732-22 ARINC 429 CH 0 Tx A PFD P732-21 ARINC 429 CH 0 Tx B	S-Tec 901 Pin 8: ROLL STEERING 429 A S-Tec 901 Pin 9: ROLL STEERING 429 B IN	PFD transmits messages 100G, 121, 320. Autopilot listens to message 121 for GPS Roll Steering.
Flight Director – Flag	RA Pin 33: Pitch Solenoid Logic	PFD #1 P732-72 DISCRETE IN 11 PFD #2 P732-72 DISCRETE IN 11	10 VDC = Flight Director ON 0 VDC = Flight Director OFF
Vertical Speed – VS Cmd	PFD P733-42 ANALOG OUT 0	Autopilot: VS IN	The PFD remotely commands a vertical rate to the autopilot with the DC analog VS Cmd signal. VS Cmd is centered on +5VDC indicating 0 fpm. VS Cmd increases 130 mV for each 100 fpm increase in vertical speed commanded up to a limit of 1600 fpm. VS Cmd decreases 130 mV for each 100 fpm decrease in vertical speed commanded down to a limit of –1600 fpm.

Appendix H: System Interconnect - External Air Data Module

The following table identifies the labels that the EXP5000 expects from an external ADM (Air Data Module).

Table 33: CH 4 External Air Data Module

Name	Label	Format	Update Rate
Pressure Altitude	203	ARINC 429 BNR	31.3 to 62.5 ms
Mach Number	205	ARINC 429 BNR	62.5 to 125 ms
Computed Airspeed (CAS)	206	ARINC 429 BNR	62.5 to 125 ms
True Airspeed (TAS)	210	ARINC 429 BNR	62.5 to 125 ms
Total Air Temperature (TAT)	211	ARINC 429 BNR	250 to 500 ms
Altitude Rate	212	ARINC 429 BNR	31.3 to 62.5 ms

Note: ARINC channels 0-5 are low speed. Channels 6 and 7 are high speed.

Appendix I: System Interconnect, ADF

Table 34: ADF System Interconnect, KR-87 with Shadin 933752-000 (See Figure 28)

Signal	Wiring Source	Wiring Destination	Data Description
ADF ARINC 429 Port	Shadin J1-4 ARINC 429 OUTPUT A J1-5 ARINC 429 OUTPUT B	PFD J732-46 ARINC 429 CH 5 RX A J732-45 ARINC 429 CH 5 RX B	Receive ARINC 429 label(s) 162 ADF Bearing

Table 35: ADF System Interconnect, DFS-43A (See Figure 29)

Signal	Wiring Source	Wiring Destination	Data Description
ADF ARINC 429 Port	DFS-43A J1001-32 ARINC 429 OUTPUT A J1001-17 ARINC 429 OUTPUT B	PFD J732-46 ARINC 429 CH 5 RX A J732-45 ARINC 429 CH 5 RX B	Receive ARINC 429 label(s) 162 ADF Bearing 032 ADF Frequency

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Avidyne Corporation
Lincoln Office
55 Old Bedford Road
Lincoln, MA 01773 USA
781-402-7400

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AVIDYNE CORPORATION
55 Old Bedford Road
Lincoln, MA 01773
Telephone: 781-402-7400
Toll Free: 800-AVIDYNE (800-284-3963)
FAX:781-402-7599
www.avidyne.com

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