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System Installation Manual

KSN 765/770 Safety Navigator

Part Number	CAGE
066-01204-0101	22373
066-01204-1101	22373
066-01213-0101	22373
066-01213-1101	22373

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SYSTEM INSTALLATION MANUAL
066-01204 / 066-01213

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TRANSMITTAL INFORMATION

THIS IS AN INITIAL RELEASE OF THE KSN 765/770 SAFETY NAVIGATOR SIM PUB. NO. 006-10716-0000 AND IS ISSUED FOR USE IN SUPPORT OF THE FOLLOWING:

Table TI-1 shows the applicable components.

Table TI-1. Applicable Components

Component PN	Nomenclature
066-01204-0101	KSN 770 Safety Navigator
066-01204-1101	KSN 770 Safety Navigator
066-01213-0101	KSN 765 Safety Navigator
066-01213-1101	KSN 765 Safety Navigator

Revision History

Table TI-2 shows the revision history of this SIM.

Table TI-2. Revision History

Revision Number	Revision Date
0	6 Dec 2012

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RECORD OF REVISIONS

For each revision, write the revision number, revision date, date put in the manual, and your initials in the applicable column.

NOTE: Refer to the Revision History in the TRANSMITTAL INFORMATION section for revision data.

Revision Number	Revision Date	Date Put In Manual	By	Revision Number	Revision Date	Date Put In Manual	By

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RECORD OF TEMPORARY REVISIONS

Instructions on each page of a temporary revision tell you where to put the pages in your manual. Remove temporary revision pages only when discard instructions are given. For each temporary revision, put the applicable data in the record columns on this page.

Definition of Status column: TR may be active, cancelled, or incorporated. If TR is incorporated list the revision number. For example enter: INC Rev 7. If TR is replaced by another TR then put “Cancelled”. For example: Cancelled by TR NN-NN. “Active” is entered by the holder of manual.

Temporary Revision Number	Status	Page Number	Issue Date	Date Put in Manual	By	Date Removed From Manual	By

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SERVICE BULLETIN LIST

Service Bulletin/ Revision Number	Title	Modification	Date Put in Manual

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F indicates a foldout page.

* indicates a changed or added page.
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TABLE OF CONTENTS (CONT)

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INTRODUCTION

1. How to Use This Manual

A. General

(1) This publication gives maintenance instructions for the equipment shown on the Title page.

(2) Standard maintenance procedures that technicians must know are not given in this manual.

(3) This publication is written in agreement with the ATA Specification.

(4) Warnings, cautions, and notes in this manual give the data that follows:

- A WARNING gives a condition or tells personnel what part of an operation or maintenance procedure, which if not obeyed, can cause injury or death
- A CAUTION gives a condition or tells personnel what part of an operation or maintenance procedure, which if not obeyed, can cause damage to the equipment
- A NOTE gives data, not commands. The NOTE helps personnel when they do the related instruction.

(5) Warnings and cautions go before the applicable paragraph or step. Notes follow the applicable paragraph or step.

B. Observance of Manual Instructions

(1) Make sure that you carefully obey all safety, quality, operation, and shop procedures for the unit.

(2) All personnel who operate equipment and do maintenance specified in this manual must know and obey the safety precautions.

C. Symbols

(1) The symbols and special characters are in agreement with IEEE Publication 260 and IEC Publication 27. Special characters in text are spelled out.

(2) The signal mnemonics, unit control designators, and test designators are shown in capital letters.

(3) The signal names followed by an “*” show an active low signal.

(4) The symbols in Figure INTRO-1 show ESDS and moisture sensitive devices.

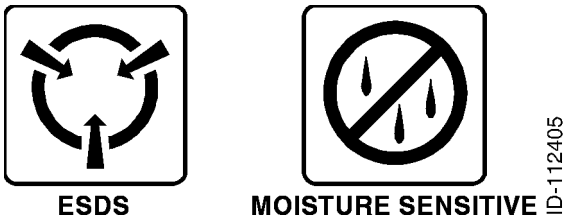

Figure INTRO-1. Symbols (Sheet 1 of 1)

D. Units of Measure

(1) Measurements, weights, temperatures, dimensions, and other values are expressed in the USMS followed by the appropriate SI metric units in parentheses. Some standard tools or parts such as drills, taps, bolts, nuts, etc. do not have an equivalent.

E. Standard Practices Manual

(1) Standard cleaning, check, repair, and assembly procedures applicable to multiple models can be found in a standard practices manual. Refer to Paragraph 3, References.

F. Electrostatic Discharge

(1) Touch the items susceptible to electrostatic discharge in accordance with MIL-HDBK-263. Refer to MIL-STD-1686 for definition of the standards and conditions.

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3. References

A. Honeywell/Vendor Publications

(1) Related Honeywell publications in this manual are shown in the list that follows:

- ATA No. 34-70-07 (Pub. No. 006-15716-0000), CMM, KSN 765/770 Safety Navigator
- Pub. No. A09-1100-004, Standard Repair Procedures for Honeywell Avionics Equipment Instruction Manual.

B. Other Publications

(1) These publications are standard references. Check for latest version of publication.

- The United States GPO Style Manual 2000 (available at http://www.gpoaccess.gov/stylemanual/browse.html)
- IEEE Std 260, Standard Letter Symbols for Units of Measurement (available from the American National Standards Institute, New York, NY)
- ASME Y14.38, Abbreviations for Use on Drawings and in Text (available from the American National Standards Institute, New York, NY)
- ANSI/IEEE Std 91, Graphic Symbols for Logic Functions (available from the American National Standards Institute, New York, NY)
- H4/H8 CAGE Codes (available at http://www.logisticsinformationservice.dla.mil)
- IEEE 315/ANSI Y32.2, Graphic Symbols for Electrical and Electronics Diagrams (available from the American National Standards Institute, New York, NY)
- MIL-HDBK-263, Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) (Metric) (available from any military standards database)
- MIL-STD-1686, Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) (Metric) (available from any military standards database).

4. Acronyms and Abbreviations

A. General

(1) The abbreviations are used in agreement with ASME Y14.38.

(2) Acronyms and non-standard abbreviations used in this publication are as follows:

List of Acronyms and Abbreviations

Term	Full Term
AC	alternating current
AHRS	attitude heading reference system

List of Acronyms and Abbreviations (Cont)

Term	Full Term
AMP	ampere
ANSI	American National Standards Institute
ARTCC	air route traffic control center
ARINC	Aeronautical Radio, Incorporated
ASME	American Society of Mechanical Engineers
ATA	Air Transport Association
AWG	American wire gauge
C	celsius
CAGE	commercial and government entity
CDI	course deviation indicator
COM	communication
cm	centimeter
CMM	component maintenance manual
dB	decibel
DC	direct current
DME	distance measuring equipment
DPL	detailed parts list
EB	engineering bulletin
EGPWS	enhanced ground proximity warning system
EIA	Electronic Industries Association
ELT	emergency locator transmitter
EMEA	Europe, the Middle East, and Africa
ESDS	electrostatic discharge sensitive
EZ	electrically zeroed
F	fahrenheit
FMS	flight manual supplement
FSS	flight service station
GND	ground
GPO	Government Printing Office
GPS	ground positioning satellite
HSI	horizontal situation indicator
Hz	Hertz

List of Acronyms and Abbreviations (Cont)

Term	Full Term
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IFIS	electronic flight information system
IFR	instrument flight rule
I/O	input/output
INS	inertial navigation system
IRU	inertial reference unit
kg	kilogram
KRC	King Radio Company
LCD	liquid crystal display
LPV	localizer performance with vertical guidance
LOC	localizer
mA	milliampere
MAX	maximum
MFD	multifunction display
MOD	modification
mm	millimeter
MMDS	multimode digital sensor
mW	milliwatt
N/A	not applicable
NAV	navigation
NAVAID	navigational aid
NBD	non-directional beacon
nm	nautical mile
No.	number
OBS	omni-bearing selector
ORZ	omni-range zeroed
PN	part number
Pub.	publication
RAIM	receiver autonomous integrated monitor
RDR	radar

List of Acronyms and Abbreviations (Cont)

Term	Full Term
REF	reference
RF	radio frequency
RX	receive
SB	service bulletin
SBAS	satellite based augmentation system
SID	standard instrument departure
SIM	system installation manual
SSM	sign status matrix
STAR	standard terminal arrival route
STC	supplemental type certificate
SUA	special-use airspace
TAS	traffic awareness system
TAWS	terrain awareness and warning system
TCAS	traffic collision avoidance system
THD	TBD BY ENGINEERING
TIS	traffic information service
TR	temporary revision
TSO	Technical Standard Order
TX	transmit
VHF	very high frequency
VOR	very high frequency omnidirectional range
USB	universal serial bus
USMS	United States Measurement System
VAC	volt, alternating current
VDC	volt, direct current
VLOC	very high frequency omni-range localizer
VNAV	vertical navigation
VOR	very high frequency omni-range
WAAS	wide area augmentation system
WOW	weight on wheels
Vrms	volt, root-mean-square
WX	weather

List of Acronyms and Abbreviations (Cont)

Term	Full Term
XM	satellite based flight information services weather source

5. Process Verification

A. Verification Data

(1) Honeywell does a verification of these technical instructions by performance or by simulation of the necessary procedures. Performance shows that the procedures were checked by the use of the manual. Simulation shows that the applicable personnel looked at the procedure in the manual and that the procedure is technically correct. The dates of verification for this manual are given in Table INTRO-1.

Table INTRO-1. Verification Data

Section	Method	Date
TBD	TBD	TBD
TBD	TBD	TBD
TBD	TBD	TBD

6. Software History

A. Software Data

(1) Not applicable.

7. History of Changes

A. Modification/Configuration History

(1) Not applicable.

B. Change History for Parts List

(1) Not applicable.

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SECTION I - GENERAL INFORMATION

1.1 Introduction

This manual contains information relative to the physical, mechanical, and electrical characteristics of the KSN 7xx Safety Navigator. Installation and operating procedures are also included.

765/770 - would prefer to see this throughout the manual

Operating instructions are provided in KSN 7xx Pilot's Manual, Pub. No. 006-18324-0000. Information relative to the maintenance, alignment, and procurement of the replacement parts can be found in the ATA No. 34-70-07 (Pub. No. 006-15716-0000), CMM, KSN 765/770 Safety Navigator.

1.2 Applicability of the Installation Manual

This manual is applicable only to the KSN 7xx integrated avionics systems with the part numbers as shown in Table 1-1.

Table 1-1. Installation Manual Applicability

System	PN	Description
KSN 765	300-10940-0000	Top level assembly
	066-01213-0101	Safety Navigator
	066-01213-1101	Safety Navigator with RDR/EGPWS Support
KSN 770	300-10694-0000	Top level assembly
	066-01204-0101	Safety Navigator NAV/COM
	066-01204-1101	Safety Navigator NAV/COM with RDR/EGPWS Support

1.3 Description of the Equipement

1.3.1 KSN 7xx Safety Navigator

The KSN 7xx product family feature is a full featured WAAS, integrated GPS navigator capable of LPV approaches. Some of the system features include:

A. A TSO, GPS based, long range airborne database driven navigation. The primary purpose of the KSN 7xx is to provide the pilot with present position information, to display guidance information with respect to a flight plan defined by the pilot, and to provide communications functions to the pilot. Flight plan information is entered by the pilot via the concentric knobs and buttons on the front panel.

B. A front loading pilot updateable database using a USB 2.0 thumb drive. Databases contain worldwide information on NAVAID, intersections, low altitude airways, terrain, obstructions and minimum safe altitudes. Database also includes public use and military airports with runways at least 3000 feet (914.4 meters) in length, airport communication frequencies, runway information, air route traffic control center data, flight service station frequencies, and SUA. SID and STAR waypoints and approaches are also included. The information can be selected by airport and procedure name.

C. Information on the KSN 7xx is displayed on a large, easy-to-read color LCD. Pilot information is input to the unit via flexible combination of touchscreen and graphics interface combined with cursor control and by the 16 push buttons on the front panel.

D. An optional NAV receiver and COM transceiver that will allow integrated navigation and communications on KSN 7xx units so equipped.

The KSN 7xx can use its present position information to determine crosstrack error, distance-to-waypoint, ground speed, track angle, time-to-waypoint and bearing to waypoint.

The KSN 7xx can provide navigation data to external displays and autopilots. Some of this data is output to external devices.

The internal database of the KSN 7xx contains information concerning airports, VOR, NDB, SUAs, airport runways and frequency location information, and nearest FSS and ARTCC names and frequencies. Waypoints are stored in the database by their ICAO identifiers. The ICAO identifiers are (in most cases) taken directly from Jeppesen or government aeronautical charts.

1.3.2 GPS Antenna

The KA 96 GPS antenna, PN 071-01620-0001 or equivalent is the designated antenna for the KSN 7xx.

1.3.3 KCM 200 Configuration Module

The configuration module is used to store some installation specific information, which is used by the KSN 7xx. The KCM 200 configuration module used with the KSN 7xx, is supplied with the KSN 7xx and is also available under PN 071-00188-1101.

1.4 Technical Characteristics

Refer to Table 1-2 for the KSN 765 Safety Navigator leading particulars.

Refer to Table 1-3 for the KSN 770 Safety Navigator leading particulars.

Table 1-2. KSN 765 Safety Navigator Leading Particulars

Characteristic	Specification
TSO compliance	TSO C146c, TSO-C165, TSO-C113, TSO-C63c, TSO-C147, TSO-C118, TSO-C157a, TSO-C110a, TSO-C151b, ETSO-2C63c
Length	11.80 inches (299.8 mm)
Width	6.25 inches (158.8 mm)
Height	5.40 inches (137.2 mm)
Weight	Refer to SECTION II - INSTALLATION
Mounting	Panel mount
Environmental conditions	RTCA/DO-160G
Temperature	–4 to 131°F (–20 to +55°C)
Altitude	25,000 feet (7,620 meters)

Table 1-2. KSN 765 Safety Navigator Leading Particulars (Cont)

Characteristic	Specification
Vibration	Category S, curves B & M; Category R curve G
Electrical:	
Operating voltage	+11 to +33 VDC
Operating current: +28 VDC +14 VDC	 4.9 AMP MAX 8.6 AMP MAX
Software	RTCA/DO-178B Levels B and C
Hardware	RTCA/DO-254 Levels B and C

Table 1-3. KSN 770 Safety Navigator Leading Particulars

Characteristic	Specification
TSO compliance	TSO C146c, TSO-C165, TSO-C113, TSO-C63c, TSO-C147, TSO-C118, TSO-C157a, TSO-C110a, TSO-C151b, ETSO-2C63c, TSO-C169a, TSO-C128a, TSO-C34e, TSO-C36e, TSO-C40c, ETSO-2C34f, ETSO-2C36F, ETSO-2C169a, ETSO-2C40c, and ETSO-2C128
Length	11.80 inches (299.8 mm)
Width	6.25 inches (158.8 mm)
Height	5.40 inches (137.2 mm)
Weight	Refer to SECTION II - INSTALLATION
Mounting	Panel mount
Environmental conditions	RTCA/DO-160G
Temperature	–4 to 131°F (–20 to +55°C)
Altitude	25,000 feet (7,620 meters)
Vibration	Category S, curves B & M; Category R curve G
Electrical:	
Operating voltage	+11 to +33 VDC
Operating current: +28 VDC +14 VDC	 4.9 AMP MAX Steady State, 12.4 AMP TX 8.6 AMP MAX Steady State, 15.6 AMP TX
Software	RTCA/DO-178B Levels B and C

Table 1-3. KSN 770 Safety Navigator Leading Particulars (Cont)

Characteristic	Specification
Hardware	RTCA/DO-254 Levels B and C

1.5 Units Supplied

1.5.1 KSN 7xx Safety Navigator

Refer to Table 1-1 for the available configurations.

1.5.2 GPS Antennas

The KA 96 GPS active antenna, PN 071-01620-0001 is the designated antenna for the KSN 770 Safety Navigator, and must be ordered separately.

1.6 License Requirements

An aircraft radio station license is no longer required for the KSN 7xx models that transmit for domestic (US) operations. For international travel, forms can be obtained from your nearest FCC field office or found online at http://transition.fcc.gov/Forms/Form605/605.html/ (See the regulatory authority for all countries in which the KSN 7xx will be operated for more information).

1.7 Recommendations for IFR Approval

The following functions are required for IFR certification of the KSN 7xx.

A. Aircraft Logbook Entry

B. Aircraft Installation Requirements

(1) TSO'd Antenna

The antenna must be a TSO'd KA 96 GPS antenna, PN 071-01620-0001 or equivalent.

(2) NAV Instrumentation

The navigation information (D-Bar, NAV Flag, and TO-FROM) must be displayed on an instrument in the pilot's panel within the pilot's field of view. Electromechanical indicators are capable of displaying the variable scale factors of enroute, terminal, and approach modes. If the NAV information is displayed on an EFIS system, it must be capable of displaying variable D-Bar scaling required for GPS approaches. This may require a modification to the EFIS system. Refer to SECTION III - SYSTEM INTERCONNECT for the typical indicator usage.

(3) OBS Interface

For approach approval, the OBS resolver must be interfaced so that selected course through the HSI/CDI indicator will be sent to the KSN 7xx for D-Bar resolution. In mechanical indicators, it will be accomplished by switching the OBS resolver lines; in EFIS installations, it will usually be through the serial busses. Some EFIS applications may require an adapter. Refer to SECTION III - SYSTEM INTERCONNECT for further information regarding OBS resolver characteristics.

(4) Switch/Annunciators

Refer to SECTION III - SYSTEM INTERCONNECT for specific information regarding switch/annunciator characteristics.

(5) Altitude Source

An altitude source is required for IFR certification. The altitude may be derived from a compatible encoding altimeter, some RS 232 air data systems, and most ARINC 429/575 air data systems. Refer to SECTION III - SYSTEM INTERCONNECT for further information regarding altitude source characteristics.

C. Approved Airplane Flight Manual Supplement

A flight manual supplement will need to be prepared and approved. The supplement may be prepared based on the sample. Refer to the FMS Appendix and the STC Appendix (TBD BY ENGINEERING), for further information.

D. Pilot's Guide

The KSN 770 Pilot's Guide must be placed in the aircraft in a location that is accessible to the pilot. The Pilot's Guide is PN 006-18324-0000.

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SECTION II - INSTALLATION

2.1 Overview

This section contains suggestions and factors to consider before installing the KSN 7xx Safety Navigator. Close adherence to these suggestions will assure satisfactory performance from the equipment.

NOTE: The conditions and tests performed on 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 these performance standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

2.2 Unpacking and Inspecting Equipment

Exercise extreme caution when unpacking equipment. Perform a visual inspection of the unit for evidence of damage incurred during shipment. If a damage claim must be filed, save the shipping container and all packing materials to substantiate your claim. The claim must be filed as soon as possible. The shipping container and all packing materials must be retained in the event that storage or reshipment of the equipment is necessary.

2.3 KSN 7xx Installation

2.3.1 General

The following paragraphs contain information pertaining to the installation of the KSN 7xx, including instructions concerning the location and mounting of the antenna.

The equipment must be installed in the aircraft in a manner consistent with acceptable workmanship and engineering practices, and in accordance with the instructions set forth in this publication. To ensure the system has been properly and safely installed in the aircraft, the installer must make a thorough visual inspection and conduct an overall operational check of the system, on the ground, prior to flight.

CAUTION: AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, A CHECK MUST BE MADE WITH THE AIRCRAFT PRIMARY POWER SUPPLIED TO THE MOUNTING CONNECTOR TO ENSURE THAT POWER IS APPLIED ONLY TO THE PINS SPECIFIED IN THE INTERWIRING DIAGRAMS IN SECTION III.

The KSN 7xx system installation will conform to standards designated by the customer, installing agency, and existing conditions as to the unit location and type of installation. However, the following suggestions must be carefully considered before installing your KSN 7xx system.

2.3.2 Minimum System Configuration

2.3.3 Installation Materials

2.3.3.1 Installation Kit Contents

2.3.3.1.1 KSN 765 Safety Navigator

Refer to Table 2-1 for the KSN 765 Installation Kit, PN PL050-03727-0000.

Table 2-1. KSN 765 Safety Navigator Installation Kit, PN PL050-03727-0000

Description	Qty	Bendix/King PN
Connector, D-SUB, 27 mixed size crimp contacts, straight	1	53500239-2
Contact, female, 10 AMP power, combo-D, 16 AWG, crimp, female	4	030-01454-0002
Connector, 2-row, 50 sockets, board to cable - 0.156, crimp, straight	1	53502330-1
Contact, socket, crimp, 20 AWG	42	030-01157-0011
Connector, SUB-D HSG 37 contact, female sockets	1	030-01175-0000
Connector, contact, board to cable, crimp, 20-24 AWG socket	24	53502674-1
Connector, 25 contact subd hood	1	030-01447-0000
Connector, 37 contact subd hood	1	030-01447-0001
Contact, D-sub, 22 AWG, crimp, female	156	030-01466-0001
Connector, high density subd, 78 contact	2	030-03296-0001
Connector, 50 ohms BNC jack to push-on adaptor	1	030-03589-0001
Connector, 75 ohms BNC jack to push-on adapter	1	030-03589-0002
Rack chassis assembly with finish	1	047-11434-0004
Nut plate, 50 pos as finish	2	073-01158-0003
Nut plate, 25 pos as finishing	1	073-01159-0003
Rear panel with hardware	1	073-01160-0004
Nut plate, 37 pos as finish	1	073-01161-0003
Spacer as finish	2	076-03228-0002
Nut clip, 6-32	10	089-02353-0001
Screw, pan head, #4-40 x 3/8	4	089-05903-0006
Screw, pan head, #4-40 x 7/16	2	089-05903-0007
Screw, pan head, #4-40 x 13/16	6	089-05903-0013
Screw, flat head, #4-40 x 3/8	4	089-06008-0006
Screw, flat head, #6-32 x 3/8	10	089-06012-0006

Table 2-1. KSN 765 Safety Navigator Installation Kit, PN PL050-03727-0000 (Cont)

Description	Qty	Bendix/King PN
Cable assembly, fan	1	155-12514-0001
Metal backshell kit, deep straight, DD shell size (kit consists of 1 shell, 2 cable clamps, 2 screws and 2 hex nuts)	2	53002878-1
Connector, board to cable - 3 mm, crimp, 1-row, sockets-004, straight, receptacle housing, latch	1	53500258-1
Connector contact, (board to cable, crimp, 20-24 AWG socket	4	53500259-1
Fan gasket	2	57000118-001
Shoulder screw, #4-40	6	57000119-001
KCM 200 KSN 7xx configuration module	1	071-00188-0201
KSN 7xx installation drawing	REF	155-01812-0000
Connector, sub-D HSG 25 contact, female pins	1	030-01173-0000

2.3.3.1.2 KSN 770 Safety Navigator

Refer to Table 2-2 for the KSN 70 Installation Kit, PN PL050-03727-0001.

Table 2-2. KSN 770 Safety Navigator Installation Kit, PN PL050-03727-0001

Description	Qty	Bendix/King PN
Connector, D-sub, 27 mixed size crimp contacts, straight	1	53500239-2
Contact, female, 10 AMP power, combo-D, 16 AWG, crimp, female	4	030-01454-0002
Connector, 2-row, 50 sockets, board to cable - 0.156, crimp, straight	1	53502330-1
Contact, socket, crimp, 20 AWG	42	030-01157-0011
Connector, sub-D HSG 37 contact, female sockets	1	030-01175-0000
Connector, contact, board to cable, crimp, 20-24 AWG socket	24	53502674-1
Connector, 25 contact subd hood	1	030-01447-0000
Connector, 37 contact subd hood	1	030-01447-0001
Contact, D-sub, 22 AWG, crimp, female	156	030-01466-0001
Connector, high density subd, 78 contact	2	030-03296-0001
Connector, 50 ohms BNC jack to push-on adaptor	1	030-03589-0001
Connector, 75 ohms BNC jack to push-on adapter	1	030-03589-0002
Rack chassis assembly with finish	1	047-11434-0004
Nut plate, 50 pos as finish	2	073-01158-0003
Nut plate, 25 pos as finishing	1	073-01159-0003

Table 2-2. KSN 770 Safety Navigator Installation Kit, PN PL050-03727-0001 (Cont)

Description	Qty	Bendix/King PN
Rear panel with hardware	1	073-01160-0004
Nut plate, 37 pos as finish	1	073-01161-0003
Spacer as finish	2	076-03228-0002
Nut clip, 6-32	10	089-02353-0001
Screw, pan head, #4-40 x 3/8	4	089-05903-0006
Screw, pan head, #4-40 x 7/16	2	089-05903-0007
Screw, pan head, #4-40 x 13/16	6	089-05903-0013
Screw, flat head, #4-40 x 3/8	4	089-06008-0006
Screw, flat head, #6-32 x 3/8	10	089-06012-0006
Cable assembly, fan	1	155-12514-0001
Metal backshell kit, deep straight, DD shell size (kit consists of 1 shell, 2 cable clamps, 2 screws and 2 hex nuts)	2	53002878-1
Connector, board to cable - 3 mm, crimp, 1-row, sockets-004, straight, receptacle housing, latch	1	53500258-1
Connector contact, board to cable, crimp, 20-24 AWG socket	4	53500259-1
Fan gasket	2	57000118-001
Shoulder screw, #4-40	6	57000119-001
KCM 200 KSN 7xx configuration module	1	071-00188-0201
KSN 7xx installation drawing	REF	155-01812-0000
Connector, sub-D HSG 25 contact, female pins	1	030-01173-0000

2.3.3.2 Accessories Required But Not Supplied

Table 2-3 list the available equipment (but not supplied) to assist in installation of the KSN 7xx. Other equipment may be acceptable; refer to the appropriate section in this manual for other options.

Table 2-3. Accessories Required But Not Supplied

Description	Qty	Source	PN [1]
Circuit breaker (pull to open, 10 AMP main power in)	1	Klixon	MS26574-10
Circuit breaker (pull to open, 7.5 AMP MMDS TX power in)	1	Klixon	MS26574-7.5
Wire (single strand, 20, 22, 24 AWG)	AR	commercially available	MIL-W-22759/16
Wire (shielded, 22 AWG)	AR	commercially available	MIL-C-27500

Table 2-3
We should not be calling out specific brands and models of antennas, except in the case of Honeywell specific.
Comm and Nav antennas should be generically described
I don't like the term commercially available. We will be asked for Honeywell P/N's or equivalent.

Description	Qty	Source	PN [1]
Screw (flat head, #6-32) [2]	6	commercially available	MS24693-S30
Wire (coaxial cable)	AR	commercially available	MIL-DTL-17
Nut (locknut, #6-32) [2]	6	commercially available	MS21044N06
Washer (#6) [2]	6	commercially available	NAS1149FN632P
Antenna (broadband communications, 50 ohms)	1	Dorne	DM C70-1/A
Antenna (VHF NAV, 50 ohms)	1	Comant	CI-158C-2 [3]
Antenna (GPS)	1	CAGE: 22373	KA 96
Configuration module	1	CAGE: 22373	KGS 200
adhesive		commercially available	RTV3145
Alumiprep No. 33		Turco	594015
Alodine No. 1001		Henkel	594417
Electrical insulating compound		Dow Corning	DC-4
Misc. screws, washers, cable ties, etc.		commercially available	Installer supplied

NOTE:

1. Equivalent substitute can be used.
2. Use to mount the tray.
3. Must also order PN 0900532 for gasket and template.

2.3.3.3 Optional Accessories - Not Supplied

Refer to Table 2-4 for the accessories required but not supplied.

Table 2-4. Accessories Required But Not Supplied

Description	Qty	Source	PN
Annunciator panel	1	Mid-Continent	MD41
CDI	1	Various	Refer to Paragraph 3.12 NAV Indicator Interface
Remote swap switch - NAV	1		
Remote swap switch - COM	1		
Remote switch - Next FREQ	1		
Thumb drive	1		

Table 2-4
We want to be more flexible about the callout of Annunciator Panels. There are a lot of vendors that shops will want to use.
The Remote swap switches, remote switch and Thumb drives need to be better described.
We should not be calling out specific brands and models of Antenna splitter, NAV. There are many that are suitable.

Draft as of 10/15/2012

Table 2-4. Accessories Required But Not Supplied (Cont)

Description	Qty	Source	PN
Antenna splitter, NAV	1	Comant	CI-1125

2.3.3.4 Software Options

2.3.3.4.1 Table 2-5
Do we really want to call out Operational Software in an Install Manual.
206-xxxxx-yyyy's belong in the CMM?

Software Description	PN
KSN 765 Safety Navigator	206-0476-0101
KSN 770 Safety Navigator	206-00454-0101

2.3.3.4.2 Aviation Database

Table 2-6, 2-7 & 2-8 Databases
Are 723 Numbers appropriate for the install manual? Aren't these Engineering drawing numbers?

rt number

YY = Last two digits of the current year
CC – Cycle Number (01-13)

2.3.3.4.2.1 Americas Database, refer to Table 2-6.

Table 2-6. Americas Database

Database Description	Part Number
Americas aviation database	723-429YY-00CC
Americas navigation database	723-432YY-00CC
Americas cartography database	723-435YY-00CC
Americas terrain database	723-43800-0000
Americas database data File	723-440YY-00CC

2.3.3.4.2.2 Atlantic Database, refer to Table 2-7.

Table 2-7. Atlantic Database

Database Description	Part Number
Americas aviation database	723-430YY-00CC
Americas navigation database	723-433YY-00CC
Americas cartography database	723-436YY-00CC
Americas terrain database	723-43800-0001
Americas database data File	723-441YY-00CC

same question as Table 2-6 & 2-7

2.3.3.4.2.3 Pacific Database, refer to Table 2-8.

Table 2-8. Pacific Database

Database Description	Part Number
Americas aviation database	723-431YY-00CC
Americas navigation database	723-432YY-00CC
Americas cartography database	723-435YY-00CC
Americas terrain database	723-43800-0002
Americas database data File	723-440YY-00CC

2.3.3.5 Special Tools Required, refer to Table 2-9.

Table 2-9 Special Tools
We need much better information about the tools and how to get them

Number [1]	Description	Source
9507	Crimp tool (D-Sub)	commercially available
9502-3	Crimp tool positioner (D-Sub)	commercially available
4811-1-0-0	Insertion/Extraction Tool (D-Sub)	commercially available
NOTE: 1. Equivalent substitute can be used.		

2.3.4 KSN 7xx Installation Considerations

Care must be exercised to avoid mounting components near equipment operating with high pulse current or high power outputs such as radar and satellite communications equipment. In general, the equipment must be installed in a location convenient for operation, inspection, and maintenance, and in an area free from excessive vibration, heat, and noise generating sources.

2.3.4.1 KSN 7xx Mounting Considerations

The KSN 7xx installation will conform to standards designated by the customer, installing agency, and existing conditions as to the unit location and type of installation. However, the following suggestions will assure more satisfactory performance from the equipment.

A. Plan a location on the aircraft so that the KSN 7xx is plainly visible to the pilot, and so that the pilot has complete access to all front panel controls (refer to Paragraph 2.3.4.2 Field of View Considerations for more information).

NOTE: Care must be taken in selecting the optimum location for the KSN 7xx. In some potential mounting locations, glare and reflections may cause the display to be nearly unreadable. Therefore, careful considerations of these effects must be made before choosing the final mounting location.

B. Check to be sure that there is adequate depth behind the unit for connectors and cabling.

C. Ensure there is at least 1.0 inch (25.4 mm) (minimum), unobstructed from the muffin fan.

D. Be sure that the mounting location is not close to heater vents or other sources of high heat.

E. Refer to Figure 2-4 for the cutout dimensions. Mark and cut the opening.

F. Mount the rails on either side of the cutout. Ensure that the rails are electrically bonded (less than 10 milliohms to aircraft GND).

G. Attach the cable harness to the rear connectors. The KSN 7xx must be wired according to the interconnect diagrams in Section III of this manual.

H. Attach the coaxial cables to the rear antenna connectors. Refer to Figure 2-6 for the details for mounting the coaxial connectors to the coaxial cable.

I. Prior to installing any equipment, make a continuity check of all wires and cables associated with the system. Then apply power and check for proper voltages at system connectors, and then remove power before completing the installation.

J. Slide the unit in, and secure it.

2.3.4.2 Wiring Harness Consideration

To allow for inspection or repair of the wiring of the connector assembly itself, sufficient lead length must be left so that when the mounting hardware for the rear connectors and antenna coaxial cable is removed the assembly may be pulled forward several inches. Also, a bend must be made in the harness (at the rear connectors) to allow water droplets that might form on the harness due to condensation, to drip off at the bend and not collect in the connection.

The length of cables from the KSN 7xx connector to other system units is not generally critical because unit interfaces are designed with high impedance inputs, low impedance outputs, and low noise susceptibility characteristics. The exceptions are the wires from the KSN 7xx to the KCM 200 Configuration Module (refer to Paragraph 3.17 Miscellaneous Interface).

2.3.4.3 Field of View Considerations

TBD BY ENGINEERING – See AC 20-138A, TSO-C146c, FAA Issue Paper clarifying "…on or near the affected display".

2.3.4.3.1 Centerline Determination

The centerline of the acceptable field of view is determined in the following order:

(1) The centerline of the Basic T.

(2) For aircraft without the Basic T configuration, use the centerline of the pilot side control yoke or stick, unless it is offset from the center position of the pilot's seat (such as with a side stick or Beech Bonanza style throw over style yoke).

(3) For aircraft without a centered yoke or control stick, an imaginary line from the center of the pilot's seat through the instrument panel may be used.

2.3.4.3.2 CDI Source Selection

If the KSN 7xx is mounted in the field of view as shown in Figure 2-1, then no external annunciator showing CDI source is required. If the KSN 7xx is mounted outside of this area, then an external annunciator indicating whether VLOC or GPS is selected must be mounted in close proximity to the CDI and within the field of view as shown in Figure 2-1.

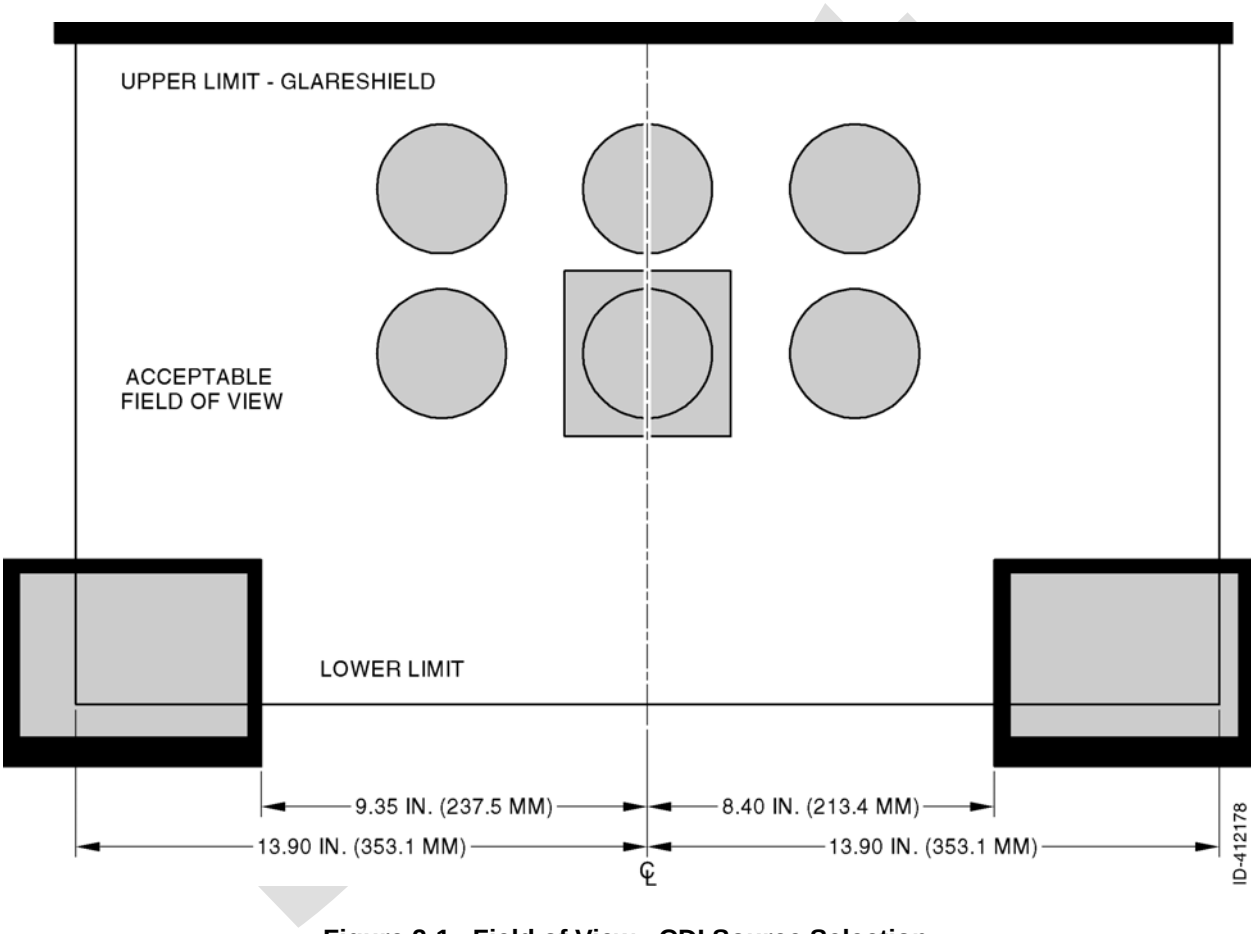

Figure 2-1. Field of View - CDI Source Selection

2.3.4.3.3 GPS Annunciation

The GPS annunciations as shown in Figure 2-2 must be in the pilot's field of view. If the KSN 7xx is not mounted with the boarders defined in Figure 2-2, then an external annunciation must be mounted within this field of view.

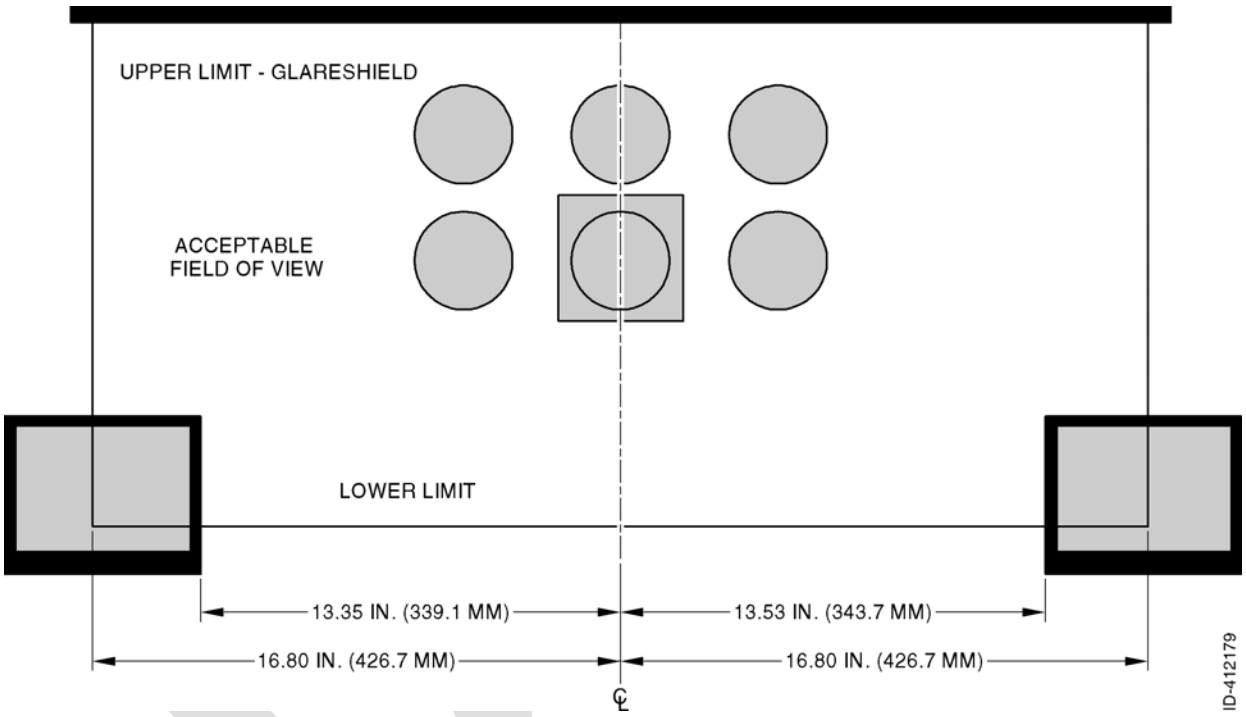

Figure 2-2. Field of View - GPS Annunciation

2.3.4.3.4 TAWS

Refer to Figure 2-3 for the TAWS.

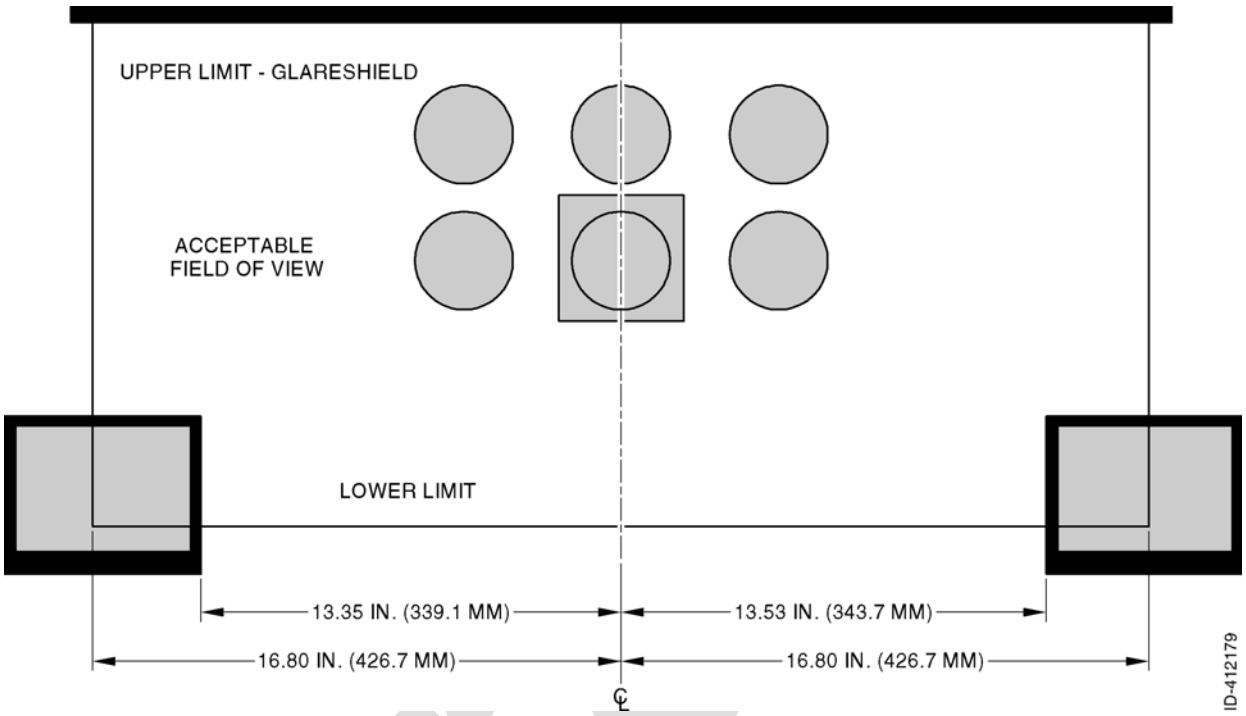

Figure 2-3. Field of View - TAWS

2.3.4.4 Pressurized Aircraft Considerations

In pressurized aircraft, any wiring that penetrates the pressure vessel must be installed in accordance with the Type Design of the aircraft. Considerations for penetrating the pressure vessel of the aircraft for installation are beyond the scope of this manual.

2.3.5 KSN 7xx Cooling Requirements

External forced air cooling is not required for the KSN 7xx. Cooling fans are provided internal to the unit.

The KSN 7xx complies with DO 160C Paragraph 4.5.4 Category V for 30 minutes operation after in flight loss of cooling at 104°F (40°C) ambient temperature and sea level pressure.

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NOTES:

1. Deleted.
2. Dimensions are in inches (millimeters).
3. Tolerances for panel cutouts: +0.030 inch (+0.76 mm) / -0.000 inch (-0.00 mm).
4. Center of gravity (CG) locations are approximate and do not include mating cables. Weight and CG includes installation rack and fans. Refer to Table 1.
5. Remove the peel-off liner and put the fan gasket on the rear panel, PN 073-01160-0004, in two places.
6. Install fan so that airflow arrow points away from the unit. Allow 0.60 inch (15.2 mm) minimum clearance to the fan outlet surface.
7. Install KCM 200 configuration module A2 in wiring harness within 24 inches (610 mm) of equipment rack.
8. Attach rack in 10 places with stainless steel flathead 100 degree No. 6-32 screws, PN 089-06012-0006 (supplied) or equivalent.
9. Remove protective covers from connectors and locking rod before installation.
10. Equivalent screws for replacement. Refer to Table 2.

4

TABLE 1

PN	"X" INCH (MM)	"Y" INCH (MM)	"Z" INCH (MM)
066-01204-0101	3.20 (81.3)	2.95 (74.9)	5.10 (129.5)
066-01204-1101	3.20 (81.3)	2.90 (73.7)	5.10 (129.5)
066-01213-0101	3.15 (80.0)	2.65 (67.3)	4.75 (120.7)
066-01213-1101	3.15 (80.0)	2.60 (66.0)	4.80 (121.9)

TABLE 2

SCREW PN FROM INSTALLATION KIT	SUITABLE REPLACEMENT PN
089-05903-0006	MS51957-15
089-05903-0007	MS51957-16
089-06008-0006	NONE
089-05903-0013	NASM24693-C4
089-06012-0006	NASM24693-C26

ID-412180 E155-01812-0000-1-

Figure 2-4. KSN 7xx Safety Navigator Outline Drawing (Dwg. No. 155-01812-0000 Rev. E) (Sheet 1 of 4)

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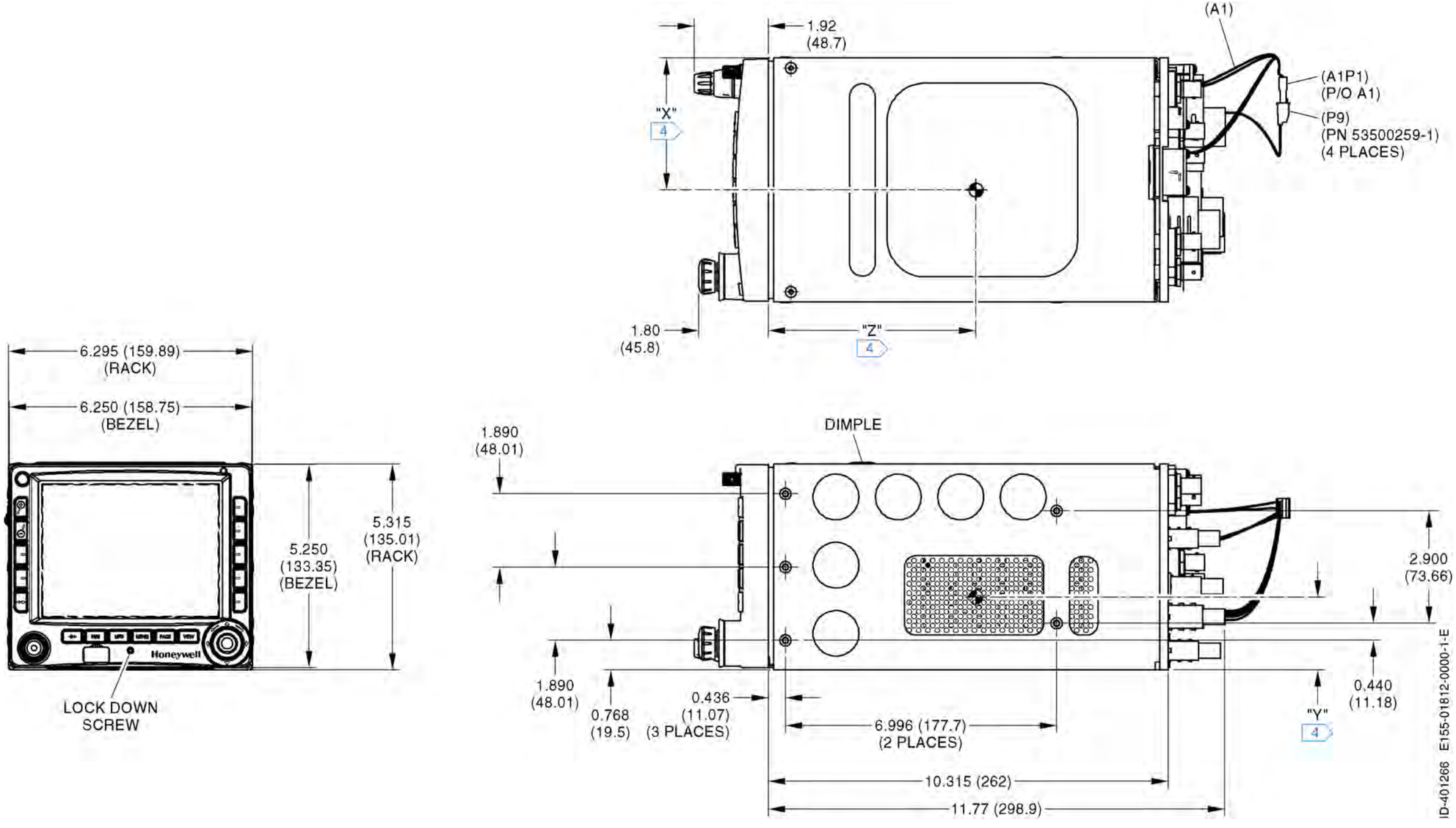

Figure 2-4. KSN 7xx Safety Navigator Outline Drawing (Dwg. No. 155-01812-0000 Rev. E) (Sheet 2 of 4)

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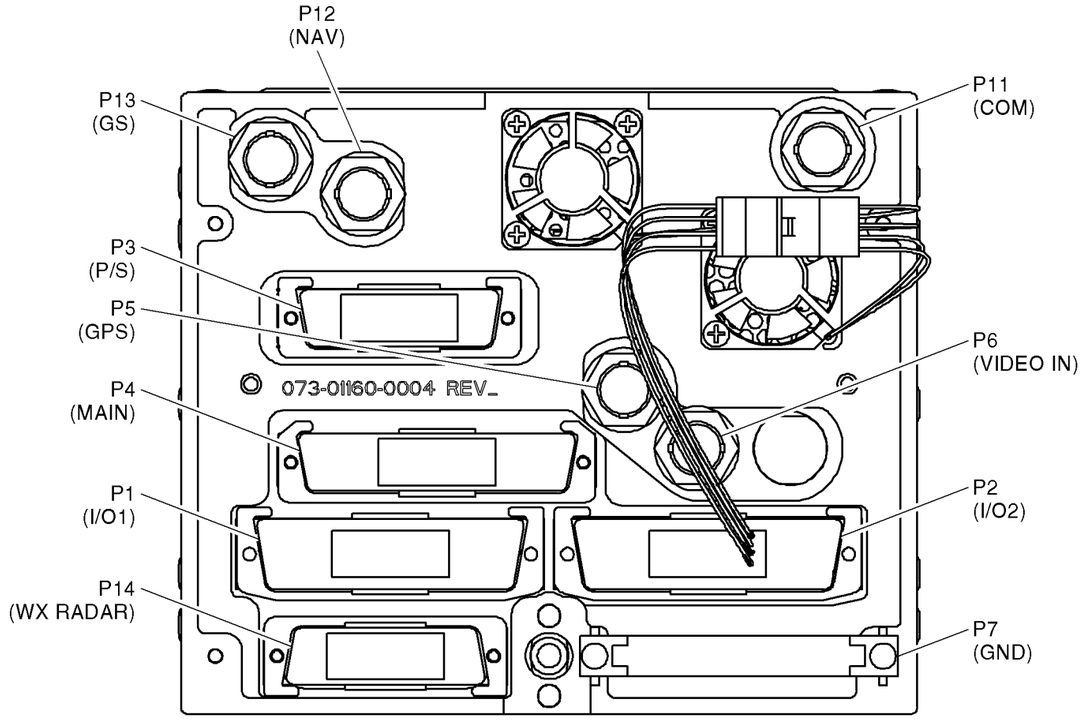
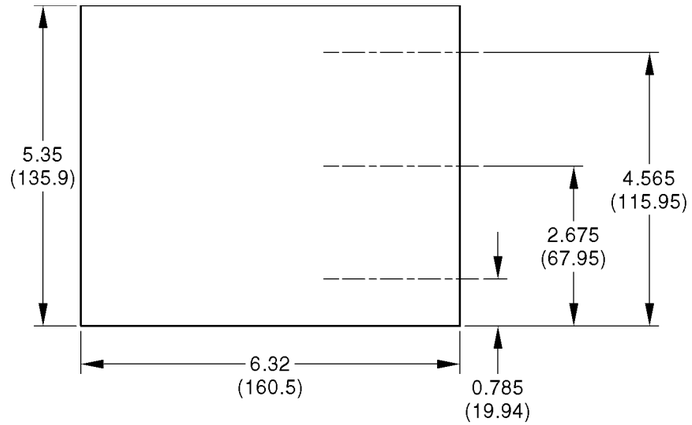
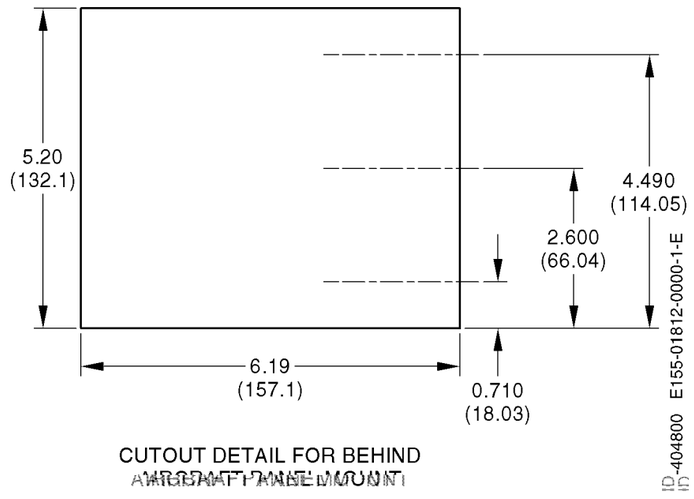




CUTOUT DETAIL FOR FRONT
AIRCRAFT PANEL MOUNT



CUTOUT DETAIL FOR BEHIND
AIRCRAFT PANEL MOUNT

Figure 2-4. KSN 7xx Safety Navigator Outline Drawing (Dwg. No. 155-01812-0000 Rev. E) (Sheet 3 of 4)

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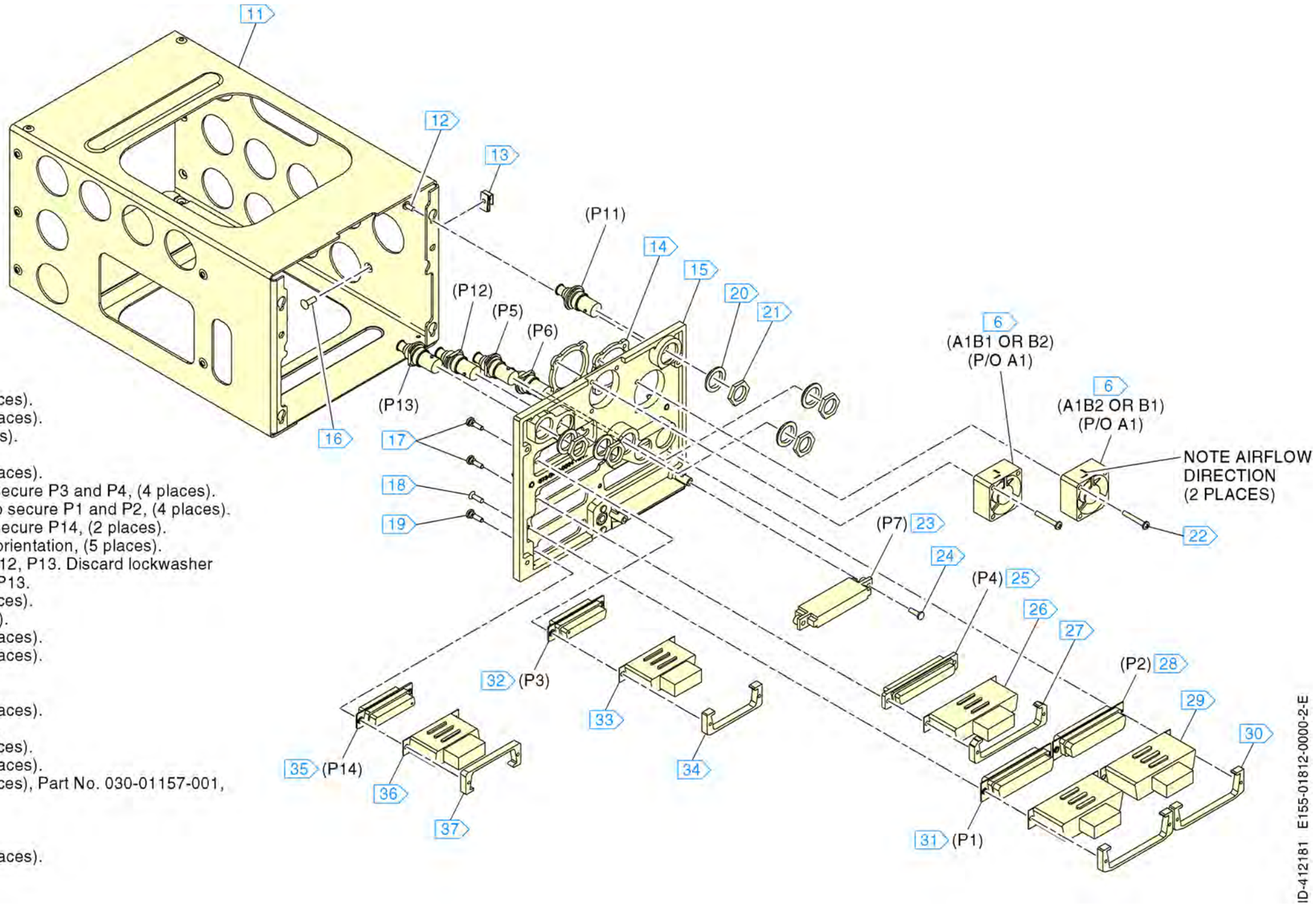

NOTES:

11 Part No. 047-11434-0004.
12 Part No. 089-05903-0006, (4 places).
13 Part No. 089-02353-0001, (10 places).
14 Part No. 57000118-001, (2 places).
15 Part No. 073-01160-0004.
16 Part No. 089-06012-0006, (10 places).
17 Part No. 57000119-001. Use to secure P3 and P4, (4 places).
18 Part No. 089-06008-0006. Use to secure P1 and P2, (4 places).
19 Part No. 57000119-001. Use to secure P14, (2 places).
20 Part No. 076-03228-0002. Note orientation, (5 places).
21 Nut supplied with P5, P6, P11, P12, P13. Discard lockwasher supplied with P5, P6, P11, P12, P13.
22 Part No. 089-05903-0013, (6 places).
23 Part No. 53502674-1, (24 places).
24 Part No. 089-05903-0007, (24 places).
25 Part No. 030-01157-0011, (37 places).
26 Part No. 030-01447-0001.
27 Part No. 073-01161-0003.
28 Part No. 030-01466-0001, (78 places).
29 Part No. 53002878-1, (2 places).
30 Part No. 073-01158-0003, (2 places).
31 Part No. 030-01446-0001, (78 places).
32 Part No. 030-01454-0002, (4 places), Part No. 030-01157-001, (5 places).
33 Part No. 030-01447-0000.
34 Part No. 073-01159-0003.
35 Part No. 030-01157-0011, (25 places).
36 Part No. 030-01447-0000.
37 Part No. 073-01159-0003.

Figure 2-4. KSN 7xx Safety Navigator Outline Drawing (Dwg. No. 155-01812-0000 Rev. E) (Sheet 4 of 4)

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2.3.6 KSN Pinouts

2.3.6.1 Refer to Figure 2-5 for the back panel connector locations.

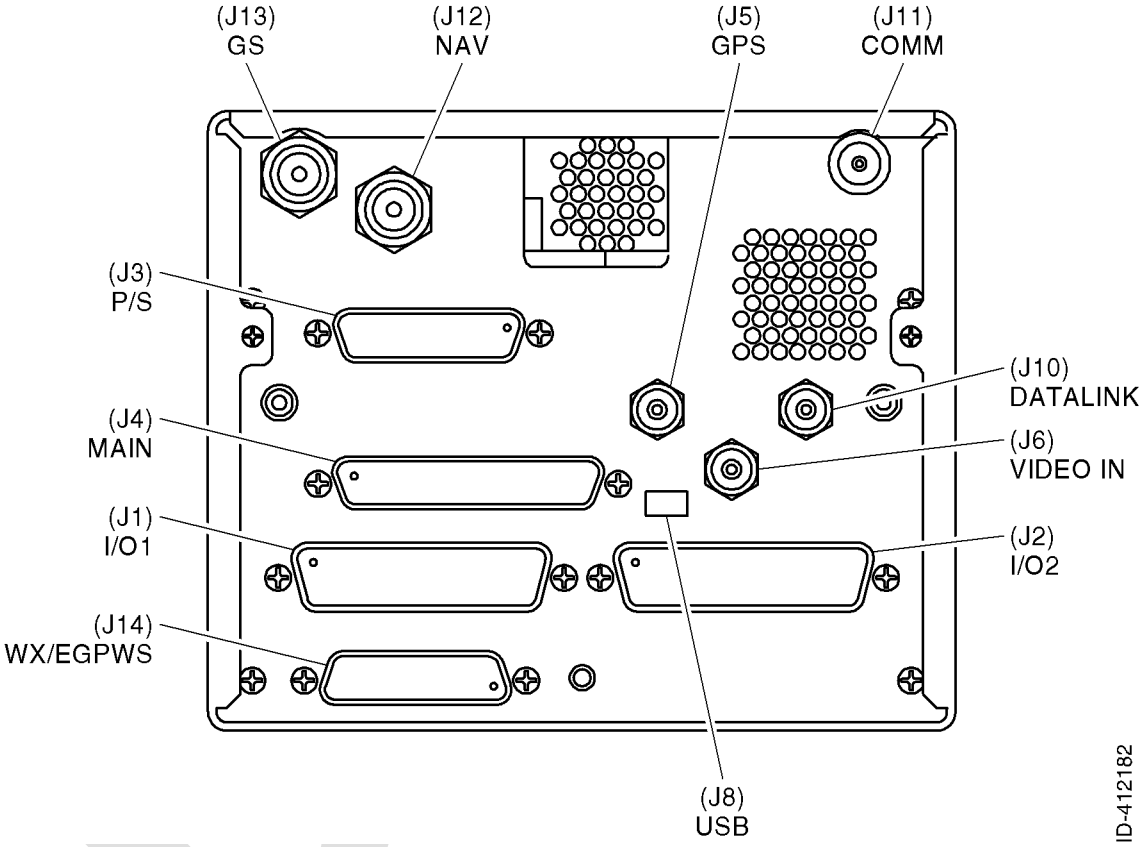

Figure 2-5. KSN 7xx Back Panel

Refer to Table 2-10 for the connector list.

Table 2-10. Connector List

Connector	Type	Signal Descriptions
J1	78 Pin D High Density	Refer to Table 2-11.
J2	78 Pin D High Density	Refer to Table 2-12.
J3	13 Pin D	Refer to Table 2-13.
J4	37 Pin D	Refer to Table 2-14.
J5	RF	Refer to Table 2-15.
J6	Video	Refer to Table 2-16.
J7	-	-

Table 2-10. Connector List

Connector	Type	Signal Descriptions
J8	Mini B USB (not used)	Refer to Table 2-17.
J9	-	-
J10	RF	Refer to Table 2-18.
J11	RF	Refer to Table 2-19.
J12	RF	Refer to Table 2-20.
J13	RF	Refer to Table 2-21.
J14	25 Pin D	Refer to Table 2-22.

2.3.6.2 Connector Pinouts

Refer to Table 2-11 for the signals assigned to the I/O 1 connector (J1).

Table 2-11. Signals Assigned to the I/O 1 Connector (J1)

Function	Description	Signal Type	I/O	Interface Pin No.
AHRS	AHRS 429 RX A	429	Input	66
AHRS	AHRS 429 RX B	429	Input	46
AHRS	Heading REF HI	Analog	Input	6
AHRS	Heading REF LO	Analog	Input	7
AHRS	Heading Valid	Discrete	Input	21
AHRS	Heading X	Synchro	Input	77
AHRS	Heading Y	Synchro	Input	58
AHRS	Heading Z	Synchro	Input	59
ALT	Airdata/Fuel/Heading 232 RX	RS-232	Input	61
NAV/IND	LNAV/VNAV Approach Active Annunciate	High Current Discrete	Output	15
DME [1]	DME Channel Request	KRC	Input	76
DME [1]	DME Common	KRC	Input	56
DME [1]	DME Serial Clock	KRC	Output	75
DME [1]	DME Serial Data	KRC	Output	57
EGPWS(E)	Legacy PXPRESS 232 GND	RS-232	REF	43
EGPWS(E)	Legacy PXPRESS 232 TX	RS-232	Output	63

Table 2-11. Signals Assigned to the I/O 1 Connector (J1) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
GPS	GPS Flight Plan 232 TX	RS-232	Output	62
GPS	GPS GAMA 429 TX A	429	Output	71
GPS	GPS GAMA 429 TX B	429	Output	51
GPS	GPS/Airdata/Fuel 232 GND	RS-232	REF	42
Growth	Spare 429 RX 3 A	429	Input	67
Growth	Spare 429 RX 3 B	429	Input	47
Growth	Spare 429 TX A	429	Output	70
Growth	Spare 429 TX B	429	Output	50
Growth	Spare 2 RS 232 RX	RS-232	Input	23
NAV/IND	LNAV Approach Active Annunciate	High Current Discrete	Output	16
NAV/IND	CDI From	Analog	Output	8
NAV/IND	CDI GPS Annunciate	High Current Discrete	Output	18
NAV/IND	CDI Select In	Discrete	Input	3
NAV/IND	CDI To	Analog	Output	27
NAV/IND	CDI VLOC Annunciate	High Current Discrete	Output	38
NAV/IND	Dead Reckoning Annunciate	High Current Discrete	Output	17
NAV/IND	EFIS CTRL 429 RX A	429	Input	68
NAV/IND	EFIS CTRL 429 RX B	429	Input	48
NAV/IND	ILS Approach Energize	High Current Discrete	Output	40
NAV/IND	Lateral Deviation (CDI) Flag–	Analog	Output	9
NAV/IND	Lateral Deviation (CDI) Flag+	Analog	Output	28
NAV/IND	Lateral Deviation (CDI) Left	Analog	Output	10
NAV/IND	Lateral Deviation (CDI) Right	Analog	Output	29
NAV/IND	Lateral Deviation Superflag	Analog	Output	13
NAV/IND	Loss of Integrity Annunciate	High Current Discrete	Output	19
NAV/IND	Message Annunciate	High Current Discrete	Output	20
NAV/IND	OBI Clock	OBI	Output	25
NAV/IND	OBI Data	OBI	Output	5
NAV/IND	OBI Select In	Discrete	Input	24

Table 2-11. Signals Assigned to the I/O 1 Connector (J1) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
NAV/IND	OBI Sync	OBI	Output	4
NAV/IND	OBS_C (REF LO)	OBS	I/O	74
NAV/IND	OBS_D (COS HI)	OBS	Input	54
NAV/IND	OBS_E (COS LO)	OBS	Input	55
NAV/IND	OBS_F (SIN HI)	OBS	Input	34
NAV/IND	OBS_G (SIN LO)	OBS	Input	33
NAV/IND	OBS_H (REF HI)	OBS	I/O	14
NAV/IND	OFF PATH Annunciate	High Current Discrete	Output	35
NAV/IND	Suspend Annunciate	High Current Discrete	Output	36
NAV/IND	Suspend In	Discrete	Input	2
NAV/IND	LP Approach Active Annunciate	High Current Discrete	Output	37
NAV/IND	Vertical Deviation Down	Analog	Output	12
NAV/IND	Vertical Deviation Flag–	Analog	Output	11
NAV/IND	Vertical Deviation Flag+	Analog	Output	30
NAV/IND	Vertical Deviation Superflag	Analog	Output	32
NAV/IND	Vertical Deviation Up	Analog	Output	31
NAV/IND [1]	VOR/ILS TX A	429	Output	72
NAV/IND [1]	VOR/ILS TX B	429	Output	52
NAV/IND [1]	VOR/LOC Composite Out	Analog	Output	60
NAV/IND [1]	VOR/LOC Composite REF	Analog	REF	41
NAV/IND [1]	Waypoint Annunciate	High Current Discrete	Output	39
PWR	GND1	Common GND	REF	1
PWR	GND2	Common GND	REF	78
PWR	KEY1	Key	Key	26
Traffic	TA Aural Active	Discrete	Input	22
Traffic	Traffic Ctrl TX A	429	Output	73
Traffic	Traffic Ctrl TX B	429	Output	53
Traffic	Traffic Display 429 RX A	429	Input	69
Traffic	Traffic Display 429 RX B	429	Input	49

Table 2-11. Signals Assigned to the I/O 1 Connector (J1) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
WX	WX-500 422 #2 RX A	RS-422	Input	44
WX	WX-500 422 #2 RX B	RS-422	Input	45
WX	WX-500 422 #2 TX A	RS-422	Output	64
WX	WX-500 422 #2 TX B	RS-422	Output	65
NOTE: 1. KSN 7x0 Only.				

Refer to Table 2-12 for the signals assigned to the I/O 2 connector (J2).

Table 2-12. Signals Assigned to the I/O 2 Connector (J2)

Function	Description	Signal Type	I/O	Interface Pin No.
ALT	Airdata REF LO	Analog	I/O	67
ALT	Airdata REF HI	Analog	I/O	48
ALT	Baro ALT 429 A	429	Input	46
ALT	Baro ALT 429 B	429	Input	65
ALT	Baro Correction HI	Analog	Input	8
ALT	Baro Correction LO	Analog	Input	28
ALT	Gillham ALT A1	Discrete	Input	18
ALT	Gillham ALT A2	Discrete	Input	37
ALT	Gillham ALT A4	Discrete	Input	57
ALT	Gillham ALT B1	Discrete	Input	17
ALT	Gillham ALT B2	Discrete	Input	36
ALT	Gillham ALT B4	Discrete	Input	56
ALT	Gillham ALT C1	Discrete	Input	16
ALT	Gillham ALT C2	Discrete	Input	35
ALT	Gillham ALT C4	Discrete	Input	55
ALT	Gillham ALT D4	Discrete	Input	76
EGPWS	EGPWS Status 429 TX A	429	Output	45
EGPWS	EGPWS Status 429 TX B	429	Output	64
EGPWS	Landing Gear	Discrete	Input	34
EGPWS	OAT–	Analog	Input	68

Table 2-12. Signals Assigned to the I/O 2 Connector (J2) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
EGPWS	OAT +	Analog	Input	69
EGPWS	OAT GND	Analog	Output	49
EGPWS	OAT REF	Analog	Output	50
EGPWS	Shared - Flaps or Tactical Select (Low ALT Mode)	Discrete	Input	15
EGPWS	Terrain Caution Annunciate	High Current Discrete	Output	24
EGPWS	Terrain Inhibit	Discrete	Input	74
EGPWS	Terrain Warn Annunciate	High Current Discrete	Output	4
EGPWS	Terrain Failure Annunciate	High Current Discrete	Output	3
EGPWS	WOW	Discrete	Input	54
EGPWS	Shared - Audio On or Low Altitude Mode Annunciate	High Current Discrete	Output	23
EGPWS	EGPWS Self Test	Discrete	Input	75
Flight Control	GPS Steering Select	Discrete	Output	77
Flight Control	GPS/LOC Approach Annunciate	High Current Discrete	Output	22
Flight Control	Remote Go Around	Discrete	Input	72
Flight Control	Roll Steer–	Analog	Output	9
Flight Control	Roll Steer+	Analog	Output	10
Flight Control	Roll Steer REF HI	Analog	Input	30
Flight Control	Roll Steer REF LO	Analog	Input	29
Flight Control	Roll Steer Valid	Discrete	Output	59
Connected Gateway	XM WX 232 GND	RS-232	REF	41
Connected Gateway	XM WX 232 RX	RS-232	Input	60
Connected Gateway	XM WX 232 TX	RS-232	Output	40
Growth	Spare 429 RX 1 A	429	Input	44
Growth	Spare 429 RX 1 B	429	Input	63
Growth	Spare 429 RX 2 A	429	Input	47
Growth	Spare 429 RX 2 B	429	Input	66

Table 2-12. Signals Assigned to the I/O 2 Connector (J2) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
Growth	Spare In1	Discrete	Input	12
Growth	Spare In2	Discrete	Input	31
Growth	Spare In3	Discrete	Input	51
Growth	Spare In4	Discrete	Input	70
Growth	Spare In5	Discrete	Input	11
Growth	Spare In6	Discrete	Input	73
Growth	Spare Out1	High Current Discrete	Output	38
NAV/IND	LPV Approach Active Annunciate	High Current Discrete	Output	58
MAINT	IOP 422 #4 RX A	RS-422	Input	42
MAINT	IOP 422 #4 RX B	RS-422	Input	43
MAINT	IOP 422 #4 TX A	RS-422	Output	61
MAINT	IOP 422 #4 TX B	RS-422	Output	62
MISC	FAN Return	Common GND	REF	19
MISC	KSN Fan	Discrete	Output	20
MISC [1]	MMDS Fan	Discrete	Output	39
NAV/COM [1]	COM Audio Out HI	Audio	Output	5
NAV/COM [1]	COM Audio Out LO	Audio	Output	25
NAV/COM [1]	COM Channel Decrement	Discrete	Input	14
NAV/COM [1]	COM Channel Increment	Discrete	Input	13
NAV/COM [1]	COM Mic Audio In HI	Audio	Input	6
NAV/COM [1]	COM Mic Audio In LO	Audio	Input	26
NAV/COM [1]	COM Mic Key	Discrete	Input	71
NAV/COM [1]	COM Remote Transfer	Discrete	Input	52
NAV/COM [1]	Emergency Frequency	Discrete	Input	33
NAV/COM [1]	NAV Audio Out HI	Audio	Output	7
NAV/COM [1]	NAV Audio Out LO	Audio	Output	27
NAV/COM [1]	Transmit Interlock	Discrete	Input	53
PWR	GND3	Common GND	REF	1

Table 2-12. Signals Assigned to the I/O 2 Connector (J2) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
PWR	GND4	Common GND	REF	78
PWR	KEY2	Key	Key	32
Traffic	Traffic Disc 1 Out	Discrete	Output	2
Traffic	Traffic Disc 2 Out	Discrete	Output	21
NOTE: 1. KSN 7x0 Only.				

Refer to Table 2-13 for the signals assigned to the power supply interface connector (J3).

Table 2-13. Signals Assigned to the Power Supply Interface Connector (J3)

Function	Description	Signal Type	I/O	Interface Pin No.
MAINT	33V_BOOST_TEST	Analog (Test Only)	Output	1
MAIN	5V_KSN_TEST	Analog (Test Only)	Output	4
MAINT	5V7_STARTUP-TEST	Discrete (Test Only)	Output	5
Main [1]	12VPOS_MMDS_TEST	Analog (Test Only)	Output	3
PWR	MAIN_POWER_IN	Aircraft Power	Input	A3
PWR	MAIN_POWER_IN _RTN	Aircraft GND	Input	A1
PWR [1]	MAIN_POWER_IN _RTN	Aircraft GND	Input	A4
PWR [1]	MMDS_TX_POWER_IN	Aircraft Power	Input	A2
MAINT	ON_OFF_Status_N	Discrete (Test Only)	Output	2
NOTE: 1. KSN 7x0 Only.				

Refer to Table 2-14 for the signals assigned to the main processor board interface connector (J4).

Table 2-14. Signals Assigned to the Main Processor Board Interface Connector (J4)

Function	Description	Signal Type	I/O	Interface Pin No.
CONFIG MOD	Config MOD Data	I2C	I/O	12
CONFIG MOD	Config MOD GND	I2C	Output	29
CONFIG MOD	Config MOD Power	I2C	Output	11
Dual	KSN 7XX 422 #1 RX A	RS-422	Input	24

Table 2-14. Signals Assigned to the Main Processor Board Interface Connector (J4) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
Dual	KSN 7XX 422 #1 RX B	RS-422	Input	25
Dual	KSN 7XX 422 #1 TX A	RS-422	Output	6
Dual	KSN 7XX 422 #1 TX B	RS-422	Output	7
GPS	GPS Dataload 232 GND	RS-232	REF	31
GPS	GPS Dataload 232 RX	RS-232	Input	32
GPS	GPS Dataload 232 TX	RS-232	Output	13
GPS	GPS Enhanced PXPRESS 232 GND	RS-232	REF	21
GPS	GPS Enhanced PXPRESS 232 RX	RS-232	Input	20
GPS	GPS Enhanced PXPRESS 232 TX	RS-232	Output	2
GPS	GPS Time Mark HI	RS-422	Output	10
GPS	GPS Time Mark LO	RS-422	Output	28
Growth	Spare In8	Discrete	Input	3
Lighting	Remote Dimming HI	Analog	Input	17
Lighting	Remote Dimming LO	Analog	Input	36
MAINT	Demo Mode Select	Discrete	Input	19
MAINT	Shop Mode Select	Discrete	Input	18
MAINT/ AUDIO	Shared - Maintenance or Voice Recognition 422 RX B	RS-422	Input	23
MAINT/ AUDIO	Shared - Maintenance or Voice Recognition 422 TX B	RS-422	Output	5
MAINT/ AUDIO	Shared - Maintenance or Voice Recognition 422 RX A	RS-422	Input	22
MAINT/ AUDIO	Shared - Maintenance or Voice Recognition 422 TX A	RS-422	Output	4
PWR	GND5	Common GND	REF	1
PWR	GND6	Common GND	REF	37
WX	Datalink Receiver 422 #3 RX A	RS-422/RS-232	Input	26
WX	Datalink Receiver 422 #3 RX B	RS-422/RS-232	Input	27
WX	Datalink Receiver 422 #3 TX A	RS-422/RS-232	Output	8
WX	Datalink Receiver 422 #3 TX B	RS-422/RS-232	Output	9
WX	Satellite Audio - Left HI	Audio	Output	15

Table 2-14. Signals Assigned to the Main Processor Board Interface Connector (J4) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
WX	Satellite Audio - Left LO	Audio	Output	34
WX	Satellite Audio - Right HI	Audio	Output	14
WX	Satellite Audio - Right LO	Audio	Output	33

Refer to Table 2-15 for the signals assigned to the GPS antenna connector (J5).

Table 2-15. Signals Assigned to the GPS Antenna Connector (J5)

Function	Description	Signal Type	I/O	Interface Pin No.
GPS	GPS Antenna	RF	I/O	Center
GPS	GPS Antenna GND	RF	I/O	Shell

Refer to Table 2-16 for the signals assigned to the video connector (J6).

Table 2-16. Signals Assigned to the Video Connector (J6)

Function	Description	Signal Type	I/O	Interface Pin No.
Video	Remote Video	Video	Input	Center
Video	Remote Video GND	Video	Input	Shell

Refer to Table 2-17 for the signals assigned to the rear panel USB connector (J8).

Table 2-17. Signals Assigned to the Rear Panel USB Connector (J8)

Function	Description	Signal Type	I/O	Interface Pin No.
Not Used	USB2 D–	Mini USB	I/O	2
Not Used	USB2 D+	Mini USB	I/O	3
Not Used	USB2 D GND	Mini USB	Output	5
Not Used	USB2 VBUS	Mini USB	Output	1
Not Used	USB2 ID	Mini USB	Output	4

Refer to Table 2-18 for the signals assigned to the XM WX datalink antenna connector (J10).

Table 2-18. Signals Assigned to XM WX Datalink Antenna Connector (J10)

Function	Description	Signal Type	I/O	Interface Pin No.
WX	Datalink Antenna	RF	Input	Center
WX	Datalink Antenna GND	RF	Input	Shell

Refer to Table 2-19 for the signals assigned to the VHF transceiver antenna connector (J11).

Table 2-19. Signals Assigned to the VHF Transceiver Antenna Connector (J11) (KSN 7x0 Only)

Function	Description	Signal Type	I/O	Interface Pin No.
NAV/COM	COM Antenna	RF	I/O	Center
NAV/COM	COM Antenna GND	RF	I/O	Shell

Refer to Table 2-20 for the signals assigned to the navigation radio (VOR/LOC) antenna connector (J12).

Table 2-20. Signals Assigned to the Navigation Radio (VOR/LOC) Antenna Connector (J12) (KSN 7x0 Only)

Function	Description	Signal Type	I/O	Interface Pin No.
NAV/COM	VOR/LOC Antenna	RF	Input	Center
NAV/COM	VOR/LOC Antenna GND	RF	Input	Shell

Refer to Table 2-21 for the signals assigned to the navigation radio (GS) antenna connector (J13).

Table 2-21. Signals Assigned to the Navigation Radio (GS) Antenna Connector (J13) (KSN 7x0 Only)

Function	Description	Signal Type	I/O	Interface Pin No.
NAV/COM	GS Antenna	RF	Input	Center
NAV/COM	GS Antenna GND	RF	Input	Shell

Refer to Table 2-22 for the signals assigned to the WX RDR/EGPWS connector (J14).

Table 2-22. Signals Assigned to the WX RDR/EGPWS Connector (J14)

Function	Description	Signal Type	I/O	Interface Pin No.
EGPWS(E)	EGPWS CTRL 429 TX A	429	Output	13
EGPWS(E)	EGPWS CTRL 429 TX B	429	Output	12

Table 2-22. Signals Assigned to the WX RDR/EGPWS Connector (J14) (Cont)

Function	Description	Signal Type	I/O	Interface Pin No.
EGPWS(E)	External Audio Inhibit	Discrete	Input	24
EGPWS(E)	KCPB RX A	453	Input	9
EGPWS(E)	KCPB RX B	453	Input	22
EGPWS(E)	KCPB RX GND	453	Input	10
Power	GND10	Common GND	REF	25
Power	GND9	Common GND	REF	1
WX	WX RDR 708A 453 GND	453	Input	4
WX	WX RDR 708A 453 RX A	453	Input	5
WX	WX RDR 708A 453 RX B	453	Input	17
WX	WX RDR CTL 429 TX B	429	Output	14
WX	WX RDR CTL 429 TX A	429	Output	2
WX	WX RDR Power ON/OFF	Discrete	Output	15

2.3.7 KSN Wiring and Cable Harness Fabrication

The KSN MMDR receives primary power from the aircraft power source. A typical interface is shown in Paragraph 3.3 Power System Interface. Aircraft specific interfaces with more details are provided in separate EB or installation drawings.

The length of the wires to parallel pins must be approximately the same length, so that the best distribution of current can be effected. Honeywell recommends that all wires (including spares) as provided with the interconnect definition information be included in the fabrication of the wiring harness. However, if full wiring is not desired, the installer must ensure that the minimum wiring requirements for the features and functions to be used have been incorporated.

When cables are installed in the aircraft, they must be supported firmly enough to prevent movement and must be carefully protected against chaffing. Additional protection must also be provided in all locations where the cable may be subjected to abuse. In wire bundles, the cabling must not be tied tightly together as this tends to increase the possibility of noise pickup and similar interference.

When routing cables through the aircraft the cables must cross high level RF lines at right angles.

Prior to installing any equipment, make a continuity check of all wires and cables associated with the system. Then apply power and check for proper voltages at system connectors, and then remove power before completing the installation. The following guidelines are recommended:

(1) The installing facility will supply and fabricate all external cables. The required connectors are supplied as part of the installation kit (refer to Table 2-1 or Table 2-2).

(2) The unit must be kept a minimum of 36 inches (914 mm) from all antennas. Additionally, the antenna coax cable must not be bundled with the other wiring harnesses to the unit. Coaxial cables must be routed separately and be kept a minimum of 1.0 inch (25.4 mm) from each other.

(3) The length and routing of the external cables must be carefully planned before attempting the actual installation. Avoid sharp bends or locating the cable near aircraft control cables. The wiring cables must be of a length to allow for a “maintenance loop”; that is, the length must be adequate to access and extend the connectors aft of the panel for future maintenance purposes. Excess cabling must be secured and stowed by tie-wrapping until such maintenance is required.

(4) The cables must be supported firmly enough to prevent movement. They must be carefully protected wherever one may chafe against another or against some other object (such as the aircraft structure). Extra protection must be provided in all locations where the cables may be subject to abuse. Shields on shielded wires must be grounded in accordance with the system interconnection information.

(5) Shields must be carried through any obstruction via a thru-bulkhead connector. If shielding cannot be carried through by use of a bulkhead/connector pin, precautions must be taken to ensure each segment of the shielded lead be grounded at only one point. A GND connection of not more than two inches in length must be used. The preceding discussion does not apply to coaxial and quadraxial cable.

(6) Avoid routing cabling near high noise and high power sources.

2.3.7.1 Audio Electrical Noise

Improper installation of the audio lines to an audio panel can cause GND loops and degraded audio performance. Refer to your Audio Panel installation manual for guidance on proper installation of the audio lines.

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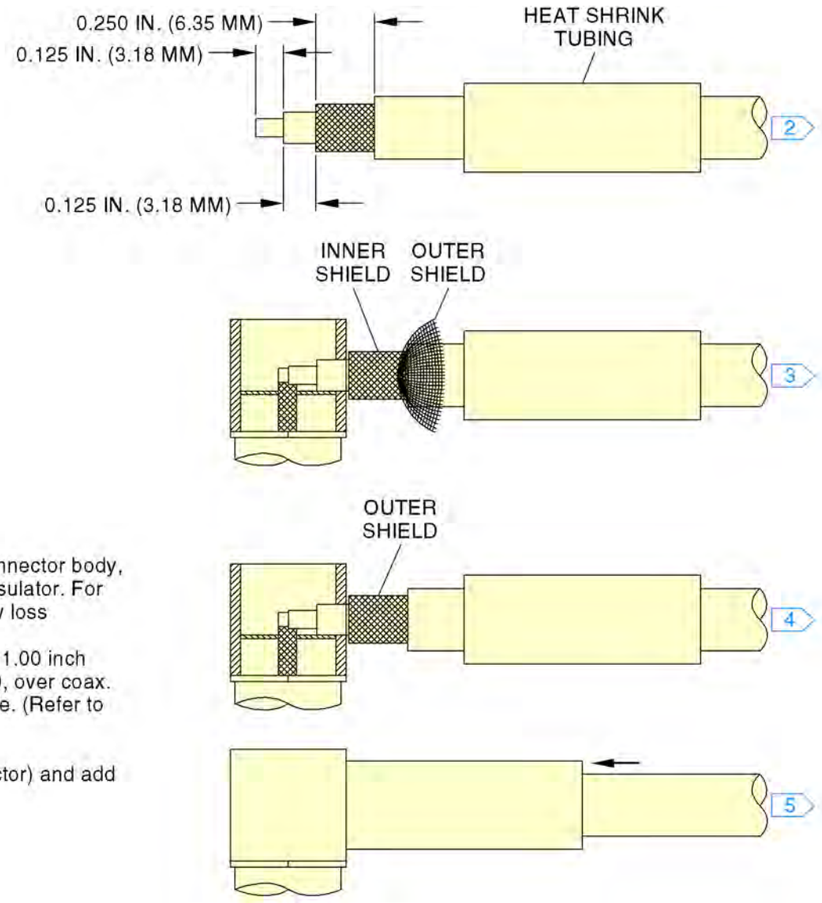

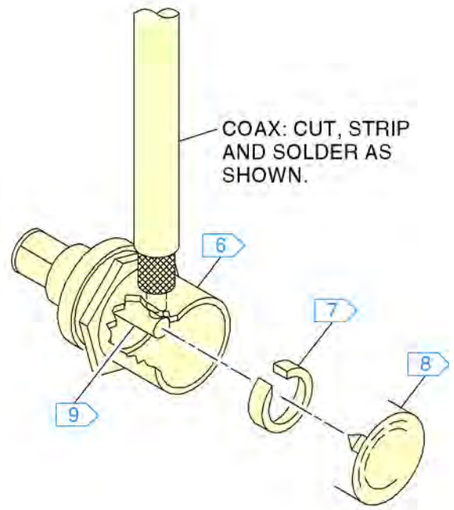

NOTES:

1. When soldering, avoid applying excess heat to connector body, heat sink spring contacts, and center conductor insulator. For normal applications use RG142 or RG400. For low loss applications use RG393.
2. Strip RG-142B/U, PN 024-00002-0000, and place 1.00 inch (25.4 mm) heat shrink tubing, PN 150-00025-0010, over coax.
3. Solder center contact and solder inner shield inside. (Refer to Note 1).
4. Solder outer shield outside. (Refer to Note 1).
5. Slide heat shrink tubing forward (flush with connector) and add heat to shrink the tubing.
6. PN 030-00101-0002.
7. Install 50 ohm match.
8. After installing cap, tack solder, (2 places).
9. Avoid excess solder on center conductor.

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Figure 2-6. Coaxial Right Angle Connector Instruction Sheet (Sheet 1 of 1)

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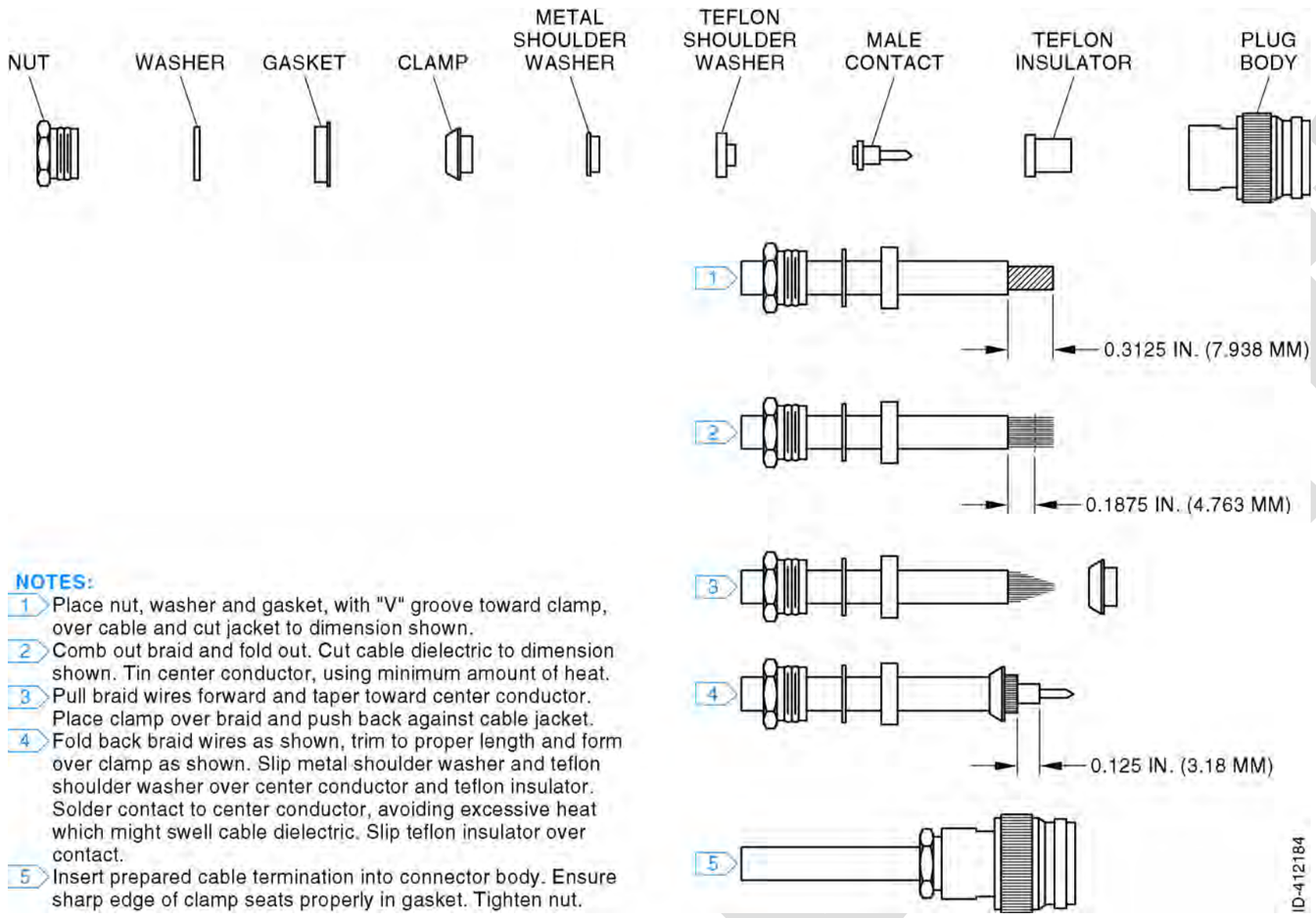

NOTES:

1. Place nut, washer and gasket, with "V" groove toward clamp, over cable and cut jacket to dimension shown.
2. Comb out braid and fold out. Cut cable dielectric to dimension shown. Tin center conductor, using minimum amount of heat.
3. Pull braid wires forward and taper toward center conductor. Place clamp over braid and push back against cable jacket.
4. Fold back braid wires as shown, trim to proper length and form over clamp as shown. Slip metal shoulder washer and teflon shoulder washer over center conductor and teflon insulator. Solder contact to center conductor, avoiding excessive heat which might swell cable dielectric. Slip teflon insulator over contact.
5. Insert prepared cable termination into connector body. Ensure sharp edge of clamp seats properly in gasket. Tighten nut.

Figure 2-7. TNC Antenna Coax with Straight Connector (Sheet 1 of 1)

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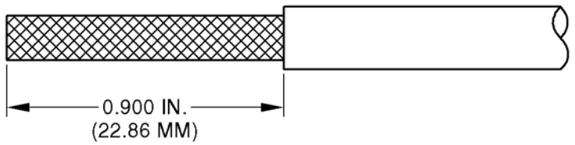
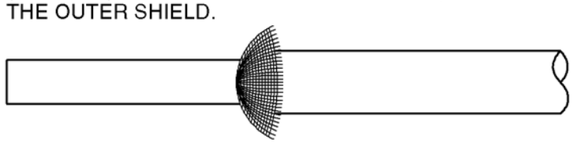
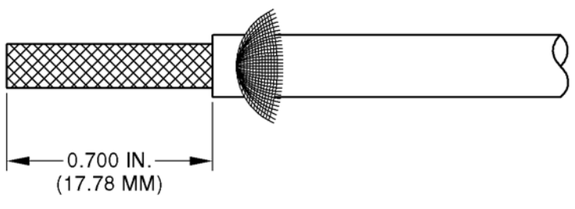


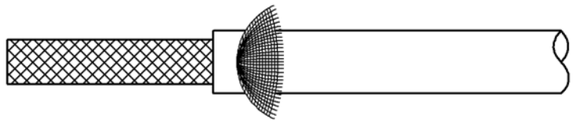
STEP 1. REMOVE THE OUTER INSULATION 0.900 IN. (22.86 MM) FROM THE END OF THE CABLE, EXPOSING THE OUTER SHIELD.



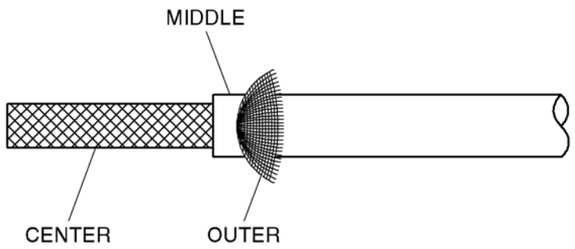
STEP 2. PUSH THE BRAID BACK AS FAR AS POSSIBLE. THIS WILL BE PULLED BACK UP LATER AND SOLDERED TO THE CONNECTOR BODY.



STEP 3. MEASURE BACK 0.700 IN. (17.78 MM) AND REMOVE THE OUTER INSULATION FROM THE MIDDLE SHIELD.



STEP 4. TIN THE EXPOSED SHIELD OF THE MIDDLE COAX. WITH A CUTTING TOOL, SCORE THE TINNED SHIELD AROUND THE ENTIRE CIRCUMFERENCE.



STEP 5. CAREFULLY BREAK LOOSE THE TINNED MIDDLE COAX SHIELD AND SLIDE IT OFF. THIS WILL EXPOSE THE CENTER COAX INSULATION.

ID-412185

Figure 2-8. Quadraxial Cable Preparation (Sheet 1 of 3)

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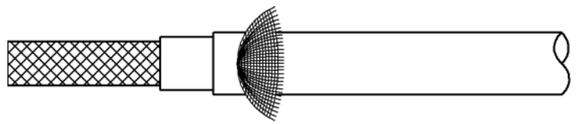
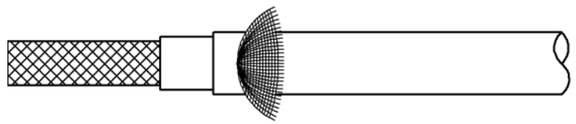
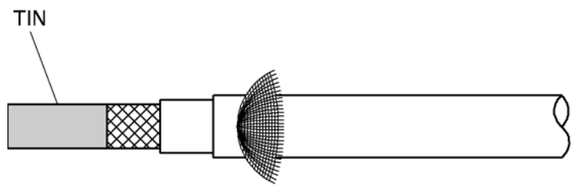


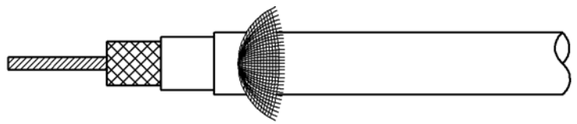
STEP 6. MEASURE BACK 0.500 IN. (12.70 MM) AND REMOVE THE INSULATION FROM THE CENTER SHIELD.



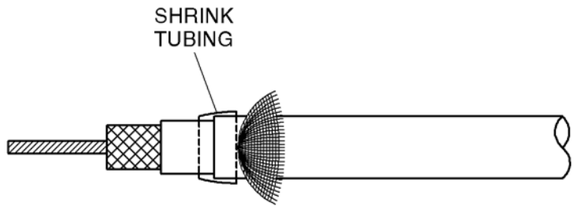
STEP 7. TIN THE SHIELD FOR THE CENTER COAX.



STEP 8. MEASURE BACK FROM THE END OF THE CABLE 0.300 IN. (7.62 MM) AND SCORE THE CENTER SHIELD WITH A CUTTING TOOL AROUND THE FULL CIRCUMFERENCE.



STEP 9. CAREFULLY BREAK THE SHIELD LOOSE. STRIP OFF THE INSULATION FROM THE CENTER CONDUCTOR.



STEP 10. INSTALL A 0.250 IN. (6.35 MM) LENGTH OF SHRINK TUBING OVER THE MIDDLE SHIELD STUB TO PREVENT POSSIBLE SHORTS TO THE OUTER SHIELD.

ID-412186

Figure 2-8. Quadraxial Cable Preparation (Sheet 2 of 3)

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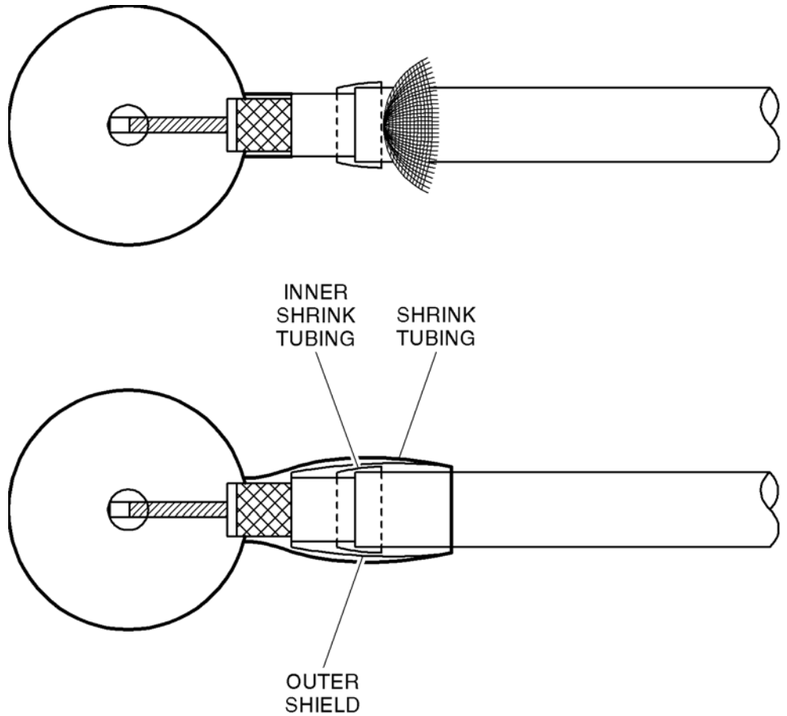

STEP 11. ASSEMBLE CONNECTOR AS FOLLOWS:

- INSTALL THE FERRULE OVER THE CENTER SHIELD AND SOLDER.
- SLIP THE CABLE INTO THE CONNECTOR HOUSING.
- SOLDER THE CENTER CONDUCTOR TO THE CENTER TERMINAL.
- PULL UP THE OUTER SHIELD AND SOLDER TO THE BOTTOM STEM.
- INSTALL SHRINK TUBING OVER THE ENTIRE ASSEMBLY TO THE BOTTOM OF THE CONNECTOR HOUSING.
- INSTALL THE HORSE SHOE SHAPED INSERT FOR A 50 OHM IMPEDANCE MATCH.
- INSTALL THE REAR COVER CAP AND SOLDER TO BARREL LIP IN TWO PLACES.

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Figure 2-8. Quadraxial Cable Preparation (Sheet 3 of 3)

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2.3.8 KSN Power Distribution

The KSN 7xx is powered through two dedicated circuit breakers. A 10.0 AMP circuit breaker powers the MMDS radio system. A 7.5 AMP circuit breaker powers the rest of the KSN 7xx functions. These circuit breakers must be connected to the same power bus sources. The power bus can range from +11 to +33 VDC. For aircraft weighing less than 6000 pounds (2721.6 kg) with two KSNs, it is recommended that each KSN is powered from a separate power bus. For aircraft weighing more than 6000 pounds (2721.6 kg) with two KSNs, it is required that each KSN is powered from a separate power bus.

2.3.9 Placards and Labels

All placards and labels must be visible in all lighting conditions. Text must be a minimum of 0.10 inch (2.5 mm) in height, and must be a contrasting color to the background of the label/placard. Text must be permanent and not easily disfigurable. If the KSN is not configured for IFR operation, a placard stating “The KSN 7xx is limited to VFR use only” (or similar) must be installed in the pilots field of view.

2.3.10 Weight and Balance

Using component weights from Table 2-23 and the moment arm of the component mounting locations, perform a weight and balance calculation per AC 43-13-1B Chapter 10. Also account for equipment remove during the modification process.

Table 2-23. Component Weights

Component	Weight
KSN 770 (standard, includes KCM 200 and rack)	9.9 pounds (4.5 kg)
KSN 770 (with WX RDR/EGPWS)	10.2 pounds (4.6 kg)
KSN 765 (standard, includes KCM-200 and rack)	8.1 pounds (3.7 kg)
KSN 765 (with WX RDR/EGPWS)	8.4 pounds (3.8 kg)
GPS Antenna (KA-96)	Refer to KA 96 IM (0.5 pounds [0.2 kg] nominal)
Annunciator Panel	Refer to the manufacturers data
NAV Antenna	Refer to the manufacturers data
COM Antenna	Refer to the manufacturers data
Indicator	Refer to the manufacturers data

2.4 Antenna Installation

The antenna(s) must be well removed from other antenna projections, the engine(s), and propeller(s). It must also be well removed from landing gear doors, access doors, or other openings which will break the GND plane for the antenna(s). On metal skinned aircraft, the antenna(s) must be bonded to the surface of the aircraft in a fore to aft location that provides the flattest GND plane. On composite aircraft, the antenna(s) must be located at the center of a conductive GND plane, contoured to the shape of the aircraft, having dimensions of at least 24.0 by 24.0 inches (610 by 610 mm). The antenna penetration must be designed such that the structural integrity of the fuselage is not compromised. The antenna(s) need to be within 5 degrees of the centerline.

Where practical, plan the antenna location(s) to keep cable lengths as short as possible and avoid sharp bends in the cable to minimize the VSWR. Avoid running other cables or wires near the antenna cable(s).

On pressurized aircraft, the antenna(s) must be sealed using an approved sealant, such as RTV No. 3145 (Honeywell PN 016-01082-0000) or equivalent, around the connector and mounting hardware.

The antenna edge and mounting hardware recesses must be sealed from the outside for moisture protection using RTV or equivalent.

Mount the antenna(s) in as clean as environment as possible, away from exhaust gases and oils. The antenna(s) must be kept clean. If left dirty (oil covered), the antenna performance may be affected.

Antennas must be installed in accordance with their own installation manuals.

2.4.1 GPS/WAAS Antenna Location Considerations

The KA 96 GPS active antenna, PN 071-01620-0001 or equivalent is the designated antenna for the KSN 7xx.

The antenna must be mounted on top of the fuselage near the cockpit. Avoid mounting the antenna near any projections, the propeller, or the T-tail of the aircraft, where shadows could occur. It is recommended that there be a separation of at least 36.0 inches (914 mm) between the GPS antenna and any VHF COM antenna on the aircraft.

The antenna baseplate must be level within ±5 degrees in both axes when the aircraft is level (level is defined as the aircraft attitude required when weighing the aircraft for weight and balance) for optimum performance. If the antenna is tilted more than 5 degrees or is mounted close to other objects that shadow it, loss of some of the satellites will occur and system performance may be degraded. Antenna cable and connector information, including vendor information is listed below.

Refer to Figure 2-7 for the cable/connector assembly instructions for the 0 to 40 feet (0 to 12.2 meters) category using RG 400/U or RG 142B/U.

Refer to Table 16 GPS Antenna Cable Information (for both TNC and BMA) for the 0 to 80 feet (0 to 24.4 meters) and 0 to 100 feet (0 to 30.5 meters) categories.

NOTE: The Nominal signal gain for the KA 96 is 27 to 31 dB, the noise figure is 1.9 dB at 77°F (25°C), 2.5 dB maximum. With 0.050 ice on the radome, gain will not decrease by more than 2.0 dB when viewing a satellite from 30 degrees above the horizon to zenith (as compared to a no ice condition).

Table 2-24. GPS Antenna Cable Information

Cable Length	Cable PN	TNC Connector (KSN 7xx)	TNC Connector Antenna	Maximum Allowable Loss (dB) @ 1.575 GHz
0 to 40 feet (0 to 12.2 meters)	PN: 024-00002-0000 VPN: RG142B/U	PN: 030-00134-0000 VPN: TED Mfg. 5-10-30	PN: 030-00134-0001 VPN: TED Mfg. 5-30-102-1	8.0
	PN: 024-00051-0060 VPN: RG400/U	PN: 030-00134-0000 VPN: TED Mfg. 5-10-30	PN: 030-00134-0001 VPN: TED Mfg. 5-30-102-1	8.0
0 to 80 feet (0 to 24.4 meters)	PN: 024-00072-0000 VPN: ECS 311601	PN: 030-00108-0002 VPN: TED Mfg. 5-10-307	PN: 030-00108-0002 VPN: TED Mfg. 5-10-307	8.0
0 to 100 feet (0 to 30.5 meters)	PN: 024-00071-0000 VPN: ECS 311201	PN: 030-00108-0003 VPN: TED Mfg. 5-10-306	PN: 030-00108-0003 VPN: TED Mfg. 5-10-306	8.0
100 to 165 feet (30.5 to 50.3 meters)	Contact TED, ECS or PIC for complete cable/connector assembly			

Table 2-25. Cable Vendor Contact Information

TED Manufacturing Corp. 11415 Johnson Drive Shawnee Mission, Kansas 66203 Tel: (913) 631-6211 http://www.tedmanufacturing.com	Electronic Cable Specialists (now part of CarlisleIT) 5300 W. Franklin Drive Franklin, Wisconsin 53132 Tel: 800 327-9473 or (414) 421-5300 http://www.ecsdirect.com/ http://www.carlisleit.com/	PIC Wire and Cable N53 W24747 South Corporate Circle Sussex, WI 53089-0330 Tel: (800) 742-3191 or (262) 246-0500 http://www.picwire.com/ sales@picwire.com
NOTE: Manufacturer contact information is provided as convenience only and may change any time.		

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2.4.2 COM and NAV Antenna Installation Considerations

2.4.2.1 COM Antenna Location

The VHF COM antenna must be mounted as far away as possible (8.0 feet [244 cm] minimum) from other similar antennas and the vertical stabilizer. Mounting the COM antenna as far away as possible from the navigation antenna will help reduce COM to NAV interference. The COM antenna must also be mounted as far away as possible from an ELT antenna to prevent distortion of the radiated pattern and to prevent radiated broadband noise from affecting the ELT when excited by the COM transmissions. Radiated broadband noise from an ELT is a common cause of COM-to-COM and COM-to-NAV interference. Mounting one antenna on top of the fuselage at the highest location to ensure a good radiation pattern and the other on the bottom of the fuselage offers good separation with a minimum of interaction.

It is recommended that one COM transceiver be connected to the top antenna for good GND communication and that the other COM transceiver be connected to the bottom antenna to provide good airborne communications. If mounting antennas on the same side of the aircraft is unavoidable, maintain the minimum allowable separation (8.0 feet [244 cm]).

The antenna must be mounted on a section of the aircraft that is horizontal during cruise flight. The base of the antenna must be well bonded to the metal aircraft skin. Remove any paint from around the mounting holes to ensure a good connection between the antenna and the skin. The metal aircraft skin at the base of the antenna must extend a minimum of 24.0 inches (610 mm) in every direction. This provides the GND plane required for the antenna. Any less metallized area will result in reduced communication range at some bearings around the aircraft and may increase interference to and from other systems.

The COM transceiver performance depends heavily on the integrity of the electrical bonding to the airframe and also the electrical integrity of the aircraft structure. If the electrical resistance between an antenna and the aircraft or between adjacent skin panels changed intermittently, noisy communications may result.

Connect the antenna to the COM unit with 50-ohm coaxial cable, keeping the cable length to a minimum and avoiding sharp bends in the cable. Keep the COM antenna cable as far away from other antenna cables as possible and do not bundle several antenna cables together. Prepare the cable to the BNC connector as shown in Figure 2-6.

Use Dow-Corning DC-4, or equivalent, on both inside and outside of the connector and its mate as an effective barrier against moisture and to prevent corrosion.

2.4.2.2 NAV Antenna Location

The NAV antenna must be well removed from other antennas, projections, engines or propellers. It must have a clear line of sight area if possible. The antenna must be mounted symmetrically with the center line of the aircraft. Avoid running other coaxial cables and wires near the NAV antenna cable.

The VOR/LOC antenna with Glideslope is a two piece dipole with one part mounted on each side of the vertical stabilizer. It must be installed on the upper section of the vertical stabilizer of single finned aircraft and be at least 28.0 inches (711 mm) (measured vertically) from the horizontal stabilizer.

On dual VOR/ILS installations, it is recommended that a splitter be used to divide signals from a single VOR/LOC antenna into two or more receivers. Use double shielded cables to reduce interference to the receivers.

Prepare the cable to the BNC connector as shown in Figure 2-6.

2.5 Optional Accessory Installation

Section 2.5.1
We do not want to be tied down to only one Brand and Model of External Annunciators. Is the MD 41 the only option?

2.5.1 External Annunciators

The recommended external annunciator for the KSN 7xx is the Mid Continent MD41-TBD (refer to the Mid Continent installation manual for installation instructions).

Section 2.5.2
Same comment for External switches as 2.5.1.

2.5.2 External Switches

External switches may be added for functions such as external increment and decrement of channel frequencies. Unless otherwise noted, these are signal level inputs and may be activated using MS 25089-1C Normally Open switches or equivalent necessary for system operation.

2.6 Magnetic Compass Recalibration

After the KSN 7xx has been installed and is operational, be sure to recalibrate the magnetic compass.

SECTION III - SYSTEM INTERCONNECT

3.1 Introduction

Section III contains information relative to KSN 7xx Safety Navigator interconnection diagrams, options available to the system planner, and specific electrical characteristics of the various interfaces where applicable. Each paragraph in this section contains the installation wiring diagrams for that section.

For information regarding the compatibility of equipment not listed in this manual, the installing agency must contact Bendix/King customer service at www.BendixKing.com.

Section III is divided into major sections by interface type or major topic. Each major section describes in detail the specifications for particular types of interfaces connecting to the KSN 7xx.

3.2 Standard Interface Definitions

Unless otherwise stated, the following interface definitions will apply.

3.2.1 Discrete Input

Refer to Table 3-1 for the discrete input states.

Table 3-1. Discrete Input States

State	Voltage Upper Limit	Voltage Lower Limit	Comment
Open/High	N/A	≥14 VDC for aircraft power ≥24.8 VDC ≥7.0 VCD for aircraft power ≥12.4 volts	Impedance is >230 kilohms to GND
Low	≤3.0 VDC	0 VDC	Impedance is <95 ohms to GND

3.2.2 Discrete Output

Unless otherwise stated, the following interface definitions will apply. Unless otherwise stated, all outputs may be used as high current discrete outputs.

3.2.2.1 High Current

Refer to Table 3-2 for the high current discrete output states.

Table 3-2. High Current Discrete Output States

State	Voltage Upper Limit	Sinking Current	Comment
Active	2.0 VDC	0 to 250 mA DC	-
Inactive	N/A	N/A	Open collector

3.2.2.2 Superflag

Refer to Table 3-3 for the superflag output states.

Table 3-3. Superflag Output States

State	Voltage Upper Limit	Voltage Lower Limit	Comment
Active	N/A	≥18 VDC	When the normal AC power is ≥24.8 VDC and the output is sourcing up to 250 mA.
	N/A	≥10 VDC	When the normal AC power is ≥12.4 VDC and the output is sourcing up to 250 mA.
Inactive	≤3.5 VDC	0 VDC	

3.2.3 EIA Standard Serial Interfaces

3.2.3.1 RS-232

Electrical characteristics are per ANSI TIA/EIA-232-F. Each RS-232 port will be configurable on the maintenance pages for the following:

- Buad Rate
- Data Bits
- Parity Bit
- Stop Bits.

3.2.3.2 RS-422

Electrical characteristics are per ANSI TIA/EIA-422-A.

3.2.4 ARINC 429 Standard Serial Interfaces

Electrical characteristics are per ARINC 429.

3.2.5 ARINC 453 Interface

This bus format is 1600 bit Manchester bi-phase per ARINC 708A. The data rate on this bus is 1 Mbit/s.

3.3 Power System Interface

3.3.1 General

The KSN 7xx power system interface contains information relative to both the aircraft power bus and the lighting bus.

The KSN 7xx is compatible with 14 VDC, 28 VDC aircraft. The 16 watts VHF COM option provided with the KSN 7xx requires a 28 VDC power source.

The KSN 7xx will accept 5 VAC, 5 VDC, 14 VDC, or 28 VDC for panel lighting control. Panel lighting on the KSN 7xx is adjusted based on the aircraft lighting bus.

3.3.2 Electrical Characteristics

Refer to Table 3-4 for the TBD.

Table 3-4. TBD

KSN 7xx Version	Pins	Description	Notes
KSN 765	J3-A3 MAIN POWER IN (11 to 33 VDC)	Main power for unit.	
KSN 770 10W COM	J3-A3 MAIN POWER IN (11 to 33 VDC) J3-A2 MAIN POWER IN (11 to 33 VDC)	Main power for unit. Power for NAV/COM	
KSN 770 16W COM	J3-A3 MAIN POWER IN (11 to 33 VDC) J3-A2 MAIN POWER IN (11 to 33 VDC)	Main power for unit. Power for NAV/COM	16 watts COM must have +28 VDC.
NOTE: These pin connects to the aircraft power with 16 AWG wire minimum.			

The KSN 7xx will draw 4.5 AMP maximum current at 28 VDC input voltage with panel lighting at maximum brightness and all superflags active and loaded.

Total power consumption is no more than:

Unit power: 150 watts receive, 350 watts transmit.

Panel lighting at maximum brightness: 100 mA maximum.

Superflag power: Up to 0.25 AMP per active superflag (lateral, vertical, steering, and serial superflags).

Refer to Table 3-5 for the TBD.

Table 3-5. TBD

KSN 7xx Version	Pins	Description	Notes
KSN 765	J3-A4 GND	Main power return for unit.	
KSN 770 10W COM	J3-A4 GND J3-A1 GND	Main power return for unit. Power return for NAV/COM	
KSN 770 16W COM	J3-A4 GND J3-A1 GND	Main power return for unit. Power return for NAV/COM	16 watts COM must have +28 VDC.
NOTE: These pins connect to the airframe GND with 16 AWG wire minimum.			

3.3.3 Panel Lighting Inputs

J4-17 REMOTE DIMMING HI
J4-38 REMOTE DIMMING LO

These pins connect to airframe GND with 22 AWG wire minimum.

The KSN 7xx is compatible with 28 VDC, 14 VDC, 5 VDC, and 5 VAC for panel lighting voltages.

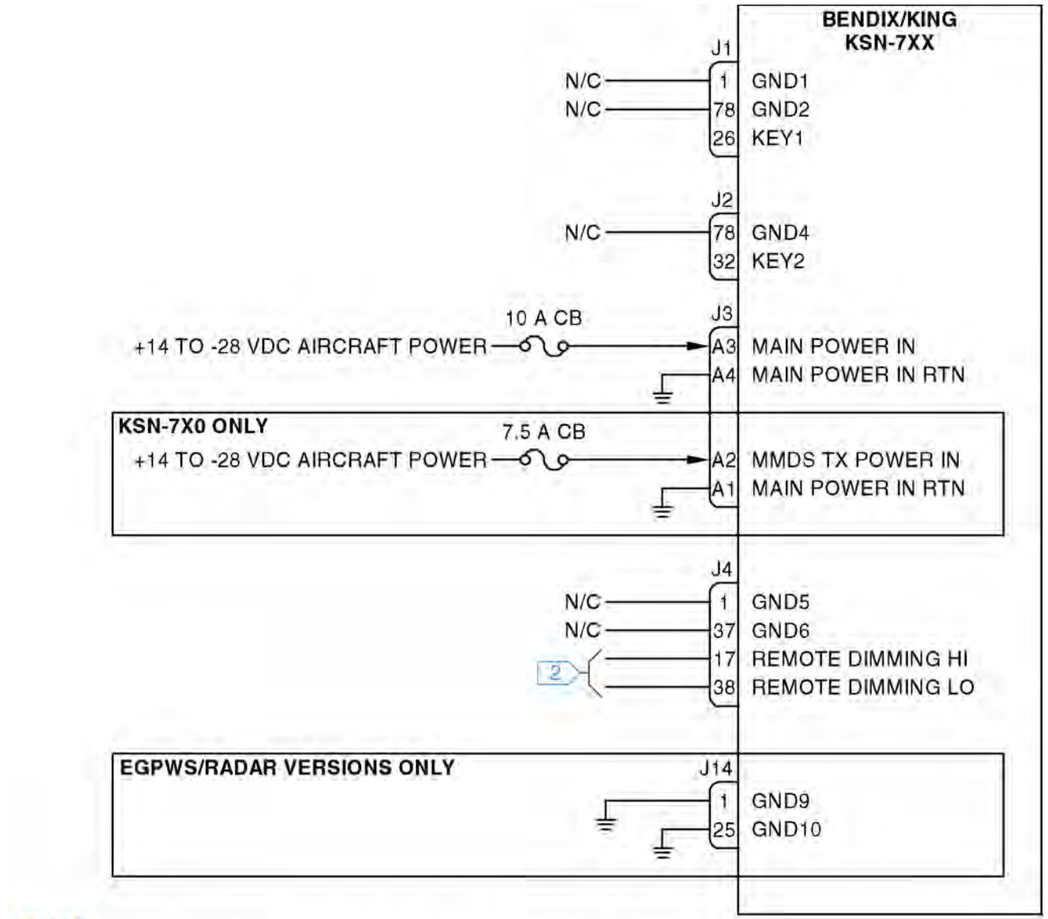
These inputs do not supply power to the KSN 7xx panel lighting; rather, the KSN 7xx senses the level on this input and drives the panel lighting lamps using the 14 to 28 VDC MAIN POWER IN input.

The KSN 7xx must be configured for the correct lighting voltage on the Maintenance pages for proper operation. No damage will occur to the KSN 7xx if the lighting is configured improperly.

If configured for too low a voltage, the lamps will be full brightness for most of the panel lighting rheostat range. If configured for too high a voltage, the lamps will only be adjustable between dim and OFF.

3.3.4 Interconnect Diagram

Refer to Figure 3-1 for the power system interface interconnect diagram.



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG with the exception of the power and power ground wires connected to J3, power wires are 16 AWG.
2. +14 VDC, +28 VDC, +5 VDC or 5 VAC lighting bus voltage.

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Figure 3-1. Power System Interface Interconnect Diagram (Sheet 1 of 1)

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3.4 Position Interface

3.4.1 Applicable Part Numbers

All part numbers and software revisions perform all position interface functions.

3.4.2 Function

The position interface outputs allow moving map products (such as the EFIS 40/50, Aspen EFD, and ARGUS 3000/5000/7000 series of products) and ELT products to use KSN 7xx position data. Position is output as both RS-232 data and ARINC 429 data.

3.4.3 Requirements and Limitations

The position interface must be left open if there are no using units are connected to the KSN 7xx.

3.4.4 Electrical Characteristics

J1-62 GPS FLIGHT PLAN 232 TX
J1-42 GPS/AIRDATA/FUEL 232 GND

This serial data bus conforms to EIA RS-232 electrical characteristics. This bus outputs position information, which also includes (but may not be limited to) distance to go, groundspeed, time to go, and flight plan waypoint data.

J1-71 GPS GAMA 429 TX A
J1-51 GPS GAMA 429 TX B

This serial data bus conforms to ARINC 429 electrical characteristics, and is configured for low operating speed.

J1-63 LEGACY PXPRESS 232 TX
J1-43 LEGACY PXPRESS 232 GND

This serial data bus conforms to EIA RS-232 electrical characteristics, and may be configured for speed on the maintenance pages.

3.4.5 Interconnect Diagram

Refer to Figure 3-2 for the position interface interconnect diagram.

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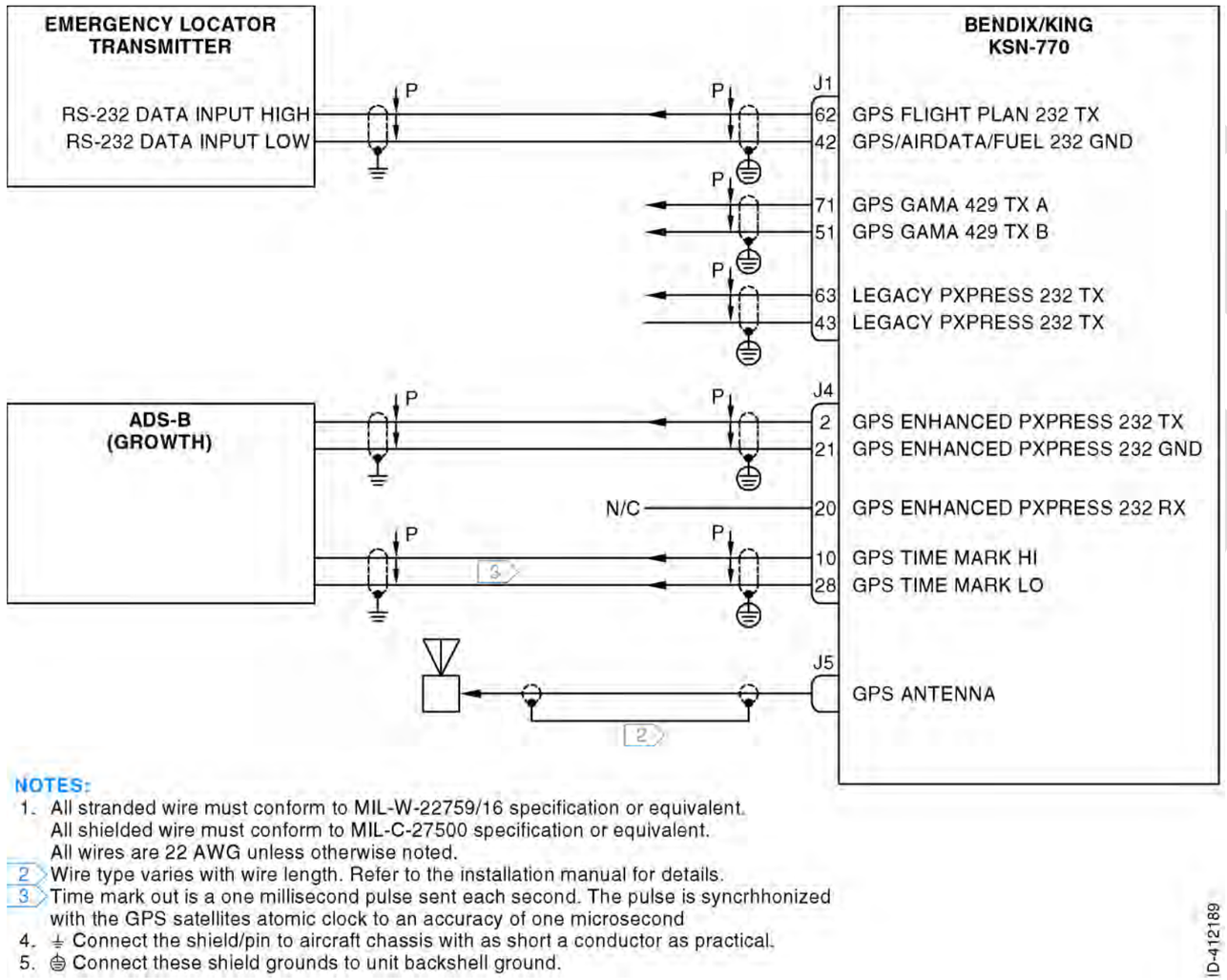

NOTES:
1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Wire type varies with wire length. Refer to the installation manual for details.
3. Time mark out is a one millisecond pulse sent each second. The pulse is syncrhhonized with the GPS satellites atomic clock to an accuracy of one microsecond
4. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
5. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-2. Position Interface Interconnect Diagram (Sheet 1 of 1)

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3.5 WX RDR Interface

3.5.1 Applicable Part Numbers

This function is only available when the optional KSN 7xx WX RDR/EGPWS option board is installed and the associated product feature key is installed.

When the WX RDR is not connected to the KSN 7xx, the pins must be left open.

3.5.2 Function

Radar is a method for locating thunderstorms using radio waves. The radar transmitter generates microwave energy in the form of pulses which are then transferred to the antenna where they are focused into a beam by the antenna and radiated. When the beam intercepts a target, the energy is reflected as an echo back to the antenna. It is then transferred to the receiver and processing circuits in the receiver/transmitter unit. These echoes are displayed on the KSN 7xx.

3.5.3 Requirements and Limitations

The KSN 7xx must be configured for the radar installed for proper operation. The following radar types are supported. Configuration of each type is covered in Section 4.

Refer to Table 3-6 for the WX RDR requirements and limitations.

3.5.4 Electrical Characteristics

A. WX RDR Control (ARINC 429)

J14-2 WX RDR CTL 429 TX A
J14-14 WX RDR CTL 429 TX B

This serial data bus conforms to ARINC 429 electrical characteristics, and may be configured for operating speed on the maintenance pages.

B. Power ON/OFF

J14-15 WX RDR POWER ON/OFF

This pin controls the power emissions of the WX RDR, and is active low, so that when the output is pulled low, the WX RDR turns ON.

C. WX RDR Data (ARINC 708A)

J14-5 WX RDR 708A 453 RX A
J14-17 WX RDR 708A 453 RX B

This serial data bus conforms to ARINC 708A electrical characteristics.

3.5.5 Interconnect Diagram

Refer to Figure 3-3 for the WX RDR interface interconnect diagram.

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Table 3-6. WX RDR Requirements and Limitations

RDR Type (Note 9)	Horizontal Scan Angle°	Vertical Profile Enable	Vertical Scan Angle°	Auto Tilt	WX Manual Gain	Sector Scan	WX/ARL Mode	5,320 nm Ranges	Auto Standby
RDR 2000	100 (90)	Enabled	60	N/A	N/A	N/A	N/A	N/A	Enabled
RDR 2100	120 (100)	Enabled	60	Enabled	Disabled	Disabled	Enabled	Enabled	Enabled
RDS 81	90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Enabled
RDS 82	90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Enabled
RDS 82VP	90	Enabled	50	N/A	N/A	N/A	N/A	N/A	Enabled
RDS 84	120	N/A	N/A	N/A	N/A	N/A	N/A	Enabled	Enabled
RDS 84VP	120	Enabled	60	N/A	N/A	N/A	N/A	Enabled	Enabled
RDS 86	120	N/A	N/A	Enabled	N/A	N/A	Enabled	Enabled	Enabled
RDS 86VP	120	Enabled	60	Enabled	N/A	N/A	Enabled	Enabled	Enabled
Other	120 (90) (100)	Disabled	60 (50)	Disabled	Disabled	Disabled	Disabled	Enabled	Enabled

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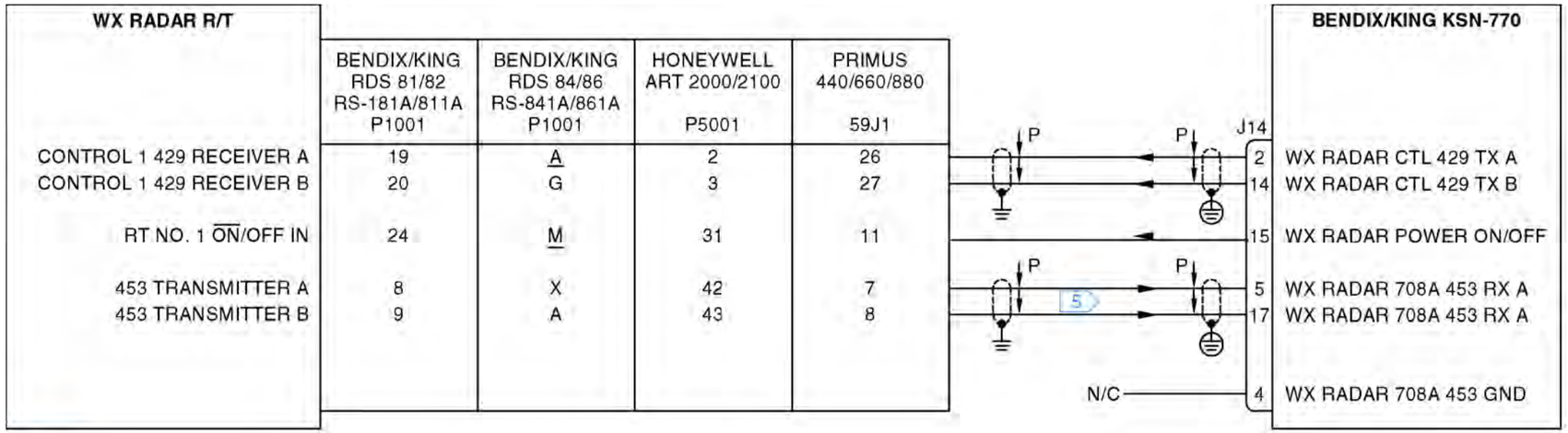

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.

5 Use M17/176-00002 wire or equivalent for the WX 453 interface. Existing WX radar installations can use the existing quadrax cable.

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Figure 3-3. WX RDR Interface Interconnect Diagram (Sheet 1 of 1)

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3.6 EGPWS Interface

3.6.1 Applicable Part Numbers

A. Internal EGPWS (Growth)

All part numbers and software versions perform all published internal EGPWS functions.

B. External EGPWS

This function is only available when the optional KSN 7xx WX RDR/EGPWS option board is installed and the associated product feature key is installed. Contact Bendix/King Product Support for the feature key.

When the EGPWS is not connected to the KSN 7xx, the pins must be left open.

The following are part number families of the external EGPWS units that will interface with the KSN 7xx. The minimum EGPWS software versions (the last six digits) required for compatibility with KSN 7xx installations is as follows:

- 965-0976-XXX-212-212 Mark V EGPWC
- 965-0976-XXX-212-212 Mark V EGPWC
- 965-0976-XXX-212-212 Mark V EGPWC
- 965-1076-XXX-212-212 Mark VII EGPWC
- 965-1076-XXX-212-212 Mark VII EGPWC
- 965-1076-XXX-212-212 Mark VII EGPWC
- 965-1176-005 Mark VI EGPWC
- 965-1186-005 Mark VI EGPWC
- 965-1206-005 Mark VIII EGPWC
- 965-1216-005 Mark VIII EGPWC
- 965-1227-0XX Mark XXI EGPWC
- 965-1590-006 Mark XXII EGPWC
- All versions of the KGP 560 EGPWS and KGP 860
- All versions of the KMH 880 EGPWS. and KMH 980

3.6.2 Function

EGPWS is a terrain awareness and alerting system. It uses aircraft inputs including geographic position, attitude, airspeed, and glideslope combined with internal terrain, obstacle, and airport databases to predict a potential conflict between an aircraft's flight path and terrain or an obstacle. The KSN 7xx has both an internal and an external EGPWS option which are defined below.

In a later certification, the KSN 7xx will offer an internal/integrated EGPWS function.

3.6.2.1 Internal EGPWS Function (Growth)

The internal EGPWS function uses GPS position along with altitude from a blind encoder or air data computer to verify obstacle clearance.

3.6.2.2 External EGPWS Function

The external EGPWS function allows the KSN 7xx to interface to a variety of external EGPWS units providing ground proximity warnings to pilots.

3.6.3 Requirements and Limitations

A. Internal EGPWS (Growth)

The KSN 7xx needs an external altitude reference for the internal EGPWS to work correctly. Refer to Paragraph 3.9 Altitude/Airdata/Fuel Interface for sources of altitude that may be used.

B. External EGPWS

The external EGPWS unit will need a set of inputs described in its own installation manual. The KSN 7xx can supply the GPS position needed by the EGPWS boxes.

3.6.4 Electrical Characteristics

The EGPWS will also output audio alerts. Refer to Paragraph 3.15 Audio Interface for connections to the audio system.

A. Internal EGPWS (Growth)

(1) Terrain Inhibit

J2-74 TERRAIN INHIBIT

Normal Operation:	Open
EGPWS Inhibited:	GND

This input inhibits the operation of the internal EGPWS.

(2) EGPWS Self Test (Growth)

J2-75 EGPWS SELF TEST

Normal Operation: Open
Start Self Test: Momentary GND

This input starts the EGPWS Self Test.

(3) Landing Gear (Growth)

J2-34 LANDING GEAR

Gear Down: GND
Gear Up: Open

This input signals the state of the landing gear.

(4) Flaps or Tactical Select (Growth)

J2-15 SHARED-FLAPS OR TACTICAL SELECT (LOW ALTITUDE MODE)

For fixed wing aircraft, this indicates the position of the flaps as follows:

Flaps Retracted: Open
Flaps Extended: GND

For Rotorcraft, this input indicates normal or low altitude mode:

Normal Operation: Open
Low Altitude Operation: GND

(5) Annunciations (Growth)

J2-24 TERRAIN CAUTION ANNUNCIATE
J2-4 TERRAIN WARN ANNUNCIATE
J2-3 TERRAIN FAILURE ANNUNCIATE
J2-23 SHARED-AUDIO OR LOW ALTUTIDE MODE ANNUCIATE

These annunciations are active when grounded.

B. External EGPWS

(1) EGPWS Control

J14-13 EGPWS CTRL 429 TX A
J14-12 EGPWS CTRL 429 TX B

This serial data bus conforms to ARINC 429 electrical characteristics, and is configured for high operating speed.

Label 017 (discretes data) is provided on this output of the KSN 7xx to implement the EGPWS control functions.

include KGP 860

Bendix King products don't use hyphens

Currently, the KGP 560, MK XXI and KMH-880 EGPWS units will accept label 017 from the KSN 7xx starting with the 003 version of the EGPWS software.

ble 3-7 for the ARINC 429 Label 017 control function availability in EGPWS units.

Table 3-7. ARINC 429 Label 017 Control Function Availability in EGPWS Units

EGPWS Unit	Minimum EGPWS Software Revision Level Required to Support ARINC 429 Control					
	Test	**Inhibit**	**LO ALT**	**G/S Cancel**	**Steep Approach**	**Flap Override**
KGP-560	003	003	N/A	N/A	N/A	N/A
KMH-880	003	003	N/A	N/A	N/A	N/A
MK-IV	N/A	N/A	N/A	N/A	N/A	N/A
MK-V	N/A	N/A	N/A	N/A	N/A	N/A
MK-VI	N/A	N/A	N/A	N/A	N/A	N/A
MK-VII	N/A	N/A	N/A	N/A	N/A	N/A
MK-VIII	N/A	N/A	N/A	N/A	N/A	N/A
MK-XXI	003	003	003	N/A	N/A	N/A
MK-XXII	N/A	N/A	N/A	N/A	N/A	N/A

NOTE: Currently, no EGWPS unit supports control of G/S cancel, steep approach or flap override through ARINC 429.

(2) Audio Inhibit

J14-24 EXTERNAL AUDIO INHIBIT (LOW TO INHIBIT, OPEN TO ALLOW).

This is an input from the external EGPWS system telling the KSN 7xx to stop EGPWS audio annunciations.

(3) Terrain Data

J14-9 KCPB RX A
J14-22 KCPB RX B

This serial data bus conforms to ARINC 429 electrical characteristics, and is configured for high operating speed. This allows the KSN 7xx to receive terrain warning information from the external EGPWS.

(4) Position Data

J14-43 LEGACY PXPRESS 232 GND
J14-63 LEGACY PXPRESS 232 TX

This serial data bus conforms to EIA RS-232 electrical characteristics. This allows the KSN 7xx to transmit position information to the external EGPWS, if required.

3.6.5 Interconnect Diagram

Refer to Figure 3-4 for the EGPWS interface - internal (growth) interconnect diagram.

Refer to Figure 3-5 for the EGPWS interface - external interconnect diagram.

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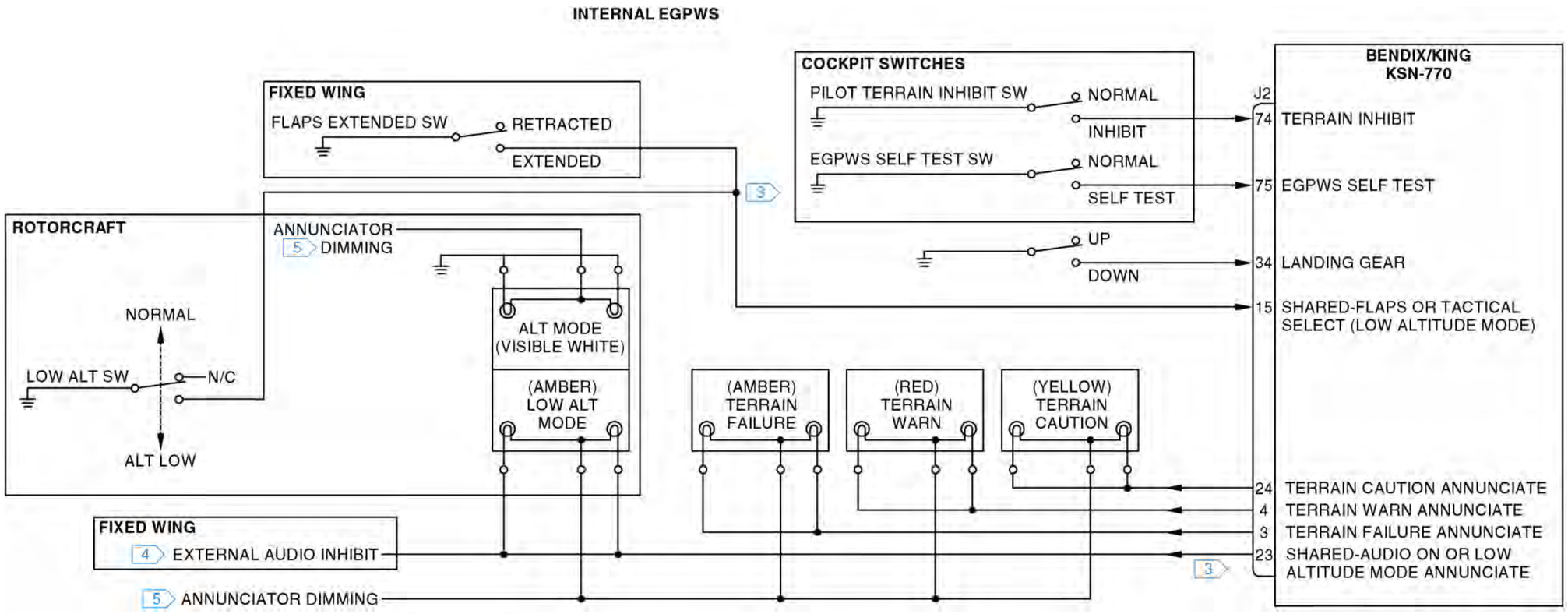

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. This pin can have one of two functions. The configuration must be set correctly for proper operation.
4. Connect this line to external audio inhibit where needed (see KMH 880, J82010, Pin 22 for an example).
5. Annunciator dimming may be by photocell or day/night switch. Do not use panel lighting rheostat dimming bus.
   Since the "ALT Mode" legend is daylight visible white in ambient light, it is not necessary to light the lamp during daylight operation.
   The lamp may be lit during daylight, may be illuminated from the photocell or day/night switch, or may be driven from the night position of the day/night switch.
   Not illuminating the lamp with the higher voltages during day operation, however, will greatly reduce the touch temperature to the pilot's fingers.

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Figure 3-4. EGPWS Interface - Internal (Growth) Interconnect Diagram (Sheet 1 of 1)

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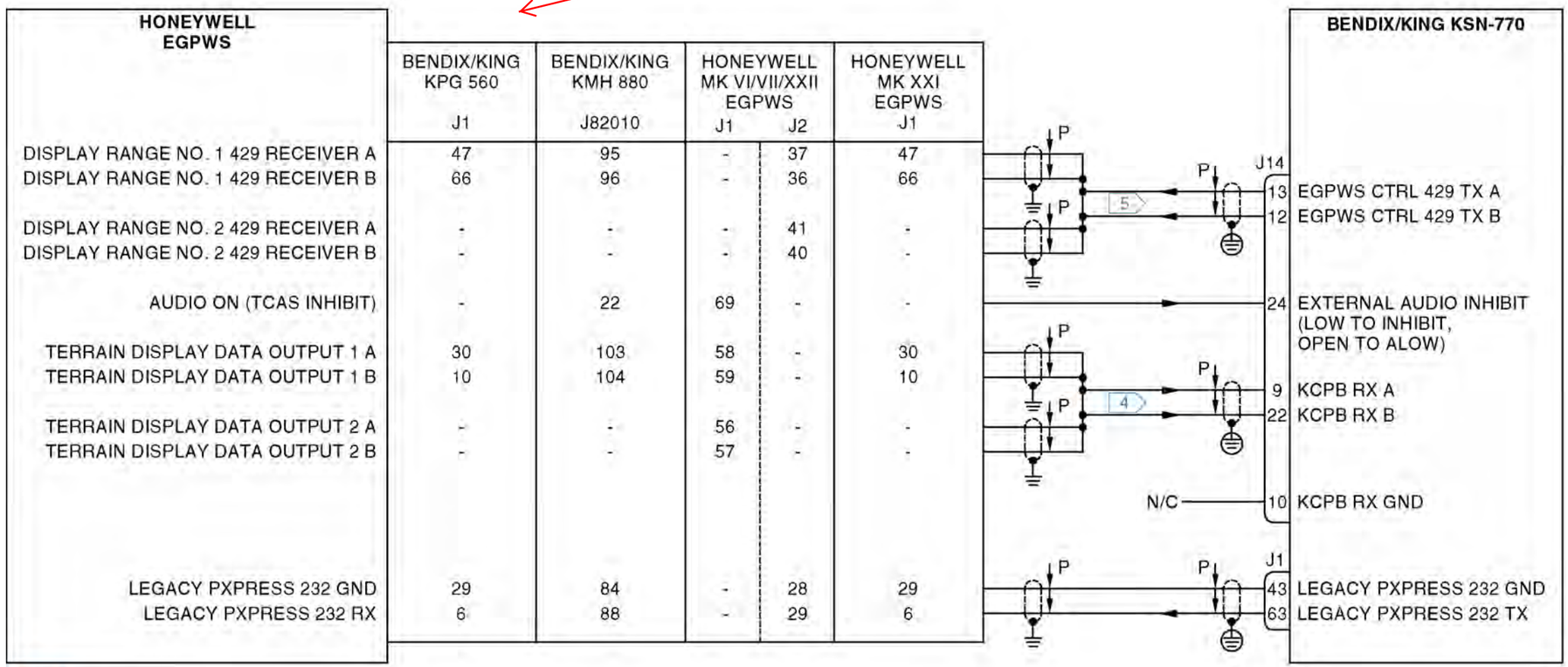
Figure 3-5 does not call out all of the EGPWS options, like KMH 980 and KGP 860

EXTERNAL EGPWS



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Connect the KSN 770 to the same display data output number as the display range input number.
5. Connect the KSN 770 to the No. 1 display range input if it is the only display. Connect to the No. 2 display range input if No. 1 is already being used.

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Figure 3-5. EGPWS Interface - External Interconnect Diagram (Sheet 1 of 1)

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3.7 Traffic Interface

3.7.1 Applicable Part Numbers

A. TIS

All part numbers and software versions perform all published TIS functions.

When the TIS is not connected to the KSN 7xx, the pins must be left open.

B. TCAS/TAS

This function is only available when the optional KSN 7xx WX RDR/EGPWS option board is installed and the associated product feature key is installed. Contact Bendix/King Product Support for the feature key.

When the TCAS/TAS is not connected to the KSN 7xx, the pins must be left open.

3.7.2 Function

A. TIS

TIS is a data link service that provides information similar to VFR RDR traffic advisories received over voice radio. The data is received from the terminal Mode S radar system through the Mode S transponder to the KSN 7xx once per radar scan (approximately every 5 seconds).

TIS provides the relative position, relative altitude, altitude trend, and estimated ground track angle for as many as eight intruders that are within 7 nm horizontally and +3500/–3000 feet (+1067 to –914 meters) vertically of the aircraft receiving TIS. This function is only available when optional KSN 7xx software is installed.

B. TCAS/TAS

TCAS and TAS are airborne systems used to detect and track aircraft in the vicinity of a particular aircraft through the interrogation of their transponders. Aircraft detected, tracked, and displayed by the TCAS/TAS systems are referred to as intruders.

The system then analyzes the transponder replies to determine range, bearing, and relative altitude. If the TCAS/TAS processor determines that a possible collision hazard exists, it issues visual and aural warnings.

This function is only available when optional KSN 7xx software is installed.

3.7.3 Requirements and Limitations

The KSN 7xx must be configured for the traffic equipment installed for proper operation. Configuration of each type is covered in Section 4.

3.7.4 Electrical Characteristics

A. Traffic Control

J14-73 TRAFFIC CTRL TX A
J14-53 TRAFFIC CTRL TX B

This serial data bus conforms to ARINC 429 electrical characteristics, and is configured for high operating speed. This is the bus that controls the traffic LRUs.

B. Traffic Display

J14-69 TRAFFIC DISPLAY 429 RX A
J14-49 TRAFFIC DISPLAY 429 RX B

This serial data bus conforms to ARINC 429 electrical characteristics, and is configured for high operating speed. This is the bus that supplies the KSN 7xx with traffic information to display.

C. Traffic Alert Aural Annunciation

J14-22 TA AURAL ACTIVE

Aural ON: Low
Aural OFF: High

This is a normally open discrete input to the KSN 7xx. This input signals to the KSN 7xx when the traffic alert aural for traffic is active, for audio priority management within the KSN 7xx.

D. Traffic Discretes

(1) TPU-66A, TPU-67A, KTA 810/910, KMH 820/920

J14-2 TRAFFIC DISC 1 OUT (TRAFFIC DISPLAY VALID)

Active: Low
Inactive: High

These are high current discrete outputs. This output is set up for proper operation on the maintenance pages.

For TPU-66A, TPU-67A, KTA 810/910, and KMH 820/920, TRAFFIC DISC 1 OUT is active whenever the KSN 7xx is displaying traffic data. TRAFFIC DISC 2 OUT is not used in these systems, and must remain unconnected.

(2) Skywatch 497

J14-2 TRAFFIC DISC 1 OUT (TEST command signal)

Normal:	High
Test Command:	Low

J14-21 TRAFFIC DISC 2 OUT (OPERATE / STANDBY)

Operate:	Low
Standby:	High

For L3 Skywatch 497, TRAFFIC DISC 1 OUT is the test command signal and TRAFFIC DISC 2 OUT is the operate/standby command. This output is set up for proper operation on the maintenance pages.

3.7.5 Interconnect Diagram

Refer to Figure 3-6 for the traffic interface interconnect diagram.

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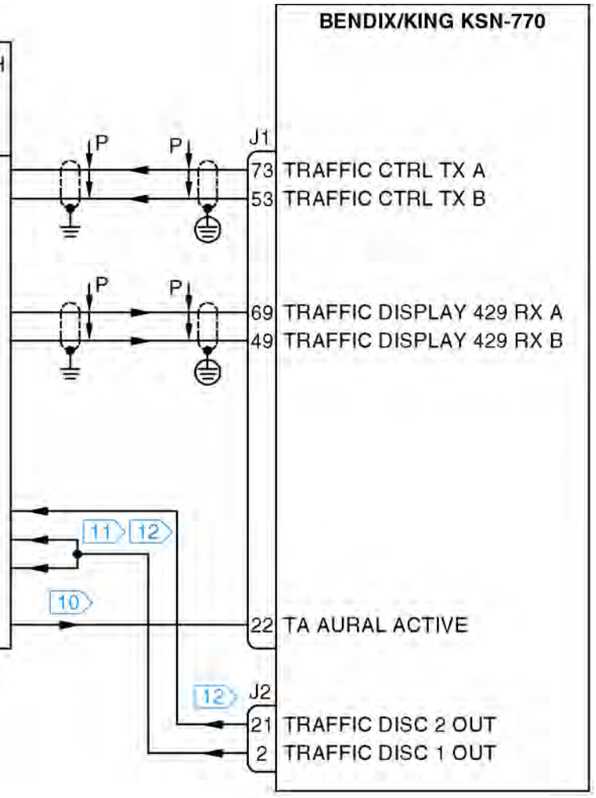
TCAS I/ TCAS II/ TRAFFIC AWARENESS SYSTEM/ TRAFFIC INFORMATION SERVICE	BENDIX/KING TPU 66A P1A	BENDIX/KING TPU 66A P1B	BENDIX/KING TPU 67A P1A	BENDIX/KING TPU 67A P1B	BENDIX/KING KTA 810/910 KMH 820/920 J1	AVIDYNE 9900BX P1	BENDIX/KING KT 73 J1	L-3 SKYWATCH TRC497 P1	L-3 SKYWATCH TRC497 P2	L-3 SKYWATCH HP TRC899 P1
CONTROL HEAD 429 RECEIVER 1 A	-	55	5		58	-	4C	-	-	-
CONTROL HEAD 429 RECEIVER 1 B	-	7	5		59	-	4D	-	-	-
TA/RA DISPLAY 429 TRANSMITTER 1 A	-	30	-	30	54	8	1N	-	34	42
TA/RA DISPLAY 429 TRANSMITTER 1 B	-	16	-	16	55	9	16	-	33	43
ALT_DISP1	-	-	-	-	-	-	-	80	-	-
CONFIG_GND	-	-	-	-	-	-	-	12	-	-
$\overline{\text{SFTKEY4\_IN}}$	-	-	-	-	-	-	-	82	-	21
$\overline{\text{SFTKEY1\_IN}}$	-	-	-	-	-	-	-	85	-	19
DISPLAY STATUS NO. 1 INPUT	34	-	34	-	-	-	-	-	-	-
TA AURAL TRAFFIC	-	-	90	-	-	-	-	-	-	-



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.
5. TPU 67A does not use the KSN 770 as a control head. Consult the applicable TCAS manual for control head information.
6. The ALT_DISP1 configuration pin must be terminated to the CONFIG_GND pin to enable alternate display of TAS on the KSN 770.
7. The KT 73 does not use TRFC display valid.
8. Aural active output not supported by KTA 810/910, KMH 820/920, KT 73, and TRC 497.
9. Aural active output during voice messages is not supported by TPU 66A.
10. Only connect TPU 67A if it is configured to activate output during aural messages.
11. For TPU 66A, TPU 67A, KTA 810/910, and KMH 820/920, Traffic Disc 1 is active whenever the KNS 770 is displaying traffic data. The KSN 770 must be configured correctly for proper operation.
12. For L-3 Skywatch 497, Traffic Disc 1 is test command signal and Traffic Disc 2 is OPR/STBY command. The KSN 770 must be configured correctly for proper operation.

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Figure 3-6. Traffic Interface Interconnect Diagram (Sheet 1 of 1)

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3.8 Heading/AHRS Interface

3.8.1 Applicable Part Numbers

All part numbers and software revisions perform all Heading/AHRS functions.

3.8.2 Function

Connecting a heading input to the KSN 7xx is optional, but highly recommended. However, the KSN 7xx uses its heading input to orient its map and to compute wind speed, wind direction and drift angle. In addition, the KSN 7xx requires heading to compute both analog and ARINC 429 roll steering, and for moving map overlays of data from heading referenced sensors.

A. All part numbers of the following AHRS systems are compatible with the KSN 7xx:

- Bendix/King KAH 460
- Rockwell Collins AHC 85
- Bendix/King KFD-840
- Bendix/King KSG-7200
- Bendix/King KFD 840
- Aspen EFD 1000.

B. All part numbers of the following compass systems are compatible with the KSN 7xx:

- Aeronetics 9100’s with remote bootstrap synchros
- Bendix/King KCS 55A (only with KI 525As with compass bootstrap synchros)
- Bendix/King KCS 305, Bendix/King KI 825
- Rockwell Collins MCS 65 (only with DGS 65’s with compass bootstrap synchros)
- Rockwell Collins PN 101 (only with 331A-3G or 331A-6P indicators with bootstrap synchros)
- Rockwell Collins MC 102
- Rockwell Collins MC 103
- Honeywell Sperry C14.

3.8.3 Requirements and Limitations

Although only one heading source is necessary for computations involving heading, the KSN 7xx will operate properly with any combination of XYZ, RS 232, ARINC 429, and ARINC 429 EFIS heading inputs connected simultaneously. In this case, the KSN 7xx will first look for ARINC 429 true heading (EFIS, IRU or INS label 314) and the internally derived magnetic variation to create magnetic heading; if not available, ARINC 429 magnetic heading (EFIS, AHRS, IRU or INS label 320) is used; if not available XYZ heading is used (XYZ heading is always assumed to be magnetic). If no other sources of heading are available, RS232 heading is used.

If the XYZ heading output of an IRU or INS may be switched between magnetic and true, it must not be connected to the KSN 7xx; use only the ARINC 429 heading for this installation.

The KSN 7xx INDICATOR 26 VAC input is used as the reference for detecting the XYZ heading input; both must be the same phase. The KSN 7xx will accept either a superflag format heading valid or a “ground-for-valid” format heading valid. The Maintenance page is used to select the correct format. No damage to the KSN 7xx will occur if configured incorrectly; however the heading data will always be flagged.

3.8.4 Electrical Characteristics

A. AHRS Heading

J1-66 AHRS 429 RX A
J1-46 AHRS 429 RX B

The AHRS input is for high speed ARINC 429. Low speed ARINC 429 must not be connected to this input.

All serial data must conform to ARINC 429, ARINC 704 and ARINC 705 for electrical characteristics, content and transmission interval (high speed bus). The KSN 7xx is configured to know whether an AHRS is connected or not. A system may have many more labels than those listed below. Label 314, true heading, is used if it is available, and combined with the KSN 7xx computed magnetic variation to determine magnetic heading. If true heading is not available from the AHRS, then the input magnetic heading is used.

Refer to Table 3-8 for the AHRS labels.

Table 3-8. AHRS Labels

Label	Parameter
314	True heading
320	Magnetic heading

B. XYZ Heading

J1-21 HEADING VALID

This pin is configurable on the Maintenance page for either valid high or valid low. An open HEADING VALID pin always indicates invalid.

HI:	No less than 18.5 VDC (or two-thirds the voltage applied to the 18-33 VDC AC POWER).
Load Resistance:	No more than 3.5 VDC. Input impedance no less than 10 kilohms.

J1-77 HEADING X
J1-58 HEADING Y
J1-59 HEADING Z

Three-wire XYZ format with Z grounded. Input impedance is no less than 10 kilohms. Maximum lead-to-lead voltage is 11.8 Vrms.

NOTE: To accept this input HEADINGVALID (J1-21) must be valid. The 26 VAC used to excite the heading source synchro must be of the same phase as the KSN 7xx 26 VAC reference input.

J1-6 HDG REF HI

This is the indicator 26 VAC reference. Input impedance no less than 10 kilohms.

J1-7 HDG REF LO

This pin serves as the 26 VAC return. Impedance to AC GND less than 0.1 ohm.

3.8.5 Interconnect Diagram

Refer to Figure 3-7 for the heading interface - XYZ interconnect diagram.

Refer to Figure 3-8 for the AHRS interface interconnect diagram.

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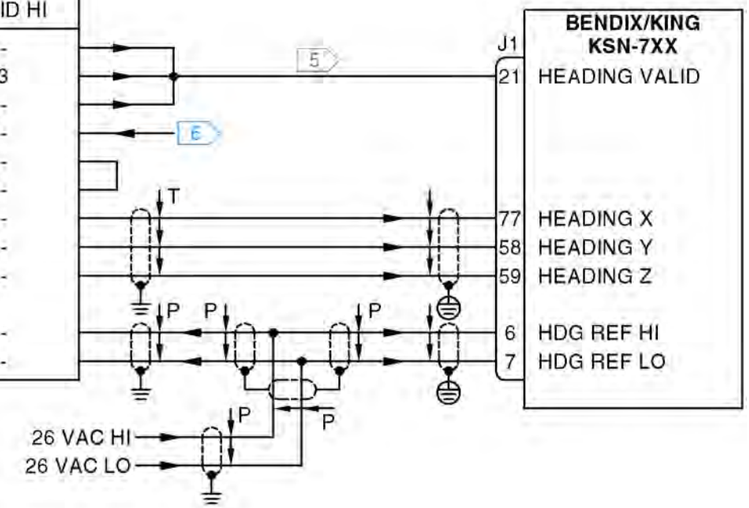
XYZ SYNCHRO	AERONETICS MODEL 9100	BENDIX/KING KCS 55A		BENDIX/KING KCS 305	BENDIX/KING KI 825	COLLINS (PN 101)	
	REMOTE GYRO P1	PICT NAV IND KI 525A		DIR GYRO KSG 105 P1	EHSI P2	COURSE IND 331A-3G P1	SLAVING ACC 328-3G P1
HEADING VALID POLARITY CONFIG	VALID HI	VALID LO		VALID HI	VALID LO	VALID HI	VALID HI
HEADING VALID	-	-	P	-	W	-	-
HEADING VALID HI	28	-	-	-	-	-	3
HEADING VALID RELAY OUT	-	-	-	V	-	-	-
HEADING VALID RELAY IN	-	-	-	N	-	-	-
HEADING VALID COMMON	-	-	-	-	-	-	-
GROUND	33	J	-	B	-	-	-
HEADING X	8	-	S	Z	S	S	-
HEADING Y	9	-	V	W	V	T	-
HEADING Z	10	-	T	T	T	U	-
26 VAC HI	6	-	R	P	R	V	-
26 VAC LO	7	-	U	D	U	W	-



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.
5. The KSN 7xx must be configured for the correct heading valid state.
6. The +28 VDC or ground may be connected to this relay contact. Check to see if a connection has already been made before making a new connection.

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Figure 3-7. Heading Interface - XYZ Interconnect Diagram (Sheet 1 of 2)

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XYZ SYNCHRO	COLLINS (PN 101)		COLLINS MCS-65	COLLINS MC102	COLLINS MC103	SPERRY C14
	COURSE IND 331A-6P P2	SLAVINGS ACC 328-3G P1	DIR GYRO DGS 65 P1	COMPAS AMP 328-2A 2P1	COMPAS AMP 328-5 P1	GYROSYN COMPASS 1P2
HEADING VALID POLARITY CONFIG	VALID HI	VALID HI	VALID HI	VALID HI	VALID HI	VALID HI
HEADING $\overline{\text{VALID}}$	-	-	-	-	-	$\underline{-}$
HEADING VALID HI	-	3	50	25	11	-
HEADING VALID RELAY OUT	-	-	-	-	-	$\underline{E}$
HEADING VALID RELAY IN	-	-	-	-	-	$\underline{D}$
HEADING VALID COMMON	-	-	-	17	-	-
GROUND	-	-	39	23	1	D
HEADING X	37	-	25	11	32	L
HEADING Y	38	-	40	4	22	M
HEADING Z	39	-	24	3	12	K
26 VAC HI	40	-	6	26	53	H
26 VAC LO	41	-	5	22	57	J

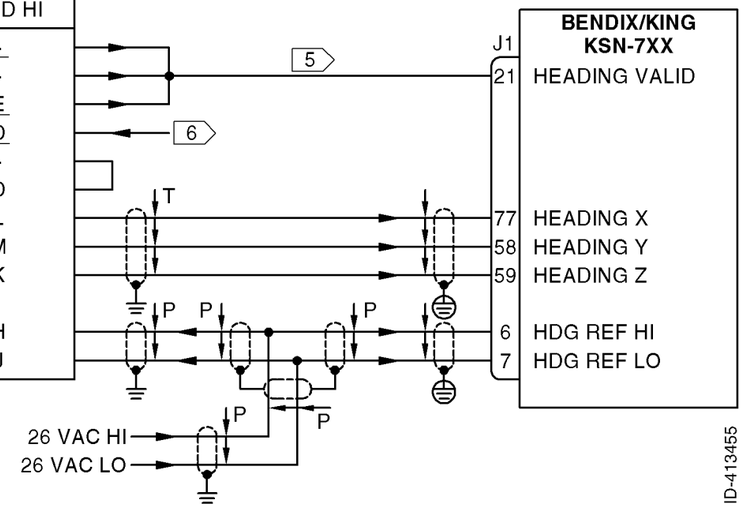

Figure 3-7. Heading Interface - XYZ Interconnect Diagram (Sheet 2 of 2)

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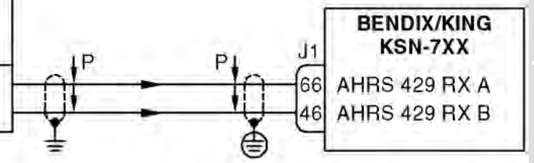
AHRS	BENDIX/KING KAH 460	COLLINS AHC 85	BENDIX/KING KFD 840	BENDIX/KING KSG7200
	AHRS KAU 461 P1B	AHRS AHC-85E P1	PFD P8401	AHRS
IRU/AHRS TRANSMITTER A	26	16	36	45
IRU/AHRS TRANSMITTER B	27	14	56	46



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-8. AHRS Interface Interconnect Diagram (Sheet 1 of 1)

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3.9 Altitude/Airdata/Fuel Interface

3.9.1 Applicable Part Numbers

All part numbers and software revisions perform all Altitude/Airdata/Fuel functions.

3.9.2 Functions

A. Altitude

All part numbers of the Bendix/King KEA 346-08 or above, with MOD 3 incorporated, are compatible as a DC precision baro-corrected altitude or baro-setting source with the KSN 7xx through the Analog BARO CORRECTION HI interface.

All part numbers of the Bendix/King KEA 130A (not including KEA 130) are compatible as a baro setting source with the KSN 7xx through the analog BARO CORRECTION HI interface.

Kollsman-IDC model 519-28702-906 and Smiths model WL 1407/AM/MS 5 or 6 are compatible as a baro setting source with the KSN 7xx through the Analog BARO CORRECTION HI interface.

Kollsman-IDC models PD 44929-935, 28704-495, and 28704-XXX are compatible as a baro setting source with the KSN 7xx through the Analog BARO CORRECTION HI interface.

The KSN 7xx is capable of receiving barometric altitude data from multiple sources. These include (in order of priority):

- ARINC 429/419 digital air data computers (highest priority)
- RS-232 digital air data computers
- Gillham altitude data (lowest priority).

Certain altimeters provide an internal potentiometer that is driven by a baro setting mechanism. The baro setting mechanism can be linear with inches of mercury (kPa) or linear with feet of baro correction. Inches of mercury (kPa) represent the sea level baro metric pressure. The altitude value in feet represents the difference between pressure altitude (gray code altitude) and the baro corrected altitude. The potentiometer must be excited by an external voltage. If two or more devices are monitoring this potentiometer output then only one of them can excite the potentiometer and the other(s) must only monitor the reference input. In some aircraft installations the KSN 7xx will be the only user of the baro setting potentiometer and it will need to supply the excitation. In others, it will share the potentiometer with the flight control system. Some flight control systems must always supply their own excitation. For these systems the KSN 7xx must not supply the excitation but must monitor what the supplied excitation is so that it can divide its value into the value from the potentiometer to determine the potentiometer value.

The DC baro setting reference is configurable as input or output based on whether KSN 7xx is going to provide the excitation voltage or monitor the externally supplied excitation voltage.

Refer to the maintenance pages on how to set the parameters in the configuration module. There are two major types of DC baro setting outputs on encoding altimeters: Baro set linear and altitude correction linear.

(1) Altitude Function - Baro Set Linear

Baro set linear encoding altimeters have a DC output voltage that is linear to the barometric pressure setting (inches of mercury). Encoding altimeter models which use this type of baro correction output include:

519-44929-935 (Kollsman-IDC, used on Cessna 525s)
519-28704-495 (Kollsman-IDC)

(2) Altitude Function - Altitude Correction Linear

Altitude correction linear encoding altimeters have a DC output voltage that is linear to the correction from pressure altitude to indicated altitude. Encoding altimeter models which use this type of baro correction output include:

KEA 346 (Bendix/King)
KEA 130A (Bendix/King)
519-28704-5XX (Kollsman-IDC)

B. Airdata

The -0200 and -0300 part numbers of the B&D 2600 transmit data too slowly to be compatible with the KSN 7xx. These units may be converted to -0600 and -0700 part numbers respectively, which are compatible with the KSN 7xx. All other part numbers of the B&D 2600 are compatible with the KSN 7xx.

All part numbers of the B&D 2601, B&D 2800, and BENDIX/KING KDC -481 are compatible with the KSN 7xx through the ARINC serial airdata interface using ARINC 429.

All part numbers of the Rockwell Collins ADC 81A and ADC 82 are compatible with the KSN 7xx through the ARINC serial airdata interface using ARINC 575-3.

The following models of the Rockwell Collins ADC 80 are compatible with the KSN 7xx through the ARINC serial airdata interface using ARINC 575-3, and transmit all airdata labels:

A	B	C	D	E	-	G	-	I	J
K	L	M	-	-	-	Q			

The following models of the Rockwell Collins ADC 80 are compatible with the KSN 7xx through the ARINC serial airdata interface using ARINC 419 (575-3); however, they only transmit label 210, TRUE AIRSPEED.

-	-	-	-	-	F	-	H	-	-
-	-	-	-	N	-	-			

The KSN 7xx can be configured to receive RS-232 serial air data in one of two different formats:

- Format C-Fuel and Airdata
- Format D-Fuel and Barometric Airdata.

The format of the RS-232 data can be configured in the Maintenance pages.

Barometric altitude information is used for aiding the GPS receiver in acquiring and tracking its position, ensuring the accuracy of RAIM calculations (outside of SBAS coverage),for altitude alerting functions, and for advisory VNAV calculations.

True airspeed is used to compute winds aloft.

C. Fuel Flow

The KSN 7xx may be interfaced to fuel flow systems with a separate fuel flow indicator for enhanced flight planning.

3.9.3 Requirements and Limitations

A. Altitude/Airdata

A source of true airspeed is optional. With an airspeed input, an automatic winds aloft calculation is provided. True airspeed may be entered manually when it is not provided electrically.

A source of barometric altitude is required for GPS installations certified for IFR.

The KSN 7xx accepts analog altitude inputs which utilize DC excitation only. Certain aircraft are wired to excite altimeters with 400 Hz AC, and the KSN 7xx is not compatible with these installations.

The KSN 7xx DC altitude resolution is such that you may see as much as 200 feet (61 meters) of error between the altimeter and the altitude displayed on the KSN 7xx. This performance is acceptable for aiding the GPS receiver, but is marginal if VNAV or altitude alerting are to be used.

Some Airdata computers require up to ten minutes warm-up time. This can result in an ALTITUDE FAIL message on the KSN 7xx during the Airdata warm-up period. Connecting to a gray code altitude source that does not require warm-up will prevent this message as the KSN 7xx will revert to the gray code source until the airdata becomes valid.

B. Fuel Flow

The KSN 7xx receives fuel flow information from external equipment over the AIRDATA/FUEL/HDG 232 RX bus. It can receive one fuel flow from each of up to two engines.

3.9.4 Electrical Characteristics

A. Gillham Altitude

Gillham Altitude Input

J2-13	D4
J2-34	A1
J2-35	A2
J2-49	A4
J2-17	B1
J2-54	B2
J2-53	B4
J2-45	C1
J2-18	C2
J2-31	C4

These inputs are active low, and conform to the requirements of ARINC 575-3, Attachment 5.

HI:	A voltage of not less than 10.0 volts relative to AC GND or a resistance to AC GND of not less than 100 kilohms.
LO:	A voltage of not more than 1.9 volts relative to AC GND or a resistance to AC GND of not more than 375 ohms.

NOTE: Some receivers of the altitude encoder do not have internal isolation diodes to prevent the unit from pulling the encoder lines to GND when the unit is OFF. The KSN 7xx has diodes internal to the unit. However, some transponders and other devices do not have the internal diodes. These units require a diode to be added to the installation harness for every encoder line. The diodes are inserted at the connection to the unit that does not have internal diodes. The anode is on the receiving unit's side and the cathode is on the encoder side. A set of diodes is required for each unit without internal diodes.

B. Analog Baro Correction

J2-8	BARO CORRECTION HI
J2-28	BARO CORRECTION LO

These pins are configured on the maintenance pages for input of either DC altitude or DC barometric correction. This is an altimeter potentiometer voltage. The most positive lead of the potentiometer must be connected to BARO CORRECTION HI (i.e. if the potentiometer is excited with a negative voltage, the lead with the negative voltage must be connected to BARO CORRECTION LO).

If the BARO CORRECTION inputs are used for baro correction, the maintenance page must be configured properly. Some altimeters output a baro correction voltage that is linear with inches of mercury barometric pressure. Others output a voltage that is linear with the altitude correction between pressure altitude and indicated altitude. Refer the installation manual for the piece of equipment being connected for more information.

Maximum differential input voltage: 21 volts
Maximum voltage to GND (each side): 13.5 volts
Input impedance: 420 kilohms

J2-48 AIRDATA REFERENCE HI
J2-67 AIRDATA REFERENCE LO

These pins always read the voltage used to excite an altimeter's potentiometer. If no other source in the aircraft is exciting the potentiometer, the KSN 7xx may be configured to excite the potentiometer through these pins. If this is the case, the following apply:

AIRDATA REFERENCE HI is +9.0 volts referenced to AIRDATA REFERENCE LO.

Maximum differential input voltage: 21 volts
Maximum voltage to GND (each side): 13.5 volts
Input impedance: 420 kilohms
Minimum output load impedance: 2 kilohms

NOTE: Although current limiting is provided internal to the KSN 7xx, damage could occur if the KSN 7xx is configured to excite the potentiometer at the same time another source is exciting it. In addition, the analog airdata interface will not function properly in this case.

C. ARINC Serial Airdata Input

J2-46 BARO ALT 429 A
J2-65 BARO ALT 429 B

This input is for high speed ARINC 429. Low speed ARINC 429 must not be connected to this input.

If the airdata source broadcasts a label used by the KSN 7xx with the SSM set to failure warning, then the ARINC 429 AIRDATA FAIL message will appear. An example of this is when the BENDIX/KING KDC 481 airdata computer broadcasts TAS with the SSM set to failure warning upon its determination that the temperature probe is not connected.

A system may have many more labels than those listed. Selection of ARINC 429 or ARINC 419 is done in the maintenance pages.

All versions of the KSN 7xx accept the following ARINC 429 serial airdata labels as shown in Table 3-9.

Table 3-9. ARINC 429 Serial Airdata Labels

429 Label	Parameter
203	Altitude (1013.25 mB)
204	Barometer corrected altitude #1
205	MACH (reserved for growth)
206	Computed airspeed
210	True airspeed

Table 3-9. ARINC 429 Serial Airdata Labels

429 Label	Parameter
211	Total air temperature
212	Altitude rate
213	Static air temperature

All versions of the KSN 7xx accept the following ARINC 419 (575-3) serial airdata labels shown in Table 3-10.

Table 3-10. ARINC 429 Serial Airdata Labels

429 Label	Parameter
203	Altitude (1013.25 mB)
204	Barometer corrected altitude #1
205	MACH
210	True airspeed
211	Total air temperature
213	Static air temperature

D. RS 232 Serial Airdata Input

J1-61 AIRDATA/FUEL/HDG 232 RX

This signal is referenced to AC GND. It is an EIA RS-232 format serial bus. All versions of the KSN 7xx will receive RS 232 Airdata in either "Format C" or "Format D".

When PRESSURE ALTITUDE, BAROMETRIC SETTING, and BARO-CORRECTED ALTITUDE are all available, pressure altitude and baro-corrected altitude are used to calculate the baro setting displayed on the KSN 7xx (rather than the KSN 7xx displaying the RS 232 BAROMETRIC SETTING).

E. Outside Air Temperature (OAT) Input (Growth)

J2-69 OAT+
J2-68 OAT–

The OAT probe is used to correct internal TAWS altitude.

The KSN 7xx is capable of interfacing directly to a standard 500-ohm temperature probe for aircraft operated in cold environments. Very cold air temperatures cause an increase in the density of the air mass and can result in barometric altimeter errors, both in sensitive altimeters/encoders and blind encoders. Aircraft normally operated in very cold climates can benefit from the addition of an OAT probe interfaced to the KSN 7xx

The Bendix/King OAT temp probe Kit is PN 050-03610-0002.

3.9.5 Interconnect Diagrams

A. Altitude Interface

Refer to Figure 3-9 for the altitude interface interconnect diagram.

B. Airdata/OAT Interface

Refer to Figure 3-10 for the airdata/OAT interface interconnect diagram.

C. Fuel Flow/Airdata Interface

Refer to Figure 3-11 for the fuel flow/airdata interface interconnect diagram.

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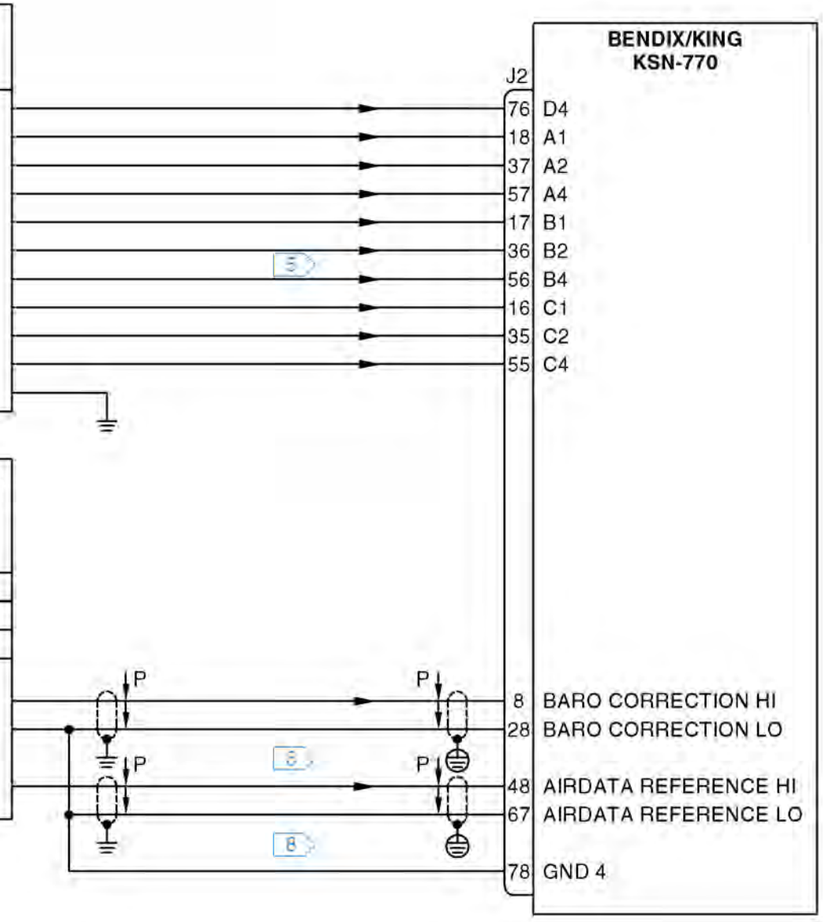
GRAY CODE (GILLHAM) ALTITUDE	BENDIX/KING KEA 127/129 P1	BENDIX/KING KEA 130/A P1	BENDIX/KING KEA 346 P1	KOLLSMAN-IDC 519-28704-XXX P1	KOLLSMAN-IDC 519-44929-935 P1
D4	1	1	A	A	L
A1	2	2	B	B	K
A2	3	3	C	C	J
A4	4	4	M	M	H
B1	5	5	N	N	G
B2	9	9	P	P	F
B4	10	10	D	D	E
C1	11	11	L	L	D
C2	13	13	U	U	C
C4	12	12	V	V	B
SIGNAL COMMON	6	6	R	R	A

BARO SETTING	BENDIX/KING KEA 1330A P2	BENDIX/KING KEA 346 P3461	KOLLSMAN-IDC 519-28704-495 (EXCEPT -495) P1	KOLLSMAN-IDC 519-28704-495 (EXCEPT -495) P1	KOLLSMAN-IDC 519-44929-935 P1
BARO CORRECTION SETTING CONFIG	FT	FT	INHG	FT	INHG
SCALE FACTOR CONFIG	+03,564	+03,564	-3.379	-10,308	-2.993
OFFSET CONFIG	-02,073	-02,073	+31.365	+01,546	+31.019
BARO POT OUTPUT	B	Y	E	E	V
BARO POT COMMON	C	Z	F	F	U
BARO POT EXCITATION	A	S	D	D	W



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.
5. Some receivers of the altitude encoder do not have internal isolation diodes to prevent the unit from pulling the encoder lines to ground when the unit is off.
   Some transponders and other devices do not have the internal diodes. These units require a diode to be added to the installation harness for every encoder line.
   The diodes are inserted at the connection to the unit that does not have internal diodes. The anode is on the receiving units side and the cathode is on the encoder side.
   A 1N4007, (Honeywell PN 007-06048-0000) meets HIRF and lightning requirements. A set of diodes is required for each unit without internal diodes. The KSN 770 has internal diodes.
6. The KSN 770 configuration must be set correctly for barometer setting, whether the KSN 770 excites or only monitors the excitation, linear with inches of mercury or linear with feet of altitude correction.
7. The KSN 770 is not compatible with altimeters that are excited with AC (400 Hz) voltage.
8. If the KSN 770 is configured to supply a +9-volt reference to the altimeter, the LO side of the barometer POT or altitude POT must be grounded.

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Figure 3-9. Altitude Interface Interconnect Diagram (Sheet 1 of 1)

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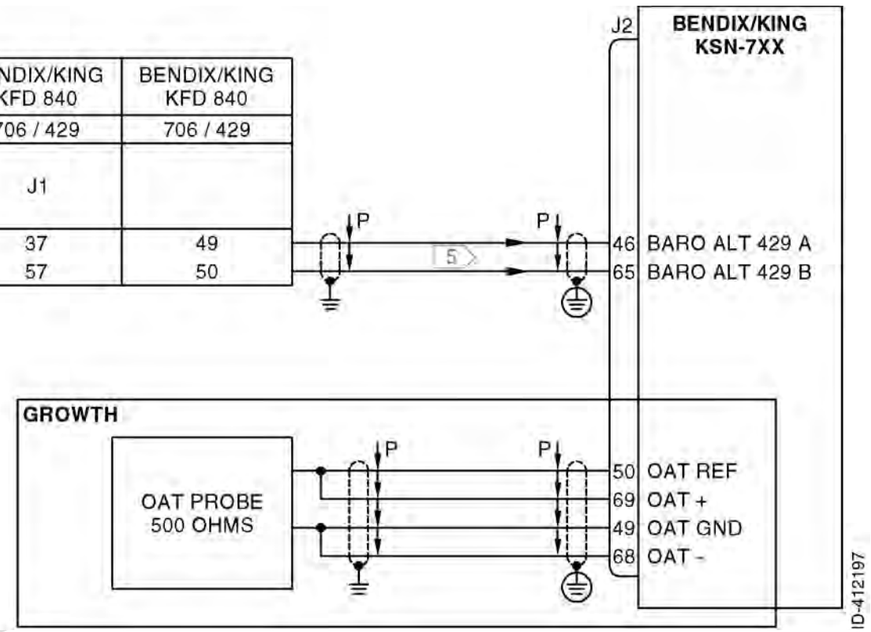
AIR DATA COMPUTER	B AND D 2600	B AND D 2601	B AND D 2800	B AND D 9004	BENDIX/KING KAD 280	BENDIX/KING KAD 280	COLLINS ADS 80/81A/82A	BENDIX/KING KFD 840	BENDIX/KING KFD 840
ARINC ADS TYPE	706 / 429	706 / 429	706 / 429	706 / 429	706 / 429	706 / 429	575 / 419	706 / 429	706 / 429
			P201		KDC 281 P2811	KDC 481 P4811	ADC 81/81A/82A P3	J1	
TRANSMITTER A	6	14	11	27	5	U	36	37	49
TRANSMITTER B	8	13	28	9	6	I	35	57	50



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.
5. The KSN 7xx airdata receiver configuration must be set correctly for ARINC 575/419 or ARINC 706/429 for proper operation.

Figure 3-10. Airdata/OAT Interface Interconnect Diagram (Sheet 1 of 1)

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NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.
5. GPS flight plan 232 TX can drive seveal inputs. Only one transmitter can be connected to airdata/fuel/HDG 232 RX at a time.
6. RS-232 receivers may not be used as the primary flight display for the KSN770.

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Figure 3-11. Fuel Flow/Airdata Interface Interconnect Diagram (Sheet 1 of 2)

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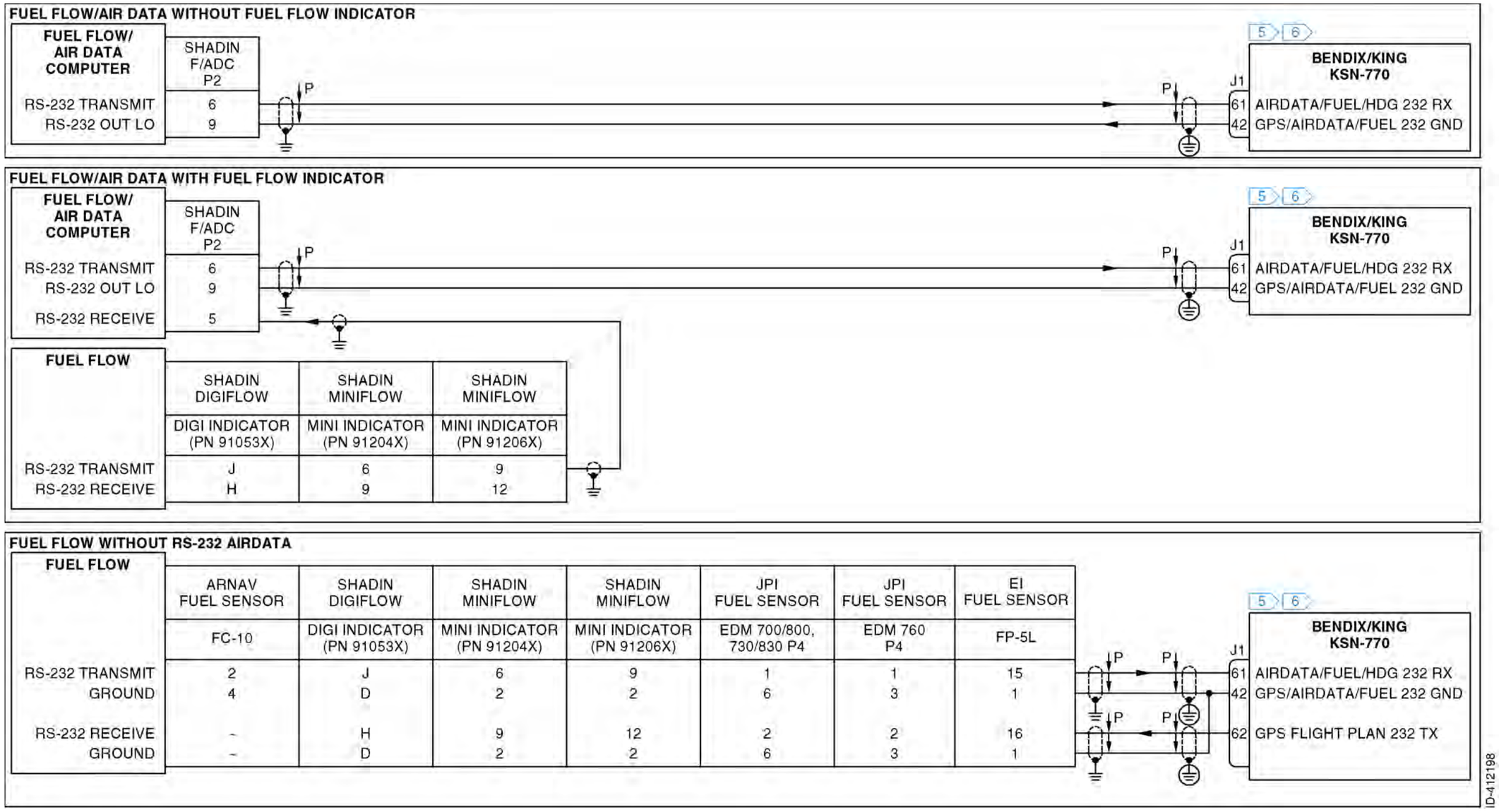

Figure 3-11. Fuel Flow/Airdata Interface Interconnect Diagram (Sheet 2 of 2)

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3.10 Flight Control Interface

3.10.1 Applicable Part Numbers

All part numbers and software revisions perform all flight control functions.

3.10.2 Function

A. GPS

Three different interface methods exist to couple the KSN 7xx GPS function to an automatic flight control system. For lateral guidance, roll composite steering is provided which conforms to the ARINC 561 format for enroute/terminal use and has increased authority for approach arm and approach active modes. It is provide in ARINC 429, and an analog AC or DC command. If roll steering is not supported with the autopilot, analog course datum and D-bar signals may be used with or obtained from an HSI or NAV indicator connected to the KSN 7xx. For SBAS approaches ILS type vertical and lateral commands are generated in both analog deviations and ARINC 429 formats.

B. VHF NAV (KSN 7x0 Only)

For VHF NAV guidance based operation, LOC/VOR/GS outputs are provided in analog deviation/OBS resolver, an analog composite NAV output, and a dedicated ARINC 429 bus. A built in VHF NAV/GPS switching function for the analog deviations (lateral and vertical) outputs is incorporated internally, so that external switching is not required in the aircraft between GPS and VHF NAV sources.

An ARINC 429 interface facilitates connection with numerous flight control systems.

3.10.3 Requirements and Limitations

A. ARINC 429

All part numbers of the Bendix/King KFC 400 are compatible with the KSN 7xx.

The following part numbers of the KFC 275 and KFC 325 are compatible with the KSN 7xx ARINC 429 roll steering through the Bendix/King EFIS 40/50 when the KSN 7xx is installed for IFR non-precision approaches:

KCP 220 065-0064-

	01				05	06	07	08	
					15	-			
-									

The following part numbers of the Bendix/King KFC 275 and KFC 325 flight control systems are compatible with the KSN 7xx ARINC 429 roll steering through the Bendix/King EFIS 40/50 when the KSN 7xx is not installed for IFR non-precision approaches:

KCP 220 065-0064-

	01				05	06	07	08	
					15	16			
20									

B. Roll Composite Steering

All part numbers of the Rockwell Collins APS 65, and Bendix/King KFC 275 and KFC 325 are compatible with the KSN 7xx.

The following part numbers of the Bendix/King KFC 275 and KFC 325 flight control systems are compatible with the KSN 7xx roll composite steering when the KSN 7xx is installed for IFR non-precision approaches:

KCP 220 065-0064-

	01				05	06	07	08	
					15	-			
-									

The following part numbers of the Bendix/King KFC 275 and KFC 325 flight control systems are compatible with the KSN 7xx roll composite steering when the KSN 7xx is not installed for IFR non-precision approaches:

KCP 220 065-0064-

	01				05	06	07	08	
					15	16			
20									

KSN 7xx interface to a flight control system is optional.

If the KSN 7xx installation is to be certified for GPS/SBAS approaches and the aircraft's flight control system uses course datum and analog deviation signals from the KSN 7xx, then use of the FCS LOCALIZER ENGAGE signal is strongly recommended. This KSN 7xx output is active when the KSN 7xx is in approach active mode and when the pilot manually sets the CDI scale to 0.3 nm, and is equivalent in function to an ILS energize signal in that it indicates approach autopilot gain scheduling is required.

For enroute/terminal operations, roll composite steering is the preferred method of coupling to a flight control system. If flight control coupling is made using course datum and D-bar and the KSN 7xx cannot drive the course selector and the pilot will need to make manual course adjustments encountered in the flight plan. For the roll steering to function on the KSN 7xx a heading source must be connected to the KSN 7xx.

The pilot must be made aware of the problems that can occur if the course selector is not manually updated as with simple course deviation indicators and HSIs without remote course select. The flight control system will be able to remain on course (CDI centered) if the combination of both the selected course error and the current cross-wind correction does not exceed the autopilot's cross-wind correction authority which is typically 30 degrees. Once the cross-wind correction authority limit of the autopilot has been reached the autopilot will begin to fly the CDI with a constant offset.

The size of the offset is proportional to the degree which the authority limit has been exceeded.

Any bank angle limiting of less than 25 degrees within the flight control system will cause overshooting of the waypoint due to the KSN 7xx turn anticipation algorithm assuming a 25 degrees bank angle turn.

FCS LOCALIZER ENGAGE is used to make an interfaced flight control system track more appropriately when the KSN 7xx is in approach active mode. Hookup is required if autopilot-coupled GPS approaches will be flown using course datum and D-bar from the KSN 7xx.

For the roll steering to function on the KSN 7xx an ARINC 429 or XYZ heading source must be connected to the KSN 7xx.

NOTE: In the cases of the following ports, unused pins must be configured as "NONE" or "N" on the maintenance pages for proper operation. Open pins configured as being used will flag data and may generate failure messages:

3.10.4 Electrical Characteristics

A. ARINC Output

J1-71 GPS GAMA 429 TX A
J1-51 GPS GAMA 429 TX B

This output is shared with the ARINC position interface. Refer to Paragraph 3.4.4 Electrical Characteristics for details.

Flight computer information is broadcast on this bus. The roll steering output is groundspeed scheduled. If there is no GPS groundspeed, 0 degree will be commanded by label 121, roll steering command. Post-installation checkout is facilitated by data output during self-test.

While the self-test page is displayed on the KSN 7xx, label 121 goes through the following cycle continuously:

NOTE: The output is 0 degree for 6 seconds, then ramps up to 5 degrees at 1 degree/sec. The output is then stable at 5 degrees for 6 seconds. The output then ramps down to 0 degree at 1 degree/sec.

B. 26 VAC Reference Input

J2-30 ROLL STEER REF HI (26 VAC REFERENCE)
J2-29 ROLL STEER REF LO

The KSN 7xx ROLL STEER REF HI input is a 26 VAC signal and is used to provide a phase reference for the KSN 7xx steering output. This signal is independent of the 26 VAC phasing signal used for the indicator interface.

Input impedance is no less than 10 kilohms.

C. Roll Steering Command Output

J2-10 ROLL STEER+
J2-9 ROLL STEER–

Based on the configuration module, the KSN 7xx will output either a commanded bank angle or a commanded turn rate. This output is groundspeed scheduled. If there is no GPS groundspeed, 0 degree will be commanded.

(1) Commanded Bank Angle (DC)

Scale:	550 mV/degree (of bank).
Accuracy:	Less than the greater of 0.3 degree or 5% of the commanded bank angle.
Voltage Range:	±13.75 VDC
Resolution:	0.125 degree or more
Update Rate:	10 Hz or greater
Polarity:	Angles between 0 and 180 degrees (commanding a right turn) are positive angles between 180 and 360 degrees (commanding a left turn) are negative.

(2) Commanded Turn Rate (DC)

Scale:	2V/degree per second (positive right turn)
Accuracy:	No worse than 5% of the full scale: 0.3 dps, or 600 mV
Voltage Range:	±13.75 VDC
Resolution:	0.05 degree per second, or 92 mV
Update Rate:	10 Hz or greater
Polarity:	Angles between 0 and 180 degrees (commanding a right turn) are positive angles between 180 and 360 degrees (commanding a left turn) are negative.

D. Steering Superflag Output

J2-59 ROLL STEER VALID

Valid:	HI (≥ +18.0 VDC when 18 to 33 volts AC POWER >24.8 volts. ≥+10 VDC when 18 to 33 volts AC POWER >12.4 volts); maximum current 250 mA.
Invalid:	LO (No more than +3.5 VDC)

E. GPS/LOC Approach Output

J2-22 GPS/LOC APPROACH

This is an open collector output. When active, the output device is turned on and conducting which provides a GND path for a load such as a lamp or relay which is pulled up to a maximum voltage of +38 VDC.

Connection of this output is not required when roll steering is used. No localizer output from any unit must be connected directly to the flight control system. The GPS/NAV relay, or other relays, must insure that only the navigation source that is driving the flight control system is driving the localizer energize input. In addition, the KSN 7xx GPS/LOC APPROACH logic must not drive the localizer energize input on an RMI or HSI as this could park the RMI pointer or remove the TO/FROM indicator when the KSN 7xx is in approach active mode.

F. Remote Go Around Input

J2-72 REMOTE GO AROUND (Growth)

This input is normally OPEN and is activated with a momentary LOW.

G. GPS Steering Select Output

J2-77 GPS STEERING SELECT

This is a high current discrete output. This output may be used by a flight control system to activate the flying of roll steering commands during the enroute portion of the flight.

3.10.5 Interconnect Diagram

A. Roll Composite Steering

Refer to Figure 3-12 for the flight control interface - roll composite steering interconnect diagram.

B. Deviation/Course Datum

Refer to Figure 3-13 for the flight control interface - deviation/course datum interconnect diagram.

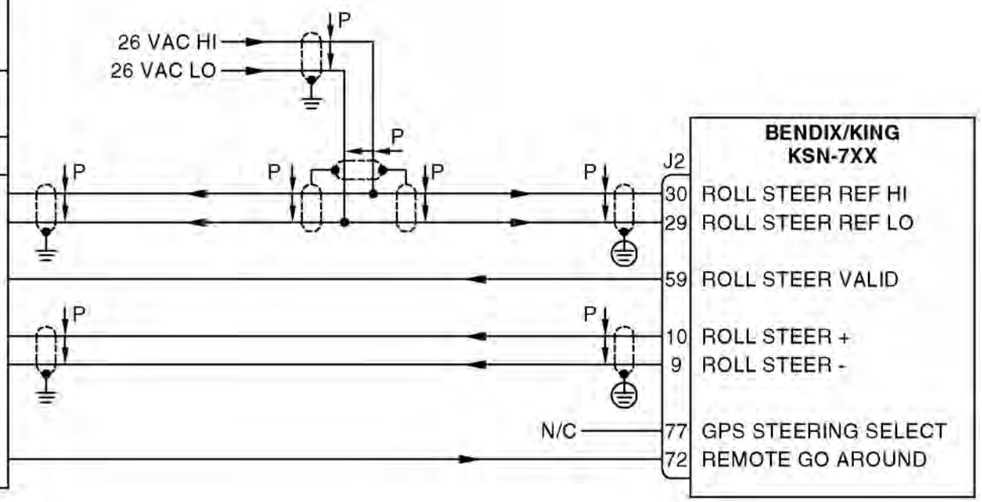
C. DC

Refer to Figure 3-14 for the flight control interface - DC interconnect diagram.

D. ARINC 429

Refer to Figure 3-15 for the flight control interface - ARINC 429 interconnect diagram.

ROLL COMPOSITE STEERING FLIGHT CONTROL SYSTEM	BENDIX/KING KFC 275/325 -14 AND BELOW				COLLINS APS 65			
	KC 220 P2201	KC 220 P2203	KMC 221 P2211	KMC 221 P2211	APC 65 P1	APC 65 P2	APC 65 P3	FCP 65 P1
ROLL STEER TYPE	AC ROLL STEERING				AC ROLL STEERING			
26 VAC REF HI	-	23	-	-	-	-	41	-
26 VAC REF LO	-	24	-	-	-	-	32	-
STEERING VALID	35	-	-	-	24	-	-	-
ROLL STEERING HI	-	30	-	-	-	-	32	-
ROLL STEERING LO	-	50	-	-	-	-	36	-
GO AROUND	-	-	4	4	-	-	-	22



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

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Figure 3-12. Flight Control Interface - Roll Composite Steering Interconnect Diagram (Sheet 1 of 1)

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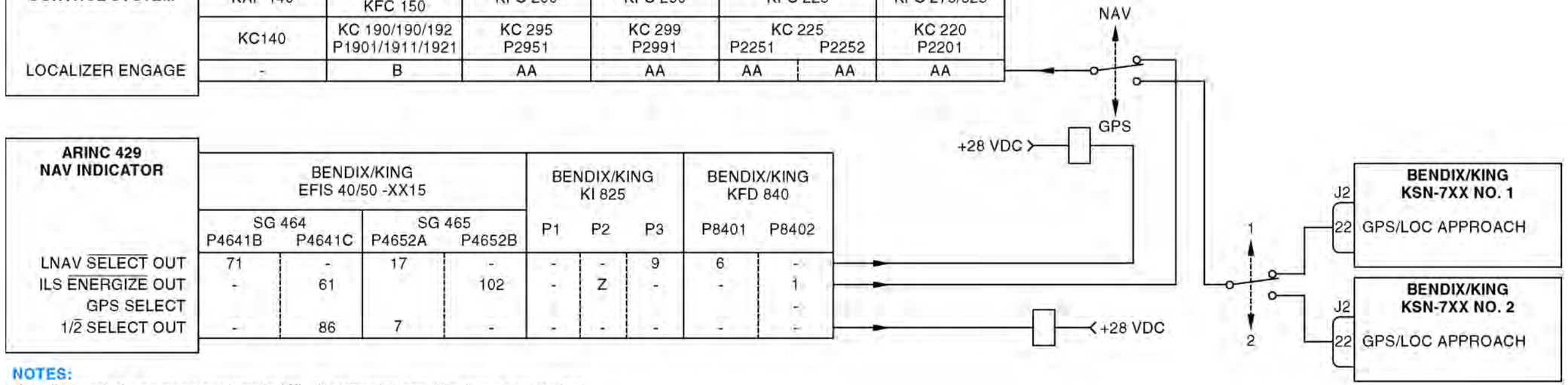
DEVIATION/COURSE DAUTM FLIGHT CONTROL SYSTEM	BENDIX/KING KAP 140	BENDIX/KING KAP 100/150 KFC 150	BENDIX/KING KFC 200	BENDIX/KING KFC 250	BENDIX/KING KFC 225		BENDIX/KING KFC 225		
	KC 140	KC 190/191/192 P1901/1911/1921	KC 295 P2951	KC 299 P2991	KC 299 P2251	P2252	KC 220 P2201	KMC 221 P2211	KMC 321 P3211
LOCALIZER ENGAGE	-	B	AA	AA	AA	AA	22	-	-
GO AROUND	-	-	L	L	L	L	4	4	4

DEVIATION/COURSE DAUTM FLIGHT CONTROL SYSTEM	BENDIX/KING KAP 140	BENDIX/KING KAP 100/150 KFC 150	BENDIX/KING KFC 200	BENDIX/KING KFC 250	BENDIX/KING KFC 225		BENDIX/KING KFC 275/325
	KC140	KC 190/190/192 P1901/1911/1921	KC 295 P2951	KC 299 P2991	KC 225 P2251	P2252	KC 220 P2201
LOCALIZER ENGAGE	-	B	AA	AA	AA	AA	AA

ARINC 429 NAV INDICATOR	BENDIX/KING EFIS 40/50 -XX15				BENDIX/KING KI 825			BENDIX/KING KFD 840	
	SG 464 P4641B	P4641C	SG 465 P4652A	P4652B	P1	P2	P3	P8401	P8402
LNAV SELECT OUT	71	-	17	-	-	-	9	6	-
ILS ENERGIZE OUT	-	61		102	-	Z	-	-	1
GPS SELECT									-
1/2 SELECT OUT	-	86	7	-	-	-	-	-	-



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.

Figure 3-13. Flight Control Interface - Deviation/Course Datum Interconnect Diagram (Sheet 1 of 1)

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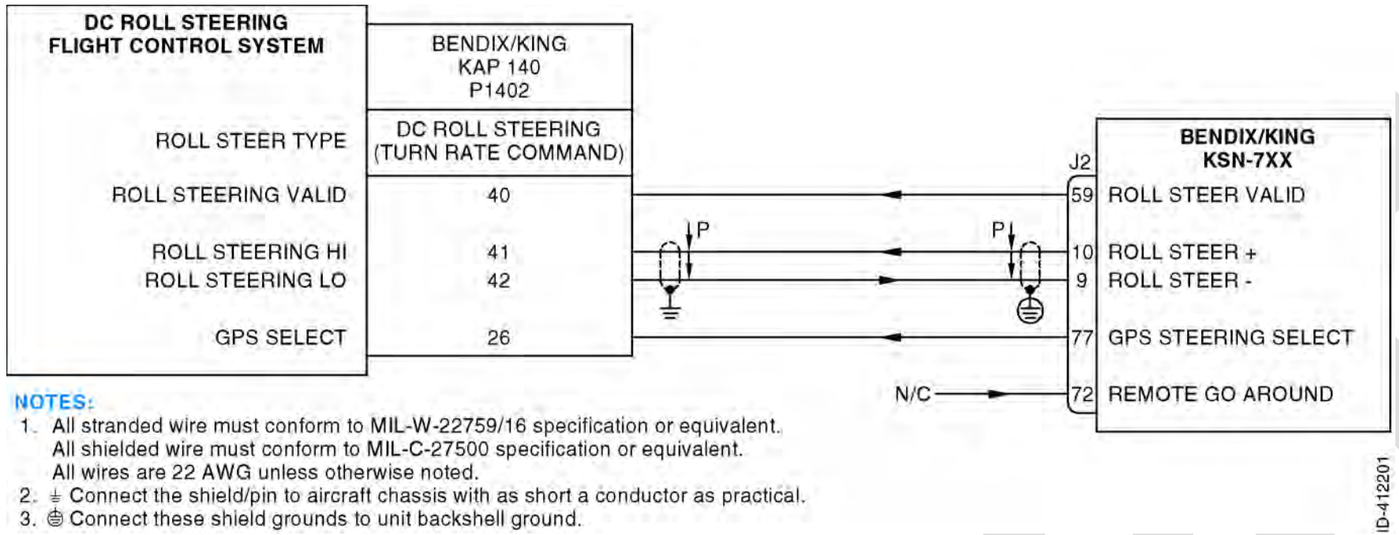

NOTES:
1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-14. Flight Control Interface - DC Interconnect Diagram (Sheet 1 of 1)

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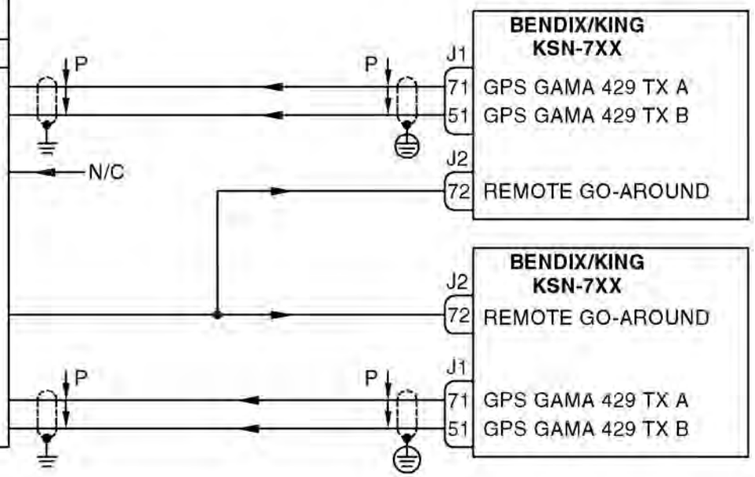
ARINC 429 FLIGHT CONTROL SYSTEM	BENDIX/KING KFC 275/325 -14 AND BELOW				BENDIX/KING KFC 225		BENDIX/KING KFC 275/325 -15 AND ABOVE		
	KCP 420 P4201	KCP 420 P4202	KMS 446 P4461	KMS 446 P4461	P2251	P2252	KCP 220 P2203	KMC 221 P2211	KMC 321 P3211
ROLL STEER TYPE	N/A				N/A		N/A		
LNAV 1 RECEIVER A	X	-	-	-	46	-	39	-	-
LNAV 1 RECEIVER B	-	-	-	-	47	-	45	-	-
ROLL STEERING STRAP	X	J	-	-	-	-	-	-	-
GO AROUND	-	-	L	8	-	38	-	4	4
LNAV 2 RECEIVER A	-	W	-	-	-	-	-	-	-
LNAV 2 RECEIVER B	-	F	-	-	-	-	-	-	-



NOTES:
1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.

ID-412202

Figure 3-15. Flight Control Interface - ARINC 429 Interconnect Diagram (Sheet 1 of 1)

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3.11 DME Interface

3.11.1 Applicable Part Numbers

The KSN 7x0 are DME.

All part numbers and software revisions perform all DME functions.

3.11.2 Function

The SERIAL CLOCK, DATA, SYNC bus may be used to drive distance, groundspeed, and time-to-go indicators. This is a King Serial DME bus only.

King Serial DME allows display of the KSN 7xx distance, groundspeed, and time-to-go on Bendix/King KDI-572 and KDI-574 DME indicators.

The ARINC TRANSMITIER (ARINC 429) bus may be configured for high-speed or low-speed on the Maintenance pages, and contains a large variety of labels that may be used by many different receivers. Transmission of distance, groundspeed, and time-to-go is discussed in this chapter.

3.11.3 Requirements and Limitations

For proper functioning of the King Serial DME indicator interface, a DME receiver (in addition to the KSN 7xx and the indicator) must be connected to the SERIAL CLOCK and SERIAL DATA lines.

When the KSN 7xx is mounted in the aircraft pedestal, some certification agencies (including the FAA) require a distance display in the pilot's scan area for IFR certification. Consult your approval agency for additional information.

The KSN 7xx may display distance, groundspeed and time-to-station on the KPI-553A, KDI-572, KDI-573 and KDI-574 DME distance displays. The DME in the aircraft continues to supply power to these displays while the KSN 7xx information is displayed. A NAV/GPS annunciator switch and relays can switch the DME display between displaying DME and GPS information (refer to the DME installation documentation for details).

3.11.4 Electrical Characteristics

A. ARINC 429 Transmitter

J1-72 VOR/ILS TX A
J1-52 VOR/ILS TX B

This serial data bus conforms to ARINC 429 electrical characteristics, and may be configured for low-speed on the Maintenance pages. Many ARINC 429 labels are output on the ARINC TRANSMITTER bus. ARINC 429 labels relating to the distance indicator interface are shown in Table 3-11.

Table 3-11. ARINC 429 Label

Label	Parameter	Type
001	Distance to go	BCD
002	Time to go	BCD
012	Groundspeed	BCD
251	Distance to go	Binary
252	Time to go	Binary
312	Groundspeed	Binary

B. King Serial DME Bus

J1-75 SERIAL CLOCK
J1-57 SERIAL DATA
J1-76 DME CHANNEL REQUEST
J1-56 DME COMMON

These connections transmit Bendix/King format serial DME information.

In the King Serial DME configuration, SERIAL SYNC is an input. When the KSN 7xx receives an active-high pulse on SERIAL SYNC, it transmits pulses on the SERIAL CLOCK and SERIAL DATA lines.

3.11.5 Interconnect Diagram

Refer to Figure 3-16 for the DME interface - remote interconnect diagram.

Refer to Figure 3-17 for the DME interface - panel mount interconnect diagram.

Refer to Figure 3-18 for the DME interface - ARINC 429 interconnect diagram.

Draft as of 10/15/2012

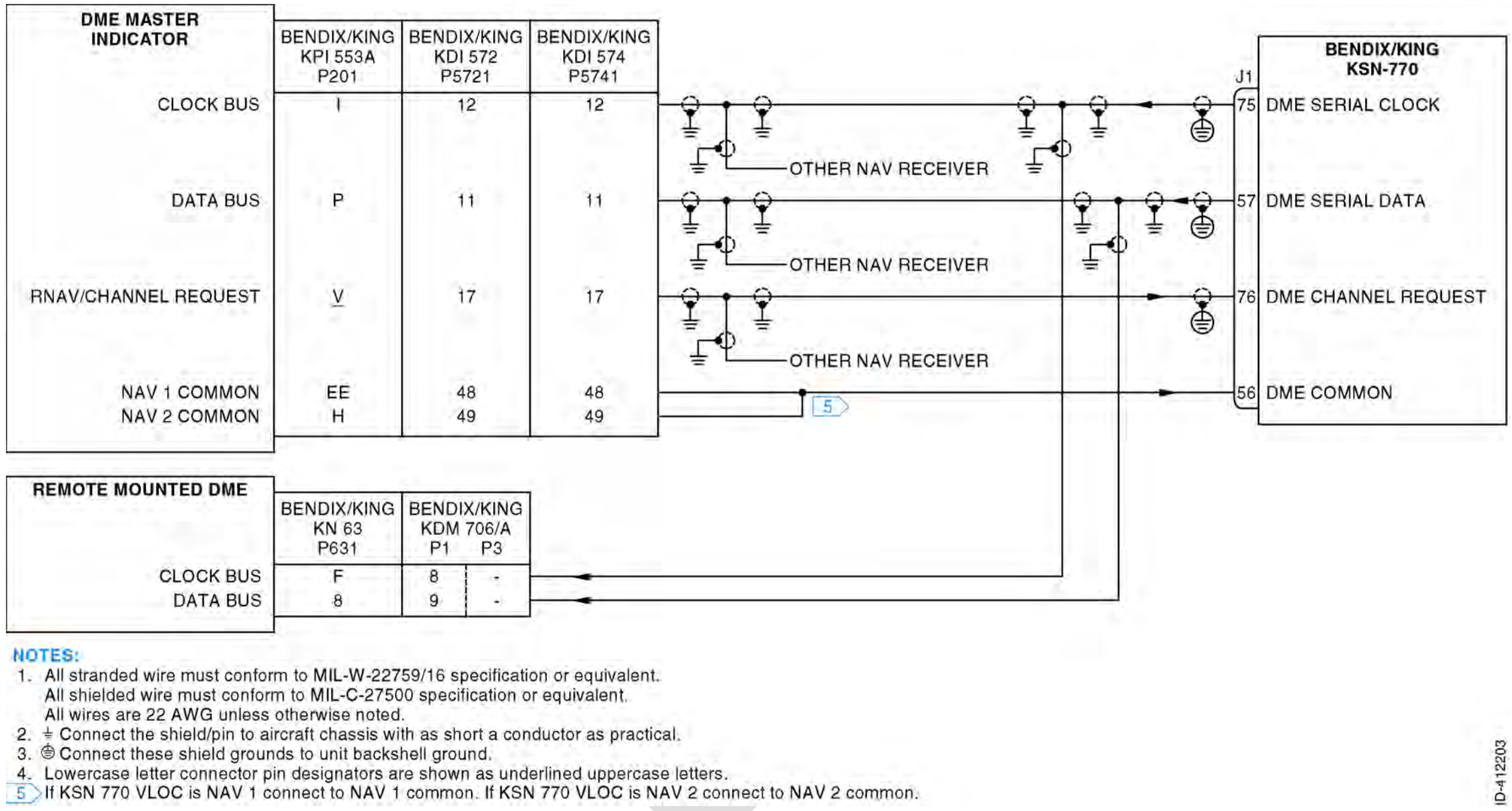

Figure 3-16 & 17 The DME interface cannot work as drawn. It has the RNAV/Channel Request and DME Channel Request confused and shown incorrectly. There is no DME Channel request. There is an RNAV/Channel Request and a DME Request and they are different functions.

Figure 3-16. DME Interface - Remote Interconnect Diagram (Sheet 1 of 1)

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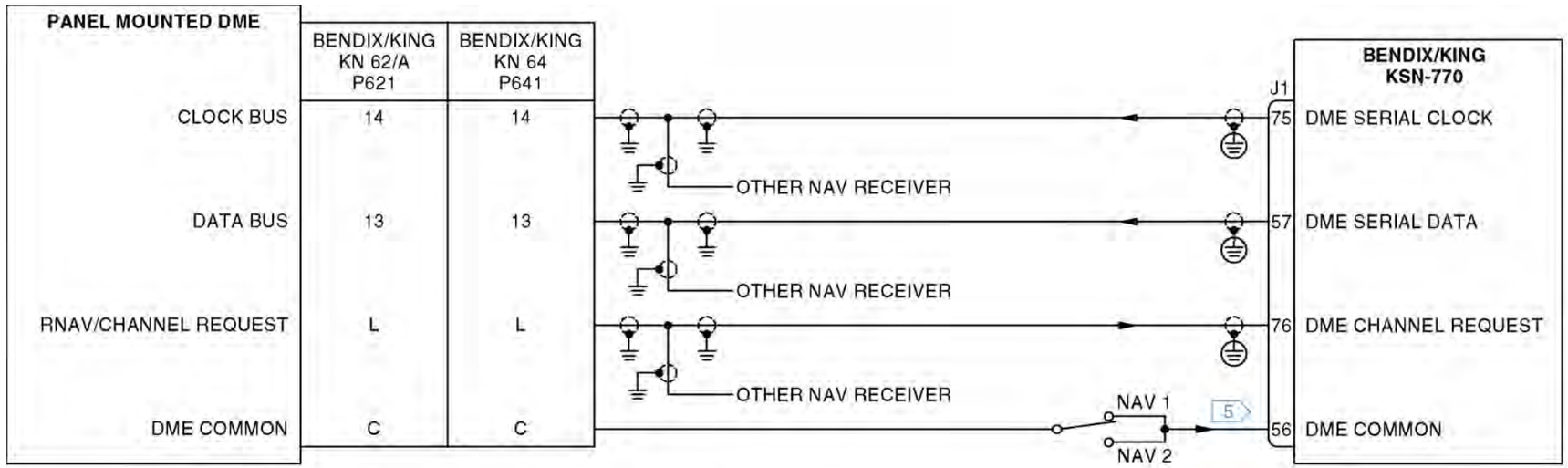

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.
5. If KSN 770 VLOC is NAV 1 connect to NAV 1. If KSN 770 VLOC is NAV 2 connect to NAV 2.

Figure 3-16 & 17 The DME interface cannot work as drawn. It has the RNAV/Channel Request and DME Channel Request confused and shown incorrectly. There is no DME Channel request. There is an RNAV/Channel Request and a DME Request and they are different functions.

Figure 3-17. DME Interface - Panel Mount Interconnect Diagram (Sheet 1 of 1)

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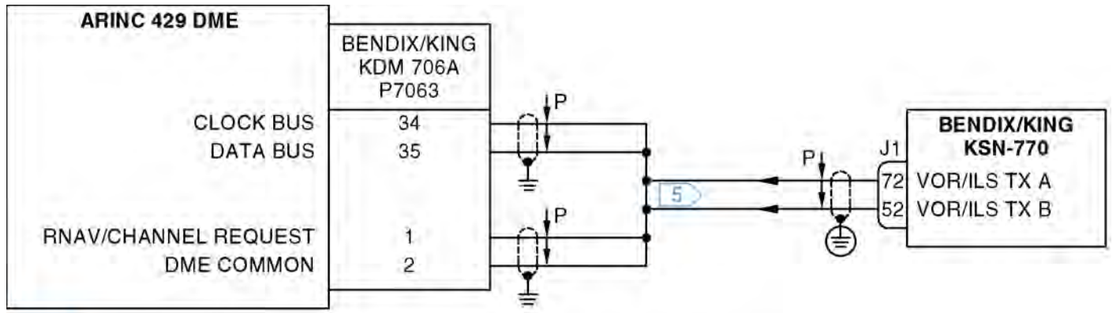

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.
5. If KSN 770 VLOC is NAV 1 connect to NAV 1. If KSN 770 VLOC is NAV 2 connect to NAV 2.

Figure 3-18 cannot work. This is mixture of King Serial and ARINC 429.

Figure 3-18. DME Interface - ARINC 429 Interconnect Diagram (Sheet 1 of 1)

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3.12 NAV Indicator Interface

3.12.1 Applicable Part Numbers

All part numbers and software revisions perform all NAV indicator functions. The comosite indicator interface is only available in KSN 7x0 models.

3.12.2 Function

The NAV indicator displays the lateral deviation from selected course, TO/FROM indications, and NAV flag (both meter level and superflag). In addition, the KSN 7xx includes outputs for vertical deviation, meter flag, and superflag.

The KSN 7xx has the ability to read selected course from the NAV indicator. The selected course is used by the KSN 7xx in both the leg and OBS modes. In OBS mode, the NAV indicator selected course is input as the GPS selected course, eliminating the need for the pilot to select the course on both the indicator and the KSN 7xx. In Leg mode, the KSN 7xx notifies the pilot when there is a discrepancy of 5 degrees or more between the KSN 7xx magnetic desired track and the NAV indicator selected course.

An input called GPS DISPLAYED tells the KSN 7xx whether its navigation information is presently being displayed on the NAV indicator and consequently whether the NAV indicator selected course must be used by the KSN 7xx.

The KSN 7xx provides selected course drive capability for EFIS. Slewable NAV indicators (XYZ or SIN/COS drive) may be driven by the KSN 7xx. When interfaced with nonslewable NAV indicators, the pilot is directed with messages to manually move the course selector to match the selected course displayed on the KSN 7xx.

3.12.3 Requirements and Limitations

IFR certified installations of the KSN 7xx are required to have a NAV indicator installed, and it must be located in the pilot's primary scan area. RS-232 receivers may not be used as the primary flight display for the KSN 7xx.

Selected course may be input as OBS SIN/COS, RS 422, or ARINC 429. Only one of the three possible interfaces can be connected in the aircraft.

GPS DISPLAYED must be connected if the selected course is input as OBS SIN/COS or RS 422.

GPS DISPLAYED is not required if selected course is input as ARINC 429 into the EFIS RECEIVER. In addition, the Maintenance page must be configured for OBS RESOLVER: Y, for the OBS SIN/COS inputs to be used.

KPI 552, KPI 553, and KPI 553A units which interface with Bendix/King KNR-665A or KNR-615 units do not have course selection knobs. Some certification agencies require entry of OBS selected course on the CDI/HSI.

NOTE: In the cases of the following ports, unused pins must be configured as "None" or "N" on the Maintenance pages for proper operation. Open pins configured as being used will flag data and may generate failure messages:

3.12.4 Electrical Characteristics

A. Deviation

J1-29 LATERAL DEVIATION RIGHT
J1-10 LATERAL DEVIATION LEFT
J1-31 VERTICAL DEVIATION UP
J1-12 VERTICAL DEVIATION DOWN

Range:	±300 mVDC.
Load Resistance:	≥200 ohms in parallel with a capacitance of ≤0.01 μF.
Resolution:	<1.5 mV.
Accuracy:	less than the greater of ±4.5 mV or 5% of commanded deviation.
Update Rate:	10 Hz or greater.

D-Bar sensitivity depends on the navigation mode and is indicated in Table 3-12.

Table 3-12. TBD

Mode	D-Bar Sensitivity
En Route	30.0 mVDC/NM
Approach Arm (ARM)	150.0 mVDC/NM
Approach Active (ACTV)	500.0 mVDC/NM

B. Meter Level Flags

J1-28 LATERAL DEV FLAG+
J1-9 LATERAL DEV FLAG–
J1-30 VERTICAL DEV FLAG+
J1-11 VERTICAL DEV FLAG–

Valid:	HI (voltage at FLAG+ is no less than +350 mV and no more than +900 mV with respect to FLAG–).
Invalid:	LO (voltage at FLAG+ is within 50 mV of the voltage at FLAG–). Flag current is 0 ±50 μA.
Load Resistance:	≥200 ohms in parallel with a capacitance of ±3 nF.
Update Rate:	10 Hz or greater.

C. NAV Superflags

J1-13 LATERAL DEVIATION SUPERFLAG
J1-32 VERTICAL DEVIATION SUPERFLAG

Valid:	HI (≥+18.0 VDC when aircraft power >24.8 VDC; (≥+10.0 VDC when aircraft power >12.4 VDC). Maximum current allowed is 250 mA.
Invalid:	LO (No more than +3.5 VDC).
Update Rate:	10 Hz or greater.

D. TO/FROM Flag

J1-27 CDI TO
J1-8 CDI FROM

TO Flag:	+TO is positive with respect to +FROM
FROM Flag:	+FROM is positive with respect to +TO

CDI TO and CDI FROM are within 5 mVDC when LATERAL DEVIATION FLAG is in the invalid state. CDI TO shall be 40 to 900 mV with respect to CDI FROM when the desired course is within ±85 degrees of the bearing to active waypoint. CDI TO must be −100 to −900 mV with respect to CDI FROM when the desired course is 180 ±8.5 degrees with respect to the bearing to the active waypoint.

Range:	+40 to +900 mV with respect to the CDI FROM output when in the TO state. −40 to −900 mV with respect to the CDI FROM output when in the FROM state
Load Resistance:	≥40 ohms in parallel with a capacitance of ≤3 nF.
Accuracy:	Within ±5 mV of the CDI FROM output whenever the NAV FLAG is in the "not valid" (including "OFF state" for LOC) state.
Update Rate:	10 Hz or greater.

E. SIN/COS OBS Input

J1-34 OBS F (SIN HI)
J1-54 OBS D (COS HI)

This is an AC SIN/COS OBS input, indexed at 300 degrees. Nominal input impedance 36.5 kilohms each line. This interface is compatible with indicators that are EZ at 300 degrees and indicators that are ORZ at 300 degrees. This interface will operate properly with either "0.85 gain" or "0.41 gain" resolvers with no special programming requirements.

Input Impedance:	10 kilohms.
Resolution:	≤0.25 degree.
Accuracy:	±1 degree.
Update Rate:	5 Hz.

Refer to the Maintenance pages for the indicator calibration procedure.

F. OBS Excitation Output

J1-14 OBS H (REF HI)
J1-74 OBS C (REF LO)

Amplitude:	Unloaded peak amplitude of ±5.8 volts ±15%.
Wave Form:	400 Hz ±20% sin wave.
Load Resistance:	10 ohms ±10%, or one Bendix/King 148-00043-0000 in parallel with 0.56 μF (±5%).
Current Source:	Minimum of 40 mA to a resistive load terminated at OBS_C.

G. ARINC Selected Course Input

J1-68 EFIS CTRL 429 RX A
J1-48 EFIS CTRL 429 RX B

All serial data conforms to ARINC 429 for electrical characteristics, content and transmission interval.

All versions of the KSN 7xx accept the following ARINC 429 labels as shown in Table 3-13.

Table 3-13. ARINC 429 Labels

Label	Parameter
100	Selected course
306	NAV/WPT/APT latitude
307	NAV/WPT/APT longitude
314	True heading
320	Magnetic heading

H. NAV Composite Interface (KSN 7x0 models only)

J1-60 VOR/LOC COMPOSITE OUT
J1-48 VOR/LOC COMPOSITE OUT REF

This is a standard localizer composite signal containing two tones whose nominal frequencies are 90 Hz and 150 Hz.

Range: 300 to 500 mVRMS. 350 mVRMS into a 47 kilohms load (factory setting).

Accuracy: ±9% of the set point.

Update Rate: 10 Hz.

3.12.5 Interconnect Diagram

A. Deviation and Flags Interface

All part numbers of the Bendix/King models KI 202, KI 206, KI 525A, KPI 552/B, KPI 553/A/B, and IN 863A, Rockwell Collins models HSI 84, 331A-6P and 331A-9G, and Honeywell Sperry models RD 550A and RD 650 are compatible with the KSN 7xx deviation and flags interface.

Refer to Figure 3-21 for the NAV indicator interface - deviation and flag interconnect diagram.

B. OBS Resolver Interface

All part numbers of the Bendix/King models KI 202, KI 206, KI 525A, KPI 552B and IN 863A, Rockwell Collins models HSI 84, 331A-6P and 331A-9G, and Honeywell Sperry models RD 550A and RD 650 are compatible with the KSN 7xx OBS resolver interface.

The following part numbers of Bendix/King KPI 553 and 553B are compatible with the KSN 7xx OBS Resolver interface:

KPI 553 066-3027-

-	-	-	-	-	-	16	17	-	-
-	-	-	-	24	25	-	-	-	-

KPI 553B 066--3069-

The 30 Hz-only part numbers of Bendix/King KPI 552/B and KPI 553/A require a modified interconnection. This interconnection requires the use of a spare winding on the resolver.

Some units may have been produced from the factory with the connections to this winding reversed. These units will not work correctly if connected as shown on the alternate interconnect for the 30 Hz only KPI 552/B and the KPI 553/A. The majority of the units will work properly when wired per the primary drawing, and this interface must be attempted first. No damage will occur to the units in either configuration however, the wrong configuration will result in the KSN 7xx OBS display incrementing when the OBS decrements, and vice versa. The following part numbers are compatible with the KSN 7xx OBS resolver interface:

KPI 552 066-3024-

00	-	02	03	-	05			08	-
10	11	-	13				17	18	19
20									
-		-	-		-			-	
-	-		-				-	-	-
-									

KPI 553 066-3027-

10		12	13	-	15	-	-	18	-
20	21	-	23	-	-	26			

KPI 553A 066-3045-

10	-	12	13	-	15			18	-
20	21	-	23			26			
-		-	-		-			-	
-			-			-			

Refer to Figure 3-19 for the NAV indicator interface - OBS 1 interconnect diagram.

Refer to Figure 3-20 for the NAV indicator interface - OBS 2 interconnect diagram.

C. ARINC 429 NAV Indicator Interface

All part numbers of the Bendix/King model KA 90 are compatible with the KSN 770 ARINC 429 NAV Indicator interface.

The Bendix/King model KA 90, PN 071-01508-0202, with software MOD status 02/02, provides a warning through the KSN 770 if it loses the 400Hz power source.

Bendix/King models SG 464 and SG 465 with software release 11 and above are compatible with the KSN 7xx ARINC 429 NAV Indicator interface when the KSN 7xx is to be used for non-precision approach operations. Symbol generators with software below release 11 will not correctly display the KSN 7xx variable deviation scale factors, but are compatible when the KSN 7xx is not configured for non-precision approach operations.

If two KSN 7xx units are to be interfaced to a single EFIS symbol generator, the SG 464 or SG 465 must have software release 08 or above. The KSN 7xx uses the SDI bits in label 100 SELECTED COURSE to determine which KSN 7xx's selected course must be changed by the EFIS. In addition, the #2 KSN 7xx's SDI configuration must be set to "2" on the maintenance pages for proper EFIS receiver operation.

Refer to Figure 3-22 for the NAV indicator interface - ARINC 429 interconnect diagram.

D. Composite Indicator Interface

Refer to Figure 3-23 for the NAV indicator interface - composite interconnect diagram (KSN 7x0 models only).

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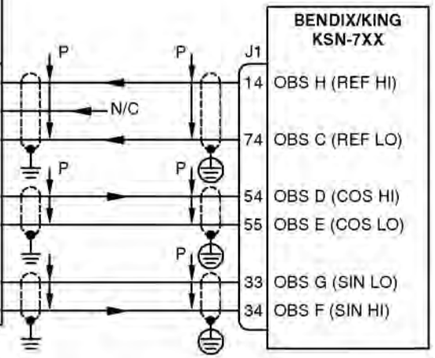
NAV INDICATOR	BENDIX/KING KI 202	BENDIX/KING KI 206	BENDIX/KING KI 525A		BENDIX/KING KPI 552 30/400 HZ COMBO	BENDIX/KING KPI 552 30 HZ ONLY	BENDIX/KING KPI 552 400 HZ ONLY	COLLINS HSI 84	COLLINS 331A-6P	COLLINS 331A-9G		SPERRY RD 550A		SPERRY RD 650A	
	P2021	P2061	P1	P2	P101	P101	P101	P1	P1	P1	P2	P1	P2	P1	P2
OBS A/H	C	C	-	X	W		A	1	1	1	-	DD	-	6	-
OBS B	-	-	-	S	N		-	2	2	2	-	EE	-	7	-
OBS C	Z	Z	-	A	V		V	3	3	3	-	FF	-	8	-
OBS D (COS HI)	L	L	-	V	Z	SEE FIGURE 3-20	Z	4	4	4	-	Z	-	9	-
OBS E (COS LO)	P	P	-	Y	A		A	5	5	5	-	AA	-	10	-
OBS F (SIN LO)	T	T	-	B	Y		Y	6	6	6	-	BB	-	11	-
OBS G (SIN HI)	W	W	-	E	X		Z	7	7	7	-	CC	-	12	-



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NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.

Figure 3-19. NAV Indicator Interface - OBS 1 Interconnect Diagram (Sheet 1 of 1)

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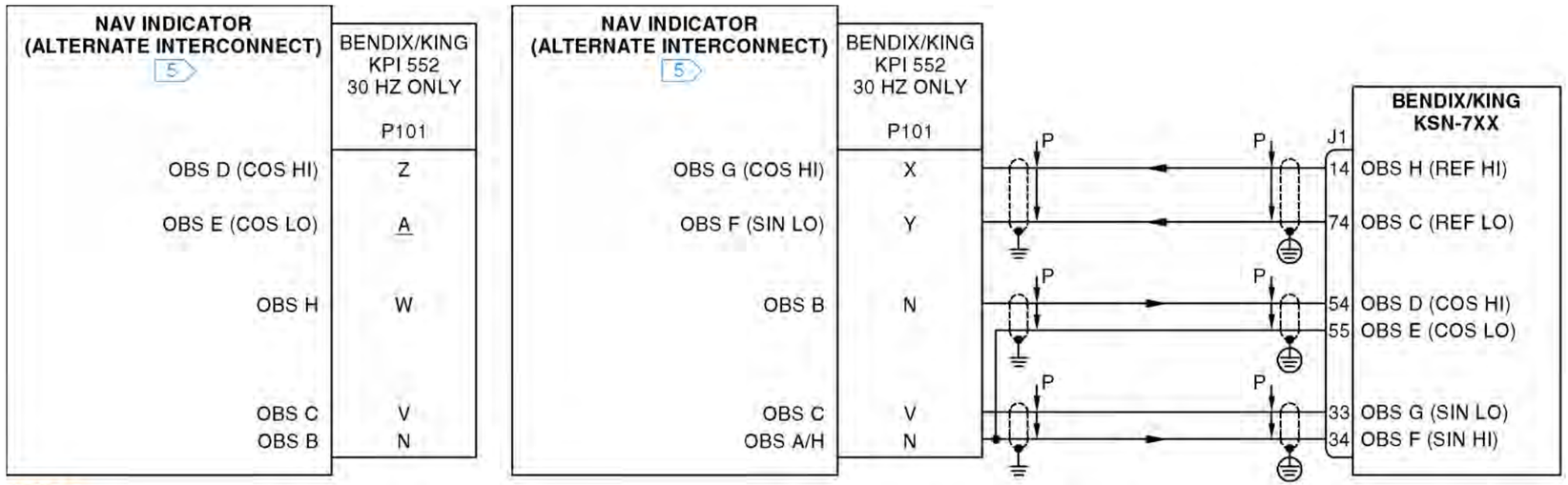

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.
5. Some KPI 552/553 may have left the factory with a resolver winding reversed. The majority of the units will work correctly if wired per the primary interconnect. Use the alternate interconnect if the primary does not work. Use of the wrong interconnect results in the KSN 7xx OBS display incrementing when the indicator OBS decrements and vice versa.

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Figure 3-20. NAV Indicator Interface - OBS 2 Interconnect Diagram (Sheet 1 of 1)

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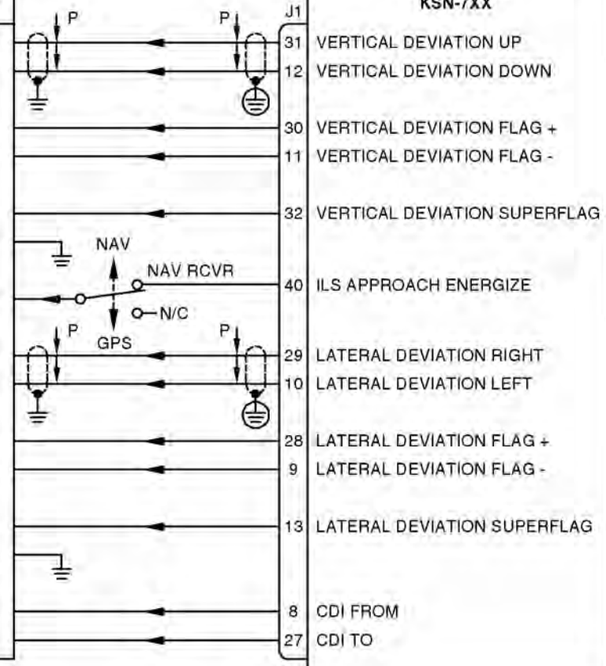
NAV INDICATOR	BENDIX/KING KI 202 P2021	BENDIX/KING KI 206 P2061	BENDIX/KING KI 525A P1	BENDIX/KING KI 525A P2	BENDIX/KING KPI 552/553 P101	BENDIX/KING IN 863A P1	COLLINS HSI 84 P1	COLLINS HSI 84 P2	COLLINS 331A-6P P1	COLLINS 331A-9G P1	COLLINS 331A-9G P2	SPERRY RD 550A P1	SPERRY RD 550A P2	SPERRY RD 650A P1	SPERRY RD 650A P2	BENDIX/KING KSN-7XX J1	BENDIX/KING KSN-7XX
GLIDESLOPE DEVIATION +UP	-	K	-	E	JJ	B	33	–	33	-	5	-	C	–	5	31	VERTICAL DEVIATION UP
GLIDESLOPE DEVIATION +DOWN	-	M	-	B	HH	A	34	–	34	-	6	-	D	-	6	12	VERTICAL DEVIATION DOWN
GLIDESLOPE DEVIATION +FLAG	-	H	-	J	FFF	E	35	–	35	-	-	-	-	-	-	30	VERTICAL DEVIATION FLAG +
GLIDESLOPE DEVIATION -FLAG	-	J	W	-	G G	F	36	–	36	-	-	-	-	-	-	11	VERTICAL DEVIATION FLAG -
GLIDESLOPE SUPERFLAG	-	-	-	-	-	-	-	–	-	-	7	-	U	38	-	32	VERTICAL DEVIATION SUPERFLAG
GLIDESLOPE SUPERFLAG (-)	-	-	-	-	-	-	-	–	-	-	-	-	W	-	8		
LOC ENGAGE	-	-	-	-	5	-	-	44	-	-	-	-	-	-	47	40	ILS APPROACH ENERGIZE
COURSE DEVIATION +R	J	J	B	-	H	W	29	-	28	-	3	-	E	-	3	29	LATERAL DEVIATION RIGHT
COURSE DEVIATION +L	N	N	V	-	I	X	29	-	29	-	4	-	F	-	4	10	LATERAL DEVIATION LEFT
COURSE DEVIATION +FLAG	N	N	K	-	F	C	31	–	31	-	-	-	-	-	-	28	LATERAL DEVIATION FLAG +
COURSE DEVIATION -FLAG	F	F	F	-	G	D-	32	-	32	-	-	-	-	-	-	9	LATERAL DEVIATION FLAG -
NAV SUPERFLAG	-	-	-	-	-	-	-	–	-	-	37	-	P	39	-	13	LATERAL DEVIATION SUPERFLAG
NAV SUPERFLAG (-)	-	-	-	-	-	-	-	–	-	-	38	-	S	-	36		
+ FROM	S	S	T	-	K	Z	27	-	27	-	2	-	B	-	2	8	CDI FROM
+ TO	E	E	Z	-	Z	Y	26	-	26	-	1	-	A	-	1	27	CDI TO



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.
5. A relay is not required for the LOC engage connection to the indicator as this pin does not have a course deviation function; it is used to park the RMI needle.

ID-412208

Figure 3-21. NAV Indicator Interface - Deviation and Flag Interconnect Diagram (Sheet 1 of 1)

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NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. The No. 2 KSN 7xx SDI configuration must be set to "2" for proper EFIS receiver operation.

ID-413457

Figure 3-22. NAV Indicator Interface - ARINC 429 Interconnect Diagram (Sheet 1 of 2)

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ARINC 429 NAV INDICATOR NO. 1	BENDIX/KING EFIS 40/50				BENDIX/KING KA 90	BENDIX/KING KI 825		BENDIX/KING KFD 840
	SG 464 P4641B	SG 464 P4641C	SG 465 P4652A	SG 465 P4652B	P901	P2	P3	J1
NAV 1 RECEIVER A	4	-	16	-	-	C	-	42
NAV 1 RECEIVER B	30	-	29	-	-	R	-	62
NAV 2 RECEIVER A	-	104	-	38	-	-	11	21
NAV 2 RECEIVER B	-	63	-	25	-	-	13	22
LNAV TRANSMITTER A	-	56	-	47	18	-	27	38
LNAV TRANSMITTER B	-	83	-	20	19	-	26	56
LNAV 1 RECEIVER A	15	-	67	-	14	-	29	40
LNAV 1 RECEIVER B	14	-	53	-	15	-	28	60
LNAV 2 RECEIVER A	-	105	-	64	-	-	2	41
LNAV 2 RECEIVER B	-	65	-	63	-	-	1	61

ARINC 429 NAV INDICATOR NO. 2	BENDIX/KING EFIS 40/50				BENDIX/KING KA 90	BENDIX/KING KI 825		BENDIX/KING KFD 840
	SG 464 P4641B	SG 464 P4641C	SG 465 P4652A	SG 465 P4652B	P901	P2	P3	J1
LNAV TRANSMITTER A	-	56	-	47	18	-	27	38
LNAV TRANSMITTER B	-	83	-	20	19	-	26	56
LNAV 1 RECEIVER A	15	-	67	-	14	-	29	40
LNAV 1 RECEIVER B	14	-	53	-	15	-	28	60
LNAV 2 RECEIVER A	-	105	-	64	-	-	2	41
LNAV 2 RECEIVER B	-	65	-	63	-	-	1	61
NAV 1 RECEIVER A	4	-	16	-	-	C	-	42
NAV 1 RECEIVER B	30	-	29	-	-	R	-	62
NAV 2 RECEIVER A	-	104	-	38	-	-	11	21
NAV 2 RECEIVER B	-	63	-	25	-	-	13	22

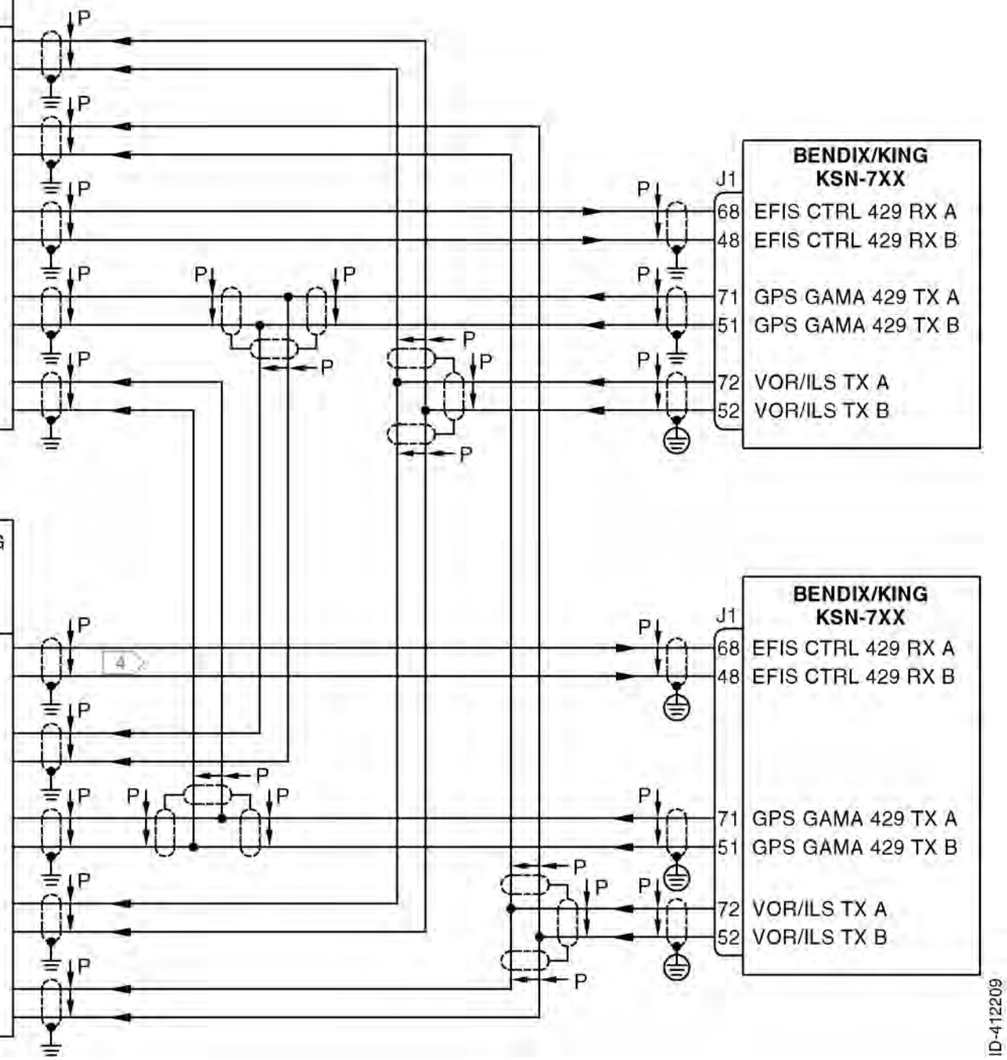
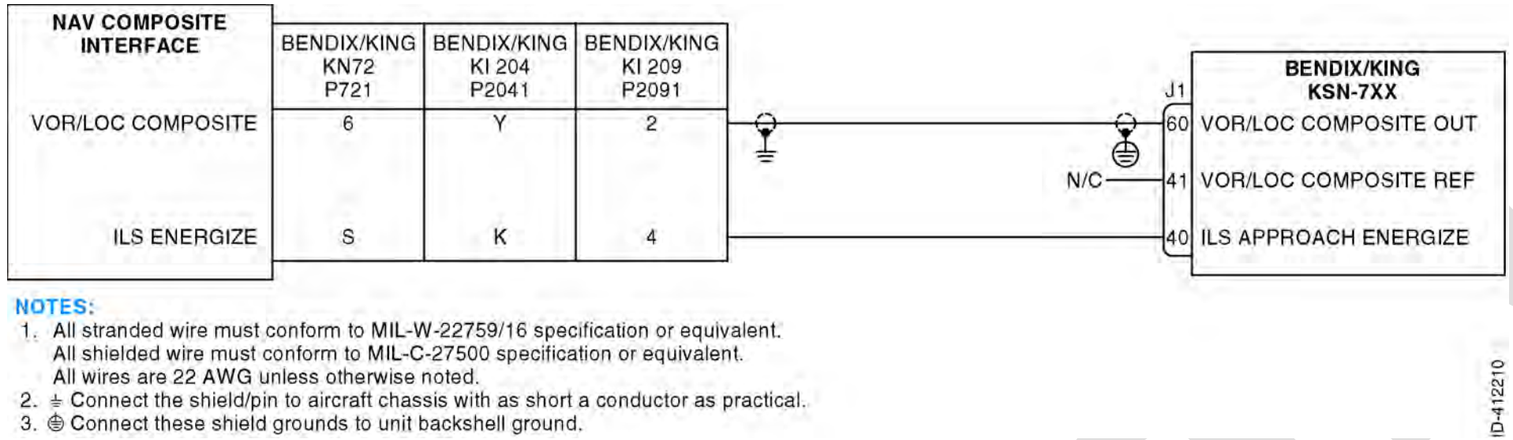


Figure 3-22. NAV Indicator Interface - ARINC 429 Interconnect Diagram (Sheet 2 of 2)

Blank Page



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-23. NAV Indicator Interface - Composite Interconnect Diagram (KSN 7x0 Models Only) (Sheet 1 of 1)

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3.13 RMI/OBI Interface

3.13.1 Applicable Part Numbers

AC SIN/COS OBI and XYZ RMI information functions are only available when the KSN 7xx is interfaced to a Bendix/King KA 90 (PN 071-01508-02XX only) or a Bendix/King KDA 697.

3.13.2 Function

The KSN 7xx provides bearing information TO the active waypoint in two ways:

Serial OBI (OBI CLOCK, OBI DATA, OBI SYNC) and ARINC TRANSMITTER (A and B).

The ARINC TRANSMITTER function and the SERIAL TRANSMITTER function are discussed in Paragraph 3.11 DME Interface.

3.13.3 Requirements and Limitations

Display of KSN 7xx RMI/OBI information in the aircraft is optional. Annunciators, placards, or a supplement to the aircraft flight manual must clearly indicate the available sources and switching procedures for bearing pointers that are shared with other systems. An example of this would be a NAV/GPS relay switching a bearing pointer from the KSN 7xx bearing to the VOR bearing. It may not be possible to certify an installation that displays non-VOR bearing information on older RMIs or HSIs with selectors or flags labeled “VOR”.

A Bendix/King KA 90 (PN 071-01508-02XX only) or a Bendix/King KDA 697 interface is required to provide bearing data in AC SIN/COS and XYZ RMI formats.

3.13.4 Electrical Characteristics

J1-5 OBI DATA
J1-25 OBI CLOCK
J1-4 OBI SYNC

This is Bendix/King format serial OBI information.

J1-4 OBI SELECT IN

The KSN 7xx will output GPS OBI when this input is Open, and VOR OBI when the input is GND.

3.13.5 Interconnect Diagram

All part numbers of the Bendix/King KNI 582 and KI 229 RMIs and the KDA 692 RMI adapter are compatible with this interface.

Refer to Figure 3-24 for the RMI/OBI interface interconnect diagram.

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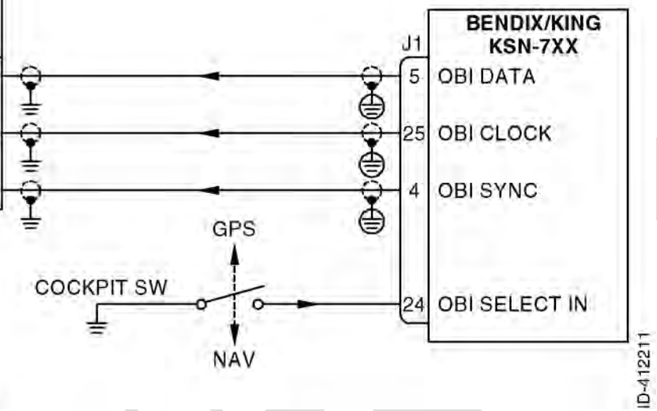
RADIO MAGNETIC INDICATOR	BENDIX/KING KI 229 P2291	BENDIX/KING KNI 582 NO. 1 POINTER P5821	BENDIX/KING KNI 582 NO. 2 POINTER P5821	BENDIX/KING KDA 692 P6921
OBI DATA IN	19	17	16	L
OBI CLOCK IN	12	8	7	11
OBI SYNC IN	11	33	24	M



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent. All shielded wire must conform to MIL-C-27500 specification or equivalent. All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.

Figure 3-24. RMI/OBI Interface Interconnect Diagram (Sheet 1 of 1)

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3.14 Dual System Interface (Cross-Fill)

3.14.1 Applicable Part Numbers

All part numbers and software revisions perform all dual system interface functions.

3.14.2 Function

When two KSN 7xx's are installed in an aircraft, they may be connected so they will cross-fill flight planning information between them.

3.14.3 Requirements and Limitations

The user data cross-fill function eliminates repetitive work such as creating flight plans and user waypoints on two individual KSN 7xx. The two units must both be KSN 7xx for the user data cross-fill to operate

3.14.4 Electrical Characteristics

J4-6	KSN 7xx 422 TX A
J4-7	KSN 7xx 422 TX B
J4-24	KSN 7xx 422 RX A
J4-25	KSN 7xx 422 RX B

These are standard EIA-422 data busses.

3.14.5 Interconnect Diagram

Refer to Figure 3-25 for the dual system interface interconnect diagram.

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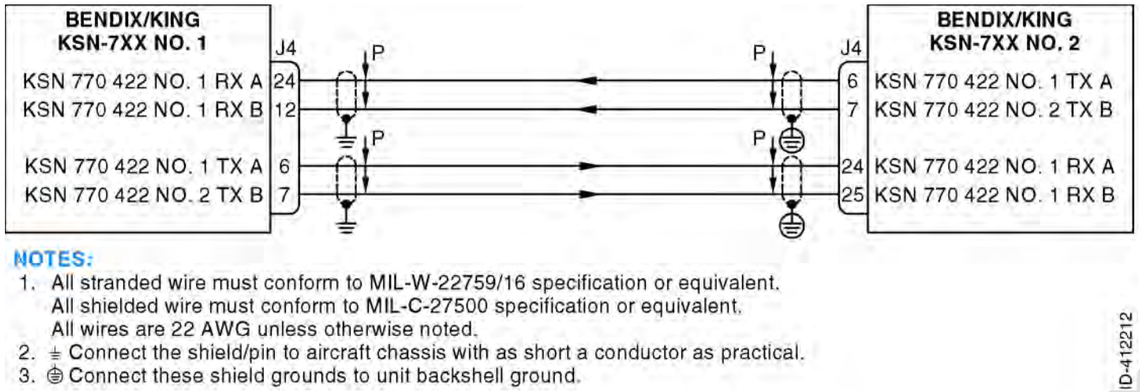

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-25. Dual System Interface Interconnect Diagram (Sheet 1 of 1)

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3.15 Audio Interface

3.15.1 Applicable Part Numbers

All part numbers and software revisions perform all audio interface functions.

3.15.2 Function

The KSN 7xx provides audio information to the pilot for the alert audio.

3.15.3 Requirements and Limitations

The audio interface provides audio alerts based on EGPWS and internal SBAS terrain generated warnings.

3.15.4 Electrical Characteristics

J4-16 AUDIO ALERT OUT HI
J4-35 AUDIO ALERT OUT LO

This is an analog output from the KSN 7xx with the following characteristics:

Impedance:	500 ±50 ohms
Output Power:	10 mW RMS into 500 ohms at 1 kHz
Frequency Response:	Less than 3 dB variation from 350 Hz to 2.5 kHz by 20 dB relative to a 1 kHz tone. Frequencies below 200 Hz and above 10 kHz are attenuated.
Distortion:	Less than 10% at rated audio and less than 3% at 10% of rated audio from 300 Hz to 2.5 kHz.
Noise Level:	Minimum of at least 50 dB below rated output.
Protection:	Electrically isolated by an audio transformer.

3.15.5 Interconnect Diagram

Refer to Figure 3-26 for the audio interface 1 interconnect diagram.

Refer to Figure 3-27 for the audio interface 2 interconnect diagram.

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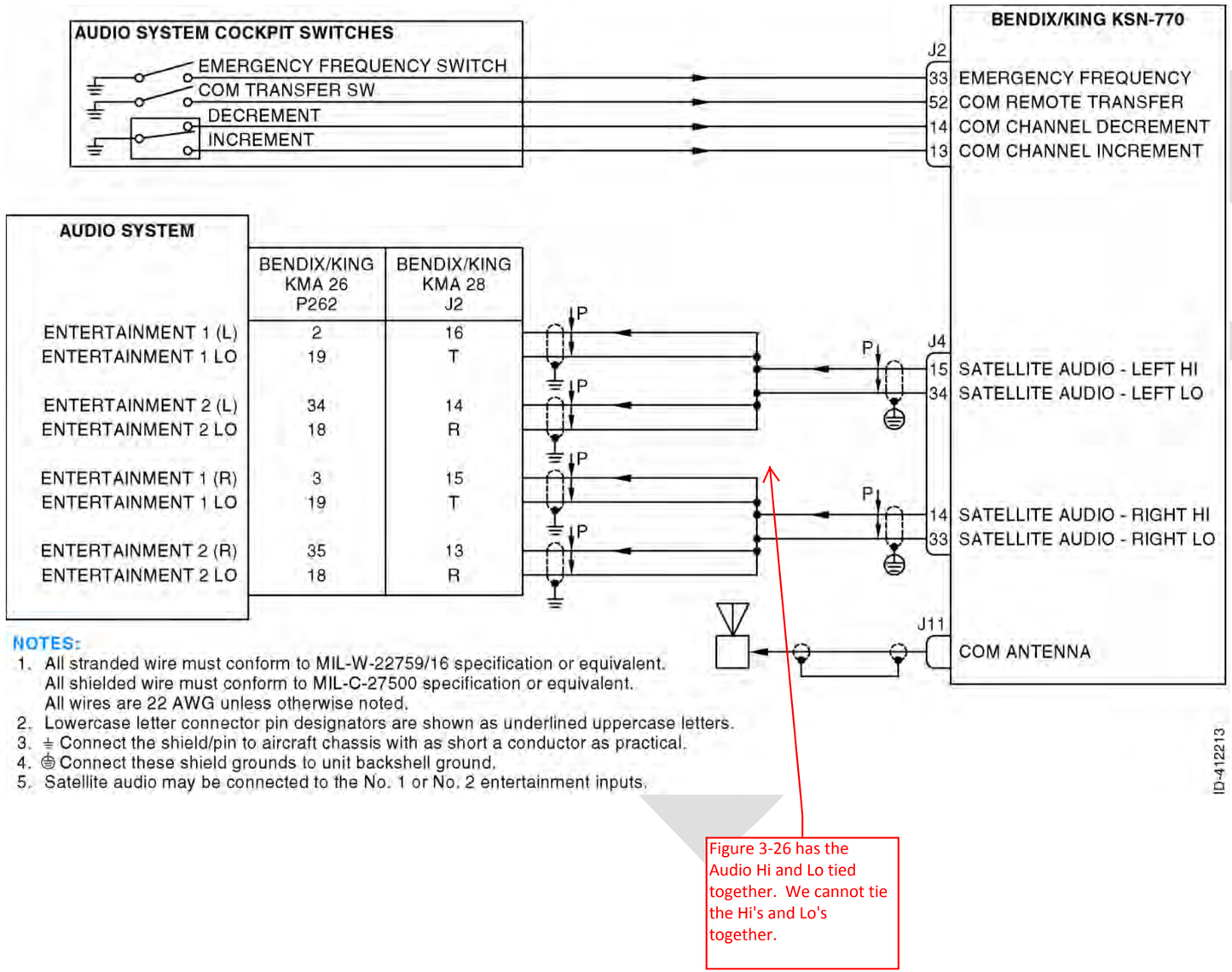

Figure 3-26 has the Audio Hi and Lo tied together. We cannot tie the Hi's and Lo's together.

Figure 3-26. Audio Interface 1 Interconnect Diagram (Sheet 1 of 1)

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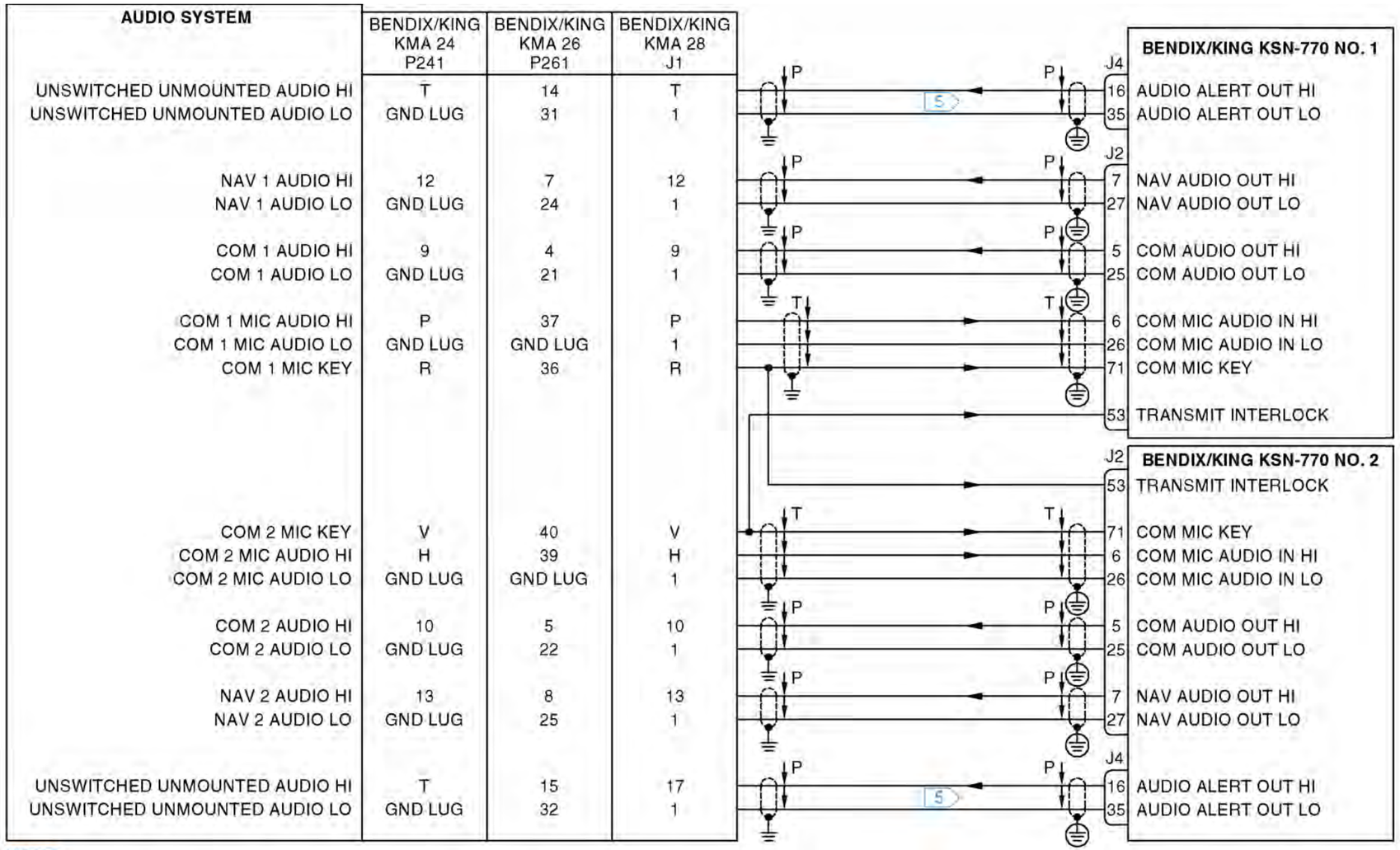
AUDIO SYSTEM	BENDIX/KING KMA 24 P241	BENDIX/KING KMA 26 P261	BENDIX/KING KMA 28 J1
UNSWITCHED UNMOUNTED AUDIO HI	T	14	T
UNSWITCHED UNMOUNTED AUDIO LO	GND LUG	31	1
NAV 1 AUDIO HI	12	7	12
NAV 1 AUDIO LO	GND LUG	24	1
COM 1 AUDIO HI	9	4	9
COM 1 AUDIO LO	GND LUG	21	1
COM 1 MIC AUDIO HI	P	37	P
COM 1 MIC AUDIO LO	GND LUG	GND LUG	1
COM 1 MIC KEY	R	36	R
COM 2 MIC KEY	V	40	V
COM 2 MIC AUDIO HI	H	39	H
COM 2 MIC AUDIO LO	GND LUG	GND LUG	1
COM 2 AUDIO HI	10	5	10
COM 2 AUDIO LO	GND LUG	22	1
NAV 2 AUDIO HI	13	8	13
NAV 2 AUDIO LO	GND LUG	25	1
UNSWITCHED UNMOUNTED AUDIO HI	T	15	17
UNSWITCHED UNMOUNTED AUDIO LO	GND LUG	32	1



NOTES:
1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent. All wires are 22 AWG unless otherwise noted.
2. Lowercase letter connector pin designators are shown as underlined uppercase letters.
3. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
4. ⏚ Connect these shield grounds to unit backshell ground.
5. The KMA 24 and some other audio panels only have a single unmuted audio input. Connecting multiple sources to a single input may reduce the output level of the audio panel. The KMA 26 and KMA 28 and some other audio panels have multiple unmuted audio inputs. If the inputs shown on this drawing are already in use, connect to an unused input.

ID-412214

Figure 3-27. Audio Interface 2 Interconnect Diagram (Sheet 1 of 1)

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3.16 Annunciations - Suspend/Dead Reckoning/NAV Interface

3.16.1 Applicable Part Numbers

All part numbers and software revisions perform all annunciatons - suspend/dead reckoning/NAV functions.

3.16.2 Function

A. Suspend

When in the suspend mode, the KSN 7xx will suspend automatic sequencing of waypoints.

SUSPEND ANNUNCIATE: When SUSPEND ANNUNCIATE is active, the KSN 7xx no longer automatically sequencing waypoints.

SUSPEND IN: Signals to the KSN 7xx to stop automatic sequencing of waypoints.

B. Dead Reckoning

The dead reckoning function indicates to the pilot when GPS is not available and the KSN 7xx is navigating by dead reckoning.

DEAD RECKONING ANNUNCIATE: When DEAD RECKONING ANNUNCIATE is active, the KSN 7xx is navigating via dead reckoning.

C. NAV

(1) CDI Switching Function

CDI SELECT IN: The CDI SELECT IN input pin is used to tell the KSN 7xx whether output GPS or VLOC information to the external indicator. The input is normally open, with a momentary GND applied when the switch is pressed. When the KSN 7xx sees this input go low, it toggles the navigation source on the primary CDI output between GPS and VLOC.

(2) Annunciator Functions

The following outputs are provided to annunciate KSN 7xx conditions. They may be used to illuminate lamps, engage relays, or be sensed directly by other systems. The term “illuminated”, as used below, indicates the active low state of the annunciator output.

LNAV APPROACH ACTIVE ANNUNCIATE: Will illuminate whenever the KSN 7xx is configured for LNAV IFR approaches and the unit is in the approach active mode.

CDI GPS ANNUNCIATE: Will illuminate whenever the KSN 7xx is outputting GPS deviation signals to the NAV Indicator.

LOSS OF INTEGRITY ANNUNCIATE: Will illuminate whenever the KSN 7xx integrity monitor indicates a loss of GPS integrity.

MESSAGE ANNUNCIATE: Will illuminate whenever the message prompt on the KSN 7xx is ON.

LP APPROACH ACTIVE ANNUNCIATE: Will illuminate whenever the KSN 7xx is configured for LP IFR approaches and the unit is in the approach active mode.

CDI VLOC ANNUNCIATE: Will illuminate whenever the KSN 7xx is outputting VOR or LOCALIZER data.

WAYPOINT ANNUNCIATE: Will illuminate indicating that the aircraft will soon arrive at the active waypoint. When in the leg navigation mode with turn anticipation enabled, the WPT annunciator will begin flashing 20 seconds before turn anticipation begins, then will go on solid when turn anticipation begins, through the conclusion of turn anticipation. When the KSN 7xx is in the OBS navigation mode or in the leg mode with turn anticipation disabled, the WPT annunciator will begin flashing 36 seconds prior to the estimated time of arrival at the active waypoint.

LNAV/VNAV APPROACH ACTIVE ANNUNCIATE: Will illuminate whenever the KSN 7xx is configured for LNAV/VNAV IFR approaches and is outputting GPS information to the primary CDI.

LPV APPROACH ACTIVE ANNUNCIATE: Will illuminate whenever the KSN 7xx is configured for LPV IFR approaches and is outputting GPS information to the primary CDI.

3.16.3 Requirements and Limitations

A. Suspend

N/A

B. Dead Reckoning

N/A

C. NAV

Requirements for remote switching and annunciation of the KSN 7xx navigation functions vary depending on the level of certification of the installation. The following requirements represent typical standards in the USA, but even so may vary regionally within the USA (refer to Table 3-14). If the switches/annunciators are required, it is required that the message and waypoint alert annunciators be in the pilot's primary field of view area (refer to Paragraph 2.3.4.3 Field of View Considerations). Primary field of view location is highly recommended for the remainder of the annunciators, but not required. Many EFIS systems provide some amount of switching and annunciation. A typical EFIS system provides NAV/GPS switching/annunciation and message/waypoint alert annunciation.

Table 3-14. NAV Annunciators by Installation Type

Annunciation	Suggested Legend and Color	VFR Only	IFR		
			Enroute/ Terminal	Non-Precision Approach	LPV Approach
CDI GPS ANN	GPS (Grn)	May be Reqd	May be Reqd	May be Reqd	May be Reqd
CDI VLOC ANN	NAV (Grn)	May be Reqd	May be Reqd	May be Reqd	May be Reqd
WPT ANN	WPT (Ambr)	Optional	Reqd	Reqd	Reqd
MSG ANN	MSG (Ambr)	Optional	Reqd	Reqd	Reqd
LOSS OF INTEGRITY ANN	LOI (Ambr)	Optional	Optional	Optional	Optional
OFFPATH ANN	OFF PATH (Ambr)	Optional	Optional	Optional	Optional
LNAV APPROACH ACTIVE ANN	LNAV (Grn)	Of No Use	Of No Use	Reqd	Reqd
LNAV/VNAV APPROACH ACTIVE ANN	L/VNAV (Grn)	Of No Use	Of No Use	Reqd	Reqd
LP APPROACH ACTIVE ANN	LP (Grn)	Of No Use	Of No Use	Of No Use	Reqd
LPV APPROACH ACTIVE ANN	LPV (Grn)	Of No Use	Of No Use	Of No Use	Reqd

(1) VFR-Only Installations

No requirement for waypoint alert and message annunciator, or an OBS/Leg course mode annunciator. These are optional, and it may be desirable to include a waypoint alert/message annunciator in the primary instrument scan area for the pilots' convenience. There is no need for approach mode switching or annunciation. A NAV/GPS navigation source switch is required if both NAV and GPS may be displayed on a single CDI or HSI.

(2) IFR En Route and Terminal Installations

Waypoint alert and message annunciators are required.

Remote OBS/Leg course mode switch/annunciator is optional. There is no need for approach mode switching or annunciation. A NAV/GPS navigation source switch is required if both NAV and GPS may be displayed on a single CDI or HSI.

(3) IFR En Route, Terminal, and Non-precision Approach Installations

Waypoint alert and message annunciators are required. Remote OBS/Leg course mode switch/annunciator is optional.

Approach mode switching and annunciation are required. A NAV/GPS navigation source switch is required if both NAV and GPS may be displayed on a single CDI or HSI.

(4) LPV Approach Installations

Waypoint alert and message annunciators are required. Remote OBS/Leg course mode switch/annunciator is optional.

Approach mode switching and annunciation are required. A NAV/GPS navigation source switch is required if both NAV and GPS may be displayed on a single CDI or HSI.

3.16.4 Electrical Characteristics

NOTE: Annunciators are to be DC voltage only with a maximum of +38 VDC. Annunciator dimming may be by photocell or day/night switch. Do not use panel lighting rheostat dimmed bus.

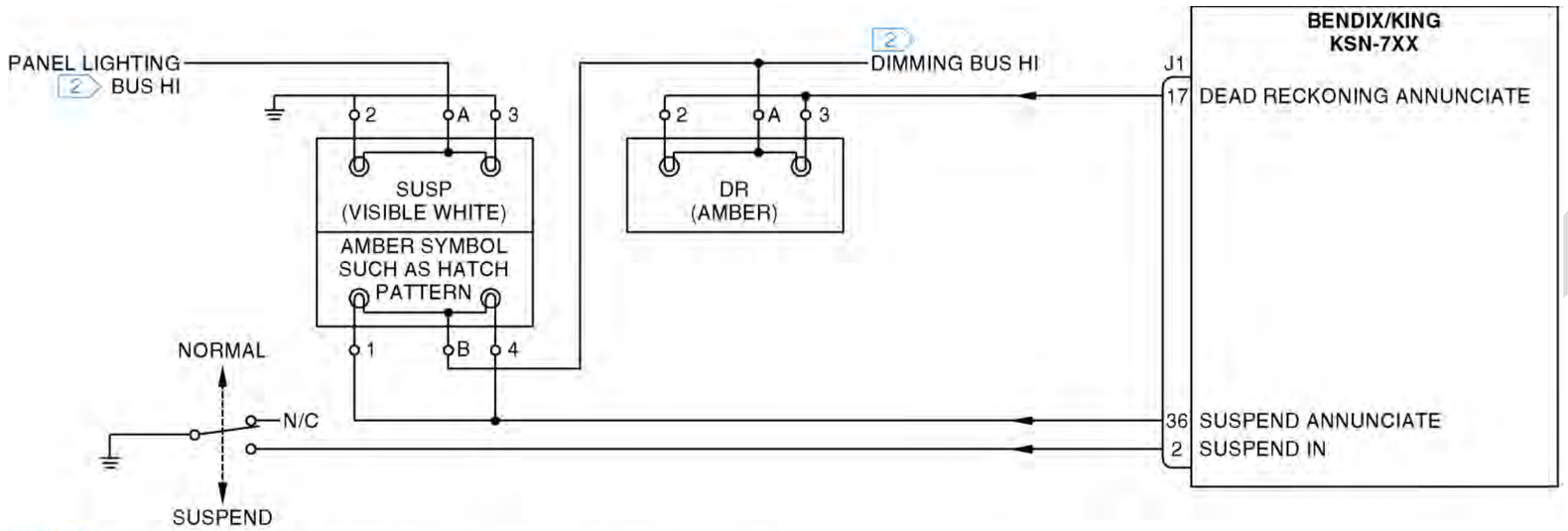
These outputs are open collector outputs. When active, the output device is turned on and conducting which provides a GND path for a load such as a lamp or relay that is pulled up to a maximum voltage of +38 VDC.

J1-3 CDI SELECT IN
J1-16 LNAV APPROACH ACTIVE ANNUNCIATE
J1-18 CDI GPS ANNUNCIATE
J1-19 LOSS OF INTETRITY ANNUNCIATE
J1-20 MESSAGE ANNUNCIATE
J1-35 OFFPATH ANNUNCIATE
J1-37 LP APPROACH ACTIVE ANNUNCIATE
J1-38 CDI VLOC ANNUNCIATE
J1-39 WAYPOINT ANNUNCIATE
J2-38 LNAV/VNAV APPROACH ACTIVE ANNUNCIATE
J2-58 LPV APPROACH ACTIVE ANNUNCIATE

Active:	LO (≤1.0 VDC while sinking current up to 250 mA).
Inactive:	HI (≥50 kilohms to GND, and up to +38 VDC).

3.16.5 Interconnect Diagram

Refer to Figure 3-28 for the annunciations - suspend/dead reckoning interconnect diagram.
Refer to Figure 3-29 for the annunciations - NAV interface interconnect diagram.



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. Annunciator dimming may be by photocell or day/night switch. Do not use panel lighting rheostat dimming bus.
   Since the "SUSP" legend is daylight visible white in ambient light, it is not necessary to light the lamp during daylight operation.
   The lamp may be lit during daylight, may be illuminated from the photocell or day/night switch, or may be driven from the night position of the day/night switch.
   Not illuminating the lamp with the higher voltages during day operation, however, will greatly reduce the touch temperature to the pilot's fingers.

ID-412215

Figure 3-28. Annunciations - Suspend/Dead Reckoning Interconnect Diagram (Sheet 1 of 1)

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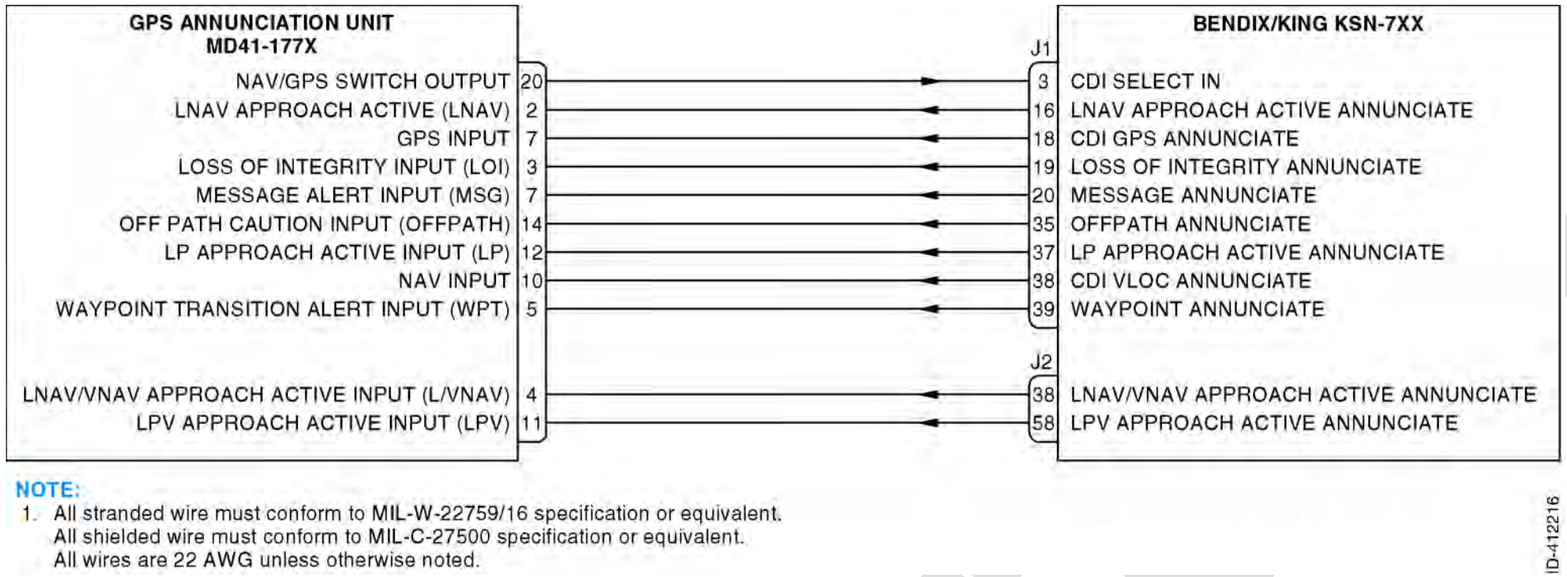

NOTE:
1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.

Figure 3-29. Annunciations - NAV Interface Interconnect Diagram (Sheet 1 of 1)

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3.17 Miscellaneous Interface

3.17.1 Applicable Part Numbers

All part numbers and software revisions perform all miscellaneous functions.

3.17.2 Function

3.17.2.1 Cooling

Two fans are used as the primary method of providing internal cooling to the KSN 7xx. Aircraft supply of forced air cooling is not required. Two externally mounted cooling fans (part of KSN 7xx equipment rack design) provide all required cooling for the KSN 7xx.

3.17.2.2 Configuration Module

The configuration module is used to keep implementation specific setup information on board the aircraft. This facilitates configuration of the KSN 7xx in the event service is needed.

3.17.2.3 WOW Input

The WOW input is configurable in the maintenance pages to be active either high or low, and must be configured correctly for proper operation.

3.17.2.4 Spare, Reserved only Pins

This is a list of spare pins that are included in the KSN 7xx, but not used in installation, and is for reference only.

3.17.3 Requirements and Limitations

3.17.3.1 Cooling

N/A

3.17.3.2 Configuration Module

N/A

3.17.3.3 WOW Input

N/A

3.17.3.4 Spare Pins

N/A

3.17.4 Electrical Characteristics

3.17.4.1 Cooling Interface

J2-20 KSN FAN
J2-1 GND 3
J2-39 MMDS FAN
J2-19 FAN RETURN

These pins provide power and GND to the KSN 7xx cooling fans.

3.17.4.2 Configuration Module Interface

J4-11 CONFIG MODULE POWER
J4-29 CONFIG MODULE GND

These pins provide +5 VDC and GND to the Bendix/King KCM 200 configuration module.

J4-30 CONFIG MODULE CLOCK
J4-12 CONFIG MODULE DATA

These pins provide the serial data interface to the configuration module. The wire length between the KSN 7xx and the KCM 200 must not exceed 72 inches (183 cm).

If the KCM 200 configuration module is not present on unit power-up, the KSN 7xx's internal configuration data is used. If there is an error detected in the KCM 200 configuration data and the internal KSN 7xx configuration data is good, the internal data will be used, but not copied to KCM 200. The message "CONFIGURATION MEM ERROR" is shown on the KSN 7xx screen. If errors are detected in both the KCM 200 and internal configuration data, the internal data shall change to the factory default values, and the KCM 200 data is not changed.

3.17.4.3 WOW

J2-54 WOW

The WOW input is supplied by the aircraft. The input is normally open, and grounded when there is weight on the aircrafts wheels.

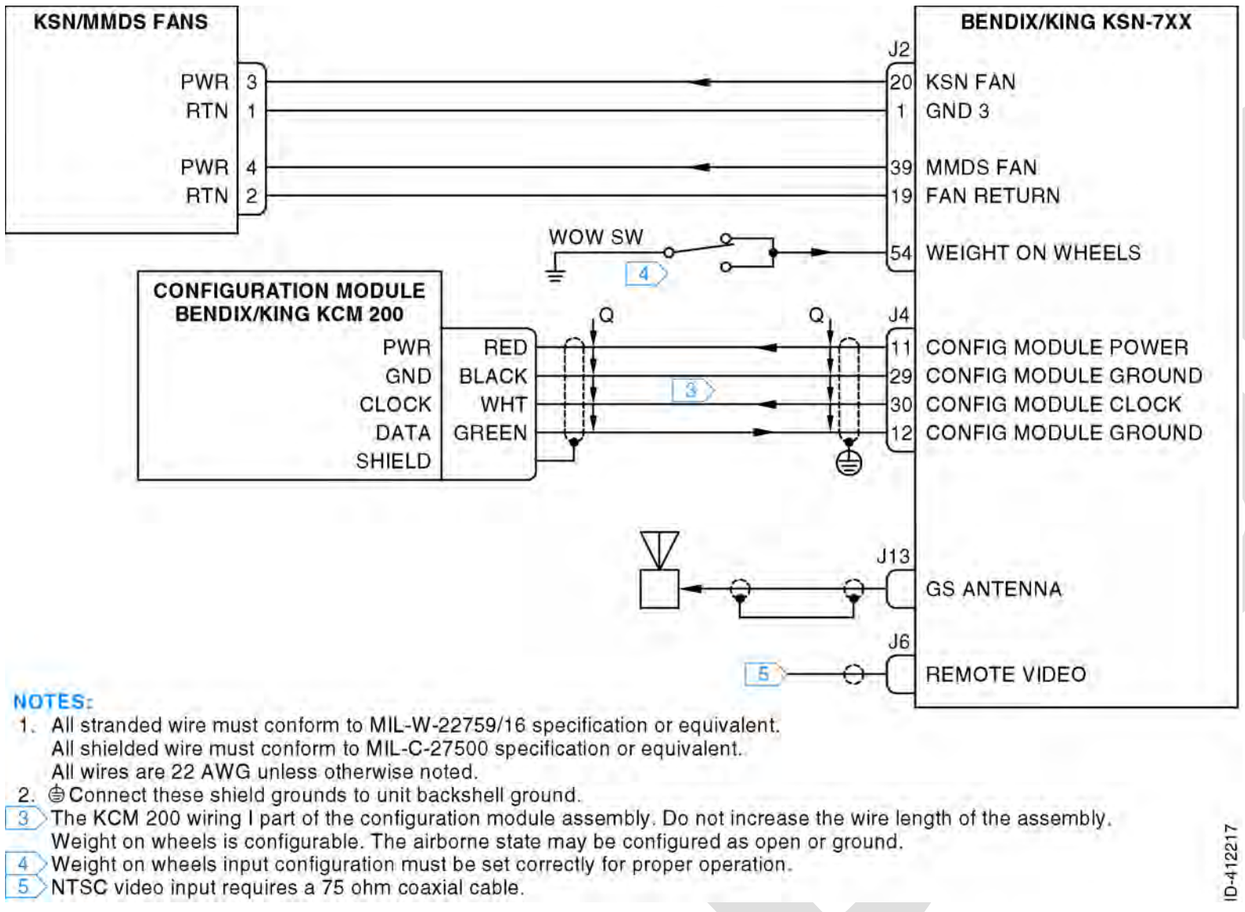
3.17.4.4 Spare RS-232

All pins identified as spare are reserved for future use.

3.17.5 Interconnect Diagram

Refer to Figure 3-30 for the miscellaneous interface 1 interconnect diagram.

Refer to Figure 3-31 for the miscellaneous interface 2 interconnect diagram.



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect these shield grounds to unit backshell ground.

3 The KCM 200 wiring I part of the configuration module assembly. Do not increase the wire length of the assembly.
Weight on wheels is configurable. The airborne state may be configured as open or ground.

4 Weight on wheels input configuration must be set correctly for proper operation.

5 NTSC video input requires a 75 ohm coaxial cable.

Figure 3-30. Miscellaneous Interface 1 Interconnect Diagram (Sheet 1 of 1)

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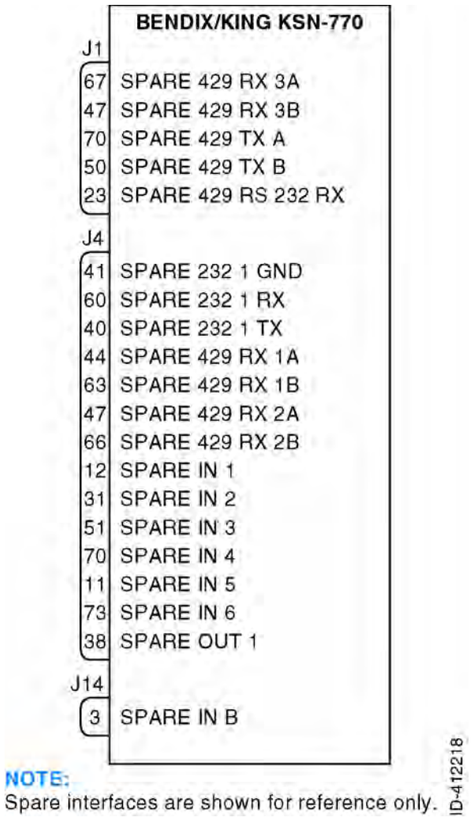

NOTE:
Spare interfaces are shown for reference only.

Figure 3-31. Miscellaneous Interface 2 Interconnect Diagram (Sheet 1 of 1)

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3.18 XM Receiver Interface

3.18.1 Applicable Part Numbers

All part numbers and software revisions perform all XM receiver functions.

3.18.2 Function

TBD

3.18.3 Requirements and Limitations

TBD

3.18.4 Electrical Characteristics

J4-26 DATALINK RECEIVER 422 #3 RX A
J4-27 DATALINK RECEIVER 422 #3 RX B

This is a standard EIA 422 data bus with the following characteristics:

BAUD:	57600
Data Bits:	8
Start Bits:	None
Stop Bits:	2
Parity:	None
Handshaking:	None

3.18.5 Interconnect Diagram

Refer to Figure 3-32 for the XM receiver interface interconnect diagram.

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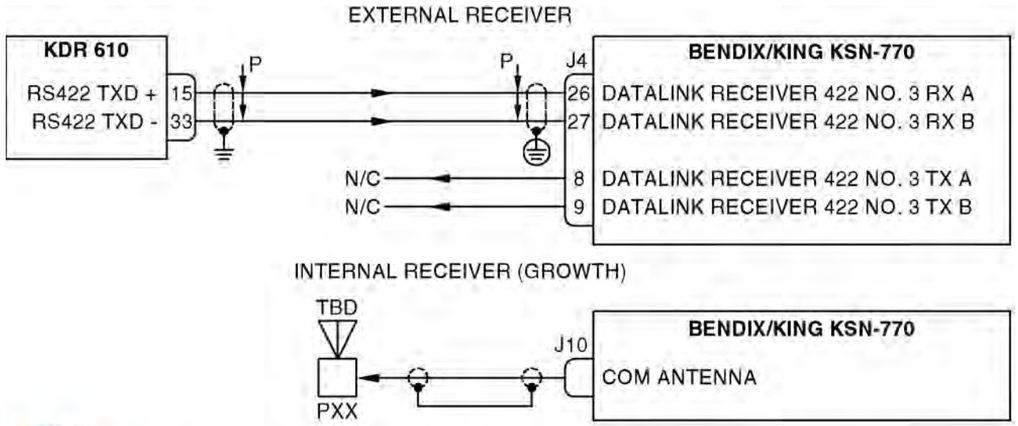

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-32. XM Receiver Interface Interconnect Diagram (Sheet 1 of 1)

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3.19 Maintenance Interface

3.19.1 Applicable Part Numbers

All part numbers and software revisions perform all maintenance functions.

3.19.2 Function

All pins and busses (with the exception of the front USB connector) are for shop maintenance only, and must not be included in the aircraft harness.

A. Front USB

Information about navigational elements contained on thumb drives is transferred to the KSN 7xx data base memory the front USB port. Data base loading need only be performed upon the receipt of a new data (available every 28 days from Bendix/King).

The KSN 7xx will not navigate during data loading, and therefore it is necessary to load the data base before flight. The thumb drive contains data for airports, VORs, NDBs, published Intersections, SID and STAR waypoints, non-precision approach waypoints, and other miscellaneous data. The procedure for updating the published data base is detailed in the KSN 7xx pilot's guide.

In addition to loading of the published data base, non-published data base items such as user-defined flight plans, waypoints, navaids and airports may be transferred between the KSN 7xx and a IBM-compatible personal computer via a thumb drive on the front USB port. The PC software kit for this function is available through Bendix King. User data such as user defined flight plans, waypoints, navaids, and airports may also be transferred between KSN 7xx systems in dual installations through use of the dual system interface. It is not possible to transfer the published data base from the KSN 7xx to a thumb drive or from one KSN 7xx to another over the dual system interface.

B. Rear USB

TBD

3.19.3 Requirements and Limitations

All pins and busses (with the exception of the front USB connector) are for shop maintenance only, and must not be included in the aircraft harness.

3.19.4 Electrical Characteristics

A. GPS Dataload RS-232

J4-13 GPS DATALOAD 232 TX
J4-32 GPS DATALOAD 232 RX
J4-31 GPS DATALOAD 232 GND

This is a standard EIA-232 serial interface that is only used for shop testing, and must not be connected in the aircraft harness.

B. Demo Mode Select

J4-19 DEMO MODE SELECT

This pin is normally open, and when it is held low during power up, will take the KSN 7xx into demo mode. This pin is only used for shop testing, and must not be connected in the aircraft harness.

C. Shop Mode Select

J4-18 SHOP MODE SELECT

This pin is normally open, and when it is held low during power up, will take the KSN 7xx into shop mode. This pin is only used for shop testing, and must not be connected in the aircraft harness.

D. Maintenance RS-422

J4-22 MAINTENANCE 422 RX A
J4-23 MAINTENANCE 422 RX B
J4-4 MAINTENANCE 422 TX A
J4-5 MAINTENANCE 422 TX B

This is a standard EIA-422 data bus that is only used for shop testing, and must not be connected in the aircraft harness.

E. IOP RS-422 A

J2-42 IOP 422 #4 RX A
J2-43 IOP 422 #4 RX B
J2-61 IOP 422 #4 TX A
J2-62 IOP 422 #4 TX B

This is a standard EIA-422 data bus that is only used for shop testing, and must not be connected in the aircraft harness.

F. Discretes

J3-1	33V Boost Test
J3-4	5V KSN Test
J3-5	5V7 Startup Test
J3-3	12V POS MMDS Test
J3-2	ON OFF Status N

These discretes are all used for shop testing, and must not be connected in the aircraft harness.

G. Front USB

FRONT-2	USB 1 D –
FRONT-3	USB 1 D +
FRONT-4	USB 1 D GND
FRONT-8	USB 1 VBUS

This is a standard v2.0 USB bus that is used for data loading.

H. Rear USB

J8-2	USB 2 D –
J8-3	USB 2 D +
J8-5	USB 2 D GND
J8-1	USB 2 D VBUS
J8-4	USB 2 ID

This is a standard v2.0 USB bus that is only used for shop testing.

3.19.5 Interconnect Diagram

Refer to Figure 3-33 for the maintenance interface interconnect diagram.

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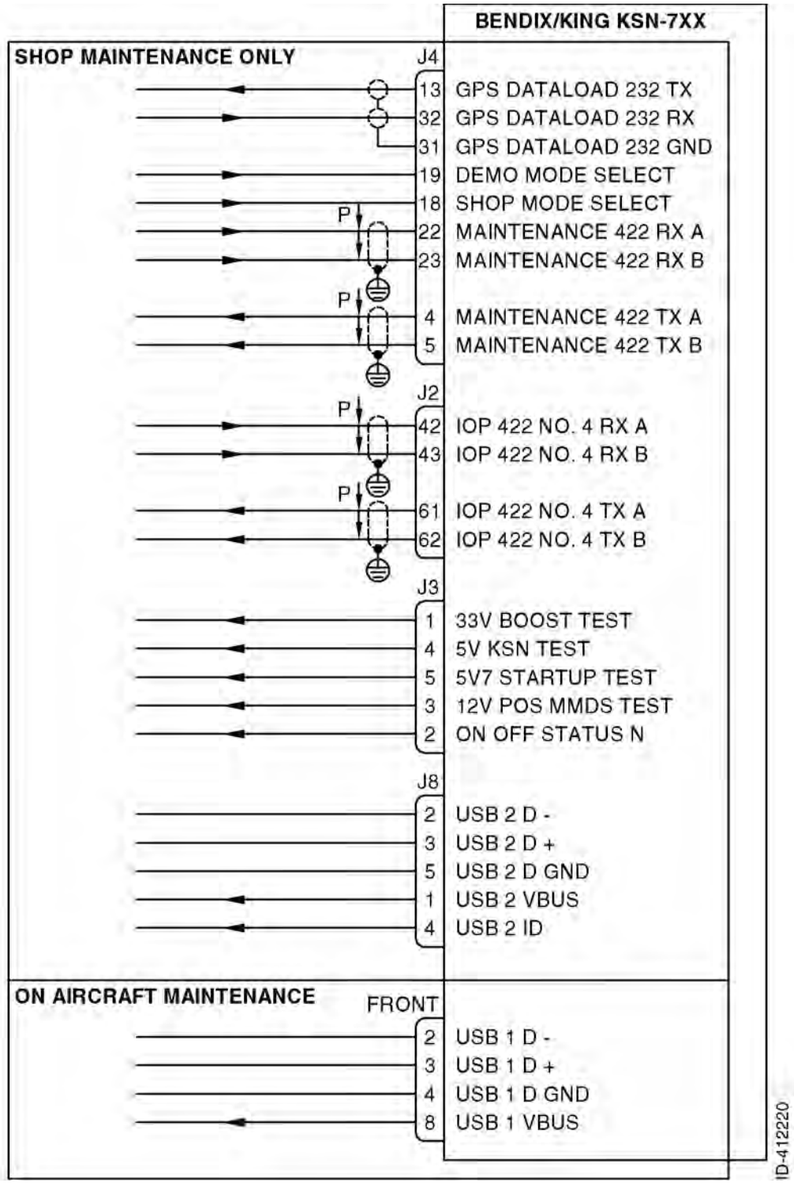

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent. All shielded wire must conform to MIL-C-27500 specification or equivalent. All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-33. Maintenance Interface Interconnect Diagram (Sheet 1 of 1)

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3.20 Stormscope Interface (WX-500)

3.20.1 Applicable Part Numbers

All part numbers and software revisions perform all stormscope interface functions.

3.20.2 Function

The L3 WX-500 stormscope is a remote weather mapping sensor which detects and processes lightning strikes. It interfaces with the KSN 7xx in order to provide this lightning detection and avoidance information. WX-500 control and display information is communicated by a serial interface between the WX-500 and the KSN 7xx. Two modes of weather display are available: Strike Mode and Cell Mode. The KSN 7xx must be configured for a WX-500 on the maintenance pages for the WX-500 function to be displayed.

3.20.3 Requirements and Limitations

The WX-500 must be installed in accordance with its own installation manual in order to assure proper operation.

3.20.4 Electrical Characteristics

A. Stormscope Control

J1-64 WX-500 422 #2 TX A
J1-65 WX-500 422 #2 TX B

This is a standard EIA-422 data bus.

B. Stormscope Data

J1-44 WX-500 422 #2 RX A
J1-45 WX-500 422 #2 RX B

This is a standard EIA-422 data bus.

3.20.5 Interconnect Diagram

Refer to Figure 3-34 for the stormscope interface (WX-500) interconnect diagram.

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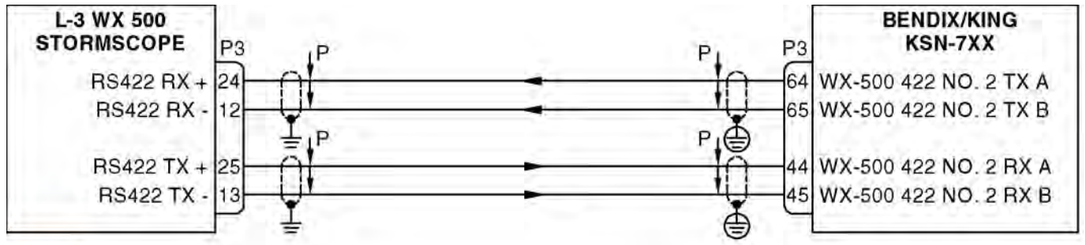

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent. All shielded wire must conform to MIL-C-27500 specification or equivalent. All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Use wire, PN M17/176-00002 or equivalent for the WX 453 interface. Existing WX radar installations can use the existing quadrax cable.
5. Wire type varies with wire length. Refer to antenna installation considerations section of installation manual for details.

Figure 3-34. Stormscope Interface (WX-500) Interconnect Diagram (Sheet 1 of 1)

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3.21 NAV/COM Interface (KSN 7x0 Only)

3.21.1 Applicable Part Numbers

All KSN 7x0 navigators will be capable of all COM/NAV interface functions.

3.21.2 Function

The NAV/COM function of the KSN 7x0 integrated navigators provides the following COM/NAV functions:

A. Two way voice communications within the frequency range of 118.000 to 136.975 MHz (760 channels) in 25 KHz increments.

B. Reception of navigation signals within the frequency range of 108.00 to 117.95 MHz in 50 kHz increments (200 channels).

C. Reception of glide slope signals within the frequency range of 3.29.15 to 335.00 MHz in 150 kHz increments (40 channels).

D. DME channeling to selected remote and panel mount DME equipment via the King Serial DME bus.

3.21.3 Requirements and Limitations

A. COM

A conventional 50-ohm vertically polarized COM antenna is required with the KSN 7x0. Vertically bent whip antennas are not recommended. Antennas must be installed per their manufacturer's recommendations. Additional recommendations are as follows:

(1) Mount the antenna on a flat metal surface or install a GND plane at least 18 inches (457 mm) square.

(2) The antenna must be well removed from any projections, the engine(s), and the propeller(s).

B. NAV

A conventional 50-ohm horizontally polarized VOR/LOC/GS antenna is required with the KSN 7x0. Antennas must be installed per their manufacturer's recommendations. Additional recommendations are as follows:

(1) The location must be well removed from other antennas, projections, engine(s), and propeller(s). It must have a clear line of sight area if possible.

(2) The antenna must be mounted symmetrically with the centerline of the aircraft.

(3) Avoid running other coaxial cables and wires near the NAV antenna cable.

C. DME Channeling

For proper functioning of the King Serial DME indicator interface, a DME receiver (in addition to the KSN 7xx and the indicator) must be connected to the SERIAL CLOCK and SERIAL DATA lines.

When the KSN 7xx is mounted in the aircraft pedestal, some certification agencies (including the FAA) require a distance display in the pilot's scan area for IFR certification. Consult your approval agency for additional information.

The KSN 7xx may display distance, groundspeed and time-to-station on the KPI-553A, KDI-572, KDI-573 and KDI-574 DME distance displays. The DME in the aircraft continues to supply power to these displays while the KSN 7xx information is displayed. A NAV/GPS annunciator switch and relays can switch the DME display between displaying DME and GPS information (refer to the DME installation documentation for details).

3.21.4 Electrical Characteristics

J2-33 EMERGENCY FREQUENCY

This input is normally open, and is active when pulled low. While pulled low, this discrete will force the COM transceiver to:

A. Ignore all requests to change the COM channel until the input returns to open.

B. Ignore all requests to change the COM volume until the input returns to open.

C. Load the emergency frequency stored in NVM as the active frequency of the COM transceiver.

D. Set the COM volume to the emergency volume Level as per the configuration module defined value (as set up in the maintenance pages).

J2-52 COM REMOTE TRANSFER

This input is normally open, and is activated when pulled to GND. When this input is held low for longer than 2 seconds, the emergency frequency will be loaded into the standby channel. When a low to open transition is detected following a low signal of <2 seconds, the KSN 7xx will transfer the active COM frequency to standby and will transfer the standby COM frequency to active.

J2-14 COM CHANNEL DECREMENT
J2-13 COM CHANNEL INCREMENT

These inputs are normally open and are activated by being momentarily pulled to GND. When the COM CHANNEL DECREMENT input is activated, the KSN 7xx will change the COM standby frequency to the previous channel in the user defined COM channel list. When the COM CHANNEL INCREMENT input is activated, the KSN 7xx will change the COM standby frequency to the next channel in the user defined COM channel list.

J2-5 COM AUDIO OUT HI
J2-25 COM AUDIO OUT LO

This is an analog output from the KSN 7xx with the following characteristics:

Impedance:	500 ±50 ohms from 350 to 2500 Hz when the KSN 7xx is powered, and >450 ohms when the KSN 7xx is unpowered.
Range:	15.0 Vrms from 350 to 2500 Hz with <10% THD into an open circuit.
Rated Audio:	100 mW into 500 ohms.
Squelch:	<2 mVrms signal and noise into 500 ohms.
Minimum State:	<2 mVrms signal and noise into 500 ohms.

J2-6 COM MIC AUDIO IN HI
J2-26 COM MIC AUDIO IN LO

This is an analog input to the KSN 7xx with the following characteristics:

Impedance:	485 ±49 ohms from 350 to 2500 Hz.
Bias Voltage:	9.0 ±1.0 VDC through an internal series resistance of 500 ±50 ohms to a load which can range from 0 ohm to open.
Range:	125 mVrms ≤Signals ≤1.5 Vrms.

J2-71 COM MIC KEY

This input is normally open, with a momentary GND applied when a switch is pressed. When the switch is open, the KSN 7xx disables the COM transmitter and sidetone; when grounded the COM transmitter and sidetone are enaled.

J2-53 TRANSMIT INTERLOCK

This discrete input signal may be optionally activated from remote equipment that might interfere with the VHF COM. The input is normally open, and is activated momentarily as long as a GND is applied to it. When the input is open, the COM receiver operates normally with normal sensitivity and sidetone. When this input is held low, the COM receiver is desensitized. If held low for longer than 30 seconds continuously, the receiver reverts to the normal mode until the signal is released (open) and pulled low again.

J2-7 NAV AUDIO OUT HI
J2-27 NAV AUDIO OUT LO

This is an analog output from the KSN 7xx with the following characteristics:

Impedance:	500 ±50 ohms from 350 to 2500 Hz when the KSN 7xx is powered, and >450 ohms when the KSN 7xx is unpowered.
Range:	15.0 Vrms from 350 to 2500 Hz with <10% THD into an open circuit.
Rated Audio:	100 mW into 500 ohms.
Minimum State:	<2 mVrms signal and noise into 500 ohms.

King Serial DME Bus

J1-75 SERIAL CLOCK
J1-57 SERIAL DATA
J1-76 DME CHANNEL REQUEST
J1-56 DME COMMON

These connections transmit Bendix/King format serial DME information.

In the King Serial DME configuration, SERIAL SYNC is an input. When the KSN 7xx receives an active-high pulse on SERIAL SYNC, it transmits pulses on the SERIAL CLOCK and SERIAL DATA lines.

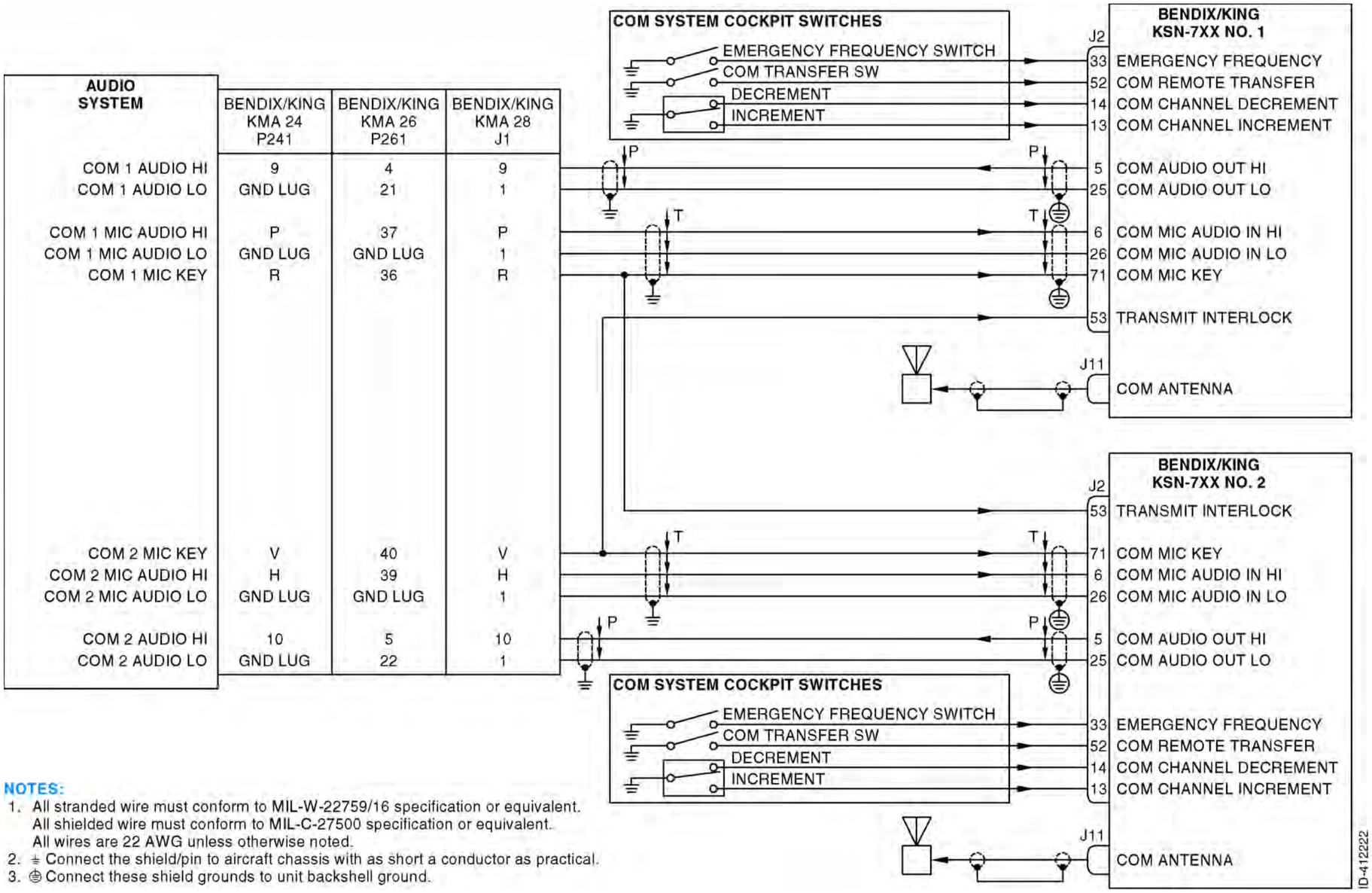
3.21.5 Interconnect Diagram

Refer to Figure 3-35 for the COM interface interconnect diagram.

Refer to Figure 3-36 for the NAV interface interconnect diagram.

Refer to Figure 3-37 for the NAV interface - remote DME channeling interconnect diagram.

Refer to Figure 3-38 for the NAV interface - panel mount DME channeling interconnect diagram.



NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent. All shielded wire must conform to MIL-C-27500 specification or equivalent. All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-35. COM Interface Interconnect Diagram (Sheet 1 of 1)

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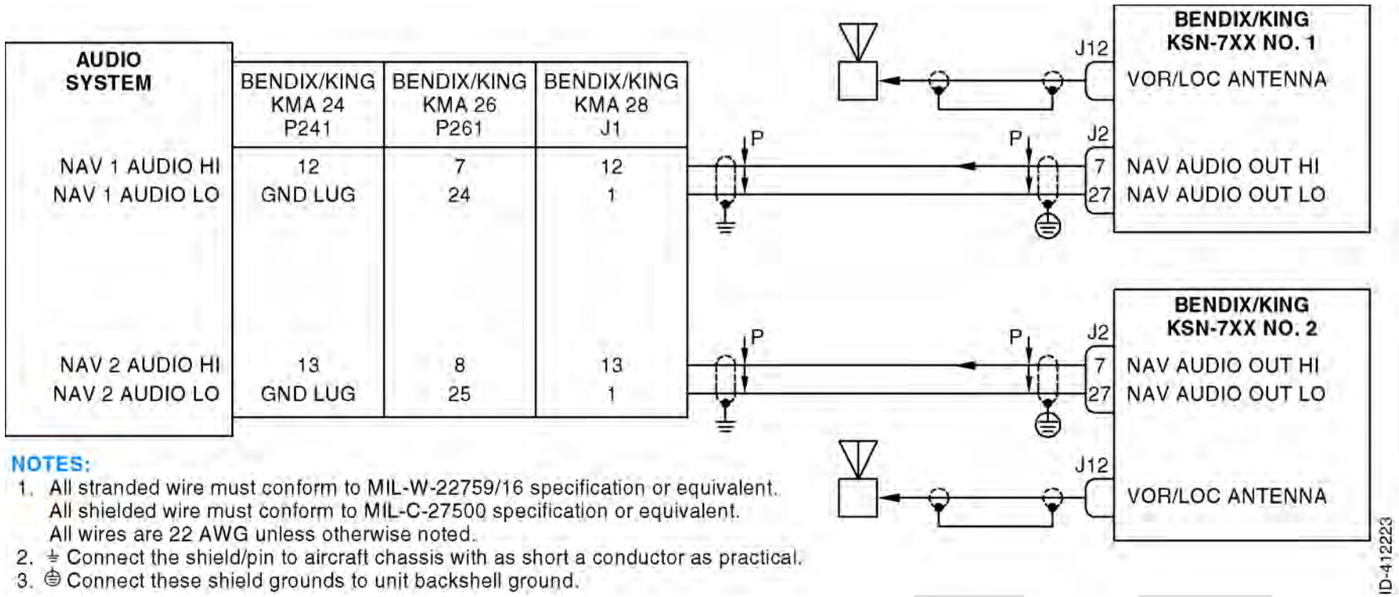

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.

Figure 3-36. NAV Interface Interconnect Diagram (Sheet 1 of 1)

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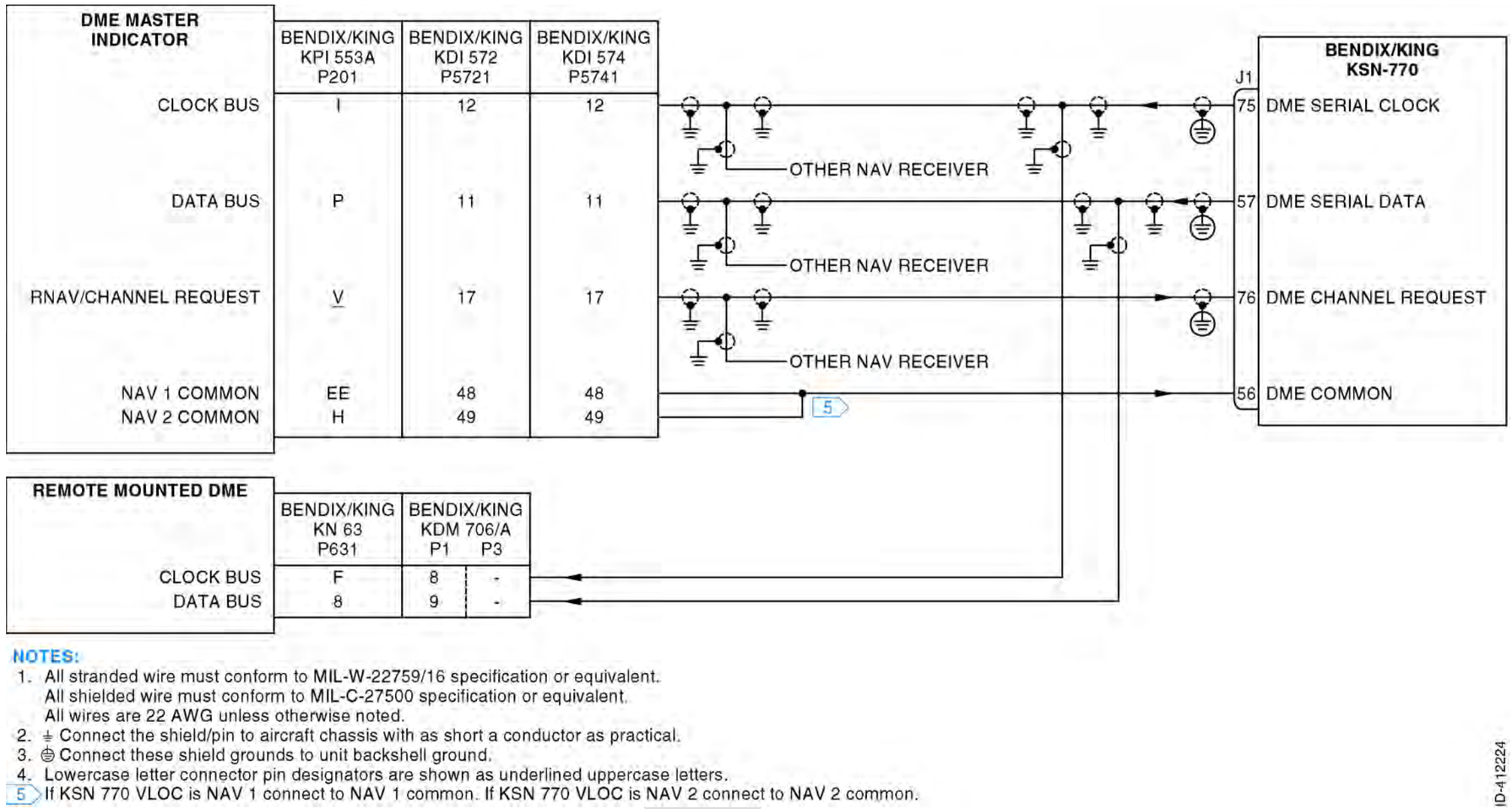
Draft as of 10/15/2012



NOTES:
1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.
5. If KSN 770 VLOC is NAV 1 connect to NAV 1 common. If KSN 770 VLOC is NAV 2 connect to NAV 2 common.

ID-412224

Figure 3-37 & 3-38 seems to be a duplicate of Figure 3-16 & 3-17. They are wrong, because it has the RNAV/Channel Request and DME Channel Request confused and shown incorrectly. There is no DME Channel request. There is an RNAV/Channel Request and a DME Request and they are different functions.

Figure 3-37. NAV Interface - Remote DME Channeling Interconnect Diagram (Sheet 1 of 1)

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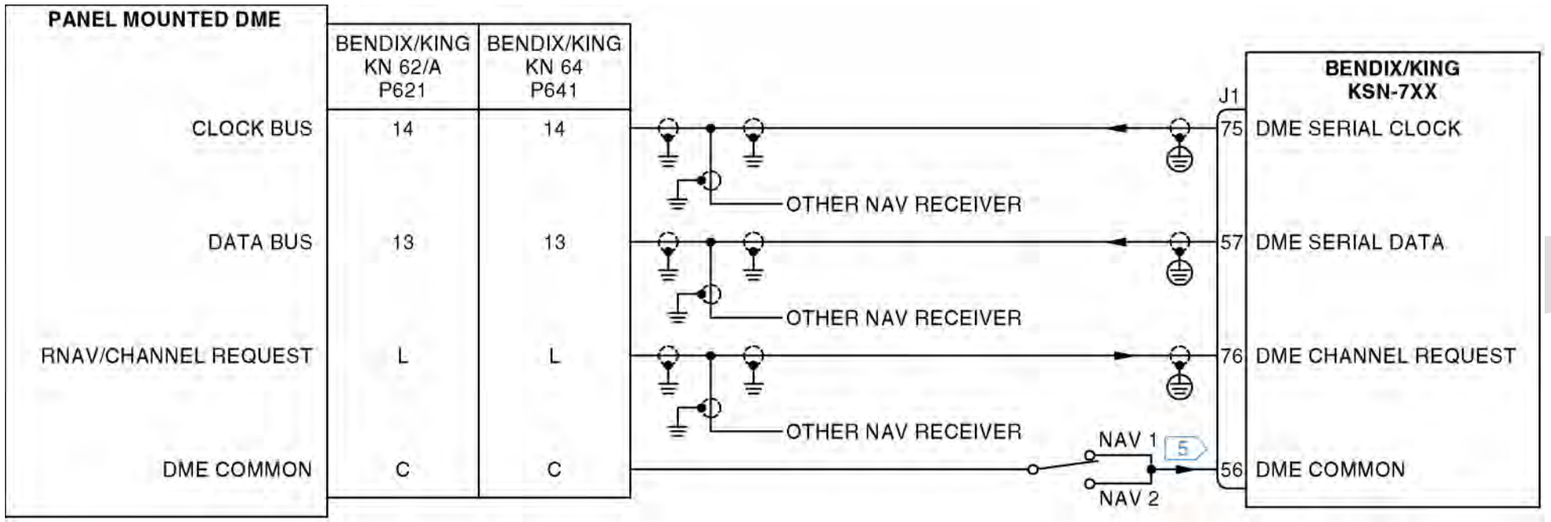

NOTES:

1. All stranded wire must conform to MIL-W-22759/16 specification or equivalent.
   All shielded wire must conform to MIL-C-27500 specification or equivalent.
   All wires are 22 AWG unless otherwise noted.
2. ⏚ Connect the shield/pin to aircraft chassis with as short a conductor as practical.
3. ⏚ Connect these shield grounds to unit backshell ground.
4. Lowercase letter connector pin designators are shown as underlined uppercase letters.
5. If KSN 770 VLOC is NAV 1 connect to NAV 1. If KSN 770 VLOC is NAV 2 connect to NAV 2.

ID-412225

Figure 3-37 & 3-38 seems to be a duplicate of Figure 3-16 & 3-17. They are wrong, because it has the RNAV/Channel Request and DME Channel Request confused and shown incorrectly. There is no DME Channel request. There is an RNAV/Channel Request and a DME Request and they are different functions.

Figure 3-38. NAV Interface - Panel Mount DME Channeling Interconnect Diagram (Sheet 1 of 1)

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3.22 Data Bus Information

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SECTION IV
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