

Honeywell

***SYSTEM INSTALLATION
MANUAL***

BENDIX/KING[®]

KMH 880/KTA 870

***MULTI-HAZARD AWARENESS
SYSTEM/TRAFFIC ADVISORY
SYSTEM***

***MANUAL NUMBER 006-10609-0000
REVISION 0 OCTOBER, 2000***

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KMH 880/KTA870

***MULTI-HAZARD AWARENESS
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REVISION HISTORY AND INSTRUCTIONS

MANUAL KMH 880/KTA 870 System Install Manual
REVISION 0, October, 2000
PART NUMBER 006-10609-0000

Add, delete or replace pages as indicated below and retain all tabs and dividers. Insert this page immediately behind the title page as a record of revisions. This revision level of this manual consists of the following individual publications:

PAGE	ACTION
Initial Release	Insert Entire Manual

THIS PAGE IS RESERVED

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SECTION 1

GENERAL INFORMATION

1.0 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the KMH 880/KTA 870 Multi-Hazard Awareness System. It includes the basic guidelines, considerations and recommendations for the installation and ground checkout of KMH 880/KTA 870 Multi-Hazard Awareness System and associated components. It is intended to provide the detail required to assist the installer in preparation for installation and appropriate work instructions to ensure a proper installation and checkout.

This manual assumes a familiarity with avionics installation practices, with systems on board the aircraft and access to manuals and regulations commensurate with the installation of such equipment.

The information contained herein, together with the general procedures outlined in FAA AC.43.13-1B and AC.4313- 2A should be followed carefully to ensure a safe and electrically sound system installation.

The contents of this manual are for information and reference use only and must not be construed as a formal FAA approved work authorization.

It is highly recommended that prior to beginning the installation of the KMH 880/KTA 870 system that this manual is carefully reviewed. Upon review the necessary configuration items and system requirements will be identified allowing a speedy installation.

Operational information is contained in the KMH 880/KTA 870 Operators Manual supplied with each unit.

1.1 PURPOSE

This manual will describe the detailed system requirements for the Bendix/King KMH 880 Multi-Hazard Awareness System and KTA 870 Traffic Advisory System . The KMH 880 combines TAS (Traffic Advisory System) with EGPWS (Enhanced Ground Proximity Warning System). The KTA 870 has TAS only.

1.2 APPLICABILITY OF THE SYSTEM MANUAL

1.2.1 Equipment Applicability

This manual is applicable only to KMH 880/KTA 870 Multi-Hazard Awareness System part numbers displayed in the table below:

UNIT	NOMENCLATURE	PART NUMBER
KTA 810	Traffic Advisory Unit	066-01152-0101
KMH 820 w/o GPS	Multi-hazard Awareness Unit	066-01175-0101
KMH 820 w/GPS	Multi-hazard Awareness Unit	066-01175-2101

Table 1-1 KMH 880/KTA 870 Applicable Versions

1.3 SYSTEM DESCRIPTION

1.3.1 Basic EGPWS System

The KMH 880 EGPWS is a revolutionary new step in Controlled Flight Into Terrain (CFIT) protection. It is capable of producing advanced alerting for prevention of CFIT accidents. In addition to the alerting protection the system will also produce a terrain display. This display depicts relative terrain in reference to the lateral and vertical positions of the aircraft.

The EGPWS is intended for Light Turbine and Piston Aircraft Operations. It has effective operational performance in providing timely alerts and operational terrain display to enhance situational awareness. This performance, coupled to the system's simplicity, practicality, small size and weight, with a minimum number of required aircraft sensors, provides a formidable safety value.

NOTE

The EGPWS portion of the KMH 820 is not suitable for helicopter operation.

No Radio Altimeter, Landing Gear or Flap discretes, or Glideslope receiver are necessary. This significantly lowers the installation costs.

The KMH 880 is a system designed to minimize the system requirements down to a level economical to the private pilot. It is the central component in the system providing timely alerts and optional display of impending terrain incursions.

The KMH 880 is a TSO C151A class B compliant system.

1.3.2 Basic TAS System

The Airborne TAS system is capable of surveillance of aircraft equipped with transponders (i.e., Mode S and Mode C) able to reply to ATCRBS Mode C interrogations in their operational environments. This is a step toward determining potential collisions and displaying traffic advisory information to the pilot. The TAS system will interoperate with the U.S. National Standard Air Traffic Control Radar Beacon System (ATCRBS) and perform reliably out to a range of ten nautical miles for densities up to 0.08 aircraft per square nautical mile while complying with all ATCRBS signals-in-space requirements. The TAS equipment will not degrade either the electromagnetic or the air traffic environment.

When all features are implemented the equipment has the capabilities of the Traffic Advisory System (TAS) defined by TSO-C147.

The TAS system will provide:

- (1) An alert to the pilot using an audible and visual advisory of the proximity of an intruder aircraft.
- (2) The range to ± 0.1 nautical mile, altitude (if reported by surveilled aircraft), and relative bearing of intruder aircraft with maximum installed accuracy of $\pm 30^\circ$ with high reliability. If the intruder aircraft is transponder equipped, within ten nautical miles, $\pm 10,000$ feet relative altitude, and TAS is not in interference limiting, it will be reliably detected and reported.
- (3) Timely data that does not lag more than 2 seconds behind the actual relative position as seen by the pilot during normal flight operations.
- (4) Probability of displaying false targets will be less than 2%. If they are displayed, they will not persist for more than a few seconds.
- (5) No increase of traffic on the Secondary Surveillance Radar radio frequencies in a manner that degrades the ATC system.
- (6) Display of indications that do not encourage the pilot to maneuver without first visually acquiring the other aircraft and determining that a maneuver is required.

1.3.3 System Components

The KMH 880 Multi-Hazard Awareness System shall be composed of the KMH 820 (TAS/EGPWS Processor), a top mounted directional antenna (KA 815), a bottom mounted antenna (monopole or directional antenna which shall provide estimated bearing of target aircraft), a top mounted GPS antenna (KA 92), and a Configuration Module (CM 805).

A Multifunctional Display Unit, KMD 540, shall provide control and display of traffic (via the KAC 504 Traffic Card) and control and display of EGPWS data (via the KAC 502 Adapter Card). Other displays that are compatible with ARINC 735A may be used for traffic with this system. See Figure 1-1.

The KTA 870 Traffic Advisory System is similar to the KMH 880 except the KTA 810 Traffic Advisory Unit has only TAS and not EGPWS. The KTA 870 system does not use a KA 92 GPS antenna. See Table 1-2 and Table 1-3 for a complete description and part number listing for both systems.

KMH 880 SYSTEM PRIMARY LRUs			
System Component	LRU Manufacturer/ Model Designator	LRU Description	LRU Part Number
TAS/GA EGPWS Processor	Bendix/King KMH 820	Multi-Hazard Awareness Processor	066-01175-0101 066-01175-2101
Directional Antenna	Bendix/King KA 815	TAS Directional Antenna	071-01599-0100
GPS Antenna	Bendix/King KA 92	GPS Antenna	071-01553-0200
Configuration Module	Bendix/King CM 805	Configuration Module	071-00112-0100
Control Panel/Display	Bendix/King KMD 540	Multi-function Display	066-04035-0X01
	Bendix/King KAC 502	EGPWS Card	071-00158-0211
	Bendix/King KAC 504	Traffic Card	071-00166-0411

Table 1-2 KMH 880 LRUs

KTA 870 SYSTEM PRIMARY LRUs			
System Component	LRU Manufacturer/ Model Designator	LRU Description	LRU Part Number
TAS Processor	Bendix/King KTA 810	TAS Processor	066-01152-0101
Directional Antenna	Bendix/King KA 815	TAS Directional Antenna	071-01599-0100
Configuration Module	Bendix/King CM 805	Configuration Module	071-00112-0100
Control Panel/Display	Bendix/King KMD 540	Multi-function Display	066-04035-0X01
	Bendix/King KAC 504	Traffic Card	071-00166-0411

Table 1-3 KTA 870 LRUs

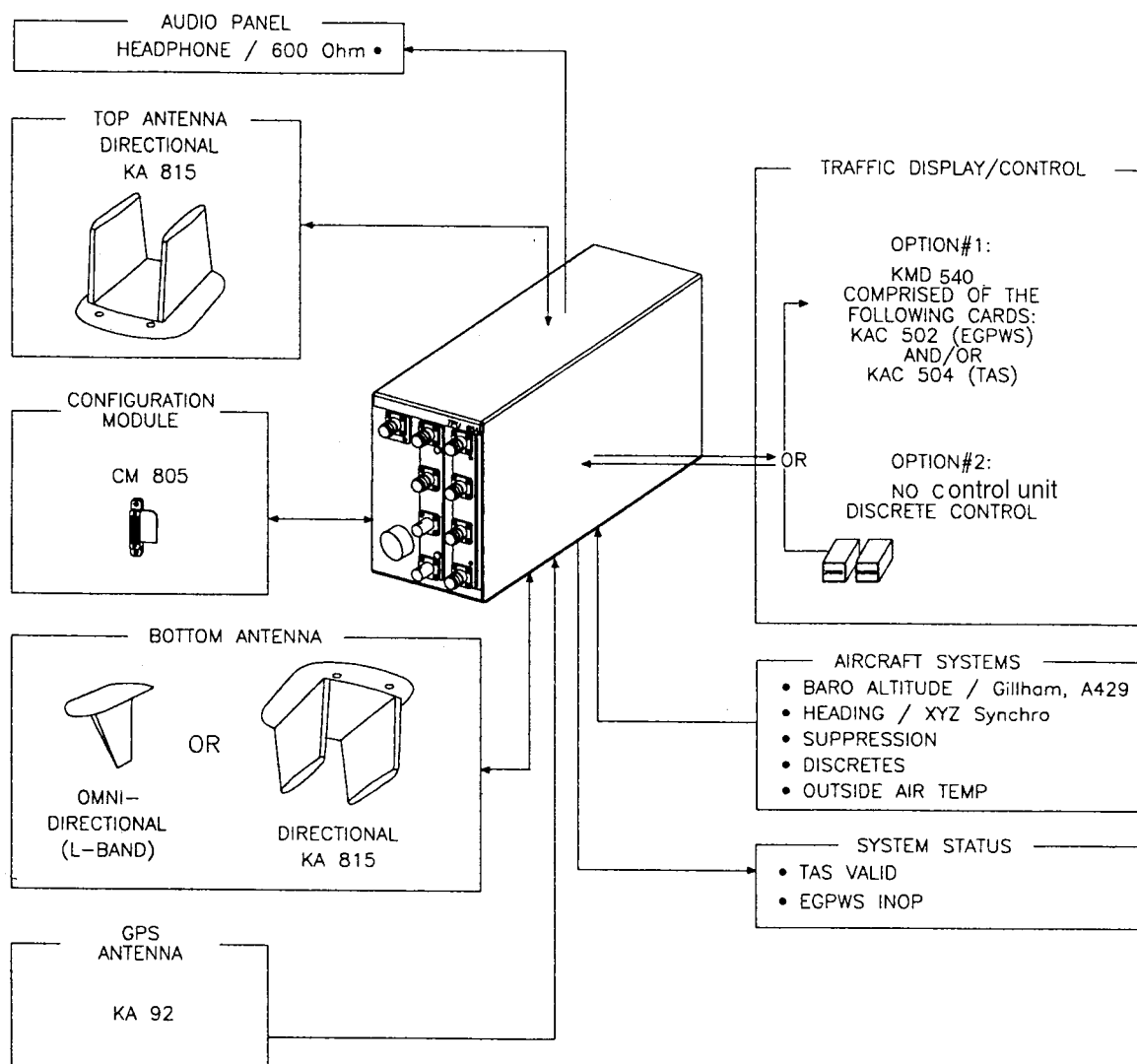


Figure 1-1 KMh 880/KTA 870 System

1.3.4 System Operation

A. EGPWS System

1. EGPWS Modes of Operation

a. TSO Mode

The EGPWS has provisions to allow the selection of alerting/warning curves which comply with the requirements of TSO C151a class B or an alternate set of warning curves which are optimized for some General Aviation operations which do not require compliance with TSO C151a-class B.

This option is programmed into the EGPWS configuration module during system installation and thus remains specific to the aircraft. Once set up, any Enhanced Ground Proximity Warning Computer installed in the aircraft will access the configuration module and provide the appropriate mode of operation.

NOTE

All aircraft, which are required by Federal Aviation Regulations to have Terrain Awareness and Warning System (TAWS) comply with TSO C151a-class B, must be configured with the TSO curves. Additionally, the alternate Audio Menu must be selected to meet the alert/warning aural requirements of the TSO.

b. Non-TSO Mode

If this installation is intended to provide the operator with a non-required Terrain Awareness and Warning System to enhance safety of flight, it may be appropriate to select the Non-TSO Mode of operation. As a general rule, higher performance aircraft, especially ones flown primarily IFR and operating into larger airports may find the TSO curves most appropriate. Slower performance aircraft operating primarily VFR and operating at low altitudes AGL into small airports may find the Non-TSO curves better suit their operation. Any installation not required to comply with TSO C151a-class B may select either the Basic Audio menu or the Alternate Audio menu.

The EGPWS may also be installed in aircraft that do not require FAA approved TAWS Systems, and may be utilized with an optional set of alerting and warning parameters that are designed especially for smaller piston aircraft and their normal flight characteristics.

c. GPS Sensor

The KMH 880 contains an embedded GPS-XPRESS Card sensor that produces validated navigational position data by continuous signal acquisition and tracking of the navigational satellite network. The GPS Sensor receives the C/A code signals transmitted by the satellite network on the L1 frequency of 1575.42 MHz. The sensor has 8 signal processing channels allowing 8 satellites to be tracked simultaneously. At least 4 satellites must be in view of the antenna for the sensor to operate. The GPS Sensor uses data in the satellites' navigation messages to solve for latitude, longitude, altitude, horizontal velocity, vertical velocity and current UTC.

GPS Data can also be supplied via the ARINC 743, 743A and RS 232 (KLN94) interfaces.

A GPS Antenna Splitter could be used in lieu of installing another antenna.

B. TAS System

1. TAS Modes of Operation

a. Setup Mode

The system shall be configured using an external PC via the Diagnostic (RS 232) Interface. Reference the Appendices for the programming procedures.

b. Standby Mode

When the Standby mode is selected, the TAS Processor shall disable surveillance and tracking operations.

The Standby mode may be activated by any of the following: discrete selection, self-test, aircraft on ground (configuration option), or system failure.

c. Functional Test Mode

When the Functional Test mode is selected, the unit shall be placed into the Standby mode and the Functional Test portion of BITE shall be performed.

d. TAS Operation (Traffic Advisory) Mode

When the TAS Operation mode is selected, the TAS Processor shall perform all the surveillance functions and shall provide for the generation of traffic advisories. The information conveyed in the traffic advisories is intended to assist the flight crew in sighting nearby traffic.

e. TAS Processor

The TAS Processor shall provide intruder surveillance and tracking, generating traffic advisories for both Altitude-Reporting and Non-Altitude-Reporting intruders to display potential conflicts and advisories to the flight crew.

The TAS Processor shall track intruders under surveillance and analyze range and range rate data, and altitude of the traffic to determine whether that intruder represents a threat.

The TAS Processor shall also select "proximate traffic" and "other traffic" intruders to be displayed on the basis of their altitude relative to own aircraft. The "other traffic" intruders are those that do not qualify to be TA or proximate traffic but are displayed.

NOTE

Optional (The TAS Processor may be controlled using discrete inputs).

C. Options

1. Display Option

TSO C151a-class B does not require a display for terrain data, however, if at all possible, terrain data should be displayed for the aircraft operator. The terrain display greatly improves situational awareness. The EGPWS supports numerous displays including traditional Radar displays as well as mode modern MFD's.

Installations, which include a display, will also need to provide the EGPWS with range data via ARINC 429 format.

2. Altitude Monitor Option

The EGPWS has the ability to monitor altitude sources and provide cautionary messages should an altitude source be suspected of being in error. This feature compares barometric altitude with GPS altitude and generates a "Check Altitude" message when an error is detected. This is a highly recommended option, which can alert a pilot to problems such as a stuck altimeter or plugged static port. This option requires no additional hardware and is enabled during the system installation by programming the configuration module. This feature can provide both audio and display messages.

3. Outside Air Temperature (OAT) (Recommended)

The EGPWS supports an OAT 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 EGPWS. If the aircraft is equipped with an Air Data Computer which outputs Digital data with Corrected Altitude on an ARINC 429 port, this can be used instead of an encoder and external OAT Probe. OAT is programmed into the configuration module during system installation.

1.4 TECHNICAL CHARACTERISTICS

KMH 820 w/o GPS MULTI-HAZARD AWARENESS UNIT P/N 066-01175-0101	
TSO COMPLIANCE:	See TSO Appendix E
PHYSICAL DIMENSIONS:	See Figure 2-1
WEIGHT:	9.32 lbs.
Installation Kit	050-03361-0000
POWER REQUIREMENTS:	Voltage Nominal: +28 Vdc Range: +22 to +30 Vdc Current Nominal: 1.3 ± 0.2 A Max Operating 1.65 ± 0.2 A Bootup: 3.3 ± 0.5 A Power 46 ± 2.3 Watts

Table 1-4 KMH 820 w/o GPS Multi-Hazard Awareness Unit Technical Specifications

KMH 820 w/ GPS MULTI-HAZARD AWARENESS UNIT P/N 066-01175-2101	
TSO COMPLIANCE:	See TSO Appendix E
PHYSICAL DIMENSIONS:	See Figure 2-1
WEIGHT:	9.68 lbs.
Installation Kit	050-03361-0000
POWER REQUIREMENTS:	Voltage Nominal: +28 Vdc Range: +22 to +30 Vdc Current Nominal: 1.3 ± 0.2 A Max Operating 1.65 ± 0.2 A Bootup: 3.3 ± 0.5 A Power 46 ± 2.3 Watts

Table 1-5 KMH 820 w/ GPS Multi-Hazard Awareness Unit Technical Specification

KTA 810 TRAFFIC ADVISORY UNIT P/N 066-01152-0101	
TSO COMPLIANCE:	See TSO Appendix E
PHYSICAL DIMENSIONS:	See Figure 2-1
WEIGHT:	8.75 lbs
Installation Kit	050-03361-0000
POWER REQUIREMENTS:	Voltage Nominal: +28 Vdc Range: +22 to +30 Vdc Current Nominal: 1.15 ± 0.2 A Max Operating 1.45 ± 0.2 A Bootup: 2.9 ± 0.5 A Power 41 ± 2.3 Watts

Table 1-6 KTA 810 Traffic Advisory Unit Technical Specifications

CM 805 CONFIGURATION MODULE P/N 071-00112-0100	
TSO COMPLIANCE:	See TSO Appendix E
PHYSICAL DIMENSIONS:	See Figure 2-2
WEIGHT:	0.1 lbs.
POWER REQUIREMENTS	5 Vdc from KMH 820/KTA 810.

Table 1-7 CM 805 Configuration Module Technical Specifications

KA 815 TRAFFIC ANTENNA P/N 071-01599-0100	
TSO COMPLIANCE:	See TSO Appendix E
PHYSICAL DIMENSIONS:	See Figure 2-3
WEIGHT:	0.95 lbs.
Installation Kit	050-03622-0000
MOUNTING:	See Figure 2-4 and 2-5
POWER REQUIREMENTS	None

Table 1-8 KA 815 Traffic Antenna Technical Specifications

KA 92 GPS ANTENNA P/N 071-01553-0200	
TSO COMPLIANCE:	See TSO Appendix E
PHYSICAL DIMENSIONS:	See Figure 2-6
WEIGHT:	0.27 lbs.
Installation Kit	050-03318-0000
MOUNTING:	See Figure 2-6
POWER REQUIREMENTS	5v supplied by the GPS receiver.

Table 1-9 KA 92 GPS Antenna Technical Specifications

1.5 UNIT AND ACCESSORIES SUPPLIED

1.5.1 TAS Processor Unit

The TAS Processor will provide intruder surveillance and tracking, generating traffic advisories for both Altitude-Reporting and Non-Altitude-Reporting intruders to display potential conflicts and advisories to the flight crew.

The TAS Processor will track intruders under surveillance and analyze range and range rate data, and altitude of the traffic to determine whether that intruder represents a threat.

SYSTEM COMPONENT	MANUFACTURER/ MODEL DESIGNER	DESCRIPTION	PART NUMBER	TSO COMPLIANCE
TAS/GA EGPWS Processor	Bendix/King KMh 820	Multi-Hazard Awareness Processor	066-01175-0101 066-01175-2101	TSO C147 TSO C151a
TAS Processor	Bendix/King KTA 810	TAS Processor	066-01152-0101	TSO C147

Table 1-10 KMh 820/KTA 810 Processor Units

1.5.2 Configuration Module

The Configuration Module contains two EEPROMs, one for the TAS Processor and one for the EGPWS.

The Configuration Module will be remotely mounted in the airframe. It will be mapped with the Configuration at the installation of the system. An external PC program will be available to the installer to initialize/program the configuration module. Reference this Install Manual, Section IV for the programming procedures. A system failure will be annunciated if the configuration module is not programmed, not compatible with the current TAS processor software or if the CRC read from the module is incorrect.

SYSTEM COMPONENT	MANUFACTURER/ MODEL DESIGNER	DESCRIPTION	PART NUMBER	TSO COMPLIANCE
Configuration Module	Bendix/King CM 805	Configuration Module	200-00112-0100	TSO C147 TSO C151a

Table 1-11 CM 805 Configuration Module

1.5.3 Antennas

Full bearing coverage will be achieved by the use of a top and bottom directional antenna system. The TAS Processor will also be capable of supporting a top directional and bottom monopole antenna configuration. In the latter configuration, only intruders being tracked via the top directional antenna will have bearing information.

The antennas will be vertically polarized and cover 360 degrees in azimuth and at least -10 to +20 degrees in elevation.

SYSTEM COMPONENT	MANUFACTURER/ MODEL DESIGNER	DESCRIPTION	PART NUMBER	TSO COMPLIANCE
Directional Antenna	Bendix/King KA 815	TAS Directional Antenna	071-01599-0100	TSO C147
GPS Antenna	Bendix/King KA 92	GPS Antenna	071-01553-0200	TSO C129
Omni-Directional Antenna	Dorne and Margolin	L-Band Antenna	DM NI50-2-2*	TSO C66a TSO C74

Table 1-12 KA 815/KA 92 Antennas

* This antenna has not been tested for direct effects of lightning and the installer must determine the suitability of the antenna for the specific installation.

CABLE TYPES AND PERMISSABLE GPS CABLE RUN LENGTHS (8dB allowable loss, including splitter.)	
CABLE TYPE	CABLE RUN LENGTH (W/O Splitter)
* R/G 142B/U P/N 024-00002-0000	Up to 46 ft.
* R/G 400/U P/N 024-00051-0060	Up to 46 ft.
* These cables use R/G 142/400 style connectors. Note: When using Non-KPN or Non-standard P/N cables, connectors etc., the installer has the responsibility of proving airworthiness.	

Table 1-13 GPS Cable Run Lengths

1.6 INSTALLATION ACCESSORIES SUPPLIED

1.6.1 KMH 820/KTA 810 Installation Kit

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	-0000
	200-09894-0000	Rack, KMH 820/ KTA 810	[EA]	1
J10	D38999/26FJ35SN	128 Pin I/O Connector	[EA]	1
	M85049/38-25N	Strain Relief for 128 Pin I/O Connector	[EA]	1
J4,J8	030-00005-0002	TAS Antenna Ports, BNC Connectors	[EA]	2
J1-J3, J5-J7, J9	030-00134-0000	Connector, TNC	[EA]	7
	071-00112-0100	CM 805 Configuration Module	[EA]	1
	030-01171-0000	Conn Sub-D HSG 9S (Female Pins)	[EA]	2
	010-00135-0000	Terminals	[EA]	2
	010-00068-0026	Terminals	[EA]	8
	150-00072-0000	Solder Sleeve	[EA]	8
	030-01157-0011	Socket Contact	[EA]	6
	030-01451-0000	Socket Contact 22 ga	[EA]	15
	030-01464-0000	9 Pin Plastic Hood	[EA]	2
	030-01428-0001	EMI Hood W/ Lock 15 Pin High Density	[EA]	1
	030-03447-0001	High Density 15 Pin Female DSub	[EA]	1
	155-06060-0000	KMH 820/KTA 810 Installation Drawing	REF	

Table 1-14 KMH 820/KTA 810 Installation Kit P/N 050-03361-0000

1.6.2 Antenna Installation Kits

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	-0000
	071-01599-0100	KA 815 Antenna	[EA]	1
	M39012/30-0101	Connector, TNC Rt Angle	[EA]	4
	MS29513-148	KA 815 O-Ring	[EA]	1
	MS24693-C54	Screw PHP 8-32x.875	[EA]	4
	155-06059-0000	KA 815 Installation Drawing	REF	

Table 1-15 KA 815 Installation Kit P/N 050-03622-0000

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	-0000
	030-00134-0001	Connector, TNC Rt Angle	[EA]	1
	047-10735-0002	Antenna DBLR Complete	[EA]	1
	089-05909-0012	Screw PHP 8-32x3/4	[EA]	4
	187-01831-0000	Antenna Gasket	[EA]	1
	155-06019-0000	KA 92 INstallation Drawing	REF	

Table 1-16 KA 92 Installation Kit P/N 050-03318-0000

1.6.3 Databases

PART NUMBER	DESCRIPTION	[UOM]
071- 00167-0101	America's Database	[EA]
071-00167-0102	Atlantic Database	[EA]
071-00167-0103	Pacific Database	[EA]

Table 1-17 KMH 880/KTA 870 Databases

1.7 ACCESSORIES REQUIRED BUT NOT SUPPLIED

1.7.1 Temperature Probe

The EGPWS 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 EGPWS

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	-0001
	137-00042-0001	OAT Probe	[EA]	1
	MS3106E12S-3S	OAT Probe Connector	[EA]	1
	090-01034-0001	OAT Probe Mounting Kit	[EA]	1
	010-00068-0016	Crimp Terminal	[EA]	1

Table 1-18 Temperature Probe P/N 050-03610-0002

NOTE

The EGPWS Processor does not require a Temperature Probe input if a Digital Air Data Computer, with an OAT Label present on the bus, is available as an interface.

1.7.2 GPS Antenna Splitter

To have the flexibility of using an existing KA 92 GPS Antenna, Honeywell offers a splitter that will greatly simplify the installation procedure. One of the split ports is DC blocked from the common port so that equipment voltage regulators do not conflict.

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	QTY
	050-03610-0003	GPS Antenna Splitter Kit	[EA]	1
	030-00134-0000	TNC Connector Straight	[EA]	3
	030-00134-0001	TNC Connector Rt Angle	[EA]	1

Table 1-19 GPS Antenna Splitter P/N 071-01600-0001

1.7.3 Miscellaneous

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	QTY
	050-03610-0000	Basic Annunciator Kit	[EA]	1
	050-03610-0001	Terrain Switching Kit	[EA]	1

Table 1-20 Miscellaneous Accessories

NOTE:

Specification Drawing 031-00810-01 defines all of the sub-assembly parts and spacers to cover different panel thicknesses (Sheet 2). Artwork definitions for associated items are also covered (Sheet 3).

1.7.4 CABLE AND WIRE

SYMBOL	PART NUMBER	DESCRIPTION	[UOM]	QTY
	M17/158-RG400	Coaxial Cable	[FT]	AR
	MIL-W-22759/16 or Equivalent.	Wire	[FT]	AR
	M17/176-00002	Shielded Wire	[FT]	AR
	MIL-C-27500 or Equivalent.	Shielded Wire	[FT]	AR

Table 1-21 Cable and Wire

1.8 LICENSE REQUIREMENTS

There are no license requirements for the KMH 880/KTA 870 Multi-Hazard/Traffic Advisory System.

1.9 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

FAR Part 23.1529, 25.1529, 27.1529, AND 29.1529 Instructions for Continued Airworthiness is met per the following Instructions:

Design and manufacture of the equipment will provide for installation so as not to impair the airworthiness of the aircraft.

1.9.1 KMH 820/KTA 810 Unit

If the unit should require maintenance, remove the unit and have it repaired by an appropriately rated Honeywell approved Instrument Service Center. If the aircraft is to fly with the KMH 820/KTA 810 removed, secure the connector(s) as necessary and placard the aircraft accordingly. After re-installation of the unit, accomplish the appropriate Post Installation Checkout in Section IV.

During each annual or 100 hour inspection of the aircraft, perform a Level 2 Self Test of the KMH 820/KTA 810 as defined in the Post Installation Checkout in Section IV.

1.9.2 Annunciators/Relays

If an annunciator bulb needs replacement, use a bulb with the same type and voltage rating as originally installed. If a relay malfunctions, replace it with an airworthy relay having the same part number. If a combination annunciator/relay unit is used, e.g. MD41-1208/1308, remove the unit and have it repaired by a factory-rated service center. If the aircraft is to fly with a relay or annunciator removed, secure the connector(s) as necessary and placard the aircraft accordingly. After re-installation of the unit, accomplish the appropriate Post Installation Checkout in Section IV.

1.9.3 GPS Antenna

If the GPS Antenna should fail, replace it with an airworthy antenna having the same part number. Verify good electrical bonding surfaces before installing the antenna. Ensure that antenna radome is clean and not covered with paint. After re-installation of the antenna, accomplish the appropriate Post Installation Checkout in Section IV.

1.9.4 GPS Antenna Splitter

If the GPS Antenna Splitter should fail, replace it with an airworthy antenna splitter having the same part number. The signal loss between the GPS Antenna and the GPS Receiver cannot exceed 8 dB. After re-installation of the GPS Antenna Splitter, accomplish the appropriate Post Installation Checkout in Section IV.

1.9.5 Temperature Probe

If the KMH 820/KTA 810 Self Test indicates a failure of the temperature probe, replace the temperature probe with an airworthy temperature probe having the same part number. After installation of the temperature probe, accomplish the appropriate Post Installation Checkout in Section IV.

1.9.6 Wires and Coax Cables

During ON-condition or regularly scheduled maintenance, inspect the wires and coax cables following the guidelines listed in AC 43.13-1B Chapter 11 as necessary.

1.9.7 Terrain Data Base Updates

To order database updates contact Honeywell International Inc., Navigation Services:

Honeywell International Inc.
Aerospace Electronic Systems
One Technology Center
23500 West 105th Street
Olathe, Kansas 66061 USA
Attn: Navigation Services MS 66

Phone: (800) 247-0230 within the United States or Canada
(913) 712-3145 outside of the United States or Canada
FAX: (913) 712-3904

e-mail: nav.database@honeywell.com

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SECTION II

INSTALLATION

2.0 INTRODUCTION

This section contains suggestions and factors to consider before installing the KMH 880/KTA 870 System. Close adherence to these suggestions will assure satisfactory performance from the equipment.

NOTE

The conditions and tests performed on the system components are minimum performance standards. It is the responsibility of those desiring to install the KMH 880/KTA 870 either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. The KMH 880/KTA 870 may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the administrator.

2.1 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 the packing materials to substantiate your claim. The claim should be filed as soon as possible. The shipping container and all packing material should be retained in the event that storage or re-shipment of the equipment is necessary.

2.2 EQUIPMENT INSTALLATION

2.2.1 General

The following paragraphs contain information pertaining to the installation of the KMH 880/KTA 870 System, including instructions concerning location and mounting of the antennas.

The equipment should 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 should 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 SHOULD 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 KMH 880/KTA 870 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 should be carefully considered before installing your system.

2.2.2 Avionics Cooling Requirements

The most important contribution to improved reliability of all avionics equipment is to limit the maximum operating temperature of the individual unit, whether panel mounted or remote mounted. While modern circuit designs consume less total energy, the heat dissipated per unit volume (Watts/cubic inch) remains much the same due to contemporary high density packaging techniques. While each individual unit may not require forced air cooling, the combined heat generated by several units operating in a typical panel or rack, can significantly degrade the reliability of the equipment. Consequently, the importance of providing force air cooling to avionics equipment mounted in either a panel or rack, is essential to the life span of the equipment. Adequate provisions for cooling should be incorporated during the installation.

2.2.3 Processor Installation

2.2.3.1 Cooling Considerations

The KMH 820/KTA 810 requires no external forced air cooling.

2.2.3.2 Installation Considerations

Consideration should be given to the following items affected by the choice of installation location within the aircraft:

- A. Environmental Considerations
- B. Ease of Interface to aircraft systems

- C. GPS Antenna location and coaxial cable length
- D. Ability to extract and insert new terrain/obstacle Data Bases supplied on a CompactFlash Card.

If possible, install the KMH 820/KTA 810 in a dry, temperature-controlled area such as within the passenger compartment of the aircraft. Standard avionics bays are acceptable as well.

If possible, the KMH 820/ KTA 810 should **NOT** be located in close proximity to equipment which produce considerable heat.

Locations, which require disassembly of the aircraft to gain access, are less desirable.

Any location that is exposed to moisture and/or temperature extremes should be avoided.

Select a mounting location that allows sufficient clearance at the front of the unit for connectors and cables.

Do not bundle data lines or antenna cable with any power cables.

No more than 8.0dB signal loss is allowed in the GPS antenna cable run, including the antenna splitter, (if used). Refer to Note 5 on the Antenna Interface Drawing and Table 1-13 in Section 1 for information on cable types and lengths.

Mount the unit to provide good electrical bonding to airframe ground. Lightning strike protection and RF susceptibility and emission characteristics depend on good electrical grounding of the unit and cable shield returns.

Refer to Figures 2-11 and 2-12 for TNC connector assembly guidelines.

NOTE

The KMH 820/KTA 810 will need to interface to the aircraft audio system, aircraft DC power, panel mounted warning lamps and switches, a source of barometric altitude (usually an encoding altimeter or blind encoder), a GPS antenna and a panel mounted display.

If possible, clearance to the top of the KMH 820 should be provided to facilitate removal and installation of the terrain database CompactFlash card. The terrain database card is removed and installed with power NOT applied to the system. The KMH 820 may be removed from the aircraft to extract and install database cards if the mounting location does not provide enough clearance.

Updating the Terrain DataBase is accomplished by:

Moving the aluminum cover over the CompactFlash card out of the way.

Pressing the flash card ejector button located within the unit.

Removing the old flash card.

Inserting the new flash card and replacing the cover.

If possible, mount the KMH 820 such that the above can be accomplished without requiring disassembly of the aircraft or removal of the KMH 820.

The KMH 820 drives three lamps and accepts input from two switches. The lamps should be identified as:

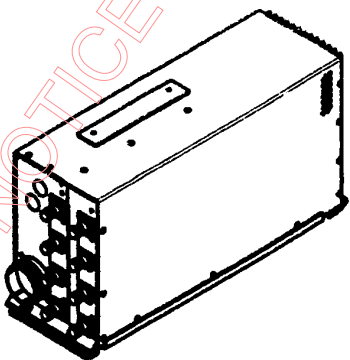
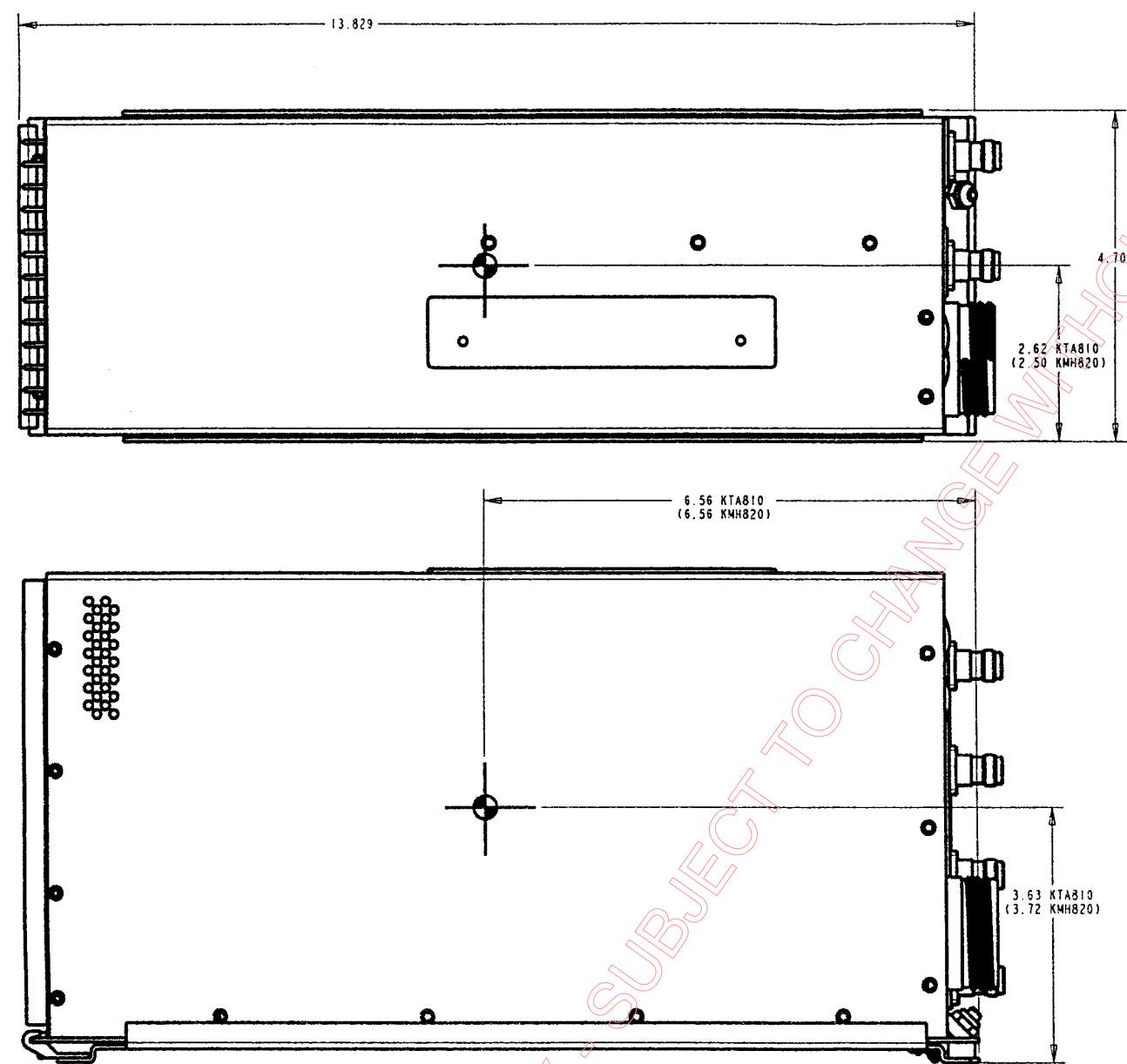
FUNCTION	COLOR	LEGEND
Not Available	Amber	Terrain N/A or Terr N/A
Caution	Amber	Terrain
Warning	Red	Terrain

The RED Warning lamp must be located in the pilot's primary field of view.

The EGPWS provides a single 600 ohm audio output which should be connected to a un-switched/un-muted auxiliary audio input on the aircraft's audio control panel. The audio output power level is set by programming the configuration module.

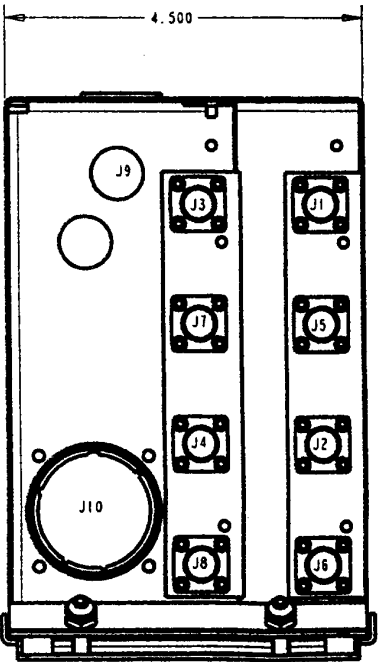
2.2.3.3 Installation Procedure

- A. Slide the unit into the rack and secure it.
- B. Attach the harness to the front mating connector of the unit.
- C. Attach coax cables J1 thru J10 to the front of the unit.



SCALE 0.250

- EXT CONNECTORS:
- J1 TOP SUM ANTENNA 030-00134-0000
 - J2 TOP DIRECTIONAL ANTENNA 1 030-00134-0000
 - J3 TOP DIRECTIONAL ANTENNA 2 030-00134-0000
 - J4 TOP ANTENNA TST 030-00005-0002
 - J5 BOTTOM SUM 030-00134-0000
 - J6 BOTTOM DIRECTIONAL ANTENNA 1 030-00134-0000
 - J7 BOTTOM DIRECTIONAL ANTENNA 2 030-00134-0000
 - J8 BOTTOM ANTENNA TST 030-00005-0002
 - J9 GPS ANTENNA 030-00134-0000 KMH 820 ONLY
 - J10 I/O CONNECTOR 038999/26FJ35SN



- NOTES:
1. DIMENSIONS SHOWN ARE FOR REFERENCE ONLY, NOT FOR INSPECTION
 2. CENTER OF GRAVITY (CG) LOCATIONS ARE APPROXIMATE AND DO NOT INCLUDE MATING CONNECTORS OR CABLES.
 3. WEIGHT = 8.75 KTA810 (9.68 KMH820) LBS NOMINAL +/- 15%
 4. DIMENSIONS ARE IN INCHES. DIMENSIONS ENCLOSED IN BRACKETS ARE IN MILLIMETERS.
 5. GROUND BONDING AREA.
 6. MATING CONNECTOR: P/N 038999/26FJ2535SN
 7. UNIT IDENTITY LABEL, THIS SURFACE.
 8. UNIT VOLUME 380 CU IN.

Figure 2-1 KMH 820/KTA 810 Installation Drawing
Dwg. No. 300-05639-0000 R-0 (Sheet 1 of 2)

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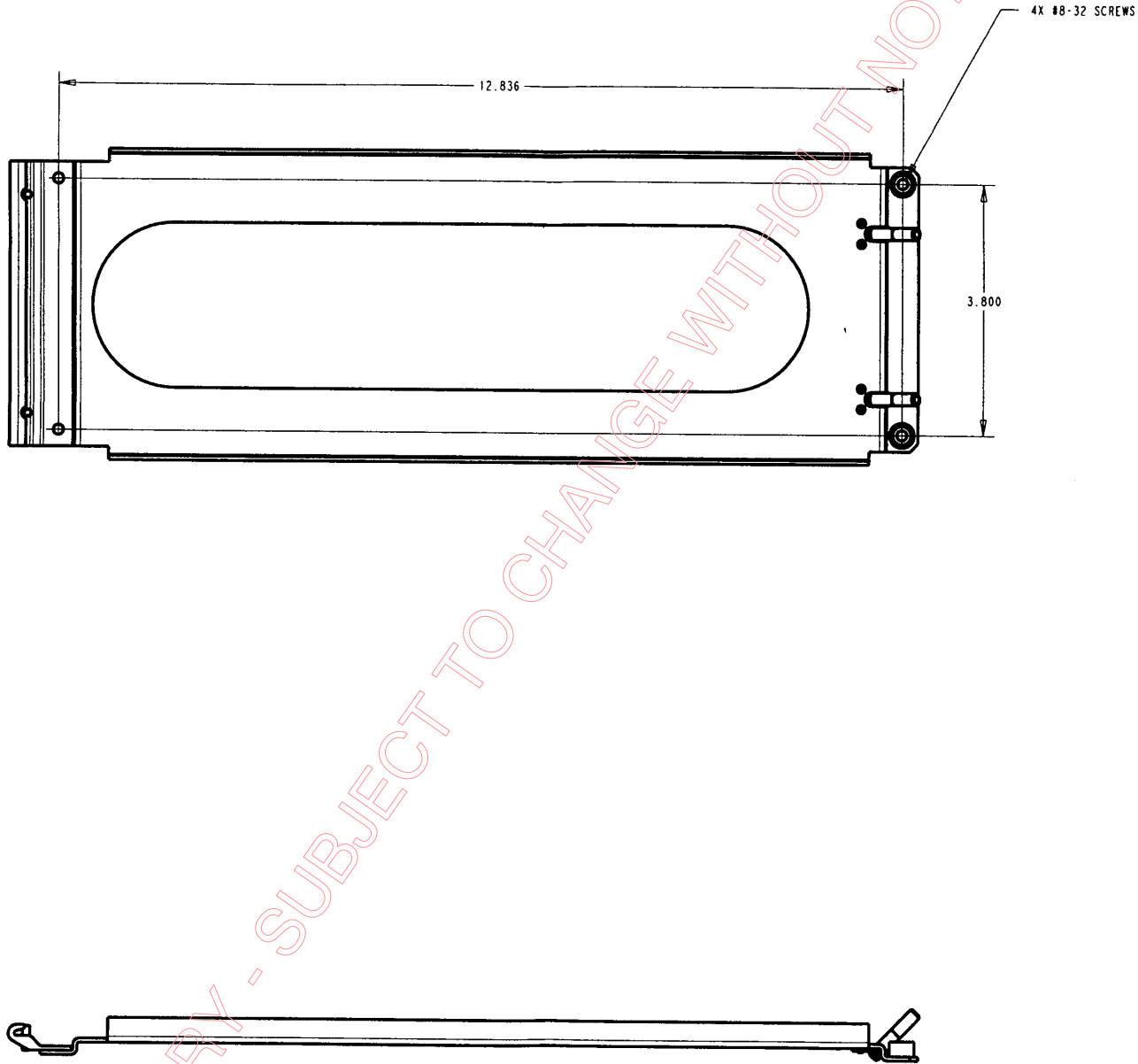


Figure 2-1 KMH 820/KTA 810 Installation Drawing
Dwg. No. 300-05639-0000 R0 (Sheet 2 of 2)

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PRELIMINARY - SUBJECT TO CHANGE WITHOUT NOTICE

2.2.4 Configuration Module Installation

System configuration is defined via a Configuration Module which contains the aircraft interface and functionality definitions specific to the installed aircraft.

2.2.4.1 Cooling Considerations

- A. Make sure that the unit is installed in a location where the ambient temperatures are -67°F to +158°F (-55°C to +70°C).

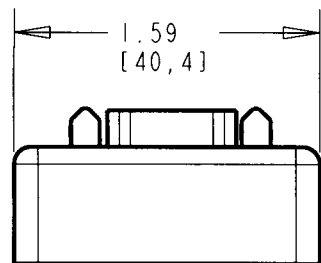
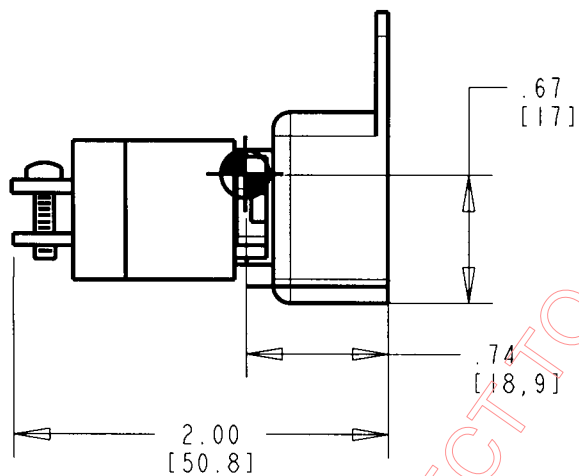
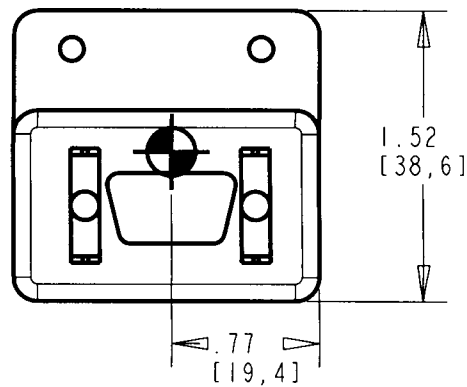
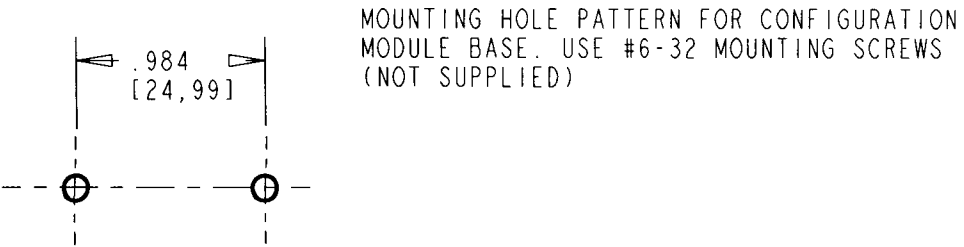
2.2.4.2 Installation Considerations

- A. The Configuration Module must be mounted to the airframe within maximum cable/harness length of 2 feet. Make sure to leave adequate space to mount the Configuration Module when installing the Processor Unit.

2.2.4.3 Installation Procedure

- A. Install the Configuration Module into the airframe. Refer to figure 2- 2 .
- B. Tighten the mounting screws to secure the Configuration Module.

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- NOTES:
1. INSTALLATION OF CM 805 (CONFIGURATION MODULE) IS TO BE WITHIN 2 FEET OF KTA 810 OR KMH 820 INSTALLATION.
 2. ALL DIMENSIONS IN INCHES [MILLIMETERS].
 3.  DENOTES CENTER OF GRAVITY.
C.G. IS THE CENTER OF GRAVITY WITH MATING CONNECTOR HOOD ASSEMBLY..
 4. WEIGHT (INCLUDING MATING CONNECTOR AND HOOD ASSEMBLY) : 0.10 LBS. [.0454 kg]

Figure 2-2 Configuration Module Installation Drawing
Dwg. No. 300-06161-0000 R-0

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2.2.5 DIRECTIONAL ANTENNA INSTALLATION

2.2.5.1 KA 815 Antenna Installation Considerations

A. Antenna Location

NOTE

The following antenna location procedure is provided for guidance purposes and to outline a method of achieving certifiable system performance.

The KMH 880/KTA 870 System uses a top-mounted directional antenna and either a bottom-mounted directional or an L-band omni-directional antenna. Refer to directional antenna outline drawings in Figure 2-3. Mounting the directional antenna **MUST** include the appropriate doubler plate. The installing agency is required to fabricate the doubler plate for the antenna installations.

NOTE

The L-band omni-directional has not been tested for the direct effects of lightning and the installer (TC or STC applicant) must determine the suitability of the antenna for the specific installation.

NOTE

KMH 880/KTA 870 Systems **REQUIRE** that the antenna installation guidelines be followed. Adherence to these guidelines will assure that critical specifications are considered. Optimum bearing accuracy can be achieved by following these directions.

Antenna locations should be chosen so that both antennas appear to be at the same range and bearing from the intruder.

The centerline of the top and bottom-mounted TAS Antenna should be located as close as possible to the aircraft centerline.

The top directional TAS Antenna should be the most forward antenna and as far forward on the constant radius portion on the fuselage as possible.

Obstructions and ground plane discontinuities, such as door hatches, cowlings and unriveted airframe skin overlaps must be 18 inches from the nearest edge of the TAS Antenna. Other antennas, particularly high profile and L-band transponder antennas, cannot be located in front of or within 30 inches (edge to edge) of the top mounted TAS directional antenna. This will ensure a minimum of 20 dB of isolation at 1090 MHz, while minimizing far-field path distortion in the forward quadrants.

- B. Mount the antenna on the aircraft skin which is horizontal during enroute flight. Antenna baseplate must be level within + or - 5° in longitudinal and lateral axes when the aircraft is in level flight. See Figure 2-4.)
- C. The antenna must be mounted on a nearly flat surface such that the antenna contacts the bare metal skin all around the perimeter without gaps when normal mounting screw torque is applied.

NOTE

Aircraft with fixed landing gear must be equipped with a **bottom mono-pole** antenna. Furthermore, the landing gear discrete must be strapped to the retracted position. The bearing from a **bottom directional** is invalidated when landing gear is extended, so it would always be invalidated on a fixed-gear aircraft. (Therefore, there would be no use for a directional antenna.)

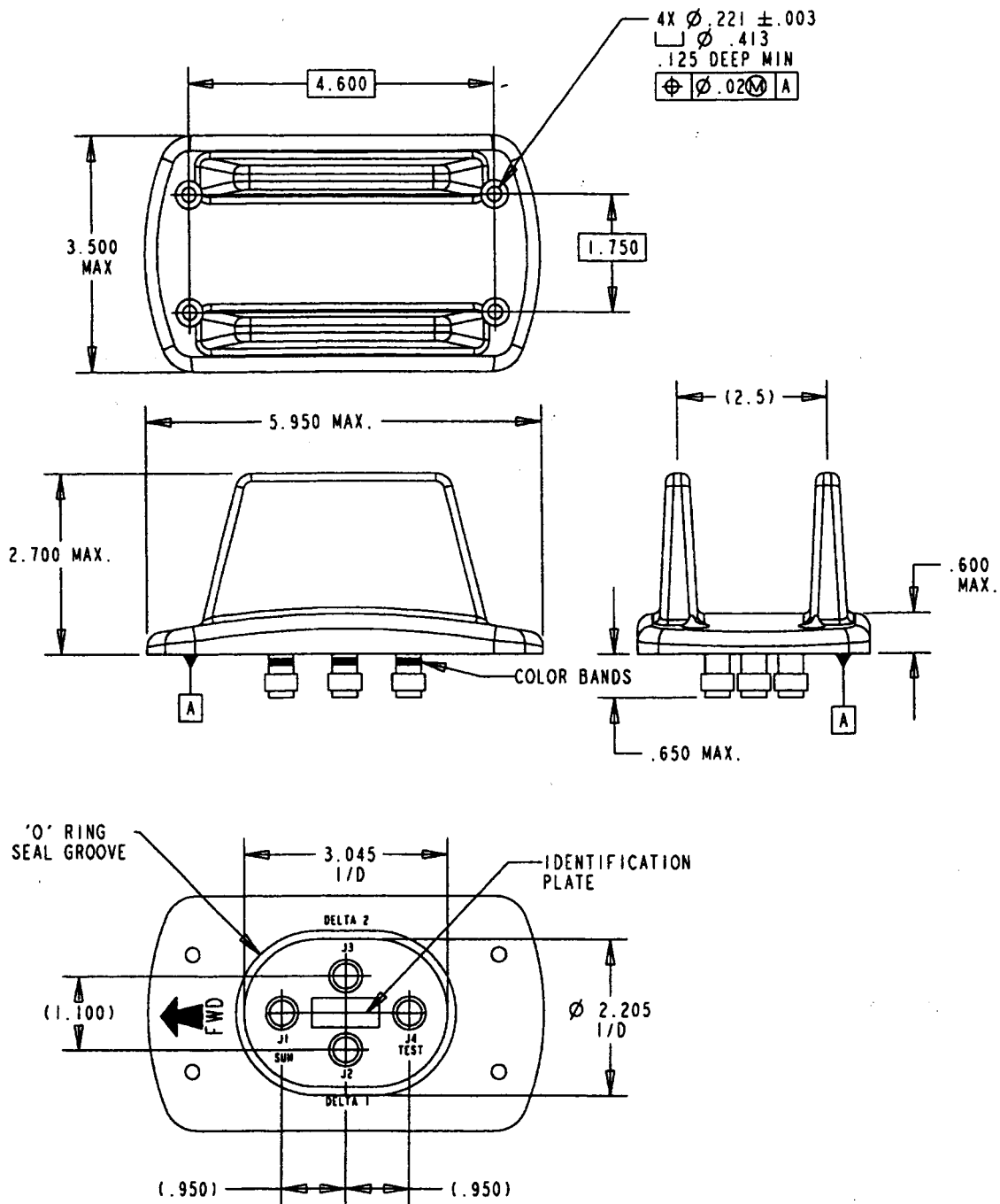


Figure 2-3 KA 815 Antenna Outline Drawing

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2.2.6 GPS ANTENNA INSTALLATION

2.2.6.1 KA 92 Antenna Installation Considerations (KMH 820 P/N 066-01175-2101 only)

- A. The KA 92 GPS Antenna should be mounted on top of the fuselage near the cockpit and in the centerline of the aircraft. Avoid mounting the antenna near any projections, and the tail of the aircraft, where shadows could occur. It is recommended that there be a separation of at least 3 feet between the GPS antenna and any VHF Comm, HF Comm, etc. on the aircraft. A minimum of 3 feet from any satcomm antenna should also be observed. Refer to Figure 2-6.
- B. Mount the GPS antenna on the aircraft skin which is horizontal during enroute flight. Antenna baseplate must be level within + or - 5° in the longitudinal and lateral axes when the aircraft is in level flight.

2.2.6.2 Installation Procedure

- A. Make sure the antenna is well bonded to the aircraft skin.
- B. Make sure the antenna is sealed to the aircraft to prevent corrosion from forming between the skin of the aircraft and the antenna.
- C. Install the optional GPS Antenna Splitter, if aircraft is already equipped with a GPS antenna.
- D. Make sure the antenna cable is connected to the antenna, splitter and unit prior to system checkout.
- E. Perform system checkout using instructions in Section 4.3.

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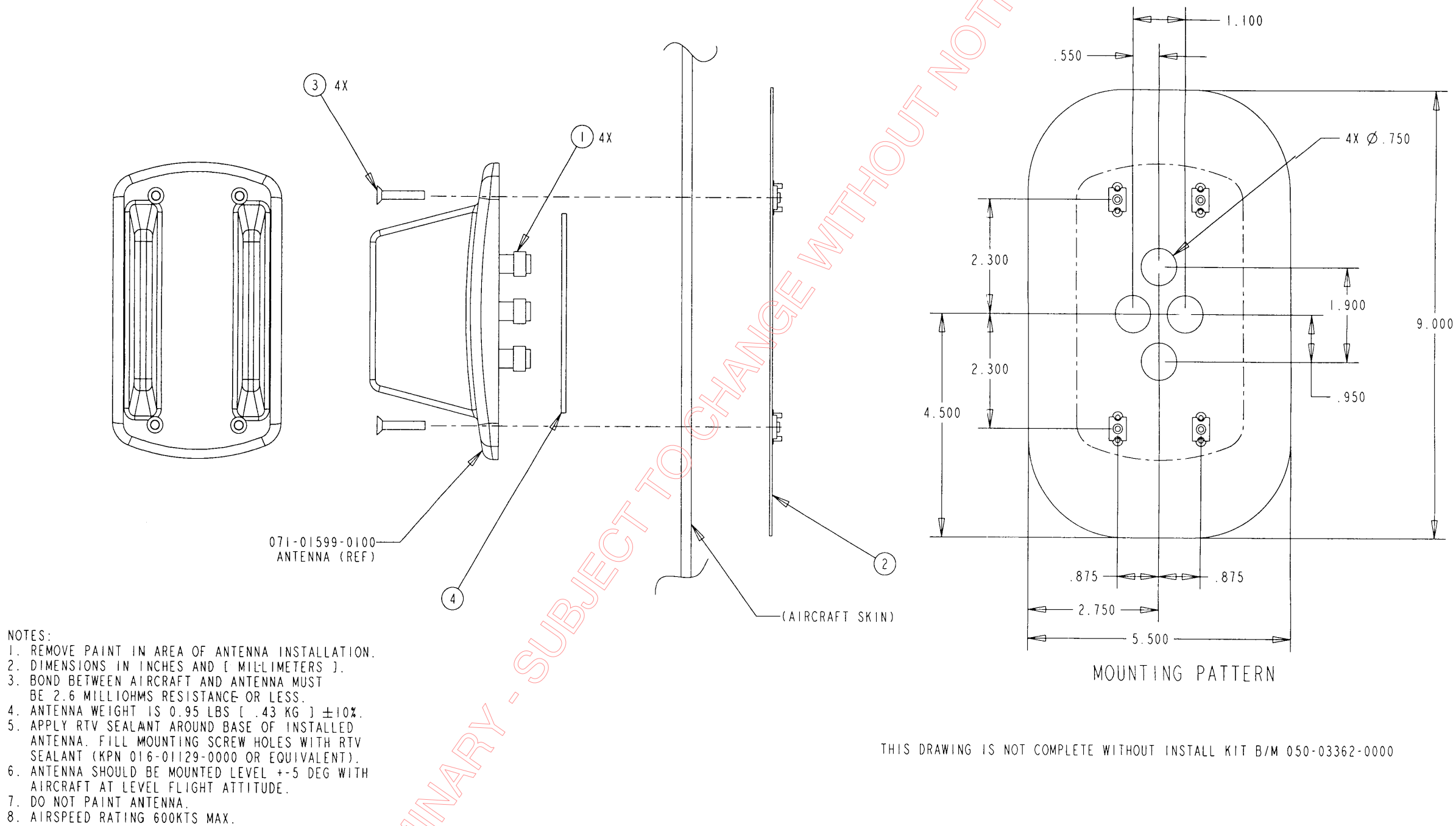


Figure 2-4 KA 815 Installation and Mounting Drawing
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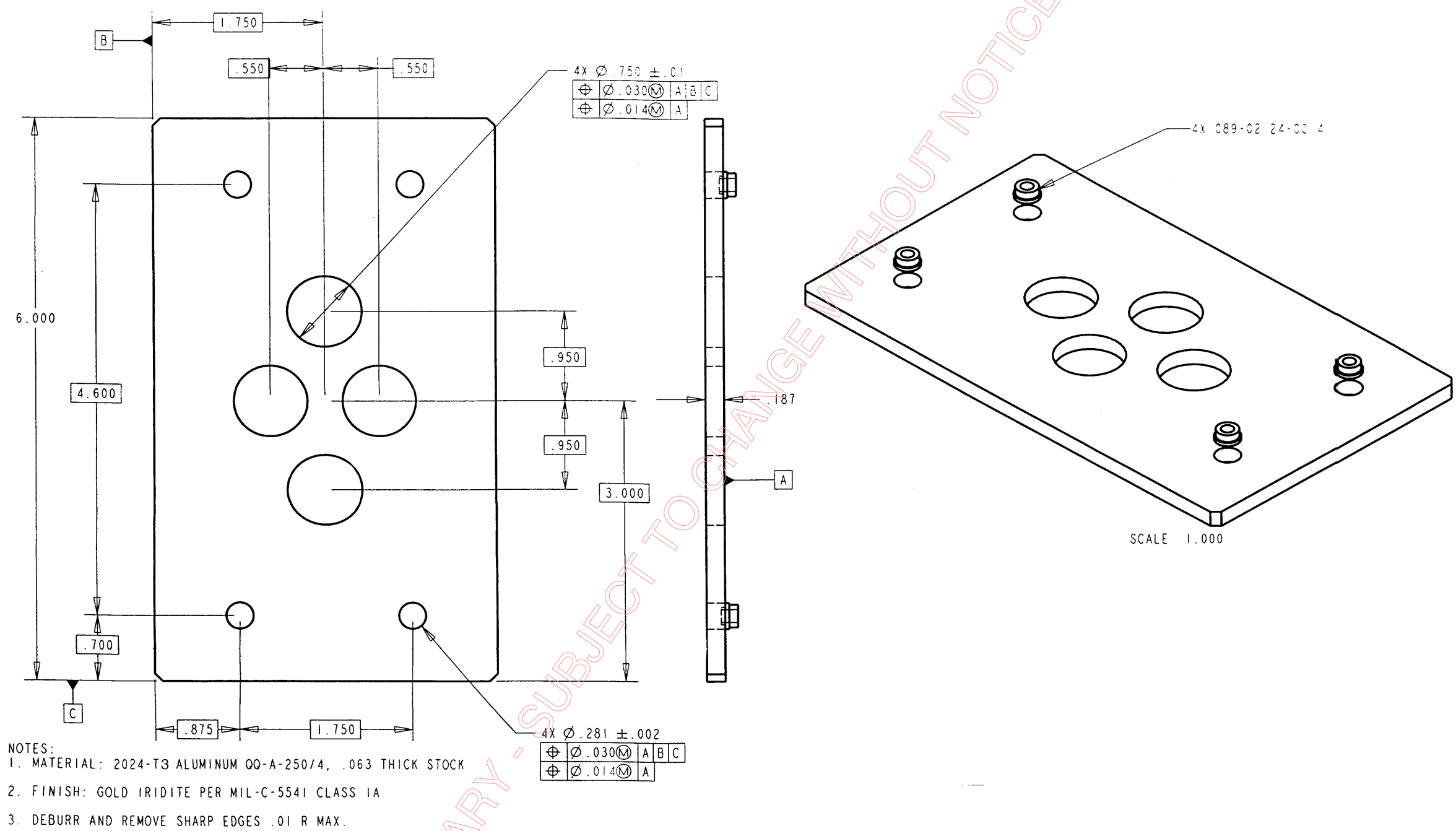
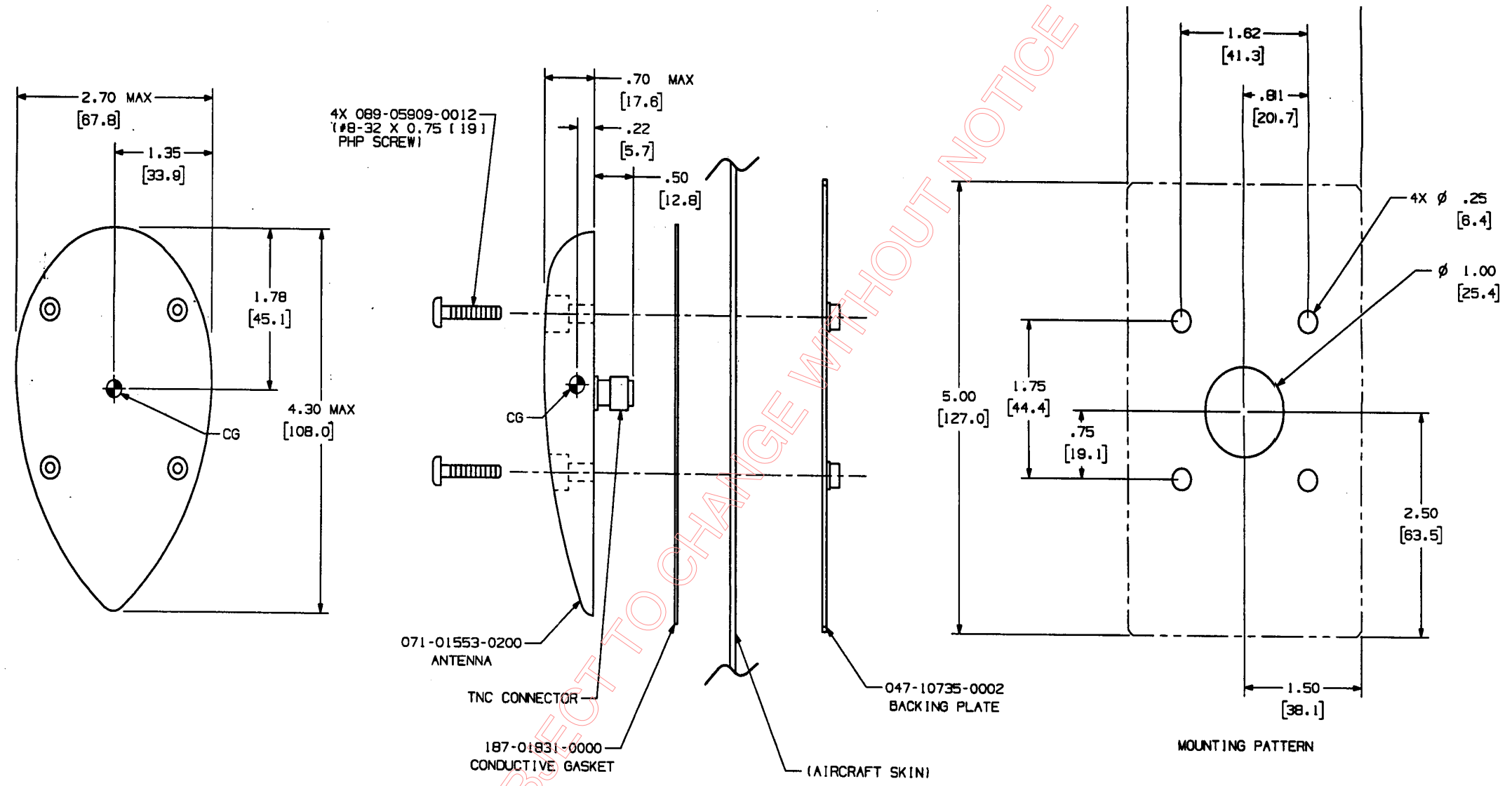


Figure 2-5 KA 815 Doubler Plate

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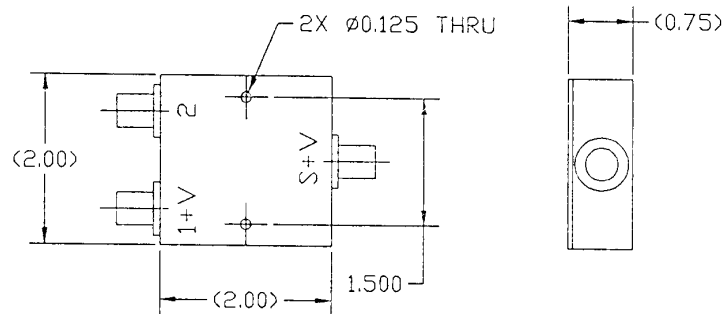
- NOTES UNLESS OTHERWISE SPECIFIED:
1. REMOVE PAINT IN AREA OF ANTENNA INSTALLATION.
 2. DIMENSION IN INCHES (MILLIMETERS)
 3. FOR BEST PERFORMANCE, BOND BETWEEN AIRCRAFT AND ANTENNA TO BE 10 MILLIOHMS RESISTANCE OR LESS.
 4. UNIT WEIGHT IS .27 LBS (.12 KG)
 5. APPLY WHITE RTV SEALANT AROUND BASE OF INSTALLED ANTENNA. FILL MOUNTING SCREW HOLES WITH RTV SEALANT. (KPN 016-01129-0000 OR EQUIVALENT)
 6. ANTENNA SHOULD BE MOUNTED LEVEL $\pm 5^\circ$ WITH AIRCRAFT AT LEVEL FLIGHT ATTITUDE.
 7. DO NOT PAINT ANTENNA.
 8. AIRSPEED RATING 600KTS MAX TAS.

Figure 2-6 KA 92 Outline and Mounting Drawing
Dwg. No. 155-06019-0000 R-AA

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ALL DIMENSIONS IN INCHES



NOTES:

1. DESCRIPTION: GPS ANTENNA SPLITTER, WITH BLOCKING CAPACITOR AT OUTPUT 2
2. QUALIFIED MFG. SOURCE: MINI-CIRCUITS, P/N ZAPD-2-DC-T
3. ELECTRICAL DESIGN CHARACTERISTICS:
 - TNC FEMALE CONNECTORS. CONNECTOR BODY, CONTACT MATERIALS, AND PLATING PER MIL-PRF-39012
 - FREQUENCY 1200-1600 MHZ
 - INSERTION LOSS ABOVE 3 dB 0.6 dB MAX.
 - ISOLATION 19 dB MIN.
 - IMPEDANCE 50 OHMS
 - MATCHED POWER RATING 5 WATTS
 - INTERNAL LOAD DISSIPATION 0.125 WATTS
 - DC BLOCK WITH A BREAKDOWN VOLTAGE OF 50 V ON PORT 2
 - TEMPERATURE RATING -40 TO 85°C
 - VSWR (FOR REFERENCE ONLY) (1.8:1 MAX.)
4. MARKING (BY MANUFACTURER)
 - VENDOR NAME AND PART NUMBER
 - SUM PORT MARKED "S+V"
 - PORT 1 MARKED "1+V"
 - PORT 2 MARKED "2"
5. PRODUCT ACCEPTANCE MINIMUM REQUIREMENTS SHALL CONSIST OF VERIFICATION OF APPROVED MANUFACTURER, MFG. PART NUMBER, AND MFG. CERTIFICATE OF CONFORMANCE. HONEYWELL RESERVES THE RIGHT TO TEST ANY PRODUCTION COMPONENT TO THE DESIGN CHARACTERISTICS LISTED IN NOTE 3.
6. COMPONENT TO BE MARKED FAA/PMA BY HONEYWELL RECEIVING INSPECTION PER 001-01099-0000 PRIOR TO STOCKING. FINAL PART NUMBER IS: 071-01600-0001

Figure 2-7 GPS Antenna Splitter
Dwg. No. 071-01600-0001

2.2.7 TAS Coaxial Cable Fabrication

The TAS cables must have an attenuation of 2.0 ± 1.0 dB within the frequency band of 1030-1090 MHz. To ensure proper phase matching, each of the four cables of a set must be of the same type. The lengths in each set of four must be within 2.0" of each other. Color bands on the cable ends to match the antenna color bands is suggested as an aid to hook up. Cables can be fabricated or purchased from a cable vendor.

NOTE

The nominal length of each set of four cables should be recorded for the particular installation in the event a cable should require replacement. If rework is required, a cable may be cut a maximum of 6".

The following defines the characteristics of the 50 ohm coaxial cable types that can be used with the KA 815 Antenna. Connectors are also defined. All lengths are defined as end to end. Any in-line or bulkhead penetrations must be evaluated separately. It is recommended that the installer purchase prefabricated cable assemblies when using in-line or bulkhead disconnects. Prefabricated cables can be purchased from Pic Wire & Cable or ECS. These vendors have expertise in providing the aviation industry reliable cable assemblies that meet the requirements for the various collision avoidance systems. It is the installing agency's responsibility to show airworthiness of the fabricated cable assemblies.

When determining cable type and length make the following assumptions.

- A. Attenuation of each straight TNC male connector is 0.06 dB @ 1GHz (using a 030-00134-0000 RF Connector)
- B. Attenuation of each right angle TNC male connector is 0.07 dB @ 1 GHz (using a 030-00134-0001 RF Connector)
- C. Attenuation of each TNC female panel mount connector is 0.06 dB @ 1 GHz (using a 030-00101-0002 RF Connector)
- D. Attenuation of M17/128-RG 400 Coaxial Cable is 0.13 dB/ft @ 1 GHz

Using the above information, a RG 400 cable with a right angle TNC (antenna end) and a straight TNC (KMH/KTA end) must be no longer than 22 feet long as measured from end to end. If longer length is required, then a lower loss cable with appropriate connectors must be selected. Reference the diagram below.

2.2.8 GPS Coaxial Cable Fabrication

The GPS Antenna Splitter allows the existing KA 91 or KA 92 GPS antenna to be interfaced to the KMH 820 EGPWS.

The following criteria must be observed when using the antenna splitter:

1. The length of an M17/128-RG400 coaxial cable cannot exceed 18 feet.
2. The maximum allowable signal loss between the KA 91/92 antenna and the KLN series GPS receiver cannot exceed 8.0 dB. Refer to the appropriate KLN series GPS receiver Installation Manual for determination of loss.
3. The maximum allowable signal loss between the KA 91/92 antenna and the KMH 820 cannot exceed 8.0 dB. Refer to the following table to determine the loss between the antenna and the KMH 820.

Part Number	Description	Signal Loss per Item	Example Quantity	Example Signal Loss	Actual Quantity	Actual Signal Loss
071-01600-001	GPS Antenna Splitter	3.4 dB	1 ea	3.4 dB		
M17/128-RG400	Coaxial Cable (18 ft max)	0.2dB/ft	10 ft	2.0 dB		
030-00134-0000	Straight TNC Connector	0.1dB	2 ea	0.2 dB		
030-00134-0001	Rt Angle YNC Connector	0.1dB	2 ea	0.2 dB		
030-00101-0002	Panel Mount Plug	0.1dB	0	0		
M39012/28-0504	Bulkhead TNC Connector	0.1dB	0	0		
M39012/29-0504	Panel TNC Connector	0.1dB	0	0		
	TOTAL SIGNAL LOSS (8.0 dB max.)			5.8 dB		

Table 2-1 Signal Loss

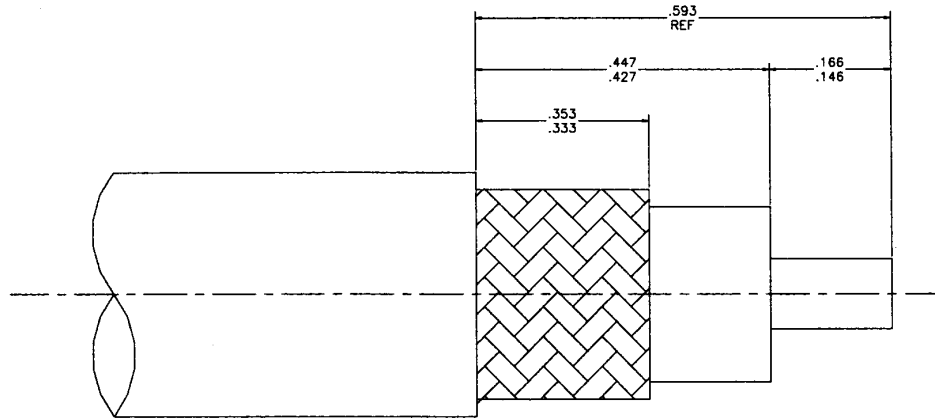


Figure 2-8 Coax Cable Treatment

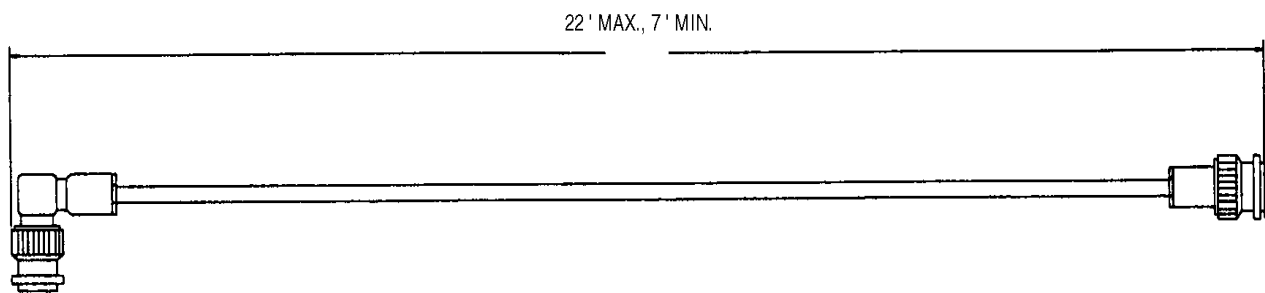


Figure 2-9 Standard RG-400 Coax Cable

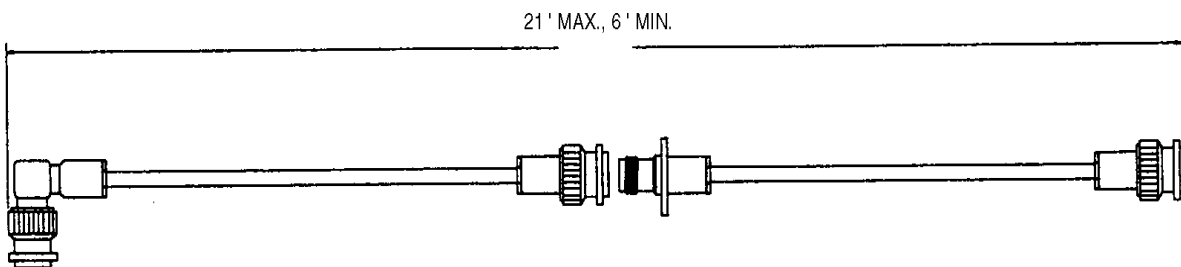


Figure 2-10 Bulkhead/In-Line Connection RG-400 Coax Cable

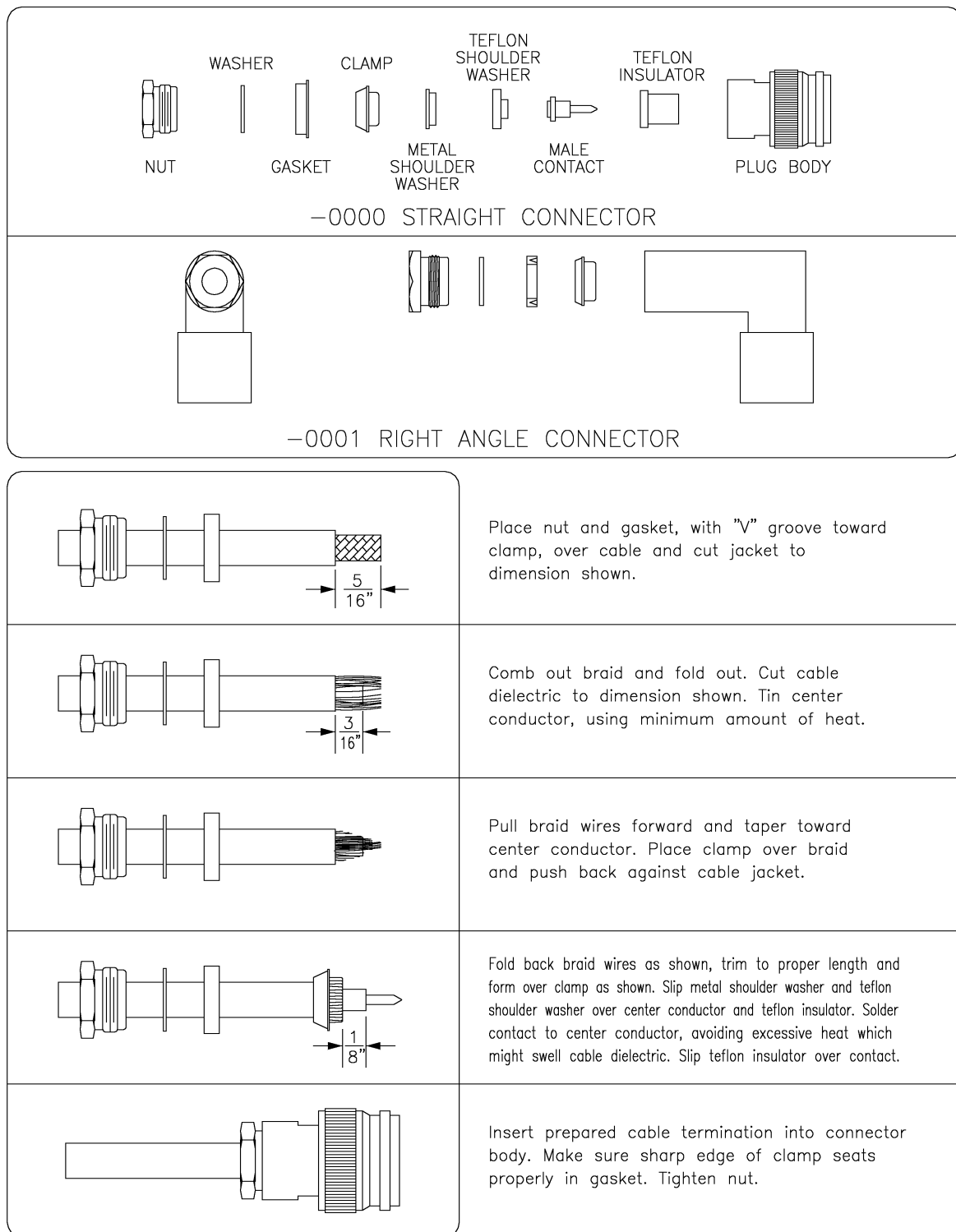
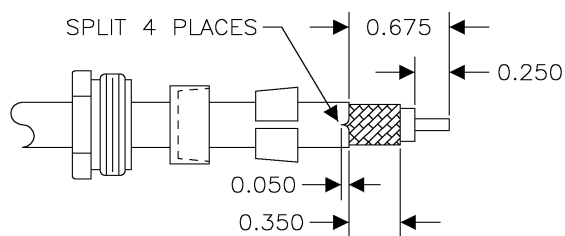
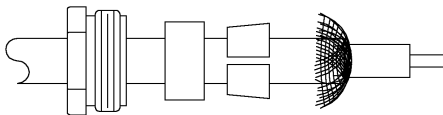


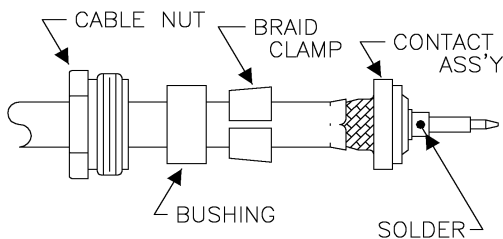
Figure 2-11 TNC Antenna Coax/Connector Assembly



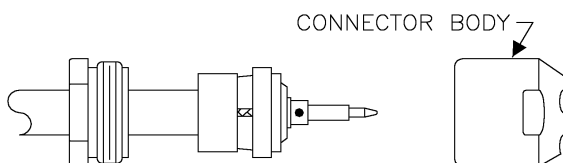
1. Place cable nut, bushing and braid clamp over outer jacket, braid and dielectric to dimensions shown. Split outer jacket in 4 places (approximately 90 degrees apart) to dimension. Lightly tin center conductor.



2. Fold back braid, foil and inner shield to expose dielectric.



3. Slide contact assembly (pin or socket) between inner dielectric and foil shield. Make certain contact assembly is pushed on cable to flare outer jacket and center conductor is visible through inspection hole. Smooth shields back over contact assembly and solder center contact as shown.



4. Push braid clamp and bushing forward over shield as far as possible. Slide cable nut over bushing and insert finished assembly into connector body. Tighten cable nut completely to seal cable assembly.

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Figure 2-12 TNC Antenna Coax/Connector Assembly

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SECTION III SYSTEM PLANNING

3.0 INTRODUCTION

You will find information relative to the KMH 880/KTA 870 system requirement options available to the system planner and the electrical characteristics of the various interfaces in Section III. You will also find pin function lists and interconnect diagrams in this section.

Section III contains interconnect family diagrams for the KMH 880/KTA 870 system. Refer to figure 3-3 for the KMH 880/KTA 870 system diagram. There are several interconnect drawings for popular equipment that interface with the KMH 880/KTA 870. The installing agency should contact Honeywell International Inc. Product Support at (800) 257-0726 for information regarding the compatibility of equipment not listed in this manual. Normal business hours are 8:00 A.M. to 5:00 P.M. CST, Monday through Friday.

3.0.1 Applicable Part Numbers Subsection Description

Information given in this section pertains only to the KMH 880/KTA 870 System using part numbers. Refer to Section 1.4.1 for complete part number descriptions.

3.0.2 Function Subsection Description

Detailed information concerning the purpose and operation of the interface are described in this section.

3.0.3 Requirements and Limitations Subsection Description.

Any operational requirements or limitations relating to the interface are described in this section. Widely followed regulatory requirements may also be described here. Regionally enforced requirements vary greatly and adherence to them remains the responsibility of the installing agency.

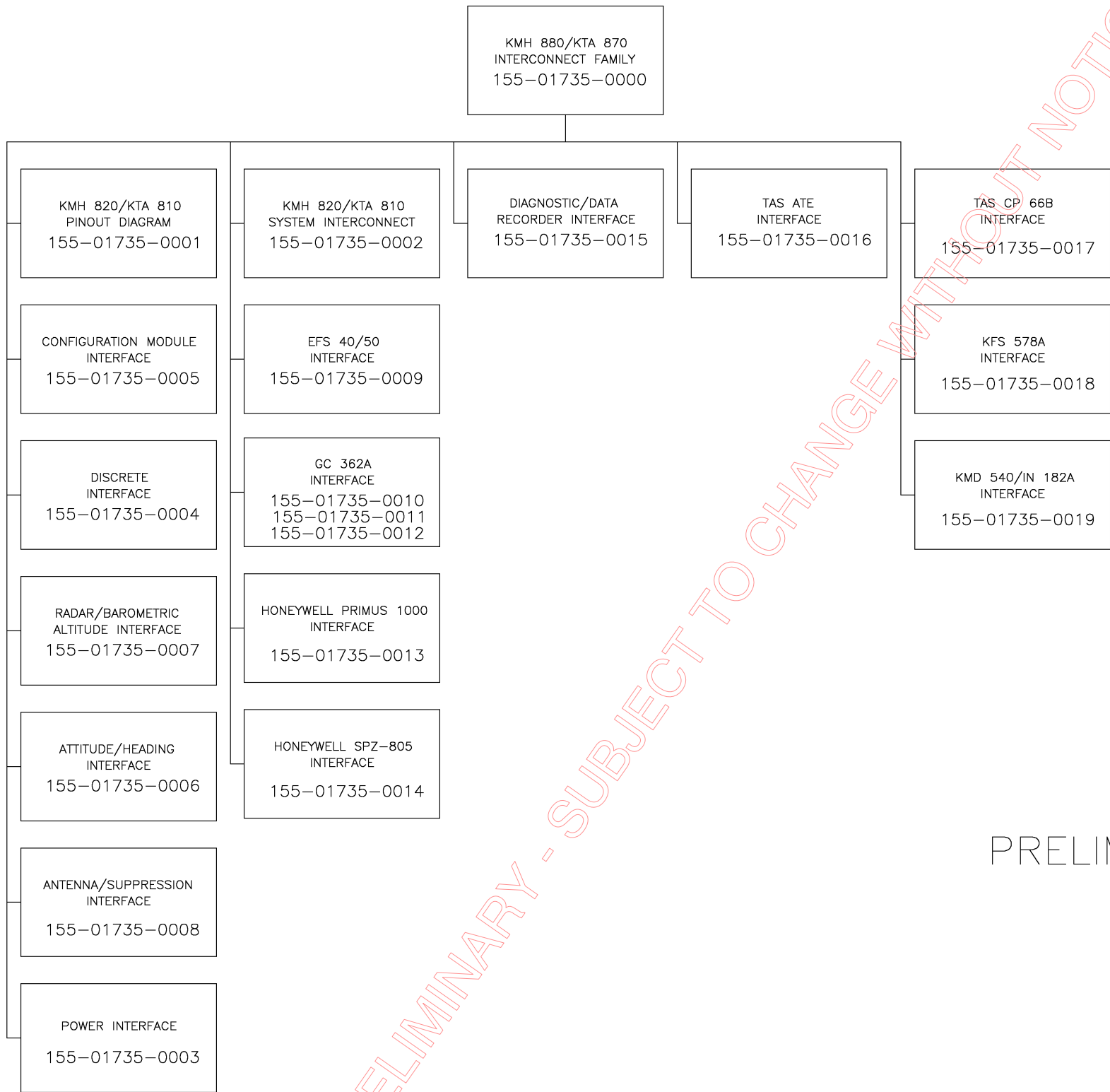
3.0.4 Electrical Characteristics Subsection Description.

The electrical characteristics and format of the interface signals are described in this section. Any flavor-related differences in signal format are also described here. Overlined pin names generally indicate active low signals, although the absence of an overline does not necessarily indicate an active high signal.

3.0.5 Interface Subsection Description

The harness techniques for shielding and shield termination described in this manual are identical to those specified for the test harness used during HIRF and Lightning testing. Adherence to the information in this manual is essential in establishing an installation environment equivalent to the test environment used during HIRF and Lightning testing.

Should grounding the shields, as shown in the interconnect diagrams, cause unacceptable interference due to noise sources on the aircraft, double shielded wire may be substituted for single shielded wire shown in this manual. The outer shield must be grounded at both ends to comply with HIRF and Lightning requirements. The inner shield may then be grounded at a single end to protect against the aircraft noise source. Normally the inner shield is grounded at the source end of the signal carried by the wire. Planning to install double shielded wire for low level signals known to have a history of interference may be easier than later adding the double shielded wire into the aircraft harness.



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Figure 3-1 KMH 880/KTA 870 Interconnect Family
Dwg. No. 155-01735-0000 (08/18/2000)

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3.1 GENERAL INTERCONNECT INFORMATION

3.1.1 Power Inputs

The Processor is powered with +28 VDC and is protected by a circuit breaker (5 Ampere) in the Aircraft distribution center.

A. 28 Volts Direct Current

J10 - 59 & 82 → Nominal: + 28 Vdc A/C Power In.

Range: + 22 Vdc to + 30 Vdc.

1.3 ± 0.2 Amps @ 28 VDC typical current

1.65 ± 0.2 Amps @ 28 VDC Max operating

3.3 Amps @ 18 VDC maximum current

Power: 46 ± 2.3 Watts

B. DC Return

J10 - 127 & 128

These pins connect to airframe ground with 22 gauge wire minimum.

NOTE

The KMH 820/KTA 810 will shut down when the power line dips below +15 VDC. The KMH 820/KTA 810 will resume normal operation (i.e. surveilling targets) on power restoration (when the power line meets +18 VDC minimum).

3.1.2 Air/Ground Discrete Input

The Air/Ground Discrete, if used, is wired to a logic source in the aircraft that presents a standard "open" circuit while the aircraft is airborne and a standard "ground" when the aircraft is on the ground. The Air/Ground Discrete is filtered to allow takeoff and landings. The discrete will remain in the same state for 10 seconds before changing states.

AIRBORNE = >100Kohms , or +18.5 to +36 VDC.

ON GROUND = < 10 ohms, or 0 to +3.5 VDC.

J10-4 Air_Gnd*

NOTE

The normal mechanical failure mode will be the “airborne” condition

3.1.3 Landing Gear Discrete Input

The Landing Gear Discrete, if used, will present a standard “open” circuit when the gear is retracted and a standard ground when the gear is extended.

RETRACTED = > 100Kohms to airframe DC GND or +18.5 to +36 VDC.

EXTENDED = <10 ohms to airframe DC GND or 0 to +3.5 VDC

J10-3 Landing_gear*.

NOTE

Aircraft with fixed landing gear must be equipped with a bottom monopole antenna. Furthermore, the landing gear discrete must be strapped to the retracted position.

NOTE

The normal mechanical failure mode is the “retracted” condition.

3.1.4 Above/Below/Normal Input

This input defines the Altitude Select for the display. Momentary (250 msec. minimum) application of a “ground” at this input will cause a transistion between the three states in a cyclical manner ; Normal- Below-Above. The default mode is “Normal”.

J10-71 ABV_BEL_NORM*

3.1.5 Baro Altitude (ARINC 429) Input

Baro Altitude will be input to the TAS Processor via the Baro Altitude ARINC 429 low speed input bus. This bus may also be used as an ARINC 419 low speed input bus. The ARINC 706 Air Data Computer will interface to the TAS Processor using the ARINC 429 input ports and the ARINC 575 Air Data Computer will interface to the TAS Processor using the ARINC 419 input ports.

3.1.6 Advisory Inhibit Input

The Advisory Inhibit into the TAS Processor will cause annunciations to be inhibited when higher priority events occur (i.e., wind-shear alerts, terrain alert warnings.)

NOTE

The TAS Computer Unit will inhibit certain functions which would tend to distract the pilot when faced with a potentially hazardous condition such as windshear or terrain alerts. These conditions are presumed to have a more immediate possibility and higher probability of harm than the threat of a collision. Thus, TAS functions such as aural announcements and aural alerts are to be inhibited by placing the TAS Computer Unit in a mode which would preclude its issuing the unwanted information.

If the Advisory Inhibit has been activated, no new voice or annunciator outputs can be activated by the TAS computer unit during the deferment period. If already activated, these outputs will be discontinued within 250 milliseconds. If an advisory condition is present when the deferment is removed, it will be annunciated.

ADVISORY INHIBIT = GROUND

NORMAL ADVISORY/ALERT = OPEN

J10-22 ADV_INHIBIT*

3.1.7 TAS Valid Output

This output is provided as a primary indicator of valid system operation. This output is driven to the valid state during normal operation. The TAS Valid discrete will go invalid during power up self tests and operator commanded self tests.

VALID = GROUND (< 10 ohms to ground)

INVALID = OPEN

J10-25 TAS_VALID*

3.1.8 Visual Annunciate Traffic (Lamp Output)

The “Visual Annunciator Traffic” output is activated whenever a traffic advisory is issued. This output will remain in the activated state for the duration of the advisory unless cancelled or inhibited.

ACTIVE = GROUND (< 10 ohms to ground), VOLTAGE 0 to +3.5 VDC.

INACTIVE = OPEN

Current Capability = 200 milliamps., when activated.

Voltage Capability = +36 VDC, when not activated.

J10-24 VIS_ANNUN_TRAFFIC*

3.1.9 Synthesized Voice output

KMH 820/KTA 810 will supply low level audio signals of up to 100 milliwatts at 1000 Hz into a 600 ohm audio distribution system. The outputs are on pins “PH_HI” and “PH_LO”.

J 10-20 = PH_HI

J 10-21 = PH_LO

The power output will be adjustable based on the audio level inputs.

The TAS messages available for output are as follows:

1. “TAS System Test OK”
2. “TAS System Test Fail”
3. “Traffic, Traffic”
4. “Traffic”

NOTE

A 1 kHz tone is available for calibration adjustments only.

3.1.10 Air Temperature Input

Outside Air Temperature is an optional input. This can come from a number of sources such as ARINC 429/575 Air Data or a dedicated AOT probe. EGPWS is capable of interfacing directly to a standard 500 ohm temperature probe for low temperature operations.

J10-109 OAT_H, J10-110 OAT_L, J10-111 OAT_Ref.

3.1.11 GPS Input

GPS information is furnished in ARINC 429 and RS-232 (NEMA or RNAV) formats. The following Information is required from the GPS:

1. Latitude/Longitude
2. Ground Speed
3. True Track Angle
4. GPS Altitude
5. Indication of the quality of the navigation solution. (VFOM and HFOM preferred).

Optional information to be used, if available, are:

1. GPS Vertical Velocity
2. Number of satellites tracked
3. Results of RAIM
4. Altitude aiding flag

NOTE

An internal GPS xpress Card provides all the needed signals for proper operation.

3.1.12 Factory Test Input

When active, the EGPWS will go into the Factory Test Mode. The TAS Processor and the Automatic Test Equipment will interface via RS-232 and the ATE Test Pins.

J10-113 GSE_PRES# (Factory Test) (Factory Only)

3.1.12.1 TAS ATE Enable Input

The ATE Enable is used to enable the ATE lines for the Anechoic Chamber and the RGS stations. The TAS Automated Test Equipment will fully test the TAS system closing the loop around the TAS antenna system by emulating the functions of an intruder aircraft.

3.1.12.2 TAS Built In Test Equipment (BITE)

BITE enables the TAS Processor to provide internal system performance monitoring under normal bench conditions, under environmental extremes and during normal operation. All BITE functions are an integral part of the normal operational TAS system and do not interfere with normal TAS operations. The TAS Processor BITE function is responsible for executing the test outlined below (during cold start or functional test) to ensure that the TAS Processor and inputs from interfacing components are functional.

1. Automatic System Performance Monitoring (SPM) and Functional Test

The TAS Processor SPM and functional test functions will test the TAS Processor for correct operation (detection of internal faults) and test inputs provided by external system components for correct operation (detection of external faults). The SPM function and functional test are capable of detecting and initiating the appropriate response to all faults that would affect the ability of the TAS Processor to meet TAS system safety and performance requirements.

System Performance Monitoring is performed on a continuous basis. The tests outlined below are accomplished to ensure correct operation of the TAS Processor and interfacing components during normal operation.

NOTE

The purpose of the TAS Processor automatic system performance monitoring (SPM) and Self Test is to detect malfunctions that degrade or preclude TAS protection.

2. Failure Processing

After each functional test or monitoring cycle is complete, the failures detected are prioritized and logged in fault memory if the severity of the fault allows. The fault memory will keep the three highest priority faults per power cycle.

When a fault is detected that would cause the TAS Processor to declare TAS inoperative or failed the following responses, regardless of failure category will be initiated:

- A. Set the 'TAS Valid Output' discrete to invalid.
- B. Inhibit ATCRBS interrogations from TAS.
- C. Deactivate the 'normal' TAS display functions.
- D. Cancel any TA voice message.

If a fault is detected that would invoke one of the above responses, then that response will be accomplished within one second of detecting the fault.

3. Failure Categories

A. Catastrophic

The severity of a catastrophic failure will preclude any software from executing.

B. Fatal

The severity of a fatal failure will preclude any TAS surveillance software from executing.

C. Critical

The severity of a critical failure will force the system to run in a failed state.

D. System

This type of failure is used for inputs from system sources external to the TAS Processor.

3.1.12.3 EGPWS Self Test Input

Level 1 cockpit self-test will annunciate "System OK" when the system is operating properly.

J10-121 GND_DISC_07 (Self Test)

3.1.12.4 Display Select Input

An input supplied by a momentarily actuated cockpit manual switch that toggles between activating and de-activating the Terrain Awareness Display (TAD).

J10-123 GND_DISC_12 (Disp. Sel.)

3.1.12.5 Terrain Awareness Inhibit Discrete

Terrain awareness will be provided via Terrain and Runway Databases. All runways >2000 feet are provided. The nominal terrain database resolution around the airport will be 15 arc-seconds where available. This resolution is not needed for flat areas.

J10-126 GND_DISC_15 (Terrain Awareness Inhibit)

3.1.13 Terrain Warning

This is a means of displaying to the flight crew that there is a critical situation involving terrain clearance and corrective action is required.

J10-116 TERRAIN WARNING

3.1.14 Terrain Caution

This is a means of displaying to the flight crew that there is a terrain clearance situation developing that needs to be monitored.

J10-117 (TERRAIN CAUTION)

3.1.15 Weather Select Output

A discrete output for controlling the terrain display. It can be used either to control a picture bus switching relay or connected directly to a symbol generator.

J10-118 (WX/EGPWS DISPLAY SELECT)

3.1.16 EGPWS Audio On Discrete

The Audio On Discrete goes true whenever any voice message is being annunciated. It will stay true until the voice is completed. This output can be used to inhibit other audio systems (e.g., TAS) during EGPWS audio or used to drive the audio key line input provided on some aircraft audio systems. This discrete is internally wired to the TAS advisory inhibit and is available on:

J10-22 ADV_INHIBIT*

3.1.17 EGPWS, Terrain Inop and Terrain not available Output

The EGPWS produces one monitor output. This discrete reflects the EGPWS Inop and Terrain Inop / Terrain Not Available functions. This discrete activates with the loss of EGPWS power. The status of this discrete is also contained on an ARINC 429 output word.

J10-120 (EGPWS Inop)

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NOTES:

1. VISUAL ANNUNCIATOR TRAFFIC (J10-24)
GROUND = PRESENCE OF A TRAFFIC ADVISORY/ACTIVE STATE (200mA DC MAX)
OPEN = NO TRAFFIC ADVISORY PRESENT
2. TAS VALID (J10-25)
GROUND = NORMAL TAS OPERATION/ACTIVE STATE (100mA DC MAX)
OPEN = TAS SYSTEM FAULT (FAILURE)
3. ADVISORY INHIBIT (J10-22)
A 'GROUND' ON ADVISORY INHIBIT DISCRETE SHALL CAUSE THE TAS PROCESSOR TO INHIBIT AURAL ADVISORIES.
4. PUSH BUTTON IS NORMALLY OPEN – MOMENTARY CONTACT. THE DEFAULT MODE IS NORMAL AIRSPACE. THE MODE TRANSITIONS FROM NORMAL TO BELOW TO ABOVE AND BACK TO NORMAL AIRSPACE PER EACH BUTTON PUSH.
5. * THIS STATE IS ACTIVE IF TIED TO GROUND.
6. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT.
7.  CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
8. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
9. ONLY USE A SWITCH IF NO 429 SOURCE IS INSTALLED.
10. DASHED LINES DENOTE ALTERNATIVE/ OPTIONAL EQUIPMENT.
11. THE 50 OHMS TERMINATIONS FOR J6 AND J7 MUST BE TNC MALE.
THE 50 OHMS TERMINATION FOR J8 MUST BE BNC MALE.
12. PUSH BUTTON IS NORMALLY OPEN – MOMENTARY CONTACT.
FUNCTIONAL TEST IS ACTIVATED UPON PUSH BUTTON.
13.  CONNECT THESE SHIELD GROUNDS TO CONNECTOR BACKSHELL/STRAIN RELIEF.
14. THE DIAGNOSTIC INTERFACE IS REQUIRED, AND THE INSTALLATION SHALL PROVIDE FOR A CONVENIENT CONNECTION LOCATION IN THE AIRCRAFT SINCE TESTING SHALL BE PERFORMED IN-FLIGHT.
15. THE DATA RECORDER INTERFACE IS OPTIONAL. IT IS ONLY RECOMMENDED FOR PRODUCT SUPPORT. FOR NORMAL FLIGHT CONDITIONS, THIS INTERFACE MUST BE DISABLED IN THE CONFIGURATION MODULE. THE INSTALLATION SHALL PROVIDE FOR A CONVENIENT LOCATION NEAR THE TAS PROCESSOR.
16. THE PICTURE BUS CABLE TYPE SHALL CONFORM TO M17/176-00002 PER MIL-C-17/176D SPEC. OR EQUIVALENT.
17. FIXED-GEAR AIRCRAFT MUST BE STRAPPED AS GEAR EXTENDED (DOWN).
FIXED-GEAR AIRCRAFT MUST HAVE A BOTTOM MONOPOLE ANTENNA.
18. THE CONFIGURATION MODULE SHOULD BE SET UP TO EITHER USE OR IGNORE THIS INPUT.

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NOTE: G = PIN CONNECTED TO AIRCRAFT GROUND
O = PIN LEFT OPEN

Figure 3-2 KMH 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001 (Sheet 1 of 7) (08/10/2000)

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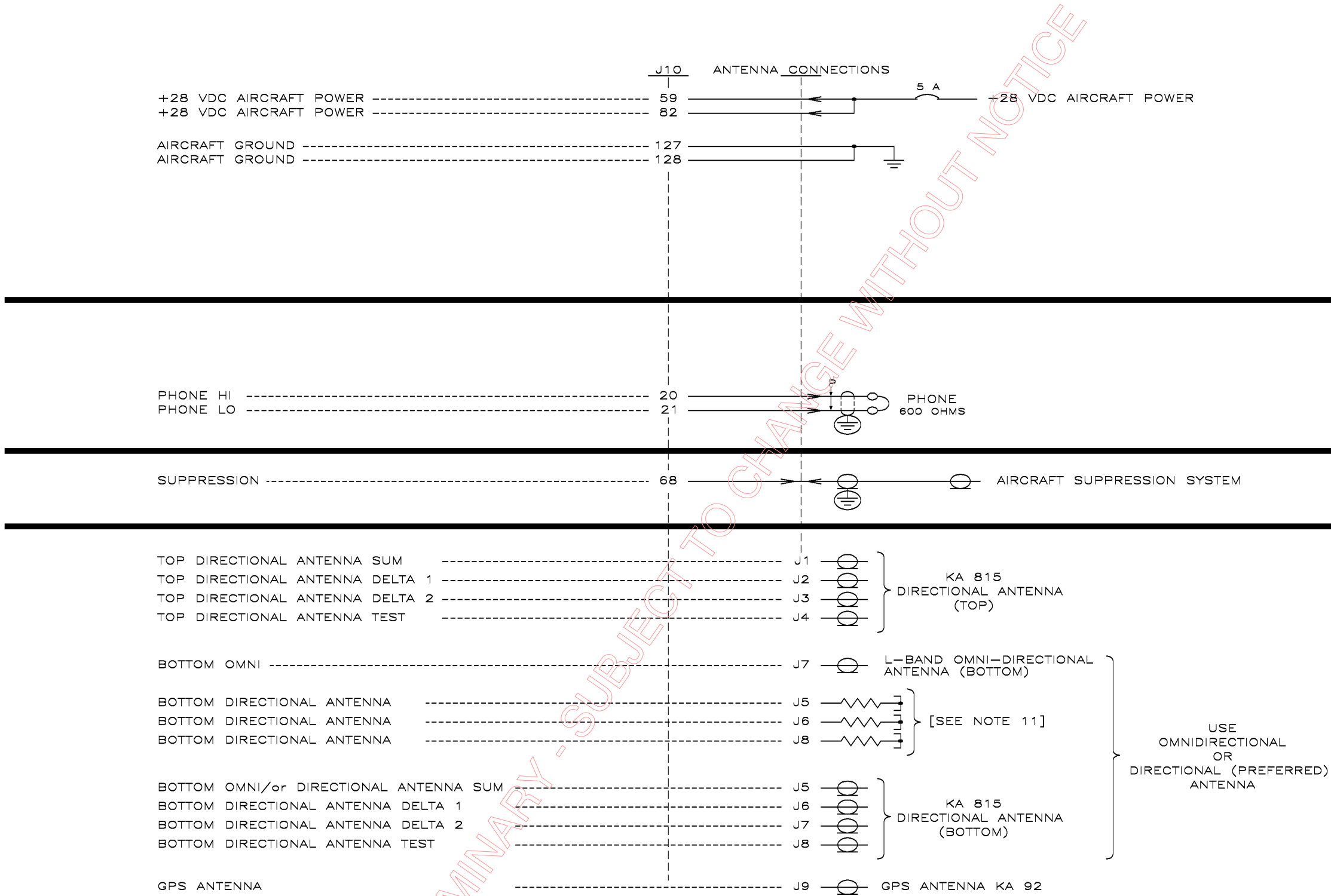


Figure 3-2 KMH 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001 (Sheet 2 of 7) (08/10/2000)

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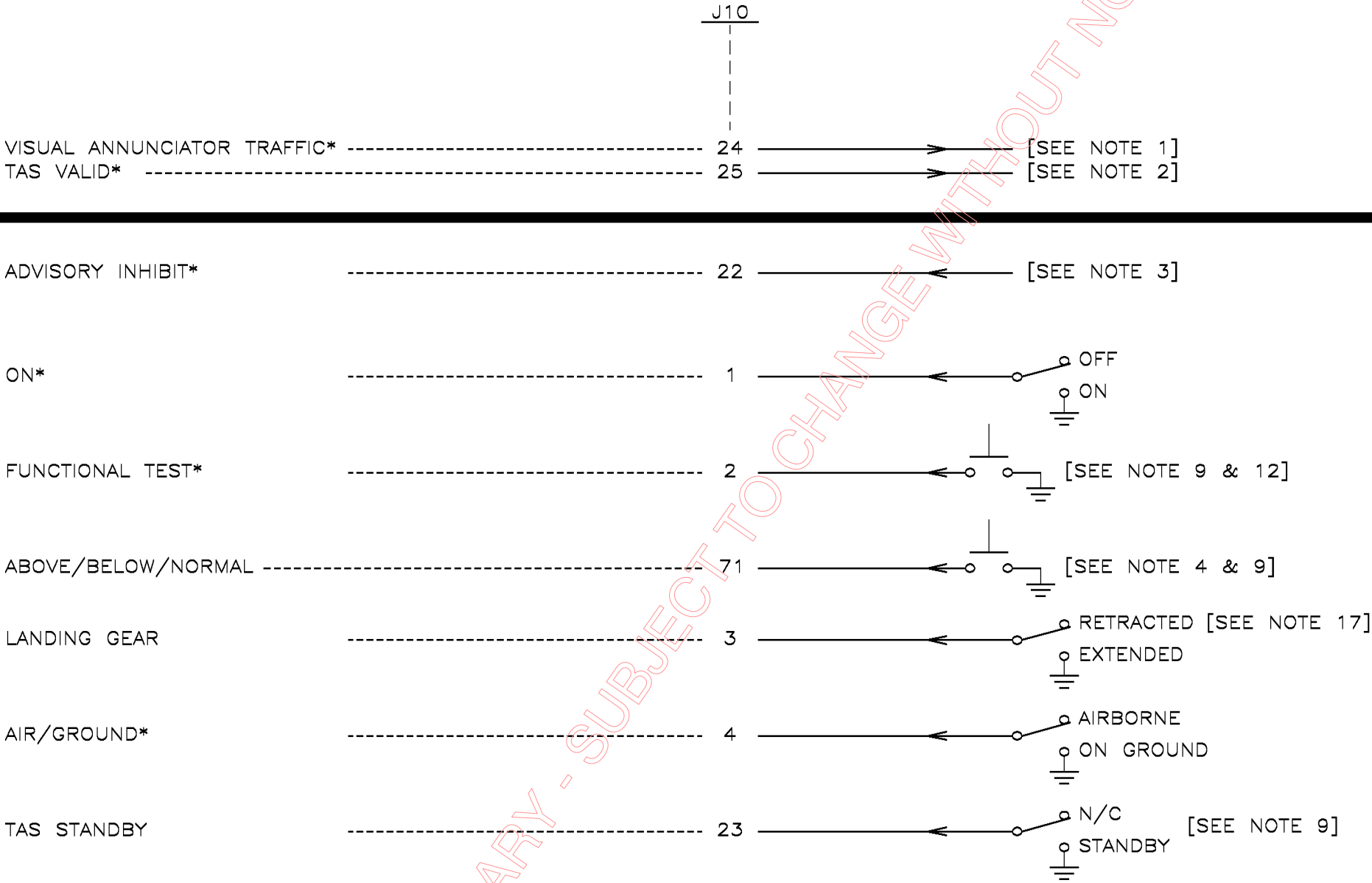


Figure 3-2 KMH 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001 (Sheet 3 of 7) (07/11/2000)

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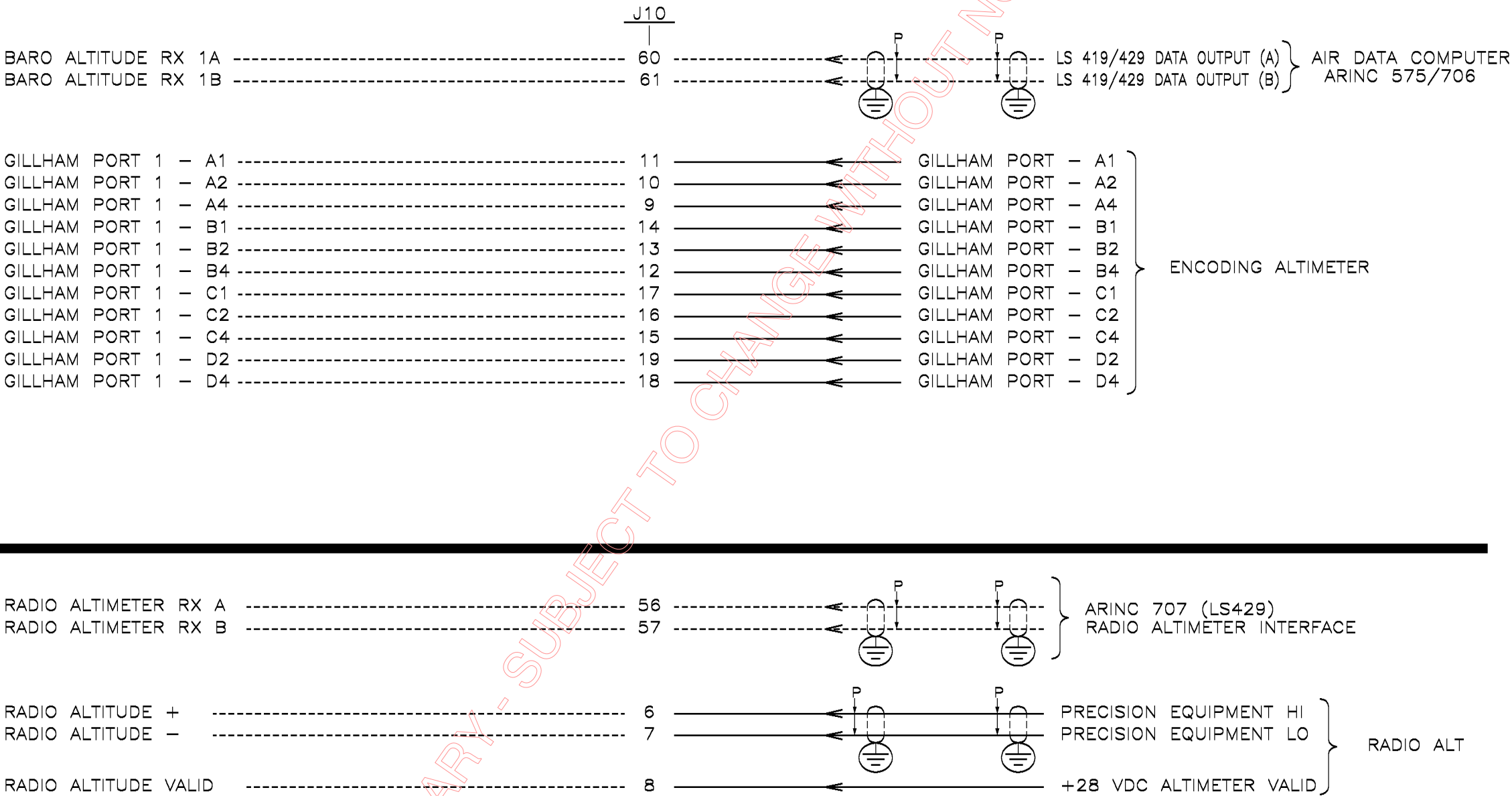


Figure 3-2 KMH 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001 (Sheet 4 of 7) (08/10/2000)

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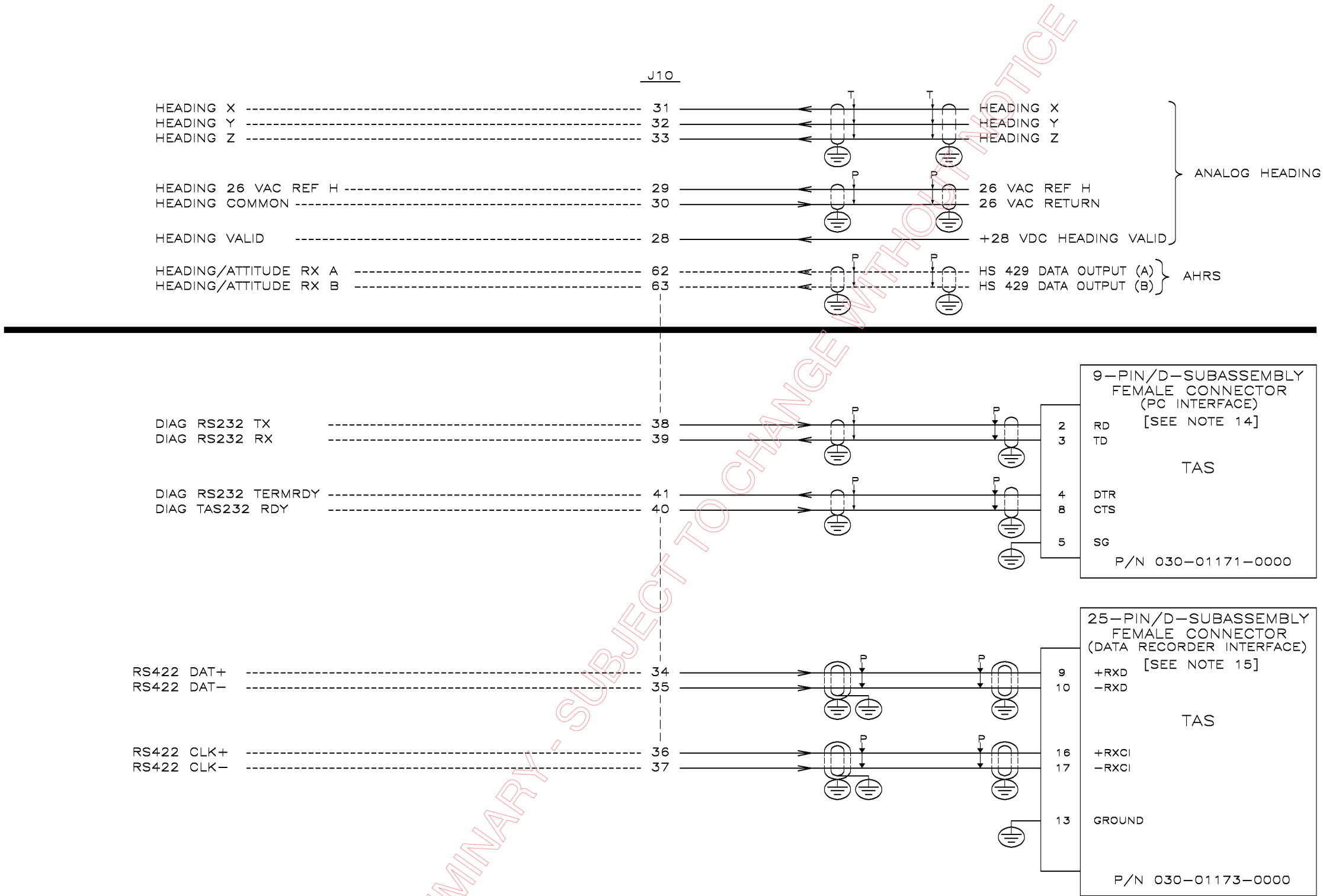


Figure 3-2 KMH 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001 (Sheet 5 of 7) (08/10/2000)

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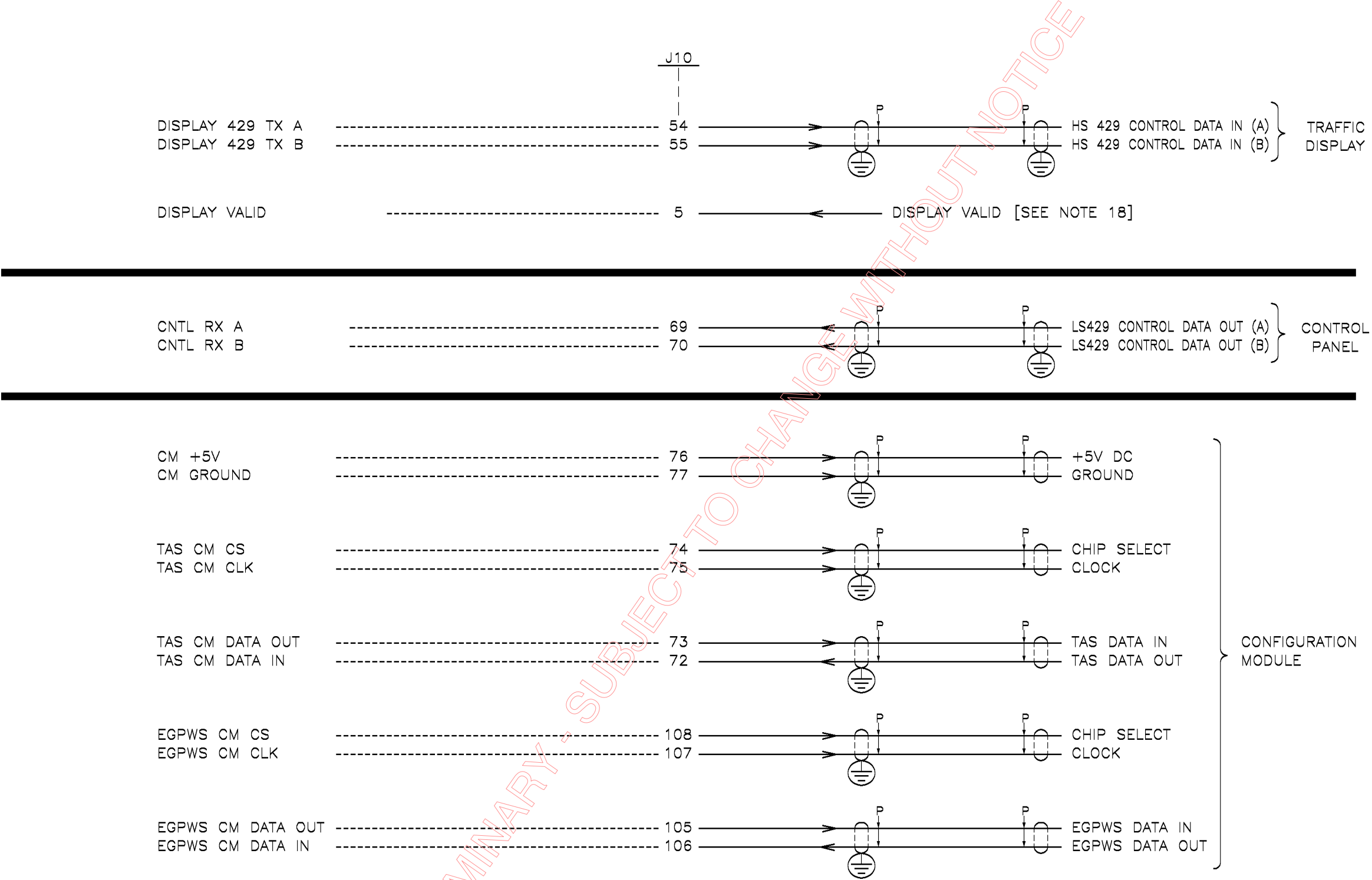


Figure 3-2 KMA 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001 (Sheet 6 of 7) (08/10/2000)

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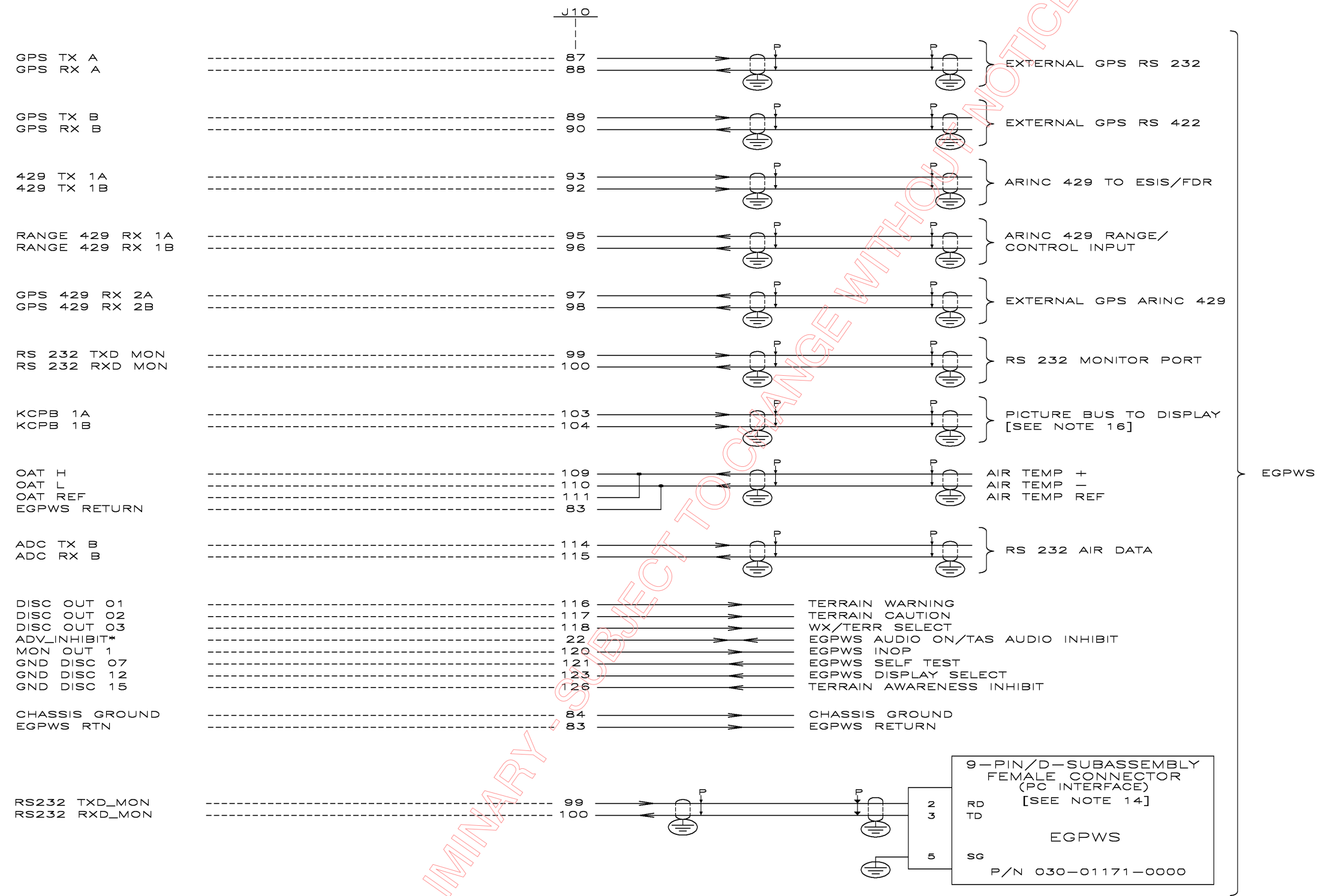


Figure 3-2 KMH 820/KTA 810 Pinout Diagram
Dwg. No. 155-01735-0001(Sheet 7 of 7) (08/11/2000)

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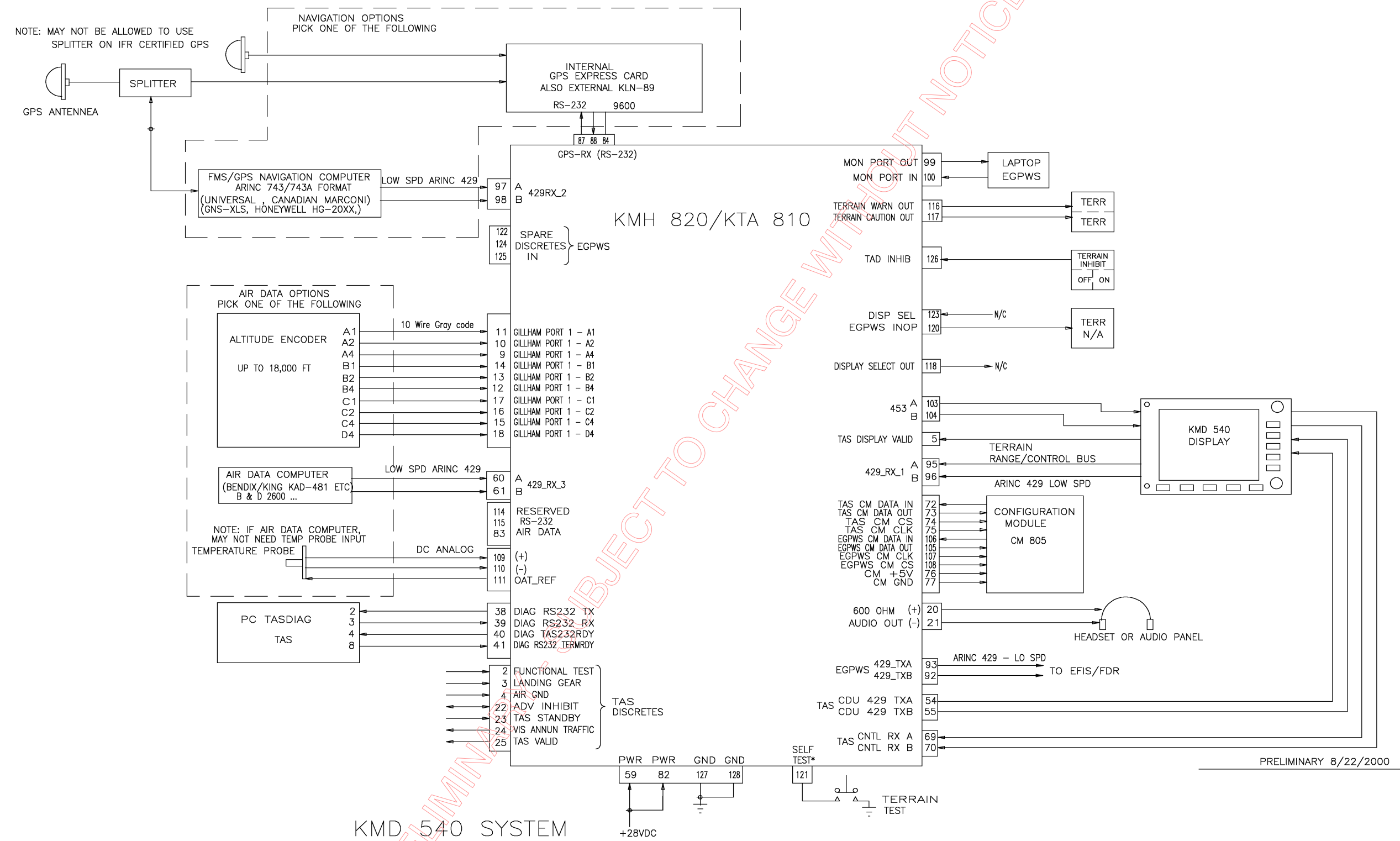


Figure 3-3 KMH 820/KTA 810 System Interconnect Block Diagram
Dwg. No. 155-01735-0002 (Sheet 1 of 2) (08/22/2000)

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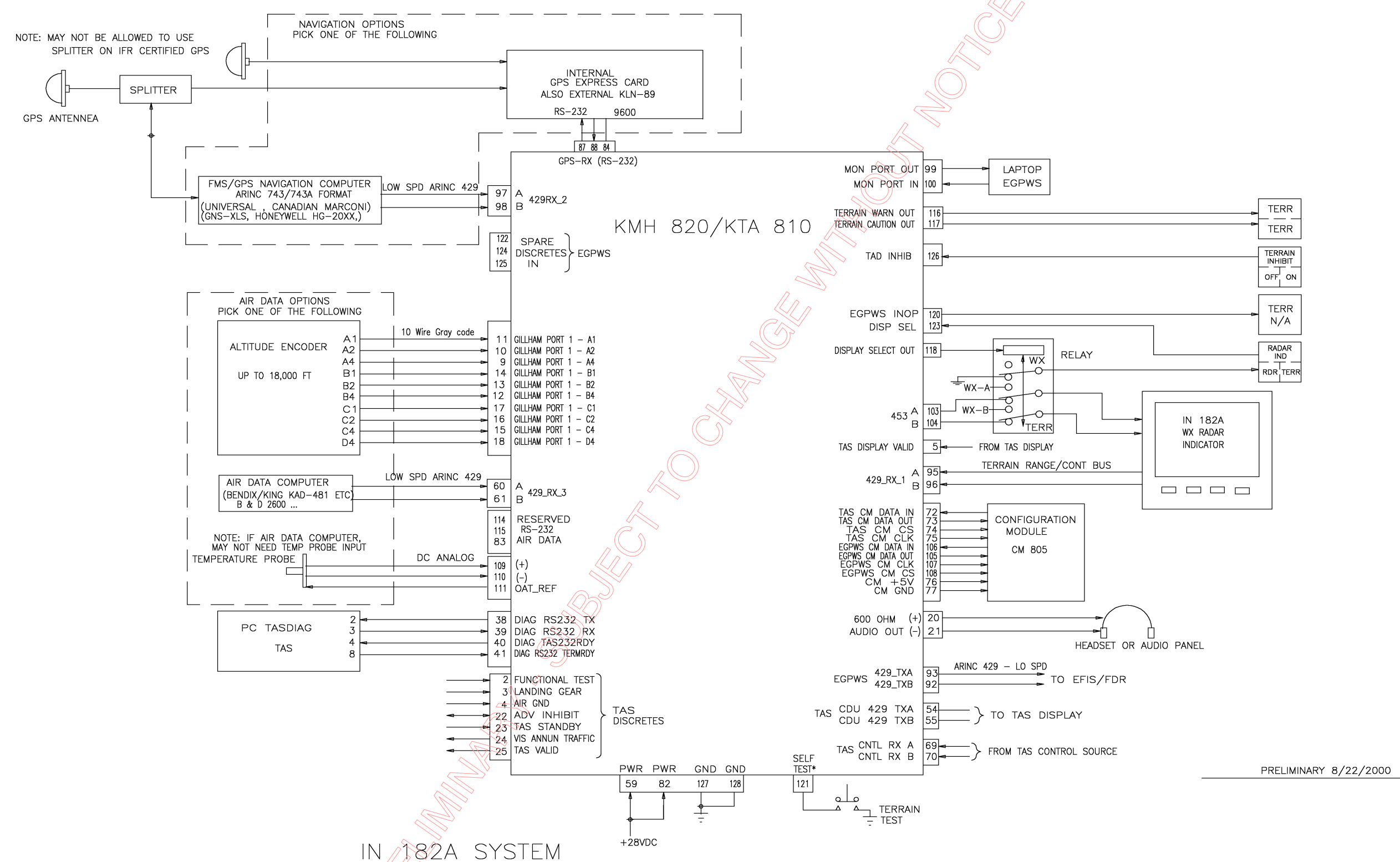
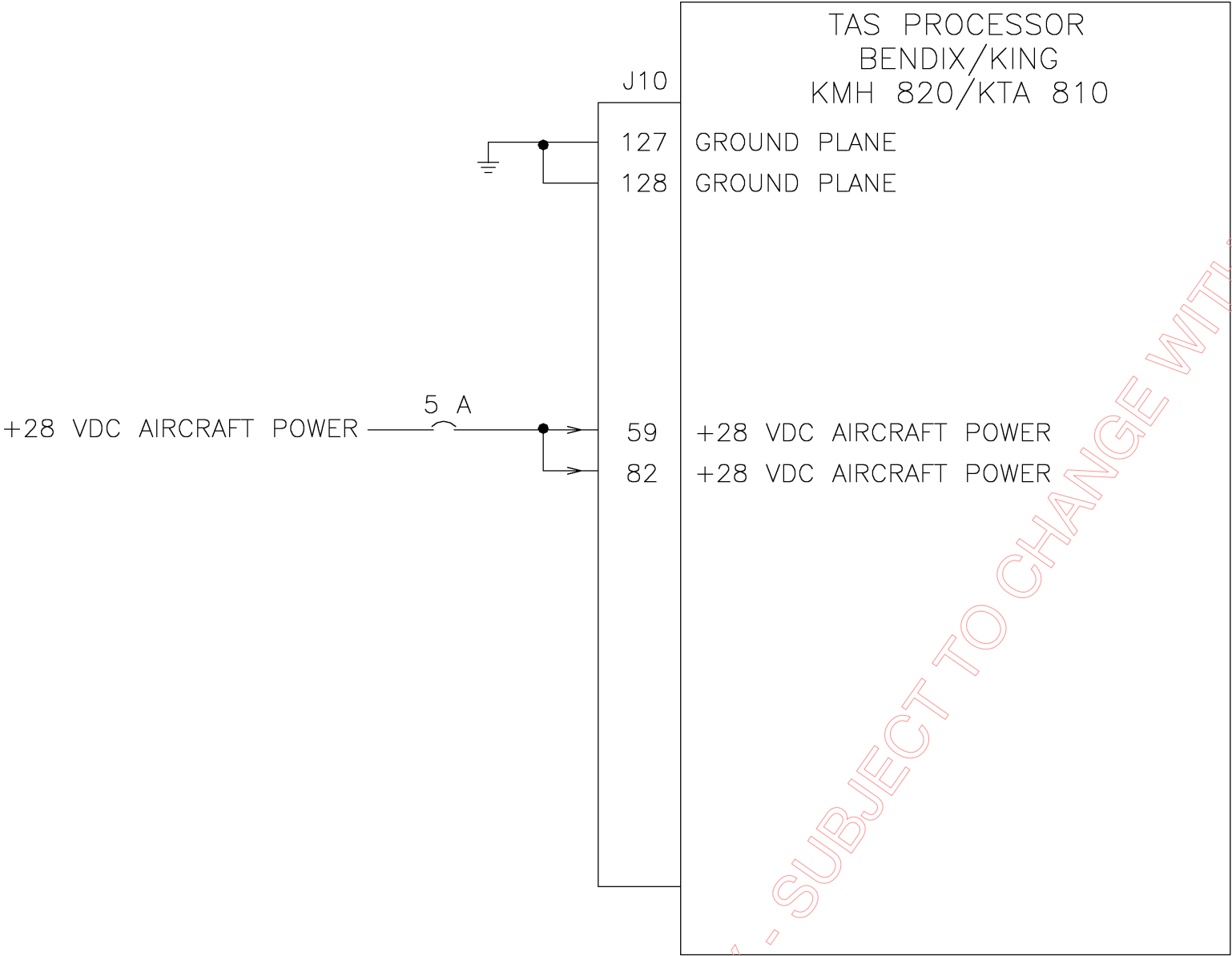


Figure 3-3 KMH 820/KTA 810 System Interconnect Block Diagram
Dwg. No. 155-01735-0002 (Sheet 2 of 2) (08/22/2000)

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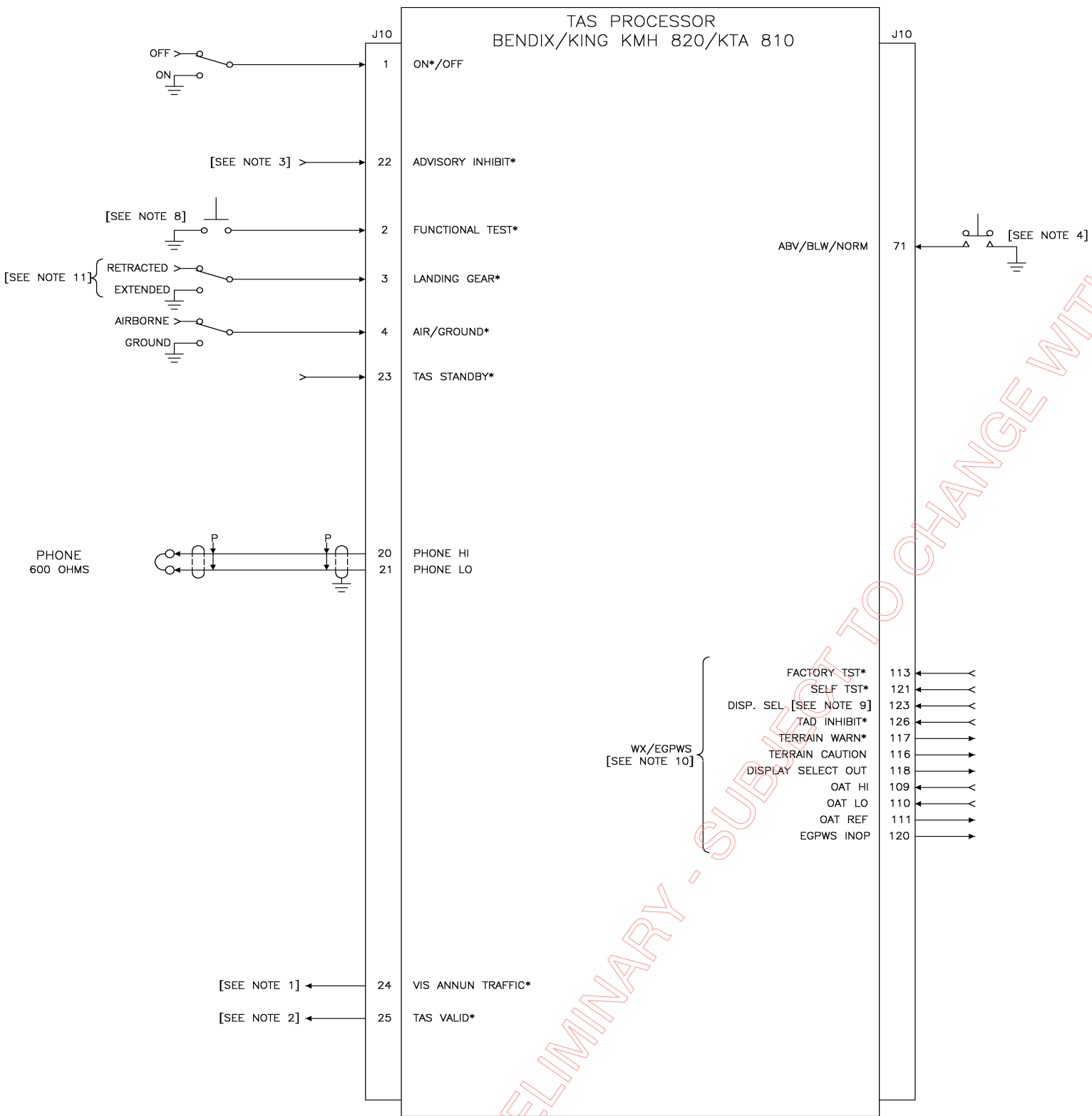
- NOTES:
- 1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT.
 - 2. * THIS STATE IS ACTIVE IF TIED TO GROUND.
 - 3. $\perp$ CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

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Figure 3-4 KMH 820/KTA 810 Power Interface
Dwg. No. 155-01735-0003

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NOTES:

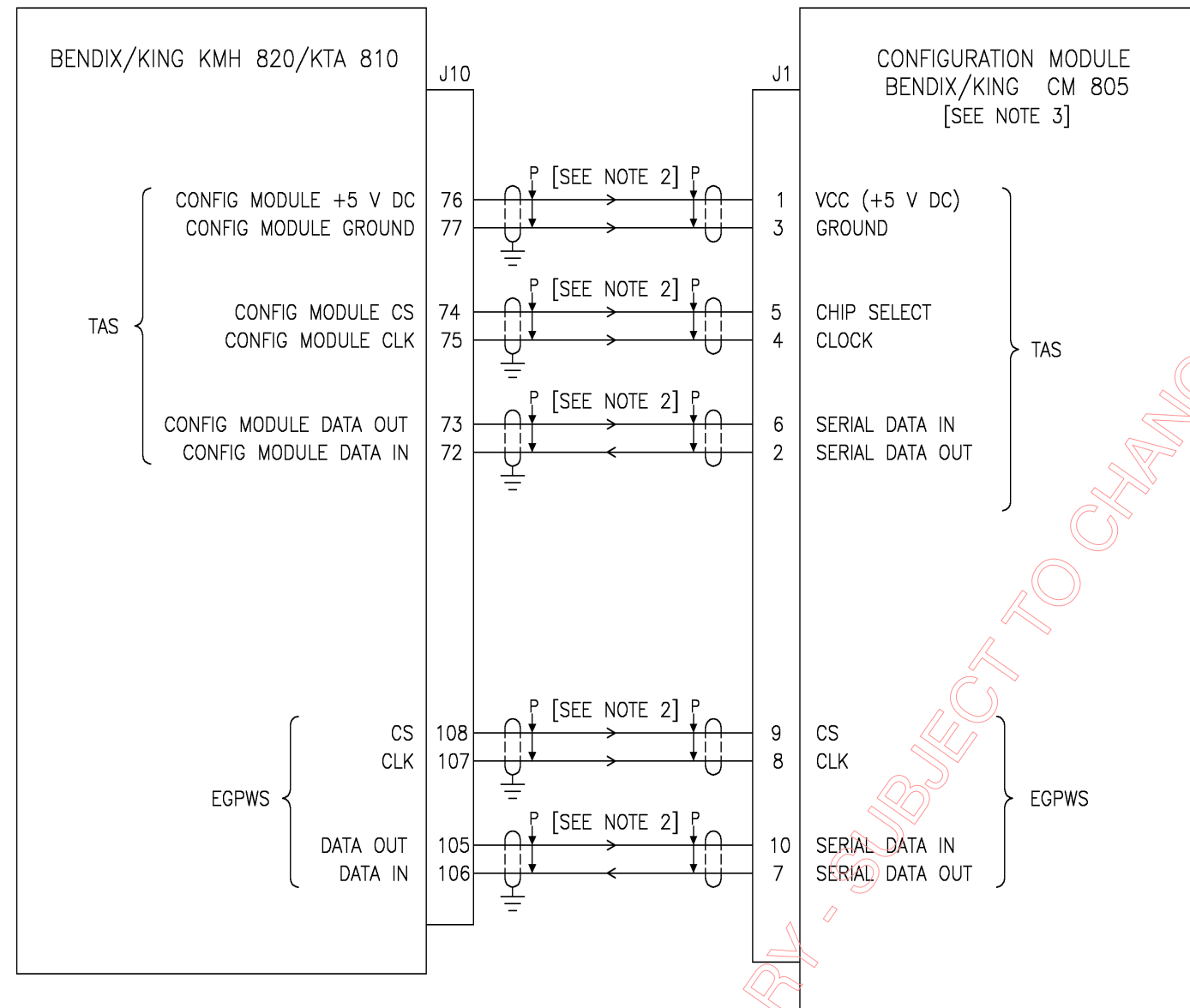
1. VISUAL ANNUNCIATOR TRAFFICX (J10 - 24)
GROUND = PRESENCE OF A TRAFFIC ADVISORY/ ACTIVE STATE (200mA DC MAX)
OPEN = NO TRAFFIC ADVISORY PRESENT
2. TAS VALID* (J10 - 25)
GROUND = NORMAL TCAS OPERATION/ ACTIVE STATE (100mA DC MAX)
OPEN = TCAS SYSTEM FAULT (FAILURE)
3. ADVISORY INHIBIT 1 (J10-22)
AN 'OPEN' ON THIS PIN INDICATES NORMAL ADVISORY/ ALERT OPERATION.
A 'GROUND' ON ADVISORY INHIBIT DISCRETE SHALL CAUSE THE UNIT TO INHIBIT THE AUDIO OUTPUT.
4. PUSH BUTTON IS NORMALLY OPEN - MOMENTARY CONTACT. THE DEFAULT MODE IS NORMAL AIRSPACE. THE MODE TRANSITIONS FROM NORMAL TO BELOW TO ABOVE AND BACK TO NORMAL AIRSPACE PER EACH BUTTON PUSH.
5. * THIS STATE IS ACTIVE IF TIED TO GROUND.
6. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL TWISTED SHIELDED PAIRS AND/OR TRIPLES ARE 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
7. CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
8. PUSH BUTTON IS NORMALLY OPEN - MOMENTARY CONTACT. FUNCTIONAL TEST IS ACTIVATED UPON BUTTON PUSH.
9. DISPLAY SELECT (MOMENTARY)
10. WX/EGPWS SELECT
GND = SELECT TERRAIN
OPEN = SELECT WX
11. AIRCRAFT WITH FIXED LANDING GEAR MUST BE EQUIPPED WITH A BOTTOM MONOPOLE ANTENNA. FURTHERMORE, THE LANDING GEAR DISCRETE MUST BE STRAPPED TO THE RETRACTED POSITION. THE BEARING FROM A BOTTOM DIRECTIONAL IS INVALIDATED WHEN THE LANDING GEAR IS EXTENDED, SO IT WOULD ALWAYS BE INVALIDATED ON A FIXED-GEAR AIRCRAFT. (THEREFORE, THERE WOULD BE NO USE FOR A DIRECTIONAL ANTENNA).

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Figure 3-5 KMH 820/KTA 810 Discrete Interface
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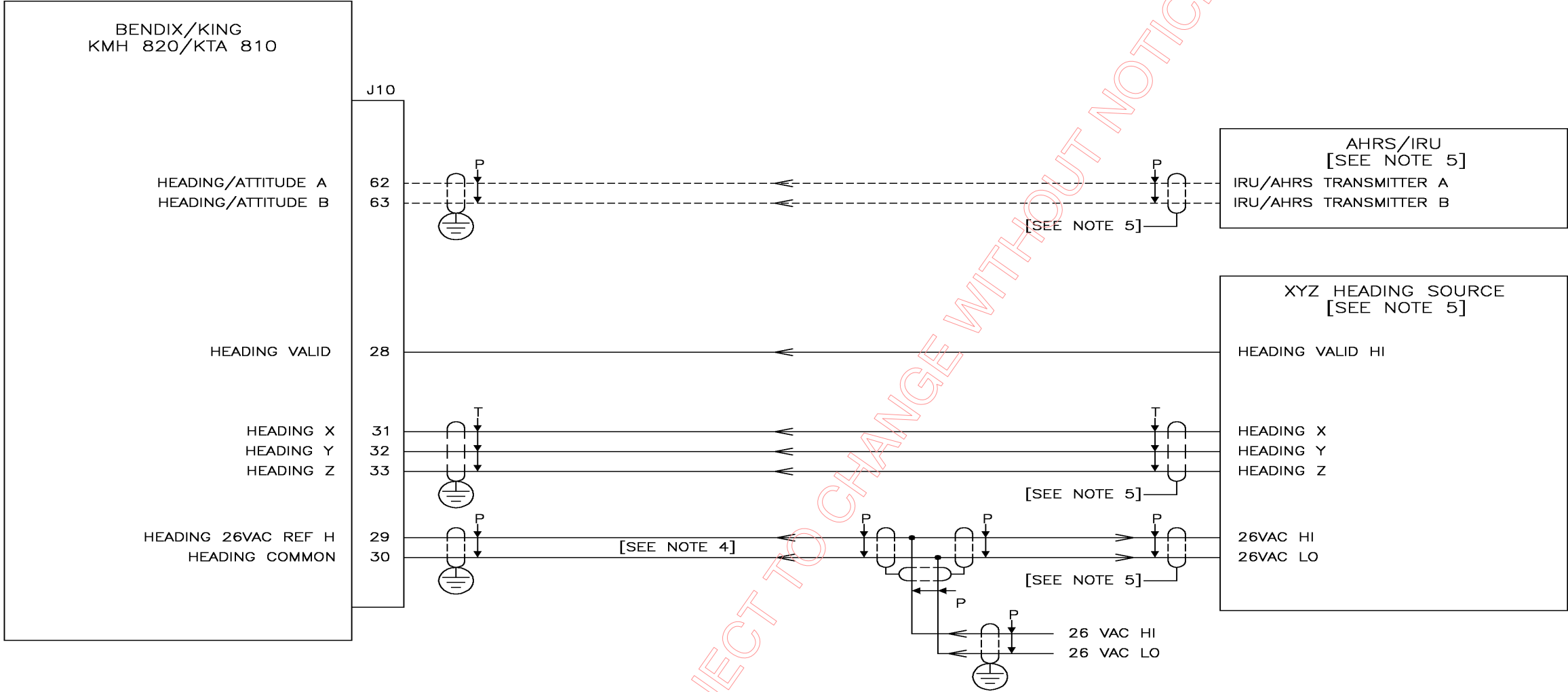
1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL TWISTED SHIELDED PAIRS AND/OR TRIPLES ARE 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2. MAXIMUM WIRE LENGTH IS 24".
3. THE CONFIGURATION MODULE IS PROGRAMMED WITH THE FOLLOWING INFORMATION (REFER TO THE SYSTEM INSTALLATION MANUAL FOR PROCEDURE):

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NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL TWISTED SHIELDED PAIRS AND/OR TRIPLES ARE 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2. DASHED LINES DENOTE ALTERNATIVE/OPTIONAL EQUIPMENT.
3.  CONNECT THE SHIELD TO THE CONNECTOR HOUSING FRAME.
4. THE 26 VAC USED TO EXCITE THE HEADING SOURCE XYZ SYNCHRO MUST BE THE SAME PHASE AS THE KMH 820/KTA 810 26 VAC REFERENCE INPUT.
5. TERMINATE SHIELDED WIRES IN ACCORDANCE WITH THE ORIGINAL AIRCRAFT WIRING PRACTICES AND/OR THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

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Figure 3-7 KMH 820/KTA 810 Attitude/Heading Interface
Dwg. No. 155-01735-0006 (08/10/2000)

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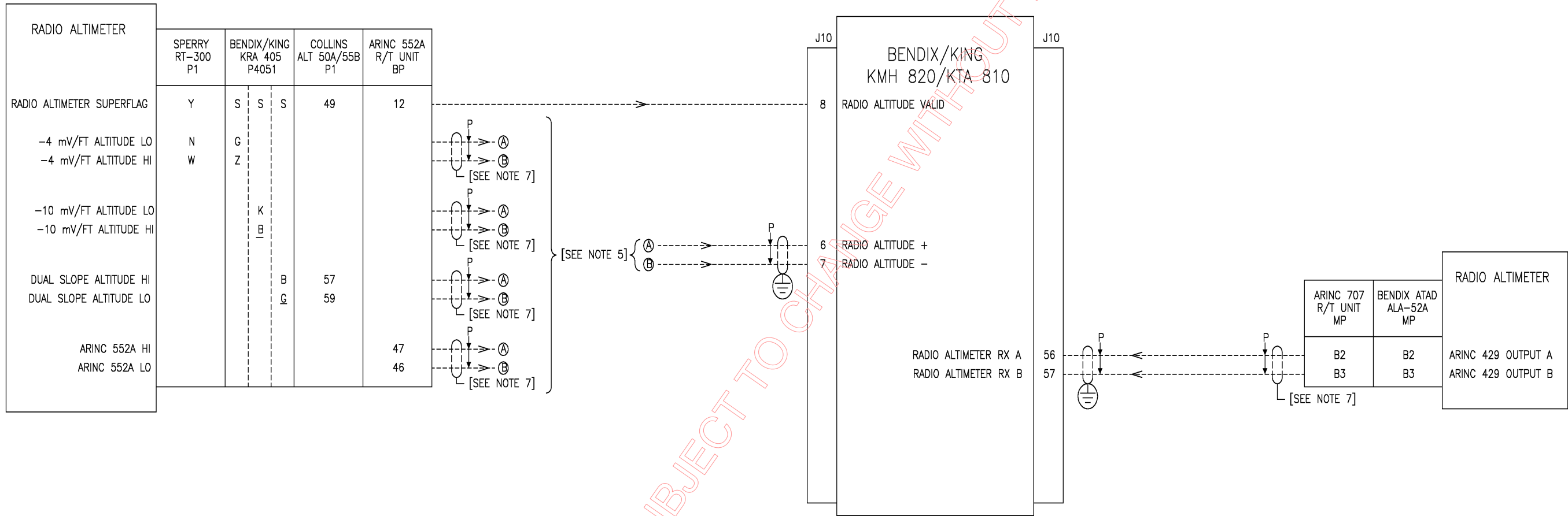
1. LOWERCASE LETTER CONNECTOR PIN DESIGNATORS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.
2. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL TWISTED SHIELDED PAIRS AND/OR TRIPLES ARE 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
3. * THIS STATE IS ACTIVE IF TIED TO GROUND.
4.  CONNECT THE SHIELD TO THE CONNECTOR FRAME.
5. THE TAS PROCESSOR MUST BE CONFIGURED TO ACCEPT THE PROPER ALTITUDE FORMAT. THE RADIO ALTIMETER HI INPUT TO THE PROCESSOR MUST BE POSITIVE WITH RESPECT TO THE RADIO ALTIMETER LO INPUT TO PROVIDE A POSITIVE ALTITUDE.
6. DASHED LINES DENOTE ALTERNATIVE/OPTIONAL EQUIPMENT.
7. TERMINATE SHIELDED WIRES IN ACCORDANCE WITH THE ORIGINAL AIRCRAFT WIRING PRACTICES AND/OR THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

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Figure 3-8 KMH 820/KTA 810 Radar/Barometric Altitude Interface
Dwg. No. 155-01735-0007 (Sheet 1 of 4) (08/10/2000)

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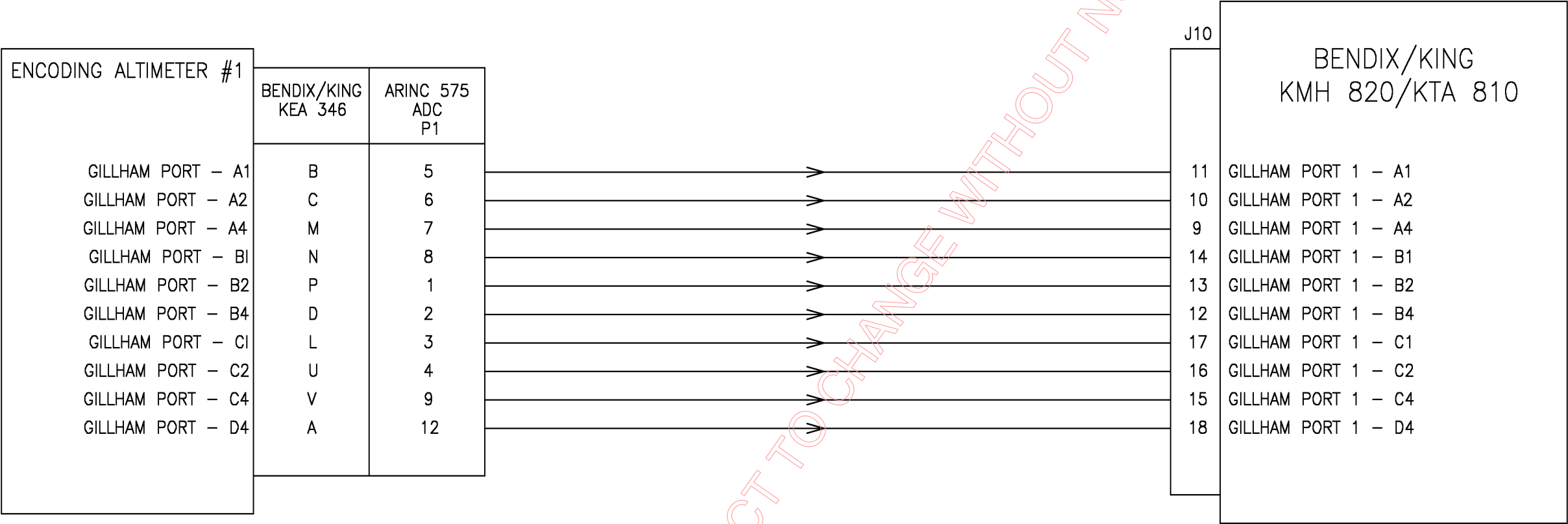


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Figure 3-8 KMH 820/KTA 810 Radar/Barometric Altitude Interface
Dwg. No. 155-01735-0007 (Sheet 2 of 4) (08/10/2000)

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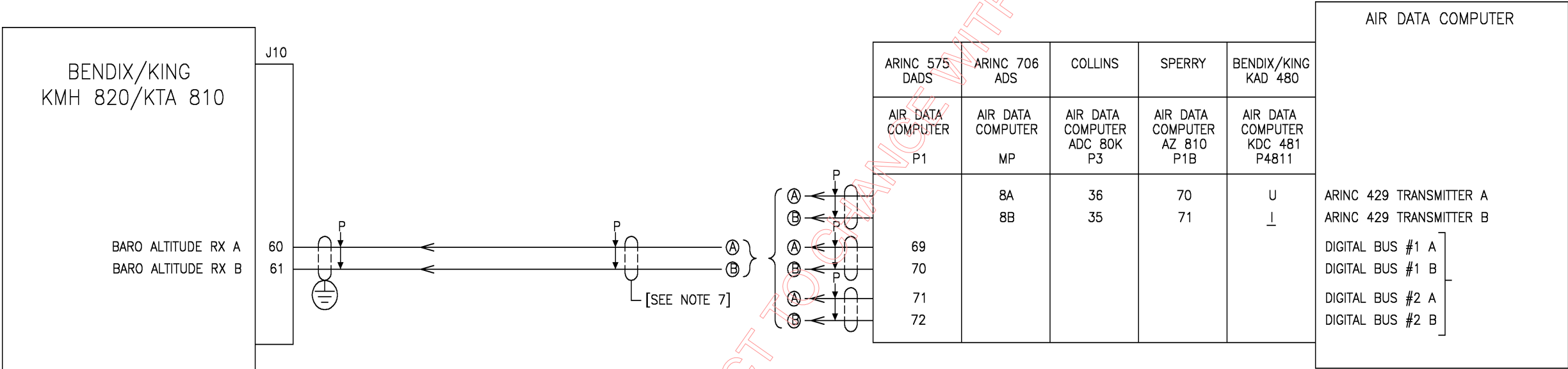


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Figure 3-8 KMH 820/KTA 810 Radar/Barometric Altitude Interface
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Figure 3-8 KMH 820/KTA 810 Radar/Barometric Altitude Interface
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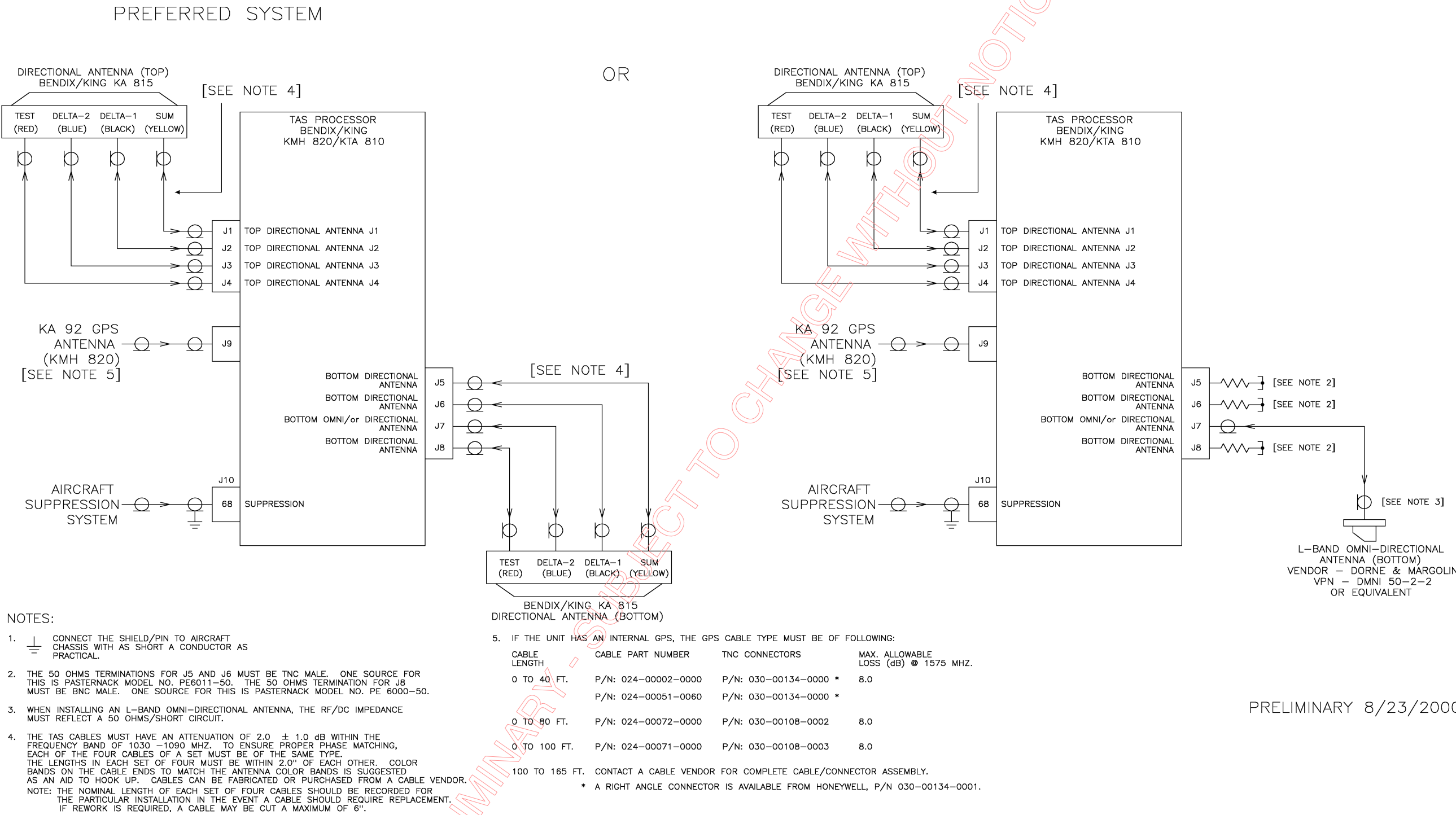
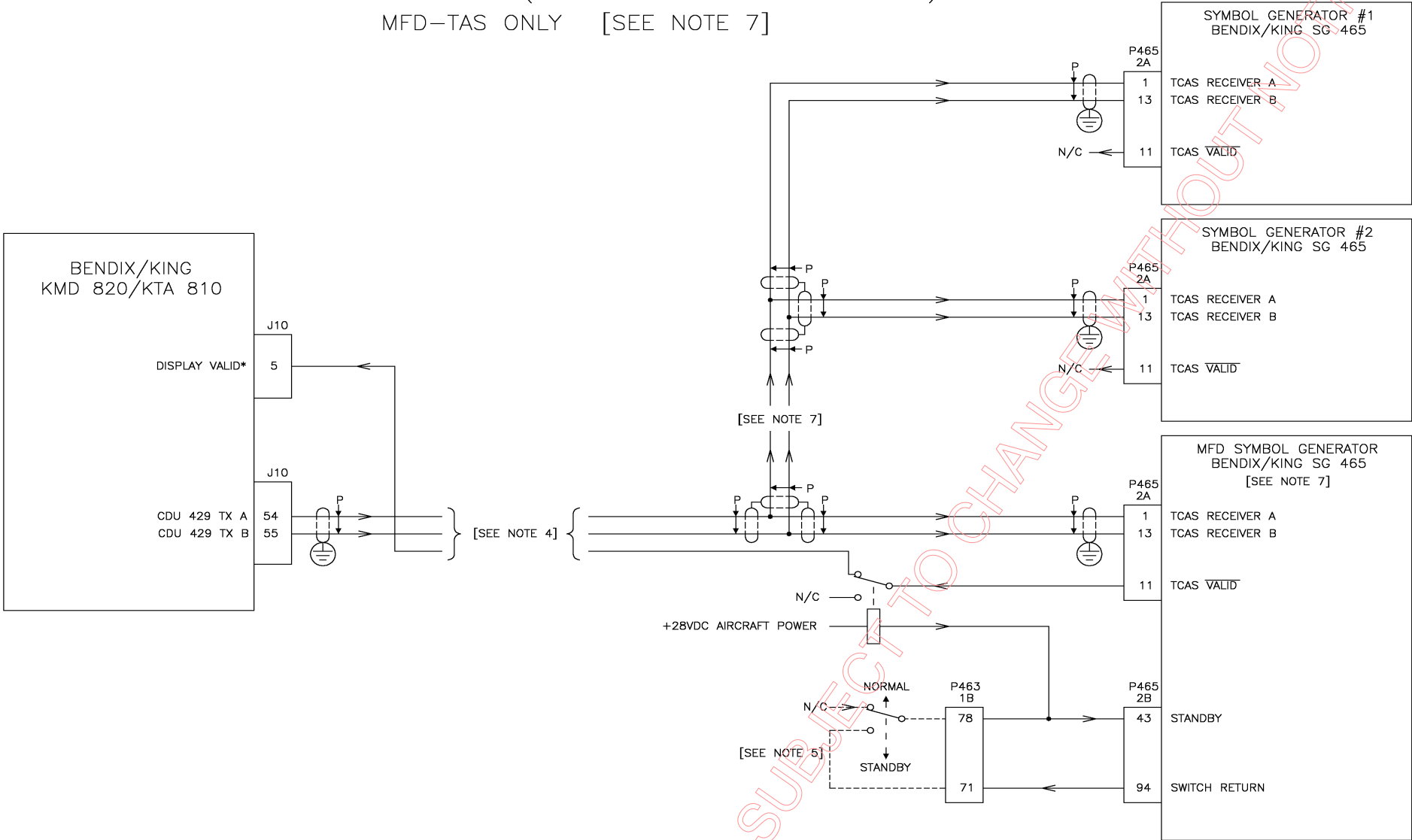


Figure 3-9 KMH 820/KTA 810 Antenna/Suppression Interface
Dwg. No. 155-01735-0008 (08/23/2000)

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CONFIGURATION 1: HSI-NONE (TAS STATUS ANNUNCIATION ONLY)
MFD-TAS ONLY [SEE NOTE 7]



NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2. * THIS STATE IS ACTIVE IF TIED TO GROUND.
3.  CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. THE CDU DISPLAY TRANSMIT BUS OF THE TAS PROCESSOR CAN NORMALLY BE CONNECTED TO MULTIPLE TRAFFIC DISPLAYS. THE DISPLAY VALID FROM THE PRIMARY DISPLAY SHOULD BE CONNECTED TO J10 PIN 5.
5. DASHED LINES INDICATE WIRING THAT IS INTERNAL TO THE BENDIX/KING SU 463 SWITCHING UNIT. THESE WIRES ARE NOT PART OF THE AIRCRAFT ELECTRICAL HARNESS AND ARE SHOWN HERE TO ILLUSTRATE THE SIGNAL FLOW WITHIN THE SWITCHING UNIT.
6.  CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
7. TAS DISPLAY INFORMATION SHALL ONLY BE DISPLAYED UPON THE MFD IN THE "TCAS ONLY" MODE. THE NAVIGATIONAL DISPLAYS SHALL ONLY DISPLAY TCAS STATUS ANNUNCIATION MOMENTARILY AT THE TIME OF OCCURRENCE (VIA SYMBOL GENERATOR #1 AND #2). THE CONNECTION OF SYMBOL GENERATOR #1 AND #2 IS OPTIONAL IF TCAS STATUS ANNUNCIATION UPON THE NAVIGATIONAL DISPLAY IS NOT DESIRED.

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Figure 3-10 KMH 820/KTA 810 EFS 40/50 TAS Interface
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NOTES:

- 1. EXTERNAL MODE SELECT BUTTON IS NORMALLY OPEN – MOMENTARY CONTACT. THE DISCRETE BUTTON IS ONLY REQUIRED WHEN THE TCAS CONTROL PANEL DOES NOT OFFER THE WX/TCAS MODE SELECTOR.
- 2. REFER TO THE UNIT INSTALLATION MANUAL FOR COMPLETE WIRING INFORMATION.
- 3. POP UP DISCRETE (P3621-46)
GROUND = POP UP WITH WX AND TCAS
OPEN = TCAS ONLY
- 4. DISPLAY DISCRETE (P3621-47)
GROUND = "429" DISPLAY CONTROL (WX/TCAS MODE SELECTION VIA ARINC 429 TCAS CONTROL PANEL)
OPEN = DISCRETE DISPLAY CONTROL (EXTERNAL MODE SELECT BUTTON)
- 5. STRAPING OF THESE PROGRAM PINS INDICATES THE RADAR SWEEP ANGLE

SWEEP	PROGRAM 1	PROGRAM 3
90	GROUND	GROUND
120	OPEN	OPEN
160	GROUND	OPEN

- 6. THE GC360A MUST BE OF THE FOLLOWING UNIT STATUS PRIOR TO INTERFACING:
 - * KPN 071-01313-0010,-0011,-0012, OR -0013 W/SOFTWARE -08 OR HIGHER.
 - * KPN 071-01313-0000,-0001,-0002, OR -0003 W/UNIT MODIFICATION M-1.THIS CONVERTS THESE FLAVORS TO BE EQUIVALENT TO -0010,-0011,-0012, OR -0013 AND IS A PRODUCT IMPROVEMENT NOT WARRANTY REIMBURSABLE.
- 7. USE 16 AWG WIRE BETWEEN THE GC360A, GC362A, AND IN842A OR IN862A FOR DC GROUND.
- 8. THE ONLY IN182A FLAVORS COMPATIBLE WITH THE GC360A ARE AS FOLLOWS:
066-03084-0002, -0003, -0032, AND -0033.
- 9. LOWERCASE LETTER CONNECTOR PIN DESIGNATORS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.
- 10. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
- 11.  CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
- 12. DASHED LINES DENOTE REQUIRED INTERCONNECT ONLY WHEN RADAR GRAPHIC UNIT, GC 360A, IS INSTALLED.

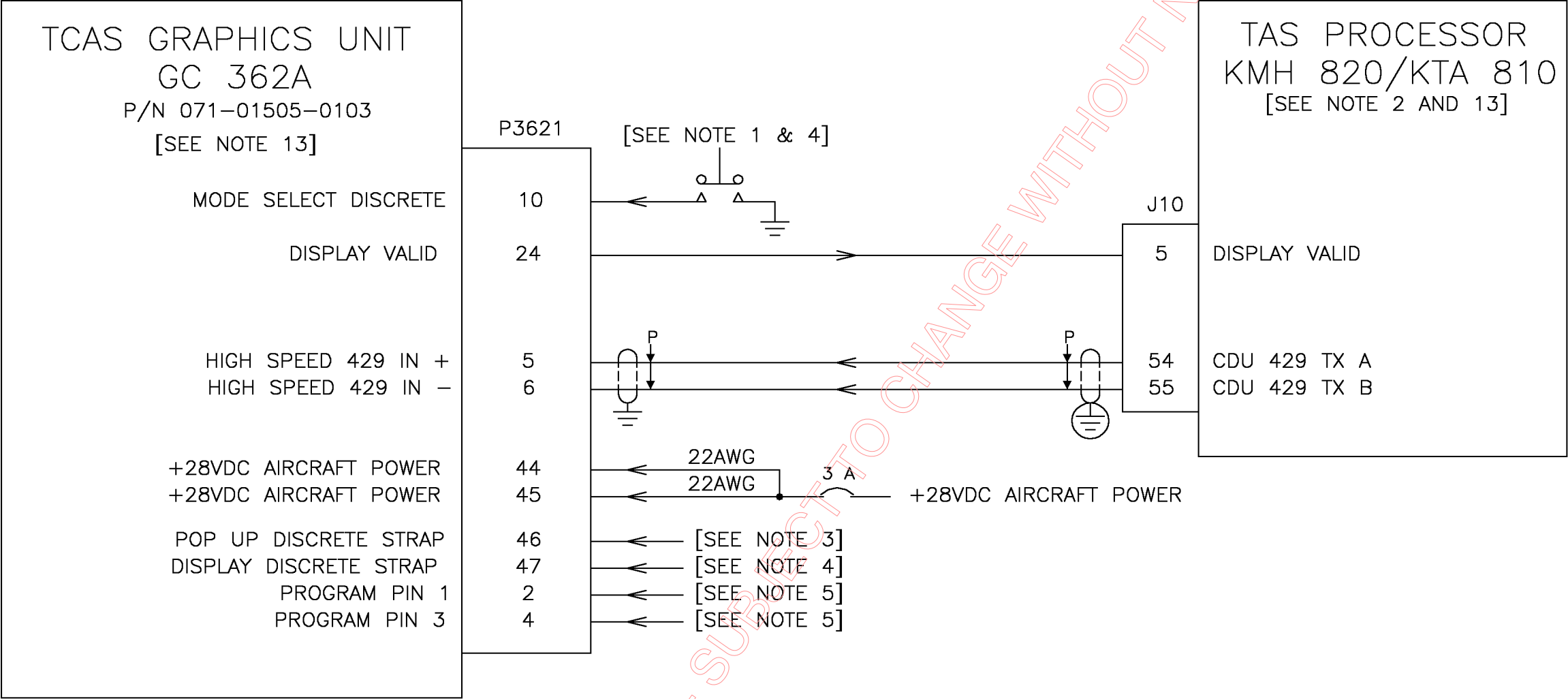
- 13. GC 362A P/N 071-01505-0101/0103 WILL INTERFACE TO THE CAS-81 TCAS.
P/N 071-01505-0103/0203 WILL INTERFACE TO THE CAS 66A/67A TCAS OR KMH 820/KTA 810 TAS.
- 14. P8121-9 SHALL BE CONNECTED TO P8121-26 FOR AN IN182A INDICATOR.
P8121-9 SHALL BE UNCONNECTED FOR AN IN812A INDICATOR.
- 15.  CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.

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Figure 3-11 KMH 820/KTA 810 GC 362A Interface
Dwg. No. 155-01735-0010 (Sheet 1 of 3) (08/10/2000)

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Figure 3-11 KMH 820/KTA 810 GC 362A Interface
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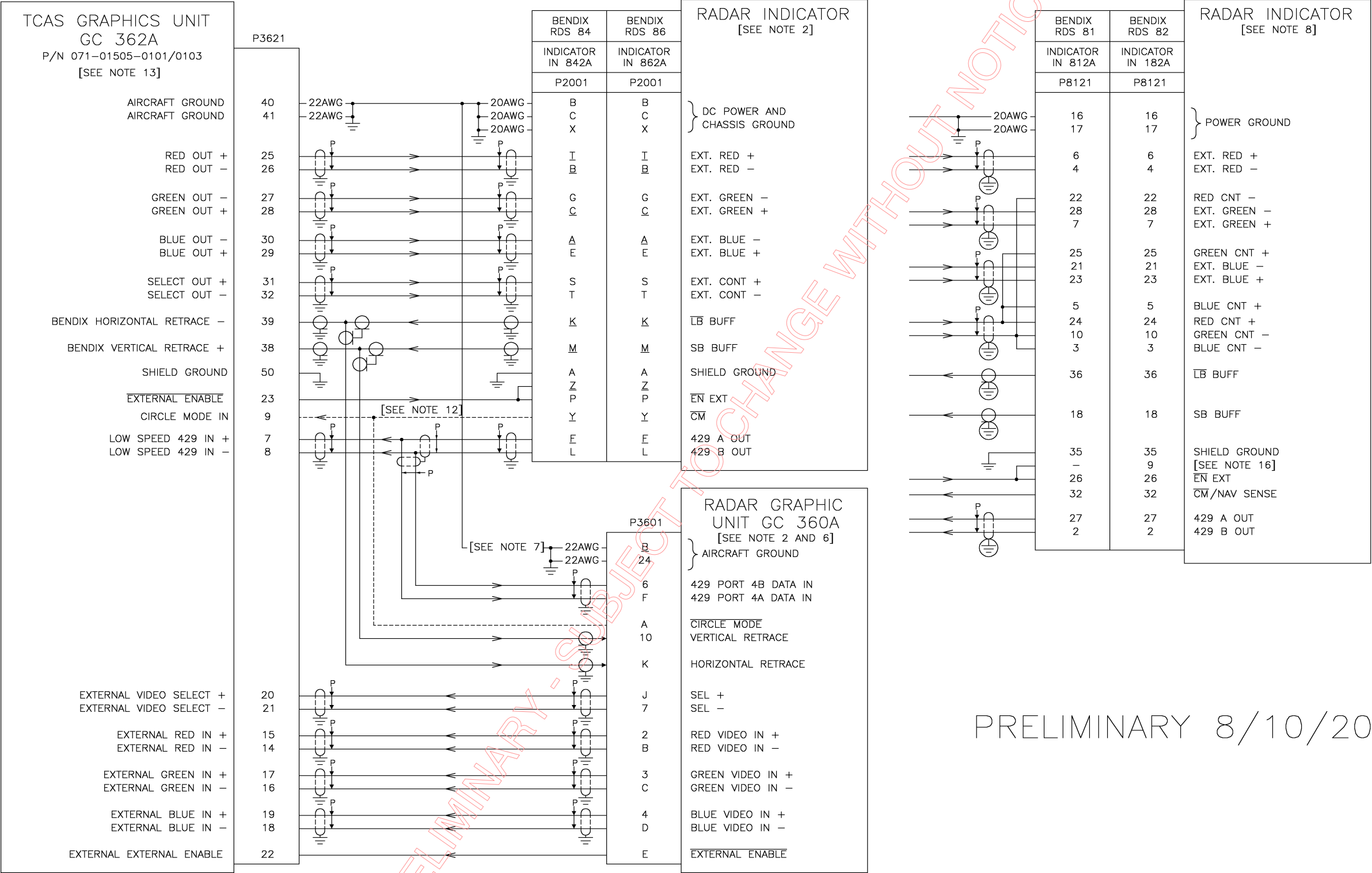


Figure 3-11 KMH 820/KTA 810 GC 362A Interface
Dwg. No. 155-01735-0010 (Sheet 3 of 3) (08/10/2000)

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NOTES:

- 1. EXTERNAL MODE SELECT BUTTON IS NORMALLY OPEN – MOMENTARY CONTACT. THE DISCRETE BUTTON IS ONLY REQUIRED WHEN THE TCAS CONTROL PANEL DOES NOT OFFER THE WX/TCAS MODE SELECTOR.
- 2. REFER TO THE UNIT INSTALLATION MANUAL FOR COMPLETE WIRING INFORMATION.
- 3. POP UP DISCRETE (P3621-46)
GROUND = POP UP WITH WX AND TCAS
OPEN = TCAS ONLY
- 4. DISPLAY DISCRETE (P3621-47)
GROUND = "429" DISPLAY CONTROL (WX/TCAS MODE SELECTION VIA ARINC 429 TCAS CONTROL PANEL)
OPEN = DISCRETE DISPLAY CONTROL (EXTERNAL MODE SELECT BUTTON)
- 5. STRAPING OF THESE PROGRAM PINS INDICATES THE RADAR SWEEP ANGLE

SWEEP	PROGRAM 1	PROGRAM 3
90	GROUND	GROUND
120	OPEN	OPEN
160	GROUND	OPEN

- 6. REFERENCE SPERRY SALES BULLETIN #26-85 BEFORE ATTEMPTING THIS INTERFACE. NOT ALL SPERRY INDICATORS HAVE A STANDBY OUTPUT AND MUST BE MODIFIED TO PROVIDE THIS. ALSO BE AWARE THAT SOME SPERRY INDICATORS CANNOT BE MODIFIED TO PROVIDE A STANDBY OUTPUT. AN INDICATOR MUST BE INSTALLED THAT PROVIDES THIS OUTPUT AND IT MUST BE CONNECTED TO THE GC362A, P3621 PIN 33 (STANDBY).
- 7. PIN 38 IS A DUAL FUNCTION PIN. IT IS VERTICAL RETRACE ON BENDIX RDS SERIES, AND IT IS VIDEO SYNC ON THE COLLINS/SPERRY RADAR INDICATORS.
- 8. RANGE 3 FUNCTION IS ONLY AVAILABLE ON GC362A PART NUMBER 071-01505-0103 AND ABOVE.
- 9. LOWERCASE LETTER CONNECTOR PIN DESIGNATORS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.

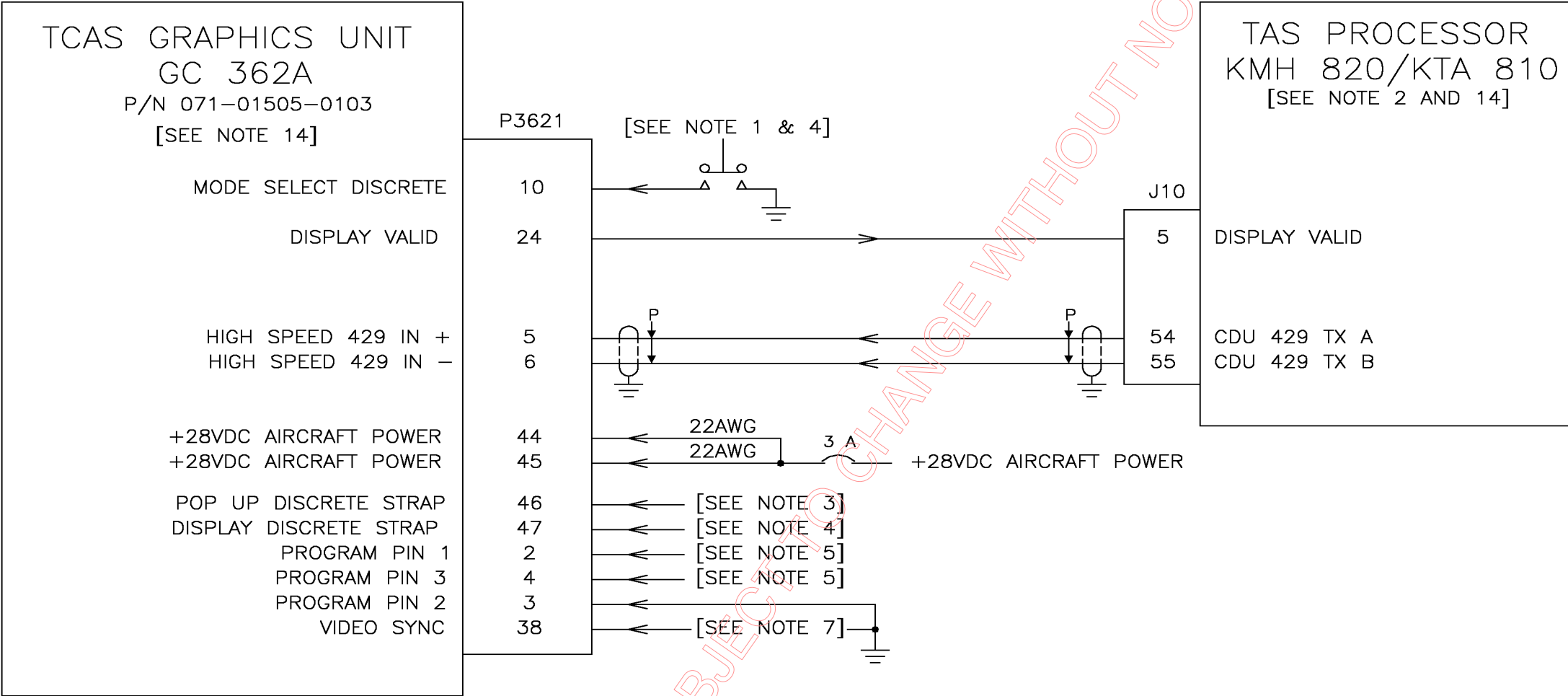
- 10. REFER TO THE HONEYWELL (SPERRY) RADAR MANUAL FOR THE MAX CABLE LENGTHS AND REQUIRED WIRE CHARACTERISTICS.
- 11. ONLY THE SPERRY PRIMUS 650 AND 870 REQUIRES THE RANGE 3 FUNCTION; ALL OTHER INDICATORS RESERVE THIS FUNCTION FOR FUTURE USE.
- 12. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
- 13. 1 CONNECT THESE SHIELD GROUNDS TO AIRCRAFT GROUND CHASSIS WITH AS SHORT 3 A CONDUCTOR AS PRACTICAL.
- 14. GC 362A P/N 071-01505-0101 WILL INTERFACE TO CAS-81 TCAS AND SPERRY 200/300SL/400/800 OR P90 INDICATORS.
GC 362A P/N 071-01505-0103 WILL INTERFACE TO CAS 66A/67A TCAS, KMH 820/KTA 810 TAS, AND SPERRY 200/300SL/400/650/700/870 OR P90 INDICATORS.
- 15. PROGRAM PIN 2 IS THE MANUFACTURER'S STRAP PIN. IT SHOULD BE GROUNDED FOR ALL NON-BENDIX RADAR INTERFACES.

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Figure 3-12 KMH 820/KTA 810 GC 362A Honeywell Interface
Dwg. No. 155-01735-0011 (Sheet 1 of 3) (08/10/2000)

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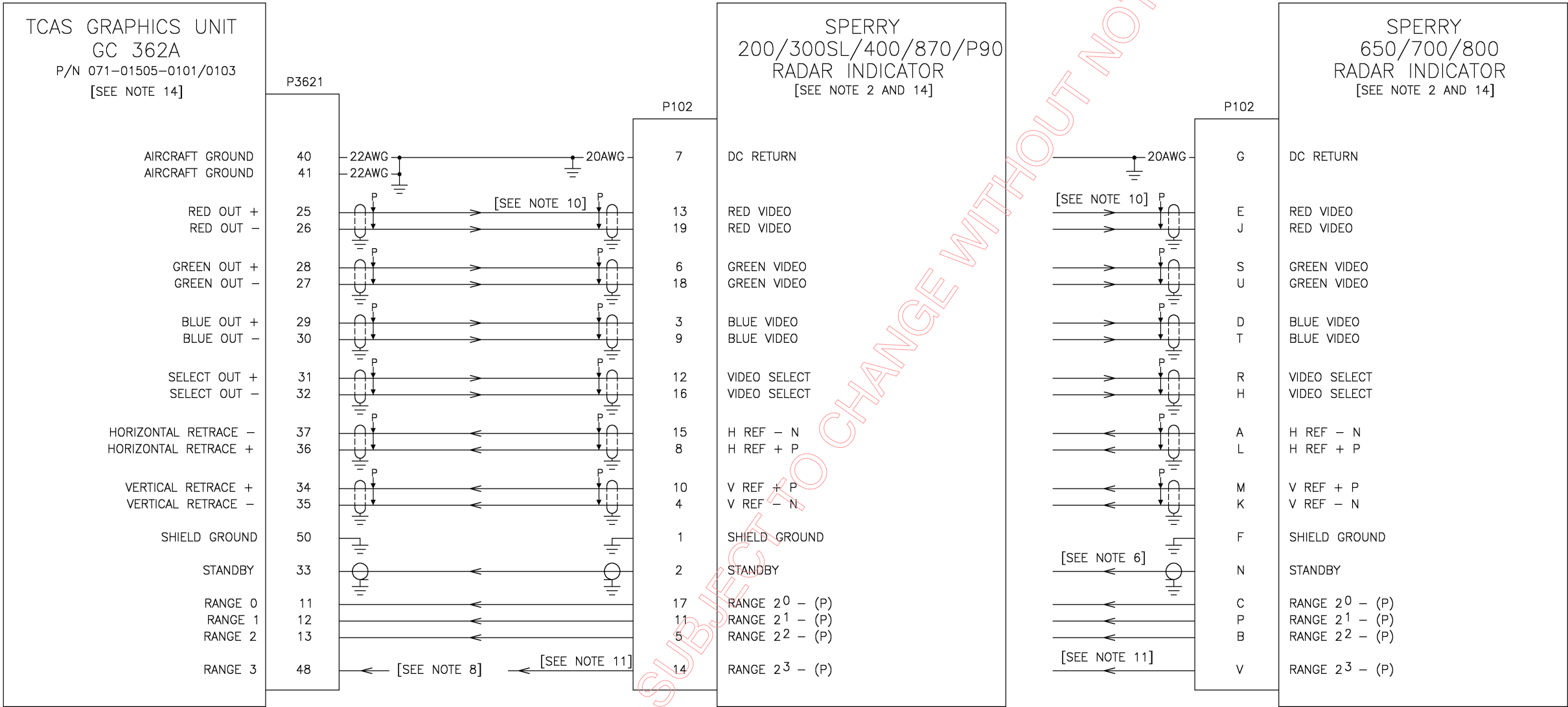


PRELIMINARY 8/10/2000

Figure 3-12 KMH 820/KTA 810 GC 362A Honeywell Interface
Dwg. No. 155-01735-0011 (Sheet 2 of 3) (08/10/2000)

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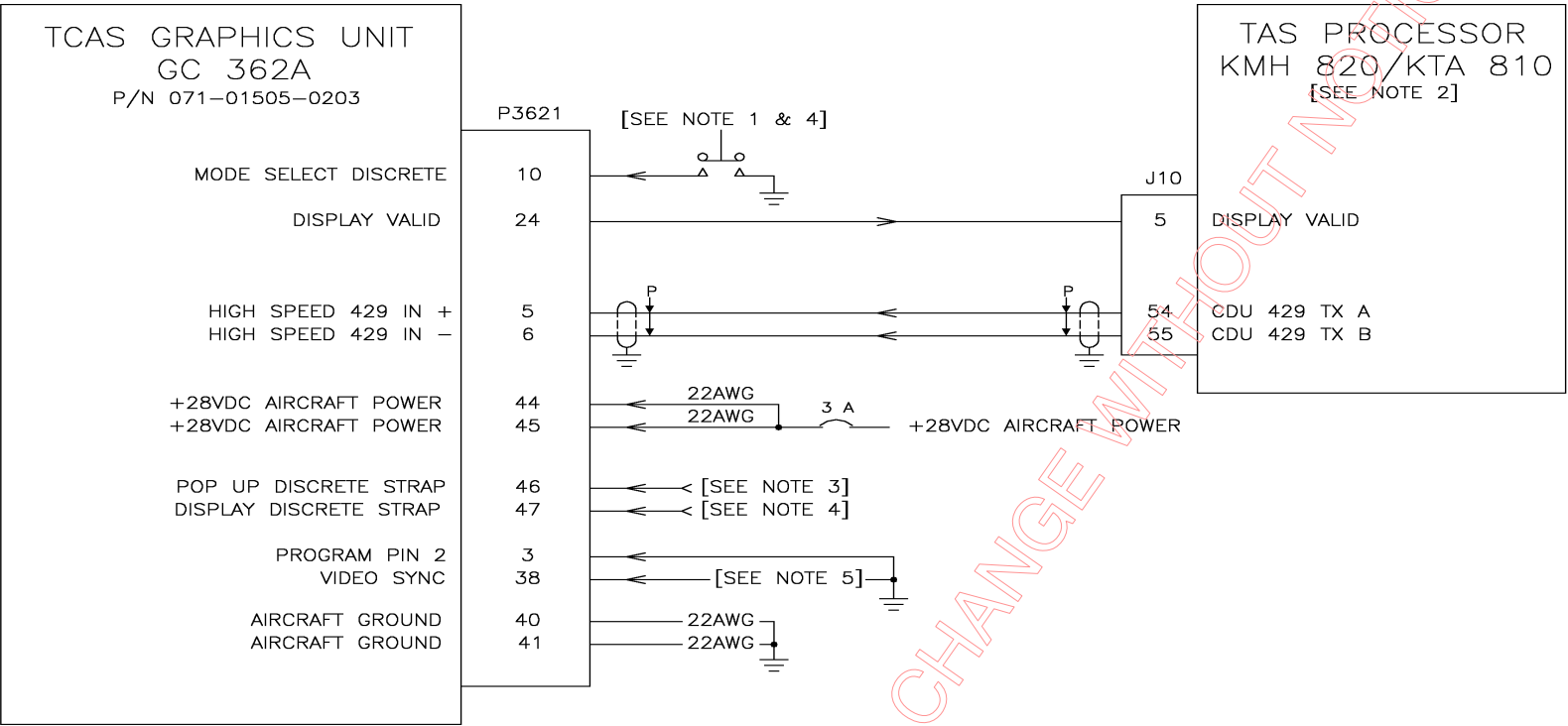


PRELIMINARY 7/13/2000

Figure 3-12 KMH 820/KTA 810 GC 362A Honeywell Interface
Dwg. No. 155-01735-0011 (Sheet 3 of 3) (07/13/2000)

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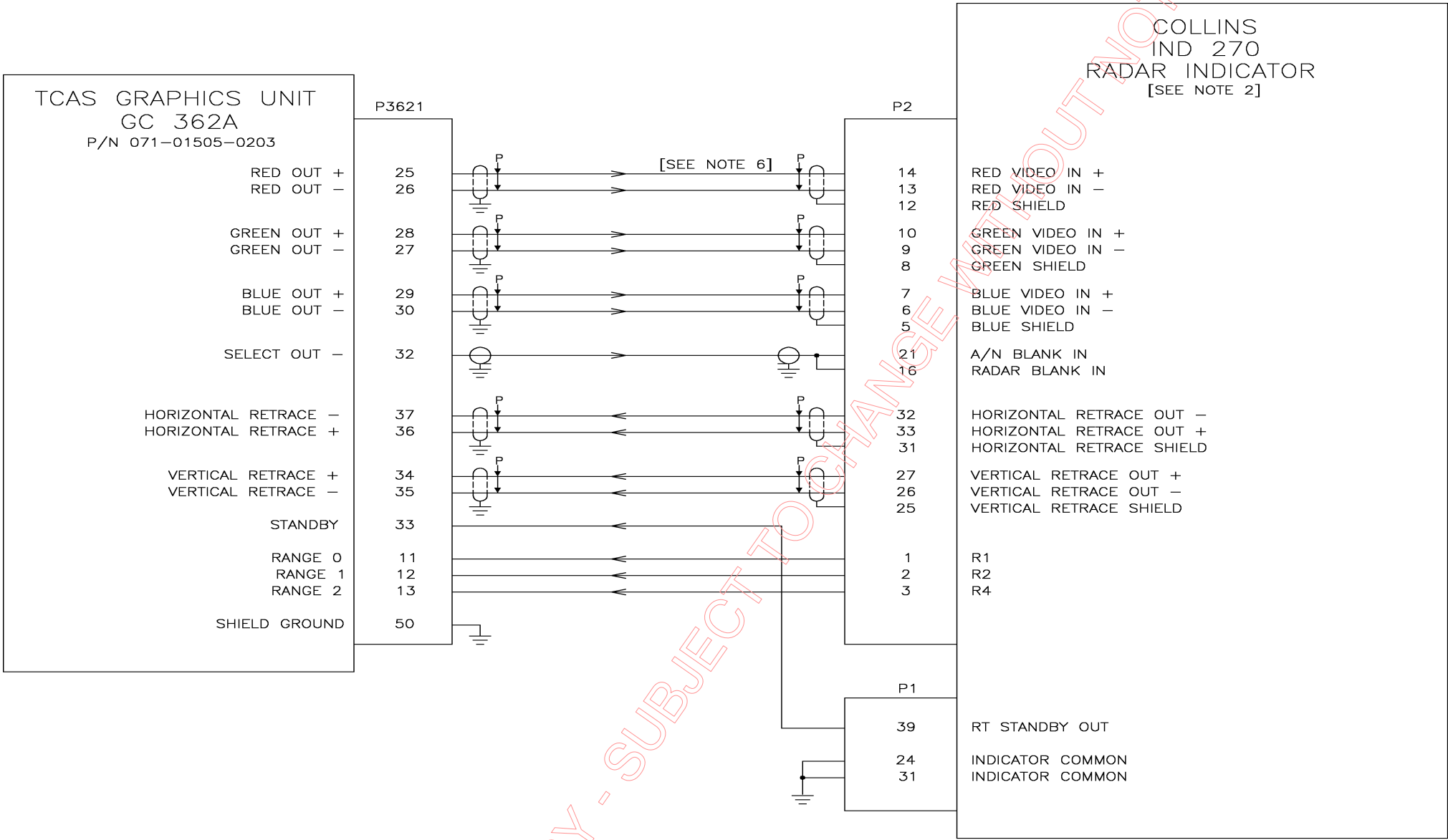
NOTES:

1. EXTERNAL MODE SELECT BUTTON IS NORMALLY OPEN — MOMENTARY CONTACT. THE DISCRETE BUTTON IS ONLY REQUIRED WHEN THE TCAS CONTROL PANEL DOES NOT OFFER THE WX/TCAS MODE SELECTOR.
2. REFER TO THE UNIT INSTALLATION MANUAL FOR COMPLETE WIRING INFORMATION.
3. POP UP DISCRETE (P3621—46)
GROUND = POP UP WITH WX AND TCAS
OPEN = TCAS ONLY
4. DISPLAY DISCRETE (P3621—47)
GROUND = "429" DISPLAY CONTROL (WX/TCAS MODE SELECTION VIA ARINC 429 TCAS CONTROL PANEL)
OPEN = DISCRETE DISPLAY CONTROL (EXTERNAL MODE SELECT BUTTON)
5. PIN 38 IS A DUAL FUNCTION PIN. IT IS VERTICAL RETRACE ON BENDIX RDS SERIES, AND IT IS VIDEO SYNC ON THE COLLINS/SPERRY RADAR INDICATORS.
6. REFER TO THE COLLINS MANUAL FOR THE MAX CABLE LENGTHS AND REQUIRED WIRE CHARACTERISTICS.
7. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
8.  CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

Figure 3-13 KMH 820/KTA 810 GC 362A Collins Interface
Dwg. No. 155-01735-0012 (Sheet 1 of 2) (08/10/2000)

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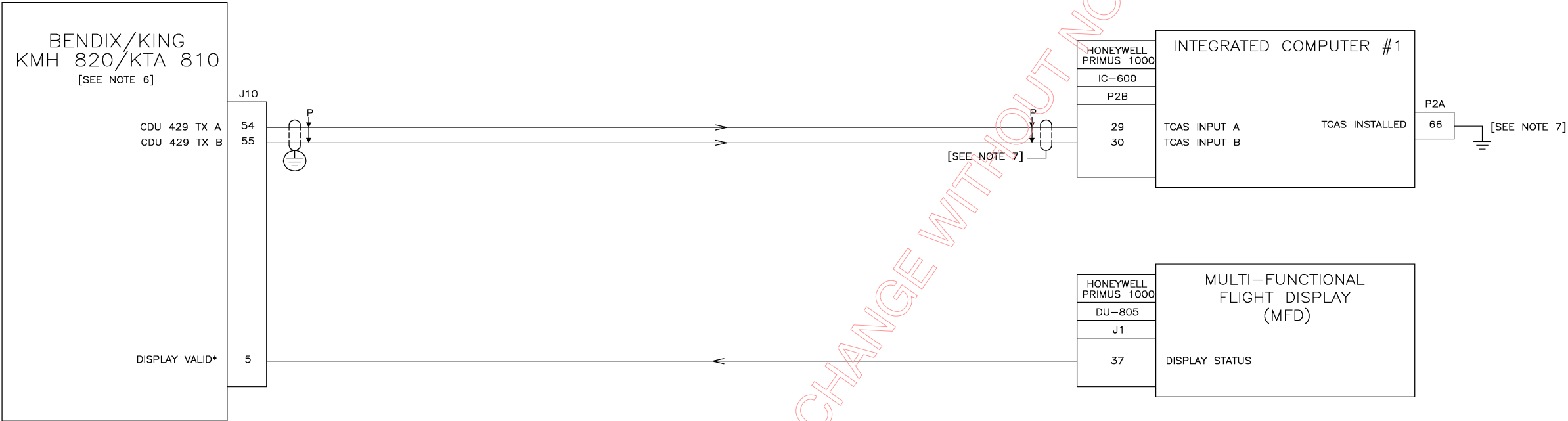


PRELIMINARY 7/13/2000

Figure 3-13 KMH 820/KTA 810 GC 362A Collins Interface
Dwg. No. 155-01735-0012 (Sheet 2 of 2) (07/13/2000)

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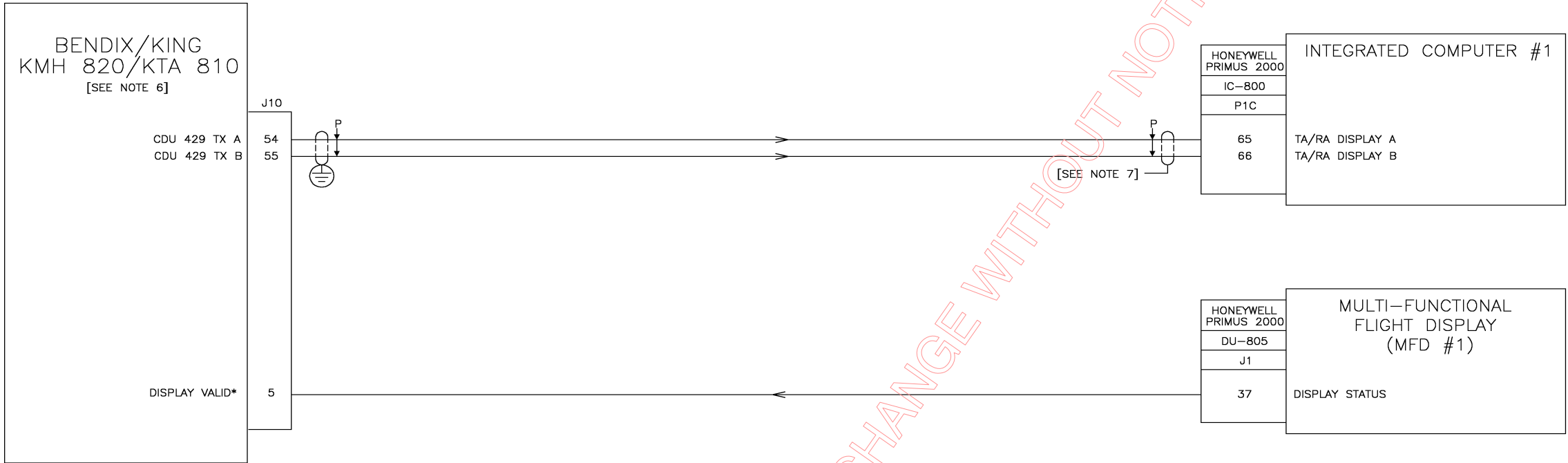
- NOTES:
1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
 2. * THIS STATE IS ACTIVE IF TIED TO GROUND.
 3. $\perp$ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
 4. #1 - INDICATES PILOT'S UNITS.
#2 - INDICATES COPILOT'S UNITS.
 5. $\oplus$ CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
 6. THE "TA/RA BLOCK TRANSFER PROGRAM" NEEDS TO BE CONFIGURED TO THE HONEYWELL BCAS (EFIS) PROTOCOL FORMAT.
 7. TERMINATE SHIELDED WIRES IN ACCORDANCE WITH THE ORIGINAL AIRCRAFT WIRING PRACTICES AND/OR THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

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Figure 3-14 KMH 820/KTA 810 Honeywell Primus 1000 Interface
Dwg. No. 155-01735-0013 (Sheet 1 of 2) (08/10/2000)

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NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2. * THIS STATE IS ACTIVE IF TIED TO GROUND.
3. $\perp$ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. #1 - INDICATES PILOT'S UNITS.
#2 - INDICATES COPILOT'S UNITS.
5. $\oplus$ CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
6. THE "TA/RA BLOCK TRANSFER PROGRAM" NEEDS TO BE CONFIGURED TO THE ARINC 735 PROTOCOL FORMAT.
7. TERMINATE SHIELDED WIRES IN ACCORDANCE WITH THE ORIGINAL AIRCRAFT WIRING PRACTICES AND/OR THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

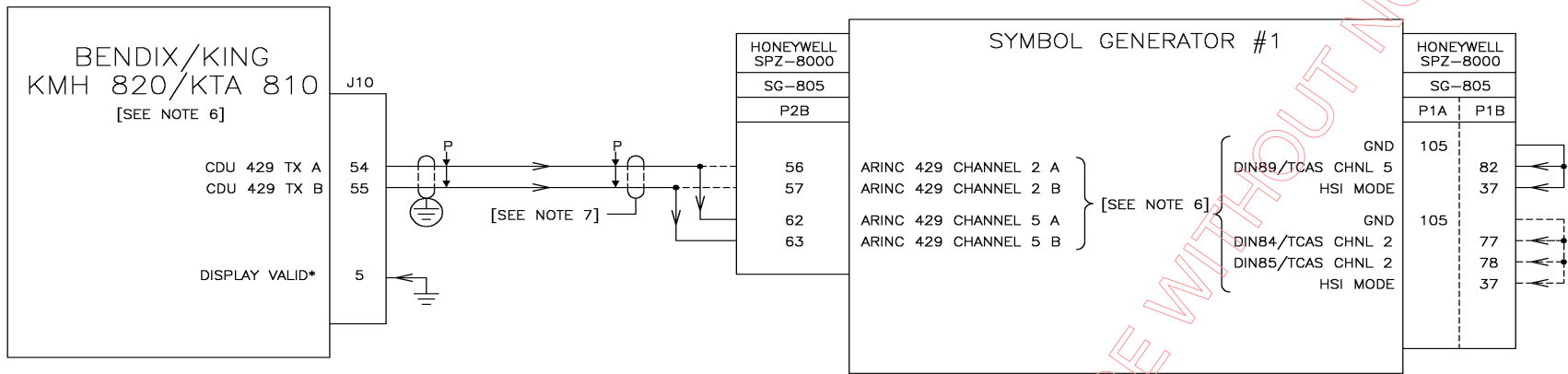
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Figure 3-14 KMA 820/KTA 810 Honeywell Primus 1000 Interface
Dwg. No. 155-01735-0013 (Sheet 2 of 2) (08/10/2000)

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SG-805 INSTALLATION



NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2. * THIS STATE IS ACTIVE IF TIED TO GROUND.
3. CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. #1 - INDICATES PILOT'S UNITS.
#2 - INDICATES COPILOT'S UNITS.
5. CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
6. THE "TA/RA BLOCK TRANSFER PROGRAM" NEEDS TO BE CONFIGURED TO THE HONEYWELL BCAS (EFIS) PROTOCOL FORMAT.
7. TERMINATE SHIELDED WIRES IN ACCORDANCE WITH THE ORIGINAL AIRCRAFT WIRING PRACTICES AND/OR THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

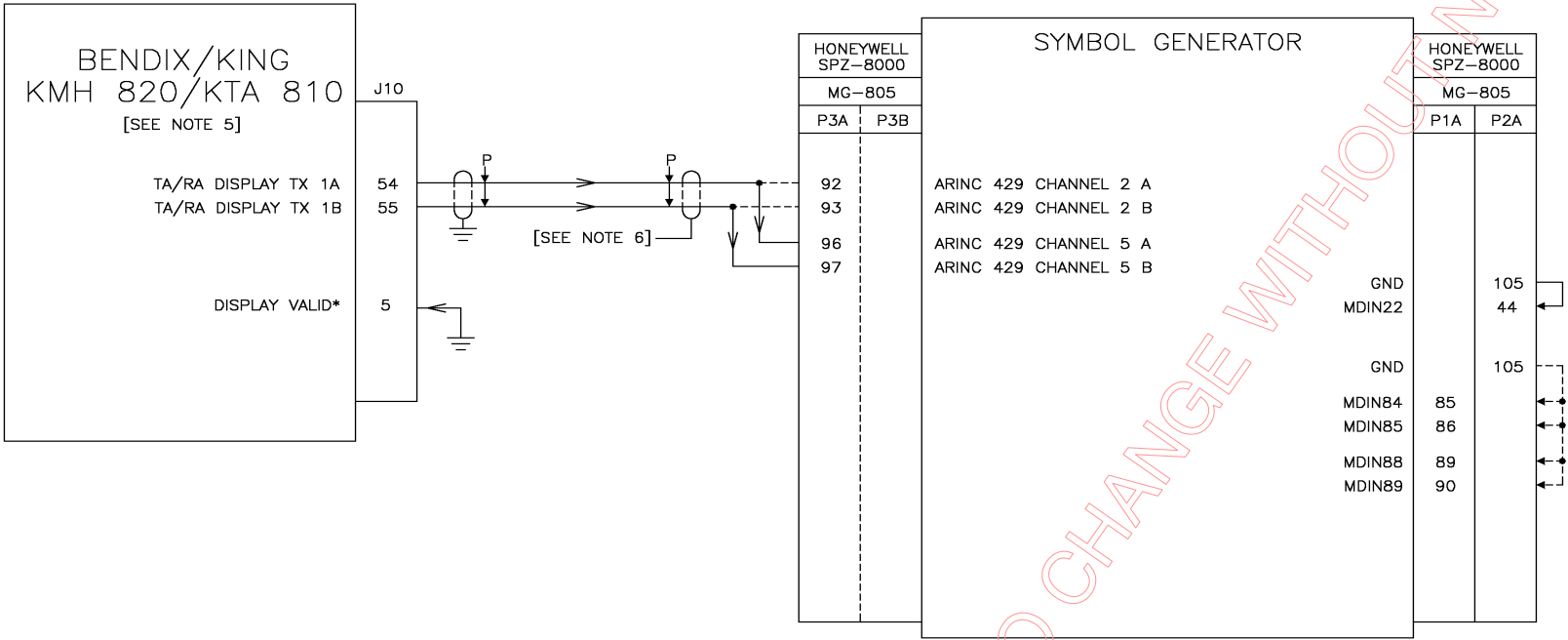
PRELIMINARY 8/14/2000

Figure 3-15 KMH 820/KTA 810 Honeywell SPZ-805 Interface
Dwg. No. 155-01735-0014 (Sheet 1 of 2) (08/14/2000)

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MG-805 INSTALLATION



NOTES:

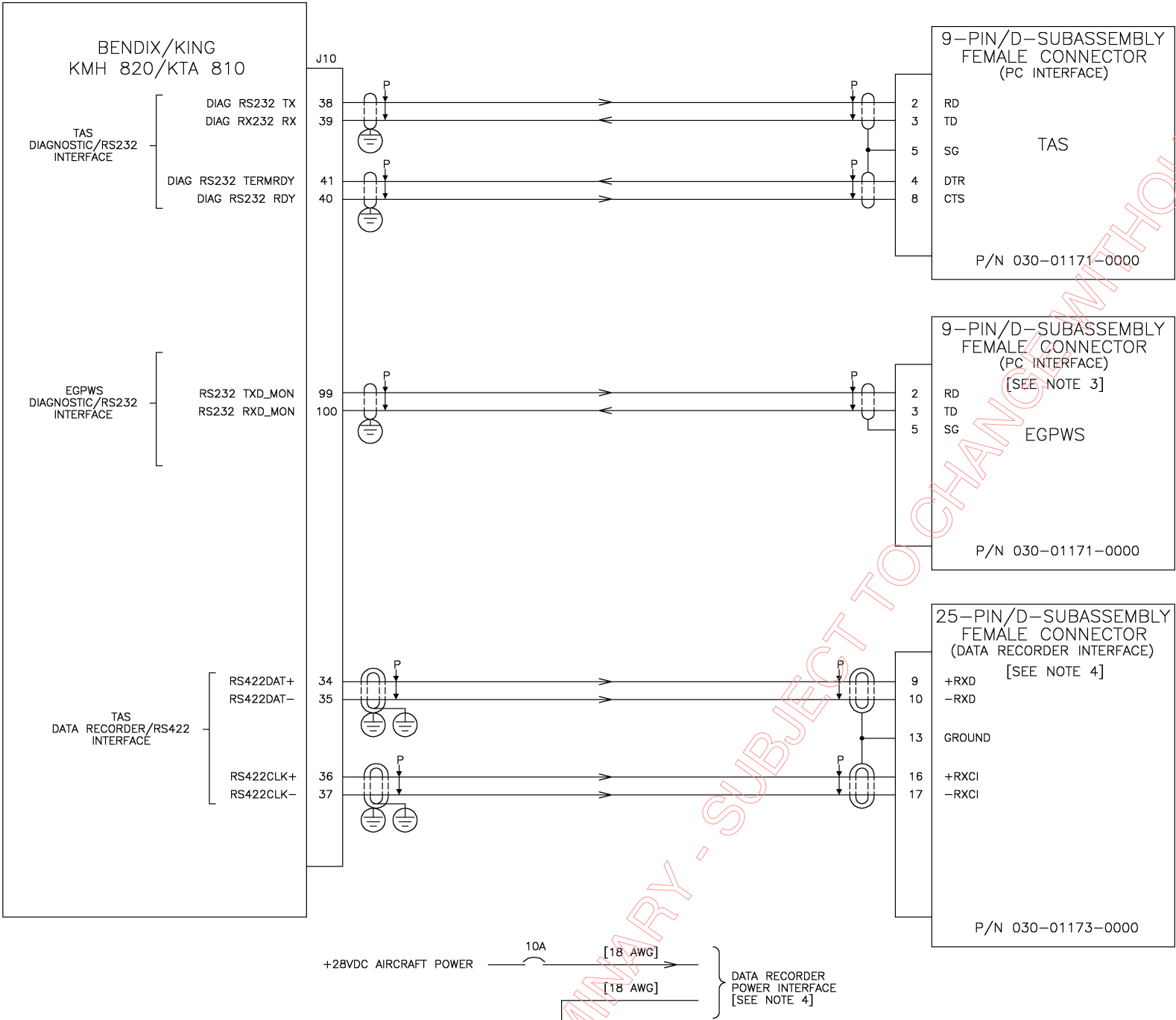
1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2. * THIS STATE IS ACTIVE IF TIED TO GROUND.
3. CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. CONNECT THESE SHIELD GROUNDS TO UNIT BACKSHELL GROUND.
5. THE "TA/RA BLOCK TRANSFER PROGRAM" NEEDS TO BE CONFIGURED TO THE HONEYWELL BCAS (EFIS) PROTOCOL FORMAT.
6. TERMINATE SHIELDED WIRES IN ACCORDANCE WITH THE ORIGINAL AIRCRAFT WIRING PRACTICES AND/OR THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS.

PRELIMINARY 8/10/2000

Figure 3-15 KMH 820/KTA 810 Honeywell SPZ-805 Interface
Dwg. No. 155-01735-0014 (Sheet 2 of 2) (08/10/2000)

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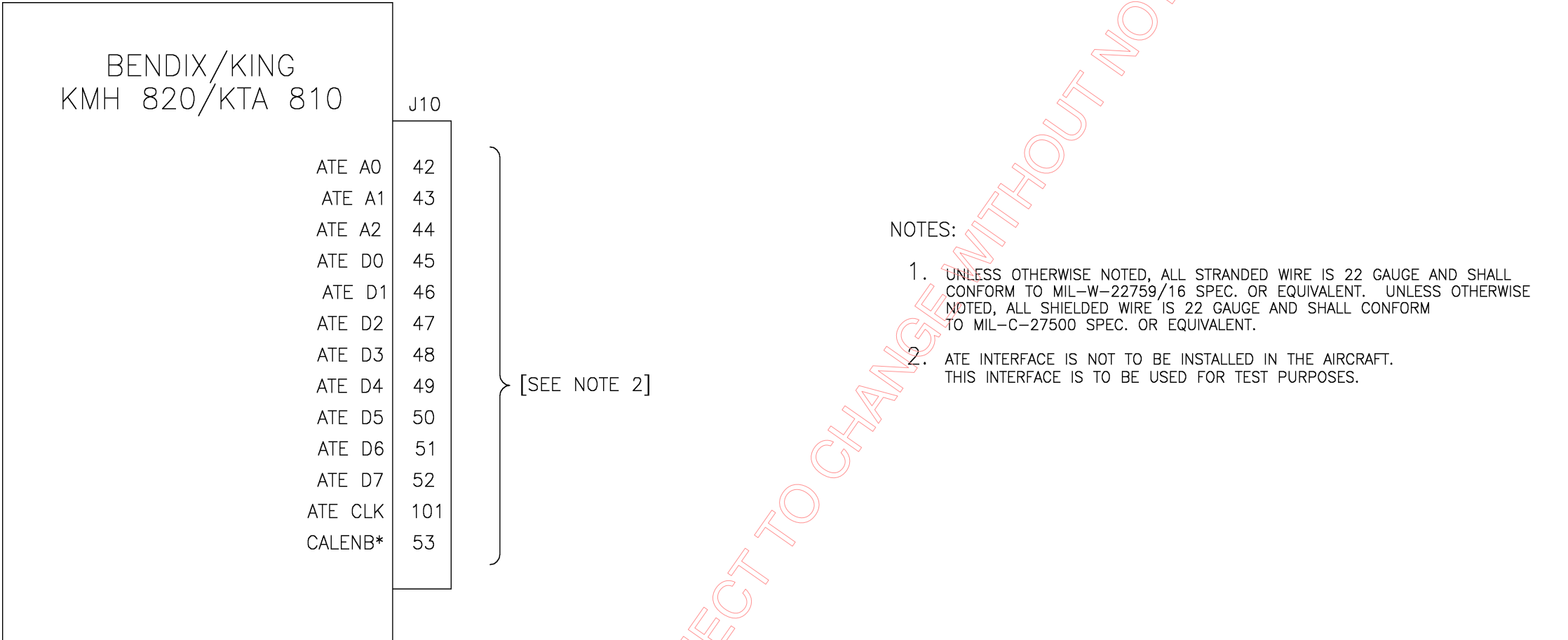
- NOTES:
1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
 2. CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
 3. THE DIAGNOSTIC INTERFACE IS REQUIRED, AND THE INSTALLATION SHALL PROVIDE FOR A CONVENIENT CONNECTION LOCATION IN THE AIRCRAFT COCKPIT SINCE TESTING SHALL BE PERFORMED IN-FLIGHT.
 4. THE DATA RECORDER INTERFACE IS OPTIONAL BUT IS STRONGLY RECOMMENDED FOR PRODUCT SUPPORT. THE INSTALLATION SHALL PROVIDE FOR A CONVENIENT CONNECTION LOCATION NEAR THE TAS PROCESSOR.
 5. CONNECT THESE SHIELD GROUNDS TO CONNECTOR HOUSING FRAME.

PRELIMINARY 8/14/2000

Figure 3-16 KMH 820/KTA 810 Diagnostic/Data Recorder Interface
Dwg. No. 155-01735-0015 (08/14/2000)

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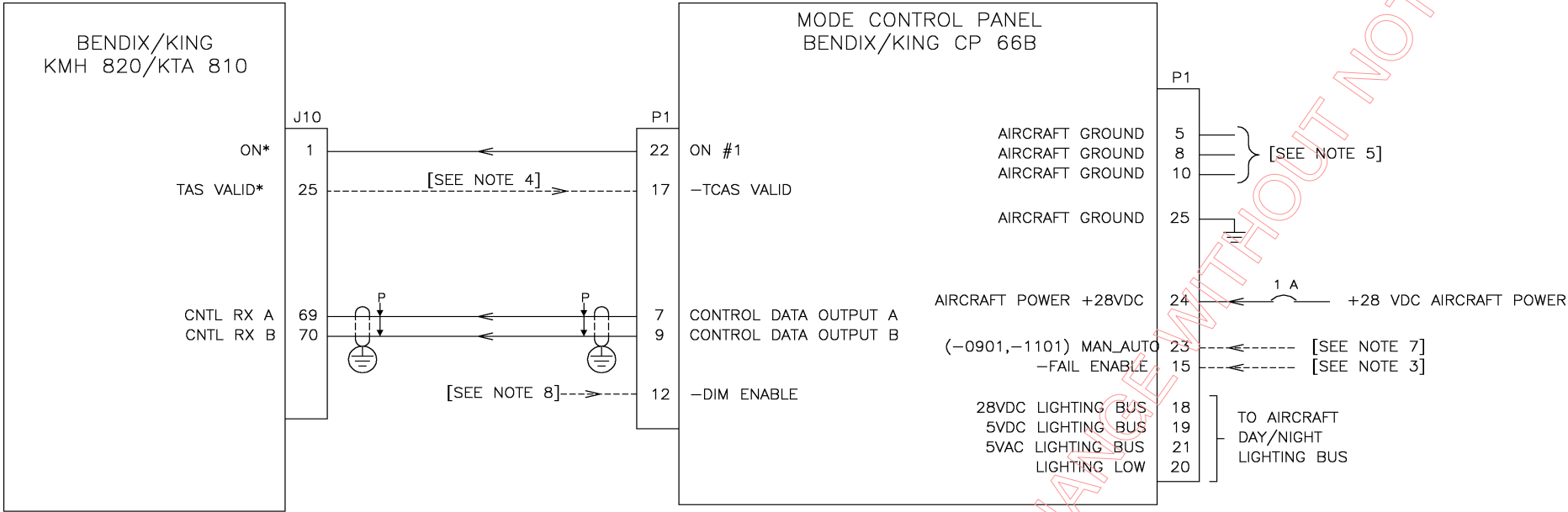


PRELIMINARY 8/10/2000

Figure 3-17 KMH 820/KTA 810 TAS ATE Interface
Dwg. No. 155-01735-0016

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NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
2.  CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
3. -FAIL ENABLE (P1-15)
GROUND = TCAS FAIL ANNUNCIATOR ENABLED
OPEN = TCAS FAIL ANNUNCIATOR INOPERABLE
4. INSTALL CONNECTION WHEN -FAIL ENABLE (P1-15) IS TIED TO AIRCRAFT GROUND.
5. ONLY 'AIRCRAFT GROUND' SIGNAL (P1-25) IS REQUIRED TO BE TIED TO AIRCRAFT CHASSIS, BUT ALL THE 'AIRCRAFT GROUND' SIGNALS MAY BE TIED TO AIRCRAFT CHASSIS. NOTE: PINS P1-12,-15,-17 AND -23 ARE NOT 'AIRCRAFT GROUND'.
6. DASHED LINES DENOTE ALTERNATIVE/OPTIONAL EQUIPMENT.
7. MAN_AUTO (P1-23) (-0901, -1001 VERSIONS ONLY, RESERVED OTHERWISE)
GROUND = AUTO DISPLAY MODE
OPEN = MANUAL DISPLAY MODE
8. -DIM ENABLE (P1-12) (-1101) ONLY
GROUND = FAIL ANNUNCIATOR/ HALF LIGHTING
OPEN = FAIL ANNUNCIATOR/ FULL LIGHTING
9.  CONNECT THE SHIELD TO THE CONNECTOR BACKSHELL/STRAIN RELIEF.

PRELIMINARY 8/11/2000

Figure 3-18 KMH 820/KTA 810 CP 66B Interface
Dwg. No. 155-01735-0017 (08/11/2000)

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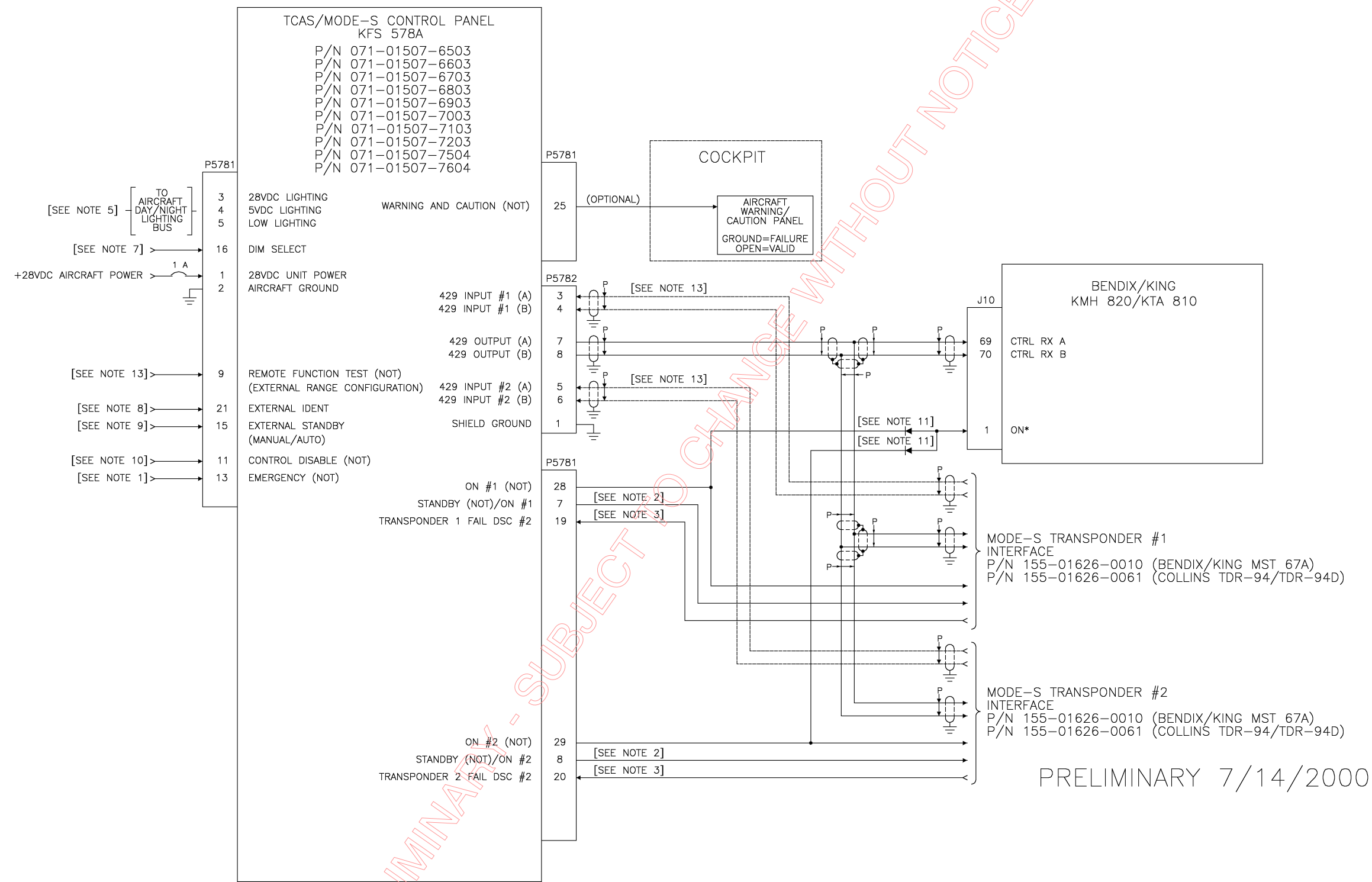


Figure 3-18 KMH 820/KTA 810 KFS 578A Interface
Dwg. No. 155-01735-0018 (Sheet 1 of 2) (07/14/2000)

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NOTES:

1. SQUAWK CODE 7700/EMERGENCY (P5781-13)
GROUND = EMERGENCY ACTIVE
OPEN = INACTIVE
2. STANDBY/ON
GROUND = XPNDR IN STANDBY/ACTIVE STATE (100mA DC MAX)
OPEN = XPNDR ON
3. TRANSPONDER FAIL DISCRETE #2
GROUND = NORMAL OPERATION
OPEN = TRANSPONDER FAILURE
4.  CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
5. THE CONTROL PANEL DASH NUMBER DETERMINES THE DAY/NIGHT BUS VOLTAGE.
6. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-W-22759/16 SPEC. OR EQUIVALENT. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE IS 22 GAUGE AND SHALL CONFORM TO MIL-C-27500 SPEC. OR EQUIVALENT.
7. DIM SELECT (P5781-16)
GROUND = DISPLAY BRIGHTNESS FOLLOWS PANEL LIGHTING VOLTAGE
OPEN (N/C) = DISPLAY BRIGHTNESS FOLLOWS AMBIENT LIGHT LEVEL (PHOTOCELL)
+28VDC = DISPLAY BRIGHTNESS IS SET TO MAXIMUM BRIGHTNESS
8. EXTERNAL IDENT (P5781-21)
GROUND = IDENT ACTIVE
OPEN = INACTIVE
9. EXTERNAL STANDBY (P5781-15)
GROUND = STANDBY ACTIVE
OPEN = INACTIVE
(MANUAL/AUTO)
GROUND = AUTO
OPEN = MANUAL
FOR UNIT VERSIONS 7504, AND 7604, EXTERNAL STANDBY IS DISABLED, MANUAL/AUTO IS ENABLED, AND AUTO MODE PROVIDES A POP-UP FEATURE REQUIRED WITH INSTALLATIONS USING A HONEYWELL TCAS DISPLAY UNIT (I.E. CITATION VB ULTRA).
10. CONTROL DISABLE (P5781-11)
GROUND = CONTROL DISABLED
OPEN = CONTROL ENABLED
11. RECTIFIER SILICON, 1N4005, P/N 007-06047-0000.
12. REMOTE FUNCTION TEST (P5781-9)
GROUND = ACTIVATED
OPEN = NOT ACTIVATED
(EXTERNAL RANGE CONFIGURATION)
GROUND = ACTIVATED
OPEN = NOT ACTIVATED
FOR UNIT VERSIONS 7504, AND 7604, REMOTE FUNCTION TEST IS DISABLED, EXTERNAL RANGE CONFIGURATION IS ENABLED, AND IT PROVIDES RANGE SELECTION AS FOLLOWS: IF ACTIVATED, RANGES OF 5, 10, 20, AND 40 NM ARE AVAILABLE. IF NOT ACTIVATED, RANGES OF 3, 5, 10, 15, 20, AND 40 NM ARE AVAILABLE.

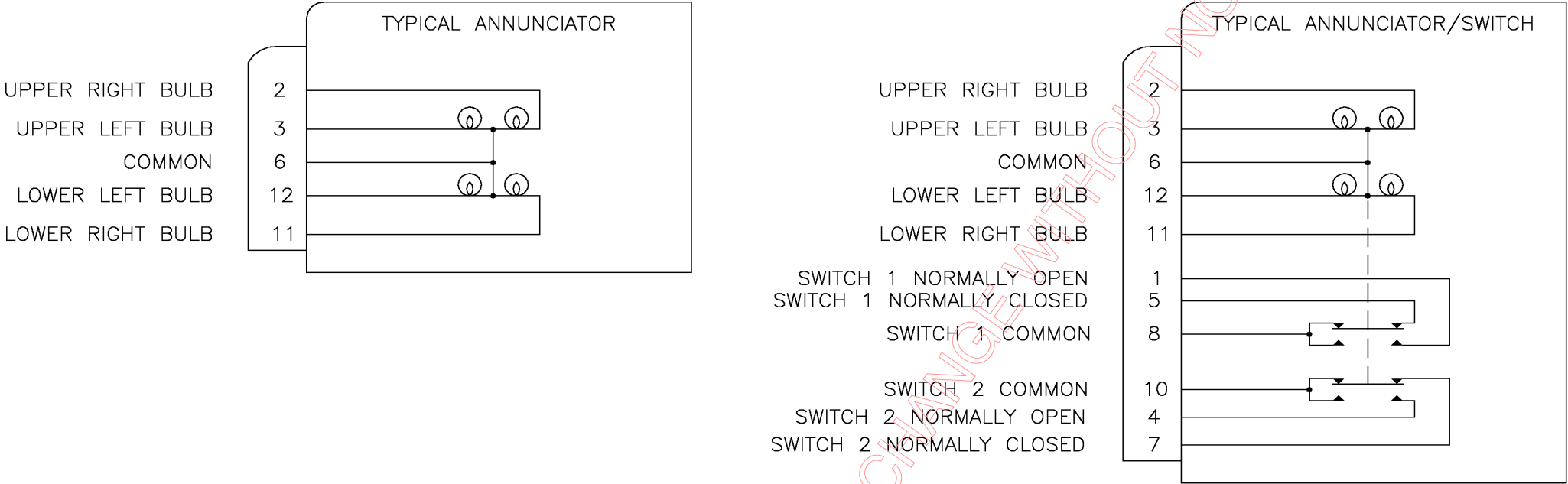
13. ONLY INSTALL 429 INPUT #1 AND #2 WITH HONEYWELL MST 67A MODE S TRANSPONDERS.
14.  CONNECT THE SHIELD TO THE CONNECTOR BACKSHELL/STRAIN RELIEF.

PRELIMINARY 8/11/2000

Figure 3-19 KMH 820/KTA 810 KFS 578A Interface
Dwg. No. 155-01735-0018 (Sheet 2 of 2)

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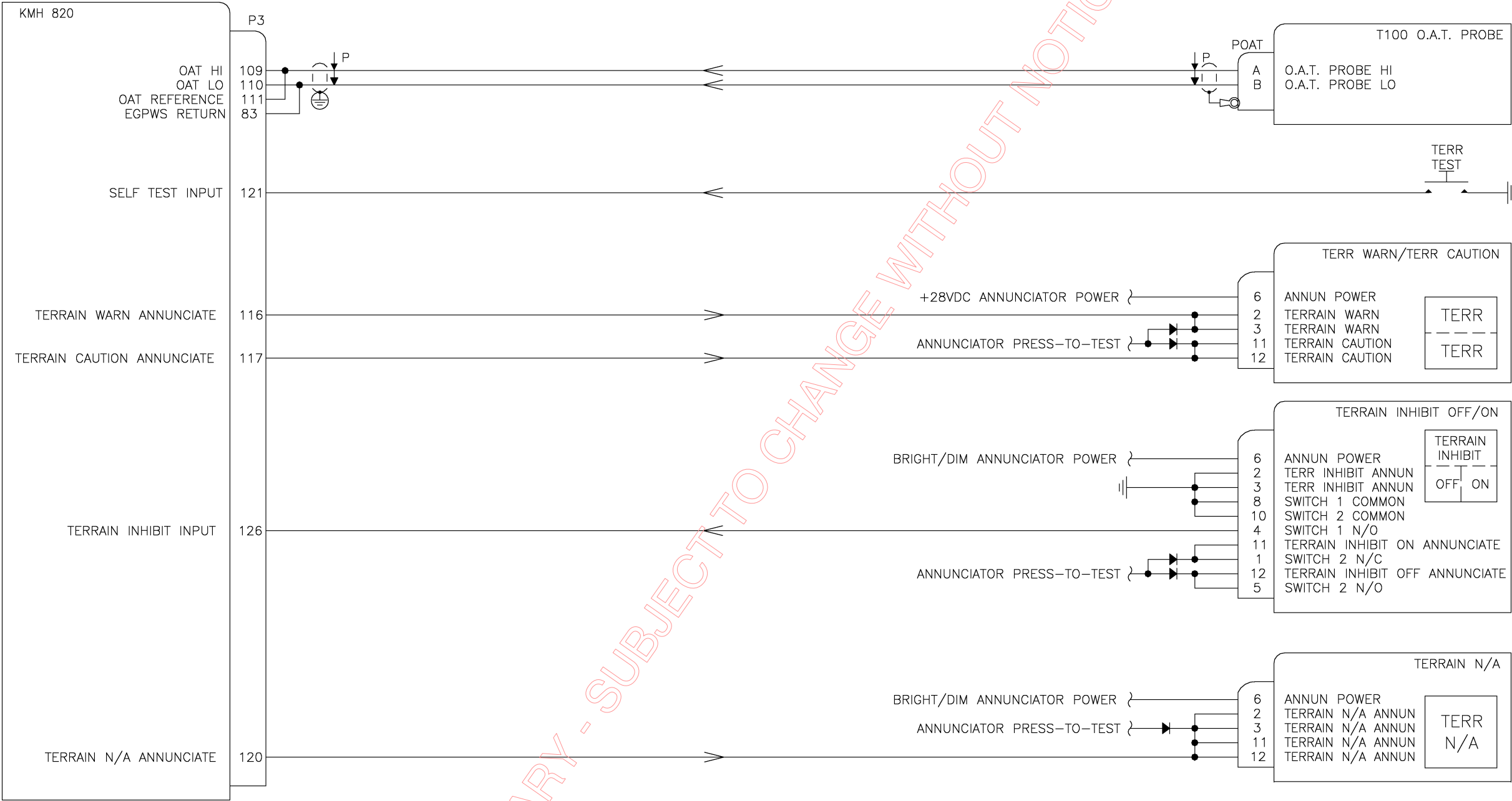
PRELIMINARY 8/18/2000

KMD 540 AND IN 182A SYSTEMS

Figure 3-20 KMH 820/KTA 810 Display Interface
Dwg. No. 155-01735-0019 (Sheet 1 of 4) (08/18/2000)

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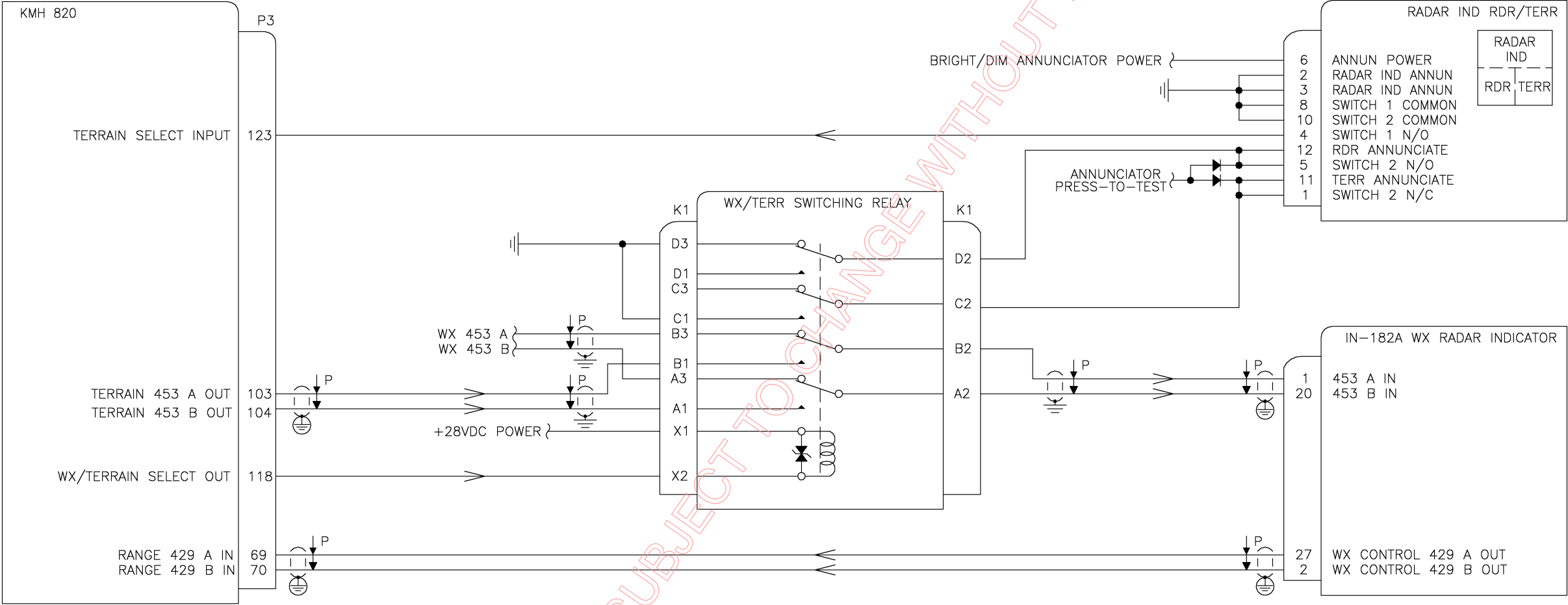
PRELIMINARY 8/22/2000

KMD 540 AND IN 182A SYSTEMS

Figure 3-20 KMH 820/KTA 810 Display Interface
Dwg. No. 155-01735-0019 (Sheet 2 of 4) (08/22/2000)

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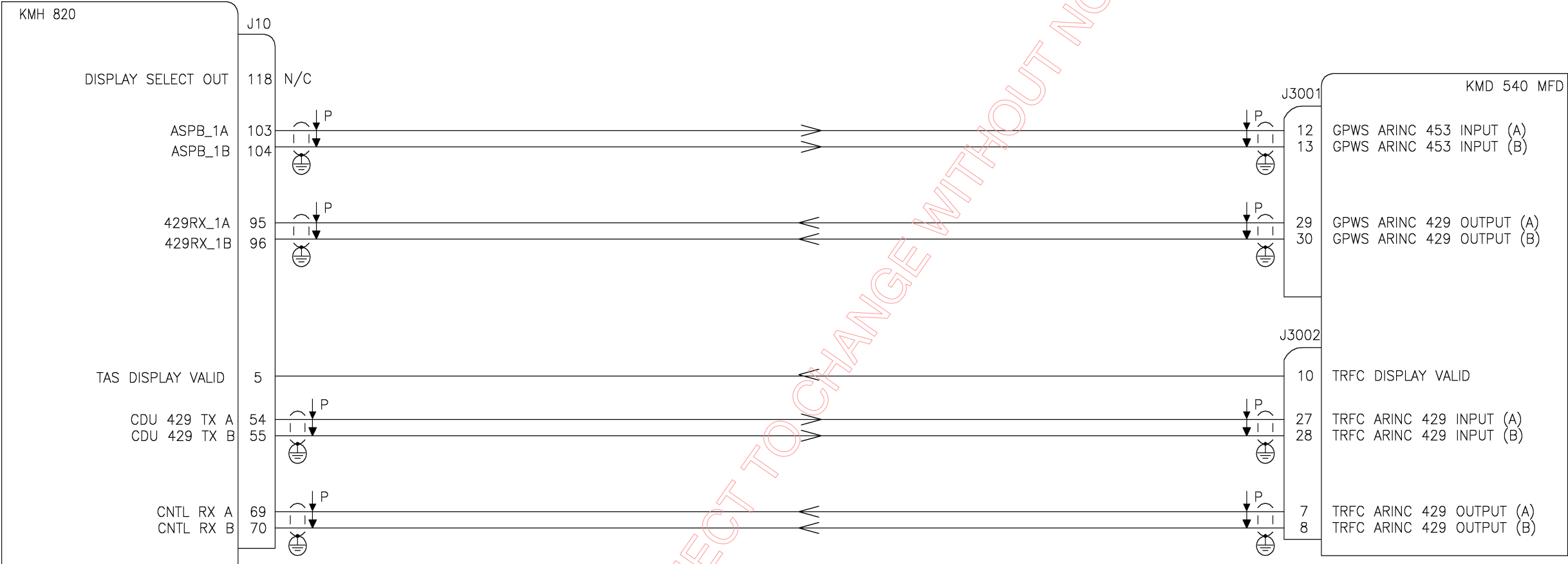
PRELIMINARY 8/21/2000

IN 182A SYSTEM

Figure 3-20 KMH 820/KTA 810 Display Interface
Dwg. No. 155-01735-0019 (Sheet 3 of 4) (08/21/2000)

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PRELIMINARY 8/22/2000

KMD 540 SYSTEM

Figure 3-20 KMH 820/KTA 810 Display Interface
Dwg. No. 155-01735-0019 (Sheet 4 of 4) (08/22/2000)

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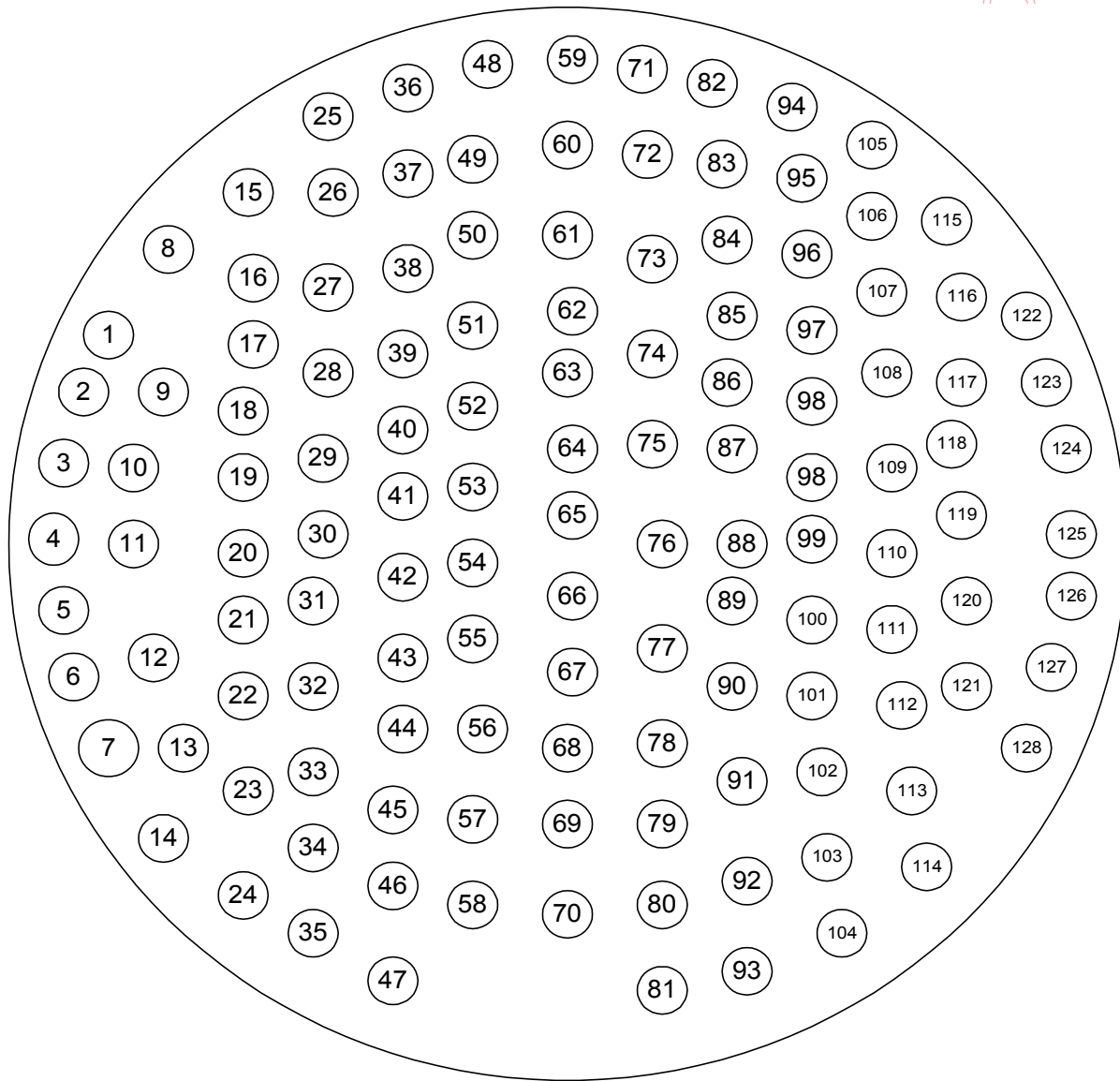
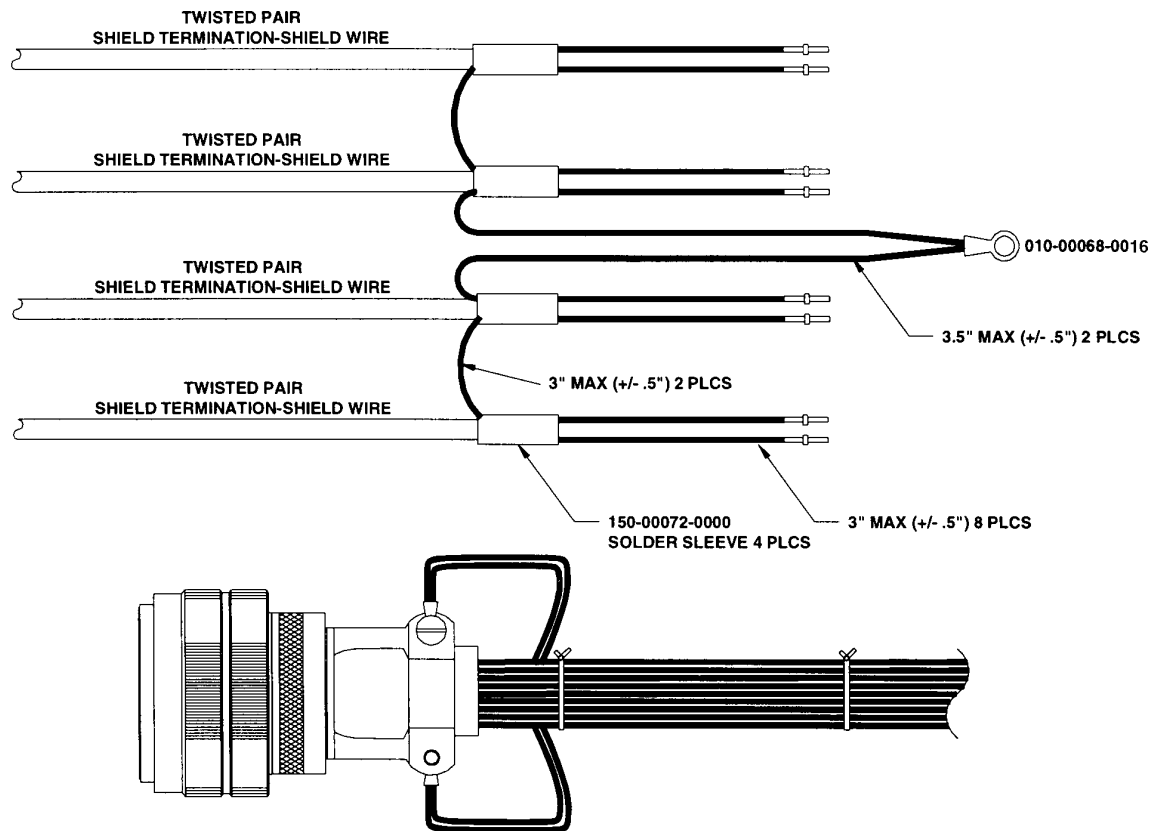


Figure 3-21 KMH 820/KTA 810 Processor Front Connector

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Figure 3-22 KMH 820/KTA 810 Front Connector Cable

I/O	Pin	Description	Unit	Notes	Future Use (Do Not Wire)
I	1	ON*	PS	POWER ON=GND	
I	2	FUNCTIONAL_TEST	TAS	TEST=GND	
I	3	LANDING_GEAR*	TAS	EXTENDED=GND	
I	4	AIR_GND*	TAS	ON GND=GND	
I	5	DISPLAY_VALID*	TAS	VALID=GND	
I	6	RADIO_ALT+	TAS	ANALOG	
I	7	RADIO_ALT-	TAS	ANALOG	
I	8	RAD_ALT_VAL	TAS	ANALOG	
I	9	GIL_ALT_A4	BOTH		
I	10	GIL_ALT_A2	BOTH		
I	11	GIL_ALT_A1	BOTH		
I	12	GIL_ALT_B4	BOTH		
I	13	GIL_ALT_B2	BOTH		
I	14	GIL_ALT_B1	BOTH		
I	15	GIL_ALT_C4	BOTH		
I	16	GIL_ALT_C2	BOTH		
I	17	GIL_ALT_C1	BOTH		
I	18	GIL_ALT_D4	TAS		
I	19	GIL_ALT_D2	TAS		
O	20	PH_HI	TAS	HEADPHONE	
O	21	PH_LO	TAS	HEADPHONE	
I	22	ADV_INHIBIT*	BOTH	MUTE=GND	
I	23	TAS_STANDBY*	TAS	STBY=GND	
O	24	VIS_ANNUN_TRAFFIC*	TAS	TRAFFIC=GND	***
O	25	TAS_VALID*	TAS	VALID=GND	***
O	26	SPARE_DO1	TAS		X
O	27	SPARE_DO2	TAS		X
I	28	HEADING_VALID	TAS		
I	29	HEADING_H	TAS		
I	30	HEADING_C	TAS		
I	31	HEADING_X	TAS		
I	32	HEADING_Y	TAS		
I	33	HEADING_Z	TAS		
O	34	RS422_DATA+	TAS		
O	35	RS422_DATA-	TAS		
O	36	RS422_CLK+	TAS		
O	37	RS422_CLK-	TAS		
O	38	DIAG_RS232_TX	TAS		***
I	39	DIAG_RS232_RX	TAS		
O	40	DIAG_RS232_RDY	TAS		***
I	41	DIAG_RS232_TERM_RDY	TAS		
O	42	ATE_A(0)	TAS		
O	43	ATE_A(1)	TAS		
O	44	ATE_A(2)	TAS		
O	45	ATE_D(0)	TAS		
O	46	ATE_D(1)	TAS		
O	47	ATE_D(2)	TAS		
O	48	ATE_D(3)	TAS		

Table 3-1 KMH 820/KTA 810 Connector Pin Assignment

I/O	Pin	Description	Unit	NOTES	Future Use (Do Not Wire)
O	49	ATE_D(4)	TAS		
O	50	ATE_D(5)	TAS		
O	51	ATE_D(6)	TAS		
O	52	ATE_D(7)	TAS		
I	53	CALENB*	TAS		
O	54	CDU_429_TX_A	BOTH		***
O	55	CDU_429_TX_B	BOTH		***
I	56	RAD_ALTIM_RX_A	TAS		
I	57	RAD_ALTIM_RX_B	TAS		
	58	n/c			X
I	59	AIRCRAFT POWER	PS		
I	60	BARO_ALT_RX_A	BOTH		
I	61	BARO_ALT_RX_B	BOTH		
I	62	HDG_ATT_RX_A	TAS		
I	63	HDG_ATT_RX_B	TAS		
O	64	SPARE_RS232_TX	TAS		X
I	65	SPARE_RS232_RX	TAS		X
O	66	SPARE_RS232_RDY	TAS		X
I	67	SPARE_RS232_TERM RDY	TAS		X
I/O	68	SUPPRESSION	TAS	>18V=ACTIVE	***
I	69	CNTL_RX_A	TAS		
I	70	CNTL_RX_B	TAS		
I	71	ABV_BEL_NORM	TAS	Above/Below/Norm	
I	72	CONFIG_MOD_DATA_IN	TAS		
O	73	CONFIG_MOD_DATA_OUT	TAS		
O	74	CONFIG_MOD_CHIP_SEL	TAS		
O	75	CM_CLOCK	TAS		
O	76	CM_+5V	TAS		***
O	77	CM_GND	BOTH		
I	78	SPARE_RX_A	TAS		X
I	79	SPARE_RX_B	TAS		X
O	80	SPARE_TX_A	TAS		X
O	81	SPARE_TX_B	TAS		X
I	82	AIRCRAFT POWER	PS		
O	83	EGPWS RETURN	EGPWS		
O	84	CHASSIS GROUND			
O	85	RS232TXD_GAMMA	EGPWS		X
I	86	RS232RXD_GAMMA	EGPWS		X
O	87	GPS_TXA	EGPWS	232 OUT A / 422	
I	88	GPS_RXA	EGPWS	232 IN A / 422	
O	89	GPS_TXB	EGPWS	422	
I	90	GPS_RXB	EGPWS	422	
O	91	ADC_TXA	EGPWS		X
O	92	429TX_1B	BOTH	JUMPER TO TAS	
O	93	429TX_1A	BOTH	JUMPER TO TAS	
I	94	ADC_RXA	EGPWS		X
I	95	429RX_1A	EGPWS	RANGE INPUT	
I	96	429RX_1B	EGPWS	RANGE INPUT	

Table 3-1 KMH 820/KTA 810 Connector Pin Assignment (Cont')

I/O	Pin	Description	Unit	NOTES	Future Use (Do Not Wire)
I	97	429RX_2A	EGPWS	GPS	
I	98	429RX_2B	EGPWS	GPS	
O	99	RS232TXD_MON	EGPWS	MONITOR PORT	***
I	100	RS232RXD_MON	EGPWS	MONITOR PORT	
	101	ATE_CLOCK	TAS		X
	102	n/c			X
O	103	ASPB_1A	EGPWS	PICT BUS	
O	104	ASPB_1B	EGPWS	PICT BUS	
O	105	SPIMOSI_CM_2	EGPWS	CM DATA OUT	***
I	106	SPIMISO	EGPWS	CM DATA IN	
O	107	SPICLK_CM_2	EGPWS	CM CLK	***
O	108	SPISEL_CM#_2	EGPWS	CM SEL	***
I	109	OAT_H	EGPWS	AIR TEMP +	
I	110	OAT_L	EGPWS	AIR TEMP -	
O	111	OAT_REF	EGPWS	AIR TEMP REF	
	112	n/c			X
I	113	GSE_PRES#	BOTH	FACTORY TEST	
O	114	ADC_TXB	EGPWS		
I	115	ADC_RXB	EGPWS		
O	116	DISC_OUT_01	EGPWS	LAMP ALERT	
O	117	DISC_OUT_02	EGPWS	WARNING ALERT	
O	118	DISC_OUT_03	EGPWS	WX SELECT	
I	119	SPARE_IN_2	TAS		
O	120	MON_OUT_1	EGPWS	EGPWS INOP	
I	121	GND_DISC_07	EGPWS	SELF TEST	
I	122	GND_DISC_08	BOTH		X
I	123	GND_DISC_12	EGPWS	DISP SEL	
I	124	GND_DISC_13	BOTH		X
I	125	GND_DISC_14	BOTH		
	126	GND_DISC_15	EGPWS	TERRAIN AWARE	
I	127	AIRCRAFT GROUND	PS		
I	128	AIRCRAFT GROUND	PS		
		Notes:			
		* indicates active ground			
		*** indicates that this line has a transorb located on the the interconnect board			

Table 3-1 KMH 820/KTA 810 Connector Pin Assignment (Con't)

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SECTION IV

POST INSTALLATION CONFIGURATION AND CHECK OUT

4.0 INTRODUCTION

This Section describes the procedure for configuring and testing the KMH 880/KTA 870 System after it is installed in the aircraft.

4.1 POST CONFIGURATION TEST

This Post-Installation Test verifies the proper operation of the KMH 880/KTA 870 System. These procedures are used after the units have been initially installed. Thereafter, these procedures can be used as an operational check. These tests are performed on the ground.

Many of the test can be performed indoors. The scenario tests should be done in an area where the local traffic and signal multipath are not a factor. The bearing accuracy tests should be conducted outside away from operating aircraft. 115 VAC, 60 Hz power may be required for the test equipment.

CAUTION:

ADVISE THE LOCAL AIR TRAFFIC CONTROL BEFORE TESTING THE TRANSPONDERS OR THE KMH 880/KTA 870 SYSTEM WITH A SYNTHETIC ALTITUDE TO ACKNOWLEDGE POSSIBLE INTERACTION WITH OTHER TAS/TCAS-EQUIPPED AIRCRAFT.

4.2 CONFIGURATION PROCEDURE

This section describes the configuration options available to be programmed into the Configuration Module of the KMH 880/KTA 870 System.

4.2.1 Power On

Turn the KMH 880/KTA 870 System on.

4.2.2 Aircraft Configuration

Aircraft Configuration strapping is stored in the configuration module via a personal computer executing TASDIAG software across the RS-232 port. Follow instructions for configuration programming in the TASDIAG Diagnostic, Appendix D of this manual.

4.2.3 EGPWS Configuration Instructions

These instructions will detail the configuration check list, initial configuration (new configuration module) and volume output levels for the EGPWS.

It describes how the EGPWS interfaces to specific aircraft configurations. It contains an overview of the selection categories for the different aircraft sensor interfaces. It defines how the category IDs are selected for the interface to aircraft sensors and to select EGPWS performance options. It defines the specific aircraft applications of the EGPWS.

4.2.3.1 Equipment Needed

- A. EGPWS Installed and Operating
- B. Interconnect Cable
- C. IBM or Compatible PC
- D. A Copy of Honeywell WINVIEWS

NOTE

WinViews is an Enhanced GPWS diagnostic communications program that runs from Windows on a PC that is connected to the EGPWS. WinViews HELP, as well as many other menu items are active even though the program is fully operational when communications are established with the EGPWS.

4.2.3.2 Configuration Module Programming

The Configuration Module Programming is completed via the RS-232 port. The application code is capable of loading the Configuration Module with new data.

This programming is achieved by using the WinsViews software. In WinViews, the EGPWS will accept valid commands. To prevent inadvertent access to the Configuration Module's EEPROM, the keyboard monitor is set up with a tiered menu. The keyboard monitor command "**CFG**" is used to gain access to the Configuration monitor.

The command to program the memory with the Configuration String is "**CUW**". This command takes a pre-configured **String** (defined below) containing the new memory contents and a CRC (written by the EGPWS) and writes them to the Configuration Module's EEPROM.

4.2.3.3 Configuration String Format

The EGPWS requires a string of configuration information to be written to the configuration module memory when requested from the keyboard monitor.

Example String: = CUW 0/901000220/ (Space after cuw, category and each number if there is no separator)

Where the first 0 reflects the string version, the next number is the number of categories and the remaining numbers before the second separator reflect the ID for each of the categories.

String breakdown Explanations:

CUW	= The command to write	
0	= String Version	
/	= Separator	
9	= the number of categories	
0	= Category #1 ID = 0	(TSO-C151a Class B curve set)
1	= Category #2 ID = 1	(Altitude Encoder with 500 ohm Temperature Probe)
0	= Category #3 ID = 0	(GPS, Internal GPS Express RS-232)
0	= Category #4 ID = 0	(Display select = ASPB)
0	= Category #5 ID = 0	(I/O Discrete Type Select = Basic, Lamp format 2)
0	= Category #6 ID = 0	(Audio Menu Select = Basic)
2	= Category #7 ID = 2	(Audio Output Level = -12dB)
2	= Category #8 ID = 2	(Altitude Monitor Option Select = Disable)
0	= Category #9 ID = 0	(TA&D Alternate Pop Up = False)
/	= Separator	

4.2.3.4 EGPWS RS-232 Maintenance Port (port: SMC1)

One port is provided which meets the characteristics specified in RS232C. This bus can be used to access internal data from the EGPWS for aircraft testing. In addition to the internal data, other items such as unit configuration and flight history can also be accessed.

Baud Rate	19,200
Parity	none
Data Bits	8
Stop Bits	1
Maximum Recommended Cable Length	15 meters
Pin Assignment (Signal Mnemonic)	
RS-232TXD_MON	J10-99
RS-232RXD_MON	J10-100

4.2.3.5 Configuration Sequence of Events (Application)

- A. Turn the KMH 880 system power on.
- B. Bring up the WINVIEWS program. Type Ctrl Z.
- C. At the WINVIEWS prompt type "CFG". Press the ENTER key.
- D. Type in the pre-configured STRING using the command "CUW". Press the ENTER key.
- E. After loading this string in the WINVIEWS, the cursor will flash waiting for an answer "Y" or "N".
- F. Type "Y".

NOTE

At this point the EGPWS will reboot itself.

- G. When, the system comes back up type Ctrl "Z" then type "PS" (Present Status).
- H. Check the Status information displayed. Confirm that your configuration input write is accurate.

4.2.3.6 Configuration Types (Categories)

The selection of the basic interfaces to the EGPWS can be found in the following categories.

Aircraft/Mode Type	Category 1
Air Data Type	Category 2
Position Type	Category 3
Terrain Display Type	Category 4
I/O Discretes Types	Category 5
Audio Menu Type	Category 6
Audio Output Level Type	Category 7
Altitude Monitor Options Type	Category 8
Terrain Display Alternate Pop up Option	Category 9

4.2.3.7 Configuration Identification Selection (ID)

The method to select the Configuration Identification (ID) for each Category Type on a given aircraft installation is with the information in this document and the following table.

This table provides the procedure to determine the Configuration ID selection required for any given aircraft installation.

STEP (CATEGORY)	SIGNAL SELECTION	INSTRUCTION		IDENT. NO.
1	Selects: a) Aircraft Type b) Mode Type	Using Table 4-2 and any sub-tables contained within, locate the Aircraft/Mode type.	Record the Ident (ID No.) on the space available on Ident column of this table.	_____ ID #
2	Selects: a) Air Data Source	Using Table 4-3 and any sub-tables contained within, locate the desired Air Data signal type.	Record the Ident (ID No.) on the space available on Ident column of this table	_____ ID #
3	Selects: a) Position Source	Using Table 4-4 and any sub-tables contained within, locate the desired Position Signal type.	Record the Ident (ID No.) on the space available on Ident column of this table.	_____ ID #
4	Selects: a) Display Configuration	Using Table 4-5 and any sub-tables contained within, locate the desired Display indicator type/range bus type.	Record the Ident (ID No.) on the space available on Ident column of this table.	_____ ID #
5	Selects: a) Input discrete Functions b) Output Discrete Functions.	Using Table 4-6 and any sub-tables contained within, locate the desired I/O Discrete type.	Record the Ident (ID No.) on the space available on Ident column of this table.	_____ ID #
6	Selects: a) Audio Menu	Using Table 4-7 and any sub-tables contained within, locate the desired Audio Menu type	Record the Ident (ID No.) on the space available on Ident column of this table.	_____ ID #
7	Selects: a) Audio Output Level	Using Table 4-8 and any sub-tables contained within, locate the desired Volume type	Record the Ident (ID No.) on the space available on Ident column of this table.	_____ ID #

STEP (CATEGORY)	SIGNAL SELECTION	INSTRUCTION		IDENT. NO.
8	Selects: a) Altitude Monitor Display Disable b) Altitude Monitor Call out Disable c) Altitude Monitor Disable	Using Table 4-9 and any sub-tables contained within, select the desired True or False Condition for Altitude Monitor Display Disable, Altitude Monitor Callout Disable, and Altitude Monitor Disable.	Record the Ident (ID No.) on the space available on Ident column of this table.	<u> </u> ID #
9	Selects: a) TA&D alternate Pop Up	Using Table 4-10 and any sub-tables contained within, select the desired True or False condition for TA&D Alternate Pop Up.	Record the Ident (ID No.) on the space available on Ident column of this table.	<u> </u> ID #

Table 4-1 Configuration Identification

4.2.3.8 Configuration Tables

The Category columns define a category (or group) of functions or input devices that are selected through ID Numbers. The Category Number identifies the subsection where the details are defined. For example Air Data, Category 2, is identified in Table 4-3 and Position Input Source, Category 3, is defined in Table 4-4.

4.2.3.8.1 Category 1, Aircraft/Mode Type Select

The following table provides identification of the basic mode types and associated parameters.

In this category only the following parameters are to be defined:

- Basic mode alert and warning thresholds

ID	Aircraft/Mode Type	Description	Effectivity App. Cfg.	
0	0	TSO-C151a Class B curve set	-001	-001
1	1	Non-TSO curve set #1	-001	-001

Table 4-2 Aircraft / Mode Type Select

NOTE

When selecting ID 0; Category 6, (Audio Menu Select) must select ID #1 (Alternate) in order to be in compliance with TSO-C151a.

4.2.3.8.2 Category 2, Air Data Input Select

The following table provides identification of the Air Data source type. In this category only the following parameters are to be defined:

- Gillham/Gray coded altitude or uncorrected altitude in ARINC 429 format.
- Temperature, Outside Air or Static Air in analog or ARINC 429 format.

ID	AIR DATA TYPE	DESCRIPTION	EFFECTIVITY App. Cfg.	
0	0	Altitude Encoder (9 wire Gillham/Gray coded altitude)	-001	-001
1	1	Altitude Encoder (9 wire Gillham/Gray coded altitude) with 500 ohm OAT Temperature Probe	-001	-001
2	2	Digital - ARINC 429 (Required Labels are 203 and 213)	-001	-001
3	3	Digital - ARINC 429 (with Corrected Altitude) (Required Labels are 203,204,212,and 213)	-001	-001

Table 4-3 Air Data Input Select

4.2.3.8.3 Category 3, Position Input Select

The following table provides identification of the Position Source Signal. In this category, only the following POSITION signals are to be defined:

- | | |
|-------------------------------------|-----------------------------------|
| • Altitude | • Sensor Status |
| • Date | • Track angle |
| • Ground Speed | • Universal Time Correlation |
| • Horizontal Figure of Merit (HFOM) | • Vertical Figure of Merit (VFOM) |
| • Horizontal Integrity Limit | • Vertical Velocity |
| • Latitude Position | • N/S Velocity |
| • Longitude Position | • E/W Velocity |

ID	POSITION INPUT TYPE	DESCRIPTION	GPS ALTITUDE REFERENCE	EFFECTIVITY App. Cfg.	
0	0	GPS, Internal GPS-PXPRESS RS-232	MSL	-001	-001
1	1	GPS, External RS-232 (GPS-PXPRESS format)	MSL	-001	-001
2	2	GPS, ARINC 429 low speed, 743A format	MSL	-001	-001
3	3	GPS, ARINC 429 low speed, 743 format	MSL	-001	-001
4	4	GPS, ARINC 429 low speed, 743 format (GPS Altitude referenced to WGS-84)	WGS-84	-001	-001

Table 4-4 Position Input Select

NOTE 1

The GPS Altitude Reference MSL or WGS-84 must be properly applied for the appropriate GPS Position Type. At the time of release of this document, all GPS sources except the Universal UNS-1 GPS are of the MSL type. The Universal UNS-1 GPS (GPS-1000 engine in the UNS-1B+, -1C, -1D, -1k, and -1M) sources are of WGS-84 type.

NOTE 2

This configuration is only applicable to Honeywell Qualification Test Lab. When this configuration is enabled on a 066-01175-2101 (EGPWS with internal GPS) a software internal GPS monitor is activated for testing.

4.2.3.8.4 Category 4, Terrain Display Select

The following table has an identification number (ID) associated with each Terrain Display configuration. Each of the ID rows has a group number for the Display configuration, the Input Control and the output 429 bus. The *TA&D* Pop Up Disable function is defined by a Boolean. See Table 4-10.

In this category the following signals are configured by the ID number:

SIGNAL NAME	SIGNAL TYPE	DEFINED BY
Terrain Display Bus	ASPB or ARINC	Display configuration Group
Range Bus	ARINC 429	Display Input Control Group
TA&D Alternate Pop Up	Boolean	Defined directly in Table 4-10

ID	DISPLAY CONFIG. GROUP	DISPLAY INPUT CONTROL GROUP (NOTE 1)	OUTPUT 429 BUS GROUP	APPLICATION NOTES	EFFECTIVITY App. Cfg.	
0	0	0	0	ASPB	-001	-001
1	None	None	0	No Display	-001	-001
2	1	1	0	Bendix IN 182A, IN 812A	-001	-001
3	2	1	0	Bendix IN 842A, IN 862A	-001	-001
4	3	2	0	Bendix RDR 4A/B PPI (with blue waters modification)	-001	-001

Table 4-5 Terrain Display Select

4.2.3.8.5 Category 5, Input/Output Discrete Type Select

The following table provides identification of the Input/Output Discrete Type.

ID	Input/Output Discrete Type	Description	Effectivity App. Cfg.	
0	0	Basic input/output discretes (Lamp Format: Type 2)	-001	-001

Table 4-6 Input/Output Discrete Type Select

NOTE

If a single cockpit lamp is desired for Terrain Cautions and Warnings, J10-116 and J10-117 can be diode or'ed together to drive one lamp.

4.2.3.8.6 Category 6, Audio Menu Select

The following table provides identification of the Voice Menu type.

ID	AUDIO MENU TYPE	DESCRIPTION	EFFECTIVITY App. Cfg.	
0	0	Basic	-001	-001
1	1	Alternate	-001	-001

Table 4-7 Audio Menu Select

NOTE

If Category 1 selected ID #0 (TSO-C151a Class B curve set) Category 6 ID #1 (Alternate) must be selected to be in compliance with the TSO.

4.2.3.8.7 Category 7, Audio Output Level

The following provides identification of the Audio Output Level type. Each entry in the ID column corresponds to a particular nominal alert output level selection (max, -6dB, -12 dB, -18dB AND -24Db). The Nominal "Max" Output is 100 mW/rms for the 600 ohm output. The output power level will be the nominal maximum output 100mW reduced by the selected volume type.

ID	VOLUME TYPE	EFFECTIVITY App. Cfg.	
0	Max (600 ohm $\approx$ 100mW)	-001	-001
1	-6 dB	-001	-001
2	-12dB	-001	-001
3	-18dB	-001	-001
4	-24dB	-001	-001
255	-14db for KMh 880/KTA 870 configuration	-001	-001

Table 4-8 Audio Output level

4.2.3.8.8 Category 8, Altitude Monitor Options

The following table provides identification of the Altitude Monitor Options. Each entry in the ID column corresponds to a particular combination of Altitude Monitor Display Disable, Altitude Monitor Callout Disable and Altitude Monitor Disable.

ID	ALTITUDE MONITOR DISABLE	ALTITUDE MONITOR CALLOUT DISABLE	ALTITUDE MONITOR DISPLAY DISABLE	EFFECTIVITY App. Cfg.	
0	False	False	False	-001	-001
1	False	False	True	-001	-001
2	False	True	False	-001	-001
3	False	True	True	-001	-001
4	True	True	True	-001	-001

NOTE: TRUE = Disable

Table 4-9 Altitude Monitor Options

4.2.3.8.9 Category 9, Terrain Display Alternate Pop Up Option

The following table provides identification of the Terrain Display Alternate Pop Up Option.

TA&D Alternate Pop Up = False allows automatic Pop Up On Caution or Warnings.

TA&D Alternate Pop Up = True disables the automatic Pop Up feature.

ID	TA&D ALTERNATE POP UP DISABLE	EFFECTIVITY	
0	False	-001	-001
1	True	-001	-001

Table 4-10 Terrain Display Alternate Pop Up Option

4.2.4 TAS Configuration Options

The TAS Processor will acquire the following hardware strap information from the configuration module.

NOTE

Format is as follows: Configuration Option; Configuration Option Description.

- A. Display Intruder Limit; 3 (Minimum) Display Intruder Limit 30 (Maximum), incremented by 1.

The Display Intruder Limit Program is used to limit the number of intruders displayed in the aircraft. The Display Intruder Limit will be configured to a value between 3 (minimum FAA requirement) and 30 (max. intruder limit).

NOTE

The TAS Processor will transmit a maximum of 30 intruders to the traffic display.

- B. Heading Type; Synchro Data or ARINC 429 Data

The Heading Type Program will indicate the type of heading source (either ARINC 429 or Synchro) that interfaces to the TAS.

- C. Attitude Type; Not Installed or ARINC 429 Data.

ARINC 429 magnetic heading (BCD or Binary), pitch angle and roll are input to the TAS Processor via the Attitude/Magnetic Heading ARINC 429 high speed input bus.

- D. Radio Altimeter Type; Not Installed, ARINC 429, Bendix/King Analog, Sperry Analog, Collins Analog or ARINC 552A.

The Radio Altimeter Source Port will input to the TAS Processor. The input impedance into this port is 55 Kohms. The port has an associated Radio Altitude Valid flag input to the TAS Processor.

Radio Altimeter Valid input will be 20 to 30 VDC during proper altimeter operation (if present). Any failure of the altimeter causes the flag signal to become an open circuit. The analog radio altimeter input (if present) will be considered failed if the altitude is within a valid range (-20 to 2500 feet) and the valid pin is in the invalid state.

The Radio Altimeter Type Program will indicate which type of radio altimeter input is used.

NOTE

Due to tolerances in the TAS Processor analog I/O hardware, the accuracy for the 0 - 100 foot range may be ± 10 feet.

- E. On Ground Display Mode; TAS in Standby Mode On-Ground or TAS in TA Only Mode On-Ground.

The On Ground Display Mode will indicate to the processor whether the system will go to Standby Mode when on the ground or that the system will go to TA Mode (with aural and voice inhibited due to altitude defined by TAS logic) when the aircraft is on the ground.

- F. Baro Altimeter Type; Gillham, ARINC 575, ARINC 706.

The Barometric Altimeter Type program will indicate the type of barometric altimeter source [either Gillham/Gray Code, ARINC 575 (ARINC 419) or ARINC 706 (ARINC 429)] that interfaces to the TAS Processor.

- G. Controller Type; ARINC 735 Protocol, or Discrete Control.

The Controller Type will determine the type of control data, either the Control Panel to the TAS Processor via the CNTL HD RX (ARINC 429) input bus or via Discrete Control switches.

- H. Ground Headphone Volume; 1.25, 2.5, 5, 10, 20, 40, 80, 100 mw.

The on ground headphone level will be configurable to the above levels.

- I. Airborne Headphone Volume; 1.25, 2.5, 5, 10, 20, 40, 80, 100 mw.

The airborne headphone level will be configurable to the above levels.

- J. Airborne Functional Test; Inhibited or Allowed.

When the Airborne Functional Test is inhibited, the TAS Processor will inhibit Functional Test while in the air.

When the Airborne Functional Test is allowed, the TAS Processor will allow Functional Test in the air.

- K. ATE Output; Enabled or Disabled.

The ATE Output will be used to enable the ATE lines for the Anechoic Chamber and the RGS stations.

- L. Intruder File Protocol

ARINC 735a or Honeywell Business and Commuter Aviation Systems (BCAS) protocol.

- M. Display Valid Input Usage: Used or Ignored.

If "Used" is selected, TAS will use the Display Valid Input for BITE purposes. If "Ignored" is selected, TAS will ignore the Display Valid Input for BITE purposes.

- N. RS-422 Output Drivers: enabled or disabled

When the TAS processor is configured to have the Data Recorder RS-422 Drivers enabled, the RS-422 output bus **shall** be active. When the RS-422 Drivers are disabled the output bus **shall** be inactive. This should be set to "disable" for aircraft installations.

4.2.4.1 TAS RS-232 Maintenance Port

One port is provided which meets the characteristics specified in RS232C. This bus can be used to access internal data from the TAS for aircraft testing. In addition to the internal data, other items such as unit configuration and flight history can also be accessed.

Baud Rate	38,400
Parity	none
Data Bits	8
Stop Bits	1
Maximum Recommended Cable Length	15 Meters
Pin Assignment (Signal Mnemonic)	

DIAG_RS232_TX	J10-38
DIAG_RS232_RX	J10-39
DIAG_RS232_RDY	J10-40
DIAG_RS232_TERMRDY	J10-41

4.2.4.2 TAS RS-422 Data Recorder

One port is provided which meets the characteristics specified in EIA RS-422A. This bus can be used as a data recording vehicle. It need not be wired unless requested by Honeywell personnel.

Maximum Recommended Cable Length	15 Feet
Pin Assignment (Signal Mnemonic)	

RS422_DATA+	J10-34
RS422_DATA-	J10-35
RS422_CLK+	J10-36
RS422_CLK-	J10-37

4.3 GROUND TEST PROCEDURES

4.3.1 Required Testing Equipment

- Personal Computer with Diagnostic Program (WinViews for the EGPWS ground tests and TASDIAG for TAS ground tests. (See Appendix D).
- TCAS Ramp Test Set; TCAS 201, or equivalent.
- Transponder Ramp Test Set.

- Pitot-Static Test Set.
- Radio Altimeter Test Set, or equivalent.
- Volt-Ohmmeter (DVM) (optional).
- 429 Bus reader (optional).

4.3.2 EGPWS Ground Test Procedures (066-01175-x101 only).

This Ground Test Procedure is designed to minimize potential equipment damage and verify proper operation of the Honeywell EGPWS as installed in the aircraft.

- A. Review your aircraft installation drawings against the manufacturer's data sheets and verify that all necessary connections are included on your drawings and that the pin numbers are in agreement.
- B. With all units disconnected and aircraft power off, do a point to point wiring check using an ohm meter to verify proper wiring interconnect.
- C. With all units disconnected, apply aircraft DC power and verify that power is supplied to the power input pins.
- D. Remove power from the aircraft and connect all units.
- E. Connect a PC to the RS-232 communications port of the EGPWS unit.
- F. Power up the PC, start "WinViews" and select connect.
- G. Power up the avionics in the aircraft. You should note the "Not Available" light ON and you should see INITIALIZATION messages coming from the EGPWS on your PC. When the messages quit (could be as long as 3 minutes for the first application of power) press Control 'Z' on your keyboard. The PC display should show a '>'.
PRELIMINARY - SUBJECT TO CHANGE WITHOUT NOTICE
- H. Type 'PS' and the 'return' key on your PC. You should receive several lines of status messages from the EGPWS. One of the messages should be 'Configuration Module not initialized'. Instructions for programming the configuration module are contained in section 4.2.3.2 of this document. Go to section 4.2.3.2 at this time and after configuration has been completed, return to item I below.
- I. With your PC communicating with the EGPWS, select 'file' at the top of the WinViews screen. Select 'Load Command File' and then select the file named Gagnddtst.cmd. (This file was supplied on your WinsViews Disk).

- J. Now press function key F6 on your keyboard.
- K. Set the aircraft's altimeter to 29.92 IN Hg and note the altitude displayed on the altimeter. Now look at the PC screen and locate the item named Gillham Alt ft. and verify that the altitude shown agrees with the aircraft altimeter, ± 100 feet. If it does not, troubleshoot the encoding altimeter / wiring.
- L. Provide a source of GPS signals to the GPS antenna. This can be accomplished by using a GPS repeater inside a hanger, or by taking the aircraft outside where it has a clear view of the sky.
- M. Press function key F6 to return to the command mode of WinsViews. Type in GPS followed by the 'Return' key to view the status of the GPS receiver. Typing control 'R' on the keyboard will re-issue the last command sent and allow you to continue to monitor GPS status. Once the GPS has acquired satellites, the status message "Not Navigating" will change to "Navigation with possible data collection". The Not Available Lamp should turn off and if a display is being used, a North UP terrain view should be shown on the display.
- N. Press the 'Self Test' switch and verify that the unit lights all lamps, produces audio and the display, if installed, shows a test pattern. The EGPWS self test function will identify any problems with the interfaces or with the EGPWS computer. Troubleshoot any problem reported during the self test.
- O. Connect a pitot-static test set to the aircraft static system. Operation of the pitot-static test set should be performed only by persons trained in its use. Additionally, if the aircraft static system was opened or modified to add an encoder, the static system must be tested and approved by a licensed mechanic or authorized repairman. Improper use of the pitot-static test set can result in damage to altimeters, vertical speed indicators, etc.
- P. Start with the pitot-static test set at current field elevation. Set the reference altimeter in the test set for 29.92 IN. Hg.
- Q. On the PC, select the Data display mode (F6). With the system receiving GPS signals and no faults reported, you should now verify that the system has correctly identified your closest airport. Look at the following items on the PC display:

CrwyApt (the letter/number identifier of the closest airport Only
public airports with runways 2000 feet or longer)

CRwyDist nm The distance in nm to the reference point of the airport.

Verify that the displayed information agrees with your geographic location.

- R. Set the pitot-stat test set to -1000 feet, exercise caution to avoid excessive pressure changes to the static system of the aircraft. Verify that the PC display shows the item named Gillham Alt ft. at -1000 feet $\pm$ 100 feet.
- S. Set up the pitot-static test set to allow an ascent to 30,000 feet, or to the maximum altitude of the lowest rated device attached to the static system. If, for example, the aircraft uses a blind encoder rated to 25,000 feet; the altitude to climb to would be 25,000 feet.

You must verify that all equipment connected to the static system can safely be driven to your test altitude. If you go above 30,750 feet, the Gillham Altitude displayed on your PC will start going backwards. This is normal because the EGPWS does not use Gillham Code line D4. At altitudes above 18,000 feet, the EGPWS uses GPS altitude for calculations.

- T. Start an ascent at 3,000 feet per minute while monitoring the item named Gillham Alt ft. At approximately a 2-second rate the displayed altitude should increase by 100 feet. Make absolutely certain that the altitude always increases; never goes backwards and never skips a 100 foot increment. You can record this test using the data collection feature of Win-Views.

This will allow you to look through the data after the test using a text editor. This test verifies that the barometric altitude source is working correctly and that the wiring is correct. Troubleshoot anomalies discovered during this test.

- U. Return the static test set and aircraft static system to the local ambient pressure.
- V. If installed, press the Terrain Inhibit switch and verify that the item named TerrDis switches between true and false on your PC's display.
- W. This completes the Ground Test of the EGPWS.

4.3.3 (TAS) Ground Test Procedure

Installation of the TAS System requires three stages of testing to ensure the proper operation of the TAS System components. Initially, before installation of the TAS processor and display units, a system interwiring check is performed. This check verifies that the aircraft and all TAS System interconnections are correct, before power is applied. After the units are installed, a visual inspection of the equipment and connections is made. The Post-installation test is used to apply power and functionally check out the system. Successful completion of the post-installation test verifies the proper operation of the KMH/KTA Traffic Advisory System.

- A. To check the aircraft system interconnections, perform the following:

Check that all cables and interwiring are installed according to the Interwiring and Cable Fabrication instructions. (paragraph 2.2.7 and 2.2.8)

Check that the following functions are properly strapped to reflect the aircraft system configuration. (paragraph 4.2.3.6)

- Aircraft/Mode Type
- Air Data Type
- Position Type
- Terrain Display type
- I/O Discretes Type
- Audio Menu Type
- Audio Output Level Type
- Altitude Monitor Options Type
- Terrain Display Alternate Pop UP Option

Using the interconnect diagrams (Figures 3-1 through Figure 3-23), check wiring for proper destinations, opens and shorts.

Check RF Cable for electrical length matching, insertion loss and VSWR. (See paragraph 2.2.7 and 2.2.8)

Check the transponder and DME interface.

NOTE

The only required interface between the KMH/KTA TAS and the transponder is the suppression line. Some installations may use a common control for the transponder and the TAS. In these cases, the TAS control comes from the transponder control unit.

- B. In conjunction with the system installation, perform a visual inspection.
- C. Perform the Pretest Setup to set the initial conditions to check the operation and self-test features of the system. The following steps apply and check the TAS System input power, configure the operational controls, and verify that the system is ready for testing. It is assumed that the person performing these tests has a working knowledge of the KMH/KTA TAS System and the Graphics Unit and is qualified to perform these tests on the aircraft.

Ensure that all aircraft systems are secure and safe. Confirm that 28Vdc and 26Vac 400 Hz power sources are operational; i.e., check power bus meter.

Check that the aircraft 5Vac or Vdc or 28 Vdc panel background lighting power source and dimmer control is operational by adjusting the cockpit dimmer switch for proper cockpit panel background illumination.

Check that the Transponder, TAS, and Radar Systems are OFF. If applicable, the selected encoding altitude source should be #1. If applicable, the ADC (Air Data Computer) source should be set to normal.

Operate the appropriate aircraft circuit breakers to apply power to the TAS Processor, Traffic Advisory displays and all other aircraft equipment connected to the TAS Processor subsystem. Check that the circuit breakers remain closed (pushed in).

Allow enough time for equipment warm-up. Equipment in the TAS system require one minute for equipment warm-up. External sensors may require more than one minute warm-up time.

On the TAS control panel, Place the SBY switch to SBY mode. Place the ABOVE/NORM/BELOW switch so as to indicate "NORM". Place the Range so the 5 nautical mile (nmi) range has been selected. The following should be visible on the traffic display screen:

- No "TAS" flag annunciation.
- "TAS STBY".
- If installed, the TA/VSI vertical speed needle should indicate 0 fpm.

Check that the brightness of the traffic display can be controlled by the appropriate control. Brightness of the traffic display may be controlled by the aircraft dimmer switch or by the BRT control on the display unit.

On the TAS Control Unit, select the ON position. The following conditions should exist:

- The traffic display should indicate "TA" or "TA ONLY".
- No faults or fail annunciations are present on the traffic display.
- Traffic may be displayed on the traffic display depending on the TAS strapping configuration and whether traffic exists in the area.
 - Non-threat Traffic, displayed as an open white diamond.
 - Proximity Intruder Traffic, displayed as a filled white diamond.
 - Traffic Advisory (TA) traffic, displayed as a yellow circle.

- D. Perform the Self-test by initiating the TAS System Self-test on the TAS Control Panel. The following events should occur during the test period:
On the traffic display, a test pattern will be displayed that allows verification of each type of intruder symbol that can be displayed. During the self-test,

the word “TEST” is displayed on the display. The following symbols are displayed:

- Traffic Advisory (yellow circle) will appear at 9 o'clock, range of 2 miles, 200 feet below and climbing.
- Proximity traffic (solid white diamond) will appear at 1 o'clock, range 3.6 miles, 1000 feet below and descending.
- Non-threat traffic (open white diamond) will appear at 11 o'clock, range of 3.6 miles, flying level 1000 feet above.

At the conclusion of a successful self-test, a synthesized voice announces, “TAS System Test OK”. Should a failure be detected during self-test, the audio message says, “TAS System Test Fail”.

E. Perform the Ground Test.

Ground tests are necessary to meet the requirements of DRAFT AC 20 ZZ. While the tests are organized in a sequential fashion, they may be completed in a random order to accommodate other conditions. The person performing these tests should be familiar with the TAS equipment, the aircraft installation and the supporting test equipment.

NOTE

In the following test results space “_____”, enter “P” for Passed, “F” for Failed and/or fill in the results or comments. If the section does not apply, write N/A.

1. Perform the TAS Power Checks

Verify aircraft power to TAS

Pull the 5 amp TAS Processor circuit breaker.

Verify that the “TAS” flag appears on the traffic display.

Reset the circuit breaker. Verify that the flag clears.

Pass/Fail _____.

Pull the 1 amp TAS Control circuit breaker.

Verify that the “TAS” flag appears on the traffic display.

Reset the circuit breaker. verify that the flag clears.

Pass/Fail _____

NOTE

The following three steps should only be performed when the configuration module is set to use the Display Valid input.

Pull the Traffic Display circuit breaker.

NOTE

The above circuit breaker should be for the unit providing a valid to the TAS Processor at pin 5.

Verify that the appropriate flag appears INVALID.

Reset the circuit breaker. Verify that the flag clears.

Pass/Fail _____

Disable the 26Vac 400 Hz source used as a reference for the Hg and Alt inputs.

Verify that the "TAS" flag appears on the traffic display.

Reset the circuit breaker. Verify that the flag clears.

Pass/Fail _____

2. On the TAS Control Panel exercise all the TAS control functions and observe for correct operation.

Test the ON/OFF and STB/ON functions as follows:

Set the PWR switch to the OFF condition. (If applicable)

Reset the PWR switch to the ON condition. (If applicable)

Set the SBY switch to the ON mode.

On the traffic display screen, check that "TA" or "TA ONLY" annunciation is displayed.

Pass/Fail _____

Test the ABOVE/NORMAL/BELOW function as follows:

On the TAS Control Panel, set the ABOVE/NORMAL/BELOW to ABOVE. On the traffic display screen, "ABOVE" should be annunciated. Traffic between 2700 feet below and 8700 feet above can be displayed.

Select BELOW. The screen should annunciate "BELOW" in place of the "ABOVE" annunciation. Traffic between 8700 feet below and 2700 feet above can be displayed.

Set the switch to NORMAL. The screen area that annunciated "ABOVE" or "BELOW" should be blank. Traffic between 2700 feet above and 2700 feet below can be displayed.

Traffic Display _____

On the traffic display, check the TAS ranges to observe the range annunciations and range rings.

NOTE

There are two configurations for the KMH 820/KTA 810, 3-5-10-15 and 5-10-20-40. Not all ranges are available in every configuration.

NOTE

The 2 nm range ring is visible on all TAS RANGE selections less than 20 nm.

Set TAS RANGE switch to 3 nautical miles. The following properly scaled range rings should be visible:

2 and 3 nautical mile range rings. _____

Set TAS RANGE switch to 5 nautical miles. The following properly scaled range rings should be visible:

2 and 5 nautical mile range rings. _____

Set TAS RANGE switch to 10 nautical miles. The following properly scaled range rings should be visible:

2 and 10 nautical mile range rings. _____

Set TAS RANGE switch to 15 nautical miles. The following properly scaled range rings should be visible:

2 and 15 nautical mile range rings. _____

Set TAS RANGE switch to 20 nautical miles. The following properly scaled range rings should be visible:

5, 10, and 20 nautical mile range rings. _____

Set TAS RANGE switch to 40 nautical miles. The following properly scaled range rings should be visible:

NOTE

On the traffic display unit, an outer ring represents maximum nautical (nm) display scaling as selected on the RANGE switch.

If applicable, test the FL (Flight Level) function as follows:

Press the FL switch.

Observe that the traffic display indicates "FL" in the upper left hand corner. It will be FL --- (flagged) on most displays unless encoding altitude source is higher than 18,000 feet.

Pass/Fail _____

If applicable (-0901 and -1001 versions of the CP 66B with a Honeywell Multi-Functional Display), check that the display modes can be selected properly via the MAN_AUTO discrete as follows:

Via the separate Man/Auto switch, ground MAN_AUTO, CP 66B J1 pin 23, and verify that when TCAS is not selected on the Multi-Functional Display, it only displays TAS information when a TA is in effect.

Via the separate Man/Auto switch, open MAN_AUTO, CP 66B J1 pin 23, and verify that TAS information is displayed on the Multi-Functional Display only when TAS has been selected on it regardless of whether there is a TA in effect.

Pass/Fail _____

3. If applicable, check that the traffic modes (T/WX) can be selected on the color radar indicator as follows:

Set the T/WX switch to indicate "WX" (Weather Only).

Observe that the traffic display (radar indicator) annunciates "TA AUTO", but unless TA traffic is present only the radar picture is displayed.

Set the T/WX switch to "T/WX" (TAS and Weather).

Observe that the traffic display annunciates "TA" or "TA ONLY" and shows both traffic and weather if the radar is ON.

Select "TCAS" (TAS ONLY) with the T/WX switch.

Observe that the traffic display annunciates "TA" or "TA ONLY" and shows TAS traffic but no weather is displayed.

Pass/Fail _____

4. Confirm the Sensor Input to TAS by using a diagnostic computer program. Additionally, the fault source can be viewed on the radar indicator or by reading the LED fault code on the processor.

Verify the heading source interface to the TAS Processor. Confirm the heading source and measure the inputs at the KMH/KTA Processor. Refer to the drawings for the proper pin assignments.

The TAS and heading system should be operating normally for the following test. Connect the Diagnostic Computer to the KMH/KTA through the RS-232 port. Run the TASDIAG Input Data program and observe the following on the Diagnostic Computer.

Monitor the heading source in the cockpit. Observe the Mag. Heading readout on the computer. The computer readout should agree to within a few degrees with the cockpit heading display. Record a heading other than North (0.0°) _____.

The Heading Status on the computer should indicate VALID. The heading type should indicate Synchro or ARINC 429.

Flag the heading source by pulling the circuit breaker.

Verify that the Heading Status goes INVALID.

Verify that the "TAS" flag appears on the traffic display.

Reset the circuit breaker. Verify that the TAS flag clears.

Pass/Fail _____

5. Verify that the encoding altitude is properly interfaced to the TAS Processor. Confirm that the encoding altitude of the transponder and TAS agree.

CAUTION

PRECAUTIONS MUST BE TAKEN TO INSURE THAT THE ALTITUDE TEST OF THE TRANSPONDER DOES NOT INTERFERE WITH OTHER TCAS/TAS EQUIPPED AIRCRAFT. SHIELDING THE TRANSPONDER AND TAS ANTENNAS IS THE BEST WAY TO PREVENT INTERFERENCE WITH OTHER AIRCRAFT.

The TAS, transponder and encoding altitude source(s) should be operating normally for the following test. Connect the Diagnostic Computer to the KMH/KTA through the RS-232 port. Run the TAS-DIAG Input Data program and observe the following on the Diagnostic Computer.

Monitor the altitude source in the cockpit. Set the baro to 29.92". Observe the Enc. Altitude readout. The computer readout should agree to within 50 feet of the cockpit altimeter.

The Enc. Alt. Status in the computer should indicate VALID.

Confirm the following Encoding Altitudes at the altimeter, Diagnostic Computer and transponder:

Altitude at 2,000 feet, the computer screen indicates _____ feet.

Transponder indicates _____ feet.

Altitude at 7,800 feet, the computer screen indicates _____ feet.

Transponder indicates _____ feet.

Altitude at 19,000 feet, the computer screen indicates _____ feet.

Transponder indicates _____ feet.

Altitude at 31,800 feet, the computer screen indicates _____ feet.

Transponder indicates _____ feet.

NOTE

The above test step checks both logic states for all Gillham lines. Other tests may be adequate for some installations.

Flag the encoding altitude source by pulling the circuit breaker.

Verify that the Enc. Alt. Status goes INVALID.

Verify that the "TAS" flag appears on the traffic display.

Reset the circuit breaker. Verify that the "TAS" flag clears.

Enc. Altitude Source #1 Pass/Fail _____.

If applicable, select the other encoding source and repeat the above steps.

Enc. Altitude Source #2 Pass/Fail _____.

If applicable, verify the attitude interface to the TAS Processor. Confirm the pitch and roll attitude source and measure the inputs at the KMH/KTA Processor.

The TAS and attitude should be operating normally for the following test. Connect the Diagnostic Computer to the KMH/KTA through the RS-232 port. Run the TASDIAG Input Data program and observe the following on the computer screen.

Monitor the attitude source in the cockpit. Observe the Pitch and Roll attitude readouts. The computer screen readouts should agree to within a few degrees of the cockpit heading display. Record a pitch and roll attitude other than (0.0°) _____. Is it consistent with the aircraft's attitude?

The Pitch and Roll Status on the computer should indicate VALID.

Flag the attitude source by pulling the circuit breaker.

Verify that the Pitch and Roll Status goes INVALID.

Verify that the "TAS" flag appears on the traffic display.
Reset the circuit breaker. Verify that the "TAS" flag clears.

Pass/Fail _____.

6. If applicable, verify that the Radio Altimeter is properly interfaced to the TAS Processor. Confirm the radio altitude configuration straps and measure the input at the KMH/KTA Processor.

The TAS and radio altitude source(s) should be operating normally for the following test. Connect the Diagnostic Computer to the TAS through the RS-232 port. Run the TASDIAG Input Data program and observe the following on the computer.

Monitor the radio altitude source in the cockpit. Observe the Radio Altitude readout. The computer readout should agree with the cockpit radio altimeter indicator. If the computer display is too erratic, measure the voltage with an alternative test.

The Rad. Alt. Status on the computer should indicate VALID

Using the radio altimeter self-test, confirm the following:

With Radio Altitude source at 0 feet (on Ground), the computer indicates _____ feet.

When Radio altitude self-test (40-50') is pressed, the computer indicates _____ feet.

Do these readings agree with the cockpit display? Yes/No

An alternate method can be by using a Radio Altimeter tester.

Confirm the following:

When the Radio altitude is at 0 feet, the Diagnostic Computer indicates _____ feet.

When the Radio altitude is at 1,000 feet, the Diagnostic Computer indicates _____ feet.

When the Radio altitude is at 2,000 feet, the Diagnostic Computer indicates _____ feet.

When the Radio altitude is at 2,500 feet, the Diagnostic Computer indicates _____ feet.

Flag the Rad. Altitude source by pulling the circuit breaker.

Verify that the Rad. Alt. Status goes INVALID.

Verify that the "TAS" flag appears on the traffic display.

Reset the circuit breaker. Verify that the "TAS" flag clears.

Rad. Altitude Source #1 Pass/Fail _____.

7. Check that the configuration module and logic discretes are correct. Refer to supporting drawings and documentation if necessary to confirm the following items.

The TAS and related aircraft system should be operating normally for the following test. Connect the Diagnostic Computer to the KMH/KTA through the RS-232 port. Run the TASDIAG Input Data program and observe the following on the Diagnostic Computer.

Disable the WOW logic and check that the air/ground (J10-4) mode changes from "ON-GROUND" (GND) to "AIRBORNE" (OPEN).

Pass/Fail _____.

Disable the landing gear logic and check that the gear position (J10-3) changes from "EXTENDED" (GND) to "RETRACTED" (OPEN).

Pass/Fail _____.

If applicable, confirm that ADVISORY INHIBIT (J10-22) changes from "INHIBITED" (GND) to NOT-INHIBITED (OPEN). when testing the GPWS.

Top Antenna elements (J1-J4) indicate _____.

The HEX value of the antenna elements should indicate between:

J1: BF H and CC H.

J2: D4 H and DF H.

J3: E5 H and ED H.

J4: 6C H and 93 H.

Bottom Antenna elements (J1-J4) indicate _____.

The HEX value of the bottom directional antenna elements should indicate as described above. The value of the monopole antenna elements (J2-J4) should indicate between 00 H and 93 H. antenna,

Do all items Pass/Fail _____?

8. Perform the Ramp test. This test requires the use of a TCAS Ramp Tester. Specific instructions for operating the ramp tester are contained in the applicable operator's manual. Using the TCAS Ramp Tester exercise the TAS with the various intruder aircraft scenarios. Monitor the displays and aural messages to verify that system response is correct.

Evaluate proper operation of the TAS system by observing traffic advisories, proximity traffic and "other" traffic. Confirm that the voice announcement is correct and occurs at the proper time. At this time it will be necessary to have the appropriate systems operational.

WARNING

PRECAUTIONS MUST BE TAKEN TO INSURE THAT THIS TEST DOES NOT INTERFERE WITH OTHER TCAS/TAS EQUIPPED AIRCRAFT.

Apply static pressure to the airplane using the pitot-static tester. Increase the altitude to 20,000 feet.

NOTE

The TAS and Transponder controls should be in Standby until the test altitude is set.

Apply a radio altitude signal to the aircraft using the radio altimeter test set or equivalent. Increase the radio altitude to 2,000 feet or greater.

Disable the WOW logic and put the aircraft systems into the "AIRBORNE" mode. For retractable gear aircraft, the landing gear logic should remain in the "EXTENDED" or DOWN position.

Put the TAS and transponder control panels in the ON position. Select #1 Transponder.

Using TASDIAG, enable the “Ramp Tester Mode” under the “File” drop down menu.

NOTE

Once “Ramp Tester Mode” is entered, power must be cycled on the KMH/KTA before any flight

Set up the TCAS Ramp Test Set.

Using the TCAS Ramp test set, create a scenario to simulate an approaching Mode C transponder equipped aircraft beginning at 10 NM, at an altitude of 20,500 feet, at a closure rate of +450 KTS and an altitude rate of 0 FPM. An alternate scenario may be required for some test sets.

Initiate the intruder test on the TCAS Ramp Tester.

Verify that the intruder symbol corresponds to the scenario in bearing, distance and relative altitude. Confirm that the audio announcement agrees with the scenario.

The intruder symbol will begin as an open white diamond with relative altitude tag of + 05. The bearing should be from the direction of the test antenna. The intruder will become proximity traffic at 5 NM; The white diamond will be filled. Finally, the intruder becomes a TA (traffic advisory) and the symbol will change to a yellow circle.

“TRAFFIC, TRAFFIC” voice announcement should occur around 3.75 NM.

Traffic Display _____, Taffic Announcement _____.

While simulating a pressure altitude of more than 18,000 feet, MSL, press the “FL” (Flight Level) switch on the TCAS Control Panel. Verify the proper operation of the flight level mode on the traffic displays.

Traffic Display _____.

9. If installed, verify that the GPWS and Windshear warnings and TAS voice alerts are compatible. Also verify that the GPWS and Windshear warnings have been prioritized over the TAS voice alerts.

Another test to check the Advisory Inhibit Inputs can be performed with the Diagnostic Computer.

Initiate the TAS self-test.

As soon as the "TAS SYSTEM TEST OK" message begins, press the GPWS Test switch or simulate a GPWS advisory. TAS audio is interrupted.

Pass/Fail _____.

Initiate the TAS self-test.

As soon as the "TAS SYSTEM TEST OK" message begins, press the Wind Shear test switch or simulate a Wind Shear advisory. Verify the TAS audio is interrupted.

Pass/Fail _____.

10. TAS Bearing Accuracy is required for STC Approval.

Evaluate the performance of the directional antenna for 360° coverage at 30° intervals.

NOTE

Whenever checking the TAS bearing accuracy, the test antenna must be within line-of-sight of the directional antenna under test. The accuracy to the top directional antenna should be checked while the test antenna is 50 to 75 feet distant, and the landing gear logic is "DOWN". When measuring the accuracy of the bottom antenna, the test antenna should not be within line-of sight of the top directional antenna. Either use the fuselage to block the top directional antenna and position the test antenna 8 to 12 feet from the bottom antenna or shield the top antenna with echosorb or equivalent. The landing gear logic must simulate "RETRACTED" (UP) whenever checking the bearing accuracy to the bottom antenna. TAS will appear as "No Bearing" targets when the gear position logic is "EXTENDED" (DOWN) because the bottom antenna is in omni directional mode.

To insure proper antenna selection, the relative altitude difference between the simulated intruder and own aircraft altitude should be + 6,000 feet (or greater) when checking the top antenna. The test antenna should be elevated slightly above the height of the top directional antenna.

When checking the bottom antenna bearing accuracy, the relative altitude difference between the simulated intruder and own aircraft altitude should be -6,000 feet (or more). The test antenna should be below the mounting plane of the bottom directional antenna.

Position the aircraft outside on a heading of north away from hangers and other aircraft.

Static pressure to the aircraft using the static tester is not required unless local conditions make it necessary.

Apply a radio altitude signal to the aircraft using the Radio Altimeter Test Set or equivalent. Increase the radio altimeter to 1,000 feet or greater. Disable the WOW logic to put the aircraft systems in the "AIRBORNE" mode

Set up the TCAS Ramp Tester on headings listed in the following Figure.

On each heading in a CW direction initiate an intruder test scenario on the TCAS Ramp Tester and measure the relative bearing to the intruder from the traffic display.

Whenever testing the bottom directional antenna, set the landing gear logic to "RETRACTED" (GEAR UP). Repeat the above steps for the bottom antenna.

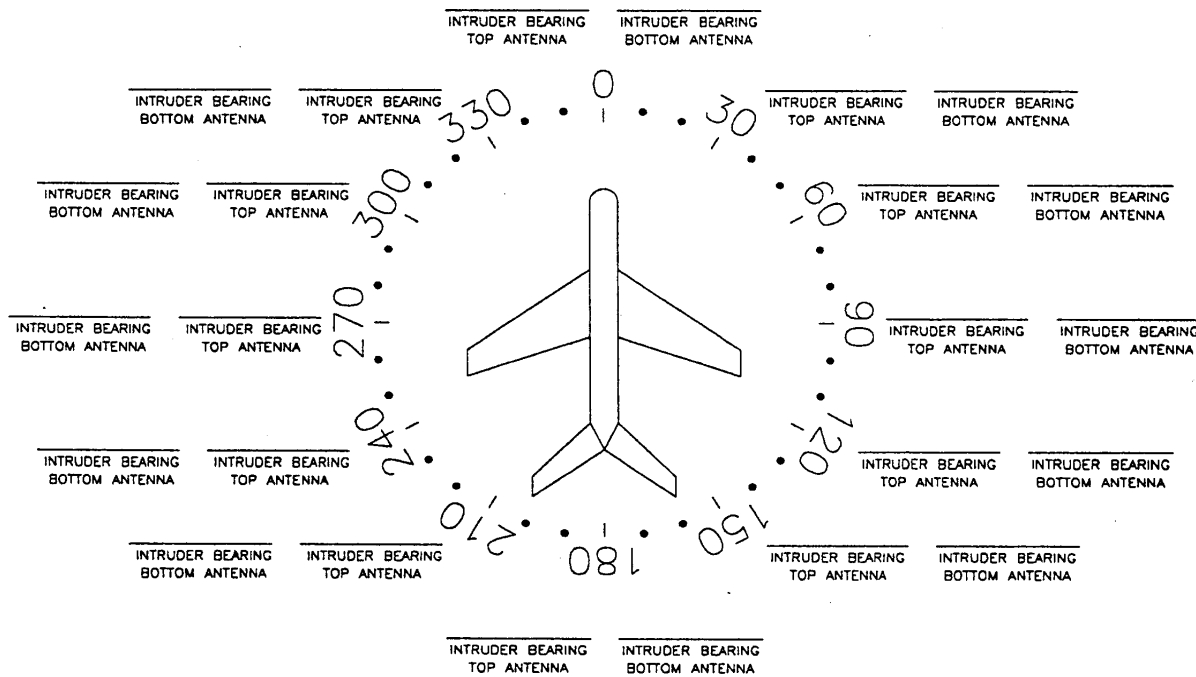


Figure 4-1 TAS Bearing Measurements

NOTE

Bearing Error equals the heading to TCAS Ramp Tester less the relative bearing of intruder. Relative bearing to the intruder should be a positive number measured clockwise from north on the traffic display unit.

NOTE

The largest acceptable TAS bearing error is +/- 30° except between 135° and 225° (aft of the wings) where the error may be 45°.

11. Perform the Power and Frequency tests shown in the TAS Operator's Guide.

12. Perform Electromagnetic Interference (EMI) / Radio Frequency Interference (RFI) required for STC. Determine if there is any mutual interference with any other aircraft system.

Pass/Fail _____.

13. Determine that the system suppression is active.

14. Conduct a flight test of TAS (Required for STC) according to the requirements of FAA Advisory Circular AC 20-ZZ, titled "Airworthiness Approval and Operational Use of Active Traffic Advisory System (TAS)".

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SECTION V CERTIFICATION

5.0 INTRODUCTION

This section outlines the procedures required to obtain IFR certification for the KMH 880/KTA 870 System. Recommended flight test procedures are also included.

5.1 CERTIFICATION PROCEDURE

5.1.1 Equipment Compatibility

Careful consideration must be paid to the electrical characteristics of existing equipment or possible additions that will be interfaced with the KMH 880/KTA 870 System, in order to ensure system compatibility. Section III of this manual provides system planning guidelines, and defines the electrical characteristics of the KMH 880/KTA 870 System. The installing agency should contact Honeywell International Inc. Product Support at (800) 257-0726, for information regarding the compatibility of equipment not listed in Section III. Normal business hours are 8:00 AM to 5:00 PM Central Time, Monday through Friday.

The TAS system may operate in conjunction with, and in close proximity to, a transponder. The functions of the system will not in any way degrade the performance of the transponder beyond its specified limits.

All of the TAS requirements stated in this document will be met when the TAS equipment is operating in conjunction with a compatible operating transponder, except when the transponder is active. The active state of the transponder is defined as the greater of the time interval between (a) the leading edge of the first transmitted pulse of the transponder reply minus 10 microseconds and the trailing edge of the last transmitted pulse of that reply plus 10 microseconds, or (b) the time interval during which a mutual suppression occurs.

5.1.2 Equipment Location

The KMH 880/KTA 870 System and associated indicators, annunciators and switches should be clearly visible and within easy reach of the pilot. Refer to Section II of this manual for complete installation information.

5.1.3 Federal Communication Commission Rules

The equipment will comply with all applicable rules of the Federal Communication Commission.

5.1.4 TSO Category

All aircraft, which are required by Federal Aviation Regulations to have a Terrain Awareness and Warning System complying with TSO C151a Class B, must be configured with the TSO curves. Additionally, the Alternate Audio Menu must be selected to meet the alert/warning aural requirements of the TSO.

5.1.5 FTZ Requirement

The KMH 880/KTA 870 system is compliant to FTZ document 17 TR 2010.

5.1.6 FAA Requirements

The installing agency should contact a local FAA Inspector (GADO, FSDO, ACDO, MIDO, or ACO) who will determine whether the installation may be approved by submitting FAA Form 337 or whether a Supplemental Type Certificate (STC) will be required. If FAA Form 337 is determined to be sufficient, the installing agency should determine the acceptability of the procedures defined within this manual. If the FAA Inspector determines that an STC is required, the installing agency will need to contact the nearest Aircraft Certification Office (ACO) to obtain acceptable procedures.

The FAA Central Region Aircraft Certification Office, Wichita, Kansas, has on file an approved report regarding the KMH 880/KTA 870 System. This report contains the bench test data and DO-160D environmental test data required to demonstrate the KMH 880/KTA 870 System's compliance.

5.1.7 FAA Form 337

FAA Form 337 (if applicable) must be completed and submitted to the FAA. A sample checklist is provided in the Certification Appendix of this manual.

5.1.8 Flight Manual Revision

A Flight Manual Supplement is usually required for approval. A sample supplement is provided in the Flight Manual Supplement Appendix of this manual. The sample is to be used as a guide to acceptable content and format, and not intended to apply to all installations. It is the responsibility of the installing agency to prepare an appropriate Flight Manual Supplement, and obtain FAA approval.

5.1.9 Pilot Briefing

The installing agency should carefully review the Flight Manual Supplement and the KMH 880/KTA 870 System Operator's Manual, P/N 006-18265-0000, with the owner/operator of the aircraft.

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PRELIMINARY - SUBJECT TO CHANGE WITHOUT NOTICE

SECTION VI

OPERATION

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SECTION VI

OPERATION

6.0 INTRODUCTION

Refer to Section IV, of this manual, for the operating instructions for the post installation checkout. Refer to the KMH 880/KTA 870 System Operator's Manual P/N 006-18265-0000, for complete operating instructions.

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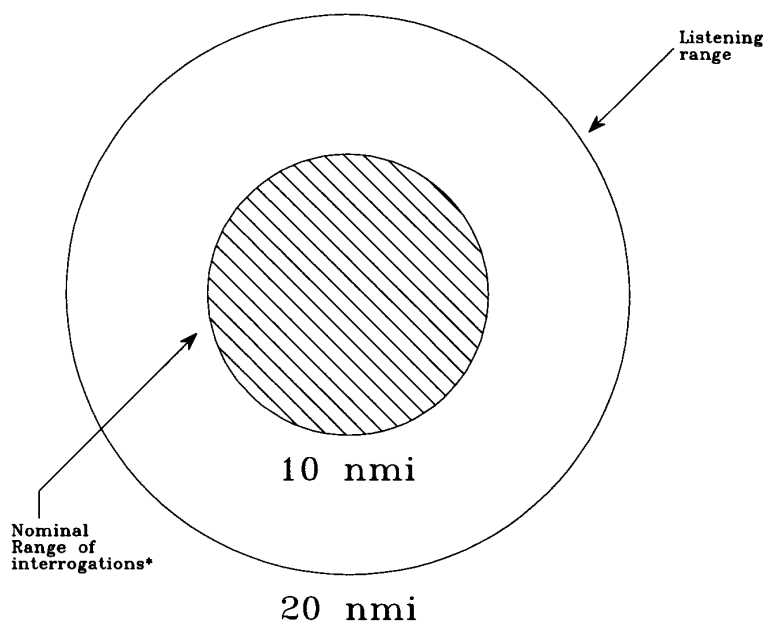
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APPENDIX A

Antenna Surveillance Range

APPENDIX A**Mode C Surveillance Range**

This appendix contains the nominal Mode C surveillance range map.

Mode C Surveillance Range on Top Antenna

* Actual ranges vary from .5 to 2 times nominal

Antenna	Inter. Power	Nominal Range
Omni Directional	Full	10 nmi

Figure A-1 Mode C Surveillance Range on Top Antenna

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APPENDIX B

STC Appendix

Information to be added, if required.

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APPENDIX C

CERTIFICATION APPENDIX

SAMPLE CERTIFICATION CHECKLIST

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SAMPLE CERTIFICATION CHECKLIST

AIRCRAFT MAKE: _____
AIRCRAFT MODEL: _____
AIRCRAFT SERIAL NUMBER: _____
AIRCRAFT REGISTRATION NUMBER: _____
DATE WORK COMPLETED: _____

- A. Installed the KMH 880/KTA 870 System in accordance with Unit Installation Manual number 006-10609-000_, Revision _____, dated _____, and has been flight tested in accordance with AC20-ZZ (draft), to verify proper operation and accuracy for a follow-on IFR approval. Original IFR approval was accomplished by STC _____, Master Drawing List number _____, specifications of TSO-C147 and TSO-C151a.
- B. Ground and flight tests were conducted and determined that the KMH 880/KTA 870 System does not interfere with normal operation of other equipment installed in the aircraft, and the KMH 880/KTA 870 System equipment is not a source of objectionable electromagnetic interference. Proper operation and accuracy were verified, and the unit functions properly and safely in accordance with the manufacturer's specifications.
- C. The unit was mounted in rack location for avionics provided by the manufacturer and is sufficient to ensure the restraint of the equipment when subjected to emergency landing loads.
- D. Installed an FAA Approved Flight Manual Supplement in the aircraft manual and a Operator's Manual, part number 006-18265-0000, Revision _____, dated _____, in the aircraft. Weight, balance and equipment list changes have been made in the aircraft flight manual.

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APPENDIX D

DIAGNOSTIC APPENDIX

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DIAGNOSTIC APPENDICES

TASDIAG-TAS Processor Field Diagnostic Program User Instructions

WARNING: DO NOT USE THE “TASDIAG PROCESSOR FIELD DIAGNOSTIC PROGRAM” WHILE AIRBORNE. THE PROGRAM IS USED ONLY WHILE THE AIRCRAFT IS ON THE GROUND. THE SYSTEM IS DEGRADED TO PERFORM MAINTENANCE FUNCTIONS AND IS NOT AIRWORTHY WHILE RUNNING THE DIAGNOSTIC SOFTWARE.

NOTE

The diagnostic tests are performed with KMH 880/KTA 870 installed in the aircraft.

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Revision	Change Order No.	PRN	Date
-	Original Issue	nnnnnn	see page 1

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1. Introduction

The TAS Processor Field Diagnostics Program (TAS Diag) provides an interface to the KMH 820/KTA 810 (TAS Processor Unit). The following information may be retrieved from the TAS Unit via TAS Diag:

- I/O data (straps, attitude, altitude, etc.),
- TAS's internal Diagnostic and Log File,
- Configuration module straps,
- Currently tracked intruder data (range, altitude, bearing, etc.),
- Cable calibration data,
- Current system status (fault LED reading and description).

TAS Diag for Windows has four different diagnostic windows:

- Main Diagnostic Window
- IO Continuous Window
- Intruder Data Window
- System Status Window

All data may be written to a user-specified file by clicking **Save** from the **File** menu. The active (selected) window will be saved.

A TAS Diag demonstration mode, in which no RS-232 communications are present, is available for familiarizing the user with the program. Select **Demo Mode** from the **File** menu.

This document is an operations manual for TAS Diag, providing tips and techniques enabling TAS Diag to be a useful tool in installation and/or troubleshooting KMH 820/KTA 810 TAS Processors.

The following Part Numbers identify the TAS Diag program and documentation:

700-01055-0000 User Manual (this documentation)

731-30007-0000 CD-ROM containing TAS Diag for Windows and User Manual

2. Computer Requirements

The TAS Diag program requires a personal computer with a CD_ROM running Microsoft Windows 95, Windows 98, or Windows NT 4.0 or above **WINDOWS 2000???**. The user should be familiar with running Windows programs.

3. Installing the TAS Diag Program

1. Insert the TAS Diag CD into your CD-ROM drive.
2. Select the "Start" button then "Run".
3. In the Command Line Box, type the letter of the drive that contains the TAS Diag CD, a colon, a backslash, and the word **setup**. For example, Type:
d:\setup
4. Click the OK button.
5. Follow the instructions that appear on the screen.
If Setup prompts you to replace some of the system files with newer versions:
 - Select OK, then Yes when prompted to restart Windows.
 - After Windows restarts, repeat steps 1 through 5.

A Program Group called "TAS Diag" should have been created.

4. Starting TAS Diag

The TAS Diag program may be started at any time. If the TAS unit is currently powered on, TAS Diag will automatically establish communications. If the TAS unit is not currently powered on, TAS Diag will continuously attempt to establish communications until communication is established or the Cancel button is pressed. Once communications are established and the TAS unit has completed initialization, TAS Diag will accept user input.

NOTE

If the TAS unit is powered on but communications are not being established, ensure that the computer's COM port is connected to the TAS unit's RS-232 diagnostics port. If the computer has more than one COM port, determine which one is connected and check TAS Diag COM port properties

The TAS Diag program is started by selecting the "**TAS Diag for Windows**" icon in the "**Start-Programs-TAS Diag**" group.

Once communications are established and the TAS unit has completed initialization, the TAS Diag main screen appears (see Figure 1). The main window consists of a menu bar and button bar at the top and TAS Processor specific information at the bottom of the window. The processor specific information consists of the TAS Processor serial number, software version, hardware version (if available), and the Engineering software version.

Figure 1 Main Window

The menu and button bars contain the available options for the TAS Diag program.

WARNING

TAS Diag is not intended for use during flight.

4.1 TAS Diag Demonstration Mode

The TAS Diag program contains a demonstration mode (in the file menu) which is useful for familiarizing the user with available options. The demonstration mode does not require an RS-232 connection to a TAS unit. Any option may be selected, and a simulation TAS unit response will occur.

5. Inspecting Current Processor I/O Data

There are two options for inspecting the TAS unit's I/O data: single snapshot or continuous (see Figure 2).

Figure 2 I/O Data View Continuous Window

5.1 Snapshot View

On the I/O Data menu, click **Snapshot View** to request a snapshot (one time) of the I/O Data. The TAS unit sends the data to the "Main Diagnostic Window".

5.2 Continuous View

On the **I/O Data Menu**, click **Continuous View** to request continuous updates of the I/O data. Continuous mode is the single snapshot repeated every one to two seconds. The TAS unit sends the data to the "I/O Continuous Window". A slight screen flicker will be noticeable as each new screen of data is written. The red **Stop** button on the button bar will be enabled as long as communications are on going and the window is being updated. To stop the update, click the **Stop** button.

6. Inspecting TAS Unit's Internal Diagnostic and Log Data

On the **Diag Log Menu**, click **View Log** to request the TAS unit's Internal Diagnostic and Log Data. The TAS unit sends the data to the "Main Diagnostic Window" (see Figure 3).

Figure 3 Diagnostic and Log Data Window

NOTE

Failures for the current power cycle are not in the Diagnostic and Log Data, since the Log is written at the end of each power cycle.

7. Configuration Module Options

The user will be offered options to view the strap data, modify the strap data, save to a text file, save to a binary file, copy from a binary file, and initialize the configuration module.

7.1 View Strap Data

This option allows the user to view the current strap settings in an easy to read layout. The TAS unit sends the data to the “Main Diagnostic Window” (see Figure 4).

Figure 4 View Strap Data Window

7.2 Modify Strap Data

The strap data is read from the TAS unit and displayed in a dialog box (see Figure 5). The dialog box has two pages, Strap Page 1 and Strap Page 2. Click on the top of each page to view/modify the different straps. The user may modify any of the straps by selecting the desired configuration. The selections are made using list boxes and radio buttons. Click the down arrow on the list boxes and click the desired configuration. For radio buttons, click the desired configuration button.

Once the user is satisfied with the strapping, click the OK button and the user will be prompted as to whether or not to write the data to the configuration module. Click the cancel button to exit without saving changes.

If the user opts to write the data to the configuration module, a message window will appear informing the user that the data is being written, the TAS unit is resetting, and the user should wait until the initialization is complete. When the TAS unit is initialized, a message will be displayed in the window. At this point the user may click the OK button to continue.

Figure 5 Modify Straps Window

7.3 Save to Text File

This option creates a specific file containing the configuration module's strap and bearing correction data. The file will have a header containing the TAS unit's serial number, the software version, the current PC date, and the current PC time. The file will be an ASCII text file.

7.4 Save to Binary File

This option allows the user to save configuration module set-ups and recall them at a later time, if needed (see section). The user will be prompted for a brief description to be attached to the binary file. File names of the format:

TASCFG.xxx,

where xxx is from 000 to 999 are created in the current PC directory.

7.5 Copy from Binary File

This option allows the user to program the configuration module with data previously stored in a binary file (see section). When this option is selected, a window allowing access to all binary file names in the current PC directory is displayed (see Figure 6). When a file is clicked, the description entered when it was saved is displayed in the File Description Field. When a file is selected (by clicking the open button), the user is prompted for the data to be written to the configuration module.

If the user opts to write the data to the configuration module, a message window will appear informing the user that the data is being written, the TAS unit is resetting, and the user should wait until the initialization is complete. When the TAS unit is initialized, a message will be displayed in the window for the user. At this point the user may click the OK button to continue.

Figure 6 Copy Binary File Window

7.6 Initialize Config Module

This option sets the configuration module's strap data to default values. The user must view both Strap Pages (see Modify Strap Data) to verify/modify the configuration. The user may click the Cancel button at any time to end the initialization process without actually writing to the configuration module.

When the Strap configuration is complete, click the OK button to save it to the configuration module.

8. Intruder Data

There are two options for viewing tracked intruder data (currently under TAS surveillance). Overwrite View and Capture View (see Figure 7).

Figure 7 Intruder Data Window

The following information is presented to the user:

- | | |
|----------|---|
| TISI-- | This is the number of interrogation update periods the TAS unit has been through since power up. |
| survno-- | This is the unique internal surveillance number assigned to an intruder. This number remains assigned to an intruder the entire time that it is under surveillance. |
| bear-- | The bearing (in degrees) of the intruder relative to own aircraft. 0 degrees is at the 12 o'clock position, 90 degrees is at the 3 o'clock position, 180 (or - 180) degrees is at the 6 o'clock position, and - 90 is at the 9 o'clock position. A series of -----'s indicates that a bearing could not be determined for the intruder. |

range--	The slant range from own aircraft to the intruder in nautical miles.
alt--	The intruder's altitude in feet (MSL). A series of -----'s indicates that the intruder is non-altitude reporting (NAR).
Ant--	This is an indication of the antenna on which the intruder is being surveilled. A 'T' indicates the top antenna, while a 'B' indicates the bottom antenna.
power--	The measure power of the last received from the intruder. A power of 255 indicates no reply was received from the intruder. A power of zero indicates that a power and/or bearing could not be computed for the intruder during the current TISI.

8.1 Overwrite View

On the **Intruder Data Menu**, click **Overwrite View**. The user is prompted for the maximum range in nautical miles-- this allows the user to limit the range at which intruders are displayed.

When this option is selected, the intruder information is erased before each update is sent to the screen. It is updated at approximately one TISI per second. To stop the update, click the **Stop** button on the button bar.

8.2 Capture View

On the **Intruder Data Menu**, click **Capture View**. This option allows the user to capture specified number of TISIs of data. The number of TISIs to be captured is entered, then the maximum range is requested (see Overwrite). When the number of TISIs have been captured, the updates are stopped. If the stop button on the button bar is clicked, the updates will also stop before completion of the specified number of TISIs.

9. Viewing Cable Calibration Data

Cable calibrations are performed periodically by the TAS unit so that bearings may be computed as accurately as possible. This option allows the user to view the results of the most recent cable calibration and causes the cable calibrations to be performed at an accelerated rate. Cable calibrations are normally spaced at two minute intervals, but this option causes the spacing between the end of one cable calibration and the start of the next to be 10 seconds. An internal TAS unit variable that displays messages on retries and/or errors is enabled. A cable calibration sequence for a dual directional system requires about 24 seconds to complete, so a new cable calibration summary will be displayed every 34 seconds. To view the cable calibration data, **View Data** on the **Cable Cal Menu** (see Figure 8).

Figure 8 Cable Calibration Data Window

NOTE

The second cable calibration summary could take as long as 2 minutes and 34 seconds before being displayed, due to the nature of the multi-tasking environment of the TAS unit and the method by which tasks are delayed.

10 Viewing Current System Status

This option allows the user to view the current TAS unit system status without having to try to read the LEDs located on the side or front of the TAS unit (see Figure 9). This data may be viewed two different ways; Overwrite or Continuously. The status is updated every second or two. The system's status is indicated along with the state of the LED indicator. When a fault occurs, a brief description is added to the LED fault information. To stop the update, click the **Stop** button on the button bar.

In the Overwrite mode, the data is erased before each update. For the overwrite mode, click **Overwrite View** on the **Sys Status Menu**. For continuously, click **Continuous View** on the **Sys Status Menu**.

Figure 9 System Status Window

11. TAS S/W Info

This option allows the user to retrieve TAS unit specific software (see Figure 10).

Figure 10 TAS S/W Window

12. Ramp Tester Mode

This option turns on the P2 pulse of TAS ATCRBS interrogations so a IFR 401B ramp tester can be used to reply to the TAS unit. To turn this option on or off, click **Ramp Tester Mode** on the **File Menu**. When the option is on, a check mark appears to the left of **Ramp Tester Mode** on the **File Menu**.

13. Suggestions and Hints

Below is a list of some of the problems that have been encountered to date along with possible solutions and/or work-arounds.

13.1 TAS Diag doesn't Communicate with the TAS unit.

If TAS Diag can not establish communications with the TAS unit, the first thing to check is the Comm port to which the RS-232 is connected. The RS-232 setting on the **File-Properties** dialog box should not be changed. However, the Comm (serial) port needs to be selected for the port connected to the TAS unit. Usually 'Comm 1' is the correct port. If you have several ports you may have to experiment by changing the Comm Port setting.

Some Laptops use Comm 1 for Modems and Infrared Sensors. If this is the case and you have only one serial port, you will need to disable the device using the Comm Port and enable it for external communications. This is usually done in the "My Computer" properties or in the BIOS setting. You should call your computer manufacturer if you can not free up the port.

TSO APPENDIX

ENVIRONMENTAL QUALIFICATION FORM

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RTCA DO-160D ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE: **KTA 810** Remote Mount Traffic Advisory Unit
KMH 820 Remote Mount Multi-Hazard Awareness Unit
CM 805 TAS / GPWS Configuration Module

PART NUMBER: 066-01152-0101 KTA 810
 066-01175-0101 KMH 820 w/o GPS
 066-01175-2101 KMH 820 w/ GPS
 071-00112-0100 CM 805
 050-03361-0000 Installation Kit
 047-12545-0003 Mounting Tray

TSO NUMBER: C147 (Class A), C151a (Class B)

MANUFACTURER'S SPECIFICATION: MPS 004-02050-4000

MANUFACTURER: Honeywell International Inc.

ADDRESS: One Technology Center
 23500 W. 105th Street
 Olathe, KS 66061 USA

CONDITIONS	DO-160D SECTION	DESCRIPTION OF CONDUCTED TESTS
Temperature and Altitude	4.0	Category A2D2
Low Temperature	4.5.1	(Low Temp. -55°C)
High Temperature	4.5.2 & 4.5.3	(High Temp. +70°C)
In-Flight Loss of Cooling	4.5.4	Category X (Not Tested)
Altitude	4.6.1	(Alt. tested to 51,500 feet)
Decompression	4.6.2	(Decomp., 8K to 51.5K < 15 sec.)
Overpressure	4.6.3	(Overpressure, 170 kPa)
Temperature Variation	5.0	Category B
Humidity	6.0	Category A
Shock (operational & crash safety)	7.0	Category B
Vibration	8.0	Category S (curves B & M) (See Notes 1, 2, & 3)
Explosion	9.0	Category X, (Not Tested)
Waterproofness	10.0	Category X (Not Tested)
Fluids Susceptibility	11.0	Category X (Not Tested)
Sand and Dust	12.0	Category X (Not Tested)
Fungus	13.0	Category X (Not Tested)
Salt Spray	14.0	Category X (Not Tested)
Magnetic Effect	15.0	Class A

Power Input	16.0	Category BZ
Voltage Spike Conducted	17.0	Category A
Audio Frequency Conducted Susceptibility	18.0	Category BZ
Induced Signal Susceptibility	19.0	Category A
Radio Frequency Susceptibility	20.0	Category RRR (See Note 4)
Radio Frequency Emission	21.0	Category L
Lightning Induced Transient Susceptibility	22.0	Category A3E3 (See note 5)
Lightning Direct Effects	23.0	Category 1B
Icing	24.0	Category X (Not Tested)
ESD	25.0	Category A

Notes:

1. Vibration Critical Frequencies – The following critical frequencies are mechanical resonances of the unit under test that have peak acceleration amplitudes greater than twice the input acceleration amplitude. Observed changes in performance of the unit under test are to be determined (TBD).

Vertical (Top to Bottom)	Longitudinal (Front to Back)	Lateral (Side to Side)
TBD	TBD	TBD

2. Observed changes in the above resonant frequencies during the test are to be determined.
3. The unit shall comply with DO-160C, vibration category N and Y for helicopters.
4. RF susceptibility degradation information placed here if applicable.
5. The unit shall comply with A3E3 on all signal lines and A4E4 on the power leads.

REVISION HISTORY

<u>Revision</u>	<u>PRN/CO #</u>	<u>Description of Change</u>	<u>Date</u>
-	PRN _____	Original Issue	TBD

Honeywell International Inc.
Environmental Qualification Form

P/N 004-02050-4800
Revision -

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