SANDEL®

SN3500
Primary Navigation Display

Installation Manual

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Revision History

Revision	Date	Comments
K	11/30/2010	Updated for software version 4.03 AR1154 Section 1.1.1: Added TACAN ITAR Export Notice. Removed NVIS notice. Section 1.3.1: Added list of recommended crimp tools. Section 2.2.2: Positronics P/Ns added for connectors Section 2.6.1: Updated 429 Label Description table. Section 2.6.2: Table formatting updated. Section 7.1.14: Changes to maintenance page 14: added procedure for calibrating the minimum brightness when an external brightness control is used.
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I	N/A	Intentionally skipped.
H	8/24/09	Updated for software version 4.01 AR1087. Section 3.3.1 change inverter range from 360 - 440Hz. to 240 - 560 Hz. Section 3.3.2 change inverter range from 360 - 440Hz. to 240 - 560 Hz. Section 7.1.1 corrected reference from ST3400 to SN3500.
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Revision	Date	Comments
E	6/16/08	Updated for software version 3.04 and TACAN support Page 1-1: Added export control notice. Page 1-2: TACAN added. Page 1-6: TACAN added to bearing pointer inputs. Page 1-8: NVIS Display Brightness / [M] button LED operation note added. Page 1-8: TACAN added Page 2-1: Low voltage operation support note added Page 2-1: Update part number definition Page 2-2: USB cable added to Bill of Materials Page 2-5: Low voltage operation note added Page 2-6: TACAN added Page 2-9: TACAN added Page 2-15: TACAN label added Page 3-4: TACAN added to pinout description Page 3-7: TACAN added to pinout description Page 7-1: Index page updated for TACAN capability Page 7-20: Page updated for NVIS brightness/ M button LED status Page 11-5: TACAN added to NAV source selection Page 11-6: TACAN added to bearing source selection Page 11-15: TACAN added to enroute operations checks Page 11-16: TACAN approach operations added.
D1	01/31/08	A/R 958 Updated Effective drawing list. Modified 82005-10 sheet 28. Added 82005-10 sheet 38
D	11/15/07	A/R 924 Page 1-1: Updated applicable TSOs and ETSO. Page 2-1: Lamp kit added. Page 2-2: Updated applicable TSOs and ETSO Pages 3-9 & 3-10: Clarify pin description P2-28, P2-13. Clarify composite input connection with analog NAVs. Page 3-9: Clarify P2-10 HDG/CRS Excitation connection when not connected. Page 5-1: Added reference to 82005-PG (SN3500 Pilot's Guide) for light source identification and data color coding details. Page 7-1: Updated INDEX maintenance page image. Page 7-10: Updated GPS-1 maintenance page image. Pages 7-10 & 7-12: Added selections for ARINC 429 on GPS 1 and GPS 2 maintenance pages. Page 7-11: Updated GPS-2 maintenance page image. Pages 7-11 & 7-12: Added selections for GPS Approach Mode Active Status on GPS1 and GPS2 maintenance pages. Page 7-15: Added definition for lateral and vertical deviation output calibration in maintenance pages. Page 7-18: KTA-810 configuration note added. Page 7-19: Updated BRT/DATA BLK maintenance page image. Page 8-2: RTCA/DO-160E Environmental Qualification Form added.
C1	12/16/05	A/R 824 Updated following pages: Page iv, revision; Page 2-4, weight in kg; Pages 2-6 and 3-5, deviation left/right; Pages 3-9 and 7-13, FCS selection; Page 3-12, P3-10 NAV menu typo; Pages 12-1 and 12-2, drawing rev updates. Pages 1, 33 & 36 of installation drawings updated.
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B	N/A	Skipped
A3	06/06/2005	A/R 782 Minor doc changes for production release
A2	05/06/2005	A/R 782 Minor doc changes and pin-out corrections

Revision	Date	Comments
A1	04/21/2005	A/R 780 minor doc and dwg changes
A	03/31/2005	Initial release

1 General Information

1.1 Introduction

The information contained within this Installation Manual describes the features, functions, technical characteristics, components, approval procedures, installation considerations, setup procedures, checkout procedures, and instructions for continued airworthiness for the Sandel Avionics SN3500 Primary Navigation Display.

The SN3500 is the industry's most capable electronic HSI. It can be used to directly replace a mechanical DG or HSI as a primary display, or the SN3500 can be used as a replacement or upgrade for an existing Sandel SN3308 navigation display. It is signal (but not plug) compatible with the SN3308, and is an upgrade in performance with both an improved display and added features.

1.1.1 EXPORT CONTROL NOTICE

The TACAN display option software key (p/n 90143-TCN) is subject to the licensing jurisdiction of the Department of State in accordance with the International Traffic in Arms Regulations (ITAR) (22 CFR 120 – 130). It may not be exported (sent, transferred, disclosed or otherwise released to a foreign person) without a license issued by DDTC.

1.2 Equipment Description

1.2.1 Features

The Sandel SN3500 Primary Navigation Display is an advanced microprocessor controlled airborne multipurpose electronic display which is FAA approved under technical standard order TSO C6d, C34e, C35d, C36e, C40c, C41d, C113, C118, and C119b. The SN3500 is also EASA approved under ETSO C113. The SN3500 employs a patented active matrix liquid crystal (AMLCD) projection display. It is designed to combine the functions of:

- **Basic Horizontal Situation Indicator (HSI)**
- **Long-Range Navigation (GPS or FMS) Map Display**
- **WX-500 Stormscope® Display**
- **DME Readout**
- **Marker Beacon Indicator**
- **NAV Converter**
- **Autopilot Switching**
- **GPS Annunciators and External Mode Switches**
- **Traffic Display**
- **FIS-B Data Link weather display (software version 3.00 and above)**
- **Optional Class B Night Vision (NVIS) Compatible (Software 3.04 and above)**
- **Optional Reversionary Attitude Display (Software 4.00 and above)**

Outputs of heading and course datum and bootstrap heading output are provided, as well as L/R and U/D deviation output and flags. The versatile digital and analog interface properties of the unit provide for compatibility with most VHF navigation receivers, ADF's, TACAN's, DME's, GPS's, remote gyros and flux gates.

The SN3500 is designed to display the flight plan data from a connected GPS receiver. The moving map database for the SN3500 as well as the internal operating system software are field loadable through the use of a portable computer equipped with a USB port and a USB capable version of Microsoft Windows.

Although simple, retrofit replacement of most existing three-inch PNI's or HSI's is possible without additional features, we strongly encourage complete installation of the unit with all compatible peripheral equipment interconnected to maximize its functional capability.

1.3 Installation Planning

Sandel Avionics has taken many equipment interface possibilities into consideration during the design of the SN3500 to ensure maximum interoperability with other avionics. Contact the factory with any questions about interfacing to specific avionics equipment not covered in the installation drawings.

To simplify installation and installation planning, signals are wired to the SN3500 pins per the installation diagrams and software setups are used in a post-installation procedure to assign protocols/gradients to each pin based on the equipment connected. There are separate maintenance menu pages for each equipment function and in most cases the selections are made by equipment make/model.

1.3.1 Installation Planning Cycle

1) Compile an equipment list for the aircraft.

2) Study the feature list below, and determine the desired functional characteristics for the installation.

3) Study the installation drawings to determine a basic interconnect scheme and check for conflicts.

4) Develop the specific wiring diagrams unique to the aircraft.

5) Assemble required tools. Recommended crimp tools are given in the following table.

Recommended Crimp Tools					
		High Density 22-28 AWG		Standard Density 20-24 AWG	
Manufacturer	Hand Crimping Tool	Positioner	Insertion/ Extraction Tool	Positioner	Insertion/ Extraction Tool
Military P/N	M22520/2-01	M22520/2-09	M81969/1-04	M22520/2-08	M81969/1-02
Positronic	9507	9502-3	M81969/1-04	9502-5	M81969/1-02
ITT Cannon	995-0001-584	995-0001-739	N/A	995-0001-604	980-2000-426
AMP	601966-1	601966-6	91067-1	601966-5	91067-2
Daniels	AFM8	K42	M24308/18-1	K13-1	M24308/1-02
Astro	615717	615725	M81969/1-02	615724	M81969/1-02

1.3.2 Post Installation Summary

1) Prior to power-up review correct wiring by using standard ohmmeter and voltage checks. Insure the correct orientation and positioning of the three SN3500 'D' connectors. The connector numbers are printed on the back of the SN3500 for reference.

2) Review special items such as connection of the NAV receiver resolver wiring.

3) Apply power to the SN3500, bring up in maintenance mode and sequentially access each SN3500 maintenance page to correctly select the installed equipment.

4) Perform Ground Test procedures

5) Perform Flight Test procedures.

1.4 Interface Planning

1.4.1 Compass System

Determine whether the SN3500 is to be used internally slaved or unslaved. Unslaved operation would be appropriate when the SN3500 is bootstrapped to an already slaved compass system or is being slaved to a panel mounted DG with bootstrap output.

Plan for:

- High Resolution Digital Output from a Mid-Continent 4305 series DG with gyro valid output, flux gate 10 Vac Fluxgate Excitation and Internal 26Vac Inverter (internal slaving)

- Quadrature stepper motor drive input from a Bendix/King KG 102 series DG with compass valid output and flux gate connected directly to SN3500 (internal slaving).
- 3-wire ARINC 407 synchro DG with or without gyro valid output and fluxgate. (internal slaving)
- 3-wire ARINC 407 synchro remote or panel mounted DG self-slaved with or without gyro valid output. (SN3500 unslaved)
- ARINC 429 Heading Input from AHRS. Sandel monitors for Label 320, Magnetic Heading Data and Label 270 System Status (SN3500 unslaved)

Internal slaving requires connection of the flux gate excitation to the SN3500 flux gate reference input P2-24. This input is used only to demodulate the flux gate signals.

DG's with XYZ bootstrap outputs require the master 400Hz inverter to be connected to the SN3500 400Hz reference input on P1-16. This input is used to lock all 400Hz inputs on P1 and 400Hz outputs in the SN3500. This input presents no loading to the source.

Follow the information on the installation drawings, and plan to set up the appropriate compass selections on the compass system maintenance page.

Internal slaving does not require the use of an external slaving accessory. Compass calibration is performed using the SN3500 Compass maintenance page. The SN3500 will provide standby heading operation from the flux gate alone in the event of directional gyro (DG) failure.

The SN3500 has a 3-wire ARINC 407 synchro bootstrap compass output if required which is capable of driving electronic loads.

1.4.2 Autopilot Switching

The SN3500 has low level deviation and flag outputs intended to drive an autopilot. These outputs feed from the pilot selected navigation source. These outputs may eliminate the need for an external autopilot switching relay.

However if an external switching relay is used (for instance for compatibility with an existing installation) the SN3500 has protected Open Drain relay output discretes intended to drive external switching relays. These outputs have 250ma maximum current and pull to within 1 ohm of ground.

NAV1 selection is the default selection and no relay driver output discrete is available. The NAV2, GPS-1, or GPS-2 outputs can be used to operate a switching relay for each source, allowing the pilot to control the NAV source selection from the front panel of the SN3500. This is referred to as "master" mode and it is the preferred mode of installation. In this configuration an additional remote switch/annunciator panel for a GPS receiver is not required.

In the event the aircraft has an existing GPS switch/annunciator panel or it is desired that one be installed, the "GPS SELECTED-" input on the SN3500 is used to remote

sense the selection of the GPS1 and annunciate the selection. This is referred to as "slave" mode. It allows annunciation of the selection on the SN3500 but does not use the front panel NAV switch to select the GPS receiver. This mode is only available for use with a single GPS.

Master/Slave mode selection is done in the NAV maintenance page.

When any relay is used, the SN3500 uses a wraparound RELAY SENSE input, which provides feedback of failure of the switching relay. A pole on the external relay is used to ground an SN3500 input pin when the relay is in the energized position. If the low signal is not detected, the SN3500 annunciates the relay failure by redlining the NAV source display.

1.4.3 Autopilot Course and Heading Datum

Course and heading datum outputs are provided. These can be selected to be AC or DC in the Flight Control System (FCS) maintenance page and depending on whether Datum Excitation is connected. The direction sense of these signals can be reversed as required.

A Back-course discrete output is provided for annunciation or AFCS reverse-course control when required. This operates during LOC operation when the aircraft is flying with the tail of the Course Pointer up.

For older Century autopilots a Datum Excitation (5Khz) input is provided. However, an external transformer coupler must be fabricated. See installation drawings.

1.4.4 GPS Annunciators

For receivers without serial communication capability, discrete annunciator inputs are provided for ARM, ACT, WPT or HLD, MSG, OBS/LEG Mode, and Parallel Track. Connect the pins appropriate to the installed receiver and select the receiver type on the LNAV maintenance page. See GPS/SWITCH/ANNUNCIATORS Installation drawing for the complete matrix of outputs and annunciators.

Discrete control outputs are provided for APPR ARM, OBS Mode (King KLN90) and HOLD (II Morrow). These are open-drain outputs.

The Garmin GNS receivers use ARINC 429 for the annunciator functions so no discrete connections are used.

1.4.5 VLOC Navigation – Internal NAV Converter

For new installations that do not already have an external NAV converter, the SN3500 supports *internal* demodulation of composite NAV and Localizer to supply the display and autopilot outputs with L/R deviation and course selection. See the appropriate installation drawings.

1.4.6 VLOC Navigation – External NAV Converter

The SN3500 has a single, conventional set of low level analog inputs for deviation, flags, etc. from a primary NAV receiver. See the installation diagram for details. These inputs are not used when the Garmin GNS430/530 ARINC NAV receiver, which uses ARINC 429 only, is being used. If more than one receiver is used which has analog signaling, this will require switching relays to feed the single set of SN3500 inputs. Deviation only NAV converters not providing bearing information are supported.

There are only low level flag inputs. If it is desired to use a Superflag instead of a low-level flag from the NAV receiver, a series resistor must be used to the low level '+' input and the '-' input is grounded. See the installation drawings.

Optional ILS lockout of the GPS selection is provided by an ILS Energize 1/2 input pins. This feature can be disabled on the NAV maintenance page. In the Master mode this will cause the SN3500 to revert to and annunciate NAV1 when an ILS is tuned on NAV1, or NAV2 when an ILS is tuned on NAV2. Disabling of ILS lockout is called for when the customer does not want ILS lockout operation, or when a GPS receiver with vertical guidance is used to drive the ILS Energize pin during GPS operation. In this situation NAV1/GPS1 use ILS Energize 1, and NAV2/GPS 2 use ILS Energize 2 to display vertical guidance.

For analog receivers, two types of resolvers are supported.

a) An electronic OBS resolver with rotor input and SIN/COS outputs is provided. An associated DC reference pin must be connected to the stator low-side connection of the NAV receiver. This may be ground but may also be a DC reference voltage of approximately 4.5vdc. WARNING: You must check the NAV receiver wiring before installation planning and before applying power to the system to prevent NAV receiver damage from inadvertent miswiring. Refer to the Sandel installation drawing.

   This resolver will operate from 30Hz to 500Hz and is calibrated in the NAV maintenance page.

b) An electronic 400Hz differential resolver is provided for use with 400Hz receivers such as Collins VIR-30A. This interconnect uses SIN/COS inputs (Z-ground referenced) and SIN/COS outputs (Z-ground referenced).

1.4.7 Marker Beacon

Three inputs are provided for a Marker Beacon repeater. These are DC level-sensitive inputs. The thresholds and logic levels are adjusted by selection of the appropriate equipment type on the MKR maintenance page. Lamp load resistors are internal.

The SN3500 can also monitor label 222 when marker beacon data is provided from an ARINC 429 source.

1.4.8 Bearing Pointers (VOR, ADF, and TACAN)

The bearing pointers can derive their information from any of the connected navigation receivers, including two composite NAV inputs, ADF's, TACAN's, and the long range navigation receivers through the serial ports.

ADF's can be connected as ARINC 407 synchro or DC SIN/COS inputs. See the installation drawings for interconnection data and select the appropriate format from the ADF maintenance page.

The composite NAV inputs accept standard 0.5v ARINC inputs. For 3v inputs a series resistor is required, please see the appropriate installation drawing. Selection of 0/180 phase is made by the appropriate maintenance page calibration.

1.4.9 ARINC Channels

The SN3500 contains universal inputs capable of communicating with ARINC 429, ARINC 419, RS232 and Analog. All equipment capable of ARINC compatibility (such as GPS/FMS, Navigation, Traffic, etc) can be directly connected to the appropriate signal input. There are a total of 17 compatible ARINC inputs.

1.4.10 DME Interface

DME inputs support ARINC 429, ARINC 568, King serial, or analog (40mV/mile) inputs. Analog DME is supported only in software versions 2.01 or higher.

1.4.11 Special Considerations for GARMIN GNS430/530 Series

Required SN3500 Setup Items	
Maintenance Page Items	Study the Sandel Maintenance Page Items on the appropriate GNS430 installation drawings, and set as indicated.
Relay Mode	MASTER
ILS Lockout	OFF

Required GARMIN GNS430 Setup Items, Receiver 1			
Software		Main 1.00 or later	
Main ARINC 429 Configuration	IN 1:	Low, Sandel SN3500	
	OUT:	Low, GAMA 429 Grph w/Int	Note: NOT ARINC 429!
	SDI:	LNAV1	SDI1
VOR/LOC/GS ARINC 429 Configuration	Speed RX:	Low	
	Speed TX:	Low	
	SDI:	VOR/ILS 1	SDI1

Required GARMIN GNS430 Setup Items, Receiver 2

Software		Main 1.00 or later	
Main ARINC 429 Configuration	IN 1:	Low, Sandel SN3500	
	OUT:	Low, GAMA 429 Grph w/Int	Note: NOT ARINC 429!
	SDI:	LNAV2	SDI2
VOR/LOC/GS ARINC 429 Configuration	Speed RX:	Low	
	Speed TX:	Low	
	SDI:	VOR/ILS 2	SDI2

1.4.12 Special Considerations for UPS GXXX

Configuration Notes:	
GX Series Notes:	In Setup, enable Extended MovMap Data Format
SN3500 Unit:	Set LNAV selection to IIMorrow GX (RS-232 ENH) Vertical deviation (if desired) requires the ILS ENG input pin pulled low.
Testing	The GX unit will not output RS-232 data in manual test mode Upon power on, the GX will go through IFR Output Test Mode and the following test can be observed: CDI & Flags VDI & Flags (if enabled on Sandel) Annunciators

1.4.13 Brightness Control

Brightness control is internal through a pilot's menu. No external brightness buss is used.

1.4.14 Traffic

The SN3500 supports Traffic input via single ARINC 429 High Speed Input on software version 2.01 and above. Purchase of a key code to enable the Traffic display is required.

Some remote traffic processors may require remote switches, see the Traffic interface drawings in this manual for these requirements.

When interfaced to a TCAS II remote processor, the SN3500 can only be used as a secondary display as it will not display vertical guidance for the purpose of resolution advisories.

1.4.15 Data Link Weather

The SN3500 supports Flight Information Services-Broadcast (FIS-B) data link weather (precipitation and lightening), input via a single RS-232 Input from a WSI Data Link receiver in software version 3.00 and above. Purchase of a key code to

enable the weather display is required. See the WSI Data Link Receiver interface drawings in this manual for interface wiring requirements.

The SN3500 can be configured to operate as the sole weather display or a listener when another display is installed and configured to command the WSI receiver. When the SN3500 is the sole display, the WSI receiver RS-232 interface must be configured as “NO FLOW CONTROL”, see the WSI receiver manual for details regarding receiver configuration.

1.4.16 TACAN

The SN3500 supports TACAN input via ARINC 419, ARINC 429, and Arinc 407 Synchro (XYZ). A TACAN key code is not required for maintenance page setup however, purchase of a key code to enable the TACAN display is required. When configured, TCN will not appear as a NAV source selection or on the bearing pointer source list if the TACAN key is not valid. See the TACAN interface drawings in this manual for interface wiring requirements.

1.4.17 Night Vision Support Option

For NVIS capable units NVIS mode is enabled by a closure to ground through an external toggle switch or maintained pushbutton switch. NVIS mode is annunciated onscreen so an external annunciator is not required.

The input will always pull up to the de-activated state when disconnected .

1.4.18 Reversionary Attitude Option

The SN3500 supports a Reversionary Attitude Display when interfaced to a Attitude Heading Reference System supplying Roll, Pitch, Heading , and lateral acceleration data via Arinc 429. An optional key code is required to enable this feature. See the Reversionary Control interface drawing in this manual for interface wiring requirements. This option is not available when the SN4500 is interfaced to an analog DME.

1.5 Disclaimer

Sandel Avionics does not assume any risk for nor accept any responsibility for the interface descriptions contained within this Installation Manual. It is the responsibility of the installer to ensure that such equipment is compatible with the SN3500 as described, and to ensure that the installation of the SN3500 is accomplished with such equipment using the specific equipment manufacturer's installation and technical instructions. No other representations are expressed herein.

2 Technical Information

2.1 General

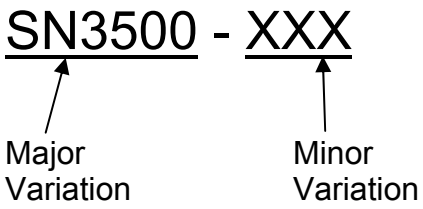
The SN3500 is enclosed in an ARINC 408, 3ATI form factor enclosure and is mounted to an instrument panel using a standard ATI clamp. A black or grey bezel is provided.

The SN3500 operates on an input voltage from 22 to 33 Volts DC (11 to 33 volts DC on units with serial number 5-2500 or higher), nominal 35 watts. One or two 26 Volts AC, 400 Hertz reference excitation inputs with a current requirement of less than 1 milliampere is required when the functions of AC synchro inputs or outputs are required for use with peripheral equipment. This reference excitation signals must be obtained from the aircraft inverter source. A third inverter input ('Datum Excitation' is available specifically used in situations where the autopilot uses an additional inverter or the autopilot inverter frequency is higher than 400Hz.

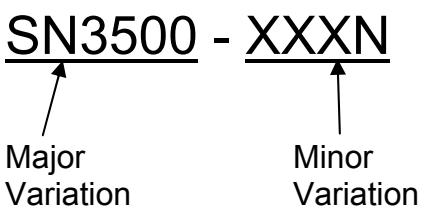
The following section describes the technical characteristics that include the appliance approval basis, physical and electrical properties, electrical connector pin allocation which details function and gradient or equipment protocol, and ARINC label support. Also included is the description of the SN3500 installation components, other equipment and installation requirements. A review of the installation approval procedures is provided for filing with authorities.

2.2 Part Numbers

The part number for the standard Sandel SN3500 is:



The part number for the Sandel SN3500 with NVIS support is:



The current version of software is displayed on the power-up screen.

2.2.1 Installation Kit and Accessories

SPN	Description
90143	SN3500 installation kit
90124	Bezel Adapter Kit KI-525 Flush (Used to fill non-standard sized hole in installations replacing a KI-525 indicator.)
90130-LK	Lamp Kit (Replacement lamp for lamp units)

2.2.2 Bill of Materials – SN3500 Install Kit

SPN	Description	Qty
32062	Conn., D- 15 with pins (Positronics P/N SD15F10JVLO)	1
32063	Conn., D-44 with pins (Positronics P/N DD44F10JVLO)	2
60144	Shim Flush Mounting	1
61062	3ATI Mounting Clamp	1
82005-IM	Installation Manual, SN3500	1
88114	USB Cable	1

2.3 Approval Summary

2.3.1 License Requirements

None.

2.3.2 Approval Data

Technical Standard Order:

TSO-C113, “Airborne Multipurpose Electronic Displays”

TSO-C3d, “Turn and Slip Instrument”

TSO-C4c, “Bank and Pitch Instruments”

TSO-C6d, “Direction Instrument, Magnetic (Gyroscopically Stabilized)

TSO-C34e, “ILS Glide Slope Receiving Equipment Operating Within The Radio Frequency Range of 328.6-335.4 Megahertz”

TSO-C35d, “Airborne Radio Marker Receiving Equipment”

TSO-C36e, “Airborne ILS Localizer Receiving Equipment Operating Within The Radio Frequency Range of 108-112 Megahertz”

TSO-C40c, “VOR Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 Megahertz (MHz)”

TSO-C41d, “Airborne Automatic Direction Finding (ADF) equipment”

TSO-C118, “Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I”

TSO-C119b, “Traffic Alert and Collision Avoidance system (TCAS) Airborne equipment, TCAS II”

Software Certification: RTCA/DO-178, Level C

Environmental Categories: RTCA/DO-160D/E

2.3.3 Technical Standard Order Stipulation

The following stipulation as presented is required by the Federal Aviation Administration for articles approved under Technical Standard Order. This statement does not preclude multiple installation and operational approvals in regard to specific aircraft make, model, or type:

> **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 standard. TSO articles must have separate approval for installation in an aircraft. The article may be installed only if performed under 14 CFR part 43 or the applicable airworthiness requirements.**

2.3.4 Installation and Operational Approval Procedures

For the purpose of seeking installation approval, declarations should be made in the “Description of Work Accomplished” section of a Federal Aviation Administration (FAA) Form 337 or other field approval, or other limited supplemented type certification form. A sample Form 337 is included in the Appendix. The basis of approval is for use as a primary navigation display for the functions of basic directional and navigational information. Moving map operations of the SN3500 is to be approved as supplemental means for VFR or IFR navigation, consistent with the approval of the long-range navigation system. See appropriate FAA Advisory Circular (AC) or other guidance on Loran-C, GPS, FMS, or INS for approval methods of such equipment. Applicable Federal Aviation Regulations (FAR) must be adhered to.

Flight Standards Information Bulletin, FSAW 95-09( )(Amended), titled: “Electronic Horizontal Situation Indicator (EHSI) Approvals” was originally published for the purpose of assisting Aviation Safety Inspectors with approval authority and methods for conducting a field approval for electronic HSI’s. This FSIB describes the qualification of displays intended for use as essential, not critical, to preclude the need to conducting additional testing to substantiate immunity to high intensity radiated fields (HIRF) requirements.

The Environmental Qualification Form for the SN3500 is included in the Appendix, and should be referenced to the categories appropriate to the aircraft type and environment into which the SN3500 is to be installed. The environmental category for the SN3500 should be stipulated on the FAA Form 337, or other approval form.

A “Functional Ground Test Procedures/Report” and an “Operational Flight Check Procedures/Report” is also included in the appendix, and should be used as a basis for validating the SN3500 equipment configuration and for verifying proper installation and functional performance. A copy of this form should be submitted along with the FAA Form 337, or other approval or certification form. A permanent copy must be filed and maintained by the installing agency. Another copy must be presented to the aircraft owner for entry into the aircraft maintenance records, as well as a copy forwarded to Sandel Avionics along with the Warranty Registration Form, Part Number 10129, to be filed after completion and installation acceptance. If any difficulty is experienced with the functionality or operational performance of the SN3500, contact Sandel Avionics for assistance.

2.4 Physical, and Electrical Properties

2.4.1 Physical Dimensions

Form Factor:	3ATI (ARINC 408)
Width:	3.175 in. (8.04 cm.)
Height:	3.175 in. (8.04 cm.)
Length:	10.17 in. (25.83 cm.) overall flush to bezel; 9.82 in (24.94 cm) measured from rear of bezel.
Weight:	2.88lbs (1.31 Kg.) LED models / (3.0 lbs. (1.36 Kg.) Lamp models
CG:	5.1" from rear of bezel.
ATI Clamp:	Sandel Avionics P/N 61062
Cooling Requirements:	Internal fan requiring ambient air at fan input.

2.4.2 Summary Operational Characteristics

Temperature/Altitude:	-20° C to +70° C - up to 55,000 feet
Power Inputs:	22 to 33 Vdc (40 watts maximum at startup for Lamp units / 33 watts maximum at startup for LED units) 11 to 33 volts DC on units with serial number 5-2500 or higher. 27.5 Vdc @ 1.4A nominal (38.5 watts) Lamp Units 27.5 Vdc @ 1.2A nominal (33 watts) LED Units 14.0 Vdc @ 2.4A nominal (33 watts) LED Units

2.5 Connector Summary

The SN3500 was designed to interface and operate with several generations of avionics equipment. It is compatible with DC analog and/or ARINC standard synchro and serial digital signals, as well as industry standard and adopted AC and DC sine, cosine, and discrete input and output voltages. The SN3500 design and operation is optimized for efficient adaptability to both new and existing avionics equipment and systems.

The lists on the following pages reflect the configurable input and output signal types for various equipment types. See "SETUP PROCEDURES" on page 4-1 for more information on maintenance setup pages.

IMPORTANT: Connectors P1 and P2 are not interchangeable. Damage to the SN3500 may result if the connectors are reversed.

2.5.1 Connector P1

Pin #			Name	Signal Type (dependent on maintenance page selection)	
	16		**Inverter Exc.**	In *Inverter*	Note: May be same or different than P2-16 inverter source. 26Vac Excitation for items on connector P1
1			**Shield Gnd**		
		31	**TCAS 1A**	In *A429* *(RS422)* *(RS232)*	 A side 429 + side 422 Ground side
	17		**TCAS 1B**	In *A429* *(RS422)* *(RS232)*	 B side 429 - side 422 Rx
2			**Data link 1A**	In *A429*	 A side 429
		32	**Data link 1B**	In *A429*	 B side (429)
	18		**N/C**		
3			**Hdg1A**	In *A429* *A407* Stepper A	 A side 429 Synchro X [Z grounded] Bendix/King stepper Phase A
		33	**Hdg1B**	In *A429* *A407* Stepper C	 B side 429 Synchro Y [Z grounded] Bendix/King stepper phase C
	19		**Hdg1 Valid**	In *Discrete Valid*	 Hdg Analog, Note: Not used when 429 is data source.
4			**ADF1A** **TACAN 2A**	In *A429* A419 *DC Sin* *A407*	 A side 429 A side 419 (TACAN only) DC Sine (ADF Only) Synchro X [Z grounded]
		34	**ADF1B** **TACAN 2B**	In *A429* A419 *DC Cos* *A407*	 B side 429 B side 419 (TACAN only) DC Cosine (ADF Only) Synchro Y [Z grounded]
	20		**ADF1 DC Ref**	In *ADF Ref*	 ADF DC, Note: Not used when 429 or XYZ is data source.
5			**ADF1 Valid**	In *Discrete Valid*	 ADF Discrete, Note: Not used when 429 is data source
		35	**WX500 1A**	In *A429* *(RS422)* *(RS232)*	 A side 429 + side 422 Ground side
	21		**WX500 1B**	In *A429* *(RS422)* *(RS232)*	 B side 429 - side 422 Rx

P1 Connector (continued from previous page)

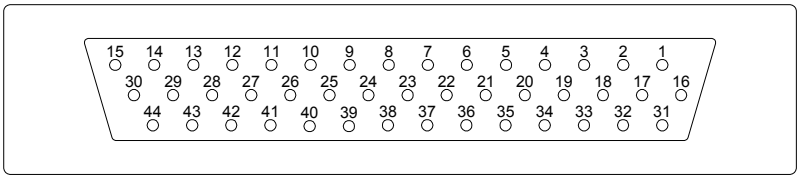
Pin #			Name	Signal Type (dependent on maintenance page selection)	
6			**GS1 LL Flag In+**	In *Flag*	Differential pair to pin 36 Note: For use with external SUPERFLAG see installation drawing for series resistor required.
		36	**GS1 LL Flag In-**	In *Flag*	Differential pair to pin 6.
	22		**GS1 LL Dev In +FLY DOWN**	In	Differential pair to pin 7. Polarity: + indicates above glideslope, fly-down indication
7			**GS1 LL Dev In +FLY UP**	In	Differential pair to pin 22. Polarity: + indicates below glideslope, fly-up indication.
		37	**LAT1 LL Flag In+**	In *Flag*	Differential pair to pin 23 Note: For use with external SUPERFLAG see installation drawing for series resistor required.
	23		**LAT1 LL Flag In-**	In *Flag*	Differential pair to pin 37.
8			**LAT1 LL Dev In +FLY RIGHT**	In	Differential pair to pin 8. Polarity: + indicates left of course, fly-right indication
		38	**LAT1 LL Dev In +FLY LEFT**	In	Differential pair to pin 38. Polarity: + indicates right of course, fly-left indication.
	24		**To/From In+**	In *Flag*	Differential pair to pin 9 Note: For use with external SUPERFLAG see installation drawing for series resistor required.
9			**To/From In-**	In *Flag*	Differential pair to pin 24.
		39	**DME 2 CLK**	In *A568*	
	25		**DME 2 DATA**	In *A568*	
10			**DME 2 SYNC**	In *A568*	
		40	**DME 2 Hold**	In *Discrete Valid*	
	26		**External Brightness Control**	(In) *(A429)* *(R422)* *(R232)* *(A407)*	n/c A side 429 + side 422 Ground side Synchro X
11			**Spare 1**	(In) *(A429)* *(R422)* *(R232)* *(A407)*	n/c B side 429 - side 422 Rx Synchro Y

P1 Connector (continued from previous page)

Pin #			Name	Signal Type (dependent on maintenance page selection)
		41	**IM**	Marker In
	27		**MM**	Marker In
12			**OM**	Marker In
		42	**429 Out A**	Out (Spare for future use) *A429* A Side
	28		**429 Out B**	Out (Spare for future use) *A429* B Side
13			**RS232TxD**	(Out *(R232)*
		43	**WPT**	In *Discrete*
	29		**MSG**	In *Discrete*
14			**ACT**	In *Discrete*
		44	**ARM**	In *Discrete*
	30		**Audio LL Out**	Out *Audio LL* Low Level Audio output, requires external amplifier. (future provision not currently supported)
15			**OBS/LEG**	In *Discrete*

Note 1: 3 volt composite inputs require the use of a series resistor. See installation drawings.

Note 2: For XYZ inputs Z is signal ground P1-1.



Outside View
(Mating Connector)

2.5.2 Connector P2

Pin #			Name	Signal Type (dependent on maintenance page selection)	
	16		**Inverter Exc.**	In *Inverter*	Note: May be same or different than P1-16 inverter source. 26Vac Excitation for items on connector P2
1			**Shield Gnd**		
		31	**FMS 1A**	In *A429* *(RS422)* *(RS232)*	 A side 429 + side 422 Ground side
	17		**FMS 1B**	In *A429* *(RS422)* *(RS232)*	 B side 429 - side 422 Rx
2			**FMS 2A**	In *A429* *(RS232)*	 A side 429 Ground Side
		32	**FMS 2B**	In *A429* *(RS232)*	 B side 429 Rx
	18		**ILS Energize1 Discrete In**	In *Discrete Valid*	 Discrete Open/Gnd or Open/+28Vdc
3			**NAV1A**	In *A429* *A407* A710	 A side 429 Synchro X [Z grounded] Composite Video
		33	**NAV1B**	In *A429* *A407*	 B side 429 Synchro Y [Z grounded]
	19		**ILS Energize2 Discrete In**	In *Discrete Valid*	 Discrete Open/Gnd or Open/+28Vdc
4			**ADF 2A TACAN 1A**	In *A429* A419 *DC Sin* *A407*	 A side 429 A side 419 (TACAN only) DC Sine (ADF only) Synchro X [Z grounded]
		34	**ADF 2B TACAN 1B**	In *A429* A419 *DC Cos* *A407*	 B side 429 B side 419 (TACAN only) DC Cosine (ADF only) Synchro Y [Z grounded]
	20		**ADF 2 DC Ref**	In *ADF Ref*	 ADF DC, Note: Not used when 429 or XYZ is data source.
5			**ADF 2 Valid**	In *Discrete Valid*	 ADF Discrete, Note: Not used when 429 is data source
		35	**NAV2A**	In *(RS422)* *(RS232)* A710	*A429* A side 429 + side 422 Ground side Composite Video
	21		**NAV2B**	In *A429* *(RS422)* *(RS232)*	Note: For composite inputs see P2-42 B side 429 - side 422 Rx

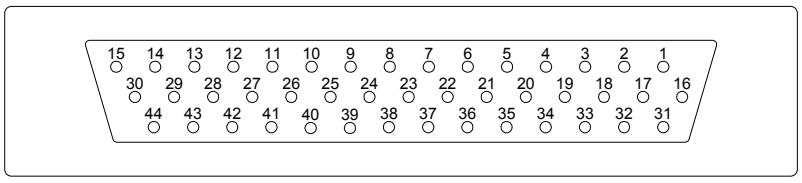
P2 Connector (continued from previous page)

Pin #			Name	Signal Type (dependent on maintenance page selection)	
6			**DME 1 DATA**	In *A568* Analog	DC+
		36	**DME 1 CLK**	In *A568* Analog	DC-
	22		**DME 1 SYNC**	In *A568*	
7			**DME 1 Hold**	In *Discrete Valid*	
		37	**OBS Resolver DC Ref**	In *Resolver DC*	
	23		**OBS Resolver H**	In *Resolver H*	
8			**OBS Resolver X/Sin out**	Out Resolver Out	
		38	**OBS Resolver Y/Cos out**	Out Resolver Out	
	24		**Fluxgate Excitation**	In Fluxgate Excitation	
9			**Fluxgate X**	In	
		39	**Fluxgate Y**	In	
	25		**Fluxgate Z (Gnd)**	In	
10			**Hdg Crs/Datum Excitation**	In	3rd inverter input used specifically if autopilot inverter is not inverter connected to P1-16 or is not 400Hz
		40	**Course Datum**	Out	Locked to P1-16 or P2-10
	26		**Hdg Datum**	Out	Locked to P1-16 or P2-10
11			**Hdg X Out**	Out	Bootstrap, locked to inverter on **P1**

P2 Connector (continued from previous page)

Pin #			Name	Signal Type (dependent on maintenance page selection)	
		41	**Hdg Y Out**	Out	Bootstrap, locked to inverter on **P1**
	27		**FCS ILS Energize Out**	Out	Active Low
12			**FCS Lat Flag+**	Out	LL Out (gnd ref)
		42	**FCS Vert Flag+**	Out	LL Out (gnd ref)
	28		**FCS Lat Dev +RIGHT**	Out	LL Out (gnd ref)
13			**FCS Vert Dev +UP**	Out	LL Out (gnd ref)
		43	**FCS Lat Superflag Out**	Out	Superflag Out
	29		**FCS Vert Superflag Out**	Out	Superflag Out
14			**RS232-2 Out**	Out	RS232
		44	**Spare**		
	30		**429-2A**	Out *A429*	A side 429
15			**429-2B**	Out *A429*	B side 429

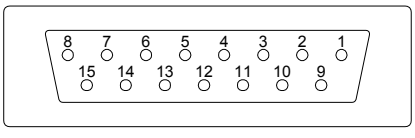
Note 1: For XYZ inputs Z is signal ground P1-1. For XYZ Outputs Z is power ground.



Outside View
(Mating Connector)

2.5.3 Connector P3

Pin #		Name	Signal Type (dependent on maintenance page selection)
1		**Aircraft Pwr**	In +22 to +33Vdc *Power*
	9	**Aircraft Pwr**	In *Power*
2		**GPS OBS/HOLD or TACAN Relay Out**	(Out) *(Open Drain)*
	10	**GPS APPR ARM or TACAN Relay Out**	(Out) *(Open Drain)*
3		**Aircraft Ground**	In System Ground
	11	**Aircraft Ground**	In System Ground
4		**GPS1 Relay Sense / Selected**	In *Discrete Valid*
	12	**GPS2 Relay Sense**	In *Discrete Valid*
5		**NAV2 Relay Sense**	In *Discrete Valid*
	13	**NVIS Ctrl or REV Control**	In – Active Low *Discrete*
6		**Analog DME Valid or REV Control**	In *Discrete Valid*
	14	**FCS BACK COURSE**	Out *(Open Drain)*
7		**GPS1 Relay**	Out *Open Drain*
	15	**GPS2 Relay**	Out *Open Drain*
8		**NAV2 Relay**	Out *Open Drain*



Outside View
(Mating Connector)

2.5.4 Signal Characteristics Table

Inputs			
Signal Type	**Nom Range**	**Absolute Max** Note 3	**Z (Ω – Power Off)**
A429	+/- 5Vdc	100Vdc	>100K
A568	0 / +10Vdc	100Vdc	>100K
RS232	+/- 10Vdc	100Vdc	>100K
RS422	+/- 5Vdc	100Vdc	>100K
A710 (ILS)	.5Vac rms +/- 20%	70Vac	>100K
A711 (VOR)	.5Vac rms +/- 20%	70Vac	>100K
A407	0 to 11.8Vac	70Vac	>100K
DC SIN/COS	+/- 20Vdc	100Vdc	>100K
A407 (AC Synchro)	11.8Vac rms +/- 20%	100Vdc	>100K
ADF_REF	10Vdc +/- 50%	60Vdc	>100K
Alt DC Coarse	0 to 15Vdc	100Vdc	>100K
Analog DME	0 to 8Vdc	75Vdc Note 5	180K
Discrete Valid (High)	>14.0Vdc Note 4	60Vdc	>500K
Discrete Valid (Low)	<3.5Vdc Note 4	40Vdc	>500K
Discrete (High)	>1.2Vdc	32Vdc	50K
Discrete (Low)	<8Vdc	32Vdc	50K
GS	+/- 225mv FS	60Vdc	>300K Note 2
GS Flag	Unflagged > 225mv	60Vdc	>300K Note 2
Inverter	26Vac rms	200Vac	>50K
Power	+22 to +33Vdc Note 1	7Adc	NA

Outputs			
Signal Type	**Nom Range**	**Absolute Max** Note 3	**Z (Ω – Power Off)**
A429	+/- 5Vdc	70mAdc	2K (Minimum)
RS232	+/- 5Vdc	70mAdc	500 (Minimum)
A575	3.54 mA +/-1%	25mA	500
Open Drain	1Ω or High Impedance (over current protected)	250mAdc	>350K

Notes:

1. At +28Vdc, nominal current is 1.4Adc for lamp equipped units and 1.2Adc for LED equipped units, 1 minute after start up.
2. Power On Load = 60.4K. For Glideslope there may need to be a 1K load somewhere else in the system to meet the receiver load requirements. Check installation instructions for the interfaced receiver.
3. Outputs are protected against shorts to ground. Shorts to power supply may cause damage to components.
4. Discrete inputs actively pulled to 27.5v through 30k ohms when selected 'active low' or actively pulled to 0v through 30k ohms when selected 'active high' in the maintenance pages. This ensures the input is in the 'inactive' state if an external connection fails. If interfacing to discrete signals which do not supply a "hard" 0v/27.5 volt transition, any input network may be used that ensures that the discrete input pin is not within 1.0v from its nominal threshold shown in the table either in the active or inactive state.
5. Value is for maximum non-sustained input voltage, maximum sustained voltage is 10.8vdc.

2.6 ARINC 429

2.6.1 ARINC 419/429 Serial Data Receivers Interfaces

The ARINC 419/429 serial data bus interface provides an information link between the SN3500 and peripheral avionics equipment. The bus conforms to 419/429 specifications for electrical characteristics, receiving, and transmission interval.

The SN3500 is capable of receiving the following ARINC 419/429 long-range NAV, ADF, TCAS, or DME inputs for processing and display as follows:

LABEL	DESCRIPTION
ADF	
162	ADF Bearing
Gyro/ AHRS	
155	Maintenance Words (Sandel SG102 Only)
270	AHRS Status Information (when available)
320	Magnetic Heading
324	Pitch
325	Roll
332	Lateral Acceleration
350	Maintenance Words (Sandel SG102 Only)
351	Maintenance Words (Sandel SG102 Only)
352	Maintenance Words (Sandel SG102 Only)
353	Maintenance Words (Sandel SG102 Only)
354	Maintenance Words (Sandel SG102 Only)
TCAS	
013	Control Word for TCAS/Mode S
015	Altitude Select Limits for TCAS / Mode S
016	Control Word for TCAS/Mode S
130	Intruder Range
131	Intruder Altitude
132	Intruder Bearing
203	Altitude (1013.25 mB)
204	Baro Corrected Altitude
320	Magnetic Heading
371	General Aviation Equipment Identifier
377	Equipment Identification
357	Request To Send (RTS) / End Transmission (ETX)
NAV	
034	VOR/ILS Frequency
173	Localizer Deviation
174	Glideslope Deviation
222	VOR Omnibearing
371	General Aviation Equipment Identifier
TACAN	
201	TACAN Distance
202	TACAN Distance
222	TACAN Bearing
246	TACAN Station ID (Characters 1-2)
247	TACAN Station ID (Characters 3-4)
362	TACAN Range Rate

LABEL	DESCRIPTION
DME	
035	DME Frequency
202	DME Distance
GPS/FMS	
076	GNSSS Altitude
100	Selected Course #1
114	Desired Track
115	Waypoint Bearing
116	Cross Track Distance
117	Vertical Deviation
125	Universal Time Coordinated (UTC)
147	Magnetic Variation
150	Time
251	Distance To Go
260	Date
261	GPS Discrete Word (GAMA)
266	FMC Nav Mode
275	Status Word (GAMA)
310	Present Position – Latitude
311	Present Position – Longitude
312	Ground Speed
313	Track Angle – True
326	Lateral Scale-Factor
327	Vertical Scale-Factor
377	Equipment Identification
303	Message Length / Type / Num
075	Active Waypoint From / To Data
074	Flight Plan Header
275	Status Word (GAMA)
113	Message Checksum
300	Station Type, Class
304	Message Characters 1-3
305	Message Characters 4-6
306	Waypoint Latitude
307	Waypoint Longitude
340	L/R Procedure Turn Azimuth
335	L/R Holding Pattern Azimuth
330	Arc Inbound Course
331	Arc Radius
332	Arc Change Angle

2.6.2 ARINC 419/429 Serial Transmitter Interfaces

The SN3500 is capable of transmitting the following low or high speed ARINC 429 data:

LABEL	DESCRIPTION
100G	Selected Course (Using extended SDI)
320	Magnetic Heading

3 Installation

3.1 General

This section provides general suggestions and information to consider before installing the SN3500 including interconnect diagrams, mounting dimensions and information pertaining to installation. Close adherence to these suggestions will assure optimum performance.

3.1.1 Unpacking and Inspecting Equipment

Exercise extreme care when unpacking the equipment. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. The claim should be promptly filed with the carrier. It would be advisable to retain the container and packaging material after all equipment has been removed in the event that equipment storage or reshipment should become necessary.

3.2 Installation Considerations

3.2.1 General Considerations

The SN3500 should be installed in accordance with standards established by the customer's installing agency, and existing conditions as to unit location and type of installation. However, the following considerations should be heeded before installing the SN3500. Close adherence to these considerations will assure a more satisfactory performance from the equipment. The installing agency will supply and fabricate all external cables. The required connectors and associated hardware are supplied by Sandel Avionics.

3.2.2 Cooling Considerations

The SN3500 Navigation Display contains its own ventilation fan for internal component cooling and therefore, does not require a forced air cooling system. Any questions concerning cooling can be verified in the post-installation checkout by monitoring the SN3500 Internal temperature on the System maintenance page.

3.2.3 Mechanical Installation Considerations

The SN3500 installation should conform to customer requirements and airworthiness standards affecting the location and type of installation.

§25.1321(a) stipulates that: "Each flight, navigation, and power plant instrument for use by any pilot must be plainly visible to him from his station with the minimum practicable deviation from his normal position and line of vision when he is looking forward along the flight path."

§ 25.1321(b) stipulates: "The flight instruments required by §25.1303 must be grouped on the instrument panel and centered as nearly as practicable about the vertical plane of the pilot's forward vision." In addition - §25.1321(b)(4) states: "The instrument that most effectively indicates direction of flight must be adjacent to and directly below the instrument in the top center position." Similar regulations apply to FAR Part 29 Transport Category Rotorcraft and to Part 23 Small Airplanes.

Refer to Sandel Avionics, Drawing No. 82005 titled, "Layout - SN3500 Installation" for specific assembly and mounting instructions.

3.2.4 Electrical Installation Considerations

Connections and functions of the SN3500 are described in this section. Refer to the SN3500 Interconnect Wiring Diagrams for detailed wiring information and appropriate notes. Refer to the Functional Pinout Descriptions for explanations of pin functions.

A. The installing agency will supply and fabricate all wiring harnesses. The length and routing of wires must be carefully measured and planned before the actual installation is attempted. Avoid sharp bends in the harness or locating the harness near aircraft controls. Observe all recommended wire sizes and types and subscribe to appropriate FAR Parts 23, 25, 27, and 29, as well as AC 43.13-1( ) and -2( ).

B. The use of MIL-C-27500 shielded wire and MIL-W-22759 single conductor wire is recommended. The use of ferrules or grounding blocks for signal ground and digital ground returns is satisfactory, however, each ground return must be electrically separated.

C. When an existing installation of a navigation source selection relay unit is installed to provide mode control switching and annunciation for a GPS or other long-range navigation system, the SN3500 may not perform these functions simultaneously. This does not preclude the SN3500 from annunciating such mode control functions.

D. In order to ensure optimum performance the SN3500 and associated wiring must be kept at least a minimum of three feet from high noise sources and not routed with cables from high power sources.

E. Prior to installing the SN3500, a point-to-point continuity check of the wiring harness should be accomplished to verify proper wiring. See **FUNCTIONAL GROUND TEST PROCEDURES/REPORT** in the appendix for verification of this step and other checks.

F. The Functional Pinout Descriptions on the following pages will assist you in determining installation requirements. **Adhere to all notes within these descriptions and on installation wiring diagrams**.

G. ***Special caution*** must be taken to observe 30 Hz OBS resolver connections in order to prevent possible damage to the installed VOR/localizer converter.

See Installation Wiring Diagrams and the MAINTENANCE MENU, Configuration Instructions for notes pertaining to these considerations.

H. ***Ground Bonding.*** In order to assure installation characteristics match the DO-160 RF and Lightning test conditions, ensure that two ground wires of at least the recommended size are installed in accordance with the installation drawings and these wires are connected to a bonded aircraft ground. Ensure that shielded wiring is used to the Flux Gate (if installed), Gyro Reference, and Gyro XYZ (if installed).

I. ***Power Wiring.*** To assure that the SN3500 will operate properly down to its rated minimum input voltage of 22Vdc, ensure that two power wires of at least the recommended size are connected from the SN3500 circuit breaker to the SN3500 in accordance with the installation drawings.

3.3 Signal Details

The following information is in the same order as the summary pin description list in the prior section.

3.3.1 Connector P-1 Pinout Description

P1-1: Signal Ground Return Input

This common Signal Ground Return is used for P1 analog signal grounds such as the Z lead of synchros, and analog signal shield grounds. See the installation wiring diagrams for details. Do not use this pin to connect digital signal ground return shields or use this for power ground return.

P1-16: Primary AC Excitation Input for P1 inputs

Connection to this pin is required only if functions of ARINC 407 synchro or 400Hz AC sine and cosine inputs are used on P1. NOTE: This is also the reference for synchro referenced ***outputs*** on the opposite connector P2. The input requirements are 26Vac nominal 400Hz. Input frequency is 560 Hz. maximum and 240 Hz. minimum. Input impedance is 220KΩ. 24 AWG shielded wire is recommended for this function.

P1-31: TCAS 429 A
P1-17: TCAS 429 B

Optional ARINC 429 input for traffic.

P1-2: Data link A
P1-32: Data link B

Optional input for FIS-B data link (Software Rev. 3.0 and above).

P1-3: Hdg X; Hdg 429A; DG Stepper A Input
P1-33: Hdg Y; Hdg 429B; DG Stepper C Input

Master HDG inputs.

For XYZ type directional gyro, ground the Z leg to signal ground P1-1. This input is referenced to the 26Vac/400Hz reference on P1-16. This function is selected on the Compass maintenance page.

Stepper connections are used exclusively for connections to the Bendix/King KG-102 or Mid-Continent series Directional Gyro when selected in the Compass maintenance page. For slaved operation see fluxgate descriptions. 24 AWG twisted shielded pair wire is recommended for this connection.

P1-19: Hdg Valid Input

Connect to the (DG) valid output if available. Not used for 429 sources. Selection of the logic level of this pin is in the Compass maintenance page.

P1-4: ADF-1 AC-X or DC-SIN Input / TACAN 2 429/419 A
P1-34: ADF-1 AC-Y or DC-COS Input / TACAN 2 429419 B

Inputs from ADF-1 Receiver. Selection of AC/DC operation is on the ADF maintenance page. For DC use P1-20 as the DC reference input. For AC inputs Z is grounded. 24 AWG twisted shielded pair wire is recommended for these functions.

P1-20 ADF-1 DC Ref

Used when DC SIN/COS inputs are used

P1-5 ADF-1 Valid

Discrete ADF Valid input used if available.

P1-35: WX500 Ground

P1-21: WX500 RS232

Connection to WX-500 Stormscope. Use 24AWG twisted pair.

P1-6: Glideslope +FLAG

P1-36: Glideslope -FLAG

Low level GS receiver flag inputs. Superflags can be supported with a series resistor, see the installation drawings.

P1-7: Glideslope +UP Deviation Input

P1-22: Glideslope +DOWN Deviation Input

GS deviation input. Two-dot deflection is ±150 m_{Vdc}. 24 AWG twisted shielded pair wire is recommended for these functions.

P1-37: VOR-LOC +FLAG

P1-23: VOR-LOC -FLAG

Used when an external NAV converter or analog output GPS is used. Differential Low level NAV Flag inputs. Superflags are supported with a series resistor, see the installation drawings. Flag out of view requires greater than 215 m_{Vdc} on +FLAG with respect to -FLAG input. 24 AWG twisted shielded pair wire is recommended for these functions.

P1-8: VOR-LOC +RIGHT Deviation Input

P1-38: VOR-LOC +LEFT Deviation Input

Used when an external NAV converter or analog output GPS is used. Analog lateral deviation from the VHF navigation receiver or long-range navigation receiver +LEFT and +RIGHT deviation outputs. Two-dot deflection is ±150 m_{Vdc}. 24 AWG twisted shielded pair wire is recommended for these functions.

P1-24: VOR +TO Pointer Input

P1-9: VOR +FROM Pointer Input

Used when an external NAV converter or analog output GPS is used. Differential input supports VHF NAV or long-range navigation +TO pointer and +FROM pointer outputs. In-view is greater than 40 m_{Vdc} (to) and –40m_{Vdc} (from). 24 AWG twisted shielded pair wire is recommended functions.

P1-39: DME 2 CLK/429B
P1-25: DME 2 Data/429A
P1-10: DME 2 Sync

ARINC 568 Sync or King Clk/Data/Sync (DME REQ) signal input. NOTE: This is DME 2.

P1-26: External Brightness Control

Broken Wire Detection
0 to 0.5VDC, revert to internal control.
Full Dim
1.5VDC
Full Bright
14V Aircraft: A/C power minus 2VDC
28V Aircraft: A/Ct power minus 4VDC

P1-40: DME 2 Hold

Discrete HOLD input signal for on-screen annunciator

P1-41: Inner Marker Beacon Input
P1-27: Middle Marker Beacon Input
P1-12: Outer Marker Beacon Input

Marker beacon receiver inputs. Normally connected to the external lamp drivers on the marker beacon receiver, see the installation drawings. Most marker beacon receivers use “DC” ground referenced outputs driven by transistor drivers. All such receivers are compatible as shown on the installation drawings. Some very old designs may use transformer outputs which are AC coupled. These may not be compatible.

P1-42: ARINC1 429-A Output
P1-28: ARINC1 429-B Output

Low or high speed ARINC 429 output, spare. (Future use.)

P1-13: Ch1 RS-232 TX Output

RS-232 serial data outputs. TXD-2 is used to support WX-500 Stormscope® . 24 AWG shielded wire is required for each of these functions.

P1-43: WPT Annunciator input
P1-29: MSG Annunciator input
P1-14: ACT (Approach Active) Annunciator Input
P1-44: ARM (Approach Arm) Annunciator Input

Active-low inputs for GPS/LRN on-screen annunciators.

P1-15: OBS-/LEG, HLD-/AUTO or PAR TRK- Annunciator Input

For selected GPS-1 receiver with OBS/LEG mode (or HOLD/AUTO), this input when low senses and annunciates OBS or HOLD on the SN3500 display and changes the mode of the course pointer from auto-slew to manual control. Otherwise, this is used as a PAR TRK input for other types of receivers, based on the selection in the LNAV maintenance page.

P1-30: Audio Out

LL audio output to the audio panel for optional callouts alerts. (Future use, not currently supported.)

3.3.2 Connector P-2 Pinout Descriptions

P2-1: Signal Ground Return Input

This common Signal Ground Return is used for P2 analog signal grounds such as the Z lead of synchros, and analog signal shield grounds. See the installation wiring diagrams for details. Do not use this pin to connect digital signal ground return shields or use this for power ground return.

P2-16: AC Excitation Input for P2 inputs

Connection to this pin is required only if functions of ARINC 407 synchro or 400Hz AC sine and cosine inputs on P2. It does NOT apply to **outputs** on P2. The input requirements are 26Vac nominal 400Hz. Input frequency is 560 Hz. maximum and 240 Hz. minimum. Input impedance is 220KΩ. 24 AWG shielded wire is recommended for this function.

P2-31: GPS1/FMS 1 429A/422+/232 Gnd
P2-17: GPS1/FMS 1 429B/422-/232 Signal

Main input from GPS/FMS 1.

P2-2: GPS2/FMS 2 429A/422+/232 Gnd
P2-32: GPS2/FMS 2 429B/422-/232 Signal

Main input from GPS/FMS 2.

P2-18: VHF Nav-1 ILS Energize Input

This pin controls the Vertical Deviation Bar when selected to **NAV1**. These signals also control the ILS Lockout logic so the SN3500 can sense when a GPS receiver is inappropriately selected as the primary NAV source when ILS Lockout is not disabled on the NAV maintenance page. Connections to these pins are from the respective VHF navigation receiver and optionally by the GPS receiver. The logic level of these inputs is selected on the NAV maintenance page, and is normally active-low.

P2-3: VHF NAV1 429A/Composite
P2-33: VHF NAV1 429B

Primary 429 input from VHF NAV1, or composite input from analog receiver for VOR bearing pointer. Composite is normally .5v VOR / .33v LOC. For 3V inputs a series resistor is required, see the installation drawings. When using the composite input for LOC deviation, the calibration procedure found in section 7.1.5 must be followed for each specific LOC input. 24 AWG shielded wire is recommended for these connections. Note: When using the composite signal for the localizer deviation input, the calibration procedure found in section 7.1.5 must be performed after the installation prior to release for flight.

P2-4: ADF-2 AC-X or AC/DC-SIN Input / TACAN 1 429/419 A
P2-34: ADF-2 AC-Y or AC/DC-COS Input / TACAN 1 429/419 B

Inputs from ADF2 Receiver. Selection of AC/DC operation is on the ADF maintenance page. For DC use P2-20 as the DC reference input. For AC inputs Z is grounded. 24 AWG twisted shielded pair wire is recommended for these functions.

P2-20: ADF2 DC Ref

Used when DC Sin/Cos inputs are used.

P2-5: ADF2 Valid

Discrete ADF Valid input used if available.

P2-19: VHF Nav2 ILS Energize Input

Control the enabling of the Vertical Deviation Bar when NAV2 selected

P2-35: VHF NAV2 429A/Composite
P2-21: VHF NAV2 429B

Primary 429 input from VHF NAV2, or composite input from analog receiver for VOR bearing pointer. Composite is normally .5v VOR / .33v LOC. For 3V inputs a series resistor is required, see the installation drawings. When using the composite input for LOC deviation, the calibration procedure found in section 7.1.5 must be followed for each specific LOC input. 24 AWG shielded wire is recommended for these connections. Note: When using the composite signal for the localizer deviation input, the calibration procedure found in section 7.1.5 must be performed after the installation prior to release for flight.

P2-6: DME1 Data, Analog DME DC+/429A
P2-36: DME1 CLK, Analog DME DC-/429B
P2-22: DME1 Sync
P2-7: DME1 Hold

Serial data inputs for either ARINC 429 / 568 serial protocols to support ARINC DME's as selected within the DME Maintenance page (Low speed only), Bendix/King DME's using King Serial Digital protocol. See the installation drawings. 24 AWG twisted shielded triple conductor is required for these functions. Note: This is DME1.

Analog DME input (40mV/mile) may also be used.

P2-37: OBS Resolver DC ref Input
P2-23: OBS Resolver H Input
P2-8: OBS Resolver SIN Output
P2-38: OBS Resolver COS Output

OBS resolver connections for NAV or GPS receivers. The input frequency range is 20Hz to 500Hz, and calibration is done on the NAV maintenance page. The resolver is electrically zeroed at zero degrees plus the calibration value in the NAV maintenance page. For normal use this calibration value will be –60 degrees (equaling 300 degrees electrical zero). This is the factory

default. A different calibration value setting is used for each possible NAV source selectable on the SN3500. 24 AWG twisted shielded pair conductor is recommended for these functions. Please see the warnings on the installation drawings concerning DC REF, which must not be inadvertently grounded..

P2-24: Flux Gate Excitation Input

This connection is made to the 400 Hz AC flux gate excitation source voltage. A 24 AWG shielded wire is recommended for this function. Note: the phase of this excitation voltage is not required to be the same as that supplied to the Primary AC Excitation input on P1 or P2.

P2-9: Flux Gate X Input
P2-39 Flux Gate Y Input
P2-25: Flux Gate Z Input

Referenced to P2-24 Excitation input. Connections to these pins are made directly from the heading system flux gate if internal slaving is selected on the compass maintenance page. If a Bendix/King KI-525 PNI or Rockwell/Collins 331A-3( ) HSI is being removed, the respective slaving accessory, should be bypassed. See the installation drawings for details. 24 AWG twisted shielded triple conductor is recommended for these signals.

P2-10: HDG/CRS Datum Excitation

This is a *ground referenced* 400-5Khz excitation input for the HDG Datum and CRS Datum outputs only. This input is only used if referenced on the applicable installation drawing. If unused, Connect P2-10 to 28vdc P3-1.

P2-40: Course Datum Output
P2-26: Heading Datum Output

These function are either AC or DC Course Datum and Heading Datum for the flight control system. If AC signals, the excitation reference is P2-10. Selection of AC/DC, gain, and direction of rotation are accomplished on the FCS maintenance page. 24 AWG single conductor shielded wire is recommended for each of these functions.

P2-11: HDG Bootstrap X out
P2-41: HDG Bootstrap Y out

Z Ground. NOTE: Referenced to P1-16. This function may be used to provide “bootstrap” output to an RMI or other directional instrument in the form of ARINC 407 synchro 24 AWG twisted shielded pair wire is recommended for these functions. Drive only electronic loads with this output – limited to 60ma max.

P2-27: FCS ILS Energize Out

Active-low open drain output to FCS when selected navigation source vertical deviation is enabled.

P2-12: FCS Lateral Flag Output+

Low Level flag output derived from selected NAV source, referenced to Ground. Connect corresponding ‘-‘ input to P2-1 (Gnd)

P2-42: FCS Vertical Flag Output+

Low Level flag output derived from selected NAV source, referenced to Ground. Connect corresponding '-' input to P2-1 (Gnd)

P2-28: FCS Lateral Deviation Output +Right

LL lateral +deviation from selected NAV source. Connect corresponding '-' deviation input to P2-1 (Gnd)

P2-13: FCS Vertical Deviation Output +UP

LL vertical +deviation from selected NAV source. Connect corresponding '-' deviation input to P2-1 (Gnd)

P2-43: FCS Lateral Superflag Output

Superflag output derived from selected NAV source.

P2-29: FCS Vertical Superflag Output

Superflag output derived from selected NAV source.

P2-14: RS-232 TX Output2

RS-232 serial FIS-B data link output (Software Rev 3.0 and above).

P2-30: ARINC2 429-A Output
P2-15: ARINC2 429-B Output

Low or high speed ARINC 429 output which transmits selected course and selected heading for ARINC 429 Long Range NAV receivers. 24 AWG twisted shielded pair wire is required for these functions.

3.3.3 Connector P-3 Pinout Descriptions

P3-1 &
P3-9: Display Primary Power Input

(22-33Vdc). Connection to both pins is required using two 20AWG wires and a 5 ampere circuit breaker. Maximum power required is 35 watts. Connection to the avionics bus is recommended to reduce voltage fluctuations during engine start.

P3-3 &
P3-11: Display Power Return Input

Pins 3 and 11 are the aircraft ground input connections. Connection to both pins is required using two 20 AWG wires. Either pin should also be used for the digital signal ground (shields) return, as required. The number of shields will vary depending upon the functions wired to Connector P3.

P3-2: GPS OBS- or HOLD- Command Discrete Output or TACAN Relay Out

Open Drain active-low output used to operate the OBS function of Bendix/King KLN-90 GPS receivers or the HOLD function of the II Morrow and Garmin GPS receivers. Accessible during normal use from the pilots GPS MODE soft key.

Can also be used to operate a switching relay, or external annunciator whenever a TACAN is selected by the NAV pushbutton. The TACAN receiver(s) are configured on the NAV maintenance pages.

P3-4: GPS1 Relay Sense / GPS SELECTED Input

This input is used when the SN3500 is set up for slave mode so an *external* GPS switch can be used to switch to an external GPS receiver. Causes proper mode switching and annunciation on the SN3500 display. This input is active only when enabled in the OBS / RELAY / CDI maintenance page 10.

P3-5: NAV2 Relay Sense

Feedback from NAV2 relay, if used. When replacing a SN3308 with the SN3500, see configuration page 7-14.

P3-6: Analog DME Valid or REV Control

Discrete input for Analog DME valid or Reversionary Display On/OFF control.

For Reversionary Attitude Display units the Reversionary Display is enabled by a closure to ground through an external toggle switch or maintained pushbutton switch.

P3-7: GPS1 Switching Relay Discrete Output

Can be used to operate a switching relay whenever GPS1 (or Loran1) is selected by the NAV pushbutton. The receiver type is selected on the LNAV1 maintenance page.

P3-8: VHF NAV2 Switching Relay Discrete Output

Can be used to operate a switching relay whenever VHF NAV2 is selected by the NAV pushbutton. VHF NAV2 is enabled on the NAV2 maintenance page.

P3-10: GPS APPR ARM Discrete Output or TACAN Relay Out

Open Drain active-low output used to select APPR ARM mode of the external GPS receiver. Accessible during normal use from the pilots NAV menu operation.

Can also be used to operate a switching relay, or external annunciator whenever a TACAN is selected by the NAV pushbutton. The TACAN receiver(s) are configured on the NAV maintenance pages.

P3-12: GPS2 Relay Sense

Feedback from GPS2 relay, if used.

P3-13: NVIS Ctrl or REV Control

For NVIS capable units NVIS mode is enabled by a closure to ground through an external toggle switch or maintained pushbutton switch. NVIS mode is annunciated onscreen so an external annunciator is not required.

For Reversionary Attitude Display units the Reversionary Display is enabled by a closure to ground through an external toggle switch or maintained pushbutton switch.

The input will always pull up to the de-activated state when disconnected.

P3-14: AFCS Back Course Discrete Output

Open Drain. Used to feed the back course sensing input of an AFCS. When the Course Select rotates either direction passing 90º clockwise or counterclockwise from the lubber line of the SN3500 will generate an open-drain closure. An external relay may be required to make this signal active-high.

P3-15: GPS2 Switching Relay Discrete Output

Can be used to operate a switching relay whenever GPS2 (or Loran2) is selected by the NAV pushbutton. The receiver type is selected on the LNAV-2 maintenance page.

4 Setup Procedures

4.1 General

Setup procedures for the SN3500 are described along with the Maintenance Menu below. The Maintenance Menu is accessed and addressed through the use of pushbuttons and the Selected Heading knob. No external connector pin programming is required.

4.2 Accessing the Maintenance Menus

To access the Maintenance Menus perform the following operations:

A. Prior to applying power to the SN3500, depress and hold the [BRG] and the [MEM] pushbuttons, then apply power to the unit. Continue to hold until the first maintenance menu appears. This protocol insures that maintenance menus cannot be called up accidentally during flight.

B. Once the Maintenance Menu is entered, press the [NEXT] or [PREV] softkeys to cycle the MAINTENANCE MENU pages. Use the UP/DOWN arrow keys for selections, and rotate the right knob to adjust and select. On some menus additional soft key legends will appear as prompts.

C. Escape the maintenance menus by pressing and holding the course pointer knob (left knob). This will allow normal operation of the unit to test the effects of settings. Re-enter the maintenance pages pressing and holding the course pointer knob (left knob).

D. To disable maintenance menu operation, power down and restart normally. All configured items are stored in non-volatile memory.

4.3 Equipment/Configuration Selections

The choices of compatible equipment contained in the SN3500 menus are listed in the Appendix. For types not listed, consult the factory.

5 Operating Details

For an explanation of the operating details of the SN3500, refer to the Pilot's Guide for the SN3500, Sandel Avionics P/N 82005-PG, and to the Airplane Flight Manual Supplement.

The SN3500 may utilize either an LED light source or a lamp light source. The pilots guide (P/N 82005-PG, revision F or later) should be referenced for light source identification and applicable data color coding information.

6 Instructions For Continued Airworthiness

6.1 General

The following is a summary of the Instructions for Continued Airworthiness prepared under the guidelines of FAA Advisory Circulars 23.1309-1( ) and 25.1309-1( ) which identifies potential failure modes of the Sandel Avionics Model SN3500 Navigation Display. The assumption made is that all functions of the SN3500 will be used in an essential (primary) navigation function.

Replace the SN3500 backlight lamp, when necessary, utilizing instructions in the SN3500 Component Maintenance Manual, document number 82005-0133.

7 Appendix A: Post-Installation Procedures

After all wiring has been verified and the SN3500 has been installed into the panel, the maintenance pages must be accessed to properly configure the SN3500 for the installed equipment. Prior to applying power to the SN3500, depress and hold the [BRG] and the [MEM] keys, and then apply power to the unit. Continue to hold until the first maintenance menu appears. This protocol insures than maintenance menus cannot be called up accidentally during flight.

Once the Maintenance Menu is entered, press the [NEXT] or [LAST] softkeys to cycle the MAINTENANCE MENU pages. Use the UP/DOWN arrow keys for selections, and rotate the right knob to adjust and select. On some menus additional soft key legends will appear as prompts.

Escape the maintenance menus by pressing and holding the CRS knob. This will allow normal operation of the unit to test the effects of settings. Re-enter the maintenance pages pressing and holding the CRS knob.

To disable maintenance menu operation, power down and restart normally. All configured items will be stored in non-volatile memory.

NOTE: When configuring ARINC 429 inputs, select ‘429’ for low-speed and ‘429H’ for high-speed.

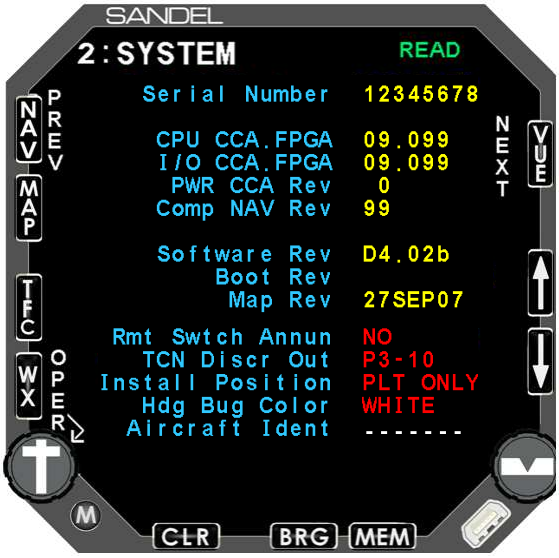
Each maintenance page, the options for each, and a brief description of each option are detailed below:

7.1.1 Page 1: INDEX

The Maintenance Index page is a multiple-choice list that provides an index of all other maintenance pages and allows the operator to jump to a particular page. First scroll the Cursor to point to the desired maintenance page listing using the [UP] Soft key or [DOWN] Soft key. The [SELECT] Soft key is then pressed to jump to this page. Once in the maintenance pages, press the [OPER] Soft key to return to the Maintenance Index page. The [PREV] or [NEXT] Soft keys may also be used to reach a particular maintenance page sequentially.

The [MODE] Soft key is used to toggle the SN3500 between READ and EDIT mode. Note: The SN3500 must be in EDIT mode to make configuration changes on the following maintenance pages.

7.1.2 Page 2: SYSTEM



The System page provides information that identifies the unit and the unit's hardware and software.

Configuration Field	Options	Comment
Rmt Switch Annun	NO YES	Set to yes to allow SN3500 to control GPS switch inputs (LEG/OBS switching, APPR ARM etc.) through Pilot's Menu. Available options will depend on the model of GPS selected on the GPS maintenance page.
TCN Discr Out	None P3-2 P3-10	Selects which pin connector pin is assigned to TACAN Relay Out Signal.
Install Position	PLT ONLY PLT DUAL COP DUAL	Set to adjust color of on-side/cross-side NAV information.
Hdg Bug Color	Orange White	Heading bug color selection.
Aircraft Ident	7 characters	Enter aircraft identification for reference.

7.1.3 Page 3: COMPASS SYSTEM

The Compass System page configures the gyro and fluxgate (if applicable) to the SN3500.

Configuration Field	Options	Comment
HEADING	NONE 429 429H XYZ XYZ- MID CONT KG102	Selects the gyro input to the SN3500.
VALID	NONE HIGH LOW	Not shown if 429 or 429H is selected for heading.
FLXGATE	NONE KMT112 COLLINS HONEYWELL STEC 6446	Selects model of fluxgate input when slaving is performed internally.
QUAD	0.0° 90.0° 180.0° 270.0°	Set automatically when fluxgate is selected.
PEAK	0 - 7	Set automatically when fluxgate is selected

CAL N CAL E CAL W CAL S	-25.0° - 25.0°	Calibration settings for fluxgate input. See below.

7.1.3.1 Compass Calibration (Applies to installations using a fluxgate input)

When a flux gate is *first selected* the quadrant and peaking adjustments will be automatically set.

The magnetic heading shown in the value field at the top of the page should be within +/-20° of the aircraft's wet compass reading. The magnetic heading reading should also increase and decrease as appropriate when the aircraft is turned. If this is not the case, the following troubleshooting procedure can be used to diagnose fluxgate problems:

a) Align the aircraft to north. Set the CAL settings to 0.0°. Adjust the quadrant setting until the magnetic heading is +/-20° of north. If it is not possible to come within +/-20° of north then the XYZ connections the fluxgate may actually be 'YZX' or 'ZXY'. Take all three wires off the fluxgate and move them one terminal 'clockwise' and retest as above. It may be necessary to repeat this step. Once the magnetic heading reads within +/-20° of north then the correct Z leg has been identified and should not be changed

   Note: When installing to existing wiring, ensure that the fluxgate center tap that exists on some Honeywell/Sperry and Collins fluxgates is not connected.

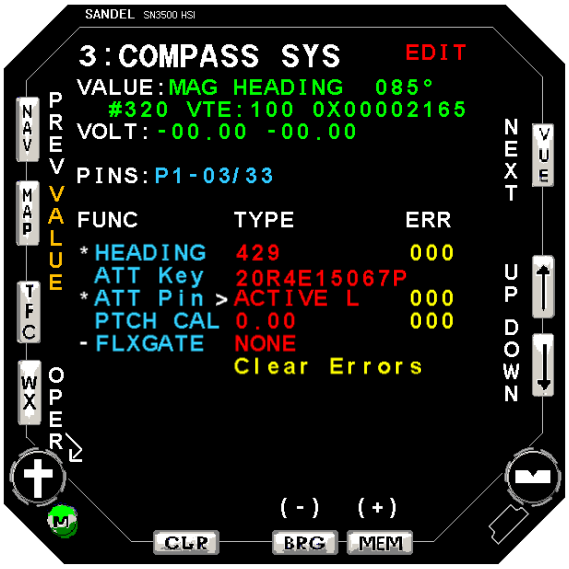
b) Ensure that the compass card rotation is correct by observing that the magnetic heading reading increases/decreases properly as the aircraft is turned. Reverse the XY inputs from the fluxgate to correct for reverse rotation if necessary.

Compass calibration is completed by aligning the aircraft at each cardinal heading and adjusting the corresponding calibration value until the magnetic heading reading observed on the compass maintenance page, matches the actual aircraft heading. After the four cardinal points have been adjusted and verified, a final check of the systems should be done by power cycling the SN3500 into normal mode and ensuring the compass rose is correct for each cardinal heading.

NOTE: Changes to the compass calibration settings may take up to two minutes to take effect when observing the compass card in normal operational mode. Therefore It is recommended to make these calibration adjustments on the compass maintenance page where the compass readings are instantaneous and not affected by the slaving logic in the SN3500.

Reversionary Attitude Configuration (ARINC 429 Low/High speed only)

When the HEADING source is configured as ARINC 429, an optional Reversionary Attitude Mode is available for activation via a valid key entry. Once configured and valid, The assigned input discrete connected to an external switch controls the switching between his Mode and Reversionary Attitude Mode.



Configuration Field	Options	Comment
ATT Key		Enter the Reversionary attitude key.
ATT Pin	None Active L (P3-6) Active L (P3-13)	Connector pin values do not appear in the ATT Pin selection field. The appear above in the PINS field.

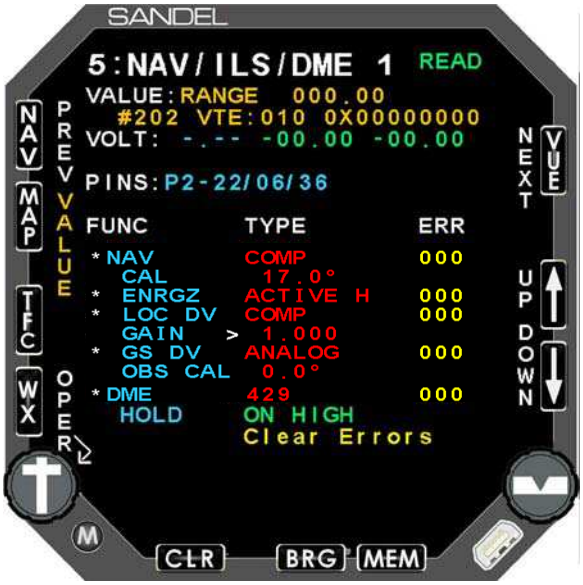
7.1.4 Page 4: ADF/TACAN/ MKR

The ADF page allows the selection for ADF1, ADF2, TACAN 1, TACAN 2, and Marker sources.

Configuration Field	Options	Comment
ADF1	NONE 429 429H XYZ XYZ- S/C DC S/C DC-	Selects type of ADF signal input. If bearing indication is off by 180°, change selection to opposite polarity.
VALID	NONE LOW HIGH	Not shown if 429 or 429H is selected for ADF source.
ADF2	NONE 429 429H XYZ XYZ- S/C DC S/C DC-	Selects type of ADF signal input. If bearing indication is off by 180°, change selection to opposite polarity.
VALID	NONE LOW HIGH	Not shown if 429 or 429H is selected for ADF source

TCN Key	Blank by default	Enter the purchased 11 character key code to enable TACAN. Use the BRG and MEM keys to select the character and the MAP and TFC keys to move the cursor.
TCN1	NONE 429 429H 429-MC 429H-MC XYZ XYZ- 419	Selects type of TACAN signal input. If bearing indication is off by 180°, change selection to opposite polarity.
VALID	NONE HIGH	Not shown unless XYZ or XYZ- is selected for TACAN source.
TCN2	NONE 429 429H 429-MC 429H-MC XYZ XYZ- 419	Selects type of TACAN signal input. If bearing indication is off by 180°, change selection to opposite polarity.
VALID	NONE HIGH	Not shown unless XYZ or XYZ- is selected for TACAN source.
MARKERS	NONE ACTIVE L ACTIVE H 429 429H	Selects type of input from the marker beacon receiver.
THOLD	Default 003	Used to adjust the signal voltage threshold when ACTIVE L or ACTIVE H is selected for the marker beacon input.

7.1.5 Page 5: NAV/ILS/DME 1



The NAV/ILS/DME1 page allows the selection of the NAV1 and DME1 sources.

Configuration Field	Options	Comment
NAV	NONE 429 TO 429H TO 429 FR 429H FR COMP NO BRG	Selects NAV signal input. For 429 interfaces, the standard setting is 'TO'. Change to 'FR' if the received bearing information is 'from' the VOR station.
CAL	Default 17.0°	Only used when COMP is selected for the NAV signal input. A VOR test set should be used to accurately calibrate the displayed bearing pointer reading.
ENRGZ	NONE 429 429H ACTIVE H ACTIVE L	Selects ILS Energize input.

LOC DV	NONE 429 429H ANALOG COMP	Selects localizer signal input. The SN3500 has a built-in NAV converter to decode localizer validity and deviation from a composite signal input. **If COMP is selected see following "Composite LOC Calibration procedure".**
GAIN		Used to calibrate LOC DV COMP
GS DV	NONE 429 429H ANALOG	Selects glideslope signal input.
OBS CAL	DEFAULT 0.0°	Calibrates NAV1 OBS.
DME	NONE 429 429-MC 568 KSD ANALOG	Selects DME signal input.
HOLD	NONE ON HIGH ON LOW	Selects DME HOLD discrete input to active high or low.
ZERO	DEFAULT 000	Present only if Analog DME is selected. Use to set zero point of DME input if necessary.
SCALE	DEFAULT 1.00	Present only if Analog DME is selected. Use to calibrate DME if necessary.

7.1.5.1 OBS Calibration (Does not apply to 429 or 400HZ Differential Resolvers)

Note: Maintenance mode and operational mode can be toggled by pressing and holding the CRS knob.

a) In operational mode set the SN3500 course pointer (OBS) to zero degrees. Set the NAV test set to zero degrees.

b) In Maintenance Mode, adjust the OBS CAL setting to center the deviation needle.

c) Set the test set to 45 degrees. Turn the course pointer to re-center the deviation needle. If it is with a few degrees of 45 degrees, then proceed. Otherwise if it is about 90 degrees out, change the OBS ROT setting on Maintenance Page 10 to REVERSED and return to step a.

d) Check the to/from flag on the SN3500 display. If to/from is reversed (and correct wiring has been verified) adjust the OBS CAL 180 degrees from the current setting.

e) Check the course pointer at 30 degree increments and verify calibration.

7.1.5.2 Composite LOC Calibration Procedure

The following procedure applies to SN3500 installations that have been configured to use the SN3500 internal localizer converter.

LOC DV COMP

This procedure does not apply for any other LOC DV setting such as Arinc 429 or Analog from an external LOC converter.

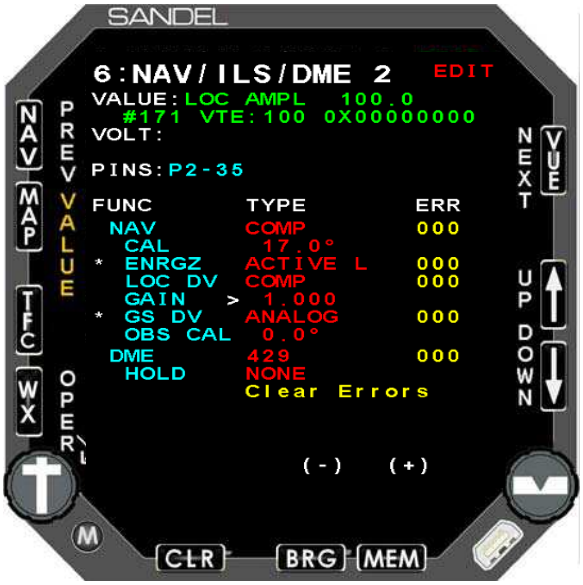
Ramp or Bench Test:

Perform the following procedure using the respective aircraft receiver. This test may be performed with a ramp test set, or may be performed on the bench with a signal generator at nominal RF signal level (25uV or greater).

1. On the SN3500 NAV maintenance page, select LOC DV and change to COMP to select Composite Localizer.
2. Select GAIN.
3. Set 0 DDM (STD) on the test set, and tune the receiver to match the LOC frequency on the test set..
4. Adjust the SN4500 GAIN value so the average value of LOC AMPL reads 100.0 +/- 2.5.
5. Exit the SN3500 maintenance page to the normal pilot's LOC display.
6. On the test set remove both 90Hz and 150Hz simultaneously and verify the SN3500 display flags within 2 seconds.
7. On the test set select .155 DDM Left and verify that removing either tone individually will flag the SN3500 display within 5 seconds.
8. On the test set select .155 DDM Right and verify that removing either tone individually will flag the SN3500 display within 5 seconds.

Perform any other LOC performance tests desired.

7.1.6 Page 6: NAV/ILS/DME 2



The NAV/ILS/DME2 page allows the selection of the NAV2 and DME2 sources.

Configuration Field	Options	Comment
NAV	NONE 429 FR 429H FR 429 TO 429H TO COMP NO BRG	Selects NAV signal input. For 429 interfaces, the standard setting is 'TO'. Change to 'FR' if the received bearing information is 'from' the VOR station.
CAL	Default 17.0°	Only used when COMP is selected for the NAV signal input. A VOR test set should be used to accurately calibrate the displayed bearing pointer reading.
ENRGZ	NONE 429 429H ACTIVE H ACTIVE L	Selects ILS Energize input.

LOC DV	NONE 429 429H ANALOG COMP	Selects localizer signal input. The SN3500 has a built-in NAV converter to decode localizer validity and deviation from a composite signal input. **If COMP is selected see "Composite LOC Calibration procedure" in the previous section.**
GAIN		Used to calibrate LOC DV COMP
GS DV	NONE 429 429H ANALOG	Selects glideslope signal input.
OBS CAL	DEFAULT 0.0°	Calibrates NAV2 OBS. See OBS calibration instructions for NAV1 in section 7.1.5.1.
DME	NONE 429 429-MC 568 KSD LO FR DME1 HI FR DME1	Selects DME signal input. For installations with a single DME receiver used by NAV1 and NAV2, select LO FR DME1 (if low on DME2 Hold P1-40 indicates NAV2 selection) or HI FR DME1 (if high on DME2 Hold P1-40 indicates NAV2 selection).
HOLD	NONE ON HIGH ON LOW	Selects DME HOLD discrete input to active high or low. Not shown if above DME selection is LO FR DME1 or HI FR DME1.

7.1.7 Page 7: GPS1

The GPS1 page allows the selection and configuration of the GPS1 input.

Configuration Field	Options	Comment
ANNUN	NONE ACTIVE L SERIAL	Automatically configured when GPS is selected from list below.
LAT DV	NONE ANALOG SERIAL	Automatically configured when GPS is selected from list below.
VERT DV	NONE ANALOG SERIAL	Automatically configured when GPS is selected from list below.
VERT ENA	NONE ACTIVE H ACTIVE L SERIAL	Automatically configured when GPS is selected from list below.
OBS CAL	DEFAULT 0.0°	Automatically configured when GPS is selected from list below. May require adjustment if the GPS receiver uses an RS-232 interface and has a resolver connected.
ARINC - 429	429 429H	Not shown when selected GPS does not have ARINC 429 output.

APR ACTV	NONE ANNUN IN ACTIVE L ACTIVE H	GPS approach active source select.
GPS	Select from list	Select the appropriate model of GPS from the list. Press the SET soft key (CLR button) to program.

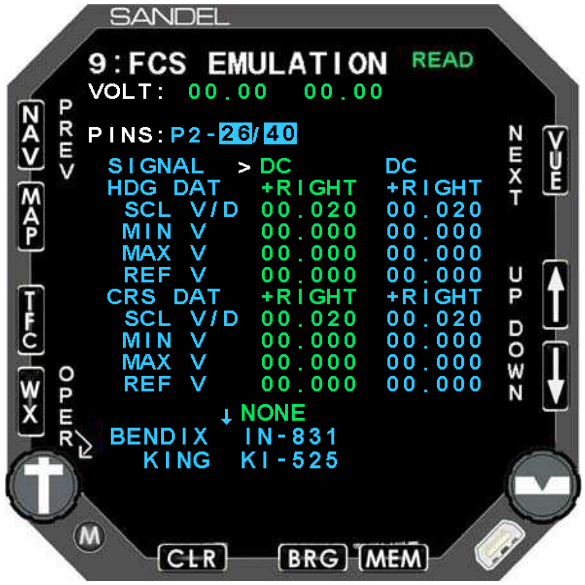
7.1.8 Page 8: GPS2

The GPS2 page allows the selection and configuration of the GPS2 input.

Configuration Field	Options	Comment
ANNUN	NONE ACTIVE L SERIAL	Automatically configured when GPS is selected from list below.
LAT DV	NONE ANALOG SERIAL	Automatically configured when GPS is selected from list below.
VERT DV	NONE ANALOG SERIAL	Automatically configured when GPS is selected from list below.
VERT ENA	NONE ACTIVE H ACTIVE L SERIAL	Automatically configured when GPS is selected from list below.
OBS CAL	DEFAULT 0.0°	Automatically configured when GPS is selected from list below. May require adjustment if the GPS receiver uses an RS-232 interface and has a resolver connected.
ARINC – 429	429 429H	Not shown when selected GPS does not have ARINC 429 output.

APR ACTV	NONE ANNUN IN ACTIVE L ACTIVE H	GPS approach active source select.
GPS	Select from list	Select the appropriate model of GPS from the list. Press the SET soft key (CLR button) to program.

7.1.9 Page 9: FCS EMULATION



The FCS Emulation allows the selection and configuration of the FCS interface.

Configuration Field	Options	Comment
SIGNAL	DC AC	Automatically configured when FCS is selected from list below.
HDG DAT	+RIGHT +LEFT	Automatically configured when FCS is selected from list below.
SCL V/D		Default settings reset when FCS is selected from list below.
MIN V		Default settings reset when FCS is selected from list below.
MAX V		Default settings reset when FCS is selected from list below.
REF V		Default settings reset when FCS is selected from list below.
CRS DAT	+RIGHT +LEFT	Automatically configured when FCS is selected from list below.
SCL V/D		Default settings reset when FCS is selected from list below.
MIN V		Default settings reset when FCS is selected from list below.

MAX V		Default settings reset when FCS is selected from list below.
REF V		Default settings reset when FCS is selected from list below.
FCS	Select from list	Select the appropriate emulation from the list. Press the SET soft key (CLR button) to program.

HDG V/D and CRS V/D increase or decrease the gain of the course or heading error relative to the lubber line, and normally match the volts/degree input of the associated autopilot computer. These values default when the FCS selection is initially set, but can be adjusted in-flight if necessary, in VFR conditions, as follows:

a) Engage the autopilot in HDG mode. After the aircraft is established on the desired heading, move the heading bug knob a large amount and ensure that the aircraft turns to the heading bug and rolls out normally without instability, overshooting or undershooting to the desired heading. To correct for overshooting or instability, reduce the HDG V/D setting. To correct for undershooting, increase the HDG V/D setting.

b) Engage the autopilot in NAV mode and turn off the NAV receiver to provide a zero course error. Repeat the tests and adjustments above using the course pointer and adjust the CRS V/D setting as appropriate.

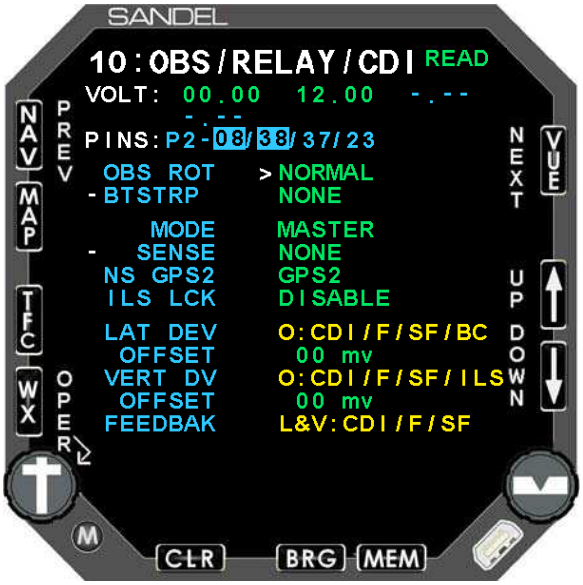
c) Use the REF V adjustment to center the heading and course rollout if not precisely on the lubber line. This will rarely be required.

HDG DAT and CRS DAT allow the direction sensing to be reversed during installation. Changing these settings is identical to reversing H/C on a synchro control transformer.

The other settings on this page are not for installer adjustment except on advice of the factory, service bulletin, or service information letter.

Note that the adjustments are shown in the left column of values. The right column shows the default values for reference purposes.

7.1.10 Page 10: OBS / RELAY / CDI



Configuration Field	Options	Comment
OBS ROT	NORMAL REVERSED DIFF A	Adjusts rotation of OBS. Select DIFF A when interfaced to 400HZ differential resolver.
BTSTRP	NONE NORMAL REVERSE	Enables bootstrap synchro heading output.
MODE	MASTER SLAVE	Selects NAV/GPS switching mode. In MASTER mode, the SN3500's NAV button is used to switch between NAV and GPS sources. In SLAVE mode a remote switch is used.
SENSE	NONE GPS1 GPS2 GPS1/GPS2 NAV2 GPS1/NAV2 GPS2/NAV2 G1/G2/N2	Enables relay sense input to verify relay switching. If a low is not detected on the relay sense input, the corresponding NAV source will be redlined on the pilot's display when selected.

NS GPS2 (software version 3.00 and above)	GPS2 NAV2 & GPS2	Normal operation of sense lines as described above in Sense selections. When replacing a SN3308 with a SN3500, use this selection and "NAV2" in Sense selections for installations with dual Garmin GNS Receivers where both receivers (All four NAV sources) are made available as NAV sources. This is the sense input (P3-5) for a relay which is wired to both the NAV-2 and GPS-2 relay outputs. Ref: SN3308 install manual 90106-IM-G (4), dual Garmin install sheet #26.
ILS LCK	DISABLE ENABLE	Enables/disables ILS Lockout feature of the ILS input for NAV1/NAV2.
LAT DEV	n/a	Monitors FCS voltage outputs.
OFFSET	n/a	Adjusts zero offset of the lateral deviation output. *
VERT DV	n/a	Monitors FCS voltage outputs.
OFFSET	n/a	Adjusts zero offset of the vertical deviation output. *

- * This adjustment may be used to fine tune the autopilot localizer or glide slope tracking if the SN3500 lat and vertical deviation outputs have been connected to the autopilot.

7.1.11 Page 11: WX-500

Configuration Field	Options	Comment
SOURCE	NONE 232	Set to 232 to enable WX-500 interface.
MODE IS	n/a	Displays current mode of the WX-500.
MODE RQ	WEATHER STRIKE TEST DEMO NOISE MONITOR SELF TEST	Selects mode of WX-500. Select WEATHER for normal operation.
ANT IS	n/a	Displays current antenna configuration.
ANT RQ	TOP BOTTOM UNKNOWN	Software selection of antenna location. Normally not used as the antenna location is set by jumpers on the WX-500.
INFO RQ	FAULT LIST CONFIGURATION ENVIRONMENT S/W VERSION	Requests information from WX-500. Information will be shown at the bottom of the display.

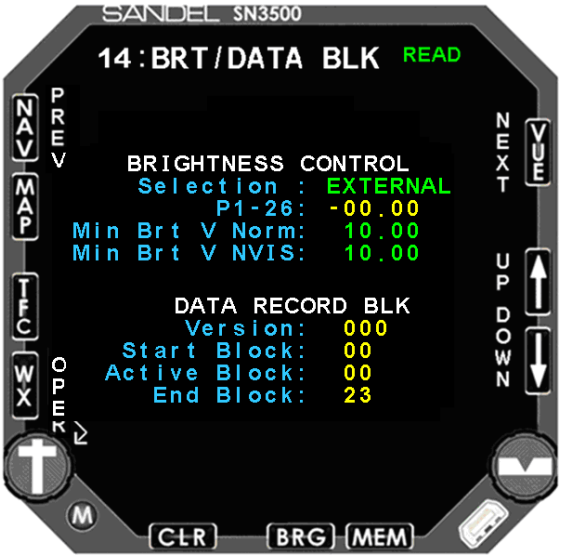
7.1.12 Page 12: Traffic

Configuration Field	Options	Comment
DATA LINK (Software version 3.00 and above)	WSI w / TX WSI no TX	SN3500 is sole display. SN3500 is wired as receive only, another display is connected to the WSI receiver.
DLINK KEY (Software version 3.00 and above)	Blank by default	Enter the purchased 11 character key code to enable data link weather. Use the BRG and MEM keys to select the character and the MAP and TFC keys to move the cursor.
TCAS KEY	Blank by default	Enter the purchased 11 character key code to enable traffic. Use the BRG and MEM keys to select the character and the MAP and TFC keys to move the cursor.
TCAS Model	Collins TCAS 4000 Goodrich Skywatch HP Goodrich TCAS791/A Honeywell CAS-66 Honeywell CAS-67 Honeywell CAS-81 Ryan 9900BX TAS	Select the appropriate model of TCAS from the list. Press the SET soft key (CLR button) to program. NOTE: Users of Honeywell KTA-810 systems should configure as CAS-66.

7.1.13 Page 13: STATUS

Sensor summary status.

7.1.14 Page 14: BRT/DATA BLK



Configuration Field	Options	Comment
Selection	INTERNAL EXTERNAL	Selects the brightness control to be external or internal.
P1-26	NONE	Monitors external brightness bus voltage. Not shown when brightness control selection is set to INTERNAL.
Min Brt V Norm		Adjusts the external brightness bus to the desired night-brightness voltage. Adjustable from 1.5 volts to 15.0 volts. Not shown when brightness control selection is set to INTERNAL.
Min Brt V NVIS		Adjusts the external brightness bus to the desired NVIS brightness voltage. Adjustable from 1.5 volts to 15.0 volts. Not shown when brightness control selection is set to INTERNAL. Not applicable to non-NVIS units.
DATA RECORD BLK	None	For factory use.

Calibrating the external brightness control minimum brightness:

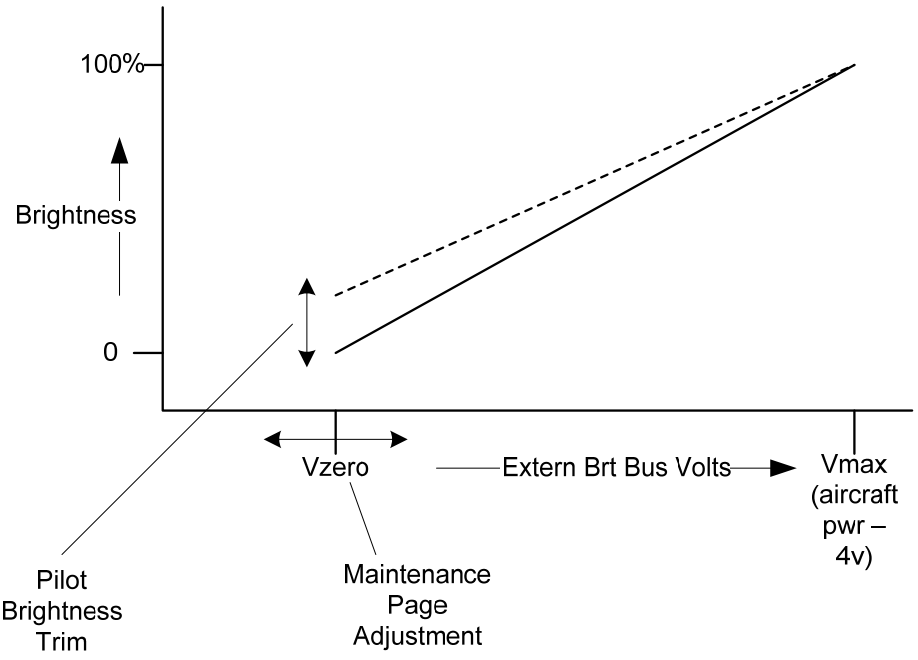
BEFORE performing calibration:
Select the “BRT” maintenance page, select EXTERNAL for brightness control.

To calibrate minimum brightness, set aircraft to NVIS OFF and do the following from BRT maintenance page. Please note: The maintenance page always displays at 100% brightness. You need to exit MAINT by pressing and holding the left knob to see the resulting brightness adjustment.

1. Select “Min Brt V Norm” with up/down arrow keys
2. Set the aircraft external brightness bus at the desired night-brightness voltage. This voltage will be displayed on-screen.
3. Press “SET” softkey. This will set Vzero (see graph below) at the current bus voltage minus 2.00 volts
4. Exit MAINT by pressing and holding the left knob and check the brightness balance with the rest of the cockpit. If you need further adjustment, re-enter BRT maintenance page by pressing and holding the left knob and trim the “Min Brt V Norm” setting using “+/- softkeys. A lower voltage setting number will INCREASE the brightness.

Repeat steps 1,2,3,4 with external NVIS selected

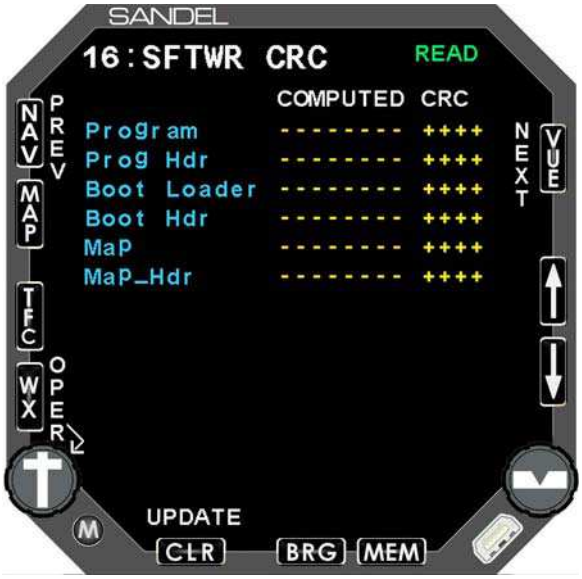
NOTE: From this point on the pilot will be able to trim the minimum brightness, if desired, using the ‘M’ button to enter the pilot’s menu.



7.1.15 Page 15: Power

Monitors power inputs to the SN3500 including the #1 and #2 inverters.

7.1.16 Page 16: Software CRC



Displays CRC values for the software and database programs. Press the [UPDATE] soft key to re-calculate. Contact Sandel if FAIL is annunciated for any of the values.

8 Appendix B: Environmental Qualification Form

RTCA/D0-160D Environmental Qualification Form (Lamp Models)

NAMEPLATE NOMENCLATURE: [(A2)(F1)]ZBAB[(H)(R)]XXXXXXZBABB[WW]M[XXF2]XXA	
TYPE/MODEL NO: SN3500	**TSO NUMBERS:** C113
MANUFACTURER'S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION:	
a.) Design Requirements & Objectives For SN3500 EHSI, document number 82006-0010	
b.) RTCA D0-160D Environmental Plan For Sandel SN3500 EHSI document number 82006-0090	
MANUFACTURER: Sandel Avionics, Inc.	
ADDRESS: 2401 Dogwood Way	
Vista, CA 92083	
REVISION & CHANGE NOS. OF D0-160: Revision D, Change Nos. 1 & 2	**DATE TESTED:** **From:** 06/04

ENVIRONMENTAL TESTS	RTCA/DO-160D SECTION	Equipment Test Category	Notes
Temperature & Altitude	4.0	[(A2)(F1)B]	PASS
Temperature Variation (combined):	5.0		
Low Temperature	4.5.1		
-Ground Survival			
-Operational			
High Temperature	4.5.2 & 4.5.3		
-Ground Survival			
-Operational			
Altitude	4.6		
-Decompression	4.6.2		
-Overpressure	4.6.3		
In-Flight Loss of Cooling	4.5.4	[(A2)Z]	PASS
Humidity	6.0	A	PASS
Operational Shock and Crash Safety	7.0	B	PASS
Vibration	8.0	[(H)(R)]	PASS: RESONANT FREQUENCIES: Section 8.7.2, Step a. and d.: Pre-Scan: X: 195Hz, Y: 500Hz, Z: 160Hz Post-Scan: X: 195Hz, Y: 450Hz, Z: 150Hz Section 8.8.1.3, Steps a. and e.: Pre-Scan: X: 190Hz, Y: 425Hz, Z: 145Hz Post-Scan: X: 190Hz, Y: 625Hz, Z: 145Hz Section 8.8.1.3, Steps b. and d.: Pre-Scan: X: 190Hz, Y: 390Hz, Z: 150Hz Post-Scan: X: 190Hz, Y: 625Hz, Z: 150Hz
Explosion	9.0	X	
Water-proofness	10.0	X	
Fluids Susceptibility	11.0	X	
Sand and Dust	12.0	X	
Fungus	13.0	X	
Salt Spray	14.0	X	
Magnetic Effect	15.0	Z	PASS
Power Input	16.0	B	PASS
Voltage Spike	17.0	A	PASS
Audio Frequency Susceptibility	18.0	B	PASS
Induced Signal Susceptibility	19.0	B	PASS
Radio Frequency Susceptibility	20.0	[WW]	PASS
Radio Frequency Emission	21.0	M	PASS
Lightning Induced Transient Susceptibility	22.0	[XX(EF)2]	PASS
Lightning Direct Effects	23.0	X	
Icing	24.0	X	
Electrostatic Discharge	25.0	A	PASS

RTCA/DO-160E Environmental Qualification Form (LED Models)

NAMEPLATE NOMENCLATURE: [A2F1Z]BBB[H(R)R(BB1G)]XXXXXXZBABBC[WW]M[XXE2F2X]XXAX	
TYPE/MODEL NO: SN3500	**TSO NUMBERS:** C113, C5e, C6d, C34e, C35d, C36e, C40c, C41d, C52b, C118
MANUFACTURER'S SPECIFICATION AND/OR OTHER APPLICABLE SPECIFICATION:	
MANUFACTURER: Sandel Avionics, Inc.	
ADDRESS: 2401 Dogwood Way	
Vista, CA 92081	
REVISION & CHANGE NOS. OF DO-160: Revision E	**DATE TESTED:** **From:** 8/29/07 **To:** 10/25/07

ENVIRONMENTAL TESTS	RTCA/DO-DO-160E SECTION	Equipment Test Category	Notes
Temperature & Altitude	4.0	A2F1	PASS
Low Temperature	4.5.1 & 4.5.2		
-Ground Survival			
-Operational			
High Temperature	4.5.3 & 4.5.4		
-Ground Survival			
-Operational			
In-Flight Loss of Cooling	4.5.5	Z	PASS
Altitude	4.6.1	F1	PASS
-Decompression	4.6.2	A2	Credit per Sandel Doc. No. 82009-0144
-Overpressure	4.6.3	A2	PASS
Temperature Variation	5.0	B	PASS:
Humidity	6.3.1	B	PASS
Operational Shock and Crash Safety	7.0	B	PASS
Vibration	8.0	[H R]	PASS: RESONANT FREQUENCIES: Section 8.7.2, Step a. and d.: Pre-Scan: X: 175Hz, Y: 330Hz Z: 190Hz Post-Scan: X: 180Hz Y: 395Hz Z: 190Hz Section 8.8.1.3, Steps a. and e.: Pre-Scan: X: 180Hz, Y: 330Hz Z: 175Hz Post-Scan: X: 175Hz Y: 275Hz Z: 150Hz Section 8.8.1.3, Steps b. and d.: Pre-Scan: X: 180Hz, Y: 330Hz Z: 175Hz Post-Scan: X: 175Hz Y: 245Hz Z: 150Hz
Explosion	9.0	X	n/a
Water-proofness	10.0	X	n/a
Fluids Susceptibility	11.0	X	n/a
Sand and Dust	12.0	X	n/a
Fungus	13.0	X	n/a
Salt Spray	14.0	X	n/a
Magnetic Effect	15.0	Z	Credit per Sandel Doc. No. 82009-0144
Power Input	16.0	B	PASS
Voltage Spike	17.0	A	PASS
Audio Frequency Susceptibility	18.0	B	PASS
Induced Signal Susceptibility	19.0	BC	Credit per Sandel Doc. No. 82009-0144
Radio Frequency Susceptibility	20.0	[WW]	PASS- RF Radiated Susceptibility, 160E section 20.5/Credit per Sandel Doc. No. 82009-0144
Radio Frequency Emission	21.0	M	PASS- RF Radiated Emission, 160E section 21.4/Credit per Sandel Doc. No. 82009-0144
Lightning Induced Transient Susceptibility	22.0	[XXE2F2X]	Credit per Sandel Doc. No. 82009-0144
Lightning Direct Effects	23.0	X	n/a
Icing	24.0	X	n/a
Electrostatic Discharge	25.0	A	PASS
Fire, Flammability	26.0	X	n/a

9 Appendix C: Sample FAA Form 337

NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

   (If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

   A. Installed the following equipment and components:

      1. Sandel Avionics, Inc., SN3500 Navigation Display *(or as appropriate)*, Part Number SN3500-000 *(or as appropriate)*
      2. Sandel Avionics LLC, Clamp Fixture 3ATI, Part Number 61062.

   B. The Sandel Avionics SN3500 is interfaced to the following equipment:

      1. Garmin International, GPS165, GPS Navigation Receiver (Approved for En route, Terminal, and Non-precision Approach). *(or as appropriate)*
      2. AlliedSignal Electronics and Avionics, KX 165 Communications and Navigation Receiver. *(or as appropriate)*
      3. AlliedSignal Electronics and Avionics, KX 155 Communications and Navigation Receiver. *(or as appropriate)*
      4. AlliedSignal Electronics and Avionics, KRA 10A Radar Altimeter System. *(or as appropriate)*
      5. AlliedSignal Electronics and Avionics, KR 22 Marker Receiver. *(or as appropriate)*
      6. AlliedSignal Electronics and Avionics, KG 102A Directional Gyro. *(or as appropriate)*
      7. AlliedSignal Electronics and Avionics, KMT 112 Magnetic Azimuth Transmitter. *(or as appropriate)*

(By example state the following functional interface properties)...

   C. The SN3500 receives and processes GPS navigation information for digital and waypoint display from the GPS165. These operations are considered supplemental navigation.

D. The SN3500 receives and processes VOR, localizer, and glideslope deviation and composite audio for bearing display from the KX 165. These operations are considered primary means of navigation.

E. The SN3500 receives and processes glideslope deviation and composite audio for bearing display from the KX 155.

F. The SN3500 receives and processes marker beacon receiver information for illumination from the KR 22.

G. The SN3500 receives and processes magnetic heading for digital and graphic display from the KG 102A and KMT 112.

H. Interference and functional tests and inspections were accomplished with reference to Advisory Circular 23.1311. *(or as appropriate)*.

I. A system design and analysis was conducted with reference to Advisory Circular 2X.1309-1( ). *(or as appropriate)*.

J. Federal Aviation Regulations, 2X.1301, 2X.1309(a), (b) and (d), 23.1311, 2X.1321(a), (b) and (d), 2X.1322, 2X.1327(a), 2X.1331, 2X1351, 2X.1357(a)-(d), 23.1365, 2X.1381, 2X.1529, and 2X.1581 *(or as appropriate)*, were the basis of compliance.

K. Installation approval is sought with reference to Flight Standards Information Bulletin, FSAW 95-09( ) (Amended), titled "Electronic Horizontal Situation Indicator (EHSI) Approvals".

L. The aircraft equipment list, and weight and balance were revised and recorded within the aircraft maintenance records.

M. All pertinent records of this alteration are on file at *(State your repair station name and number)*.

---------- End ----------

10 Appendix D: Sample Airplane Flight Manual Supplement

The following is being provided for installations in which the local FSDO requires an Airplane Flight Manual Supplement. This Sample is simply being provided for the convenience of the installer. Note that the cover page, table of contents and log of revisions has not been included here, and will be specific to your installation. The text is specific to the installed equipment, and also specifies ILS LOCKOUT operation. This text must be modified by the installation facility to be compatible with the installed equipment.

SECTION I - GENERAL

The Sandel Avionics SN3500 Primary Navigation Display (PND) is a compact three-inch instrument that performs the functions of a traditional Horizontal Situation Indicator combined with a two-pointer RMI. The SN3500 also displays a moving map, Stormscope® data, FIS-B data link weather, traffic information, marker beacon and GPS annunciators if the aircraft is appropriately equipped and configured.

***Add following text if Data Link Weather is installed*:**
FIS-B Weather Data is intended for the purpose of assisting in long-range strategic flight planning only. Please note that its delayed updating and lack of sufficient resolution makes it unsuitable for tactical maneuvering of the aircraft. It also differs significantly from on-board weather radar (which scans a narrow vertical angle) since it portrays radar returns from multiple ground stations extending from the surface up to the highest flight levels. For these reasons it may not even directly reflect the current flight conditions.

SECTION II LIMITATIONS

The system must utilize software version X.XX or later FAA approved version.

The SN3500 Navigation Display Pilots Guide, SPN 82005-PG (or applicable revision corresponding to the software version) must be immediately available to the flight crew.

The “CRC Self Test Failed” message must not appear on power-up if flight operations are predicated on the use of the SN3500 Primary Navigation Display.

Add following text if Data Link Weather is installed:
The FIS-B weather display shall not be used for tactical maneuvering of the aircraft.

SECTION III EMERGENCY PROCEDURES

If the SN3500 fails to operate, use the magnetic compass as a heading source.

If the remote directional gyro (DG) becomes inoperative, the magnetic fluxgate will provide the heading, and the resulting heading display will respond much more slowly than normal. The compass rose changes color from white to amber, and digital heading numbers will be redlined.

If the fluxgate fails, the SN3500 Navigation Display will continue to display heading based on the directional gyro (DG) input. The compass rose changes color from white to amber, heading numbers will be redlined.

Add following text if FCS outputs are <u>Used:</u>
If the "FCS FDBCK ERR" message appears when in autopilot coupled NAV or APPR mode, immediately monitor the lateral and vertical deviation indicators. If they are not tracking properly, immediately disable the autopilot and flight director NAV or APPR mode for the duration of the flight. HDG mode may still be used if the autopilot tracks the SN3500 HDG bug properly.

Add following text if FCS outputs are <u>not used</u>:
If the "FCS FDBCK ERR" message appears it has no effect on the autopilot system and no pilot action needs to be taken.

SECTION IV NORMAL PROCEDURES

The SN3500 NAV pushbutton selects the primary navigation source NAV1, NAV2 or GPS1. The selected source will drive the SN3500 deviation indicator and the autopilot.

ILS override will prevent selection of the GPS as long as an ILS frequency is tuned on NAV1 or NAV2. This will be annunciated on the SN3500 Navigation Display.

The SN3500 BRG pushbutton selects the bearing pointer 1 / 2 / both. The 'M' pushbutton followed by the BRG pushbutton selects the bearing pointer sources NAV1, NAV2, GPS1, GPS2, or ADF.

Annunciation of all GPS modes is accomplished by messages on the GPS receiver as well as on-screen annunciation on the SN3500 .

Add following text if Traffic is installed:
The traffic display mode is annunciated next to the TFC button. There are three different modes available which control how the traffic targets are displayed. Press the TFC button repeatedly to cycle through the different modes.

ON: Enables display of all targets within the selected map range (limited by the maximum range of the installed traffic system).

M: Manual mode. Traffic will be displayed at the selected map range only when alerting traffic is present, without auto ranging. Display range can be changed manually.

A: Auto mode. Traffic will be displayed at the selected map range only when alerting traffic is present, except that the map range will auto-scale to an appropriate range to show the traffic on-screen.

Manual (M) or Auto (A) modes do not display non-alerting traffic.

Add following text if Data Link Weather is installed:

The SN3500 can display two types of weather information, precipitation and lightning. Lightning may be displayed from two independent sources, WX-500 Stormscope® or a FIS-B data link receiver. Both sources of lightning may be displayed simultaneously.

The SN3500 WX pushbutton selects the type weather to be displayed:

PL: Precipitation & Lightning

P: Precipitation only

L: Lightning only

The 'M' pushbutton followed by the WX pushbutton selects the lightning display data source, either WX500, WSI, or both. The number to the right of the WX annunciation displays the time in minutes since the last FIS-B precipitation data was received from the data link receiver.

Weather graphics depicted on the SN3500 data link weather display may differ significantly from the on-board weather radar or from out of the cockpit observations for one or more of the following reasons.

- *Vertical strata information is not provided by the FIS-B weather service. The FIS-B weather data originates from NEXRAD ground based weather radar observations that include weather measurements up to 30,000 feet above the radar facility. The on-board weather radar is measuring returns relative to the current flight level.*

- *The FIS-B weather display is not exactly real time. Under certain circumstances the time from when the NEXRAD radar observations were made to when the data is displayed on the SN3500 can be as high as 40 minutes. During this time the position of the weather may have significantly changed or moved relative to the aircraft position.*

- *The graphic representation of precipitation is predicated on the level of reflected energy from moisture in the air mass (the more moisture in the air mass, the higher level of energy returned to the radar antenna). This may result in graphic presentation of precipitation on the SN3500 display when no visible moisture can be seen.*

- *Virga precipitation: the precipitation may be at a higher flight level and evaporating before reaching the current aircraft flight level.*

The circuit breaker for the SN3500 Navigation Display is located on the lower right circuit breaker panel labeled EHSI 1.

Refer to the SN3500 Primary Navigation Display Pilot's Guide for other procedures, error messages, alerts and more detailed FIS-B data link weather information.

SECTION V PERFORMANCE DATA

No Change to AFM.

11 Appendix E: Checkout Procedures

11.1 Functional Ground Test Procedures/Report

The "Functional Ground Test Procedures/Report" below is for the purpose of simplifying ground tests of the SN3500. A copy of this report (and the "Operational Flight Check Procedures/ Report") must be retained by the installing agency and a copy must be installed in the aircraft maintenance records. A copy must also be forwarded to Sandel Avionics, Inc. along with the Warranty Registration Form, Part Number 10235, which should be mailed after operational acceptance.

Repair Station Name: _____
Number: _____
Address or Location: _____
City _____ ST _____ ZIP _____
A/C Make: _____ A/C Model: _____
A/C Serial No: _____
Work Order No.: _____ Technician: _____
Date Performed: _____

COMPANY NAME
COMPANY ADDRESS
TELEPHONE/FAX

Ground Test Procedures/Report

For

Sandel Avionics SN3500

Installed in

{aircraft make and model}

Registration No. _____

SN3500 Serial No. _____

Document No. _____

Rev. - , Date

11.1.1 Introduction

The following ground test procedures are to be performed after the SN3500 has been properly configured in the "Post-Installation Procedures", but prior to performing flight test procedures. Successful completion of both the Ground Test and Flight Test procedures is necessary to support the claim that the SN3500, as installed, performs its intended function and is compatible with all aircraft systems. The ground test procedures contained herein will include testing of interfaces to other systems. Therefore, this ground test must be conducted in conjunction with, or subsequent to ground testing of other systems.

The following external system interfaces will be tested:

- Heading input from directional gyro
- Compass input from fluxgate sensor (if installed)
- Navigation data inputs: VOR/ILS/GS, ADF, DME, GPS and FMS (if installed)
- Annunciator inputs from a marker beacon receiver (if installed)
- Annunciator inputs from a GPS receiver (if installed)
- Lightning-strike inputs from a WX-500 Stormscope® sensor (if installed)
- Remote NAV source switching relays and/or indicators (if installed)
- External NVIS control switch (if installed)

11.1.2 Test Procedures and Results

11.1.3 Physical Installation

Verify that the SN3500 clamp tray has been properly installed in accordance with the manufacturer's instructions, that any external switches affecting SN3500 operation have been clearly labeled, and that a trip-free resetable circuit breaker labeled "EHSI" is clearly visible. Ensure that cooling air intake is not obstructed.

Completed _____ Comment _____

11.1.4 Wiring Verification and Initial Power-Up

Perform a 100% continuity check of all aircraft wiring to verify in accordance with installation wiring diagrams.

Completed _____ Comment _____

Power check all wiring to ensure that 28 Vdc and 26 Vac (if applicable) are applied to the proper pins and nowhere else.

Completed _____ Comment _____

Install the SN3500 into the clamp tray and verify full connector mating and that the unit installs without obstruction.

Completed _____ Comment _____

Activate the aircraft master switch and avionics master switch, if installed. Verify that the SN3500 display illuminates within 30 seconds.

Switch on all equipment interfaced to the SN3500 such as NAV receivers, gyros, and marker beacon receivers.

Completed _____ Comment _____

11.1.5 System Configuration

If not previously accomplished, perform the "Post-Installation Procedures" included in the Appendix of the SN3500 Installation Guide. These procedures describe how to configure the SN3500 for compatibility with installed systems.

Completed _____ Comment _____

11.1.6 System Functions

11.1.7 Compass System Interface

Power up the system and verify that within 3 minutes the compass card is displayed in white and agrees with the heading on a magnetic compass.

Completed _____ Comment _____

Disable the fluxgate excitation to the SN3500. Verify that within 10 seconds the compass digital heading is flagged. Restore the fluxgate excitation and verify that within 10 seconds the display is fully restored. Note: If fluxgate excitation and gyro are interconnected, remove both signals simultaneously and look for simultaneous failure indications.)

Completed _____ Comment _____

Remove power to (or otherwise disable) the remote directional gyro. Verify that the compass card is displayed in amber AND that a warning message is displayed on the SN3500 which requires operator acknowledgement.

Completed _____ Comment _____

11.1.8 NAV Source Selection

If the SN3500 is configured in "master" mode (no external NAV/GPS switch):

Press the [NAV] button repeatedly and verify that the screen legend next to the button cycles correctly through the configured NAV sources, i.e. NAV1, NAV2, GPS1, GPS 2, TACAN 1, TACAN 2 (or as configured). For each NAV source, create valid and invalid NAV conditions and verify correct display of the SN3500 NAV flag for each receiver (the large red "X" through the CDI). For each VOR/LOC source, verify that tuning an ILS frequency causes the glideslope (vertical deviation) scale to display on the screen, even if it is flagged.

Completed _____ Comment _____

[If ILS Lockout is enabled] Press the [NAV] button and select a source *other than* NAV1, such as GPS or NAV2 (if configured). Tune NAV1 to an ILS frequency, and verify that after a one-second delay, the selected NAV source automatically reverts to NAV1. Verify that as long as NAV1 is tuned to an ILS frequency, pressing the [NAV] button will not change the NAV source, but instead will display the message "NAV1 TUNED TO LOC". Verify that upon *de-tuning* the ILS frequency from NAV1, the NAV source selection returns to its original state.

Completed _____ Comment _____

If NAV2 is configured, tune both NAV1 and NAV2 to an ILS frequency and verify that NAV1 remains selected. Detune the ILS frequency on NAV1 and verify that the display reverts to NAV2.

Completed _____ Comment _____

If the SN3500 is configured in "slave" mode (using external NAV/GPS switch):

Verify that pressing NAV does not change the selected NAV source, but instead displays an advisory message.

Completed _____ Comment _____

Verify that the external NAV/GPS switch arrangement correctly controls the selected NAV source on the SN3500, including any ILS lockout scheme, if implemented.

Completed _____ Comment _____

11.1.9 LOC/GS Deviation

Using a ILS test signal generator verify proper deviation of the LOC/GS deviation indicators on the SN3500. Tune the NAV1 to match the ILS test signal generator frequency (usually 108.1 MHz.). Select LOC 1 on the SN3500. Adjust the signal generator to verify the following indications on the SN3500 LOC deviation indicator, center, 2 dots fly left, 2 dots fly right, and LOC flagged. Adjust the signal generator to verify the following indications on the SN3500 GS deviation indicator, center, 2 dots fly up, 2 dots fly down, and GS flagged. Repeat for NAV2.

Completed _____ Comment _____

11.1.10 BRG Source Selection

Press M and then press BRG on the SN3500 and verify that all installed NAV sources are presented for *each* bearing pointer (NAV1, NAV2, ADF1, ADF2, TACAN 1, TACAN 2, GPS1, GPS2 as installed). In addition, bearing pointer 1 will have “AUTO” listed as a choice.

Completed _____ Comment _____

Select each available NAV source for each pointer, and verify in turn that the depicted bearing corresponds to the actual bearing shown on the NAV source.

Completed _____ Comment _____

11.1.11 DME Selection

If two DME receivers are installed and configured:

Verify that pushing NAV to select between NAV1 and NAV2 also switches the appropriate DME readout on the SN3500 distance display. Press M and then BRG to configure bearing pointer 1 to be NAV1 and bearing pointer 2 to be NAV2. Press BRG to display both pointers simultaneously. Verify that the correct DME data is displayed in each bearing pointer data block.

Completed _____ Comment _____

If a single DME receiver is installed and is not switchable between NAV1 and NAV2:

Verify that pushing NAV to select between NAV1 and NAV2 causes the DME readout to be displayed when NAV1 is selected, and the DME readout to be removed when NAV2 is selected. Press M and then press BRG to configure bearing pointer 1 to be NAV1 and bearing pointer 2 to be NAV2. Press BRG to display both pointers simultaneously. Verify that DME data is displayed in the bearing pointer 1 data block, and that no distance data is displayed in the bearing pointer 2 data block.

Completed _____ Comment _____

If a single DME receiver is installed and is switchable between NAV1 and NAV2:

Verify that pushing NAV to select between NAV1 and NAV2 causes either the correct DME readout to be displayed or a "none" indication, depending on the position of the external DME select switch (if installed). Press M and then press BRG to configure bearing pointer 1 to be NAV1 and bearing pointer 2 to be NAV2. Press BRG to display both pointers simultaneously. Verify that DME data is displayed in the bearing pointer 1 data block when DME is externally switched to NAV1. Verify that when DME is externally switched to NAV2, an arrow ("→") appears in the DME portion of the pointer 1 data block, and that DME distance data is displayed in the bearing pointer 2 data block. Press BRG to deselect pointer 1 and only display pointer 2. Verify that proper DME data is now displayed in the bearing pointer 2 data block.

Completed _____ Comment _____

If an external DME HOLD control is configured:

Verify that enabling DME HOLD displays the "H" symbol for each installed DME receiver so equipped.

Completed _____ Comment _____

11.1.12 GPS Interface and Control

For each GPS receiver installed and configured:

Allow the receiver to acquire a valid position fix, and press NAV on the SN3500 to select that receiver as a NAV source. Enter either a single destination waypoint or a flight plan on the GPS receiver and select normal (LEG) navigation mode. Verify that the course pointer automatically rotates to the desired track, and that groundspeed and waypoint ID are displayed on the SN3500.

Completed _____ Comment _____

Press M and then press BRG and assign either bearing pointer to the selected GPS receiver. Verify that the bearing pointer corresponds to the bearing-to-waypoint, and that the distance displayed matches the display on the actual receiver.

Completed _____ Comment _____

If the GPS is equipped with an OBS mode (Bendix/King) or a HOLD mode which enables course resolver input (Garmin), select the OBS or HOLD mode and verify that rotating the course select knob turns the course pointer. Verify that the needle centers on the correct bearing to waypoint.

Completed _____ Comment _____

Enter the "CDI and Annunciator Test" mode of the GPS if available. Verify proper response of the GPS annunciators, if configured to display on the SN3500. If external mode selection is enabled on the SN3500, verify that the GPS pushbutton softkeys accessed in NAV menu control the proper GPS functions.

Completed _____ Comment _____

11.1.13 Marker Beacon Interface

If a marker beacon receiver is interfaced to the SN3500:

With a marker beacon test set, generate outer, middle, and inner marker signals respectively. Verify that the appropriate annunciation appears on the SN3500.

Completed _____ Comment _____

Press "TEST" mode on the marker beacon receiver, and verify that the "MT" symbol appears on the SN3500.

Completed _____ Comment _____

11.1.14 Flight Control System Interface

If the SN3500 is interfaced to a flight control system (FCS):

Place the FCS mode selector in heading (HDG) mode. Verify that the aircraft controls respond correctly as the heading knob is turned and the heading bug moves around the SN3500 display.

Completed _____ Comment _____

Place the FCS mode selector in nav-coupled (NAV) mode. Verify that the aircraft controls respond correctly as the course select knob is turned and the course pointer moves around the SN3500 display.

Completed _____ Comment _____

Switch sequentially through all the NAV sources and verify that the autopilot L/R and U/D (if applicable) signals responds correctly to the selected receiver.

Completed _____ Comment _____

11.1.15 Stormscope ® Interface

If the SN3500 is interfaced to a WX-500 remote lightning sensor:

Enable the Stormscope® display by within the WX menu. Verify that “WX” is annunciated on the SN3500 display.

Completed _____ Comment _____

Press M and then WX and select “WX TEST”. Verify that the word “TEST” is annunciated on the SN3500 display for approximately 10 seconds, and is then replaced by “WX”.

Completed _____ Comment _____

11.1.16 Traffic

If the SN3500 is interfaced to a traffic processor.

Activate the TEST function on the traffic processor and verify that the test pattern is displayed on the SN3500.

Completed _____ Comment _____

11.1.17 NVIS Control

If the SN3500 supports NVIS compatibility, (SN3500-XXXN).

Activate the external NVIS control switch and verify “NVIS” is annunciated on the lower right of the screen.

Completed _____ Comment _____

11.1.18 Reversionary Display Control

If the SN3500 is configured to support the Reversionary Attitude Display.

Activate the external ‘REV’ control switch and verify the SN3500 displays a representative horizon and compass arc for the attitude of the aircraft. Place the ‘REV’ control switch back in the normal position and verify the SN3500 switches back to the normal HSI display.

Completed _____ Comment _____

11.1.19 Additional Testing

Perform any additional tests deemed necessary.

Completed _____ Comment _____

11.2 EMI/RFI Test Procedures

11.2.1 Nav/Com Testing

Apply power to the avionics bus and ensure that all electrical equipment, including the SN3500, is operating normally. Open the squelch on the primary communications radio and tune the radio to each whole megahertz frequency sequentially. Attempt to discern any interference caused by the SN3500. Pull the SN3500 breaker if interference is noted, to verify that the SN3500 is the source.

Completed _____ Comment _____

Repeat for the secondary communications radio.

Completed _____ Comment _____

Tune the primary navigation radio to 112 MHz and enable the audio output. Attempt to discern any audible interference cause by the SN3500.

Completed _____ Comment _____

Repeat for the secondary navigation radio.

Completed _____ Comment _____

Transmit on the frequencies 118.000 MHz, 126.975 MHz, and 135.975 MHz on the primary communications radio and attempt to discern any changes in the SN3500 display.

Completed _____ Comment _____

Repeat for the secondary communications radio.

Completed _____ Comment _____

11.2.2 General Testing

Observe any unusual interaction between the transponder, DME, ADF or Marker Beacon receivers, and the SN3500 when switching power to any equipment.

Completed _____ Comment _____

11.2.3 Additional Testing

Perform any additional EMI/RFI-related tests deemed necessary.

Completed _____ Comment _____

11.3 Operational Flight Test Procedures/Report

The following “Operational Flight Check Procedures/Report” is for the purpose of simplifying the in-flight operational check of the SN3500. A copy of this report (and the “Functional Ground Test Procedures/ Report”) must be retained by the installing agency and a copy must be installed in the aircraft maintenance records. A copy must also be forwarded to Sandel Avionics along with the Warranty Registration Form, Part Number 10235, which should be mailed after operational acceptance.

COMPANY NAME
COMPANY ADDRESS
TELEPHONE/FAX

Flight Test Procedures/Report

for

Sandel Avionics SN3500

Installed in

{aircraft make and model}

Registration No. _____

Serial No. _____

Document No. _____

Rev. - , Date

11.4 Introduction

The Flight Test Procedures described below are to be performed after both the Post-Install Procedures and the Ground Test Procedures are performed. Successful completion of the Flight Test Procedures will then satisfy the criteria for operational acceptance of the SN3500 installation.

Specific procedures are not provided for many of the tests herein, due to differences in installed options and aircraft configurations. Refer to the SN3500 Pilot's Guide and the proposed Airplane Flight Manual Supplement for operational details of the equipment.

Each test item is followed by a space for the initials of the person performing the procedure, and a space for a description of any observations or anomalies. Determination of a successful flight test is made after analysis of these observations.

11.5 Test Procedures

11.5.1 Pre-Departure Operations

Apply power to the SN3500 and all associated equipment. Determine that all equipment initializes and functions normally.

Verify that the SN3500 internal brightness control can control the brightness of the SN3500 and that a satisfactory brightness level can be attained.

Completed _____ Comment _____

Evaluate the display of the SN3500 for readability.

Completed _____ Comment _____

Evaluate the intensity properties of the SN3500 display under both direct and indirect sunlight conditions, and in nighttime operation conditions.

Completed _____ Comment _____

Check the function of all buttons and knobs, and confirm that all controls are operational.

Completed _____ Comment _____

11.5.2 Enroute Operations

Cycle various aircraft electrical equipment such as lights, landing gear, radar, windscreen heat, and anti-icing boots. Verify that none causes interference on the SN3500 display.

Completed _____ Comment _____

Verify proper operation of one or both VHF NAV receivers (as installed), both as NAV sources and as bearing pointer sources. Simultaneously verify proper channeling and display of one or both DME sources, as installed.

Completed _____ Comment _____

Verify proper operation of one or both long-range NAV receivers (as installed), both as NAV sources and as bearing pointer sources. Include verification of map display of waypoints.

Completed _____ Comment _____

Verify proper operation of one or both TACAN receivers (as installed), both as NAV sources and as bearing pointer sources.

Completed _____ Comment _____

Verify proper operation of one or both ADF sources as bearing pointers if installed.

Completed _____ Comment _____

For each NAV source, verify proper operation of the flight control system, both in NAV (coupled) mode and in heading mode.

Completed _____ Comment _____

Verify proper operation of the WX-500 Stormscope® sensor, if installed.

Completed _____ Comment _____

11.5.3 GPS Approach Operations

If installed, configure each approach-capable GPS receiver for a non-precision approach. Conduct the approach and evaluate proper operation of:

- CDI sensitivity and deflection
- Resolver interface in OBS or HOLD mode
- GPS annunciator display on the SN3500 (as installed)
- External GPS mode control switches on the SN3500 (as installed)
- Waypoint display when map is enabled on the SN3500

Completed _____ Comment _____

11.5.4 TACAN Approach Operations

If installed, conduct at least one TACAN approach (in VFR conditions). Conduct the approach and evaluate proper operation of:

- CDI sensitivity and deflection

Completed _____ Comment _____

11.5.5 ILS Approach Operations

Conduct at least one fully coupled ILS approach (in VFR conditions) for each VHF NAV receiver installed. During the approach, verify proper operation of:

- Lateral deviation display (CDI) in both ARC and 360 modes
- Vertical deviation display in both ARC and 360 modes

- Marker beacon annunciation on the SN3500, if installed
- Flight control system operation.

Completed _____ Comment _____

11.5.6 Additional Testing

Perform any additional flight testing deemed necessary.

Completed _____ Comment _____

12 Appendix F: List of Effective Drawings and Attachments

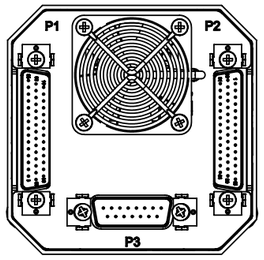
Drawing	Rev	Title
82005-07	A	LAYOUT, SN3500
82005-05	A	Layout, SN3500 INSTALLATION
82005-10 pp 1	D	POWER AND INVERTER
82005-10 pp 2	C	FCS DEVIATION (INT RELAY)
82005-10 pp 3	C	FCS DEVIATION (EXT RELAY)
82005-10 pp 4	C	FCS GENERIC CRS/HDG DATUM
82005-10 pp 5	C	BENDIX AUTOPILOTS
82005-10 pp 6	C	BENDIX /KING AUTOPILOTS
82005-10 pp 7	B	CENTURY IV AUTOPILOTS
82005-10 pp 8	A1	CENTURY 1C388 COUPLERS
82005-10 pp 9	A1	S-TEC AUTOPILOTS
82005-10 pp 10	B	KING KG102A – SN3500 SLAVING
82005-10 pp 11	B	KCS55 – BOOTSTRAP XYZ
82005-10 pp 12	B	S-TEC (AERONETICS) GYRO
82005-10 pp 13	B	XYZ GYRO (GYRO SELF SLAVED)
82005-10 pp 14	B	XYZ GYRO
82005-10 pp 15	C	XYZ GYRO WITH KMT112
82005-10 pp 16	C	COLLINS PN101 UPGRADE
82005-10 pp 17	B	MID-CONTINENT 4305
82005-10 pp 18	C	SN3500 COMPASS BOOTSTRAP
82005-10 pp 19	A1	KCS-55 REMOVAL (REF)
82005-10 pp 20	C	NAV-1RS-232 GPS (EXT RELAY)
82005-10 pp 21	C	NAV-1 RS-232 GPS (INT RELAY)
82005-10 pp 22	C2	NAV-1 / ARINC-429 GPS (EXT RELAY)
82005-10 pp 23	C	NAV-1 / ARINC-429 GPS (INT RELAY)
82005-10 pp 24	B	NAV-2, GPS-2 (RS232)
82005-10 pp 25	B	RESLOLVER INTERCONNECT
82005-10 pp 26	A1	GPS SWITCH / ANNUNCIATORS
82005-10 pp 27	C	SINGLE SN3500 / GNS430/530
82005-10 pp 28	D1	SINGLE SN3500 DUAL GNS430/530
82005-10 pp 29	A1	ADF

Drawing	Rev	Title
82005-10 pp 30	C	MARKER BEACON
82005-10 pp 31	C	DME, KING SERIAL
82005-10 pp 32	A1	DME: ARINC 568
82005-10 pp 33	C1	WX-500
82005-10 pp 34	C	TCAS/TRAFFIC
82005-10 pp 35	C	TCAS II
82005-10 pp 36	C1	SINGLE SN3500 GNS480
82005-10 pp 37	E	WSI Data Link Receiver
82005-10 pp 38	B	SN3500 with SG102 ARINC 429 or 407 Interface
82005-10 pp 39	A	SN3500 with TACAN
82005-10 pp 40	A	NVIS Control
82005-10 pp 41	B	Reversionary Attitude Control

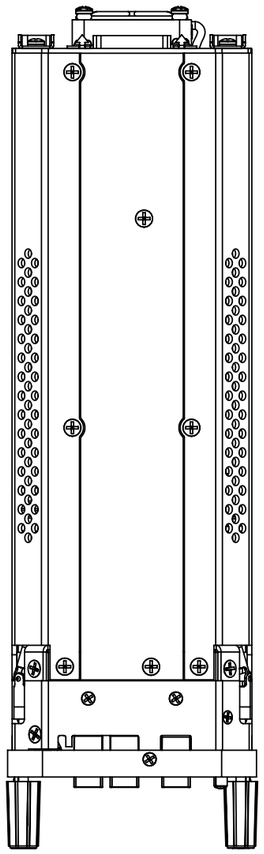
NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE		

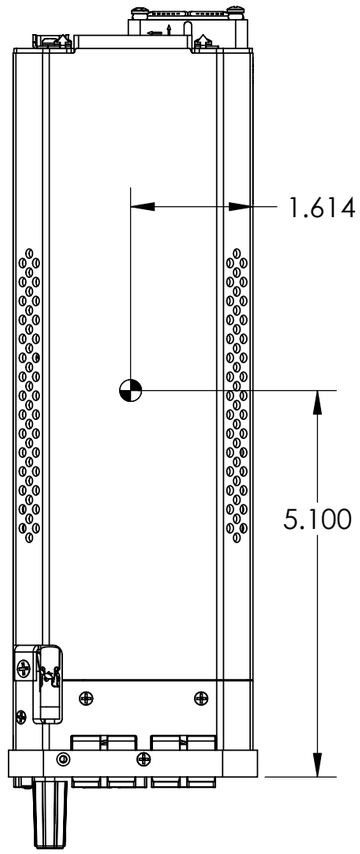
COMPUTER GENERATED DRAWING
DO NOT REVISE MANUALLY



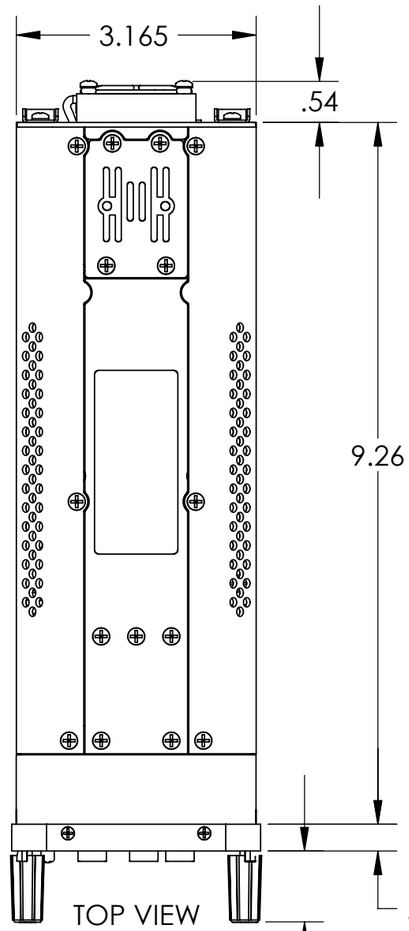
BACK VIEW



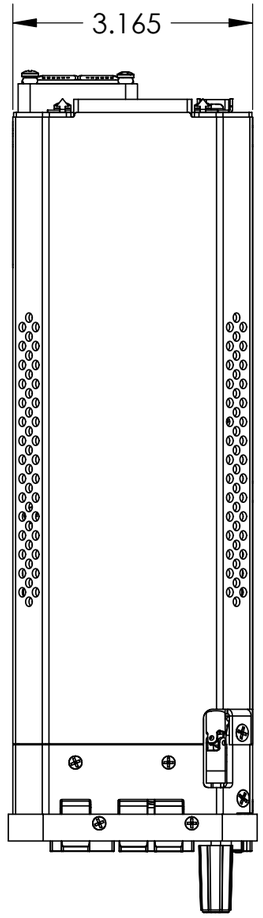
BOTTOM VIEW



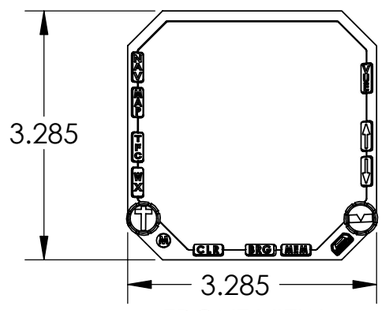
LEFT SIDE VIEW



TOP VIEW



RIGHT SIDE VIEW



FRONT VIEW

	SN3500
NEXT ASSY	USED ON
APPLICATION	

ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION	QTY REQD
		PARTS LIST		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
±X/X .XX ± .01 ±.5
.XXX ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

CAD GENERATED DRAWING, DO NOT MANUALLY UPDATE

APPROVALS	DATE
DRAWN MCLANE	03/09/05
CHECKED	
RESP ENG	
MFG ENG	
APPROVAL	

SANDEL VISTA, CA

LAYOUT, SN3500

SIZE	CATEGORY	DWG. NO.	REV.
B	07	82005	A

SCALE: 1:2 CAD FILE: SHEET 1 OF 1

NOTES: UNLESS OTHERWISE SPECIFIED.

1. LOCATE CLAMP TRAY WITH SUFFICIENT CLEARANCE ABOVE & BELOW

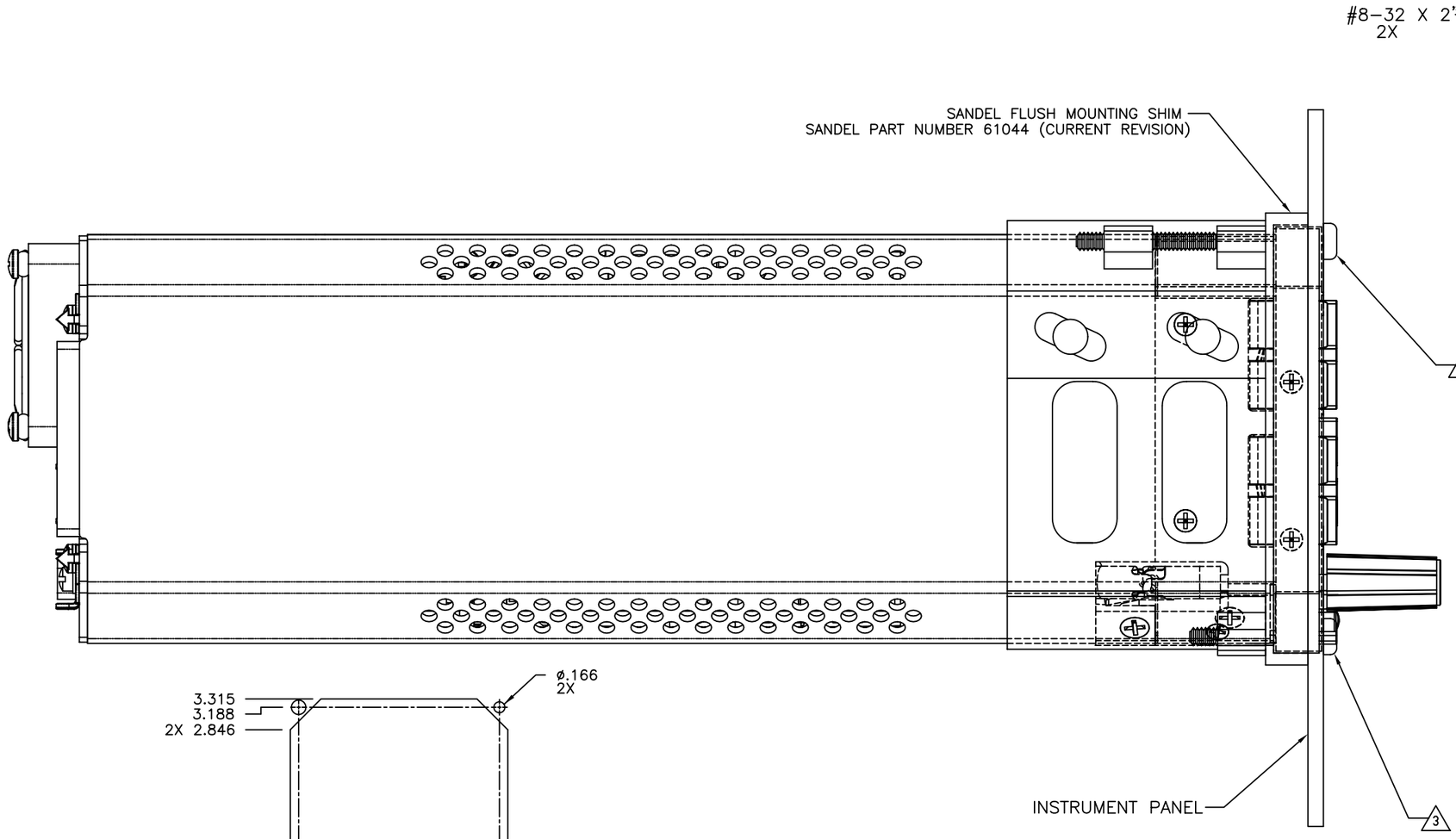
2. POSITION THE SANDEL FLUSH MOUNTING SHIM (61062) BETWEEN THE BACK SIDE OF THE INSTRUMENT PANEL AND THE CLAMP TRAY NOTE THE LOCATION OF THE CHAMFER ON THE CORNER OF THE SHIM.

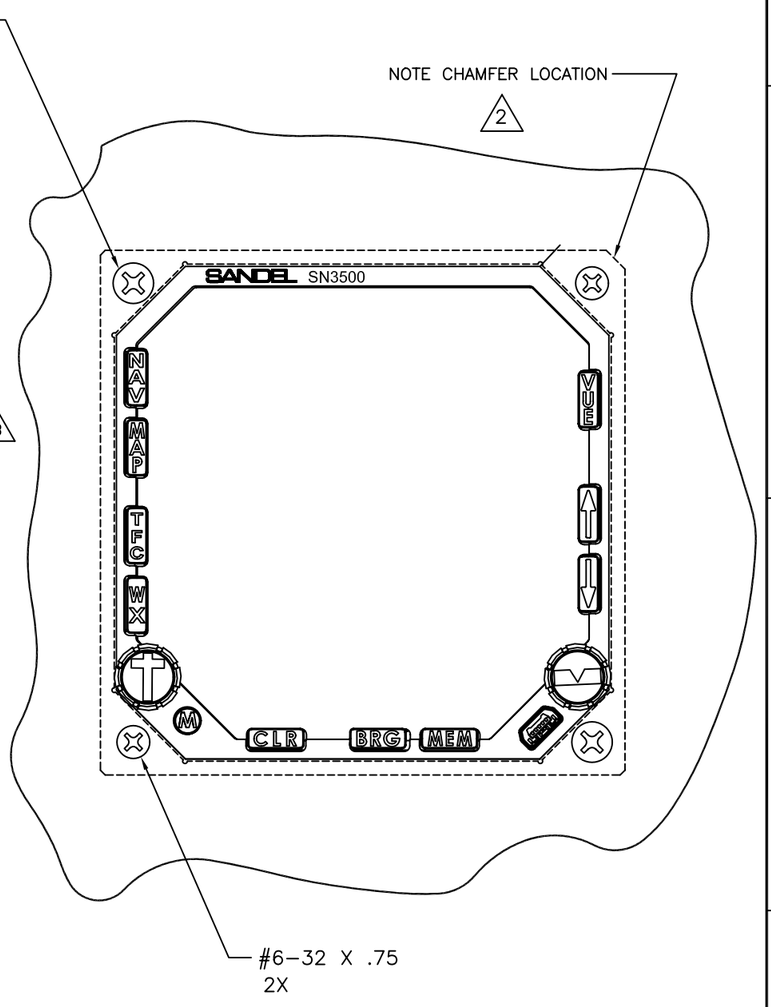
3. STARTING AT THE BOTTOM SCREWS ATTACH THE CLAMP TRAY TO THE INSTRUMENT PANEL WITH 1 EA 8–32 X 2" AND 6–32 X .75" (BOTTOM) AND 1 EAS 8–32 X 2" AND 6–32 X .75" (TOP) PAN HEAD SCREWS.

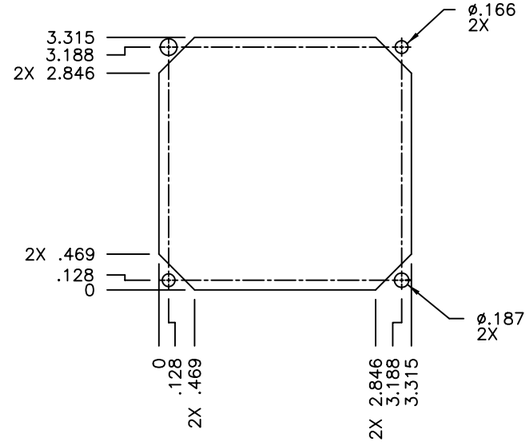
4. COMPLETE THE INSTALLATION PER INSTALLATION MANUAL SANDEL PART NUMBER 82005–IM (CURRENT REVISION).

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	INITIAL RELEASE		

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY







SUGGESTED PANEL CUT OUT (FLUSH MOUNT)

FLUSH MOUNT INSTALLATION

			SN3500
TAB NO.	NEXT ASSY	USED ON	
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± 1/32 DECIMALS .XX± .01 .XXX± .005 ANGLES ± .5°
MATERIAL: SEE NOTES
FINISH: SEE NOTES
DO NOT SCALE DRAWING

ENGINEERING NO.

APPROVALS	DATE
DRAWN M. KERSLAKE	02/14/05
CHECKED	
ISSUED	

SANDEL VISTA, CA.

LAYOUT,
SN3500 INSTALLATION

SIZE	CATGORY	DWG. NO.	REV.
D	05	82005	A

SCALE 2:1 SHEET 1 OF 2

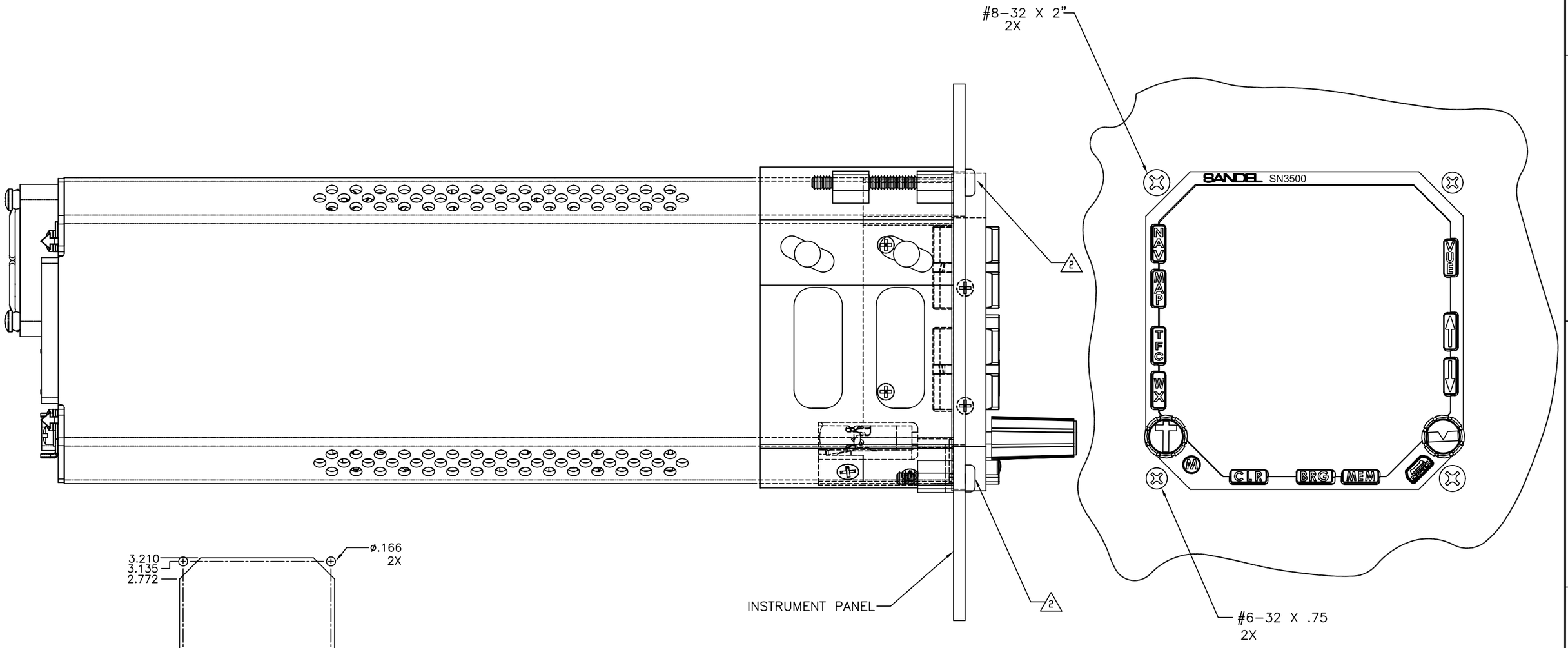
FORM: FORMD.DWG

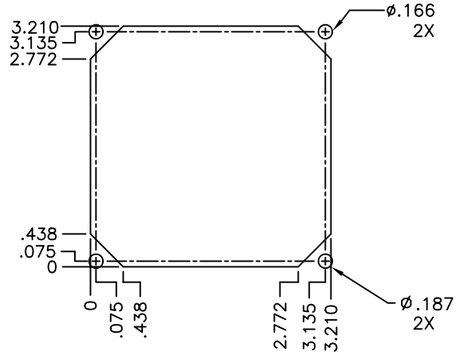
NOTES: UNLESS OTHERWISE SPECIFIED.

1. LOCATE CLAMP TRAY WITH SUFFICIENT CLEARANCE ABOVE & BELOW

2. STARTING AT THE BOTTOM SCREWS ATTACH THE CLAMP TRAY TO THE INSTRUMENT PANEL WITH 1 EA 8–32 X 2" AND 6–32 X .75" (BOTTOM) AND 1 EAS 8–32 X 2" AND 6–32 X .75" (TOP) PAN HEAD SCREWS.

3. COMPLETE THE INSTALLATION PER INSTALLATION MANUAL SANDEL PART NUMBER 82002–IM (CURRENT REVISION).





SUGGESTED PANEL CUT OUT (STANDARD 3ATI)

STANDARD 3ATI INSTALLATION

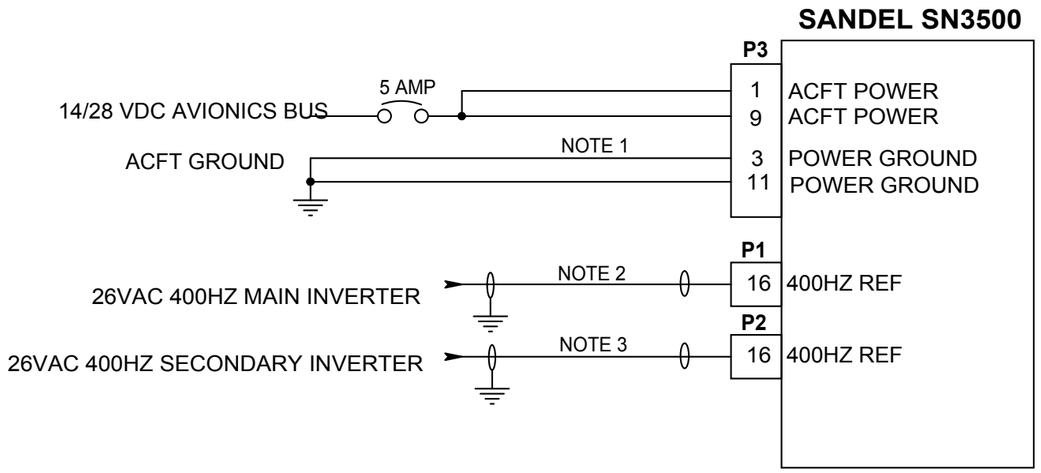
SIZE	CATGORY	DWG. NO.	REV.
D	05	82005	A
SCALE 2:1		SHEET 2 OF 2	

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	C	A/R 806 NEW PAGE NUMBER. ADDED INVERTER 2. CORRECTED NOTE 2.
JAN 12, 2006	C1	A/R 824 ADDED ADDITIONAL TEXT TO EMPHASIZE POWER REQUIREMENTS. MODIFIED NOTE 2 TO INCLUDE CLARIFICATION FOR AUTOPILOT CONNECTION.
JUL 18, 2008	D	UPDATED FOR 14 VOLT AIRCRAFT AND NOTE 4. AR 1023

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

SN3500 input power requires 11 to 33 VDC.

See Note 4.



NOTES:

1. USE 20AWG WIRE. BOTH GROUNDS AND BOTH POWER LEADS REQUIRED.

2. INVERTER 1 ONLY REQUIRED IF XYZ GYRO OR XYZ ADF ARE CONNECTED TO P1, OR IF BOOTSTRAP SYNCHRO OUTPUT IS CONNECTED, OR IF AUTOPILOT USES AC COURSE AND HEADING DATUM AND CRS/HDG EXTERNAL EXCITATION (P2-10) IS NOT USED.

3. INVERTER 2 ONLY REQUIRED IF XYZ ADF IS USED CONNECTED TO P2.

4. INSTALLATIONS IN 14 VOLT AIRCRAFT REQUIRE SN3500 SERIAL NUMBER 5-2500 OR HIGHER. SN3500 SERIAL NUMBERS LOWER THAN 5-2500 AND INSTALLED IN 14 VOLT AIRCRAFT REQUIRE A 14V TO 28V CONVERTER. CONTACT SANDEL FOR COMPATABLE MODELS.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: POWER AND INVERTER

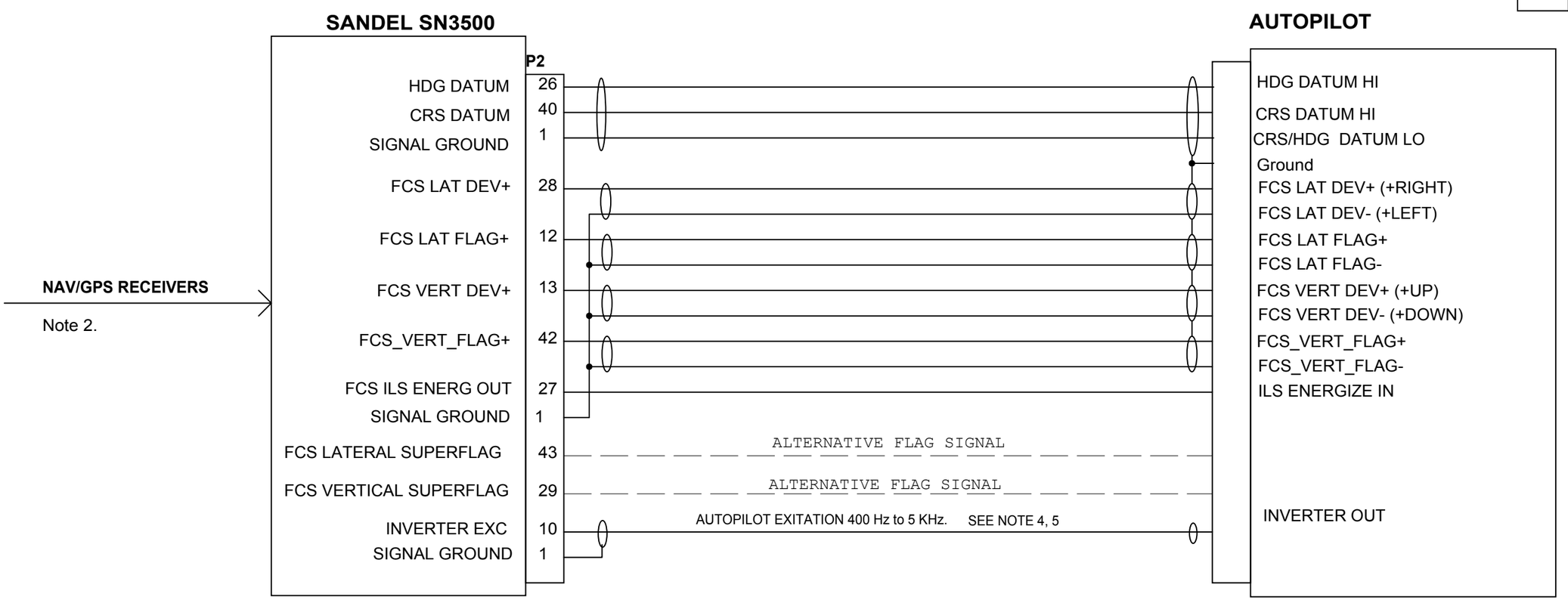
Size: B | Document Number: 82005-10 | Rev: D

Create: Sunday, May 03, 1998 | Mod: Wednesday, July 23, 2008 | Sheet 1

DATE	REV	COMMENTS
	B	INITIAL RELEASE
	C	A/R 806 Minor change, corrected signal ground line. Corrected pinout for excitation and autopilot signal names.
		Added optional superflag connection for reference and note 5. Modified note 4 for clarity.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

BLOCK DIAGRAM SHOWS USE OF INTERNAL AUTOPILOT SWITCHING RELAY



NOTES:

1. IN THIS CONFIGURATION THE SN3500 ACTS AS THE AUTOPILOT SWITCHING RELAY AND OUTPUTS TO THE AUTOPILOT WHATEVER NAV SOURCE IS SELECTED.

2. THIS IS A GENERIC ILLUSTRATION. REFER TO THE SPECIFIC DETAIL DRAWINGS FOR YOUR INSTALLATION.

3. THIS SIMPLIFIES INSTALLATIONS WITH A SINGLE ANALOG NAV AND DIGITAL GPS, OR MULTIPLE DIGITAL GPS.

4. INVERTER CONNECTION NOT REQUIRED WITH AUTOPILOTS USING DC CRS/HDG DATUM. IF AUTOPILOT EXITATION IS USED, SELECT DC SIGNAL ON FCS MAINTENANCE PAGE.

5. IF AC COURSE AND HEADING DATUMS ARE USED WITHOUT USING EXTERNAL EXCITATION ON P2-10, 400 HZ AC MUST BE CONNECTED TO P1-16 AND TO AUTOPILOT EXCITATION IN. SELECT AC SIGNAL ON FCS MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

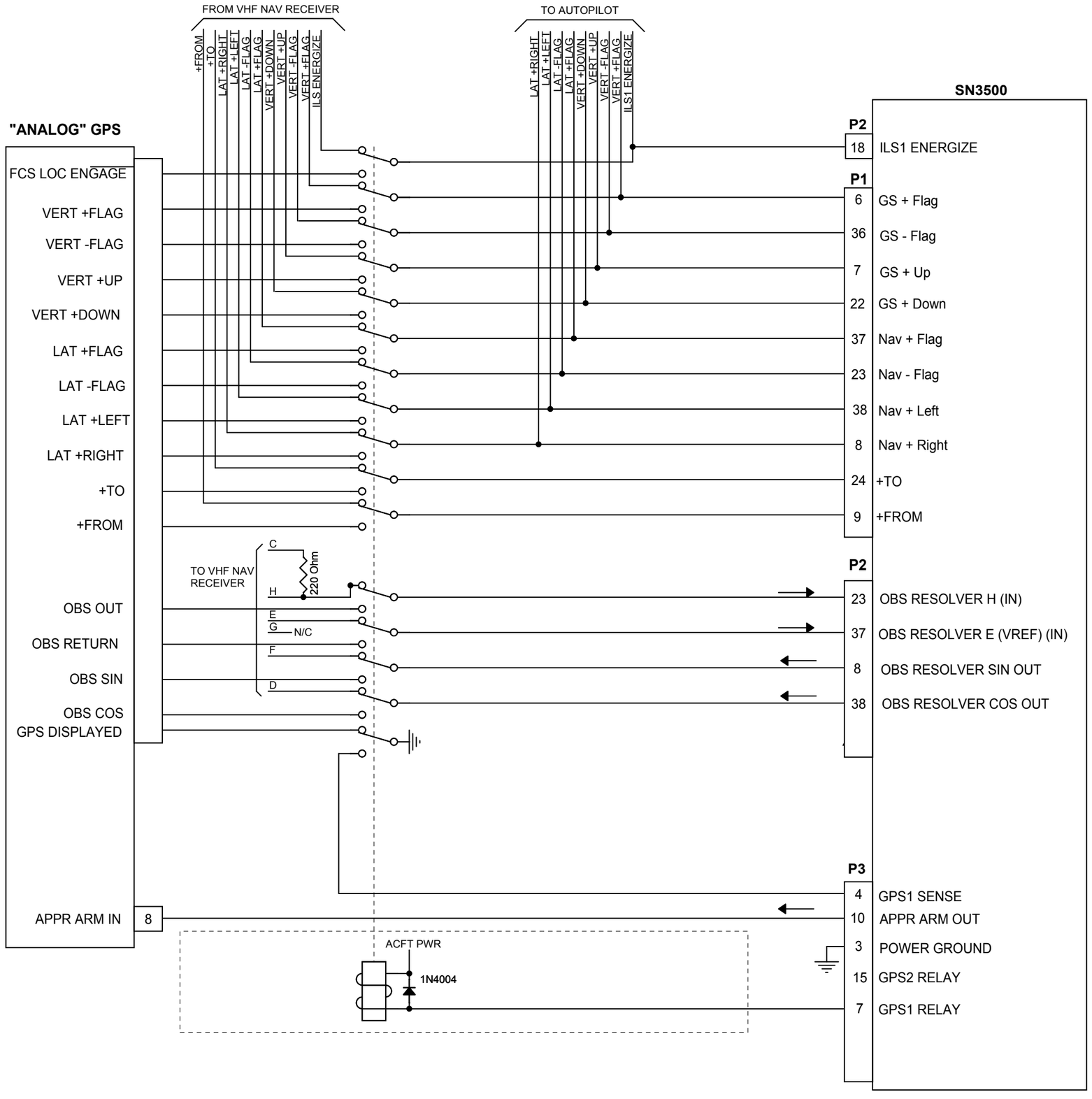
Title: FCS DEVIATION (INT RELAY)

Size	Document Number	Rev
B	82005-10	C

Create: Wednesday, May 18, 2005 | Mod: Sunday, December 09, 2007 | Sheet 2

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	C	A/R 806 MINOR DOC CHANGE P1-22 AND P1-7 REVERSED, P2-37 WAS P2-7

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



BLOCK DIAGRAM SHOWS USE OF EXTERNAL AUTOPILOT SWITCHING RELAY USING SN3500 CONVENTIONAL LOW LEVEL INPUTS

NOTES:

1: IN THIS CONFIGURATION THE SN3500 ACTS AS AN INDICATOR, FOLLOWING THE RECEIVER SELECTED WITH AN EXTERNAL RELEAY.

2. THIS IS A GENERIC ILLUSTRATION. REFER TO THE SPECIFIC DETAIL DRAWINGS FOR YOUR INSTALLATION.

3. THIS INSTALLATION IS THE SAME AS ORIGINAL SN3308 CONFIGURATION.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: FCS DEVIATION (EXT RELAY)

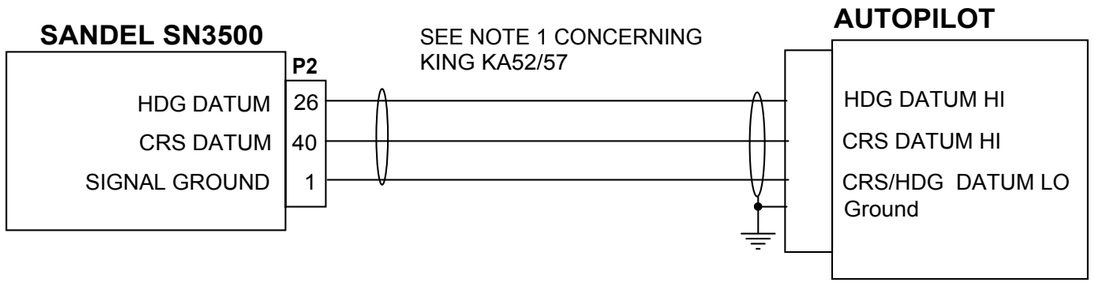
Size	Document Number	Rev
B	82005-10	C

Create: Wednesday, May 18, 2005 | Mod: Sunday, December 09, 2007 | Sheet 3

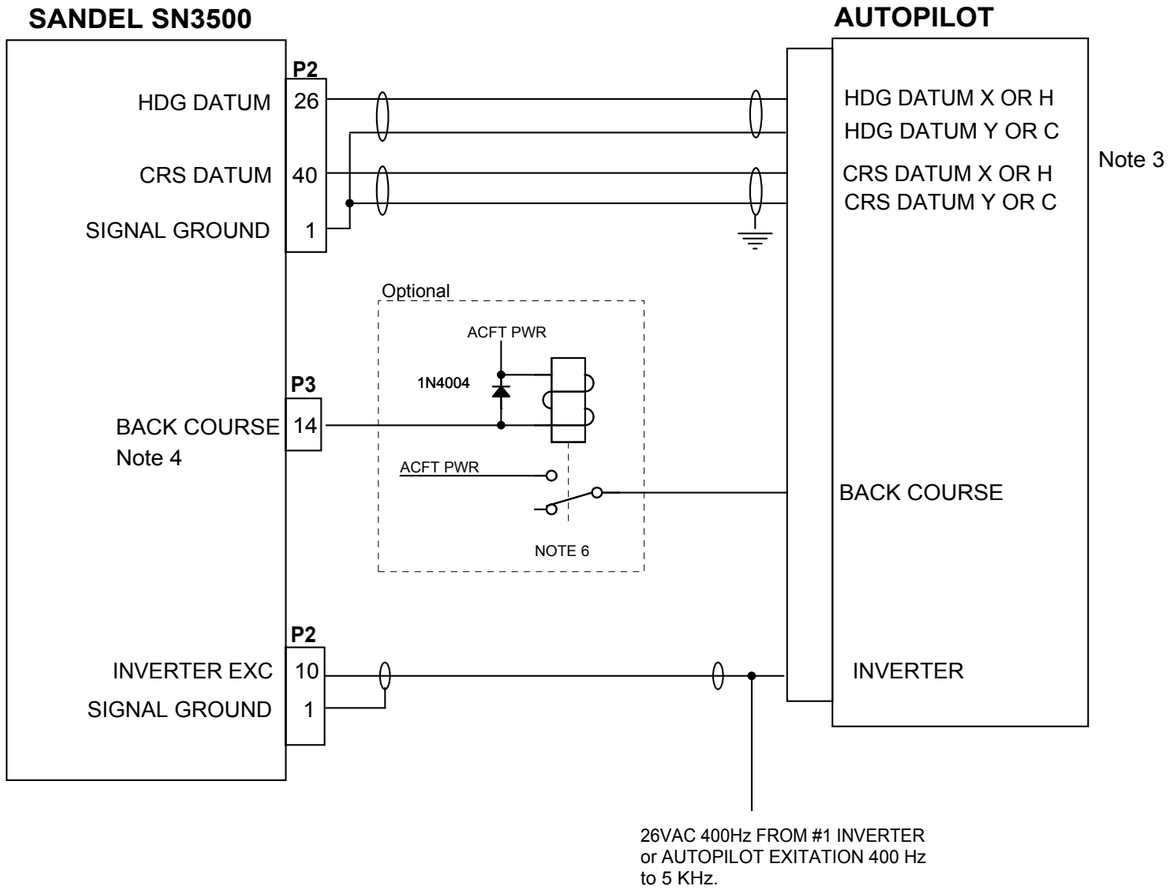
DATE	REV	COMMENTS
	B	INITIAL RELEASE
	C	A/R 806 Minor change, corrected pinout for excitation.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

DC CRS/HDG DATUM TYPICAL INTERCONNECT



400HZ AC AUTOPILOT TYPICAL INTERCONNECT



NOTES:

1. IF INSTALLATION ALREADY CONTAINS A KING KA52/57 AUTOPILOT ADAPTER IT MAY REMAIN IN THE SYSTEM. TREAT THE SN3500 AS A KI525.
2. SN3500 DATUM OUTPUTS ARE REFERENCED TO SIGNAL GROUND.
3. CHECK AUTOPILOT INTERNAL SCHEMATIC TO INSURE THAT THE SN3500 IS DRIVING THE SIGNAL INPUTS AND THAT IT IS PERMISSABLE TO GROUND 'C' OR 'Y' AS SHOWN. IN SOME CASES 'C' MAY BE SIGNAL AND 'H' MAY BE GROUND. CALL FACTORY WITH ANY QUESTIONS.
4. WHEN BC OUTPUT NOT REQUIRED LEAVE UNCONNECTED.
5. BC OUTPUT IS AN OPEN COLLECTOR. RELAY REQUIRED IF BACK COURSE INPUT TO AUTOPILOT REQUIRES +28V TO ACTIVATE. OTHERWISE CONNECT SN3500 BC OUTPUT DIRECTLY TO AUTOPILOT BC INPUT.
6. IF CRS/HDG WORK BACKWARDS, EITHER a) USE OPPOSITE PHASE OF AC EXCITATION SOURCE; b) CHANGE LEFT/RIGHT DATUM SETTING ON FCS EMULATION MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

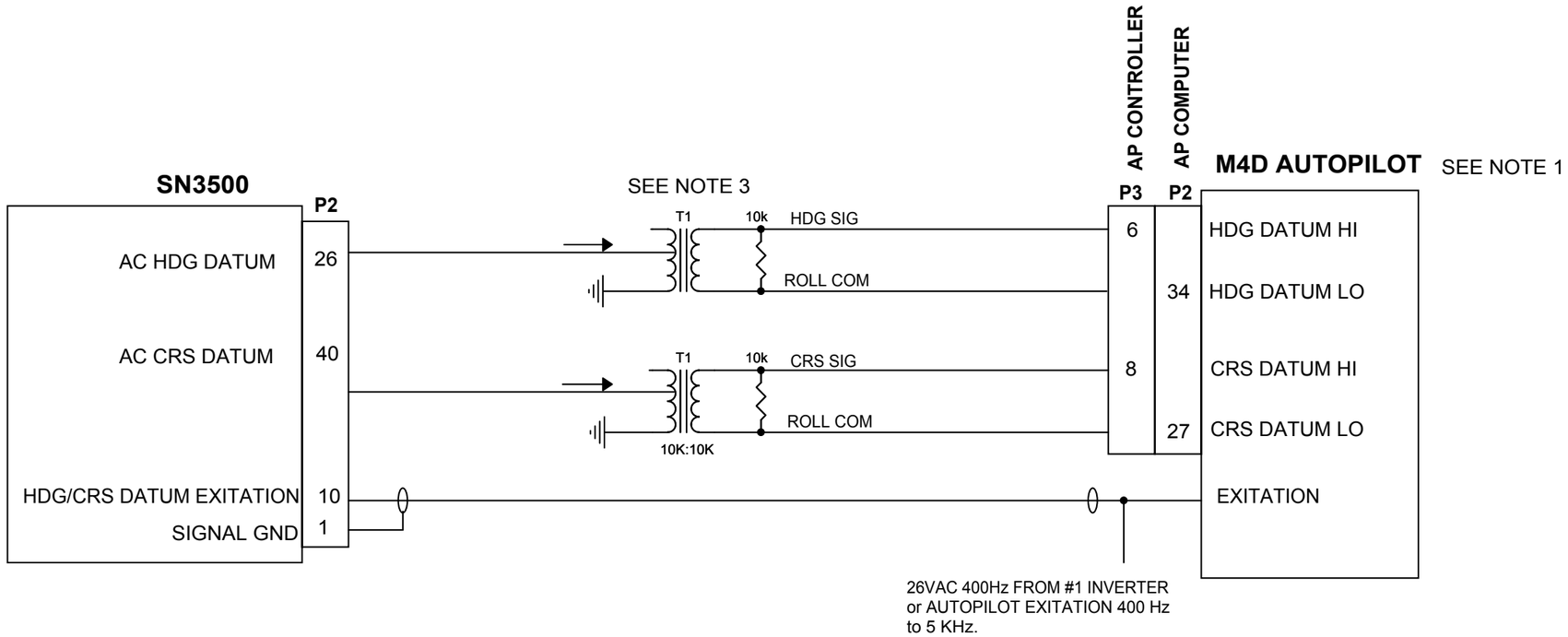
Title: FCS GENERIC CRS/HDG DATUM

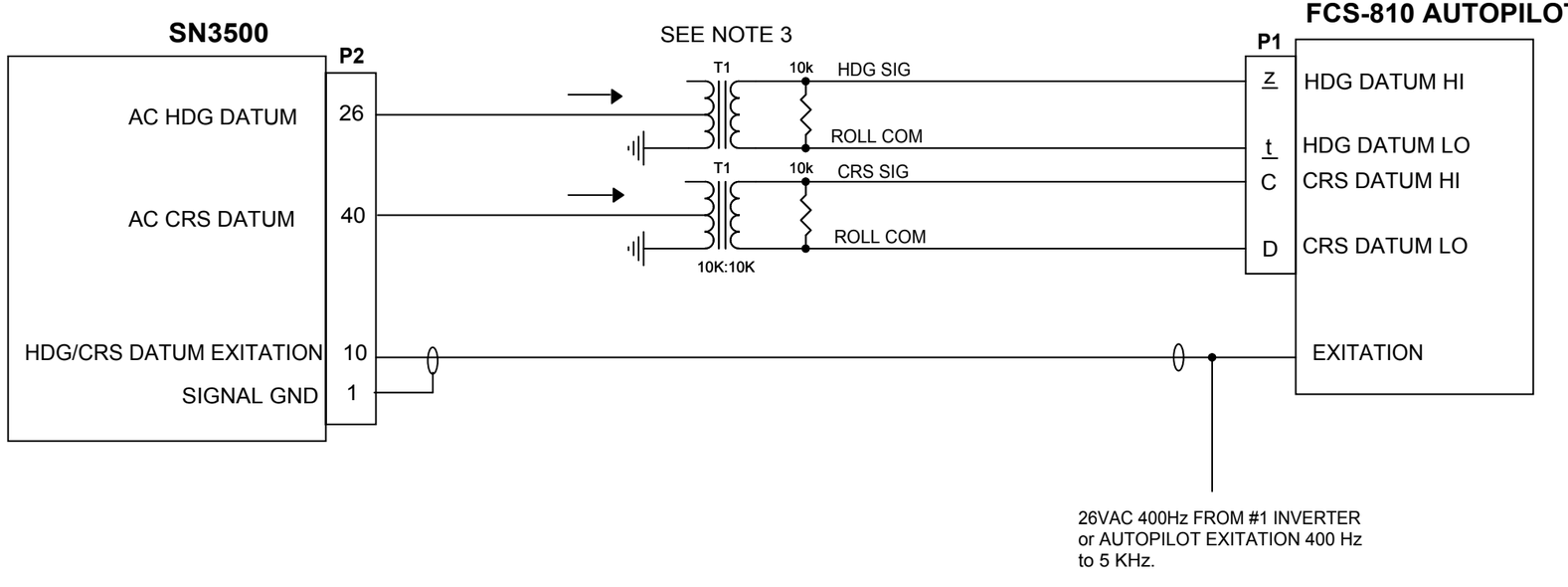
Size B | Document Number 82005-10 | Rev C

Create: Monday, May 04, 1998 | Mod: Sunday, December 09, 2007 | Sheet 4

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	C	A/R 806 Minor change, added connection for autopilot exitation.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY





NOTES

1. SELECT PN101 FOR HSI EMULATION ON THE FCS MAINTENANCE PAGE.
2. SELECT IN831 FOR HSI EMULATION ON THE FCS MAINTENANCE PAGE.
3. ANY COMMERCIAL 75MW OR GREATER AUDIO TRANSFORMERS MAY BE USED SUCH AS MAGNA-TEK TY-141P OR EQUIVALENT

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

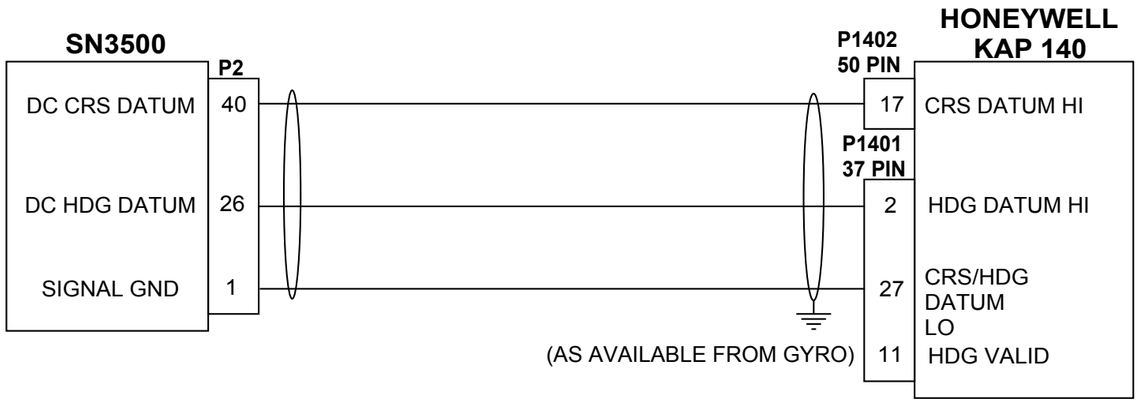
Title: BENDIX AUTOPILOTS

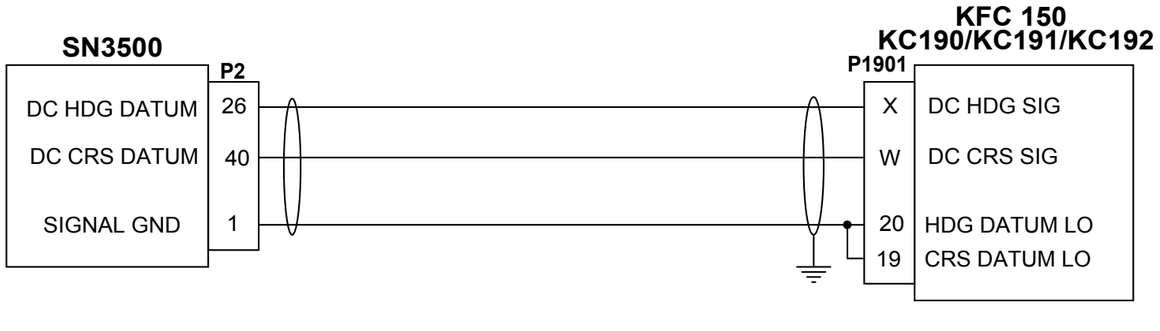
Size B | Document Number 82005-10 | Rev C

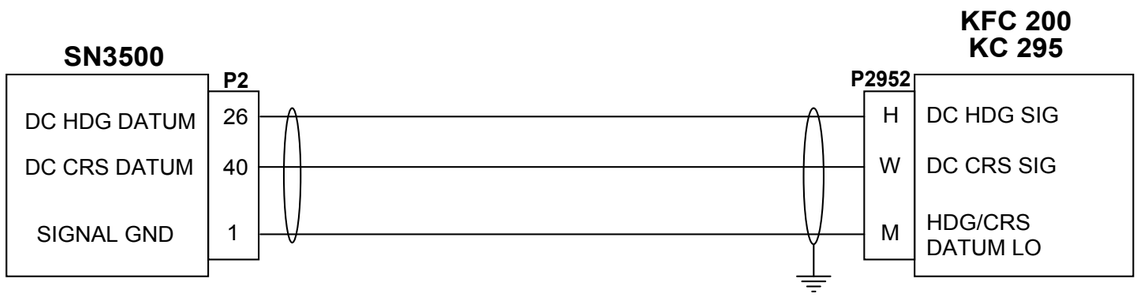
Create: Tuesday, September 19, 2000 | Mod: Sunday, December 09, 2007 | Sheet 5

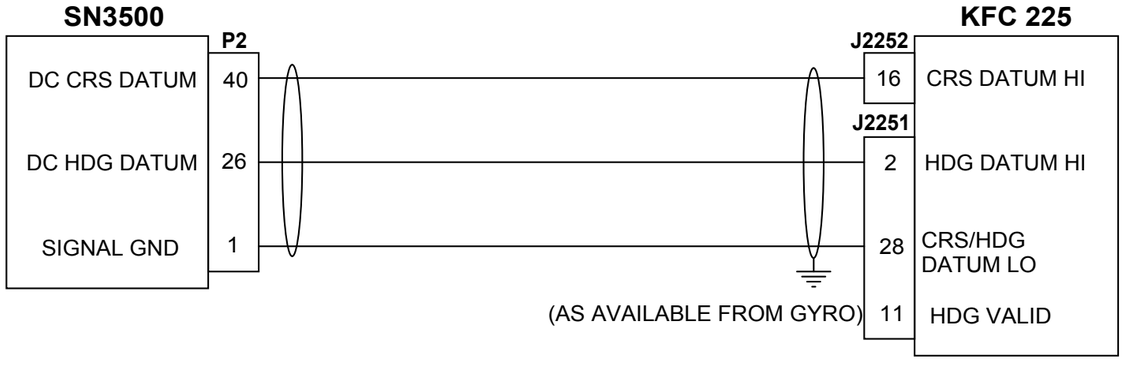
DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	C	A/R 806 Minor change, added connection for excitation KFC 300.

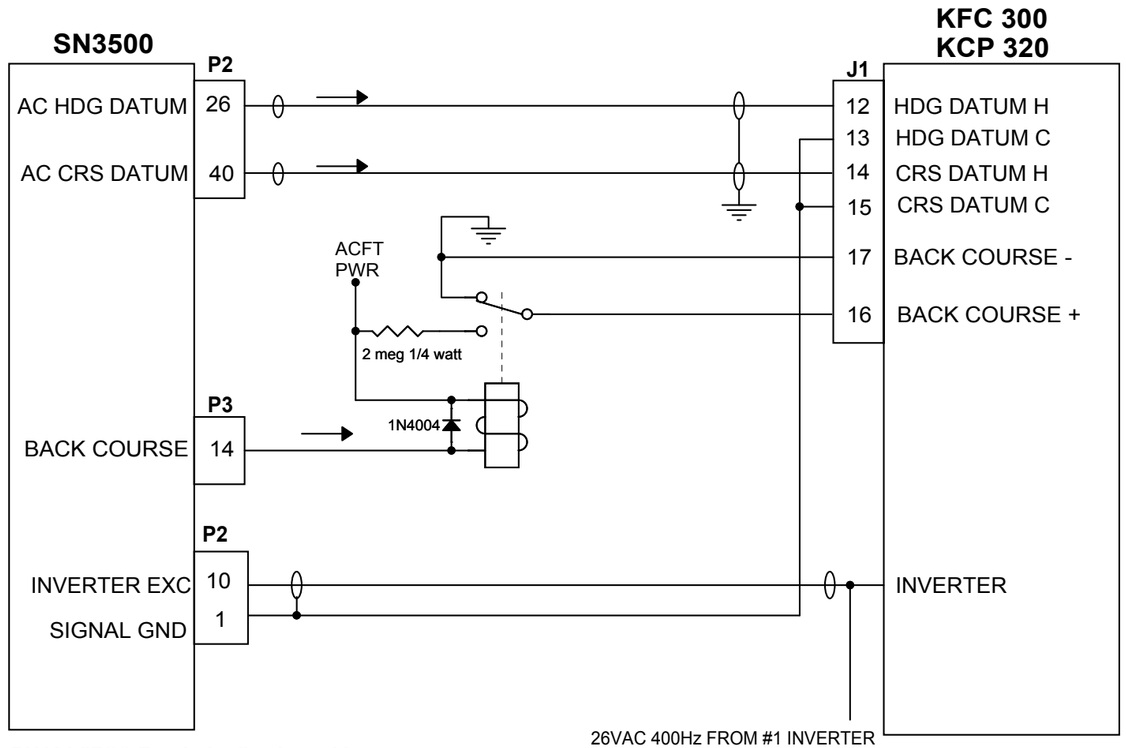
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY











PN101 "FCS Emulation" selected in setup

NOTES

1. SELECT KI525 FOR HSI EMULATION ON THE FCS MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: BENDIX/KING AUTOPILOTS

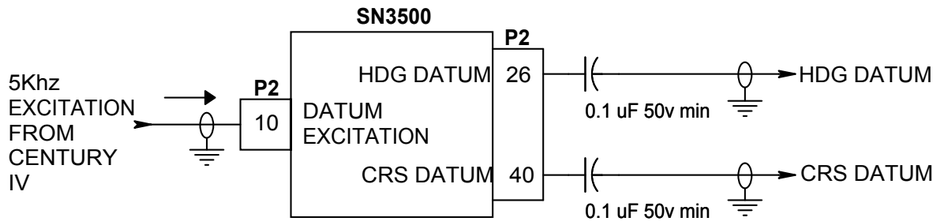
Size B | Document Number: 82005-10 | Rev C

Create: Wednesday, September 20, 2000 | Mod: Sunday, December 09, 2007 | Sheet 6

DATE	REV	COMMENTS
	B	INITIAL RELEASE

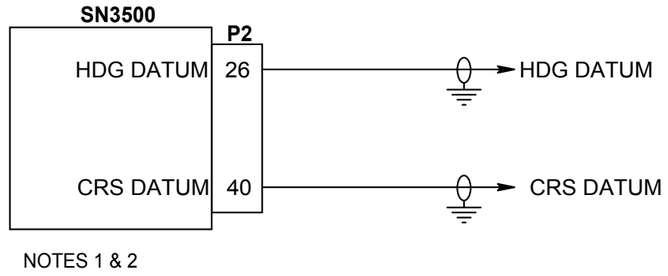
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

CENTURY IV INTERCONNECT (5KHZ AC VERSION)



NOTES 1 & 2

CENTURY IV INTERCONNECT (DC VERSION)



NOTES 1 & 2

NOTES:

1. SELECT NSD-360DC ON FCS EMULATION MAINTENANCE PAGE.

2. ON FCS-EMULATION MAINTENANC PAGE, ADJUST HDG-GRADIENT (AND CRS-GRADIENT IF USED) TO HIGHEST VALUE THAT DOES NOT OVER-SHOOT THE LUBBER LINE DURING HDG-MODE AND NAV-MODE COURSE CHANGES RESPECTIVELY. EXCEPT FOR KI-525 THESE VALUES WILL BE IDENTICAL.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: CENTURY IV AUTOPILOTS

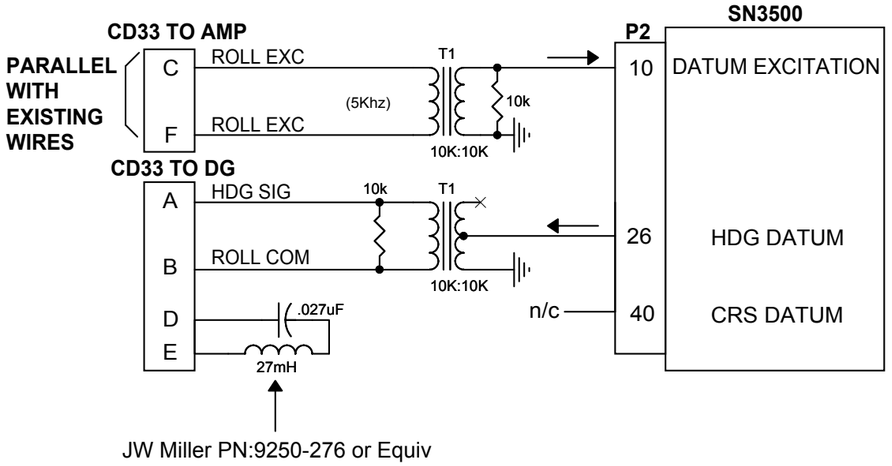
Size	Document Number	Rev
B	82005-10	B

Create: Monday, May 04, 1998 | Mod: Sunday, December 09, 2007 | Sheet 7

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES

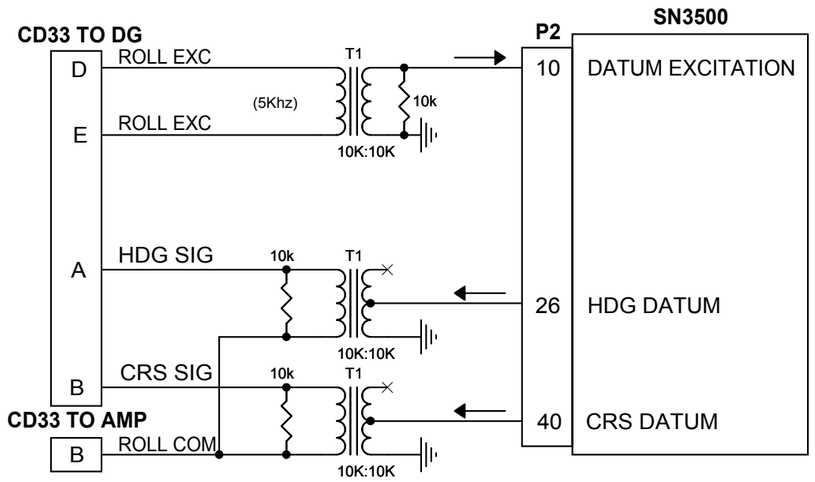
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

CENTURY 1C-388 & 1C388-M RADIO COUPLERS

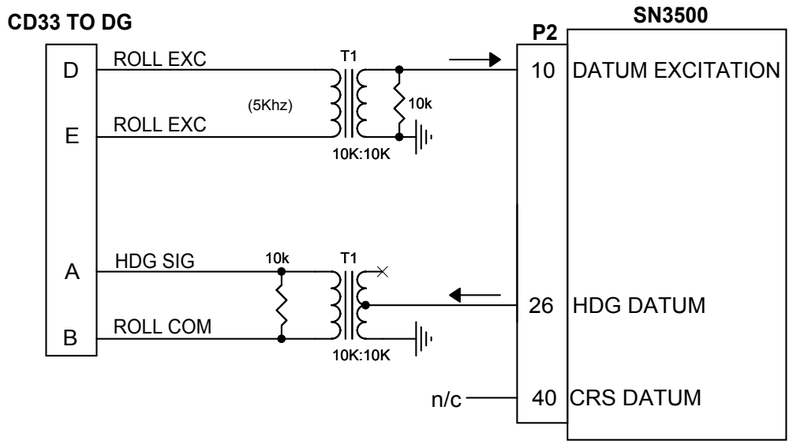


JW Miller PN:9250-276 or Equiv

CENTURY 1C-388-2 RADIO COUPLER

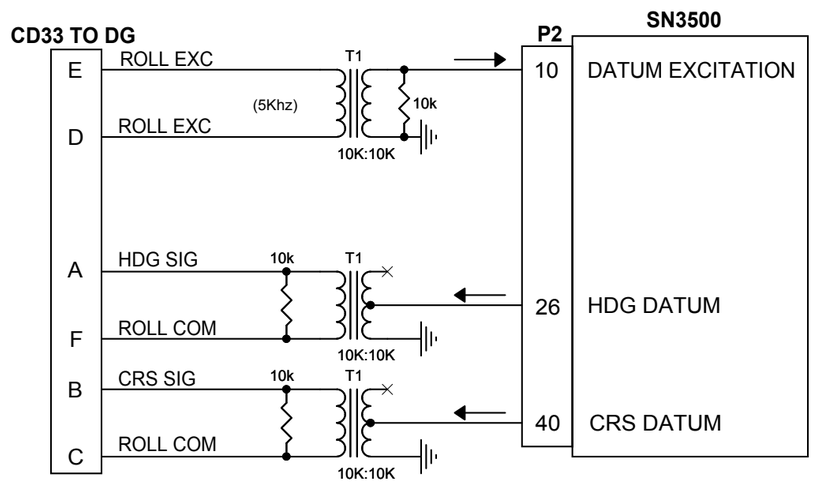


CENTURY 1C-388-C, 1C388-MC RADIO COUPLERS



(ABOVE COUPLERS DO NOT SUPPORT COURSE DATUM.)

CENTURY 1C-388-3 RADIO COUPLER



NOTES:

1. SELECT NSD-360DC ON THE FCS MENU.
2. ON FCS EMULATION MAINTENANCE PAGE, ADJUST HDG-GRADIENT (AND CRS-GRADIENT IF USED) TO HIGHEST VALUE THAT DOES NOT OVER-SHOOT THE LUBBER LINE DURING HDG-MODE AND NAV-MODE COURSE CHANGES RESPECTIVELY. NORMALLY THESE VALUES WILL BE THE SAME.
3. GROUND CONNECTIONS TO SN3500 SIGNAL GROUND.
4. DO NOT GROUND ANY CENTURY II/III SIGNALS EVEN DURING TROUBLESHOOTING. THIS COULD DAMAGE THE AUTOPILOT. SEE THE CENTURY INSTALLATION MANUAL FOR DETAILS.
5. ANY COMMERCIAL 75MW OR GREATER AUDIO TRANSFORMERS MAY BE USED. MAGNA-TEK TY-141P OR EQUIVALENT.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: CENTURY 1C388 COUPLERS

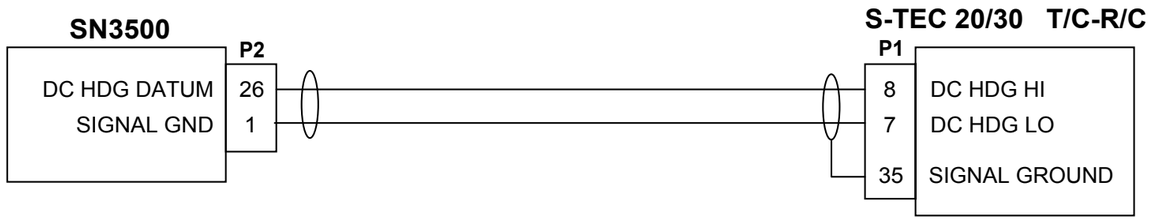
Size: B | Document Number: 82005-10 | Rev: A1

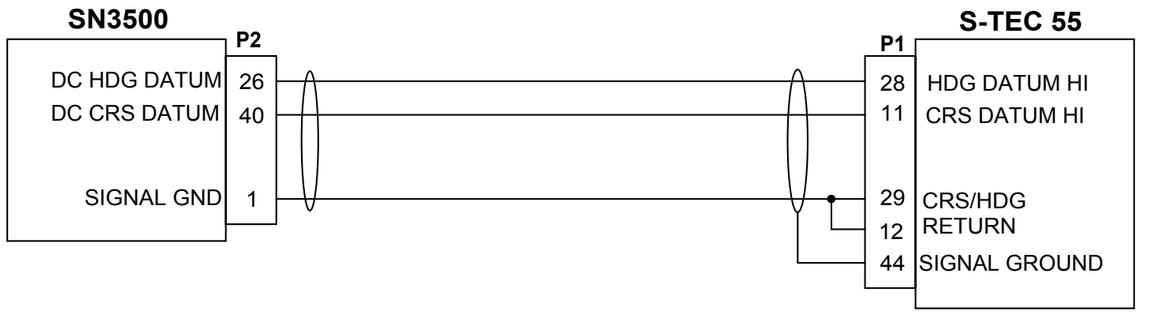
Create: Monday, May 04, 1998 | Mod: Sunday, December 09, 2007 | Sheet 8

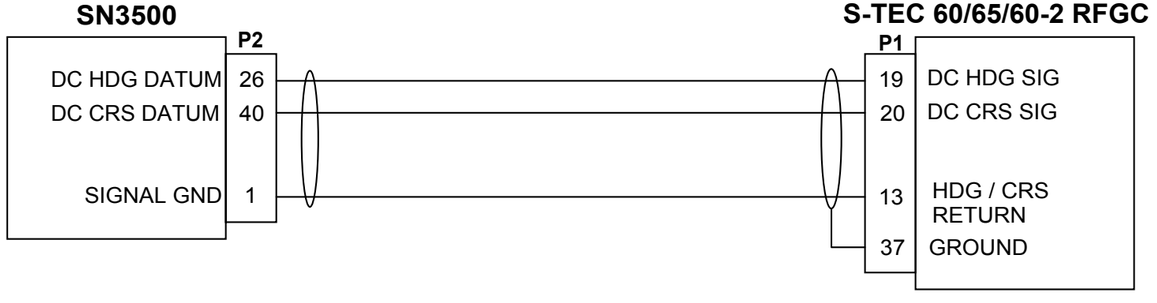
DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

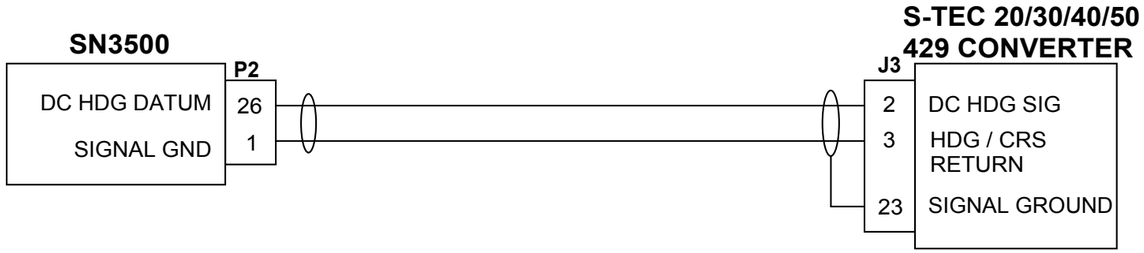
S-TEC AUTOPILOTS

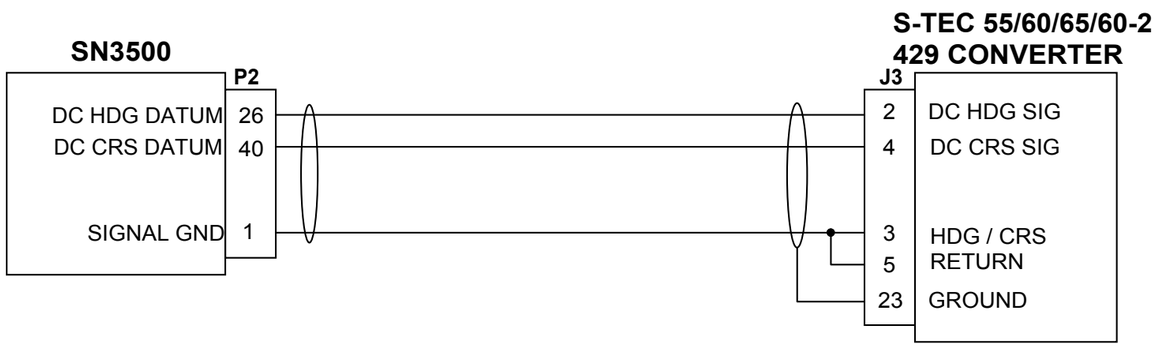






S-TEC GPSS HEADING SYSTEM'S





NOTES

1. SELECT KI525 FOR HSI EMULATION ON THE FCS MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

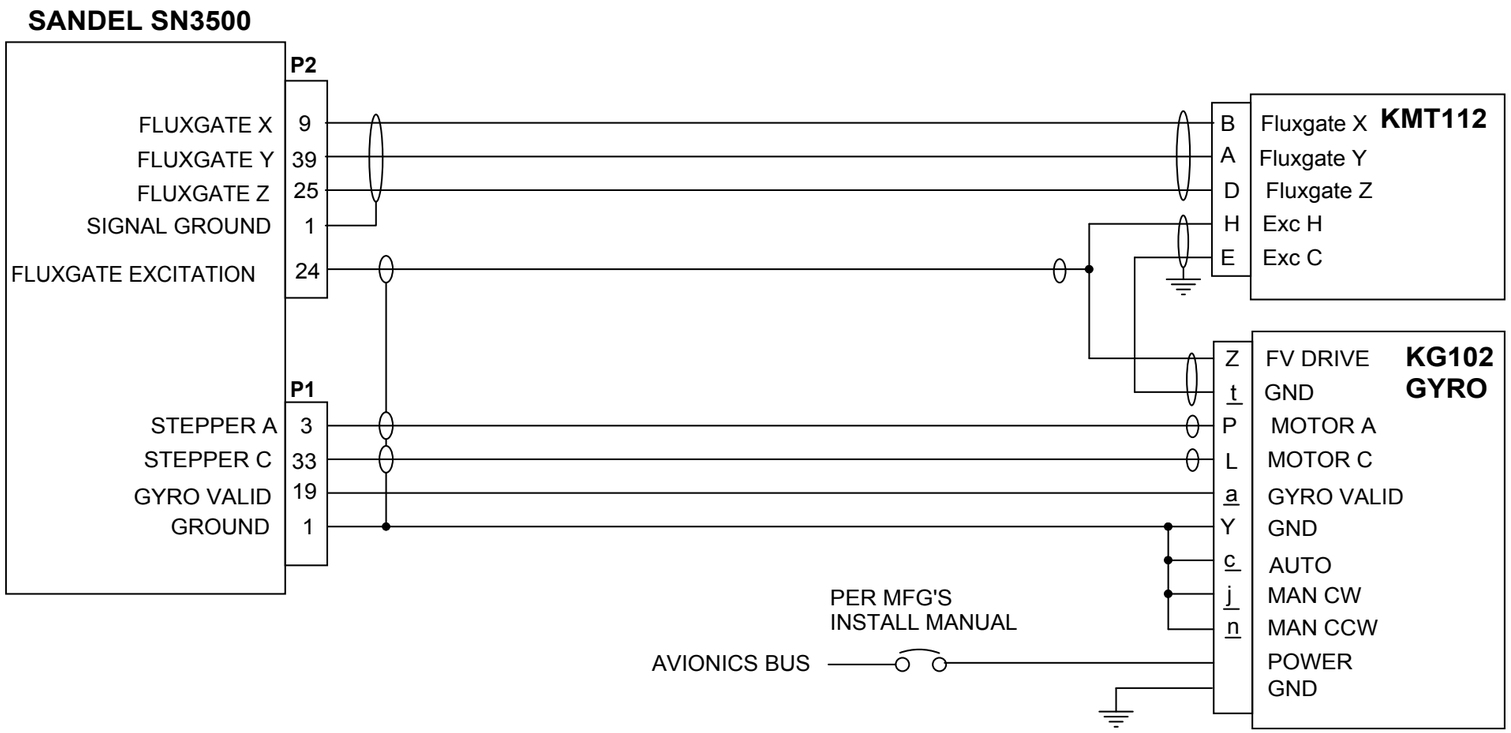
Title: S-TEC AUTOPILOTS

Size	Document Number	Rev
B	82005-10	A1

Create: Tuesday, September 19, 2000 | Mod: Sunday, December 09, 2007 | Sheet 9

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	REMOVED NON-GYRO ITEMS

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



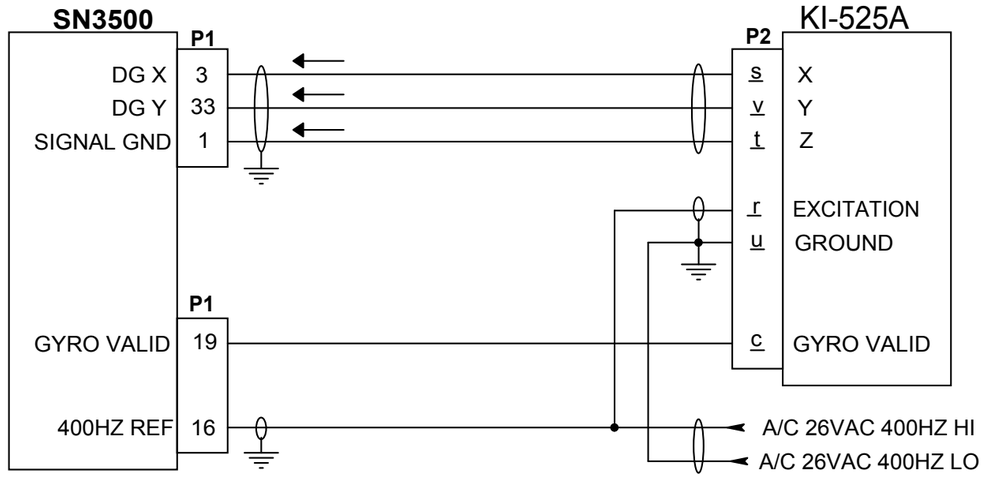
SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING		
Title: KING KG102A - SN3500 SLAVING		
Size: B	Document Number: 82005-10	Rev: B
Create: Friday, September 22, 2000	Mod: Sunday, December 09, 2007	Sheet 10

DATE	REV	COMMENTS
	B	INITIAL RELEASE

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

BENDIX/KING KI525A BOOTSTRAP MASTER WITH NO INTERNAL SN3500 SLAVING. (NOTES 1 AND 2)



1. SELECT NONE FOR FLUXGATE TYPE.
2. THIS CONFIGURATION IS USED WHEN BOOTSTRAPPED FROM AN EXISTING KCS55 SLAVED COMPASS SYSTEM. THIS MIGHT BE DESIRED WHERE AN EXISTING IS MOVED TO THE COPILOTS SIDE AND AN SN3500 IS INSTALLED ON THE PILOTS SIDE. UNDER THIS CONDITION THE SN3500 CAN BE DRIVEN BY THE BOOTSTRAP OUTPUT OF THE COPILOTS HSI.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

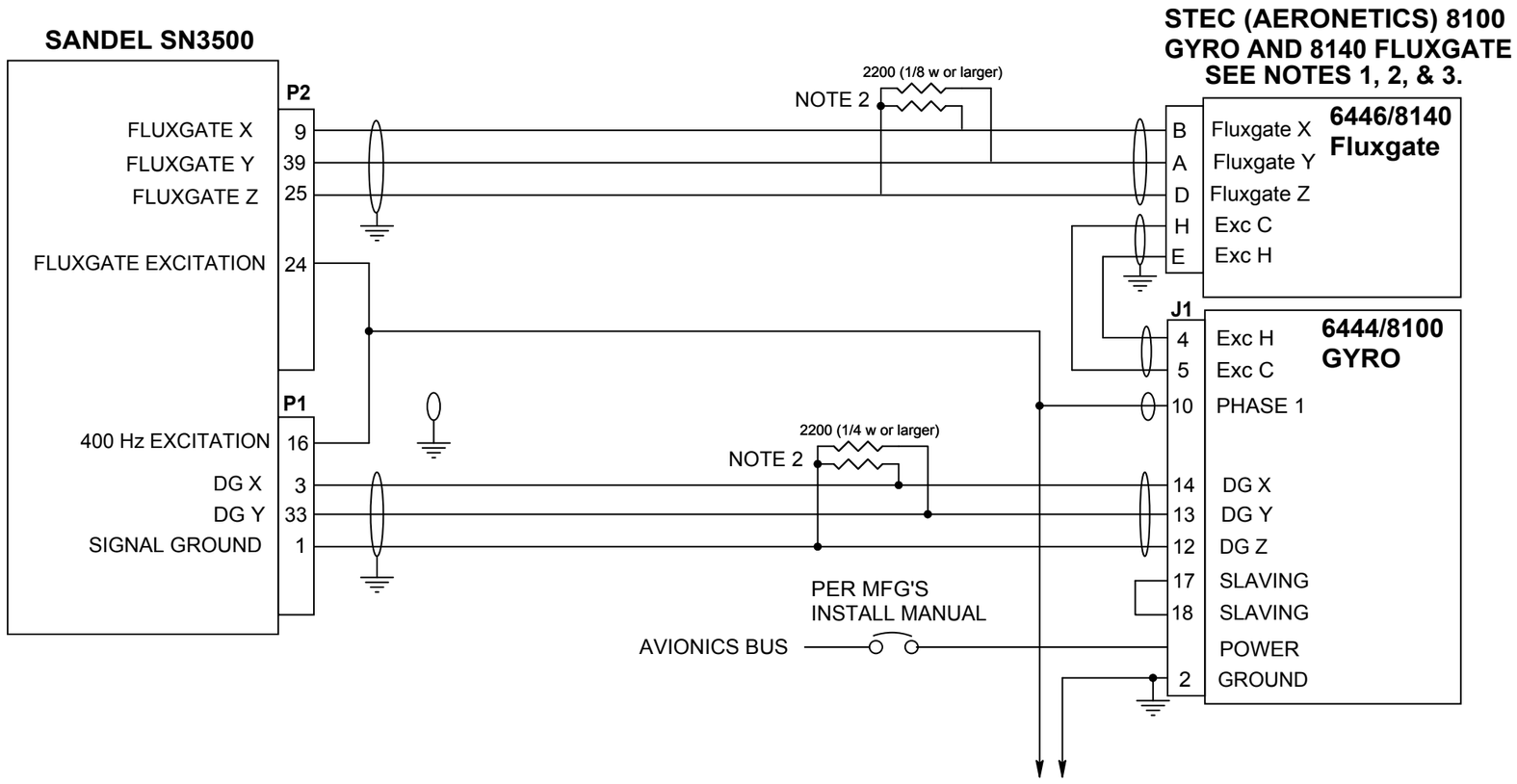
Title: KCS55 - BOOSTRAP XYZ

Size: B | Document Number: 82005-10 | Rev: B

Create: Wednesday, May 18, 2005 | Mod: Sunday, December 09, 2007 | Sheet 11

DATE	REV	COMMENTS
	A	
	A1	A/R 780 MINOR DOC CHANGES
	B	REVISED

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES

1. THE STEC/AERONETICS GYRO DOES NOT ALLOW THE USE OF AN EXTERNAL 400HZ INVERTER FOR ITS XYZ OUTPUTS. IF AN EXTERNAL INVERTER IS NEEDED TO DRIVE OTHER SYSTEMS WHICH ARE CONNECTED TO THE SN3500, THIS GYRO IS NOT COMPATIBLE.

2. THE 2200 OHM RESISTORS ARE RECOMMENDED (NOT REQUIRED) TO REDUCE RINGING FROM THE INTERNAL INVERTER. THE SN3500 APPLIES NO LOAD TO THE GYRO.

3. EARLY MODELS OF AERONETICS GYROS OPERATE AT 600HZ AND ARE NOT COMPATIBLE WITH THIS SYSTEM. CONTACT STEC FOR S/N INFORMATION.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

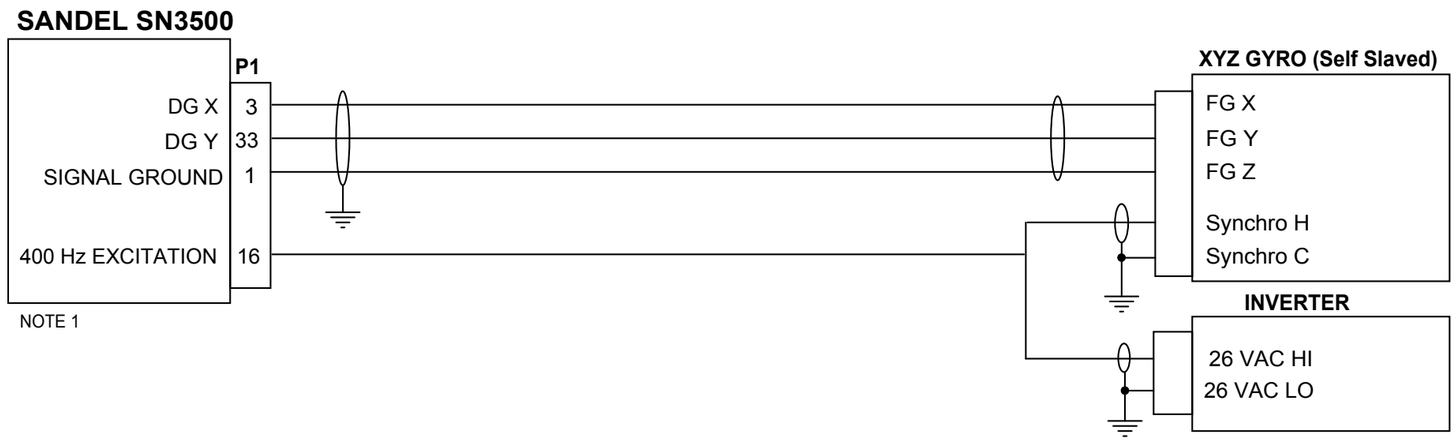
Title: S-TEC (AERONETICS) GYRO

Size	Document Number	Rev
B	82005-10	B

Create: Tuesday, September 19, 2000 | Mod: Sunday, December 09, 2007 | Sheet 12

DATE	REV	COMMENTS
	A	
	A1	A/R 780 MINOR DOC CHANGES
	B	REMOVED NON GYRO COMPONENTS. GYRO Z PIN CORRECTED

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES:

1. SELECT NONE FOR FLUXGATE TYPE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: XYZ GYRO (GYRO SELF SLAVED)

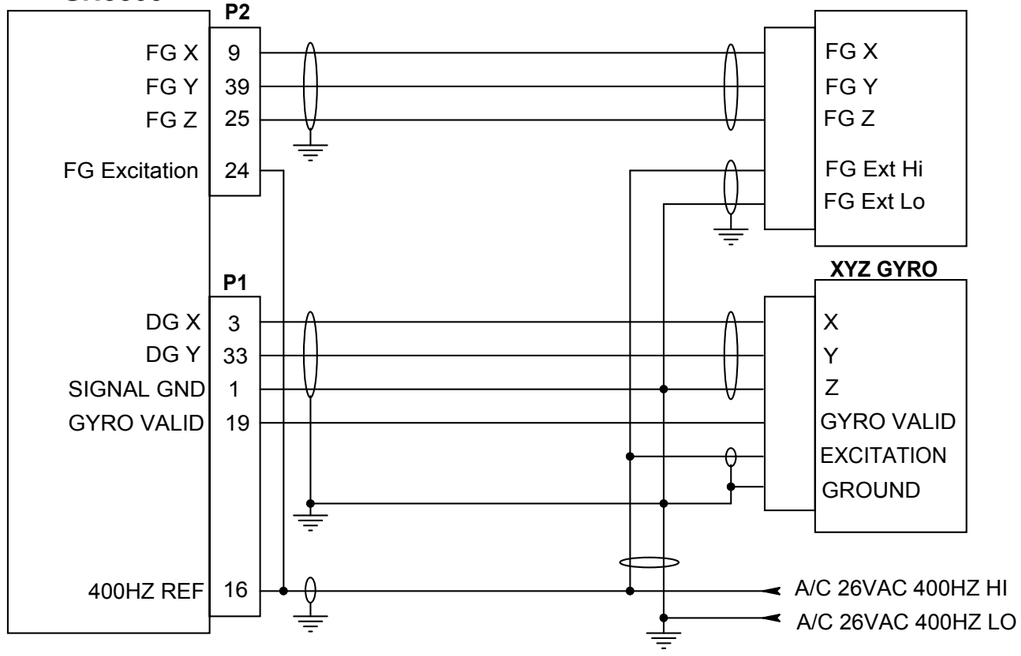
Size	Document Number	Rev
B	82005-10	B

Create: Friday, September 22, 2000 | Mod: Sunday, December 09, 2007 | Sheet 13

DATE	REV	COMMENTS
	B	INITIAL RELEASE

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

TYPICAL XYZ DG AND 26VAC FLUX GATE USING THE SN3500 INTERNAL SLAVING.



NOTES:

1. ANY TSO'D XYZ FLUX GATE IS PERMISSABLE, INSTALL ACCORDING TO MANUFACTURERS RECOMMENDATION. IF FLUX GATE REQUIRES LESS THAN 26VAC USE A PAIR OF SERIES RESISTORS (2 WATT) ONE IN EACH DRIVE LEAD TO PROVIDE THE CORRECT DRIVE VOLTAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

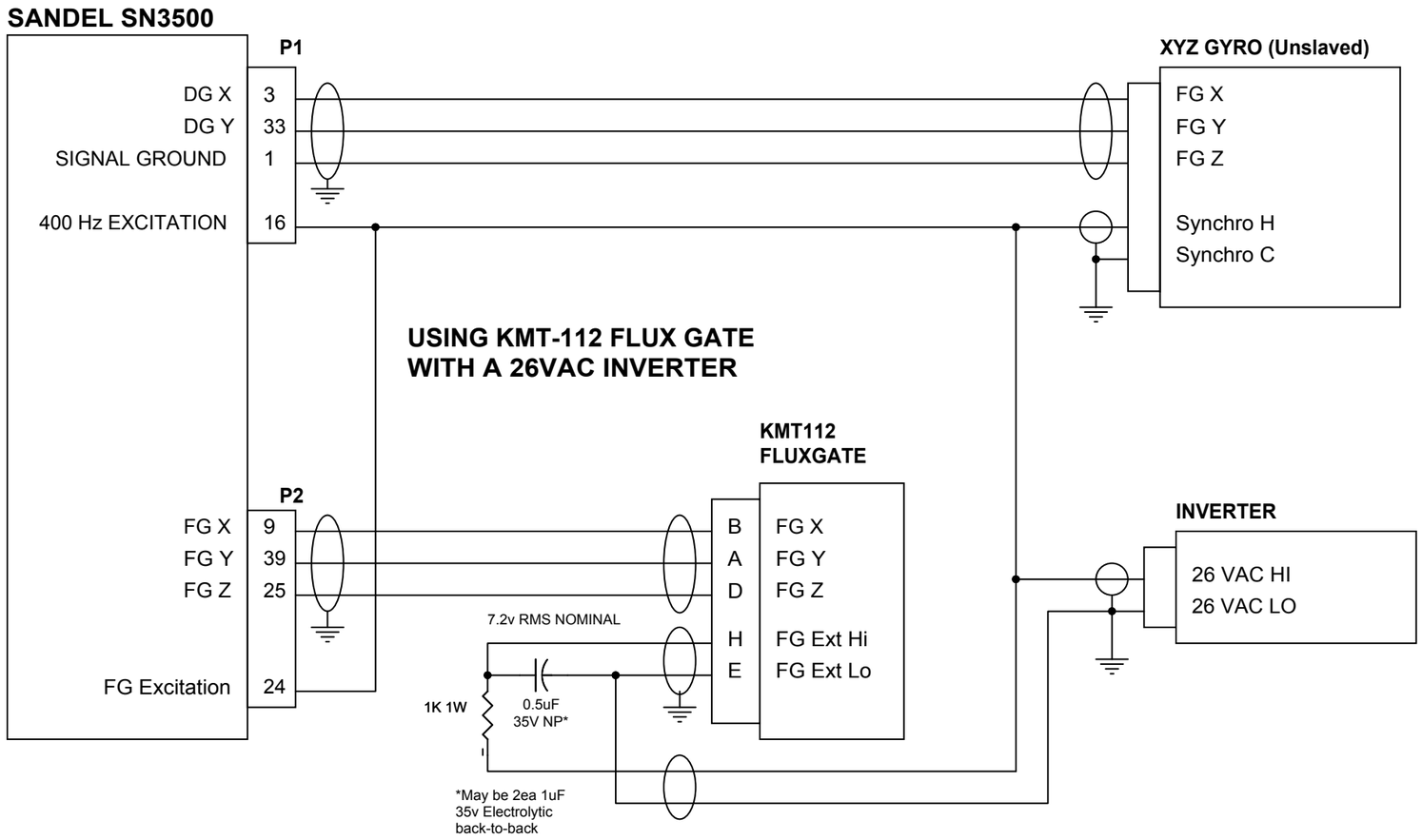
Title: XYZ GYRO

Size	Document Number	Rev
B	82005-10	B

Create: Wednesday, May 18, 2005 | Mod: Sunday, December 09, 2007 | Sheet 14

DATE	REV	COMMENTS
	B	
	C	A/R 806 TYPO P1-16 WAS P1-4

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



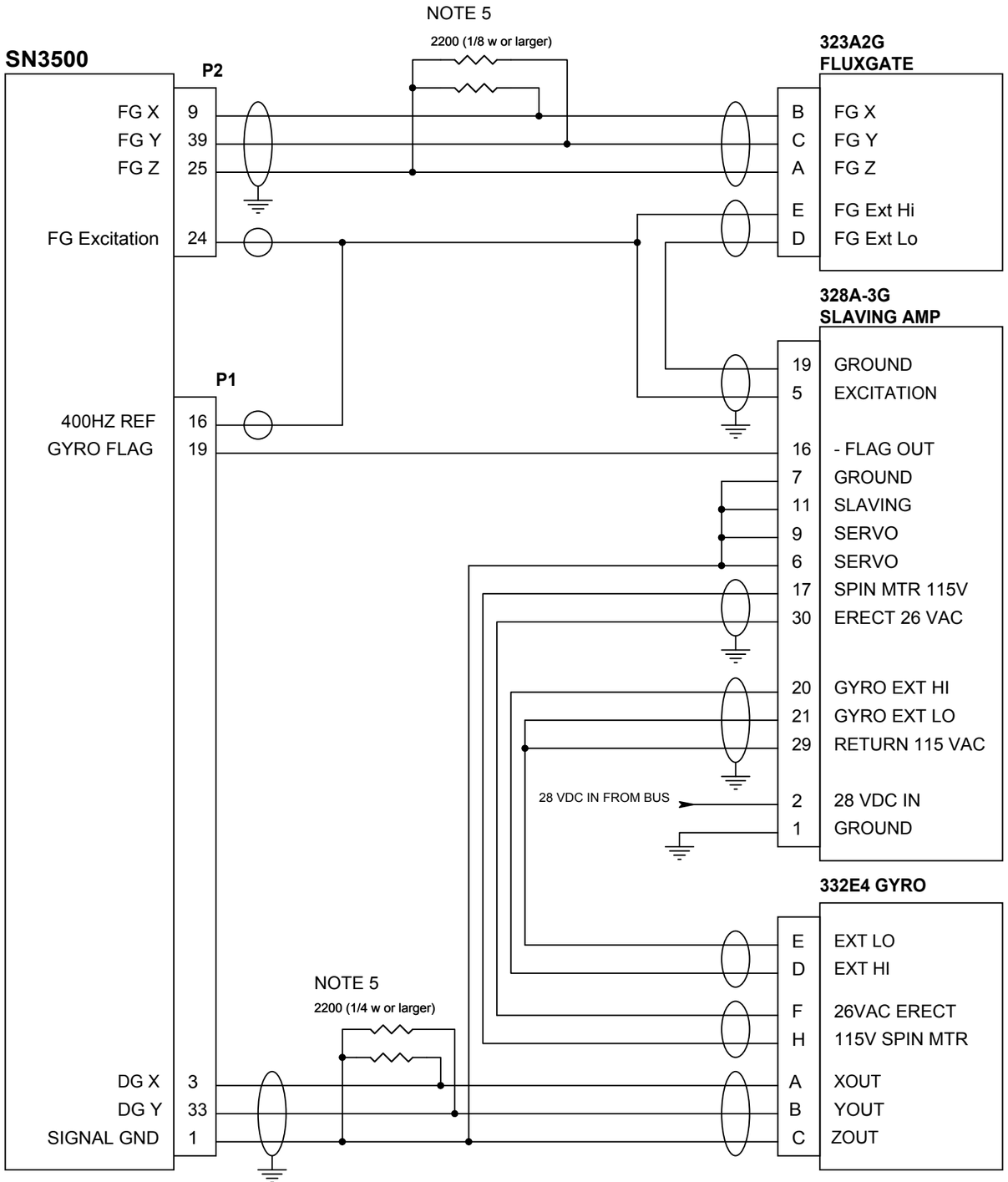
SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING		
Title: XYZ GYRO WITH KMT112		
Size: B	Document Number: 82005-10	Rev: C
Create: Wednesday, May 18, 2005	Mod: Sunday, December 09, 2007	Sheet 15

DATE	REV	COMMENTS
	A	INITITAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	NOTES CHANGED
	C	A/R 806 REVISED GYRO CONNECTIONS

COMPUER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

LEAVING INSTALLED BUT BYPASSING THE SLAVING FUNCTION OF THE COLLINS 328A-3G SLAVING ACCESSORY WHEN UPGRADING A PN101 SYSTEM. SEE NOTES



NOTES

1. THIS CONFIGURATION DOES NOT ALLOW FOR AN ADDITIONAL INVERTER DRIVING THE SN3500.
2. THIS CONFIGURATION DISABLES THE 328A-3G SLAVING ACTION. SLAVING IS PERFORMED INSIDE THE SN3500.
3. THE 328A-3G PROVIDES A HEADING FLAG OUTPUT TO THE SN3500.
4. THIS CONFIGURATION ALLOWS THE USE OF A COLLINS 332-E4 WITHOUT USING THE SLAVING FUNCTION OF THE 328A-3G SLAVING ACCESSORY.
5. THE 2200 OHM RESISTORS ARE RECOMMENDED (NOT REQUIRED) TO REDUCE RINGING FROM THE INTERNAL INVERTER. THE SN3500 APPLIES NO LOAD TO THE GYRO.
6. YOU MUST REMOVE THE 323A-3G FLUX COMPENSATOR LOCATED ON TOP OF THE FLUX VALVE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

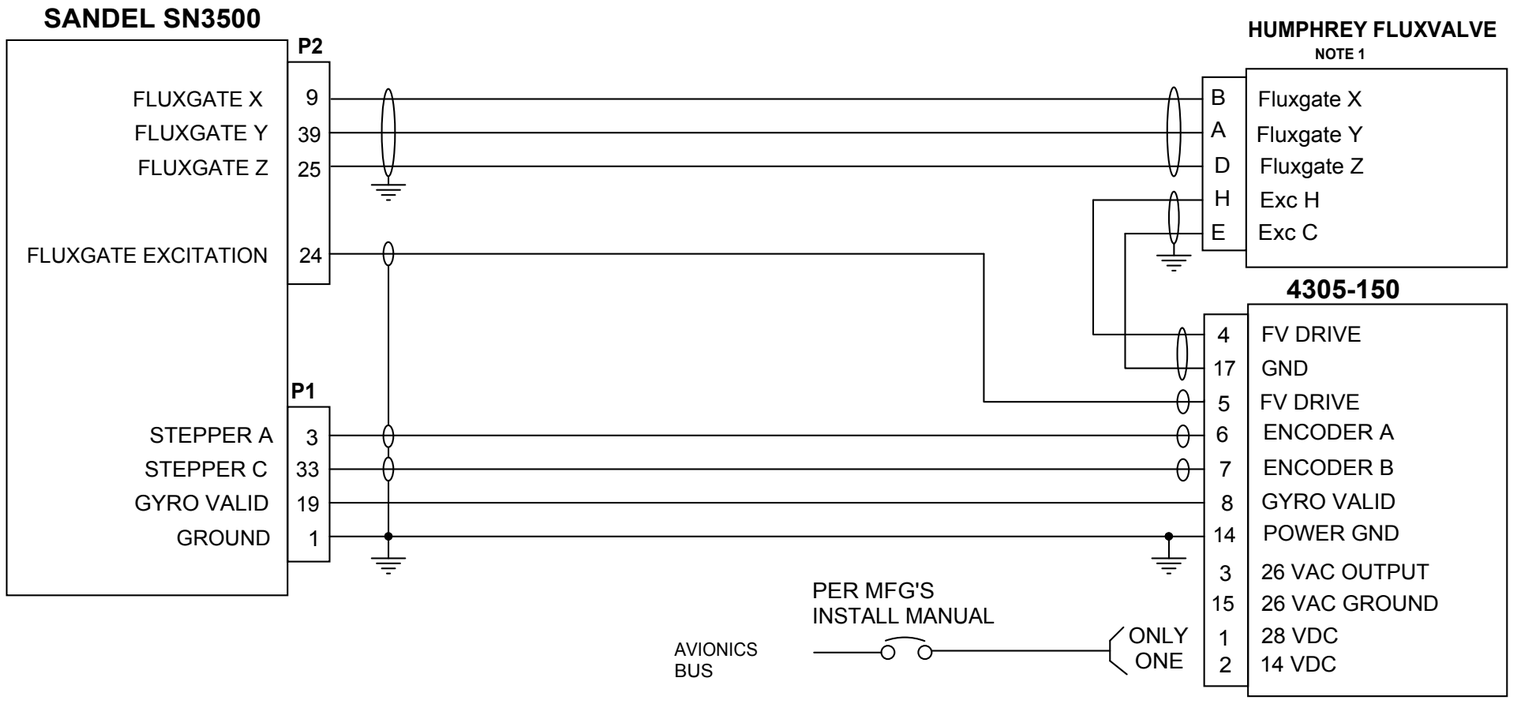
Title: COLLINS PN101 UPGRADE

Size B | Document Number: 82005-10 | Rev C

Create: Tuesday, April 28, 1998 | Mod: Sunday, December 09, 2007 | Sheet 16

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	NON GYRO ITEMS REMOVED

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLTY



NOTES:
1. **SELECT STEC 6446 FOR FLUXGATE TYPE**

SANDEL® Vista, Ca.

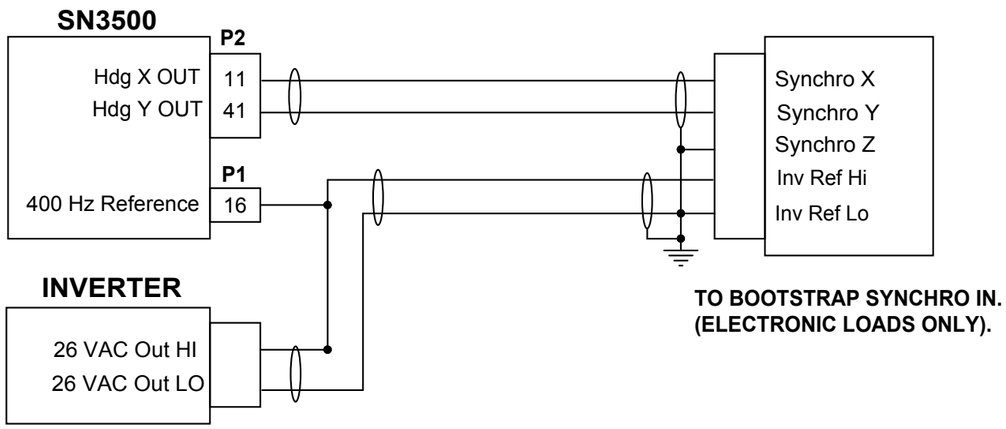
Category	SN3500 INSTALLATION DRAWING	
Title	MID-CONTINENT 4305	
Size B	Document Number 82005-10	Rev B
Create: Wednesday, October 18, 2000	Mod: Sunday, December 09, 2007	Sheet 17

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	C	A/R 806 MINOR DOC CHANGE

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

XYZ COMPASS BOOTSTRAP OUTPUT

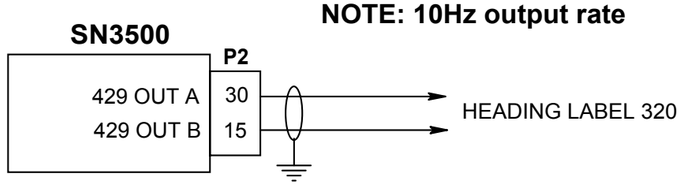
NOTE 1



TO BOOTSTRAP SYNCHRO IN.
(ELECTRONIC LOADS ONLY).

429 HDG OUTPUT

NOTE: 10Hz output rate



NOTE 1

1. SELECT NORMAL OR REVERSE FOR BOOTSTRAP SETTING ON FCS EMULATION PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: SN3500 COMPASS BOOTSTRAP

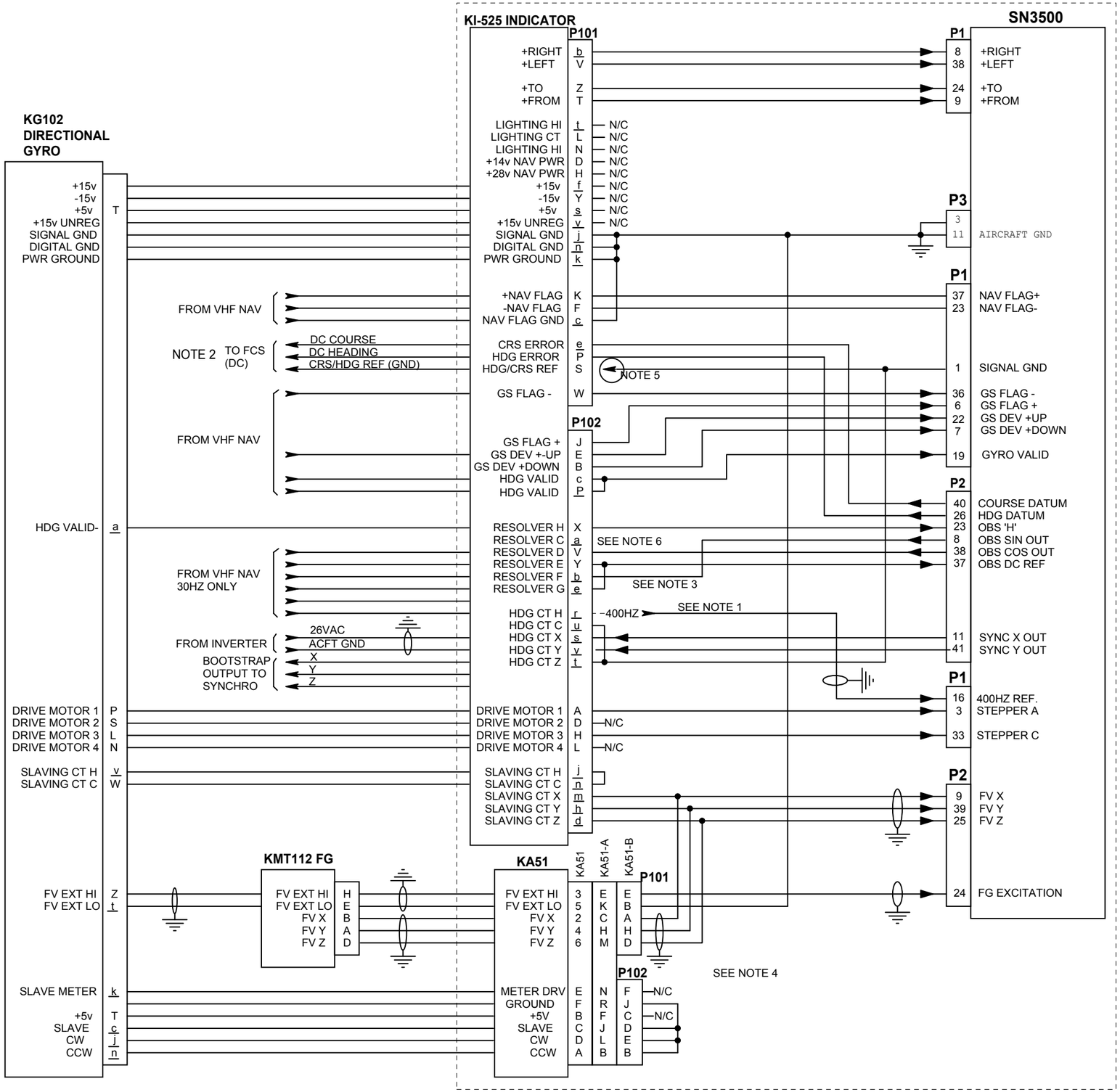
Size	Document Number	Rev
B	82005-10	C

Create: Monday, September 25, 2000 | Mod: Sunday, December 09, 2007 | Sheet 18

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

DOTTED AREA REPRESENTS THE SN3500 INTERCONNECT.
THE BALANCE OF THE DATA IS SHOWN FOR REFERENCE



NOTES:

1: THE SYSTEM 400HZ INVERTER WILL NORMALLY BE CONNECTED TO THE HEADING SYNCHRO 'H' TERMINAL. THIS WIRE CAN BE USED TO DRIVE THE SN3500 REFERENCE INPUT. IN AN UNUSUAL CASE THE SYNCHRO MIGHT HAVE BEEN WIRED IN UPSIDE DOWN AND THE 400HZ REFERENCE MAY BE ON THE 'C' TERMINAL.

2: IF AN EXISTING CONVERTER IS INSTALLED SUCH AS A KA 52 OR KA 57, LEAVE UNIT INSTALLED AND SELECT KI525 ON FCS EMULATION PAGE.

3. SHOWN IS THE 30HZ RESOLVER INTERCONNECT. CHECK APPROPRIATE NAV RECEIVER SCHEMATICS BEFORE APPLYING POWER. TYING PINS E/G TOGETHER AS SHOWN ASSUMES THEM TO BE THE NAV RECEIVER VREF. THESE ARE NORMALLY TIED TOGETHER INSIDE THE NAV RECEIVER AND GO TO SIGNAL GROUND OR AN INTERNAL DC REFERENCE VOLTAGE. IF THESE DO NOT TIE INTERNALLY PLEASE CALL SANDEL FOR ASSISTANCE.

4. WHEN CONVERTING KCS-55 SYSTEM INSTALLATIONS THE KA-51 SLAVING ACCESSORY IS NOT USED. THE FLUXGATE EXCITATION SIGNAL CAN BE PICKED UP FROM THE EXISTING KA-51 CONNECTORS AS SHOWN.

5. PRIOR TO INSTALLING THE SN3500, ENSURE THAT THIS WIRE IS COMING FROM THE FLIGHT CONTROL SYSTEM GROUND AND THAT NO VOLTAGE IS PRESENT ON THIS PIN WITH POWER APPLIED TO ALL AVIONICS. IF VOLTAGE IS PRESENT, CONNECT SN3500 P1-1 TO FCS GROUND AT THE ROLL COMPUTER WITH A NEW WIRE. IF PRIMARY POWER IS APPLIED TO SN3500 P1-1 DAMAGE MAY OCCUR TO THE SN3500 RESULTING IN AN OPEN CIRCUIT AT P1-1. THIS CAN BE CHECKED WITH AN OHM METER.

6. RESISTOR MAY BE REQUIRED. SEE RESOLVER INTERCONNECT SHEET TO DETERMINE PROPER CONNECTION.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

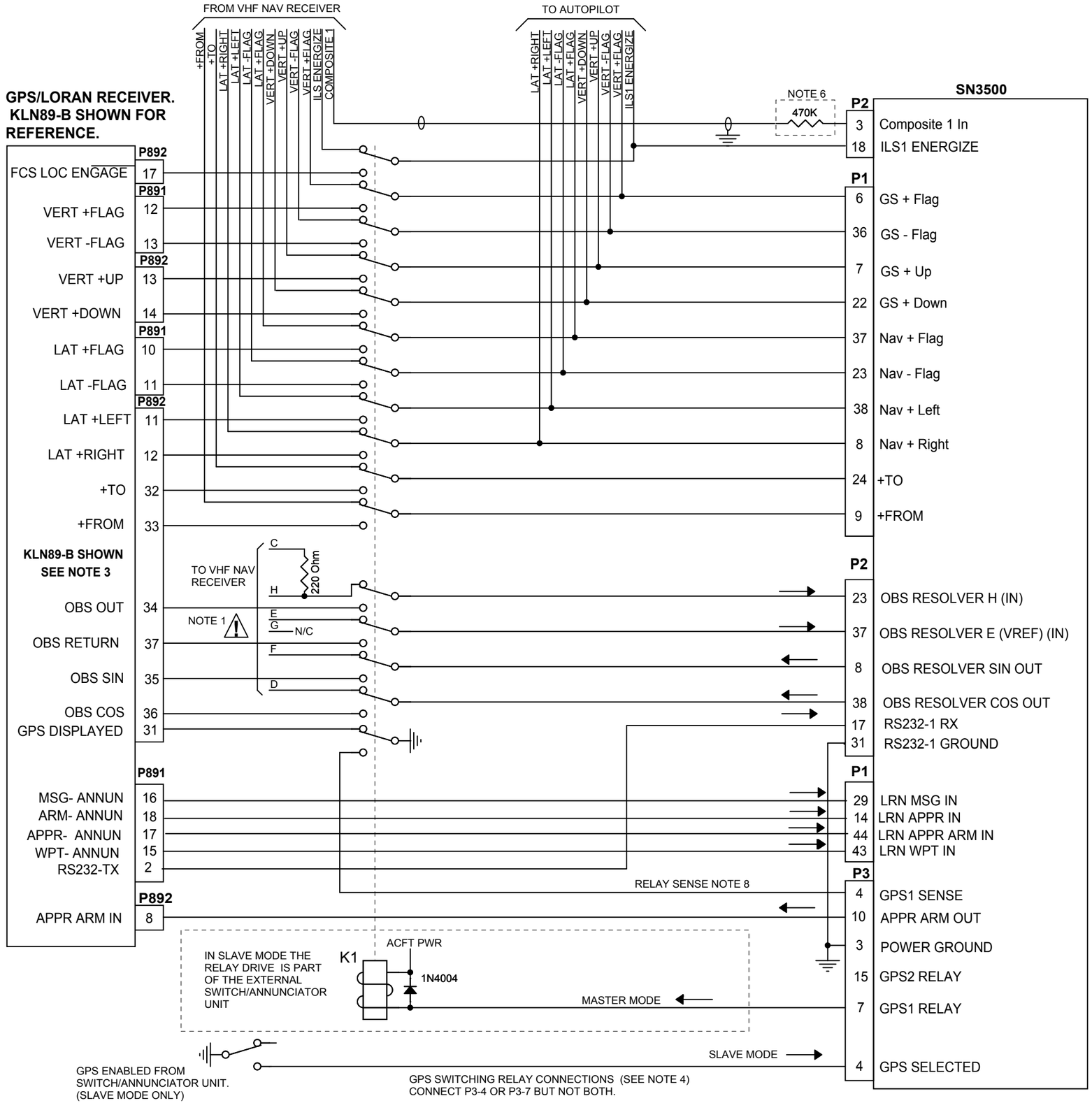
Title: KCS-55 REMOVAL (REF)

Size	Document Number	Rev
B	82005-10	A1

Create: Saturday, May 02, 1998 | Mod: Sunday, December 09, 2007 | Sheet 19

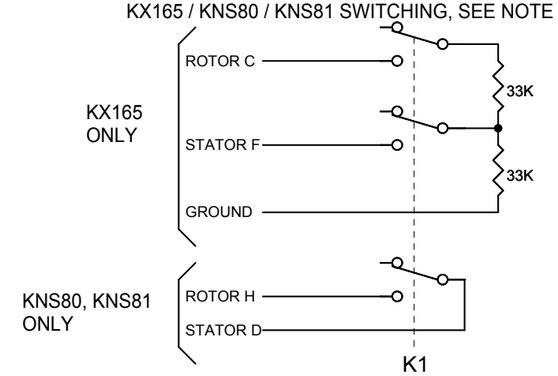
6/9/98	A	E
DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	P3 PIN 4 RENAMED
	C	A/R 806 MINOR DOC CHANGE, P1-22 AND P1-7 REVERSED, P2-37 WAS P2-7

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NAV-1 AND RS-232 GPS INTERCONNECT
KLN89-B SHOWN FOR REFERENCE

KX165 / KNS80 / KNS81 SWITCHING, SEE NOTE 2



NOTES:

1. CONNECT OBS "H" FROM RECEIVER "H" or "C" WHICHEVER IS THE ACTIVE OUTPUT. CHECK APPROPRIATE NAV RECEIVER SCHEMATICS. CONNECT "SIN OUT" and "COS OUT" TO THE ACTIVE RETURN PINS, USUALLY D/F. CONNECT "OBS VREF" TO EITHER STATOR RETURN PIN (REF OR GROUND) USUALLY E or G. THE LOAD RESISTOR SIMULATES A SYNCHRO.

2. THESE CONNECTIONS FOR KX165 OR KNX80/81 PREVENT THE RECEIVER FROM FLAGGING THE NAV SIGNAL WHEN THE RESOLVER IS BEING USED BY THE GPS. CONSULT THE APPROPRIATE KING DOCUMENTATION FOR FURTHER INFORMATION.

3. SEE ARINC-429 INSTALLATION PAGE WHICH DOES NOT REQUIRE THE RESOLVER SWITCHING RELAY (WHERE APPLICABLE).

4. THE PREFERRED INSTALLATION IS THE SN3500 IN CONTROLLING MASTER EXTERNAL SWITCHING RELAY. IF AN EXISTING SWITCH CONTROL BOX IS INSTALLED AND IT IS DESIRED TO LEAVE IT OPERATIONAL USE PIN 4 TO SENSE GPS MODE AND SELECT SLAVE FOR THE MODE SETTING ON THE OBS/RELAY/CDI MAINTENANCE PAGE.

1 MASTER: SN3500 CONTROLS THE NAV/GPS SWITCHING (PREFERRED)
2 SLAVE: EXTERNAL NAV/GPS SWITCH CONTROLS THE SN3500

5. CHECK MANUFACTURERS DOCUMENTATION FOR ANY ADDITIONAL INSTALLATION SPECIFIC RELAY POLES WHICH MAY ALSO BE NEEDED.

6. FOR 3V COMPOSITE NAV SOURCES INSERT A 470K SERIES RESISTOR LOCATED AT THE SN3500 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

7. ONLY USED WHEN SN3500 IS IN MASTER MODE. SELECT GPS1 FOR SENSE ON OBS/RELAY/CDI MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: NAV-1 RS-232 GPS (EXT RELAY)

Size	Document Number	Rev
B	82005-10	C

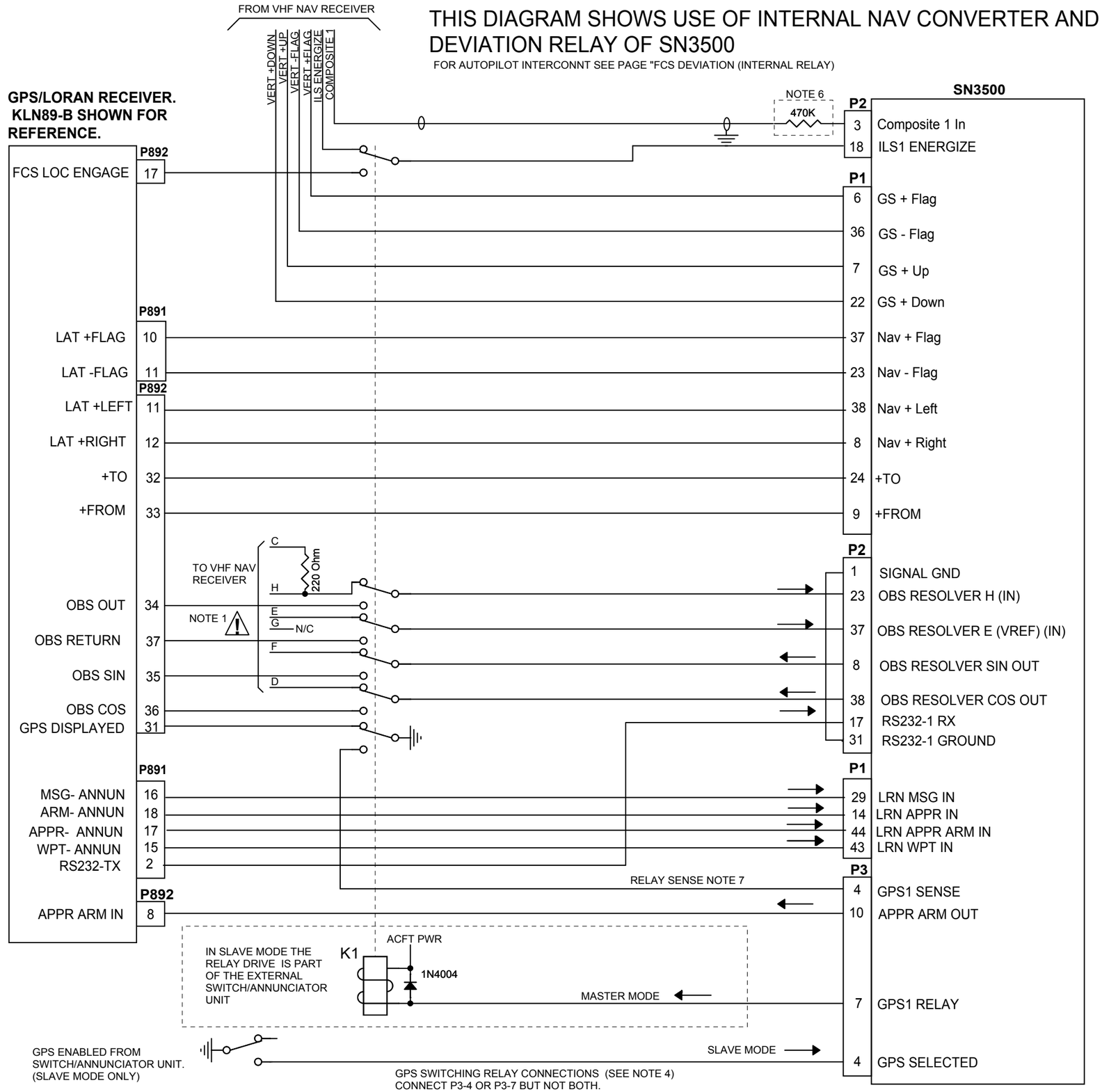
Create: Tuesday, April 28, 1998 | Mod: Sunday, December 09, 2007 | Sheet 20

THIS DIAGRAM SHOWS USE OF INTERNAL NAV CONVERTER AND DEVIATION RELAY OF SN3500

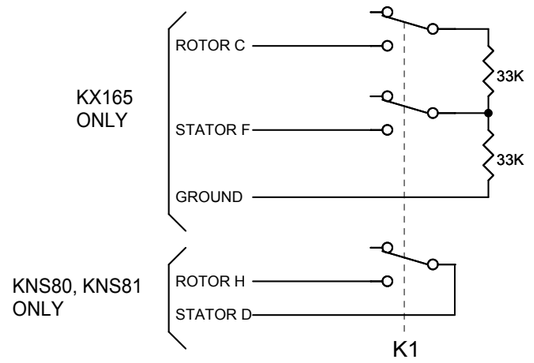
FOR AUTOPILOT INTERCONNT SEE PAGE "FCS DEVIATION (INTERNAL RELAY)

DATE	REV	COMMENTS
6/9/98	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	P3 PIN 4 RENAMED
	C	A/R 806 MINOR DOC CHANGE P1-22 AND P1-7 REVERSED, P2-37 WAS P2-7 ADDED ANALOG DEVIATION CONNECTIONS.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



KX165 / KNS80 / KNS81 SWITCHING, SEE NOTE 2



NOTES:

1. CONNECT OBS "H" FROM RECEIVER "H" or "C" WHICHEVER IS THE ACTIVE OUTPUT. CHECK APPROPRIATE NAV RECEIVER SCHEMATICS. CONNECT "SIN OUT" and "COS OUT" TO THE ACTIVE RETURN PINS, USUALLY D/F. CONNECT "OBS VREF" TO EITHER STATOR RETURN PIN (REF OR GROUND) USUALLY E or G. THE LOAD RESISTOR SIMULATES A SYNCHRO.

2. THESE CONNECTIONS FOR KX165 OR KNX80/81 PREVENT THE RECEIVER FROM FLAGGING THE NAV SIGNAL WHEN THE RESOLVER IS BEING USED BY THE GPS. CONSULT THE APPROPRIATE KING DOCUMENTATION FOR FURTHER INFORMATION.

3. SEE ARINC-429 INSTALLATION PAGE WHICH DOES NOT REQUIRE THE RESOLVER SWITCHING RELAY (WHERE APPLICABLE).

4. THE PREFERRED INSTALLATION IS THE SN3500 P3-7 CONTROLLING AN EXTERNAL SWITCHING RELAY. IF AN EXISTING SWITCH CONTROL BOX IS INSTALLED AND IT IS DESIRED TO LEAVE IT OPERATIONAL, USE P3-4 TO SENSE GPS MODE AND SELECT SLAVE FOR THE MODE SETTING ON THE OBS/RELAY/CDI MAINTENANCE PAGE.

   1 MASTER: SN3500 CONTROLS THE NAV/GPS SWITCHING (PREFERRED)
   2 SLAVE: EXTERNAL NAV/GPS SWITCH CONTROLS THE SN3500

5. CHECK MANUFACTURERS DOCUMENTATION FOR ANY ADDITIONAL INSTALLATION SPECIFIC RELAY POLES WHICH MAY ALSO BE NEEDED.

6. FOR 3V COMPOSITE NAV SOURCES INSERT A 470K SERIES RESISTOR LOCATED AT THE SN3500 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

7. ONLY USED WHEN SN3500 IS IN MASTER MODE. SELECT GPS1 FOR SENSE ON OBS/RELAY/CDI MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: NAV-1 RS-232 GPS (INT RELAY)

Size: B | Document Number: 82005-10 | Rev: C

Create: Tuesday, April 28, 1998 | Mod: Sunday, December 09, 2007 | Sheet 21

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	C	A/R 806 429 TX OUT PIN CORRECTIONS, P1-22 AND P1-7 REVERSED.
	C2	ADDED KLN90B SDI-1/2 CONNECTION. ADDED NOTE 9 AND MODIFIED NOTE 5 TO INCLUDE SDI-1/2.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

NAV-1 AND ARINC 429 GPS INTERCONNECT. KLN90-B SHOWN FOR REFERENCE

GPS/LORAN RECEIVER. KLN-90B SHOWN FOR REFERENCE

P901

FROM VHF NAV RECEIVER: +FROM, +TO, LAT +RIGHT, LAT +LEFT, LAT -FLAG, LAT +FLAG, VERT +DOWN, VERT +UP, VERT -FLAG, VERT +FLAG, ILS ENERGIZE, COMPOSITE

TO AUTOPILOT: LAT +RIGHT, LAT +LEFT, LAT -FLAG, +FLAG, +DOWN, +UP, -VERT FLAG, +VERT FLAG, ILS ENERGIZE

NOTE 7: 470K

SN3500

APPR ACTIVE SEE NOTE 2	16	
VERT +FLAG		
VERT -FLAG		
VERT +UP		
VERT +DOWN		
LAT +FLAG	19	
LAT -FLAG	25	
LAT +LEFT	25	
LAT +RIGHT	22	
KLN90-B SHOWN SEE NOTE 5		
SDI - 1/2	3	SEE NOTE 9
ARINC 429 TX-A	24	
ARINC 429 TX-B	23	
ARINC 429 RX-A	9	
ARINC 429 RX-B	8	
ARINC 429 RX-A	5	
ARINC 429 RX-B	4	
APPR ACTIVE	16	
APPR ARM	17	
GPS DISPLAYED	1	
ARM SELECT	30	
LEG/OBS- CTRL	33	

P2

3	Composite 1 In
18	ILS1 ENERGIZE

P1

6	GS + Flag
36	GS - Flag
7	GS + Up
22	GS + Down
37	Nav + Flag
23	Nav - Flag
38	Nav + Left
8	Nav + Right
24	+TO
9	+FROM

TO VHF NAV RECEIVER RESOLVER INTERCONNECT

NOTE 1

G — N/C

C — 220 Ohm — H

E

F

D

P2

23	OBS RESOLVER H (IN)
37	OBS RESOLVER E/F (VREF) (IN)
8	OBS RESOLVER SIN OUT
38	OBS RESOLVER COS OUT
31	429-1 RX-A
17	429-1 RX-B
30	429-1 TX-A
15	429-1 TX-B

JUMPERS REQUIRED IF NO AIRDATA COMPUTER INSTALLED.

P1

NOTE 6

14	LRN APPR IN
44	LRN APPR ARM IN

P3

RELAY SENSE NOTE 8

4	GPS1 SENSE
10	APPR ARM OUT
2	OBS CMND OUT
15	GPS2 RELAY
7	GPS1 RELAY
4	GPS SELECTED

IN SLAVE MODE THE RELAY DRIVE IS PART OF THE EXTERNAL SWITCH/ANNUNCIATOR UNIT

K1 — ACFT PWR — 1N4004

MASTER MODE

SLAVE MODE

GPS ENABLED FROM SWITCH/ANNUNCIATOR UNIT. (SLAVE MODE ONLY)

GPS SWITCHING RELAY CONNECTIONS (SEE NOTE 3) CONNECT P3-4 OR P3-7 BUT NOT BOTH.

NOTES:

1. CONNECT OBS "H" FROM RECEIVER "H" or "C" WHICHEVER IS THE ACTIVE OUTPUT. CHECK APPROPRIATE NAV RECEIVER SCHEMATICS. CONNECT "SIN OUT" and "COS OUT" TO THE ACTIVE RETURN PINS, USUALLY D/F. CONNECT "OBS VREF" TO EITHER STATOR RETURN PIN (REF OR GROUND) USUALLY E or G. THE LOAD RESISTOR SIMULATES A SYNCHRO.

2. THE APPROACH ACTIVE OUTPUT FROM THE GPS TO THE AUTOPILOT MAY HAVE TO BE AN ADDITIONAL RELAY. SEE THE MANUFACTURERS INSTALLATION DIAGRAMS.

3. THE PREFERRED INSTALLATION IS THE SN3500 P3-7 CONTROLLING AN EXTERNAL SWITCHING RELAY. IF AN EXISTING SWITCH CONTROL BOX IS INSTALLED AND IT IS DESIRED TO LEAVE IT OPERATIONAL, USE P3-4 TO SENSE GPS MODE AND SELECT SLAVE FOR THE MODE SETTING ON THE OBS/RELAY/CDI MAINTENANCE PAGE.

MASTER:
SN3500 CONTROLS THE NAV/GPS SWITCHING (PREFERRED)
SLAVE:
EXTERNAL NAV/GPS SWITCH CONTROLS THE SN3500

4. CHECK MANUFACTURERS DOCUMENTATION FOR ANY ADDITIONAL INSTALLATION SPECIFIC RELAY POLES WHICH MAY ALSO BE NEEDED.

5. KLN-90B PINOUTS SHOWN. CERTAIN CONNECTIONS SUCH AS GPS_DISPLAYED, SDI-1/2, AND OBS/LEG ARE SPECIFIC TO KLN-90B.

6. MSG AND WPT ANNUNCIATORS ARE COMMUNICATED ON THE ARINC 429 SERIAL CHANNEL.

7. FOR 3V COMPOSITE NAV SOURCES INSERT A 470K SERIES RESISTOR LOCATED AT THE SN3500 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

8. ONLY USED WHEN SN3500 IS IN MASTER MODE. SELECT GPS1 FOR SENSE ON OBS/RELAY/CDI MAINTENANCE PAGE.

9. IF KLN90B IS USED FOR GPS1, LEAVE SDI-1/2 PIN 3 OF KLN90B OPEN. IF KLN90B IS WIRED FOR GPS2, THEN CONNECT SDI-1/2 PIN 3 OF KLN90B TO GROUND.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: NAV-1 / ARINC-429 GPS (EXT RELAY)

Size B | Document Number 82005-10 | Rev C2

Create: Tuesday, April 28, 1998 | Mod: Sunday, December 09, 2007 | Sheet 22

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	C	A/R 806 429 TX OUT PIN CORRECTIONS, P1-22 AND P1-7 REVERSED.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

THIS DIAGRAM SHOWS USE OF INTERNAL NAV CONVERTER AND DEVIATION RELAY OF SN3500

GPS/LORAN RECEIVER. KLN-90B SHOWN FOR REFERENCE

P901

APPR ACTIVE SEE NOTE 2 — 16

KLN90-B SHOWN SEE NOTE 5

ARINC 429 TX-A — 24
ARINC 429 TX-B — 23
ARINC 429 RX-A — 9
ARINC 429 RX-B — 8
ARINC 429 RX-A — 5
ARINC 429 RX-B — 4

APPR ACTIVE — 16
APPR ARM — 17

GPS DISPLAYED — 1

ARM SELECT — 30
LEG/OBS- CTRL — 33

FROM VHF NAV RECEIVER

VERT +DOWN
VERT +UP
VERT -FLAG
VERT +FLAG
ILS ENERGIZE
COMPOSITE

NOTE 7: 470K

SN3500

P2

3 Composite 1 In
18 ILS1 ENERGIZE

P1

6 GS + Flag
36 GS - Flag
7 GS + Up
22 GS + Down

TO VHF NAV RECEIVER RESOLVER INTERCONNECT

NOTE 1

G — N/C
C — 220 Ohm
H
E
F
D

P2

23 OBS RESOLVER H (IN)
37 OBS RESOLVER E/F (VREF) (IN)
8 OBS RESOLVER SIN OUT
38 OBS RESOLVER COS OUT
31 429-1 RX-A
17 429-1 RX-B
30 429-1 TX-A
15 429-1 TX-B

JUMPERS REQUIRED IF NO AIRDATA COMPUTER INSTALLED.

NOTE 6

P1

14 LRN APPR IN
44 LRN APPR ARM IN

RELAY SENSE NOTE 8

P3

4 GPS1 SENSE
10 APPR ARM OUT
2 OBS CMND OUT
15 GPS2 RELAY
7 GPS1 RELAY
4 GPS SELECTED

IN SLAVE MODE THE RELAY DRIVE IS PART OF THE EXTERNAL SWITCH/ANNUNCIATOR UNIT

K1 — ACFT PWR — 1N4004

MASTER MODE

SLAVE MODE

GPS ENABLED FROM SWITCH/ANNUNCIATOR UNIT. (SLAVE MODE ONLY)

GPS SWITCHING RELAY CONNECTIONS (SEE NOTE 3) CONNECT P3-4 OR P3-7 BUT NOT BOTH.

NAV-1 AND ARINC 429 GPS INTERCONNECT. KLN90-B SHOWN FOR REFERENCE

NOTES:

1. CONNECT OBS "H" FROM RECEIVER "H" or "C" WHICHEVER IS THE ACTIVE OUTPUT. CHECK APPROPRIATE NAV RECEIVER SCHEMATICS. CONNECT "SIN OUT" and "COS OUT" TO THE ACTIVE RETURN PINS, USUALLY D/F. CONNECT "OBS VREF" TO EITHER STATOR RETURN PIN (REF OR GROUND) USUALLY E or G. THE LOAD RESISTOR SIMULATES A SYNCHRO.

2. THE APPROACH ACTIVE OUTPUT FROM THE GPS TO THE AUTOPILOT MAY HAVE TO BE AN ADDITIONAL RELAY. SEE THE MANUFACTURERS INSTALLATION DIAGRAMS.

3. THE PREFERRED INSTALLATION IS THE SN3500 P3-7 CONTROLLING AN EXTERNAL SWITCHING RELAY. IF AN EXISTING SWITCH CONTROL BOX IS INSTALLED AND IT IS DESIRED TO LEAVE IT OPERATIONAL, USE P3-4 TO SENSE GPS MODE AND SELECT SLAVE FOR THE MODE SETTING ON THE OBS/RELAY/CDI MAINTENANCE PAGE.

1 MASTER: SN3500 CONTROLS THE NAV/GPS SWITCHING (PREFERRED)
2 SLAVE: EXTERNAL NAV/GPS SWITCH CONTROLS THE SN3500

4. CHECK MANUFACTURERS DOCUMENTATION FOR ANY ADDITIONAL INSTALLATION SPECIFIC RELAY POLES WHICH MAY ALSO BE NEEDED.

5. KLN-90B PINOUTS SHOWN. CERTAIN CONNECTIONS SUCH AS GPS_DISPLAYED AND OBS/LEG ARE SPECIFIC TO KLN-90B.

6. MSG AND WPT ANNUNCIATORS ARE COMMUNICATED ON THE ARINC 429 SERIAL CHANNEL.

7. FOR 3V COMPOSITE NAV SOURCES INSERT A 470K SERIES RESISTOR LOCATED AT THE SN3500 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

8. ONLY USED WHEN SN3500 IS IN MASTER MODE. SELECT GPS1 FOR SENSE ON OBS/RELAY/CDI MAINTENANCE PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

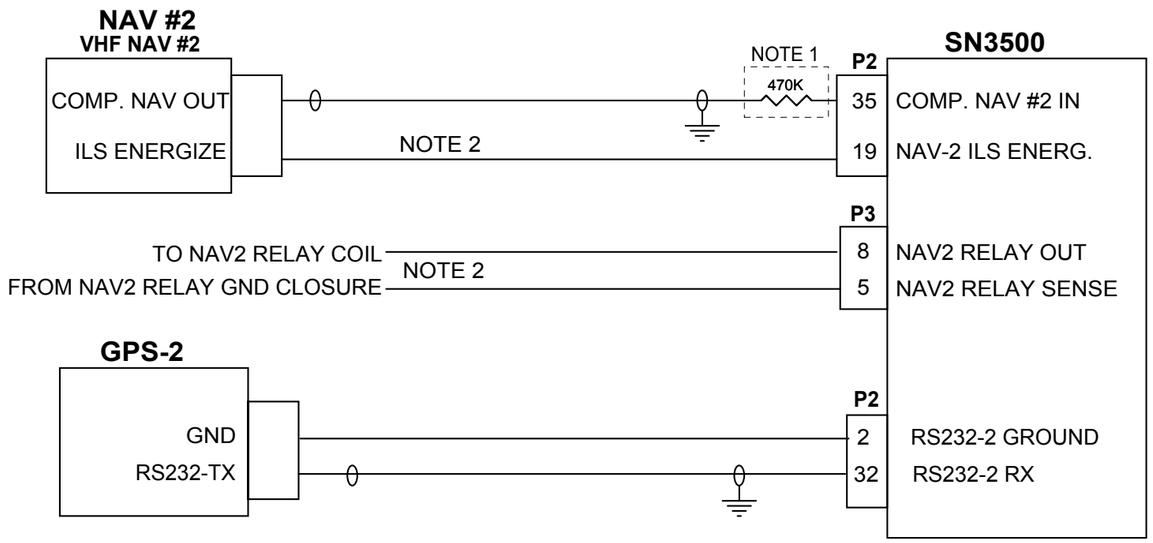
Title: NAV-1 / ARINC-429 GPS (INT RELAY)

Size: B | Document Number: 82005-10 | Rev: C

Create: Tuesday, April 28, 1998 | Mod: Sunday, December 09, 2007 | Sheet 23

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	ADDED NAV2 SENSE. OTHER MINOR CHANGES

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES:

1. FOR 3V COMPOSITE NAV SOURCES INSERT A 470K SERIES RESISTOR LOCATED AT THE SN3500 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

2. ILS ENERGIZE AND RELAY SWITCHING OUTPUT ARE ONLY REQUIRED IF NAV-2 IS TO BE USED AS A SECOND PRIMARY VHF NAV RECEIVER. IN THIS CONFIGURATION A 2ND SWITCHING RELAY IS ADDED TO SWITCH THE DBAR AND FLAG INPUTS FROM THE 2ND RECEIVER IN THE SAME MANNER AS THE GPS SWITCHING RELAY SHOWN FOR NAV-1 ON THE PREVIOUS PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: NAV-2, GPS-2 (RS232)

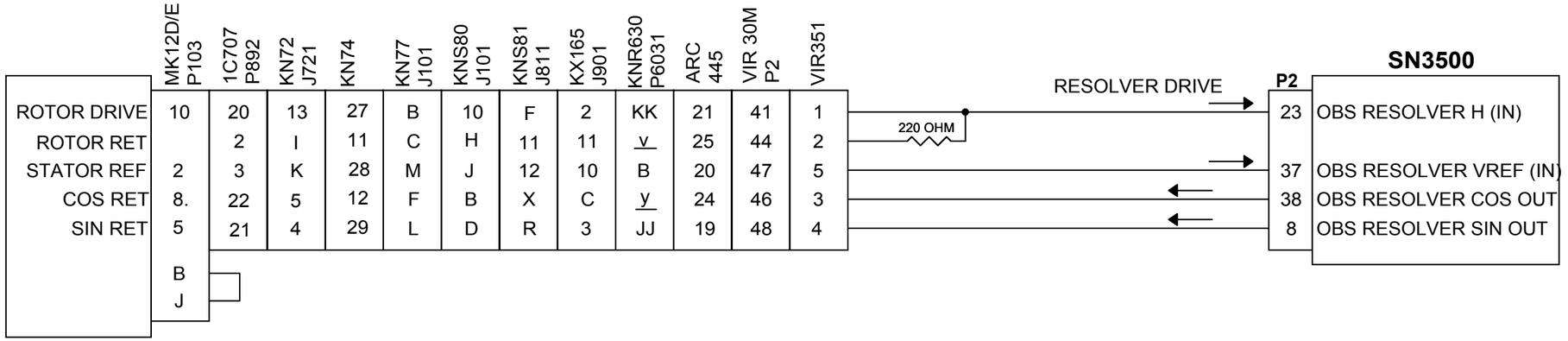
Size	Document Number	Rev
B	82005-10	B

Create: Sunday, May 03, 1998 | Mod: Sunday, December 09, 2007 | Sheet 24

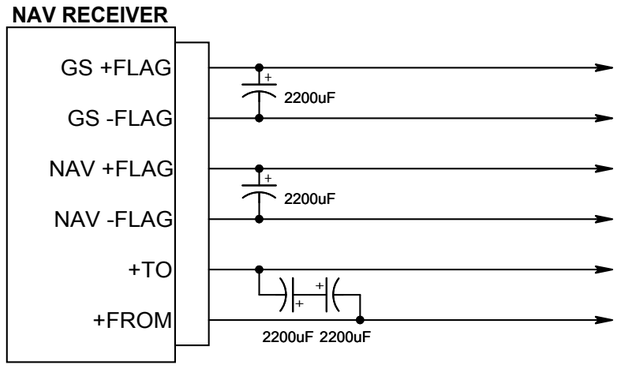
DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	MINOR CHANGES

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

COMMON NAV CONVERTER INTERCONNECTS



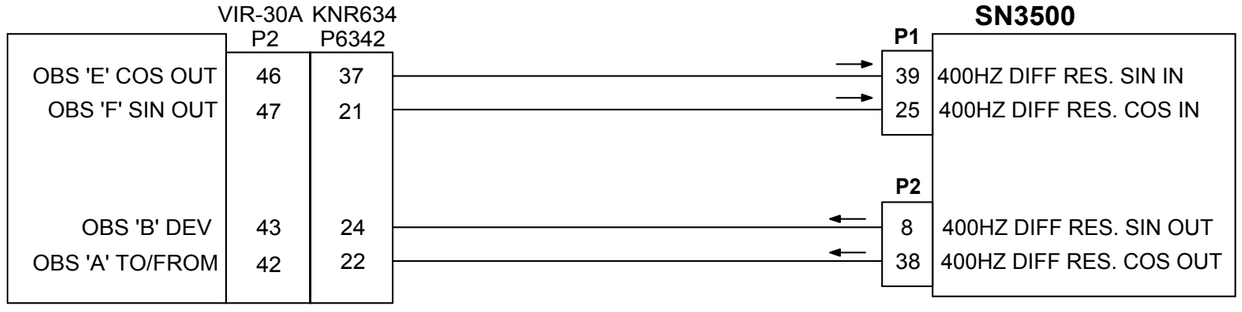
CONNECTION TO OLDER RECEIVERS SUCH AS COLLINS 51R8, 51RV-1, KING KNR660 AND SIMILAR RECEIVERS. SEE NOTE 1.



TO SN3500

United LXF10VB222M or equivalent.

ARINC NAV RECEIVERS KNR634 AND COLLINS VIR-30A (FOR VIR-30M SEE ABOVE) SEE NOTE 2.



NOTES:

1. THE SN3500 REQUIRES DC FLAG SIGNALS. SOME VERY OLD RECEIVER DESIGNS OUTPUT UNSMOOTHED DC DUE TO A LACK OF FILTERING CAPACITORS. THE SN3500 WILL SHOW UNSTABLE FLAG OPERATION UNLESS SMOOTHING CAPACITORS ARE ADDED AS SHOWN. THE CAPACITORS CAN BE MOUNTED ON A TERMINAL BLOCK NEAR THE RECEIVERS. CONSULT THE RECEIVER SERVICE MANUAL SCHEMATICS AS REQUIRED.

2. FOR ARINC NAV RECEIVER USING 400HZ DIFFERENTIAL RESOLVER:
   a) THE NAV RCVR AND SN3500 MUST BE ON THE SAME INVERTER.
   b) ON OBS/RELAY/CDI MAINTENANCE PAGE SET OBS TYPE TO "DIFF A".

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: RESOLVER INTERCONNECT

Size B | Document Number: 82005-10 | Rev B

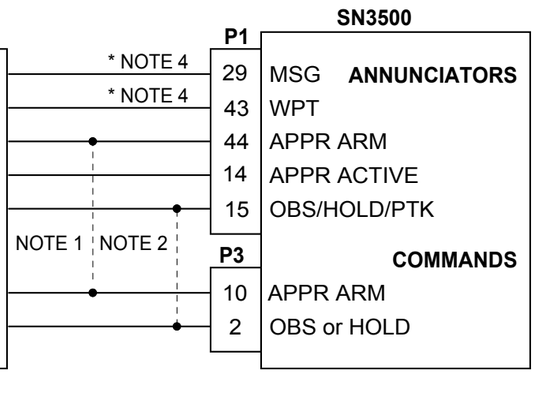
Create: Thursday, December 10, 1998 | Mod: Sunday, December 09, 2007 | Sheet 25

DATE	REV	COMMENTS
	A	INITIAL RLEASE
	A1	A/R 780 MINOR DOC CHANGES

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

GPS SWITCH ANNUNCIATOR MATRIX

II MORROW	GARMIN 150/250 150XL/250XL	GARMIN 155/165	GARMIN 155XL/300/ 300XL	KING KLN89	KING KLN90	MAGELLAN	TRIMBLE
MSG	MSG	MSG	MSG	MSG	MSG	GPS	MSG
PTK	WPT	WPT	WPT	WPT	WPT	WPT	WPT
APPR		ACTV	ACTV	ACTV	ACTV		APR
ACTV		ARM	ARM	ARM	ARM		
HOLD		HOLD/AUTO	HOLD/AUTO		OBS/LEG	NAV	
		ARM CMD	ARM CMD	ARM CMD	ARM CMD		
HOLD CMD		HOLD CMD	HOLD CMD		OBS CMD		



NOTES:

1: USED ONLY ON GARMIN 155/165 WHICH REQUIRED LATCHED ARM COMMANDS.

2. USED ON GARMIN AND KING RECEIVERS WHICH REQUIRE LATCHED MODE COMMANDS BUT NOT ON II-MORROW RECEIVERS.

3. SELECT APPROPRIATE RECEIVER ON THE SN3500 GPS MAINTENANCE PAGE. IF INSTALLED RECEIVER IS NOT SHOWN ON THIS MATRIX USE NEAREST COMPATIBLE SETTING OF THE SAME MANUFACTURER AND INSURE THE TEXT AND COLORS OF THE ON-SCREEN ANNUNCIATORS ARE ACCEPTABLE.

4. MSG AND WPT ANNUNCIATOR DISCRETES ARE NOT REQUIRED WITH ARINC-429 RECEIVERS.

5. GARMIN GNS-430 (NOT SHOWN) DOES NOT REQUIRE ANY DISCRETE ANNUNCIATOR WIRING.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

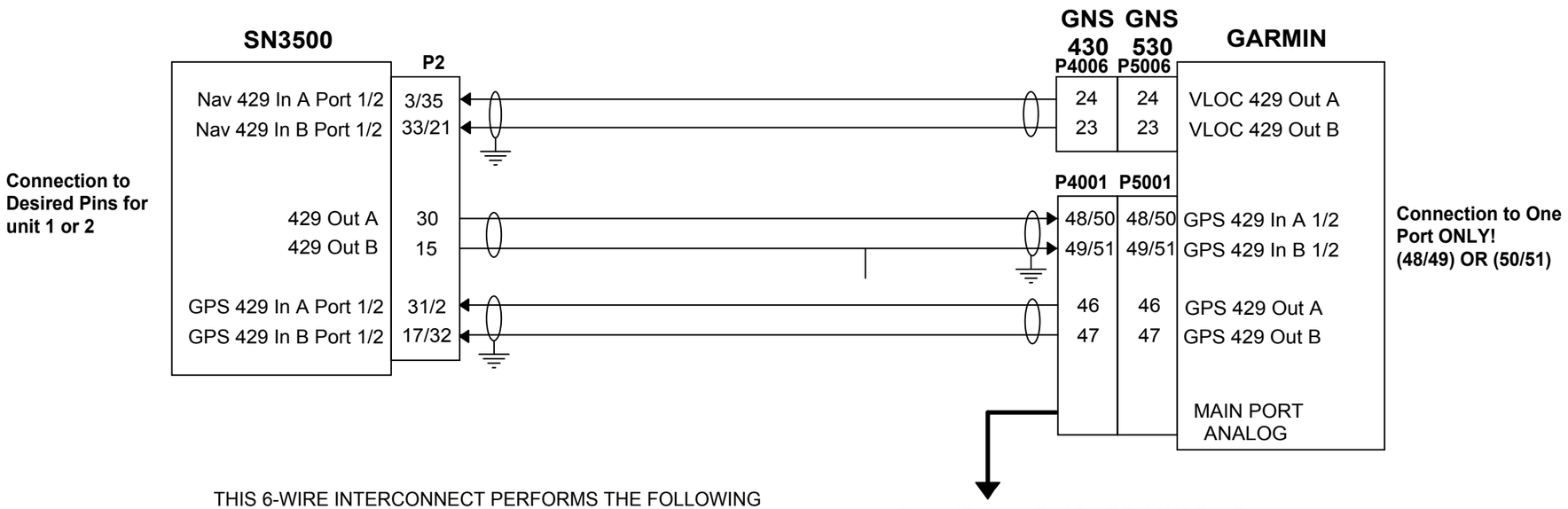
Title: GPS SWITCH/ANNUNCIATORS

Size	Document Number	Rev
B	82005-10	A1

Create: Thursday, June 18, 1998 | Mod: Sunday, December 09, 2007 | Sheet 26

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	PINS CHANGED. NOTES UPDATED
	C	A/R 806 MINOR DOC CHANGE

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



Connection to Desired Pins for unit 1 or 2

Connection to One Port ONLY! (48/49) OR (50/51)

THIS 6-WIRE INTERCONNECT PERFORMS THE FOLLOWING

- GPS/VLOC AUTOPILOT SWITCHING
- COURSE RESOLVER
- DEVIATION
- TO/FROM
- FLAGS
- ANNUNCIATORS
- MODE SWITCHING

TO AUTOPILOT, OR SEE SANDEL "FCS DEVIATION (INT RELAY)" DIAGRAM IF ADDITIONAL RECEIVERS ARE SWITCHED TO THE AUTOPILOT.

Notes:

1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.

3. MAINTENANCE PAGE ITEMS:
   LNAV-1 OR 2 GNS430 (ARINC)
   NAV-1 OR 2: ARINC 429

4. GARMIN SETUP ITEMS
   SOFTWARE MAIN 2.07 OR LATER
   MAIN ARINC-429 CONFIGURATION:
   IN 1: LOW, SANDEL EHSI
   OUT: LOW, GAMA 429 Graphics w/Int
   SDI: LNAV 1 (SDI1)
   VOR/LOC/GS ARINC-429 CONFIGURATION:
   SPD RX: LOW
   SPD TX: LOW
   SDI: VOR/ILS 1 (SDI1)

SANDEL® Vista, Ca.

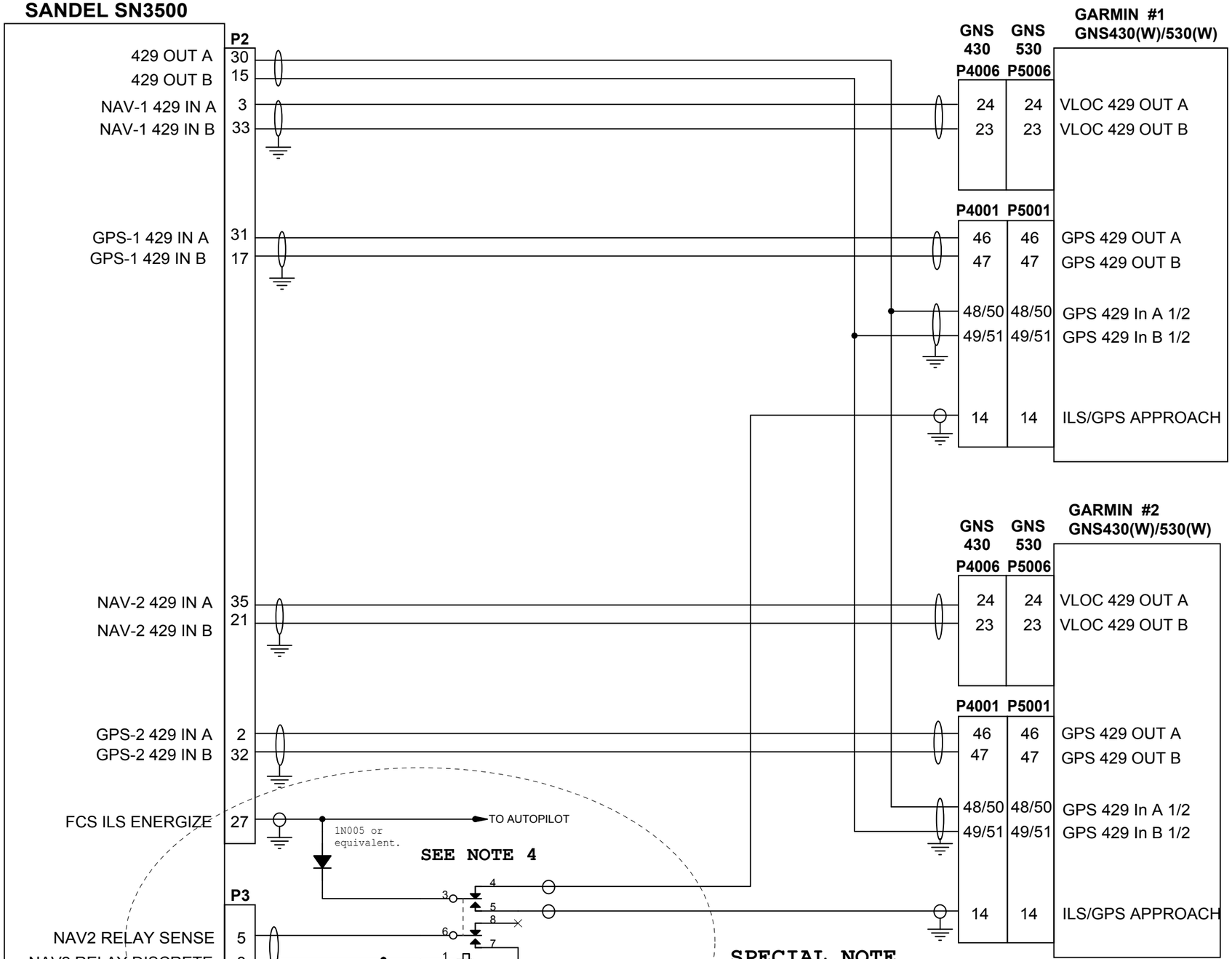
Category: SN3500 INSTALLATION DRAWING

Title: SINGLE SN3500 GNS430/530

Size B | Document Number 82005-10 | Rev C

Create: Thursday, January 07, 1999 | Mod: Sunday, December 09, 2007 | Sheet 27

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	RELAY REMOVED. PIN NUMBERS INSERTED
26-JAN-07	C	ADDED CONNECTIONS FOR GNS ILS/GPS APPROACH
09-FEB-07	D	RELAY SENSE CONNECTIONS & SETTINGS
12-DEC-07	D1	ADDED SPECIAL NOTE



Connection to One Port ONLY! (48/49) OR (50/51)

Connection to One Port ONLY! (48/49) OR (50/51)

Notes:
1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.

2. SN3500 MAINTENANCE PAGE ITEMS
   PAGE 5: NAV/ILS/DME 1
   NAV: 429 FR
   ENRGZ: 429
   LOC DV: 429
   GS DV: 429
   PAGE 6: NAV/ILS/DME 2
   NAV: 429 FR
   ENRGZ: 429
   LOC DV: 429
   GS DV: 429
   PAGE 7: GPS 1
   AS APPROPRIATE, SELECT GNS 430 (ARINC) OR GNS500 (ARINC)
   ANNUN: SERIAL
   LAT DV: SERIAL
   VERT DV: SERIAL
   VERT ENA: SERIAL
   PAGE 8: GPS 2
   AS APPROPRIATE, SELECT GNS 430 (ARINC) OR GNS500 (ARINC)
   ANNUN: SERIAL
   LAT DV: SERIAL
   VERT DV: SERIAL
   VERT ENA: SERIAL
   DUAL GNS INSTALL ONLY
   PAGE 10: OBS/RELAY/CDI
   MODE: MASTER
   SENSE: NAV2
   NS GPS2: NAV2 & GPS2

3. GARMIN SETUP ITEMS
   SOFTWARE MAIN 2.07 OR LATER
   MAIN ARINC-429 CONFIGURATION RECEIVER 1:
   IN 1: LOW, SANDEL EHSI
   OUT: LOW, GAMA 429 Graphics w/Int
   SDI: LNAV 1 (SDI1)
   VOR/LOC/GS ARINC-429 CONFIGURATION:
   SPD RX: LOW
   SPD TX: LOW
   SDI: VOR/ILS 1 (SDI1)

   MAIN ARINC-429 CONFIGURATION RECEIVER 2:
   IN 1: LOW, SANDEL EHSI
   OUT: LOW, GAMA 429 Graphics w/Int
   SDI: LNAV 2 (SDI2)
   VOR/LOC/GS ARINC-429 CONFIGURATION:
   SPD RX: LOW
   SPD TX: LOW
   SDI: VOR/ILS 2 (SDI2)

   GNS 430W/530W INSTALLATIONS
   SET VNAV TO ENABLE, APR ACTV TO ANNUN IN

4. RELAY AND CONNECTIONS TO GNS ILS/GPS APPROACH ONLY USED WITH 430W OR 530W. RELAY ONLY REQUIRED FOR DUAL GNS INSTALLATION.

SPECIAL NOTE

SN3500 SUPPORTS GPS VNAV VIA ARINC 429 INTERFACE
The connections and components shown in the dashed oval are for historical reference. These connections are no longer necessary to support GPS vertical navigation when the SN3500 software has been updated to version 3.02 or later. If desired, these connections may be retained after converting to GPS VNAV over ARINC 429.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: SINGLE SN3500 DUAL GNS430(W)/530(W)

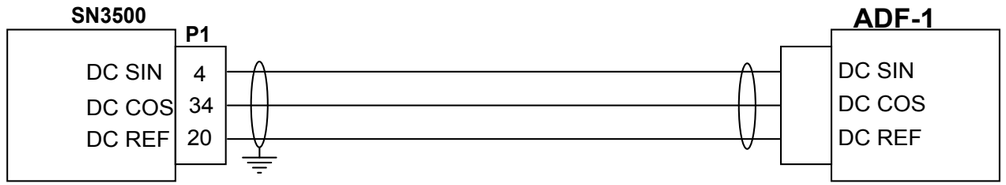
Size B | Document Number 82005-10 | Rev D1

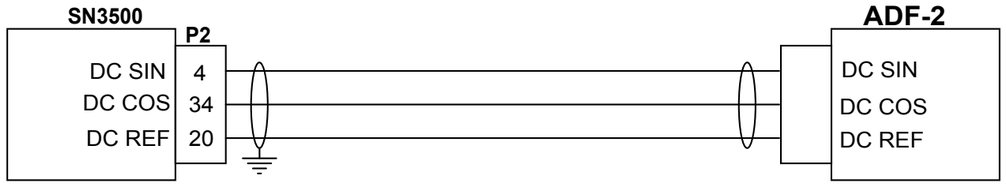
Create: Thursday, January 07, 1999 | Mod: Wednesday, July 30, 2008 | Sheet 28

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES

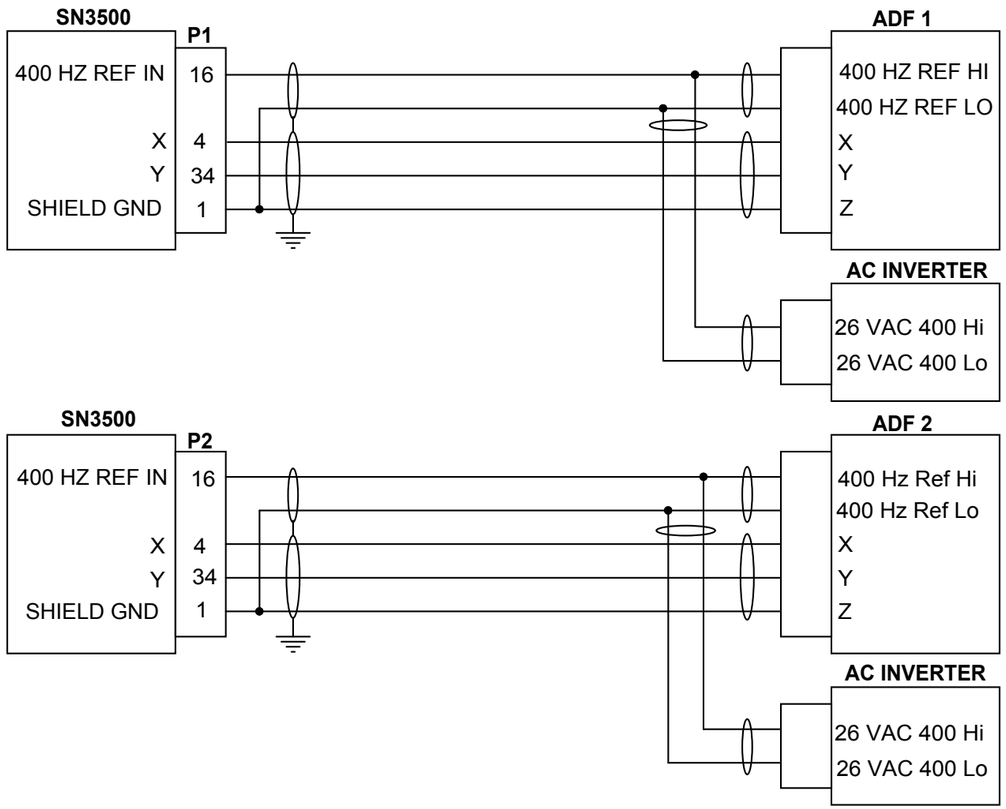
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

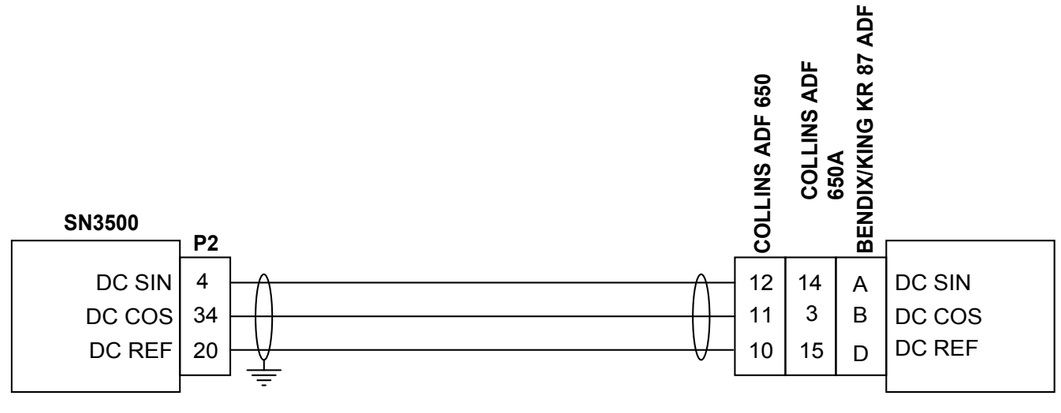
ADF RECEIVER 1/2 INTERCONNECT





400HZ ADF RECEIVERS 1&2





NOTES:

1. SELECT APPROPRIATE SETUP DATA ON ADF INSTALLATION PAGE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

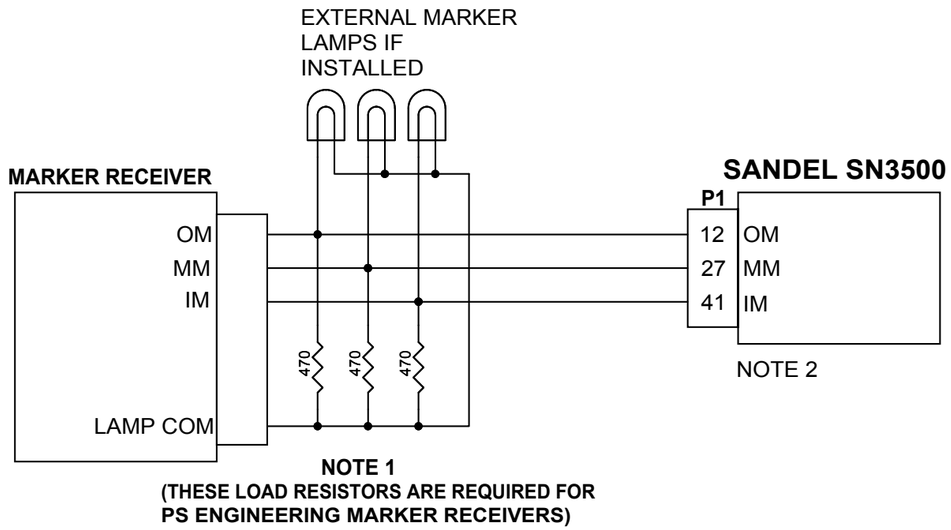
Title: ADF

Size: B | Document Number: 82005-10 | Rev: A1

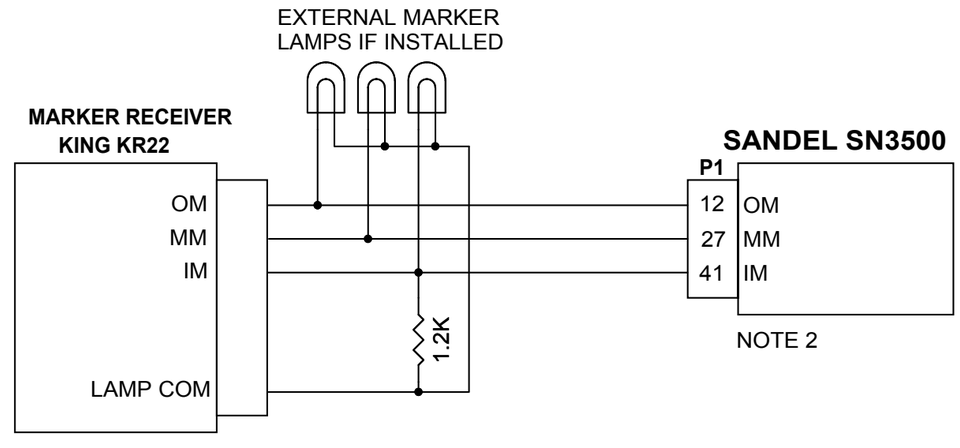
Create: Sunday, May 03, 1998 | Mod: Sunday, December 09, 2007 | Sheet 29

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	C	A/R 806 Correct KR22 SN3500 connection P2 to P1.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTE 1
(THESE LOAD RESISTORS ARE REQUIRED FOR PS ENGINEERING MARKER RECEIVERS)



NOTES:

1. THESE LOAD RESISTORS ARE REQUIRED FOR PS ENGINEERING MARKER RECEIVERS. RECOMMENDED FOR OTHER RECEIVERS TO PREVENT FAILURE OF THE SN3500 INDICATION IF THE ASSOCIATED MARKER LIGHT BULB FAILS.

2. SET MARKERS TO ACTIVE H OR ACTIVE L ON ADF1/ADF2/MKR MAINTENANCE PAGE

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: MARKER BEACON

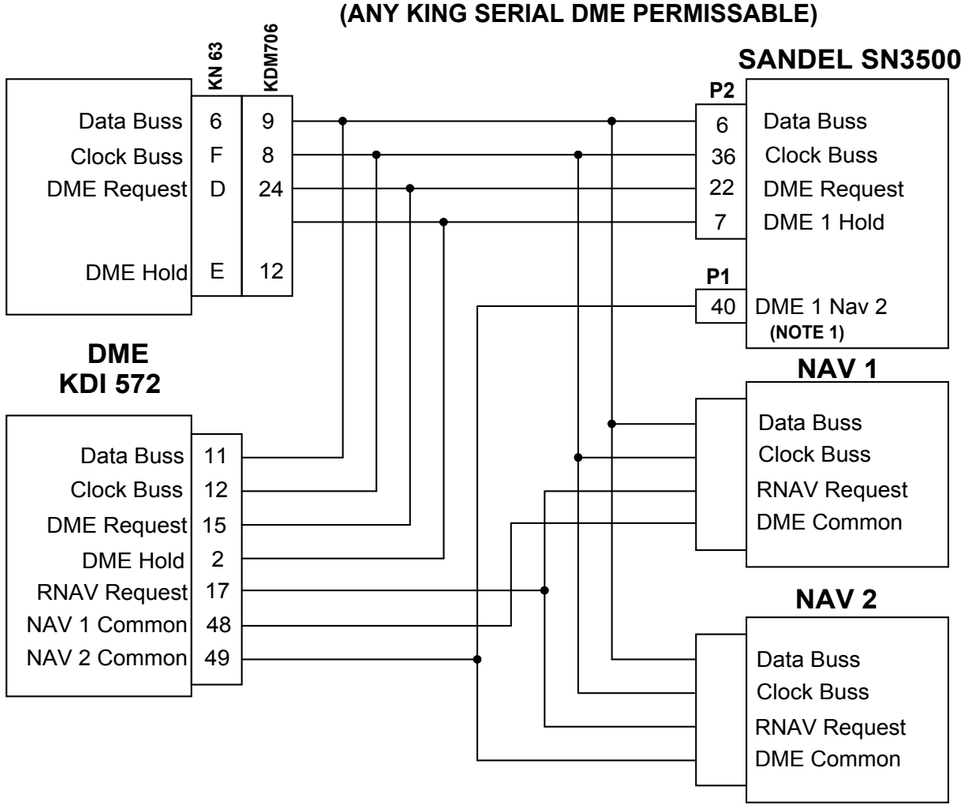
Size B | Document Number: 82005-10 | Rev C

Create: Sunday, May 03, 1998 | Mod: Sunday, December 09, 2007 | Sheet 30

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	C	A/R 806 ADDED ANALOG DME

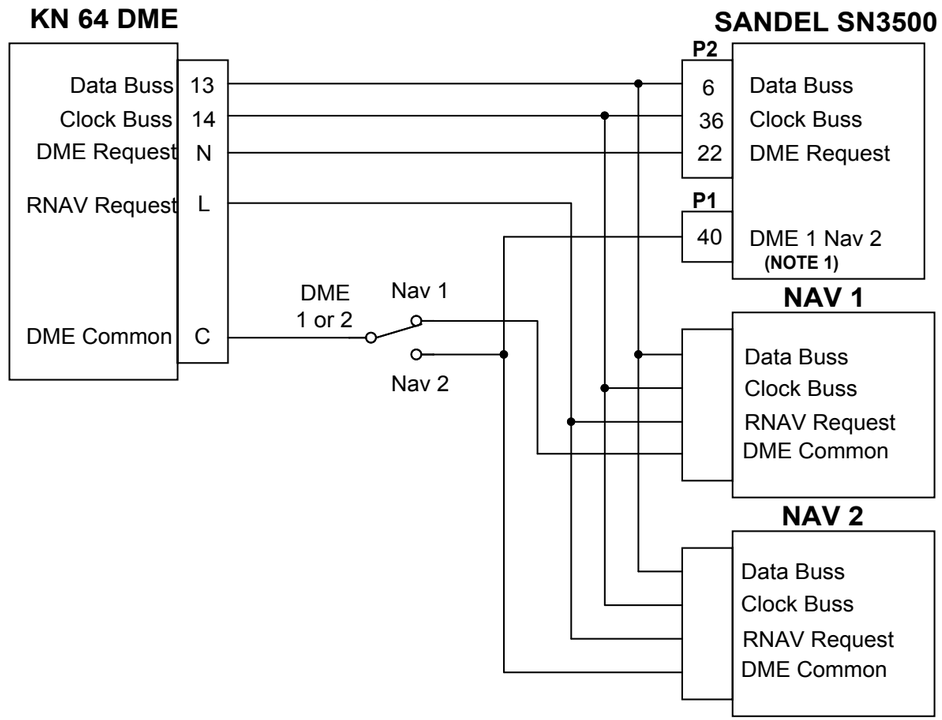
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

SINGLE KING SERIAL DIGITAL DME USING KDI572 (ANY KING SERIAL DME PERMISSABLE)

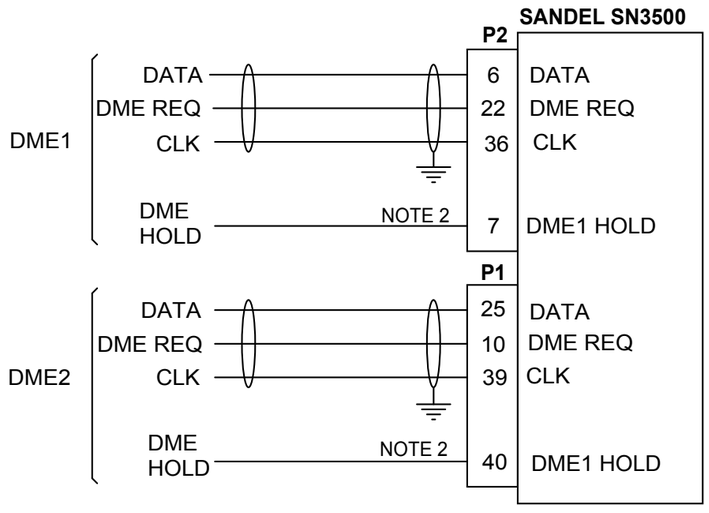


SINGLE KING SERIAL DIGITAL DME WITH SELF CONTAINED CONTROLLER (KN64 SHOWN FOR REFERENCE, KN62/KN62A PERMISSABLE)

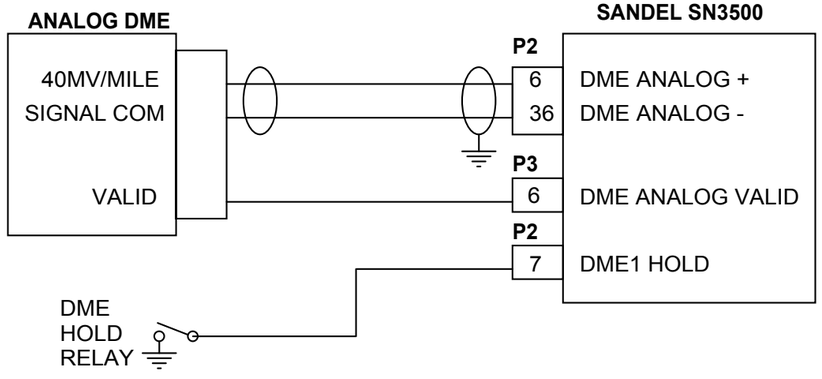
(NOTE 3)



DUAL KING SERIAL DIGITAL DME'S.



ANALOG DME



NOTES:

1. IN A SINGLE DME CONFIGURATION THE SN3500 DETECTS BOTH DME HOLD AND NAV-1/NAV-2 ASSIGNMENT. WHEN NAV-2 IS CHANNELED THE DME READOUT WILL ASSOCIATE WITH THE BEARING POINTER NAV-2 SELECTION. IF THE DME IS NOT ASSIGNABLE LEAVE THE CORRESPONDING PIN UNCONNECTED.
SET DME TO LO FR DME1 ON NAV/ILS/DME 2 MAINTENANCE PAGE TO ENABLE NAV2 DME DISPLAY.

2. IN A DUAL DME CONFIGURATION THE SN3500 CAN ONLY DETECT DME HOLD. IT ALWAYS ASSOCIATES DME-1 WITH NAV-1 AND DME-2 WITH NAV-2.

3. THE SN3500 WILL SUPPORT REMOTE DISPLAY OF KN62/64 DME'S. CONNECT AS SHOWN, TAKING "DME REQ" FROM REAR CONNECTOR PIN-N. THE KN62/64 DO NOT HAVE A HOLD OUTPUT THEREFORE NO HOLD ANNUNCIATION IS POSSIBLE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: DME, KING SERIAL AND ANALOG

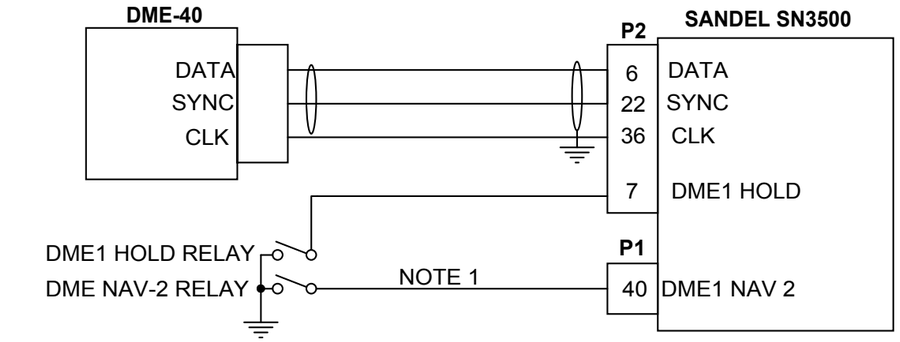
Size	Document Number	Rev
B	82005-10	C

Create:Sunday, May 03, 1998 | Mod: Sunday, December 09, 2007 | Sheet 31

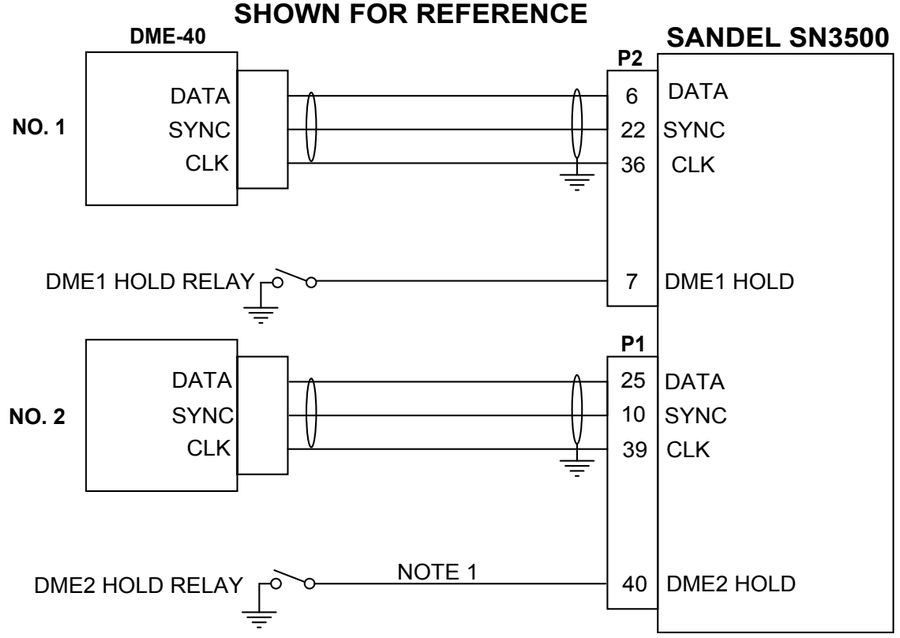
DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

SINGLE ARINC 568 DME. COLLINS DME-40 SHOWN FOR REFERENCE.



DUAL ARINC 568 DME'S. COLLINS DME-40 SHOWN FOR REFERENCE



NOTES:

1. IN A SINGLE DME CONFIGURATION THE SN3500 DETECTS BOTH DME HOLD AND NAV-1/NAV-2 ASSIGNMENT FROM THE INSTALLED SWITCHING RELAYS. WHEN NAV-2 IS CHANNELED THE DME READOUT WILL ASSOCIATE WITH THE BEARING POINTER NAV-2 SELECTION. IF THE DME IS NOT ASSIGNABLE LEAVE THE CORRESPONDING PIN UNCONNECTED.
SET DME TO LO FR DME1 ON NAV/ILS/DME 2 MAINTENANCE PAGE TO ENABLE NAV2 DME DISPLAY.

2. IN A DUAL DME CONFIGURATION THE SN3500 CAN ONLY DETECT DME HOLD. IT ALWAYS ASSOCIATES DME-1 WITH NAV-1 AND DME-2 WITH NAV-2.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: DME: ARINC 568

Size	Document Number	Rev
B	82005-10	A1

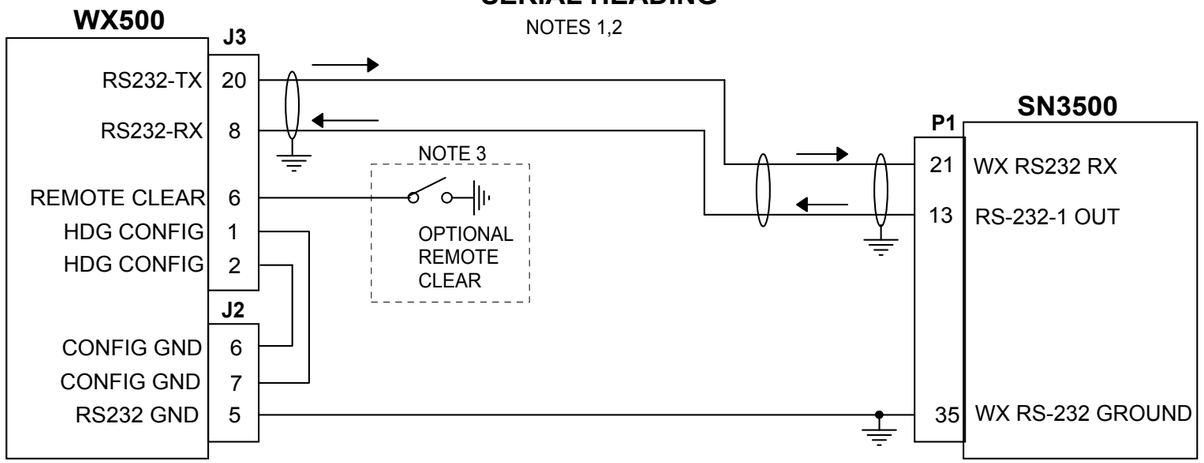
Create:Sunday, May 03, 1998 | Mod: Sunday, December 09, 2007 | Sheet 32

DATE	REV	COMMENTS
	A	INITIAL RELEASE
	A1	A/R 780 MINOR DOC CHANGES
	B	REVISED NOTES
	C	INTENTIONALLY SKIPPED
	C1	A/R 824 ADDED NOTE 4 FOR FCS SELECTION.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

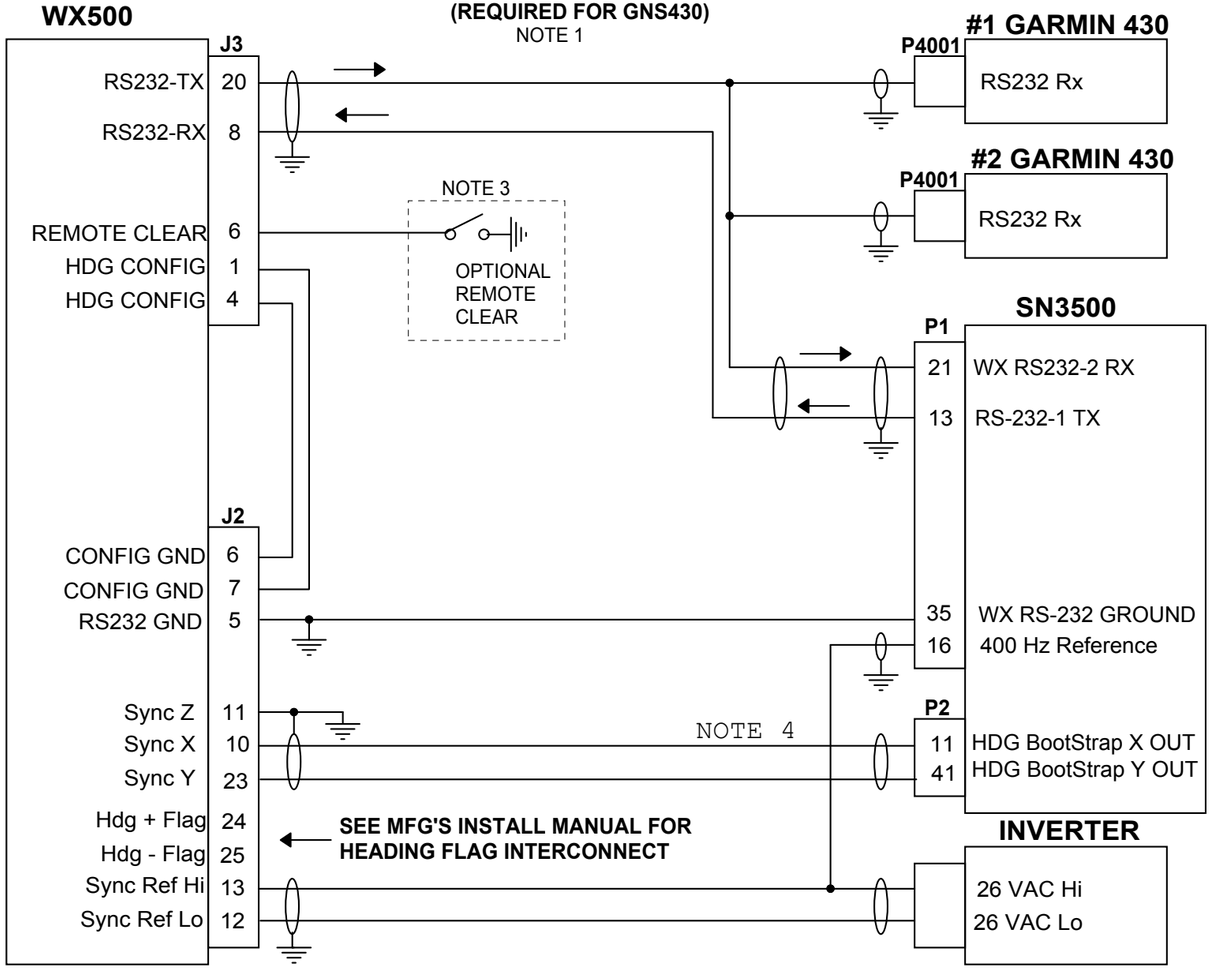
SERIAL HEADING

NOTES 1,2



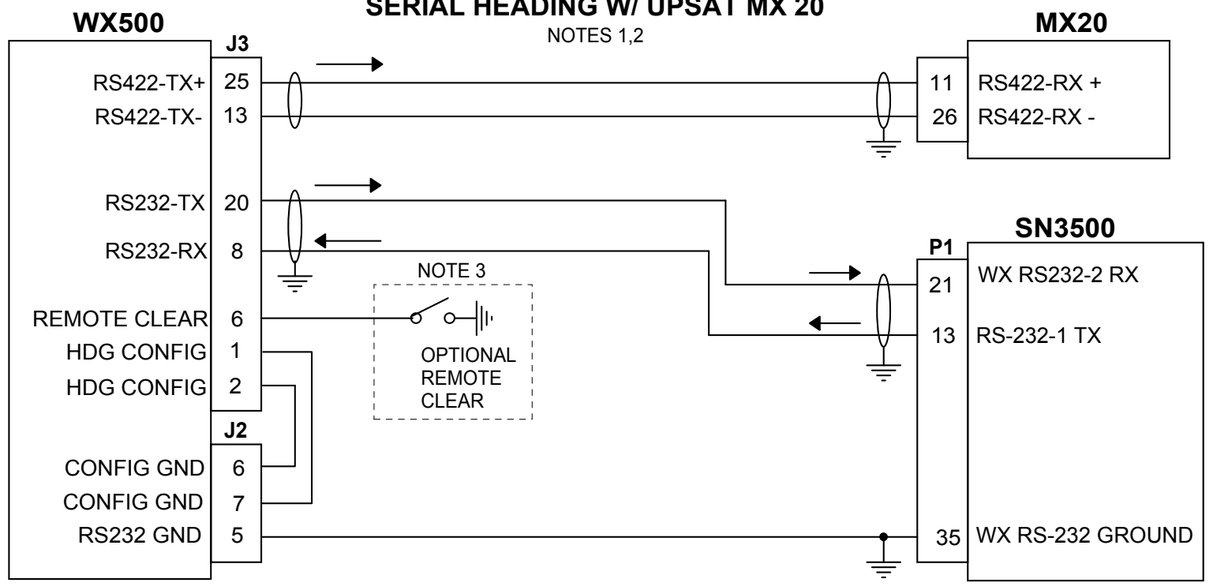
SYNCHRO HEADING
(REQUIRED FOR GNS430)

NOTE 1



SERIAL HEADING W/ UPSAT MX 20

NOTES 1,2



NOTES:

1.WX500 ALLOWS ONLY ONE UNIT TO BE MASTER. THE"MASTER" CONTROLS CELL/STRIKE MODE AND REMOTE CLEAR THROUGH THE SERIAL PORT.

2. WX-500 HEADING CONFIGURATION IS SET TO "SERIAL" (HEADING RECEIVED FROM SN3500)

3. A REMOTE-CLEAR SWITCH CONNECTED TO THE WX-500 CAN BE USED TO CLEAR THE CELL/STRIKE DISPLAY. THIS FUNCTION IS ALSO AVAILABLE ON THE FRONT PANEL OF THE SN3500 VIA SOFTKEYS.

4. TO ACTIVATE THE HEADING BOOTSTRAP OUTPUT, SET THE FCS SELECTION TO OTHER THAN "NONE" EVEN WHEN THE SN3500 IS NOT INTERFACED TO AN FCS.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: WX-500

Size B | Document Number: 82005-10 | Rev: C1

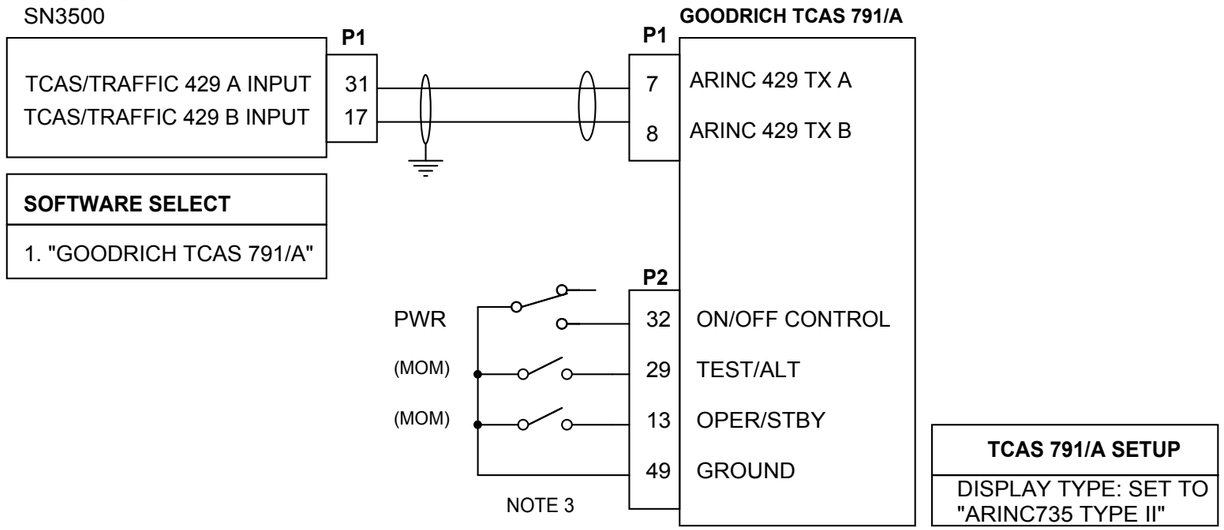
Create: Tuesday, September 19, 2000 | Mod: Sunday, December 09, 2007 | Sheet 33

DATE	REV	COMMENTS
	C	A/R 806 INITIAL RELEASE

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

TCAS 791

SN3500

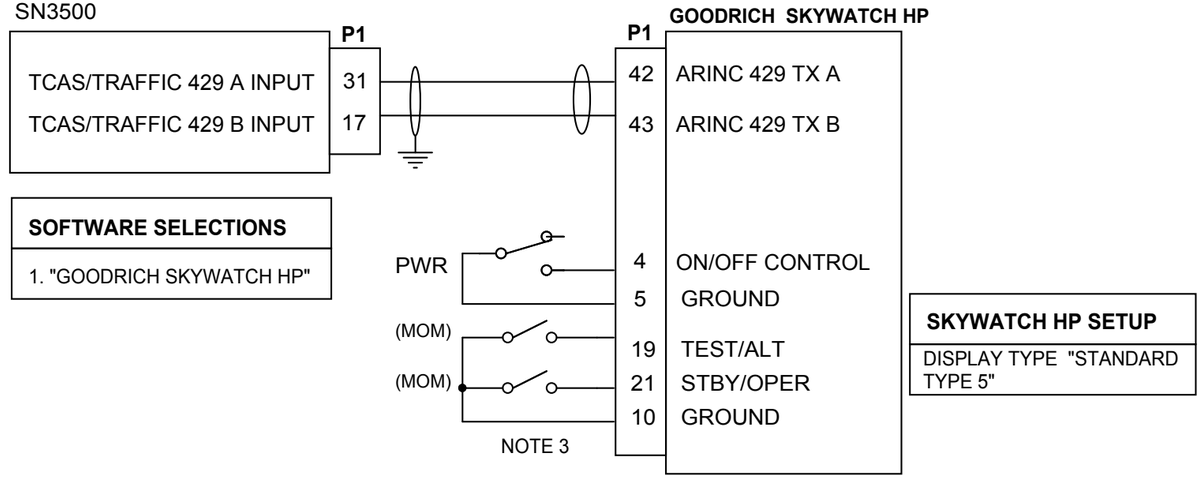


SOFTWARE SELECT
1. "GOODRICH TCAS 791/A"

TCAS 791/A SETUP
DISPLAY TYPE: SET TO "ARINC735 TYPE II"

SKYWATCH HP

SN3500

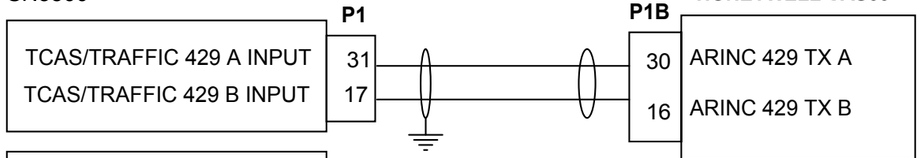


SOFTWARE SELECTIONS
1. "GOODRICH SKYWATCH HP"

SKYWATCH HP SETUP
DISPLAY TYPE "STANDARD TYPE 5"

CAS66

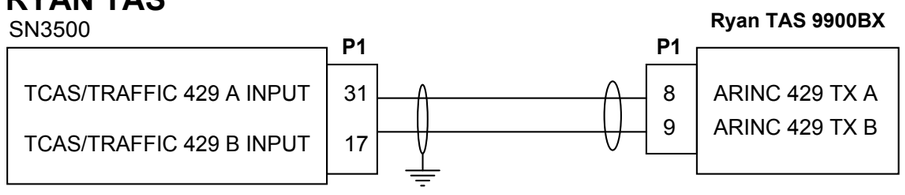
SN3500



SOFTWARE SELECT
1. "HONEYWELL CAS 66"

RYAN TAS

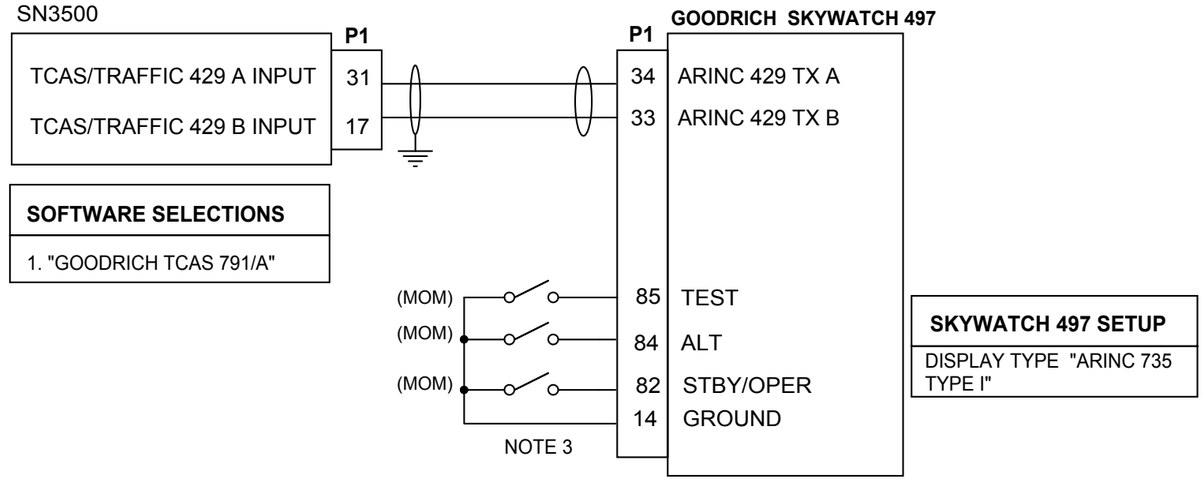
SN3500



SOFTWARE SELECT
1. "RYAN 9900 BX TAS"

SKYWATCH 497

SN3500



SOFTWARE SELECTIONS
1. "GOODRICH TCAS 791/A"

SKYWATCH 497 SETUP
DISPLAY TYPE "ARINC 735 TYPE I"

NOTES:

1. SEE MANUFACTURERS INSTALLATION MANUALS FOR COMPLETE WIRIING INTERFACE.
2. TRAFFIC INTERFACE REQUIRES SN3500 SOFTWARE 2.01 OR HIGHER AND PURCHASE OF KEY CODE
3. SWITCHES REQUIRED IF SN3500 IS PRIMARY DISPLAY.
4. THE SN3500 MAY BE USED AS A SOURCE OF MAGNETIC HEADING IF REQUIRED BY THE TCAS PROCESSOR. REFER TO COMPASS BOOTSTRAP DRAWING FOR INTERFACE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

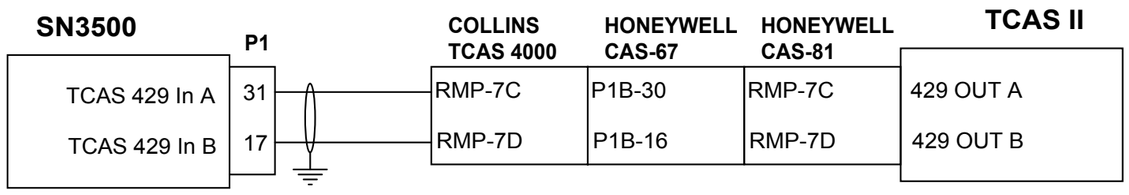
Title: TCAS / TRAFFIC

Size: B | Document Number: 82005-10 | Rev: C

Create: Thursday, November 06, 2003 | Mod: Sunday, December 09, 2007 | Sheet 34

DATE	REV	COMMENTS
	C	A/R 806 INITIAL RELEASE

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTE:

1. SEE MANUFACTURERS INSTALLATION MANUALS FOR COMPLETE WIRING INTERFACE.
2. SN3500 CAN ONLY BE USED AS A SECONDARY DISPLAY.
3. TRAFFIC INTERFACE REQUIRES SN3500 SOFTWARE 2.01 OR HIGHER AND PURCHASE OF KEY CODE.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

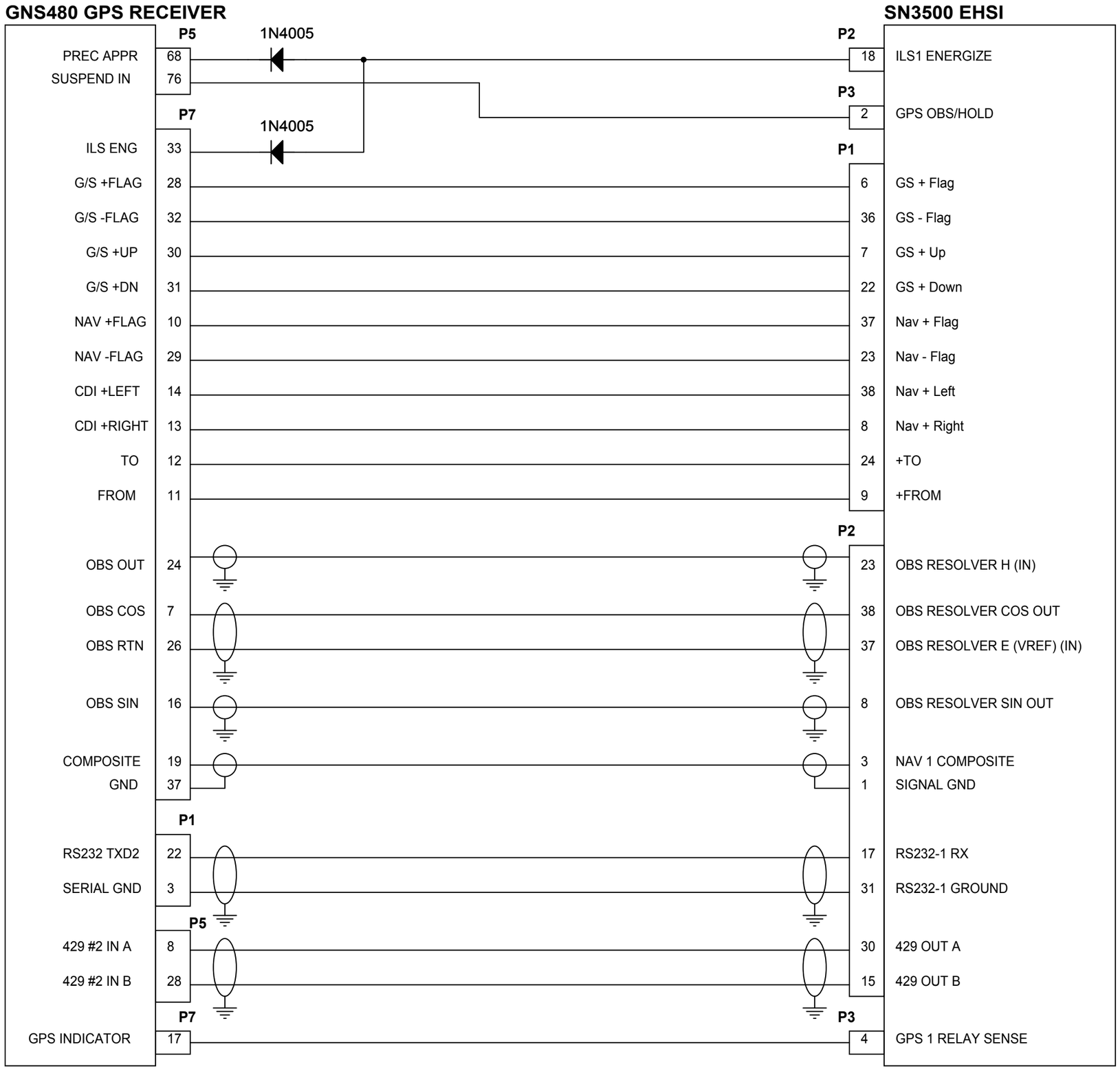
Title: TCAS II

Size: B | Document Number: 82005-10 | Rev: C

Create: Friday, March 22, 2002 | Mod: Sunday, December 09, 2007 | Sheet 35

DATE	REV	COMMENTS
6/9/98	A	
	C	A/R 806, INITIAL RELEASE
	C1	A/R 824 CORRECTED PIN NUMBERING SN3500 +LEFT AND +RIGHT DEV INPUT.

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES:

1. GNS 480 SERIAL PORT SETUP ITEMS:
   SERIAL SETUP (RX / TX)
   SERIAL PORT 2: XXX / MAPCOM (9600)
   ARINC 429 SETUP:
   CH2_IN: AHRS LOW

2. SN3500 SETUP ITEMS:

   GPS SELECT: IIMORROW GX (RS-232-ENH)
   ANNUN = SERIAL
   LAT DEV = ANALOG

   NAV SELECT:
   NAV = COMP
   ENRGZ = ACTIVE L
   LOC DV = ANALOG
   GS DV = ANALOG

   RELAY:
   MODE = MASTER
   SENSE = GPS1

3. THE INSTALLER IS RESPONSIBLE TO INCLUDE IN THE AFMS THE FOLLOWING TEXT:
" DME ARCS AND HOLDING PATTERNS WILL NOT BE DISPLAYED ON THE SN3500 EHSI."

4. IN THIS CONFIGURATION A RELAY SENSE ERROR WILL BE DISPLAYED ON THE SN3500 WHEN THE GNS480 IS SET TO NAV AND THE SN3500 IS SELECTING GPS1.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: SINGLE SN3500 GNS480

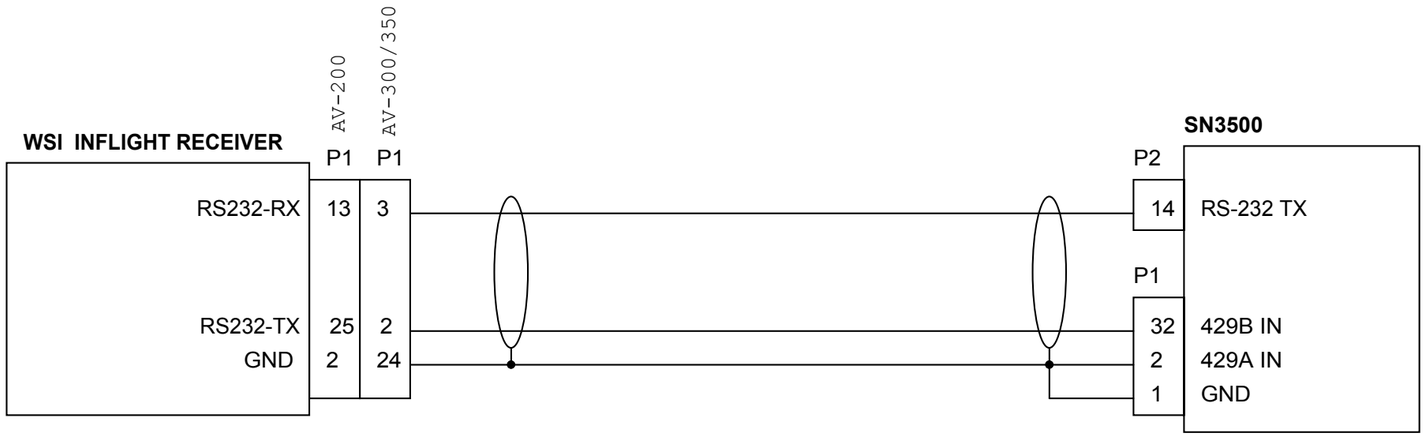
Size: B | Document Number: 82005-10 | Rev: C1

Create: | Mod: Sunday, December 09, 2007 | Sheet 36

DATE	REV	COMMENTS
	C	INITIAL RELEASE
	D	Added WSI AV-300/350 connections
	E	Correct pin #'s AV-300/350 TX and Ground (AR tbd)

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

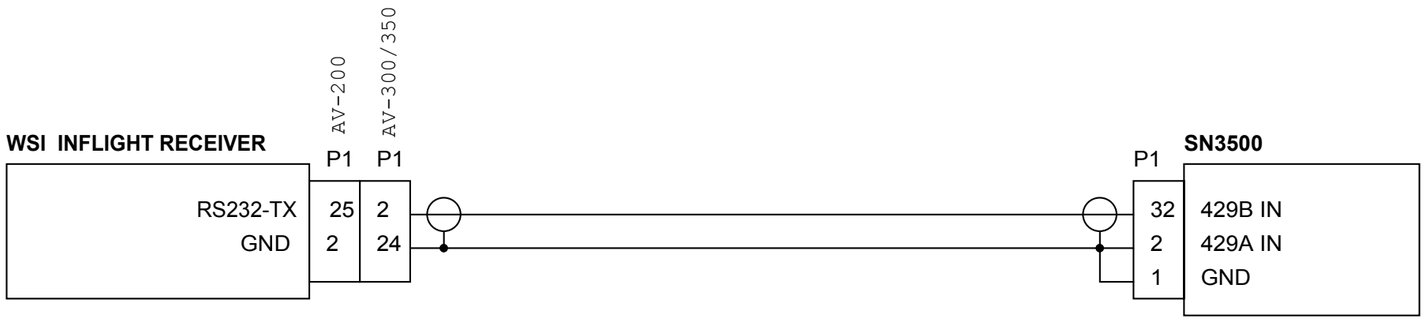
WSI Receiver with SN3500 as sole display device.



Note:

WSI mode must be set to "No Flow Control".
See WSI manual for instructions.

WSI Receiver with SN3500 as secondary display device, listen only.

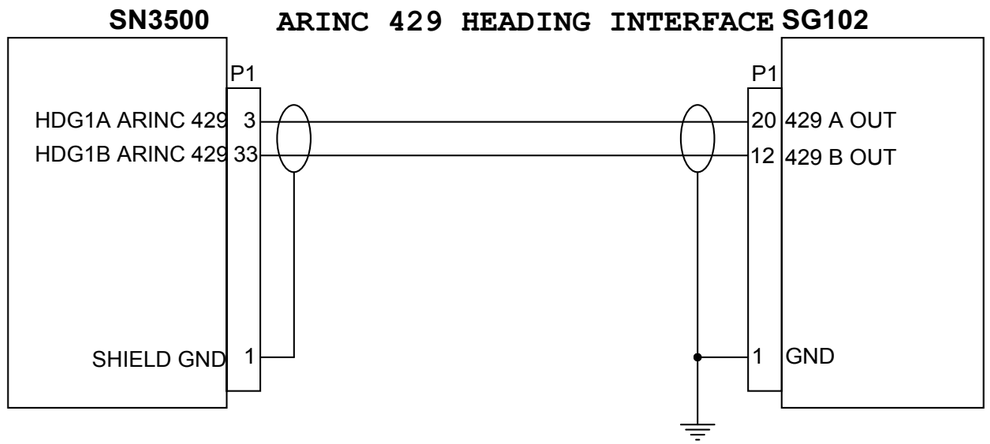


SANDEL® Vista, Ca.

Category	SN3500 INSTALLATION DRAWING
Title	WSI Data Link Receiver
Size B / Document Number	82005-10 / Rev E
Create: Friday, October 28, 2005	Mod: Wednesday, August 27, 2008 / Sheet 37

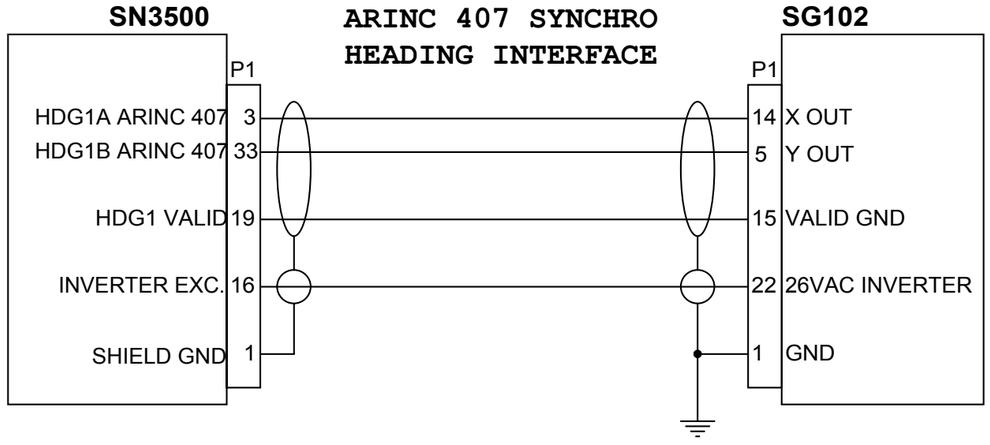
DATE	REV	COMMENTS
12-DEC-07	A	INITIAL RELEASE
27-AUG-08	B	Correct SG102 429 pin #. (ARtbd)

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES UNLESS OTHERWISE SPECIFIED

1. Unless otherwise noted, all signal wiring is 22 to 24 AWG.



SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: SN3500 with SG102 ARINC 429 or 407 Interface

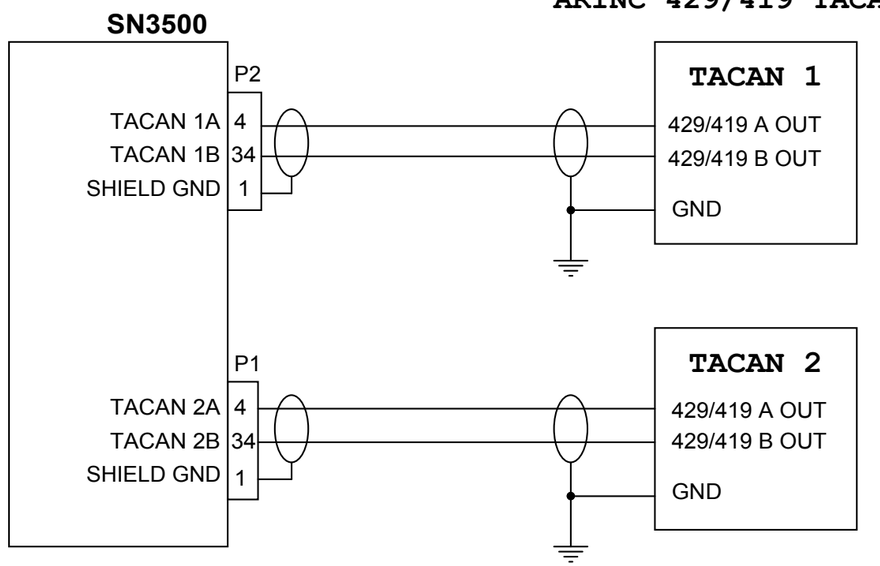
Size	Document Number	Rev
B	82005-10	B

Create: Sunday, December 09, 2007 | Mod: Wednesday, August 27, 2008 | Sheet 38

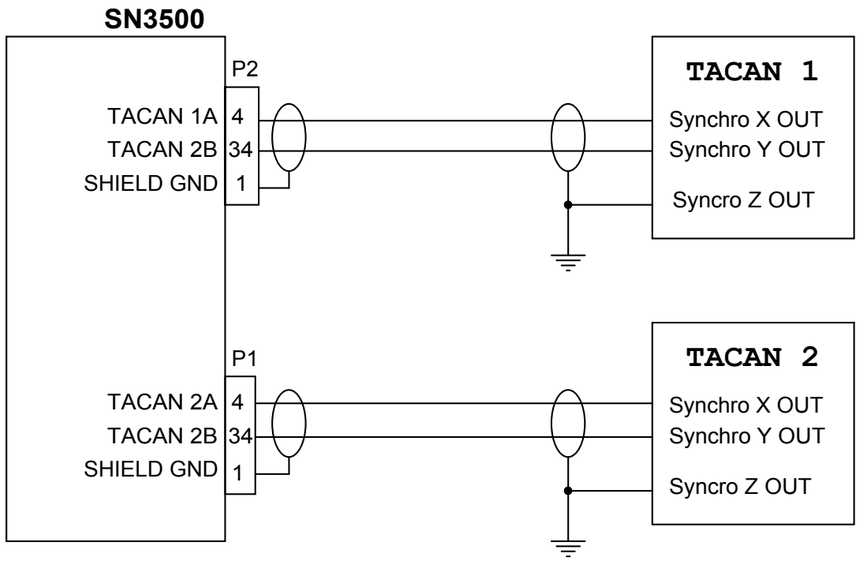
DATE	REV	COMMENTS
18-JUL-08	A	INITIAL RELEASE AR 1023

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

ARINC 429/419 TACAN



ARINC 407 TACAN



Notes

1. For distance and range rate when using Arinc 407 TACAN, use appropriate SN3500 DME interface on associated channel.

SANDEL® Vista, Ca.

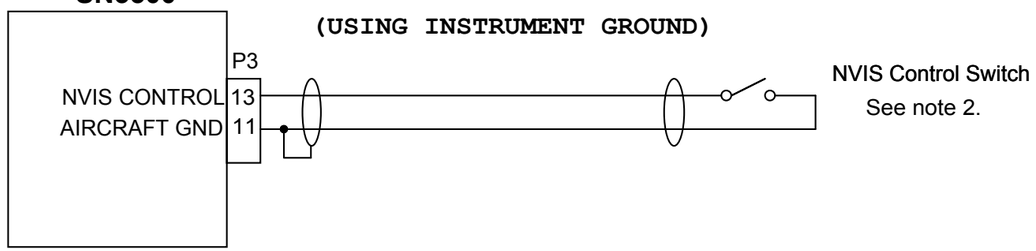
Category	SN3500 INSTALLATION DRAWING
Title	SN3500 with TACAN
Size B / Document Number	82005-10
Rev	A
Create: Friday, July 18, 2008	Mod: Wednesday, August 27, 2008
Sheet 39	

DATE	REV	COMMENTS
27-AUG-08	A	INITIAL RELEASE AR 1032

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

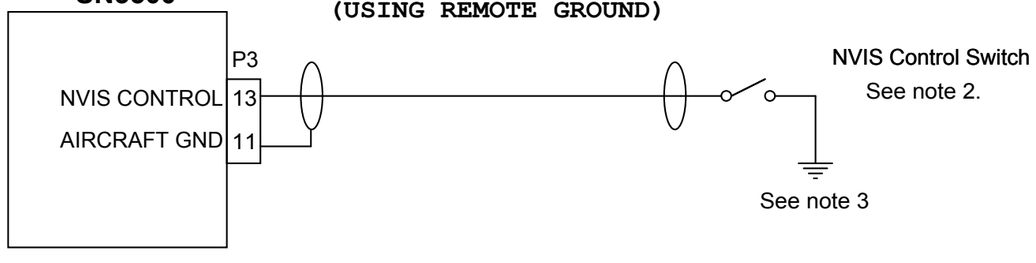
SN3500

(USING INSTRUMENT GROUND)



SN3500

(USING REMOTE GROUND)



Notes:

1. Use 24 AWG stranded shielded 1 or 2 conductor wire as required.

2. TYCO P/N TT13A9T1/404 toggle switch or equivalent. A push-on/push-off pushbutton switch may be used. Annunciator not required.

3. Use closest available airframe ground.

4. In the event of a broken wire fault the SN3500 will default to daylight (non NVIS) mode.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

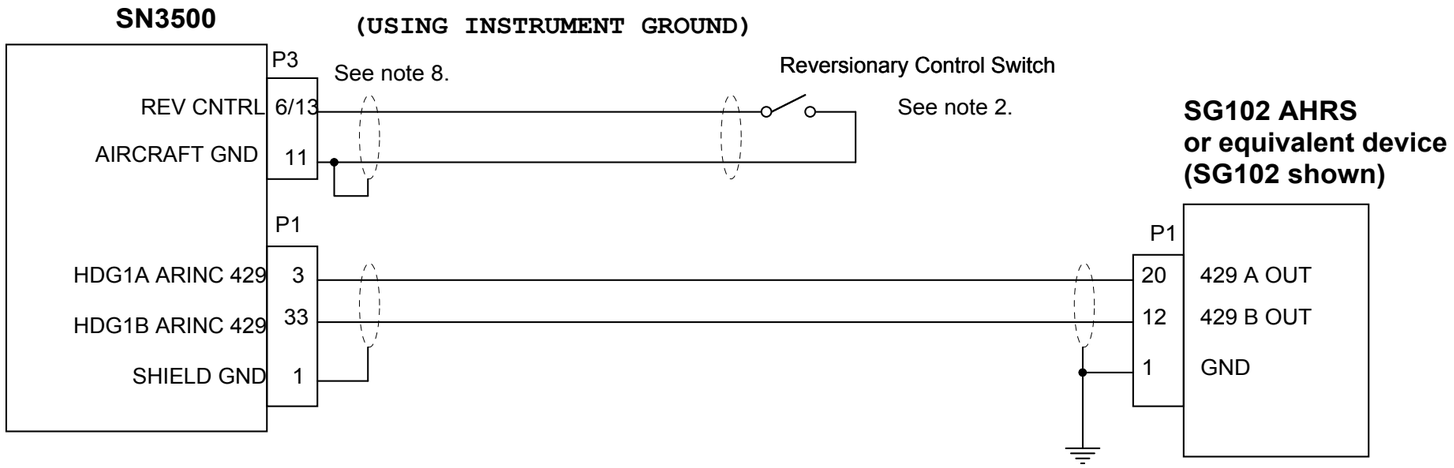
Title: NVIS CONTROL

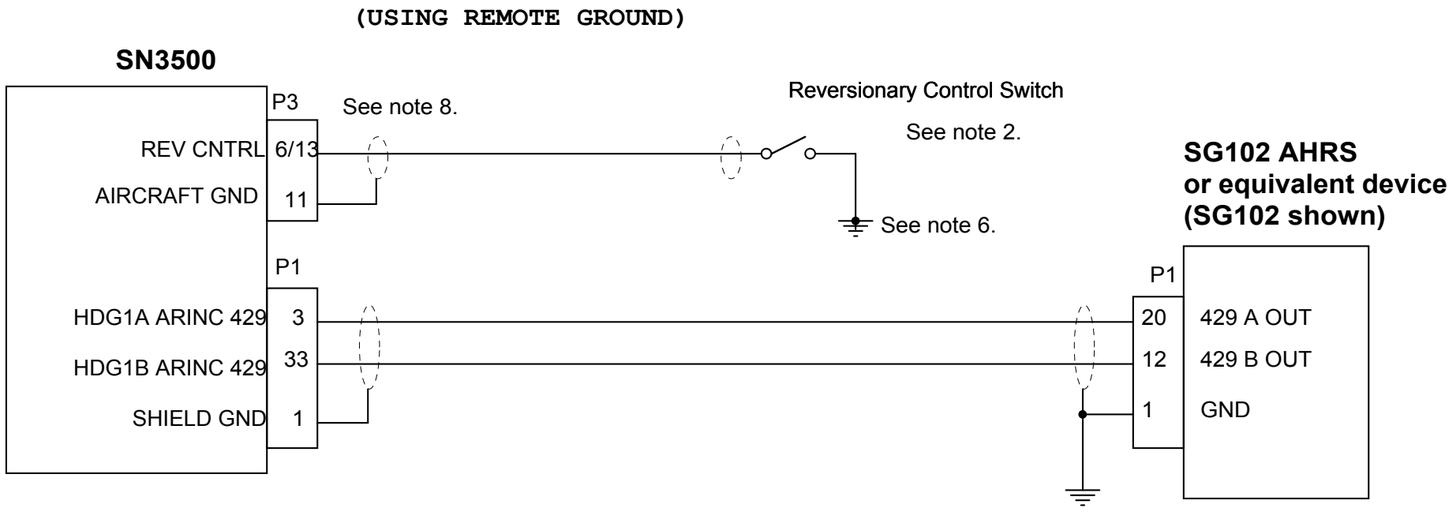
Size B | Document Number: **82005-10** | Rev **A**

Create: Wednesday, August 27, 2008 | Mod: Wednesday, September 10, 2008 | Sheet 40

DATE	REV	COMMENTS
02-MAR-09	A	INITIAL RELEASE AR1055
27-MAY-10	B	REVISED NOTE 8 AND ADDED CALLOUT TO NOTE 8. ADDED P3-13 REV ATT CONTROL, AR1110

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY





Notes:

1. Use 24 AWG stranded shielded 1 or 2 conductor wire as required.

2. TYCO P/N TT13A9T1/404 toggle switch or equivalent. A push-on/push-off pushbutton switch may be used. Annunciator not required.

3. Placard the switch "REV".

4. Locate switch and placard nearest position available to SN3500.

5. Assure adequate illuminatin of switch and placard for night operations under normal conditions.

6. Use closest available airframe ground.

7. In the event of a broken wire fault the SN3500 will default to normal display (non-reversionary) mode.

8. Standard configuration is to use P3-6 for REV CNTRL. If P3-6 is needed for Analog DME Valid (see section 2.5.3 page 2-12), use P3-13. NVIS/REV ATT/DME Analog Valid may not all be used simultaneously.

SANDEL® Vista, Ca.

Category: SN3500 INSTALLATION DRAWING

Title: REVERSIONARY ATTITUDE DISPLAY OPTION

Size B | Document Number: 82005-10 | Rev B

Create: | Mod: Wednesday, June 02, 2010 | Sheet 41