SANDEL®

SN3308 Navigation Display

Installation Manual

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Revision History

Revision	Date	Comments
A	10 June 98	Initial release
B	11 July 98	Added sample Flight Manual Supplement. Added requirements for dimmer pot and data port. Changed Maint. Page 4 to “Bearing Ptr Select”, added composite nav selections. Installation drawings revised. DO-160C Categories revised.
C	8/31/98	Note about Darlington discrete outputs. Changed flight manual supplement to say “magnetic compass” not “wet compass”. Note on ILS Energize Inputs. Minor changes in flight/ground test procedures. Added notes on resolver troubleshooting.
D	9/20/98	Far’s referenced in 337. Renamed flight manual supplement. Repaginated.
E	12/10/98	Effective Drawing List added. Software version numbers updated. Post-install temperature test. Adds information about software 1.09 features: Temperature indication, Sys page inverter/fan speed readout, ILS Lockout selection. Incorrect FCS ref note removed. Cooling considerations text changed. ILS Energize pin descriptions changed. Maintenance page text changed on ADF, FCS, NAV Change, System. Note on BC, Bootstrap output. New Airplane Flight Manual Supplement added.
F	5/26/99	1.4.10 Added Garmin Receiver 1.4.8 Note on DME. 2.3.3 Pinout Table names changed for clarity. 2.4 Added VHF NAV and GS inputs 2.5 Clarified ARINC Serial Transmitter Interface 2.8 Updated Bill Of Material 3.3 Typo on connector numbers 6.2 Updated BOM and added LMP CHG operation to lamp replacement procedures. Appd’x A: MP2: Fluxgate, new data added MP4: Brg Pointers, added info on ARINC 429 NAV. MP5: FCS added Century DC autopilots to lists. MP6: Changed nomenclature and tips. MP8: FCS Emulation updated MP10: FCS Change updated MP15: NAV Chg, added info on ARINC NAV ops

		MP16: Relay Sense, new page. MP17: SYS added info on inverter items MP21: Updated Brightness MP22-25: DVM pages added MP26: Serial Diagnostics added.
G	10/27/00	Incorporated A/R 245 Page 44 updated installation instructions for the new chassis and ejector lock tray. Page 43 Lamp Replacement Kit was P/N 90120. Page 24 Bendix/King Bezel Kit was 90118
G(1)	01/04/01	Incorporated A/R 346 Update Flight Manual Supplement in Appendix D PC Applicable revision screen nomenclature
G(2)	04/03/01	Incorporated A/R 360 1.4.7 Deleted ref to Radar Altimeter 2.3.2 Deleted ref to Radar Altimeter 2.3.3 Deleted ref to Radar Altimeter P1-32 was triple conductor wire P2-8 Deleted ref to Radar Altimeter P2-27 Deleted ref to Radar Altimeter P2-13 Deleted ref to Radar Altimeter P3-24 Deleted ref to Radar Altimeter 6.1 Lamp hours were 200 Appd'x A added Garmin GNS430 to LNAV-1 Select
G(3)	10/04/02	Incorporated A/R 573 Updated Appendix F, Drawings Corrected KR-22 Interface, Dwg 16 of 29 Added HDG Datum Low for KFC150, DWG 22 of 29 Added New DWG 24 of 29, Bendix M4D & FCS810 Corrected GNS430 Pinout on DWG 28 of 29 Corrected GNS430 Pinout on DWG 29 of 29
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H	3/24/08	Incorporated A/R 991 Sample Flight Manual Supplement revised. Added drawing 90106-10 Rev. A (pp.30) "Heading Repeater Gyro Flag Override" Revised Ground test procedure for checking free gyro mode.

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Approvals

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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 SN3308 Navigation Display. The SN3308 is available in several dash-number configurations depending on installation on pilot's side, copilot's side, or center panel. In the manual any reference to GPS receivers is generic and can be applied to Loran receivers.

1.2 Equipment Description

1.2.1 Features

The Sandel SN3308 Navigation Display is an advanced microprocessor controlled airborne multipurpose electronic display which is FAA approved under technical standard order TSO-C113. The SN3308 employs a patent-pending active matrix liquid crystal (AMLCD) projection display. It is designed to combine the functions of:

- **Horizontal Situation Indicator (HSI)**
- **DME Readout**
- **Marker Beacon Indicator**
- **WX-500 Stormscope® Display**
- **Long-Range Navigation (GPS or Loran) Map Display**
- **GPS Annunciators and External Mode Switches**

Outputs of heading and course datum and bootstrap heading output are provided. The versatile digital and analog interface properties of the unit provide for compatibility with most VHF navigation receivers, ADF's, DME's, GPS's, remote gyros and flux gates.

The SN3308 is designed to display the downloaded flightplan data from a connected GPS receiver or from a Jeppesen database (available on software version 2.00 or later). The moving map database for the SN3308 as well as the internal operating system software are field uploadable through the use of a portable computer equipped with a Windows operating system and an RS-232C Serial Port.

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 SN3308 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 SN3308 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.

In addition to connecting the desired equipment, the installer must provide the following components:

- **Dimmer Control**

  An external pot must be mounted near the SN3308 to provide for convenient dimming of the display. This is not a rheostat, it is simply a 10K, ½ Watt pot which provides a control voltage.

- **Data-load Port**

  A ¼" phone jack must be installed in any convenient location and wired to one of the SN3308's serial input ports, as shown on NAV-2,GPS1(RS422), GPS-2, DATALOAD Installation Drawing. This port will be used to upload new software and database revisions.

Refer to the installation schematics at the rear of this manual for details on connecting these two required components.

The *installation planning cycle* is summarized as follows:

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.

The *post installation procedures* are summarized as follows:

1) Prior to power-up review correct wiring by using standard ohm meter and voltage checks . Insure the correct orientation and positioning of the three SN3308 'D' connectors. The connector numbers are printed on the back of the SN3308 for reference.

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

3) Apply power to the SN3308, bring up in maintenance mode (see page 42) and sequentially access each SN3308 maintenance page to correctly select the installed equipment.

4) Allow the unit to operate for 30 minutes at maximum brightness and check the internal temperature readout on maintenance page 17 for an approximate temperature rise of approximately 10° C or 18° F. This checks proper cooling airflow.

5) Perform Ground Test procedures

6) Perform Flight Test procedures.

1.4 Interface Planning

1.4.1 Compass System

Determine whether the SN3308 is to be used internally slaved or unslaved. Unslaved operation would be appropriate when the SN3308 is bootstrapped to an already slaved compass system or is being slaved to a panel mounted XYZ DG.

Plan for:

- High Resolution Digital Output from a Mid-Continent 4305 series DG with compass valid output, flux gate 10 VAC Fluxgate Excitation and Internal 26VAC Inverter

- Quadrature stepper motor drive input from a Bendix/King KG 102 series DG with compass valid output and flux gate support,

- 3-wire ARINC 407 synchro DG with or without compass valid input and fluxgate.ARINC Low Speed 429 Heading Input. Sandel monitors for Label 320, Magnetic Heading Data and Label 270 System Status

Internal slaving requires connection of the flux gate excitation to the SN3308 flux gate reference input P1-7. This input is used only to demodulate the flux gate signals.

Synchro DG's require the master 400Hz inverter to be connected to the SN3308 400Hz reference input P2-4. This input is used to lock all 400Hz inputs and outputs in the SN3308. 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.

Slaving does not require the use of an external slaving accessory. Compass calibration is performed using the SN3308 Compass maintenance page and offers a unique 4-quadrant setup with no interaction between N-S-E-W. The SN3308 will provide standby heading operation from the flux gate alone in the event of directional gyro (DG) failure.

The SN3308 has a 3-wire ARINC 407 synchro bootstrap compass output if required. (Software 1.05 and later).

1.4.2 GPS (Loran) Switching

The SN3308 has 3 Darlington open collector relay output discretes which operate when the pilot selects NAV-2, GPS-1, or GPS-2 respectively. These outputs are restricted to 35ma maximum current – do not exceed 35ma on serial numbers 2699 and below. These outputs pull only to within 1 volt of ground. Serial numbers 2700 and above have 250ma maximum current. Serials numbers 2700 and above outputs pull to within 1 ohm of ground. Check to insure the remote switching relay is compatible. If a multi-coil relay is used the SN3308 should be configured to drive the first coil and a contact from the first coil can then be used to drive the remaining coils.

NAV 1 selection is the default selection and no relay driver output discrete is available. The NAV-2, 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 SN3308. 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 (P2-30) on the SN3308 is used to remote sense the selection of the GPS-1 and annunciate the selection. This is referred to as "slave" mode. It allows annunciation of the selection on the SN3308 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.

The SN3308 can be configured to accept a RELAY SENSE input, which provides feedback as to the actual state of the switching relay. A single pole on the relay is

used to ground an SN3308 input pin when the relay is in the energized position. If the low signal is not detected, the SN3308 annunciates the relay failure by redlining the NAV source display. The actual pin number used for the RELAY SENSE input is selected in the RELAY SENSE maintenance page.

1.4.3 GPS Annunciators

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-collector Darlington outputs which pull to within 1 volt of ground. Ensure these outputs are compatible with the associated receiver.

The Garmin GNS430 uses ARINC-429 for the annunciator functions so no discrete connections are used.

1.4.4 NAV Interface

The SN3308 has a conventional set of analog inputs for deviation, flags, etc. from the primary NAV receiver. See the installation diagram for details. These inputs are not connected with the use of the Garmin GNS430 ARINC NAV receiver, which uses ARINC-429 only.

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.

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 SN3308 to revert to and annunciate NAV-1 when an ILS is tuned on NAV-1 or NAV-2 when an ILS is tuned on NAV-2. 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/GPS2 use ILS Energize 2 to display vertical guidance.

Two types of resolvers are supported *on different sets of pins*.

a) An electronic OBS resolver with rotor input and SIN/COS outputs is provided. An associated DC reference pin (P1-28) 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 (ground referenced) and SIN/COS outputs (ground referenced). (Software 1.33 and later)

1.4.5 Marker Beacon

Three inputs are provided for Marker Beacon. 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. Note the use of lamp load resistors in the installation drawing, which are required for some receiver types.

1.4.6 Composite NAV and ADF

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

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

The composite NAV inputs accept standard .5v 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.

1.4.7 RESERVED FOR FUTURE USE

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1.4.8 ARINC Channels and DME Interface

There are three ARINC 429 receiver channels. Channel 1 supports ARINC 429 only. Channels 2/3 support King Serial Digital DME data and ARINC 568 (software 1.33 and later) for ARINC digital DME's such as Collins DME40. After the appropriate ports are assigned for the aircraft's equipment, any remaining port may be assigned as an ARINC-429 NAV receiver channel to support the Garmin GNS430.

- Channel 1 (P3-10/28) is normally used for GPS-1, Loran-1 receivers or ARINC Low Speed 429 Heading Input. Channel 1 also features an ARINC 429 Transmit channel which is used to send course and heading datum to external equipment such as GPS receivers. This is preferred over RS-232 connections

of these receivers as more data is available to the SN3308 and it also eliminates the requirement for the course resolver relay switching. See the installation drawings.

- Channel 2 (P3-9/27) is normally used for Digital DME-1 along with clock pin P3-8; it may also be used for the ARINC-429 NAV channel of the Garmin GNS-430 or ARINC Low Speed 429 Heading Input.

- Channel 3 (P3-26/7) is normally used for a second GPS, DME or ARINC Low Speed 429 Heading Input.

  ARINC channels 2/3 are also capable of ARINC 568/419 DME (Software 1.33 and later) or King Serial Digital using an additional pin. This pin is used for 568 SYNC or King DME REQ. The type of communication protocol is selected on the DME maintenance page.

  Channel 3 may also be used for the ARINC-429 NAV channel of the Garmin GNS-430 if channel 2 is in use by a DME.

King KN-63 DME's require the use of the KDI-572 controller in order to supply the DME REQ signal as shown on the installation drawings.

The KN62/64 panel mount DME's can be remote-indicated by connecting CLK/DATA/DME REQ to the SN3308 as shown in the installation drawings. A KDI-572 is *not* required. NOTE: when the KN62/64 is switched to "FREQ", the DME readout on the SN3308 will continue to associate with NAV-1 or NAV-2 depending on the DME1-NAV2 select pin, see below.

Two DME HOLD inputs are provided for annunciation. In single DME installations DME2 HOLD can alternately be used to annunciate DME1-NAV2 (i.e. cross side selection of DME1) to associate the DME with the correct bearing pointer selection. See the installation drawings.

A single 40 mV DC/nautical mile DME distance input is provided to substitute for serial digital DME 1 or 2. In this case DME2 HOLD is used as ANALOG DME VALID input and DME2 HOLD is not available.

1.4.9 RS232 / RS422 Serial Communication

Two RS232 (or RS422) ports are provided for communication with Loran, GPS, or WX-500 Stormscope®.

Channel-1 (P3-16/34 and P3-12) is normally used for GPS-1. Use this only if ARINC 429 is not available for the associated receiver. (ARINC 429 is the preferred hookup).

Channel-2 (P3-14/32 and P3-30) is normally used for the WX-500 Stormscope® or a second GPS receiver. It is also used for data loading map and program data from a

remote host PC. See the installation drawings for the recommended method for connecting channel 2.

Both of these ports support RS422 transmission which can be connected if desired. The RS-232 and RS-422 transmitters are on separate pins and operate simultaneously.

Note that the same receiver pins are used for either RS232/422. The SN3308 uses a differential receiver compatible with both standards. RS-232 is connected to the minus input of the receiver, and the plus input is grounded because RS-232 is an inverted signal, i.e. –10v is logic one and +10v is logic zero.

1.4.10 GARMIN GNS430 GPS/VOR/LOC Combination Receiver

The complete interface between the SN3308 and the GNS430 can be done using the ARINC 429 ports. The ARINC 429 data carries all GPS and VOR/LOC data, resolver information and flags & annunciators.

For a single GNS430 installation, the SN3308 429 Port 1 is used to receive GPS data, and either Port 2 or Port 3 is used to receive VOR/LOC data. If a DME is to be interfaced to the SN3308 as well, it must be on Port 2 which will necessitate connecting the GNS430 VOR/LOC to Port 3. ARINC 429 output data *from* the SN3308 must go to the GNS430 GPS 429 Input port (see installation drawing). No composite NAV signals are required, because the bearing pointers receive data via the ARINC 429.

For a dual GNS430 installation, a relay is required to switch the ARINC 429 data from the two VOR/LOC receivers into the single available SN3308 input port. In addition, the composite NAV signal from the two VOR/LOC receivers is connected to the SN3308 to provide uninterrupted NAV bearing pointers irrespective of the selected receiver. As in a single GNS430 installation, ARINC 429 output data *from* the SN3308 must go to the GNS430 GPS 429 Input ports.

In some dual GNS430 installations, the second GNS430 is wired to a mechanical indicator and will not be selectable for primary navigation on the SN3308. In this case, composite NAV and GPS ARINC 429 data from the second receiver can be connected to the SN3308 to provide RMI bearing pointers only. The SN3308 is configured as though it were connected to a single GNS430, with the additional bearing pointer sources enabled. NOTE: It is not possible to enable GPS 2 as a bearing pointer source without having it also available as a primary NAV source.

After installation, ensure that the following setup items are configured on both the SN3308 and the GNS430:

Required SN3308 Setup Items	
Hardware	MOD1 STATUS OR LATER
Software	1.30 OR LATER
Maintenance Page Items	STUDY THE SANDEL MAINTENANCE PAGE ITEMS ON THE APPROPRIATE GNS430 INSTALLATION DRAWINGS, AND SET AS INDICATED.
	IN A DUAL GNS430 INSTALLATION MAKE SURE BOTH NAV-1 AND NAV-2 ARE DOUBLE-ASSIGNED TO ARINC PORT-2.
	IN A SINGLE GNS430 INSTALLATION NAV-1 MAY BE ASSIGNED TO ARINC PORT-3, ALLOWING A SINGLE DIGITAL DME TO BE ASSIGNED TO ARINC PORT-2.
Relay Sense:	ASSIGN THE RELAY SENSE ITEMS SHOWN ON THE INSTALLATION DRAWING TO THE SPARE PINS YOU HAVE SELECTED. IN A GNS430 INSTALLATION THIS WILL USUALLY BE P2-11 AND/OR P2-29 (FORMER MSG/WPT ANNUNCIATORS, NOT USED).
Relay Mode	MASTER
ILS Lockout	OFF
DME:	A DUAL GNS430 INSTALLATION WILL USE ALL THE PORTS AND A DIGITAL DME CANNOT BE USED. ENSURE THE DME IS UNASSIGNED.

Required GARMIN GNS430 Setup Items, Receiver 1			
Software	**Main 2.07 or later**		
Main ARINC 429 Configuration	IN 1:	**Low, Sandel EHSI**	
	OUT:	**Low, GAMA 429 Grph w/Int**	Note: NOT ARINC 429!
	SDI:	**LNAV 1**	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 2.07 or later**		
Main ARINC 429 Configuration	IN 1:	**Low, Sandel EHSI**	
	OUT:	**Low, GAMA 429 Grph w/Int**	Note: NOT ARINC 429!
	SDI:	**LNAV 2**	SDI2
VOR/LOC/GS ARINC 429 Configuration	Speed RX:	**Low**	
	Speed TX:	**Low**	
	SDI:	**VOR/ILS 2**	SDI2

1.4.11 UPS GXXX RS232 INTERFACE

Starting with software 2.07, the SN3308 is able to take advantage of the IIMorrow/UPSAT GX Series Extended Moving Map Data Output. This allows the CDI, VDI and annunciator information to be received via the RS-232 serial line.

Configuration Notes:	
GX Series Notes:	In Setup, enable Extended MovMap Data Format
SN3308 Unit:	Set LNAV selection to IIMorrow GX (RS-232 ENH) Vertical deviation (if desired) requires the ILS 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) Annuciators

1.4.12 Pilot-Controlled Switches

Provision has been made for pilot controlled external switch closures (P2-22/14). We suggest that this wiring be installed but capped and stowed, until the switch functions are assigned in future versions of software. They may be used for remote map functions in later versions of software, or for other remote selection functions.

1.4.13 Autopilot Interface

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 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.

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

1.4.14 Brightness Control

A separate brightness control only for the SN3308 must be installed externally. The SN3308 does not have an internal photocell, so the pilot must be able to adjust the dimming of the SN3308 separately from the other avionics. This control allows the pilot to control the brightness of the display from 0% to 100% of normal brightness.

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 SN3308 as described, and to ensure that the installation of the SN3308 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 SN3308 is enclosed in an ARINC 408, 3ATI form factor enclosure and is mounted to an instrument panel using a specially designed clamp tray fixture containing provision for up to three captive D-Sub 37 pin connectors. A black bezel is standard which accepts a cosmetic bezel mounting adapter for customization to an appearance similar to a Bendix/King KI-525 series PNI.

The SN3308 operates on an input voltage from 11 to 33 Volts DC and requires 3.3 amperes of current at 11 Volts DC when the AMLCD display is operating at maximum brightness. Also, 26 Volts AC, 400 Hertz reference excitation 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 must be obtained from the aircraft inverter source.

The following section describes the technical characteristics which 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 SN3308 installation components, other equipment and installation requirements. A review of the installation approval procedures is provided for filing with authorities.

2.2 SN3308 Approval, Physical, and Electrical Properties

2.2.1 Approval Data

Technical Standard Order:	TSO-C113, “Airborne Multipurpose Electronic Displays”
Software Certification:	RTCA/DO-178, Level C
Environmental Categories:	RTCA/DO-160C: F1CANBMXXXXXXZBABBWA/ZXXX RTCA/DO-160D: XXXXXXXXXXXXXXXXX(E/F-2)XX

2.2.2 Physical Dimensions

Form Factor:	3ATI (ARINC 408)
Width:	3.175 in. (8.04 cm.)
Height:	3.175 in. (8.04 cm.)
Length:	10.65 in. (26.24 cm.) overall, excluding knobs

Weight:	2.9 lbs. (7.5 Kg.)
CG:	5.1” from rear of bezel.
Clamp Tray:	3ATI x 10.4 in. - Sandel Avionics P/N 61013
Cooling Requirements:	Internal fan requires ambient air at fan input.

2.2.3 Operational Characteristics:

Temperature/Altitude:	-20° C to +70° C - up to 55,000 F
Power Inputs:	11 to 33 VDC @ 3.2 Amperes Maximum (35 watts)
	13.75 VDC @ 2.5 Amperes Nominal
	27.5 VDC @ 1.5 Ampere Nominal

2.3 Interface Conventions

The SN3308 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 SN3308 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 42 for more information on maintenance setup pages.

2.3.1 Connector P1

1		Display Primary Power Input	Note 1
	20	Display Primary Power Input	Note 1
2		Clock Keep Alive Power	See Install Diagrams
	21	N/C (Key)	
3		Display Power Return (Ground)	Note 1
	22	Display Power Return (Ground)	Note 1
4		Signal Ground Return Input	
	23	DME Distance Analog LO Input	
5		DME Distance Analog HI Input	
	24	Flux Gate Z Input	
6		Flux Gate Y Input	
	25	Flux Gate X Input	
7		Flux Gate Excitation Input	
	26	Display Brightness	
8		VHF NAV-2 ILS Energize Input	
	27	VHF NAV-1 ILS Energize Input	
9		Directional Gyro Valid Input	
	28	OBS Resolver DC Reference Input for P1-13	
10		VHF NAV 2 VOR Composite Input	Note 2
	29	VHF NAV 1 VOR Composite Input	Note 2
11		KG 102 DG Stepper C Input	
	30	KG 102 DG Stepper A Input	
12		DG Synchro Y Input	Note 3
	31	DG Synchro X Input	Note 3
13		OBS Resolver H Input	
	32	OBS Resolver COS Output of P1-13	
14		OBS Resolver SIN Output of P1-13	
	33	Glideslope –FLAG Input	
15		Glideslope +FLAG Input	
	34	Glideslope +DOWN Deviation Input	
16		Glideslope +UP Deviation Input	
	35	VOR +FROM Pointer Input	
17		VOR +TO Pointer Input	
	36	VOR-LOC –FLAG Input	
18		VOR-LOC +FLAG Input	
	37	VOR-LOC +LEFT Deviation Input	
19		VOR-LOC +RIGHT Deviation Input	

Note 1. Wire to both sets of power/ground connections. See installation drawings.
Note 2. 3 volt composite inputs require the use of a series resistor. See installation drawings.
Note 3: For XYZ inputs Z is signal ground P1-4.

2.3.2 Connector P2

1		Vert. Superflag Out	Reserved
	20	Lat. Superflag Out	Reserved
2		Vert. Deviation Out	Reserved
	21	Lat. Deviation Out	Reserved
3		DME2 Hold/Analog DME Valid/DME1 Nav-2 Sense	
	22	External Switch1 In	
4		26VAC/400Hz Primary AC Excitation In	
	23	HDG/CRS Datum Excitation	
5		Audio out	Reserved
	24	AFCS Back Course Discrete Output (Darlington)	
6		Heading Bootstrap Y Out	Note 1
	25	Heading Bootstrap X Out	Note 1
7		Course Datum Output	
	26	Heading Datum Output	
8		Reserved for Future Use	Reserved
	27	Reserved for Future Use	Reserved
9		Spare Y Output	Note 1
	28	Spare X Output	Note 1
10		DME-1 Hold In	
	29	WPT Annunciator Input	
11		MSG Annunciator Input	
	30	GPS Selected- In	
12		ACT (Approach Active) Annunciator Input	
	31	ARM (Approach Arm) Annunciator Input	
13		Reserved for Future Use	Reserved
	32	OBS-/LEG, HLD-/AUTO or PAR TRK- Annun. In	
14		External Switch 2 In	
	33	Spare Input 1	
15		Inner Marker Beacon Input	
	34	Middle Marker Beacon Input	
16		Outer Marker Beacon Input	
	35	ADF-1 AC-Y or DC-COS Input	Note 1
17		ADF-1 AC-X or DC-SIN Input	Note 1
	36	ADF-2 DC Ref or ADF-2 AC-Y Input	Note 1
18		ADF-1 DC Ref or ADF-2 AC-X Input	Note 1
	37	400Hz Diff. Resolver COS or ADF-2 DC COS	Note 1
19		400Hz Diff. Resolver SIN or ADF-2 DC SIN	Note 1

Note 1: For XYZ inputs Z is signal ground P1-4. For XYZ Outputs Z is power ground P1-3/22.

2.3.3 Connector P3

1		Auxiliary Power Output	Reserved
	20	Spare1 Discrete Out (Darlington)	Reserved
2		GPS OBS- or HOLD- Command Discrete Out (Darlington)	
	21	GPS-2 Switching Relay Discrete Out (Darlington)	
3		GPS-1 Switching Relay Discrete Out (Darlington)	
	22	Spare2 Discrete Out (Darlington)	Reserved
4		Spare3 Discrete Out (Darlington)	Reserved
	23	APPR ARM- Command Discrete Out (Darlington)	
5		VHF NAV-2 Switching Relay Discrete Out (Darlington)	
	24	RESERVED FOR FUTURE USE	Reserved
6		Reserved for Future Use	Reserved
	25	DME-2 568-Clock / King Clock In	
7		DME-2 568-Sync / King DME REQ / GPS-2 429-B	PORT3
	26	DME-2 568-Data / King Serial Data / GPS-2 429-A	PORT3
8		DME-1 568-Clock / King Clock In	
	27	DME-1 568-Sync / King DME REQ / NAV 429-B	PORT2
9		DME-1 568-Data / King Serial Data / NAV 429-A	PORT2
	28	GPS-1 ARINC 429-B In	PORT1
10		GPS-1 ARINC 429-A In	PORT1
	29	ARINC 429-B OUT	
11		ARINC 429-A OUT	
	30	GPS-2 WX-500 RS-232 TX Output	
12		GPS-1 RS-232 TX Output	
	31	GPS-2 WX-500 RS-422 TX- Output	
13		GPS-2 WX-500 RS-422 TX+ Output	
	32	GPS-2 WX-500 RX 422- or 232 Signal Input	
14		GPS-2 WX-500 RX 422+ or 232 Ground	
	33	GPS-1 RS-422 TX- Output	
15		GPS-1 RS-422 TX+ Output	
	34	GPS-1 RX 422- or 232 Signal Input	
16		GPS-1 RX 422+ or 232 GROUND	
	35	TTL Low Speed Data	Reserved
17		TTL Low Speed Clk	Reserved
	36	RS-422 High Speed Clock-	Reserved
18		RS-422 High Speed Clock+	Reserved
	37	RS-422 High Speed Data-	Reserved
19		RS-422 High Speed Data+	Reserved

Note: Darlington outputs serial numbers 2699 and below 35ma MAX. Serial numbers 2700 and above 250ma MAX.

2.4 ARINC 419/429 Serial Data Receivers Interfaces

The ARINC 419/429 serial data bus interface provides an information link between the SN3308 and peripheral avionics equipment. The bus conforms to 419/429 specifications for electrical characteristics, receiving, and transmission interval.

The SN3308 is capable of receiving the following low speed ARINC 419/429 long-range NAV, VHF NAV, GS or DME inputs for processing and display as follows:

Label	Description	Rate (ms)	Data Type
034	VOR/ILS Freq	200	BCD
074	Data Record Header	1000	BNR
075	Active Waypoint To/From Data	100	DSC
100	Selected Course	50	BNR
113	Message Checksum	500	BNR
114	Desired Track (True)	50	BNR
115	Waypoint Bearing (True)	50	BNR
116	Cross Track Distance	50	BNR
121	Horizontal Steering Command	50	BNR
147	Magnetic Variation	1000	BNR
173	LOC Deviation	50	BNR
174	GS Deviation	50	BNR
222	VOR Bearing	50	BNR
251	Distance-to-Go	100	BNR
252	Time-to-Go	100	BNR
261	GPS Discrete Word	1000	DSC
270	AHRS Discrete	200	DSC
275	Long-Range NAV Status	200	DSC
300	Mag. Station Decl, Wpt. Type, Class	100	BNR
303	Message Length, Type, Number	100	BNR
304	Message Characters 1-3	100	BNR
305	Message Characters 4-6	100	BNR
306	NAV Waypoint Latitude	100	BNR
307	NAV Waypoint Longitude	100	BNR
310	Present Position Latitude	100	BNR
311	Present Position Longitude	100	BNR
312	Ground Speed	50	BNR
313	Track Angle (True)	50	BNR
314	Heading (True)	50	BNR
320	Magnetic Heading	50	BNR
321	Drift Angle	200	BCD
326	Lateral Deviation Scale Factor	100	BNR
351	Distance-to-Destination (Flight Plan)	500	BNR
352	Time-to-Destination	500	BNR
371	Specific Equipment Ident.	1000	DSC
377	Equipment Hex ID Code	1000	BNR

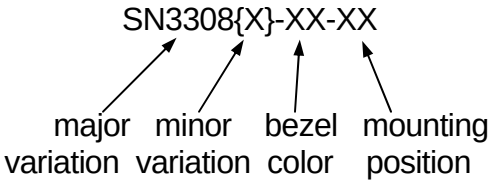
2.5 ARINC 419/429 Serial Transmitter Interfaces

The SN3308 is capable of transmitting the following low-speed ARINC 419/429 data:

Label	Description	Rate (ms)	Data Type
100G	Selected Course (Using extended SDI)	200	BNR
320	Magnetic Heading	200	BNR

2.6 Basic Component Part Number and Variants

The part number for the Sandel SN3308 is:



The "**L**", "**C**", and "**R**" variants signify the position in which the unit is to be mounted within one of the three predominate locations, i.e. Left instrument panel, Center panel, and Right instrument panel. The viewing properties of the display are optimized by the correct selection of part number.

Part number **SN3308-00**-**BL** [Black-Left] is the standard version of the SN3308. "Minor variations" are reserved for future product enhancements or special applications.

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

2.7 Installation Kit And Accessories

SPN	Description
90112	SN3308 installation kit
90124	Bezel Adapter Kit KI-525 Flush

2.8 Bill of Materials – SN3308 Install Kit

SPN	Description	Quan.	Vendor Part No.
32001	Conn., D- 37 Pin Female (part of 61013 tray assy)	3	ITT DCMAY-37SFO
32003	Connector, Female Pins D	100	ITT 031-1007-073
32037	Conn., Jack, Phone	1	Switchraft 14B
33014	Diode 1N4002	1	1N4002
38058	Pot 10K	1	Clar. RV6NAYSA103AP
41020	Shrink Tubing 1/8" Black	1"	
60103	Knob, Black	1	
60137	Knob Nut Cover 11mm	1	
60138	Knob Cap, EHSI DIM	1	
61013	Clamp Tray Fixture with hardware	1	
90106-IM	Installation Manual, SN3308	1	

2.9 License Requirements

None.

2.10 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 desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within TSO standards. If not within TSO standards, the article may be installed only if the applicant documents further evaluation for an acceptable installation and it is approved by the Administrator of the Federal Aviation Administration or by other certifying agency.**

2.11 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 Appendix C. 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 SN3308 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 the SN3308. 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. FSAW 95-09A has been superseded by a Flight Standards Memorandum dated 11/10/1998, making the SN3308 eligible for follow-on approval. A copy of this memorandum has been attached in the Appendix F.

The Environmental Qualification Form for the SN3308 is included within this Installation Manual, as Appendix B, and should be referenced to the categories appropriate to the aircraft type and environment into which the SN3308 is to be installed. The environmental category for the SN3308 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 as Appendix D, and should be used as a basis for validating the SN3308 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 SN3308, contact Sandel Avionics for assistance.

3 Installation

3.1 General

This section provides general suggestions and information to consider before installing the SN3308 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 SN3308 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 SN3308. 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 connectors and associated hardware required are supplied by Sandel Avionics.

3.2.2 Cooling Considerations

The SN3308 Navigation Display contains its own ventilation fan for internal component cooling and therefore, does not require a forced air cooling system. However, it is extremely important that the mounting area below the Clamp Tray Fixture opening and the adjacent area above the SN3308 when inserted be kept clear of any objects which would restrict the inflow of air at cabin ambient temperature. In a helicopter installation where the entire installation is shrouded ambient air must be provided to the cooling fan inlet area. Cooling can be verified in the post-installation checkout by monitoring the temperature on the System maintenance page.

3.2.3 Mechanical Installation Considerations

The SN3308 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 powerplant 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. 90106-07-( ) titled, "Layout - SN3308 Installation" for specific assembly and mounting instructions.

The chassis has four #4 holes with nut plates at the rear on both sides for purpose of mounting customer supplied harness strain relief. The strain relief may be attached to the rear of the tray utilizing an adel clamp mounted to the side of the chassis or with an adel clamp and a bracket for strain relief of the harness.

3.2.4 Electrical Installation Considerations

Connections and functions of the SN3308 are described in this section. Refer to the SN3308 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 SN3308 may not perform these functions simultaneously. This does not preclude the SN3308 from annunciating such mode control functions.

D. In order to ensure optimum performance the SN3308 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 SN3308, a point-to-point continuity check of the wiring harness should be accomplished to verify proper wiring. See **Appendix D**, **FUNCTIONAL GROUND TEST PROCEDURES/REPORT** 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 SN3308 will operate properly down to its rated minimum input voltage of 11Vdc, ensure that two power wires of at least the recommended size are connected from the EHSI circuit breaker to the SN3308 in accordance with the installation drawings.

3.3 Connector P-1 Pinout Description

P1-1, P1-20: Display Primary Power Input
P1-2: Keep alive power

Pins 1 and 20 are the aircraft DC power input (11-33VDC). Connection to both pins is required using two 20AWG wires and a 5 ampere circuit breaker. Maximum power required is 35 watts when the SN3308 is operating at maximum brightness. Connection to the Avionics bus is recommended to reduce voltage fluctuations during engine start.

Pin 2 is keep alive power. Connection to this pin is not required, but a voltage over 6.5VDC on this pin when the main power falls below 11VDC will reduce the re-boot time of the SN3308 after a power interruption to approximately 1.5 seconds instead of the typical 6 seconds for power interruptions under two minutes.

For all serial numbers the supply current on this pin may be as much as 20 milliamperes at extremes in ambient temperature so this pin should be connected to the main power bus not the battery bus.

P1-3, P1-22: Display Power Return Input

Pins 3 and 22 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.

P1-4: Signal Ground Return Input

This common Signal Ground Return is used for 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. Otherwise damage to the unit will occur.

P1-5: DME Distance Analog HI Input
P1-23: DME Distance Analog LO Input

This differential input is for connection with DME equipment furnishing 40 mVDC/nm. The maximum displayed distance is 200 nm. or 8 VDC. 24 AWG twisted shielded pair wire is recommended for this function. This input is associated with P2-3 “Analog DME Valid”.

P1-6: Flux Gate Y Input
P1-24: Flux Gate Z Input
P1-25: Flux Gate X 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.

P1-7: 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 P2-4, if used.

P1-26: Display Brightness

Input from the pilots display brightness control. 0Vdc – Acft. Power

P1-8: VHF Nav-2 ILS Energize Input
P1-27: VHF Nav-1 ILS Energize Input

These pins control the enabling of the Glideslope pointer. They are not related to the bearing pointer operation.

These signals also control the ILS Lockout logic so the SN3308 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 are selected on the NAV maintenance page, and are normally active-low.

NOTE: If ILS Lockout is disabled, NAV1/GPS1 vertical guidance is enabled by P1-27 and NAV2/GPS2 vertical guidance is enabled by P1-8.

NOTE: The ILS Energize inputs are pulled up to one-half aircraft power. In 12 volt aircraft this will make logic high 6Vdc. This many not be satisfactory as the non-energized state of an associated NAV converter or indicator. To increase the inactive high voltage, a 4.7K pullup resistor to aircraft power may be used externally to the SN3308 for 12v aircraft.

P1-9: Directional Gyro Valid Input

Connect to the (DG) valid output if available. Selection of the logic level of this pin is in the Compass maintenance page.

P1-10: VHF Nav 2 VOR Composite Input
P1-29: VHF Nav 1 VOR Composite Input

These pins supply bearing to the VOR bearing pointers. Connection to these pins is from the respective VHF navigation receiver and is normally .5v ARINC. For 3V inputs a series resistor is required, see the installation drawings. Calibration, including 0° or 180° phase angles for inverted inputs, is in the NAV maintenance page. 24 AWG shielded wire is recommended for these connections.

P1-11: KG 102 DG Stepper C Input
P1-30: KG 102 DG Stepper A Input

These quadrature DC inputs are used exclusively for connections to the Bendix/King KG-102 series Directional Gyro when selected in the Compass maintenance page. For slaved operation see descriptions of pin-6, pin-7, pin-24, pin-25. 24 AWG twisted shielded pair wire is recommended for this connection.

P1-12: DG Synchro Y input
P1-31: DG Synchro X input

Connect these pins to an XYZ type directional gyro, ground the Z leg to signal ground P1-4. This input is referenced to the 26VAC/400Hz reference on P2-4. This function is selected on the Compass maintenance page.

P1-13: OBS Resolver H Input
P1-28: OBS Resolver DC ref Input
P1-14: OBS Resolver SIN Output
P1-32: 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 SN3308. 24 AWG twisted shielded pair conductor is recommended for these functions. Please see the warnings on the installation drawings concerning the connection to P1-28.

P1-15: Glideslope +FLAG
P1-33: Glideslope -FLAG

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

P1-16: Glideslope +UP Deviation Input
P1-34: Glideslope +DOWN Deviation Input

GS deviation input. Two-dot deflection is ±150 mVDC. Note that a 24 AWG twisted shielded pair wire is recommended for these functions.

P1-17: VOR +TO Pointer Input
P1-35: VOR +FROM Pointer Input

Differential input supports VHF NAV or long-range navigation +TO pointer and +FROM pointer outputs. In-view is greater than 40 mVDC (to) and –40mVDC (from). Note that a 24 AWG twisted shielded pair wire is recommended functions.

P1-18: VOR-LOC +FLAG
P1-36: VOR-LOC -FLAG

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 mVDC on +FLAG with respect to -FLAG input. 24 AWG twisted shielded pair wire is recommended for these functions.

P1-19: VOR-LOC +RIGHT Deviation Input
P1-37: VOR-LOC +LEFT Deviation Input

Analog lateral deviation from the VHF navigation receiver or long-range navigation receiver +LEFT and +RIGHT deviation outputs. Two-dot deflection is ±150 mVDC. 24 AWG twisted shielded pair wire is recommended for these functions.

3.4 Connector P-2 Pinout Descriptions

P2-1: Vertical Superflag Output
Reserved for future use.

P2-20: Lateral Superflag Output
Reserved for future use.

P2-2: Vertical Deviation Output
Reserved for future use.

P2-21: Lateral Deviation Output
Reserved for future use.

P2-3: DME-2 HOLD / Analog DME Valid / DME-1 Nav-2 Sense
Multi-function pin setup on the DME setup page. When an analog DME is used this must be used as Analog DME Valid.

P2-22: External Switch 1 In
Used for pilot controlled switching. This has no function in current software version but it is recommended that wiring to a yoke switch be reserved for future functions.

P2-4: Primary AC Excitation Input
Connection to this pin is required only if functions of ARINC 407 synchro or 400Hz AC sine and cosine inputs or outputs are used. The input requirements are 26VAC nominal 400Hz. Input frequency is 440 Hz.

Maximum and 360 Hz. minimum. Input impedance is 220KΩ. 24 AWG shielded wire is recommended for this function.

P2-23: Hdg/Crs Datum Excitation

This is a 5Khz *ground referenced* excitation input which is associated with the HDG Datum and CRS Datum outputs. It is intended for use with older Century autopilots and can potentially eliminate the need for a King KA52 autopilot adapter to be used. Contact Sandel for details of the use of this pin. It must be externally transformer isolated.

P2-5: Audio Out

Reserved for future use.

P2-24: AFCS Back Course Discrete Output (DARLINGTON)

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 SN3308 will generate a darlington closure. An external relay is be required to make this signal active-high.

P2-6: HDG Bootstrap Y out
P2-25: HDG Bootstrap X out

Z is Ground. 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.

P2-7: 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. 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.

P2-8: Reserved for Future Use
P2-27: Reserved for Future Use
P2-9: Spare Y Output
P2-28: Spare X Output

XY (Z ground) output reserved for future use.

P2-10: DME-1 Hold Input

DME-1 Hold annunciator input.

P2-11: MSG Annunciator input
P2-12: ACT (Approach Active) Annunciator Input
P2-29: WPT Annunciator input
P2-31: ARM (Approach Arm) Annunciator Input

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

P2-30: GPS SELECTED Input

This input is used when the SN3308 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 SN3308 display. This input is active only when enabled in the System maintenance page.

P2-13: Reserved for Future Use

P2-32: 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 SN3308 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.

P2-14: External Switch 2 In.

See P2-22.

P2-33: Spare Input 1

Reserved for future use.

P2-15: Inner Marker Beacon Input

P2-16: Outer Marker Beacon Input

P2-34: Middle 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. In such an instance call Sandel for installation guidance.

P2-17: ADF-1 AC-X or DC-SIN Input

P2-35: ADF-1 AC-Y or DC-COS Input

Inputs from ADF-1 Receiver. Selection of AC/DC operation is on the ADF maintenance page. For DC use P2-18 as the DC reference input. For AC inputs Z is grounded. 24 AWG twisted shielded pair wire is recommended for these functions.

P2-18: ADF-2 AC-X or ADF-1 DC Ref

P2-36: ADF-2 AC-Y or ADF-2 DC Ref

Used as DC REF inputs when DC Sin/Cos ADF is used as ADF-1 or ADF-2. Used as AC X/Y if ADF-2 is AC. The DC function is activated when ADF-1 is selected as a DC receiver in the ADF-1 maintenance page. For AC inputs Z is grounded.

P2-19: ADF-2 DC-SIN or 400Hz Diff. Resolver SIN

P2-37: ADF-2 DC-COS or 400Hz Diff. Resolver COS

The selection of the function for these inputs is in the ADF-2 Maintenance Page and the NAV maintenance page. When 400Hz differential resolver operation is required ADF-2 operation cannot be used. For AC inputs Z is grounded. 24 AWG twisted shielded pair wire is recommended for these functions.

3.5 Connector P-3 Pinout Descriptions

P3-1: Auxiliary Power Output
This output is filtered DC which is nearly the same as the DC potential supplied to the SN3308 but is restricted to 250 ma loads. It is provided to support future accessories.

P3-20: Spare1 Discrete Out (DARLINGTON)
Reserved for future use.

P3-2: GPS OBS- or HOLD- Command Discrete Output (DARLINGTON)
Open Collector 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.

P3-21: GPS-2 Switching Relay Discrete Output (DARLINGTON)
Can be used to operate a switching relay whenever GPS-2 (or Loran-2) is selected by the NAV pushbutton. The receiver type is selected on the LNAV-2 maintenance page.

P3-3: GPS-1 Switching Relay Discrete Output (DARLINGTON)
Can be used to operate a switching relay whenever GPS-1 (or Loran-1) is selected by the NAV pushbutton. The receiver type is selected on the LNAV-1 maintenance page.

P3-22: Spare2 Discrete Out (DARLINGTON)
Reserved for future use.

P3-4: Spare 3 Discrete Output (DARLINGTON)
Reserved for future use.

P3-23: GPS APPR ARM Discrete Output (DARLINGTON)
Open Collector active-low output used to select APPR ARM mode of the external GPS receiver. Accessible during normal use from the pilots SHFT-NAV operation.

P3-5: VHF NAV-2 Switching Relay Discrete Output (DARLINGTON)
Can be used to operate a switching relay whenever VHF NAV-2 is selected by the NAV pushbutton. VHF NAV-2 is enabled on the NAV-2 maintenance page.

P3-24: Reserved for Future Use
P3-6: Reserved for Future Use
P3-26: Ch3 ARINC 429-A / 568 Data / King Serial Data
P3-7: Ch3 ARINC 429-B / 568 / King DME -REQ Input
P3-25: Ch3 ARINC 568 DME Sync / KING Serial Clock Input

P3-9: Ch2 ARINC 429-A / 568 Data / King Serial Data
P3-27 Ch2 ARINC 429-B / 568 / King DME-REQ Input
P3-8: Ch2 ARINC 568 DME Sync / KING Serial Clock Input

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, or long range navigation receivers. See the installation drawings. 24 AWG twisted shielded triple conductor is required for these functions.

P3-10: Ch1 ARINC 429-A Input
P3-28: Ch1 ARINC 429-B Input

Used to support ARINC 429 long range navigation receivers as selected in the LNAV maintenance pages. 24 AWG twisted shielded pair wire is required for these functions.

P3-11: ARINC 429-A Output
P3-29: ARINC 429-B Output

Low 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.

P3-12: Ch1 RS-232 TX Output
P3-30: Ch2 RS-232 TX Output

RS-232 serial data outputs. TXD-2 is used to communicate with WX-500 Stormscope® when connected to RXD-2 and is also used for program uploads from an external PC. TXD-1 is normally not used. Note that a 24 AWG shielded wire is required for each of these functions.

P3-13: Ch2 RS-422 TX+ Output
P3-31: Ch2 RS-422 TX- Output
P3-15: Ch1 RS-422 TX+ Output
P3-33: Ch1 RS-422 TX- Output

RS422 outputs with the same data as RS232 TXD1 and TXD2. Reserved for future use.

P3-14: Ch2 RS-422+ In or RS-232 Ground
P3-32: Ch2 RS-422- In or RS-232 Signal
P3-16: Ch1 RS-422+ In or RS-232 Ground
P3-34: Ch1 RS-422- In or RS-232 Signal

These inputs are used to connect to Long Range Navigation receivers selected in the LNAV maintenance pages. See the installation drawings. Ch2 is used to communicate with the WX-500 Stormscope®.

P3-17: TTL Low Speed Clock
P3-35: TTL Low Speed Data

Reserved for future use.

P3-18: High Speed Clock+
P3-36: High Speed Clock-
P3-19: High Speed Data+
P3-37: High Speed Data-
Reserved for future use.

4 Setup Procedures

4.1 General

Setup procedures for the SN3308 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 SN3308, depress and hold the **SHFT** and the **A-B** pushbuttons, 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.

B. 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.

C. Escape the maintenance menus by pressing the 360 softkey. This will allow normal operation of the unit to test the effects of settings. Re-enter the maintenance pages by the sequence SHFT-MAINT softkey. (Note that this softkey does not appear during normal operation, only after step “A” has been accomplished).

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

4.3 Equipment/Configuration Selections

The choices of compatible equipment contained in the SN3308 menus are listed in Appendix A. For types not listed, consult the factory.

5 Operating Details

For an explanation of the operating controls of the SN3308, refer to the Pilot's Guide for the SN3308, Sandel Avionics P/N 90106-PG, or to the Airplane Flight Manual Supplement.

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 SN3308 Navigation Display. The assumption made is that all functions of the SN3308 will be used in an essential (primary) navigation function.

The SN3308 employ a halogen lamp as the singular primary display projection light source. Lamp power is not supplied by a redundant power source. Display lamp life will vary upon the brightness level used to view the display and accumulative age and gradual degradation is likely to occur. Therefore, it is considered that a malfunction will prevent continued use. This failure condition is likely to be an inoperative display.

Sandel recommends the following practice:

> Projection lamp failure within the SN3308 is considered similar to the failure of a compass card servo mechanism of an electromagnetic horizontal situation indicator or a CRT or power supply failure within an electronic horizontal situation indicator. Sandel Avionics will demonstrate through service experience that the projection lamp will function beyond 225 hours at full brightness. However, because of its currently predicted life, maintenance personnel are advised to replace the lamp as a precautionary measure within the first 225 hours and every 225 hours thereafter, or calendar 1 year, whichever comes first. This maintenance action will prevent probable failures of the SN3308 functionality and thus meet the safety objectives.
>
> Installers of the SN3308 are advised to take maintenance actions as required to comply with Instructions for Continued Airworthiness in accordance with the Federal Aviation Regulations, or other requirements. Flight crews and ground maintenance personnel should periodically assess the lamp life and replace the lamp if required. The appropriate maintenance entry must be documented in the aircraft maintenance records. Sandel Avionics requests a copy of the maintenance record of every replacement so that reliability of the display lamp can be tracked.

6.2 Projection Lamp Replacement Procedures

The following tools will be required to remove and replace the SN3308 projection lamp:

1 ea. Phillips Screwdriver, #0 point

1 ea. Phillips Screwdriver, #1 point

1 ea. Phillips Screwdriver, #2 point

1 ea. Allen Key, 7/64”

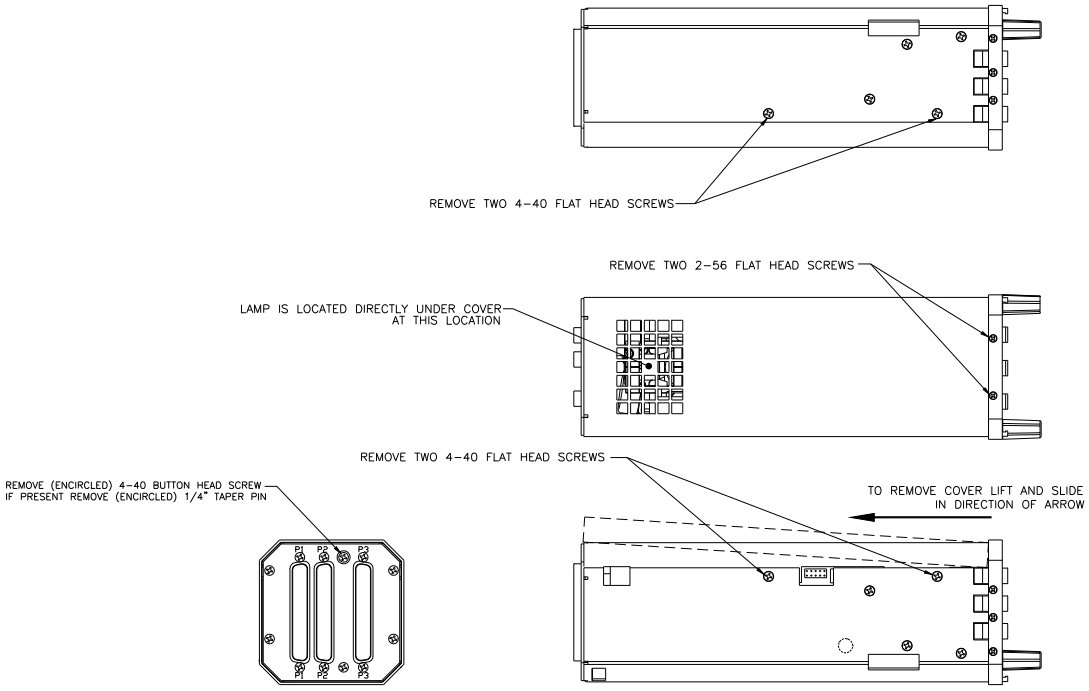
1ea. ¼” Nut Driver

1ea Sandel Lamp Replacement Kit (90122)

To remove the SN3308 loosen the top two 8-32 screws above the SN3308 to remove tension from the clamp tray. Then remove the single size 8-32 screw at the lower-left of the SN3308. Insert a 7/64” Allen key into this hole approximately ¾” and you will engage a removal jackscrew. This jackscrew is used to *assist* in removing the SN3308 but cannot extract the SN3308 alone. Rotate the jack screw clockwise while simultaneously pulling on the front bezel of the SN3308 to provide additional extraction force. Continue to assist the jackscrew in this manner turn ½ a turn at a time. If you have difficulty in removing the SN3308 the upper two clamp screws may not have been loosened sufficiently. DO NOT apply excessive torque on the jackscrew at any time.

Place the SN3308 unit firmly on a clean table or work bench. Carefully remove the two each, 2-56 screws from the top of the bezel using the #0 screwdriver Remove the four 4-40 x ¼” flat-head Phillips screws at the top of both sides of the main enclosure chassis using the #1 screwdriver and the single (encircled) 4-40 taper pin at the top of the rear connector plate. Once removed, carefully lift the top cover from the chassis by lifting up at the rear and pulling slowly backwards.

You will clearly see the projection lamp at the rear top of the unit. Press tubing from the lamp kit firmly over the lamp and pull lamp straight out. Retain the defective lamp for return to the SN3308 owner for their disposition.



Remove the new projection lamp from its box but do not touch the new lamp glass envelope with bare fingers. Instead, touch the lamp using supplied finger cots or the lamps plastic bag. Slide the lamp out far enough to expose the leads. It is permissible to touch the leads of the lamp. Use the rubber tubing in such a manner that will enable you to guide the lamp leads into the lamp socket. Once the leads are in the socket holes apply downward force to the top of the lamp envelope (touching only with the plastic shipping bag or finger cots) and seat the lamp into the socket until it stops. Move the lamp fore-and-aft slightly to seat it in position. Please note that the seated position of the lamp is approximately 10 degrees from vertical. The filament of the lamp will line up with two small V notches in the two sides of the lamp housing, which can be used as a visual reference.

Reinstall the top cover using the original screws and taper pin. Do not apply excessive torque on the small 2-56 screws in the upper bezel.

Either with an appropriate bench harness to apply power or by reinserting the unit into the clamp tray apply power to confirm operation of the replacement lamp and verify proper operation.

Changing the projection lamp requires re-initializing the system's internal lamp-test data. This is accomplished by holding both LAMP and CHG softkeys simultaneously in Maintenance Page 21. Initiating a Lamp Change cycle will store the prior lamp operational data for reference and reset current measurement values to zero. (See Maintenance Page 21).

This operation must be performed when the input power is at normal level – either 13.75v or 27.5v. Do not perform this procedure unless the input power is either 13.75v or 27.5v.

If your unit and chassis combination matches Figures A and B below follow Step A if your unit and chassis combination does not match Figures A and B follow Step B to reinstall the unit.

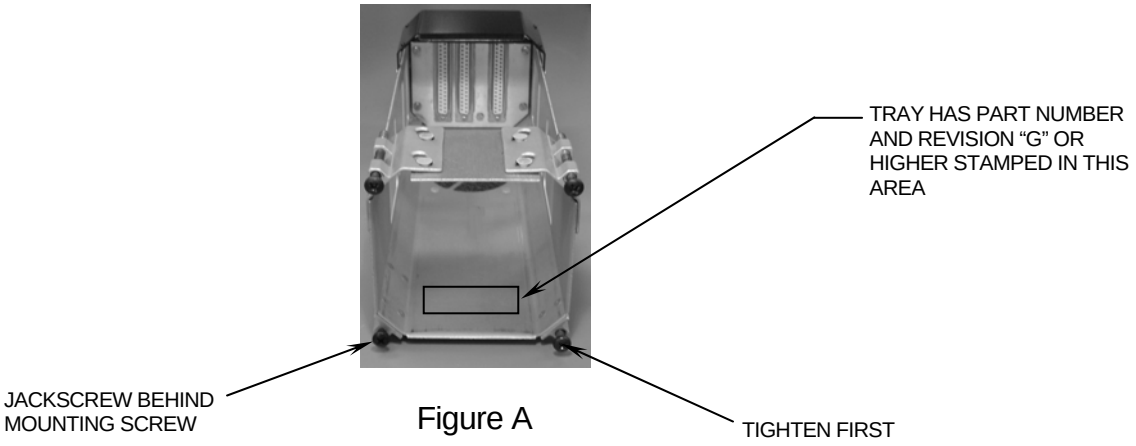


Figure A

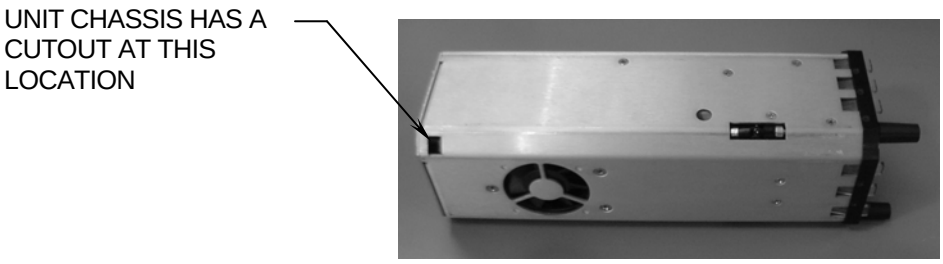


Figure B

STEP A Reinstall the SN3308. Tighten the bottom right mounting screw in the panel. Insert a 7/64" Allen key into the lower left mounting hole approximately ¾" and you will engage a jackscrew. Rotate the jackscrew fully clockwise until finger tight. Insert the SN3308 in the clamp tray, continue rotating the jackscrew counter-clockwise until the SN3308 is fully engaged in the tray connectors. Reinstall the single size 8-32 screw in the lower-left of the SN3308. Tighten the two upper screws.

STEP B Rotate the jack screw fully counter-clockwise to return the ejector mechanism to its initial position, otherwise the SN3308 will not seat in its connectors on re-installation. Reinstall the SN3308. Insert the SN3308 in the clamptray, and fully tighten the two bottom screws in the panel. Make absolutely sure the SN3308 is fully engaged in its tray connectors, and tighten the two upper screws. Do this while continuing to apply a slight force on the SN3308 bezel to keep the unit fully engaged with its connectors.

Retest by verifying proper operation of the SN3308 and all associated avionics equipment. Enter the change of the projection lamp, and inspection and test record into the aircraft maintenance records and present a copy of the description of work accomplished to the aircraft owner or operator.

Calibration: To calibrate the newly installed lamp, see the procedure in the post-installation checkout procedure for “Page 21 Brightness”.

7 Appendix A: Post-Installation Procedures

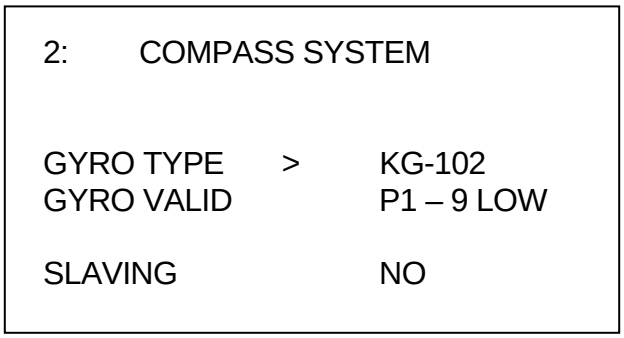
After all wiring has been verified and the SN3308 has been installed into the panel, the maintenance pages must be accessed to properly configure the SN3308 for the installed equipment. Prior to applying power to the SN3308, depress and hold the **SHFT** and the **A-B** pushbuttons, then apply power 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 NEXT repeatedly to step through any remaining maintenance pages until the normal 360-degree view is displayed. This will allow normal operation of the unit to test the effects of settings. Re-enter the maintenance pages by pressing VUE to switch to ARC mode, and then again to access the first maintenance page.

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

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



Gyro Type: Selects KG102, XYZ NORM, XYZ –180, 429 PORT 1 , PORT 2 OR 429 PORT 3. 429

Gyro Valid: Selects presence of Gyro Valid signal from Gyro; either disabled, active-high, or active-low.

Slaving: Turns slaving On and Off. When turned on, the following additional information will display:

Cont'd

```
        .
        .
        .
        .
FLUX GATE  KMT-112          (ITEM)
QUADRANT   0°               (CALIBRATION)
PEAKING    6                (ADJUSTMENT)

FG X SIG        XXX
FG Y SIG        YYY

EXC. LOCK       00
EXC. VALID      00
```

Notes:

Use ↑ and ↓ to select the item and the HDG control knob to adjust.

When a flux gate is *first selected* the Quadrant and Peaking adjustments will automatically preset.

Upon power-up, the flux gate should show a heading (on page-3) which is within ±20° of true heading (prior to calibration) and the compass card on page 3 should turn in the correct direction as the aircraft turns or the fluxgate is turned manually. If this is not the case, the following troubleshooting procedure can be used to diagnose fluxgate problems.

It is sometimes difficult to determine wiring errors because it is difficult to determine the correct fluxgate terminals which actually represent XYZ since this information may not be supplied with the fluxgate. The following procedure can be used to make this determination.

a) Align the aircraft to North. Turn the system on and step the "quadrant" adjustment to align the SN3308 display to North ±20°. (Ensure the adjustments on Page-3 are set to zero). If you can't get closer than 30 or 40 degrees, your "xyz" may actually be "yzx" or "zxy". Take <u>all three</u> wires off the fluxgate and move them one terminal "clockwise" and try again. You may have to do this a second time. Once the system achieves correct "North" seeking, the "Z" terminal has been correctly identified and should not be changed.

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

b) Ensure the compass card rotation is correct by observing that the displayed heading increases/decreases properly as the aircraft heading is changed or the fluxgate is rotated by hand. If increasing the heading of the fluxgate yields *decreasing* heading card indication, reverse the X/Y leads. This will not affect North as identified in step 'a' above.

c) Proceed to the calibration adjustment.

Use of Signal indicators (with Quadrant set to 0):

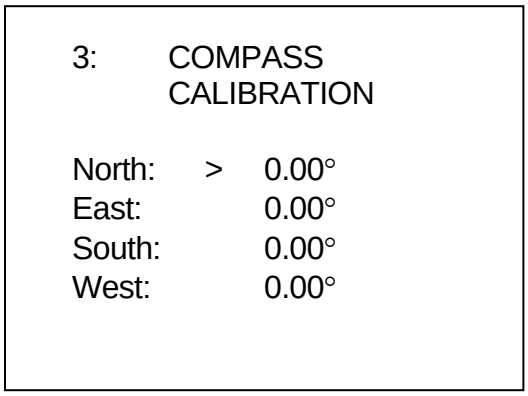
300°	X=100-250	Y=0
0°	X =150-350	Y=identical but opposite to X.
60°	X=0	Y=100-200

These readings are informational and approximate. The maximum X/Y signal is dependent on the fluxgate and is not critical as long as it falls within the above ranges.

Use of Peaking adjustment:
At a heading of North where X and Y are numerically equal but opposite, changing the Peaking adjustment should not allow increasing the X or Y level more than 10%. This does not normally require adjustment but can be used to verify proper operation. The larger ARINC style Sperry, Honeywell, Collins fluxgates use setting "0", and the smaller King, STEC (Humphrey) fluxgates use setting "6".

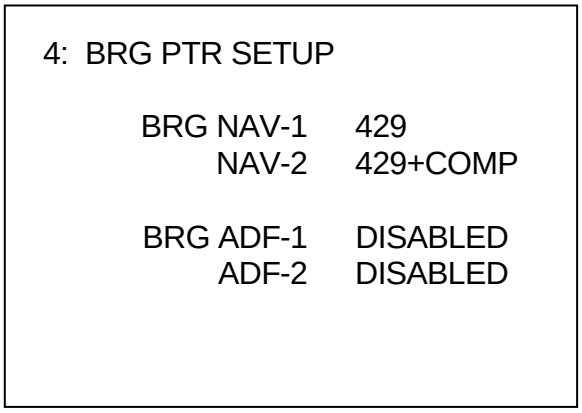
Use of Excitation Lock indicators:
The EXC LOCK indicator shows the lock status of the internal fluxgate demodulator and is shown for troubleshooting. When in normal operation, the EXC LOCK will be a low number, '00' being closer to perfect lock. Any number 30 or above is considered out of lock and will after a three second timeout cause a "Fluxgate Failed" error message to the pilot. If no fluxgate excitation is present at all, the value will be '77'. It is normal for this number to flicker from zero to a non-zero number during operation, and will depend on the inverter/gyro used.

EXC VALID is the counter which counts up to 30 (three seconds) to trigger the "Fluxgate Failed" error message to the pilot. If in the failed state the word "INVALID" will show on the maintenance page.



Purpose: Calibrates the compass slaving system.
Instructions: Use ↑ and ↓ to select the item and the HDG control knob to adjust.

Align the aircraft at each cardinal heading and adjust the corresponding calibration item to the exact heading.



Purpose: Sets up sources for the bearing pointers.

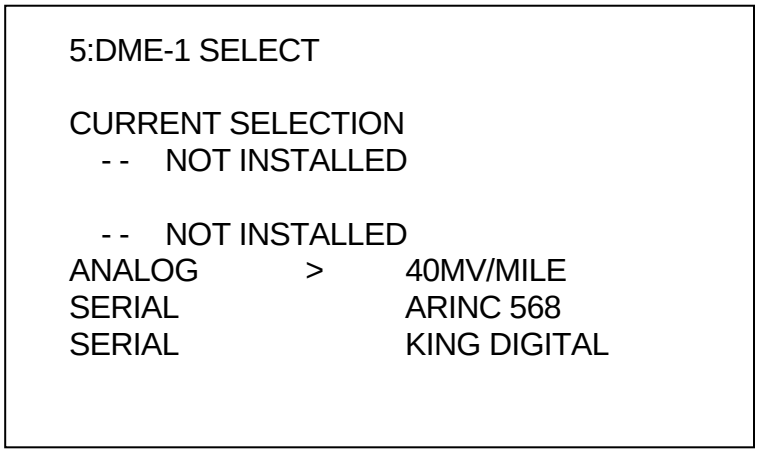
Instructions: Use ↑ and ↓ move the cursor, and use the HDG knob to adjust the value.

Notes:

NAV-1 / NAV-2: Allows selections as follows:
DISABLED: Disables this bearing pointer.
COMPOSITE: Enables and forces the source to be the composite input.

429:	Enables and forces the source to be the 429 port as selected for this receiver in the NAV setup page.
429+COMP	Uses the 429 port (as described above) unless the cross-side receiver is the pilot's current nav source, in which case defaults this pointer to the composite input. This selection is used when two 429 NAV receivers are connected which share the same port.

ADF 1/2: Selects DISABLED, DC SIN/COS, DC -SIN/COS (for Collins receivers), Synchro Normal, and Synchro –180 (to reverse bearing 180 degrees).



Purpose: Selects DME-1.

Instructions: Use ↑ and ↓ or HDG control knob to choose, and use the SET softkey to select. When the SET softkey is depressed, the active selection will appear to the top under "current selection".

Select the appropriate DME receiver type. Note that the ARINC 568 setting is used for Collins DME40 DME's.

Note: Analog 40mv/mile DME can only be assigned to DME 1 or DME 2 but not both.
Selection of Serial King Digital automatically selects 429 Port 2

```
6:DME-2 SELECT

CURRENT SELECTION
  - -   NOT INSTALLED

  - -   NOT INSTALLED
ANALOG              40MV/MILE
SERIAL              ARINC 568
SERIAL              KING DIGITAL
```

Purpose: Selects DME-2.

Instructions: Use ↑ and ↓ or HDG control knob to choose, and use the SET softkey to select. When the SET softkey is depressed, the active selection will appear to the top under “current selection”.

Note:

Analog 40mv/mile DME can only be assigned to DME 1 or DME 2 but not both.
Selection of Serial King Digital automatically selects 429 Port 3

```
7: DME 1 / 2 CHANGE

DME1:              >   NOT INSTALLED
DME2:                  NOT INSTALLED

DME-1 HOLD             ACTIVE HIGH
DME-2 HOLD             ACTIVE HIGH
DME-2 HOLD             DME2  HOLD

ANALOG   0mi           00
        90mi           000

ANALOG  DIST           00.0 nm
```

Purpose:

DME 1 HOLD
Allows setting the logic level of P2-10, DME HOLD input, ACTIVE HIGH or ACTIVE LOW signals for the DME's selected on page 5 and 6.

DME 2 HOLD
Allows setting the logic level of P2-3,
DME HOLD input, ACTIVE HIGH or ACTIVE LOW signals for the DME's selected on page 5 and 6. (See drawing "DME KING SERIAL AND ANALOG" for interface when wiring P2-3 as DME1-NAV2)

DME 2 HOLD Allows the DME-2 HOLD to be used instead for DME-1 NAV-2 (cross side) selection.

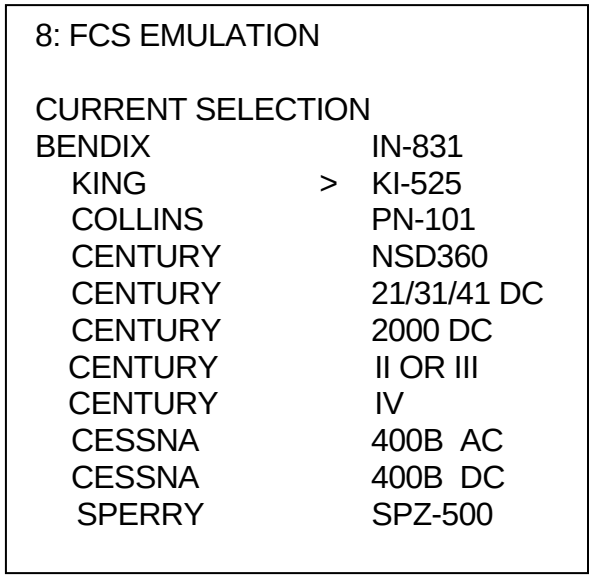
Allows calibration of Analog DME's

Instructions: Use ↑ and ↓ to move the cursor, and use the HDG knob to adjust.

To calibrate analog DME's, first using a DME test set:

a) setting the test set to 0.0 miles, calibrate 0.0miles using the 0mi calibration. Note that the adjustment scale factor is arbitrary.

b) setting the test set to 90.0 miles, calibrate 90.0 miles using the 90mi adjustment. Note that the adjustment scale factor is arbitrary.



Purpose: Changes the output of the heading/course datum signals for the flight control system to DC (KI-525 or NSD360 emulation) or AC (IN-831/PN101 emulation). The selections by manufacturer name select default settings for the items when on the next page. If an autopilot type is listed, use this to select the closest default settings otherwise select an HSI type which is the closest choice for your autopilot input and strapping.

Instructions: Use ↑ and ↓ or HDG control knob to move the cursor, and use the SET softkey to select.

9: FCS CHANGE

KING KI-525

SIGNAL	DEFAULT DC	CURRENT DC
HDG DATUM	+RIGHT	+RIGHT
CRS DATUM	+RIGHT	+RIGHT
HDG V/DEG	00.550	00.550
CRS V/DEG	00.210	00.210
MIN VOLTS	-09.997	-09.997
MAX VOLTS	09.996	09.996
REF VOLTS	00.001	00.001

Purpose: Trims the factory defaults for the emulation selected on page 8.

Instructions: HDG V/DEG and CRS V/DEG 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: (Note that prior to Software 1.33 these values were shown in arbitrary units, not in volts/deg).

a) Engage the autopilot in HDG mode. After the aircraft is established on the desired heading, move the heading bug a large amount and ensure that the aircraft turns to the heading bug and rolls out normally without instability, overshooting or undershooting the desired heading.
   To correct for overshooting or instability, reduce the HDG GAIN appropriately.
   To correct for undershooting, increase the HDG V/DEG appropriately.
b) Engage the autopilot in NAV mode and turn OFF the NAV receiver to provide a zero course error. Repeat the tests and adjustments in item ‘a’ above using the course pointer and CRS V/DEG for adjustment.
c) Use the “offset” adjustment to center the heading rollout if not precisely on the lubber line. This will rarely be required.

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

(Note prior to software 1.34 CRS and HDG were a single item and have been separated in software 1.34 to support the Sperry SPZ-500 and similar autopilots which use opposite phase on CRS and HDG).

The other settings in this menu are not for installer adjustment except on advice of the factory, service bulletin, or service information letter. These values are defaulted when an item is selected in page 8 with the SET softkey.

10: LNAV-1 SELECT

CURRENT SELECTION
NONE

	NONE
AERO COMP	LE-2004
ARNAV	R-50
II MORROW	604
II MORROW	612
II MORROW	618
II MORROW	2001 (RS-232)
II MORROW	2101 (RS-232)
II MORROW	2001 (ARINC)
II MORROW	2101 (ARINC)
II MORROW	GX (RS-232)
II MORROW	GX (RS-232 ENH)
GARMIN	150 (RS-232)
GARMIN	250 (RS-232)
GARMIN	150XL(RS-232)
GARMIN	250XL(RS-232)
GARMIN	155 (RS-232)
GARMIN	165 (RS-232)
GARMIN	155XL(RS-232)
GARMIN	300 (RS-232)
GARMIN	300XL(RS-232)
GARMIN	150 (ARINC)
GARMIN	250 (ARINC)
GARMIN	250XL(ARINC)
GARMIN	155 (ARINC)
GARMIN	165 (ARINC)
GARMIN	155XL(ARINC)
GARMIN	300 (ARINC)
GARMIN	430 (ARINC)
KING	KLN-35 (RS-232)
KING	KLN-88 (RS-232)
KING	KLN-89 (RS-232ENH)
KING	KLN-90 (RS-232)
KING	KLN-90 (ARINC)
KING	KLN-900 (ARINC)
MAGELLAN	5000
TRIMBLE	1000 (RS-232)
TRIMBLE	2000 (RS-232)
TRIMBLE	2101 (RS-232)
TRIMBLE	3000 (RS-232)
TRIMBLE	3100 (RS-232)

Purpose: Changes selection of primary NAV LNAV-1. If none installed select NONE.

Instructions: Use ↑ and ↓ or right control knob to move the cursor, and use the SET softkey to select.

Note **Selection of LNAV 1 selects 429 Port 1 or #1 RS232**

Maintenance Page 11 is identical and sets LNAV-2.
Selection of LNAV 2 automatically assigns 429 Port 3 or #2 RS232
The Maintenance Screen pictured above is for illustration purposes only. To view all the choices of LNAV receiver, scroll through the list using the right knob.

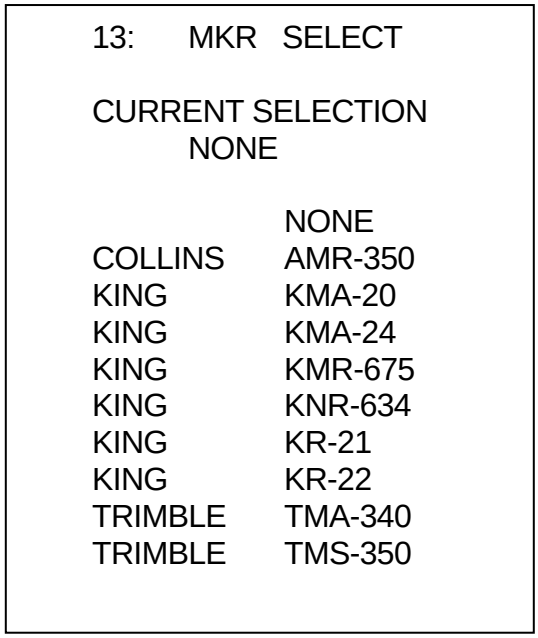
```
12:    LNAV  1 / 2 CHANGE

       NONE

ANNUN      DISCRETE
COURSE     KNOB
DEVIATION  ANALOG IN
OBS ROT    NORMAL
OBS CAL    000.0

       NONE

ANNUN      DISCRETE
COURSE     KNOB
DEVIATION  ANALOG IN
OBS ROT    NORMAL
OBS CAL    000.0
```

Purpose: Changes default settings for LNAV-1/2 selected on Maintenance Pages 10 and 11.

Instructions: Use ↑ and ↓ move the cursor, and use the HDG knob to adjust the value.

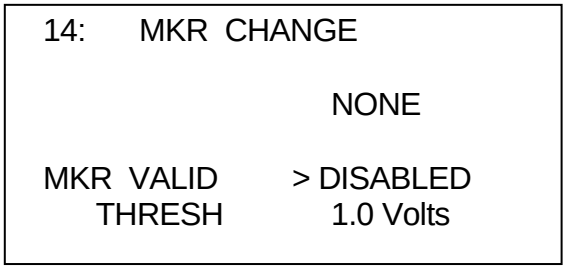
Note:In normal use only the OBS CAL is adjusted during installation. This adjusts the calibration of the OBS for each receiver. It is only required if the GPS receiver uses an RS-232 interface and has a resolver connected. When a receiver uses

an ARINC-429 interface the OBS information is transmitted to the receiver via the ARINC-429 interface.



Purpose: Changes selection of the marker beacon receiver. If none is installed select NONE.

Instructions: Use ↑ and ↓ or HDG control knob to move the cursor, and use the SET softkey to select.



Purpose: Changes default settings for the marker beacon receiver selected on page 13.

Instructions: Use ↑ and ↓ move the cursor, and use the HDG knob to adjust the value.

Notes: These settings should be changed only on instructions from the factory, service bulletin, or service information letter.

15: NAV CHANGE	
NAV-1 ENABLE	YES
PORT	429 PORT-3
NAV-2 ENABLE	YES
PORT	ANALOG
ILS	VALID LOW
RELAY MODE	MASTER
ILS LOCKOUT	NO
NAV-2 OBS	NORM
OBS CAL	000.0
COMPOSITE-1	012.0
-2	003.2

Purpose: Sets up functions associated with VHF NAV 1 & 2 and ILS.

Instructions: Use ↑ and ↓ move the cursor, and use the HDG knob to adjust the value.

Notes:

NAV-1 / NAV-2: Select installed / not-installed status. A single receiver should be installed as NAV-1.

PORT: Selects Analog if a conventional receiver or the appropriate ARINC port 1-2-3 as wired (for GNS430 installations).

RELAY MODE: See description in pinout specifications. Normally set to MASTER.

ILS LOCKOUT: Enables/disables ILS Lockout feature of the ILS Energize input pins. Disabling lockout will allow total manual control by the pilot. See NAV Interface description. Normally set to NO.

COMPOSITE: Calibrates the composite NAV demodulator for the bearing pointers set up on page 4 BRG POINTERS.

ILS-1 and ILS-2: Select logic level of "ILS Energize" associated with each NAV receiver. Note that these inputs are used ONLY to energize the VDI display and may apply to either NAV or GPS receivers. If used with GPS2 when no NAV2 is enabled, temporarily enable NAV2 to access the ILS setting, and then deselect NAV2. The ILS setting will be retained.

OBS ROTATION: If the OBS control rotates backwards when connected to the associated NAV receiver, change this setting and recalibrate. See chart below.

OBS CAL: OBS calibration for each VHF NAV receiver. When this is selected the OBS course will appear on the display and a lateral deviation scale will display. Note: changing the OBS CAL 180°

is identical to reversing the H/C leads on a standard resolver. See chart below.

COMPOSITE: Calibrates the composite NAV demodulator for the BRG pointers. When this is selected the received bearing will display.

SN3308 NAV Page Resolver Troubleshooting

Problem	Comment	Action
No resolver action at all		Ensure that you have connected the SN3308 resolver input to the correct pin on the navigation receiver. This is NOT always the 'Rotor H' – it might be 'Rotor C'. Check the receiver schematic
	No 'Vref' signal to SN3308	Check the receiver schematic to determine whether 'D' or 'E' is the appropriate connection.
	No Sin/Cos return to receiver	Check the receiver schematic to ensure the SN3308 outputs are connected to the appropriate active pins D/E/F/G of the receiver, not the grounded pins.
Calibration problems		See steps below

SN3308 NAV Page Resolver Calibration (does not apply to VIR-30 or KNR-634)

STEP	COMMENTS
1. Set nav test set to zero degrees and SN3308 course pointer (OBS) to zero degrees.	
2. Go to the NAV maintenance page on the SN3308 and adjust the NAV-1 OBS calibration to center the deviation needle.	
3. Step to the compass rose display on the SN3308.	
4. Turn the test set to 45 degrees. Set the SN3308 OBS to re-null the deviation pointer. If this is within a few degrees to a course angle of 45 degrees, proceed. Otherwise if it is –90 degrees out, step to the SN3308 NAV page and change the OBS ROTATION to "REVERSE" and go back to step 1.	
5. Step the SN3308 to the compass rose display (after the last maintenance page) and check the to/from flag and course pointer rotation. If to/from is reversed (and the wiring is correct) step back to the NAV maintenance page and re-null the OBS calibration 180 degrees from the current calibration setting with the test set and the OBS set to the same course.	This step is identical to reversing the H/C leads on a standard resolver. NOTE: If you are using a NAV401 test set from the rear-panel TONE OUT, to/from are backwards out of the generator and should be expected.
6. Check the OBS at 30 degree increments and verify calibration.	

```
16: RELAY SENSE

              NAV-2    OFF
              GPS-1    OFF
              GPS-2    OFF

          CDI SRC SEL  OFF
            RCVR 1/2   OFF
```

Purpose: Enables/disables relay sense from any relays which are driven from SN3308 relay control outputs. When a ground closure is not detected on the appropriate relay sense terminal (indicating that the relay did not close) the pilot's NAV source selection will be redlined on the pilot's display. For example if a NAV2 relay is used and doesn't close, the pilot's display will show "~~NAV2~~".

NAV-2 GPS-1 GPS-2:
Associated with the relay outputs on connector P3.

CDI SRC SEL:
This sense input enables/disables the automatic CDI function for Garmin GNS receivers when grounded/ungrounded. This is only used in a dual SN3308 installation which has Pilot/Copilot select for the autopilot. See installation drawings. In a typical pilot-only installation this sense pin is not assigned (OFF) and the SN3308 will control / be-controlled from the GNS CDI Select function.

RCVR 1 / 2:
This is the sense input for a relay which is wired to both the Nav-2 and Gps-2 relay outputs. This is specific to installations with dual Garmin GNS receivers where both receivers (all four nav sources) are made available as nav sources. See installation drawings.

Instructions: Use ↑ and ↓ move the cursor, and use the HDG knob to adjust the value.

Notes: Each selection allows assigning the appropriate relay sense function to one of the following 12 input pins. These pins represent the probable pins left-over (unassigned) after all the installed equipment has been wired/assigned to the required pins. Normally there will be at least 3-4 of these pins remaining in any installation.

Pin	Original Function
P2-3	DME-2 Hold In
P2-10	DME-1 Hold In
P2-12	Appr Active Annunciator In
P2-14	Ext. Sw 2 In
P2-19 *	400 Hz Diff Resolver SIN
P2-22	Ext. Sw 1 In
P2-29	WPT Annunciator In
P2-30	GPS Selected In
P2-31	ARM Annunciator In
P2-32	OBS/LEG Annunciator In
P2-33	Spare input 1
P2-37 *	400 Hz Diff Resolver COS

All these inputs are ACTIVE LOW, meaning a ground closure is required to activate.

* All the pins EXCEPT P2-19 and P2-37 have internal pullup resistors. If you use P2-19 or P2-37 an EXTERNAL pullup resistor must be tied to aircraft power. 10K Ohms is sufficient.

NAV-1
GPS-1
GPS-2

Enable for any relay when a single relay is operated from the NAV-1, GPS-1 or GPS-2 relay outputs. The effect of the relay not closing the appropriate sense input will be that the navigation source will be redlined on the pilot's display after the source is selected. When the relay properly operates the redline will not appear.

CDI SRC SEL

A special input related to Garmin GNS430 installations. When enabled, allows the SN3308 to control (ground) or not control (ungrounded) the CDI source select on the GNS 430. When turned off, the CDI select is always enabled.

RCVR 1 / 2

A special input related to dual Garmin GNS430 installations which drive autopilots. A ground closure to this input indicates that receiver 1 (ungrounded) or 2 (grounded) is active.

17: SYSTEM LCD SETUPS CONSULT FACTORY	
SET LEFT POS	000
SET TOP POS	198
TRIM BOT POS	541
TRIM RT POS	458
TRIM T/B CENT	314
TRIM L/R CENT	232
LCD SHP	003
LCD PLL	065
LCD TC1	050

Notes: These settings should be changed only on instructions from the factory, service bulletin, or service information letter.

18: SYSTEM	
I/O Rev	1
CPU Rev	0
INTERNAL TEMP	30° C 85° F
FAN RPM	6600
INVERTER INPUT	400 Hz
INVERTER Vp-p	36.00
COLOR SELECT	PILOT
400 Hz INVERTER	DISABLED
BOOTSTRAP OUT	ENABLED
WX DETECTION	OFF

Purpose: Shows some helpful system diagnostics.

IO/CPU Rev: These are informational showing the revision level of the internal circuit boards. These numbers are NOT the same as the MOD LEVEL information on the data plate.

Temp: Internal temperature is displayed for determination of proper installation cooling. The internal temperature should run approximately 10° C or 18°F above ambient temperature after operating for 30 minutes at maximum brightness. If due to

installation considerations it is necessary to increase cooling airflow:
1) bring additional cooling air to the fan inlet via a hose from an external avionics blower; or
2) it is permissible to remove the foam fan filter in the clamptray to increase cooling air if needed. This may be done by pulling the filter through the slots.

FAN: Displays the cooling fan RPM for proper operation. Normally approximately 6300RPM or greater

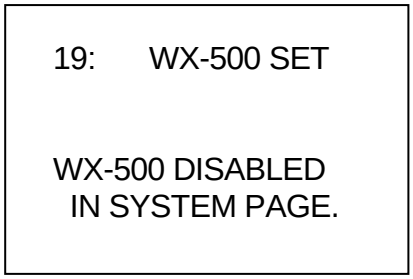
INVERTER: Displays the aircraft master inverter input frequency and voltage (if used). This can be used to test master inverter operation at normal and low bus voltage. The inverter should be between 320Hz and 480Hz. The inverter frequency is shown on the display. Check the inverter at low and high battery voltage for correct tolerance. The displayed voltage is peak voltage which for a sine wave inverter will be approximately 36v and for a square wave inverter will be approximately 26v.

The inverter may be enabled/disabled. Note: if no master inverter is used the master inverter MUST be set to DISABLED to prevent getting a spurious error message on the pilots display.

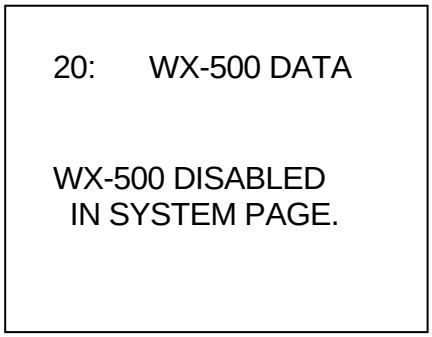
COLOR SEL: Used to select either the PILOT or COPILOT color scheme for cross-side receiver indications in a dual-SN3308 installation.

BOOTSTRAP: Used to select OFF, NORMAL, or –180 for the RMI bootstrap output signals. This output may be used to provide a heading to an external RMI, moving map or weather detection equipment. NOTE: Bootstrap selected to OFF, when providing Serial Heading for WX 500.

WX DETECT: The WX-500 functions are enabled/disabled here. Note: if Stormscope is enabled it must be connected to RS-232 port #2, which will preclude the use of a 2nd RS-232 GPS receiver on this port.



Purpose: Displays setup data used in WX-500 installations. Refer to the BFG WX-500 installation manual for instructions on the information contained in this page.



Purpose: Displays text data from the BFG WX-500. Refer to the BFG WX-500 installation manual for instructions on the information contained in this page.

21: BRIGHTNESS		
Button Lo Bright		000
Button Hi Bright		045
LAMP DATA		
V-Cal 14V		-020
I-Cal 14V		1000
I-Cal 28V		1000
Lamp PWM	249	
Lamp Ma	2000	
Lamp Init Ma	2010	2009
Lamp Peak Ma	2100	2100
Lamp Hrs Tot	002:06	123:23
Lamp Hrs HB	001:10	50:03
Lamp Profile	020000	012300

Purpose: Allows adjustment of LED buttons and viewing of lamp data.

Button Lo: Adjusts the minimum brightness of the pilot's buttons when the brightness control is at minimum. Adjust this at night.

Button Hi: Adjusts the maximum brightness of the pilot's buttons when the brightness control is turned up. Adjust at dusk.

V-Cal 14:
I-Cal 14:
I-Cal 28: Factory adjustments. Do not change unless on instruction of the factory. To prevent inadvertently change these adjustments they are locked out unless the CAL button is held while the right knob is turned.

Lamp Ma: This items shows the current lamp current in milliamps.
Other: The two-column information is data on the current bulb vs the last bulb. This information is updated when a LAMP CHG operation is performed.

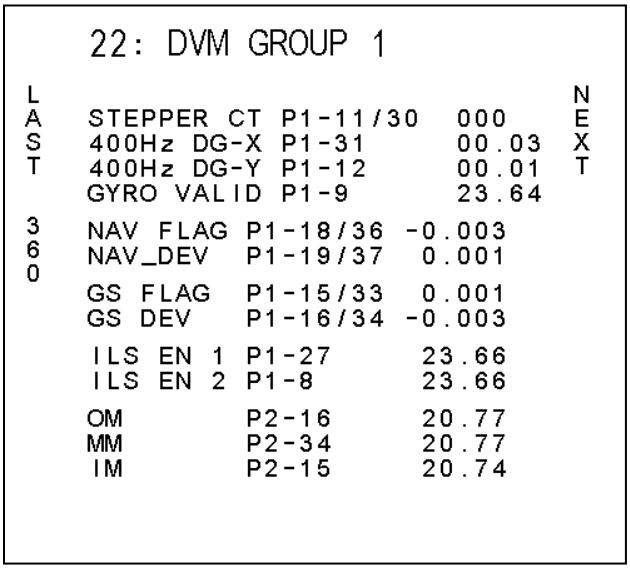
LAMP CHG: Changing the projection lamp requires re-initializing the lamp data. This is accomplished by holding both LAMP and CHG softkeys simultaneously. This operation must be performed when the aircraft bus voltage is at normal level – either 13.75v or 27.5v – either by running the engines or running from ground

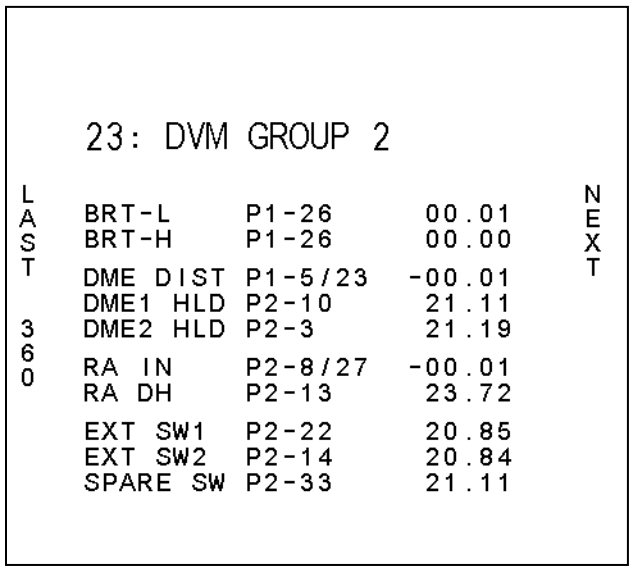
power. Do not perform this calibration if the aircraft is on battery only (i.e. at 12.0v or 24.0v).

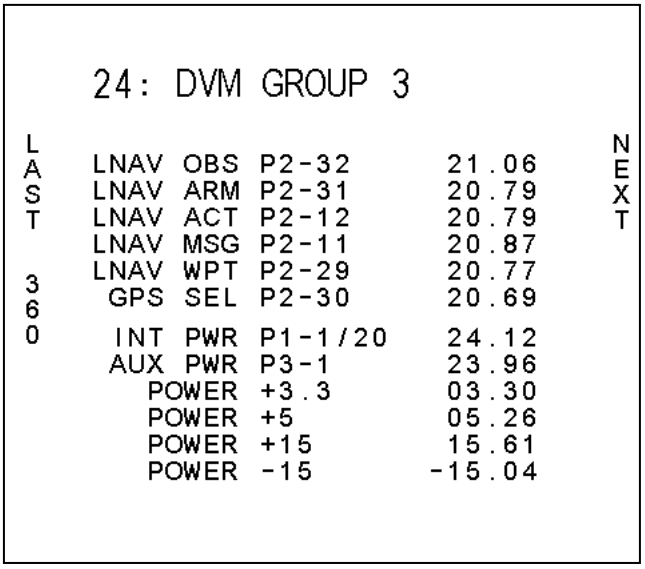
During this operation the lamp will automatically be brought to maximum brightness and measured over a period of 30 seconds. If you want to abort this operation after selecting it, remove the SN3308 power early in the test cycle.

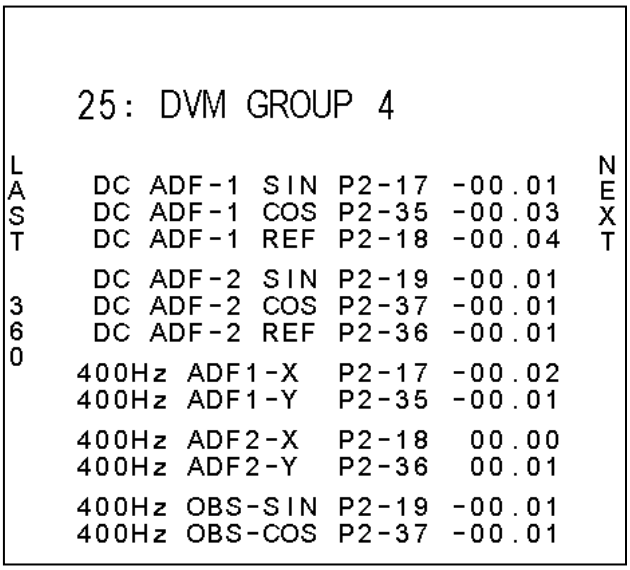
22-25: DVM Groups

Various




23: DVM GROUP 2
LAST 360
NEXT
BRT-L P1-26 00.01
BRT-H P1-26 00.00
DME DIST P1-5/23 -00.01
DME1 HLD P2-10 21.11
DME2 HLD P2-3 21.19
RA IN P2-8/27 -00.01
RA DH P2-13 23.72
EXT SW1 P2-22 20.85
EXT SW2 P2-14 20.84
SPARE SW P2-33 21.11

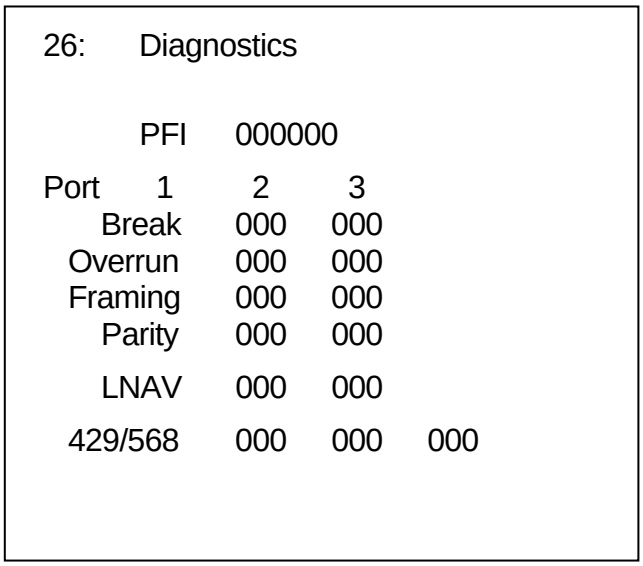

24: DVM GROUP 3
LAST 360
NEXT
LNAV OBS P2-32 21.06
LNAV ARM P2-31 20.79
LNAV ACT P2-12 20.79
LNAV MSG P2-11 20.87
LNAV WPT P2-29 20.77
GPS SEL P2-30 20.69
INT PWR P1-1/20 24.12
AUX PWR P3-1 23.96
POWER +3.3 03.30
POWER +5 05.26
POWER +15 15.61
POWER -15 -15.04



Purpose: Shows the actual measured input voltages (AC or DC as appropriate) at the SN3308 input pins as well as power supply voltages. This may be helpful in diagnosing installation wiring problems. Please note that AC signals are shown peak so a 26 volt sine wave input will show as approximately 36 volts, while a 26 volt square wave will show as 26 volts.

These values are not smoothed as in a normal DVM so a certain amount of jitter in the readings is normal.

DVM GROUP 1 also shows the internal pulse counter for the KG102 gyro interface which may be used to diagnose problems with this gyro.



Purpose: Helps diagnose problems with internal systems such as serial port error counts showing error counts.

RS232/RS422 Data:

PFI: Counts occurrences of power fail sensing. Should normally always be 000000.

Serial Ports

Break: Usually indicates +/- inputs to SN3308 are wired backwards. If also associated with framing errors may indicate the wrong baud rate selected from the sender.

Overrun: Usually indicates baud rate of sending unit is too high.

Framing: Caused by a break error or by baud rate of sending unit too low. (i.e. 1200 baud GPS sending to 9600 baud Sandel)

Parity: Not used.

LNAV: Indicates internal error decoding information from Loran or GPS.

429/568: ARINC 429 or DME communication errors (as appropriate selected/wired).

CLR SOFTKEY: Clears all the error counts

Note: It is NORMAL for some errors to occur during power up sequencing, but errors should not accumulate during normal operation.

8 Appendix B: Environmental Qualification Form

RTCA/DO-160C Environmental Qualification Form

Product nomenclature: **SN3308 ColorMap Navigation Display**

Manufacturer: **Sandel Avionics, 2401 Dogwood Way, Vista, CA 92083**

Conditions	Section/ Paragraph	Description of Conducted Tests
Temperature and altitude	4.0	Equipment tested to category F1 (-55°C to +70°C to 55,000' MSL)
Low temperature operating	4.5.1	Equipment tested to Table 4-1
Low temperature survival	4.5.1	Equipment tested to Table 4-1
High short-time operating	4.5.2	Equipment tested to Table 4-1
High temperature survival	4.5.2	Equipment tested to Table 4-1
High temperature operating	4.5.3	Equipment tested to Table 4-1
In-flight loss of cooling	4.5.4	Equipment tested to Table 4-1
Altitude	4.6.1	Equipment tested to Table 4-1
Decompression	4.6.2	Not required for equipment
Overpressure	4.6.3	Not required for equipment
Temperature variation	5.0	Equipment tested to Category C
Humidity	6.0	Equipment tested to Category A
Operational shock	7.0	Equipment tested IAW Para. 7.2.1
Crash safety	7.0	Equipment tested IAW 7.3.1
Vibration	8.0	Equipment tested to N, B, M
Explosion	9.0	Equipment identified as 'X'
Waterproofness	10.0	Equipment identified as 'X'
Fluids susceptibility	11.0	Equipment identified as 'X'
Sand and dust	12.0	Equipment identified as 'X'

Conditions	Section/ Paragraph	Description of Conducted Tests
Fungus	13.0	Equipment identified as 'X'
Salt spray	14.0	Equipment identified as 'X'
Magnetic effect	15.0	Equipment identified as 'X'
Power input	16.0	Equipment tested to Category B
Voltage spike conducted	17.0	Equipment tested to Category A
Audio frequency conducted	18.0	Equipment tested to Category B
Induced signal susceptibility	19.0	Equipment tested to Category B
Radio frequency susceptibility	20.0	Equipment tested to Category W
Radio frequency emission	21.0	Equipment tested to Category A/Z
Lightning-induced transient susceptibility	22.0	Equipment tested to DO-160D, Waveform sets E/F, Level 2
Lightning direct effects	23.0	Equipment identified as 'X'
Icing	24.0	Equipment identified as 'X'

Remarks:

Tests described in Sections 4,5,7, and 8 were conducted by Bell Technologies, Wayne, NJ.
Tests described in Sections 15, 16, 17, 18, 19, 20, 21, and 22 were conducted by Chomerics, Radiation Test Services, Woburn, MA.
Tests described in Section 6 were conducted by National Technical Systems, Boxborough, MA.
All test reports are on file at Sandel Avionics.

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 LLC, SN3308 Navigation Display ***(or as appropriate)***, Part Number SN3308-00-BL ***(or as appropriate)***
2. Sandel Avionics LLC, Clamp Tray Fixture 3ATI, Part Number 61013.

B. The Sandel Avionics SN3308 is interfaced to the following equipment:

1. Garmin International, GPS 165, 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 SN3308 receives and processes GPS navigation information for digital and waypoint display from the GPS 165. These operations are considered supplemental navigation.

D. The SN3308 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 SN3308 receives and processes glideslope deviation and composite audio for bearing display from the KX 155.

F. The SN3308 receives and processes radar (radio) altimeter information for digital and virtual display from the KRA 10A.

G. The SN3308 receives and processes marker beacon receiver information for illumination from the KR 22.

H. The SN3308 receives and processes magnetic heading for digital and graphic display from the KG 102A and KMT 112.

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

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

K. 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.

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

M. Instructions for Continued Airworthiness include the requirement to replace the projection lamp within the first 225 hours and every 225 hours thereafter, or every calendar year, whichever comes first.

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

O. 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 from a Sandel STC in a Bonanza F33. It 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.

SECTION I - GENERAL

The Sandel Avionics SN3308 Navigation Display is a compact three-inch instrument which performs the functions of a traditional Horizontal Situation Indicator combined with a two-pointer RMI. The SN3308 Navigation Display also displays a moving map, Stormscope® data, and marker beacon and GPS annunciators if the aircraft is appropriately equipped and configured.

SECTION II LIMITATIONS

The SN3308 Navigation Display Pilots Guide, SPN 90106-PG (applicable revision) 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 SN3308 Navigation Display.

SECTION III EMERGENCY PROCEDURES

If the SN3308 Navigation Display 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.

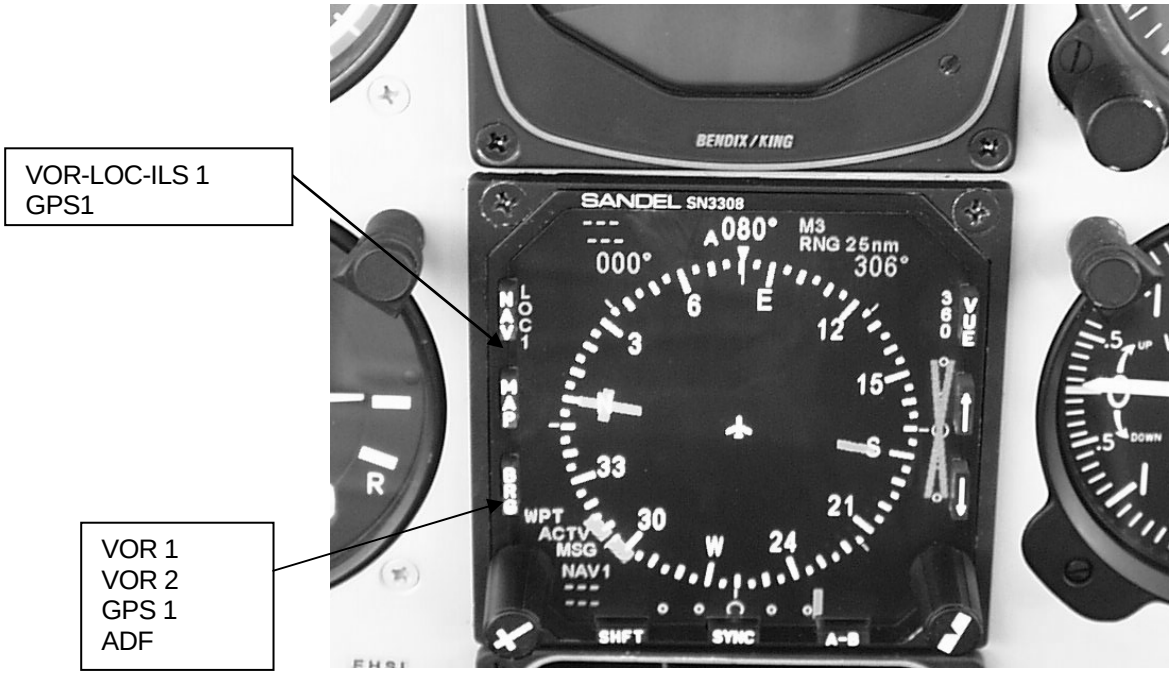
If the fluxgate fails, the SN3308 Navigation Display will continue to display heading based on the directional gyro (DG) input. The compass rose changes color from white to amber, heading numbers will be redlined.

If the remote directional gyro (DG) fails and the fluxgate fails or the SN3308 is a slaved gyro repeater, the compass rose will change from white to amber and continue to be displayed and the digital heading numbers will be redlined. Use the magnetic compass as a heading source.

The circuit breaker for the SN3308 Navigation Display is located on the lower right circuit breaker panel labeled EHSI.

Refer to the SN3308 Navigation Display Pilots Guide for other error messages and alerts.

SECTION IV NORMAL PROCEDURES



Sandel Avionics SN3308 Navigation Display

The selection of the primary navigation source between VOR-LOC-ILS 1 and GPS 1 is accomplished by the use of the **NAV** switch and will connect the source to the HSI course pointer and the autopilot.

ILS override will prevent selection of the GPS as long as an ILS frequency is tuned on VOR-ILS 1. This will be annunciated on the SN3308 Navigation Display.

The selection of the bearing pointer source between VOR 1, VOR 2, GPS1, GPS2 or ADF is accomplished by the use of the **BRG** switch.

Annunciation of all GPS modes is accomplished by discrete annunciator lamps as well as on-screen annunciation on the SN3308 Navigation Display.

[*If installed as a heading repeater (no direct fluxgate connection).***]**

When manually slewing the remote compass system, the compass rose will change from white to amber and the digital heading numbers will be relined.

[*End heading repeater language.***]**

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 SN3308. A copy of this report (and the "Operational Flight Check Procedures/ Report in Section C-2) 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 10129, 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 SN3308

Installed in

{aircraft make and model}

Registration No. _____

SN3308 Serial No. _____

Document No. _____

Rev. - , Date

11.1.1 Introduction

The following ground test procedures are to be performed after the SN3308 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 SN3308, 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)

11.1.2 Test Procedures and Results

11.1.3 Physical Installation

Verify that the SN3308 clamp tray has been properly installed in accordance with the manufacturer's instructions, that any external switches affecting SN3308 operation have been clearly labeled, and that a trip-free resettable 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 SN3308 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 SN3308 display illuminates within 12 seconds. It may be necessary to adjust the externally-mounted SN3308 dimmer control to obtain satisfactory brightness level.

CHECK SOFTWARE OPERATING VERSION NUMBER AS DISPLAYED ON TOP OF SCREEN, CHECK WEBSITE OR WITH TECH SUPPORT THAT UNIT AS LATEST REVISION. INSTALL DATABASE AT THIS TIME OR AT DELIVERY.

Software revision # _____**Database Expiration Date**_____

Switch on all equipment interfaced to the SN3308 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 Appendix A of the SN3308 Installation Guide. These procedures describe how to configure the SN3308 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 1 minute the compass card is displayed in white and agrees with the heading on a magnetic compass.

Completed _____ Comment _____

Disable the fluxgate excitation to the SN3308. 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 SN3308 which requires operator acknowledgement.

Completed _____ Comment _____

If the SN3308 is installed as a heading repeater (no direct fluxgate connection) and interfaced with a Directional Gyro (DG) that "Flags Invalid" when operated in "Free Gyro Mode". Verify that the SN3308 continues to display the compass rose while the gyro compass is manually slewed left and right. This test must be performed after the SN3308 has been powered for a minimum of 2 minutes.

Completed _____ Comment _____

11.1.8 NAV Source Selection

If the SN3308 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, GPS2 (or as configured). For each NAV source, create valid and invalid NAV conditions and verify correct display of the SN3308 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 _____

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 SN3308 is configured in “slave” mode (using external NAV/GPS switch):

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

Completed _____ **Comment** _____

Verify that the external NAV/GPS switch arrangement correctly controls the selected NAV source on the SN3308, including any ILS lockout scheme, if implemented.

Completed _____ **Comment** _____

11.1.9 BRG Source Selection

Press SHFT>BRG on the SN3308 and verify that all installed NAV sources are presented for *each* bearing pointer (NAV1, NAV2, ADF1, ADF2, 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** _____

11.1.10 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 SN3308 distance display. Press

SHFT>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 SHFT>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 SHFT>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** _____

11.1.11 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 SN3308 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 SN3308.

Completed _____ **Comment** _____

Press SHFT>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 SN3308. If external mode selection is enabled on the SN3308, verify that the GPS pushbutton softkeys accessed in SHFT>NAV control the proper GPS functions.

Completed _____ **Comment** _____

11.1.12 Marker Beacon Interface

If a marker beacon receiver is interfaced to the SN3308:

With a marker beacon test set, generate outer, middle, and inner marker signals respectively. Verify that the appropriate annunciation appears on the SN3308.

Completed _____ **Comment** _____

Press "TEST" mode on the marker beacon receiver, and verify that the "MT" symbol appears on the SN3308.

Completed _____ **Comment** _____

11.1.13 Flight Control System Interface

If the SN3308 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 SN3308 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 SN3308 display.

Completed _____ **Comment** _____

11.1.14 Stormscope ® Interface

If the SN3308 is interfaced to a WX-500 remote lightning sensor:

Enable the Stormscope® display by pressing the “WX” softkey in the SHFT>NAV submenu. Verify that “WX” is annunciated on the SN3308 display.

Completed _____ **Comment** _____

Press SHFT>NAV and select “WX TEST”. Verify that the word “TEST” is annunciated on the SN3308 display for approximately 10 seconds, and is then replaced by “WX”.

Completed _____ **Comment** _____

11.1.15 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 SN3308, 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 SN3308. Pull the SN3308 breaker if interference is noted, to verify that the SN3308 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 SN3308.

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 SN3308 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 SN3308 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 “Operational Flight Check Procedures/Report” below is for the purpose of simplifying the in-flight operational check of the SN3308. A copy of this report (and the “Functional Ground Test Procedures/ Report” in Section C-1) 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 10129, which should be mailed after operational acceptance.

COMPANY NAME
COMPANY ADDRESS
TELEPHONE/FAX

Flight Test Procedures/Report

for

Sandel Avionics SN3308

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 SN3308 installation.

Specific procedures are not provided for many of the tests herein, due to differences in installed options and aircraft configurations. Refer to the SN3308 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 SN3308 and all associated equipment. Determine that all equipment initializes and functions normally.

Verify that either the SN3308 external brightness control or the aircraft dimming bus control (as installed) can control the brightness of the SN3308 and that a satisfactory brightness level can be attained.

Completed _____ **Comment** _____

Evaluate the display of the SN3308 for readability.

Completed _____ **Comment** _____

Evaluate the intensity properties of the SN3308 display under both direct and indirect sunlight conditions, and in nighttime operation conditions.

Completed _____ **Comment** _____

Check the function of all nine buttons and both 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, pitot/windscreen heat, and anti-icing boots. Verify that none causes interference on the SN3308 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 ADF sources as bearing pointers.

Completed _____ **Comment** _____

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 SN3308 (as installed)
- External GPS mode control switches on the SN3308 (as installed)
- Waypoint display when map is enabled on the SN3308

11.5.4 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 SN3308, if installed
- Flight control system operation.

Completed _____ **Comment** _____

11.5.5 Additional Testing

Perform any additional flight testing deemed necessary.

Completed _____ **Comment** _____

12 Appendix F: List of Effective Drawings and Attachments

Drawing	Rev	Title
-		STC CERTIFICATE
-		FSAW 95-09 FAA MEMORANDUM
82001-07	B	LAYOUT, SN3308
90106-07	C	Layout, SN3308 INSTALLATION
90106-10 pp 1	G2	KING KG102A SIMPLIFIED BLOCK DIAGRAM
90106-10 pp 2	G2	S-TEC GYRO SIMPLIFIED BLOCK DIAGRAM
90106-10 pp 3	G2	XYZ GYRO SIMPLIFIED BLOCK DIAGRAM
90106-10 pp 4	G2	MID-CONTINENT SIMPLIFIED BLOCK DIAGRAM
90106-10 pp 5	G2	NAV-1 AND RS-232 GPS
90106-10 pp 6	G2	NAV-1 AND ARINC-429 GPS
90106-10 pp 7	G2	NAV-2, GPS-1, DATA LOAD (RS422) GPS2
90106-10 pp 8	G2	WX-500
90106-10 pp 9	G2	RESOLVER INTERCONNECT
90106-10 pp 10	G2	GPS SWITCH / ANNUNCIATORS
90106-10 pp 11	G2	GYROS: XYZ AND KG-102
90106-10 pp 12	G2	GYROS: 328-A3G AND XYZ
90106-10 pp 13	G2	GYROS, MID CONTINENT & S-TEC, BOOTSTRAP
90106-10 pp 14	G2	GYROS: KCS-55 UPGRADE
90106-10 pp 15	G2	ADF
90106-10 pp 16	G2	MARKER BEACON
90106-10 pp 17	G4	DME: KING SERIAL AND ANALOG
90106-10 pp 18	G2	DME: ARINC 568
90106-10 pp 19	G2	SYSTEM
90106-10 pp 20	G2	FCS INTERCONNECT
90106-10 pp 21	G2	CENTURY 1C388 COUPLERS
90106-10 pp 22	G2	BENDIX/KING AUTOPILOTS
90106-10 pp 23	G2	S-TEC AUTOPILOTS
90106-10pp 24	G2	BENDIX AUTOPILOTS
90106-10 pp 25	G4	SINGLE SN3308 / GNS430/530
90106-10 pp 26	G4	SINGLE SN3308 / DUAL GNS430/530
90106-10 pp 27	G4	SINGLE SN3308 / GNS430/530 / #2 VHF NAV
90106-10 pp 28	G4	DUAL SN3308 / GNS430/530, FCS PILOT ONLY
90106-10 pp 29	G4	DUAL SN3308 / GNS430/530, FCS SELECTABLE
90112-08	B	MOUNTING, SN3308 BRIGHTNESS POT AND DATA UPLOAD JACK

United States Of America
Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number **SA00696LA**

This Certificate issued to **Sandel Avionics LLC**
2401 Dogwood Way
Vista, CA 92083

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3* *of the* Civil Aviation *Regulations.* *Certification basis is set forth in Type Certificate Data Sheet.

Original Product Type Certificate Number: **3A15**
Make: **Beechcraft**
Model: **F33**

Description of Type Design Change: **Installation of Sandel Avionics SN3308 Navigation Display in accordance with FAA Approved Sandel Avionics Master Drawing List, Document No. ST6481-01, Revision No. "C", dated September 28, 1998, or later FAA approved revision and FAA Approved Airplane Flight Manual Supplement, Document No. ST6481-09, Revision No. "A", dated October 09, 1998.**

Limitations and Conditions: **The approval of this installation should not be incorporated in any aircraft unless it is determined that the interrelationship between this change and any previous approved configuration will not introduce adverse effect upon the airworthiness of the aircraft.**

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

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

Date of application: April 23, 1998

Date reissued:

Date of issuance: OCT 2 0 1998

Date amended:

By direction of the Administrator

(Signature)
Acting Manager, Systems and Equipment Branch
Los Angeles Aircraft Certification Office

(Title)

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

This certificate may be transferred in accordance with FAR 21.47.

Subject: FSAW 95-09A

Date: November 10, 1998

From: Manager, Continuous Airworthiness Maintenance Division, AFS-300

Reply to Attn. of: Hughes:79952

To: All Regional Flight Standards District Office Managers

In the interest of keeping current information available to all offices we are providing this interim memorandum to inform all inspectors of a recently approved Electronic Horizontal Situation Indicator (EHSI) system.

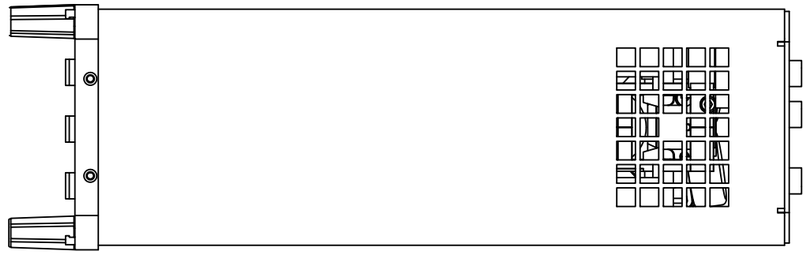
The Sandel Avionics Model SN3308 EHSI system has been approved under the Technical Standard Order process and awarded a Supplemental Type Certificate. The Sandel SN3308 system is eligible for follow-on field approval.

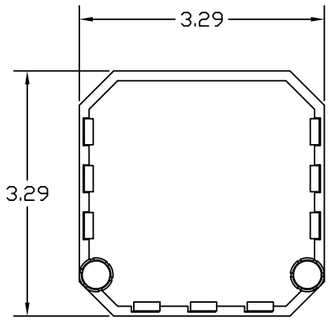
Further information regarding field approval eligibility and description of the field approval process including the " follow-on" approval process is found in FAA Order 8300.10 Volume 2, Chapter 1. Consequently, the list of eligible systems as provided by FSAW 95-09A is no longer needed.

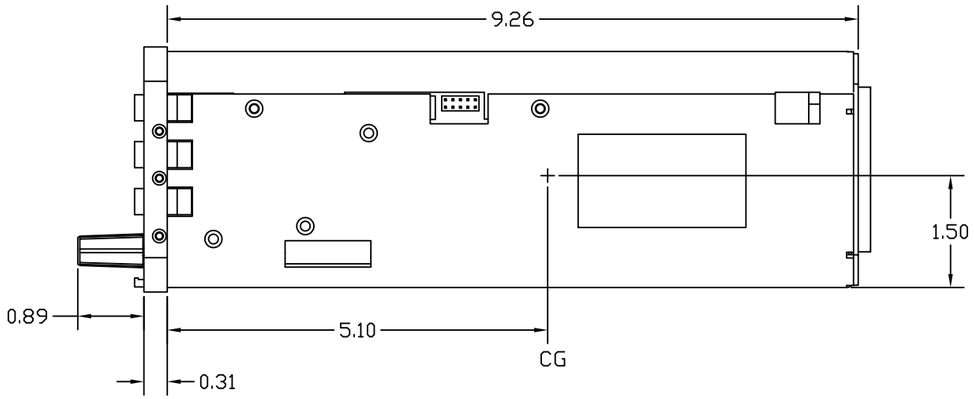
Signed by

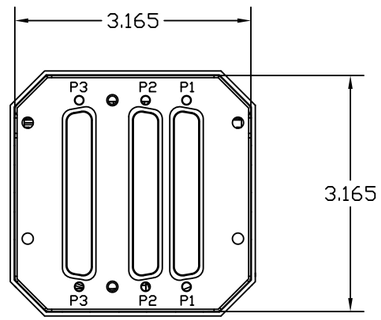
Ava L. Mims

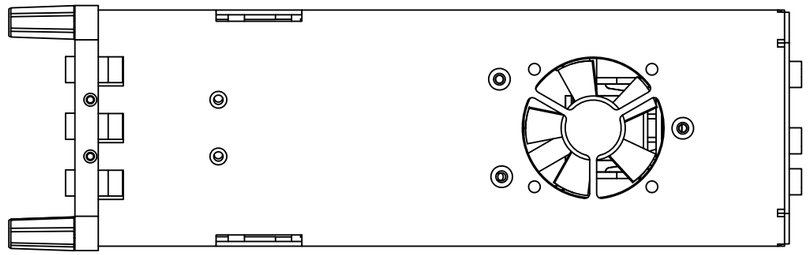
REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
ALL	A	FIRST RELEASE	1/29/98	GB
ALL	B	DIMENSIONS	6/10/98	GB











*	*	*	*	*
QTY REQ'D	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	VENDOR	ITEM NO.

PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS ANGULAR
.XX = ± .01 ± .5°
.XXX = ± .005
DO NOT SCALE DRAWING

MATERIAL SEE NOTES

FINISH SEE NOTES

FILE NO. FILE NO.

DRAWN	DATE
SCHILLING 3D	5/12/97
CHECK	
DESIGN	
DESIGN ACTIVITY	
RELEASE	
G. BLOCK	1/28/98

SANDEL AVIONICS

TITLE
LAYOUT, SN3308

SIZE	DWG NO.	CAT.	REV.
D	82001-07-B		

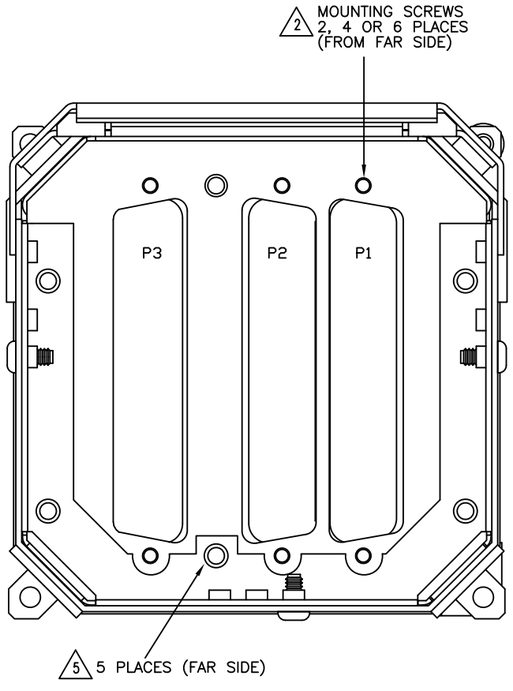
SCALE	RELEASE DATE	SHEET
1:2		1 OF 1

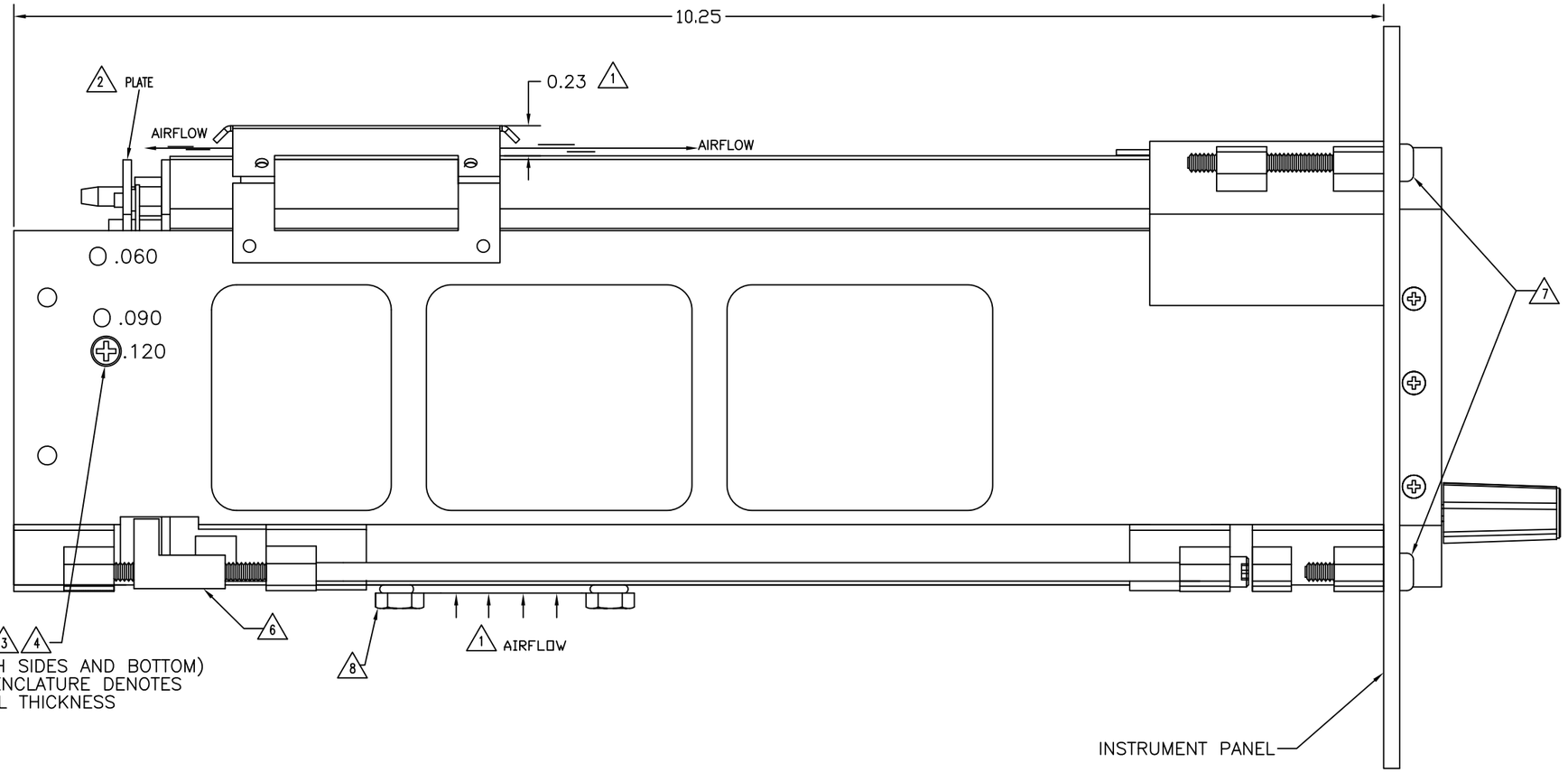
NOTES: UNLESS OTHERWISE SPECIFIED.

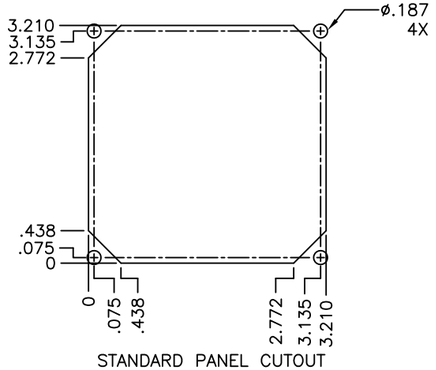
1. LOCATE CLAMP TRAY WITH SUFFICIENT CLEARANCE ABOVE & BELOW. NOTE THAT TRAY REQUIRES .23" ABOVE TOP SURFACE OF INSTRUMENT. DO NOT BLOCK AIRFLOW AT BOTTOM OF UNIT.
2. ATTACH 1, 2 OR 3 D–CONNECTORS (SPN 32001) FROM FAR SIDE TO PLATE (SPN 61015) USING 2–56x3/8" SCREWS (SPN 60117)
3. POSITION TRAY CONNECTOR BRACKET (SPN 61016) IN ONE OF THREE POSITIONS DEPENDING ON PANEL THICKNESS TO ALLOW COMPLETE PIN ENGAGEMENT OF D CONNECTORS.
4. ATTACH BRACKET TO TRAY USING 3EA. 4–40x5/16" SCREWS (SPN 60125).
5. ATTACH TRAY CONNECTOR PLATE (SPN 61015) TO BRACKET FROM FAR SIDE USING 5ea. 4–40x29/64" SHOULDER SCREWS (SPN 60144).
6. BEFORE INSTALLATION OF SN3308 INTO CLAMP TRAY, POSITION EJECTOR–LOCK TO ITS FORWARD POSITION BY ROTATING JACKSCREW CLOCKWISE USING 7/64" ALLEN KEY.
7. ATTACH CLAMP TRAY (SPN 61013) TO INSTRUMENT PANEL WITH 2ea. 8–32x 1.875" (TOP) AND 2 ea. 8–32 x .75" (BOTTOM) PANHEAD SCREWS (SUPPLIED).
8. IF NOT ASSEMBLED, ATTACH FAN GUARD (SPN 61029) OVER FILTER (SPN 60128) WITH 4 ea. LOCK NUTS (SPN 60127).

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	FIRST RELEASE	5/21/98	G.B.
	B	INDICATE PREFERRED ADJUSTMENT HOLE	6/10/98	G.B.
	C	INCORPORATED A/R 245 ADDED NEW LOCK EXTRACTOR		

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY







STANDARD PANEL CUTOUT

		SN3308				
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.

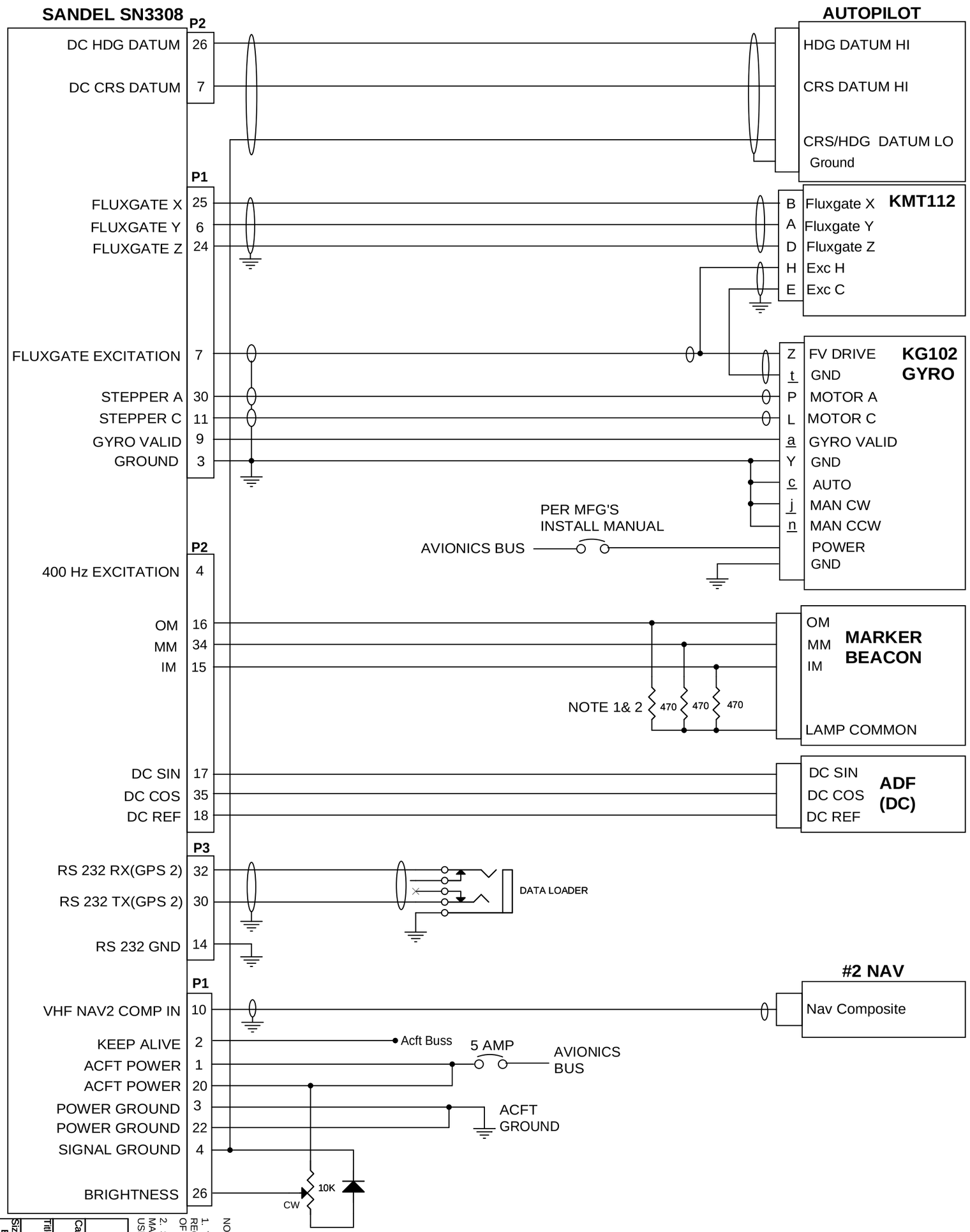
APPROVALS	DATE
DRAWN SCHILLING 3D	5/12/97
CHECKED	
ISSUED	

SANDEL VISTA, CA.

LAYOUT,
SN3308 INSTALLATION

SIZE D | DWG. NO. 90106–07 | REV. C
SCALE 2:1 | SHEET 1 OF 1

FORM: FORMD.DWG



NOTES:

1. THESE LOAD RESISTORS ARE REQUIRED FOR PS ENGINEERING MARKER RECEIVERS. RECOMMENDED FOR OTHER RECEIVERS TO PREVENT FAILURE OF THE SN3308 INDICATION IF THE ASSOCIATED MARKER LIGHT BULB FAILS.
2. SELECT THE APPROPRIATE MARKER BEACON RECEIVER ON THE SN3308 MARKER BEACON INSTALLATION PAGE. IF SPECIFIC RECEIVER NOT SHOWN USE KMA-24 SETTING.

DOES NOT SHOW NAV 1, NAV 2, GPS 1, GPS 2, DME OR STORMSCOPE INTERFACE. PLEASE SEE SPECIFIC DRAWINGS FOR INTERCONNECT MAYBE USED AS TEMPLATE+

DATE	REV	COMMENTS
10/23/00	G	
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

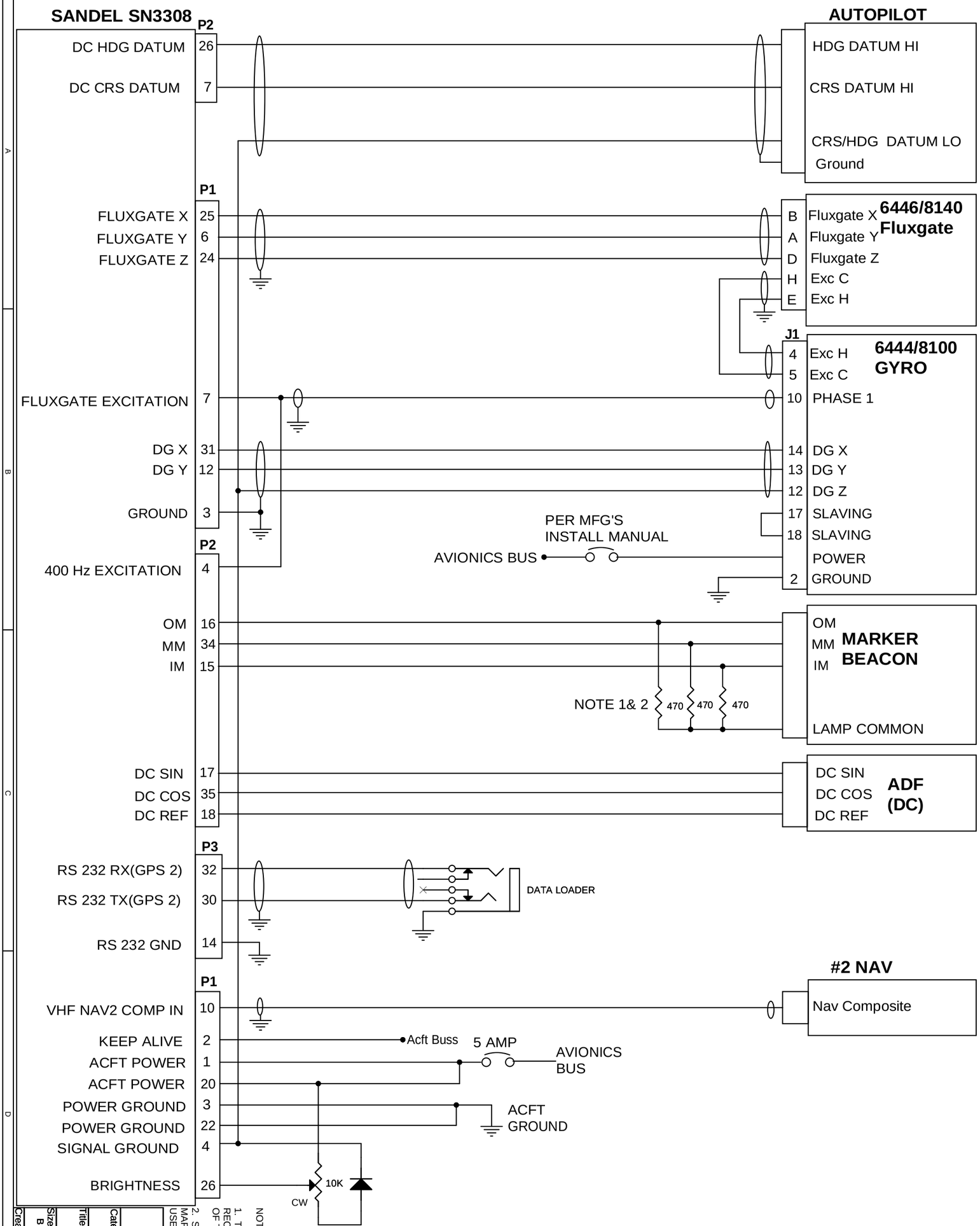
SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: KING KG102A SIMPLIFIED BLOCK DIAGRAM

Size: B | Document Number: 90106-10 | Rev: G2

Create:Friday, September 22, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 1



NOTES:

1. THESE LOAD RESISTORS ARE REQUIRED FOR PS ENGINEERING MARKER RECEIVERS. RECOMMENDED FOR OTHER RECEIVERS TO PREVENT FAILURE OF THE SN3308 INDICATION IF THE ASSOCIATED MARKER LIGHT BULB FAILS.
2. SELECT THE APPROPRIATE MARKER BEACON RECEIVER ON THE SN3308 MARKER BEACON INSTALLATION PAGE. IF SPECIFIC RECEIVER NOT SHOWN USE KMA-24 SETTING.

DOES NOT SHOW NAV 1, NAV 2, GPS 1, GPS 2, DME OR STORMSCOPE INTERFACE. PLEASE SEE SPECIFIC DRAWINGS FOR INTERCONNECT MAYBE USED AS TEMPLATE+

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

DATE	REV	COMMENTS
10/23/00	G	
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

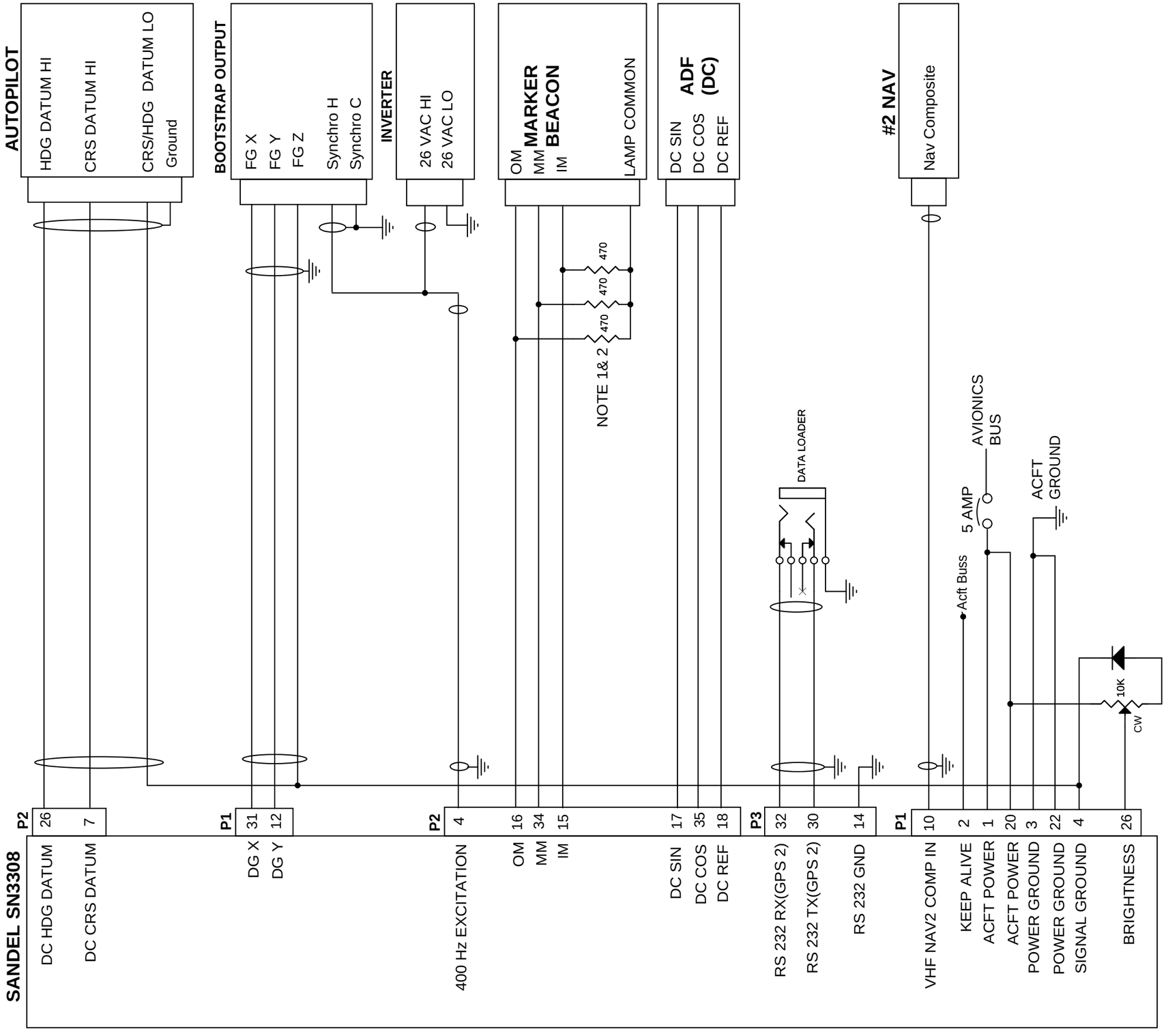
Title: S-TEC GYRO SIMPLIFIED BLOCK DIAGRAM

Size: B | Document Number: 90106-10 | Rev: G2

Create: Tuesday, September 19, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 2

DATE	REV	COMMENTS
10/23/00	G	[illegible]
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



DOES NOT SHOW NAV 1, NAV 2, GPS 1, GPS 2, DME OR STORMSCOPE INTERFACE.
PLEASE SEE SPECIFIC DRAWINGS FOR INTERCONNECT
MAYBE USED AS TEMPLATE+

NOTES:

1. THESE LOAD RESISTORS ARE REQUIRED FOR PS ENGINEERING MARKER RECEIVERS. RECOMMENDED FOR OTHER RECEIVERS TO PREVENT FAILURE OF THE SN3308 INDICATION IF THE ASSOCIATED MARKER LIGHT BULB FAILS.

2. SELECT THE APPROPRIATE MARKER BEACON RECEIVER ON THE SN3308 MARKER BEACON INSTALLATION PAGE. IF SPECIFIC RECEIVER NOT SHOWN USE KMA-24 SETTING.

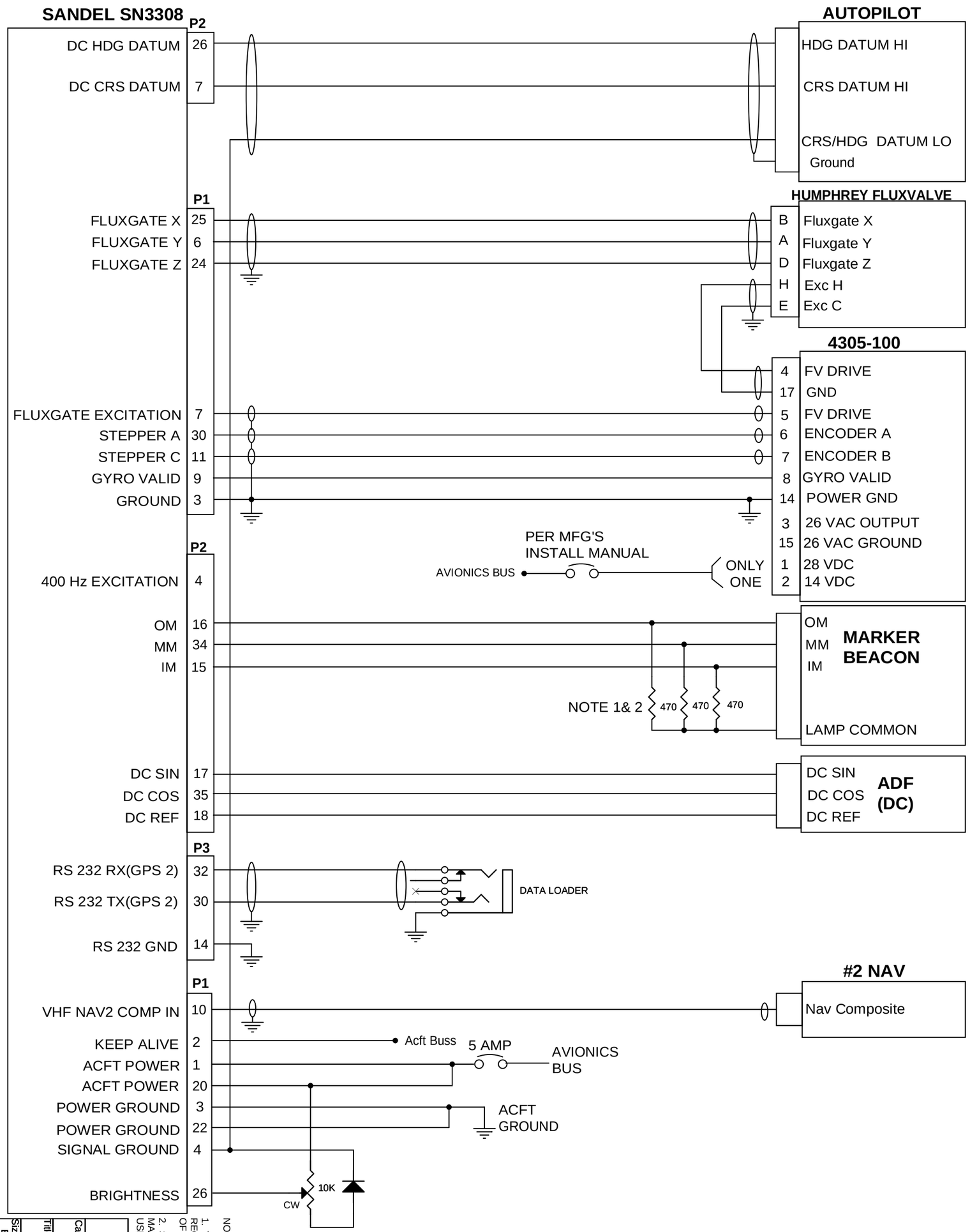
SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: XYZ GYRO SIMPLIFIED BLOCK DIAGRAM

Size	Document Number	Rev
B	90106-10	G2

Create:Friday, September 22, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 3



NOTES:

1. THESE LOAD RESISTORS ARE REQUIRED FOR PS ENGINEERING MARKER RECEIVERS. RECOMMENDED FOR OTHER RECEIVERS TO PREVENT FAILURE OF THE SN3308 INDICATION IF THE ASSOCIATED MARKER LIGHT BULB FAILS.
2. SELECT THE APPROPRIATE MARKER BEACON RECEIVER ON THE SN3308 MARKER BEACON INSTALLATION PAGE. IF SPECIFIC RECEIVER NOT SHOWN USE KMA-24 SETTING.

DOES NOT SHOW NAV 1, NAV 2, GPS 1, GPS 2, DME OR STORMSCOPE INTERFACE. PLEASE SEE SPECIFIC DRAWINGS FOR INTERCONNECT MAYBE USED AS TEMPLATE+

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

DATE	REV	COMMENTS
10/23/00	G	INITIAL RELEASE
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: MID-CONTINENT SIMPLIFIED BLOCK DIAGRAM

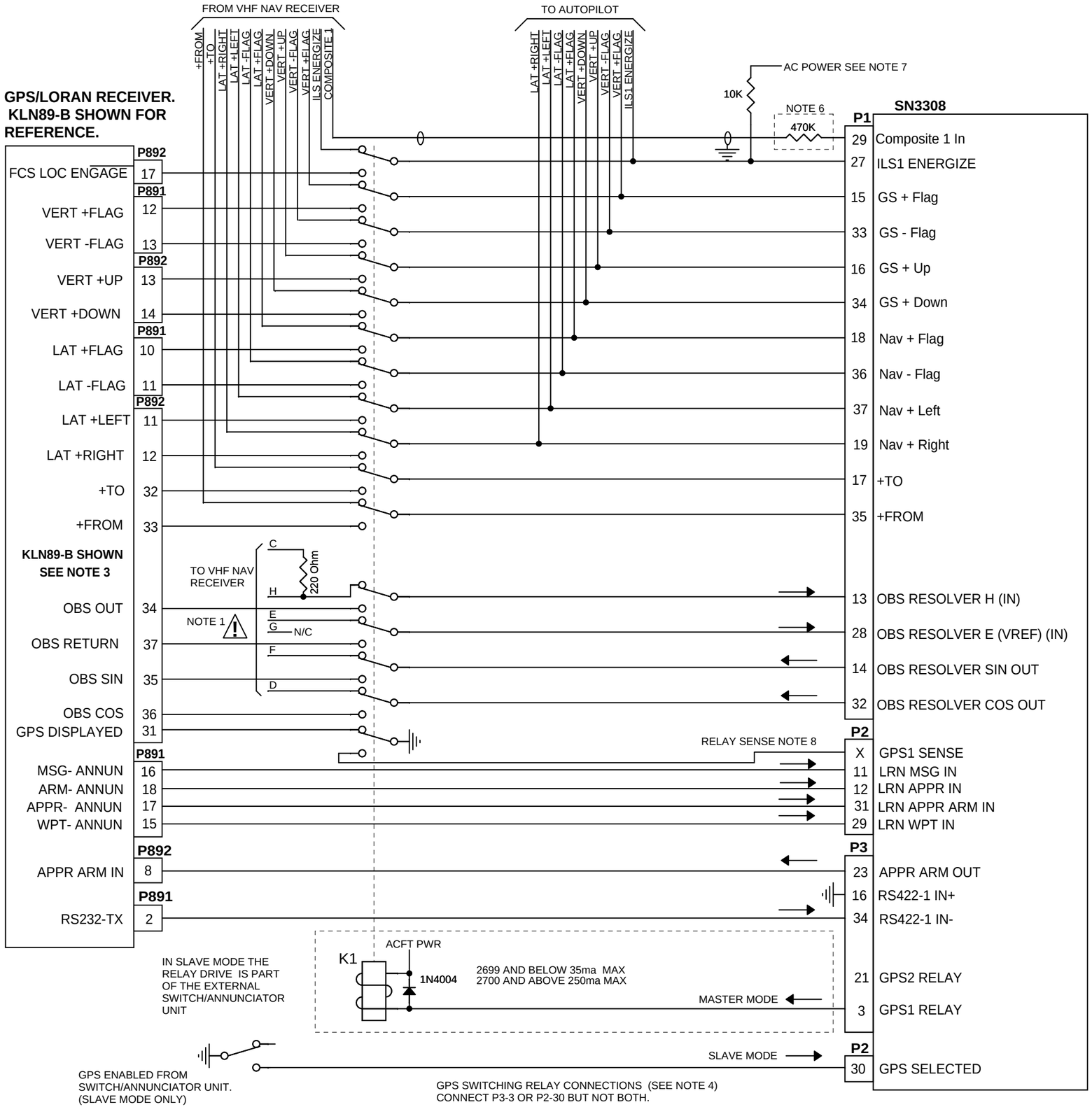
Size: B | Document Number: 90106-10 | Rev: G2

Create: Wednesday, October 18, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 4

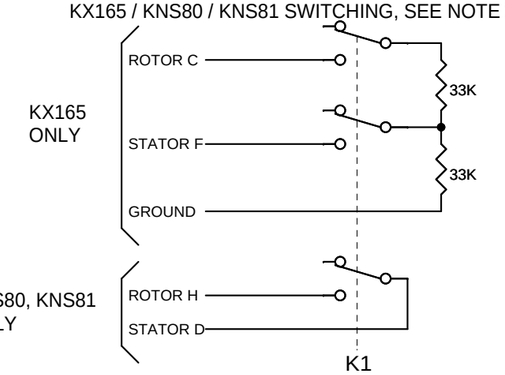
DATE	REV	COMMENTS
6/9/98	A	FIRST RELEASE
7/10/98	B	NO CHANGE TO THIS PAGE
9/10/98	C	PAGE COUNT.
12/8/98	E	RESOLVER AND NOTE 1
5/26/99	F	RELAY SENSE AND NOTE 8. TOTAL SHEETS CHANGED TO 21
10/23/00	G	MOVED GPS1 SENSE TO P2 ADDED RELAY TO FCS LOC ENGAGE TOTAL SHEETS CHANGED TO 29
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

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 SN3308 P3-3 CONTROLLING AN EXTERNAL SWITCHING RELAY. IF AN EXISTING SWITCH CONTROL BOX IS INSTALLED AND IT IS DESIRED TO LEAVE IT OPERATIONAL, USE SN3308 P2-30 TO SENSE GPS MODE. THIS WILL DISABLE THE NAV SOURCE SWITCH AND CHANGE THE SN3308 MODE TO GPS-1 WHEN ACTIVE. YOU MUST ENABLE P2-30 AS THE GPS SENSE INPUT IN THE SN3308 SYSTEM SETUP PAGE.

   1 MASTER: SN3308 CONTROLS THE GPS (PREFERRED)
   2 SLAVE: EXTERNAL GPS SWITCHING CONTROLS THE SN3308.

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 SN3308 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

7. FOR 14V AIRCRAFT A PULLUP RESISTOR MAY BE REQUIRED TO ALLOW VOR OPERATION.

8. SENSE PINS SELECTED IN SOFTWARE SEE "RELAY SENSE" MAINTENANCE PAGE DESCRIPTION IN APPENDIX A FOR LIST OF SPECIFIC PINS..

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: NAV-1 AND RS-232 GPS

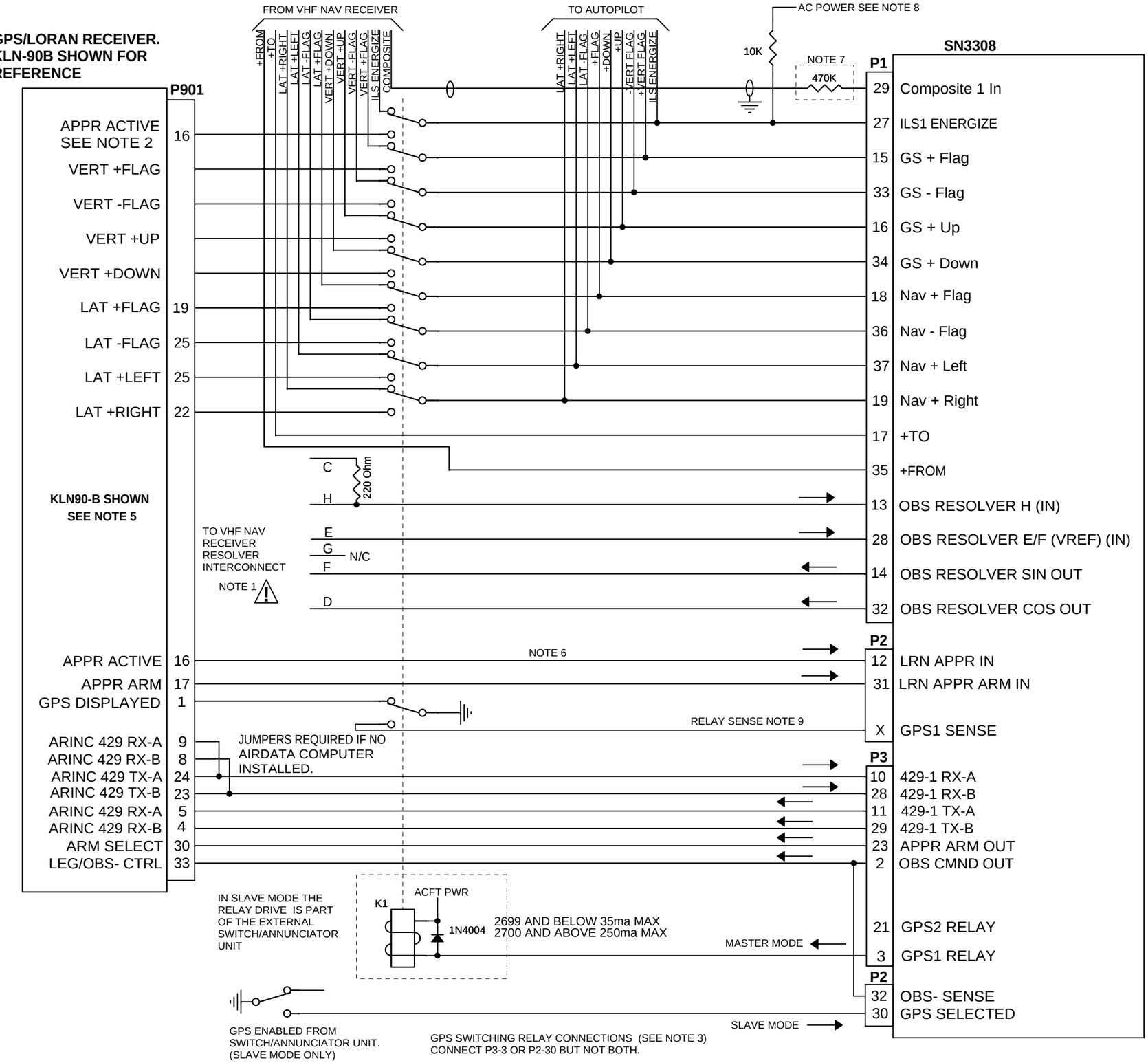
Size	Document Number	Rev
B	90106-10	G2

Create: Tuesday, April 28, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 5

DATE	REV	COMMENTS
6/9/98	A	FIRST RELEASE
7/10/98	B	KLN90 AIRDATA JUMPERS SHOWN FOR REF.
9/10/98	C	PAGE COUNT.
12/8/98	E	RESOLVER AND NOTE 1.
5/26/99	F	TOTAL SHEETS CHANGED TO 21 RELAY SENSE AND NOTE 9.
10/23/00	G	MOVE GPS1 SENSE TO P2 ADDED MAX AMPERAGE TO K1 TOTAL SHEETS CHANGED TO 29
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

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



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 SN3308 P3-3 CONTROLLING AN EXTERNAL SWITCHING RELAY. IF AN EXISTING SWITCH CONTROL BOX IS INSTALLED AND IT IS DESIRED TO LEAVE IT OPERATIONAL, USE SN3308 P2-30 TO SENSE GPS MODE. THIS WILL DISABLE THE NAV SOURCE SWITCH AND CHANGE THE SN3308 MODE TO GPS-1 WHEN ACTIVE. YOU MUST ENABLE P2-30 AS THE GPS SENSE INPUT IN THE SN3308 SYSTEM SETUP PAGE.

   1 MASTER: SN3308 CONTROLS THE GPS (PREFERRED)
   2 SLAVE: EXTERNAL GPS SWITCHING CONTROLS THE SN3308.

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 SN3308 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.

8. ON 14V AIRCRAFT A PULLUP RESISTOR MAY BE REQUIRED TO ALLOW VOR OPERATION.

9. SENSE PINS SELECTED IN SOFTWARE SEE "RELAY SENSE" MAINTENANCE PAGE DESCRIPTION IN APPENDIX A FOR LIST OF SPECIFIC PINS.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

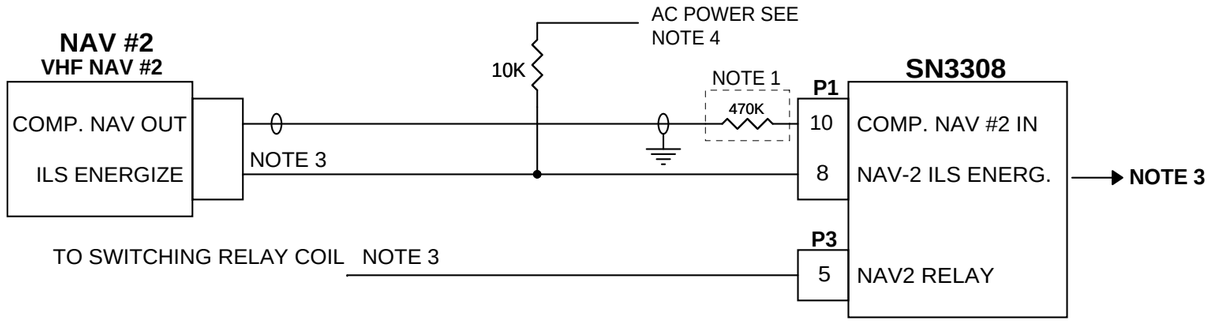
Title: NAV-1 AND ARINC-429 GPS

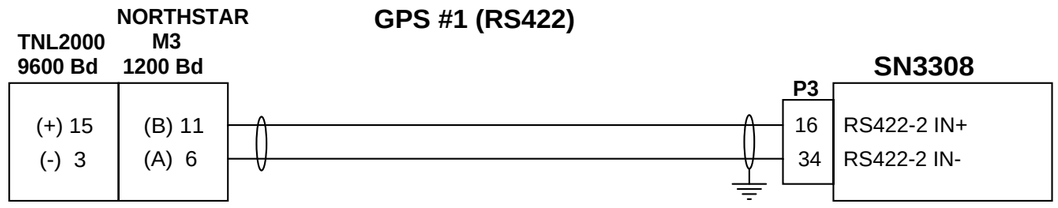
Size B | Document Number 90106-10 | Rev G2

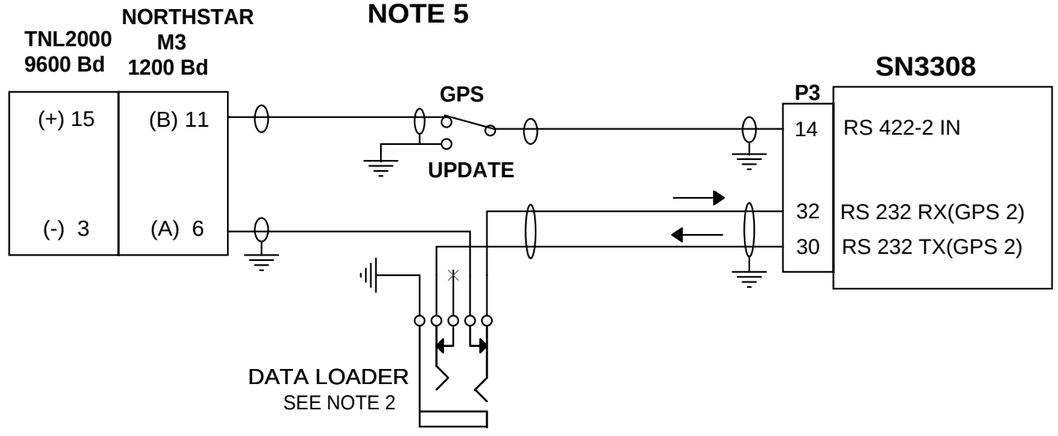
Create: Tuesday, April 28, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 6

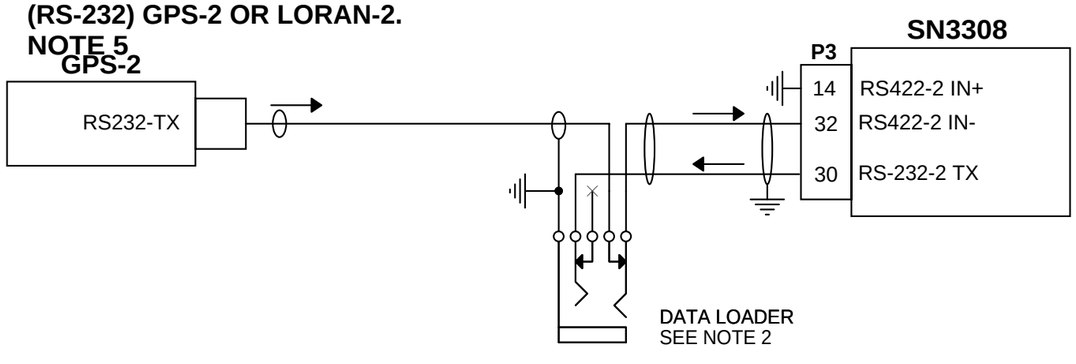
DATE	REV	COMMENTS
6/9/98	A	####
7/10/98	B	COMPOSITE NAV-2 CHANGED TO P1-10. NOTE 7 ADDED.
9/10/98	C	NOTE 7 CHANGED. PAGE COUNT.
12/10/98	E	PAGE COUNT
3/19/99	F	INCORPORATED AIR 126 ADDED SHEETS 17-21
8/13/99	F1	A/R 161 ADDED RS-422 TO GPS CONNECTION
10/23/00	G	TOTAL SHEETS CHANGED TO 29
04/03/01	G1	A/R 360 ADDED 1/4" TO STEREO PHONE PLUG PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

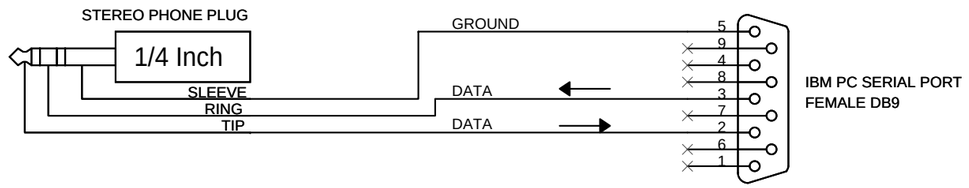
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

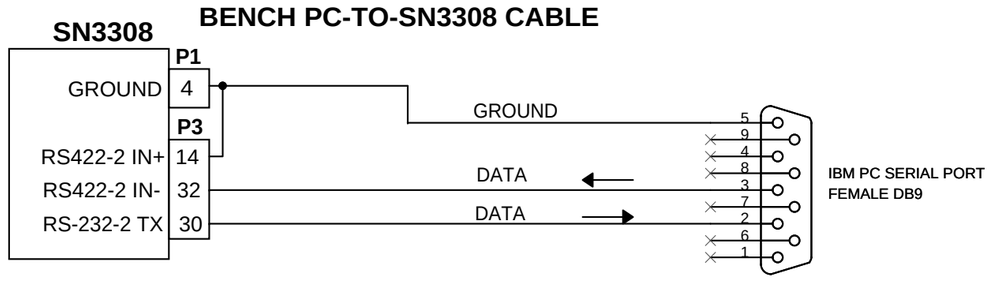


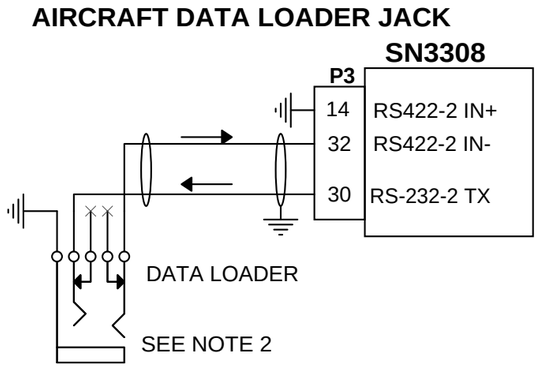












NOTES:

1. FOR 3V COMPOSITE NAV SOURCES INSERT A 470K SERIES RESISTOR LOCATED AT THE SN3308 CONNECTOR. NOT REQUIRED FOR .5V SOURCE.
2. MOUNT SOFTWARE DOWNLOAD JACK IN AN ACCESSIBLE LOCATION. JACK IS SWITCHCRAFT TYPE 14B OR EQUIVALENT. DATALOAD JACK MUST BE INSTALLED TO ALLOW FUTURE DOWNLOADS
3. 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.
4. ON 14V AIRCRAFT A PULLUP RESISTOR MAY BE REQUIRED TO ALLOW VOR OPERATION.
5. AN RS-232 GPS-2 CANNOT BE USED IN COMBINATION WITH A WX-500 STORMSCOPE ON THE SAME PORT.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: NAV-2, GPS 1 (RS422), GPS-2, DATA LOAD

Size: B | Document Number: 90106-10 | Rev: G2

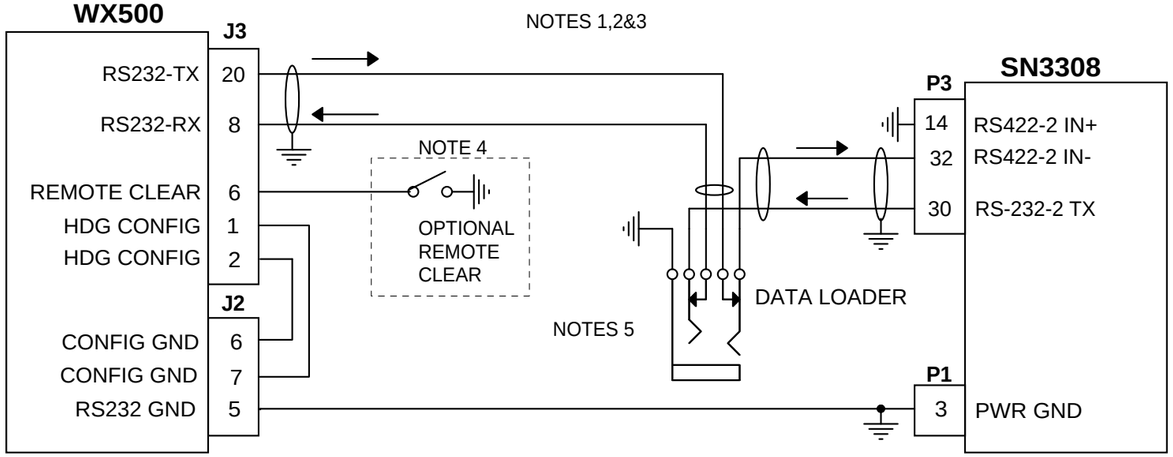
Create: Sunday, May 03, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 7

DATE	REV.	COMMENTS
10/23/00	G	INITIAL RELEASE
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

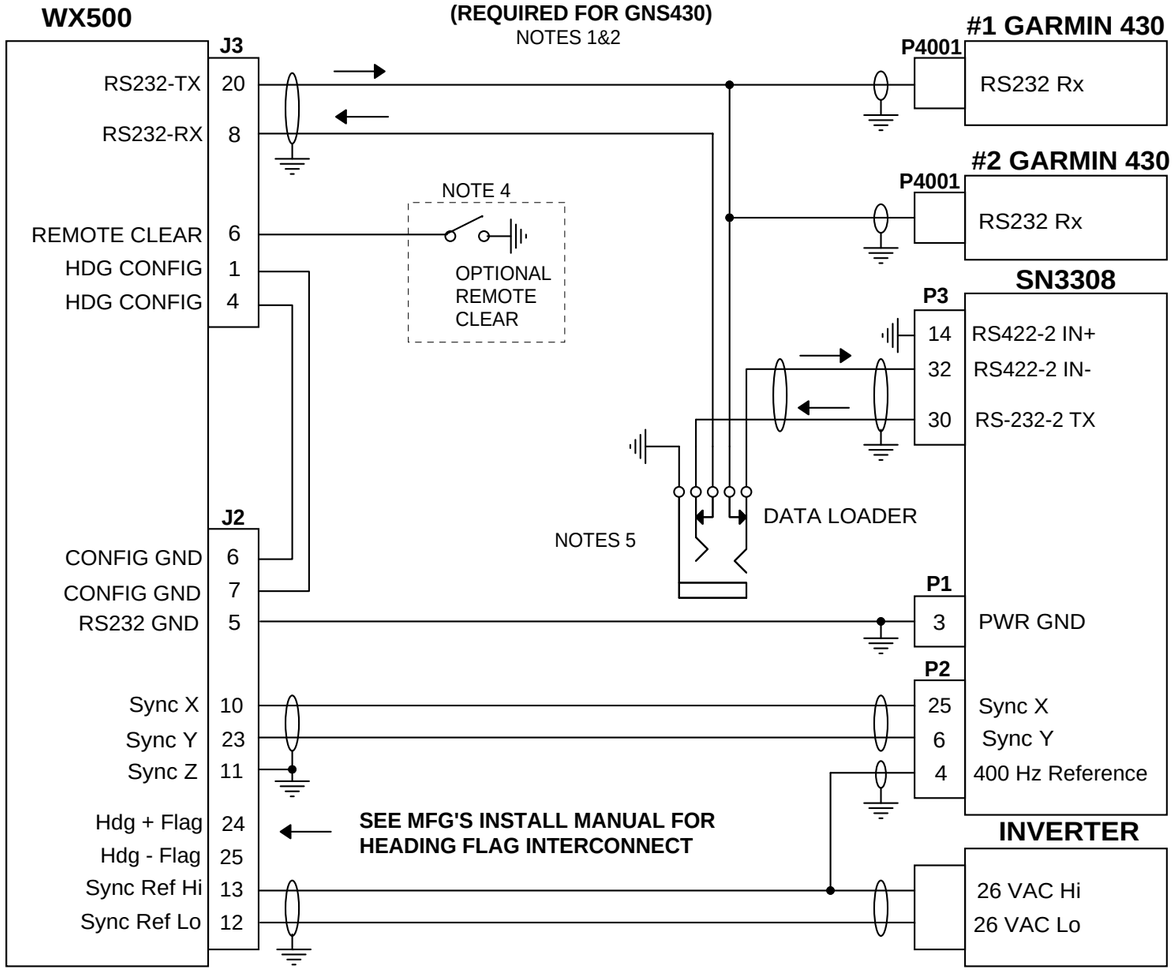
SERIAL HEADING

NOTES 1,2&3



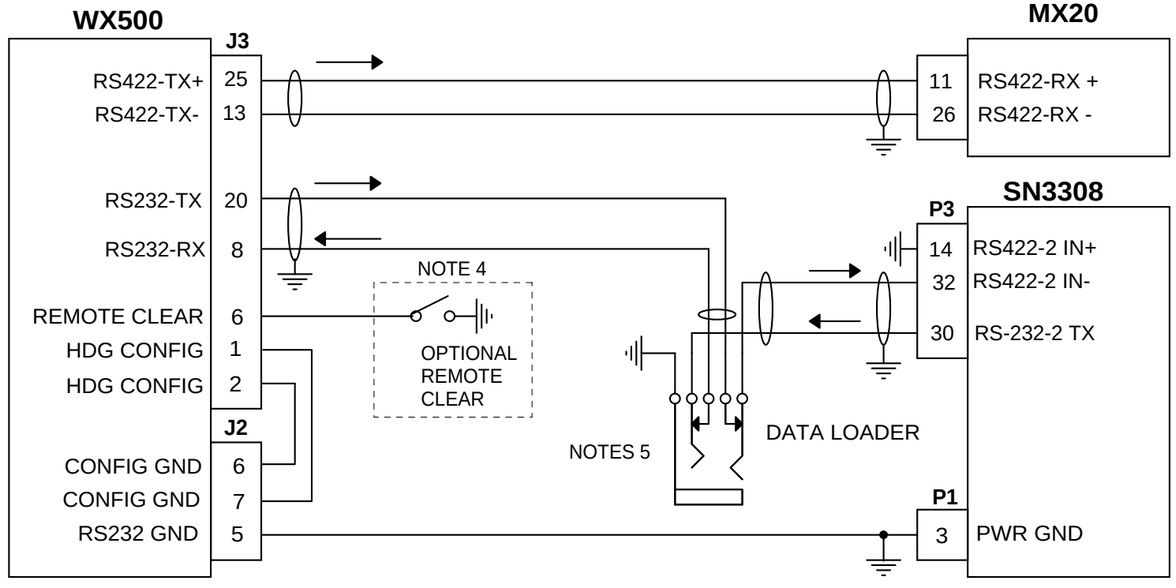
SYNCHRO HEADING
(REQUIRED FOR GNS430)

NOTES 1&2



SERIAL HEADING W/ UPSAT MX 20

NOTES 1,2&3



NOTES:

1. WX500 ALLOWS ONLY ONE UNIT TO BE MASTER. THE"MASTER" CONTROLS CELL/STRIKE MODE AND REMOTE CLEAR THROUGH THE SERIAL PORT.
2. AN RS-232 GPS-2 CANNOT BE USED IN COMBINATION WITH A WX-500 STORMSCOPE ON SANDEL RS232 PORT 2.
3. WX-500 HEADING CONFIGURATION IS SET TO "SERIAL" (HEADING RECEIVED FROM SN3308)
4. 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 SN3308 VIA SOFTKEYS.
5. MOUNT SOFTWARE DOWNLOAD JACK IN AN ACCESSIBLE LOCATION. JACK IS SWITCHCRAFT TYPE 14B OR EQUIVALENT. DATALOAD JACK MUST BE INSTALLED TO ALLOW FUTURE DOWNLOADS

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: WX-500

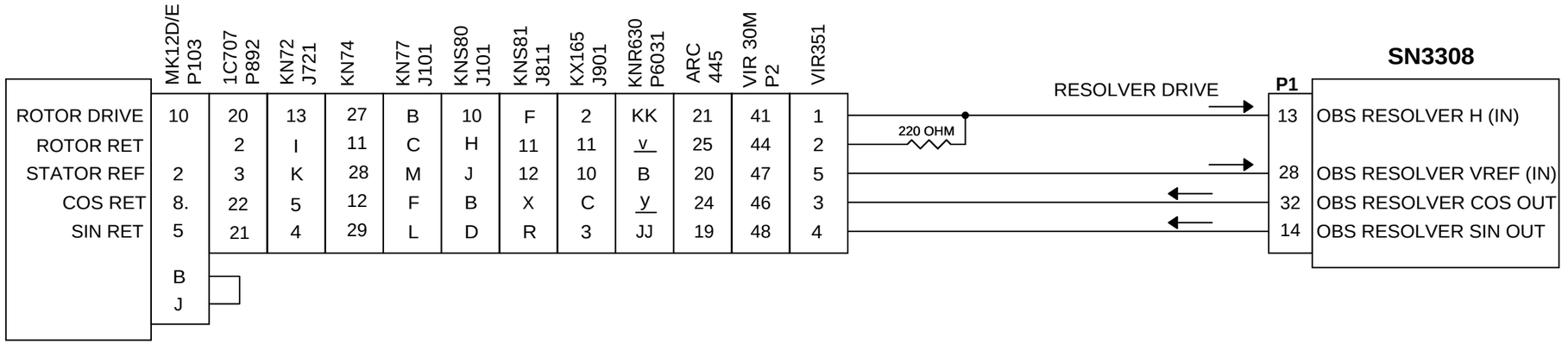
Size: B | Document Number: 90106-10 | Rev: G2

Create: Tuesday, September 19, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 8

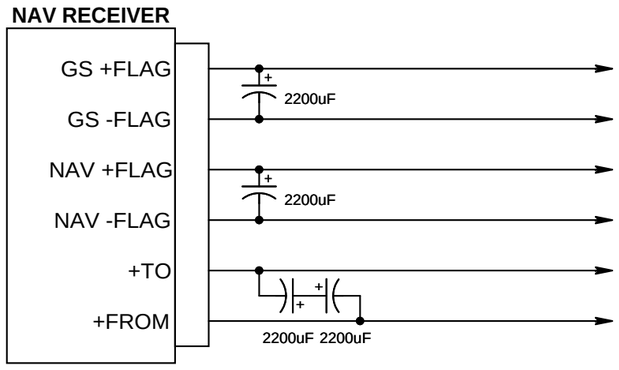
DATE	REV	COMMENTS
12/4/98	E	[illegible]
1/4/99	E1	Corrected KNS81 label, added KX165, ARC, 51R-8. A/R 107
5/26/99	F	RESOLVER INTERCONNECTS AND KNR634, VIR-30A AND M. SHEET TOTAL CHANGED TO 21.
10/23/00	G	ADDED KNR630,VIR350, KN74, KNS-80 ADDED NARCO MK12D/E. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

COMMON NAV CONVERTER INTERCONNECTS



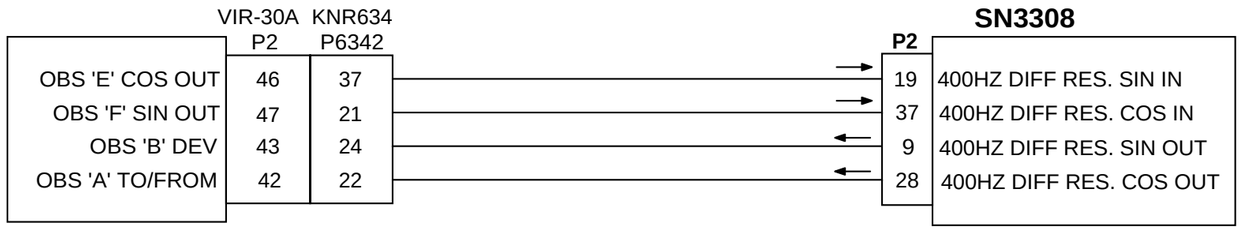
CONNECTION TO OLDER RECEIVERS SUCH AS COLLINS 51R8, 51RV-1, KING KNR660 AND SIMILAR RECEIVERS. SEE NOTE 1.



TO SN3308

United LXF10VB222M or equivalent.

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



NOTES:

1. THE SN3308 REQUIRES DC FLAG SIGNALS. SOME VERY OLD RECEIVER DESIGNS OUTPUT UNSMOOTHED DC DUE TO A LACK OF FILTERING CAPACITORS. THE SN3308 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 SN3308 MUST BE ON THE SAME INVERTER.
b) ON NAV MAINTENANCE PAGE SET OBS TYPE TO "DIFF A".
c) ON SYS MAINTENANCE PAGE ENABLE MASTER INVERTER.

3. VIR-30A AND KNR634 DIFFERENTIAL RESOLVER IS SUPPORTED ON SOFTWARE 1.33 AND LATER.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: RESOLVER INTERCONNECT

Size B | Document Number: 90106-10 | Rev: G2

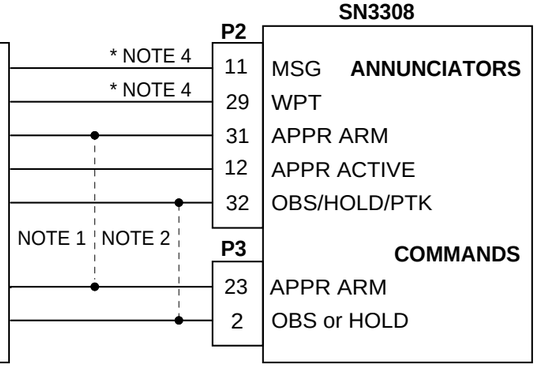
Create: Thursday, December 10, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 9

DATE	REV.	COMMENTS
6/9/98	A	[illegible]
7/10/98	B	NOTE 4 ADDED.
9/10/98	C	PAGE COUNT.
12/10/98	E	PAGE COUNT.
5/26/99	F	TOTAL SHEETS CHANGED TO 21. NOTE 5 ADDED.
10/23/00	G	UPDATED TITLE BLOCK. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

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	N'STAR	TRIMBLE
MSG	MSG	MSG	MSG	MSG	MSG	GPS	MSG	MSG
PTK	WPT	WPT	WPT	WPT	WPT	WPT	WPT	WPT
APPR		ACTV	ACTV	ACTV	ACTV		APCH	APR
ACTV		ARM	ARM	ARM	ARM			
HOLD		HOLD/AUTO	HOLD/AUTO		OBS/LEG	NAV	PTK	
		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 SN3308 LNAV 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: SN3308 INSTALLATION DRAWING

Title: GPS SWITCH/ANNUNCIATORS

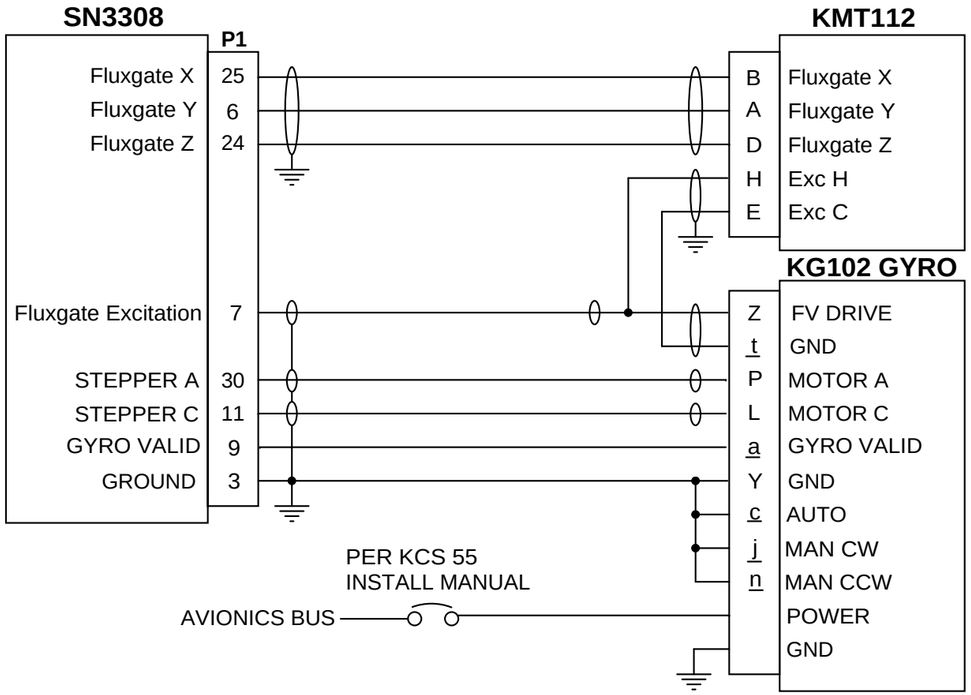
Size B | Document Number 90106-10 | Rev G2

Create: Thursday, June 18, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 10

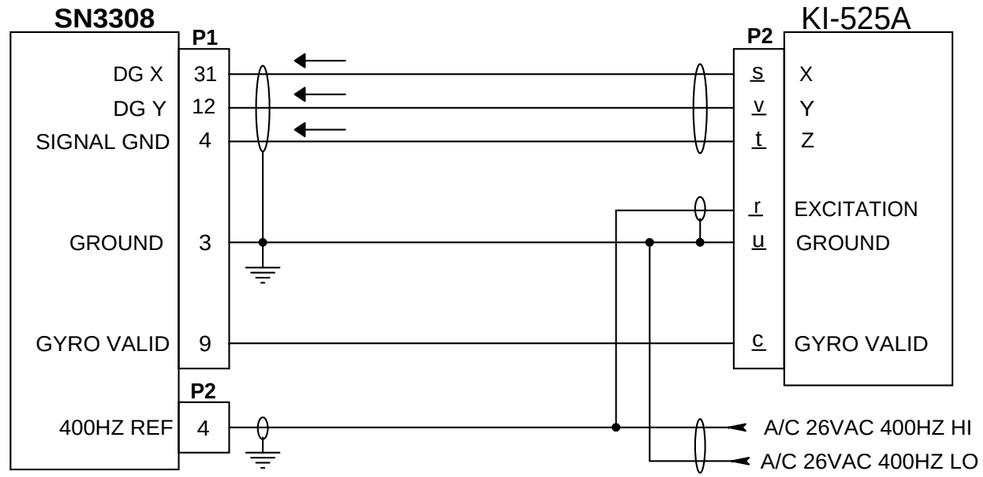
DATE	REV	COMMENTS
6/9/98	A	
7/10/98	B	KA51-A "CW" E NOW L. KA51-B A/H REVERSED. NOTE 6 CHANGED.
9/10/98	C	NOTE ON BOOTSTRAP OUTPUT. PAGE COUNT. NOTE 7 ADDED.
10/08/98	E	SHIELD ADDED ON 400HZ
5/26/99	F	TOTAL SHEETS CHANGED TO 21
10/23/00	G	ADDED KMT-112 FLUX GATE TOTAL SHEETS CHANGED TO 29
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

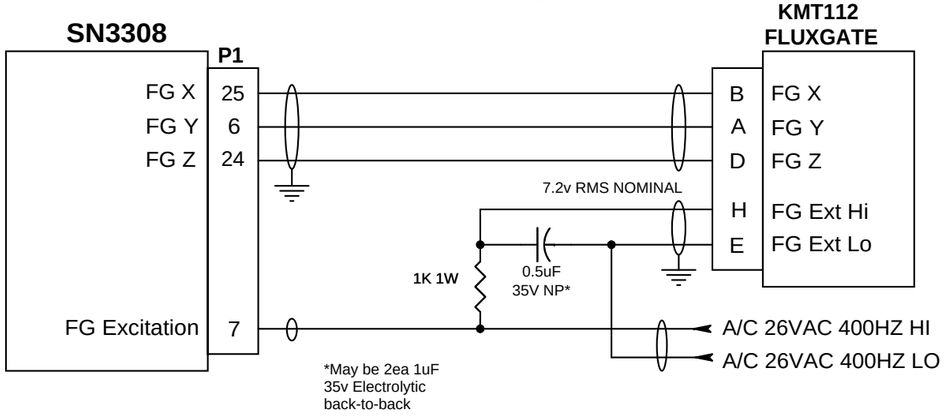
NEW KG-102 AND KMT112 INSTALLATION. NOTE 1& 4.



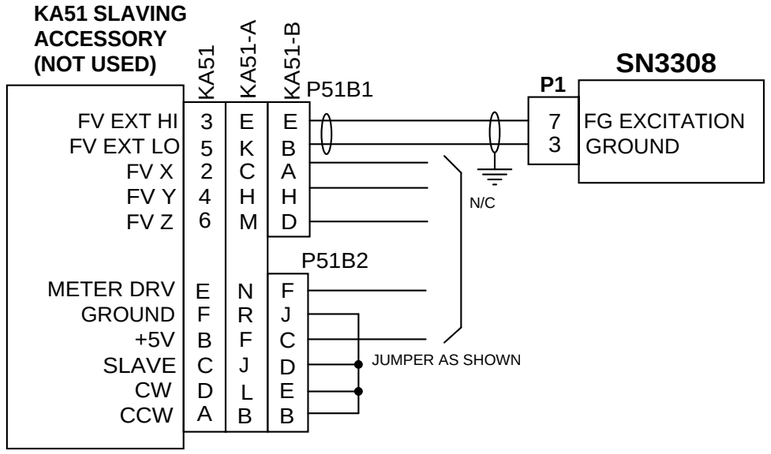
BENDIX/KING KI525A BOOTSTRAP MASTER DRIVING SN3308 WITH NO INTERNAL SN3308 SLAVING. (NOTES 2 AND 3).



USING KMT-112 FLUX GATE WITH 26VAC INVERTER NOTE XYZ GYRO ALSO REQUIRED



KA-51 SLAVING ACCESSORY REMOVAL. NOTE 5.



NOTES:

1. SELECT GYRO, FLUX GATE, AND VALID LOGIC ON COMPASS SYSTEM MAINTENANCE PAGE.
2. TURN OFF SLAVING IN COMPASS MAINTENANCE PAGE.
3. THIS CONFIGURATION IS USED WHEN BOOTSTRAPPED FROM AN EXISTING SLAVED COMPASS SYSTEM. THIS MIGHT BE DESIRED WHERE AN EXISTING COMPASS SYSTEM SUCH AS A KI525A IS MOVED TO THE COPILOTS SIDE AND AN SN3308 IS INSTALLED ON THE PILOTS SIDE. UNDER THIS CONDITION THE SN3308 CAN BE DRIVEN BY THE BOOTSTRAP OUTPUT OF THE COPILOTS HSI. THE BOOTSTRAP OUTPUT OF THE HSI MUST BE DRIVEN BY THE SAME INVERTER THAT SUPPLIES THE SN3308 REFERENCE INPUT.
4. TO UPGRADE AN EXISTING KCS-55 INSTALLATION SEE THE APPROPRIATE DRAWING IN THIS MANUAL.
5. 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. SEE THE COMPLETE DRAWING ON SEPARATE PAGE IN THIS MANUAL. INSURE THAT WHEN COMPLETE THE FLUXGATE WIRING IS CORRECT AS SHOWN FROM THE FLUXGATE TERMINALS TO THE 3308 REGARDLESS OF THE PIN NUMBERS OF THE INTERMEDIATE CONNECTORS.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: GYROS: XYZ AND KG-102

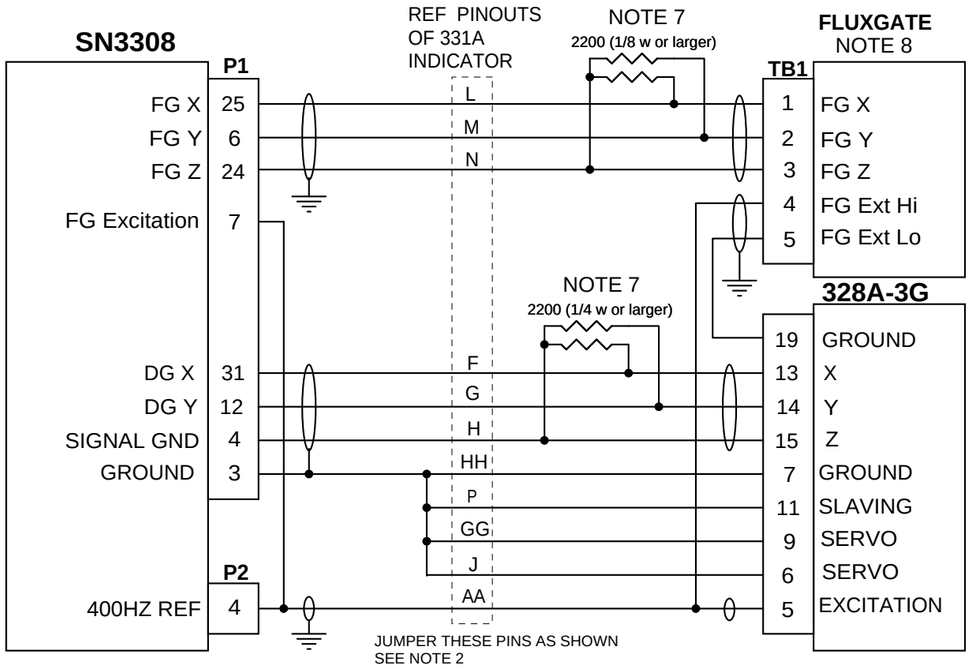
Size	Document Number	Rev
B	90106-10	G2

Create: Tuesday, April 28, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 11

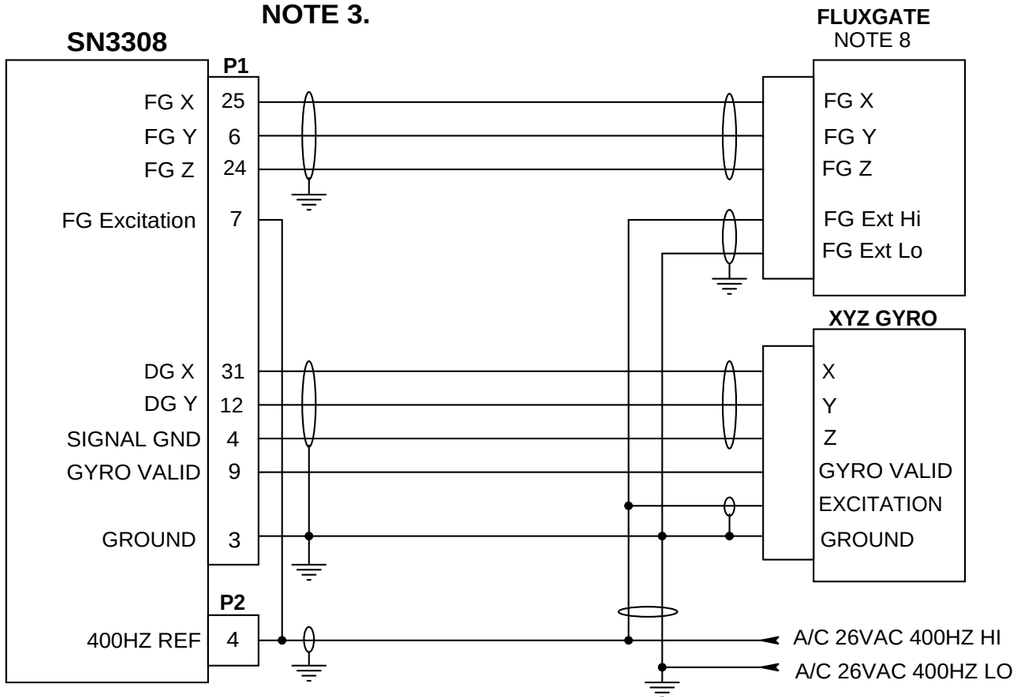
DATE	REV	COMMENTS
10/23/00	G	INITITAL RELEASE
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

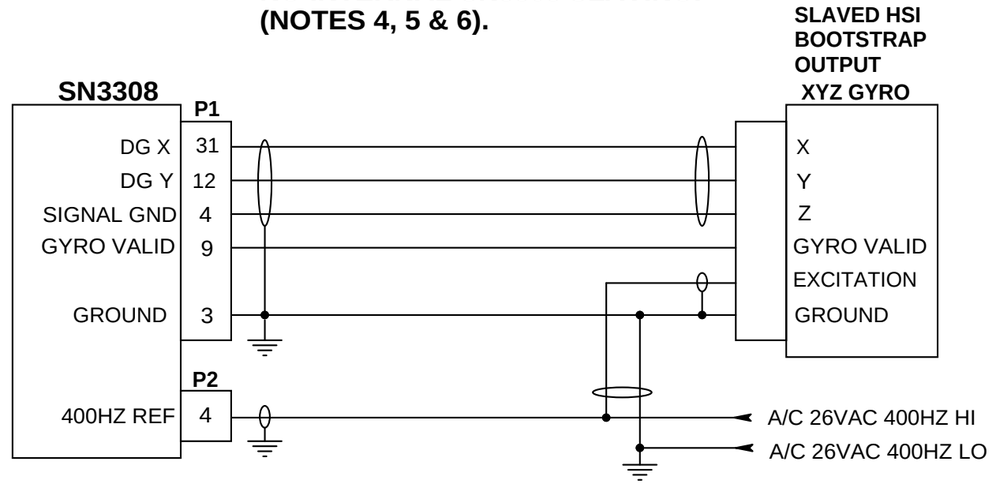
LEAVING INSTALLED BUT BYPASSING COLLINS 328A-3G SLAVING ACCESSORY WHEN UPGRADING A PN101 SYSTEM. SEE NOTE 1 & 2



TYPICAL XYZ DG AND FLUX GATE USING THE SN3308 INTERNAL SLAVING. NOTE 3.



XYZ DG WITHOUT FLUXGATE WITH NO INTERNAL SN3308 SLAVING. (NOTES 4, 5 & 6).



NOTES

1. THIS CONFIGURATION DOES NOT ALLOW FOR AN ADDITIONAL INVERTER DRIVING THE SN3308. EITHER USE THE 328A-3G AS THE INVERTER SOURCE, OR IF A DIFFERENT MASTER INVERTER IS USED THEN THE 328A-3G MUST BE REMOVED.
2. THIS CONFIGURATION DISABLES THE 328A-3G SLAVING ACTION. SLAVING IS PERFORMED INSIDE THE SN3308.
3. THIS INTERCONNECT ALLOWS THE USE OF A COLLINS 332-E4 WITHOUT USE OF 328A-3G SLAVING ACCESSORY.
4. SELECT GYRO, FLUX GATE, AND VALID LOGIC ON COMPASS SYSTEM MAINTENANCE PAGE.
5. TURN OFF SLAVING IN COMPASS MAINTENANCE PAGE.
6. IF AN EXISTING COMPASS SYSTEM IS LEFT INSTALLED (FOR INSTANCE ON RIGHT SIDE) THE SN3308 CAN BE BOOTSTRAPPED TO THE INDICATOR WITH EITHER INTERNAL OR EXTERNAL EXCITATION. THIS USES THE EXISTING COMPASS SYSTEM IN SLAVED MODE AND THE SN3308 IN UNSLAVED MODE.
7. THE 2200 OHM RESISTORS ARE RECOMMENDED (NOT REQUIRED) TO REDUCE RINGING FROM THE INTERNAL INVERTER. THE SN3308 APPLIES NO LOAD TO THE GYRO.
8. 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: SN3308 INSTALLATION DRAWING

Title: GYROS: 328-A3G AND XYZ

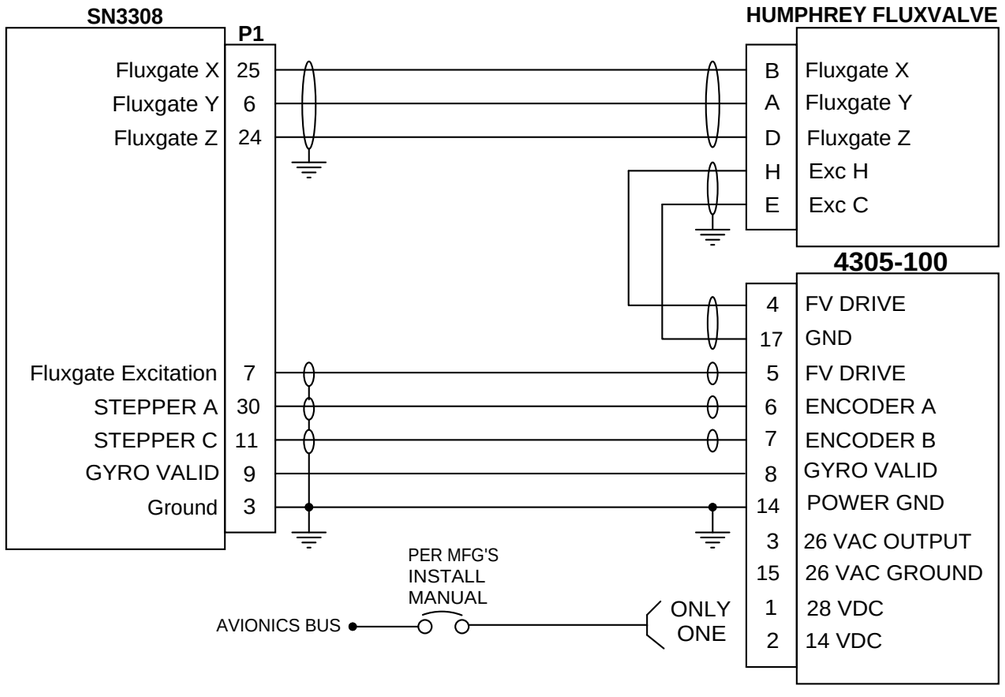
Size B | Document Number: 90106-10 | Rev G2

Create: Tuesday, April 28, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 12

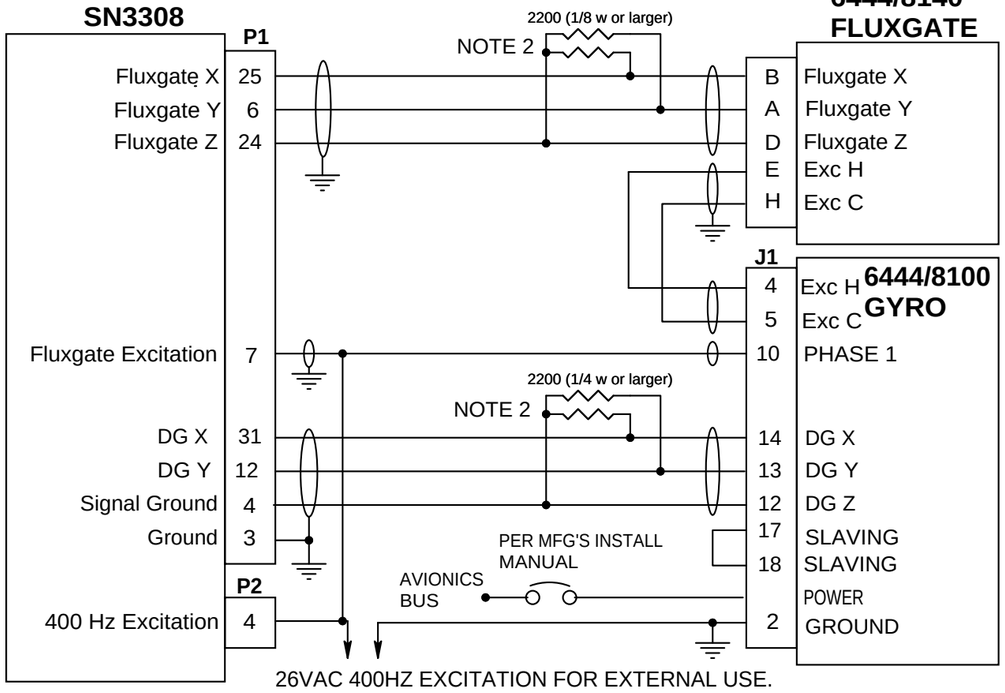
DATE	REV	COMMENTS
10/23/00	G	INITIAL RELEASE
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

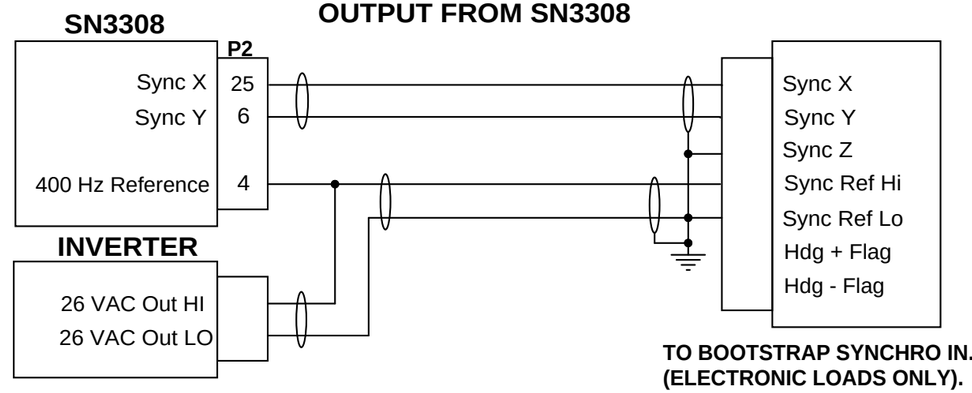
MID-CONTINENT INST CO 4305-100



STEC (AERONETICS) 8100 GYRO AND 8140 FLUX GATE WITHOUT 8130 HSI. SEE NOTES 1, 2, & 3.



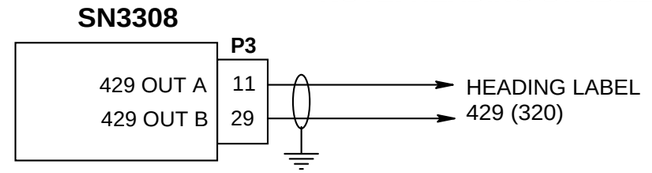
COMPASS BOOTSTRAP OUTPUT FROM SN3308



TO BOOTSTRAP SYNCHRO IN. (ELECTRONIC LOADS ONLY).

Page 18 Setup
Inverter "Enable"
Bootstrap "Normal or 180"

429 COMPASS BOOTSTRAP OUTPUT FROM SN3308
NOTE: HEADING STABILZATION OUTPUT ONLY



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 SN3308, THIS GYRO IS NOT COMPATIBLE.
2. THE 2200 OHM RESISTORS ARE RECOMMENDED (NOT REQUIRED) TO REDUCE RINGING FROM THE INTERNAL INVERTER. THE SN3308 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: SN3308 INSTALLATION DRAWING

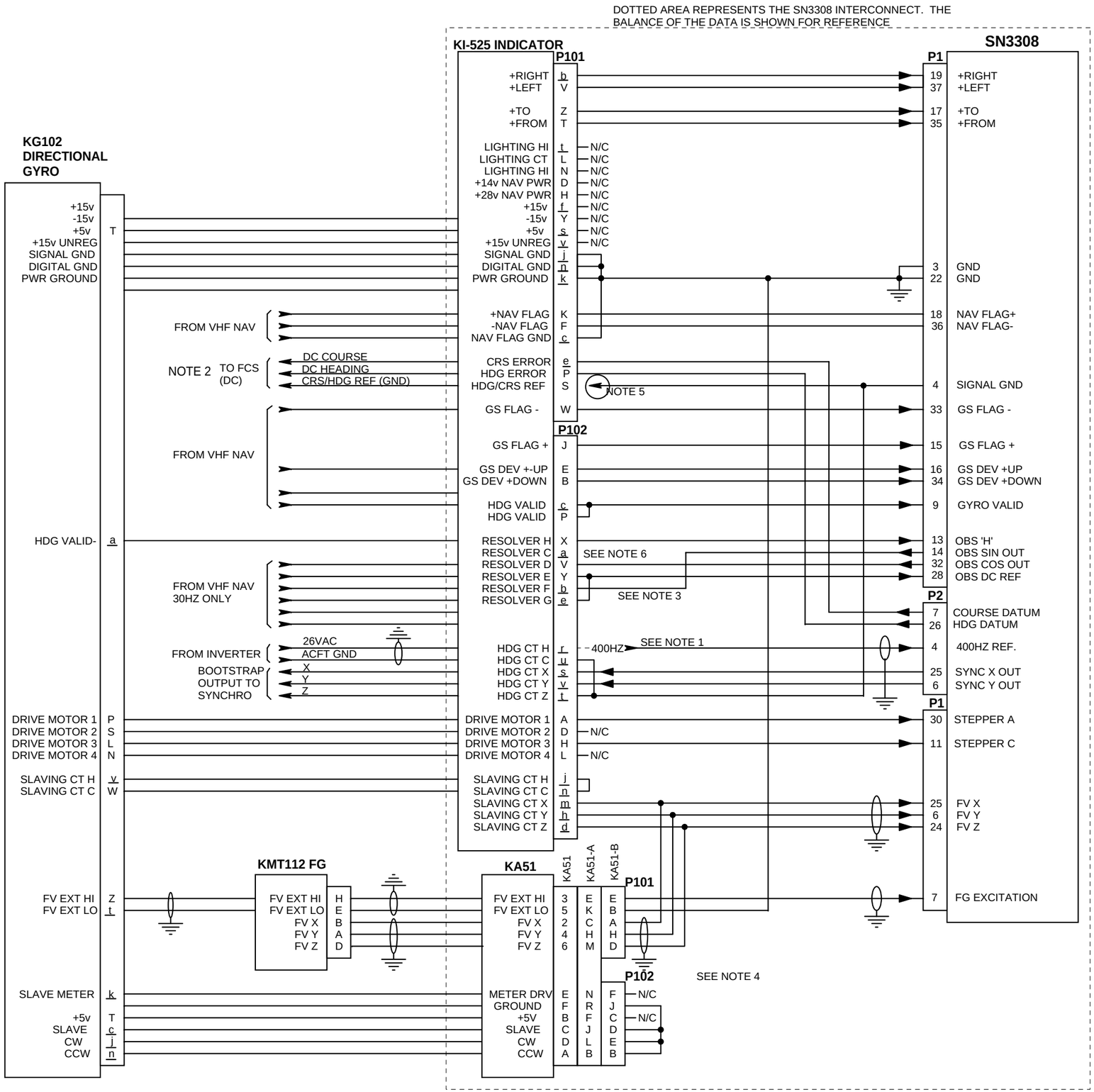
Title: GYROS, MID CONTINENT & S-TEC, BOOTSTRAP

Size	Document Number	Rev
B	90106-10	G2

Create: Monday, September 25, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 13

DATE	REV	COMMENTS
6/9/98	A	FIRST RELEASE
7/10/98	B	PAGE NUMBER CHANGED.
9/10/98	C	PAGE COUNT.
9/10/98	D	NO CHANGE.
9/23/98	E	KI525-S AND NOTE 7. SHIELDS ADDED 400HZ.
5/26/99	F	TOTAL SHEETS CHANGED TO 21 MOVED RESOLVER INTERCONNECT AND NOTES 4 AND 5 TO PAGE 4. KG102 FG H/C CORRECTED. KA51-A CHANGED 'E' TO 'L'
10/23/00	G	ADDED PINS P2-25 AND 6 ADDED NOTE 6. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES:

1: THE SYSTEM 400HZ INVERTER WILL NORMALLY BE CONNECTED TO THE HEADING SYNCHRO 'H' TERMINAL. THIS WIRE CAN BE USED TO DRIVE THE SN3308 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 SN3308, 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 SN3308 P1-4 TO FCS GROUND AT THE ROLL COMPUTER WITH A NEW WIRE. IF PRIMARY POWER IS APPLIED TO SN3308 P1-4 DAMAGE MAY OCCUR TO THE SN3308 RESULTING IN AN OPEN CIRCUIT AT P1-4. 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: SN3308 INSTALLATION DRAWING

Title: GYROS: KCS-55 UPGRADE

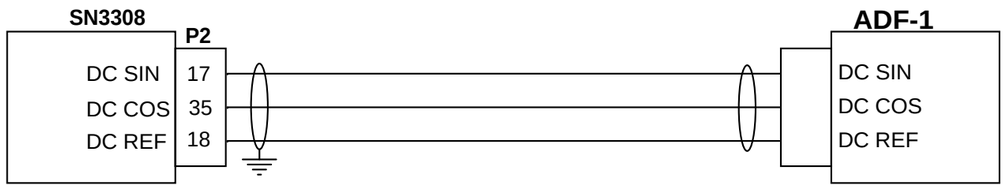
Size B | Document Number 90106-10 | Rev G2

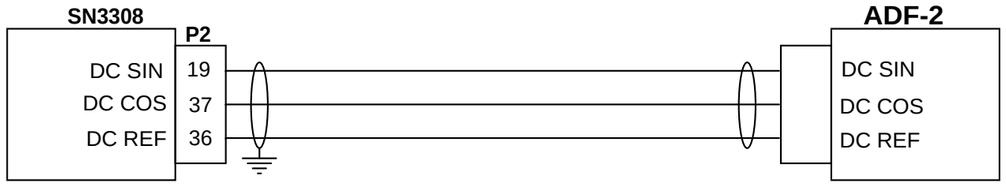
Create:Saturday, May 02, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 14

DATE	REV	COMMENTS
6/9/98	A	[illegible]
7/10/98	B	PAGE NUMBER CHANGED.
9/10/98	C	PAGE COUNT.
12/11/98	E	PAGE COUNT
5/26/99	F	TOTAL SHEETS CHANGED TO 21
10/23/00	G	ADDED INVERTERS TO ADF RECEIVERS ADDED COLLINS ADF 650/650A AND BENDIX/KING KR 87. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

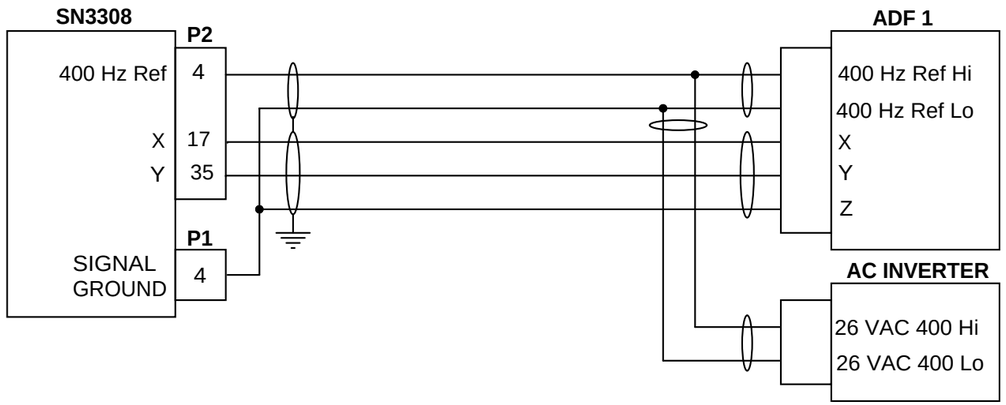
ADF RECEIVER 1/2 INTERCONNECT

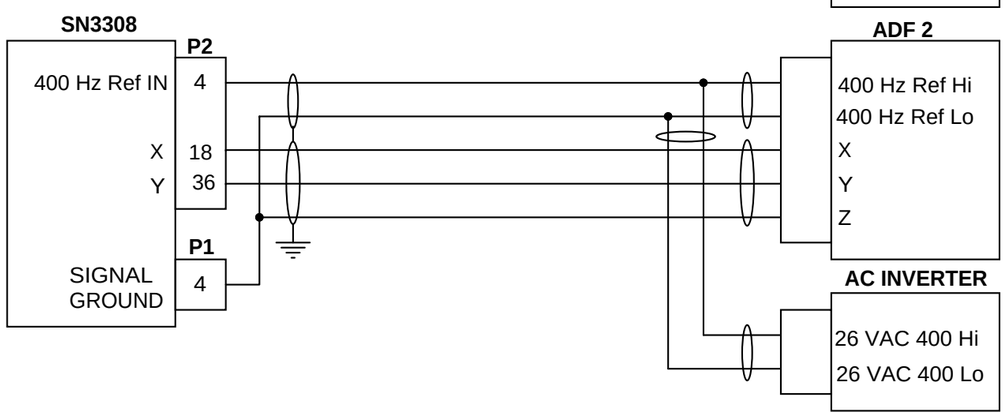


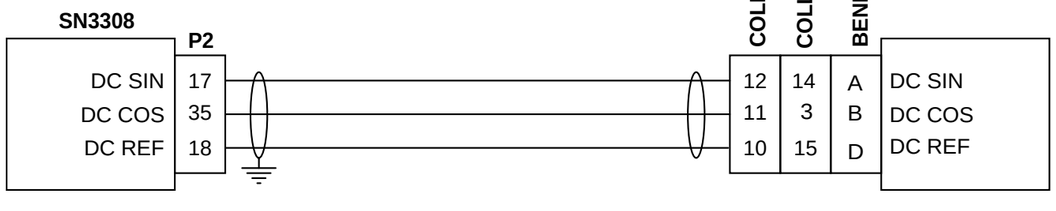


SEE NOTE 1

400HZ ADF RECEIVERS 1&2







NOTES:

1. THE SN3308 WILL NOT SUPPORT THE #2 DC ADF RECEIVER WHEN ALSO USED WITH A 400HZ #1 VHF NAV AS THE DIFFERENTIAL RESOLVER 400HZ INPUT AND THE SIN/COS ADF INPUT SHARE THE SAME PINS.

2. SELECT APPROPRIATE SETUP DATA ON ADF INSTALLATION PAGE.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

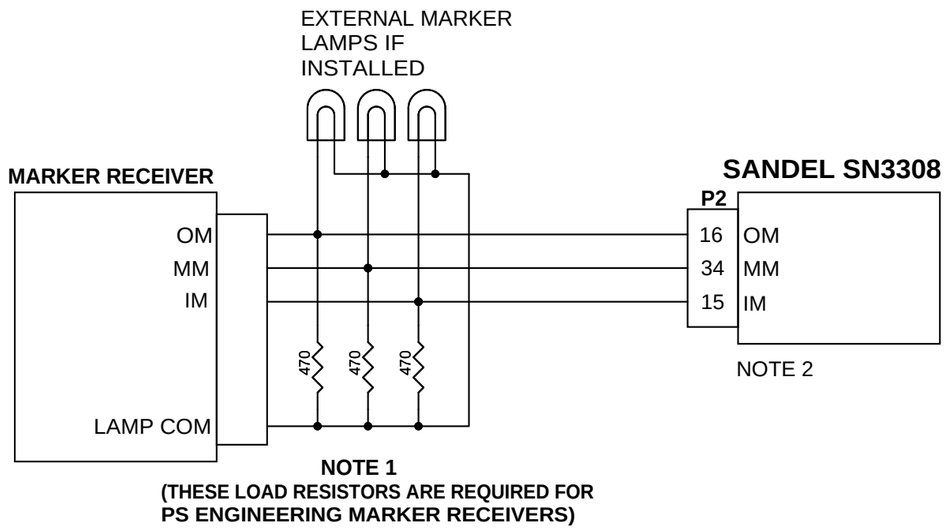
Title: ADF

Size: B | Document Number: 90106-10 | Rev: G2

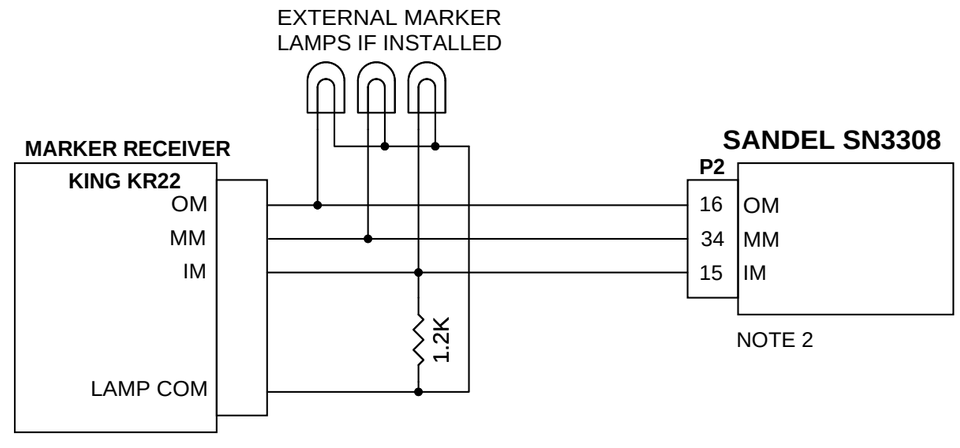
Create: Sunday, May 03, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 15

DATE	REV	COMMENTS
6/9/98	A	[illegible]
7/10/98	B	NOTE 2 CHANGED.
8/20/98	C	PS ENGINEERING NOTE. PAGE COUNT.
12/8/98	E	LOAD RESISTOR VALUES.
5/26/99	F	TOTAL SHEETS CHANGED TO 21
10/23/00	G	ADDED KING KR22. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT 1.2k ON KR22 TO INNER MARKER

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 SN3308 INDICATION IF THE ASSOCIATED MARKER LIGHT BULB FAILS.

2. SELECT THE APPROPRIATE MARKER BEACON RECEIVER ON THE SN3308 MARKER BEACON INSTALLATION PAGE. IF SPECIFIC RECEIVER NOT SHOWN USE KMA-24 SETTING.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

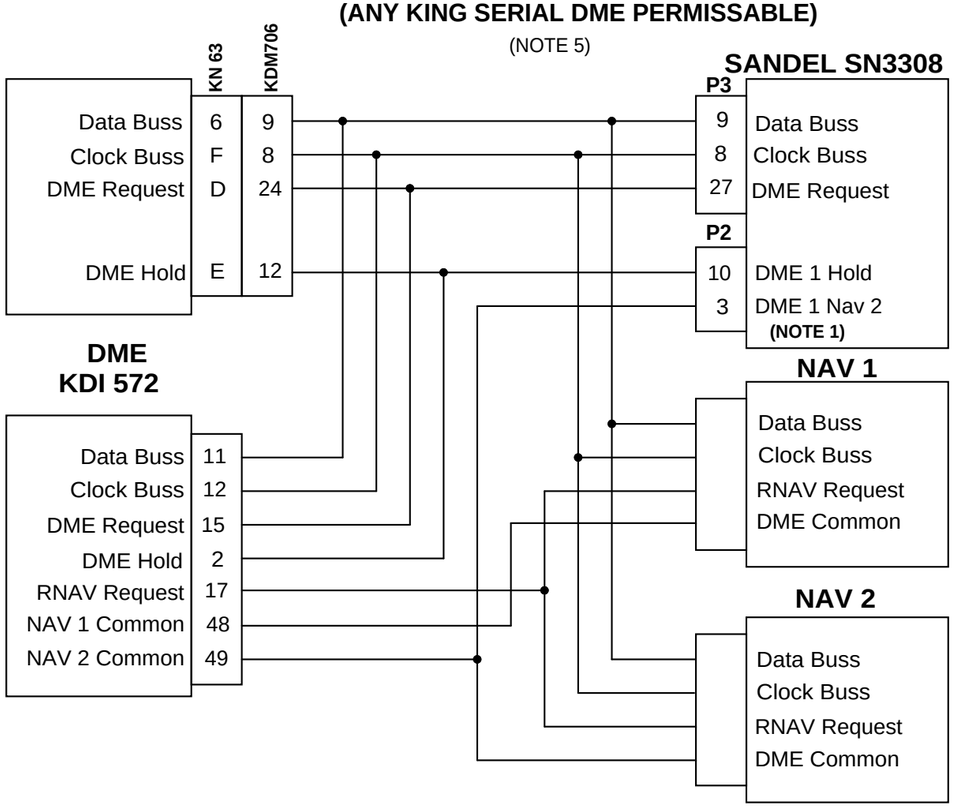
Title: MARKER BEACON

Size: B | Document Number: 90106-10 | Rev: G2

Create: Sunday, May 03, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 16

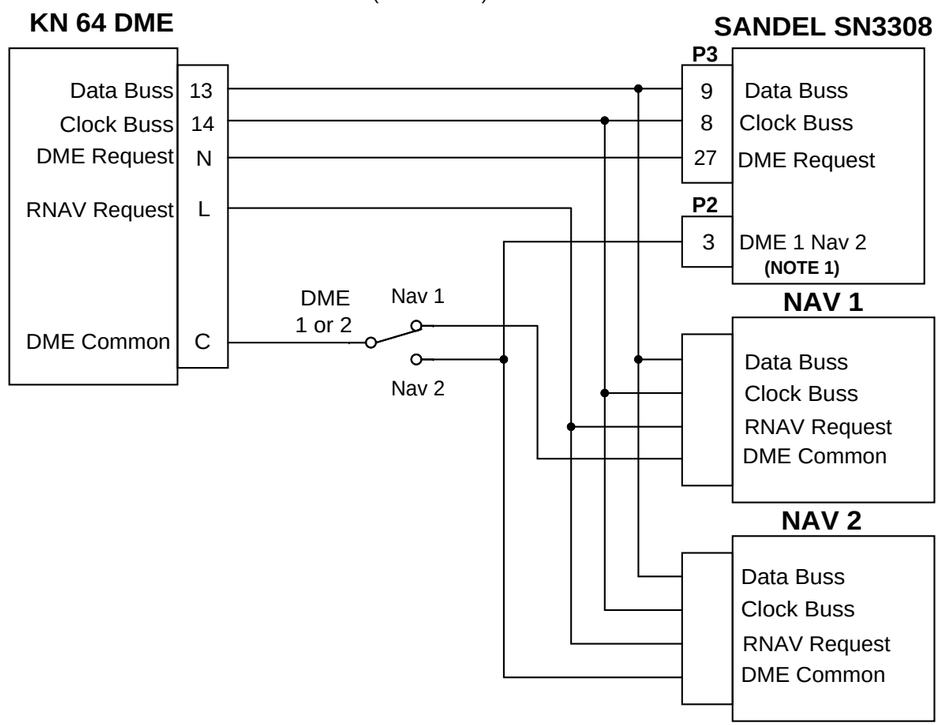
SINGLE KING SERIAL DIGITAL DME USING KDI572 (ANY KING SERIAL DME PERMISSABLE)

(NOTE 5)



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

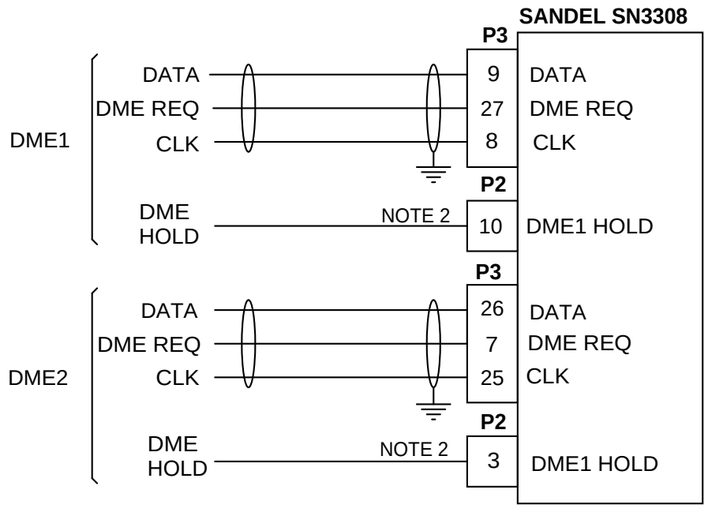
(NOTE 4 & 5)



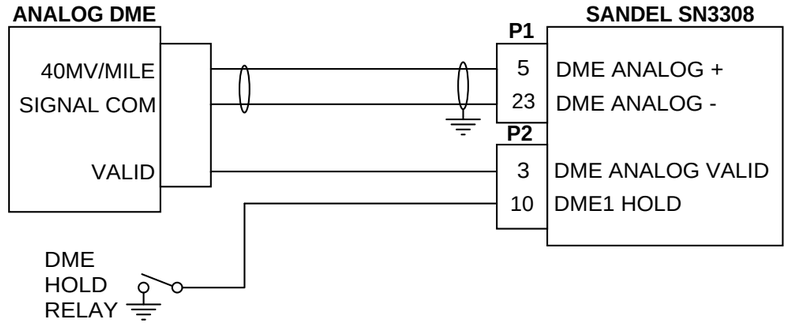
DATE	REV	COMMENTS
6/9/98	A	~~
7/10/98	B	DME HOLD SHOWN TO KDI572. DME-1 NAV-2 SHOWN TO NAV-2.
9/10/98	C	PAGE COUNT.
12/11/98	E	PAGE COUNT
5/26/99	F	TOTAL SHEETS CHANGED TO 21
10/23/00	G	ADDED KN 64 DME . ADDED NOTE 5. ADDED NAV1 & NAV2. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 KN 63 DME NAV1 & NAV 2 WERE CONN TO SN3308 P3-27 & P3-8. PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT
9/25/03	G4	A/R661: Pinout for KDM706 added. Note on permissibility added

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

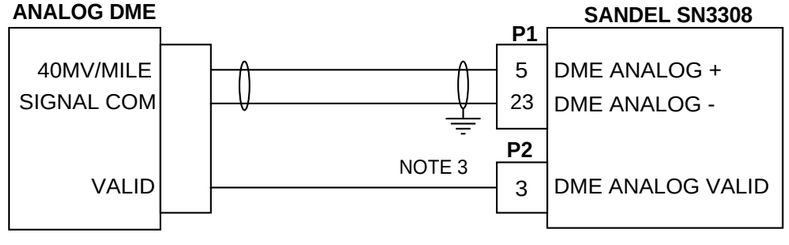
DUAL KING SERIAL DIGITAL DME'S.



ANALOG DME AS ONLY DME



ANALOG DME AS SECOND DME



NOTES:

1. IN A SINGLE DME CONFIGURATION THE SN3308 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.

2. IN A DUAL DME CONFIGURATION THE SN3308 CAN ONLY DETECT DME HOLD. IT ALWAYS ASSOCIATES DME-1 WITH NAV-1 AND DME-2 WITH NAV-2.

3. THE SN3308 WILL NOT SUPPORT HOLD ANNUNCIATION ON ANALOG DME USED AS DME-2.

4. THE SN3308 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.

5. MAINTENANCE PAGE SETUP FOR KING SERIAL DME
   DME 1/2 CHANGE
   DME1: KING DIGITAL
   DME2: NONE

   DME-1 HOLD ACTIVE LOW
   DME-2 HOLD ACTIVE LOW
   DME-2 HOLD DME 1 NAV2

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: DME: KING SERIAL AND ANALOG

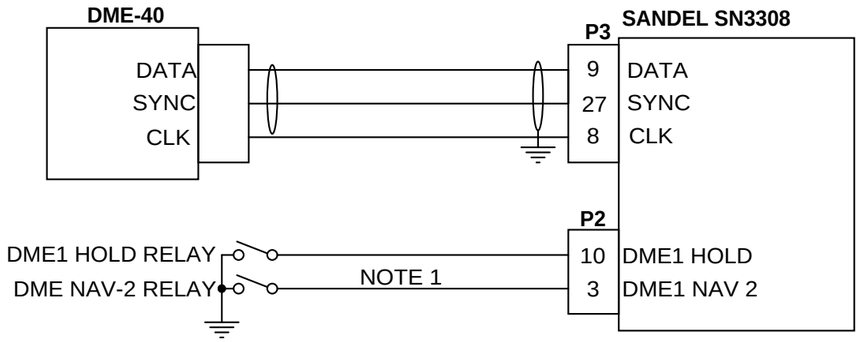
Size	Document Number	Rev
B	90106-10	G4

Create:Sunday, May 03, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 17

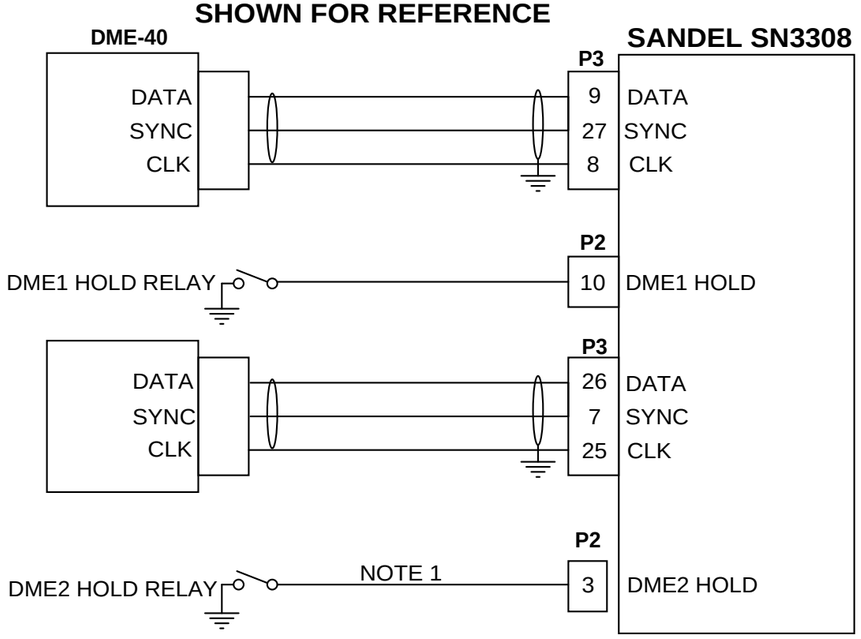
DATE	REV.	COMMENTS
6/9/98	A	FIRST RELEASE
7/10/98	B	PAGE NUMBER CHANGED.
9/10/98	C	PAGE COUNT.
12/11/98	E	PAGE COUNT
5/26/99	F	TOTAL SHEETS CHANGED TO 21. NOTE ON DME-40 SOFTWARE
10/23/00	G	UPDATED TITLE BLOCK. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

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 SN3308 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.

2. IN A DUAL DME CONFIGURATION THE SN3308 CAN ONLY DETECT DME HOLD. IT ALWAYS ASSOCIATES DME-1 WITH NAV-1 AND DME-2 WITH NAV-2.

3. DME-40 (ARINC 568) DME SUPPORTED IN SOFTWARE 1.32 AND LATER.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

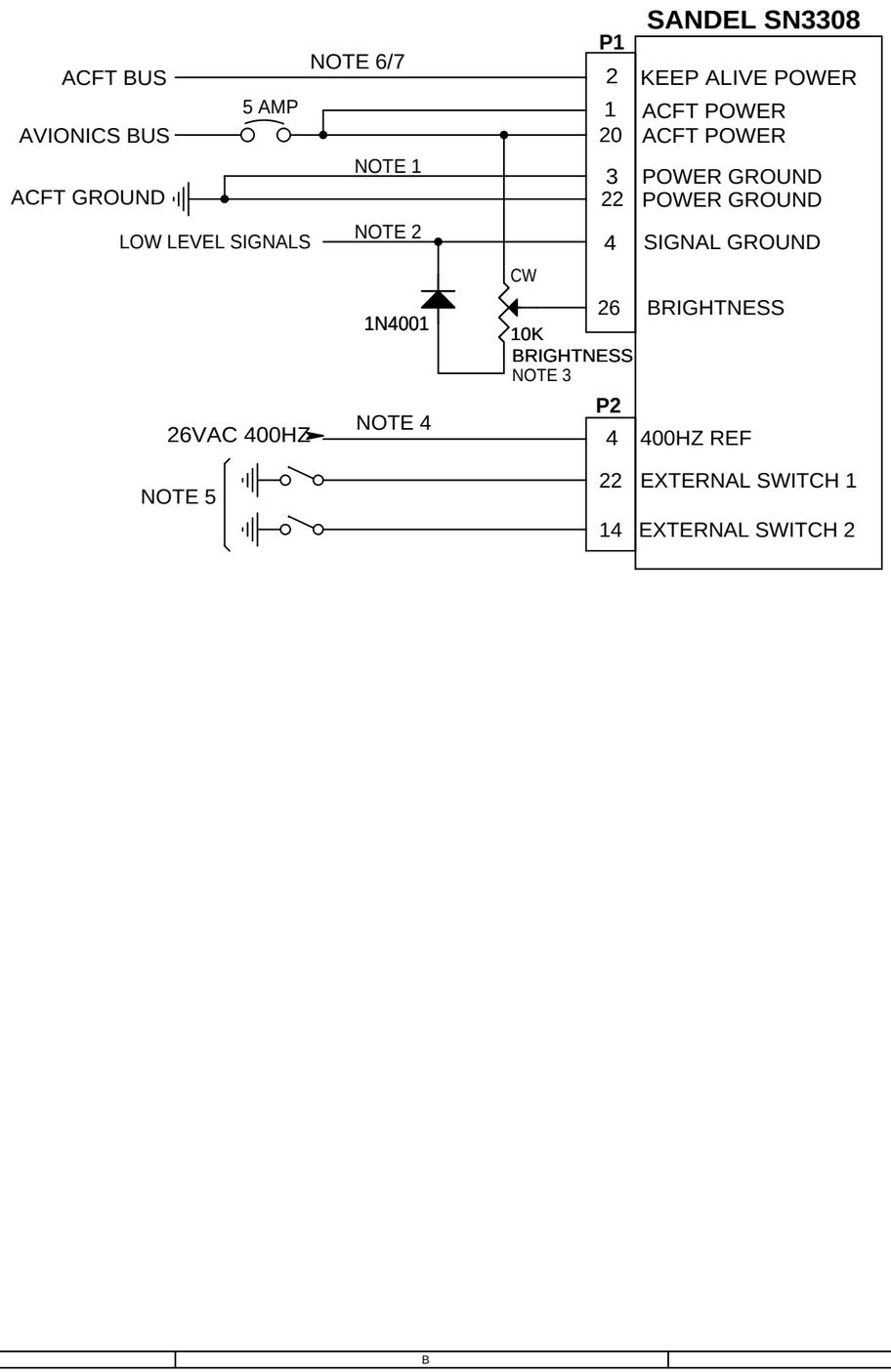
Title: DME: ARINC 568

Size	Document Number	Rev
B	90106-10	G2

Create:Sunday, May 03, 1998 | Mod: Monday, April 07, 2008 | Sheet 18

DATE	REV	COMMENTS
6/9/98	A	[illegible]
7/10/98	B	PAGE NUMBER CHANGED.
9/10/98	C	NOTE 1 CHANGED. PAGE COUNT.
12/11/98	E	MAIN POWER, PAGE COUNT
5/26/99	F	REMOVED FUSE. CHANGED NOTES 6/7. TOTAL SHEETS NOW 21.
10/23/00	G	UPDATED TITLE BLOCK. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



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

2. USE THIS GROUND PIN ONLY FOR LOW LEVEL RETURNS OF ANALOG SIGNALS SUCH AS SYNCHRO 'Z' LEGS. DO NOT USE FOR DIGITAL SIGNALS OR POWER.

3. MOUNT DIMMER CONTROL NEAR INSTRUMENT WITHIN REACH OF THE PILOT. 'CW' INDICATES CLOCKWISE ROTATION. THE DIMMER INPUT GOES TO FULL BRIGHTNESS BELOW .5VDC. THE DIODE FORCES THE LOWEST SETTING OF THE BRIGHTNESS POT TO .6V OR ABOVE.

4. WITH THE EXCEPTION OF THE OBS RESOLVER ON PINS P1-13, P1-14, P1-28 AND P1-32, THE SN3308 REFERENCES ALL 400HZ INPUTS AND OUTPUTS TO THE SIGNAL ON THIS PIN. SEE ADDITIONAL NOTES ON OTHER SHEETS OF THIS MANUAL.

5. OPTIONAL YOKE OR PANEL MOUNTED SWITCHES FOR ASSIGNABLE FUNCTIONS SUCH AS REMOTE SYNC, ARC/360, ETC. SEE SETUP INFORMATION IN SN3308 INSTALLATION MENUS.

6. FOR ALL SERIAL NUMBERS KEEP ALIVE POWER P1-2 MAY DRAW AS MUCH AS 20MA AT EXTREMES OF TEMPERATURE. THEREFORE DO NOT CONNECT TO BATTERY BUS BUT CONNECT AS SHOWN TO ACFT PWR.

7. PIN 2 IS KEEP ALIVE POWER. CONNECTION TO THIS PIN IS OPTIONAL. WHEN A PRIMARY POWER INTERRUPTION OCCURS OF LESS THAN TWO MINUTES DURATION, A VOLTAGE OVER 9.5VDC ON THIS PIN WILL REDUCE THE RE-BOOT TIME OF THE SN3308 TO APPROXIMATELY 1.5 SECONDS.
UNIT HAS INTERNAL RESISTOR/FUSE

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: SYSTEM

Size: B | Document Number: 90106-10 | Rev: G2

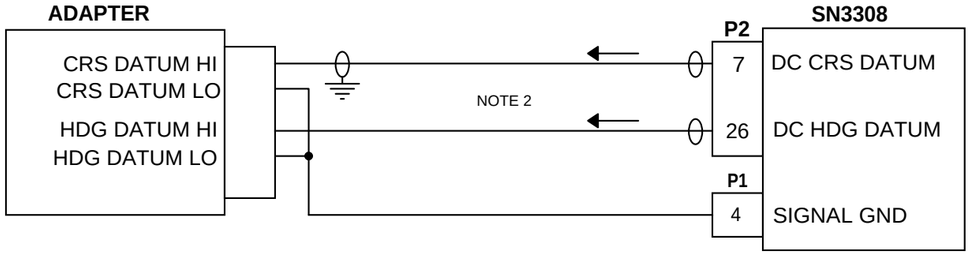
Create: Sunday, May 03, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 19

DATE	REV	COMMENTS
6/9/98	A	[illegible]
7/10/98	B	CENTURY IV ADDED.
8/20/98	C	CENTURY IV CHANGED, CENTURY 2/3 MOVED OFF PAGE. NOTES CHANGED. PAGE COUNT.
12/11/98	E	PAGE COUNT
5/26/99	F	RELAY CURRENT. TOTAL SHEETS CHANGED TO 21
10/23/00	G	ADDED MAX AMPERAGE TO BACK COURSE. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

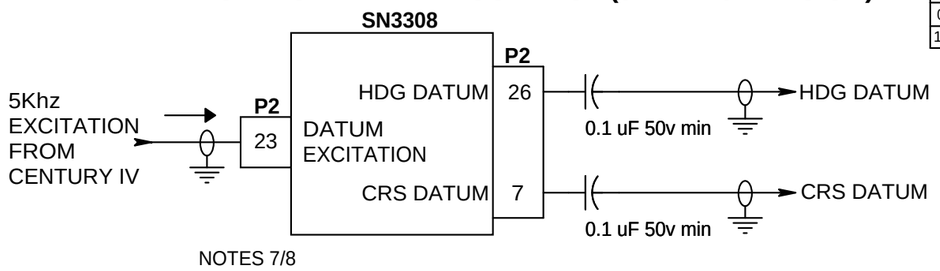
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

DC AUTOPILOT TYPICAL INTERCONNECT

SEE NOTE 1 CONCERNING KING KA52/57

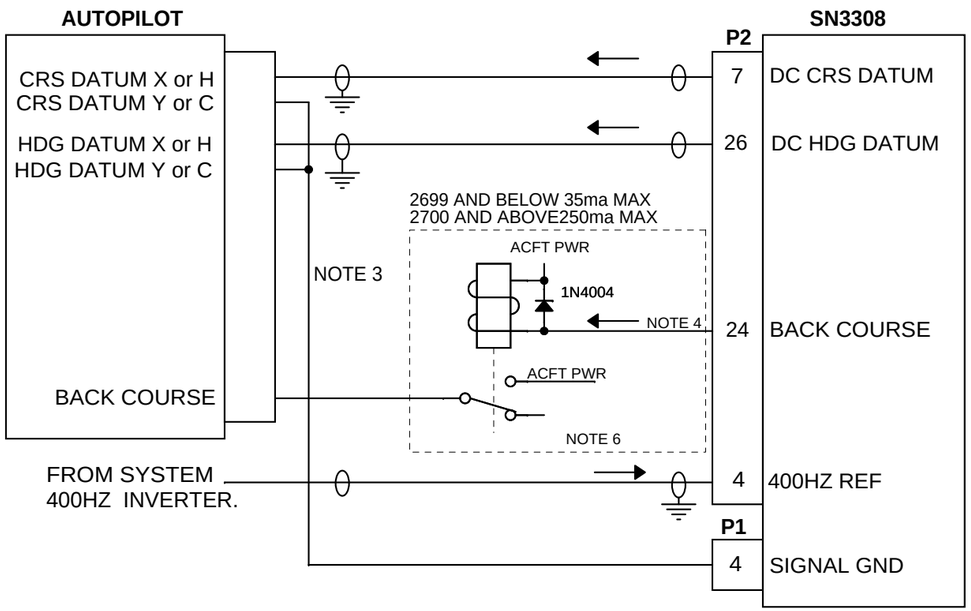


CENTURY IV INTERCONNECT (5KHZ AC VERSION)

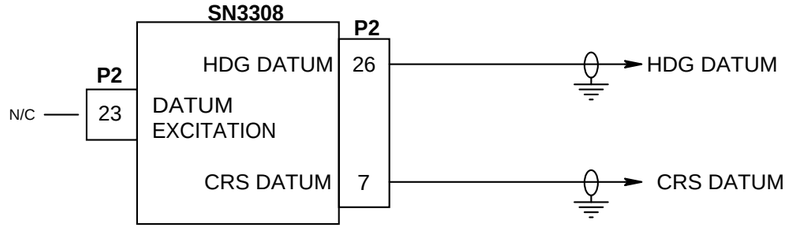


NOTES 7/8

400HZ AC AUTOPILOT TYPICAL INTERCONNECT



CENTURY IV INTERCONNECT (DC VERSION)



NOTES 7/8

NOTES:

1. IF INSTALLATION ALREADY CONTAINS A KING KA52/57 AUTOPILOT ADAPTER IT MAY REMAIN IN THE SYSTEM. TREAT THE SN3308 AS A KI525.
2. DATUM OUTPUTS ARE REFERENCED TO GROUND.
3. CHECK AUTOPILOT INTERNAL SCHEMATIC TO INSURE THAT THE SN3308 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. SELECT THE CORRECT HSI EMULATION ON THE FCS MAINTENANCE PAGE.
6. BC OUTPUT IS AN OPEN COLLECTOR. RELAY REQUIRED IF BACK COURSE INPUT TO AUTOPILOT REQUIRES +28V TO ACTIVATE. OTHERWISE CONNECT SN3308 BC OUTPUT DIRECTLY TO AUTOPILOT BC INPUT.
7. SOFTWARE ABOVE 1.04 SELECT NDS-360DC, OTHERWISE SELECT KI-525 ON THE FCS MENU.
8. ON FCS-CHANGE MENU, 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.
9. IF CRS/HDG WORK BACKWARDS, EITHER a) USE OPPOSITE PHASE OF AC EXCITATION SOURCE; b) ON SOFTWARE 1.05 OR LATER SELECT "REVERSE" ON FCS-CHANGE MAINTENANCE PAGE.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: FCS INTERCONNECT

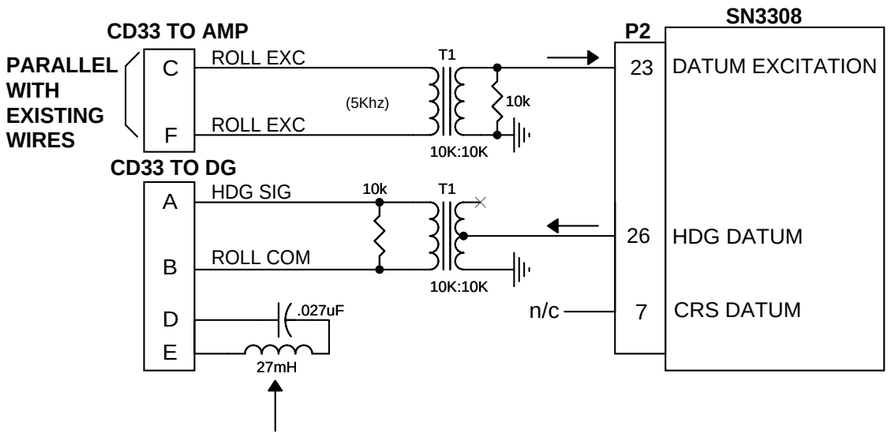
Size	Document Number	Rev
B	90106-10	G2

Create: Monday, May 04, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 20

DATE	REV	COMMENTS
9/10/98	C	
12/11/98	E	TRANSFORMER P/N, PAGE COUNT
5/26/99	F	TOTAL SHEETS CHANGED TO 21
8/20/99	F2	2:1 STEPUP OF CRS/HDG BY DRIVING TRANS. CT.
10/23/00	G	ADDED NOTE PARALLEL WITH EXISTING WIRES. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 NOTE 5 DELETED SA-330. PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

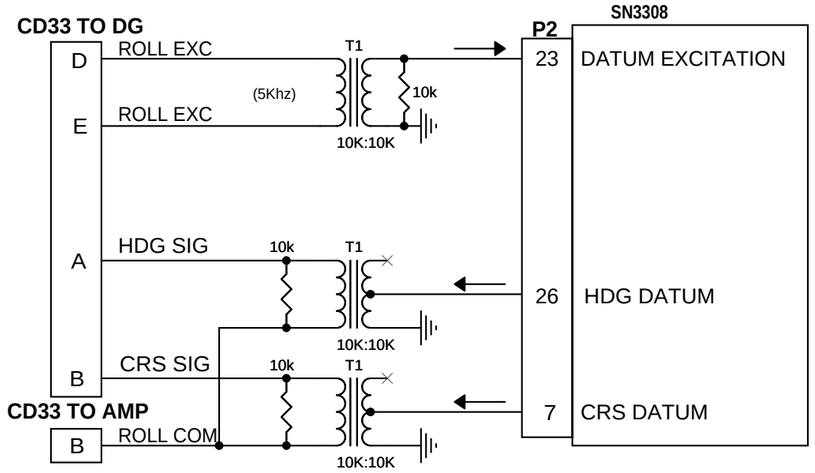
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

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

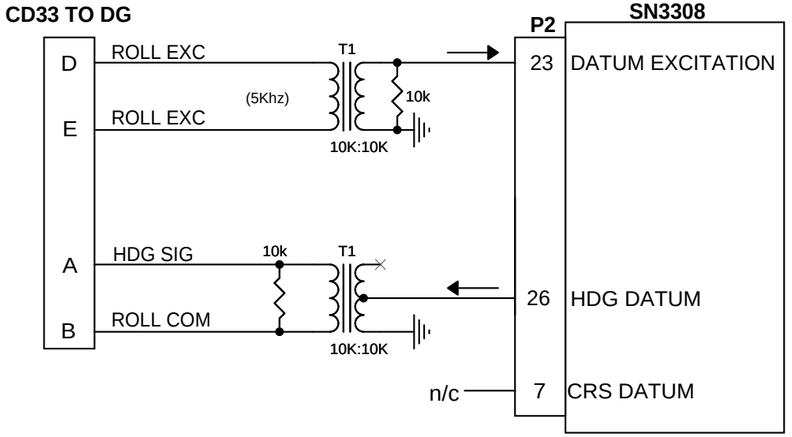


JW Miller PN:9250-276 or Equiv

CENTURY 1C-388-2 RADIO COUPLER

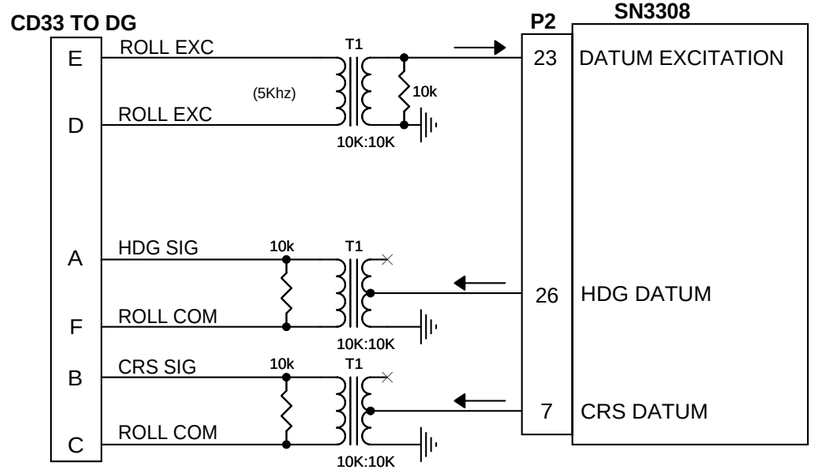


CENTURY 1C-388-C, 1C388-MC RADIO COUPLERS



(ABOVE COUPLERS DO NOT SUPPORT COURSE DATUM.)

CENTURY 1C-388-3 RADIO COUPLER



NOTES:

1. SOFTWARE ABOVE 1.04 SELECT NDS-360DC, OTHERWISE SELECT KI-525 ON THE FCS MENU.
2. ON FCS-CHANGE MENU, 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 SN3308 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.
6. TRANSFORMERS ARE MAGNA-TEK TY-141P OR EQUIVALENT.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

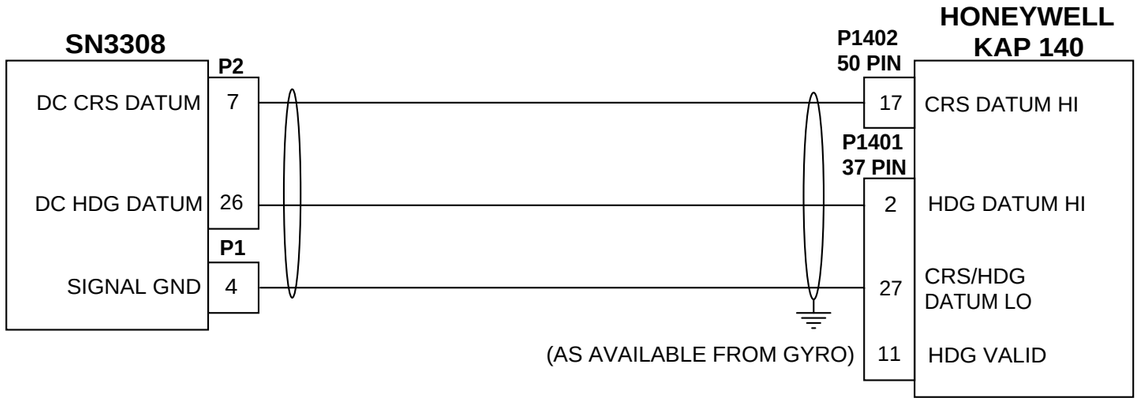
Title: CENTURY 1C388 COUPLERS

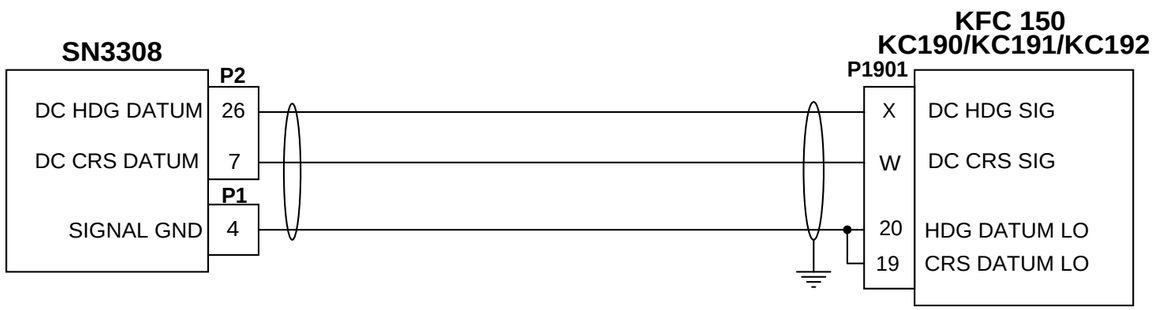
Size: B | Document Number: 90106-10 | Rev: G2

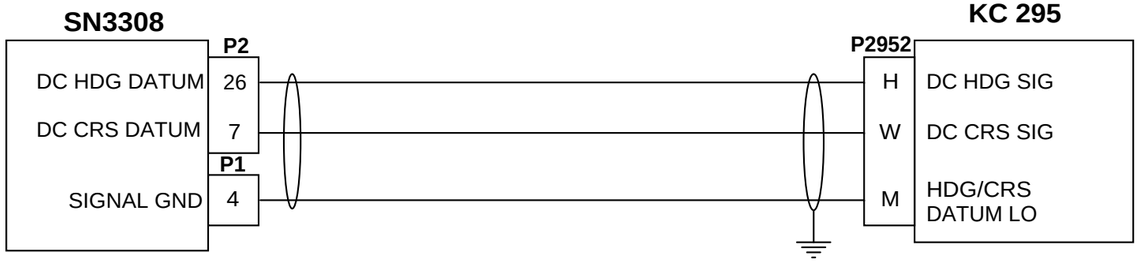
Create: Monday, May 04, 1998 | Mod: Tuesday, October 30, 2007 | Sheet 21

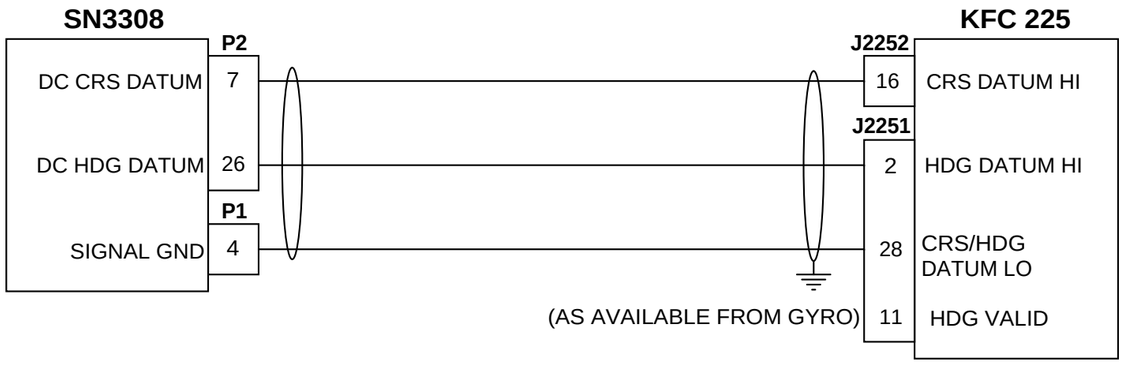
DATE	REV	COMMENTS
10/23/00	G	INITIAL RELEASE
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT ADDED HDG DATUM LOW TO KFC150

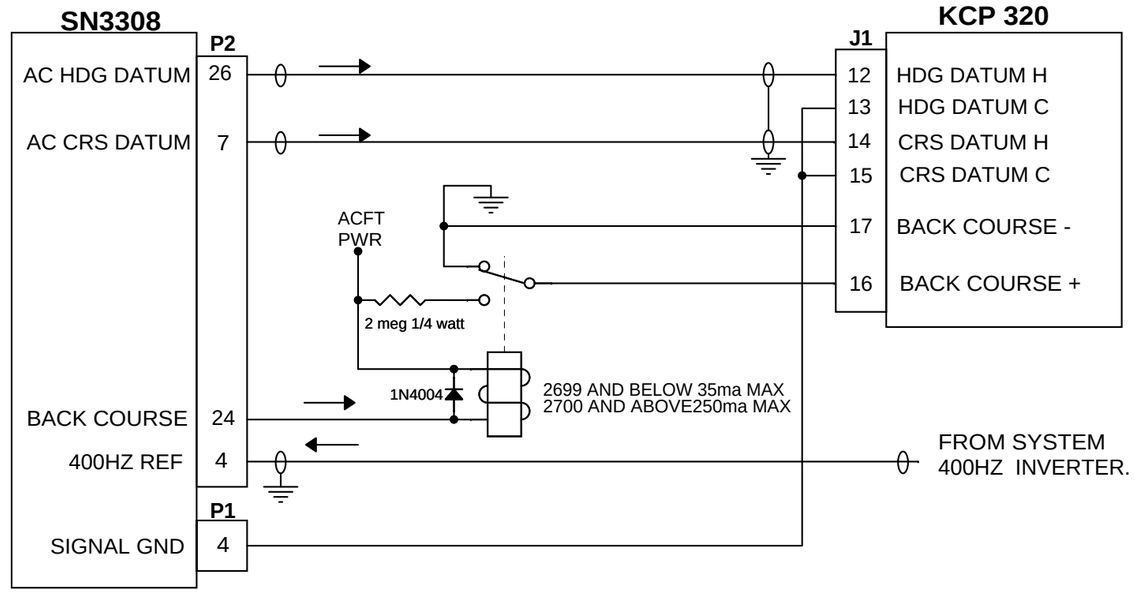
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY











PN101 "FCS Emulation" selected in setup

NOTES

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

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: BENDIX/KING AUTOPILOTS

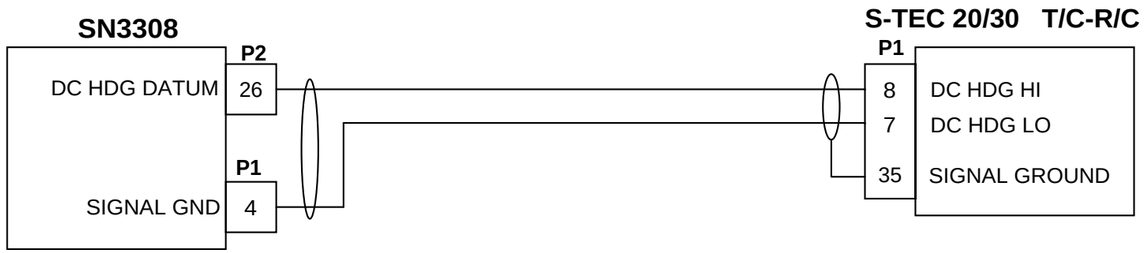
Size B | Document Number: 90106-10 | Rev: G2

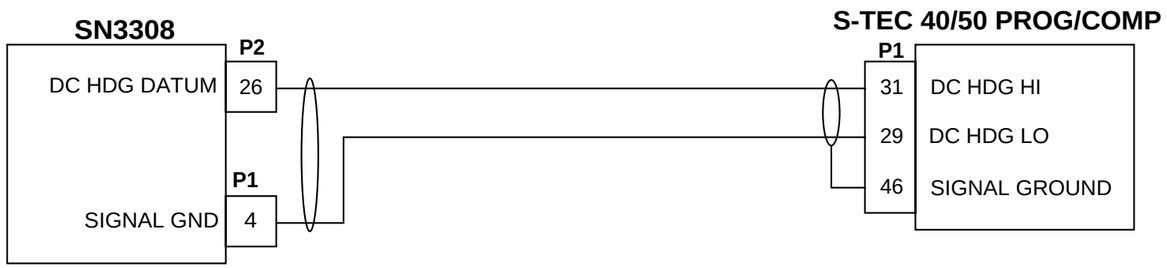
Create: Wednesday, September 20, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 22

DATE	REV	COMMENTS
10/23/00	G	INITIAL RELEASE
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT

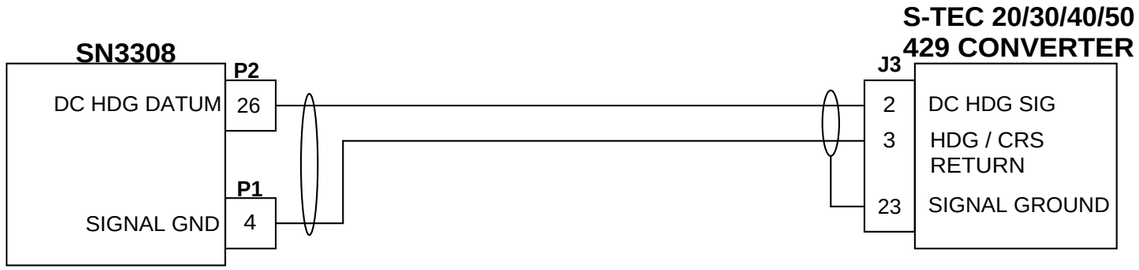
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

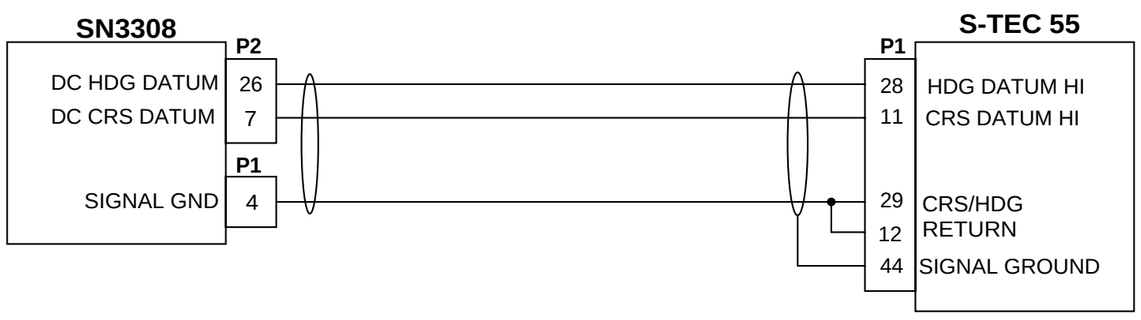
S-TEC AUTOPILOTS

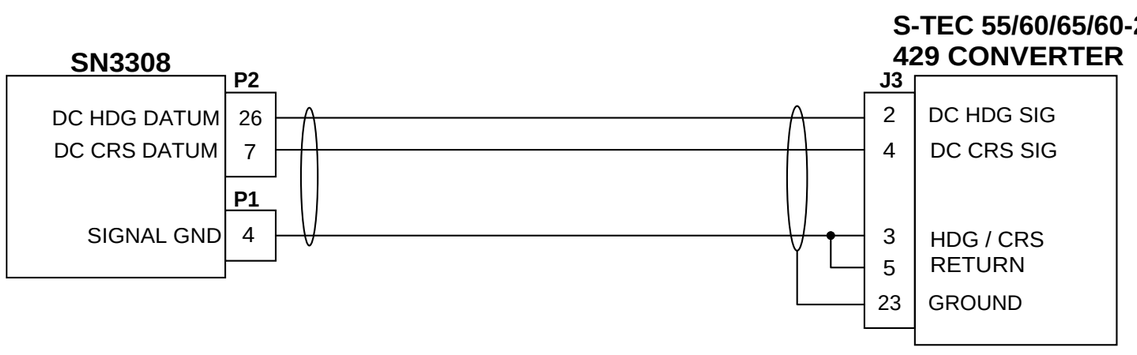


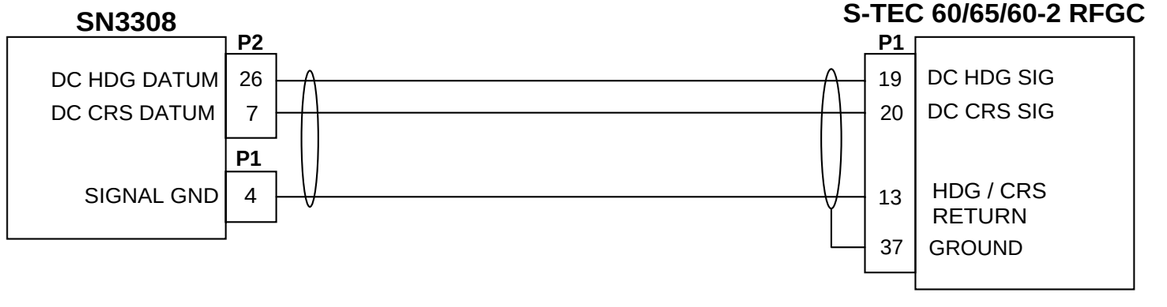


S-TEC GPSS HEADING SYSTEM'S









NOTES

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

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

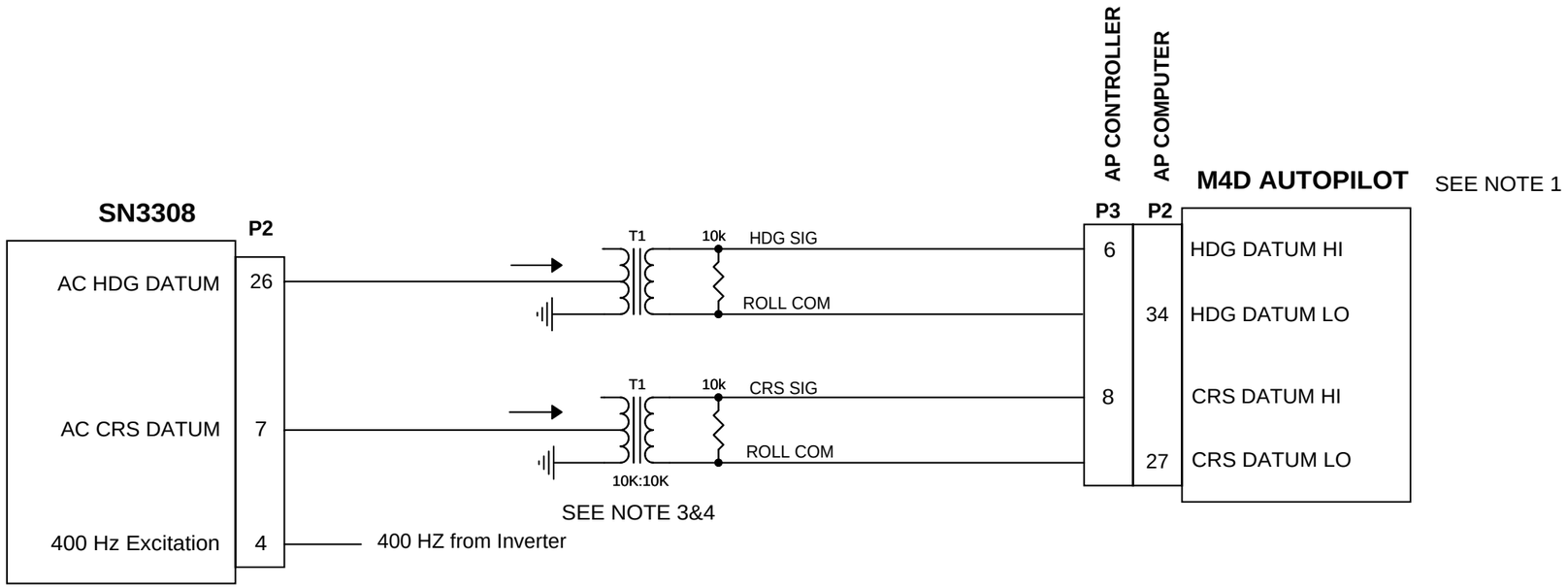
Title: S-TEC AUTOPILOTS

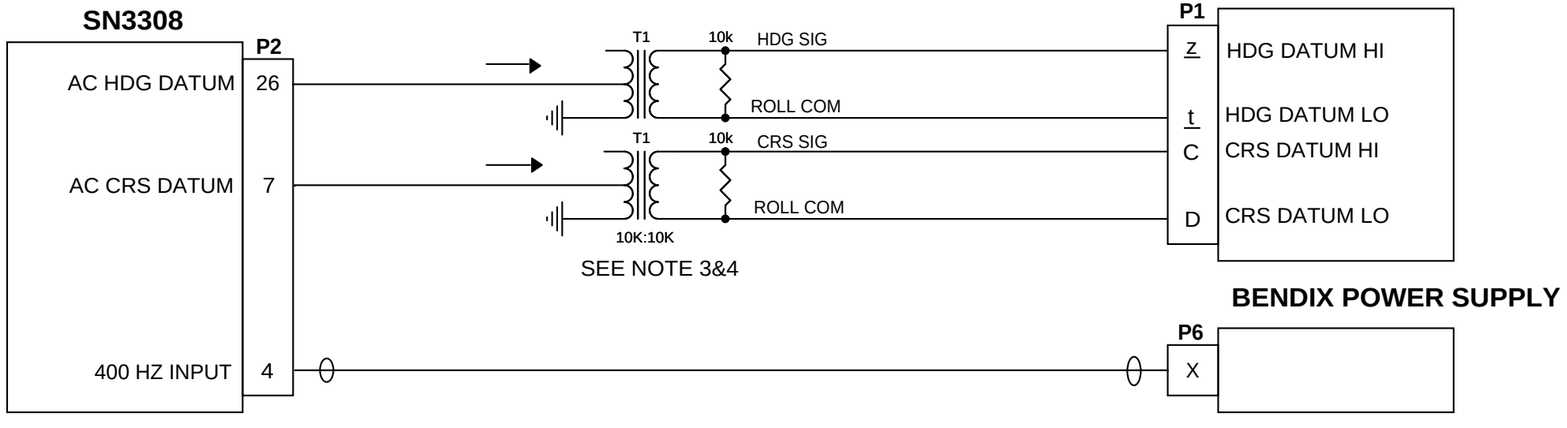
Size B | Document Number: 90106-10 | Rev: G2

Create: Tuesday, September 19, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 23

DATE	REV.	COMMENTS
10/04/02	G2	A/R 573 INITIAL RELEASE

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.
4. TRANSFORMERS ARE MAGNA-TEK TY-141P OR EQUIVALENT.
5. THE AUTOPILOT 400HZ IS THE MASTER INVERTER FOR THE SN3308.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

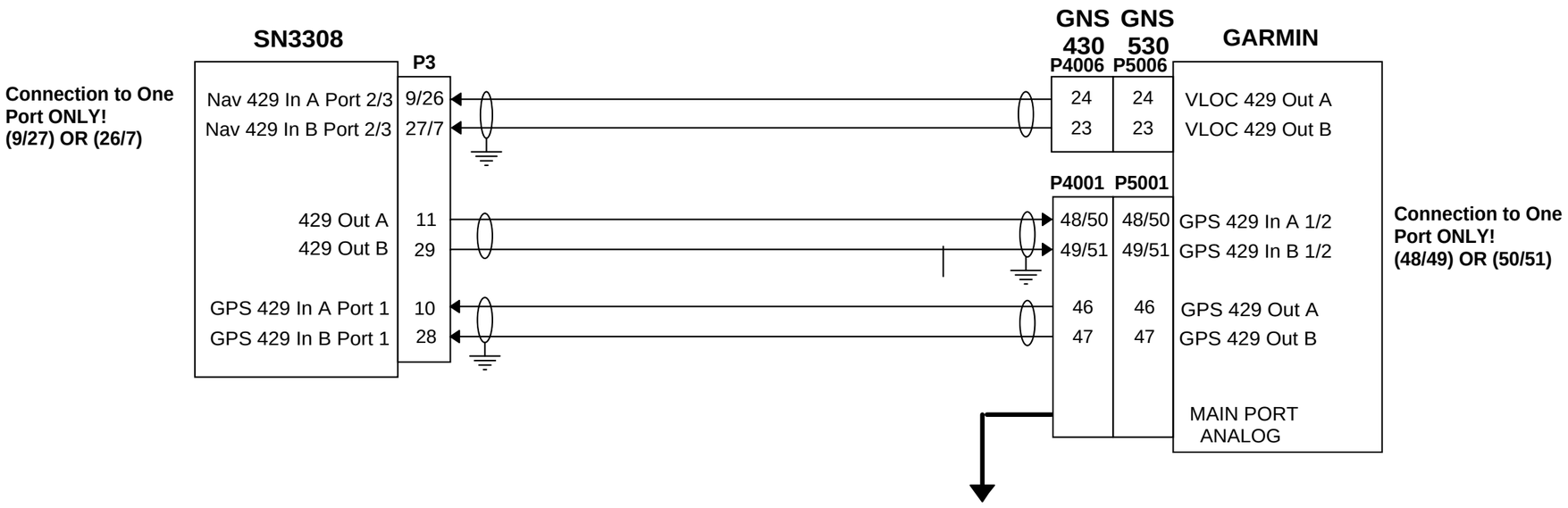
Title: BENDIX AUTOPILOTS

Size: B | Document Number: 90106-10 | Rev: G2

Create: Tuesday, September 19, 2000 | Mod: Tuesday, October 30, 2007 | Sheet 24

DATE	REV.	COMMENTS
5/26/99	F	
10/23/00	G	ADDED CONNECTION TO ONE PORT ONLY. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT
9/24/03	G4	A/R 661 ADDED GARMIN GNS 530

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



THIS 6-WIRE INTERCONNECT PERFORMS THE FOLLOWING

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

Notes:

1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.
2. UNUSED ARINC PORT MAY BE USED FOR DME OR OTHER ARINC 429 GPS.
3. MAINTENANCE PAGE ITEMS:
   LNAV-1: GNS430 (ARINC)
   NAV-1: ARINC 429 PORT 2 OR 3 AS WIRED
   BRG NAV-1: 429
   RELAY SENSE: NOT USED
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: SN3308 INSTALLATION DRAWING

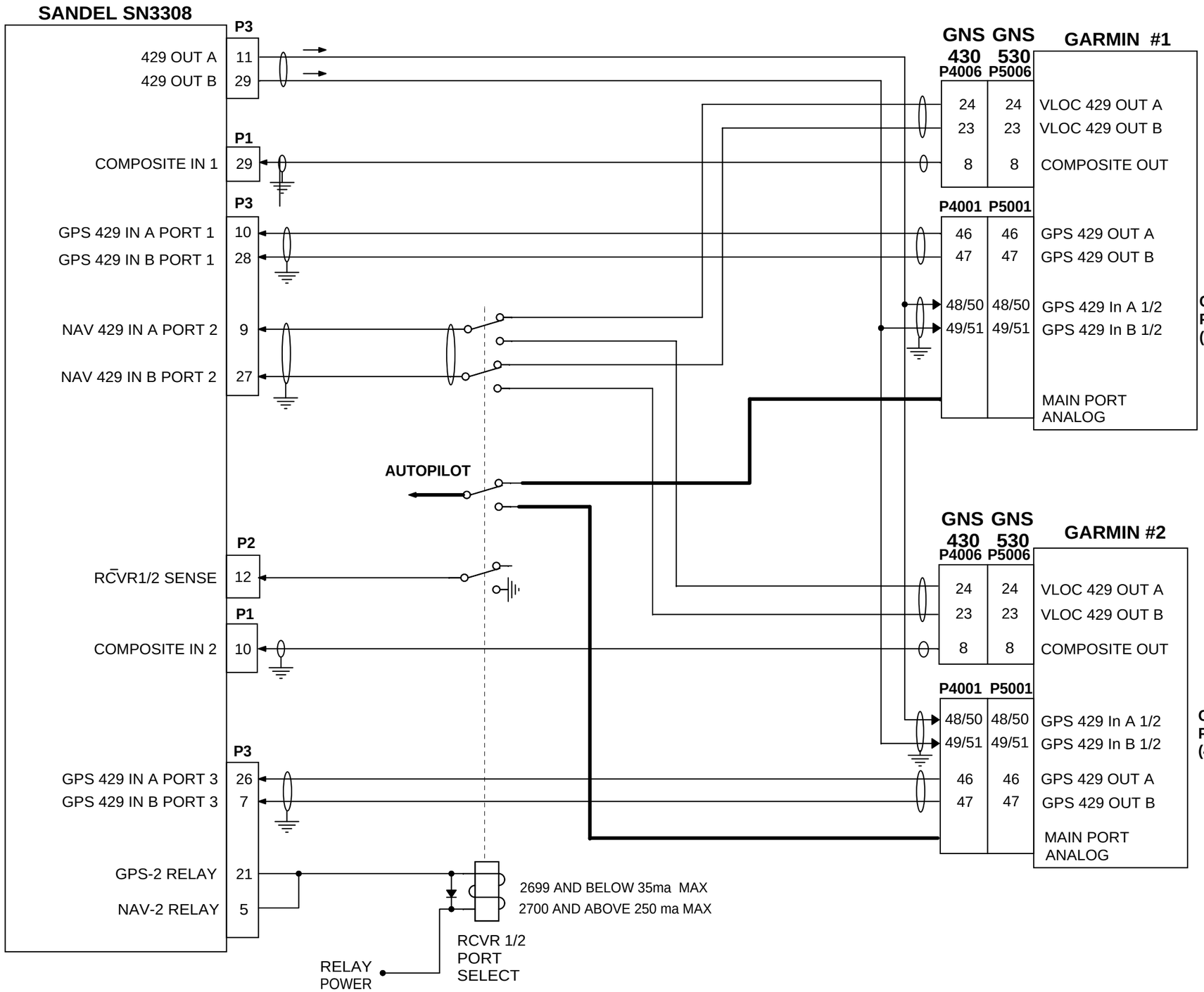
Title: SINGLE SN3308 / GNS430/530

Size B | Document Number: 90106-10 | Rev G4

Create: Thursday, January 07, 1999 | Mod: Tuesday, October 30, 2007 | Sheet 25

DATE	REV	COMMENTS
5/26/99	F	
10/23/00	G	ADDED CONNECTION TO ONE PORT ONLY. ADDED MAX VOLTAGE FOR RELAY. MOVED RCVR1/2 SENSE TO P2. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT
9/24/03	G4	A/R 661 ADDED GARMIN GNS 530

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



Notes:

1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.
2. MAINTENANCE PAGE ITEMS:
   LNAV-1: GNS430 (ARINC)
   LNAV-2: GNS430 (ARINC)
   NAV-1: 429 PORT-2
   NAV-2: 429 PORT-2
   BRG NAV-1: 429+COMP
   BRG NAV-2: 429+COMP
   RCVR 1/2 SENSE: ENABLED, SEE NOTE 3
3. SENSE PINS SELECTED IN SOFTWARE SEE "RELAY SENSE" MAINTENANCE PAGE DESCRIPTION IN APPENDIX A FOR LIST OF SPECIFIC PINS.
4. 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)

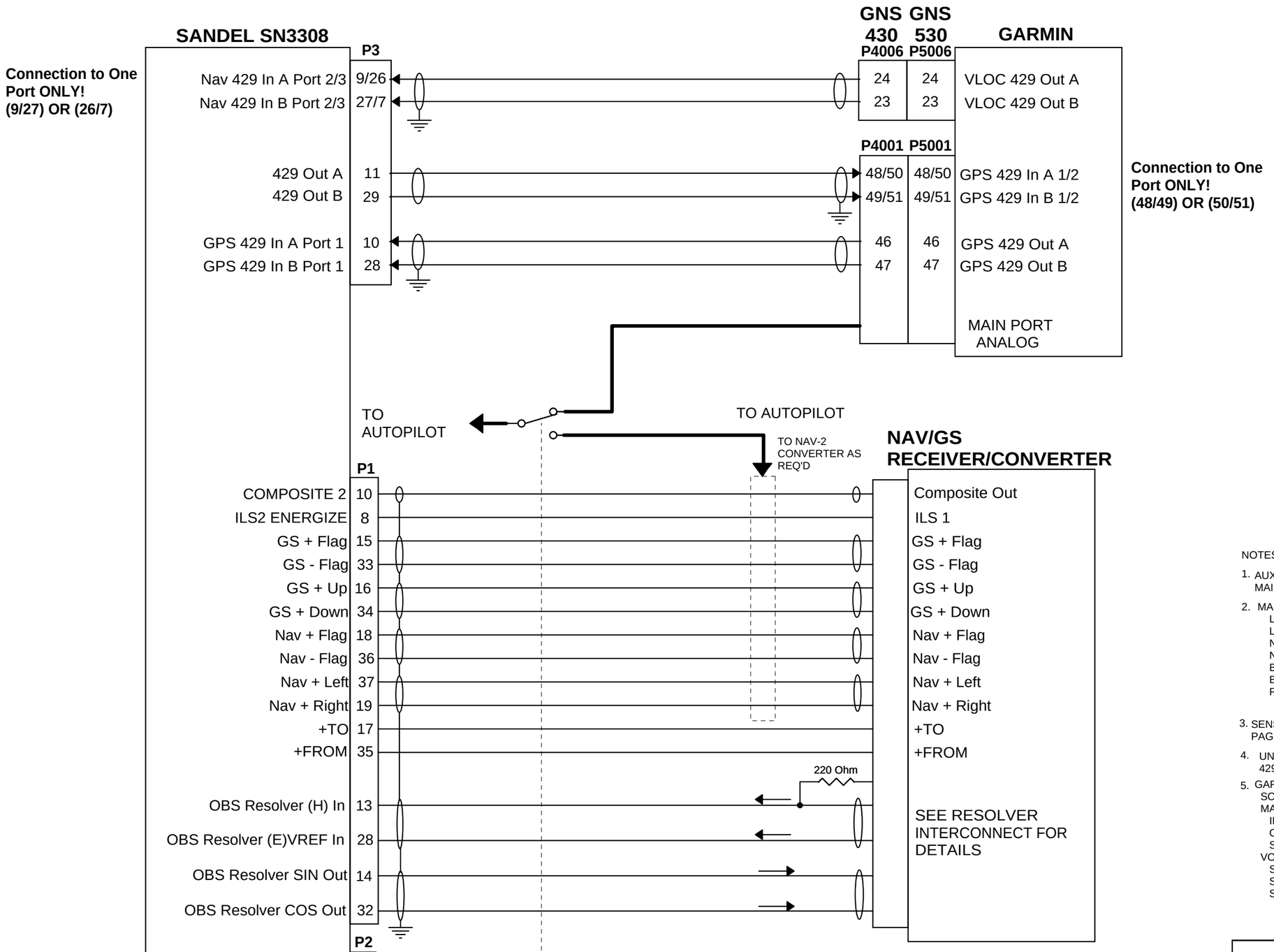
SANDEL Vista, Ca.

Category	SN3308 INSTALLATION DRAWING
Title	SINGLE SN3308 / DUAL GNS430/530
Size B	Document Number 90106-10 Rev G4
Create: Thursday, January 07, 1999	Mod: Tuesday, October 30, 2007 Sheet 26

A/R 6XX ADDED GARMIN GNS 530

DATE	REV	COMMENTS
5/26/99	F	
6/25/99	F(1)	
10/23/00	G	ADDED MAX VOLTAGE FOR RELAY. P1 16 AND 34 REVERSED ILS2 WAS ILS1. ADDED 220 OHM RESISTOR. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT
9/24/03	G4	A/R 661 ADDED GARMIN GNS 530

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES

1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.
2. MAINTENANCE PAGE SETTINGS:
   - LNAV-1: GNS430 (ARINC)
   - LNAV-2: (AS REQUIRED)
   - NAV-1: 429 PORT-2 OR PORT-3
   - NAV-2: ANALOG
   - BRG NAV-1: 429
   - BRG NAV-2: COMPOSITE
   - RELAY SENSE: NAV2 SENSE, SEE NOTE 3
3. SENSE PINS SELECTED IN SOFTWARE SEE "RELAY SENSE" MAINTENANCE PAGE DESCRIPTION IN APPENDIX A FOR LIST OF SPECIFIC PINS.
4. UNUSED ARINC PORT MAY BE USED FOR DME OR OTHER ARINC 429 GPS.
5. 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)

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

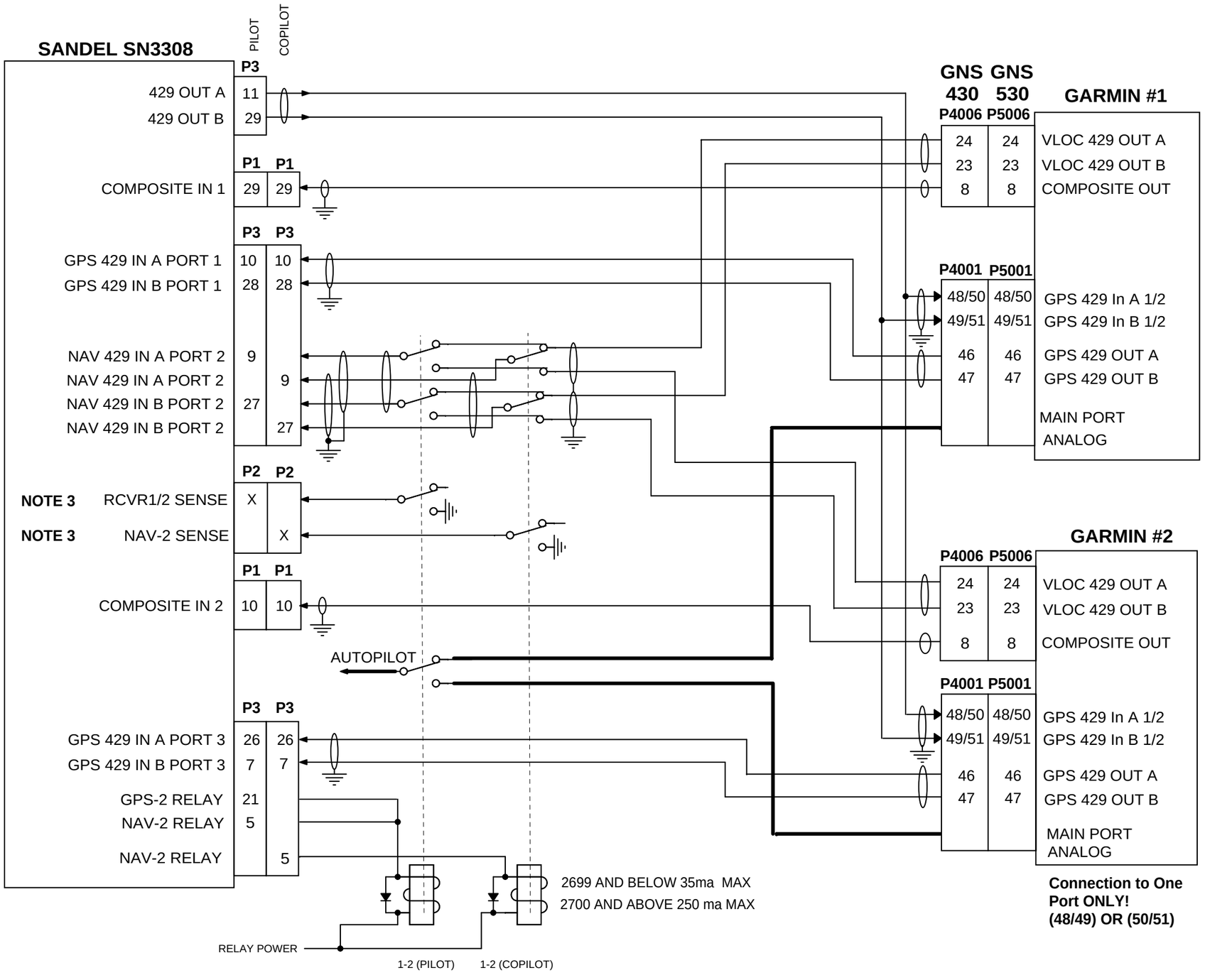
Title: SN3308 / GNS430/530 / #2 VHF NAV

Size B | Document Number: 90106-10 | Rev G4

Create: Thursday, January 07, 1999 | Mod: Tuesday, October 30, 2007 | Sheet 27

DATE	REV	COMMENTS
5/26/99	F	
10/23/00	G	ADDED MAX AMPERAGE TO RELAYS. RCVR1/2 SENSE AND NAV-2 SENSE WERE P3. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT CORRECTED 430 MISLABELED
9/24/03	G4	A/R 661 ADDED GARMIN GNS 530

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES:

1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.
2. PILOT'S MP ITEMS:

LNAV-1:	GNS430 (ARINC)
LNAV-2:	GNS430 (ARINC)
NAV-1:	429 PORT-2
NAV-2:	429 PORT-2
BRG NAV-1	429+COMP
BRG NAV-2:	429+COMP
RELAY SENSE:	RCVR 1/2 SENSE, SEE NOTE 3

3. COPILOT'S MP ITEMS:

LNAV-1:	GNS430 (ARINC)
LNAV-2:	GNS430 (ARINC)
NAV-1:	429 PORT-2
NAV-2:	429 PORT-2
BRG NAV1 :	429+COMP
BRG NAV2:	429+COMP
RELAY SENSE:	NAV 2 SENSE, SEE NOTE 3

3. SENSE PINS SELECTED IN SOFTWARE SEE "RELAY SENSE" MAINTENANCE PAGE DESCRIPTION IN APPENDIX A FOR LIST OF SPECIFIC PINS.
4. 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)

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: DUAL SN3308 / GNS430/530, FCS PILOT ONLY

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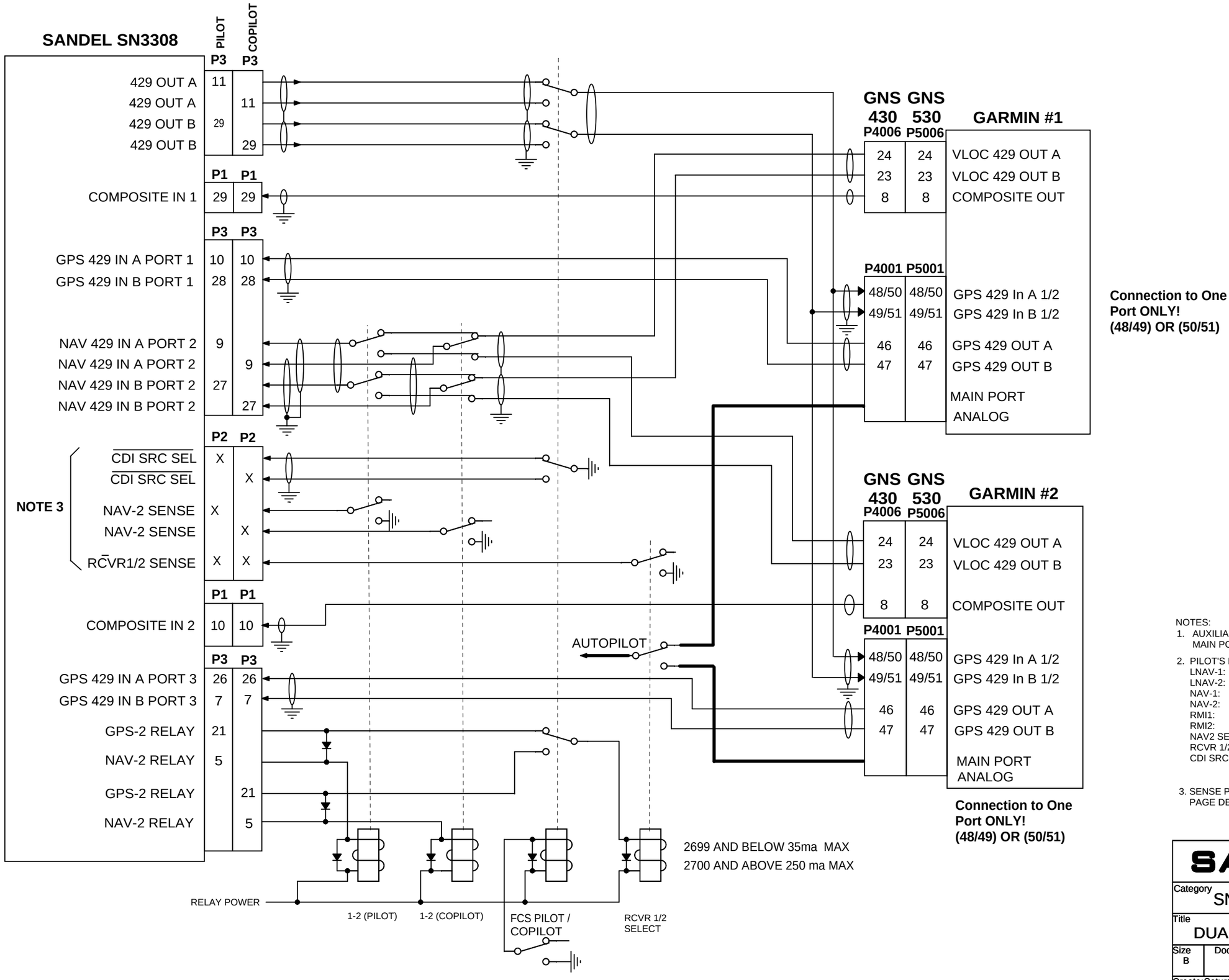
Create: Thursday, January 07, 1999 | Mod: Tuesday, October 30, 2007 | Sheet 28

DATE	REV	COMMENTS
5/26/99	F	
10/23/00	G	ALL P2 CONNECTIONS WERE P3. ADDED CONNECTION TO ONE PORT ONLY. ADDED MAX AMPERAGE TO RELAYS. TOTAL SHEETS CHANGED TO 29.
04/03/01	G1	A/R 360 PAGE COUNT
10/04/02	G2	A/R 573 PAGE COUNT CORRECTED 430 MISLABELED
9/24/03	G4	A/R 661 ADDED GARMIN GNS 530

COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY



NOTES:
1. AUXILIARY MECHANICAL RESOLVER MAY BE USED ON THE 430 MAIN PORT.
2. PILOT'S MP ITEMS:
   LNAV-1: GNS430 (ARINC)
   LNAV-2: GNS430 (ARINC)
   NAV-1: 429 PORT-2
   NAV-2: 429 PORT-2
   RMI1: 429+COMP
   RMI2: 429+COMP
   NAV2 SENSE: ENABLED
   RCVR 1/2 SENSE: ENABLED
   CDI SRC SEL: ENABLED
3. COPILOT'S MP ITEMS:
   LNAV-1: GNS430 (ARINC)
   LNAV-2: GNS430 (ARINC)
   NAV-1: 429 PORT-2
   NAV-2: 429 PORT-2
   RMI1: 429+COMP
   RMI2: 429+COMP
   NAV2 SENSE: ENABLED
   RCVR 1/2 SENSE: ENABLED
   CDI SRC SEL: ENABLED

3. SENSE PINS SELECTED IN SOFTWARE SEE "RELAY SENSE" MAINTENANCE PAGE DESCRIPTION IN APPENDIX A FOR LIST OF SPECIFIC PINS.

SANDEL Vista, Ca.

Category: SN3308 INSTALLATION DRAWING

Title: DUAL SN3308 / GNS430/530, FCS SELECTABLE

Size B | Document Number: 90106-10 | Rev G4

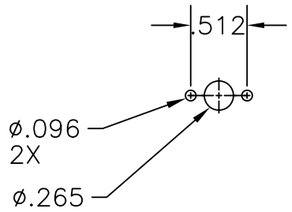
Create: Saturday, January 09, 1999 | Mod: Tuesday, October 30, 2007 | Sheet 29

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	A/R 111 INITIAL RELEASE	5/26/99	GB
	B	A/R 245 UPDATED CONNECTOR PIN CALL OUTS		

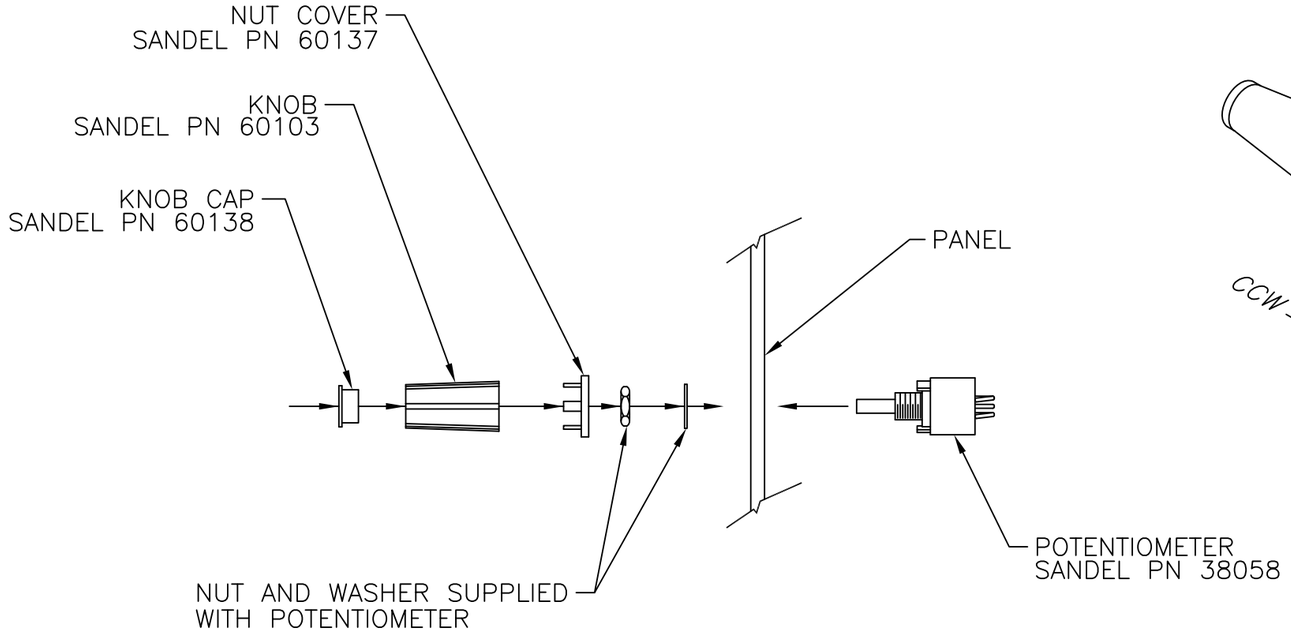
COMPUTER CONTROLLED DRAWING
DO NOT REVISE MANUALLY

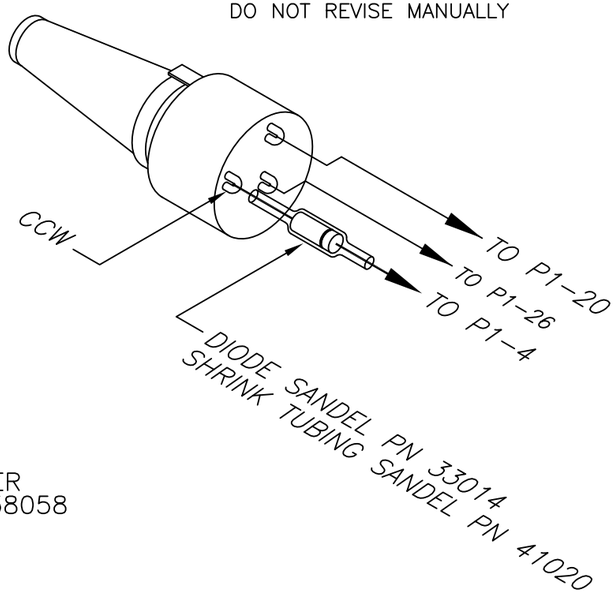
NOTES: UNLESS OTHERWISE SPECIFIED

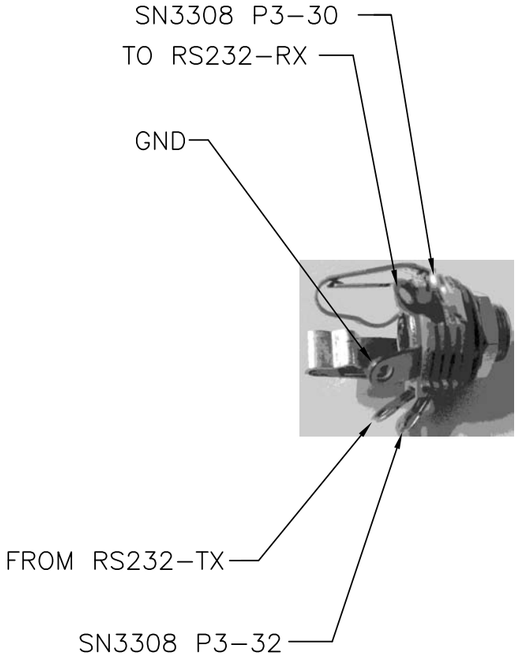
1. USE SANDEL SUPPLIED PARTS OR EQUIVALENT.

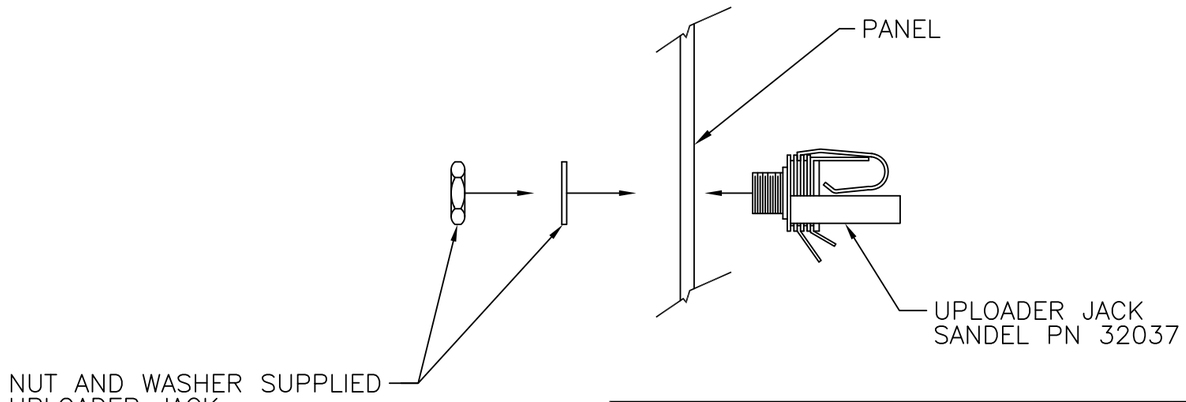


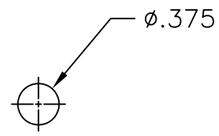
POTENTIOMETER
HOLE PATTERN











UPLOADER JACK
HOLE PATTERN

	90106-IM	SN3308
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
FINISH
DO NOT SCALE DRAWING

ENGINEERING NO.

APPROVALS	DATE
DRAWN M. KERSLAKE	99/03/02
CHECKED	
ISSUED	

SANDEL VISTA, CA.

MOUNTING, SN3308 BRIGHTNESS POT AND DATA UPLOAD JACK

SIZE C | DWG. NO. 90112-08 | REV. B
SCALE 1/1 | SHEET 1 OF 1

FORM FORMC.DWG