AVIDYNE

IFD540 & IFD440 FMS/GPS/NAV/COM
Installation Manual

Revision History

Document Number	600-00299-000	Control Category	CC2

Revision	Description	ECO	Date
00	Initial Release	ECO-14-207	07/09/14
01	Release 10.0.1.0	ECO-14-283	08/21/14
02	Release 10.0.2.0	ECO-14-356	11/12/14
03	Release 10.0.3.0	ECO-14-424	02/02/15
04	Release for TSO	ECO-15-154	04/09/15
05	Define MLB100 TSO part number	ECO-15-385	09/29/15
06	Support WiFi Bluetooth activation utility	ECO-15-425	11/06/15
07	Release 10.1.1.0	ECO-15-469	12/04/15
08	Release 10.1.2.0	ECO-16-054	03/01/16
09	Add EASA Verbiage and 10.1.3	ECO-16-182	06/23/16

Changed Pages

Revision Number	Pages Changed
01	11, 87, Appendix D
02	11, 29, 33, 49, 56-61, 66-67, 70, 74, 79-81, 84, 86, 94, 121
03	11, 12, 14, 19, 27, 29, 30, 33, 42, 50, 51, 52, 54, 64, 65, 67, 69, 74, 75, 82, 85, 91, 102, 109, 144, 177
04	All pages updated for the IFD4XX
05	74, 75, 86, 189
06	32, 108, 141, 163
07	11, 12, 13, 14, 15, 18, 20, 79
08	11, 12
09	11, 12, 15, 19, 35, 119, 120, 121, 122, 206, 207

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

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Notes to Installers:

The following important issues regarding the Avidyne 700-00182-XXX and 700-00179-XXX GPS/NAV/COM System installation should be noted during the planning stages.

1. **These installation instructions assume that the GPS/NAV/COM transceiver and GPS antenna can be installed in a structurally sound manner in accordance with the installation manual and AC 43.13-( ). All the aircraft certification requirements must remain in compliance.**
2. **Mounting the GPS antenna on composite and pressurized aircraft requires engineering guidance beyond the scope of this manual. With respect to the Approved Model List STC, the physical mounting of the antenna is specifically excluded from the approval in the case of installations on the pressure vessel of pressurized aircraft, composite aircraft, and aircraft with a certification basis of Amendment 23-45 or later, unless approved installation data is listed in the Master Document List of the STC. All early amendment, metal construction, non-pressurized aircraft antenna installations must be installed consistent with accepted industry practices. The installation must be structurally sound and in accordance with FAA Advisory Circular 43.13-1B and 43.13-2B. All other antennas must be mounted using the manufacturers' installation data.**
3. **An Electrical Load Analysis must be accomplished to determine that the electrical limits of the specific aircraft are not exceeded. The Electrical Load Analysis, Functional Hazard Assessment and other certification requirements for the aircraft must remain in compliance.**
4. **The IFD5XX/4XX Forward Looking Terrain Alerting is not a TSO-C151 system, and does not satisfy any Part 91/135 TAWS requirements.**
5. **Prior to starting IFD5XX/4XX installation, verify the aircraft make and model is on the STC Approved Model List (AML). Also, note any installation specific data for the make and model in the AML.**

1. General Information

1.1 Introduction

This manual contains information about the physical, mechanical, and electrical characteristics of the Avidyne IFD5XX/IFD4XX GPS/Navigation/Communication, and provides installation instructions for its components.

1.2 Applicability

This manual applies to the following part numbers in Table 1 and Table 2:

Model Number	Hardware Part Number	Software Part Number (or later approved revision)
IFD540 (Black Bezel, 10W)	700-00182-000	**ACR**: 530-00236-000 Rev. 02 • 510-00324-000 Rev. 02 • 510-00325-000 Rev. 00 • 510-00310-000 Rev. 00 • 510-00311-001 Rev. 00 • 510-00312-000 Rev. 01 **FPSM**: 530-00226-000 Rev. 01 • 510-00294-000 Rev. 01 • 510-00291-000 Rev. 00 **LIO App:** 530-00239-000 Rev. 01 • 510-00328-000 Rev. 00 • 510-00329-000 Rev. 01 **LIO I/O:** 530-00238-000 Rev. 02 • 510-00327-000 Rev. 02 • 510-00289-000 Rev. 01 • 510-00290-000 Rev. 01 • 510-00291-000 Rev. 00 **GPS:** 530-00229-000 Rev. 06 • 510-00876-000 Rev. 06 • 510-00877-000 Rev. 02 **VHF:** 530-00231-000 Rev. 02 • 510-00314-000 Rev. 00 • 510-00239-001 Rev. 00 • 510-00316-000 Rev. 02 • 510-00237-000 Rev. 00
IFD540 (Black Bezel, 16W)	700-00182-002	
IFD540 (Gray Bezel, 10W)	700-00182-100	
IFD540 (Gray Bezel, 16W)	700-00182-102	

Table 1: IFD5XX Variants

Model Number	Hardware Part Number	Software Part Number (or later approved revision)
IFD440 (Black Bezel, 10W)	700-00179-000	**ACR**: 530-00236-000 Rev. 02 • 510-00324-000 Rev. 02 • 510-00325-000 Rev. 00 • 510-00310-000 Rev. 00 • 510-00311-001 Rev. 00 • 510-00312-000 Rev. 01 **FPSM**: 530-00226-000 Rev. 01 • 510-00294-000 Rev. 01 • 510-00291-000 Rev. 00 **LIO App:** 530-00239-000 Rev. 01 • 510-00328-000 Rev. 00 • 510-00329-000 Rev. 01 **LIO I/O:** 530-00238-000 Rev. 02 • 510-00327-000 Rev. 02 • 510-00289-000 Rev. 01 • 510-00290-000 Rev. 01 • 510-00291-000 Rev. 00 **GPS:** 530-00229-000 Rev. 06 • 510-00876-000 Rev. 06 • 510-00877-000 Rev. 02 **VHF:** 530-00231-000 Rev. 02 • 510-00314-000 Rev. 00 • 510-00239-001 Rev. 00 • 510-00316-000 Rev. 02 • 510-00237-000 Rev. 00
IFD440 (Gray Bezel, 10W)	700-00179-100	

Table 2: IFD4XX Variants

1.3 Unit Modifications

The following table lists of hardware modification since initial release of the IFD540. The IFD440 does not have any unit modifications at the time of this revision.

Modification	Change	Hardware PN	Hardware Revision	Software	HW Release Date
MOD 2	OBS UPDATE	700-00182-000 700-00182-002 700-00182-100 700-00182-102	01 01 01 01	10.0.0.0 or later	9/25/2014
MOD 4	SERIAL DME UPDATE	700-00182-000 700-00182-002 700-00182-100 700-00182-102	03 03 03 03	10.0.3.0 or later	11/21/2014
MOD 5	STANDBY AUDIO IMPLEMENTATION	700-00182-000 700-00182-002 700-00182-100 700-00182-102	04 04 04 04	10.1 or later	12/11/2014
MOD 8	GPS MAXIM B, HIGH GAIN LNA1	700-00182-000 700-00182-002 700-00182-100 700-00182-102	07 07 07 07	10.1 or later	05/05/2015
MOD 11	REPLACEMENT OF MAIN GPS OSCILLATOR	700-00182-000 700-00182-002 700-00182-100 700-00182-102	10 10 10 10	10.1 or later	07/22/2015
MOD 12	CHANGE RESOLVER INPUTS TO AC COUPLED	700-00182-000 700-00182-002 700-00182-100 700-00182-102	11 11 11 11	10.1 or later	11/04/2015

Table 3: IFD540 Modification History

Modification	Change	Hardware PN	Hardware Revision	Software	HW Release Date
MOD 03	CHANGE RESOLVER INPUTS TO AC COUPLED	700-00179-000 700-00179-100	03 03	10.1 or later	11/04/2015

Table 4: IFD440 Modification History

1.4 Technical Specifications

This section gives mechanical and electrical characteristics for the IFD5XX and IFD4XX.

1.4.1 IFD5XX Specifications

The IFD5XX unit has the following characteristics:

1.4.1.1 IFD5XX Physical and Electrical Specifications

Physical Specifications	
Bezel Height	4.58 inches (116 mm)
Bezel Width	6.25 inches (159 mm)
Depth (w/Connectors)	11.00 inches (279 mm)
Weight	6.75 ± 0.25 lbs (2.59 kg)
Connectors (Aircraft Mating Connector)	P1001/P1050 - 78-position High Density D-Subminiature (male) P1002- 25-position Standard D- Subminiature (female) P1006- 44-position High Density D-Subminiature (male)
Electrical Requirements	
Voltage	9-33 VDC
Current	4.4A main, 6.5A COM, 0.5A NAV at 14VDC 3.0A main, 1.0A NAV at 28VDC 3.6A @ 10W, 4.1A @ 16W COM at 28VDC
Dimming Bus	28VDC/14VDC/5VDC/5VAC
Cooling Requirements	Not Required
Operating Limits	Reference Appendix A: Environmental Qualification Form

Table 5: IFD5XX Specifications

1.4.1.2 IFD5XX Display Specifications

Display Size	5.7 inches diagonal
Active Area	4.53 inches (w) x 3.40 inches (h)
Resolution	640x480 pixels
Viewing Angle	Left/Right: 80° Up: 80° Down: 60°

Table 6: IFD5XX Display Specifications

1.4.1.3 IFD5XX GPS Specifications

Channels	16 channels (13 GPS, 3 GPS/WAAS/SBAS)
Velocity	1000 knots maximum (below 60,000 ft)
TTFF (Time to First Fix)	150 seconds
Reacquisition	20 seconds
Position Update Interval	0.2 seconds (5 Hz)
Lat/Long Position Accuracy	3.4 meters
Fault Detection/RAIM	RAIM/FDE WAAS Beta 3 Compliant @ 5 Hz
Sensitivity	-123 dBm
GPS System Design Assurance (SDA)	DO-178B Level B, DO-254 Level B
GPS Source Integrity Level (SIL)	3 – Enroute
Source Integrity Level Supplement (SIL_{SUPP})	0 – "per hour"
Navigation Accuracy Category Velocity (NA C_V)	Category 3 [< 1 m/s] ADS-B installations should use a NACv of 1 unless GPS support a higher category. The AXP340 requires a NACv of Category 1 [< 10 m/s].
Receiver Class	TSO-C146d Class Gamma 3 receiver that complies with AC 20-138C

Table 7: IFD5XX GPS Specifications

1.4.1.4 IFD5XX VHF Communication Transceiver Specifications

Audio Output	65 mW into 150Ω load
Audio Response	<6dB Variation from 350 to 2500 Hz, 4kHz -18dB
AGC Characteristics	<6dB Variation from 10uV to 10mV
Sensitivity	4uV (6dB (S+N)/N 30% mod @ 1KHz)
Spurious Response	10mV spurious signal produces no more output than a desired signal at 6dB (S+N)/N
Transmitter Power	16W or 10W @ 28V, 10W @ 14V (Typical)
Transmitter Duty Cycle	Recommended 10% maximum
Modulation Capability	70%
Carrier Noise Level	-39dB (S+N)/N
Frequency Stability	>2.5 ppm
Demodulation Audio Distortion	<12% @ 70% modulation
Sidetone Fidelity	300-2500 Hz
Demodulation Audio Response	<6dB Variation from 300 to 2500 Hz

Table 8: VHF Communication Transceiver Specifications

1.4.1.5 IFD5XX VHF Navigation Specification

Glideslope Receiver	-
Selectivity	0 +/-.0091 ddm w/ test signal varied +/-17kHz. 60dB for +/- 132kHz offset
Sensitivity (flag)	10uV max
Spurious Response	>-60 dB
Centering Accuracy	0 ± 0.02 DDM or better
Deflection Response	67% of final value in 600msec
Localizer Receiver	-
Selectivity	6dB at least ±17kHz, 40dB no more than ±80kHz
Sensitivity (flag)	10uV max
Sensitivity (aural)	10uV max for 20dB (S+N)/N with 1kHz 30%mod
Centering Accuracy	+/-3mV
Deflection Response	67% of final value in 600msec
Audio Response	<6dB Variation from 350 to 2500 Hz, -20dB <150Hz >9kHz

Table 9: VHF Navigation Specification

1.4.2 IFD4XX Specifications

The IFD4XX unit has the following characteristics:

1.4.2.1 IFD4XX Physical and Electrical Specifications

Physical Specifications	
Bezel Height	2.66 inches (67 mm)
Bezel Width	6.25 inches (159 mm)
Depth (w/Connectors)	11.00 inches (279 mm)
Weight	5.16 ± 0.25 lbs (2.34 kg)
Connectors (Aircraft Mating Connector)	P1001 - 78-position High Density D-Subminiature (male) P1002- 25-position Standard D- Subminiature (female) P1006- 44-position High Density D-Subminiature (male)
Electrical Requirements	
Voltage	9-33 VDC
Current	4.4A main, 6.5A COM, 0.5A NAV at 14VDC 3.0A main, 3.6A COM, 1.0A NAV at 28VDC
Dimming Bus	28VDC/14VDC/5VDC/5VAC
Cooling Requirements	Not Required
Operating Limits	Reference Appendix A: Environmental Qualification Form

Table 10: IFD4XX Specifications

1.4.2.2 IFD4XX Display Specifications

Display Size	4.8 inches diagonal
Active Area	4.53 inches (w) x 1.70 inches (h)
Resolution	640x480 pixels
Viewing Angle	Left/Right: 80° Up: 80° Down: 60°

Table 11: IFD4XX Display Specifications

1.4.2.3 IFD4XX GPS Specifications

Channels	16 channels (13 GPS, 3 GPS/WAAS/SBAS)
Velocity	1000 knots maximum (below 60,000 ft)
TTFF (Time to First Fix)	150 seconds
Reacquisition	20 seconds
Position Update Interval	0.2 seconds (5 Hz)
Lat/Long Position Accuracy	3.4 meters
Fault Detection/RAIM	RAIM/FDE WAAS Beta 3 Compliant @ 5 Hz
Sensitivity	-123 dBm
GPS System Design Assurance (SDA)	DO-178B Level B, DO-254 Level B
GPS Source Integrity Level (SIL)	3 – Enroute
Source Integrity Level Supplement (SIL_{SUPP})	0 – "per hour"
Navigation Accuracy Category Velocity (NAC_V)	Category 3 [< 1 m/s] ADS-B installations should use a NACv of 1 unless GPS support a higher category. The AXP340 requires a NACv of Category 1 [< 10 m/s].
Receiver Class	TSO-C146d Class Gamma 3 receiver that complies with AC 20-138C

Table 12: IFD4XX GPS Specifications

1.4.2.4 IFD4XX VHF Communication Transceiver Specifications

Audio Output	65 mW into 150Ω load
Audio Response	<6dB Variation from 350 to 2500 Hz, 4kHz -18dB
AGC Characteristics	<6dB Variation from 10uV to 10mV
Sensitivity	4uV (6dB (S+N)/N 30% mod @ 1KHz)
Spurious Response	10mV spurious signal produces no more output than a desired signal at 6dB (S+N)/N
Transmitter Power	10W @ 14V (Typical)
Transmitter Duty Cycle	Recommended 10% maximum
Modulation Capability	70%
Carrier Noise Level	-39dB (S+N)/N
Frequency Stability	>2.5 ppm
Demodulation Audio	<12% @ 70% modulation

Distortion	
Sidetone Fidelity	300-2500 Hz
Demodulation Audio Response	<6dB Variation from 300 to 2500 Hz

Table 13: VHF Communication Transceiver Specifications

1.4.2.5 IFD4XX VHF Navigation Specification

Glideslope Receiver	-
Selectivity	0 +/-.0091 ddm w/ test signal varied +/-17kHz. 60dB for +/- 132kHz offset
Sensitivity (flag)	10uV max
Spurious Response	>-60 dB
Centering Accuracy	0 ± 0.02 DDM or better
Deflection Response	67% of final value in 600msec
Localizer Receiver	-
Selectivity	6dB at least ±17kHz, 40dB no more than ±80kHz
Sensitivity (flag)	10uV max
Sensitivity (aural)	10uV max for 20dB (S+N)/N with 1kHz 30%mod
Centering Accuracy	+/-3mV
Deflection Response	67% of final value in 600msec
Audio Response	<6dB Variation from 350 to 2500 Hz, -20dB <150Hz >9kHz

Table 14: VHF Navigation Specification

1.5 Power Requirements

The IFD5XX/4XX is capable of operating from 9-33 VDC. The following table shows the typical current requirements for 14VDC and 28VDC aircraft electrical systems.

Voltage	14VDC	28VDC
Main Power	4.4A	3.0A
COM Power 10W	6.5A	3.6A
COM Power 16W	N/A	4.1A
NAV Power	0.5A	1.0A

Table 15: Power Requirements

1.6 Regulatory Compliance

1.6.1 Applicable TSOs

This section identifies Technical Standard Orders (TSOs) applicable to the IFD5XX/4XX system. 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 approvals for installation in aircraft. The article may be installed only if performed under 14 CFR Part 43 or the applicable airworthiness requirements.

TSO Number	Title	Type/Categories	Ranges
TSO-C34e	ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6-335.4 Megahertz (MHz)		
TSO-C36e	Airborne ILS Localizer Receiving Equipment Operating within the Radio Frequency Range of 108-112 Megahertz (MHz)		
TSO-C40c	VOR Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 Megahertz (MHz)		
TSO-C44c	Fuel Flowmeters		
TSO-C110a	Airborne Passive		

TSO Number	Title	Type/Categories	Ranges
	Thunderstorm Detection Equipment		
TSO-C112e	Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment		
TSO-C113a	Airborne Multipurpose Electronic Display		
TSO-C118	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I		
TSO-C128a	Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Unintentional Transmissions		
TSO-C146d	Stand-Alone Airborne Navigation Equipment Using the Global Positioning System (GPS) Augmented by the Wide Area Augmentation System (WAAS).Airborne Supplemental Navigation Equipment Using the Global Positioning System (GPS) - Gamma 3		
TSO-C147	Traffic Advisory System (TAS) Airborne Equipment	Class A (Display Functions Only)	
TSO-C157a	Aircraft Flight Information Services – Broadcast (FIS-B) Datalink Systems and Equipment		
TSO-C165	Electronic Map Display Equipment for Graphical Depiction of Aircraft Position		
TSO-C169a	VHF Radio Communications Transceiver Equipment Operating Within The Radio Frequency Range 117.975 To 137.000 Megahertz	Class C, E, 3 and 5	

Table 16: IFD5XX/4XX TSO Functions

1.6.2 TSO Deviations

TSO	Deviation(s)
TSO-C34e - ILS Glideslope Receiving Equipment	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.
TSO-C36e - Airborne ILS Localizer Receiving Equipment	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.
TSO-C40c - VOR Receiving Equipment	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.
TSO-C44c - Fuel Flowmeters	1. Environmental qualification performed in accordance with DO-160G rather than a combination of DO-160B and AS407C. AS407C requirements apply to portions of the instrument not implemented by the IFD system; 2. The fuel flow indicators will not use matte white material for all graduations, numerals, pointers and indicators. Color coded indications are used where appropriate for rapid pilot recognition of exceedances; 3. The fuel flow indicators are a digital readout instead of pointer and dial.
TSO-C110a – Airborne Passive Thunderstorm Detection Equipment	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.
TSO-C113a – Airborne Multipurpose Electronic Display	1. The IFD5XX/4XX display response time is not less than 1 second during Short-Time Operating Low Temperature environmental conditions as defined in Section 4.0 of RTCA/DO-160G.
TSO-C118 - Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B. 2. The IFD5XX/4XX used the minimum performance standards set forth in the Radio Technical Commission for Aeronautics (RTCA) Document No. RTCA/DO-197A, "Minimum

TSO	Deviation(s)
	Operational Performance Standards for An Active Traffic Alert and Collision Avoidance System I (Active TCAS 1)," Section Two (2) September 12, 1994 with the exceptions listed in appendix 1 of TSO-147 in lieu of the corresponding minimum operational performance standards specified in the TSO.
TSO-C128a - Equipment that Prevents Blocked Channels used in two-ways Radio Communications due to unintentional transmissions	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.
TSO-C146d - Stand-alone Airborne Navigation Equipment using the Global Position System augmented by the Satellite based Augmentation System	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.
TSO-C147 – Traffic Advisory System (TAS) Airborne Equipment	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B; 2. The IFD5XX/4XX map does not place a range ring at 2 NM from the own aircraft symbol when a display range of 10 NM or less is selected;
TSO-C157a – Aircraft Flight Information Services – Broadcast (FIS-B) Data Link Systems and Equipment	1. Smoothing and scaling algorithms at high map ranges remove small patches of high-intensity NEXRAD returns in favor of surrounding lower-intensity returns.
TSO-C165 – Electronic Map Display Equipment for Graphical Depiction of Aircraft Position	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B; 2. De-cluttering on chart page not provided. 3. Location of traffic symbols in the absence of heading information
TSO-C169a - VHF Radio Communications Transceiver Equipment	1. Environmental qualification performed in accordance with DO-160G rather than DO-160B.

Table 17: IFD5XX/4XX TSO Deviations

Table 9 above lists the TSO Deviations and a brief description of the nature of the deviation that have been granted for those applicable TSOs.

1.6.3 Non-TSO Functions

The following IFD5XX/4XX functions are not TSO'd:

IFD5XX/4XX Function
Display of Terrain Alerting
Display of Aircraft Checklists
Calculators (Air Data, Fuel Planner, etc)
Display of Timers and Schedulers
Provision of Data to ADS-B Out System

Table 18: Non-TSO Functions

1.6.4 Partial TSO Functions

The following IFD5XX/4XX TSOs are partial function:

TSO	Description	Comment
TSO-C44c	Fuel Flowmeters	Display Only
TSO-C110a	Airborne Passive Thunderstorm Detection Equipment	Display Only
TSO-C118	Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I	Display Only
TSO-C147	Traffic Advisory System (TAS) Airborne Equipment	Display Only
TSO-C157a	Aircraft Flight Information Services - Broadcast (FIS-B) Datalink Systems and Equipment	Display Only

Table 19: Partial Function TSOs

1.6.5 Open Problem Report

At the time of this revision, the IFD5XX/4XX does not have any open problems that affect safety or design assurance level of the unit.

1.7 Software and Hardware Design Assurance Levels

The IFD5XX/4XX contains software developed in accordance with DO-178B Level B, C, and D design assurance levels. The following table lists functions of the IFD5XX/4XX system and their corresponding software design assurance level.

All complex electronic hardware devices were developed in compliance with DO-254 Level B.

Component	Function	DO-178B Design Assurance Level
IFD5XX/4XX	Traffic	D
	Lightning	D
	Digital Moving Map (not including Terrain)	C
	Terrain Alerting	C
	Wx Datalink	D
	FMS	B
	VHF Communication	C
	VHF Navigation	C
	GPS Navigation	B
	Checklist	C
	Fuel Display	C
	Charts	C
	Timers/Schedulers	D
	Calculators	D

Component	Function	DO-178B Design Assurance Level
	Maintenance Mode	D

Table 20: DO-178B Software Design Assurance Levels

1.8 Environmental Qualification Forms

The environmental Qualification for the IFD5XX/4XX is listed in Appendix A: Environmental Qualification Form.

Note: If the IFD5XX/4XX has been exposed to extreme cold temperature prior start, it may take a warm up period to achieve standard performance.

1.9 Databases

The IFD5XX/4XX utilizes several databases. All the databases can be loaded on the IFD using the USB port on the IFD5XX. Reference the IFD5XX or IFD4XX Pilot's Guide for updating the IFD5XX/4XX databases.

1.10 Fault Detection and Exclusion (FDE)

FDE software is part of all IFD5XX/4XX systems and does not require any installer or pilot action to operate. This FDE software is running at all times and if it detects an issue, it will alert the pilot through Caution-Alerting System (CAS) messages.

When the IFD5XX/4XX is installed per the directions in this Installation Manual, it complies with the governing requirements for GPS Primary Means of Navigation in Oceanic and Remote Airspace (more than 200 nm from the nearest airport), when used with any commercially available RAIM/FDE Prediction Program. Examples of these prediction programs include the FAA's raimprediction.net, Fltplan.com, www.sapt.faa.gov, and the Garmin FDE Prediction Program.

These programs only need to be run under the following scenarios for 14 CFR Parts 91, 121, 125, and 135 operations where the IFD5XX/4XX is being used as the primary means of navigation and:

- TSO-C146 compliant antenna equipped aircraft that experience a WAAS (SBAS) failure or when operating outside of SBAS coverage areas;
- Non-TSO-C146 compliant antenna equipped aircraft (e.g. TSO-C129a only compliant systems) when operating in Oceanic and Remote airspace, Enroute and Terminal airspace, or during any LNAV/VNAV, LP, or LPV approach.

Prior to conducting Class II navigation (remote/oceanic), the owner/operator must obtain operational approval for using the IFD5XX/4XX system for long-range navigation from the appropriate flight standards district office.

1.11 STC Approved Model List

The aircraft listed on the Approved Model List STC are eligible to install the IFD5XX/4XX. However, the installer must determine if the installation is in compliance with the limitations stated in the STC and this manual. Any deviations from the STC and/or this manual must have a separate installation approval.

Installations in Part 25/27/29 aircraft or Part 23 airplanes not listed on the AML STC may install the IFD5XX/4XX, however, it will require additional installation approval (e.g. Field approval, STC, or TC amendment), reference FAA Advisory Circular 23-22 as needed. If installing a IFD5XX/4XX on a Part 27/29 aircraft via field approval, the Avidyne Helicopter tray must be used, reference Table 23.

The installation of antennas on composite and/or pressurized aircraft requires engineering guidance beyond the scope of this manual. With respect to the Approved Model List STC, the physical mounting of the antenna is specifically excluded from the approval in the case of installation on the pressure vessel of a pressurized aircraft, composite aircraft, and aircraft with a certification basis of Amendment 23-45 or later, unless approved installation data is listed in the Master Document List of the STC. All early amendment, metal construction, non-pressurized aircraft may install the GPS antenna using this manual. The installation must be structurally sound and in accordance with FAA Advisory Circular 43.13-( ). All other antennas must be installed using the antenna manufacturer's installation data or FAA Advisory Circular 43.13-( ).

1.12 Avidyne Supplied Material

The following Ship Kits are available for ordering from Avidyne Corporation.

Note: Ship Kit content and/or Part numbers may change without notice, verify before ordering.

1.12.1 Product Ship Kits

Component	Ship Kit 850-00182-000 Black Bezel	Ship Kit 850-00183-100 Gray Bezel
IFD5XX Unit	700-00182-000	700-00182-100
USB Flash Drive	X	X

Table 21: IFD5XX Ship Kit

Component	Ship Kit 850-00179-000 Black Bezel	Ship Kit 850-00179-001 Gray Bezel
IFD4XX Unit	700-00179-000	700-00179-100
USB Flash Drive	X	X

Table 22: IFD4XX Ship Kit

1.12.2 Optional Ship Kits

Component	Fixed Wing Aircraft Ship Kits	Helicopter Ship Kit
IFD5XX Tray	850-00188-000	850-00188-001
IFD5XX Components Only (no tray)	820-00113-000	820-00113-000
IFD5XX Tray and	850-00188-002	850-00188-003

Component	Fixed Wing Aircraft Ship Kits	Helicopter Ship Kit
Install Kit		

Table 23: IFD5XX Optional Ship Kits

Component	Fixed Wing Aircraft Ship Kits	Helicopter Ship Kit
IFD4XX Tray	850-00184-000	850-00184-001
IFD4XX Components Only (no tray)	820-00114-000	820-00114-000
IFD4XX Tray and Install	850-00184-002	850-00184-001

Table 24: IFD4XX Optional Ship Kits

Component	Ship Kit 850-00217-000
GPS Antenna	200-00260-000

Table 25: GPS Antenna Kit

Component	Ship Kit 820-00101-001
ByteFlight Cable	033-00102-000

Table 26: ByteFlight Ship Kit

1.13 Materials Required but not Supplied

The IFD5XX/4XX will require common installation supplies. The following items may be required for installation, but not supplied:

- Wire (Shielded and Un-shielded)
- Hardware (Screws, washers, nuts, ring terminals, etc)
- Circuit Breakers

- Tie wrap or Lacing Cord
- Coaxial Cables
- Wire Splices
- Solder Sleeves
- Antenna(s)
- Diplexers

2. Installation Considerations

The following section will describe installation instructions for the IFD5XX/4XX Unit. The IFD5XX should be installed using standard industry practice while following guidance in FAA AC 43.13-( ), AC 20-138 ( ), and AC 20-67( ).

2.1 Plug & Play Considerations

The IFD5XX/4XX is designed to be a slide-in replacement for a GNS-530/W or GNS-430/W. For those replacement installations in fixed wing aircraft, the existing aircraft tray and wiring can all be reused. However, all electrical wiring, including power(s) and ground(s), should be verified per installation data shown in Appendix D: Electrical Interface Drawings. Note that 14v aircraft may be required to replace the installed circuit breaker and power and ground wiring to accommodate the IFD5XX/4XX.

If the unit being replaced was a WAAS-enabled device, then the WAAS (SBAS) antennas previously installed can be reused, assuming they are one of the GPS antennas identified in Section 3.3.5.

If the unit being replaced was not a TAWS-enabled device, or if the TAWS Audio output signals were not already connected to the aircraft audio panel(s), then some additional wiring will be required from the IFD5XX/4XX tray to the aircraft audio panel(s) as identified in Section 6.11.1 in order to supply IFD5XX/4XX terrain alerting audio (FLTA functionality) and TOD chime to the headsets. If the unit being replaced was a TAWS-enabled device used for 91/135 TAWS compliance, the IFD5XX/4XX cannot be installed without a separately installed EGWPS/TAWS unit.

For those installations that use a combined IFD5XX/4XX – Avidyne AXP340 Mode S ADS-B transponder, the on-ground/in-air discrete signal wire may need to be added from the IFD5XX/4XX tray to the AXP340 tray as identified in Section 6.12.

Note: Installations replacing an existing non-WAAS GPS/NAV/COM transceiver cannot upgrade to a WAAS installation without performing a major alteration.

Note: Installations replacing a GNS-530/W or GNS-430/W must verify the aircraft is on the IFD5XX/4XX Approved Model List, Avidyne Document Number AVIFD-318.

Note: It is imperative that only one source of terrain cautions and warnings be enabled on the airplane so as to avoid the potential for conflicting information to be presented to the pilot. If a TAWS system is installed but the IFD's internal TA and FLTA functions are to be used for terrain avoidance, the TAWS system ***must*** be fully disabled. If a TAWS system is to be used, its type must be properly configured on the IFD so that the caution and warning indications generated by the TAWS system can be displayed to the pilot and so that the IFD's TA and FLTA functions will be inhibited.

Avidyne TA/FLTA is not approved TSO-C151 EGPWS unit.

The IFD system supports a Honeywell KGP560/860 system only. All other external TAWS/EGPWS systems must be disabled if the internal TA and FLTA is operational on the IFD system.

All installations must verify the aircraft complies with either Section 2.4.1 or 2.4.2 after completing the IFD5XX/4XX installation.

2.2 Optional Installation Features

This section summarizes optional features that may require extra wiring.

Feature	Description	Reference Section for Installation Details
Audio Panel Aurals	Allows IFD5XX/4XX produced aural alerts (e.g. FLTA terrain alerts, Top of Descent alerts, 500' callouts, etc) to be heard in the headsets.	Section 6.11.1
Transponder Support	Allows IFD5XX/4XX GPS position transmission to the transponder for ADS-B operation and IFD5XX/4XX Air/Ground output to the transponder for automatic Ground-Alt transition.	Section 6.12
Com Presets	Enables external command (e.g. yoke-mounted button) to select frequencies in the com preset list to be loaded into the #1 Standby com slot.	Section 6.1.10.4
Com Frequency Active-Standby Swap	Enables external command (e.g. yoke-mounted button) to swap the Active and #1 Standby com frequencies.	Section 6.1.10.4
Nav Frequency Active-Standby Swap	Enables external command (e.g. yoke-mounted button) to swap the Active and #1 Standby nav frequencies.	Section 6.1.10.4
Synchro Heading Input	Allows the IFD5XX/4XX to take heading data in via synchro protocol.	Section 6.1.6
Standby Com Monitor	Allows the com frequency in the #1 standby slot to be heard in the headsets when installed with a compatible audio panel (e.g. Avidyne AMX240).	Section 6.1.10.5
Wifi/Bluetooth	Allows the connection of portable electronic equipment to the IFD5XX/4XX.	Requires Ship Kit 850-00182-502 KIT, IFDXXX WIFI BLUETOOTH ACTIVATION Reference Service Bulletins: 601-00182-020 SERVICE BULLETIN, ACTIVATION, IFD540 WIFI BLUETOOTH 601-00179-005 SERVICE BULLETIN, ACTIVATION, IFD440 WIFI BLUETOOTH IFD5XX/4XX Pilot Guide

Table 27: Optional Installation Features

2.3 IFD5XX/4XX Interfaces

The IFD5XX can interface with a host of other avionics equipment. The following list represents the proven interfaces. There may be other devices that can be configured the same as one on the below list but has not been tested by Avidyne and cannot make any compatibility claims.

Category	Vendor	Model
Air Data	B&D	2600 ADC
	B&D	2601 ADC
	B&D	2800 ADC
	B&D	900004-003 ADC
	Bendix King	KAD 280/480 ADC (KDC 281, 481)
	Shadin	8800T Alt Computer
	Shadin	9000T Alt Computer
	Shadin	9200T Alt Computer
	Shadin	9628XX-X Fuel/Air Data Computer
	Insight	TAS 1000 ADC
	Icarus	Instrument 3000
	Sandia	SAC7-35
	Garmin	GDC74A
Encoding Altimeter or Blind Encoders	Bendix King	KEA-130A
	Bendix King	KEA-346
	Terra	AT-3000
	Sandia	SAE5-35
	Trans-Cal Industries	IA-RS232-X
	Trans-Cal Industries	SSD120
	ACK Technologies	A-30
EFIS	Bendix King	EFS 40/50
	Avidyne	EXP5000
	Aspen	Pilot PFD (EFD1000)
	Collins	Proline 21
	Collins	EFIS 84
	Honeywell	Primus 1000

Category	Vendor	Model
	Sextant	SMD 45
Displays	Garmin	GDU 620 (G500/600)
	Garmin	MX20
	Garmin	GMX200
	Garmin	GPSMAP 195
	Garmin	GPSMAP 295
	Garmin	GPS III Pilot
	Garmin	GPSMAP 196
	Garmin	GPSMAP 296
	Garmin	GPSMAP 396
	Garmin	GPSMAP 496
	Garmin	GPSMAP 695
	Garmin	GPSMAP 696
	Garmin	Aera 796/795
	Argus	3000
	Argus	5000
	Argus	7000
	Horizon	DDMP
	Avidyne	EX500
	Avidyne	EX600
	Avidyne	EX5000
	Avidyne	FlightMax Series
Heading	Bendix King	KAH 460 Inertial System (KAU 461 also)
	Collins	AHC 85 Inertial System Laseref
	Honeywell	HG 1075AB, HG 1095AG Inertial Systems
	Litef	LTR 81 Inertial System
	Litton	LTN 90-100 Inertial System
	Litton	LTN 91 Inertial System
	Litton	LTN 92 Inertial System
EHSI	Sandel	SN3308

Category	Vendor	Model
	Sandel	SN3500
Fuel	Shadin	91053XP and 91053XT-D "Digiflo-L" Digital Fuel Mgmt Systems
	Shadin	91204XT(38)D and 91204XT-D "Miniflo-L" Digital Fuel Mgmt Systems
	Shadin	91802-() "DigiData" Fuel/Airdata
	JPI	EDM-700 Engine Monitor
	JPI	EDM-760 Engine Monitor
	JPI	FS-450
	ARNAV	FC-10
	ARNAV	FT-10
	EI	FP-5L
	Insight	GEM 3
Traffic	L3	SKY497 SkyWatch
	L3	SKY899 SkyWatchHP
	Bendix King	KTA-870
	Bendix King	KTA-970
	Bendix King	KMH980
	Bendix King	KMH880
	Garmin	GTS800/820/850
	Ryan	TCAD 9900B
	Ryan	TCAD 9900BX
	Avidyne	TAS-6XX series
Transponder	Garmin	GTX330 (transponder functionality only)
	Garmin	GTX330 ES (transponder functionality only)
	Garmin	GTX 330D ES (transponder functionality only)
	Garmin	GTX 327
	Trig	TT31
	Avidyne	AXP340/322

Category	Vendor	Model
Lightning	L3	WX500
	Avidyne	TWX670 ("Native" format)
Datalink	Garmin	GDL-69/69A
	Avidyne	MLB700/100
	WSI	AV-300/350
Autopilot	Bendix King	KFC400
	Bendix King	KCP320
	Bendix King	KFC325
	Bendix King	KFC300
	Bendix King	KFC225
	Bendix King	KFC200
	Bendix King	KFC250
	Bendix King	KFC275
	Bendix King	KFC150
	Bendix King	KAP150
	Bendix King	KAP140
	Bendix King	KAP100
	Century	I
	Century	II
	Century	III
	Century	IV
	Century	21
	Century	31/41
	Century	2000
	Century	Triden
	Century	AK 1081 GPSS Converter
	Collins	APC-65 Series
	Collins	FGC-65
	Collins	FYD-65
	STec	20
	STec	30
	STec	40

Category	Vendor	Model
	STec	50
	STec	55
	STec	55X
	STec	60 PSS
	STec	60-1
	STec	60-2
	STec	65
	STec	ST901 GPSS Converter
Miscellaneous	Garmin	GAD42 Interface Adapter
EGPWS	Bendix King	KGP560
DME	Bendix King	KN 61
	Bendix King	KN 62/62A
	Bendix King	KN 63
	Bendix King	KN 64
	Bendix King	KN65
	Bendix King	KDI 572
	Bendix King	KDI 574
	Bendix King	KDM706
	Collins	DME 40
	Collins	DME 42
	Collins	TCR 451
	Narco	DME 890
	Narco	IDME 891
	ARC (Cessna)	RTA-476A
Nav Indicator	Garmin	GI 102/A
	Garmin	GI 106/A
	Bendix King	KI 202
	Bendix King	KI 203
	Bendix King	KI 204
	Bendix King	KI 206
	Bendix King	KI 208
	Bendix King	KI 208A

Category	Vendor	Model
	Bendix King	KI 209
	Bendix King	KI 209A
	Bendix King	KI 525A
	Bendix King	KPI 552/B
	Bendix King	KPI 553/A/B
	Century	NSD 360A
	Century	NSD 1000
	Collins	331A-6P
	Collins	331A-9G
	Collins	PN-101
	Mid Continent	MD 222-402/-406
	Mid Continent	MD 200-20X/-30X
	STec	ST 180
	Sperry	RD444
	Sperry	RD 550A
	Sperry	RD 650
RMI	Bendix King	KI 229
	Bendix King	KNI 582
	Bendix King	KDA 692
External GPS Annunciator	Mid Continent	MD41-14XX
	Staco Switch	992561
	Vivisun	95-40-( )
	Vivisun	95-45-( )
Remote TAWS Annunciator	Garmin	013-0079-XX
	Mid Continent	MD41-10XX
Audio Panel	Avidyne	AMX240
	Apollo (Garmin)	SL10
	Apollo (Garmin)	SL15
	Garmin	GMA 340
	Garmin	GMA 347
	PS Engineering	6000
	PS Engineering	7000

Category	Vendor	Model
	PS Engineering	8000/8000BT
	Bendix King	KMA 24
	Bendix King	KMA 26
	Bendix King	KMA 28
	Bendix King	KMA 24H
406 ELT	Artex	ME406
	Ameri-King	AD 451-(*)
	Ack	E-04
	Narco	Not specified
	Pointer	3000
	Kannad	Not specified

Table 28: IFD5XX Compatible Equipment

2.4 Minimum System Configuration

The IFD5XX/4XX can be installed in one of two configurations.

2.4.1 VFR Installation

This section is intended for stand-alone IFD5XX/4XX installations intended for VFR navigation on un-pressurized aircraft less than 6000 pounds.

The following items must be installed in IFD5XX/4XX VFR Configuration:

- IFD5XX or IFD4XX unit
- GPS Antenna (TSO-C144a or TSO-C190, reference Section 3.3.5 for approved antennas)
- VHF Communication Antenna is needed for communication functions
- VHF Navigation Antenna is needed for VOR functions

All VFR installations must install a "GPS APPROVED FOR VFR USE ONLY" placard.

All VFR installations, as described in this Section, is considered a minor alteration when installed on a no-hazard basis to supplement VFR navigation.

2.4.2 IFR Installation

This section is intended for IFR installations. The following items must be installed in IFD5XX/4XX IFR Configuration:

- IFD5XX or IFD4XX unit;
- GPS Antenna (TSO-C190 or approved antennas listed in Section 3.3.5)

- VHF Communication Antenna is needed for communication functions;
- Navigation Antenna(s) is needed for VOR/LOC/GS functions;
- Remote Annunciator is required if the IFD5XX/4XX is not in the field of view of the pilot, reference Section 5.1.2;
- IFD5XX/4XX should be interfaced to an Airdata source for automatic altitude leg sequencing (optional). If no baro-altitude data is supplied, altitude leg types must be manually sequenced for IFD5XX with Software 10.0.3.0 or earlier. IFD4XX and IFD5XX with software 10.1.0 or later will use GPS Altitude if an airdata source is not connected;
- The IFD5XX/4XX must be connected to an external CDI/HSI/EHSI indicator installed in the pilot's field of view. The CDI must have a Vertical Deviation Indicator;
- Second navigation receiver or communication transceiver must be installed on all multi-engine or turbine-powered aircraft with a gross takeoff weight greater than 6000 lbs. Aircraft using Class II navigation (remote/oceanic) must have a second navigation receiver installed in the aircraft. In both cases, the second navigation receiver or communication transceiver must be a FAA TSO'd unit.
- Separately approved Marker Beacon System.

All aircraft approved for Class II navigation must have dual electrical power/ground connections to both IFD5XX/4XX units as shown in Section 4.9 and described in FAA AC 20-138( ) Appendix 1.

Figure 1 shows an IFR installation. IFR installation must be installed as major alteration to the aircraft.

Note: All equipment required by 14 CFR 91.205 must be previously installed on the aircraft for IFR operations.

If the IFD540/440 is installed per this section, it can provide guidance for the following operations conducted under instrument flight rules (IFR):

- VOR, LOC, ILS instrument approach procedures (procedures using VHF radio guidance)
- RNP instrument approach procedures using the following lines of minima:
  - LNAV minima (including when using advisory vertical guidance from the system);
  - LNAV/VNAV minima;
  - LPV minima; and
  - LP minima.

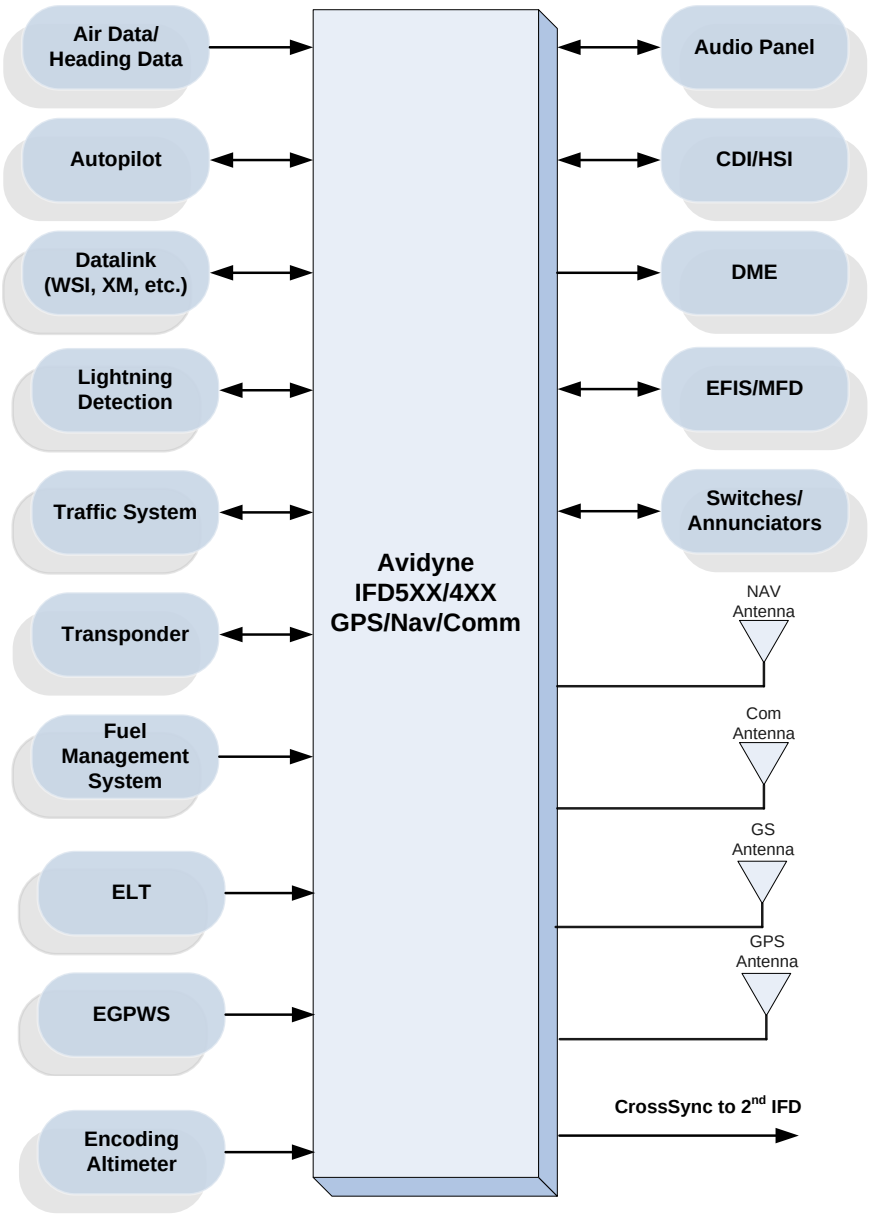


Figure 1: Full IFR Installation

2.5 Pre-Installation Checklist

Prior to beginning installation of the IFD5XX/4XX, complete the following pre-installation checklist. This checklist will help in determining installation requirements. If the Installation Items below are not complete, additional installation approval may be required.

Installation Item	Reference	IFD5XX	IFD4XX	Complete
Is the aircraft on the Avidyne STC Approved Model List?	Avidyne Document AVIFD-306	✓	✓	☐
Is IFD5XX/4XX replacing an existing GPS/NAV/COM used for Part 91/135 TAWS compliance?	If yes, a separate TAWS system must be installed. (Ref. Section 2.1)	✓	✓	☐
Can the IFD5XX/4XX tray be installed per the data in this manual?	If No, additional installation approval is required.	✓	✓	☐
Navigation(s) Antenna Installed	Section 3.5	✓	✓	☐
Communication Antenna Installed	Section 3.4	✓	✓	☐
Is the IFD5XX/4XX, or remote annunciator lights, installed within the Pilot's Field of View?	Section 5.1 or 5.2	✓	✓	☐
Does the aircraft have an approved GPS antenna installed on the aircraft? Or, can the GPS antenna be installed per this manual?	Section 3.3.5	✓	✓	☐
Does the aircraft have a previously approved Marker Beacon System installed in the aircraft? (Not needed for VFR installations)	Section 2.4.2	✓	✓	☐
Does the aircraft have a second NAV or COMM installed?	Section 2.4.2	✓	✓	☐
Does the aircraft have a sufficient electrical power for the IFD5XX/4XX installation?	Section 1.5	✓	✓	☐
Does the installation location comply with the Environmental Testing of the IFD5XX/4XX unit?	Appendix A: Environmental Qualification Form	✓	✓	☐
Does the Airplane Flight Manual Supplement adequately cover the installation?	If no, additional installation approval is required. (Reference: Avidyne Document 600-00298-000 or 600-00305-000)	✓	✓	☐

Table 29: Pre-Installation Checklist

3. Antenna Installation

This section describes the installation of the GPS, NAV, and Glideslope antennas on unpressurized, metallic fuselage airplanes. The installer is responsible to ensure the structural aspects of the installation meet all regulatory requirements and are adequate for the aircraft type. Antenna installations on airplanes with composite or pressurized fuselages, and aircraft with certification basis of Amendment 23-45 or later, are beyond the scope of this manual and a separate installation approval is required.

3.1 Antenna Bonding

All antennas should be well bonded to the aircraft. Reference AC 43.13-2b paragraph 307 for additional information.

3.2 Antenna Environmental Qualifications

Verify the antenna is appropriately qualified to be installed on the aircraft. Reference the antenna manufacturer's RTCA DO-160(x) qualification form.

3.3 GPS Antenna

The GPS Antenna should be installed using practices acceptable to the antenna and aircraft manufacturers. Regulatory guidance for antenna installations can be found in AC 20-138( ) Chapter 12, AC 43.13-2B Chapter 3, and AC 43.13-1B Chapter 4. Also reference Appendix C in this manual.

The GPS antenna listed in Table 25 can be installed on unpressurized metal airplanes with a certification basis of Amendment 23-43, or earlier, using the data below. All other GPS Antenna installations are beyond the scope of this manual and a separate installation approval is required.

The Avidyne GPS antenna, Avidyne Part Number 200-00260-000, can be installed as shown in the following Figures in Appendix C: Figure C - 37, Figure C - 38, and Figure C - 39. The GPS Antenna must be installed using the following guidelines to be in compliance with the STC.

GPS Antenna Location:

- Fuselage skin must be 2024-T3 aluminum (or equivalent)
- Fuselage skin thicknesses beyond the range provided in Table 30 below are outside the scope of this installation
- Selected antenna location may not be within one full bay of other cutouts, skin joints, or load introduction points
- Doubler installation on, or adjacent to, primary or fatigue critical structure, as defined by the aircraft manufacturer or regulatory guidance, requires separate approval
- Evaluate the installation per AC43.13-2B, Chapter 3, paragraph 303(b) for gaps due to fuselage curvature. If a saddle is required, fabrication should be per AC 43.13-1B, and should completely fill the curvature gaps, and should not be riveted to the fuselage skin. The only purpose of the

saddle is to act as a tapered shim and is not intended to transfer load into the skin

Doubler Fabrication:

- Doubler material is to be 2024-T3 clad aluminum per AMS QQ-A-250/5
- Form the doubler to match the fuselage curvature
- Etch, alodine, and prime the doubler per the guidance provided in AC43.13-1B
- Drill holes and install rivets per AC43.13-1B
  - It is acceptable to slightly vary the rivet and row spacing to accommodate existing frames and stringers provided 2D edge distance and 4D minimum rivet spacing is maintained and no rivet is installed within 0.75" of the antenna mounting holes
  - Rivet type is dependent on the type of rivets in the adjacent fuselage structure. If the adjacent rivets in the structure around the bay selected for the doubler installation are protruding head type, install MS20470AD rivets in the outer row of the doubler. If the adjacent rivets are countersunk or dimpled, install either MS20426AD or NAS1097AD rivets per the table below. Reference Table 107 for rivet type and doubler thickness appropriate for the aircraft's skin thickness.

Fuselage Thickness	Doubler Thickness	Doubler Drawing
0.016-0.025"	0.020"	See Figure C - 39
0.032-0.050	0.032"	

Table 30: Doubler Thickness

3.3.1 GPS Location

The following recommendations should be followed when choosing an installation location for the GPS antenna. Prior to installing the GPS antenna, it is recommended to temporarily mount the GPS antenna in the desired location and functional ground test the GPS system.

- The antenna must be mounted on the exterior upper fuselage of the aircraft
- The GPS antenna should be mounted more than 2 feet from any transmitting antenna.
- The GPS antenna should be mounted in a location that minimizes the effects of shadowing by the aircraft structure.
- The GPS antenna should be installed more than 6 inches from any other antenna, including another GPS antenna.

- The GPS antenna should be installed in a location that allows the antenna to be level in normal cruise flight.
- For multiple GPS installations, the antennas should not be mounted in a straight line from front to rear of the aircraft along the longitudinal axis on the aircraft to prevent simultaneous antenna damage from lightning strikes.
- Antennas should be installed 3" or more from the windshield.

3.3.1.1 Aircraft Lightning Zone

If installing an Avidyne GPS Antenna (Avidyne Part Number 200-00260-000), the GPS antenna is qualified to be installed in aircraft lightning zone 2A as defined by SAE ARP5414A and RTCA DO-160G. The ***No Installation Area*** can be determined using Figure 2. The distance found by using Figure 2 defines a zone immediately aft of the nose of the aircraft, or propeller in the case of single engine propeller driven aircraft, where the GPS antenna should not be installed. Aircraft locations aft of the ***No Installation Area*** are acceptable to install the GPS antenna. Figure 3 below shows an example of the ***No Installation Area***.

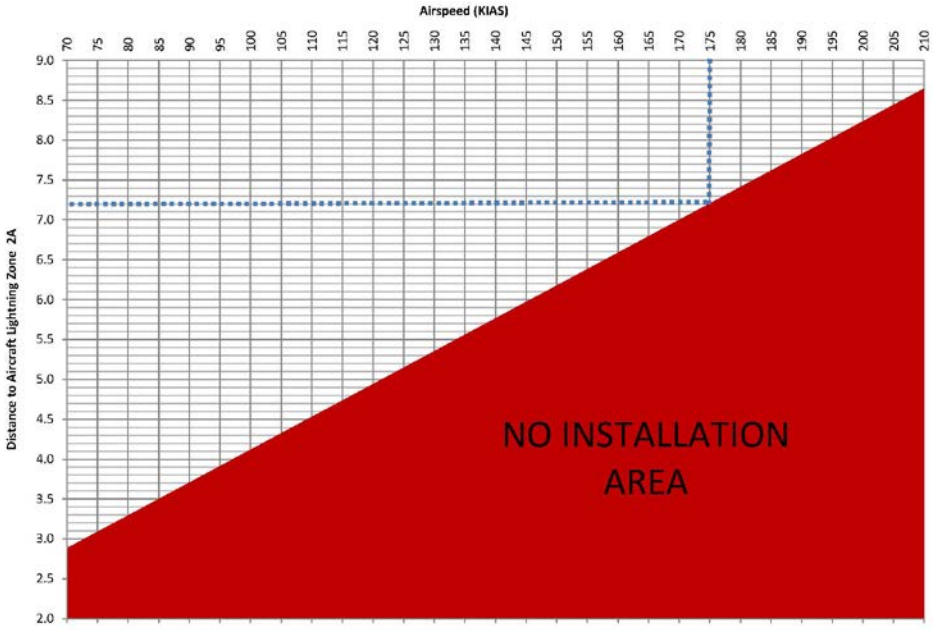


Figure 2: Distance to Aircraft Lightning Zone 2A

Procedure:

1. Determine the Maximum Cruising Speed (V_{no}) for the aircraft. **Note:** Indicated Airspeed in knots (KIAS) must be used in the table.
2. Locate the Airspeed for the aircraft on the Horizontal Axis of the table. Draw a vertical line from the Airspeed to the No Installation Area.
3. Draw a horizontal line from the No Installation Area, found in Step 2, to the Vertical Axis on the chart.

4. Determine the Distance (in feet) to Aircraft Lightning Zone 2A for the aircraft on the Vertical Axis.

Example:

For example, if an aircraft shown in Figure 3 has a V_{no} of 175 KIAS, the No Installation Area will be 7.2 feet. This is shown on Figure 2 with a dotted line and Figure 3 with a shaded area.

Aircraft with a V_{no} greater than 210 KIAS may install the GPS antenna 8.6 feet aft of the nose of the aircraft (excluding propeller).

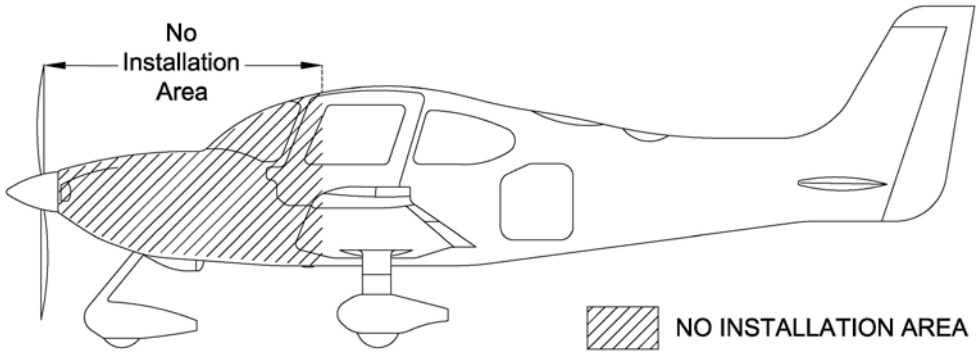


Figure 3: Aircraft No-Installation Area

Note: Locating the GPS antenna in the correct aircraft lightning zone is the responsibility of the installing agency. If a System Equipment DER is necessary, the Aircraft Electronics Association is a good source of information. The telephone number is +1 (816) 347-8400.

3.3.2 GPS Antenna Bonding

The GPS Antenna should have ≤ 2.5 milliohm resistance to the aircraft fuselage.

3.3.3 GPS Antenna Cable

The GPS Antenna Cable must be RG-142B, RG-400, or an equivalent 50Ω double shielded coaxial cable. The GPS antenna cable loss should not be greater than 6.5dB or less than 1.5 dB. Each connector on the GPS coaxial cable will add an additional 0.2 dB loss to the cable.

The GPS antenna cable should not be routed with high power wires or transmitting antenna cables.

If dual GPS Systems are installed on the aircraft, the GPS coaxial cables should be routed in such a manner to provide maximum separation between the two GPS coaxial cables.

3.3.4 GPS Coaxial Cable Connector

The connectors on the GPS coaxial cable should be assembled per the connector manufacturer's assembly instructions.

3.3.5 Approved GPS Antennas

Model Number	Description	Supplier
CI-428-200	GPS WAAS Antenna	Cobham (Comant)
CI-2580-200	VHF/GPS WAAS Antenna	Cobham (Comant)
CI-2728-410	VHF/GPS/XM Antenna	Cobham (Comant)
GA-35	GPS/WAAS Antenna	Garmin
GA-36	GPS/WAAS Antenna	Garmin
GA-37	GPS/WAAS Antenna	Garmin
GA-56A	GPS/WAAS Antenna	Garmin
GA-56W	GPS/WAAS Antenna	Garmin
GA-57	WAAS/XM Antenna	Garmin
A33 (AT575-9UW)	GPS/WAAS Antenna	Garmin /AeroAntenna
A34	GPS/WAAS Antenna	Garmin /AeroAntenna
AT575-93AVW-TNCF-000-RG-27-NM	GPS/WAAS Antenna	AeroAntenna Technology

Table 31: Approved GPS Antennas for SBAS Operation

The IFD5XX/4XX can be interfaced to all TSO-C190 antennas and the approved antennas listed in the table above. If connected to an approved SBAS (WAAS) Antenna, the IFD5XX/4XX is approved for TSO-C146d Gamma 3 operation.

The IFD5XX can be interfaced to non-antennas but the system will not be approved for any type of WAAS (SBAS) operations. In this case, the Antenna Type selection as described in Section 7.5.10 must be selected as "Non-WAAS". This will result in the FMS functionality of the IFD5XX/4XX inhibiting selection of any WAAS (SBAS) approach in the database.

Installing a new GPS antenna listed in Table 31 requires additional structural approval beyond the scope of this manual.

3.3.6 GPS Interference

After installing the IFD5XX/4XX System, the GPS antenna must be tested to insure no interference is present. The GPS Antenna System is subject to interference from VHF COM transceiver, Emergency Locator Transmitter (ELT) antenna, or Direction Finder (DF) receiver which can radiate harmonics that can potentially interfere with the GPS antenna.

If a VHF Communication transceiver is found to be the problem, installing a 1.57542 GHz notch filter may help to reduce the problem.

3.3.7 Ground Plane

The GPS Antenna should be mounted on a minimum of 8 x 8 inch metal surface or ground plane.

3.3.8 Dual IFD5XX/4XX Installations

If the aircraft has dual IFD5XX/4XX, the aircraft is permitted to have a non-WAAS system and a WAAS (SBAS) system installed, however, if the two antennas are not of the same type (i.e. dual non-WAAS or dual WAAS installation), then FMS-related data (flight plans, waypoints, routes, etc) will not be shared between IFDs.

3.3.9 Anti-Ice Protection

If the aircraft is approved for flight into known icing, verify the GPS antenna is installed in location that is not susceptible to ice buildup or complies with FAA AC 20-138( ) paragraph 13-2.

3.4 VHF Communication Antenna

The VHF communication antenna should be installed using this manual, FAA AC 43.13-( ), AC 20-67B and the antenna manufacturer's guidance.

The antennas should be installed to allow maximum separation between antennas. If possible, one antenna should be installed on the top of the aircraft, and the other on the bottom of the aircraft.

3.4.1 Antenna Environmental Qualifications

Verify the antenna is appropriately qualified to be installed on the aircraft. Reference the antenna manufacturer's RTCA DO-160(x) qualification form.

3.4.2 VHF Communication Cable

The antenna cable should be RG-142B, RG-400, or an equivalent 50Ω coaxial cable.

3.4.3 VHF Coaxial Cable Connector

The connectors on the VHF communication coaxial cable should be assembled per the connector manufacturer's assembly instructions.

3.4.4 Voltage Standing Wave Ratio

The VSWR should not exceed 2:1 over the VHF communication radio frequency range. A VSWR over 2:1 may result in loss in transmitting power up to 50%.

3.4.5 VHF Antenna

The VHF Communication Antenna should meet one of the following Technical Standard Orders (TSO): TSO-C37( ), TSO-C38( ), TSO-C169( ).

3.4.6 Antenna Ground Plane

The VHF Communication Antenna should be mounted on a minimum of 18 x 18 inch metal surface or ground plane.

3.5 Navigation Antennas

3.5.1 VOR/LOC Antenna

The NAV Antenna should be a standard 50Ω horizontally polarized antenna. The VOR/LOC antenna should be installed using the manufacturer's installation instructions and FAA AC 43.13-( ).

The VOR/LOC Antenna should meet Technical Standard Order (TSO): TSO-C36( ), TSO-C40( ).

3.5.2 Navigation Coaxial Cable

The antenna cable should be made of RG-142B, RG-400, or an equivalent 50Ω coaxial cable.

3.5.3 Navigation Coaxial Cable Connector

The connectors on the VHF navigation coaxial cable should be assembled per the connector manufacturer's assembly instructions.

3.5.4 Diplexer

The IFD5XX/4XX requires separate Glideslope and Navigation antenna inputs. A diplexer will be required if a single navigation coax delivers both VHF navigation and Glideslope navigation signals to the IFD5XX/4XX location, such as if a combined Nav/Glideslope antenna is used, or a Nav/Glideslope diplexer is installed to combine signals at the antenna location. The diplexer should be installed per the manufacturer's installation manual.

The Diplexer should be located in a position on the aircraft to minimize the amount of coaxial cable required.

3.6 Glideslope Antenna

The Glideslope Antenna should be standard 50Ω horizontally polarized antenna. The Glideslope antenna should be installed using the manufacturer's installation instructions and FAA AC 43.13-( ). The IFD5XX/4XX has separate VOR/LOC and Glideslope antenna inputs. See Diplexer text in Section 3.5.4.

3.6.1 Glideslope

The Glideslope Antenna should also be installed with a clear line of sight. The Glideslope Antenna should meet Technical Standard Order (TSO): TSO-C34( ).

4. Electrical Installation

The electrical wiring should be installed in accordance with FAA AC 43.13-1B Chapter 11, sections 8 through 13 and in accordance with this manual. The following section will describe requirements for the electrical wiring when installing the IFD5XX/4XX.

4.1 Wire Type

MIL-C-27500 and MIL-W-22759 wire is recommended. Select the appropriate wire type and size for the aircraft type and installation location per FAA AC 43.13-1B.

4.2 Wire and Connector Identification

Wires and connectors should be marked per FAA AC 43.13-1B.

4.3 Wire Routing

All wires and wire bundles must be routed and secured in such a way to eliminate risk of mechanical damage and minimize exposure to heat and fluids. Also, consider the following when installing wire harnesses in the aircraft:

- In dual GPS installations, route wire harnesses separately to prevent dual GPS failures
- Do not route harness near high power electrical lines
- Equipment should be installed with separation between redundant systems to prevent loss of navigation due to a single event

4.4 Shield Grounds

All shield grounds should be grounded using the ground block on the IFD5XX/4XX tray backplate. Shield grounds should be as short as possible (shorter than 3.0", if possible)

Shield grounds on non-Avidyne equipment should be grounded per the manufacturer's installation instructions. In the absence of any installation data, the shield wires can be connected to the connecter backshell or aircraft ground.

4.5 Wire Harness Overbraid

Copper overbraid is not required on the IFD5XX/4XX wire harness. However, in the following cases, copper overbraid is required.

4.5.1 Existing Equipment

If interfacing to any existing avionics equipment with copper overbraid over the wire harness, it must be installed on all new wiring to that existing piece of equipment. The copper overbraid must meet the specification in Section 4.5.3.

4.5.2 Severe Lightning Transient Environment

Aircraft Installations where the aircraft actual transients level is higher than the IFD5XX/4XX equipment transient design level must install copper overbraid on the entire IFD5XX/4XX wire harness. This does not include the antenna coaxial cables. The copper overbraid must be installed per Section 4.5.3.

The Approved Model List for the STC will indicate if an aircraft is required to install wire harness overbraid on the IFD5XX/4XX wiring. Note: Overbraid is not required on VFR only installations as defined in Section 2.4.1.

4.5.3 Copper Overbraid Installation

The copper overbraid must be a minimum 90% optical coverage per ASTM-B-33. The overbraid must be grounded at both ends. If the aircraft wiring passes through wire disconnects or bulkheads, the overbraid should be continued on each segment.

The wire harness overbraid should also be installed per FAA AC 43.13-1B Chapter 11-189.

4.6 IFD5XX/4XX Connectors

The following special tools may be needed during installation of the IFD5XX/4XX:

IFD5XX Connector Number	Connector Part number	Contact Part Numbers	Crimp Tool	Die/ Positioner	Extraction Tool	Insertion Tool
P1001	M24308/4- 268( )	M39029/58-360 (ORG/BLU/BLK)	M22520/02-01	M22520/2-09	M81969-1-04	M81969/1-04
P1002	M24308/2-3( )	M39029/63-368 (ORG/BLU/GRY)	M22520/02-01	M22520/2-08	M81969/1-02	M81969/1-02
P1006	M24308/4- 266( )	M39029/58-360 (ORG/BLU/BLK)	M22520/02-01	M22520/2-09	M81969-1-04	M81969/1-04
P1050	M24308/4- 268( )	M39029/58-360 (ORG/BLU/BLK)	M22520/02-01	M22520/2-09	M81969-1-04	M81969/1-04
Ground Block	583861-7 (TE Connectivity)	5-583853-4 (TE Connectivity)	91535-1 (TE Connectivity)		91073-1 (TE Connectivity)	

Table 32: D-Sub Connector Tools

Please note: The P1050 is available on the IFD5XX Series only.

4.7 Byteflight Digital Data Bus Consideration – Dual IFD Installations

Dual IFD installations use a Byteflight digital Databus protocol when connected via RS-232 Channel 3 and configured for CrossSync. The following must be considered for replacement and new installations.

4.7.1 Databus Wiring - Replacement Installations

For installations that are replacing two previously connected GNS4xx/5xx systems, the Byteflight digital Databus is capable of using the pre-existing wiring between the two pre-existing trays with no additional wiring or modifications required. All bus termination is built into the IFD units. However, the existing wire length on the CrossSync connection must not exceed 8 feet in length on IFD5XX/4XX RS-232 Channel 3 on P1001. Installations with

longer installation lengths between IFD5XX/4XX units must use Byteflight cable. The ByteFlight wire is available from Avidyne, reference Table 26.

Installations with significant amount of Byteflight data interruptions should consider installing Byteflight cable.

4.7.2 Databus Wiring – New Installations

For all new installations of dual IFDs (not replacing pre-existing GNS4xx/5xx systems), the recommended wiring for the RS-485 data protocol is shielded twisted- pair cable with an approximate characteristic impedance of 100-120 Ohms. The wire material must meet 14 CFR 23.1359 (c).

4.8 Circuit Protection

Circuit Breakers must be installed in a location easily accessible to the pilot and must be resettable trip free devices. The Circuit Breaker must be clearly identified and visible under all lighting conditions. Circuit breaker size is identified in installation data shown in Appendix D: Electrical Interface Drawings. Note that 14v aircraft may be required to replace the installed circuit breaker and power wiring to accommodate the IFD5XX/4XX.

4.9 Power Distribution

Aircraft installing one IFD5XX/4XX should connect the power and grounds as shown in Figure 4.

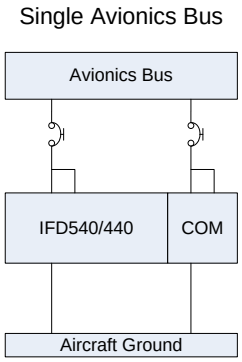


Figure 4: IFD5XX/4XX Power Distribution

Aircraft with a maximum certified gross takeoff weight less than 6000 pounds must connect the dual IFD5XX/4XX as shown in Figure 5.

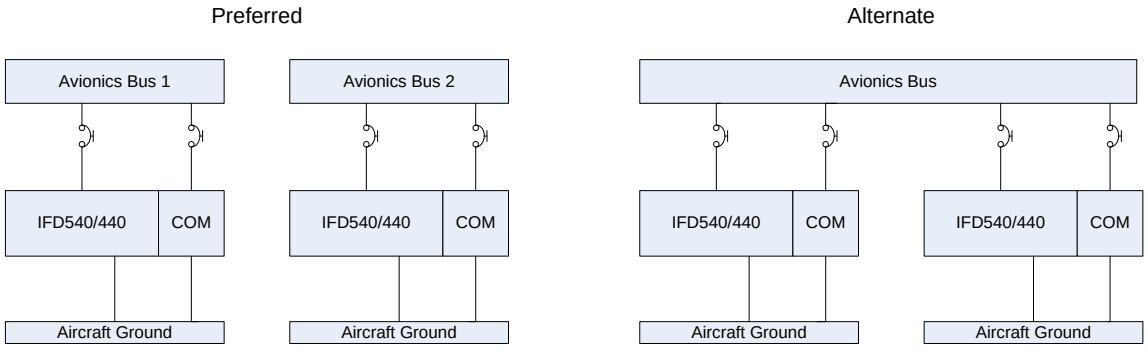


Figure 5: Dual IFD5XX/4XX Power Distribution (Aircraft <6000 lbs)

Aircraft with a maximum certified gross takeoff weight greater than 6000 pounds must install the dual IFD5XX/4XX as shown in Figure 6.

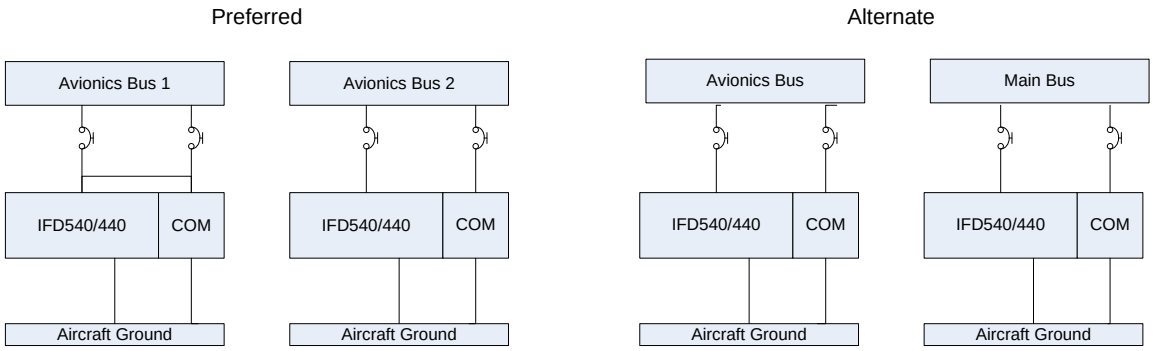


Figure 6: Dual IFD5XX/4XX Power Distribution (Aircraft >6000 lbs)

If installing a 3rd party NAV and/or COM and IFD5XX/4XX, connect the IFD5XX/4XX as shown in Figure 7.

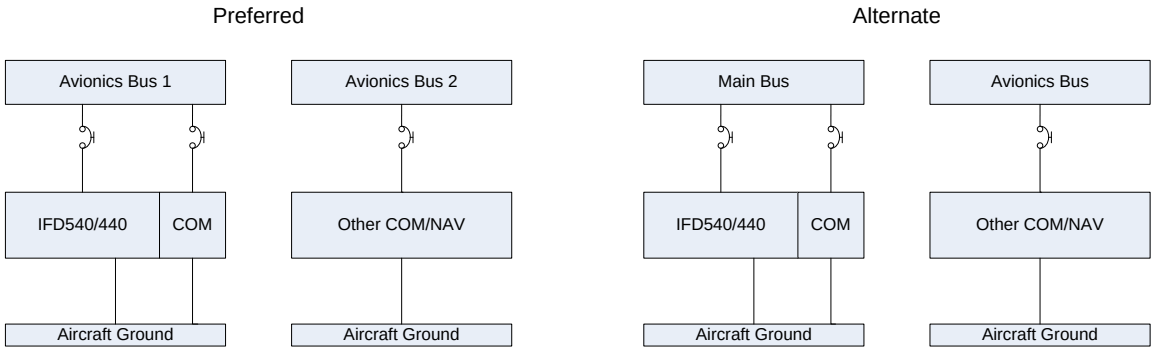


Figure 7: Dual NAV/COM Aircraft Bus Installation (Aircraft >6000 lbs)

The installer is responsible for preservation of multiple power busses on the aircraft in accordance with manufacturer's original design and the requirements of 14 CFR Part 23. This includes maintaining electrical power to essential equipment.

4.10 Electrical Load Analysis

Prior to installing the IFD5XX/4XX, an electrical load analysis (ELA) must be performed. The aircraft's electrical load should be less than 80% of the total generator output following the IFD5XX/4XX installation, reference Section 1.5 for IFD5XX/4XX power requirements. Also reference FAA AC 43.13-2B Paragraph 208 for more information on performing an aircraft electrical load analysis.

The purpose of the ELA is to show compliance to 14 CFR §23.1351 and §23.1353 (h).

4.11 Low Power Behaviors

The IFD5XX/4XX can accept input power ranging from 9VDC to 33VDC but has the following low power behaviors.

Functions are restored if the IFD input voltage rises 1VDC above threshold voltage for 1 second.

Input Voltage Level	Behavior
19.9VDC	16W VHF radio output power reduces to 10W
≥ 18VDC	High power USB charging (dedicated charging port drawing 2.1A).
< 18VDC	USB port drops from High power USB charging to Low power USB charging (dedicated charging port drawing 1.0A).
12.75VDC	USB port is turned off (no charging available).
11.5VDC	Bezel and LCD display dimmed down to 25% and a yellow "Low Volts" CAS message is presented.
10.9VDC	VHF radio output power reduces to 6W
10.0VDC	VHF radio output power reduces to 4W
9VDC	Start a 60 second power down sequence and a red "Low Volts Off in <x> sec" CAS message is presented. With 5 seconds to go until power down, the full power down message is overlaid in the middle of the display.

Table 33: IFD5XX/4XX Low Power Behavior

5. Mechanical Installation

This section will describe the physical mounting of the IFD5XX/4XX in the aircraft.

Aircraft installing the IFD5XX/4XX for VFR use only, as defined in Section 2.4.1, can install the IFD5XX/4XX unit in any location easily accessible to the pilot. However, the IFD5XX/4XX installation must not introduce any new hazards. All other installations must follow the guidance below.

5.1 Equipment Location – New Installations

If the IFD5XX/4XX is used for IFR navigation, course deviation information and navigation annunciation must be installed in the Pilot's Field of View (FOV). The FAA has provided clarification regarding the intent of TSO-C146 and acceptable source annunciation location, navigation annunciation, and FOV requirements on similar products in the past. Therefore, the installation data as follows must be followed to maintain compliance with the STC. Otherwise, additional installation approval will be required.

Aircraft requiring two pilots must have this annunciation at each pilot station or unobstructed view of the IFD5XX/4XX display. The IFD5XX/4XX should be located in a position easily reached by both pilots.

5.1.1 Determining the Field of View

The navigation source selection ("GPS" or "VLOC") field of view is approximately ±30° or 13.856" horizontally from the center of the attitude indicator, or centerline of the pilot's seat/yoke. The navigation annunciation field of view is approximately ±35° or 16.805" horizontally from the center of the attitude indicator. Both of these angles and distances are determined with the pilot seated at a minimum of 24" from the instrument panel. For aircraft without a basic instrument 'T' or an offset control yoke/control, use the center of the pilot's seat as the primary view centerline.

The vertical field of view will be from the top of the instrument panel to the portion of the instrument panel that is immediately below the basic 'T' instruments, reference Figure 8. Note, if the existing type certified HSI/CDI/PFD is lower than the basic 'T', use that as the lower limit.

Figure 8 below indicates the acceptable field of view for the IFD5XX/4XX. If the IFD5XX/4XX can be installed in this area, remote navigation annunciation is not required. If the IFD5XX/4XX cannot be installed within the acceptable field of view, the installation must have navigation annunciations installed per Section 5.1.2.

Note: The dimensions shown in Figure 8 and Figure 9 for the IFD5XX also apply to the IFD4XX.

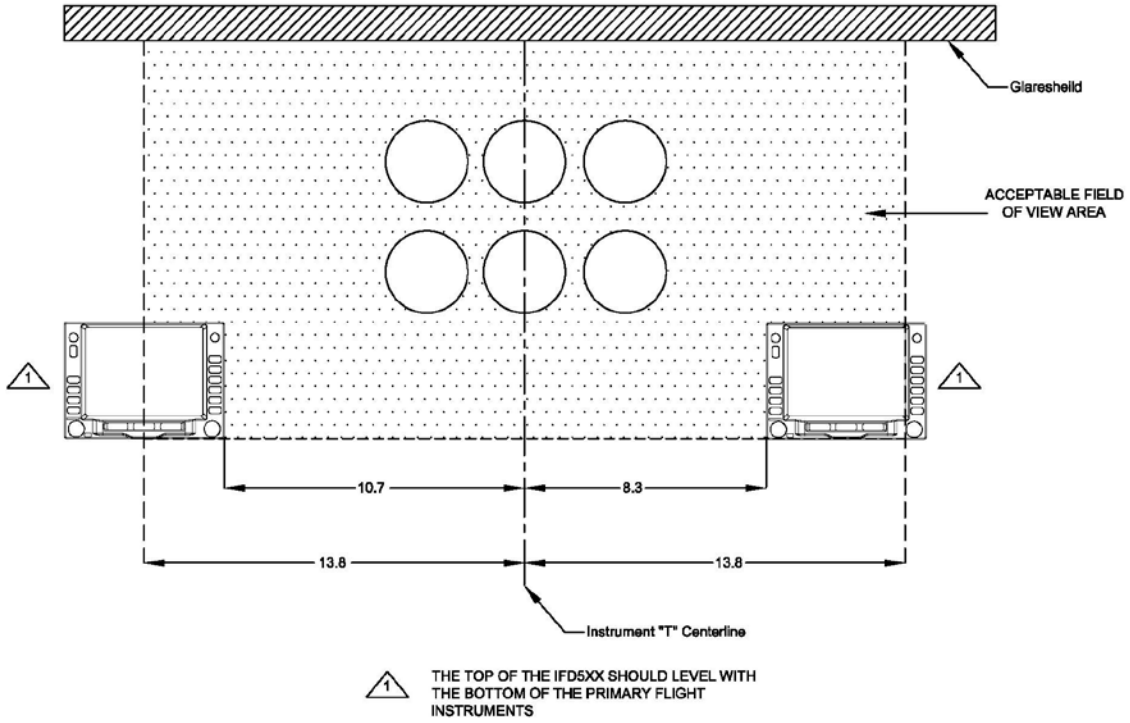


Figure 8: Field of View

5.1.2 Navigation Annunciation

The navigation annunciations listed in Table 34 must be installed in the Pilot's Field of view. This may be accomplished in several ways. The following are acceptable:

- Use Navigation Annunciation on an existing Primary Flight Display or Horizontal Situation Indicator located in the Pilot's primary field of view. CDI/HSI indicators with navigation annunciation is acceptable (e.g. GI 106, MD200-306, or similar). The CDI/HSI must be located within the primary field of view.
- If the IFD5XX/4XX is located within the acceptable field of view, as shown in Figure 8, external annunciation is not needed
- Install external annunciation lights in the acceptable field of view, as shown in Figure 9.

The IFD5XX/4XX should have the following annunciation within the Pilot's Field of View when installing an external annunciator:

Navigation Annunciation Type
VLOC Annunciate‡
GPS Annunciate‡
OBS Annunciate (optional)
Waypoint Annunciate
Terminal Annunciate
Approach Annunciate
Message Annunciate
LOI, INTEG, or INTG Annunciate

Table 34: Navigation Annunciation

‡ Must be located ±30° or 13.856", see Section 5.1.1

The navigation annunciators should be readable under all lighting conditions. The annunciators must be able to be tested prior to flight. The field of view in Figure 8 is based on ±35° from the Instrument "T" centerline at 24" aft of the panel.

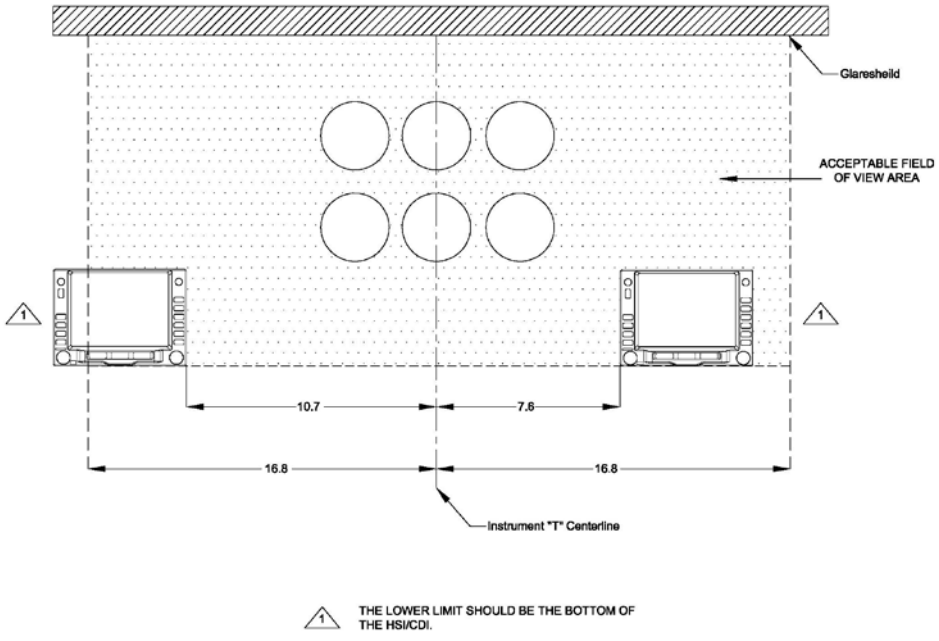


Figure 9: Navigation Annunciation Field of View

5.1.3 Course Deviation Indicator

The course deviation information must be located in the Pilot's Primary Field of view if the IFD5XX/4XX is used for IFR navigation. Installation of a CDI/HSI requires a separate installation approval.

5.1.4 Instrument Panel Cutout

The IFD5XX and IFD4XX tray is designed to be installed on the backside of the instrument panel. The instrument panel requires either a 6.320" x 4.600" or 6.320" x 2.70" hole for the IFD5XX or IFD4XX respectively. If the instrument panel in the aircraft is considered primary structure, additional installation approval will be required for the instrument panel cutout. The installer is responsible to ensure the structural aspects of this installation meet the requirements of AC 43.13-2B, Chapter 11, Paragraph 1104(a).

5.1.5 Requirements for Tray Installation

The Avidyne Tray must be installed in the aircraft as described below in order to satisfy the structural requirements for the STC. Deviations to these requirements will require separate approval.

1. Rear Tray Support (Instrument Panel)
    a. The existing instrument panel must be fabricated from 2024-T3 aluminum with a minimum thickness of 0.050". The tray brackets must be fabricated from 3/4" x 3/4" x 1/16" 2024-T3 aluminum angle extrusion for mounting the tray, as shown in Figure C - 33 and Figure: C - 34.
    b. If new components are fabricated, the fabrication methods must follow the requirements of FAA Advisory Circular 43.13-1B, Chapter 4 for general airframe fabrication criteria, including hole tolerances, edge distances, rivet spacing, and corrosion protection, and Advisory Circular 43.13-2B Chapters 2 and 11 for structural adequacy.
2. Forward Tray Support
    a. The Avidyne Tray must have forward support brackets, reference Figure C - 33 or Figure: C - 34. The forward support brace must be 0.032" 5052-H32 aluminum. (Note: equivalent or stronger is acceptable)
    b. If new forward support brackets are fabricated, the fabrication methods must follow the requirements of either Figure C - 33 or Figure: C - 34, FAA Advisory Circular 43.13-1B, Chapter 4 for general airframe fabrication criteria, including hole tolerances, edge distances, rivet spacing, and corrosion protection, and Advisory Circular 43.13-2B, Chapters 2 and 11 for structural adequacy.

The IFD5XX should be installed using six #6-32 flat head screws and self locking nuts. The IFD4XX should be installed using four #6-32 flat head screws and self locking nuts.

5.2 Equipment Location - Replacement Unit

If the IFD5XX/4XX is being installed as replacement unit on a previously approved IFR installation, the existing installation location is acceptable and does not require any changes.

5.3 Angle of Regard

The IFD5XX/4XX should be mounted in a location where the viewing angle of the display does not exceed the following angles:

- From the Left: 80°
- From the Right: 80°
- From the Top: 80°
- From the Bottom: 60°

5.4 Unit Installation/Removal

The IFD5XX/4XX should be installed using 3/32-inch hex drive tool. The hex drive is inserted into the hole in the front bezel.

5.5 Internal Cooling

The IFD has several internal fans and heat sinks as part of its basic design. There are exhaust vents on the left and right sides of the chassis with cut outs in the tray to facilitate venting. The left and right side of the front bezel have intake louvers to help pull ambient cockpit air through the unit. While not necessary, if installation flexibility permits, the unit will benefit from these intake and exhaust vents remaining as clear as feasible.

5.6 External Cooling

The IFD5XX/4XX does not require external cooling, however, additional cooling may prolong product life. A 5/8" diameter air fitting is provided in the rear of the IFD5XX/4XX mounting tray, if forced air cooling is installed.

IFD5XX/4XX installations in a tightly packed avionics stack should consider installing an electric avionics cooling fan. As a minimum, plan to leave space for clear intake and exhaust venting when able. If a fan is installed, ensure the intake air flow to the fan is not located near the exhaust of other fans or near other hot equipment.

In the event the system feels excessively hot or if an Overtemp Caution Advisory System message is presented on the display, there are some diagnostic tools provided in the IFD5XX/4XX to assist in finding more optimal cooling installations. In Maintenance Mode, select the "Status" tab along to bottom edge of the display and then press the "Info" Line Select Key as needed until "Temps" is displayed. Note the hottest source(s) on that page and supply that information to Avidyne Technical Support to include both the source and the associated temperature for follow-on guidance.

The metal bezel of the IFD5XX/4XX is intentionally designed to radiate heat away from the internal components and out of the unit. This can have the effect of a bezel that may be warm to the touch. This is considered normal. Note that the rubber bezel buttons will not conduct this heat and should not be warm. This condition will be more noticeable on hot days or during long ground runs.

5.7 Electrical Bonding

The electrical bonding between the IFD5XX/4XX tray and aircraft ground should be ≤ 10 milliohm.

5.8 Aircraft Considerations

Installing wires or antennas on a pressurized aircraft, composite aircraft, or with an aircraft certification basis of Amendment 23-45 or later is beyond the scope of this manual and requires additional installation approval, unless the aircraft model is listed on the STC AML.

5.9 Weight and Balance

After installing the IFD5XX/4XX, the aircraft's weight and balance must be updated after installation is complete.

For those installations where an IFD5XX/4XX is replacing a GNS530/430 (any variant), since the IFD5XX/4XX is within 5% of the weight of the removed GNS530 (less than 1 pound difference), no new weight and balance must actually be performed according to AC 43.13-1B Change 1 Acceptable Methods, Techniques, and Practices Aircraft Inspection and Repair (Chapter 10) and AC 120-27E Aircraft Weight and Balance Control.

5.10 Compass Safe Distance

The IFD5XX/4XX should be installed 12" or more away from the aircraft's magnetic compass. Perform an aircraft compass swing/calibration after completing the IFD5XX/4XX installation.

Note: The 12" minimum distance is a TSO-driven value that is designed to ensure the unit will have no impact on the aircraft compass. If an installation is made where this distance is less than 12", then a compass swing/calibration must be accomplished after completing the IFD5XX/4XX installation.

6. System Installation

The following section will describe interfacing the IFD5XX/4XX to various other avionics and aircraft equipment.

6.1 Pin Function List

The following Section Lists the Pin function for each connector.

6.1.1 P1001 Main Connector

Pin	Description	Signal Type
1	VLOC Annunciate	Output
2	GPS Annunciate	Output
3	Waypoint Annunciate	Output
4	Terminal Annunciate	Output
5	Approach Annunciate	Output
6	Message Annunciate	Output
7	OBS Annunciate	Output
8	Weight on Wheels (WOW)	Output
9	Integrity Annunciate	Output
10	Annunciate D	Output
11	Annunciate E	Output
12	Reserved	Output
13	GPS Select	Output
14	ILS/GPS Annunciate (Approach)	Output
15	Aircraft Power 2	Input
16	Time Mark Out	Output
17	Main Lateral Superflag	Output
18	Main Vertical Superflag	Output
19	Aircraft Power 1	Input
20	Aircraft Power 1	Input
21	Main +Left	Output
22	Main +Right (1.65V COM)	Output
23	Main Lat +Flag	Output
24	Main Lat -Flag (GND)	-

Pin	Description	Signal Type
25	Main +To (1.65V Common)	Output
26	Main +From	Output
27	Main +Up (1.65V Common)	Output
28	Main +Down	Output
29	Main Ver +Flag	Output
30	Main Ver -Flag (GND)	-
31	Main OBS Rotor C	Output
32	Main OBS Rotor H(GND)	-
33	Main OBS Stator D	Input
34	Main OBS Stator E (2.5V Common OBS)	Output
35	Main OBS Stator F	Input
36	Main OBS Stator G (2.5V Common OBS)	Output
37	Audio 1 HI (Alert audio)	Output
38	Audio 1 LO (Alert audio)	Output
39	LTG Bus HI	Input
40	LTG Bus LO (GND)	Input
41	GPS RS232 Out 3	Output
42	GPS RS232 In 3	Input
43	Main OBI Clock	Output
44	Main OBI Data	Output
45	Main OBI Sync	Output
46	GPS Arinc-429 Out A	Output
47	GPS Arinc-429 Out B	Output
48	GPS Arinc-429 In 1 A	Input
49	GPS Arinc-429 In 1 B	Input
50	GPS Arinc-429 In 2 A	Input
51	GPS Arinc-429 In 2 B	Input
52	Audio 2 HI	Output
53	Audio 2 LO	Output
54	GPS RS232 Out 4	Output
55	GPS RS232 In 4	Input
56	GPS RS232 Out 1	Output

Pin	Description	Signal Type
57	GPS RS232 In 1	Input
58	GPS RS232 Out 2	Output
59	GPS RS232 In 2	Input
60	Altitude Common (GND)	-
61	Altitude C4	Input
62	Altitude C2	Input
63	Altitude C1	Input
64	Altitude B4	Input
65	Altitude B2	Input
66	Altitude B1	Input
67	Altitude A4	Input
68	Altitude A2	Input
69	Altitude A1	Input
70	Altitude D4	Input
71	OBS Mode Select	Input
72	Aircraft Power 2	Input
73	CDI Source Select	Input
74	COM Remote Recall	Input
75	Reserved	-
76	LTG BUS 2 HI	Input
77	Aircraft GND	-
78	Aircraft GND	-

Table 35: P1001 Pin Description

6.1.2 P1002 Communication Connector

Pins	Description	Signal Type
1	Reserved	-
2	Ethernet 1 TX+	Output
3	Ethernet 1 TX-	Output
4	COM Microphone Key	Input
5	Intercom Microphone Audio HI	Input
6	COM Microphone Audio HI	Input
7	COM Audio HI	Output
8	Ethernet 1 RX+	Input
9	Ethernet 1 RX-	Input

Pins	Description	Signal Type
10	Synchro X	Input
11	Aircraft Power	Input
12	Aircraft Power	Input
13	Synchro Reference Signal +	Input
14	Transmit Interlock (Unused)	Input
15	COM Remote Transfer	Input
16	Reserved	-
17	Intercom Microphone Audio LO	Input
18	COM Microphone Audio LO	Input
19	COM Audio LO	Output
20	Reserved	-
21	Aircraft GND	-
22	Aircraft GND	-
23	Synchro Y	Input
24	Synchro Z	Input
25	Synchro Reference Signal -	Input

Table 36: P1002 Pin Description

6.1.3 P1006 Navigation Connector

Pins	Description	Signal
1	VOR/LOC +To	Output
2	VOR/LOC +From (VOR/LOC 2.5V Common)	Output
3	VOR/LOC +Flag	Output
4	VOR/LOC -Flag (VOR/LOC 2.5V Common)	Output
5	VOR/LOC +Left	Output
6	VOR/LOC +Right (VOR/LOC 2.5V Common)	Output
7	Com Monitor Audio HI	Output
8	VOR/LOC Composite Out	Output
9	VOR OBS Rotor C	Output
10	VOR OBS Rotor H (GND)	-
11	VOR OBS Stator E/G (VOR/LOC 2.5V Common)	Output
12	VOR OBS Stator F	Input
13	VOR OBS Stator D	Input
14	Parallel DME - 8MHz	Output
15	VOR/LOC Superflag	Output
16	VOR/ILS Audio HI	Output
17	VOR/ILS Audio LO	Output
18	Serial DME - Clock	Output
19	Serial DME - Data	Output
20	Ser DME-Chan Req/PAR DME - 4MHz	Input/Output
21	Ser DME-Rnav Mode/PAR DME - 2MHz	Input/Output

Pins	Description	Signal
22	DME Common	Input
23	VOR/ILS Arinc-429 Out B	Output
24	VOR/ILS Arinc-429 Out A	Output
25	VOR OBI Clock	Output
26	VLOC OBI Sync	Output
27	VOR OBI Data	Output
28	VLOC Remote Transfer	Input
29	ILS Energize	Output
30	Glideslope +Flag	Output
31	Glideslope +Down/-Flag (Glideslope 2.5V Common)	Output
32	Glideslope +Up	Output
33	Parallel DME - 1MHz	Output
34	Com Monitor Audio LO	Output
35	VOR/ILS Arinc-429 In B	Input
36	VOR/ILS Arinc-429 In A	Input
37	Parallel DME - 800KHz	Output
38	Glideslope Superflag	Output
39	Parallel DME - 400KHz	Output
40	Parallel DME - 200KHz	Output
41	Aircraft GND	-
42	Nav Par DME - 100KHz	Output
43	Nav Par DME - 50KHz	Output
44	Aircraft Power	Input

Table 37: P1006 Pin Description

6.1.4 P1050 Additional I/O Connector

Please note: This connector is not available on the IFD4XX.

Pins	Description	Signal
1	TAWS Inhibit IN	Input
2	TAWS Audio Inhibit IN	Input
3	Spare Input 4	Input
4	Spare Input 3	Input
5	Spare Input 2	Input
6	Spare Input 1	Input
7	Reserved	-
8	Reserved	-
9	Terrain Not Available Annunciate	Output
10	Terrain Warning Annunciate	Output
11	Terrain Caution Annunciate	Output

Pins	Description	Signal
12	TAWS Inhibit Annunciate	Output
13	Spare Annunc 2	Output
14	Spare Annunc 1	Output
15	TAWS Audio Active Out	Output
16	Reserved	-
17-21	Ground	-
22-41	NO CONNECT	-
42	GPS Arinc-429 Out 2A	Output
43	GPS Arinc-429 Out 2B	Output
44-59	NO CONNECT	-
60	RS232 Out 5	Output
61	RS232 IN 5	Input
62	RS232 Out 6	Output
63	RS232 IN 6	Input
64	Ground	-
65-78	NO CONNECT	-

Table 38: P1050 Pin Description

6.1.5 Altitude Gray Code

Altitude Gray code input is connected on the following pins:

Description	Connector	Pin	Signal Type
Altitude D4	P1001	70	Input
Altitude A1	P1001	69	Input
Altitude A2	P1001	68	Input
Altitude A4	P1001	67	Input
Altitude B1	P1001	66	Input
Altitude B2	P1001	65	Input
Altitude B4	P1001	64	Input
Altitude C1	P1001	63	Input
Altitude C2	P1001	62	Input
Altitude C4	P1001	61	Input
Altitude Common	P1001	60	Input

Table 39: Altitude Gray Code Description

NOTE: Some transponders and altitude encoders do not have internal isolation diodes to prevent the unit from pulling the encoder lines to ground when the unit is off. These units will require the installation of a diode into harness for each encoder line.

6.1.6 Heading Input

The IFD5XX/4XX can accept a 3-wire ARINC 407 Syncro heading input on the following connectors and pins:

Description	Connector	Pin	Signal Type
Synchro X	P1002	10	Input
Synchro Reference Signal + (26VAC 400 Hz)	P1002	13	Input
Synchro Y	P1002	23	Input
Synchro Z	P1002	24	Input
Synchro Reference Signal - (GND)	P1002	25	Input

Table 40: Synchro Heading Input

6.1.7 Main Course Deviation Indicator Output

The main indicator displays both lateral and vertical deviations, TO/From, and Flag indications from the NAV and GPS receivers.

6.1.7.1 Lateral/Vertical Deviations

The lateral and vertical deviations are on the following connector and pins:

Description	Connector	Pin	Signal Type
Main +Left	P1001	21	Output
Main +Right	P1001	22	Output
Main +Up	P1001	27	Output
Main +Down	P1001	28	Output

Table 41: Main Course Deviation Output

6.1.7.2 TO/FROM Indication Flag

The To/From Flag indication flags are on the following connector and pins:

Description	Connector	Pin	Signal Type
Main +To	P1001	25	Output
Main +From	P1001	26	Output

Table 42: Main TO/From Flag Output

6.1.7.3 Navigation Flags

The Navigation Flags is on the following connector and pins:

Description	Connector	Pin	Signal Type
Main Lateral +Flag	P1001	23	Output
Main Lateral -Flag	P1001	24	Output
Main Vertical +Flag	P1001	29	Output
Main Vertical -Flag	P1001	30	Output

Table 43: Main Navigation Flag Output

6.1.7.4 Navigation Superflags

The Navigation Superflags is on the following connector and pins:

Description	Connector	Pin	Signal Type
Main Lateral +Flag	P1001	17	Output
Main Lateral -Flag	P1001	18	Output

Table 44: Main Navigation Superflag Output

Superflag outputs system voltage when valid and <.25 VDC when not valid. This output is capable of driving 500mA at 28 VDC or 250mA at 14 VDC.

6.1.7.5 OBS

The OBS is on the following connector and pins:

Description	Connector	Pin	Signal Type
Main OBS Rotor C	P1001	31	Output
Main OBS Rotor (Ground)	P1001	32	Output
Main OBS Stator D	P1001	33	Input
Main OBS Stator E	P1001	34	Output
Main OBS Stator F	P1001	35	Input
Main OBS Stator G	P1001	36	Output

Table 45: Main OBS Output

6.1.7.6 Annunciators Electrical Output

Description	Connector	Pin	Signal Type
VLOC Annunciate	P1001	1	Output
GPS Annunciate	P1001	2	Output
Waypoint Annunciate	P1001	3	Output
Terminal Annunciate	P1001	4	Output
Approach Annunciate	P1001	5	Output
Message Annunciate	P1001	6	Output
OBS Annunciate	P1001	7	Output
Integrity Annunciate	P1001	9	Output
LNAV GPS Select	P1001	13	Output
ILS/GPS Approach	P1001	14	Output

Table 46: Annunciator Output

All outputs sink up to 500 mA when activated.

6.1.7.7 Switch Inputs

Description	Connector	Pin	Signal Type
OBS Mode Select	P1001	71	Input
CDI Source Select	P1001	73	Input

Table 47: Switch Inputs

The inputs are considered active if voltage to ground <1.9V or resistance to ground <375 Ω. These inputs are considered inactive if voltage to ground is 11-33 VDC.

6.1.7.8 Time Mark Out

Description	Connector	Pin	Signal Type
Time Mark Out	P1001	16	Output

Table 48: Time Mark Output

Outputs a 1ms ± 1µs wide pulse once every 1.0 Second ± 2 ms. Output sources 1 mA at >3.8 V and sinking 1 mA at less than 0.4 V.

6.1.8 Serial Data

6.1.8.1 RS-232

Description	Connector	Pin	Signal Type
RS-232 Output 1	P1001	56	Output
RS-232 Input 1	P1001	57	Input
RS-232 Output 2	P1001	58	Output
RS-232 Input 2	P1001	59	Input
RS-232 Output 3	P1001	41	Output
RS-232 Input 3	P1001	42	Input
RS-232 Output 4	P1001	54	Output
RS-232 Input 4	P1001	55	Input
RS-232 Output 5‡	P1050	60	Output
RS-232 Input 5‡	P1050	61	Input
RS-232 Output 6‡	P1050	62	Output
RS-232 Input 6‡	P1050	63	Input

Table 49: RS-232 Input / Output

‡ IFD5XX Only

6.1.9 ARINC 429

Description	Connector	Pin	Signal Type
GPS ARINC 429 OUT A	P1001	46	Output
GPS ARINC 429 OUT B	P1001	47	Output
GPS ARINC 429 IN 1 A	P1001	48	Input
GPS ARINC 429 IN 1 B	P1001	49	Input
GPS ARINC 429 IN 2 A	P1001	50	Input
GPS ARINC 429 IN 2 B	P1001	51	Input
VOR/ILS ARINC 429 OUT A	P1006	24	Output
VOR/ILS ARINC 429 OUT B	P1006	23	Output
VOR/ILS ARINC 429 IN A	P1006	36	Input
VOR/ILS ARINC 429 IN B	P1006	35	Input
GPS ARINC 429 OUT A‡	P1050	42	Output
GPS ARINC 429 OUT B‡	P1050	43	Output

Table 50: ARINC 429 Input / Output

‡ IFD5XX only

6.1.10 Com/VOR/ILS Audio Electrical Characteristics

6.1.10.1 Com Microphone Key

Description	Connector	Pin	Signal Type
COM MIC Key	P1002	4	Input

Table 51: VHF Communication Microphone Key

This input is active if either the voltage to ground <1.9V or the resistance to ground is <375Ω. This input is considered inactive if the voltage to ground is 11-33 VDC.

Activating the COM MIC Key will cause the transmitter to transmit the audio on the COM MIC Audio HI.

6.1.10.2 Com Microphone Audio, INTERCOM Microphone Audio

Description	Connector	Pin	Signal Type
COM MIC Audio HI	P1002	6	Input
COM MIC Audio LO	P1002	18	Input
INTERCOM MIC HI	P1002	5	Input
INTERCOM MIC LO	P1002	17	Input

Table 52: VHF Communication Audio

520Ω input impedance, supply 9V via 620Ω.

6.1.10.3 Com Audio, VOR/ILS Audio

Description	Connector	Pin	Signal Type
Com Audio HI	P1002	7	Output
Com Audio LO	P1002	19	Output
VOR/ILS Audio HI	P1006	16	Output
VOR/ILS Audio LO	P1006	17	Output

Table 53: VHF Communication and Navigation Audio Output

Each supply 65mW into a 150Ω load. These are balanced outputs and the LO output must be connected.

6.1.10.4 Discrete Inputs

Description	Connector	Pin	Signal Type
Transmit Interlock (Unused)	P1002	14	Input
Com Remote Transfer	P1002	15	Input
VLOC Remote Transfer	P1006	28	Input

Com Remote Recall	P1001	74	Input

Table 54: VHF Communication and Navigation Switch Inputs

This input is active if either the voltage to ground <1.9V or the resistance to ground is <375Ω. This input is considered inactive if the voltage to ground is 11-33 VDC.

COM Remote Transfer and VLOC Remote Transfer are momentary inputs. Momentarily depressing the VLOC or Com Remote transfer button toggles the active and #1 standby frequencies. Momentarily depressing the COM Remote Recall button inserts the next frequency in the Com preset list into the #1 standby slot.

6.1.10.5 Standby Com Monitor

Description	Connector	Pin	Signal Type
Com Monitor Audio HI	P1006	7	Output
Com Monitor Audio LO	P1006	34	Output

Table 55: Standby Communication Output

This optional signal use can be used with audio panels that have a means of selecting the #1 standby com audio (e.g. Avidyne AMX240).

6.1.11 VOR/ILS Indicator Electrical Characteristics

6.1.11.1 Superflag

Description	Connector	Pin	Signal Type
VOR/LOC Superflag	P1006	15	Output
Glideslope Superflag	P1006	38	Output

Table 56: Navigation Superflag Output

The output supplies not less than 500 mA on a 28 volt system and 250 mA on a 14 volt system with the output voltage not less than (Aircraft voltage – 3VDC) when the flag is to be out of view. The output voltage with respect to ground is less than 3 VDC when the flag is to be in view.

6.1.11.2 RMI/OBI Electrical Characteristics

Description	Connector	Pin	Signal Type
Main OBI Clock	P1001	43	Output
Main OBI Sync	P1001	45	Output
Main OBI Data	P1001	44	Output

Table 57: P1001 OBI Output

Description	Connector	Pin	Signal Type

VOR OBI Clock	P1006	25	Output
VOR OBI Sync	P1006	26	Output
VOR OBI Data	P1006	27	Output

Table 58: P1006 OBI Output

The output is active low.

6.1.12 DME Tuning

The IFD5XX/4XX can channel a DME based on the tuned VLOC frequency. The IFD5XX/4XX can be connected to a DME via 2x5, BCD, Slip parallel, or King Serial DME channeling format.

6.1.12.1 Serial/Parallel Tuning

Description	Connector	Pin	Signal Type
NAV PAR DME – 8MHz	P1006	14	Output
SER DME – CHAN REQ/PAR DME – 4MHz	P1006	20	Output*
SER DME – RNAV MODE/PAR DME – 2MHz	P1006	21	Output*
NAV PAR DME – 1MHz	P1006	33	Output
NAV PAR DME – 800 kHz	P1006	37	Output
NAV PAR DME – 400 kHz	P1006	39	Output
NAV PAR DME – 200 kHz	P1006	40	Output
NAV PAR DME – 100 kHz	P1006	42	Output
NAV PAR DME – 50 kHz	P1006	43	Output
NAV DME COMMON	P1006	22	Input

Table 59: DME Serial/Parallel Output

* Used for 2x5 parallel DME tuning.

NAV DME Common must be pulled low for the IFD5XX/4XX to channel the DME. DME is active if the voltage to ground is <1.9 V or the resistance to ground is <375 Ω.

Outputs is not more than 1.0V while sinking 20 mA.

6.1.12.2 King Serial DME Tuning

Description	Connector	Pin	Signal Type
NAV Serial DME – DATA	P1006	19	Output
NAV Serial DME – Clock	P1006	18	Output*

Serial DME – CHAN REQ/PAR DME – 4MHz	P1006	20	Output*
Serial DME – RNAV Mode/PAR DME – 2MHz	P1006	21	Output
NAV DME Common	P1006	22	Output

Table 60: DME Serial Tuning

Output high is >8V when driving a 360Ω and < 10mV for a low.

NAV DME Common must be pulled low for the IFD5XX/4XX to channel the DME. DME is active if the voltage to ground is <1.9 V or the resistance to ground is <375 Ω.

6.2 Bezel Lighting

The IFD5XX/4XX can be connected to any of the following avionics lighting sources: 5/14/28VDC or 5 VAC. Dimming controls are described in Section 7.5.6.

6.3 Traffic System

The IFD5XX/4XX can be connected to Traffic Systems either by RS232 or ARINC 429. The IFD5XX/4XX supports the following Traffic Systems:

Manufacturer	Model	Data Format	Notes
Avidyne Corporation	TAS6XX, 9900BX	RS232 or ARINC 429	RS-232 preferred
Avidyne Corporation	MLB100 (Navworx 200-0011-()-())	ARINC 429	
L3 Communications	SKY497, SKY899	ARINC 429	
Bendix/King	KTA-870, KMH880	ARINC 429	
Garmin	GTS800/820/850	ARINC 429	

Table 61: Traffic Systems

6.4 Lightning Detection System

The IFD5XX/4XX can be connected to Lightning Detection Systems via RS232. The IFD5XX/4XX supports the following Lightning Detection Systems:

Manufacturer	Model	Data Format	Notes
Avidyne Corporation	TWX670	RS232	"Native" format

L3 Communications	WX500	RS232	WX500 must set both the 232 Input and 232 Output on the IFD5XX/4XX.

Table 62: Lightning Detection System

6.5 Datalink Weather

The IFD5XX/4XX can be connected to Datalink Weather Systems via RS232. The IFD5XX/4XX supports the following Datalink Weather Systems:

Manufacturer	Model	Data Format	Notes
Avidyne Corporation	MLB700	RS232	
	MLB100 [Navworx 200-0011-()-()]	RS232	IFD5XX with s/w 10.1.0 or later
Garmin	GDL69/69A	RS232	Version 4.01 or later
WSI	AV300 AV350	RS232	

Table 63: Satellite Weather Datalink

See Table 80 for additional configuration limitations.

6.6 Audio Panels

The IFD5XX/4XX can be connected to various Audio Panels via analog connections. The IFD5XX/4XX supports the following Audio Panels:

Manufacturer	Model	Data Format	Notes
Avidyne	AMX240	Analog Audio	
Garmin	SL10/ SL10MS/ SL10M/ SL10S/ SL15/ SL15M/ GMA340/ GMA347	Analog Audio	
Honeywell (Bendix/King)	KMA24/ KMA24H-70/71 KMA26/ KMA28	Analog Audio	

PS Engineering	PMA6000/ PMA 7000 Series/ PMA 8000 Series	Analog Audio	

Table 64: Audio Panels

6.7 GAD 42

The IFD5XX/4XX can be connected to the Garmin GAD42 Interface Adapter.

If the IFD5XX/4XX is replacing a GNS530/W or GNS430/W that had previously been connected to a GAD42, then no action is required since the configuration is already saved in the GAD42.

If this is a new installation of an IFD5XX/4XX (i.e. not replacing an existing GNS-530/W or GNS-430/W) or if the GAD42 had to be replaced for service, then the GAD42 must be configured via a manual strapping method as described in Garmin P/N 190-00159-00 GAD42 Installation Manual, Section 5.1.

6.8 Air Data System Sources

The IFD5XX/4XX can be connected to either Uncorrected or Baro-corrected Altitude Sources. The IFD5XX/4XX can be connected to the following Air Data Systems:

Manufacturer	Model	Data Format	Notes
Aspen	EFD1000	ARINC 429	Low Speed
Avidyne	Entegra PFD	ARINC 429	Low Speed
Garmin	G500/600	ARINC 429	Low Speed
B & D	90004-003	ARINC 429	Low Speed
Honeywell (Bendix/King)	KDC281/481	ARINC 429	Low Speed
Insight	TAS 1000	RS232	

Table 65: Air Data Systems

6.8.1.1 Uncorrected Pressure Altitude Sources

The IFD5XX/4XX can accept uncorrected altitude from multiple sources in the following formats: ARINC 429, RS232, or a Gray Code altitude encoder. If multiple altitude sources are connected, the IFD5XX/4XX will use the altitude sources in this order (highest first):

1. ARINC 429 ADC
2. ARINC 429 EFIS
3. ARINC 429 Traffic Advisory System
4. RS232 FADC
5. RS-232 Altitude Encoder
6. Parallel Altitude Encoder (Gray Code)

6.8.1.2 Baro-corrected Altitude Sources

The IFD5XX/4XX can accept baro-corrected altitude from multiple sources. The IFD5XX/4XX can accept Altitude information from altitude Air Data Systems in the following formats: ARINC 429 or RS232. If multiple altitude sources are connected to the IFD5XX/4XX, the IFD5XX/4XX will use the altitude sources in this order (highest first):

1. ARINC 429 INS/IRU
2. ARINC 429 EFIS
3. ARINC from Transponder
4. RS232 FADC

6.8.1.3 Other Air Data Sources

The IFD5XX/4XX can be connected to Air Data Systems that transmit the following labels via ARINC 429 if all the following is true:

- The Air Data Computer provides the following labels:

  203 – Pressure Altitude

  204 - Barometric- Corrected Altitude

  210 – True Airspeed

  211 – Total Air Temperature

  213 – Static Air Temperature
- The Air Data source is TSO approved and has a separate installation approval
- All wiring must be installed per the Air Data Computer's installation data

6.9 Heading System Sources

The IFD5XX/4XX can accept Heading data from multiple sources. The IFD5XX/4XX can accept heading information from Heading Systems in the following formats: ARINC 429 or RS232. If multiple heading sources are connected to the IFD5XX/4XX, the IFD5XX/4XX will use the heading sources in this order (highest first):

1. ARINC 429 INS/IRU
2. ARINC 429 EFIS
3. ARINC 429 from GAD42
4. ARINC 429 from EHSI
5. ARINC 429 from GTX 33/330
6. ARINC 429 Traffic Advisory System
7. Synchro Heading
8. RS232 FADC
9. RS232 Lightning Detection System (The WX500 can only be used as a heading source if it is configured for a Synchro output.)

The IFD5XX can be connected to the following IRU/AHRS systems:

Manufacturer	Model	Data Format	Notes
Collins	AHS-85E	ARINC 429	High Speed

Table 66: IRU/AHRS Systems

The Avidyne IFD5XX/4XX can accept heading information via ARINC 429 from other IRU/AHRS sources if the following labels are provided:

- 314 - True Heading
- 320 - Magnetic Heading

IRU/AHRS not listed in the table above can still be approved if the following conditions are met:

- The IRU/AHRS provides ARINC 429 labels 314 and/or 320;
- The IRU/AHRS installation is previously FAA approved;
- The IFD5XX/4XX must be installed per Section 4.5.1.
- The IFD5XX/4XX must pass the ground test in Section 7.6.16 before returning aircraft to service

6.10 Multifunction Displays

The IFD5XX/4XX can be connected to Multifunction Display Systems via RS232 or ARINC 429. The IFD5XX/4XX supports the following Multifunction Display Systems:

Manufacturer	Model	Data Format	Notes
Garmin	MX20	RS232	• Aviation No Alt format for MX20 version 5.5 and earlier • Aviation format for MX20 version 5.6 and later.
Garmin	GMX200	RS232	• Aviation format for all GMX200 versions
Avidyne Corporation	EX500/EX600/EX5000	ARINC 429	• Use GAMA format 2, low speed • MFD software P/N 530-00193-( ) or later is required
Avidyne Corporation	FlightMax FSD Series	RS232	• GAMA output may also be used. However, flight plans with an Arc will be displayed as a gap.

Table 67: Multifunction Display

6.11 Terrain Alerting

This section will describe the external interfaces for the FLTA interface. Note: The IFD5XX/4XX does not contain certified TAWS functionality. FLTA does provide aural alerting to the pilot of projected terrain (ground and obstacle) conflicts. FLTA also has the ability to command the various TAWS remote annunciators to light up as appropriate.

6.11.1 Audio

Pin Name	Connector	Pin	I/O
Audio 1 HI	P1001	37	Output
Audio 1 LO	P1001	38	Output
Audio 2 HI	P1001	52	Output
Audio 2 LO	P1001	53	Output

Table 68: Terrain Awareness Audio Output

The audio output 1 is a low impedance output. 100mW at 500-ohm.

The audio output 2 has an output impedance of 240-ohm and is capable of driving 100mW into a 500-ohm load.

6.11.2 Annunciators

Pin Name	Connector	Pin	I/O
Terrain not available annunciate	P1050	9	Output
Terrain Warning Annunciate	P1050	10	Output
Terrain Caution Annunciate	P1050	11	Output
TAWS Inhibit Annunciate	P1050	12	Output

Table 69:Terrain Awareness Annunicator Output

6.12 ADS-B/Transponder Output

The IFD5XX/4XX will transmit ADS-B compliant GPS position data to the following compatible ADS-B capable transponders. Note that separate installation approval of ADS-B out is required for compliant ADS-B function.

Manufacturer	Model	Notes
Avidyne	AXP340	• ADS-B output requires a separate installation approval. • Connect the appropriate input pin on the AXP340 with the IFD5XX/4XX P1001 Pin 8 in order to get automatic on-ground / in-air mode transition. • The IFD5XX/4XX retransmits the Altitude data received from external altitude devices to AXP340. This is a non-TSO function of the

		IFD5XX/4XX and must be tested and approved by the installer prior to returning the aircraft to service. The IFD5XX/4XX will use the airdata source with the highest priority, reference Section 6.8.1.1. Installers must ensure the airdata source being used for transponder Mode C transmissions complies with 14 CFR 91.217. After installation, the transponder system must be tested per 14 CFR 91.411 to verify the airdata retransmitted by IFD5XX/4XX is operating correctly prior to return to service. The Hardware and Software Design Assurance for the Altitude Retransmission is Level B and C respectively. The IFD5XX/4XX has a maximum internal latency of 340 mS for retransmission the altitude data. • See Figure D - 39 for AXP340 interconnect.
Avidyne	AXP322	• ADS-B output requires a separate installation approval. • The IFD5XX/4XX retransmits the Altitude data received from external altitude devices to AXP322. This is a non-TSO function of the IFD5XX/4XX and must be tested and approved by the installer prior to returning the aircraft to service. The IFD5XX/4XX will use the airdata source with the highest priority, reference Section 6.8.1.1. Installers must ensure the airdata source being used for transponder Mode C transmissions complies with 14 CFR 91.217. After installation, the transponder system must be tested per 14 CFR 91.411 to verify the airdata retransmitted by IFD5XX/4XX is operating correctly prior to return to service. The Hardware and Software Design Assurance for the Altitude Retransmission is Level B and C respectively. The IFD5XX/4XX has a maximum internal latency of 340 mS for retransmission the altitude data. • See Figure D - 39 for AXP322 interconnect. • IFD5XX/4XX must have software 10.1.0 or later

Table 70: ADS-B Output

6.13 Autopilot

The IFD5XX/4XX can be connected to various Autopilot Systems via analog or ARINC 429 connections. The IFD5XX/4XX supports the following Autopilot Systems:

Manufacturer	Model	Data Format	Notes
Honeywell (Bendix/King)	KAP100/140/150, KFC150/200/250/275/300/325 KCP 320	Analog Deviation, Discrete	
	KFC225	Analog Deviation, Discrete, ARINC 429 GPSS	
	KFC400	ARINC 429	
Century	I/II/III/IV, 21/31/41, 2000, Trident	Analog Deviation, Discrete	
	AK 1081	ARINC 429 GPSS	
S-TEC (Cobham)	System 20/30/40/50/ 55/61/62/GPSS/65	Analog Deviation, Discrete	
	System 55X	Analog Deviation, Discrete, ARINC 429 GPSS	
	ST-901	ARINC 429 GPSS	
Collins	APS 65 ( )	Analog Deviation, Discrete	

Table 71: Autopilot Systems

6.14 TAWS/EGPWS Output

The IFD does not accept any data for use or display from any TAWS or EGPWS system.

The IFD5XX/4XX is capable of sending position data to the following EGPWS systems:

Manufacturer	Model	Notes
Honeywell	KGP560	Serial GPS output only

Table 72: TAWS/EGPWS Output

7. Configuration and Checkout

After completing installation, a complete installation checkout should be performed. Complete the following sections to verify the installation is installed correctly. Prior to configuring the IFD5XX/4XX unit, the following checks should be performed.

7.1 Wiring Check

Verify wiring is properly installed and secured. Verify the wiring does not interfere with the flight controls. Verify all wiring connected to IFD5XX/4XX is connected correctly to the unit. **Caution:** Failure to properly connect aircraft wiring to the IFD5XX/4XX may result in damage to the IFD5XX/4XX or to the equipment connected to the IFD5XX/4XX.

7.2 Mounting Check

Verify the IFD5XX/4XX tray is securely installed to the airframe.

7.3 Chassis ID Setting

For dual IFD5XX/4XX installations, it is imperative that the proper Chassis ID settings are established for each IFD via dip switches located along the right side of the IFD5XX/4XX outer chassis. Not doing so will result in multiple error messages and degraded performance when two or more IFDs are installed in an airplane.

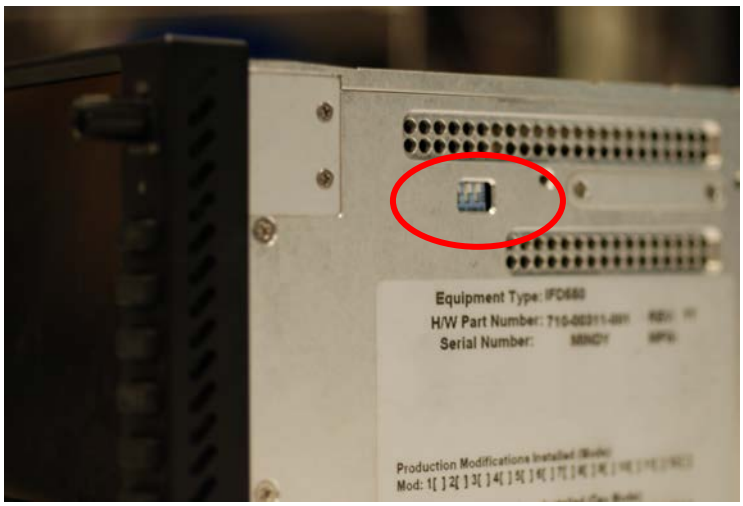


Figure 10: IFD5XX/4XX DIP Switches

At installation time, determine which IFD is to be designated as IFD #1 and which is to be designated as IFD #2 (Note, there is no operational difference, this is Databus deconfliction necessity.). Set the side chassis ID dip switches per the table below:

IFD Position Designation	DIP switch selections
IFD #1	↑ ↑ ↑ (up, up, up)
IFD #2	↓ ↑ ↑ (down, up, up)

Table 73: DIP Switch Configuration

7.4 Unit Installation

Install unit in the tray using the captive 3/32" Hex screw. Verify the connectors are fully engaged prior to powering on the unit.

7.5 Configuration

The IFD5XX/4XX can be configured in the aircraft. This section will describe the procedures for configuring the IFD5XX/4XX.

Configuration consists of setting up communication protocols in Maintenance Mode, designating specific types of equipment to be integrated and setting up system settings.

Configuration also consists of setting up User Options preferences in non-Maintenance Mode via the SYS tab of the AUX page.

For new installations, use this section to configure the IFD5XX/4XX for the specific airplane.

For replacement installations in which the IFD5XX/4XX is replacing a GNS 530/W or GNS 430/W, use Appendix F: Configuration Setup of this manual to first record the configuration of the GNS530/W or GNS430/W that is being replaced by the IFD5XX/4XX and then using that recorded data, use the IFD5XX/4XX Maintenance Mode pages as defined in this section and Appendix F: Configuration Setup to properly set up and record configurations.

7.5.1 Maintenance Mode

The Maintenance Mode can be accessed by using the following procedures (on the ground only):

1. Power on the IFD5XX/4XX
2. Press Enter Button to accept the on screen statement
3. Press Proceed Line Select Key (LSK) followed by the Confirm LSK on the database acknowledgement screen (if shown)
4. Select the "AUX" function key to display the Auxiliary Page. Press on the right side of the "AUX" Function key until the "SYS" tab is shown
5. Select "Update Databases" LSK by pressing the associated button. Press the "Confirm" LSK after it appears. The screen will blank for several seconds before coming up in Maintenance Mode

Please note: Screen Page numbers shown below may not match unit.

7.5.2 ARINC 429 Port Configuration (Page 1 of 12)

The ARINC 429 can be selected individually for each ARINC 429 Transmit and Receive Port. Each Transmit and Receive Port will have a "Speed" selection and "Data" selection.

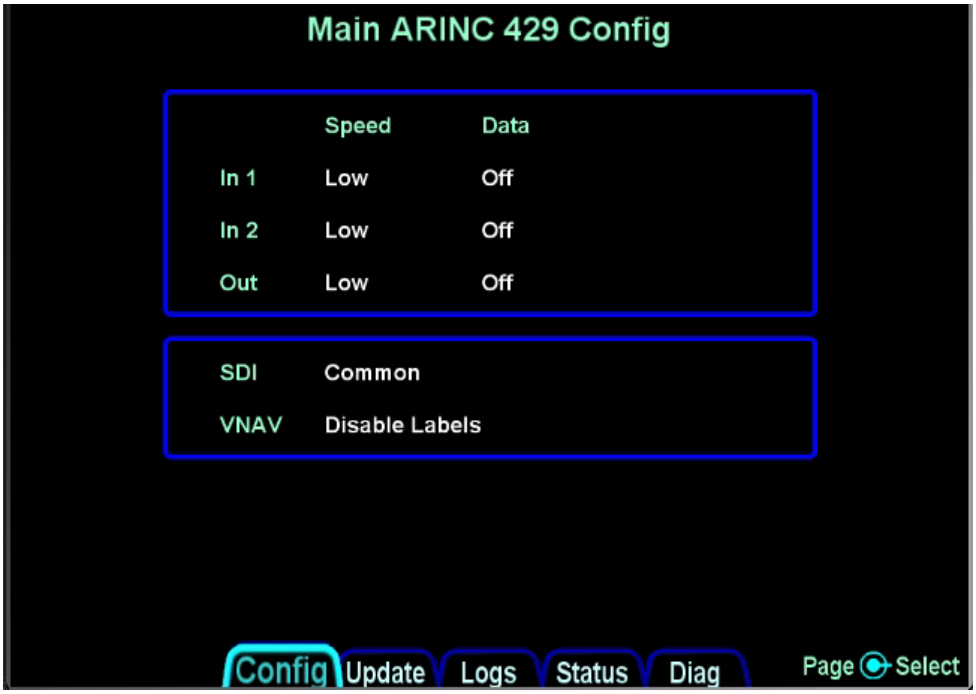


Figure 11: ARINC 429 Configuration Page

The "Speed" Selection will have the following options:

Selection	Description
Low	Standard low-speed ARINC 429 (nominally 12.5 Kb per second)
High	High-speed ARINC 429 (nominally 100Kb per second)

Table 74: ARINC 429 Speed Selection

The "Data" will have the following INPUT options:

Selection	Description
Off	No device connected to this ARINC 429 input
Airdata	Altitude, temperature, and speed information from the following Air Data Systems: B&D 2600, 2601, 2800, 90004-003, Bendix/King KAD 280/480, Shadin ADC 2000
Airdata/AHRS	Heading, altitude, temperature, and speed information from an Air Data/AHRS system.
EFIS	Selected course, heading, and joystick waypoint information from a EFIS system. Certain versions of the Collins and Honeywell EFIS may be compatible with this format.
EFIS/Airdata	Selected course, heading, joystick waypoint, altitude, temperature, and speed information.
Flight Control	Selected course information from the following Flight Control systems: Bendix/King KFC400
Garmin GAD 42	Selected course, heading, and true airspeed data from Garmin GAD 42.
Garmin GDU	Selected course, heading, altitude, temperature and speed information from the following systems: Garmin GDU (G500/G600)
Garmin GTX 330	Garmin GTX330 (No TIS) This ARINC 429 speed should be set to the high speed.
Garmin GTX 330 w/Traffic	Garmin GTX 330 w/TIS This ARINC 429 speed should be set to the high speed.
Honeywell EFIS	Selected course, heading, and joystick waypoint information from the following EFIS systems: Aspen EFD1000 (If connected to an ACU1, set the ARINC 429 speed to low speed. If connected to an ACU2 and using ADF, RADALT or Remote OAT data set the ARINC 429 speed to high speed, otherwise low speed.) Honeywell Primus 1000
INS/IRU	Heading information from the following Inertial systems: Bendix/King KAH 460 Collins AHC 85 Honeywell Laseref

	Litef LTR 81 Litton LTN 90-100, LTN 91, LTN 92
RADAR Graphics	Joystick waypoint information from a RADAR graphics unit
Sandel EHSI	Selected course and heading information from the following EHSI systems: Sandel SN 3308 Sandel SN 3500 Avidyne EXP5000
Traffic Advisory	Traffic information from the following traffic advisory systems: Bendix/King KTA-870, KMH880 Garmin GTS 800/820/850 Avidyne TAS6XX (but RS-232 is preferred) Avidyne MLB100 (Navworx 200-0011-()-()) (Ryan 9900BX) (but RS-232 is preferred) L3 Communications SKY497 Skywatch L3 Communications SKY899 Skywatch HP

Table 75: ARINC 429 Input Selection

Note: ARINC 429 devices should be wired to both IFDs in dual IFD installations since ARINC 429 data is not shared between IFDs on the CrossSync line.

The "Data" will have the following OUTPUT options:

Selection	Description
Off	No device(s) connected to ARINC 429 output
ARINC 429	Standard ARINC 429 output (non-GAMA)
GAMA 429	ARINC data as define by the General Aviation Manufacturers' Association (GAMA) General Aviation Subset, 2nd Edition. The output data includes navigation, flight plan information to the following systems: Garmin GAD 42 Interface Adapter Collins EFIS 84 (select "Non-WAAS" on the IFD) Certain other versions of Collins EFIS may also be compatible with this format.
GAMA 429 Bendix/King	ARINC 429 data as defined by the GAMA General Aviation Subset, 2nd Edition. The output data includes navigation, flight plan and GPS vertical guidance information to the following systems: Bendix/King EFS 40/50 (GPS vertical guidance provided on EFIS)
GAMA 429 Graphics	ARINC 429 data as defined by the GAMA General Aviation Subset, 2nd Edition including GAMA Graphics Protocol 'A'. This format outputs intersection symbols as generic waypoint symbols. The output data includes navigation and flight plan information (including graphical representation of the flight plan procedures) to the following systems: Honeywell Primus 1000
GAMA 429 Graphics w/ INT	ARINC 429 data as defined by the GAMA General Aviation Subset, 2nd Edition including GAMA Graphics Protocol 'A'. The output data includes navigation and flight plan information (including graphical representations of flight plan procedures) to the following systems: Sandel SN3308 Sandel SN3500 Aspen EFD1000 (see note below) Avidyne EX500 Avidyne EX600 Avidyne EX5000 Note: When integrating an Aspen EFD1000 with a dual IFD5XX/4XX installation, ensure the "CRS SDI" field in the Aspen setup pages (page 18) is set to Nav 1/2 and not Common.
GAMA 429 Pro Line 21	ARINC 429 data as defined by the GAMA General Aviation Subset, 2nd Edition.
GAMA 429	ARINC 429 data as defined by the GAMA General Aviation Subset,

Selection	Description
Sextant	2nd Edition
GAMA 429 Non-standard	ARINC 429 data that is not necessarily conforming to the GAMA General Aviation Subset, 2nd Edition.
ARINC 743A	ARINC 429 - 743A labels

Table 76: ARINC 429 Output Selection

SDI

Note: It is important in dual IFD installations that the corresponding SDI selection be made properly. That typically means selecting LNAV 1 or LNAV 2.

Selection	Description
Common	Rx: Accepts all 429 inputs Tx: Generates all 429 outputs with SDI = 0
LNAV 1	Number 1 (Pilot) long-range navigator RX: Accepts 429 inputs with SDI = 0 or 1. TX: Generates all 429 outputs with SDI = 1.
LNAV 2	Number 2 (Copilot) long-range navigator RX: Accepts 429 inputs with SDI = 0 or 2. TX: Generates all 429 outputs with SDI = 2.

Table 77: SDI Selection

VNAV

Selection	Description
Disable Labels	ARINC 429 labels associated with GPS-based vertical guidance (labels 117G and 327G) are not transmitted in the output data stream. Note: If replacing an existing GNS-530 and the VNAV field was not present on the 530, then select "Disable" on the IFD5XX/4XX.
Enable Labels	ARINC 429 labels associated with GPS-based vertical guidance (labels 117G and 327G) are transmitted in the output data stream. ARINC 429 vertical: Sandel SN3500 Aspen EFD1000 Other systems may also use these labels.

Table 78: VNAV Selection

7.5.3 RS-232 Port Configuration (Page 2 of 12)

The RS-232 Configuration Page allows the configuration Inputs and Outputs to match that of the equipment installed in the aircraft.

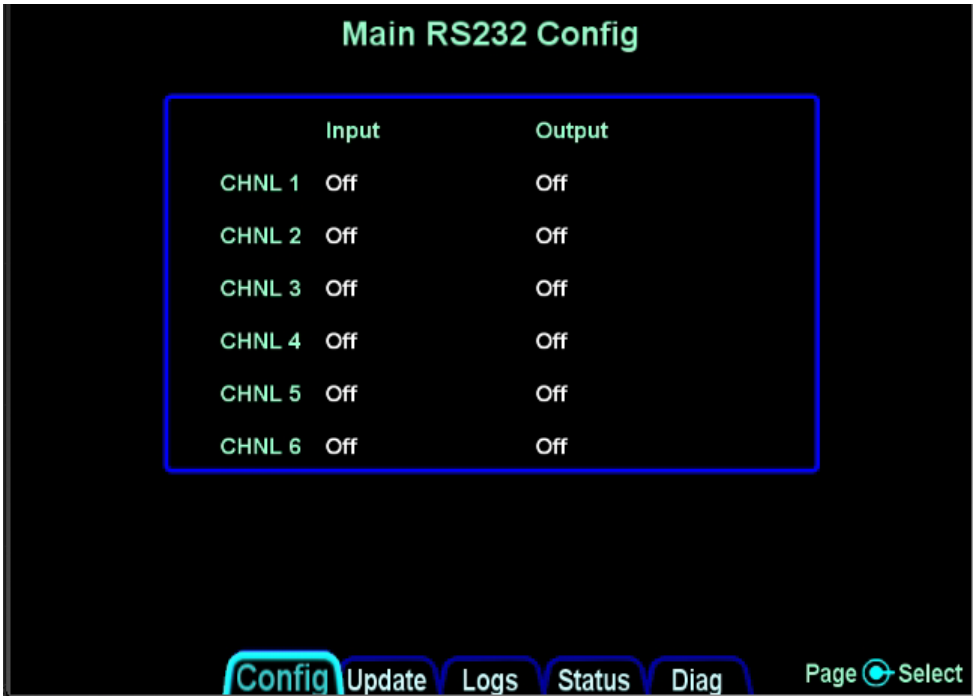


Figure 12: RS-232 Configuration Page

The following selections can be made on the RS-232 Input.

Channel Inputs

Selection	Description
Off	No device(s) connected to input of this channel
Arnav/EI-fuel	Serial fuel flow information from the following units: ARNAV FC-10, FT-10 Electronics International FP-5L
AXP322	Select for Avidyne AXP322 Remote Transponder
CrossSync	Serial transfer of flights plans and user waypoints and cross-side data (e.g. Datalink, traffic, lightning, etc) between IFD5XX/4XX units. Note: This is only an option for CHNL 3.
GDL 69*	Serial data input for in-flight access to weather and messaging from the following units: Garmin GDL69/69A (Version 4.01 or later)

Selection	Description
Icarus-ALT	Serial altitude data from the following units: Icarus Instruments 3000 Sandia SAE5-35 Garmin GTX 327 Transponder Trans-Cal Industries IA-RS-232-X, SSD120 ACK Technologies A-30 (Mod 8 and above)
Ryan TCAD	Traffic information from a Ryan 9900B, 9900BX, or TAS6XX Series System.
Shadin-ADC	Serial airdata information from the following units: Shadin ADC 200, 200+, 2000
Shadin-ALT	Serial altitude data from the following units: Shadin 8800T, 9000T, 9200T
Shadin-fadc	Shadin 9628XX-X Fuel/Air Data Computer Insight TAS 1000 Air Data Computer
Shadin-Fuel	Serial fuel flow information from the following units: Shadin 91053XP and 91053XT-D "DigiFlo-L" Digital Fuel Management Systems Shadin 91204XX(38)D and 91204XT-D "MiniFlo-L" Digital Fuel Management Systems JP Instrument EDM-700 or EDM-760 Engine Monitor Other JPI systems (e.g. JPI FS-450) can use this setting but see the specific format guidance from JPI for the Garmin GNS series.
MLB100 Wx*	Serial weather data information from the Avidyne MLB100
MLB700*	Serial weather data information from the Avidyne MLB700
TWX	Serial lightning data information from the Avidyne TWX670 in "Native" format
WX-500	Serial lightning data information from the L3 Communications WX-500 Stormscope

Table 79: RS-232 Input Selection

*** These devices are mutually exclusive. Multiple devices should not be installed/configured on a single unit.**

Channel Outputs

Selection	Description
Off	No device(s) connected to output of this channel
ADS-B (Avi)	Serial position data to the following units: Trig TT31 (V 3.1 or later) Avidyne AXP340
Aviation‡	Serial position, altitude, velocity, and navigation data to the following units: Argus 3000, 5000, or 7000 Moving Map Avidyne FSD Series Garmin MX20 (V5.6 or later), GMX200 Garmin GPSMAP 195, GPSMAP 295 or GPS III Pilot Garmin GPSMAP 196, GPSMAP 296, and GPSMAP 396 Garmin GPSMAP 496, and GPSMAP 696 Garmin Aera 796/795 Garmin GTX 327 Transponder JP Instruments EDM-700 or EDM-760 Engine Monitor Shadin 91204XM Digital Fuel Management System Shadin 91053XP Digital Fuel Management System Shadin 9628XX-X Fuel/Air Data Computer Stormscope Series II (with NAVAID) Moving Map
Aviation no Alt‡	Serial position, velocity, and navigation data to the following units: Garmin MX20 (V5.5 or earlier) Horizon DDMP Insight TAS 1000 Air Data Computer
AXP322	Select for Avidyne AXP322 Remote Transponder
CrossSync	Serial transfer of flights plans and user waypoints and cross-side data (e.g. Datalink, traffic, lightning, etc) between IFD5XX/4XX units Note: This is only an option for CHNL 3.
GDL 69*	Serial data output to a Garmin GDL69/69A (Version 4.01 or later)
HW EGPWS	Serial communication to a Bendix/King (Honeywell) KGP 560 EGPWS
Ryan TCAD	Traffic information to a Ryan 9900B, 9900BX, or TAS6XX Series System.

Selection	Description
MapMX‡	Serial position, altitude, velocity, and navigation data to the following units: Garmin MX20 (V5.7 or later), GMX 200
WX-500	Serial communication to L3 Communications WX500 Stormscope
MLB100 Wx*	Serial data to the Avidyne MLB100
MLB700*	Serial weather data information to the Avidyne MLB700 and WSI AV-300 / 350
TWX	Serial communication to the Avidyne TWX670

Table 80: RS-232 Output Selection

‡ **Aviation, Aviation No Altitude, and MapMx output types can only be configured on one RS232 transmit port**.

* **These devices are mutually exclusive. Multiple devices should not be installed/configured on a single unit.**

7.5.4 Main System Configuration (Page 3 of 12)

This is a general page for miscellaneous configurations.

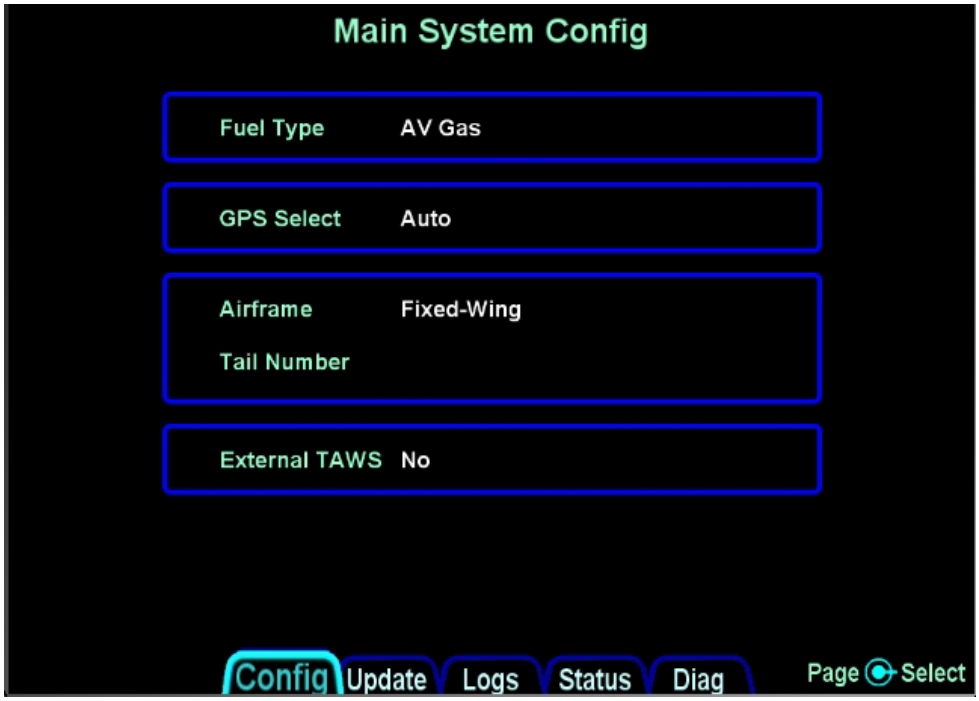


Figure 13: Main System Configuration Page

The Main System Configuration Page (Page 3 of 12) allows the configuration of the following Airframe Options and GPS Parameters on the IFD5XX/4XX.

Fuel Type Selections:

Select Fuel in the Configure field, the following options can be selected:

Selection	Description
Avgas	The aircraft is using Aviation gas (5.967 lbs/gal)
Jet A	The aircraft is using Jet A or Jet A-1 fuel (6.843 lbs/gal)
Jet B	The aircraft is using Jet B (JP-4) fuel (6.467 lbs/gal)

Table 81: Aircraft Fuel Type

GPS Select Selections:

Selection	Description
Auto	In GPS mode on the IFD5XX/4XX, the GPS Select discrete will not be active (open) in a GPS approach, and no messages will annunciate on the IFD5XX/4XX and no pilot action is required. This setting allows the pilot to use the GPS → VLOC Capture option on the User Options part of the Setup tab on the AUX page.
Prompt	In GPS mode, the user will be prompted to enable the approach in KAP140 and KFC225 equipped aircraft. When Prompt is selected, and a GPS approach mode is active, a CAS message will prompt the pilot to "Enable A/P Approach" on the FPL tab. At that point, the pilot may then enter APR mode on the autopilot. This setting will also ignore the GPS → VLOC Capture option on the User Options part of the Setup tab on the AUX page.

Table 82: GPS Sequencing

Airframe Selections:

Selection	Description
Fixed Wing	For Fixed Wing installations
Helicopter	For Helicopter installations

Table 83: Airframe Selection

Tail Number:

Tail number is a text field and is used for Jeppesen JSUM purposes. Enter the aircraft tail number associated with the user JSUM account.

External TAWS Selections:

Selection	Description
Yes	Select if an external EGPWS or TAWS device (e.g. KGP 560) is connected to the IFD5XX/4XX. This will enable the IFD5XX/4XX to send position data to the device and it will disable FLTA and TA functionality as well as aural alerts in the IFD5XX/4XX

Selection	Description
No	Select when no external EGPWS or TAWS device is connected to the IFD5XX/4XX, thereby enabling all FLTA and TA functionality on the IFD5XX/4XX.

Table 58: External TAWS Selection

Note: It is imperative that only one source of terrain cautions and warnings be enabled on the airplane so as to avoid the potential for conflicting information to be presented to the pilot. If a TAWS system is installed but the IFD's internal TA and FLTA functions are to be used for terrain avoidance, the TAWS system *must* be fully disabled. If a TAWS system is to be used, its type must be properly configured on the IFD so that the caution and warning indications generated by the TAWS system can be displayed to the pilot and so that the IFD's TA and FLTA functions will be inhibited.

Avidyne TA/FLTA is not an approved TSO-C151 EGPWS unit.

The IFD system supports a Honeywell KGP560/860 system only. All other external TAWS/EGPWS systems must be disabled if the internal TA and FLTA is operational on the IFD system.

7.5.5 Main Input Configuration (Page 4 of 12)

The Main Input Page displays information received from ARINC 429, RS-232, and other electrical inputs. This page is helpful during troubleshooting of the IFD5XX/4XX system.

7.5.6 Main Lighting Configuration (Page 5 of 12)

The source of the lighting for the IFD5XX/4XX can be the bezel photocell sensor or the dimming bus. 28VDC, 14VDC, 5VDC and 5VAC dimming buses are all supported and are automatically detected by the IFD5XX/4XX.

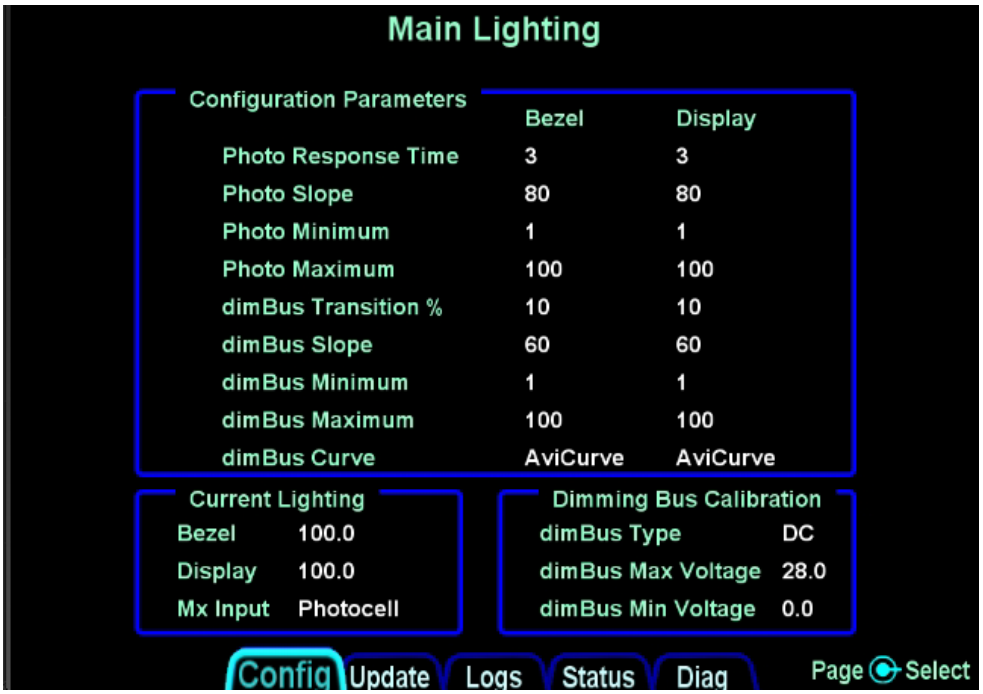


Figure 14: Main Lighting Configuration Page

Photo Response Time

Sets the speed at which the brightness changes when photocell is selected as the lighting source. Both the Bezel and Display fields have a range of 1 to 5, and the factory default is 3.

Photo Slope

The Photo Slope sets the sensitivity of the display/bezel to changes in the input when the dimming source is the IFD5XX/4XX photocell. This field has a range of 15 to 100, and the factory default is 80.

Photo Minimum

The Photo Minimum sets the minimum brightness when the dimming source is the photocell. Both the Bezel and Display fields have a range of 1 to 50, and the factory default is 1.

Photo Maximum

The Photo Maximum sets the maximum brightness when the dimming source is the photocell. Both the Bezel and Display fields have a range of 50 to 100, and the factory default is 100.

dimBus Transition %

The dimBus Transition % sets the threshold where the aircraft dimming bus takes over from the photocell. Below this threshold, the aircraft dimmer controls the IFD5XX/4XX lighting. Both the Bezel and Display fields have a range of 0 to 100, and the factory default is 10.

Note: If it is not desired to hand brightness control over to the dimming bus from the photocell at any point, set dimBus Transition % to 0 (zero). Doing so will prevent the scenario where, in increasingly darker environments (e.g. flying past sunset into dark night), the display automatically dims and dims and dims and then suddenly jumps to bright.

dimBus Slope

The dimBus Slope sets the sensitivity of the display/bezel to the aircraft dimmer. Both the Bezel and Display fields have a range of 15 to 100, and the factory default is 60.

Note: Previous to Release 10.1.1.0, a dimBus slope value of 100 on the AviCurve resulted in a maximum brightness value of 21%. In Release 10.1.1.0 and later, a slope value of 100 will result in 100% maximum brightness.

dimBus Minimum

The dimBus Minimum sets the minimum brightness when the aircraft dimmer is the dimming source. Both the Bezel and Display fields have a range of 1 to 50, and the factory default is 1.

dimBus Maximum

The dimBus Maximum sets the maximum brightness when the aircraft dimmer is the dimming source. Both the Bezel and Display fields have a range of 50 to 100, and the factory default is 100.

dimBus Curve

The dimBus Curve sets the aircraft dimming bus to either a Proportional Curve or AviCurve on the IFD5XX/4XX.

The Proportional Curve tracks the aircraft lighting bus as follows: Maximum night lighting at maximum aircraft lighting bus voltage, Minimum night lighting at minimum aircraft lighting bus voltage (linear in-between).

The AviCurve tracks the aircraft dimming bus as follows:

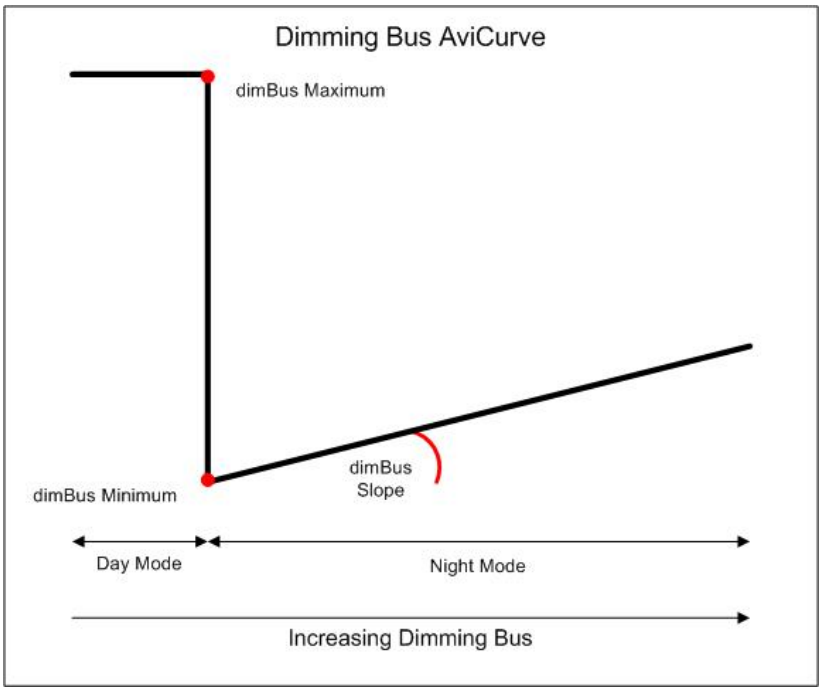


Figure 15: Lighting Curve - AviCurve

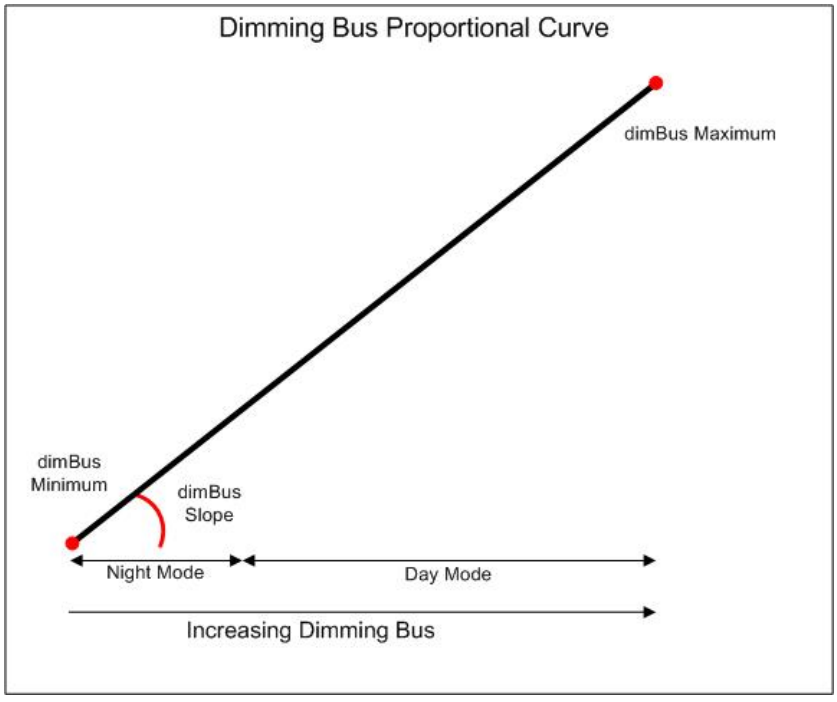


Figure 16: Lighting Curve - Proportional Curve

Field	Selection
Bezel	Value displayed represents the current % brightness of the bezel backlighting
Display	Value displayed represents the current % brightness of the display backlighting
Mx Input	Photocell – Maintenance Mode will use this method if selected. This is the default setting. This setting uses the Photocell on the IFD5XX/4XX bezel or display. dimBus – Maintenance Mode will use this method if selected. This setting uses the aircraft lighting buss to control the lightning of the bezel or display.

Table 84: Lighting Bus Configuration

Dimming Bus Calibration

The section will calibrate the IFD5XX/4XX to the aircraft avionics lighting bus.

Selection	Description
dimBus Type	DC – select this option if the dimming bus is a DC bus. AC – select this option if the dimming bus is an AC bus. The IFD needs to know the bus type in order to alter internal configuration as well as properly perform the calibration.
dimBus Max Voltage	Sets the maximum aircraft dimming bus voltage. Range is 0 – 28V.
dimBus Min Voltage	Sets the minimum aircraft dimming bus voltage. Range is 0 – 28V.

Table 85: Lighting Bus Configuration

To calibrate the dimming bus:

1. Select desired dimBus Type;
2. Select the dimBus Max Voltage field;
3. Push the right bezel knob;
4. Set the dimming bus to the maximum value (e.g. full clockwise position on dimming rheostat);
5. Push the right bezel knob to store;

Repeat the process for the minimum value (use full counter-clockwise position of rheostat)

7.5.7 Main CDI/OBS Config Page (Page 6 of 12)

This page will test the Main CDI/OBS output on the IFD5XX/4XX.

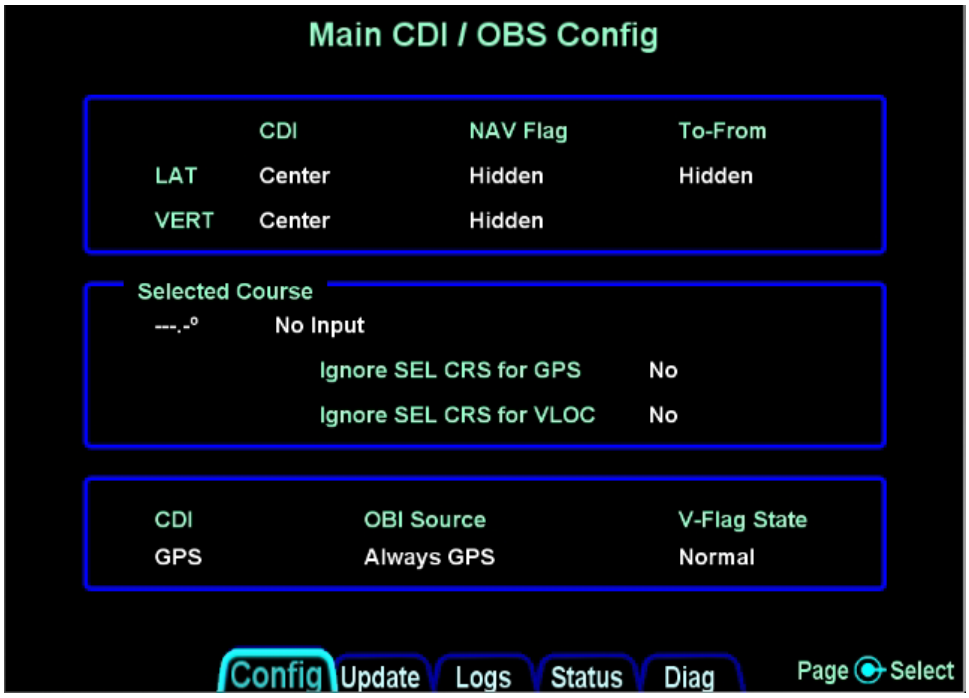


Figure 17: Main CDI/OBS Configuration Page

The following parameters can be tested:

CDI (LAT/VERT)

Selection	Description
Max Left	The remote CDI will be off-scale full deflection to the left/up
Full Left	The remote CDI will be deflected to the left/up
Center	The remote CDI will be centered
Full Right	The remote CDI will be deflected to the right/down
Max Right	The remote CDI will be off-scale full deflection to the right/down

Table 86: Main CDI Test Page

NAV Flag (LAT/VERT)

Selection	Description
Hidden	The lateral and vertical flag on the external indicator is hidden
In view	The lateral and vertical flag on the external indicator is in view

Table 87: Main CDI Flag Test Page

TO-FROM

Selection	Description
From	The From flag on the external indicator is in view
Hidden	The TO/FROM flag on the external indicator is hidden
TO	The TO flag on the external indicator is in view

Table 88: Main CDI Flag Test Page

Selected Course

This section will calibrate the external CDI/HSI to the IFD5XX/4XX.

1. Select 150° on the CDI/HSI;
2. Verify the Selected Course is displayed on the IFD5XX/4XX and press the ENTR button on the IFD5XX/4XX;
3. After calibrating, verify 30° increments on the CDI/HSI are properly displayed on the IFD5XX/4XX ±2°.

Ignore Options

Selection	Description
Ignore SEL CRS for GPS	Yes/No – Nav Source knob used in OBS. Yes = ignore analog or 429 selected course. OBS mode then uses the Nav Source knob to dial the course.
Ignore SEL CRS for VLOC	Yes/No – Yes = Lateral navigation flag displays VOR validity, deviation data for VOR is always centered. No = deviation and flag data is based on OBS selection.

Table 89: Ignore Options Selection

CDI Selection

Selection	Description
GPS	The GPS is the navigation source. The GPS annunciator will also be active.
VLOC	The VLOC is the navigation source. The VLOC annunciator will also be active.
GPS Only	The VLOC selection on the IFD5XX/4XX Nav Source knob has been disabled. Therefore, GPS and OBS are the only two available choices via the IFD5XX/4XX Nav Source knob

Table 90: CDI Source Selection

OBI Source

Selection	Description
Always GPS	The MAIN Serial OBI output will always be selected to GPS.
Track CDI	The MAIN Serial OBI will track the Nav Source knob selection.

Table 91: OBI Source Selection

V-Flag State

Selection	Description
Declutter	The vertical deviation bar will be in parked in the maximum UP position when the vertical flag is removed, except in the following cases: • VLOC is selected on the Nav Source knob and an ILS frequency is tuned • GPS is selected on the Nav Source knob and valid GPS approach is active (precision GPS with vertical guidance)
Normal	The vertical deviation bar will be in the center position when vertical navigation is invalid and the vertical flag will be present.

Table 92: V-Flag State

7.5.8 VOR/LOC/GS CDI (Page 7 of 12)

This will test the operation of the VOR/LOC/GS output from the IFD5XX/4XX on the P1006 connector to an external CDI/HSI display.

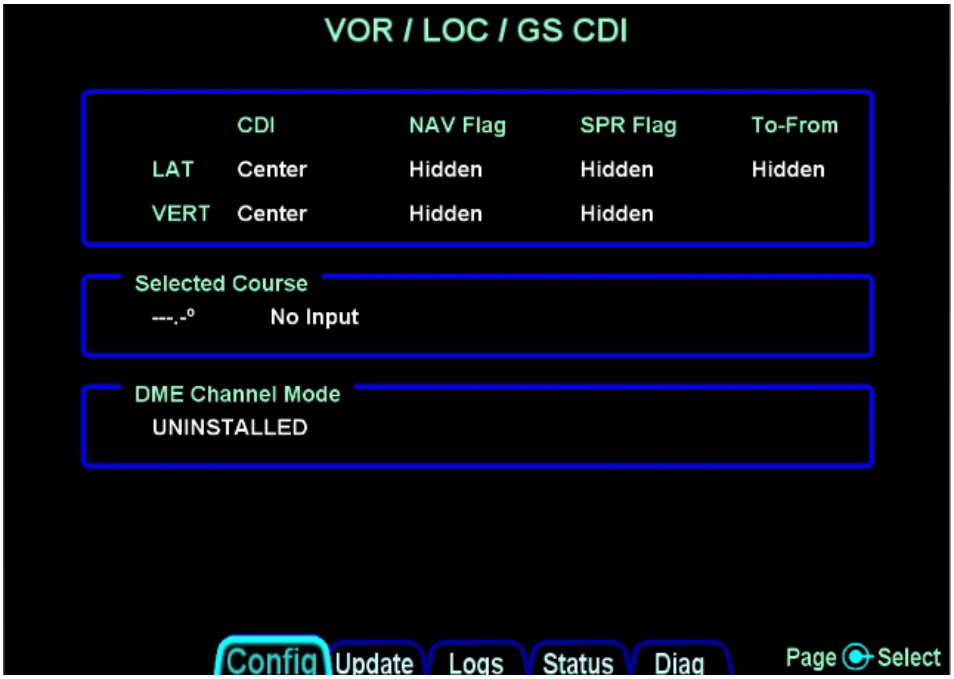


Figure 18: CDI Test Page

CDI (LAT/VERT)

Selection	Description
Max Left	The external CDI will be off-scale full deflection to the left/up
Full Left	The external CDI will be deflected to the left/up
Center	The external CDI will be centered
Full Right	The external CDI will be deflected to the right/down
Max Right	The external CDI will be off-scale full deflection to the right/down

Table 93: Navigation CDI Test Page

NAV Flag (LAT/VERT)

Selection	Description
Hidden	The lateral and vertical flag on the external indicator is hidden
In view	The lateral and vertical flag on the external indicator is in view

Table 94: Navigation Flag Test Page

SPR Flag (LAT/VRT Super Flag)

Selection	Description
Hidden	The lateral and vertical flag on the external indicator is hidden
In view	The lateral and vertical flag on the external indicator is in view

Table 95: NAV Superflag Test Page

TO-FROM

Selection	Description
From	The From flag on the external indicator is in view
Hidden	The TO/FROM flag on the external indicator is hidden
TO	The TO flag on the external indicator is in view

Table 96: Navigation TO/FROM Page

Selected Course

This section will calibrate the external CDI/HSI to the IFD5XX/4XX.

1. Select 150° on the CDI/HSI;
2. Verify the Selected Course is displayed on the IFD5XX and press the ENTR button on the IFD5XX/4XX;
3. After calibrating, verify 30° increments on the CDI/HSI are properly displayed on the IFD5XX/4XX ±2°.

DME Channel Mode

This configuration allows you to set the format for the DME tuning data output.

Selection	Description
UNINSTALLED	No DME installed/configured
King Serial	King Serial DME tuning
Parallel 2x5	2 of 5 parallel DME tuning
Parallel BCD	Shifted BCD (Binary Coded Decimal) parallel DME tuning
Parallel Slip	Slip-code parallel DME tuning
Narco 890/891	2 of 5 parallel DME tuning, compatible with the following DME units: Narco DME 890 Narco DME 891 ARC (Cessna) RTA-476A

Table 97: DME Channel Mode

7.5.9 VOR/LOC/GS ARINC 429 Configuration (Page 8 of 12)

This page will configure the ARINC 429 for the VOR/LOC/GS output.

Figure 19: VOR/LOC ARINC 429 Configuration Page

The following parameters can be configured.

Speed:

Selection	Description
Low	Standard Low-speed ARINC 429
High	High-speed ARINC 429

Table 98: VOR/LOC/GS ARINC 429 Speed Configuration

SDI:

Selection	Description
Common	RX: Accepts all 429 inputs TX: Generates all 429 outputs with SDI =0
VOR/ILS 1	Number 1 (Pilot) VOR/ILS Receiver RX: Accepts 429 inputs with SDI = 0 or 1 TX: Generates all 429 outputs with SDI = 1
VOR/ILS 2	Number 2 (Copilot) VOR/ILS Receiver RX: Accepts 429 inputs with SDI = 0 or 2 TX: Generates all 429 outputs with SDI = 2

Table 99: VOR/LOC/GS SDI Selection

DME Mode:

Selection	Description
Directed Freq 1	If the IFD5XX/4XX is connected to a single-channel or multi-channel ARINC429 DME, Direct Freq 1 will channel Receiver 1.
Directed Freq 2	If the IFD5XX/4XX is connected to a multi-channel ARINC429 DME, Direct Freq 2 will channel Receiver 2

Table 100: DME Mode Selection

7.5.10 GPS Vertical Offset (Page 9 of 12)

This page will configure the GPS Receiver for the antenna offset on the aircraft and designate if the IFD5XX/4XX will use the WAAS (SBAS) functionality of the system.

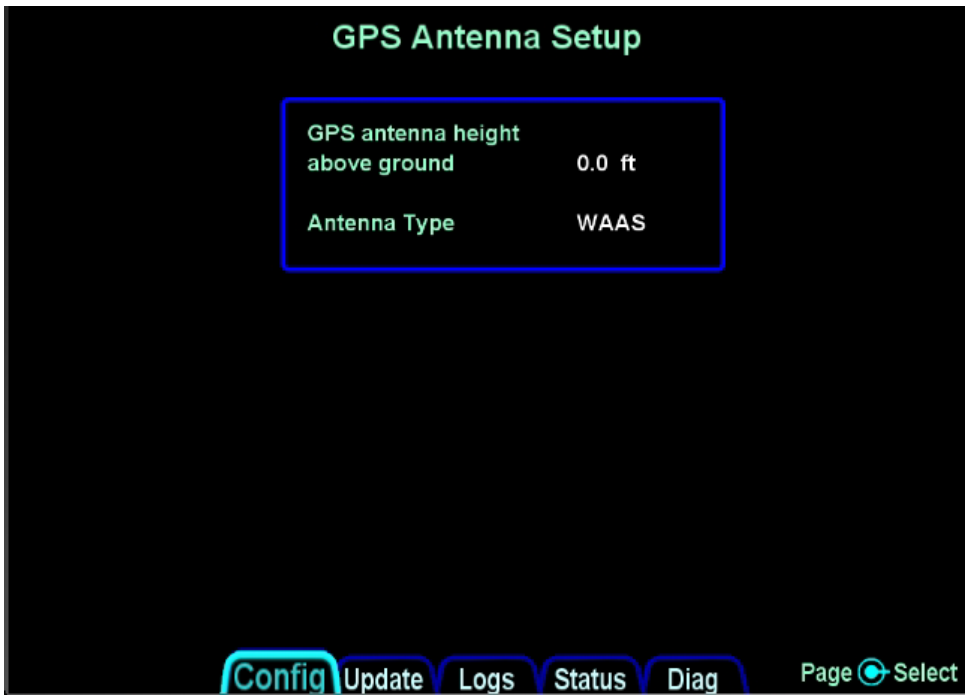


Figure 20: GPS Antenna Setup

Measure the distance from the ground to the top of the GPS antenna to nearest tenth of a foot, as shown in the image below, and enter the value into the IFD5XX/4XX (to the nearest 1/10th foot).

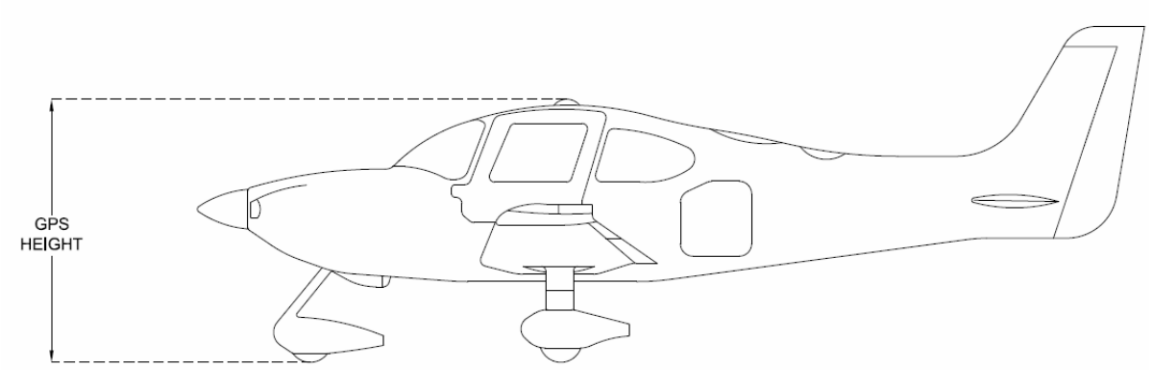


Figure 21: GPS Height

7.5.11 GDL Configuration Pages (Page 10 of 12)

This page allows the configuration of the Garmin GDL 69/69A. This page is always displayed in Maintenance Mode. The GDL 69/69A must be activated prior to configuring the IFD5XX/4XX, reference the GDL installation manual for setup and configuration information.

Figure 22: GDL Configuration Page

GDL Selection Page

This page selects the attenuation and the type of GDL receiver connected to the IFD5XX/4XX.

Selection	Description
Attenuation	This parameter sets the attenuation GDL 69/69A. Reference the Garmin GDL69/69A installation manual for more information.
Model	This parameter sets the model to either GDL 69 (weather only) or GDL 69A (weather and audio) models.

Table 101: GDL Selection Page

Note: GDL69/69A software version must be version 4.01 or later.

7.5.12 Remote XPDR Configuration (Page 11 of 12)

This page will configure the Avidyne AXP322 Remote transponder. Reference the AXP322 installation manual as needed. The transponder must be configured to operate.

Please note, it may take up to 3 minutes to update the transponder configuration after changing a parameter below.

Selection	Description
Hex Code	Enter the aircraft's Mode S Address issued by the registration authority. This code must be entered as a hexadecimal value.
A/C Width	Enter the aircraft's width in meters
A/C Length	Enter the aircraft's length in meters
GPS Lin. Offset	Enter the distance from the front of the aircraft to the GPS antenna in meters
1090 MHz Receiver	Enter "Yes" if the aircraft is equipped with 1090 MHz ADS-B In receiver
UAT Receiver	Enter "Yes" if the aircraft is equipped with UAT ADS-B In receiver
Squat Input	Enter the squat switch input type. Select "Avidyne" for IFD5XX/4XX units.
A/C Class	Enter the aircraft category
A/C Speed	Enter the aircraft speed
GPS Lat. Offset	Enter the lateral distance in meters for the GPS antenna
Certification	VFR installations, aircraft with a non-WAAS antenna (reference Section 7.5.10), or unapproved ADS-B out installations must set this field to "uncertified". All other installations reference the Avidyne AXP322 installation manual for certification level.

Table 102: Remote XPDR Configuration Selections

7.5.13 WiFi/Bluetooth Setup (Page 12 of 12)

1. Ensure that your system is running version 10.1.0.0.or later. If this is not the case, do not proceed.
2. Power on the unit.
3. If not in Maintenance mode, put the IFD into Maintenance mode.
   a. This can be done by inserting the USB stick and cycling the IFD's power.
4. Press the left-side of the "AUX" key until the "Update" tab is displayed.
5. Press “Un-Select All” to disable the check marks. ** Critical **
6. Using the right knob to highlight (twist) and select (push) items:
   a. Select only the item identified as "EnableBTWifiUserOptions".
   b. Verify a green check mark appears after “EnableBTWifiUserOptions”.

c. Press Proceed. Do NOT turn off power to the IFD while the update is in progress

d. When complete, the system should display “All items completed with no error” at the top of the screen, and “OK” adjacent to “EnableBTWifiUserOptions"

7. Press the "Done" soft key to reboot the box into flight mode.

Post Accomplishment Checkout - Verify the load

1. Boot the sytem into flight mode.

2. Using the AUX key, navigate to the "Setup" tab

3. Using the soft key, display the "User Options"

4. Verify that both the "Wi-Fi" and "Bluetooth" options are set to "On".

Note: If post accomplishment check fails, please contact Avidyne Technical Support

7.5.14 GAD 42 Configuration

The IFD5XX/4XX can be connected to the Garmin GAD42 Interface Adapter but there is no dedicated GAD42 configuration page in the IFD5XX/4XX.

If the IFD5XX/4XX is replacing a GNS530/W or GNS430/W that had previously been connected to a GAD42, then no action is required since the configuration is already saved in the GAD42.

If this is a new installation of an IFD5XX/4XX (i.e. not replacing an existing GNS530/W or GNS430/W) or if the GAD42 had to be replaced for service, then the GAD42 must be configured via a manual strapping method as described in Garmin P/N 190-00159-00 GAD42 Installation Manual, Section 5.1.

If the IFD5XX/4XX displays a “GAD 42 Needs Service” message, return the GAD 42 unit to the manufacturer.

7.5.15 Other System Diagnostics Pages

The IFD provides other miscellaneous diagnostics pages that are shown here for reference. Each page variant is accessed by pressing the L4 LSK labeled “Info”.

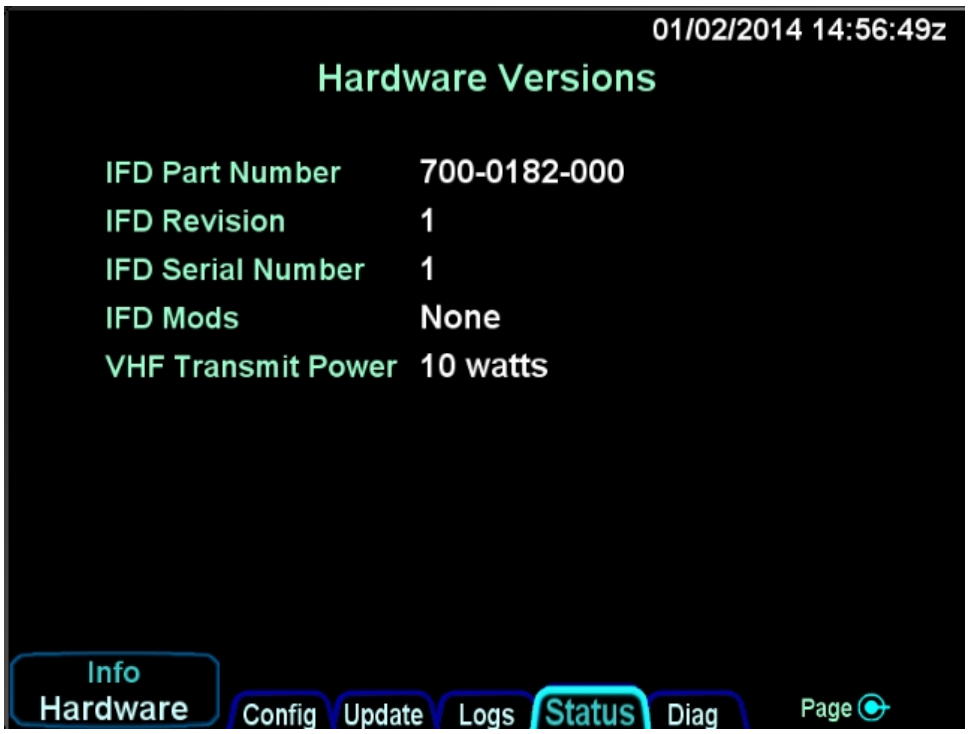


Figure 23: Hardware Version Page

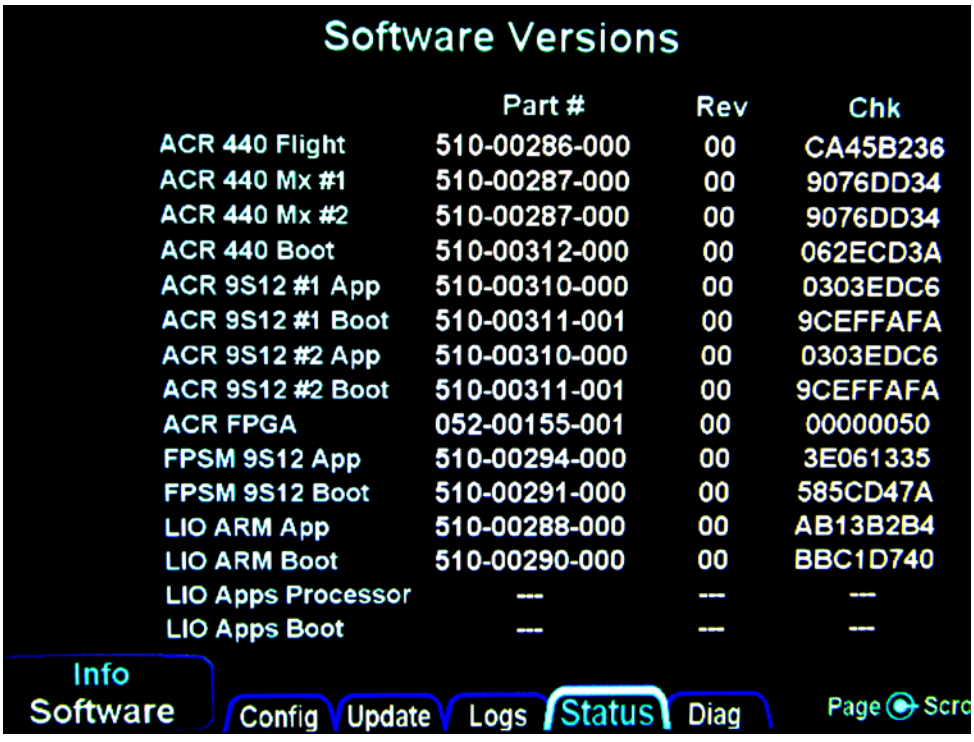


Figure 24: Software Version Page

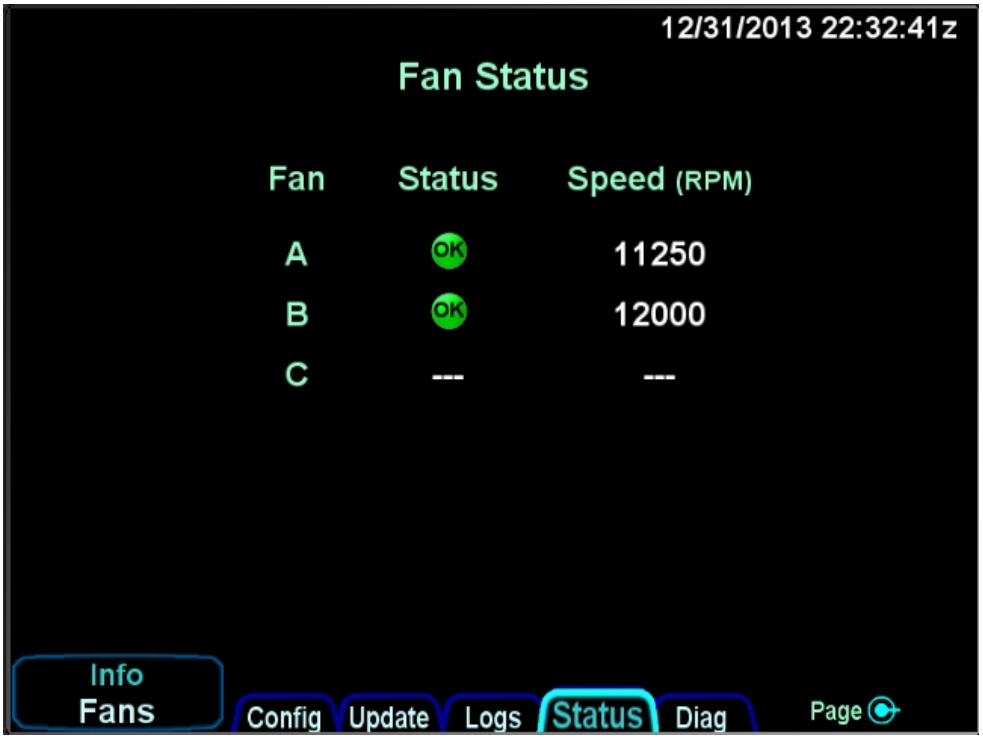


Figure 25: Fan Status Page

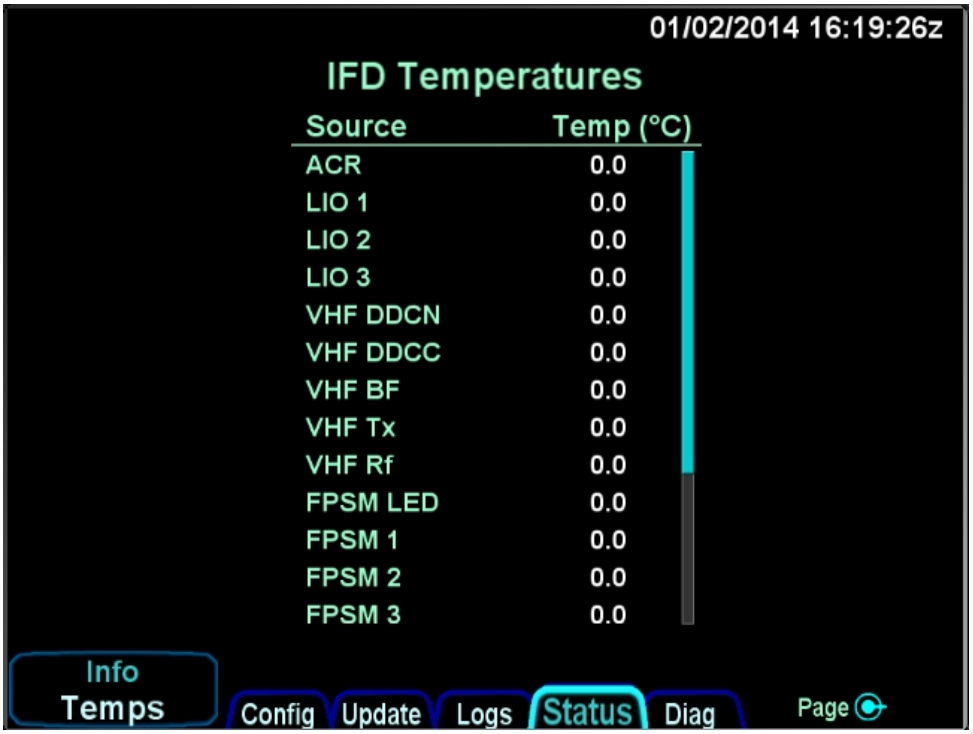


Figure 26: IFD Temperature Status Page

The pages on the "Diag" tab are for Avidyne Service Center diagnostics purposes and are not described in this manual.

7.6 Checkout

After configuring the IFD5XX/4XX, the following post-installation tasks should be performed.

7.6.1 Database Check

Verify the Navigation, Chart, and Obstacle databases are up-to-date. If the databases need to be updated, reference the IFD5XX/4XX Pilot's Guide or Section 10.1 for update procedures.

7.6.2 Airplane Flight Supplement Check

Complete and install the IFD5XX/4XX Airplane Flight Manual Supplement in the aircraft's Flight Manual or Pilot's Operating Manual.

7.6.3 Instructions for Continued Airworthiness

Complete and install the IFD5XX/4XX Instruction for Continued Airworthiness in the aircraft maintenance records.

7.6.4 Aircraft Weight and Balance

Update the Aircraft's Weight and Balance in the aircraft records.

For those installations where an IFD5XX is replacing a GNS530 or GNS430 (any variant), since the IFD5XX/4XX is within 5% of the weight of the removed GNS530/430 (less than 1 pound difference), no new weight and balance must actually be performed according to AC 43.13-1B Change 1 Acceptable Methods, Techniques, and Practices Aircraft Inspection and Repair (Chapter 10) and AC 120-27E Aircraft Weight and Balance Control.

7.6.5 Electrical Load Analysis

Verify the aircraft's electrical load is within limits, reference Section 4.10.

7.6.6 GPS Signal Acquisition

After installation, position the aircraft outside with clear unobstructed view of the sky. Verify the IFD5XX/4XX acquires and calculates a GPS position. Verify no interference from other aircraft equipment is observed (e.g. TCAS, SATCOM, etc)

7.6.7 VHF COM Checkout

7.6.7.1 VHF COM Interference

After installation, the VHF Communication should be tested. In 1 MHz increments between 118-136.000 MHz, transmit for 35 seconds on each frequency. Verify, no interference between VHF Comm and other aircraft systems.

Evaluate the GPS system on the following frequencies. The GPS system should not experience complete signal loss on when transmitting on the VHF Comm.

25 kHz channels

- 121.150

- 121.175
- 121.200
- 131.250
- 131.275
- 131.300

8.33 kHz channels

- 121.185
- 121.190
- 130.285
- 131.290

7.6.7.2 VHF Antenna Checkout

Verify the VSWR is less than 2:1 through the entire frequency band. This can be verified using an aviation navigation test set (e.g. IFR 4000 or similar test equipment). VSWR higher than 2:1 will have reduced VHF Communication performance. If >2:1 VSWR, verify in-flight performance is acceptable.

7.6.7.3 Receiver/Transmitter Operation

Test VHF Com's ability to receive and transmit to another VHF Com station. Verify using a low/middle/high frequency.

7.6.8 VOR/LOC/ GS Checkout

If installed, test the VOR/LOC/GS system using a local frequency or test set. Verify the OBS (selected course) is functioning, CDI/HSI/PFD is indicting correctly, and NAV audio is received. Also, verify no EMI on the VOR/LOC/GS system.

7.6.9 Autopilot

If the IFD5XX/4XX can be coupled to an Autopilot system, verify the Autopilot is operating correctly with the IFD5XX/4XX as the navigation source.

7.6.10 Magnetic Compass Swing

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

7.6.11 IFD5XX/4XX Bezel and Display Lighting

Verify the Bezel and Display Lighting for the IFD5XX/4XX can be set to an appropriate level for Day and Night flight conditions. Likewise, verify any external HSI/CDIs can be properly adjusted for day and night lighting conditions.

7.6.12 External Annunciators and Switches

If installed, verify external annunciators and switches are operating correctly. Verify the external annunicator lighting can be adjusted for Day and Night flight conditions (Bright and Dim setting, but never off). Verify all external switches are functioning correctly.

7.6.13 Placards

Verify all circuit breaker(s), switches, and limitation placards (if needed) are installed.

If required per Section 2.4.1, there must be a placard in clear view of the pilot that specifies the kind of operations to which the operation of the airplane is limited or from which it is prohibited under 14 CFR 23.1525. The limitation placard must be installed in a conspicuous place in the Pilot's field of view. The placard text height must be a minimum of 0.10 inches in contrasting color to the surrounding area. The text must be high-quality solid-color font of at least 300 DPI (dots per inch). The placard must not be easily disfigured, erased, or obscured.

7.6.14 Self-test Page

For the duration that the notification of legal rights page is displayed during normal power up on the ground, all remote annunciator lamps are lit up and the system generates a specific set of electrical outputs for the purpose of self-test and troubleshooting. Table 103 below defines the outputs transmitted during this time.

Parameter	Self-test Value
Course Deviation	Half-scale left deviation, TO indication, flag stowed
Glideslope/Vertical Deviation	Half-scale up deviation, flag stowed
Annunciators	All on
Bearing to Waypoint (RMI)	135°
Selected Course (OBS)	150° when interfaced to an HSI with course pointer
Desired Track	150°
Distance To Go	10.0 NM
Time To Go	4 minutes
Active Waypoint	"AVDYN"
Groundspeed	150 knots
Present Position	N39°04.05', W094°53.86'
Waypoint Alert	Active
Phase of Flight	Enroute
Message Alert	Active
GPS Integrity	Invalid
Roll Steering (if applicable)	Flight Director commands 0° bank (level flight) for 5 seconds; commands increasing right bank at 1°/second for 5 seconds; commands 5° right bank for 5 seconds; commands decreasing right bank at 1°/second for 5 seconds, until command is 0° bank again. This cycle repeats continuously.

Table 103: Self-test Output

7.6.15 Dual IFD5XX/4XX Configuration

If installing two IFD5XX/4XX units, verify duplex communication between the two units. Reference Section 3.3.8 and 7.3 for limitations and configuration.

7.6.16 AHRS/IRU Interface Check

Verify the IFD5XX/4XX is receiving heading information from an external source. This can be verified on the Main Input Page in maintenance mode, reference Section 7.5.5. If power is removed from the external heading source, the Main Input Page will display dashed lines for heading. Note: If the IFD5XX/4XX is connected to a Primary Flight Display, it must be turned off before performing this check.

7.6.17 ADS-B Output

If the IFD5XX/4XX is connected to ADS-B out transponder, verify the position information transmitted is correct per 14 CFR 91.227. Also, if using the IFD5XX/4XX for transponder Mode-C altitude information, verify the transponder is using the correct altitude source from the IFD5XX/4XX, reference Section 6.12.

8. Functional Verification - Flight

The IFD5XX/4XX must be flown to verify the installation is operating properly. The following items should be verified in flight to verify the IFD5XX/4XX function.

8.1 GPS Verification

Verify the following in flight:

- Verify the GPS reception during all phases of flight. (e.g., bank angles of up to 30 degrees and pitch angles associated with take-off, departures, landing and missed approaches)
- Verify the following GPS/FMS operation:
  - Hold at a designated waypoint
  - Intercept and track to or from a waypoint on a selected course
  - Waypoint sequencing
  - Verify the overall operation of procedures or paths
  - Selection of an approach
- Evaluate the display of navigation parameters on the flight instruments (PFD, HSI, CDI) is correct
- Verify annunciation is correct and in the Pilot's field of view

8.2 VHF COM Flight Check

Verify inflight the IFD5XX/4XX VHF communication transceiver in the high, mid, and low frequency ranges. Verify the VHF at least 50 nautical miles and at an appropriate altitude.

8.3 VOR Flight Checks

Verify inflight the IFD5XX/4XX VHF navigation receiver by tuning a local VOR station within 50 nautical miles. Verify the audio tone is heard and course deviation information and flag information is correct.

8.4 ILS Flight Checks

Verify inflight the IFD5XX/4XX VHF navigation receiver by tuning an airport with an ILS. Verify the NAV ID audio tone is heard and the course deviation and flag information is correct.

8.5 Autopilot Checks

Verify the IFD5XX/4XX interface to the autopilot is correct. Reference the Autopilot Manual installation/maintenance manual for test procedures. Verify the following functions:

- Evaluate the steering response while in Flight Director (FD) and when the autopilot is coupled
- Execute several fly-by-turns with varying wind conditions for the FD and autopilot

- Evaluate the autopilot's response to a GNSS fault (e.g., pulling the IFD5XX/4XX Circuit Breakers)

8.6 Sensors Verification

Verify the IFD5XX/4XX interface to other aircraft sensors are operating correctly (e.g., Traffic, Lightning, Weather, etc).

9. Glove Validation Procedures

Many types of gloves can be used with the IFD touch screen display. The key parameter for the effectiveness of a glove with touch screen is the distance between the finger and the glass and to a lesser extent, the type of material separating the skin from the glass. The thinner the glove or the more compatible the material (e.g. leather, fine cotton, etc), the greater the likelihood of success will be. Likewise, the more surface area that comes in contact with the glass, the greater the success may be. Each glove must be qualified for compatibility with the display and those glove calibration procedures (specific to the glove and the pilot combination) are immediately below. If all verification steps are marked as a "Pass" then the glove/pilot combination is considered to be a qualified pair.

Pilot Name		
Description of Glove		
Verification Step	Circle	one
Touch the standby frequency window and verify a virtual keyboard is displayed.	Pass	Fail
Type 121.7, press the "ENTER" button on the virtual keyboard and confirm 121.700 is the displayed frequency in the #1 Standby Com window.	Pass	Fail
Press each of the page tabs displayed on the present page and verify the IFD changes to the selected tab.	Pass	Fail
With the FMS FPL tab displayed, use touch to type in a typical flight plan and verify that all entries were recognized.	Pass	Fail
With the Map page and tab displayed, attempt to pan the map.	Pass	Fail
With the Map page and tab displayed, attempt to pinch zoom (in or out) the map to produce a range change.	Pass	Fail
With the Map page and tab displayed, attempt to graphically flight plan ("rubber band") and verify the intended change was made.	Pass	Fail
Press the "Freq" function key on the bezel and then double tap a frequency from the list to place it into the #1 standby slot.	Pass	Fail

Table 104: Glove Validation Procedure

10. Software and Database Update Procedures

10.1 Data Updates

Periodic updates to navigation data, charts data, and obstacle data are all made through the USB port on the front of each IFD. Updates must be performed in accordance with 14 CFR Part 43, Appendix A (c) and FAA AC 20-153( ) paragraph 11.

The table below summarizes the databases update periods:

Database	Update Cycle	Comments & Source
Chart Data	14 days	Expiration watermark displayed after 14 days indefinitely until data updated (Jeppesen)
Nav Data	28 days	Airport, airway, navaid, airspace, and FMS data (Jeppesen)
Obstacle Data	56 days	Displayed on map and used for TA and FLTA functions (Jeppesen)
Terrain Data	As required	Displayed on map and used for TA and FLTA functions. The IFD is shipped from the factory with this database already loaded and updates are anticipated to be a rare occurrence.

Table 105: Database Update Cycle

In the event the terrain data ever needs updating, this is also performed through the front panel USB port.

Use one of the formatted fobs supplied by Avidyne (marked by the Avidyne logo printed on one side). In the event one of those fobs are not available, either call Avidyne for a replacement fob (a nominal fee will be charged) or purchase a replacement through other means. Acceptable alternative USB drives are FAT32 format, between 1-16 GB, and manufactured by WINTEC Filemate. (http://www.wintecind.com/features/FileMate/USBFlashDrives.html).

To perform a data update, ensure the data to be updated is placed onto one of the acceptable USB fobs. Carefully insert the USB fob into the IFD USB slot while power is turned off. When the IFD is powered up, select the “Setup” tab of the SYS page and then pick the “Update Databases” LSK.

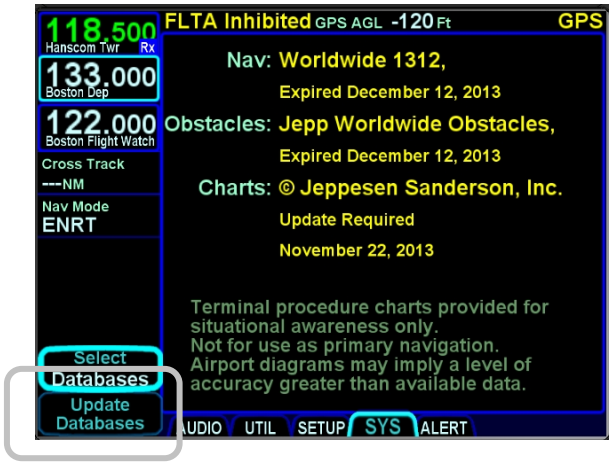


Figure 27: Update Databases LSK

You will be prompted to "Confirm" or "Cancel". Assuming you selected "Confirm", you should see a dialog box presented in the middle of the screen and all uploadable files on that fob will be individually listed and check marks may be visible next to each file name.

Figure 28: Confirm and Cancel LSK

Use the "Select All", "Un-select All" LSKs and the IFD knob as required to ensure check marks are associated with all the desired files to upload to the IFD. Now press the "Proceed" LSK to begin the file upload.

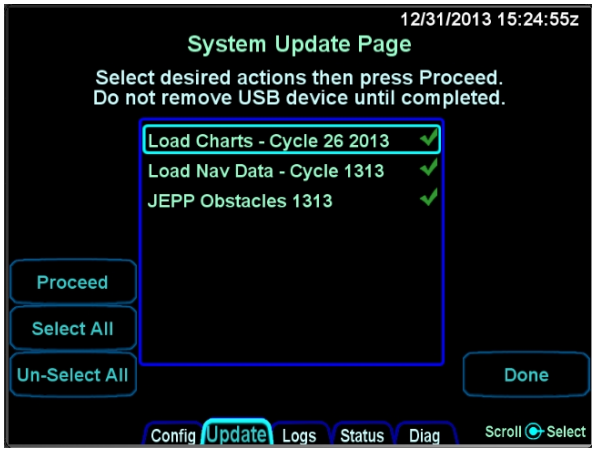


Figure 29: LSK Options

A progress bar will be presented to help provide an idea of how much longer the upload will take.

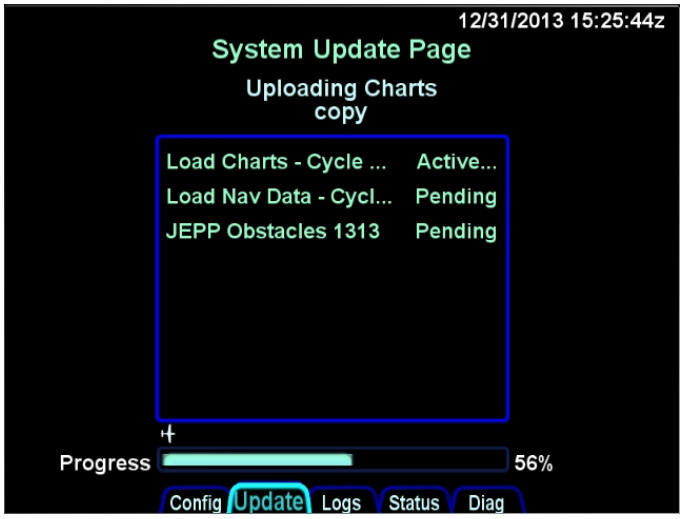


Figure 30: Progress Bar

Typical upload times are:

- Worldwide Obstacles (1.5 MB) – 5 sec
- Eastern US Charts (100 MB) – 3 min
- US Charts (180 MB) – 5 ½ min
- Worldwide Charts (430 MB) – 13 min
- US Nav Data (8 MB) – 3 ½ min
- Europe Nav Data (10 MB) – 2 ½ min
- Australian Nav Data (1.5 MB) – 30 sec
- Worldwide Nav Data (15 MB) – 7 Min

For multiple IFD installations, the database uploads must be performed individually for each IFD to be updated.

Due to some of the upload durations, Avidyne recommends creating a fob for each IFD to be updated so that the updates can happen in parallel and not stacked serially, thereby extending the overall time to accomplish a full update.

A clear indication is presented when the data uploads have been completed. Likewise, if the USB fob was removed prior to finishing the data upload, an error message will be presented and the entire process will need to be manually restarted once the fob is reinserted in the IFD.

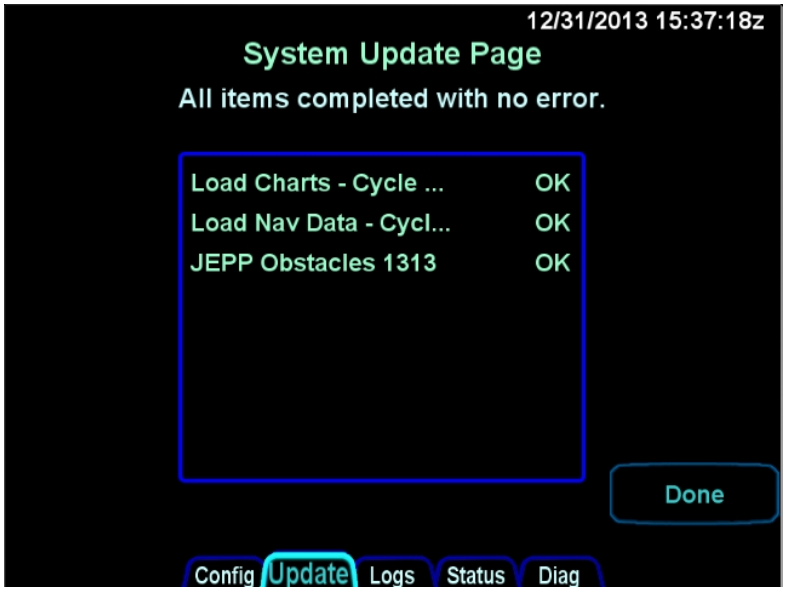


Figure 31: Update Complete Indication

When you are all done press the "Done" LSK, which will restart the IFD into flight mode. Remove the USB fob and perform a normal start up. It is highly recommended to verify the data was updated from the "Setup" LSK of the SYSTEM tab on the AUX page.

If an IFD is in normal operating mode (not maintenance mode), the presence of a USB fob is ignored and these pages cannot be accessed.

10.2 Datalogs Download

There is extensive data-logging that is automatically done on all IFDs. These datalogs can be accessed post-flight and used for a number of purposes.

There are five types of datalogs employed in the IFDs:

- **System Log –** This log provides an in-depth record of the navigation state. From this log, you can re-create many aspects of the FMS output and IFD state. It logs at a rate of approximately 1Hz;
- **Flight Log –** This log provides a detailed record of your aircraft state as measured by the various IFD sensors. It logs at a rate of approximately 5Hz;

- **Engine Log –** This log provides details on fuel flow sensor data (if configured). It logs at a rate of approximately ¼ Hz;
- **Event Log –** This log contains miscellaneous data such as all alerts, keystrokes, system status and error messages, etc. It is designed to be diagnostics log for Avidyne Service Center technicians and not expected to be used by owners/operators. It logs at an on-condition rate;
- **Voltage Log –** This log contains internal diagnostic data such as the voltages and currents on sub-system boards, temperatures and internal fan status. It logs at a rate of approximately 1Hz.
- **Download Configuration Info -** This log contains the system configuration for the unit.
- **GPS Log** - This log contains detailed internal state data for the GPS.

The "Download Logs" LSK is presented when "Software" is selected on the SYS tab and the system is not in-air. When the "Download Logs" LSK is pressed, a pair of Confirm/Cancel LSKs are presented. Selecting Confirm will launch the Maintenance Mode of the IFD5XX/4XX. From Maintenance Mode, press the right side of the AUX page function key to select the "Logs" tab. Ensure a USB fob is inserted in the IFD front bezel USB port and then use a combination of the left side LSKs and the bottom right IFD knob to select the desired combination of logs and type of action to perform.

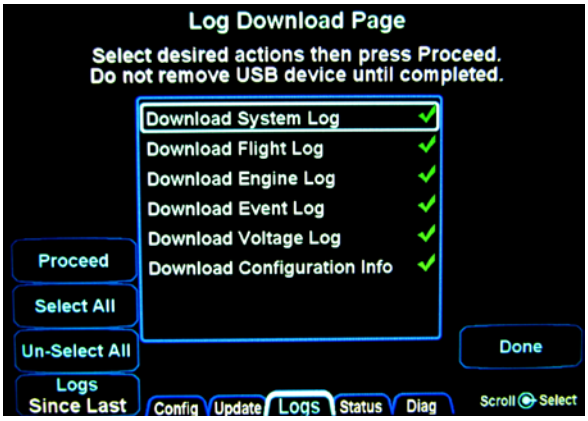


Figure 32: Datalogs Download Page

Pressing the "Proceed" LSK will immediately start downloading all logs listed in the center of the page with green check marks adjacent to them. If only a subset of the logs are to be downloaded, use the "Un-Select All" LSK to deselect all logs and then use the bottom right IFD knob to highlight the desired log and push in to generated a green check mark.

The "Logs" LSK on that Maintenance Mode page provides two options for downloading this data via dedicated LSKs. The first option ("Full") allows a download of all data logs onto the USB fob. The second option ("Since Last") downloads the data logged since the last time a download was completed. Since the logs contain a large amount of data, the second option will be a quicker option in almost every case.

Download times are highly dependent on the number and types of logs being downloaded and how it's been since the last download. Times can range from a few seconds to more than 15 minutes. The more often logs are downloaded, the shorter the download times will be.

In order to provide an indication of download progress, a progress bar will be presented with both a symbolic aircraft indicating download in progress and a % complete estimate. The files to be downloaded can have one of several states – "OK", "In progress…", "Pending", "Skipped", "Active", "Failed".

When downloaded to the USB fob, the data logs will be saved in .csv files. This can be imported into newer versions of Microsoft Excel into a table format. The data can then be plotted or analyzed by several 3rd party tools. Note that files can easily contain 50MB or more of data.

10.3 Software Update

The following procedures should be followed when performing optional or mandatory software change to the IFD System:

1. Acquire the software image and associated loading procedure from the manufacturer.
2. Verify the software part number configuration before and after maintenance is performed on the airborne equipment using the loading procedure instructions.
3. It is the responsibility of maintenance personnel to ensure the identified part is recorded in the necessary maintenance logs.
4. It is the maintenance personnel's responsibility to ensure that the software part identification has been logged. When new software is loaded into the unit, the correct software part number should be verified according to the instructions accompanying the software change before the unit is returned to service. Hardware versions are identified on the data label by brackets following the main part number.

Changes to software part number, version, and/or operational characteristics should be reflected in the Operator's Manual, Aircraft Flight Manual, Aircraft Flight Manual Supplement, and/or any other appropriate document.

11. Periodic Maintenance

The IFD5XX/4XX does not require any periodic or preventative maintenance. Maintenance on the IFD5XX/4XX is on condition.

11.1 Equipment Calibration

The IFD5XX/4XX has no required servicing tasks.

11.2 VOR Checks

Every 30 days, verify the limits of the VOR per 14 CFR §91.171. Only required for IFR operations.

11.3 Cleaning

The front display and bezel may require cleaning periodically, reference Section 13.

12. Factory Service Policies and Procedures

12.1 Technical Support

Avidyne's website contains information that may assist the operator and installer with questions or problems with their Avidyne IFD5XX/4XX. Technical support questions may be submitted, via the following:

- Email: techsupport@avidyne.com
- Fax: 781-402-7599
- Voice: 1-888-723-7592
- Internet: www.Avidyne.com

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

- Monday through Friday: 8:00 AM to 5:00 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.

For After Hours Technical Support, via the following:

- AOG Support: 877-900-4AOG (4264)

12.2 General Service Procedures

Repair of the IFD5XX/4XX are performed at authorized Part 145 service centers and the Avidyne factory.

Prior to returning a unit for service, contact Avidyne at 1-888-723-7592 to obtain a Return Merchandise Authorization (RMA) number.

When calling or emailing for product-related help, please have the following information available:

1. Customer Name/Account Information

2. IFD5XX/4XX Serial Numbers either read it from the label physically attached to back of IFD (need to partially remove the IFD to see it), or get it from the aircraft maintenance records.

3. IFD5XX/4XX Software Part Numbers: Press the "SYS" page function key and then tab over to the "Setup" tab. Record the "Software Version" and the "Flight Software Part Number". Also make a note of any other yellow text on that page.

4. Be prepared to download the aircraft flight logs and email/transmit them to Avidyne Customer Service.

13. Bezel and Display Cleaning

If the IFD 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 a 1:1 ratio of de-ionized water and isopropyl alcohol (IPA). Use caution, as it may be flammable. Always apply the cleaning solution directly on the cloth. Never spray cleaner directly on the screen.

In general, isopropyl alcohol is a safe and effective cleaner. Methanol and most acidic solutions can be toxic or damaging to glass coatings if misused.

Excessive or unnecessary cleaning should be avoided to prevent damage to the coated optical filter surfaces. Never allow excess amounts of cleaning agents to dry if they have formed into pools, streaks or droplets to help avoid spotting of the glass surface.

The use of any 3rd party screen protector, especially those that adhere directly to the IFD display glass, is not endorsed by Avidyne due to the touch-screen nature of the display and may void the warranty for any display related issue.

Appendix A: Environmental Qualification Form

Environmental Tests	RTCA/DO-160G Section	Test Category
Temperature and Altitude	4.0	
Low Temp	4.5.2	Equipment qualified to Category C1
High Temp	4.5.3 & 4.5.4	Equipment qualified to Category C1
In-Flight Loss of Cooling	4.5.5	Equipment qualified to Category W
Altitude	4.6.1	Equipment qualified to Category C1
Decompression	4.6.2	Equipment qualified to Category A1
Overpressure	4.6.3	Equipment qualified to Category A1
Temperature Variation	5	Equipment qualified to Category B
Humidity	6	Equipment qualified to Category A
Operational Shocks & Crash Safety	7	Equipment qualified to Category E
Vibration‡	8	Equipment qualified to Category S, Curves B and M, Category U, Curve G
Explosive Atmosphere	9	Category X, no test performed
Waterproofness	10	Category X, no test performed
Fluids Susceptibility	11	Category X, no test performed
Sand and Dust	12	Category X, no test performed
Fungus Resistance	13	Category X, no test performed
Salt Spray	14	Category X, no test performed
Magnetic Effects	15	Equipment qualified to Class Z
Power Input	16	Equipment qualified to Category B
Voltage Spike	17	Equipment qualified to Category A
Audio Frequency Conducted Susceptibility	18	Equipment qualified to Category B
Induced Signal Susceptibility	19	Equipment qualified to Category ZC
Radio Frequency Susceptibility	20	Equipment qualified to Category W (conducted)/WR (radiated)
Emission of Radio Frequency Energy	21	Equipment qualified to Category M
Lightning Induced Transient Susceptibility	22	Category B4HZL4 (Power) and B3K4L4 (All other I/O)
Lightning Direct Effects	23	Category X, no test performed
Icing	24	Category X, no test performed
Electrostatic Discharge	25	Equipment qualified to Category A
Fire and Flammability	26	Category X, no test performed
‡ Avidyne recommends the following for helicopter installations: Plug & Play VFR Installations – Installer has option to use existing tray; New VFR Installations – Installer should use Avidyne's Helicopter Tray, reference Table 23 or Table 24; All IFR Installations – Installer must use Avidyne's Helicopter Tray, reference Table 23 or Table 24.		

Table 106: Environmental Qualification Form - IFD5XX/4XX

Appendix B: STC Permission

Avidyne Corporation hereby grants to all National Aviation Authorities (FAA, CAA, JAA, etc) approved installers the use of data from STC SA00343BO to install the Avidyne IFD5XX/4XX System. This also includes any international validations of the STC (e.g. EASA, ANAC, etc). Copies of the STC data are available on the Avidyne website Technical Publications page or upon request. The latest data revisions are listed in Avidyne 700-00182-XXX/700-00179-XXX Master Document List, AVIFD-306.

Installers must abide by the conditions and limitations stated in both the STC and in the Installation Manual in order to maintain compliance. The use of this data by itself does not constitute installation approval.

Appendix C: Mechanical Drawings

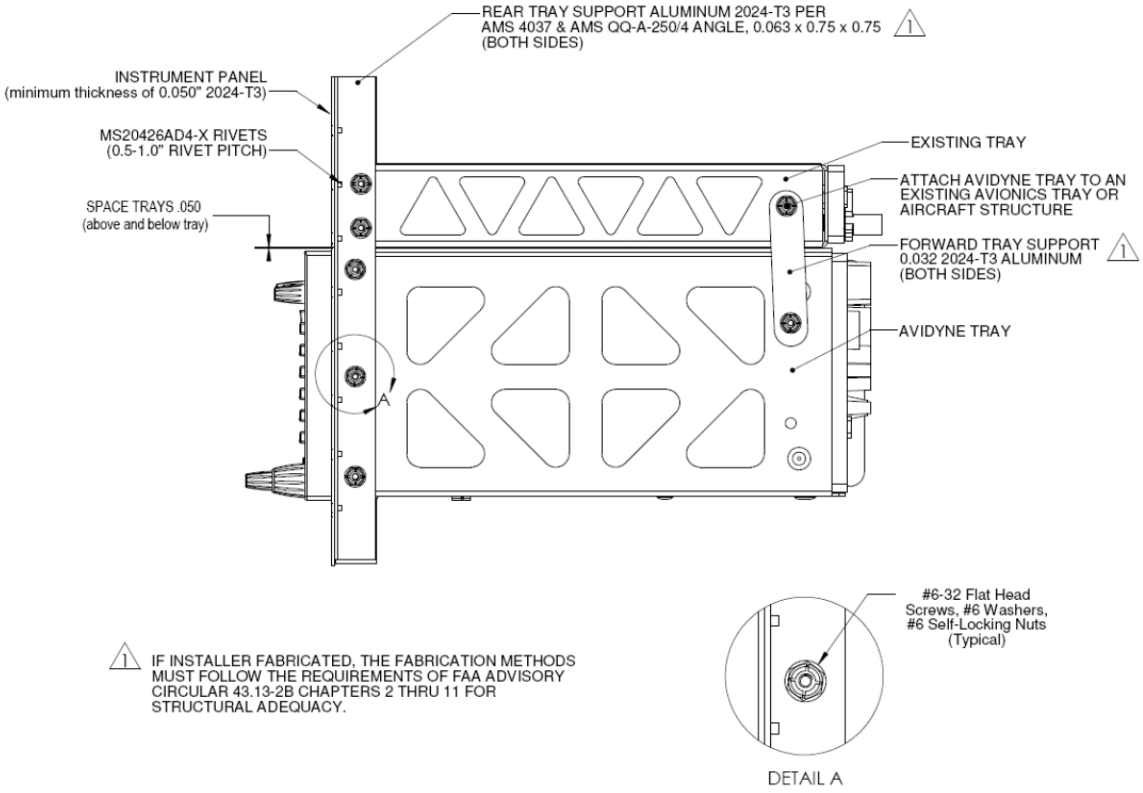


Figure C - 33: IFD5XX Tray Installation

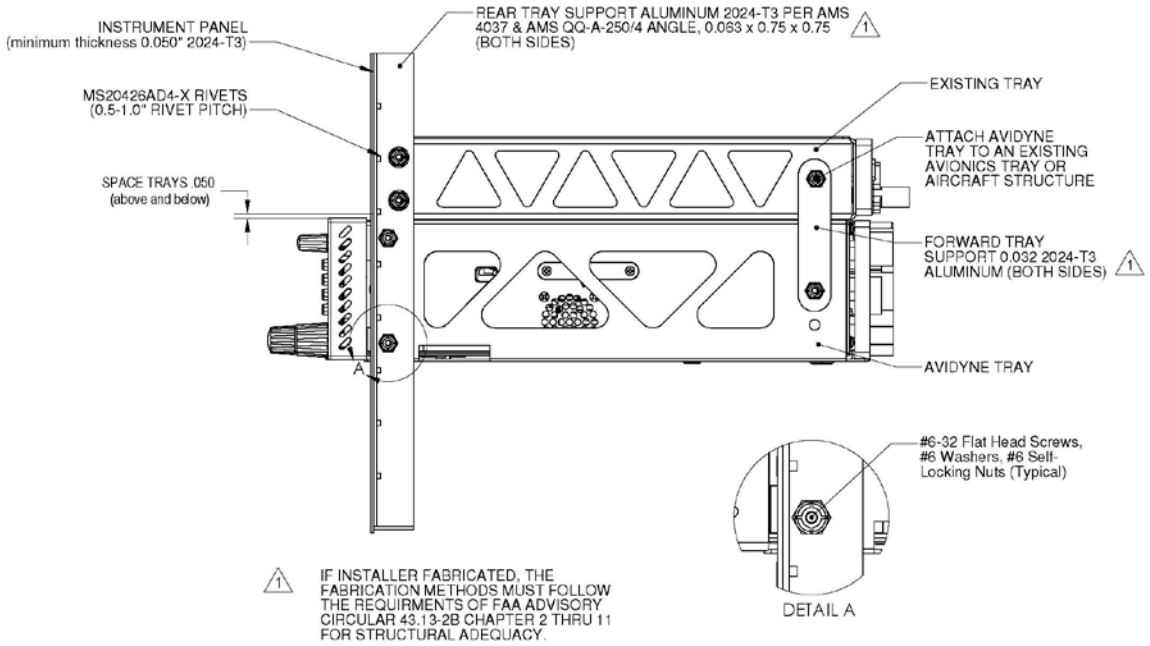
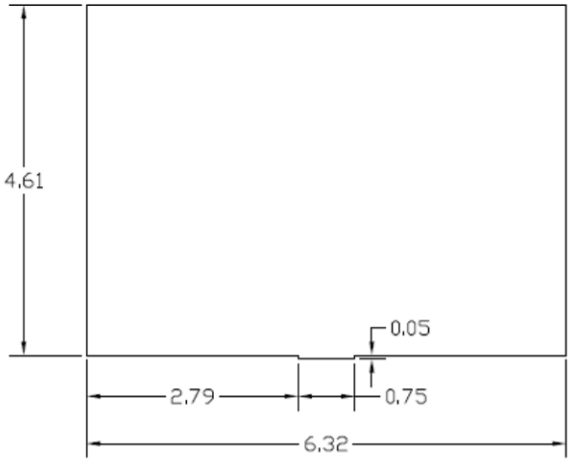


Figure: C - 34: IFD4XX Instrument Panel Cutout

INSTRUMENT PANEL CUTOUT
UNIT INSTALLED FROM THE FRONT OF INSTRUMENT PANEL



INSTRUMENT PANEL CUTOUT
UNIT INSTALLED FROM THE REAR OF THE INSTRUMENT PANEL
MAXIMUM PANEL THICKNESS .125 INCHES

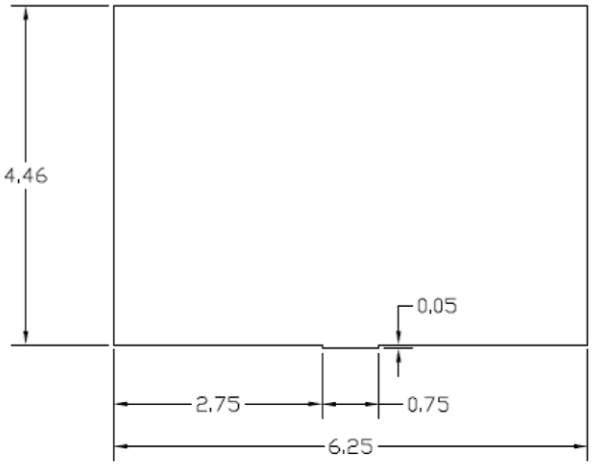
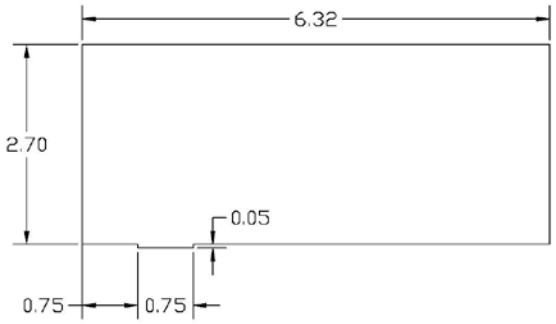


Figure: C - 35: IFD5XX Instrument Panel Cutout

INSTRUMENT PANEL CUTOUT
UNIT INSTALLED FROM THE FRONT OF INSTRUMENT PANEL



INSTRUMENT PANEL CUTOUT
UNIT INSTALLED FROM THE REAR OF THE INSTRUMENT PANEL
MAXIMUM PANEL THICKNESS .125 INCHES

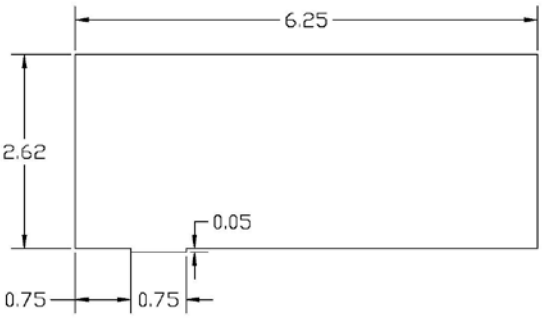


Figure C-36: IFD4XX Instrument Panel Cutout

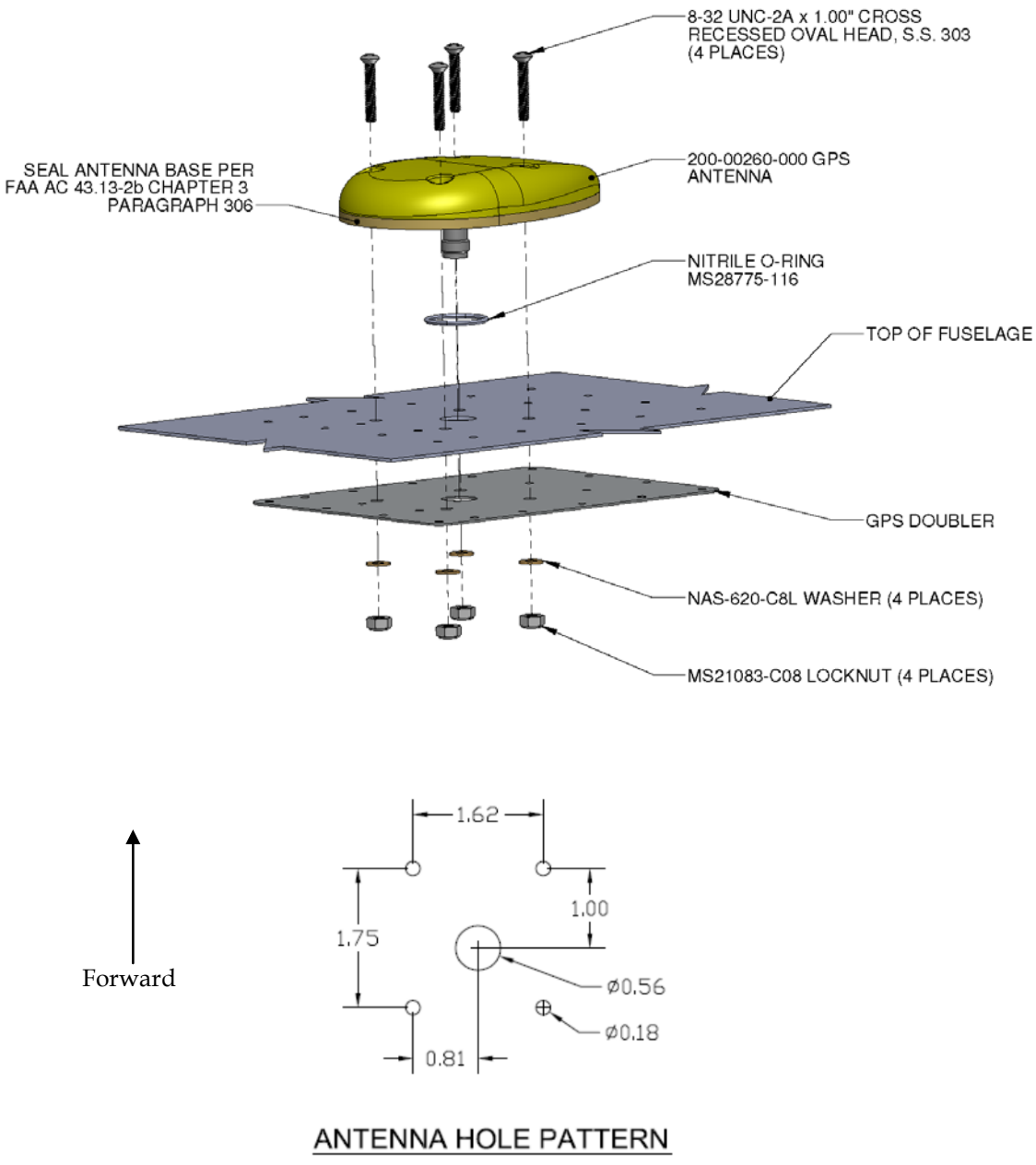
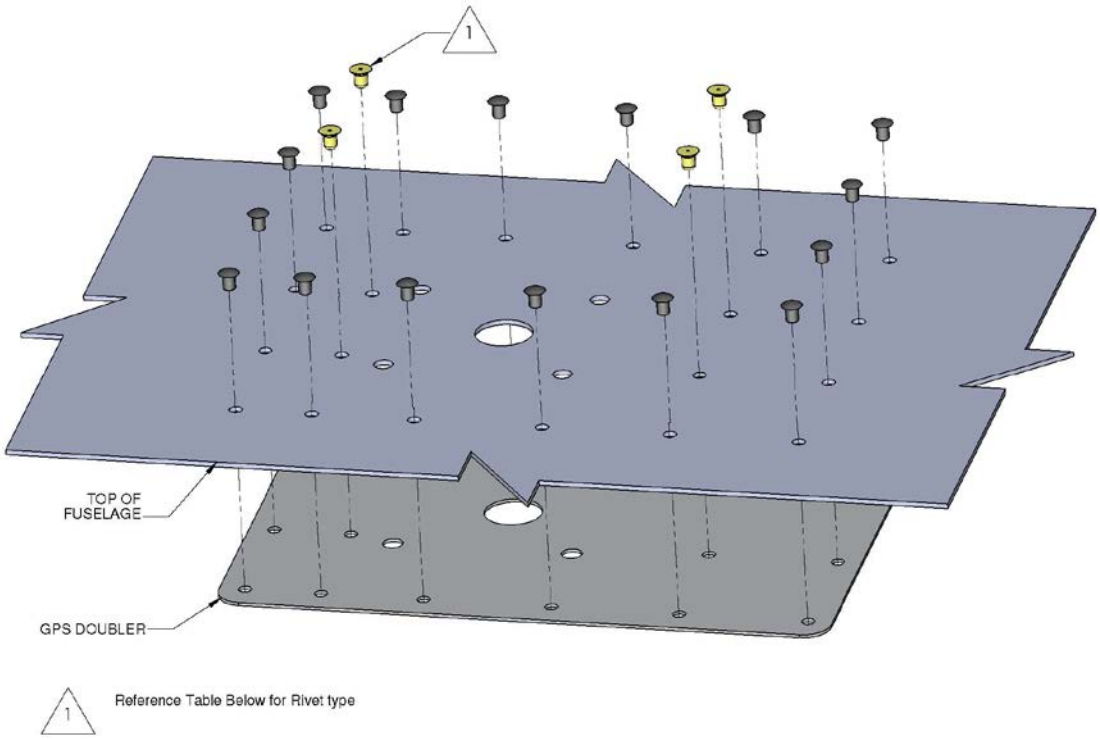


Figure C - 37: GPS Antenna Installation



Fuselage Skin Thickness	*Adjacent Structure ‡ Rivet Type*	*Doubler Thickness*	*Outer Rivet Row in Doubler*	*Inner Four Rivet in Doubler*
0.016" - 0.025"	Dimpled skin / Countersunk Rivets	0.020"	MS20426AD3 (Double Dimple)	MS20426AD3 (Double Dimple)
0.016" - 0.025"	Protruding Head Rivets	0.020"	MS20470AD3	MS20426AD3 (Double Dimple)
0.032" - 0.025"	Countersunk Skin / Countersunk Rivets	0.032"	NAS1097AD4 (Countersunk)	NAS1097AD4 (Countersunk)
0.032" - 0.050"	Protruding Head Rivets	0.032"	MS20470AD4	NAS1097AD4 (Countersunk)

Table 107: Rivet/ Doubler Selection

‡ Rivet type is dependent on the type of rivets in the adjacent fuselage structure. If the adjacent rivets in the structure around the bay selected for the doubler installation are protruding head type, install MS20470AD rivets in the outer row of the doubler. If the adjacent rivets are countersunk or dimpled, install either MS20426AD or NAS1097AD rivets per the table above.

Figure C - 38: GPS Antenna Doubler Installation

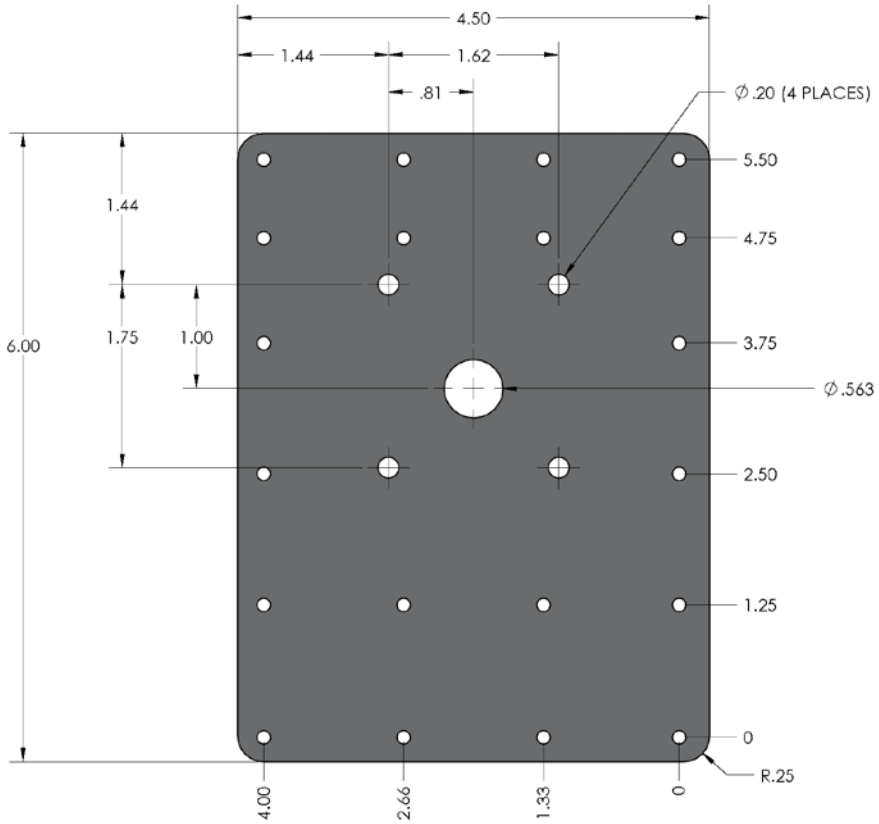


Figure C - 39: GPS Antenna Doubler

Appendix D: Electrical Interface Drawings

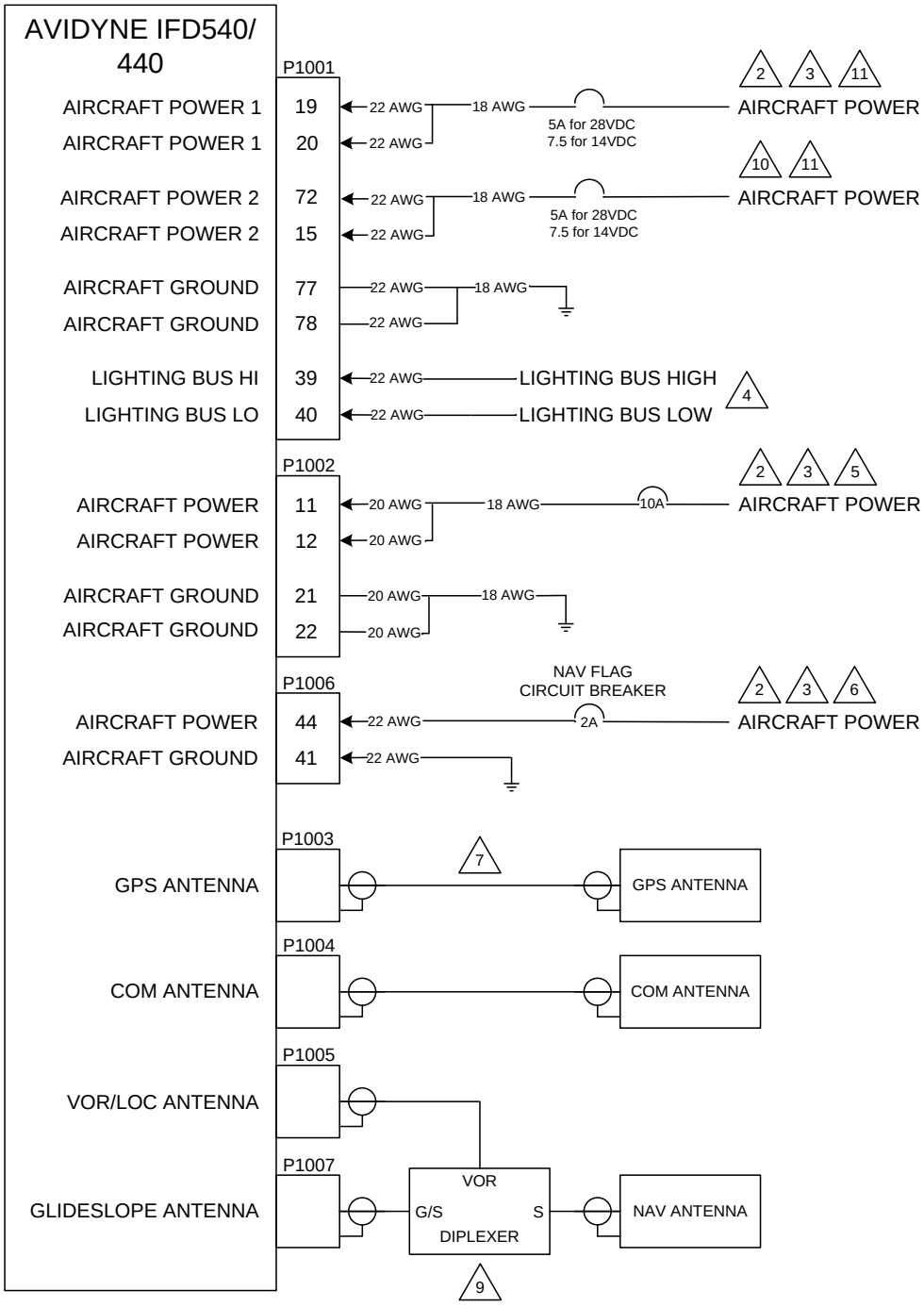


Figure D - 1: Lighting, Power, and Antenna Interconnect

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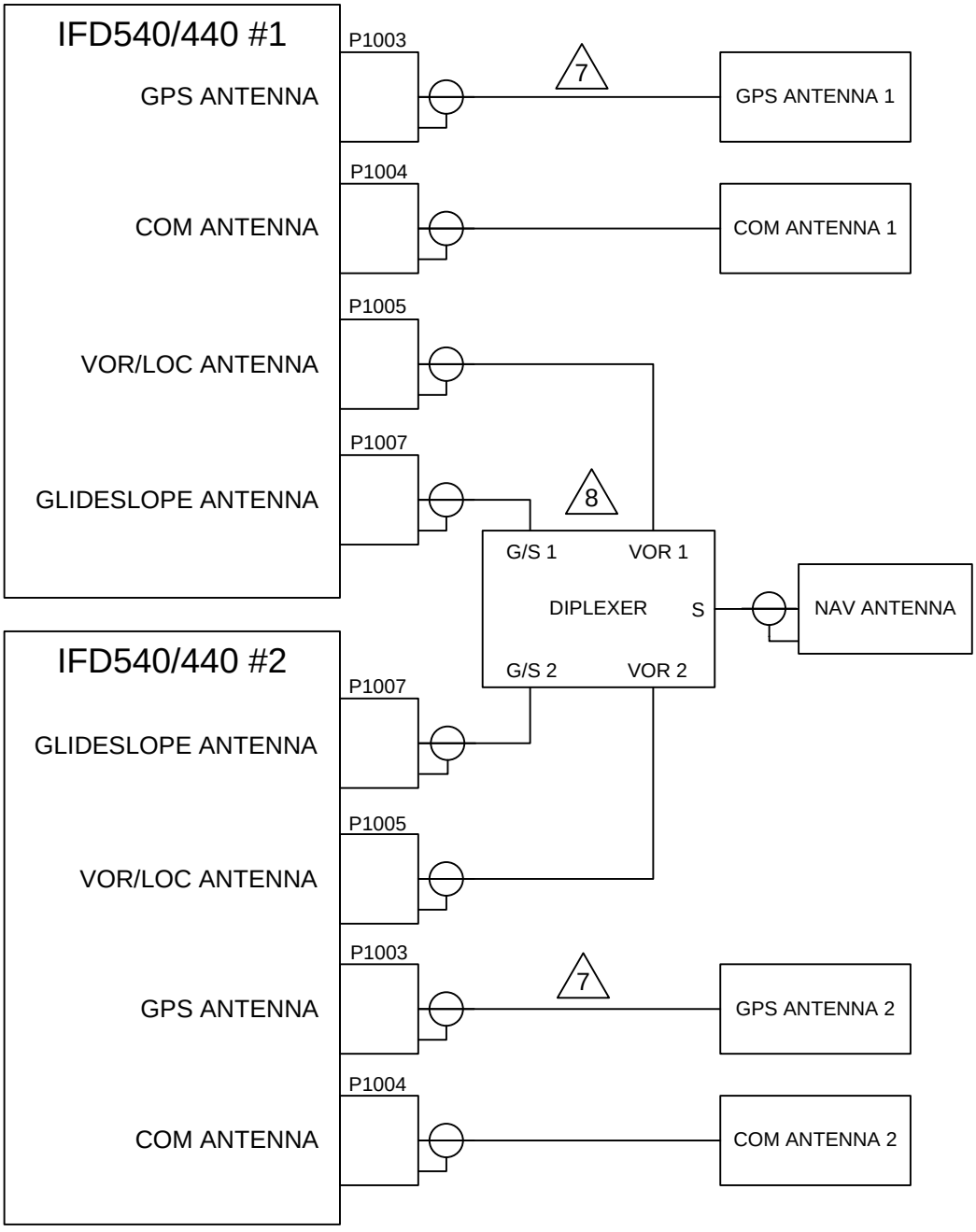

IFD540/440 #1
P1003
GPS ANTENNA
7
GPS ANTENNA 1
P1004
COM ANTENNA
COM ANTENNA 1
P1005
VOR/LOC ANTENNA
P1007
GLIDESLOPE ANTENNA
8
G/S 1
VOR 1
DIPLEXER
S
NAV ANTENNA
G/S 2
VOR 2
IFD540/440 #2
P1007
GLIDESLOPE ANTENNA
P1005
VOR/LOC ANTENNA
P1003
GPS ANTENNA
7
GPS ANTENNA 2
P1004
COM ANTENNA
COM ANTENNA 2

NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. IF AIRCRAFT HAS MULTIPLE POWER BUSSES, IT IS RECOMENDED THAT IFD540/440 POWER CONNECTIONS BE CONNECTED AS DESCRIBED IN SECTION 4.

3. AIRCRAFT POWER INPUT TO THE IFD5XX/4XX MAY BE 9-33 VDC.

4. THE IFD540/440 SHOULD BE CONFIGURED FOR THE CORRECT LIGHTING BUS VOLTAGE POST-INSTALLATION. NO DAMAGE WILL OCCUR IF THE UNIT IS CONFIGURED INCORRECTLY. IN ADDITION, LIGHTING CAN BE SET TO AUTOMATICALLY COMPENSATE FOR AMBIENT LIGHTING CONDITIONS USING ITS LIGHT SENSOR. A MANUAL LIGHTING CONTROL OPTION IS ALSO AVAIABLE. REFER TO THE POST-INSTALLATION CONFIGURATION PROCEDURE.

5. MAXIMUM ALLOWABLE WIRE GAUGE INTO P1002 PINS IS 20 AWG.

6. THE AIRCRAFT POWER INPUT P1006-44 PROVIDES POWER FOR THE VOR/LOC SUPERFLAG (P1006-15) AND GLIDESLOPE SUPERFLAG (P1006-38) OUTPUTS. NO POWER CONNECTION IS REQUIRED ON P1006-44 IF THESE FLAG OUTPUTS ARE NOT USED.

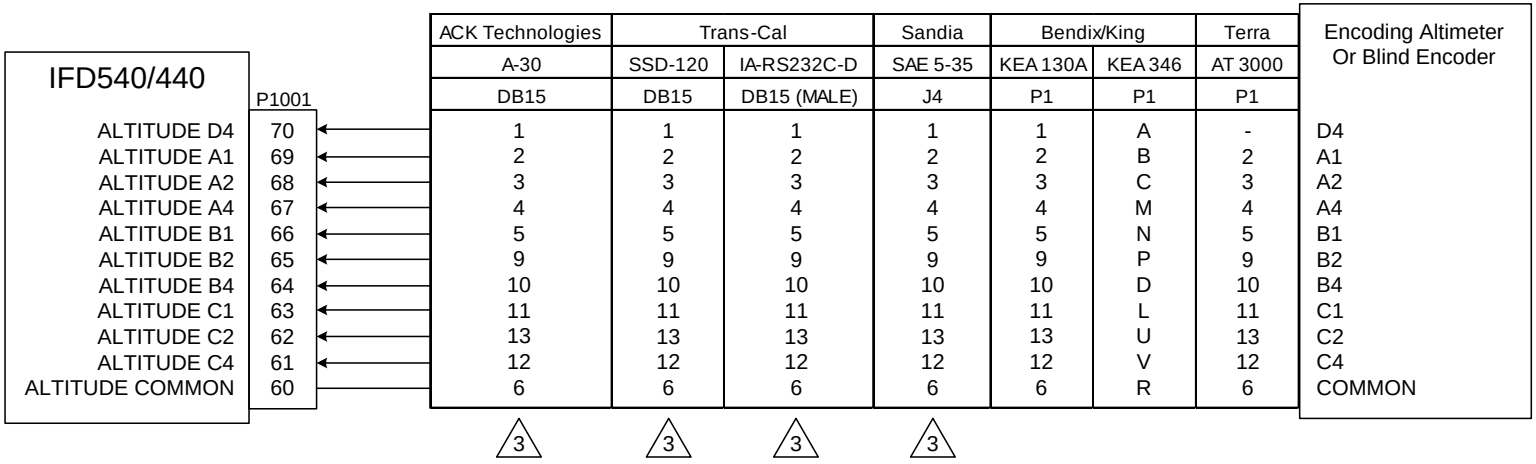
7. THE GPS ANTENNA COAXIAL CABLE MUST BE DOUBLE OR TRIPLE SHIELDED AND THE LOSS (INCLUDING CONNECTORS) MUST BE GREATER THAN 1.5 dB AND LESS THAN 6.5 dB.

8. COMMANT CI1125 DIPLEXER, OR EQUIVALENT, SHOULD BE USED.

9. COMMANT CI507 DIPLEXER, OR EQUIVALENT, SHOULD BE USED.

10. ACFT PWR 1 IS INTERNALLY DIODE ISOLATED FROM ACFT PWR 2. ONLY ONE POWER INPUT IS REQUIRED FOR NORMAL OPERATION.

11. FOR THE MAIN POWER INPUT, A 14VDC INSTALLATION REQUIRES TWO AIRCRAFT POWER INPUTS AND TWO AIRCRAFT GROUND CONNECTIONS BE USED FOR EACH MAIN POWER INPUT USED. A 28VDC INSTALLATION REQUIRES A MINIMUM OF ONE POWER AND GROUND CONNECTION, BUT TWO ARE RECOMMENDED.



NOTES:

1. ALL WIRES TO BE 24 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

3 THIS ENCODER MAY ALSO BE CONNECTED VIA RS-232.

Figure D - 2: Blind Altitude Encoders Interconnect

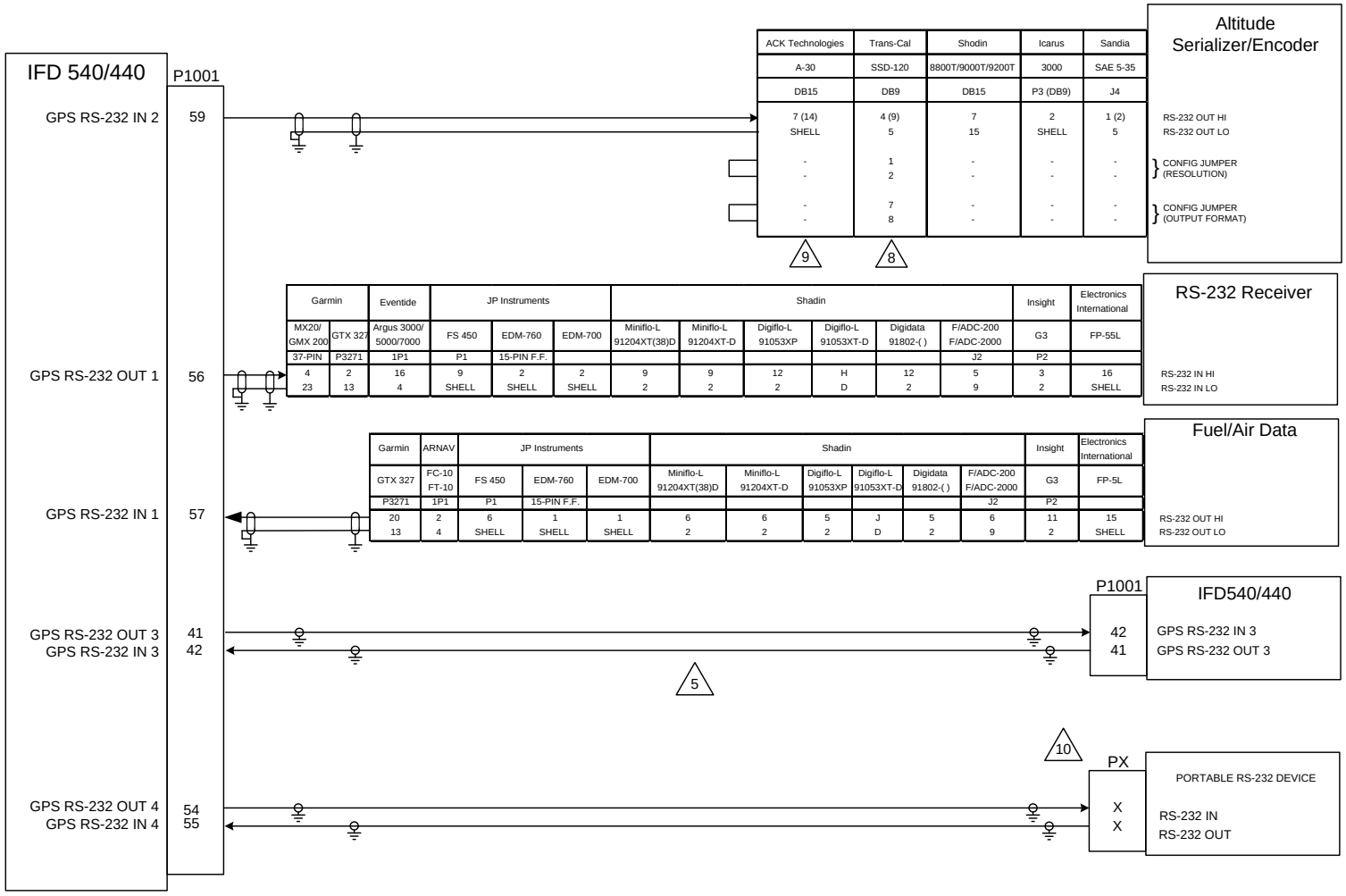


Figure D - 3: RS-232 Serial Data Interconnect

Page 1 of 2

NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.

3. REFER TO SECTION 7 FOR RS-232 CHANNEL SETTINGS

4. REFER TO THE GTX 327 TRANSPONDER INSTALLATION MANUAL, 190-00187-02, FOR COMPLETE INFORMATION.

5. IF TWO OR MORE IFD4XX/5XX SERIES UNITS ARE INSTALLED, THE RS-232 LINE ON P1001-41 AND P1001-42 MAY BE CROSS-CONNECTED TO CROSSFILL FLIGHT PLANS AND USER WAYPOINTS. TO CROSSFILL FLIGHT PLANS, IT IS REQUIRED THAT BOTH UNITS HAVE IDENTICAL DATABASE CYCLE DATES AND MAY BE REQUIRED THAT THEY HAVE IDENTICAL VERSIONS OF THE MAIN SOFTWARE. REFERENCE SECTION 4 FOR WIRING INFORMATION.

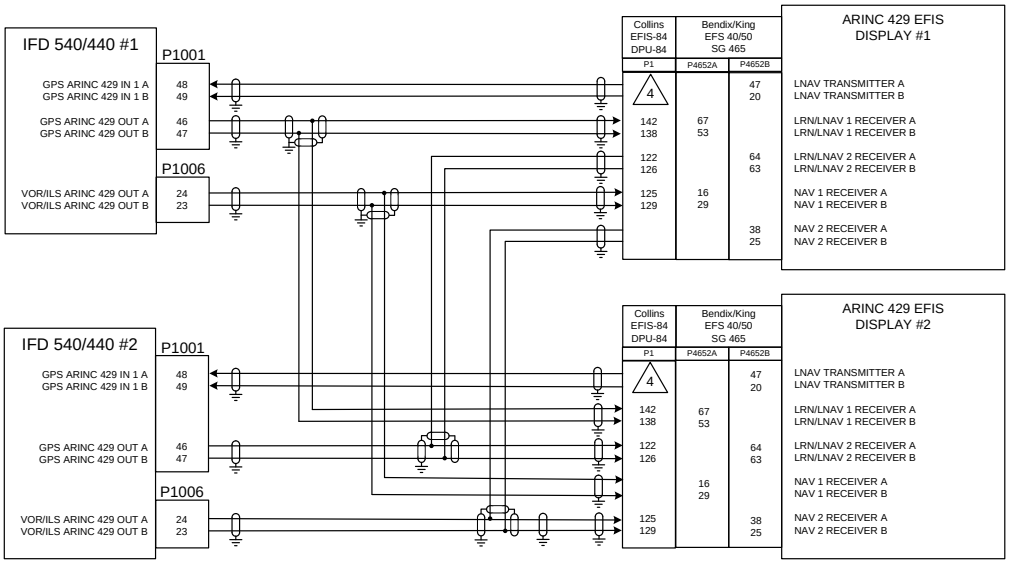
6. MAPMX (MAIN SOFTWARE VERSION 3.10 AND LATER) IS THE PREFERRED COMMUNICATION PROTOCOL FOR THE MX20/GMX200. OTHER INPUT PORTS ON MX20/GMX200 MAY BE USED INSTEAD OF THE PORT SHOWN. REFER TO APPROPRIATE MANUFACTURER'S INSTALLATION DOCUMENTATION.

7. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

8. IF USING THE SERIAL PORT SOFTWARE METHOD TO CONFIGURE THE OUTPUT OF THE ENCODER, ENSURE THAT THE "TRIMBLE/GARMIN 9600 BPS" FORMAT IS SELECTED.

9. MOD LEVEL 8 (OR HIGHER) IS REQUIRED TO SUPPORT RS-232 INTERFACE. ENSURE THAT JUMPERS ARE SET FOR "TRIMBLE/GARMIN 9600 BPS" AND "10 FOOT RESOLUTION."

10. THE IFD5XX/4XX STC DOES NOT PROVIDE INSTALLATION APPROVAL OF ANY PORTABLE ELECTRONIC DEVICES. ADDITIONAL INSTALLATION APPROVAL IS REQUIRED FOR THESE DEVICES.



NOTES:

1. ALL WIRES TO BE 24 AWG OR GREATER UNLESS OTHERWISE NOTED.

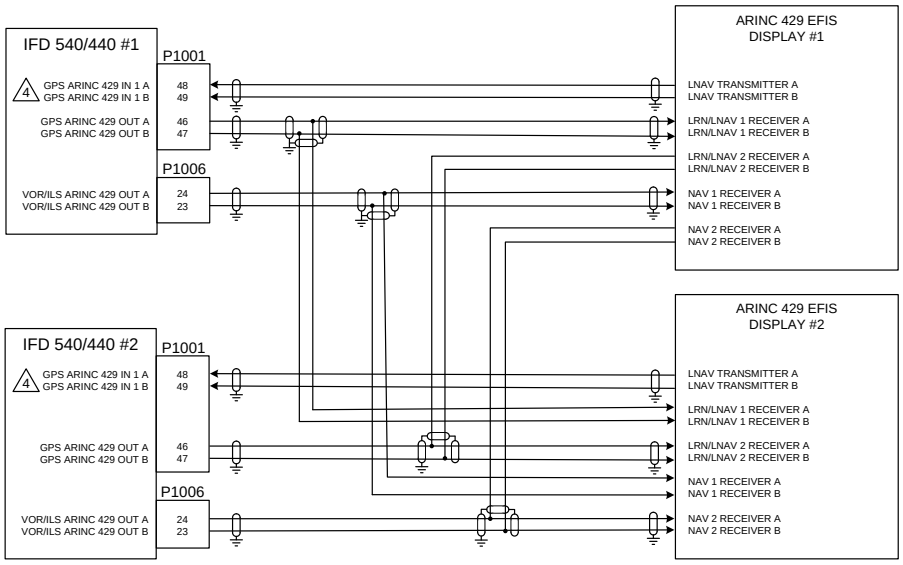
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

3. IF THE GPS ARINC 429 IN 1 PORT (P1001-48 AND -49) IS ALREADY USED FOR ANOTHER PURPOSE, THE GPS ARINC 429 IN 2 PORT (P1001-50 AND -51) MAY BE CONNECTED INSTEAD.

△4 THE DEPICTED COLLINS EFIS-84 INTERFACE DOES NOT SUPPORT SELECTION OF THE GPS COURSE VIA THE EFIS CONTROL PANEL, A GAD 42 IS REQUIRED FOR GPS SELECTED COURSE.

5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D - 4: EFIS Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. IF RS-232 PORT 1 IS NOT AVAILABLE, USE ANY OTHER AVAILABLE PORT.

4 IF ARINC 429 PORT 1 IS NOT AVAILABLE, USE ANOTHER AVAILABLE PORT.

Figure D - 5: Generic EFIS Interconnect

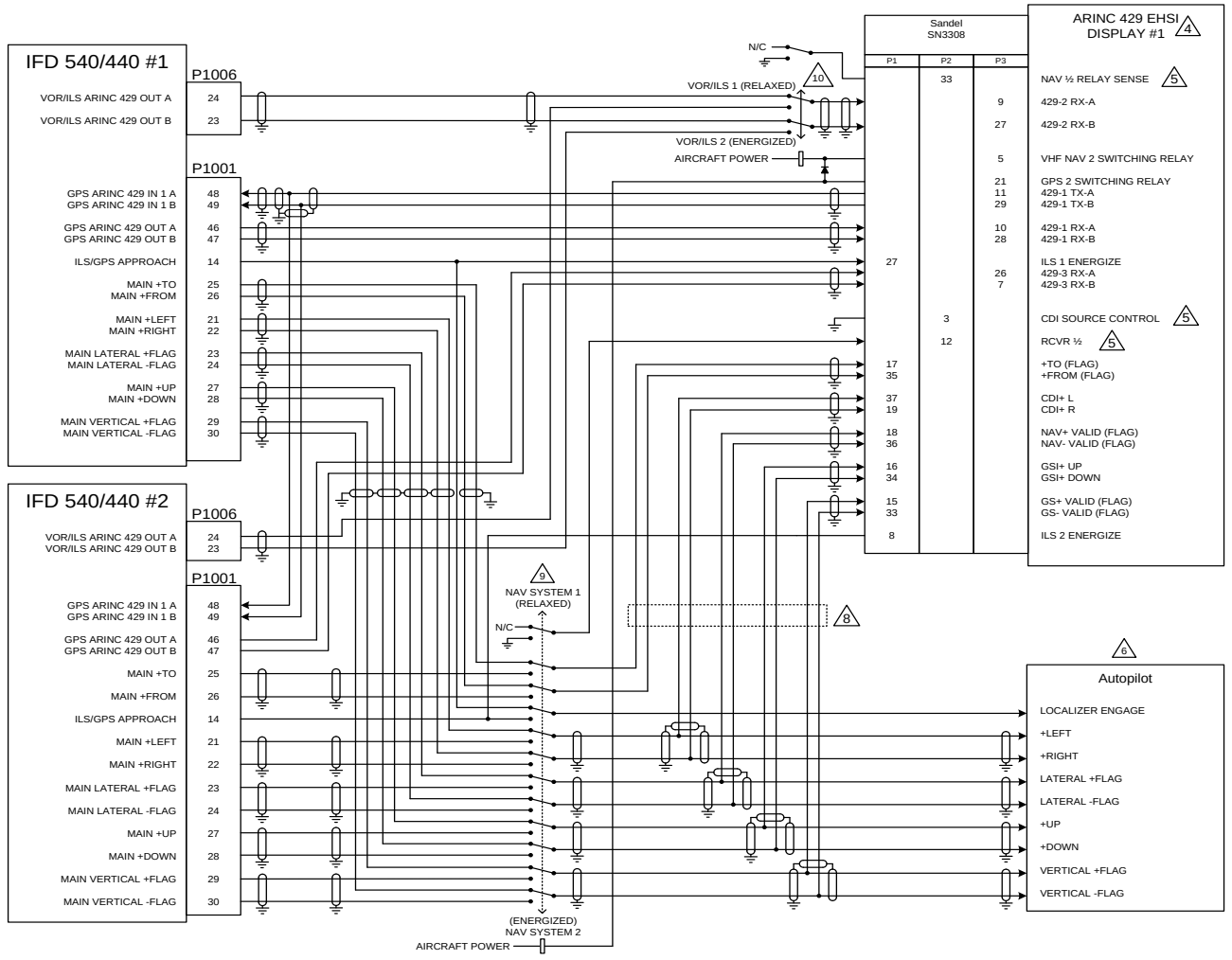


Figure D - 6: EHSI ARINC 429 Interconnect, Dual IFD5XX/4XX, Sandel SN3308 Interconnect

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NOTES:

1. ALL WIRES TO BE 24 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.

3. **IFD540/440 #1 SETUP**

MAIN ARINC 429 CONFIG:	IN 1:	LOW, SANDEL EHSI	
	OUT:	LOW, GAMA 429 GRPH W/INT	
	SDI:	LNAV 1	
	VNAV:	DISABLE LABELS	
VOR/LOC/GS ARINC 429:	SDI:	VOR/ILS 1	
	SPEED:	RX:	LOW SPEED
		TX:	LOW SPEED

IFD540/440 #2 SETUP

MAIN ARINC 429 CONFIG:	IN 1:	LOW, SANDEL EHSI	
	OUT:	LOW, GAMA 429 GRPH W/INT	
	SDI:	LNAV 2	
	VNAV:	DISABLE LABELS	
VOR/LOC/GS ARINC 429:	SDI:	VOR/ILS 2	
	SPEED:	RX:	LOW SPEED
		TX:	LOW SPEED

4. **SANDEL SN3308 #1 AND #2 SETUP ITEMS:**

LNAV 1/2 SELECT:	IFD540	NAV CHANGE:	NAV-1 ENABLE: YES
			PORT: 429 PORT-2*
			NAV-2 ENABLE: YES
			PORT: 429 PORT-2*
ANNUN:	SERIAL	RELAY SENSE:	NAV-2: P2-33
COURSE:	OBS/LEG		GPS-1: OFF
DEVIATION:	ANALOG/IN		GPS-2: OFF
OBS ROT:	NORMAL		CDI SRC SEL: P2-3
OBS CAL:	000.0		RCVR 1/2: P2-12

*NAV 1 /2 MUST TEMPORARILY BE SET TO “ANALOG” AND ILS MUST BE SET TO “VALID LOW” FOR PROPER OPERATION OF THE VDI.

5. THESE PINS ON THE SANDEL SN3308 ARE CONFIGURABLE AND CAN BE CHANGED TO SUIT THE PARTICULAR INSTALLATION.

6. AUTOPILOT SHOWN FOR REFERENCE ONLY. REFER TO APPROPRIATE AUTOPILOT INTERCONNECT DIGRAM.

7. IF IT IS DESIRED TO USE THE NAV RECEIVERS AS A SOURCE FOR THE SN3308 BEARING POINTERS, IT IS RECOMMENDED THAT THE IFD540/440 #1/#2 COMPOSITE OUTPUTS (P1006-8) BE CONNECTED TO THE SN3308 COMPOSITE INPUTS (P1-29 AND P1-10, #1 AND 2# RESPECTIVELY) AND THE SN3308 BRG NAV-1/NAV-2 BE SET TO “429+COMP”.

8. ANALOG CONNECTIONS TO THE SN3308 ARE REQUIRED TO ALLOW VERTICAL GUIDANCE TO BE DISPLAYED FOR GPS APPROACHES.

9. USE RELAY AMERI-KING P/N AK-950-R12-()V OR EQUIVALENT.

10. USE RELAY LEACH P/N WN460-() () () OR EQUIVALENT.

11. REFER TO MANUFACTURER’S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

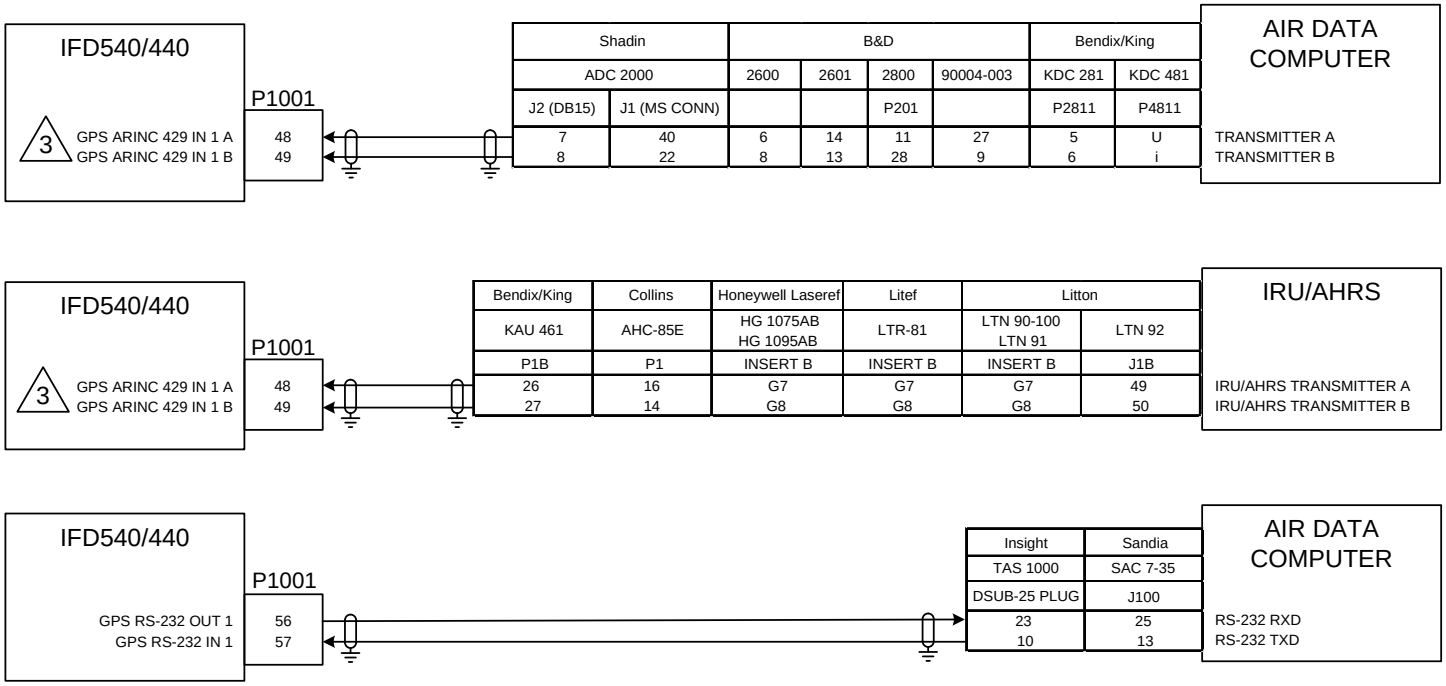

Figure D - 7: ARINC 429/RS-232 Air Data/IRU/AHRS Interconnect

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NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

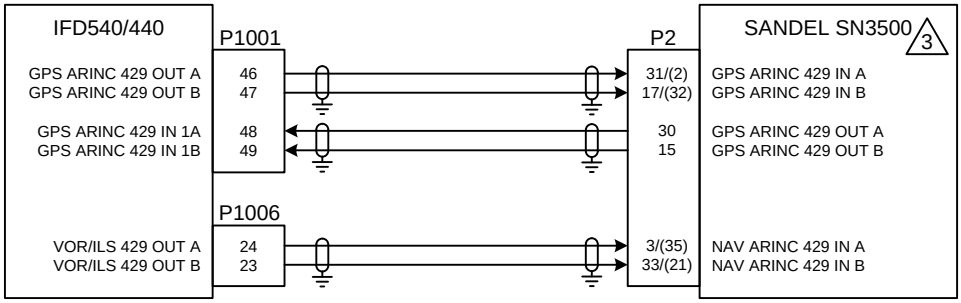
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE. THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

3. IF THE GPS ARINC 429 IN 1 PORT (P1001-48 AND -49) IS ALREADY USED FOR ANOTHER PURPOSE, THE GPS ARINC 429 IN 2 PORT (P1001-50 AND -51) MAY BE CONNECTED INSTEAD.

4. REFER TO SECTION 7 FOR ARINC 429 CHANNEL SETTINGS.

5. REFER TO SECTION 7 FOR RS-232 CHANNEL SETTINGS.

6. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPELTE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT INFORMATION AND CONFIGURATION.

Figure D - 8: Sandel SN3500 Interconnect

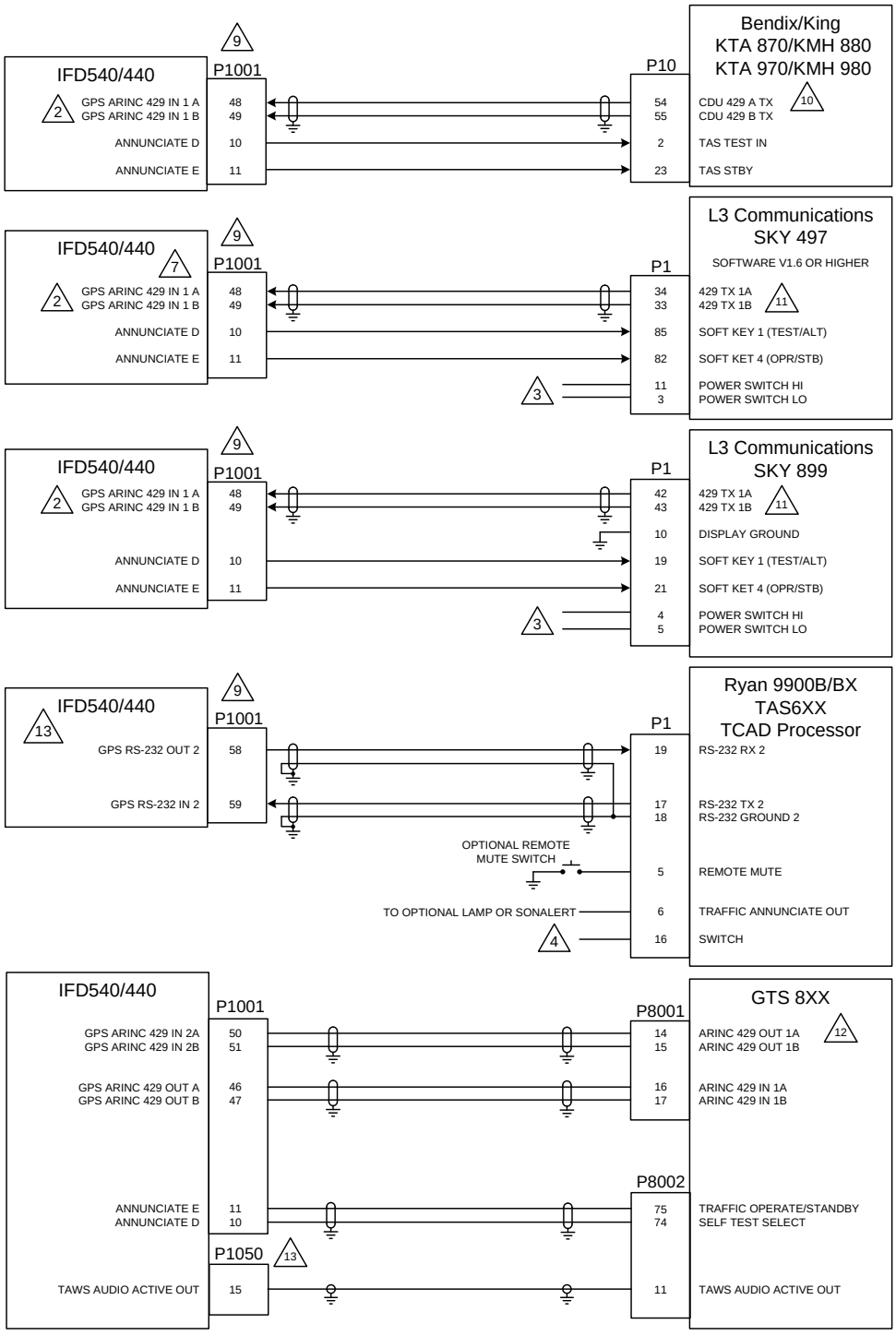


Figure D - 9: Traffic Advisory Interconnect

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NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. IF THE GPS ARINC 429 IN 1 PORT (P1001-48 AND -49) IS ALREADY USED FOR ANOTHER PURPOSE. THE GPS ARINC 429 IN 2 PORT (P1001-50 AND -51) MAY BE CONNECTED INSTEAD.

3. THE SKYWATCH POWER SWITCH PINS, SHOWN ON P1, SHOULD BE CONNECTED TOGETHER TO TURN THE PROCESSOR UNIT ON AND DISCONNECTED TO TURN IT OFF. IF A SKYWATCH CONTROL/DISPLAY UNIT IS NOT IN THE INSTALLATION, A DEDICATED SWITCH MAY BE REQUIRED TO TURN THE SKYWATCH PROCESSOR UNIT ON OR OFF.

4. THE AVIDYNE/RYAN TAS PROCESSOR SWITCH PIN (P1-16) SHOULD BE GROUNDED TO TURN THE PROCESSOR UNIT ON, AND OPEN TO TURN THIS UNIT OFF. IF A RYAN TCAD DISPLAY UNIT IS NOT IN THE INSTALLATION, A DEDICATED SWITCH MAY BE REQUIRED TO TURN THE TAS PROCESSOR UNIT ON AND OFF.

5. IF ANY OF THESE TRAFFIC SYSTEMS ARE INSTALLED WITHOUT A CONTROL/DISPLAY UNIT, A PLACARD IS REQUIRED NEAR THE IFD 5XX/4XX UNIT, INDICATING THAT A TRAFFIC ADVISORY SYSTEM IS INSTALLED, AND ITS DATA MAY BE DISPLAYED ON THE IFD5XX/4XX UNIT.

6. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER INPUTS SHOWN FOR REFERENCE ONLY.

7. IN ORDER FOR SKYWATCH DATA TO BE DISPLAYED ON THE IFD5XX/4XX UNIT'S MAP PAGE, THE IFD5XX/4XX UNIT MUST HAVE A DIGITAL HEADING SOURCE, OR THE SKYWATCH MUST HAVE A SYNCHRO OR SERIAL HEADING SOURCE. A STEPPER HEADING SOURCE WILL NOT ALLOW SKYWATCH DATA TO BE DISPLAYED ON THE MAP PAGE.

8. AT IFD5XX/4XX UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

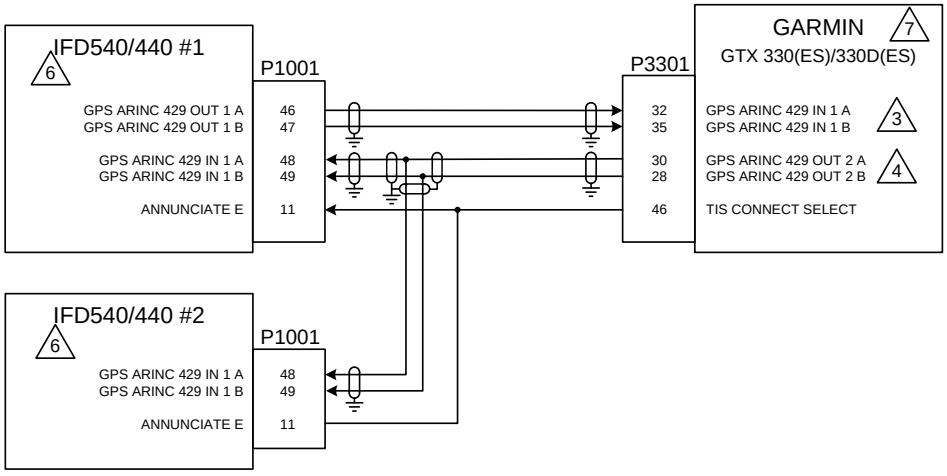
9. REFER TO SECTION 7.0 FOR ARINC 429 AND FOR RS-232 SETTINGS. IF AN ARINC 429 TRAFFIC SOURCE IS USED, THE CORRESPONDING ARINC 429 INPUT MUST BE SET TO HIGH SPEED.

10. KTA 870/KMH 880/KTA 970/KMH 980 SYSTEMS MUST HAVE TRAFFIC CONFIGURED FOR "CONTROLLER TYPE: DISCRETE" AND "DISPLAY VALID: IGNORE".

11. SKYWATCH MUST BE CONFIGURED FOR AN ARINC 735 TYPE 1 DISPLAY.

12. FOR GTX 8XX CONFIGURATION SETTINGS, SEE THE GTX 8XX INSTALLATION MANUAL.

13. THE P1050 CONNECTOR IS NOT AVALIABLE ON IFD4XX UNITS.



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE. THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

3 ARINC 429 IN 1 (P3301-32 AND -35) INPUT ALLOWS AUTOMATED START AND STOP OF FLIGHT TIMER AND PLACES THE TRANSPONDER IN GROUND (GND) MODE UPON LANDING.

4 IF EXTERNAL STBY SELECT IS CONNECTED IN THIS INSTALLATION USE GTX 330 ARINC 429 OUT 1 A AND 1 B, (PINS 37 AND 34) RATHER THAN ARINC 429 OUT 2 A AND 2 B (PINS 30 AND 28) SHOWN. ALTITUDE DATA WILL NOT BE TRANSMITTED OVER ARINC 429 PORT 2 TO THE IFD540/440 UNIT WHEN EXTERNAL STBY SELECT IS GROUNDED.

5. WHEN TIS IS USED IN THE AIRCRAFT DO NOT CONNECT ANOTHER TRAFFIC SYSTEM TO THE SAME IFD540/440 UNIT.

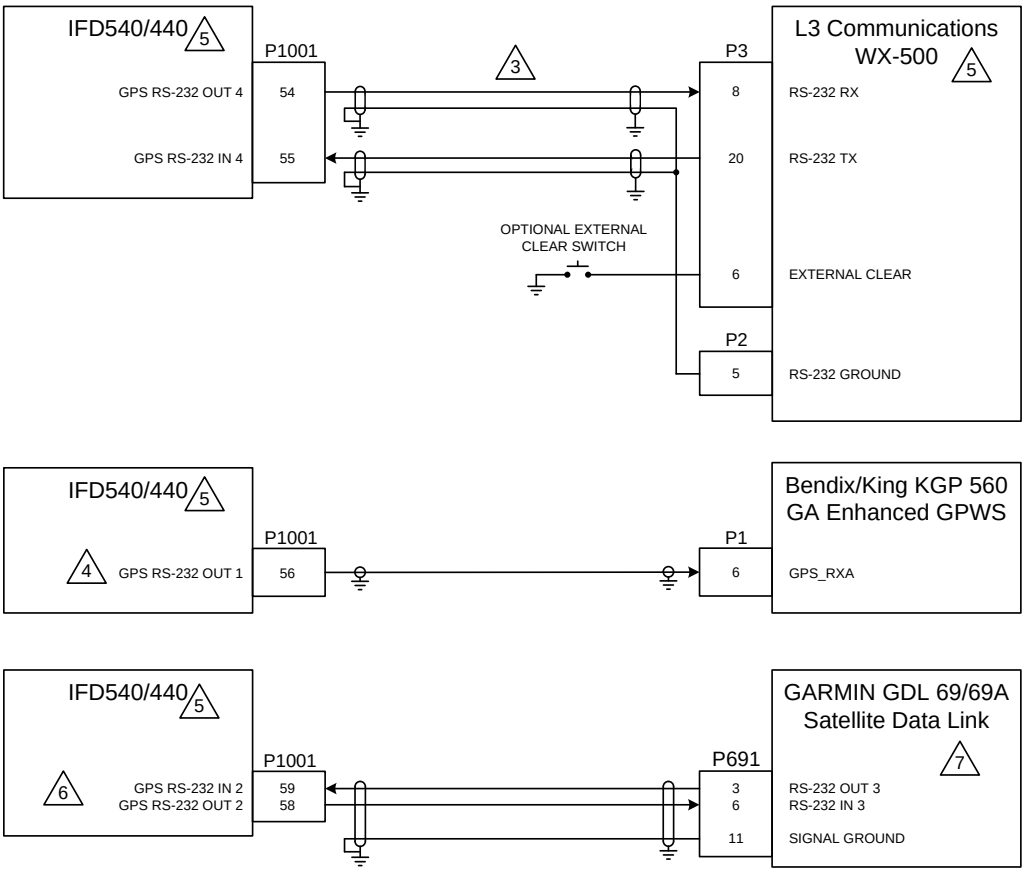
6 IFD540/440 SETUP:

MAIN ARINC 429 CONFIG: IN 1: HIGH, GARMIN GTX 330
OUT: SET TO MATCH INSTALLATION

7 GTX 330 SETUP:

429 INPUT CHANNEL 1: GPS (SPEED SET TO MATCH IFD540/440 #1 OUTPUT)
429 OUTPUT CHANNEL 2: GARMIN W/TIS

Figure D - 10: GTX 330 Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE. THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

△3 IN ORDER FOR WX-500 DATA TO BE DISPLAYED ON THE IFD540 UNIT'S MAP PAGE, THE IFD540/440 MUST HAVE A DIGITAL HEADING SOURCE, OR THE WX-500 MUST HAVE A SYNCHRO OR SERIAL HEADING SOURCE. A STEPPER HEADING SOURCE WILL NOT ALLOW WX-500 DATA TO BE DISPLAYED ON THE MAP PAGE.

△4 IF AN RS-232 OUTPUT PORT IS CONFIGURED FOR THE HONEYWELL EGPWS, THE CORRESPONDING RS-232 INPUT OF THE SAME PORT MAY NOT BE USED.

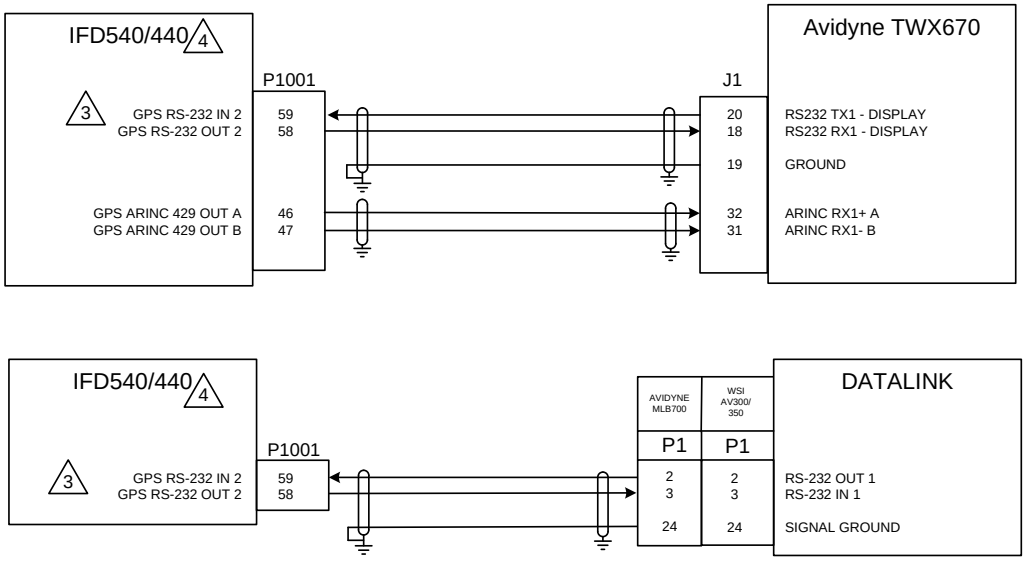
△5 REFER TO SECTION 7.0 FOR RS-232 CHANNEL SETTINGS.

△6 CONNECTION TO RS-232 PORT #2 OF THE IFD540/440 UNIT IS SHOWN. IF PORT #2 IS ALREADY IN USE, ANY OTHER AVAILABLE RS-232 PORT MAY BE USED AS WELL.

△7 CONNECTION TO RS-232 PORT #2 OF THE GDL 69/69A MAY BE USED AS WELL.

8. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUT OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D - 11: Terrain and Weather Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE. THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

△3 CONNECTION TO RS-232 PORT #2 OF THE IFD540/440 UNIT IS SHOWN. IF PORT #2 IS ALREADY IN USE, ANY OTHER AVAILABLE RS-232 PORT MAY BE USED AS WELL.

△4 REFER TO SECTION 7.0 FOR RS-232 CHANNEL SETTINGS.

Figure D - 12: Weather Interconnect

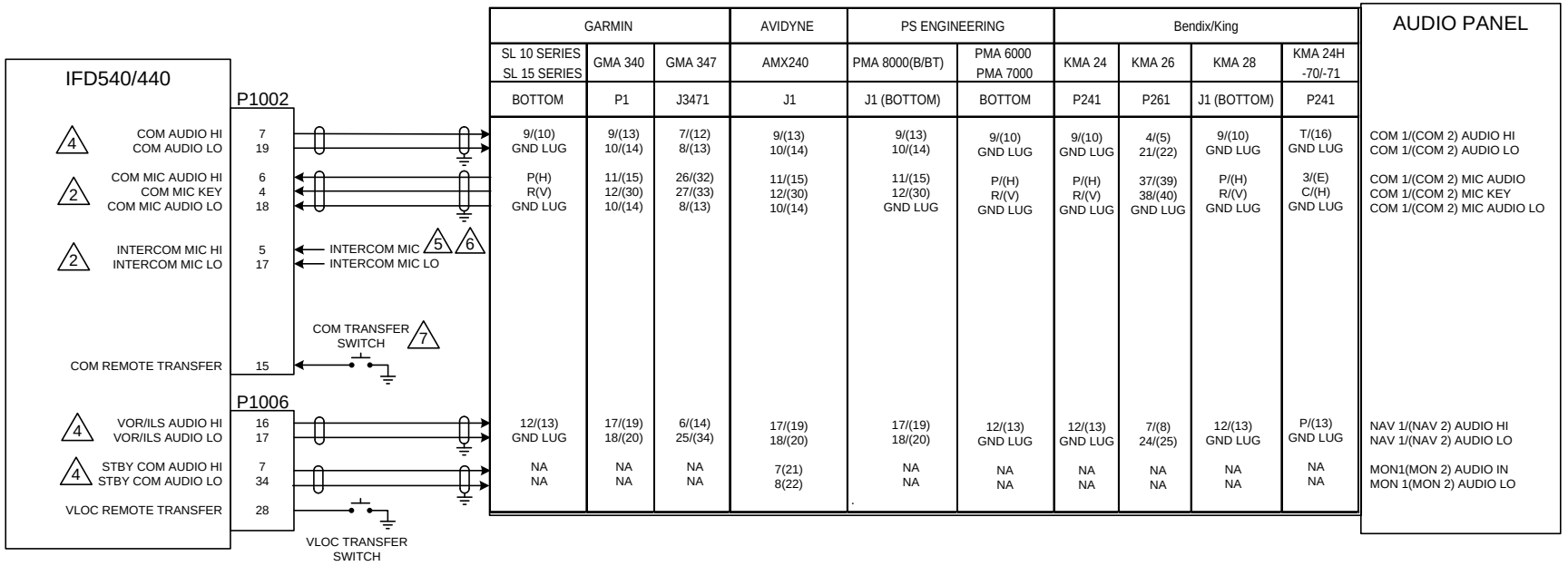


Figure D - 13: Audio Panel Interconnect
Page 1 of 2

NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

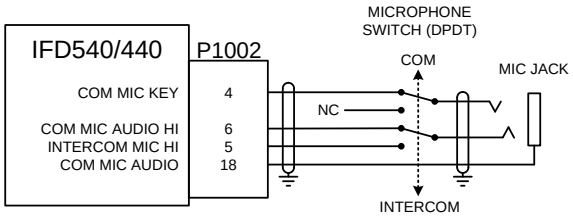
2 CONNECTING TWO MICROPHONES TO MIC AUDIO HI/LO OR INTERCOM MIC HI/LO AT THE SAME TIME MAY RESULT IN WEAK OR DISTORTED AUDIO. MIC ISOLATION RELAYS ARE RECOMMENDED SO THAT ONLY ONE MIC IS ACTIVE AT A TIME.

3. RESERVED

4 IF THE AUDIO PANEL DOES NOT HAVE A LO INPUT. IT SHOULD BE CONNECTED TO A GROUND LUG AT THE AUDIO PANEL.

5 THE IFD540/440 INTERCOM FUNCTION SHOULD ONLY BE USED IF THERE IS NO OTHER INTERCOM SYSTEM IN THE AIRCRAFT.

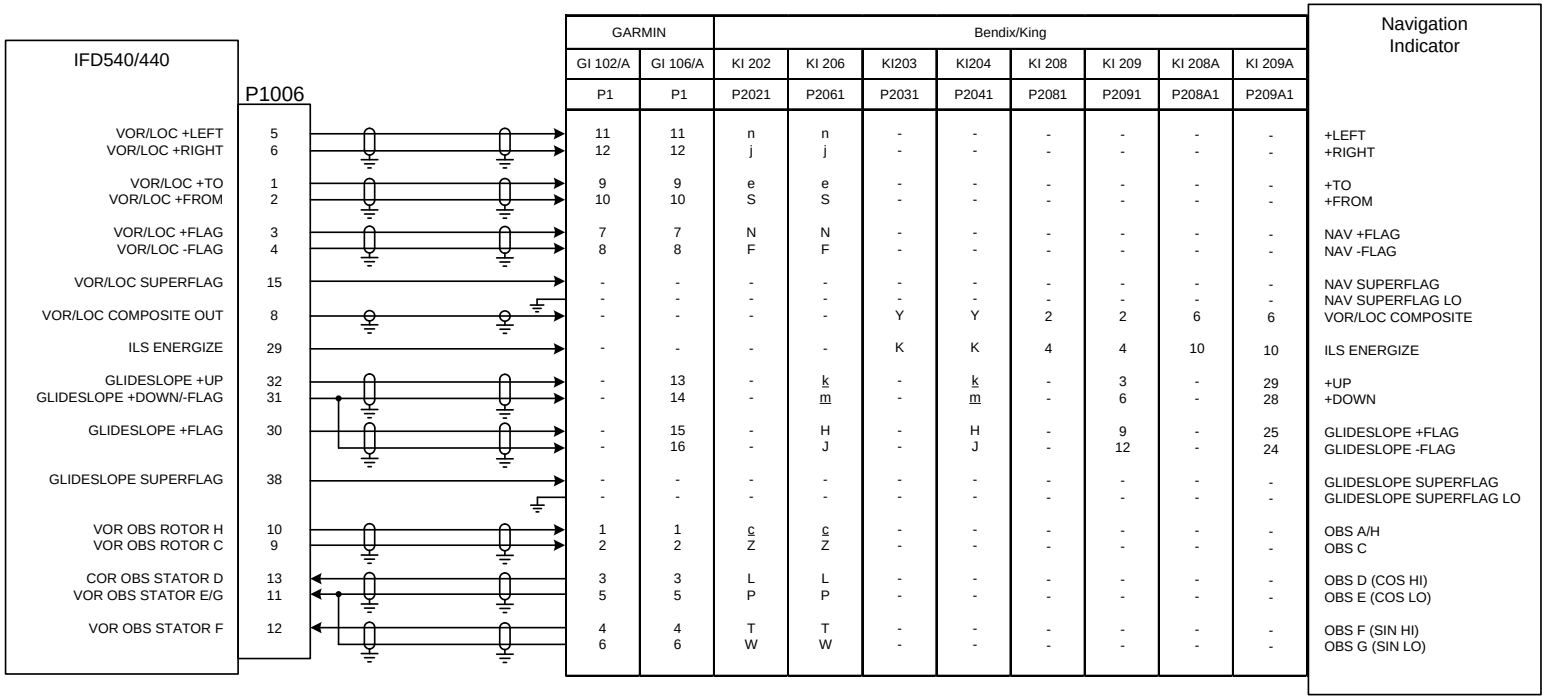
6 INTERCOM WIRING OPTION:



7 THE COM REMOTE TRANSFER INPUT (P1002-15) MAY BE USED FOR EMERGENCY OPERATION OF THE COM TRANSMITTER. IF THE REMOTE TRANSFER SWITCH IS ACTIVE FOR THREE SECONDS, THE ACTIVE COM FREQUENCY WILL CHANGE TO 121.50 MHZ.

8. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUT OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

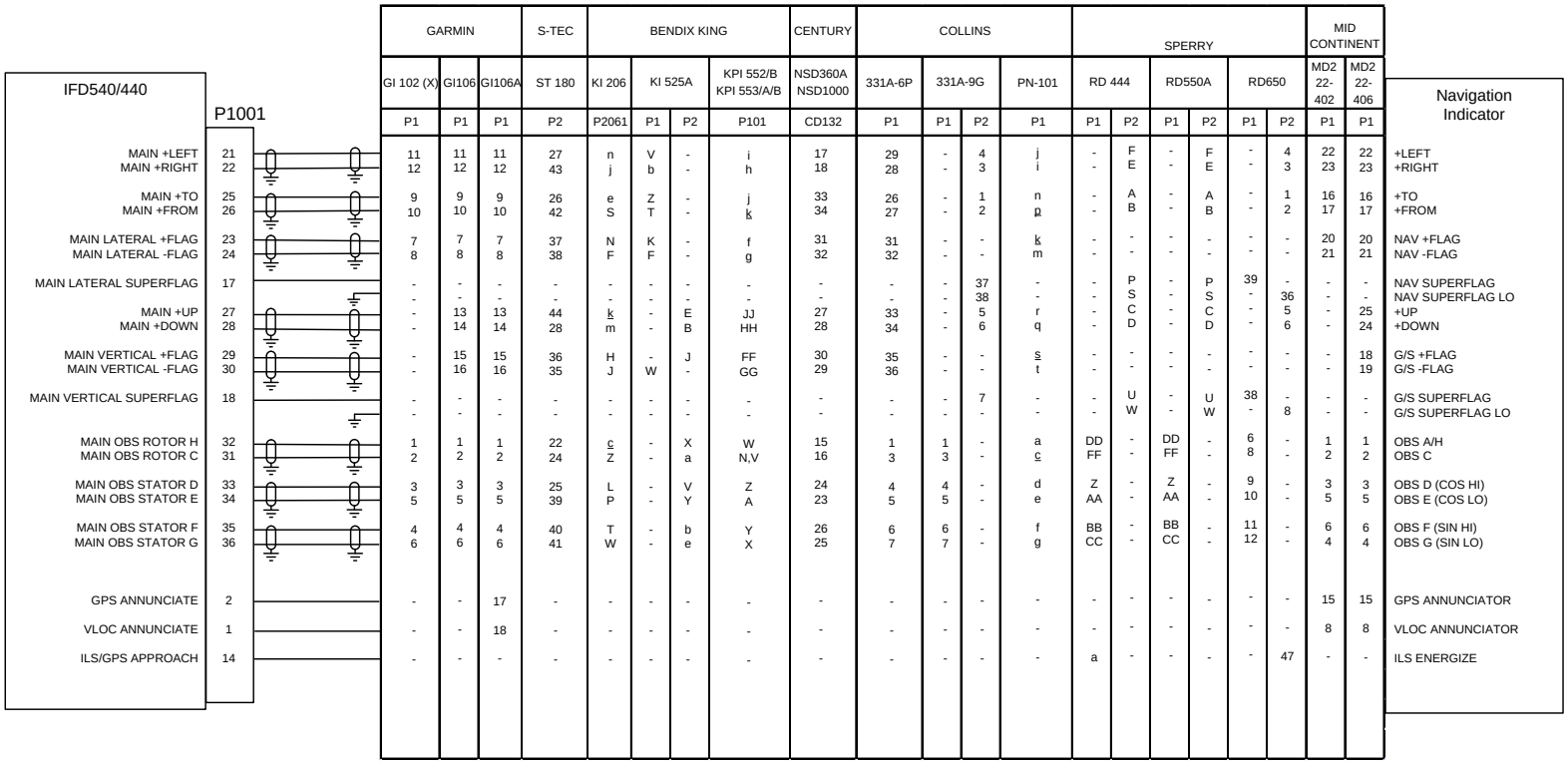
9. SHIELDS FOR AUDIO CABLES SHOULD BE GROUNDED AT ONE END (WITH LEADS LESS THAN 3.0 INCHES) AND LEFT FLOATING AT THE OTHER END. IF SHIELDED AUDIO CABLE IS CARRIED THROUGH DISCONNECT, CARRY SHIELD GROUND THROUGH DISCONNECT ON SEPARATE PIN.



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. THIS INTERCONNECT APPLIES ONLY WHEN IT IS DESIRED FOR A SEPARATE INDICATOR TO DISPLAY IFD540/440 VOR/ILS INFORMATION (REGARDLESS OF THE SELECTED NAVIGATION SOURCE).
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
4. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

Figure D - 14: VOR/ILS Indicator Interconnect



		GARMIN			S-TEC	BENDIX KING				CENTURY	COLLINS				SPERRY						MID CONTINENT		
		GI 102 (X)	GI106	GI106A	ST 180	KI 206	KI 525A		KPI 552/B KPI 553/A/B	NSD360A NSD1000	331A-6P	331A-9G		PN-101	RD 444		RD550A		RD650		MD2 22-402	MD2 22-406	Navigation Indicator
		P1	P1	P1	P2	P2061	P1	P2	P101	CD132	P1	P1	P2	P1	P1	P2	P1	P2	P1	P2	P1	P1	
MAIN +LEFT	21	11	11	11	27	n	V	-	i	17	29	-	4	j	-	F	-	F	-	4	22	22	+LEFT
MAIN +RIGHT	22	12	12	12	43	j	b	-	h	18	28	-	3	i	-	E	-	E	-	3	23	23	+RIGHT
MAIN +TO	25	9	9	9	26	e	Z	-	j	33	26	-	1	n	-	A	-	A	-	1	16	16	+TO
MAIN +FROM	26	10	10	10	42	S	T	-	k	34	27	-	2	p	-	B	-	B	-	2	17	17	+FROM
MAIN LATERAL +FLAG	23	7	7	7	37	N	K	-	f	31	31	-	-	k	-	-	-	-	-	-	20	20	NAV +FLAG
MAIN LATERAL -FLAG	24	8	8	8	38	F	F	-	g	32	32	-	-	m	-	-	-	-	-	-	21	21	NAV -FLAG
MAIN LATERAL SUPERFLAG	17	-	-	-	-	-	-	-	-	-	-	-	37	-	-	P	-	P	39	-	-	-	NAV SUPERFLAG
		-	-	-	-	-	-	-	-	-	-	-	38	-	-	S	-	S	-	36	-	-	NAV SUPERFLAG LO
MAIN +UP	27	-	13	13	44	k	-	E	JJ	27	33	-	5	r	-	C	-	C	-	5	-	25	+UP
MAIN +DOWN	28	-	14	14	28	m	-	B	HH	28	34	-	6	q	-	D	-	D	-	6	-	24	+DOWN
MAIN VERTICAL +FLAG	29	-	15	15	36	H	-	J	FF	30	35	-	-	s	-	-	-	-	-	-	-	18	G/S +FLAG
MAIN VERTICAL -FLAG	30	-	16	16	35	J	W	-	GG	29	36	-	-	t	-	-	-	-	-	-	-	19	G/S -FLAG
MAIN VERTICAL SUPERFLAG	18	-	-	-	-	-	-	-	-	-	-	-	7	-	-	U	-	U	38	-	-	-	G/S SUPERFLAG
		-	-	-	-	-	-	-	-	-	-	-	-	-	-	W	-	W	-	8	-	-	G/S SUPERFLAG LO
MAIN OBS ROTOR H	32	1	1	1	22	c	-	X	W	15	1	1	-	a	DD	-	DD	-	6	-	1	1	OBS A/H
MAIN OBS ROTOR C	31	2	2	2	24	Z	-	a	N,V	16	3	3	-	c	FF	-	FF	-	8	-	2	2	OBS C
MAIN OBS STATOR D	33	3	3	3	25	L	-	V	Z	24	4	4	-	d	Z	-	Z	-	9	-	3	3	OBS D (COS HI)
MAIN OBS STATOR E	34	5	5	5	39	P	-	Y	A	23	5	5	-	e	AA	-	AA	-	10	-	5	5	OBS E (COS LO)
MAIN OBS STATOR F	35	4	4	4	40	T	-	b	Y	26	6	6	-	f	BB	-	BB	-	11	-	6	6	OBS F (SIN HI)
MAIN OBS STATOR G	36	6	6	6	41	W	-	e	X	25	7	7	-	g	CC	-	CC	-	12	-	4	4	OBS G (SIN LO)
GPS ANNUNCIATE	2	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	15	GPS ANNUNCIATOR
VLOC ANNUNCIATE	1	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	8	VLOC ANNUNCIATOR
ILS/GPS APPROACH	14	-	-	-	-	-	-	-	-	-	-	-	-	-	a	-	-	-	-	47	-	-	ILS ENERGIZE

NOTES:

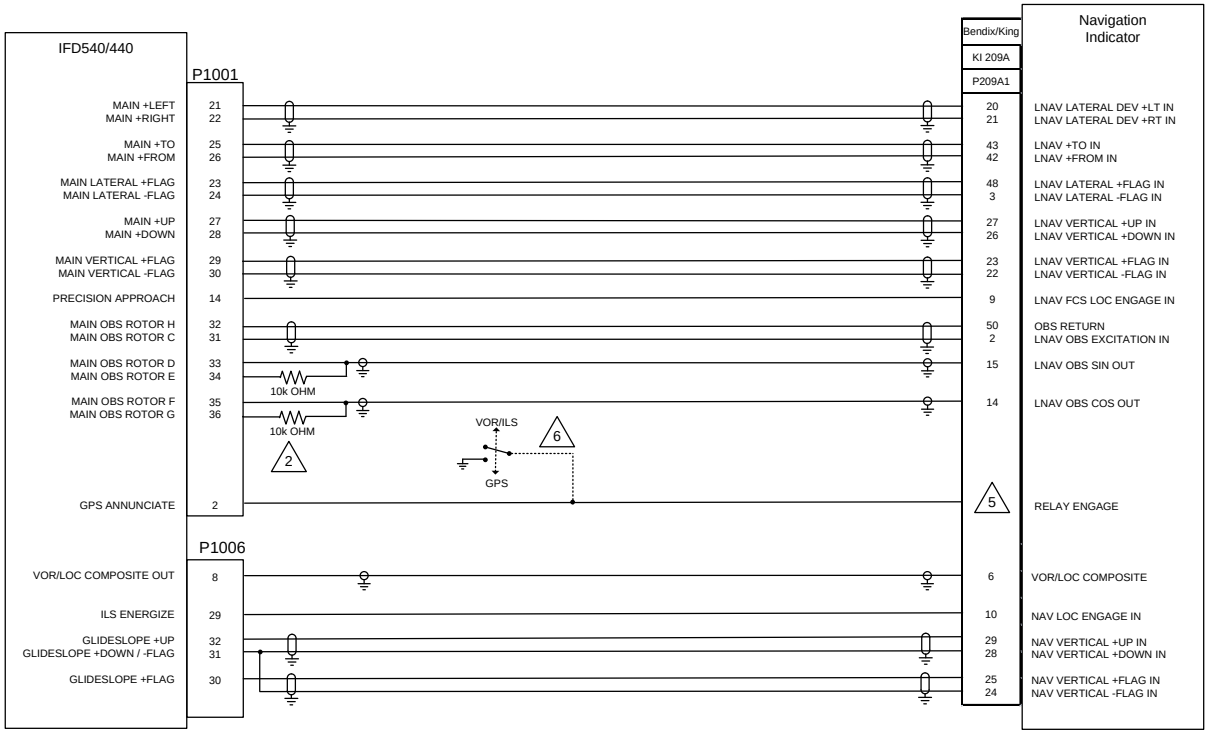
1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

3. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

4. LOWER CASE PIN DESIGNATORS ARE SHOWN AS UNDERLINED LETTERS.

Figure D - 15: Main Indicator Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. TO CONNECT THE IFD540/440 TO A KI209A INDICATOR, ADD TWO 10K OHM, ¼ WATT RESISTORS AS SHOWN.

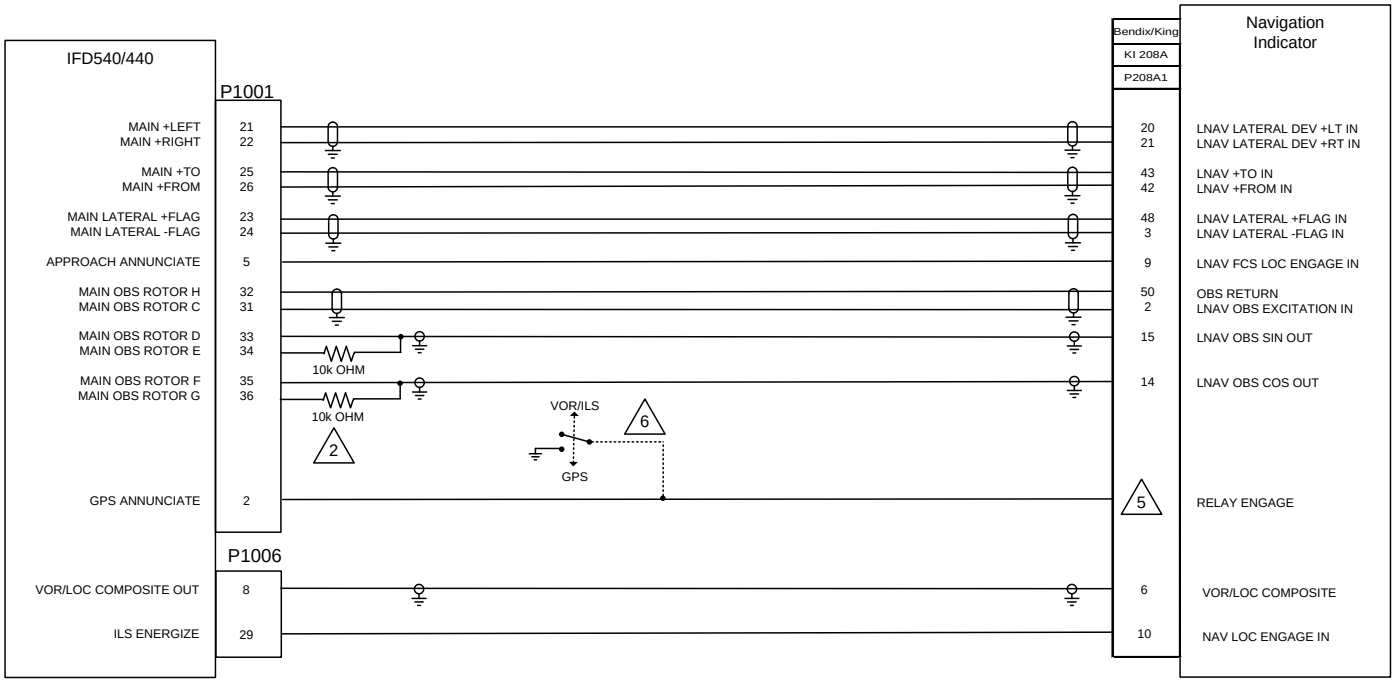
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

4. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. PROPER CONNECTION OF THE RELAY ENGAGE INPUT OF THE KI 209A IS DEPENDENT ON ITS POWER SUPPLY VOLTAGE. REFER TO KI 209A DOCUMENTATION FOR PROPER CONNECTION.

6. IF THE IFD540/440 IS INSTALLED, AND ANOTHER VOR/ILS RECEIVER IS AVAILABLE TO DRIVE THE NAVIGATION INDICATOR, AN EXTERNAL SOURCE SELECTION SWITCH MUST BE USED IN LIEU OF THE GPS ANNUNICATE OUTPUT.

Figure D - 16: Main Indicator KI209 Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. TO CONNECT THE IFD540/440 TO A KI209A INDICATOR, ADD TWO 10K OHM, ¼ WATT RESISTORS AS SHOWN.

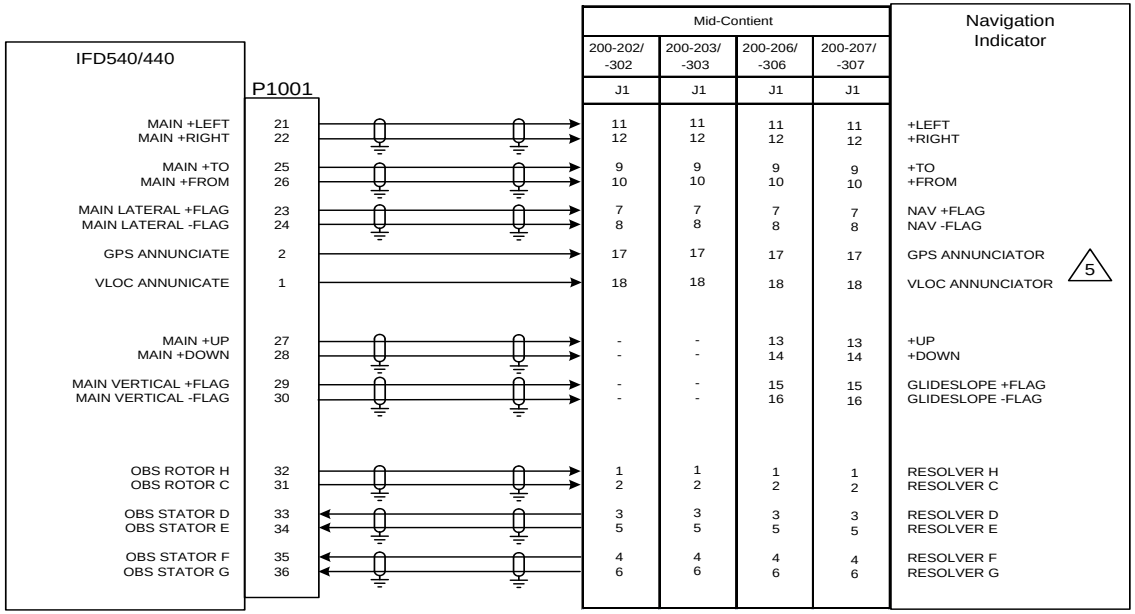
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

4. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. PROPER CONNECTION OF THE RELAY ENGAGE INPUT OF THE KI 208A IS DEPENDENT ON ITS POWER SUPPLY VOLTAGE. REFER TO KI 208A DOCUMENTATION FOR PROPER CONNECTION.

6. IF THE IFD540/440 IS INSTALLED, AND ANOTHER VOR/ILS RECEIVER IS AVAILABLE TO DRIVE THE NAVIGATION INDICATOR, AN EXTERNAL SOURCE SELECTION SWITCH MUST BE USED IN LIEU OF THE GPS ANNUNICATE OUTPUT.

Figure D - 17: Main Indicator KI208 Interconnect

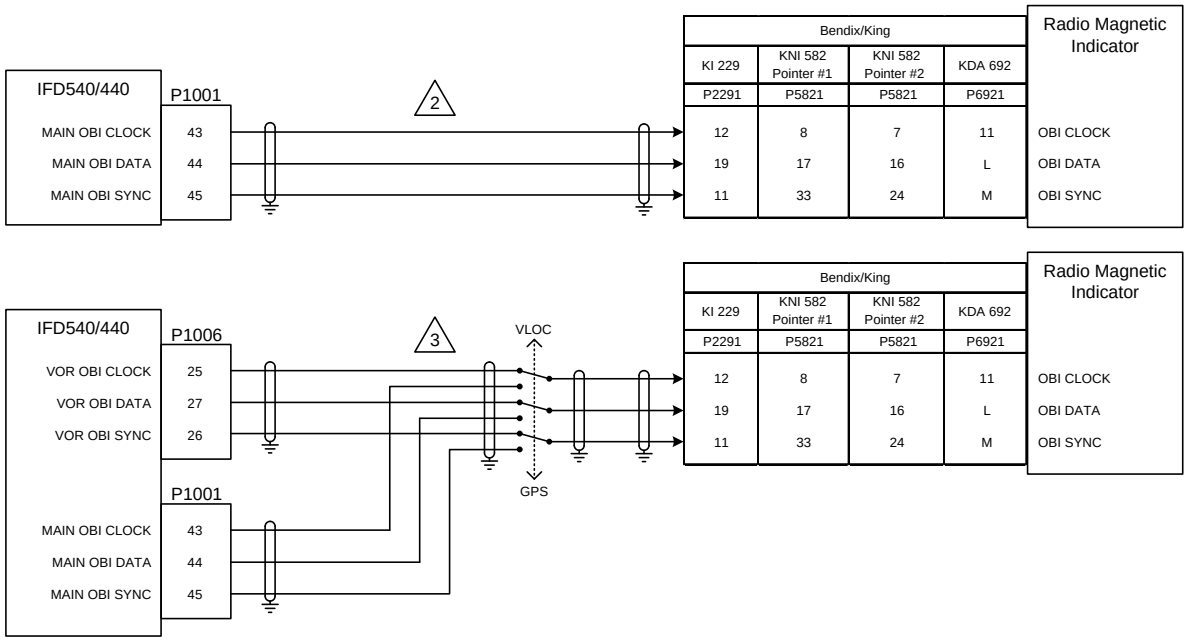


NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. THE 200-202/-203/-302/-303 DOES NOT HAVE VERTICAL DEVIATION INDICATOR. DO NOT USE FOR IFR NAVIAGATION.
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.
4. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5 NAVIAGATION ANNUNCIATION

Figure D - 18: Main Indicator MD200-20X/-30X Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

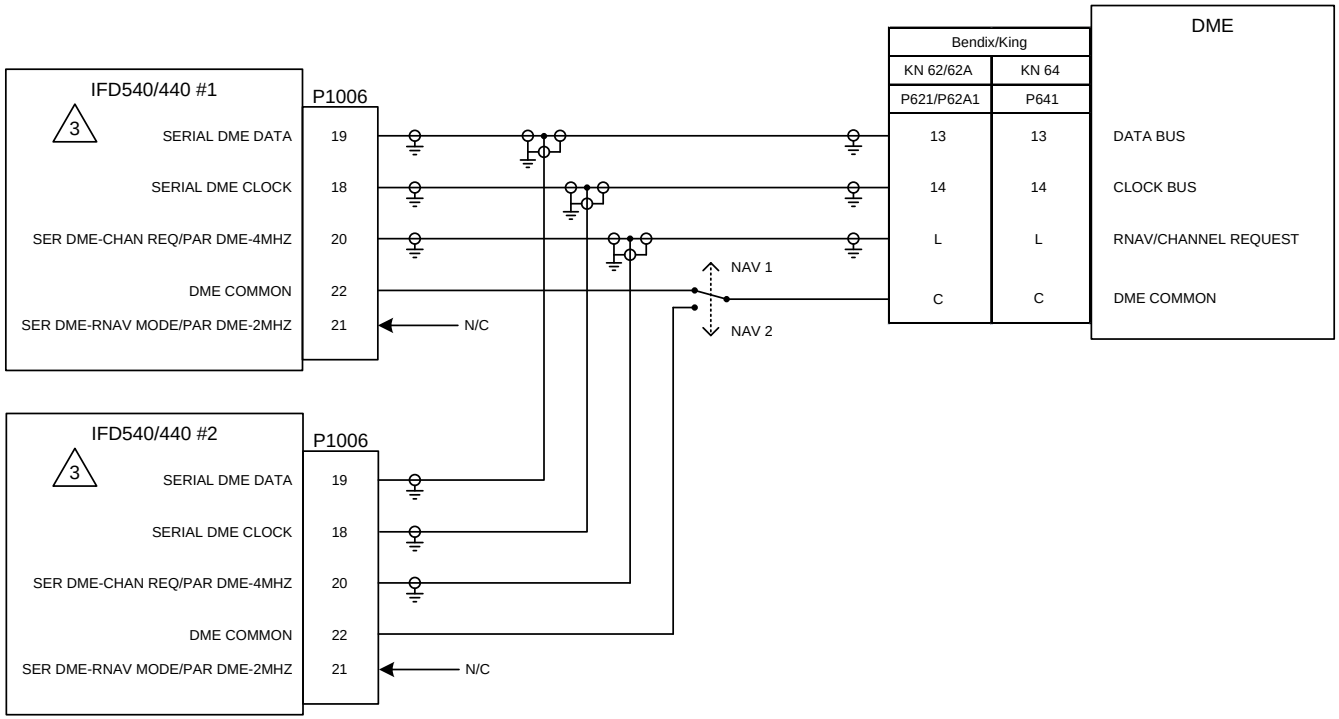
2. IF IT IS DESIRED FOR THE RMI POINTER TO SWITCH WITH THE CDI BUTTON ON THE FRONT PANEL OF THE IFD540/440. INSTALL AS PER THE TOP DIAGRAM. AND SELECT TRACK CDI FOR THE OBI SOURCE FIELD OF THE MAIN CDI/OBS CONFIG PAGE.

3. IF IT IS DESIRED TO USE A SEPARATE SWITCH FOR THE RMI POINTER, INSTALL AS PER BOTTOM DIAGRAM AND SELECT ALWAYS GPS FOR THE OBI SOURCE FIELD OF THE MAIN CDI/OBS CONFIG PAGE.

4. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

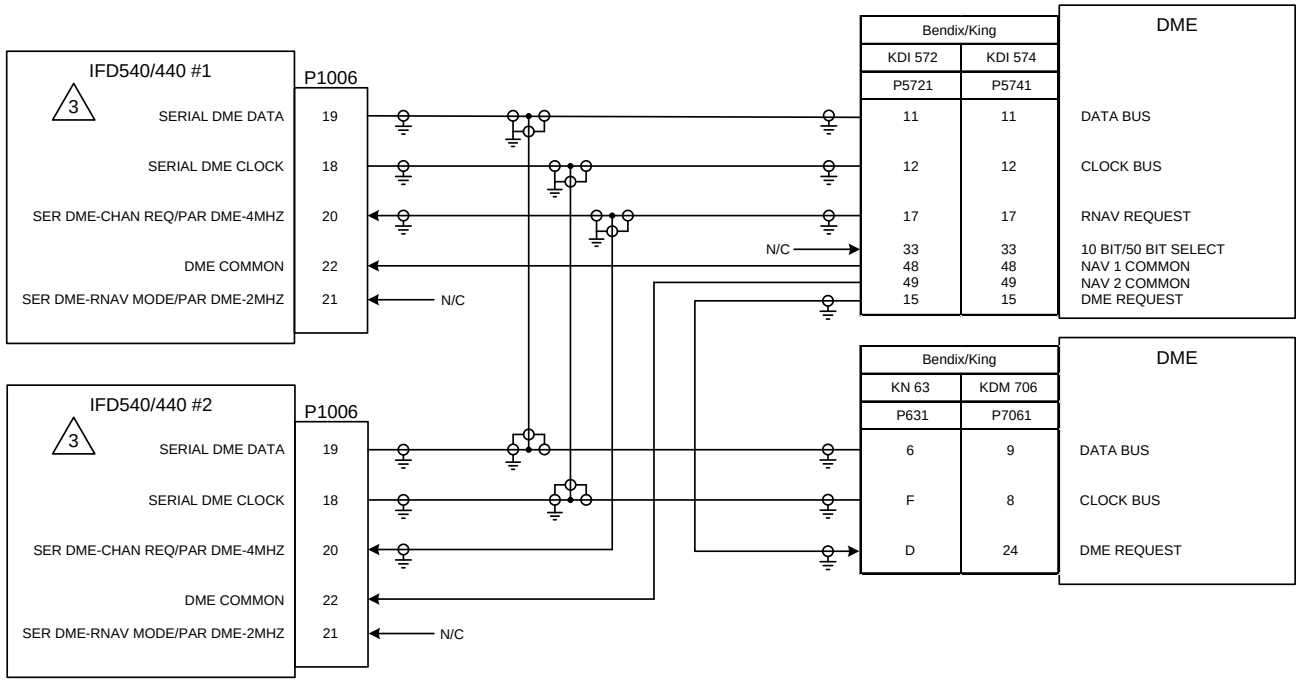
Figure D - 19: RMI/OBI Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
3. THE IFD540/440 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT KING SERIAL DME TUNING DATA UNDER THE DME CHANNEL MODE.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D - 20: King Serial DME Tuning Interconnect, Panel Mount



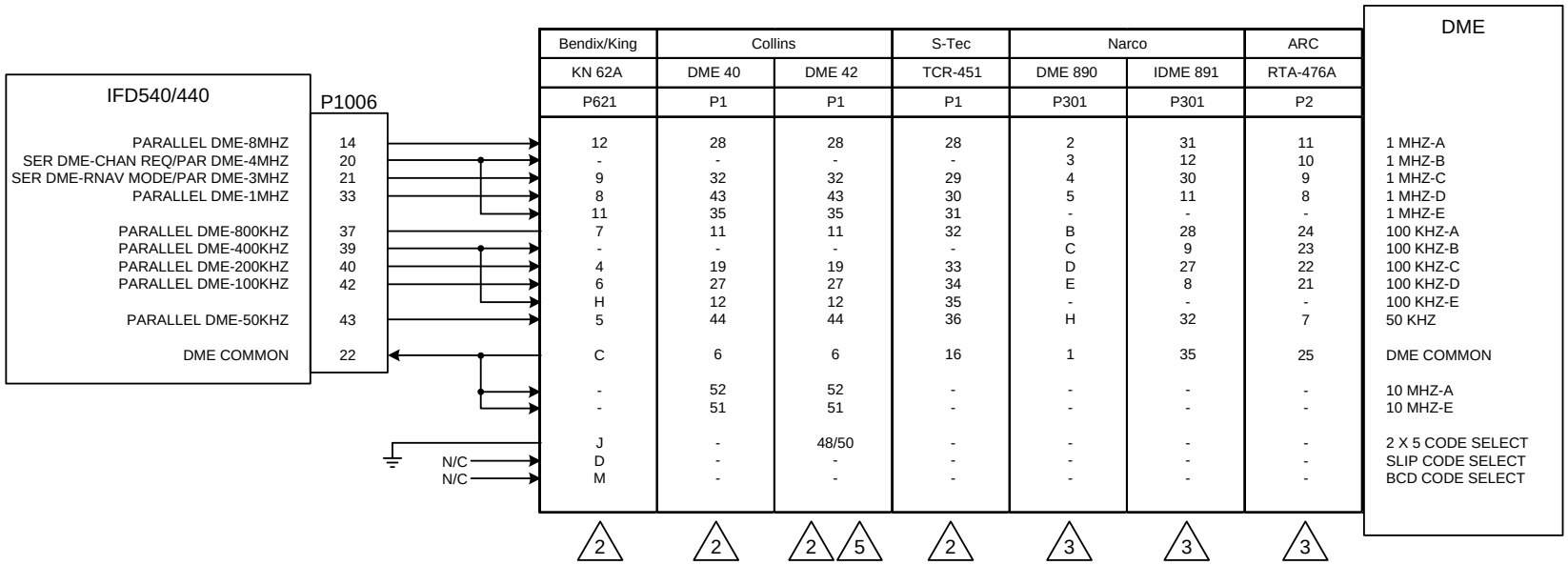
NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

△3 THE IFD540/440 MUST BE CONFIGURED AT INSTALLATION TO OUTPUT KING SERIAL DME TUNING DATA UNDER THE DME CHANNEL MODE.

4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D - 21: King Serial DME Tuning Interconnect, Remote Mount



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

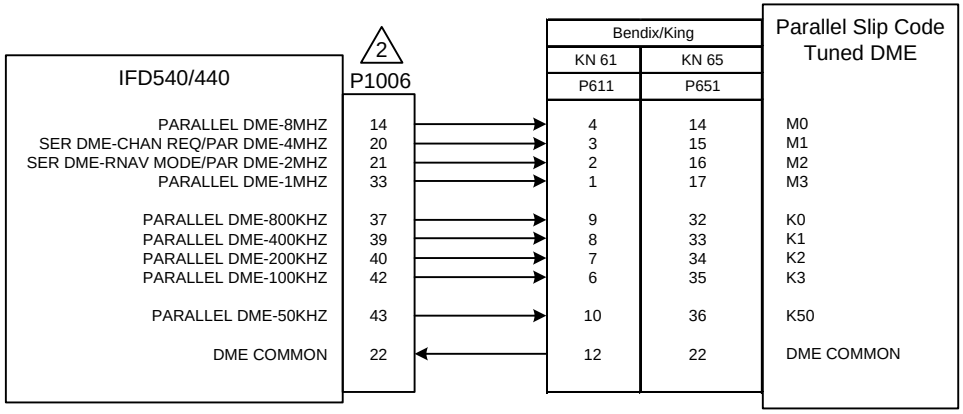
2. THE IFD540/440 MUST BE CONFIGURED FOR PARALLEL 2X5 DME CHANNELING MODE FOR PROPER OPERATION WITH THIS MODEL OF DME TRANSCEIVER.

3. THE IFD540/440 MUST BE CONFIGURED FOR NARCO 890/891 DME CHANNELING MODE FOR PROPER OPERATION WITH THIS MODEL OF DME TRANSCEIVER.

4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

5. DME 42 MUST BE STRAPPED FOR 2X5 TUNING. REFER TO DME 42 INSTALLATION MANUAL FOR STRAPPING INFORMATION.

Figure D - 22: Parallel DME Tuning Interconnect



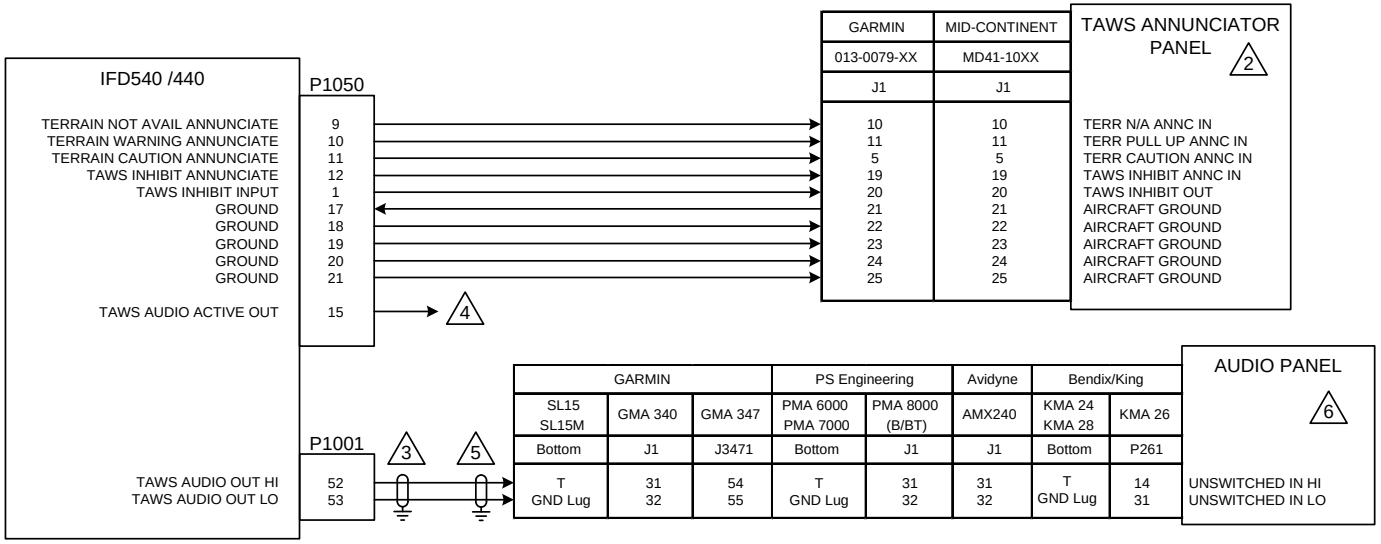
NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. THE IFD540 MUST BE CONFIGURED TO OUTPUT SLIP CODE DME TUNING DATA FOR PROPER OPERATION IN THIS CONFIGURATION.

3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D - 23: Parallel DME Tuning Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. THE TERRAIN ALERTING ON THE IFD5XX/4XX DOES NOT SATISFY ANY PART 91/135 REQUIRMENT FOR A TAWS SYSTEM. INSTALLING AN EXTERNAL ANNUNCIATOR IS NOT REQUIRED.

3. WHEN TWO TAWS-EQUIPPED UNITS ARE INSTALLED IN AN AIRCRAFT, ONLY ONE SHOULD UTILIZE P1001-52/53 TO AVOID COMPETING AUDIO MESSAGES.

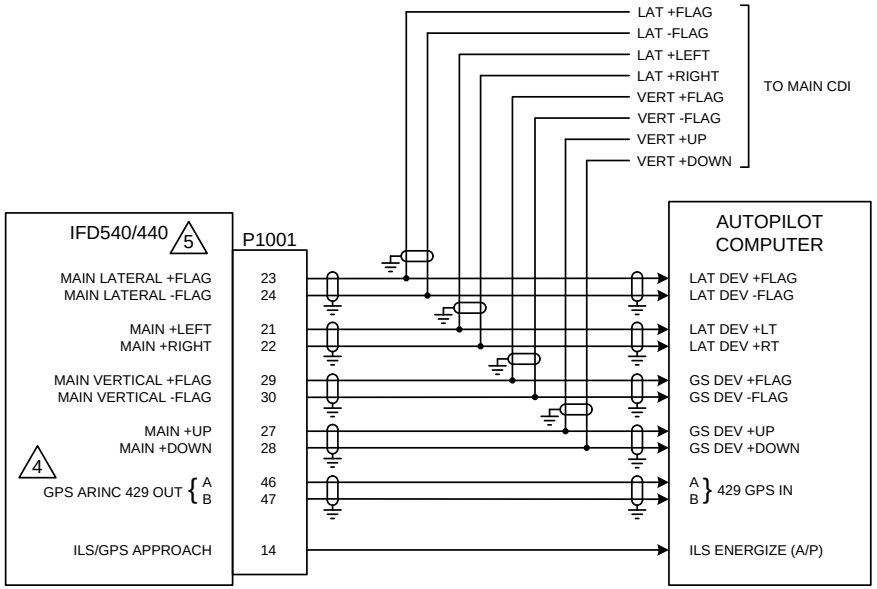
4. CONNECT TO THE AUDIO INHIBIT INPUTS OF OTHER SYSTEMS WITH LOWER PRIORITY AURALS THAN TAWS. THIS CONNECTOR IS NOT AVAILABLE ON THE IFD4XX.

5. SHIELDS FOR AUDIO CABLES SHOULD BE GROUNDED AT ONE END (WITH LEADS LESS THAN 3.0 INCHES) AND LEFT FLOATING AT THE OTHER END. IF SHIELDED AUDIO CABLE IS CARRIED THROUGH A DISCONNECT, CARRY SHIELD GROUND THROUGHOUT DISCONNECT ON A SEPARATE PIN.

6. OTHER UNSWITCHED INPUTS ON THE AUDIO PANEL MAY BE USED IN LIEU OF THOSE SHOWN.

7. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION. PINOUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

Figure D - 24: TAWS Interconnect



NOTES:

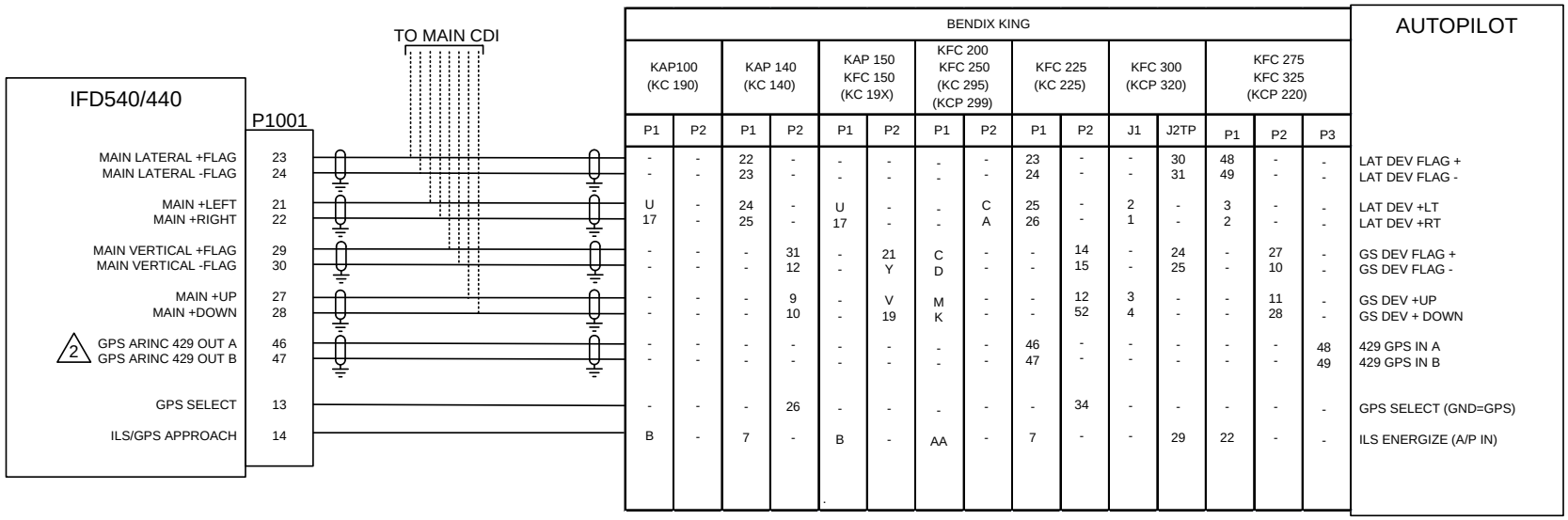
1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
3. ONLY CONNECTIONS SUPPORTED BY THE AUTOPILOT ARE REQUIRED.

△4 ALL “GAMA 429” CONFIGURATIONS OF THE GPS ARINC 429 OUTPUT PROVIDE DATA REQUIRED BY THE AUTOPILOT FOR GPSS. THE “ARINC 429” CONFIGURATION CANNOT BE USED.

△5 IFD540/440 SETUP ITEMS:

MAIN SYSTEM CONFIG PAGE: DISCRETES – ILS/GPS APR: APPROACH ONLY

Figure D - 25: Autopilot Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. ALL GAMA 429 CONFIGURATIONS OF THE GPS ARINC 429 OUTPUT PROVIDE DATA REQUIRED BY AUTOPILOT FOR GPSS. THE ARINC 429 CONFIGURATION CANNOT BE USED.

3. SETUP ITEMS: MAIN SYSTEM CONFIG PAGE: GPS SELECT: PROMPT (KAP 140 AND KFC 225)
   AUTO (FOR ALL EXCEPT KAP 140 AND KFC 225)

4. IF AN EFIS IS INSTALLED, NONE OF THE CONNECTIONS SHOWN ARE REQUIRED. THESE AUTOPILOT SIGNALS ARE PROVIDED BY THE EFIS SYSTEM.

Figure D - 26: Bendix/King Autopilot Interconnect

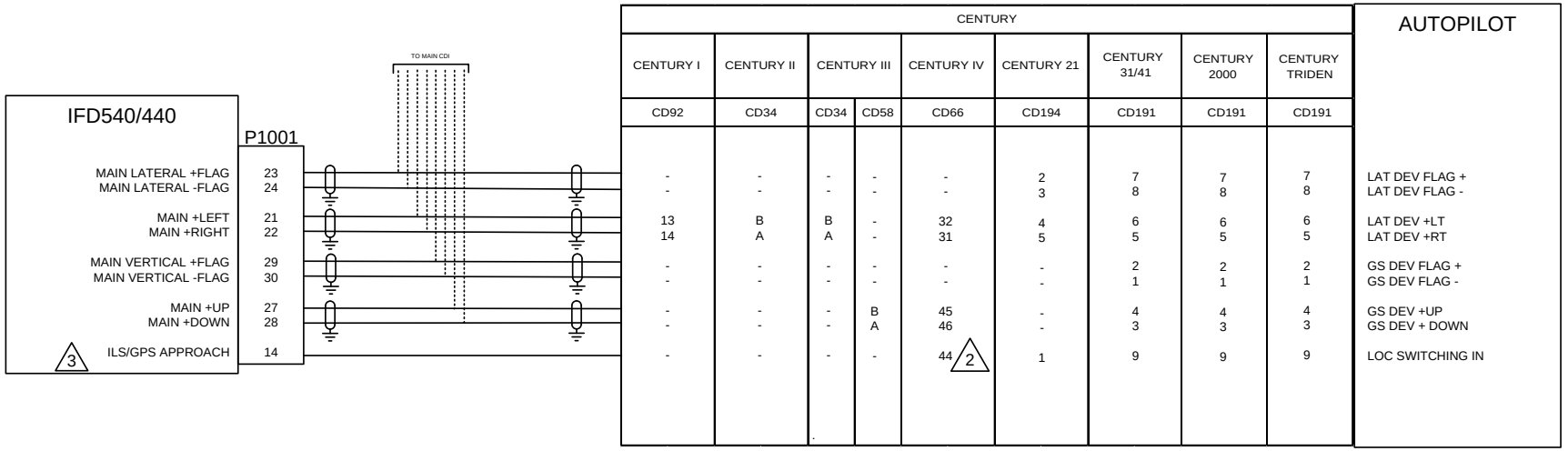
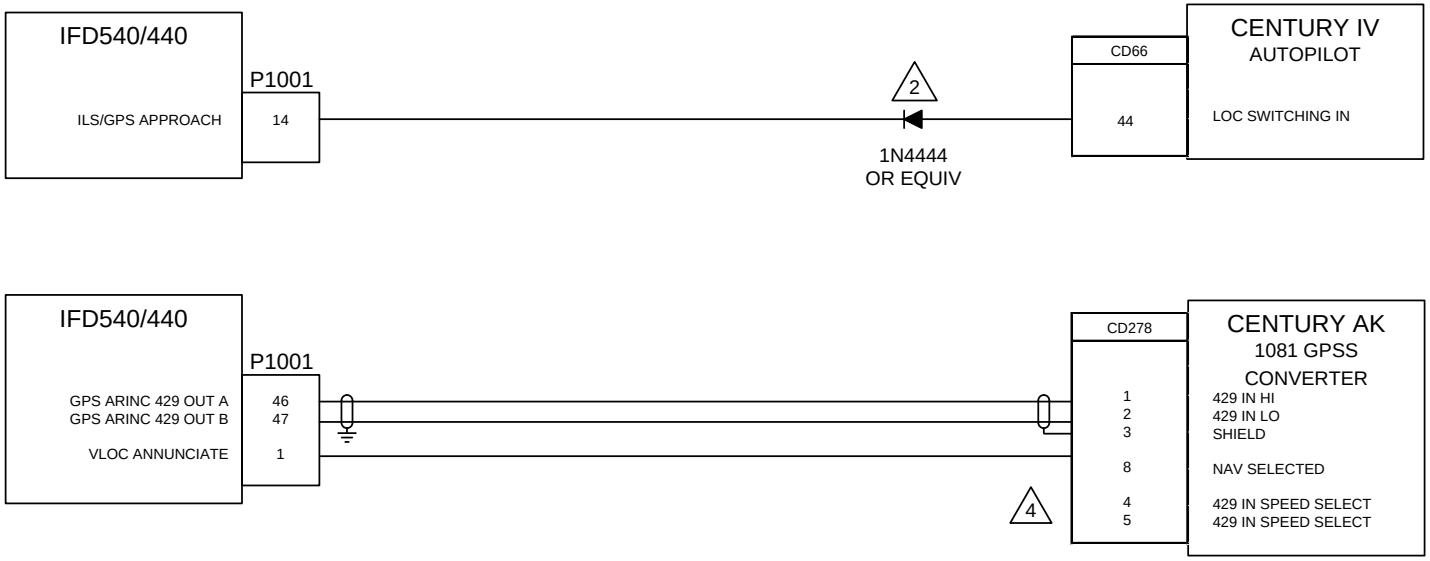


Figure D - 27: Century Autopilot Interconnect Page 1 of 2



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. THE CENTURY IV REQUIRES THAT AN ISOLATION DIODE BE INSTALLED ON THE LOC SWITCHING INPUT AS SHOWN.

3. SETUP ITEMS, MAIN SYSTEM CONFIG PAGE: GPS SELECT: AUTO

4. INSTALL JUMPER AS REQUIRED TO SET AK 1081 ARINC 429 INPUT SPEED TO MATCH IFD540/440 OUTPUT SETTING. REFER TO MANUFACTURER'S DOCUMENTATION FOR ADDITIONAL DETAILS.

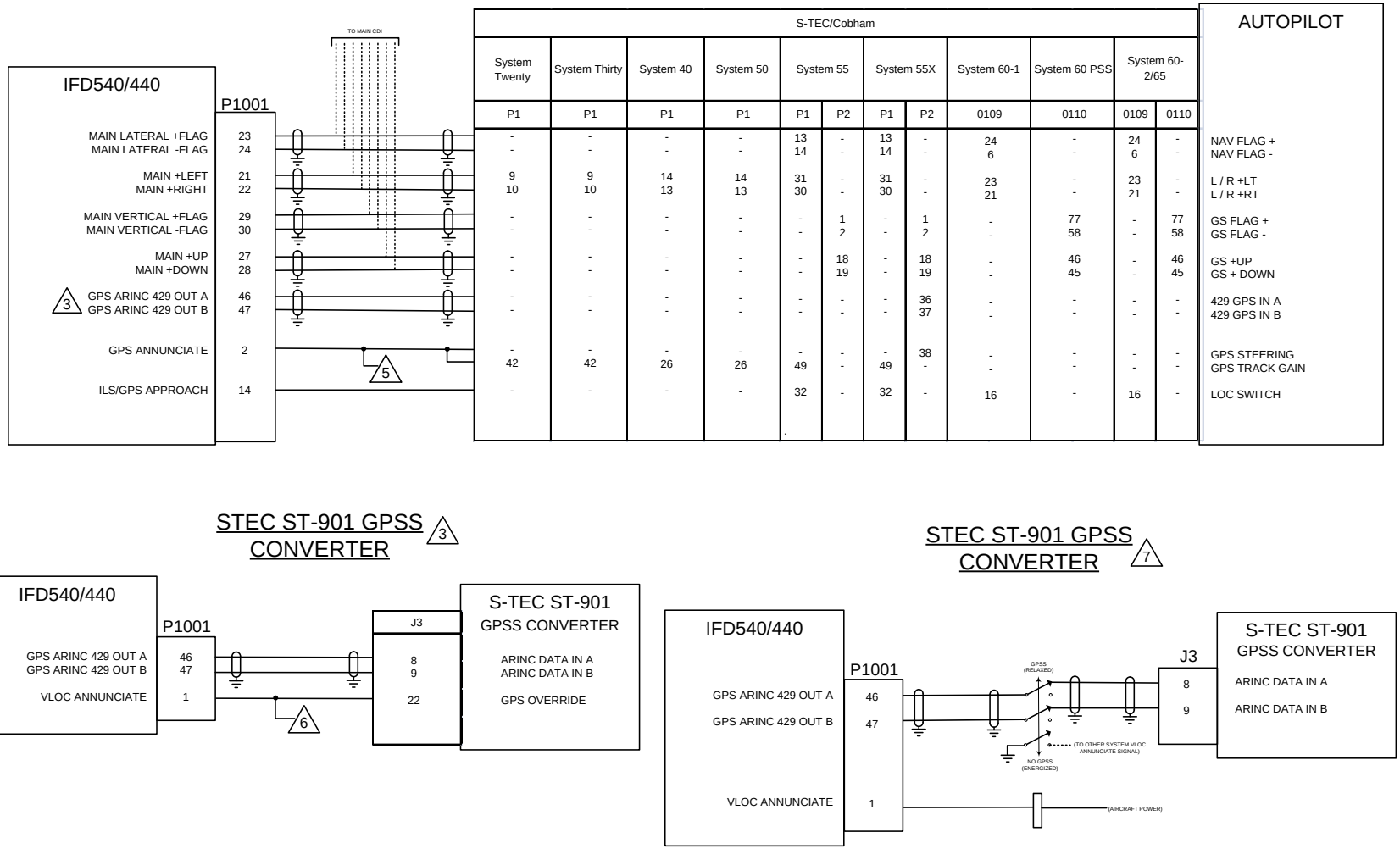
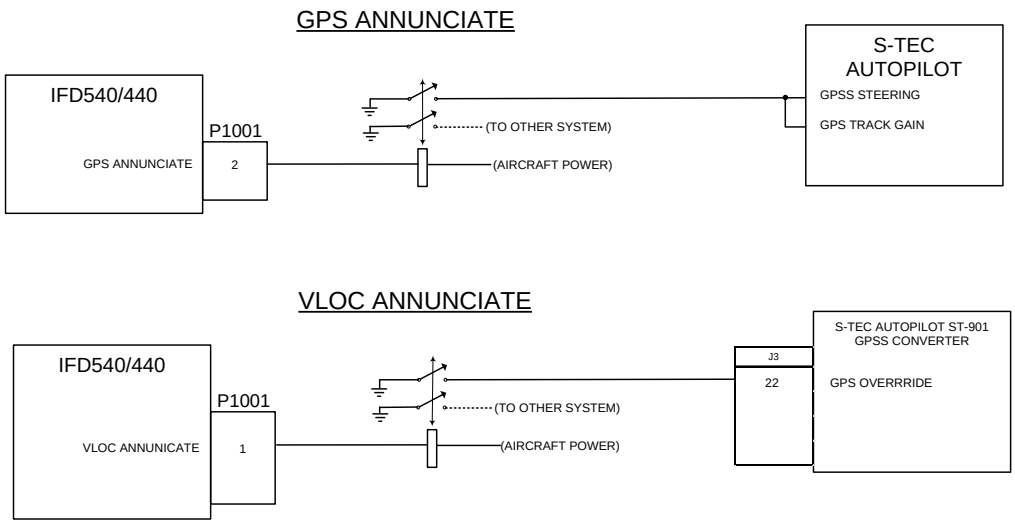


Figure D - 28: S-Tec Autopilot Interconnect

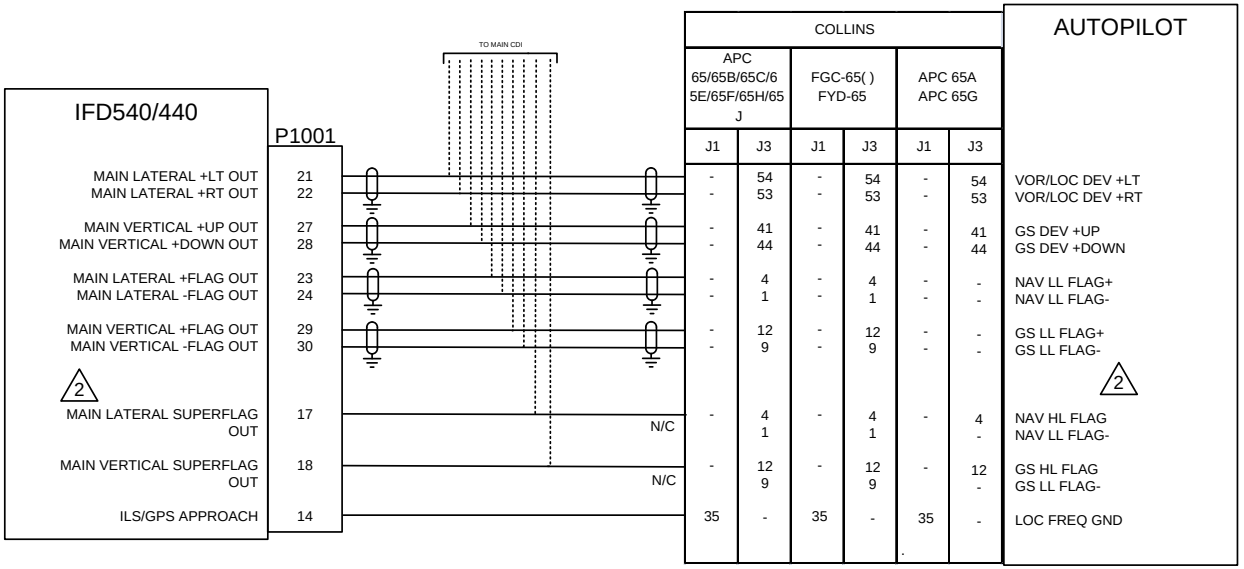
Sheet 1 of 2



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. RESERVED
3. FOR CONVERTERS 01278-( ) S/N 600A AND ABOVE.
4. INSTALL JUMPER AS REQUIRED TO SET AK 1081 ARINC 429 INPUT SPEED TO MATCH IFD540 OUTPUT SETTING. REFER TO MANUFACTURER'S DOCUMENTATION FOR ADDITIONAL DETAILS.
5. IF THE GPS ANNUNCIATE SIGNAL IS ONLY USED BY THE AUTOPILOT, THIS MAY BE CONNECTED DIRECTLY.
6. IF THE VLOC ANNUNCIATE SIGNAL IS ONLY USED BY THE AUTOPILOT, THIS MAY BE CONNECTED DIRECTLY.
7. FOR CONVERTERS 01278-( ) 599 AND BELOW.

Sheet 2 of 2

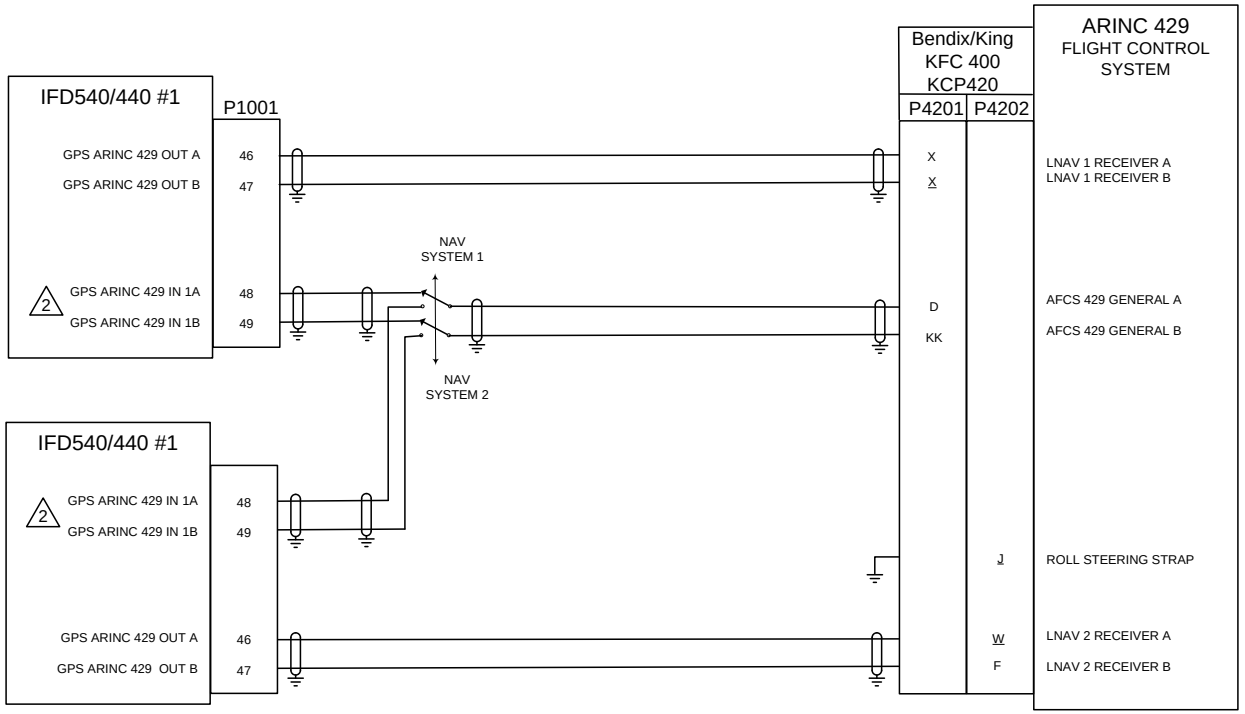


NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2 CONNECT EITHER THE LOW-LEVEL FLAGS OR THE SUPERFLAGS. DO NOT CONNECT BOTH SETS OF FLAGS IN A PARTICULAR INSTALLATION

Figure D - 29: Collins Autopilot Interconnect

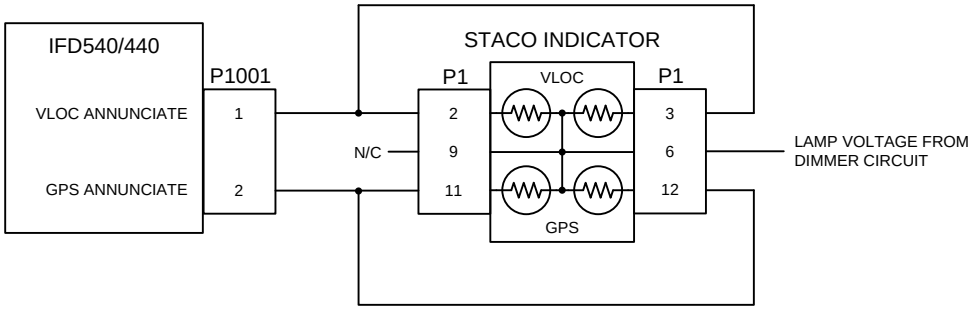


NOTES:

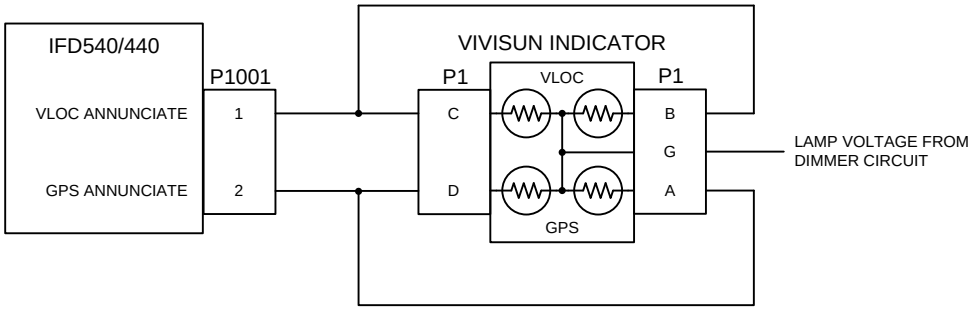
1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. IF THE GPS ARINC 429 IN PORT 1 IS ALREADY BEING USED, GPS ARINC PORT MAY BE USED.
3. LOWER CASE LETTERS SHOWN UNDERLINED.
4. REFER TO MANUFACTURERS' DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

Figure D - 30: Bendix King KFC400 Autopilot Interconnect

STACO INDICATOR CONNECTION 4



VIVISUN INDICATOR CONNECTION 5



VIVISUN INDICATOR/SWITCH CONNECTION 6

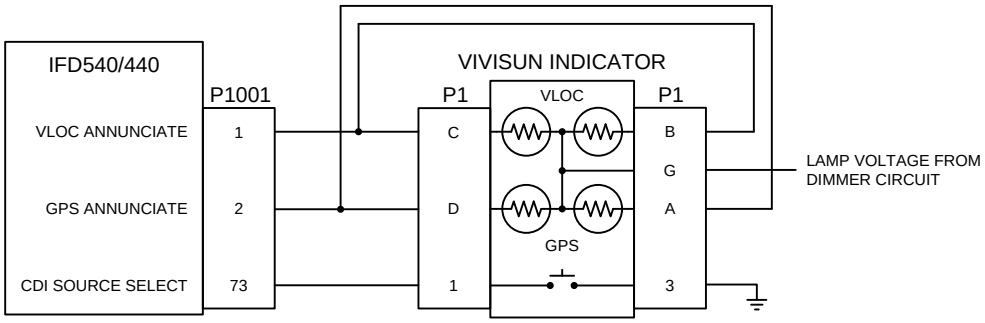
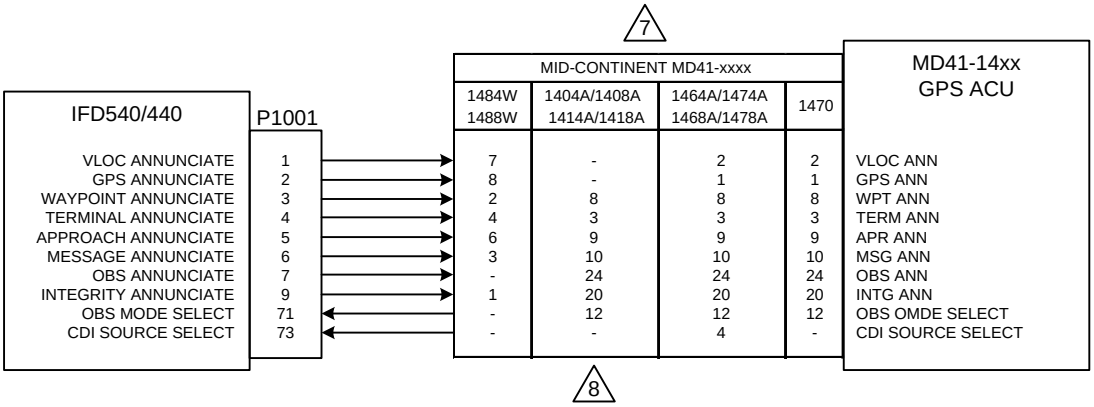


Figure D - 31: External Navigation Source and GPS Annunciators Interconnect

Page 1 of 2



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. IF NAVIGATION ANNUNCIATORS IS REQUIRED, INDICATORS ON THIS PAGE ARE SUITABLE TO MEET THE ANNUNCIATION REQUIREMENT.

3. THE PREFERRED ANNUNCIATION IS VLOC/GPS, ALTHOUGH NAV/GPS WILL BE ACCEPTABLE.

4. STACO SWITCH INDICATOR P/N 992561-1241762200 (14V SYSTEMS) AND P/N 992561-1241862200 (28V SYSTEMS) SHOWN.

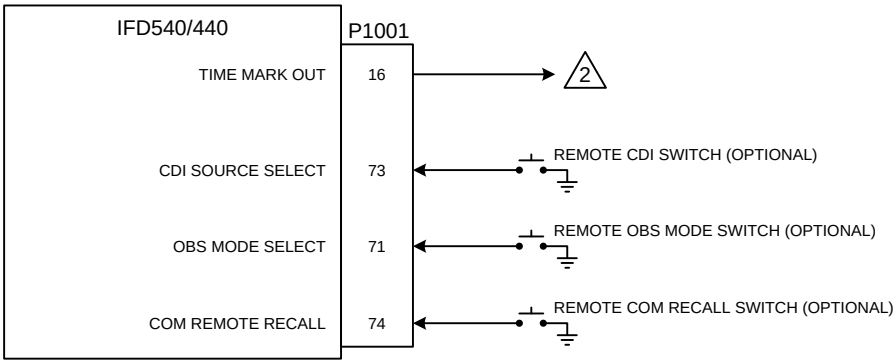
5. VIVISUN INDICATOR P/N 95-40-17-B6-AW724 (28V SYSTEMS) SHOWN. INDICATOR MAY BE CONVERTED TO 14V OPERATION BY REPLACING 28V LAMPS WITH 14V LAMPS P/N 14-113.

6. VIVISUN INDICATOR WITH MOMENTARY SWITCH P/N 95-45-11-B6-AW724 (28V SYSTEMS) SHOWN. INDICATOR MAY BE CONVERTED TO 14V OPERATION BY REPLACING 28V LAMPS WITH 14V LAMPS P/N 14-113.

7. THESE UNITS ALSO PROVIDE NAVIGATION SOURCE SELECTION ANNUNCIATION. MID-CONTINENT ANNUNCIATION CONTROL UNITS FOR BOTH 14V AND 28V SYSTEMS SHOWN. THIS DIAGRAM IS PROVIDED TO SHOW INTERCONNECTION BETWEEN IFD540/440 AND ACU ONLY. REFER TO MID-CONTINENT INSTALLATION MANUAL FOR ADDITIONAL INSTALLATION INFORMATION.

8. CDI SOURCE SELECTION AND ANNUNCIATION IS DONE WITH EXTERNAL RELAYS. REFER TO MID-CONTINENT INSTALLATION MANUAL FOR ADDITIONAL INSTALLATION INFORMATION.

Page 2 of 2



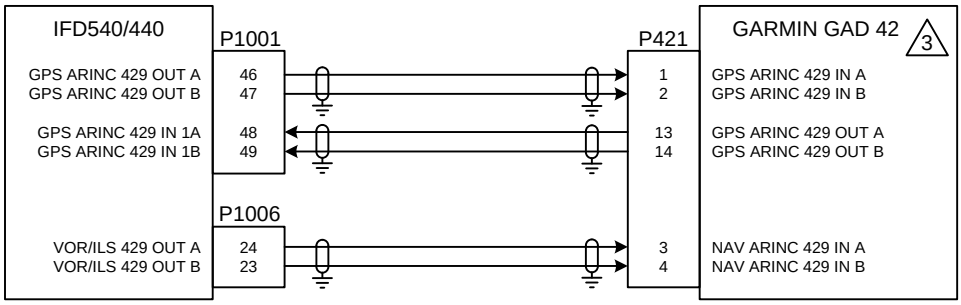
NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. TIME MARK OUT (P1001-16) OUTPUTS A 1 MILISECOND WIDE PULSE ONCE PER SECOND.

3. COM REMOTE RECALL (P1001-74) INPUT MAY BE USED TO SCROLL THROUGH A LIST OF PRESET COM FREQUENCIES.

Figure D - 32: Switch Interconnect



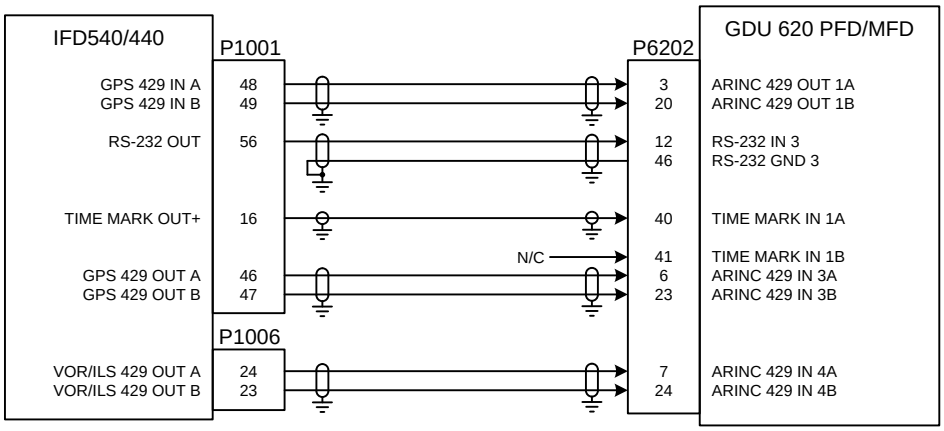
NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

△3 SEE GARMIN GAD 42 INSTALLATION MANUAL FOR COMPLETE PIN-OUT AND INTERCONNECTION INFORMATION. GAD42 MUST BE CONFIGURED USING STRAPS ON THE UNIT.

Figure D - 33: Garmin GAD 42 Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.

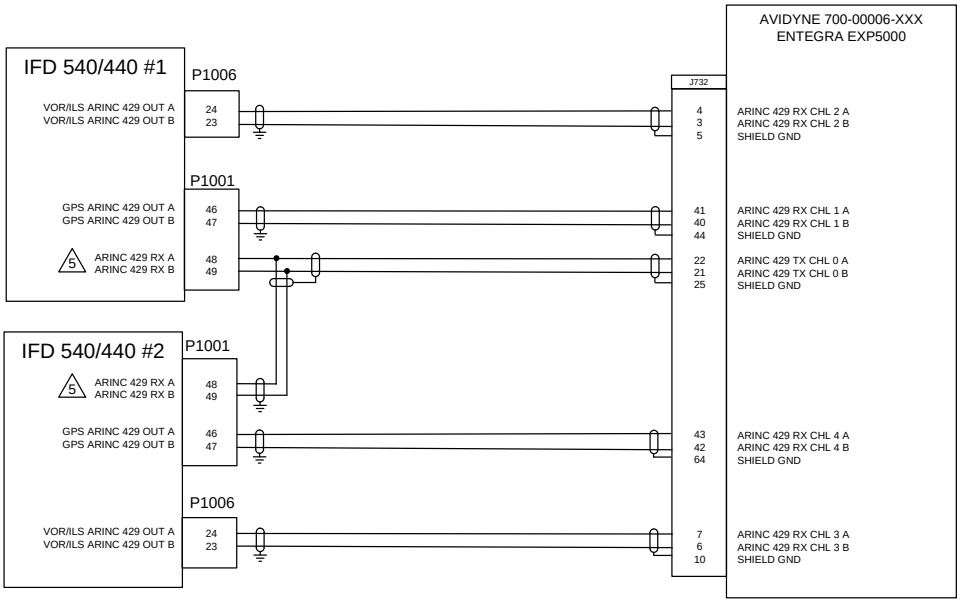
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE – THE SHIELD LEADS MUST BE LESS THAN 3.0 INCHES. CONNECT OTHER SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

3. REFER TO THE MANUFACTURER'S DOCUMENTATION FOR COMPLETE PIN-OUT AND INTERCONNECT INFORMATION. PIN-OUTS OF OTHER UNITS SHOWN FOR REFERENCE ONLY.

4. FOR PROPER SETUP TO INTERFACE WITH THE G600. REFER TO THE G600 INSTALLATION MANUAL. APPENDIX E (P/N 190-00601-06).

6. FOR OTHER CONNECTION OPTIONS REFER TO THE G600 INSTALLATION MANUAL.

Figure D - 34: Garmin G600 Interconnect

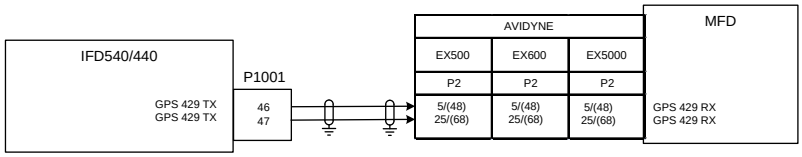


NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.
3. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

△5 IF THE GPS ARINC 429 IN 1 PORT (P1001-48 AND -49) IS ALREADY USED FOR ANOTHER PURPOSE, THE GPS ARINC 429 IN 2 PORT (P1001-50 AND -51) MAY BE CONNECTED INSTEAD.

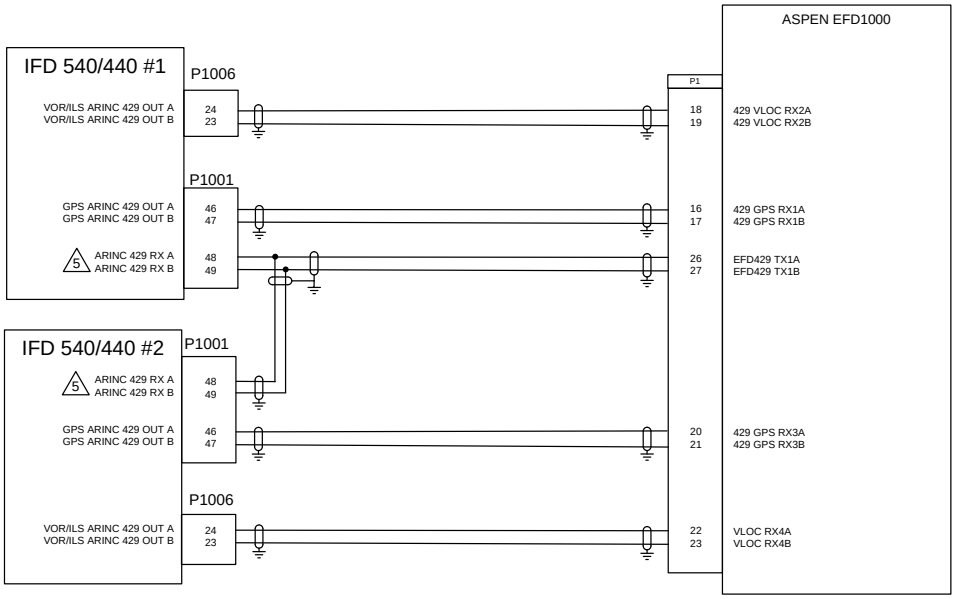
Figure D - 35: Avidyne Entegra Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.
3. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

Figure D - 36: Avidyne EX500/600/5000 Interconnect



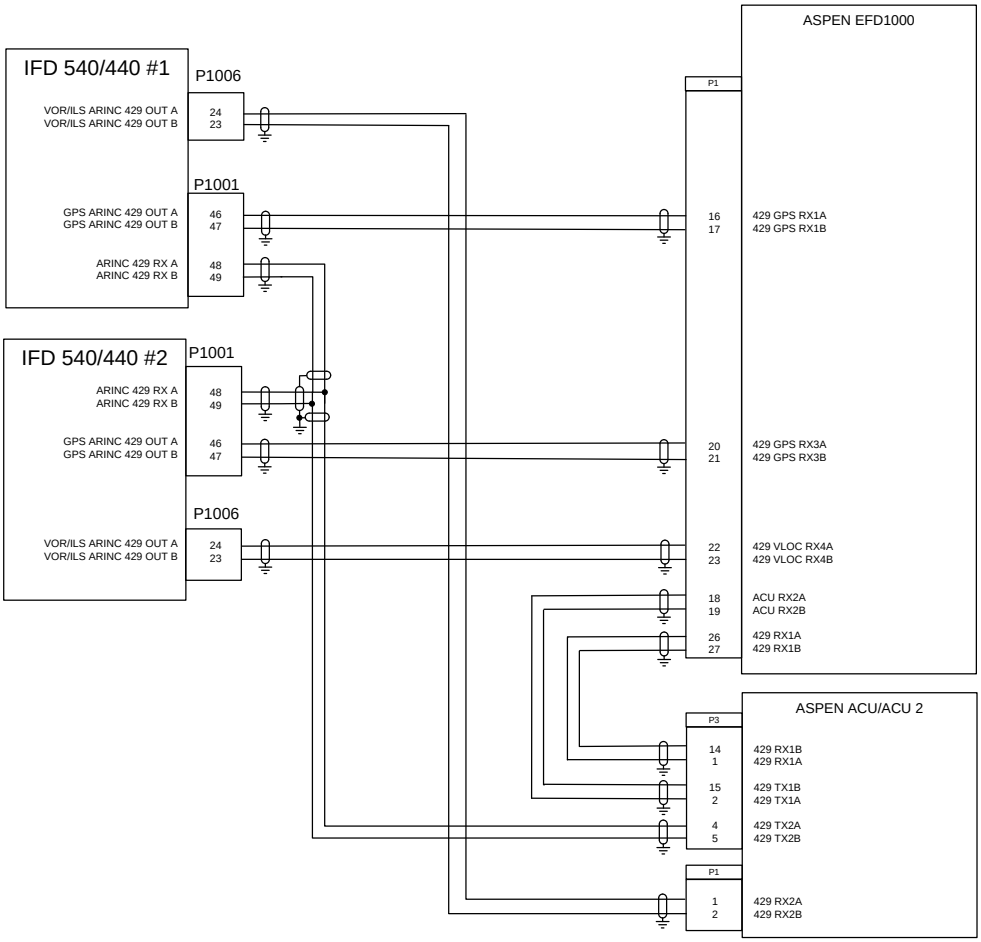
NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.
3. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

5. IF THE GPS ARINC 429 IN 1 PORT (P1001-48 AND -49) IS ALREADY USED FOR ANOTHER PURPOSE, THE GPS ARINC 429 IN 2 PORT (P1001-50 AND -51) MAY BE CONNECTED INSTEAD.

6. REFER TO MANUFACTURER'S INSTALL MANUAL FOR AIRDATA CONNECTION. ASPEN EFD1000 S/W 2.X OR LATER WILL TRANSMIT AIRDATA ON THE ARINC 429 TRANSMIT.

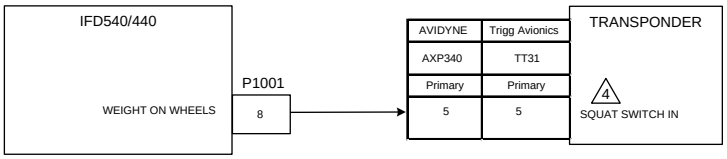
Figure D - 37: Aspen EFD1000 Interconnect (without ACU)



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.
3. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
4. IF THE GPS ARINC 429 IN 1 PORT (P1001 -48 AND -49) IS ALREADY USED FOR ANOTHER PURPOSE, THE GPS ARINC 429 IN 2 PORT (P1001-50 AND -51) MAY BE CONNECTED INSTEAD.
5. THE ACU AND ACU2 TRANSMITS DIFFERENT ARINC 429 LABELS. REFER TO MANUFACTURER'S INSTALL MANUAL FOR DIFFERENCES BETWEEN THE ACU AND ACU2.

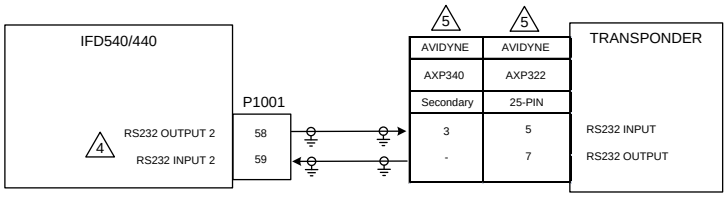
Figure D - 38: Aspen EFD1000 Interconnect (with ACU)



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

△4 IF THE AIRCRAFT HAS AN EXISTING WEIGHT ON WHEELS OUTPUT, DO NOT CONNECT.



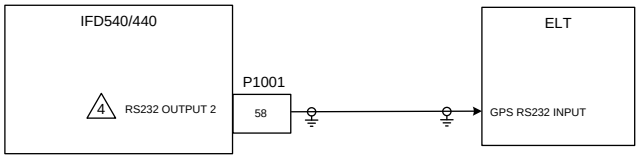
NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

△4 IF RS-232 PORT 2 IS NOT AVAILABLE, USE ANY OTHER AVAILABLE PORT.

△5 ADS-B OUTPUT REQUIRES A SEPARATE INSTALLATION APPROVAL.

Figure D - 39: Transponder Interconnect

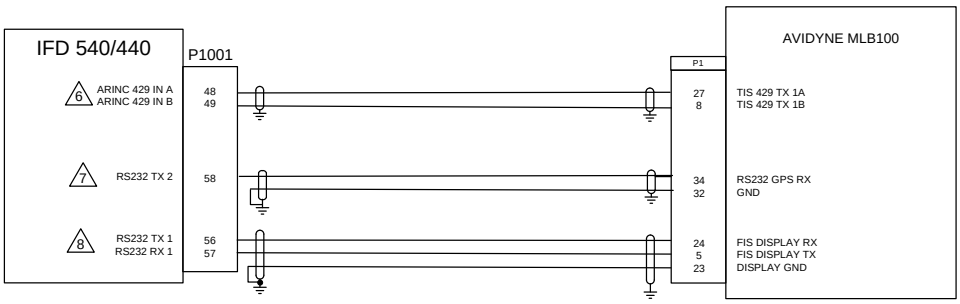


NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
3. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.

4 IF RS-232 PORT 2 IS NOT AVAILABLE, USE ANY OTHER AVAILABLE PORT.

Figure D - 40: ELT Interconnect



NOTES:

1. ALL WIRES TO BE 22 AWG OR GREATER UNLESS OTHERWISE NOTED.
2. AT IFD540/440 UNIT, TERMINATE SHIELD GROUNDS TO THE CONNECTOR BACKSHELL OR USE CARD-EDGE CONNECTOR TO TERMINATE SHIELD GROUNDS TO BACK PLATE.
3. WIRE HARNESS OVERBRAID IS NOT SHOWN BUT MAY BE REQUIRED.
4. REFER TO MANUFACTURER'S DOCUMENTATION FOR COMPLETE PINOUT AND INTERCONNECT INFORMATION.
5. IF RS232 OR ARINC429 PORTS ARE UNAVAILABLE, USE ANY OTHER AVAILABLE PORT.
6. CONFIGURE ARINC 429 PORT FOR **Advisory Traffic, Port Speed: High**
7. CONFIGURE GPS RS232 PORT FOR **Aviation**
8. CONFIGURE DISPLAY RS232 PORT FOR **MLB100 Wx**

Figure D - 41: MLB100 ADS-B IN Receiver

Appendix E: Troubleshooting Guide

Component	Trouble	Probable Cause	Solution
IFD5XX/4XX	The unit is not getting power to the main connector	The unit is not getting power.	Check Circuit Breaker
			Check wiring and unit seating in tray
	The IFD5XX/4XX is not computing a position	Wiring	Check Coaxial Cables
		Antenna	Verify antenna has a clear unobstructed view of the sky
	The GPS Signal levels are very low	Wiring	Check coaxial cable and connectors
			Check routing
		Antenna shading	Verify the antenna is mounted on top of the aircraft
			Verify antenna is clear of hangars, buildings, etc.
		Interference	Verify another piece of aircraft equipment is not interfering with the GPS system
	VHF Com is not transmitting	Wiring	Check the aircraft's PTT switch
			Check Audio Panel (if installed)
			Check wiring
	The IFD5XX/4XX is not tuning the DME	Configuration	Verify the IFD5XX/4XX is configured correctly.
		Wiring	Checking wiring
		DME	Verify the DME is configured for the IFD5XX/4XX tuning type
	RS-232 Device is not communicating	Configuration	Verify the IFD5XX/4XX is configured for the appropriate device.
		Wiring	Check wiring and unit seating in tray
	ARINC 429 is not communicating	Configuration	Verify the IFD5XX/4XX is configured for the appropriate device.
		Wiring	Check wiring and unit seating in tray
	Display appears excessively dim or off	Configuration (configured for "night mode")	Check cockpit dimming rheostat position

Component	Trouble	Probable Cause	Solution
			Check Flight Mode settings on User Options page for Display and Bezel Brightness and source
			Check power button on IFD
			Check Mx Mode settings on Lighting page for proper setting
	CMOS Battery Dead CAS Message	The 10-year life expectancy of the CMOS battery has been reached. This may result in longer GPS satellite acquisition times.	Return the IFD to Avidyne Service Center for battery replacement
	VHF Radio Slots displaying Red-Xs	No power on the P1002 Connector	Ensure all governing circuit breakers have power
		Chassis ID not set to 0 or 1	Check and set as required, the Chassis ID per section 2.2
	Unit starts up in Maintenance Mode	USB fob installed at power up	Ensure fob is not in the USB slot and reapply power to the IFD
		IFD last shut down in Maintenance Mode	Press the left or right side of the AUX page until the “DONE” Line Select Key is visible and press that LSK to force the IFD to restart into flight mode
	Unable to get out of Maintenance Mode or not sure how to	---	Press the left or right side of the AUX page until the “DONE” Line Select Key is visible and press that LSK to force the IFD to restart into flight mode
	IFD to IFD Communication is not functional as indicated by either “CROSSYNC FAIL” CAS message or no data sharing observed between the IFDs	IFD is misconfigured	Ensure RS-232 Channel 3 is set to CrossSync on each IFD
		Wiring incorrect	Ensure serial Channel 3 wiring is installed per Section 4.7
	"Config Mismatch" CAS message on IFD5XX/4XX (dual IFD5XX/4XX only)	Configuration mismatch between the two IFD540 units	Power cycle the IFD5XX units Verify configuration on IFD5XX/4XX units If problem persists, send IFD5XX/4XX log data to Avidyne Technical Support

Appendix F: Configuration Setup

In order to support the requirements of some validations of the AML STC, this section should be easily removable and inserted into the aircraft logs.

For those installations where an IFD5XX/4XX is replacing a GNS-530/W or GNS-430, please record the following parameters from the GNS-530/W or GNS-430/W setup pages before removing the unit (***Note: this will need to be conducted for each GNS-530/W or GNS-430/W being replaced***):

WAAS Enabled (530**W** or 430**W** with approved antenna)? Yes ☐ No ☐ 2nd unit: Yes ☐ No ☐ N/A ☐

530/W or 430/W Hardware Part Number and Revision Number (back of unit or aircraft logs) _____/_____

530/W or 430/W Software Part Number ("Main SW Version" on start up splash screen) __-_____/_____

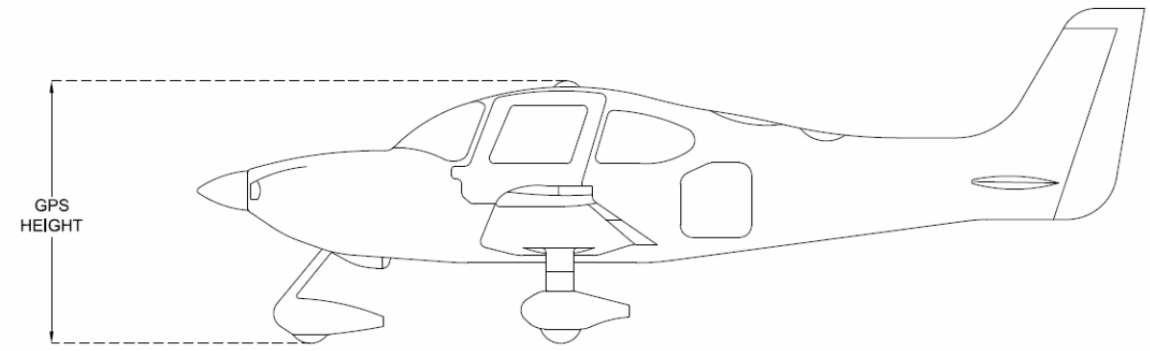
If multiple GNS-530/W or GNS-430/W were installed, describe the slot/location that this specific unit was removed from.

Cockpit Location of Unit(s) in Question

Description of location/slot in the cockpit (Include rough sketch if deemed helpful)	

Measure the distance from the ground to the top of the GPS antenna to nearest tenth of a foot, as shown in the image below, and enter the value in the box below: (to the nearest 1/10th foot).

Measured Height of GPS Antenna



Please list the other avionics that are installed in the aircraft (please be as specific as possible with make and models of the gear) and connected to the GNS-530/W or GNS-430/W. Enter "None" or "Don't Know" as required. The GNS-530/W or GNS-430/W Setup pages will be captured on subsequent pages.

Identification of Devices Connected to the GNS-530/W or GNS-430/W

	1st GNS 530/W or GNS 430/W	2nd GNS 530/W or GNS-430/W (if applicable)
Traffic		
Datalink		
Lightning Sensor		
Autopilot		
Fuel Flow System		
Display(s)		
CDI(s)		
RMI(s)		
Transponder		
DME		
ADF		
Air Data		
IRU/INS		
Other		
Other		
Other		

Please list the other avionics that are installed in the aircraft and connected to the IFD5XX/4XX. Enter "None" or "Don't Know" as required. The IFD5XX/4XX Setup pages will be captured on subsequent pages.

Identification of Devices Connected to the IFD5XX at time of Install

	1st IFD5XX/4XX	2nd IFD5XX/4XX (if applicable)
Traffic		
Datalink		
Lightning Sensor		
Autopilot		
Fuel Flow System		
Display(s)		
CDI(s)		

RMI(s)		
Transponder		
DME		
ADF		
Air Data		
IRU/INS		
Other		
Other		
Other		

GNS-530/W or GNS-430/W Maintenance Mode Entry:

GNS-530 configuration data is accessed from the GNS-530/W Maintenance Mode settings which is entered via holding ENTR button on 530/W bezel during power application.

GNS-530/W or GNS-430/W Page Navigation:

Use the inner right knob on the GNS-530/W to scroll through the maintenance mode pages. Each clockwise click of the knob selects the next page. On pages where selectable fields exist, a push of the right knob will produce a flashing cursor. The outer right knob moves through the fields on a page when there is a flashing cursor. Twist the inner right knob clockwise to see a list of choices. Use the inner right knob to scroll through the list of choices and press the "ENT" button to select the desired choice.

IFD5XX/4XX Maintenance Mode Entry:

IFD5XX configuration data is accessed via Mx Mode which is entered by starting the IFD with a USB Fob already installed or selecting the AUX page, SYS tab, ensuring that the "Select" LSK = Software, and then pressing the "Download Logs" LSK, followed by the "Confirm" LSK. These tables contain all the data that can be entered at time of installation to ensure the IFD5XX/4XX is properly configured. There are additional setup options that selectable by the pilot (Display Options on AUX Setup tab) that are not documented here.

IFD5XX/4XX Page Navigation:

To reach the IFD pages on which this data is to be entered, select the CONFIG tab in Maintenance Mode. Use the outer right knob to select the page – each clockwise click of the outer right knob selects the next page in the list. Push the right knob in to generate a cursor and then use the outer right knob to select an individual field with the cursor. Then twist the inner right knob to scroll through the selectable options for that field and push in the right knob when done with each field selection.

For retrofit installations (those installations in which an IFD5XX/4XX is replacing a GNS-530/W or GNS-430/W), enter the data in the following tables/menu pages from the corresponding fields recorded below in the GNS-530/W or GNS-430/W tables on the left side of each page. Repeat for each retrofit IFD5XX/4XX.

For new installations (those installations in which an IFD5XX is NOT replacing a GNS-530/W or GNS-430/W), select and record the appropriate settings for each configuration page per the descriptive material below each table.

Garmin 530/W or 430/W - MAIN ARINC 429 CONFIG page

	Speed	*Data*
IN 1		
IN 2		
OUT		
SDI		
VNAV (if present)		

IFD5XX/4XX - Main ARINC 429 Config Page (1/12)

	Speed	*Data*
In 1		
In 2		
Out		
SDI		
VNAV		

For new IFD5XX installations, see Section 7.4.2 for selections and descriptions

GNS-530/W or 430/W – MAIN RS232 CONFIG Page

	Input	*Output*
CHNL 1		
CHNL 2		
CHNL 3		
CHNL 4		
CHNL 5		

IFD5XX/4XX - Main RS232 Config Page (2/12)

	Input	*Output*
CHNL 1		
CHNL 2		
CHNL 3		
CHNL 4		
CHNL 5		
CHNL 6		

For new IFD5XX Installations, see Section 7.4.3 for selections and descriptions. IFD4XX do not have Channels 5 and 6.

GNS-530/W or 430/W – MAIN SYSTEM CONFIG Page (Fuel)

CONFIGURE	*Fuel*
FUEL TYPE	

GNS-530/W or 430/W – MAIN SYSTEM CONFIG Page (Terrain) [if present]

CONFIGURE	*Terrain*
TERRAIN TYPE	
TEST CARD?	
HW CONFIG	
012-00296-	
012-00401-	

GNS-530/W or 430/W– MAIN SYSTEM CONFIG Page (Discretes) [if present]

CONFIGURE	*Discretes*
GPS SELECT	
COM PRESETS	

Note: Com Presets are always enabled on the IFD5XX/4XX

GNS-530/W or 430/W– MAIN SYSTEM CONFIG Page (Airframe) [if present]

CONFIGURE	*Airframe*
AIRFRAME	
AIR/GROUND (if present)	

Note: The Air/Ground selection is only present when helicopter is selected for the airframe and is a trigger to look for squat switch input. No equivalent in IFD5XX/4XX.

IFD5XX/4XX – Main System Config page (3/12)

Fuel Type	
GPS Select	
Airframe	
Tail Number	
External TAWS	

Tail Number is a free text field and is used for JSUM.

GNS-530/W or 430/W – MAIN INPUTS Page

OAT		*HDG*		*B ALT*	
SAT		*W DIR*		*D ALT*	
TAT		*GPS SC*		*P ALT*	
IAS		*VLC SC*		*L FF*	
TAS		*CDI*		*R FF*	
W SPD				*T FF*	
				T FOB	
JOYSTICK WPT					

IFD5XX/4XX – MAIN INPUTS Page (4/12)

OAT		*HDG*		*B ALT*	
SAT		*W DIR*		*D ALT*	
TAT		*GPS SC*		*P ALT*	
IAS		*VLC SC*		*L FF*	
TAS		*CDI*		*R FF*	
W SPD				*T FF*	
				T FOB	
JOYSTICK WPT					

Note: There is no data to enter on the IFD5XX/4XX from this page – it is for diagnostics only

GNS-530/W or 430/W – INSTRUMENT PANEL SELF TEST (For reference only)

CDI		*FUEL CAPACITY*
FLG		
VCDI		*FUEL ON-BOARD*
VFLG		
TO/FRM		*FUEL FLOW*
ANNUN		
RMI		*Set Fuel Flow?*
OBS		
DTK		

No IFD5XX/4XX Equivalent Page

GNS-530/W or 430/W– MAIN LIGHTING Page

	Display		*Key*	
LIGHTING				
SOURCE				
RESP TIME / MIN				
SLOPE / OFFSET				
PHOTO TRANS % (if applicable)				
PHOTO SLP / OFST (if applicable)				

IFD5XX/4XX – MAIN LIGHTING Page (5/12)

	Bezel	*Display*
Photo Response Time		
Photo Slope		
Photo Minimum		
Photo Maximum		
dimBus Transition %		
dimBus Slope		
dimBus Minimum		
dimBus Maximum		
dimBus Curve		

Current Lighting		*Dimming Bus Calibration*	
Bezel		*dimBus Type*	
Display		*dimBus Max Voltage*	
Mx Input		*dimBus Min Voltage*	

See Section 7.4.5 for instructions on this page.

GNS-530/W or 430/W – DATE / TIME SETUP Page (No Need to Fill In – For Reference Only)

UTC DATE	*UTC TIME*

No IFD5XX/4XX Equivalent Page

GNS-530/W or 430/W – MAIN DISCRETE I/O Page

GRAY CODE		*DECODED ALTITUDE*	
	EXTERNAL SWITCH	*STATE*	
	RMT CDI ☐	*OBS* ☐	
	DISCRETE TOGGLE		
APR ☐		*OBS* ☐	*ILS/GPS APR* ☐
GPS ☐		*TERM* ☐	
INTEG ☐		*VLOC* ☐	
MSG ☐		*WPT* ☐	

No IFD5XX/4XX Equivalent Page

Note: Check off the squares, as required, to match the solid squares on the GNS-530/430 unit – these check that discretes are wired correctly.

GNS-530/W or 430/W – MAIN CDI / OBS CONFIG Page

	CDI	*NAV FLAG*	*TO-FROM*
LAT			
VERT			
SELECTED	*COURSE*		
CDI	*OBI SOURCE*	*V-FLAG STATE*	

IFD5XX/4XX – MAIN CDI / OBS CONFIG Page (6/12)

	CDI	*NAV FLAG*	*TO-FROM*
LAT			
VERT			
SELECTED	*COURSE*		
	Ignore SEL CRS for GPS		
	Ignore SEL CRS for VLOC		
CDI	*OBI SOURCE*	*V-FLAG STATE*	

For new IFD5XX/4XX installations, see Section 7.4.6 for selections and descriptions.

GNS-530/W or 430/W – COM SETUP Page (GNS-530W/430W Only)

FREQ		*SQ 250*	
SPACING		*SQ 833*	
		SIDETN	
		MIC	
		STORE	*CALIBRATION?*
PTT ☐	*XFR*	☐ ☐	*TX* ☐

Note: The squares above do not need to be recorded – they fill in when/if that function is activated.

No IFD5XX/4XX Equivalent Page

(Use the User Options tab to select 25 or 8.33 kHz spacing)

GNS-530/W or 430/W – VOR/LOC/GS CDI Page

	CDI	*NAV FLAG*	*SPR FLAG*	*TO-FROM*
LAT				
VERT				
SELECTED COURSE				
DME CHANNEL MODE				

GNS-530W or GNS-430W Only

IFD5XX/4XX – VOR/LOC/GS CDI Page (7/12)

	CDI	*NAV FLAG*	*SPR FLAG*	*TO-FROM*
LAT				
VERT				
SELECTED COURSE				
DME CHANNEL MODE				

For new IFD5XX/4XX installations, see Section 7.4.7 for selections and descriptions.

GNS-530/W or 430/W – VOR/LOC/GS ARINC 429 CONFIG Page (GNS-530W/430W Only)

	RX	*TX*
SPEED		
SDI		
DME MODE		

IFD5XX/4XX – VOR/LOC/GS ARINC 429 CONFIG Page (8/12)

	RX	*TX*
SPEED		
SDI		
DME MODE		

For new IFD5XX/4XX installations, see Section 7.4.8 for selections and descriptions.

GNS-530/W or 430/W– GPS Vertical Offset (if present)

GPS Antenna Height Above Ground	

IFD5XX/4XX – GPS Antenna Setup Page (9/12)

GPS Antenna Height Above Ground	
Antenna Type	

Note: Use the data recorded at the beginning of Appendix F to enter the Antenna Type field.

GNS-530/W or 430/W– Stormscope Config Page (if configured for Stormscope)

STATUS:	*MODE:*
SW VERSION:	*ANT MOUNT:*
HDG FORMAT	*HDG FLG SENSE*
☐ *HDG FLAG*	☐ *SYNC ANGLE*
☐ *HDG STAB*	☐ *SYNC REF*
☐ *HDG VALID*	

Note: Squares should all be green if no issues.

No IFD5XX/4XX Equivalent Page

GNS-530/W or 430/W – STORMSCOPE TEST Page (if configured for Stormscope)

MODE
STATUS
TRIGGER COUNT
HDG

No IFD5XX/4XX Equivalent Page

Note: Stormscope and TWX monitoring in the IFD5XX/4XX is accomplished after a 3 minute suppression period in-flight after which any faults are displayed.

GNS-530/W or 430/W– STORMSCOPE DATA DOWNLOAD Page (if configured for Stormscope)

SOFTWARE VERSIONs:	

No IFD5XX/4XX Equivalent Page

GNS-530/W or 430/W – Traffic Config Page (if configured for Traffic)

ALT	
LIM A *(if 429 interface)*	
LIM B *(if 429 interface)*	
HDG *(if 429 interface)*	
BARO ALT ☐	*(if 429 interface)*
RAD ALT ☐	*(if 429 interface)*
TEST MODE?	*(if 429 interface)*

Note: Check off the squares, as required, to match the solid squares on the GNS-530 unit.

No IFD5XX/4XX Equivalent Page

Note: Traffic monitoring is accomplished after a 3 minute suppression period in-flight when any faults are announced. There should be no Red-X on the traffic thumbnail if configured on the Setup pages.

GNS-530/W or 430/W– RYAN TCAD CONFIG Page (if configured for Ryan TCAD]

MODE	
APPROACH MODE	
HEIGHT	
RANGE	
GND/FLD ELEVATION	
VOLUME	
MUTE DURATION	
VOICE ALERT	
UNKNOWN DEVICE	☐ *STATUS* ☐ *MUTE*

No IFD5XX/4XX Equivalent Page

Note: Use the presence of the traffic thumbnail and the Audio Volume Control page to control these parameters in the IFD5XX/4XX.

GNS-530/W or 430/W – GAD 42 Config Page (if configured for an ARINC 429 input from GAD 42)

MAIN RMI/OBI		*ROLL STEERING*	
NAV RMI/OBI		*REMOTE CRS SEL*	
SEL CRS DRIVE		*TAS INPUT*	
DIST SERIAL		*GPS/NAV 429 L/H*	
		HEADING 429 L/H	
GAD SW VER:			
STATUS:			

No IFD5XX/4XX Equivalent Page

Note: Manually strap the GAD42 or ensure stored configuration is not lost. The IFD5XX/4XX alerts in flight mode if the GAD42 reports a fault.

GNS-530/W or 430/W– TAWS Audio Config Page 1 (if installed)

TAWS CONFIG	
VOICE GENDER	
VOLUME	
PLAY AUDIO MSG	

No IFD5XX/4XX Equivalent Page

(Use the User Options LSK and Volume Control LSK of the Audio Tab instead)

GNS-530/W or 430/W – TAWS Audio Config Page 2 (if installed)

ALERT	*Reduced Terrain Clearance*
CAUT	
WARN	
ALERT	*Reduced Obstacle Clearance*
CAUT	
WARN	
ALERT	*Imminent Terrain Impact*
CAUT	
WARN	
ALERT	*Imminent Obstacle Impact*
CAUT	
WARN	

No IFD5XX/4XX Equivalent Page

(Use the User Options Tab instead)

GNS-530/W or 430/W – GDL Config Page (if installed)

ATTENUATION	
MODEL (if displayed)	

IFD5XX/4XX – GDL Config Page (if installed) (10/12)

ATTENUATION	
MODEL	

GNS-530/W or 430/W – DATALINK DIAGNOSTICS Page (if installed)

QOS	*TERR*
SAT 1	*SAT 2*
TUNER	

No IFD5XX/4XX Equivalent Page

Note: Use the Datalink Status page on the AUX-SYS tab for datalink status data.

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