Preliminary - Subject To Change Without Notice

Honeywell

INSTALLATION MANUAL

BENDIX/KING®

KT 73

MODE S TRANSPONDER

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Preliminary - Subject To Change Without Notice

WARNING
Prior to the export of this document, review for export license requirement is needed.

REVISION HISTORY

KT 73 Installation Manual

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ITEM	ACTION
New manual	No previous manual revision exists.

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GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the Honeywell KT 73 Mode S Transponder. Installation and operating procedures are also included. Information relative to the maintenance, alignment, and procurement of the replacement parts may be found in the KT 73 Maintenance/Overhaul Manual, P/N 006-15563-0000.

1.2 EQUIPMENT DESCRIPTION

1.2.1 General Description

The KT 73 General Aviation Mode S Transponder is designed to meet TSO-C112 for a Class 2A ATCRBS/Mode Select Airborne Transponder System. It is a panel mounted transponder that fulfills the role of the airborne beacon equipment according to the requirements of the Air Traffic Radar Beacon System (ATCRBS). Its functionality includes replying to ATCRBS Mode A and C, Intermode and Mode S interrogations as well as handling Comm A and B Mode S Data Link protocols. The basic surveillance capability of the KT 73 satisfies the European Mode S mandate.

The KT 73 will pass Surveillance (UF 4 and 5) and Comm-A (UF 20 and 21) interrogations (minus the 24 bit Aircraft Address) to the ADLP (Airborne Data Link Processor). It will also be capable of receiving messages from the ADLP. It will also be capable of receiving messages from the ADLP and sending the messages to the ground in Comm-B (DF 20 and 21) replies. The transponder/ADLP will communicate using a RS-232 hardware interface and the RS-232 protocol developed by Lincoln Labs. Other Mode S formats that the KT 73 can handle include Uplink Formats 0 and 11 and Downlink Formats 0, 4, 5, 11, 16, 17, and 18.

The KT 73 also provides Mode "C" or altitude reporting information. When the KT 73 is operated in the "ALT" Mode and used in conjunction with an encoding altimeter, the flight level altitude is displayed in addition to the 4096 code, and the altitude information is transmitted to the ground in response to Mode "C" interrogations.

The Mode S function of the KT 73 will allow the ground station to individually select the aircraft by its Aircraft Address assigned to the aircraft by the FAA.

When the "IDT" button is pressed, the current 4096 code and an additional special ident pulse are transmitted by the KT 73 in response to a Mode A interrogation, to insure positive identification.

A test mode is also included in the KT 73 to confirm that the unit is operational.

The KT 73 implements the following DO-181C functions: Basic Transponder, Minimum Data Link Transponder, and Extended Squitter Capability. The KT 73 implements its data link via an RS-232 bus. The KT 73 does not support enhanced data link.

The KT 73 does not have full ELM capability and does not support Comm-D ELM protocol. The KT 73 is not a TCAS-compatible transponder.

1.2.2 Hardware

The KT 73 features an all solid state transmitter with microprocessor control. Mode and Code selection are performed by the rotary knobs, and all functions including flight level altitude, 4096 code, and aircraft address are presented on the gas discharge display. The KT 73 is derived from the KT 70 Mode S transponder and will retrofit into KT 70, KT 71, and KT 76C installations.

The KT 73 has a Gas Discharge Display, Mode Select Knob, VFR pushbutton, Ident pushbutton, and four ident code selector knobs.

The KT 73 has an Air/Ground discrete which, when connected to a strut switch on the aircraft, can disable ATCRBS and Mode S All-Call replies when the aircraft is on the ground. A front panel switch position, 'GND', can also be used by the pilot instead of the strut switch.

1.2.3 Features

The KT 73 is capable of interfacing to the Traffic Information Service (TIS). This data link is intended to improve the safety and efficiency of "see and avoid" flight by providing the pilot automatic display of nearby traffic and warnings of any potentially threatening conditions. The display of TIS traffic requires a compatible MFD, currently the KMD 540. TIS is only provided within the service volume of most Mode S terminal radar facilities and only in the contiguous United States (US).

The KT 73 is also capable of Automatic Dependent Surveillance - Broadcast (ADS-B) operation which allows an aircraft or surface vehicle to transmit position, altitude, vector, and other information for use by other aircraft, surface vehicles, or ground facilities. ADS-B requires a source of GPS data, currently the KLN 94/KLN 900 are the only acceptable sources. The KT 73 has the capability to transmit extended squitters and to operate in the Extended Squitter/Non Transponder mode.

NOTE:

ADS-B is not currently operational but may be at a later date.

The KT 73 has the ability to enter and display an 8-digit alpha-numeric Flight ID code. The Flight ID information is entered by the pilot via front panel controls or is received from an ADLP. Flight ID is selected for display from the front panel.

When the KT 73 receives Mode A interrogations from the ground radar facility, it will transmit a coded group of pulses which consist of a four digit identification number that has been assigned by the Air Traffic Controller. This code is entered into the KT 73 by the pilot and is transmitted back to the ground as a Mode "A" reply. This coded information is presented on the ground radar display at the appropriate range and azimuth. The Air Traffic Controller can then identify each aircraft that is transponder equipped by its distinct coded number.

The VFR code, aircraft address, maximum air speed, display adjust, and installation parameters can be programmed from the front panel of the KT 73 and stored in nonvolatile memory. Pilot adjustments include VFR code, Flight ID, and display brightness. Installation adjustments include aircraft address, maximum airspeed, and configuration parameters (refer to Section 3 for specific programming sequences). A configuration module is provided to store the address with the rack, allowing units to be swapped from rack to rack without having to reprogram the aircraft address or other configuration parameters.

NOTE:

The above features must be enabled via the programming mode.

The flight ID information can be entered by the pilot via front panel controls. Flight ID can be selected for display from the front panel.

The KT 73 has BITE (Built-In-Test-Equipment) which constantly monitors the operational health of the unit. When a fault is detected, the transponder will display an error code on the front panel display in order to help diagnose problems. When a critical fault is detected, the unit will turn on an amber FAIL light on the front of the unit.

1.3 TECHNICAL CHARACTERISTICS

1.3.1 KT 73 TECHNICAL CHARACTERISTICS

TSO COMPLIANCE:	SEE ENVIRONMENTAL QUALIFICATIONS APPENDIX
PHYSICAL DIMENSIONS:	See figure 2-4
WEIGHT:	See figure 2-4
APPLICABLE DOCUMENTS:	TSO-C112 Class 2A ARINC 718-4 RTCA DO-181C ICAO DOC 9688-AN/952 RTCA DO-160D ICAO ANNEX 10, AMENDMENT 71 RTCA DO-178B RTCA DO-239 RTCA DO-260 EUROCAE ED-102 EUROCAE ED-14D EUROCAE ED-73A
MOUNTING:	PANEL MOUNTED
TEMPERATURE:	-20 ° C TO +55 ° C Canadian cold soak tested to -35 ° C
ALTITUDE RANGE:	51,500 FT
COOLING:	NO FORCED-AIR COOLING REQUIRED, BUT RECOMMENDED.
VIBRATION:	DO-160D CATEGORY S (CURVES B &M) CATEGORY R (CURVE G) ZONE 2
SHOCK:	RIGID MOUNTING 6 G OPERATIONAL 20 G CRASH SAFETY.
POWER INPUT:	35 WATTS (MAX) 1.25 A @ 27.50 V DC 2.50 A @ 13.75 V DC Lighting Current 320 mA @ 14 V 160 mA @ 28 V

NOTE:
All measurements are made with a 2.0 dB cable loss at the antenna end.

1.3.2 KT 73 RECEIVER CHARACTERISTICS

Sensitivity Variation with Frequency:

The RF input level required to produce 90% replies will not vary by more than 1 dB and will at no time exceed a level of -69 dBm for standard ATCRBS interrogations in the frequency range between 1029.8 and 1030.2 MHz.

Bandwidth:

A standard ATCRBS interrogation signal required to trigger the transponder below 1005 MHz and above 1055 MHz will be at least 60 dB stronger than that required to trigger the transponder at 1030 MHz with the same reply efficiency.

Sensitivity and Dynamic Range:

The minimum triggering level (MTL) is defined as the minimum input power level that results in a 90% reply ratio if the interrogation has nominal pulse characteristics.

A. The MTL for ATCRBS and ATCRBS/Mode S All- Call interrogations will be -73 dBm ± 4 dB.

B. The MTL for Mode S interrogations will be - 74 dBm ±3 dB.

C. The reply ratio will be at least 99% for all Mode S interrogations between MTL +3 dB and -21 dBm and at least 90% for ATCRBS and ATCRBS/Mode S All-Call interrogations between MTL and -21 dBm.

D. The variation of MTL between ATCRBS Mode A and Mode C interrogations will not exceed 1 dB.

ATCRBS, Mode S,ATCRBS/Mode S All-Call Low-Level Reply Ratio:

The reply ratio will not be more than 10% for interrogations at signal levels below -81 dBm.

L.O. Leakage:

L.O. level at 970 MHz will not exceed -73 dBm.

1.3.3 KT 73 TRANSMITTER CHARACTERISTICS

Reply Transmission Frequency:

The transmitter frequency of the reply will be 1090 ±1 MHz when observed into a 50 ohm load with a VSWR of 1.5:1 or less.

RF Peak Power Output:

The transmitter output power will be 125 watts (21.0 dBW) peak power minimum and 500 watts (27.0 dBW) peak power maximum at the terminals of the transponder antenna. The pulse amplitude variation between any two pulses in an ATCRBS reply will not exceed 1 dB. A Mode S reply will not contain a pulse amplitude variation, between any two pulses, of greater than 2 dB.

ATCRBS Reply Rate Capability:

The transponder will be able to continuously generate at least 500 ATCRBS 15-pulse replies per second and will have the capability of a peak reply rate of 1,200 ATCRBS 15-pulse replies for a duration of 100 ms.

NOTE:
A 15-pulse reply includes 2 framing pulses, the 12 information pulses, and the SPI pulse.

Mode S Reply Rate Capability:

The transponder will have the capability of generating the following reply rates for short Mode S downlink formats:

A. 50 Mode S replies in a 1 second interval.
B. 18 Mode S replies in a 100 ms interval.
C. 8 Mode S replies in a 25 ms interval.
D. 4 Mode S replies in a 1.6 ms interval.

The transponder will have the capability of generating the following reply rates for long Mode S downlink formats:

A. At least 16 of the 50 Mode S replies in any 1 second interval.
B. At least 6 of the 18 Mode S replies in a 100 msec interval.
C. At least 4 of the 8 Mode S replies in a 25 msec interval.
D. At least 2 of the 4 Mode S replies in a 1.6 msec interval.

Unwanted Output Power:

The RF output power at 1090 MHz ±3 MHz, at the RF output of the transponder, will not exceed -50 dBm when the transmitter is in the inactive state. The inactive state is defined to include the entire period between ATCRBS and/or Mode S transmissions less 10 μsec transition periods, if necessary, preceding and following the extremes of the transmission.

1.3.4 ANTENNA

Any L-Band blade antenna is suitable for use with the KT 73 provided it is certified to TSO-C74c.

1.4 UNITS AND ACCESSORIES SUPPLIED

1.4.1 CONFIGURATIONS AVAILABLE

P/N 066-01164-0101 is the only version of the KT 73 that is currently available. Included with the KT 73 is the mounting rack and the configuration module. The configuration module is optional but is strongly suggested. With the module, the installation unique configuration is maintained if a different KT 73 is swapped into the aircraft.

1.4.2 KT 73 INSTALLATION KIT

The KT 73 Transponder installation kit P/N 050-03451-0000 contains the following parts:

050-03451-0000 INSTALL KIT KT 73 Rev. B

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	-0000
	030-00101-0002		PANEL MOUNT PLUG	EA	1.00
	030-01094-0002		CONNECTOR 12/24 P	EA	1.00
	030-01096-0000		KEY POLARIZER	EA	1.00
	030-01107-0024		CONNECTOR TERM 24T	EA	1.00
	030-01407-0000		CONTACT FEMALE	EA	7.00
	030-03454-0002		CONN, RECT, RECPT,	EA	1.00
	057-05944-0024		KT 73 INSTALL KIT	EA	1.00
	089-02013-0037		NUT FLAT 6-32	EA	3.00
	089-02147-0022		NUT LOCK 6-32	EA	2.00
	089-02353-0001		NUT CLIP 6-32	EA	6.00
	089-05903-0007		SCR PHP 4-40X7/16	EA	2.00
	089-05907-0006		SCR PHP 6-32X3/8	EA	1.00
	089-06012-0008		SCR FHP 6-32X1/2	EA	6.00
	089-08016-0037		WSHR INTL LK #6	EA	2.00
	089-08027-0030		WSHR FLT STD #6	EA	1.00
	089-08094-0030		WSHR FLT STD .446	EA	1.00
	089-08110-0034		WSHR SPLT LK #6	EA	1.00
	089-08168-0002		WASHER WAVE	EA	1.00
	090-00019-0007		RING RTNR .438	EA	1.00
	091-00031-0005		NY CA CLAMP .312	EA	1.00
	155-06046-0000		INSTALLATION DWG	RF	.00

1.5 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

The following parts are recommended for a cable setup with dimensions of 4.5 feet to 11 feet: (See Figure 2-12, Sheet 1 of 2).

Honeywell PART NUMBER	DESCRIPTION	QUANTITY
030-00101-0002	Connector, Coax	1
024-00051-0060	Cable,Coax	11 ft.
030-00005-0000	Connector, Coax Mod Type BNC	1

The following parts are recommended for a cable setup with dimensions of 10 feet to 25 feet: (See Figure 2-12, Sheet 2 of 2).

Honeywell PART NUMBER	DESCRIPTION	QUANTITY
030-00102-0001	Connector, Type Unit	1
024-00072-0000	Cable,Coax	25 ft.
030-00435-0000	Connector, Antenna	1

The following parts are recommended for a cable setup with dimensions of 16 feet to 32 feet (See Figure 2-12, Sheet 2 of 2):

Honeywell PART NUMBER	DESCRIPTION	QUANTITY
030-00101-0002	Connector Type Unit	1
024-00051-0060	Cable, Coax	6 in.
024-00071-0000	Cable, Coax	32.5 ft.
030-00138-0000	Connector, Unit extension to antenna connector	6 in.
030-00434-0000	Connector, Antenna	2

1.6 LICENSING REQUIREMENTS

For US registered aircraft, the transmitter, as installed in the aircraft, requires an Aircraft Radio Station License. This license is obtained by filing the FCC Form 404. While awaiting the receipt of the station license, a copy of FCC Form 404 must be kept in the aircraft.

This equipment has been type accepted by the FCC and entered on the type accepted equipment list, as FCC ID: ASYKT73 and must be identified as FCC ID: ASYKT73 on your Form 404, Aircraft Radio Station License application.

For non-US registered aircraft, follow applicable licensing requirements as required.

1.7 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

The instructions for continued airworthiness given in the TC or STC approvals for this product supplements or supersedes the instructions for continued airworthiness in this manual.

Most Honeywell products are designed and manufactured to allow "on condition maintenance." On condition maintenance is described as follows; There are no periodic service requirements necessary to maintain continued airworthiness. No maintenance is required until the equipment does not properly perform its intended function. When service is required, a complete performance test should be accomplished following any repair action. Consult the appropriate unit Maintenance/Overhaul Manual for complete performance test information.

SECTION II
INSTALLATION

2.1 GENERAL INFORMATION

This section contains suggestions and factors to consider before installing the KT 73 Mode S Transponder. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within TSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme caution when unpacking the unit. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for a damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place all packing materials in the shipping container for future storage or reshipment of the unit.

2.3 EQUIPMENT INSTALLATION

2.3.1 GENERAL

The following paragraphs contain information pertaining to the initial installation of the KT 73 Mode S Transponder, including instructions concerning the location and mounting of the supporting antenna.

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 that the system has been properly and safely installed in the aircraft, the installer should make a through 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 INTERCONNECTION DRAWINGS, FIGURES 2-5 THRU 2-10.

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

NOTE:

The TSO identifies the minimum performance standards, tests, and other conditions applicable for issuance of design and production approval of the article. The TSO applicant is responsible for documenting all limitations and conditions suitable for installation of the article. An applicant requesting approval for installation of the article within a specific type or class of product is responsible for determining environmental and functional compatibility.

2.3.2 AVIONICS COOLING REQUIREMENTS FOR PANEL MOUNTED EQUIPMENT

The greatest single contributor to increased reliability of all modern day avionics is to limit the maximum operating temperature of the individual units whether panel or remote mounted. While modern day individual circuit designs consume much less electrical energy, the watts per cubic inch dissipated within avionics units remains much the same because of high density packaging techniques utilized. Consequently, the importance of providing avionics stack cooling is essential to the life span of the equipment.

While each individual unit may not require forced air cooling, the combined heat load of several units operating in a typical avionics stack will significantly degrade the reliability of the avionics if provisions for stack cooling are not incorporated in the initial installation. Recommendations on stack cooling are contained in Honeywell Installation Bulletin #55. Failure to provide stack cooling will certainly lead to increased avionics maintenance costs and may void the warranty.

2.3.3 KT 73 INTERCONNECTION AND CABLE HARNESS FABRICATION

2.3.3.1 General

The KT 73 Mode S Transponder receives primary power from the aircraft power source. Power connections, voltage requirements, and circuit breaker requirements are shown on the interconnect diagrams (Figures 2-5 through 2-10).

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

When cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chaffing. Additional protection should also be provided in all locations where the cable may be subjected to abuse.

In wire bundles, the cabling should not be tied tightly together as this tends to increase the possibility of noise pickup and similar interference. When routing cables through the aircraft the cables should cross high level rf lines at right angles.

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

The following guidelines are recommended:

(1) The installing facility will supply and fabricate all external cables (see figures 2-1 through 2-3, 2-5 through 2-15). The required connectors are supplied as part of the installation kit (P/N 050-03451-0000).

(2) The KT 73 must be kept a minimum of three feet from the antenna. Additionally, the antenna coax cable should not be bundled with the other wiring harnesses to the KT 73.

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

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

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

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

(7) Do not route the transponder antenna coax near ADF sense or loop antenna cables.

NOTE:

The total losses in the coaxial cable run and interconnects between the antenna and the KT 73 transponder must not be less than 1 dB and must not be more than 2.1 dB at 1030MHz. Use Figures 2-5 through 2-10 as a reference and adhere to the dimensions prescribed in Figure 2-13.

2.3.3.2 Primary Power and Circuit Breaker Requirements and Wiring

The KT 73 transponder receives primary power from the aircraft power circuit breakers. The KT 73 is designed to operate over the range of 11-33V dc. Power connections, wire sizes, and circuit breaker requirements are shown on the interconnection diagrams Figures 2-5 through 2-10.

2.3.3.3 Functional Pinout Descriptions

This section gives a brief description of the inputs and outputs of the KT 73 (refer also to figure - 2-3). It is provided so that the installer can determine what aircraft specific wiring requirements are needed in order to install the unit. Unless otherwise specified, pins not used are to be left open.

Main Connector - JKT73-1

Pin 1; AIRCRAFT GROUND

This pin provides an internal connection to chassis and may be used as the third wire for RS-232 busses.

Pin 2; +14 V DC LIGHTING

+14 VDC lighting (320mA ± 32 mA) Open for +28 V DC lighting.

Pin 3; +28 V DC LIGHTING

+28 VDC lighting (160mA ± 16 mA). Ground for +14 V DC lighting.

Pin 4; ARINC SUPPRESSION I/O

As an input, a voltage ≥ 18 V and ≤ 70 V will cause suppression. A steady state voltage ≥ 18 V will cease suppression. As an output, this pin will go ≥ 18 V when the transponder transmits. This pin conforms to ARINC 718A Attachment 6.

Pin 5; EXTERNAL AIR/GROUND

GND (<10 ohms) on this pin will inhibit ATCRBS replies and replies to Mode S All Call messages.

Pin 6; TIS 429 TX B

This line is half of a standard differential ARINC 429 output used to broadcast traffic information services to a display.

Pin 7; RS232 ALT RX

This line is programmable as the receive line of an RS-232 port used to report altitude.

Pin 8; GILLHAM ALTITUDE D4/RS232 ALT TX

This line is programmable as a Gillham altitude input or as the transmit line of an RS-232 port used to report altitude. As a Gillham input, HIGH = voltage > 18.5 VDC or resistance-to-ground > 100KΩ. Per ARINC 572, Attachment 4, input is an active LOW pulse where LOW = voltage < 2.0 volts or resistance-to-ground < 15 KΩ.

Pin 9; 9 V SUPPRESSION IN

This line is a 9V Suppression Input. Voltage ≥ 5 will suppress. Voltage < 3.5V or an open will not suppress the transponder.

Pin 10; EXTERNAL STANDBY~

GND (<10 ohms) on this pin will prevent replies and squitters.

Pin 11; 11 - 33 V DC

Aircraft Power

Pin 12; 11 - 33 V DC

Aircraft Power

Pin A; AIRCRAFT GROUND

This pin provides an internal connection to chassis and may be used as the third wire for RS-232 busses.

Pin B; GILLHAM ALTITUDE B4/RS232 GPS RX

This line is programmable as a Gillham altitude input as defined for pin 8 or as the receive line of an RS-232 port used to receive GPS information to support ADS-B.

Pin C; GILLHAM ALTITUDE B2/RS232 GPS TX

This line is programmable as a Gillham altitude input as defined for pin 8 or as the transmit line of an RS-232 port used to receive GPS information to support ADS-B.

Pin D; GILLHAM ALTITUDE C1/ARINC429 RX 0B

This line is programmable as a Gillham altitude input as defined for pin 8 or as the receive line of an ARINC 429 port used to report altitude.

Pin E; GILLHAM ALTITUDE B1/ARINC429 RX 0A

This line is programmable as a Gillham altitude input as defined for pin 8 or as the receive line of an ARINC 429 port used to report altitude.

Pin F; EXTERNAL IDENT~

GND (<10 ohms) will initiate IDENT sequence. HIGH = resistance-to-ground > 100KΩ (inactive IDENT).

Pin H; GILLHAM ALTITUDE C4/RS485 RX B

This line is programmable as a Gillham altitude input as defined for pin 8 or as the receive line reserved for a future interface.

Pin J; GILLHAM ALTITUDE A4/RS485 RX A

This line is programmable as a Gillham altitude input as defined for pin 8 or as the receive line reserved for a future interface.

Pin K; GILLHAM ALTITUDE A2/RS485 TX B

This line is programmable as a Gillham altitude input as defined for pin 8 or as the transmit line reserved for a future interface.

Pin L; GILLHAM ALTITUDE C2/RS485 TX A

This line is programmable as a Gillham altitude input as defined for pin 8 or as the transmit line reserved for a future interface.

Pin M; GILLHAM ALTITUDE A1

This line is programmable as a Gillham altitude input as defined for pin 8.

Pin N; TIS 429 TX A

Standard ARINC 429 output used to broadcast traffic information services to a display.

Auxiliary Connector - JKT73-2

Pin 1; EXTERNAL EEPROM CS

Voltage ≥ 2.0 VDC selects external EEPROM.

Pin 2; EXTERNAL EEPROM

Voltage ≥ 2.0 VDC indicates external EEPROM is available.

Pin 3; AUDIO HI

Message audio output.

Pin 4; +5 V DC

This pin provides +5 VDC ± 0.3 VDC out to power external EEPROM.

Pin 5; AUDIO LO

Message audio output.

Pin 6; AUDIO INHIBIT

Mutes audio with input of <3.0 V DC or < 10 ohms. Input > 100 K ohms will not mute.

Pin A; SERIAL DATA OUT

Used by microprocessor to write data to external EEPROM.

Pin B; SERIAL DATA IN

Used by microprocessor to read data from external EEPROM.

Pin C; SERIAL CLOCK

Used by microprocessor to provide serial clocking for pins A and B.

Pin D; AIRCRAFT GROUND

This pin provides an internal connection to chassis and may be used as the third wire for RS-232 busses.

Pin E; ARINC429 RX 1A/RS232 RX

Programmable line to receive ARINC 429 TIS control or provide RS-232 RX input for either ADLP or ADS-B.

Pin F; ARINC429 RX 1B/RS232 TX

Programmable line to receive ARINC 429 TIS control or provide RS-232 TX output for either ADLP or ADS-B.

Antenna Connector - JKT73-3

Pin 1; RF RX/TX PORT

Receive at 1030 MHz ± 0.01 MHz; Transmit at 1090 MHz ± 1.00 MHz.

External Connector - JKT73-4

Pin A; AUDIO INHIBIT

Mutes audio with input of <3.0 V DC or < 10 ohms. Input > 100 K ohms will not mute.

This input is designed for installations including an EGPWS system. In that case, the Audio Out discrete of the EGPWS must be connected to this pin.

Pin B; AIRCRAFT GROUND

This pin provides an internal connection to chassis and may be used as the third wire for RS-232 busses.

Pin C; ARINC429 RX 1A/RS232 RX

Programmable line to receive ARINC 429 TIS control or provide RS-232 RX input for either ADLP or ADS-B.

Pin D; ARINC429 RX 1B/RS232 TX

Programmable line to receive ARINC 429 TIS control or provide RS-232 TX output for either ADLP or ADS-B.

Pin E; AUDIO HI

Message audio output.

Pin F; AUDIO LO

Message audio output.

2.3.4 EQUIPMENT LOCATION

Care should be exercised to avoid mounting components near equipment operating with high pulse current or high power outputs such as radar and satellite communications equipment. In general, the equipment should be installed in a location convenient for operation, inspection, and maintenance, and in an area consistent with the TSO environmental limits.

Refer to the mechanical installation drawing (figure 2-4), cable and connector assembly diagrams (figures 2-1, 2-2, 2-11 through 2-15, interconnection drawings (figures 2-5 through 2-10), and connector pin assignments diagrams (figure 2-3) as required. Determine the mounting location for system components following the guidelines below.

2.3.4.1 Transponder And Mounting Tray Locations

The tray-mounted KT 73 Mode S Transponder can be installed in any convenient location on the panel that is free from excessive heat and vibration and which provides reasonable access for inspection and maintenance. To achieve maximum performance, the KT 73 should be installed adjacent to other receivers with similar functions.

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

Except for antenna cables, (see Figure 2-12) the lengths of the cables from the KT 73 transponder mounting tray connector to other system units are not critical because unit interfaces are designed with high impedance inputs, low impedance outputs, and low noise susceptibility characteristics.

Forced air cooling is recommended but is not a requirement. Outline drawing Figure 2-4 shows transponder and mounting tray dimensions.

2.3.4.2 Antenna

The antenna should be well removed from other antenna projections, the engine(s), and propeller(s). It should also be well removed from landing gear doors, access doors, or other openings which will break the ground plane for the antenna. The surface directly beneath the antenna should be a flat plane over as large an area as possible.

A back-up plate should be used for added strength on thin-skinned aircraft.

To prevent rf interference, the antenna must be physically mounted a minimum distance of three feet from the KT 73 and the wiring harness.

The transponder antenna should be mounted a minimum of six feet away from the DME antenna and four feet from the ADF sense antenna.

Where practical, plan the antenna location to keep cable lengths as short as possible and avoid sharp bends in the cable to minimize the VSWR.

Avoid running other cables or wires near the antenna cable.

On pressurized aircraft, the antenna should be sealed using RTV No. 3145 (P/N 016-01082-0000) or equivalent around the connector and mounting hardware.

The antenna mounting should be sealed from the outside for moisture protection using RTV or equivalent.

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

2.3.5 KT 73 INSTALLATION

The mounting tray for the transponder should be mounted using the dimensions specified in the outline and mounting drawing, Figure 2-4. The mounting tray should be wired according to the system interconnect diagram, Figure 2-5 through 2-10.

2.3.5.1 Retrofit into existing KT 70, KT 71, and KT 76C Installations

If the KT 73 is replacing an existing KT 70, KT 71, or KT 76C without adding new functionality such as TIS, ADLP, or ADS-B, the KT 73 may simply be installed in the existing rack, provided that the installation is in a fixed wing aircraft. If the installation is in a rotary wing aircraft, the existing rack will have to be replaced with a new rack. If the new rack in installed, it is suggested that a new configuration module be used even if the existing installation did not have one. The KT 73 must be programmed per section 3.2.

2.3.5.2 New Transponder Tray Installations

(1) Rear connector wiring must be completed before permanently fastening the mounting tray to the panel.

(2) Remove the panel area specified on the outline and mounting drawing (see Figure 2-4) for front and rear dimensions. Care must be taken to avoid damage to the adjacent equipment and cables.

(3) Secure the tray to the panel. The mounting tray must be secured in the rear by attaching the tray to a structural member of the airframe.

(4) Look at the bottom of the unit and confirm the front lobe of the hold-down device is in a vertical position. This can be accomplished by using a 3-32 inch Allen wrench through the front plate.

2.3.5.3 Transponder

(1) Slide the transponder into the tray until the front lobe touches the mounting tray.

(2) Turn the Allen wrench clockwise until the rear lobe engages the mounting tray slot. Continue turning the wrench clockwise until tight.

(3) For removal, turn the 3-32 inch Allen wrench counter-clockwise until the unit disengages from the mounting tray slot. The unit can now be pulled completely out.

CAUTION:
DO NOT OVERTIGHTEN THE LOCKING FASTENER

2.3.5.4 Aircraft Address Programming Options

The Mode S aircraft address and maximum airspeed data must be programmed for use by the KT 73. In installations having an external EEPROM module (also referred to as a Configuration Module), this information is contained in that module as well as in the memory internal to the KT 73. In these cases, the data in the external Configuration Module will automatically be copied into the internal memory of any KT 73 plugged into the rack. This assumes that the external module has been previously programmed by a KT 73 as described elsewhere in this manual.

Data that has been programmed into an external Configuration Module as part of a KT 70 installation will be automatically replaced by data contained in the internal memory of the KT 73. All new installations will have a Configuration Module as these installations use a new rack (P/N 200-10069-0000) which includes the Configuration Module.

In retrofit installations where a Configuration Module does not exist, the KT 73 will recognize this condition and operate from the data contained in the internal memory. In this arrangement, the configuration data will be lost when the KT 73 is replaced with a different unit, such as a loaner, and must be re-entered.

NOTE:

THE AIRCRAFT MODE S ADDRESS MUST BE OBTAINED FROM FAA AND PROGRAMMED INTO THE KT 73 OR EXTERNAL ADDRESS EEPROM. FOR US REGISTERED AIRCRAFT, THE ICAO AIRCRAFT ADDRESS CODE CAN BE FOUND ON THE AIRCRAFT REGISTRATION.

AIRCRAFT MODE S ADDRESSES MAY BE OBTAINED BY CALLING THE FAA AIRMAN AND AIRCRAFT REGISTRY DIVISION AT (405)-954-3116. IF THREE (3) OR MORE ADDRESSES ARE NEEDED, WRITE TO AIRCRAFT REGISTRATION BRANCH, ANV-450, P.O. BOX 25082, OKLAHOMA CITY, OK 73125.

To program the aircraft address and/or the maximum air speed please refer to Section 3.2.

2.3.5.5 Antenna

For L-band blade antenna outline drawing, installation procedures, and mounting dimensions, refer to the manufacturer's instructions.

2.3.6 MOLEX CONNECTOR ASSEMBLY PROCEDURE

The KT 73 uses a special connector that mates directly with the printed circuit board inside the unit (see Figure 2-1). Assemble the connector using the following procedure:

2.3.6.1 Solderless Contact Terminal Assembly using Molex Crimper

Refer to instructions in Figure 2-1.

2.3.6.2 Solderless Contact Terminal Assembly using Pliers

(1) Strip each wire 5/32 inches for contact terminal (P/N 030-01107-0024). The last two digits of the contact terminal part number indicates the number of terminals furnished.

(2) Tin the exposed conductor.

(3) Using needle nosed pliers, fold over each conductor tab, in turn, onto the exposed conductor. when both tabs have been folded, firmly press the tabs against the conductor.

(4) Repeat step (3) for insulator tabs.

(5) Apply a small amount of solder (using minimum heat) to the conductor/tab connection to assure a good electro-mechanical joint.

2.3.6.3 Contact Insertion into Molex Connector Housing

(1) After the contact terminals have been installed on the wiring harness, the contact terminals can be inserted into the proper location in the connector housing (P/N 030-01094-0066). The terminal cannot be inserted upside down. Be sure to push the terminal all the way in, until a click can be heard or felt.

(2) The self-locking feature can be tested by gently pulling on the wire.

2.3.6.4 Extraction of Contact from Molex Connector

(1) Slip the flat narrow blade of a Molex contact ejector tool, HT-1884 (Honeywell P/N 047-05099-0001), under the contact on the mating side of the connector. By turning the connector upside down one can see the blade slide to the stop.

(2) When the ejector is positioned against the stop the locking key of the contact is raised, allowing the contact to be removed by pulling moderately on the lead.

(3) Neither the contact or position is damaged by removing a contact; however, the contact should be checked visually before reinstalling in connector, to be certain that retaining tab "A" extends as shown (see Figure 2-1) for retention in connector.

2.3.7 POSITRONIC CONNECTOR ASSEMBLY PROCEDURE

Assemble the Positronic connector using the procedures detailed in figure 2-2.

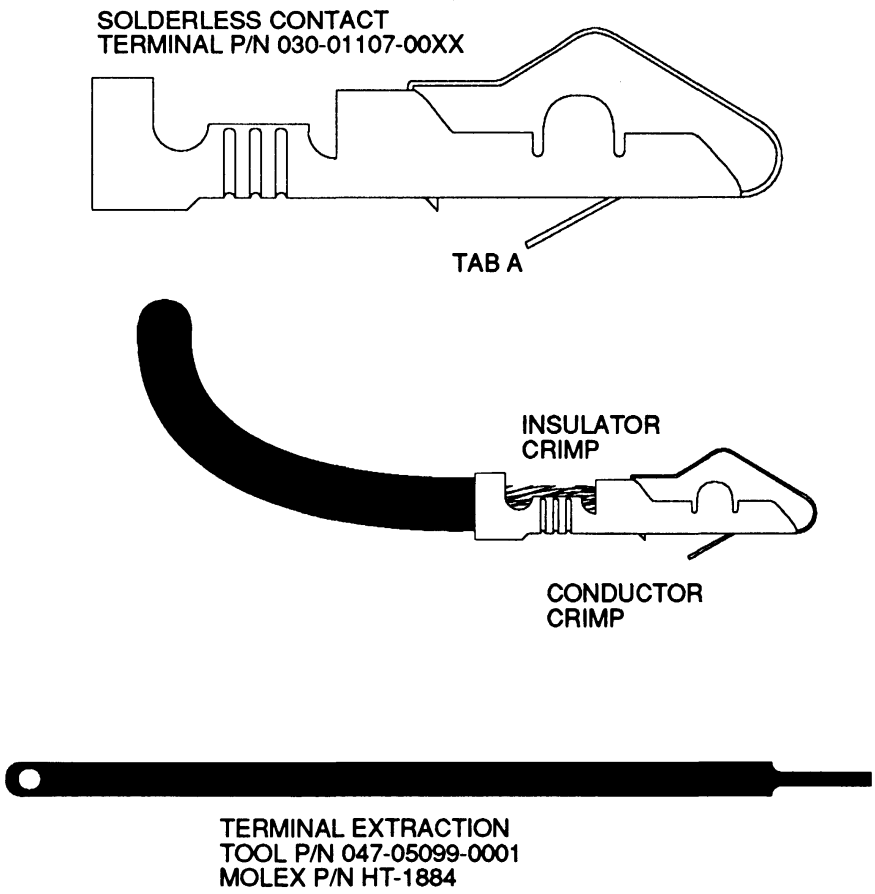
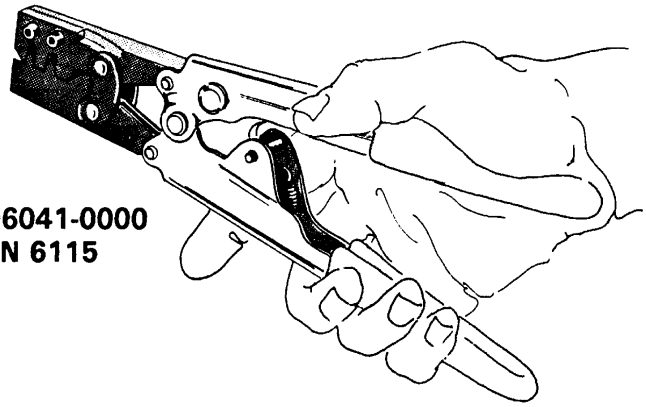


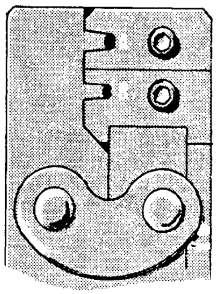
FIGURE 2-1 CRIMPING TOOLS (MOLEX)
(Sheet 1 of 3)

Holding the hand crimpers as shown, release the crimper's ratchet pawl and open by squeezing tightly on the handles, and then releasing pressure.

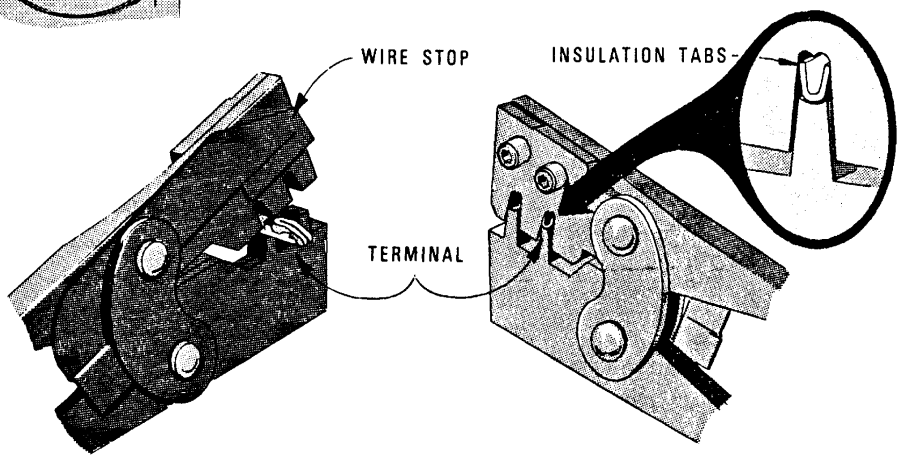


HAND CRIMPER
P/N 071-06041-0000
MOLEX P/N 6115

Close crimpers until ratchet begins to engage. Then insert terminal into jaws from the back side. (See the following; Figure 2-1). For 24 to 30 AWG wire, it will be necessary to start the crimp in jaw A and then complete in jaw B.



JAW	TERMINAL	WIRE SIZE	INSULATION RANGE
A	030-01107-0030	18 to 24 AWG	.110 TO .055
B	030-01107-0030	24 to 30 AWG	.055 to .030

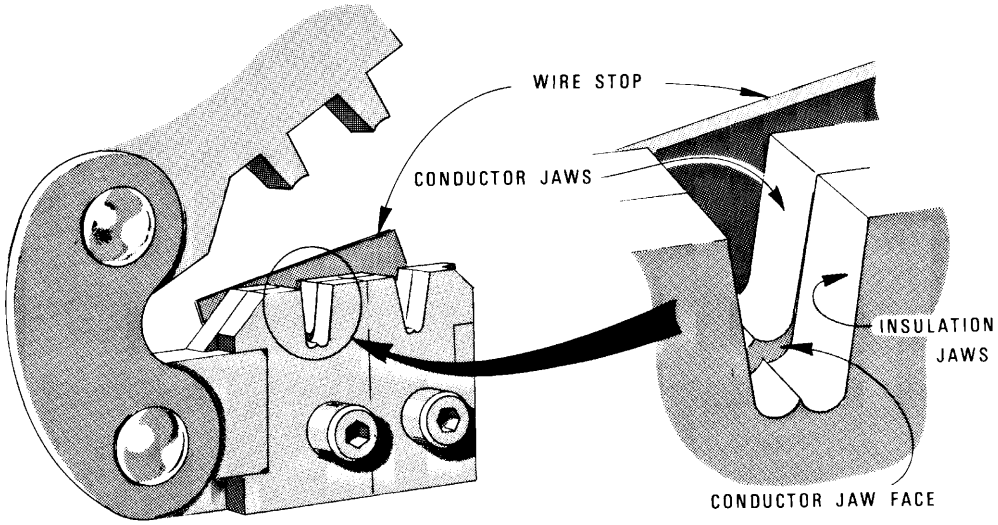


Terminal is in the correct position when insulation tabs are flush with outside face of crimp jaws.

FIGURE 2-1 CRIMPING TOOLS (MOLEX)
(Sheet 2 of 3)

Once the terminal is in the correct position, close the jaws gently until the terminal is held loosely in place. Push the wire stop down so that it rests snugly behind the contact portion of the terminal.

Strip off 1/8 inch of the wire insulation and insert the wire through the insulation tabs into the conductor tabs until the insulation hits the conductor jaw face or until the conductor touches the wire stop.



Squeeze the handles until the crimp jaws close and the ratchet releases.
Straighten the terminal if necessary, then release the plier grips and remove the crimped terminal.

CRIMPING PRESSURE ADJUSTMENT

If too much or too little pressure is needed to release the crimper's ratchet pawl at the end of the crimp stroke, the ratchet can be easily adjusted. A spanner wrench provided with the tool can be used to loosen the lock nut, and rotate the keyed stud clockwise for increased pressure and counter-clockwise for decreased pressure. Once the desired pressure has been set, the lock nut must be tightened again. Newer models may have a screwdriver adjustment.

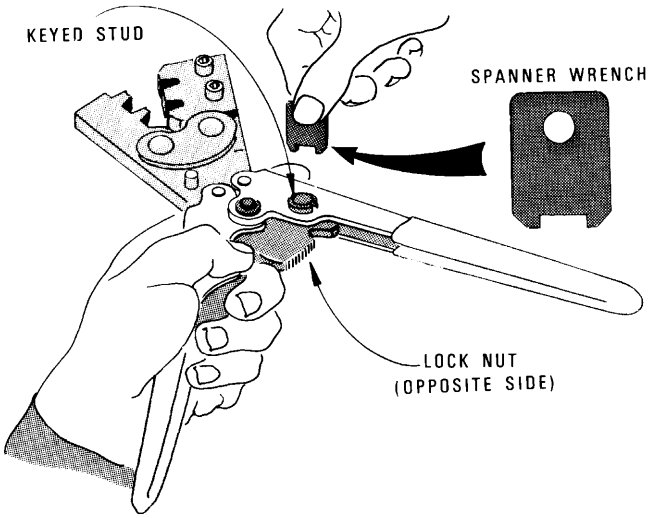


FIGURE 2-1 CRIMPING TOOLS (MOLEX)
(Sheet 3 of 3)

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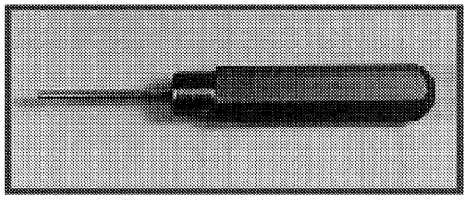
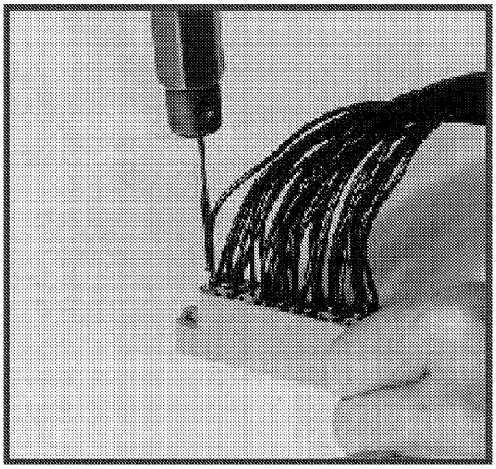
CONTACT INSERTION TOOL
Part No. 9099-1

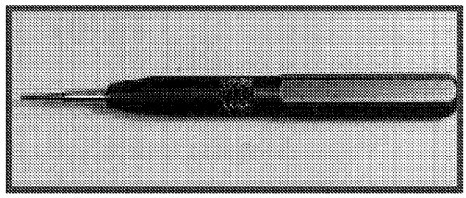
An easy to use contact insertion tool for 22 AWG (0.3 mm²) and smaller wires. See photographic demonstration shown below for recommended insertion procedures.

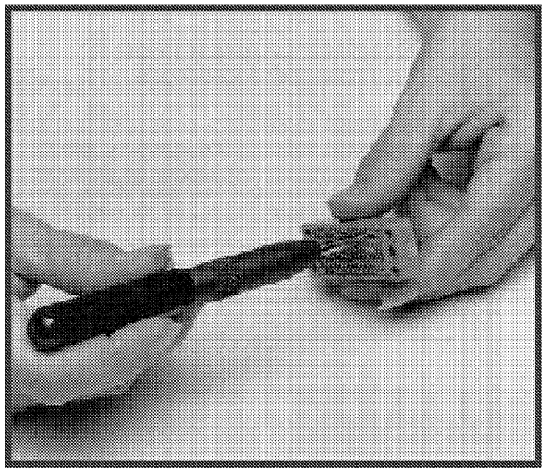




CONTACT EXTRACTION TOOL
Part No. 9081-1

The spring loaded contact extraction tool simplifies the extraction of removable contacts from the connector insulators. Simply insert the hollow tool tip over the male or female contact from the front face of the insulator, rotate the tool slightly while increasing the pushing force against the butt of the extraction tool. The contact will be released from the insulator retention system and "pop out" of the rear face of the insulator. See photo below for recommended removal procedure.





CYCLE-CONTROLLED STEP ADJUSTABLE HAND CRIMP TOOL
M22520/2-01
Part No. 9507

Features of this positive ratchet action tool include accommodations for wire sizes 22 AWG (0.3 mm²) through 28 AWG (0.08 mm²), and eight (8) impression crimp on wires and contacts of various compositions. Required for use with this basic tool is the turret positioner part numbers 9502-12 for the male contacts and 9502-13 for the female contacts.

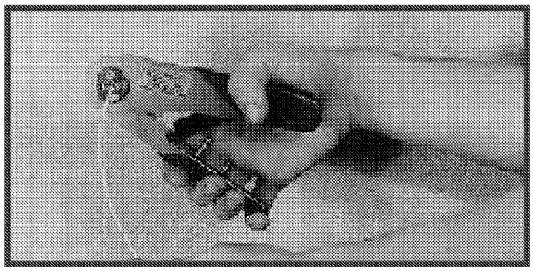


FIGURE 2-2 CRIMPING TOOLS (POSITRONIC)
(Sheet 1 of 3)

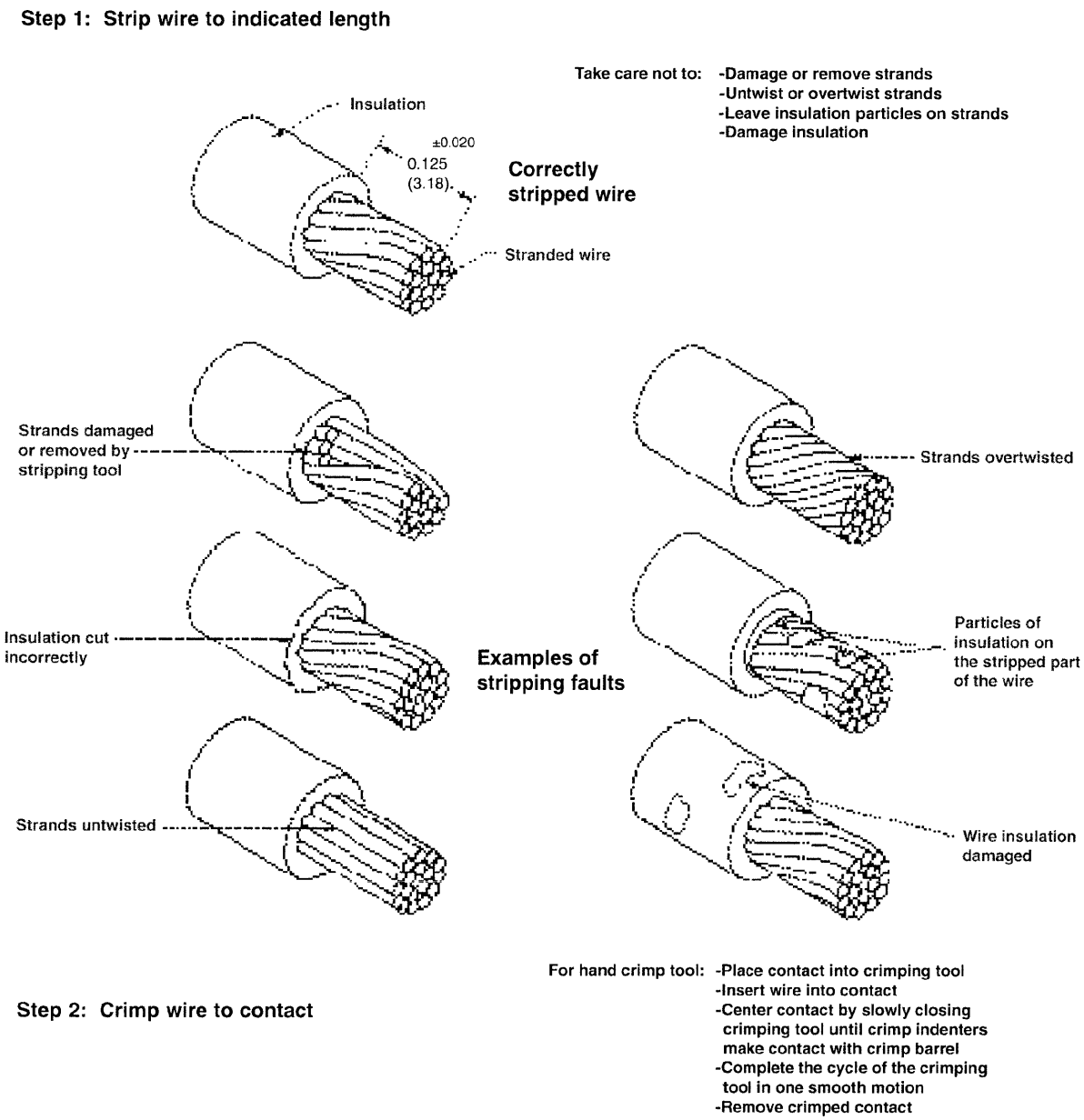


FIGURE 2-2 CRIMPING TOOLS (POSITRONIC)
(Sheet 2 of 3)

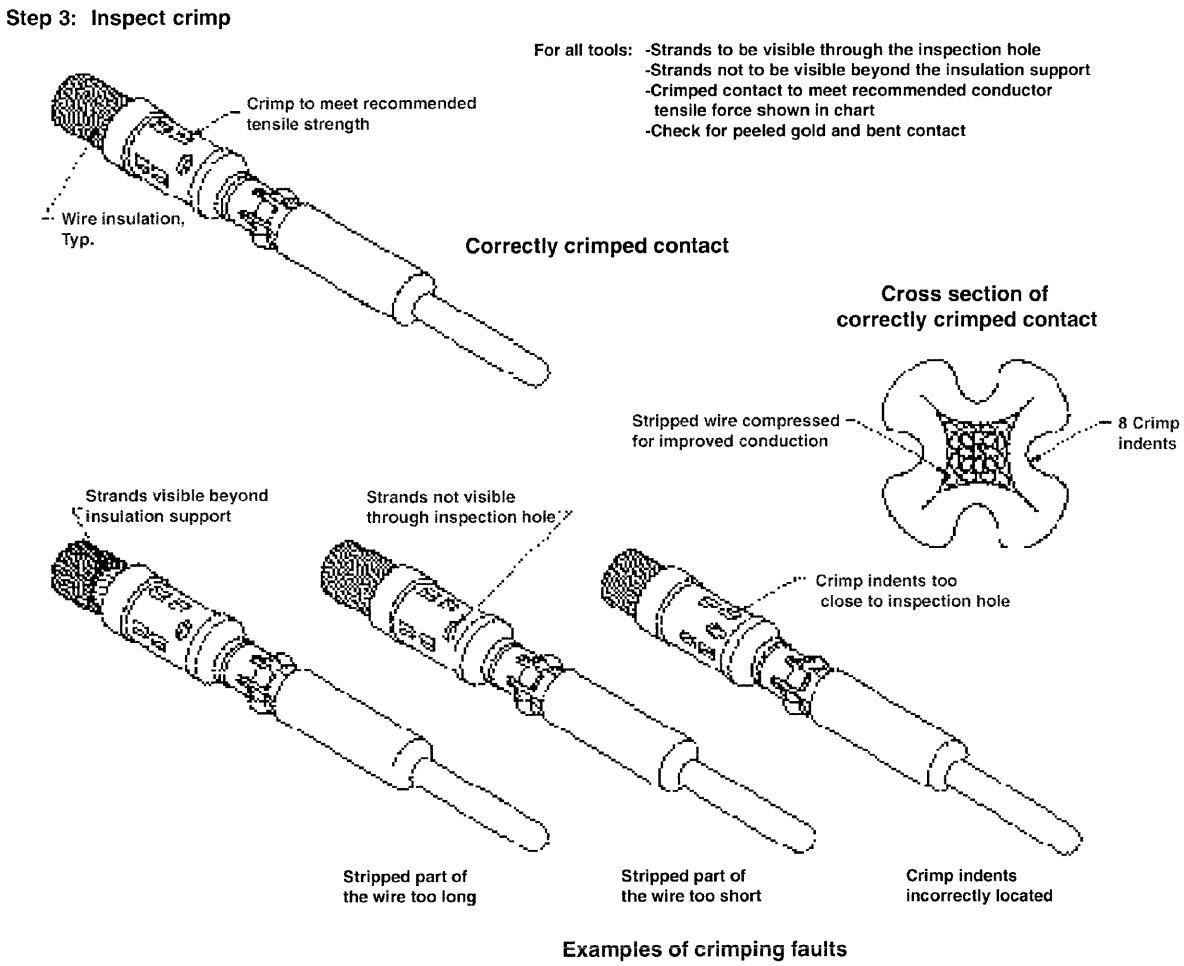


FIGURE 2-2 CRIMPING TOOLS (POSITRONIC)
(Sheet 3 of 3)

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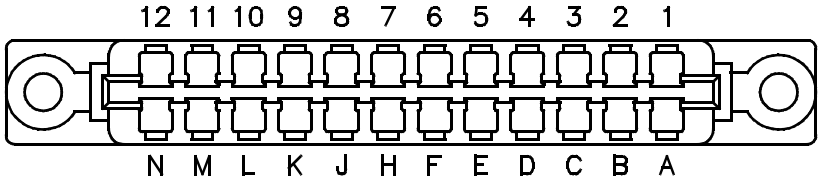
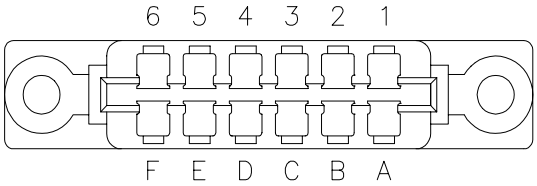


Main Connector - JKT73-1 Front View

Pin #	I/O	Description
1	O	AIRCRAFT GROUND
2	I	+14 V DC LIGHTING
3	I	+28 V DC LIGHTING
4	I/O	ARINC SUPPRESSION I/O
5	I	EXTERNAL AIR/GROUND
6	O	TIS 429 TX B
7	I	RS232 ALT RX
8	I	GILLHAM ALTITUDE D4/RS232 ALT TX
9	I	9 V SUPPRESSION IN
10	I	EXTERNAL STANDBY~
11	I	11-33 V DC
12	I	11-33 V DC
A	O	AIRCRAFT GROUND
B	I	GILLHAM ALTITUDE B4/RS232 GPS RX
C	I	GILLHAM ALTITUDE B2/RS232 GPS TX
D	I	GILLHAM ALTITUDE C1/ARINC 429 RX 0B
E	I	GILLHAM ALTITUDE B1/ARINC 429 RX 0A
F	I	EXTERNAL IDENT~
H	I	GILLHAM ALTITUDE C4/RS485 RX B
J	I	GILLHAM ALTITUDE A4/RS485 RX A
K	I	GILLHAM ALTITUDE A2/RS485 TX B
L	I	GILLHAM ALTITUDE C2/RS485 TX A
M	I	GILLHAM ALTITUDE A1
N	O	TIS 429 TX A

FIGURE 2-3 KT 73 Pinout Diagrams
(Sheet 1 of 3)



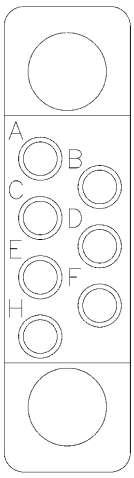
Auxiliary Connector - JKT73-2 Front View

Pin	I/O	Description
1	O	EXTERNAL EEPROM CS
2	I	EXTERNAL EEPROM
3	O	AUDIO HI
4	O	+5 V DC
5	O	AUDIO LO
6	I	AUDIO INHIBIT
A	O	SERIAL DATA OUT
B	I	SERIAL DATA IN
C	O	SERIAL CLOCK
D	O	AIRCRAFT GROUND
E	I	ARINC429 RX 1A/RS232 RX
F	I/O	ARINC429 RX 1B/RS232 TX

Antenna Connector - JKT73-3

Pin	I/O	Description
1	I/O	RF RX/TX PORT

FIGURE 2-3 KT 73 Pinout Diagrams
(Sheet 2 of 3)



External Connector - JKT73-4 Front View

Pin	I/O	Description
A	I	AUDIO INHIBIT
B	O	AIRCRAFT GROUND
C	I	ARINC429 RX 1A/RS232 RX
D	I/O	ARINC429 RX 1B/RS232 TX
E	O	AUDIO HI
F	O	AUDIO LO

FIGURE 2-3 KT 73 Pinout Diagrams
(Sheet 3 of 3)

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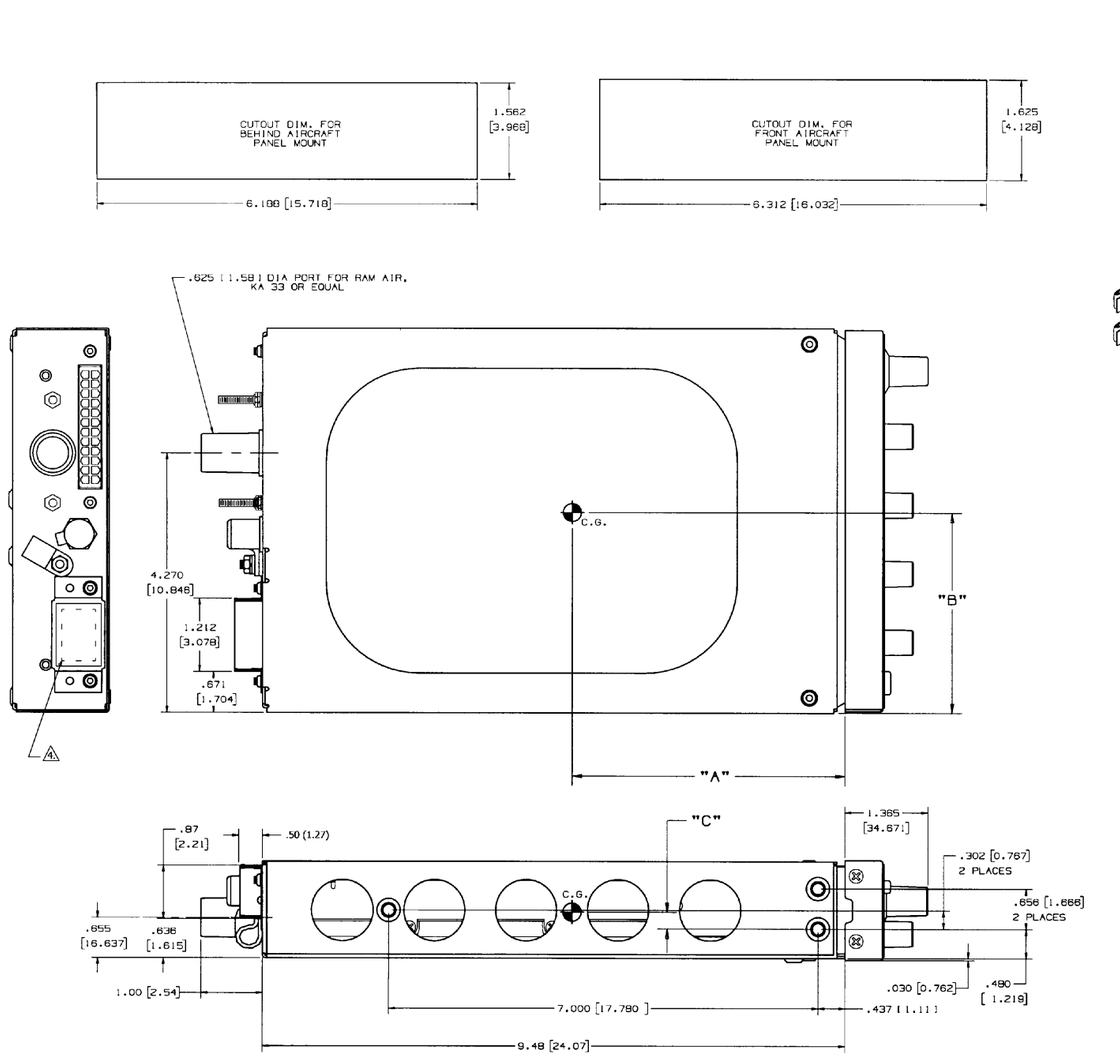
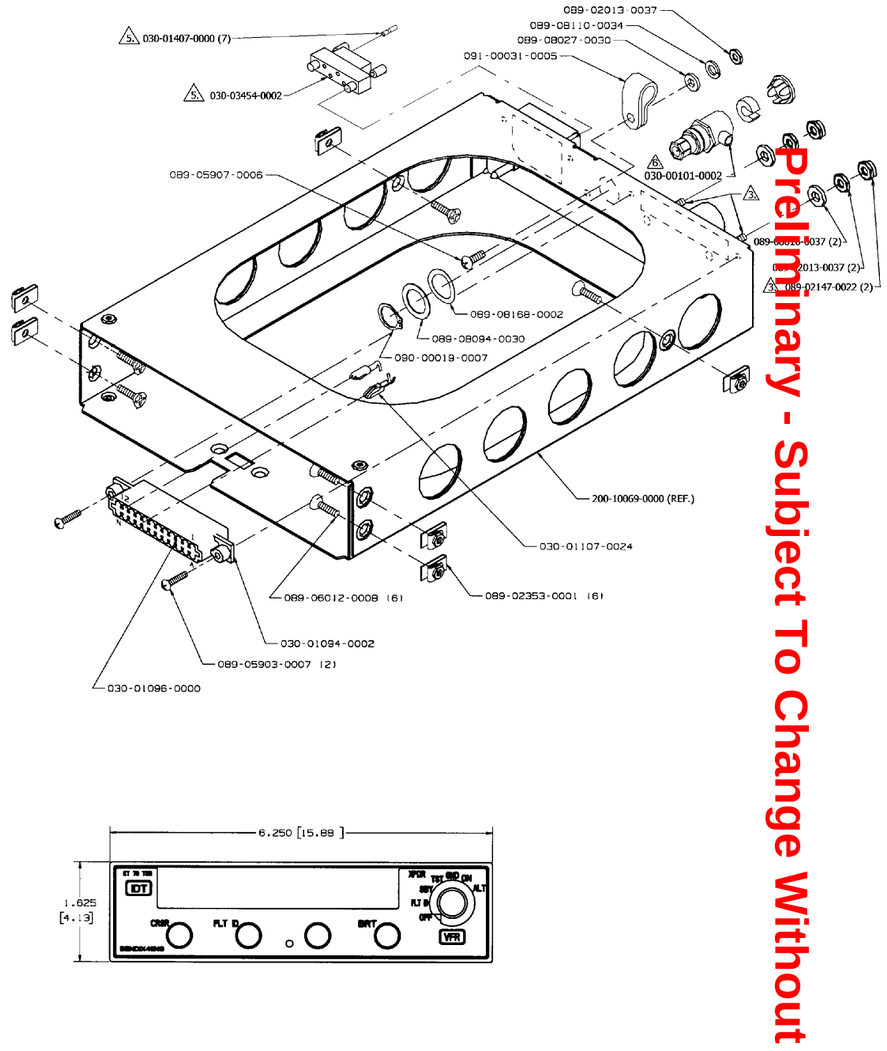


C.G LOCATIONS (DIMENSIONS REF. ONLY)			
UNIT FLAVOR	"A"	"B"	"C"
-0101	4.30 [10.92]	3.30 [8.38]	0.27 [0.68]

NOTES:

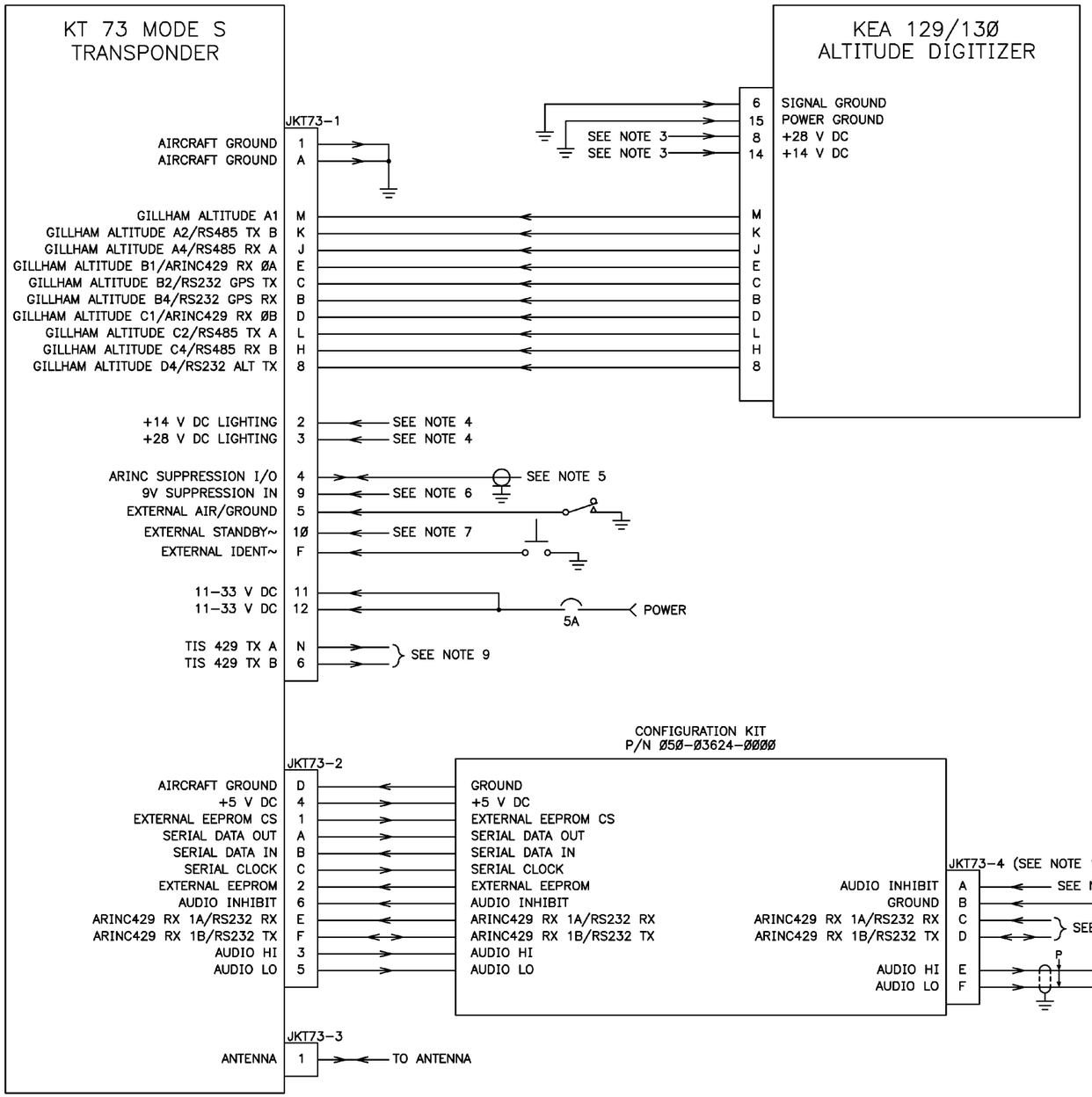
1. DIMENSIONS IN BRACKETS ARE IN CENTIMETERS.
2. -0101 WEIGHT: WITHOUT MTG. RACK, 3.44 +/- 0.2 Lbs., 1.56 +/- 0.09 Kg. WITH MTG. RACK, 3.88 +/- 0.2 Lbs., 1.76 +/- 0.09 Kg.

3. STUDS ARE PROVIDED FOR TERMINATION OF THE SHIELD GROUNDS. USE 089-02147-0022 TO SECURE THE SHIELD GROUNDS.
4. REMOVE METAL TAPE ONLY TO GAIN ACCESS TO TIS INHIBIT OR THE RS-232 ADLP PORT.
5. USED WITH TIS INHIBIT OR RS-232 ADLP PORT ONLY.
6. AN OPTIONAL STRAIGHT TNC CONNECTOR (030-00491-0001 OR EQUIV.) MAY BE USED.



THIS DRAWING IS NOT COMPLETE WITHOUT 030-03451-0000.

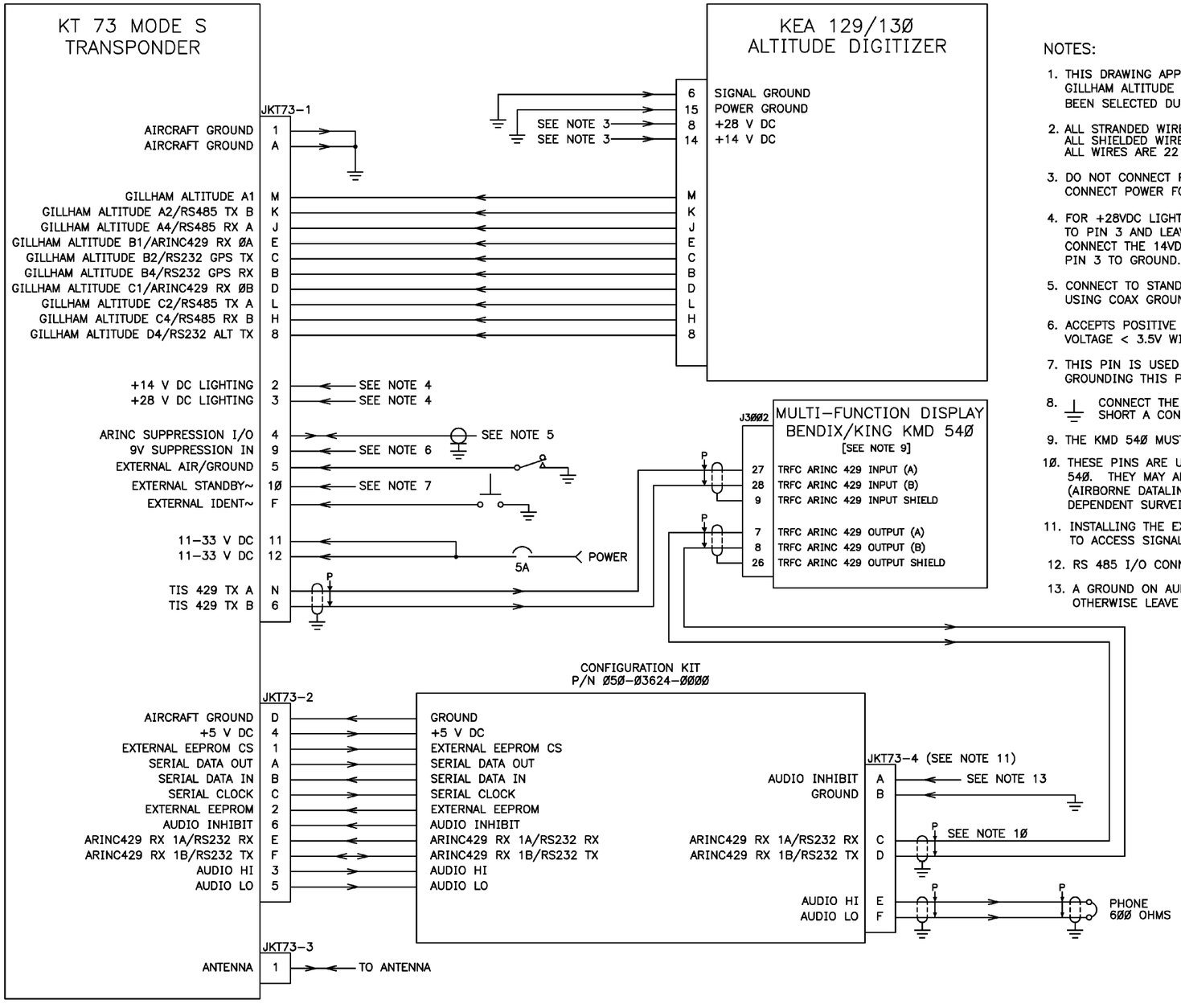
FIGURE 2-4 KT 73 INSTALLATION DRAWING (Dwg. 155-06046-0000 Rev. D)



NOTES:

1. THIS DRAWING APPLIES TO A BASIC INSTALLATION WITHOUT TIS OR ADLP SERVICES. GILLHAM ALTITUDE SOURCE AND AUTOGROUND HAVE BEEN SELECTED DURING INSTALLATION PROGRAMMING.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL–W–22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO MIL–C–27500 SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. DO NOT CONNECT PINS 8 AND 14 OF THE KEA 129/13Ø TOGETHER. DO NOT CONNECT POWER FOR THE KEA 129/13Ø TO PINS 11 AND 12 OF THE KT 73.
4. FOR +28VDC LIGHTING, CONNECT THE 28VDC LIGHTING BUSS TO PIN 3 AND LEAVE PIN 2 OPEN. FOR +14VDC LIGHTING, CONNECT THE 14VDC LIGHTING BUSS TO PIN 2 AND CONNECT PIN 3 TO GROUND.
5. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL, USING COAX GROUNDED AT BOTH ENDS.
6. ACCEPTS POSITIVE GOING SUPPRESSION. VOLTAGE ≥ 5V WILL SUPPRESS. VOLTAGE < 3.5V WILL NOT SUPPRESS.
7. THIS PIN IS USED FOR DUAL TRANSPONDER INSTALLATIONS. GROUNDING THIS PIN WILL PUT THE TRANSPONDER IN STANDBY.
8. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
9. USE ONLY WHEN TIS (TRAFFIC INFORMATION SERVICE) IS INSTALLED.
10. THESE PINS ARE USED FOR ARINC 429 RX FUNCTION WITH THE KMD 54Ø. THEY MAY ALSO BE USED AS RS232 TX/RX FOR AN ADLP (AIRBORNE DATALINK PROCESSOR) OR AN ADS–B (AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST).
11. INSTALLING THE EXTERNAL OPTIONAL CONFIGURATION MODULE IS THE ONLY WAY TO ACCESS SIGNALS FROM THE SMALL CARD EDGE CONNECTOR, JKT73–2.
12. RS 485 I/O CONNECTIONS ARE RESERVED FOR REMOTE MOUNT INSTALLATIONS.
13. A GROUND ON AUDIO INHIBIT SHALL CAUSE THE AUDIO TO BE MUTED, OTHERWISE, LEAVE OPEN.

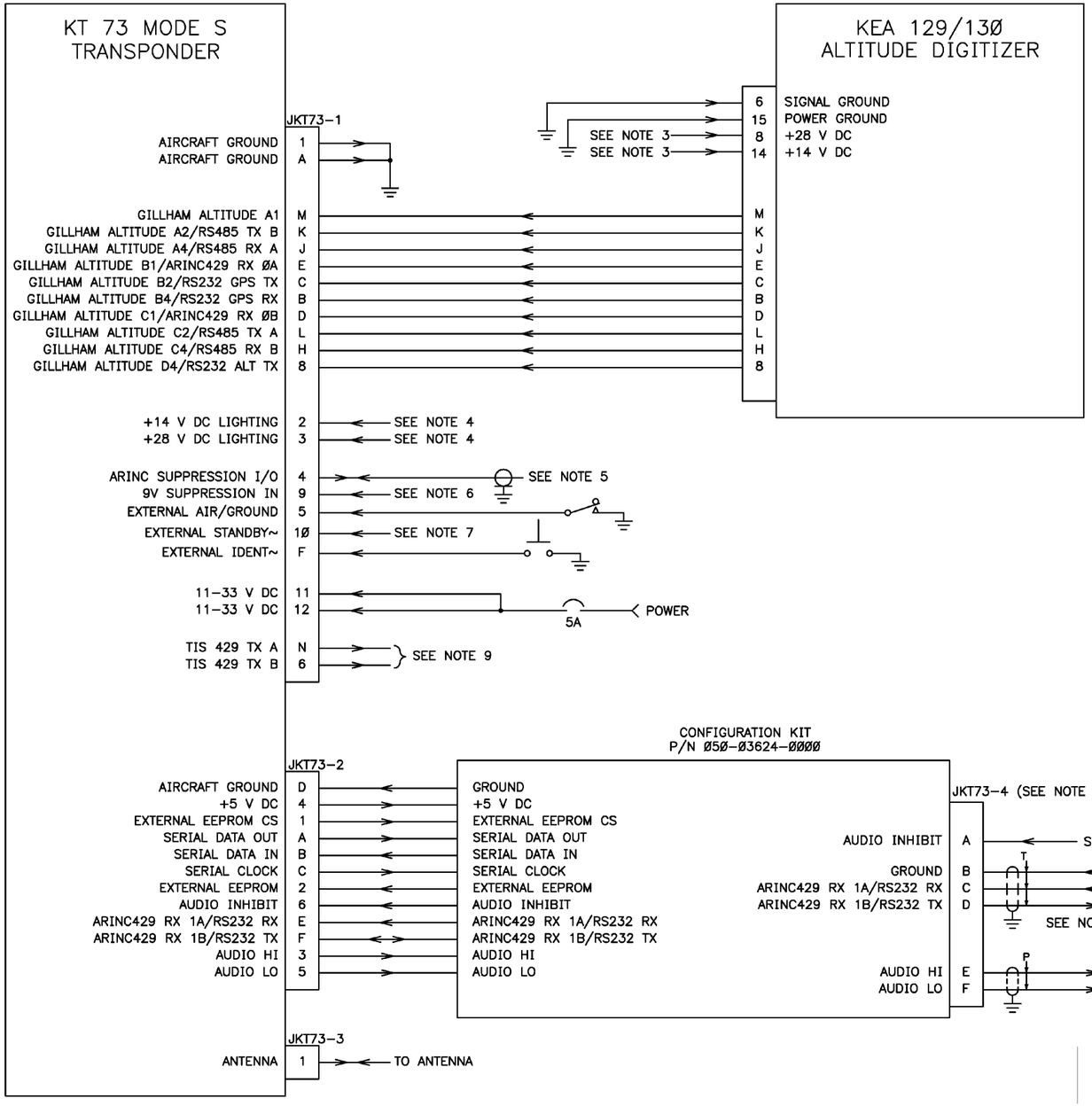
FIGURE 2-5 SINGLE KT 73 BASIC INTERCONNECTION DRAWING
(Dwg. 155-01689-0001 Rev. -)



NOTES:

1. THIS DRAWING APPLIES TO AN INSTALLATION WITH TIS SERVICES. GILLHAM ALTITUDE SOURCE, TIS, AND AUTOGROUND HAVE BEEN SELECTED DURING INSTALLATION PROGRAMMING.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL-W-22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO MIL-C-27500 SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. DO NOT CONNECT PINS 8 AND 14 OF THE KEA 129/13Ø TOGETHER. DO NOT CONNECT POWER FOR THE KEA 129/13Ø TO PINS 11 AND 12 OF THE KT 73.
4. FOR +28VDC LIGHTING, CONNECT THE 28VDC LIGHTING BUSS TO PIN 3 AND LEAVE PIN 2 OPEN. FOR +14VDC LIGHTING, CONNECT THE 14VDC LIGHTING BUSS TO PIN 2 AND CONNECT PIN 3 TO GROUND.
5. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL, USING COAX GROUNDED AT BOTH ENDS.
6. ACCEPTS POSITIVE GOING SUPPRESSION. VOLTAGE ≥ 5V WILL SUPPRESS. VOLTAGE < 3.5V WILL NOT SUPPRESS.
7. THIS PIN IS USED FOR DUAL TRANSPONDER INSTALLATIONS. GROUNDING THIS PIN WILL PUT THE TRANSPONDER IN STANDBY.
8. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
9. THE KMD 54Ø MUST HAVE THE KAC 5Ø4 TRAFFIC CARD INSTALLED.
10. THESE PINS ARE USED FOR ARINC 429 RX FUNCTION WITH THE KMD 54Ø. THEY MAY ALSO BE USED AS RS232 TX/RX FOR AN ADLP (AIRBORNE DATALINK PROCESSOR) OR AN ADS-B (AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST).
11. INSTALLING THE EXTERNAL OPTIONAL CONFIGURATION MODULE IS THE ONLY WAY TO ACCESS SIGNALS FROM THE SMALL CARD EDGE CONNECTOR, JKT73-2.
12. RS 485 I/O CONNECTIONS ARE RESERVED FOR REMOTE MOUNT INSTALLATIONS.
13. A GROUND ON AUDIO INHIBIT SHALL CAUSE THE AUDIO TO BE MUTED, OTHERWISE LEAVE OPEN.

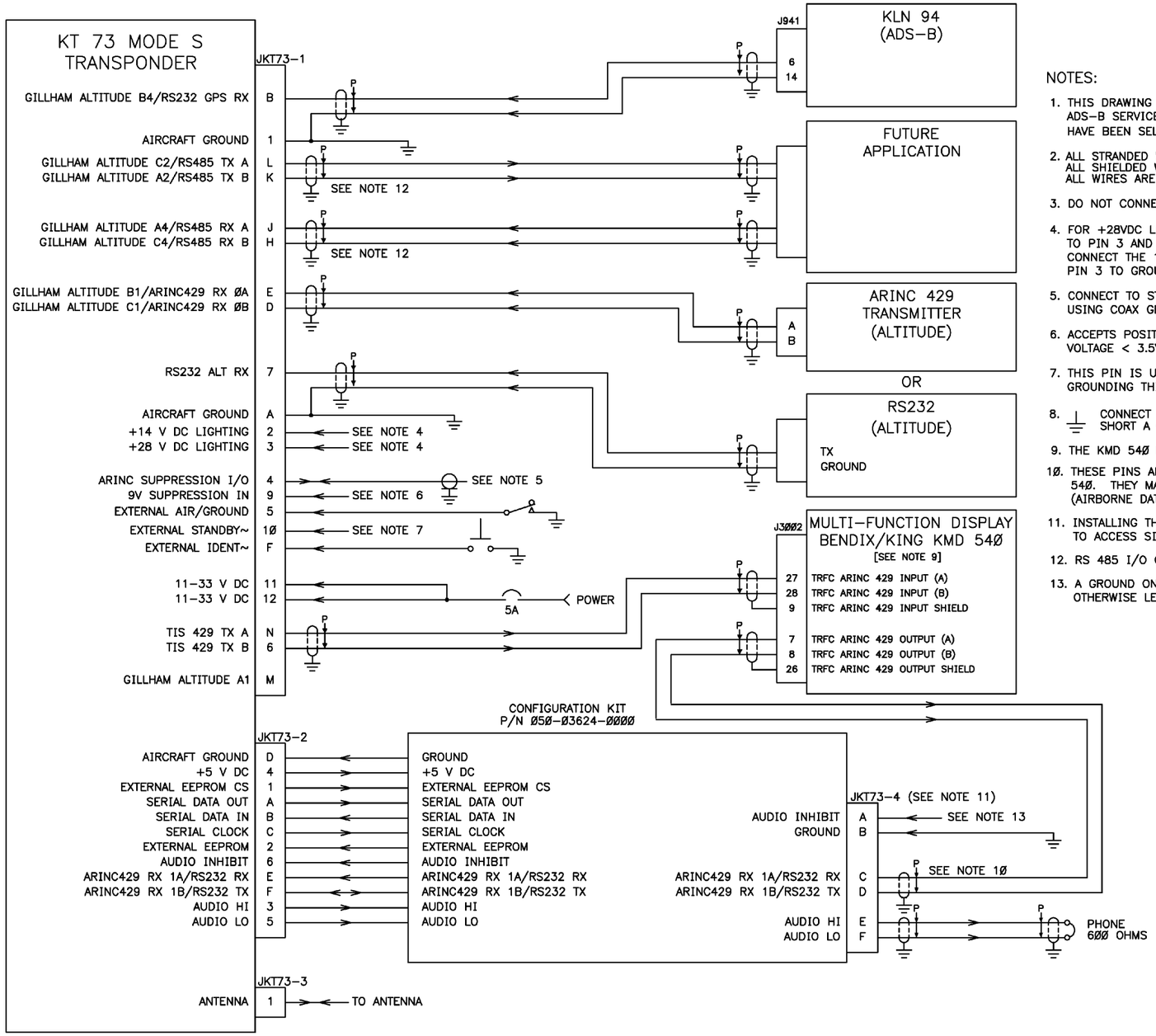
FIGURE 2-6 SINGLE KT 73 WITH TIS INTERCONNECTION DRAWING (Dwg. 155-01689-0002 Rev. -)



NOTES:

1. THIS DRAWING APPLIES TO AN INSTALLATION WITH AN ADLP CONNECTION. GILLHAM ALTITUDE SOURCE, ADLP OR ADB-B, AND AUTOGROUND HAVE BEEN SELECTED DURING INSTALLATION PROGRAMMING.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL-W-22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO MIL-C-2750Ø SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. DO NOT CONNECT PINS 8 AND 14 OF THE KEA 129/13Ø TOGETHER. DO NOT CONNECT POWER FOR THE KEA 129/13Ø TO PINS 11 AND 12 OF THE KT 73.
4. FOR +28VDC LIGHTING, CONNECT THE 28VDC LIGHTING BUSS TO PIN 3 AND LEAVE PIN 2 OPEN. FOR +14VDC LIGHTING, CONNECT THE 14VDC LIGHTING BUSS TO PIN 2 AND CONNECT PIN 3 TO GROUND.
5. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL, USING COAX GROUNDED AT BOTH ENDS.
6. ACCEPTS POSITIVE GOING SUPPRESSION. VOLTAGE ≥ 5V WILL SUPPRESS. VOLTAGE < 3.5V WILL NOT SUPPRESS.
7. THIS PIN IS USED FOR DUAL TRANSPONDER INSTALLATIONS. GROUNDING THIS PIN WILL PUT THE TRANSPONDER IN STANDBY.
8. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
9. USE ONLY WHEN TIS (TRAFFIC INFORMATION SERVICE) IS INSTALLED.
10. THESE PINS ARE USED FOR ARINC 429 RX FUNCTION WITH THE KMD 54Ø. THEY MAY ALSO BE USED AS RS232 TX/RX FOR AN ADLP (AIRBORNE DATALINK PROCESSOR) OR AN ADS-B (AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST).
11. INSTALLING THE EXTERNAL OPTIONAL CONFIGURATION MODULE IS THE ONLY WAY TO ACCESS SIGNALS FROM THE SMALL CARD EDGE CONNECTOR, JKT73-2.
12. RS 485 I/O CONNECTIONS ARE RESERVED FOR REMOTE MOUNT INSTALLATIONS.
13. A GROUND ON AUDIO INHIBIT SHALL CAUSE THE AUDIO TO BE MUTED, OTHERWISE LEAVE OPEN.

FIGURE 2-7 SINGLE KT 73 WITH ADLP OR ADS-B INTERCONNECTION DRAWING
(Dwg. 155-01689-0003 Rev. -)



NOTES:

1. THIS DRAWING APPLIES TO AN INSTALLATION WITH TIS, OR ADS-B SERVICES. SERIAL ALTITUDE, TIS, ADS-B, AND AUTOGROUND HAVE BEEN SELECTED DURING INSTALLATION PROGRAMMING.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL-W-22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO MIL-C-27500 SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. DO NOT CONNECT PINS MARKED N/C.
4. FOR +28VDC LIGHTING, CONNECT THE 28VDC LIGHTING BUSS TO PIN 3 AND LEAVE PIN 2 OPEN. FOR +14VDC LIGHTING, CONNECT THE 14VDC LIGHTING BUSS TO PIN 2 AND CONNECT PIN 3 TO GROUND.
5. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL, USING COAX GROUNDED AT BOTH ENDS.
6. ACCEPTS POSITIVE GOING SUPPRESSION. VOLTAGE ≥ 5V WILL SUPPRESS. VOLTAGE < 3.5V WILL NOT SUPPRESS.
7. THIS PIN IS USED FOR DUAL TRANSPONDER INSTALLATIONS. GROUNDING THIS PIN WILL PUT THE TRANSPONDER IN STANDBY.
8. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
9. THE KMD 54Ø MUST HAVE THE KAC 5Ø4 TRAFFIC CARD INSTALLED.
10. THESE PINS ARE USED FOR ARINC 429 RX FUNCTION WITH THE KMD 54Ø. THEY MAY ALSO BE USED AS RS232 TX/RX FOR AN ADLP (AIRBORNE DATALINK PROCESSOR).
11. INSTALLING THE EXTERNAL OPTIONAL CONFIGURATION MODULE IS THE ONLY WAY TO ACCESS SIGNALS FROM THE SMALL CARD EDGE CONNECTOR, JKT73-2.
12. RS 485 I/O CONNECTIONS ARE RESERVED FOR REMOTE MOUNT INSTALLATIONS.
13. A GROUND ON AUDIO INHIBIT SHALL CAUSE THE AUDIO TO BE MUTED, OTHERWISE LEAVE OPEN.

FIGURE 2-8 SINGLE KT 73 WITH SERIAL ALTITUDE INPUTS INTERCONNECTION DRAWING (Dwg. 155-01689-0004 Rev. -)

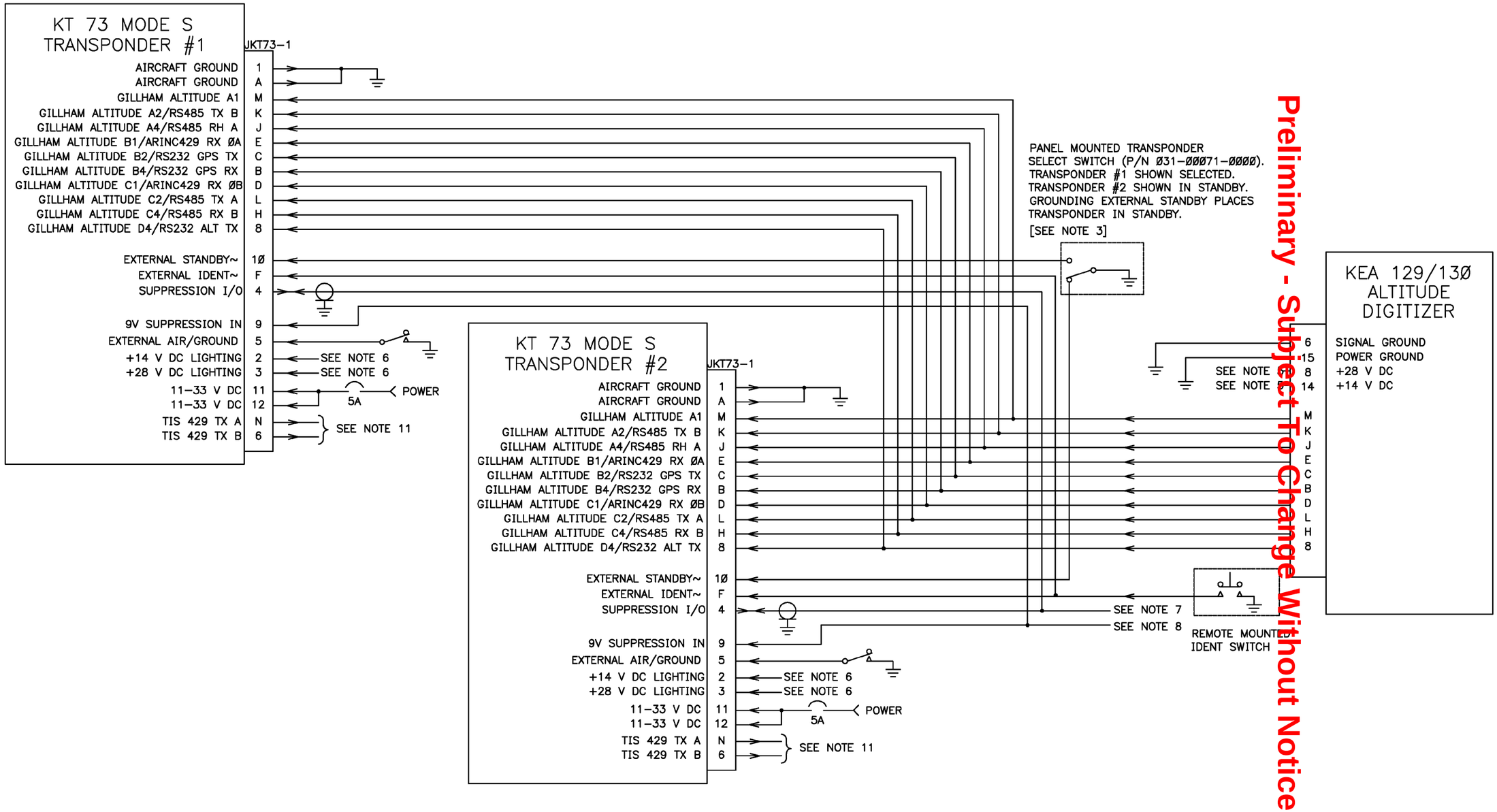
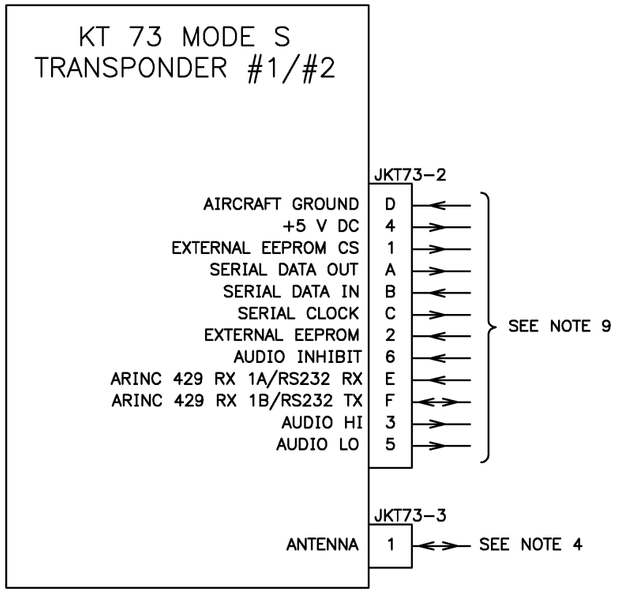


FIGURE 2-9 DUAL KT 73 BASIC INTERCONNECTION DRAWING
(Dwg. 155-01689-0005 Rev. -, Sheet 1 of 2)



NOTES:

1. THIS DRAWING APPLIES TO A BASIC DUAL INSTALLATION WHERE GILLHAM ALTITUDE AND AUTOGROUND HAVE BEEN SELECTED DURING INSTALLATION PROGRAMMING.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL-W-22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO MIL-C-27500 SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. BOTH TRANSPONDERS CANNOT BE ACTIVE AT THE SAME TIME. THE PILOT WILL MANUALLY SELECT EITHER #1 OR #2.
4. TRANSPONDER #1 AND TRANSPONDER #2 MUST BE CONNECTED TO SEPARATE ANTENNAS.
5. DO NOT CONNECT PINS 8 AND 14 OF THE KEA 129/130 TOGETHER. DO NOT CONNECT POWER FOR THE KEA 129/130 TO PINS 11 AND 12 OF THE KT 73.
6. FOR +28VDC LIGHTING, CONNECT 28VDC LIGHTING BUSS TO PIN 3 AND LEAVE PIN 2 OPEN. FOR +14VDC LIGHTING, CONNECT 14 VDC LIGHTING BUSS TO PIN 2 AND CONNECT PIN 3 TO GROUND.
7. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL USING COAX GROUNDED AT BOTH ENDS.
8. ACCEPTS POSITIVE GOING SUPPRESSION. VOLTAGE ≥ 5V WILL SUPPRESS. VOLTAGE < 3.5V WILL NOT SUPPRESS.
9. REFER TO KT 73 INTERCONNECTION DRAWINGS 155-01689-0001/-0002 -0003/-0004, FOR OPTIONAL CONFIGURATION MODULE CONNECTIONS.
10. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
11. USE ONLY WHEN TIS (TRAFFIC INFORMATION SERVICES) IS INSTALLED.
12. RS 485 I/O CONNECTIONS ARE RESERVED FOR REMOTE MOUNT INSTALLATIONS.
13. A GROUND ON AUDIO INHIBIT SHALL CAUSE THE AUDIO TO BE MUTED, OTHERWISE LEAVE OPEN.

FIGURE 2-9 DUAL KT 73 BASIC INTERCONNECTION DRAWING
(Dwg. 155-01689-0005 Rev. -, Sheet 2 of 2)

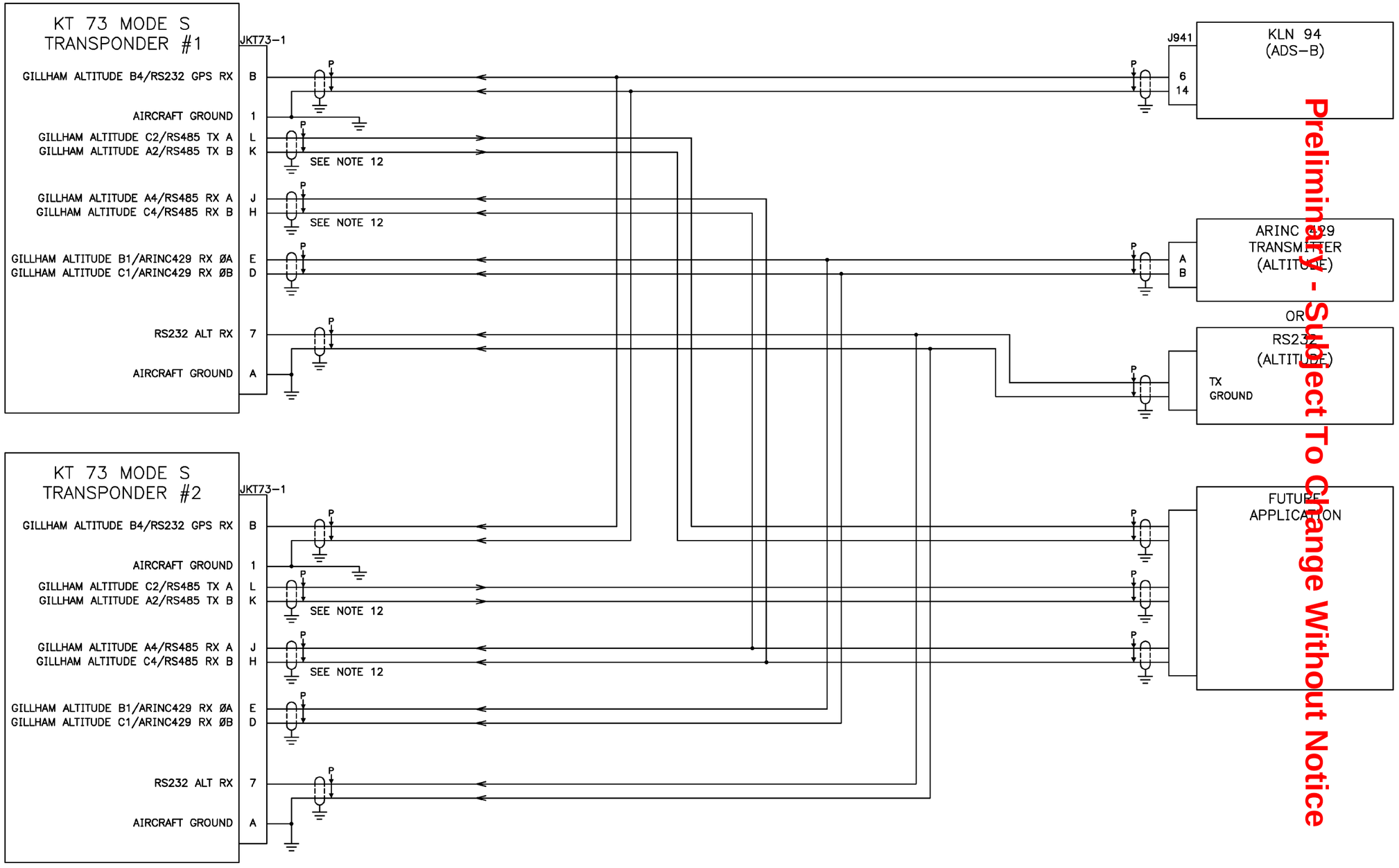


FIGURE 2-10 DUAL KT 73 WITH SERIAL ALTITUDE INPUTS INTERCONNECTION DRAWING
(Dwg. 155-01689-0006 Rev. -, Sheet 1 of 3)

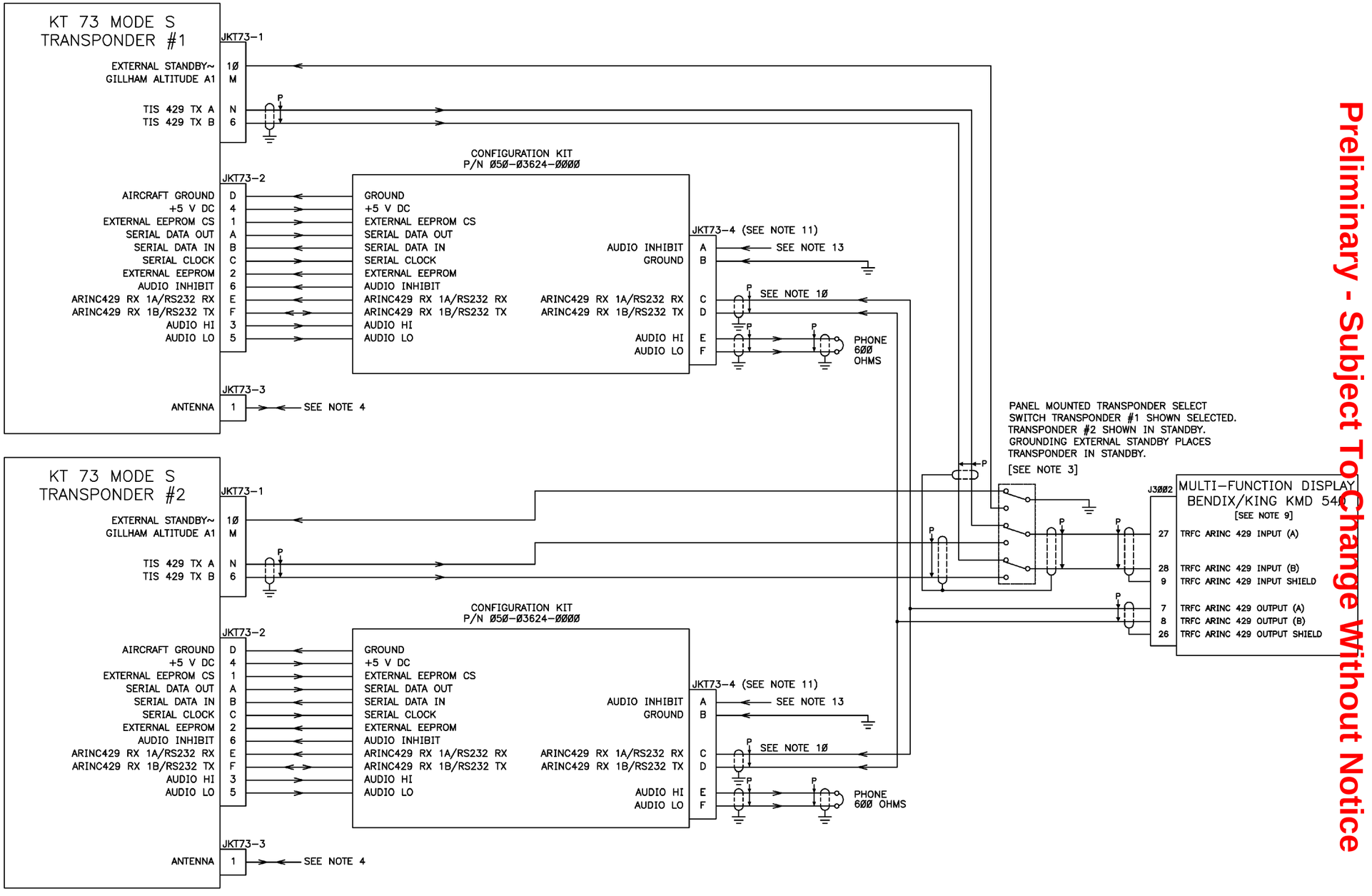
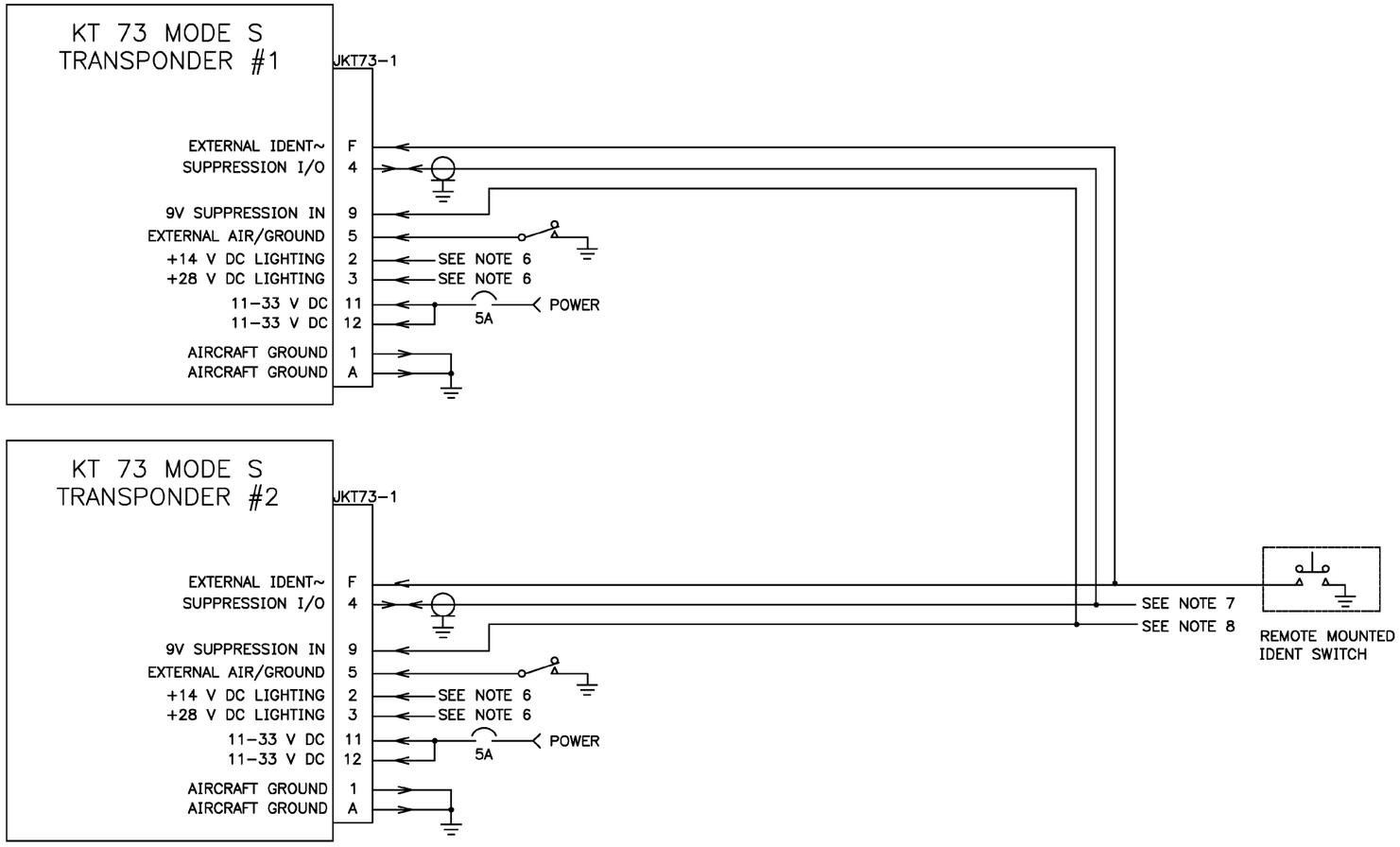


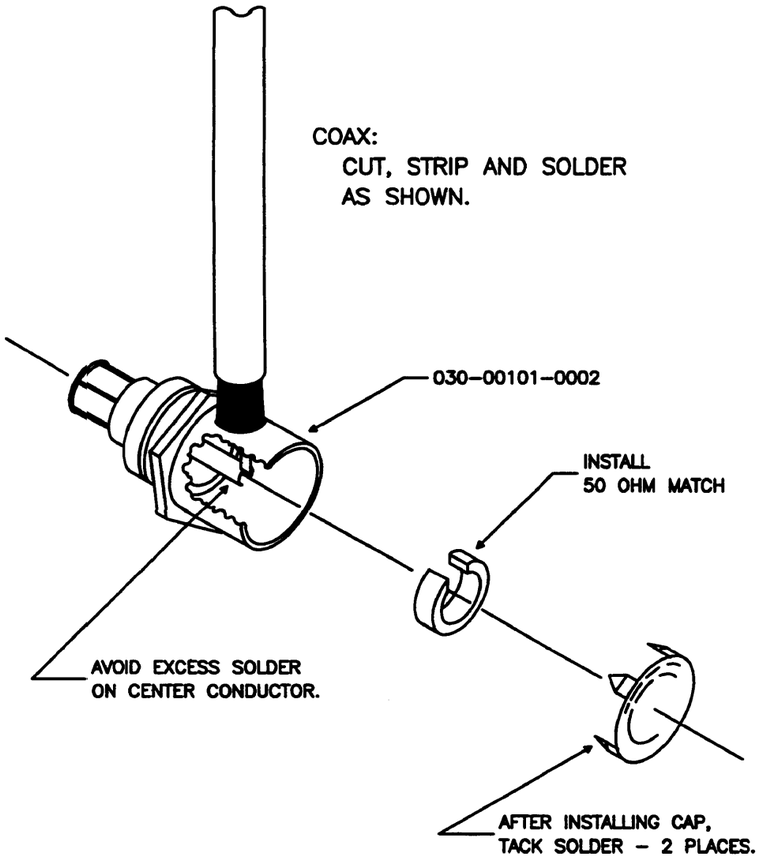
FIGURE 2-10 DUAL KT 73 WITH SERIAL ALTITUDE INPUTS INTERCONNECTION DRAWING
(Dwg. 155-01689-0006 Rev. -, Sheet 2 of 3)



NOTES:

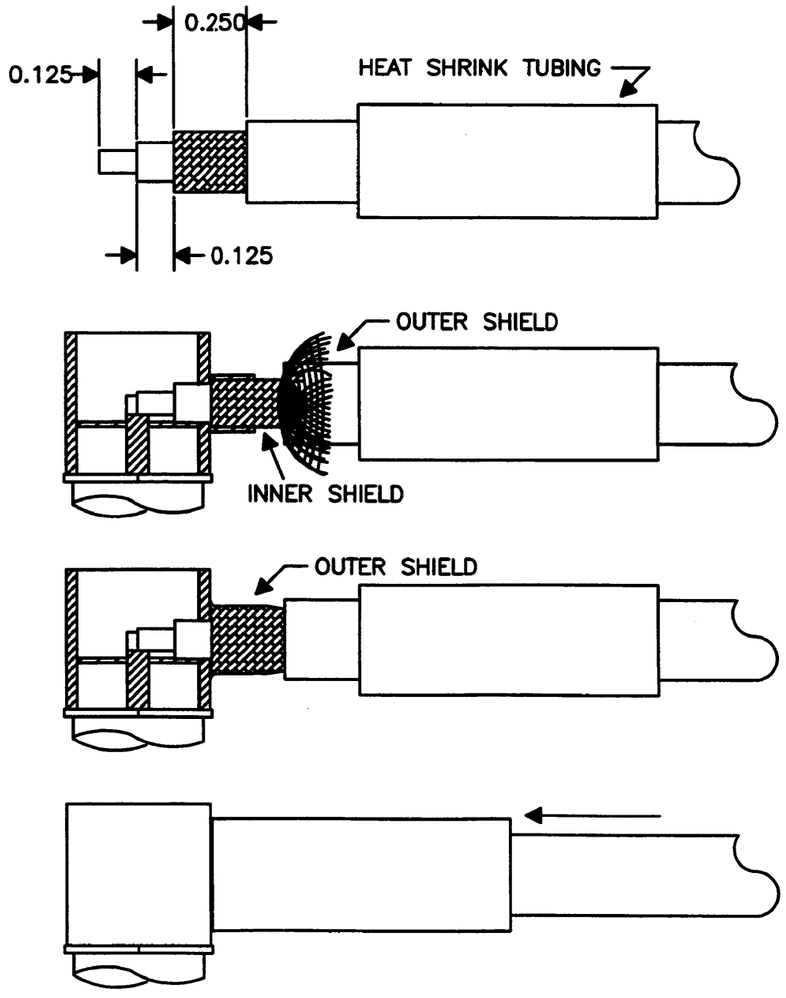
1. THIS DRAWING APPLIES TO A DUAL INSTALLATION WHERE SERIAL ALTITUDE HAS BEEN SELECTED DURING INSTALLATION PROGRAMMING. SERIAL ALTITUDE, TIS, ADS-B, AND AUTOGROUND HAVE BEEN SELECTED DURING INSTALLATION PROGRAMMING.
2. ALL STRANDED WIRE SHALL CONFORM TO MIL-W-22759/16 SPEC OR EQUIVALENT. ALL SHIELDED WIRE SHALL CONFORM TO M27C-27500 SPEC OR EQUIVALENT. ALL WIRES ARE 22 GAUGE UNLESS OTHERWISE NOTED.
3. BOTH TRANSPONDERS CANNOT BE ACTIVE AT THE SAME TIME. THE PILOT WILL MANUALLY SELECT EITHER #1 OR #2.
4. TRANSPONDER #1 AND TRANSPONDER #2 MUST BE CONNECTED TO SEPARATE ANTENNAS.
5. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT GROUND WITH AS SHORT A CONDUCTOR AS PRACTICAL.
6. FOR +28VDC LIGHTING, CONNECT 28VDC LIGHTING BUSS TO PIN 3 AND LEAVE PIN 2 OPEN. FOR +14VDC LIGHTING, CONNECT 14 VDC LIGHTING BUSS TO PIN 2 AND CONNECT PIN 3 TO GROUND.
7. CONNECT TO STANDARD ARINC 718A ATTACHMENT 6 SUPPRESSION LEVEL USING COAX GROUNDED AT BOTH ENDS.
8. ACCEPTS POSITIVE GOING SUPPRESSION. VOLTAGE ≥ 5V WILL SUPPRESS. VOLTAGE < 3.5V WILL NOT SUPPRESS.
9. THE KMD 540 MUST HAVE THE KAC 504 TRAFFIC CARD INSTALLED.
10. THESE PINS ARE USED FOR ARINC 429 TX FUNCTION WITH THE KMD 540. THEY MAY ALSO BE USED AS RS232 TX/RX FOR AN ADLP (AIRBORNE DATALINK PROCESSOR).
11. INSTALLING THE EXTERNAL OPTIONAL CONFIGURATION MODULE IS THE ONLY WAY TO ACCESS SIGNALS FROM THE SMALL CARD EDGE CONNECTOR, JKT73-2.
12. RS 485 I/O CONNECTIONS ARE RESERVED FOR REMOTE MOUNT INSTALLATIONS.
13. A GROUND ON AUDIO INHIBIT SHALL CAUSE THE AUDIO TO BE MUTED, OTHERWISE LEAVE OPEN.

FIGURE 2-10 DUAL KT 73 WITH SERIAL ALTITUDE INPUTS INTERCONNECTION DRAWING (Dwg. 155-01689-0006 Rev. -, Sheet 3 of 3)



NOTES:

1. WHEN SOLDERING, AVOID APPLYING EXCESS HEAT TO CONNECTOR BODY, HEAT SINK SPRING CONTACTS, AND CENTER CONDUCTOR INSULATOR.



1. STRIP CABLE (P/N 024-00051-0060) OR (P/N 024-00072-0000) * AND PLACE 1" HEAT SHRINK TUBING (P/N 150-00025-0010) OVER COAX.

SOLDER CENTER CONTACT AND SOLDER INNER SHIELD INSIDE. SEE NOTE 1.

3. SOLDER OUTER SHIELD OUTSIDE. SEE NOTE 1.

4. SLIDE HEAT SHRINK TUBING FORWARD (FLUSH WITH CONNECTOR) AND ADD HEAT TO SHRINK THE TUBING.

USE CONNECTOR 030-00101-0002 FOR CABLE:
RG-400 HONEYWELL **P/N 024-00051-0060**
*** FOR ECS CABLE P/N 311601**
HONEYWELL **P/N 024-00072-0000,**
USE CONNECTOR 030-00102-0001

FIGURE 2-11 RF CONNECTOR DRAWING

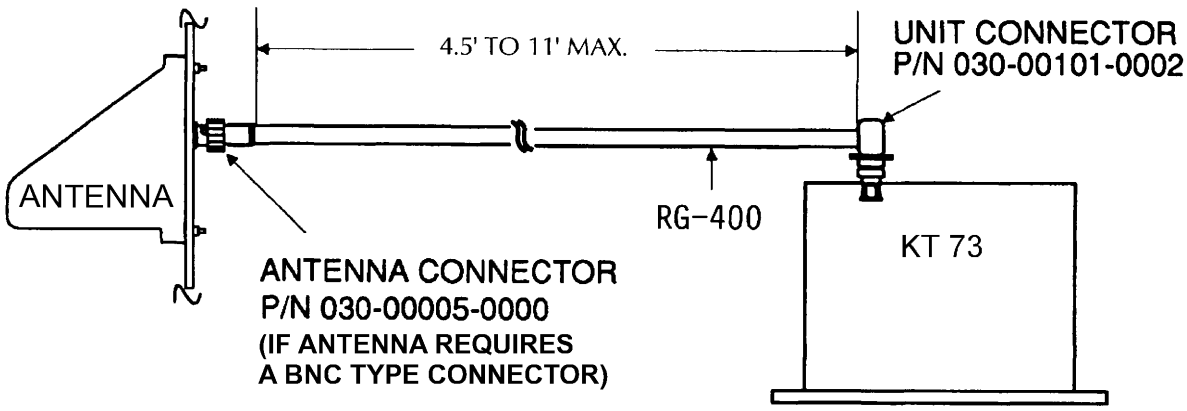


FIGURE 2-12 ACCEPTABLE CABLE CONNECTIONS DRAWING
(Sheet 1 of 2)

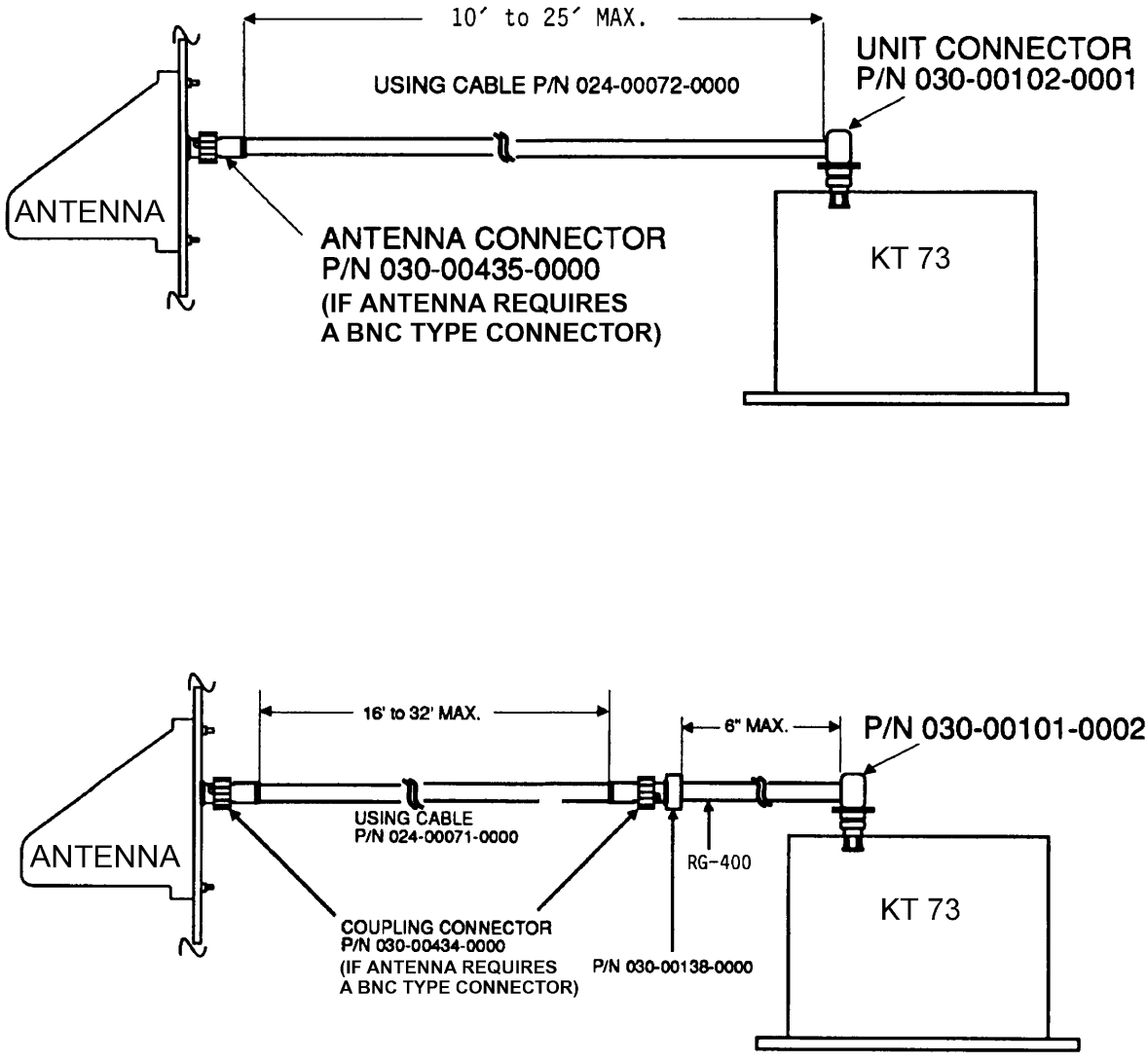
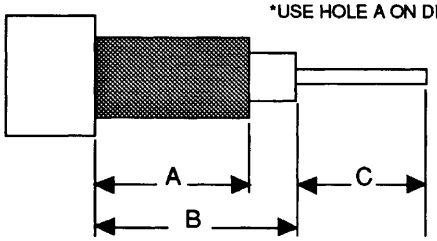


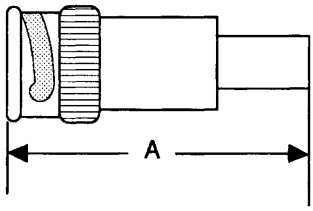
FIGURE 2-12 ACCEPTABLE CABLE CONNECTIONS DRAWING
(Sheet 2 of 2)

CRIMP TOOL CHART			
CONTACT		TUBE	
TURR HEAD	CABLE	TOOL FRAME	TOOL DIE
SOLDER	311201	M22520/5-01	M22520/5-33
SOLDER	311601	M22520/5-01	M22520/5-19*

*USE HOLE A ON DIE #M22520/5-19 FOR CABLE P/N 311601

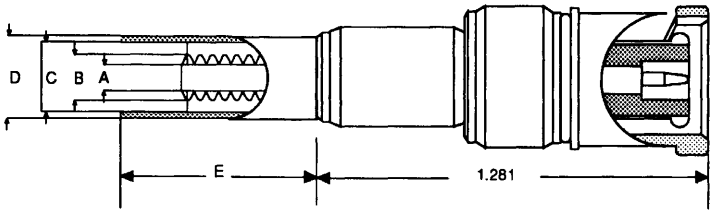


STRIPPING DIMENSIONS			
CABLE	A	B	C
311201	.40	.53	.21
311601	.40	.55	.78



ECS P/N	CABLE	DIMENSION A
CBS122	311201	1.94

PART NUMBER	A	B	C	D	E
CBS922	.152	.228	.261	.297	.750



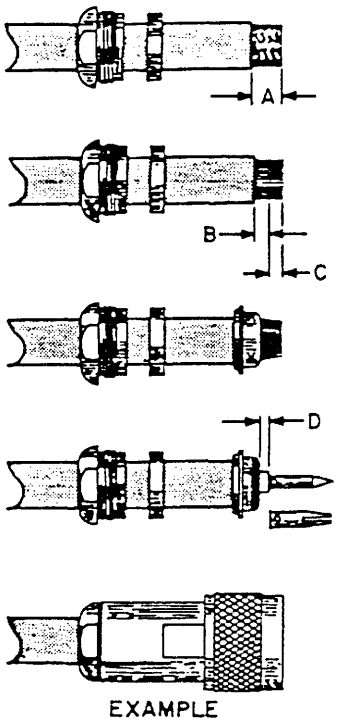
INSTALLATION INSTRUCTIONS:

1. SLIDE TUBE ONTO CABLE
2. CUT OUTER JACKET (SEE CHART)
3. STRIP LENGTH OF CENTER CONDUCTOR (SEE CHART)
4. INSTALL CENTER PIN
5. FLAIR OUT WIRE BRAID
6. CUT INNER SHIELD
7. PUSH BODY ON FIRMLY UNTIL CENTER PIN SEATS
8. TRIM EXCESS BRAID AND PUSH TUBE ONTO CONNECTOR
9. CRIMP TUBE

NOTE: DO NOT NICK BRAID OF CENTER CONDUCTOR

CONNECTOR CROSS REFERENCE CHART		
	TED	ECS
030-00435-0000	4-10-154 SOLDER	CBS 922 CRIMP
030-00434-0000	4-10-153 SOLDER	CBS 122 CRIMP
		ECS REQUIRES CRIMPING TOOLS. SEE CRIMP TOOL CHART.

FIGURE 2-13 CABLE CONNECTOR DRAWING



Place nut and gasket over cable and cut jacket to dimension shown.

Comb out braid and fold out. Cut cable dielectric to dimension shown. Tin center conductor.

Pull braid wires forward and taper toward center conductor. Place clamp over braid and push back against cable jacket.

Fold back braid wires as shown, trim to proper length (D) and form over clamp as shown. Solder contact to center conductor.

Insert cable and parts into connector body. Make sure sharp edge of clamp seats properly in gasket. Tighten nut.

PART NUMBER	SIZE	DIMENSION			
	RG/U CABLE	A	B	C	D
024-00075-0000	393	9/32	1/8	5/32	3/64
024-00051-0060	400	9/32	1/8	5/32	3/64

FIGURE 2-14 TYPE "N" AND "C" CONNECTOR ASSEMBLY DRAWING

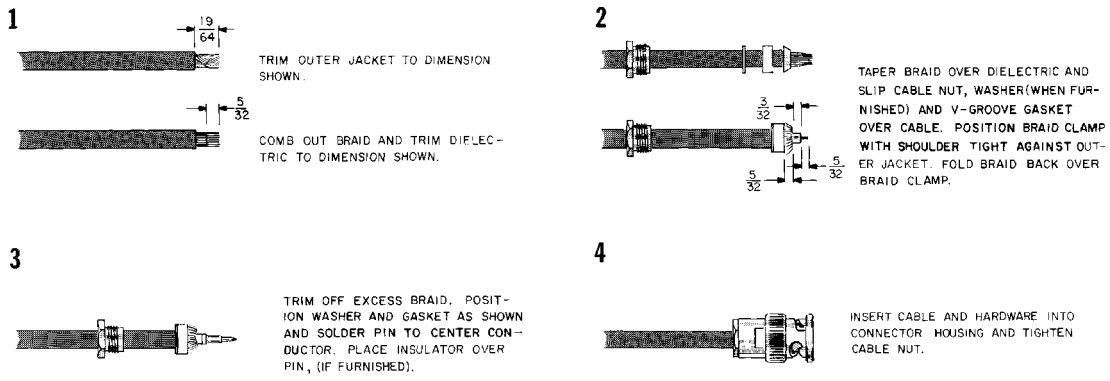


FIGURE 2-15 BNC CONNECTOR ASSEMBLY DRAWING

THIS PAGE IS RESERVED

2.4.1 TRANSPONDER SYSTEM CHECKOUT

The post-installation test is used to apply power and functionally checkout the system. Successful completion of the post-installation test verifies the proper operation of the KT 73 Mode S Transponder System.

Table 2-1 is a visual inspection/check procedure that should be performed after system installation as part of a system checkout. A post-installation test per paragraph 2.4.1.2 should be performed. In addition, the procedure should be used as a periodic maintenance inspection check.

EQUIPMENT	INSPECTION/CHECK PROCEDURE
KT 73 Mode S Transponder	A. Inspect external surface for damage. B. Check that the unit is securely installed and that retaining mechanism is securely tightened. C. Ensure that all connections in the mounting tray are properly mounted and secure.
Antennas	A. Inspect external surfaces for damage. B. Check that antenna is properly mounted and mounting screws are tight. C. Ensure that antenna coaxial cable connectors are properly mated and secure.

TABLE 2-1 INSPECTION/CHECK PROCEDURE

2.4.1.1 Inspection

Perform the following inspection on the overall system:

(1) Check that cables do not interfere with aircraft controls or other equipment.

(2) Check cabling for proper routing and check security of tie-down points. Inspect and adjust cable runs to ensure that cables are not strained, kinked, or severely twisted and are not exposed to rough or sharp surfaces.

2.4.1.2 Post-Installation Checkout/Operation

(1) General

Installation of the transponder system requires three stages of testing to ensure the proper operation of the Mode S transponder. Initially, prior to the installation of the transponder and antenna, a system interwiring check should be performed. This check verifies that the aircraft and all transponder interconnections are correct, before power is applied. After the units are installed a visual inspection of the equipment and connections is made. Finally, a ramp test is performed.

(2) System Interwiring Check

To check the aircraft and transponder system interconnections proceed as follows:

(a) Check that all cables and interwiring are installed in accordance with the Interwiring and Cable Harness Fabrication instructions (paragraph 2.3.3).

(b) Using the interconnect diagram (see Figure 2-5 through 2-10), check wiring for proper destination, opens, and shorts.

(c) Check rf cables for insertion loss and VSWR.

(3) Visual Inspection

In conjunction with system installation, perform the inspection/check procedure (Table 2-1 in this section).

(4) Post-Installation Test

The Post-Installation Test verifies the proper operation of the KT 73 Mode S Transponder System. Utilizing the self-test function and a ramp tester, this procedure is used after the system units have been installed and thereafter as an operational check. This procedure is comprised of a pretest setup, manual test and ramp test. The following tests are performed on the ground.

(a) Pretest Setup
Check KT 73 system source power as follows:

1) Confirm that aircraft 11-33V dc is operational.

2) Confirm that the aircraft panel background lighting power source is operational by adjusting the cockpit dimmer switch for proper cockpit panel illumination.

(b) Operate appropriate aircraft circuit breakers and switches to apply power to the system as follows:

1) Apply 11-33V dc to Mode S transponder #1 and if applicable transponder #2.

2) Apply primary power inputs to all equipment that interfaces with the transponder(s) per the system configuration.

(c) Verify that all KT 73 circuit breakers are closed.

(d) Allow one minute for warm-up.

(e) Verify the 4096 code is annunciated on the ATC IDENT code display with mode select switch in the "ON" position.

(f) Verify that "GND" is annunciated with the mode selector switch in the "GND" position.

(g) Self-Test
Refer to 3.3.3 (Section III) for Built In Test Equipment (BITE) procedures.

(h) Manual Test
This test checks the ATC IDENT code switches and display.

1) Rotate ident code selector knob. Verify the most significant digit increases from zero to seven with clockwise rotation and decreases with a counter-clockwise rotation.

2) Repeat step 1) for the remaining three digits of the squawk code.

3) Momentarily push the IDENT switch to store the selected code. (The code will automatically be stored after a five second period if Ident switch is not momentarily pushed.)

(5) Conformity Inspection

Visually inspect the installed equipment to determine the use of acceptable workmanship and engineering practices. Verify that all mechanical and electrical connections have been made properly.

(6) Ramp Test (see section 2.4.1.3, 2.4.1.4)

The following test will be conducted to verify operation.

1) Aircraft Address and Maximum Airspeed Verification.

Verify that the correct Aircraft Address and Maximum Airspeed has been programmed correctly.

The Aircraft Address may be verified when the KT 73 is first powered on. See Section 3.2.1 for details.

2) Reply Frequency

Verify that the reply frequency is 1090 ± 1 MHz.

2.4.1.3 Ramp Test (Per AC 20-131A)

This test requires the use of a Mode S Ramp Tester. Specific instructions for operating the ramp tester are contained in the applicable operator's manual. In systems with dual transponders and altitude sources configure the system to check each function. Table 2-2 lists tests that will be performed during ramp testing. In addition, Table 2-2 contains a brief description of each test and the pass/fail criteria.

TEST	DESCRIPTION	PASS/FAIL CRITERIA
RF Power Output	Measures the effective radiated power output from the antenna.	Minimum of 125 watts.
RF Frequency	Measures the transmit frequency	1090 MHz ±1 MHz
ATCRBS Receiver Sensitivity	Measures the receiver minimum triggering level (MTL) for a 90% reply rate.	-74 dBm ±3.0 dBm
Mode S Reply Delay	Measures the time difference between the transponder interrogation and reply.	128 μsec ± 0.25 μsec.

TABLE 2-2 RAMP TESTS
(Sheet 1 of 2)

TEST	DESCRIPTION	PASS/FAIL CRITERIA
Mode S Reply Jitter	Measures transmitted pulse to pulse time variations.	0.05 μsec.
ATCRBS SLS Level	Checks sidelobe suppression function by varying the SLS pulse level and monitoring transponder reply rates.	Reply if P1 exceeds P2 by 9 dB or more. No reply if P2 equals or exceeds P1
ATCRBS Reply	Verifies transponder replies to Mode A and C interrogations. Measures F1 to F2 spacing and duration of pulses.	Replies to interrogations. F1 to F2 spacing, 20.3 μsec ±0.1 μsec. F1 and F2 pulse width, 0.45 μsec ± 0.10 μsec.
ATCRBS Only All-Call	Verifies that the Mode S transponder does not respond to Mode A only or Mode C only interrogations.	No reply.
Mode S All-Call	Verifies that the transponder replies, with the proper address, to a Mode S All-Call interrogation.	Proper reply address.
Invalid Mode S Address	Verifies that the transponder does not reply to Mode S interrogations that contain invalid addresses.	No reply.
Ident	Verifies Ident function is operating.	Reply with SPI present in ATCRBS Mode A only. Reply with SPI absent.
Mode S UF 0	Verifies that the transponder replies to a Mode S UF 0 interrogation with the correct altitude, address, and format.	Proper DF 0 reply.
Mode S UF 4	Verifies that the transponder replies to a Mode S UF 4 interrogation with the correct altitude, address, and format.	Proper DF 4 reply.
Mode S UF 5	Verifies that the transponder replies to a Mode S UF 5 interrogation with the correct ID, address, and format.	Proper DF 5 reply.
Mode S UF 11	Verifies that the transponder replies to a Mode S UF 11 interrogation with the correct address, and format.	Proper DF 11 reply.
Squitter	Verifies squitters are transmitted from the transponder at varying intervals about a one second rate.	1 second (0.8 to 2.4 seconds).

TABLE 2-2 RAMP TESTS
(Sheet 2 of 2)

2.4.1.4 Ramp Test (TIS and/or ADS-B Functions)

The following procedures check the TIS and ADS-B functions of an installation without requiring a ramp tester with more capability than required for the testing of ATCRBS and Mode S functionality.

If the system includes the TIS function, use the following procedure (requires a KMD 550/850):

(1) Press the “TRFC” button on the Display Unit (KMD 550/850).

(2) Switch the mode to “ON”.

(3) Verify that the message “TIS UNAVAILABLE” is being displayed on the KMD 550/850.

(4) If the message “NO DATA RECEIVED FROM TRAFFIC UNIT” is being displayed, this indicates that no data is being received from the KT 73. This could be due to the following.

(a) The KT 73 is not powered up.

(b) The wiring between the KT 73 and the KMD 550/850 is not correct.

(c) The KT 73 has not been configured to provide the TIS function.

If the system includes the ADS-B function, use the following procedure (requires a KLN 94 or KLN 900):

(1) Place the KT 73 in the Test Mode (see 3.3.1 “When the unit is in TST (Test) mode:”).

(2) After performing the self-test sequence, the KT 73 should display “TEST OK”. The KT 73 will issue the audio message “TEST OK”.

(3) Switch the KLN 94 off.

(4) Momentarily switch the KT 73 to “ON” then back to the “TST” mode.

(5) The KT 73 should display “SBY F604” and the audio should announce “CHECK FAULT CODES”.

(6) Switch the KLN 94 on and allow it to complete its initialization activity.

(7) Momentarily switch the KT 73 to “ON” and then back to the “TST’ mode.

(8) The KT 73 should display “TEST OK”. The KT 73 will issue the audio message “TEST OK”.

(9) If in step 2 the KT 73 displays a fault code, consult the fault code table in paragraph 3.3.3 and take the indicated corrective action.

(10) If in step 2 any of the “F6XX” codes or the “F501” code are (is) displayed, check that the appropriate source has power. If is does, check the wiring between the source and the KT 73.

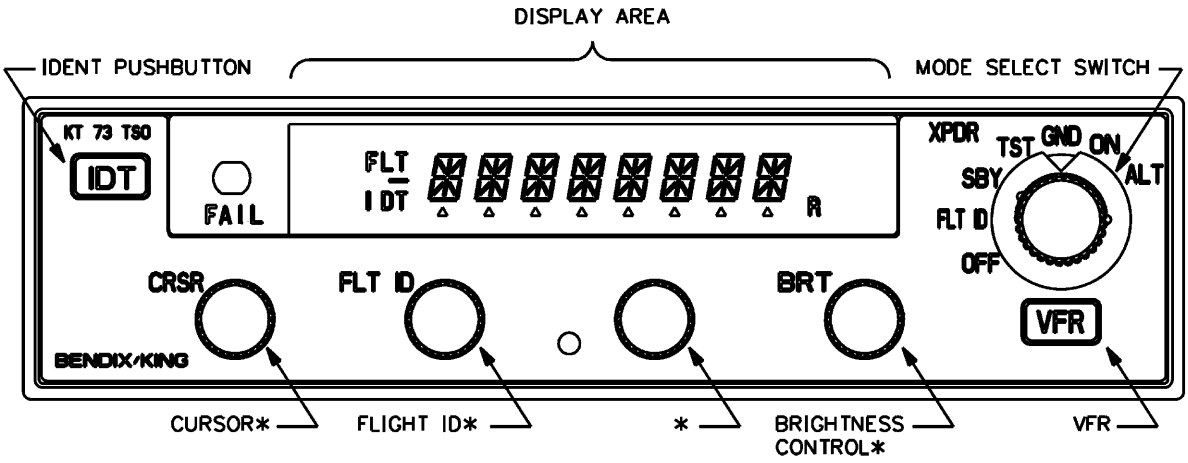
THIS PAGE IS RESERVED

SECTION III
OPERATION

3.1 GENERAL

Section 3 describes the operation of the KT 73. Where applicable, illustrations of the displays are furnished to assist the operator in understanding the operation of the unit and also provide a visual aide for programming sequences. Figure 3-1 illustrates the various panel controls and displays of the unit.

NOTE:
The KT 73 and all other avionics, should be turned off before starting the aircraft engine(s).



LEFT 4 DIGITS OF THE DISPLAY AREA REPRESENT THE ALTITUDE WINDOW.
RIGHT 4 DIGITS OF THE DISPLAY AREA REPRESENT THE IDENT WINDOW.

* REPRESENTS TRANSPONDER CODE SELECTOR KNOBS. EACH SELECTS A SEPARATE DIGIT OF THE IDENTIFICATION CODE.

FIGURE 3-1 KT 73 FRONT PANEL

3.2 PROGRAMMING MODE

NOTE:
While in the programming mode, the KT 73 will not transmit RF energy.

The programming mode is entered using the following procedure:

(1) Place the unit in Standby mode.

(2) Select 0000 ident code.

(3) Simultaneously depress the IDT and VFR buttons for a minimum of 2 seconds.

To select the programming mode menu, rotate the cursor (CRSR) knob either clockwise or counter clockwise to advance either up or down, respectively, through the following menu options and then depress the IDENT button.

(1) A/C ADDR (Aircraft Address)

(2) MAX AIR (Maximum Airspeed)

(3) ALT SRC (Altitude Source Select)

(4) ENH FUNC (Enhanced function when Gillham altitude source is selected)

(5) ENH FUNC (Enhanced function when ARINC 429 or RS-232 altitude source is selected)

(6) AUTO GND (Automatic on ground determination)

(7) AIR VOL (Audio volume while in the air)

(8) GND VOL (Audio volume while on the ground)

(9) ADSB EMT (ADS-B emitter category)

(10) OTHER (Reserved for Factory Only)

Upon completing the programming of the KT 73, power down the unit. The settings chosen are now stored in the unit's internal memory and configuration module.

For a listing of the above menus and their respective sub-menus, refer to figure 3-2 on the following page. To navigate the programming menu and sub-menus depicted in figure 3-2, use the following procedure:

(1) Rotate the CRSR knob to move across the major headings.

(2) Press the IDT button to select a particular heading option.

(3) Rotate the cursor (CRSR) knob to cycle between choices.

For example, when ALT SRC is selected as the major heading option, the CRSR knob is rotated to cycle between the following choices:

429 (706)

RS-232

Gillham

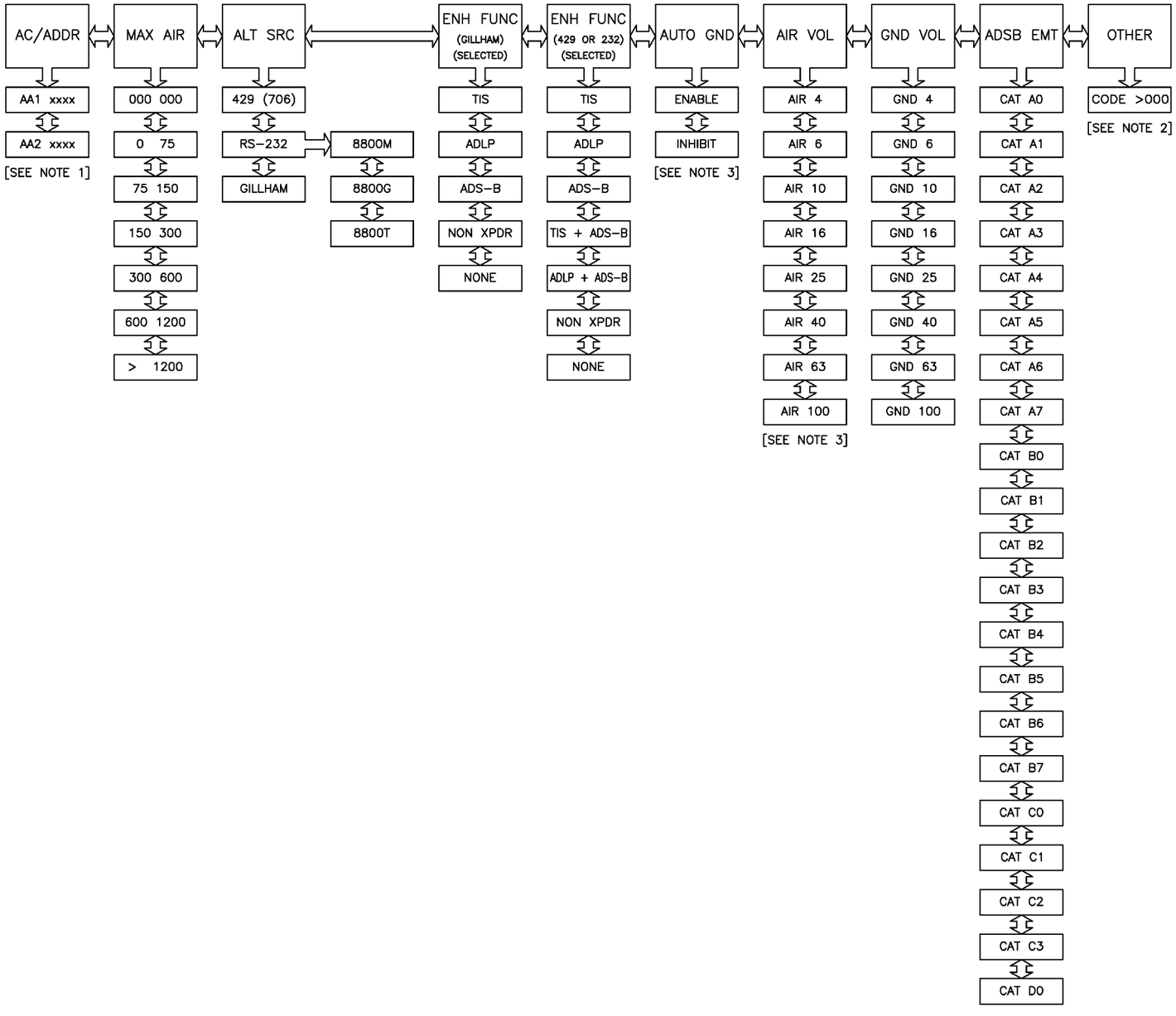
If the RS-232 sub-menu option is selected, three sub-options may also be selected by first pressing the IDT button and then rotating the CRSR button. They are listed below:

8800M (Shadin Models compatible with UPS AT, formerly IIMorrow)

8800G (Shadin Models compatible with Magellan)

8800T (Shadin Models compatible with Trimble)

In summary, the CRSR knob cycles between heading choices. Once a given choice is displayed, the IDT knob selects it and moves the cursor to the next major heading. In this case, the cursor would move from ALT SRC to ENH FUNC (Gillham Selected).



NOTES:

1. THE X'S ARE SET BY THE FOUR ROTARY KNOBS.
2. 'OTHER' IS USED FOR FACTORY CALIBRATION.
3. PRESS THE VFR BUTTON TO HEAR THE AUDIO LEVEL.

FIGURE 3-2 KT 73 CONFIGURATION MENU

3.2.1 PROGRAMMABLE PARAMETERS

3.2.1.1 Programmable Parameters

The following parameters must be programmed prior to installation:

A/C ADDR:

When the unit is in the A/C ADDR (Aircraft Address) program menu:

(a) The aircraft address is programmable (see section 2.3.5.4 for address information).

(b) The aircraft address consists of 8 octal digits.

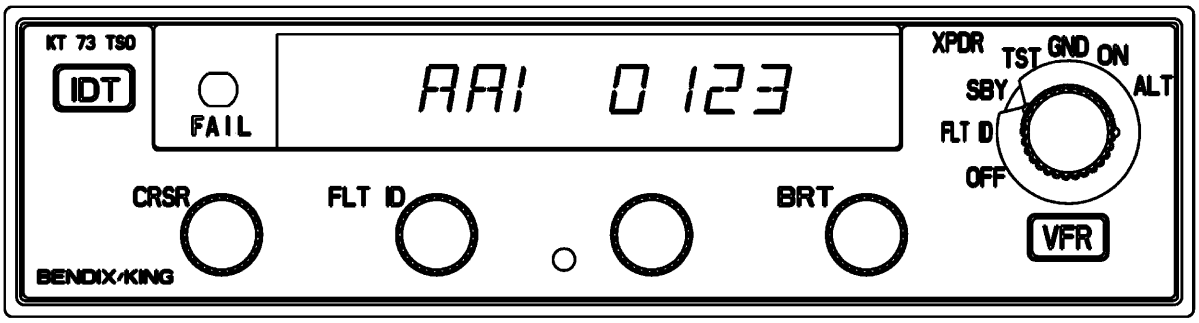


FIGURE 3-3 KT 73 FIRST 4 OCTAL DIGITS OF THE AIRCRAFT ADDRESS

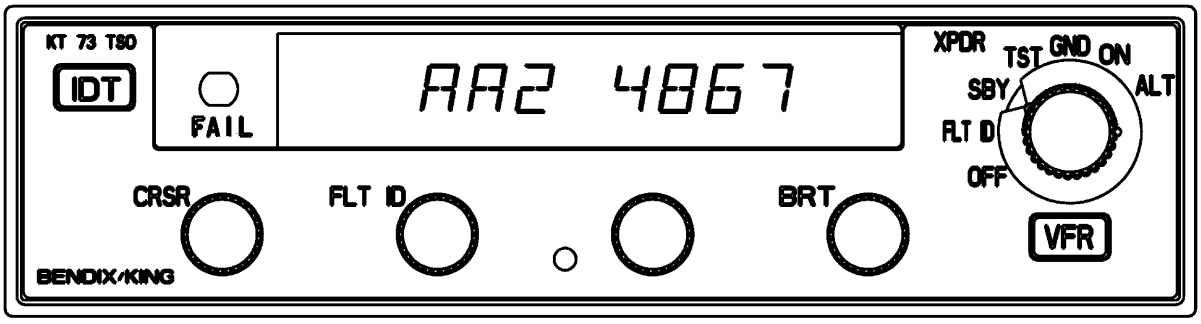


FIGURE 3-4 KT 73 LAST 4 OCTAL DIGITS OF THE AIRCRAFT ADDRESS

MAX AIR:

When the unit is in the MAX AIR (Maximum Airspeed (knots)) program menu the maximum airspeed is programmable to one of the following ranges:

(a) 0 to 75
(b) 75 to 150
(c) 150 to 300
(d) 300 to 600
(e) 600 to 1200
(f) --- to 1200

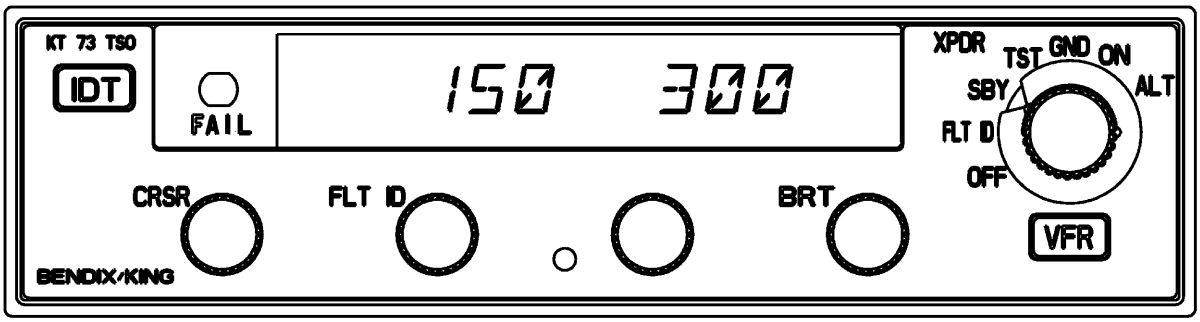


FIGURE 3-5 KT 73 LOWER AND UPPER MAXIMUM AIRSPEED

ALT SRC:

The ALT SRC (altitude source) is programmable to the following:

(a) ARINC 429 (706)
(b) RS-232
Shadin 8800M
Shadin 8800G
Shadin 8800T
(c) Gillham

NOTE:

If a Trancal RS-232 altitude source is used, refer to the manufacturer's data to configure it as 8800M, 8800G, or 8800T.

ENH FUNC (Gillham Selected):

The Enhanced Function coding includes one of the following:

(a) TIS
(b) ADLP
(c) ADS-B (JKT73-4, Pin C - GPS RX)
(d) Non XPDR (Squitter Only) (JKT73-4, Pin C - GPS RX)
(e) None (No enhanced function selected)

ENH FUNC (429 or 232 Selected):

The Enhanced Function coding includes one of the following:

(a) TIS
(b) ADLP
(c) ADS-B (JKT73-1, Pin B - GPS RX)
(d) TIS and ADS-B (JKT73-1, Pin B - GPS RX)
(e) ADLP and ADS-B (JKT73-1, Pin B - GPS RX)
(f) Non XPDR (JKT73-1, Pin B - GPS RX)
(g) None

AUTO GND:

The KT 73 has AUTO GND (Automatic Ground Programming) capability when enabled.

(a) Enable
(b) Inhibit

NOTE:

Automatic Grounding refers to external discrete being connected to the landing gear strut switch where applicable.

AIR VOL:

Air Volume includes one of the following audio power levels while the aircraft is in flight:

(a) AIR 4 (4 mw)
(b) AIR 6 (4 mw)
(c) AIR 10 (10 mw)
(d) AIR 16 (16 mw)
(e) AIR 25 (25 mw)
(f) AIR 40 (40 mv)
(g) AIR 63 (63 mw)
(h) AIR 100 (100 mw)

NOTE:
WHILE PROGRAMMING THE AIR OR GND VOLUME, PUSHING THE VFR BUTTON WILL CAUSE THE AUDIO MESSAGE "TEST OK" TO BE ISSUED AT THE APPROPRIATE AUDIO LEVEL.

GND VOL:

Ground Volume includes one of the following audio power levels while the aircraft is on the ground:

(a) GND 4 (4 mw)
(b) GND 6 (4 mw)
(c) GND 10 (10 mw)
(d) GND 16 (16 mw)
(e) GND 25 (25 mw)
(f) GND 40 (40 mw)
(g) GND 63 (63 mw)
(h) GND 100 (100 mw)

ADSB EMT:

The KT 73's ADS-B Emitter Categories are configurable to one of the following:

(a) Category set "A" code:
- 0 No ADS-B Emitter Category Information
- 1 Light (<15,500 lbs.)
- 2 Small (15,500 to 75,000 lbs.)
- 3 Large (75,000 to 300,000 lbs.)
- 4 High-Vortex Large (aircraft such as B-757)
- 5 Heavy (> 300,000 lbs.)
- 6 High Performance (>5g acceleration and > 400 knots)
- 7 Rotorcraft

(b) Category set "B" code:
- 0 No ADS-B Emitter Category Information
- 1 Glider/Sailplane
- 2 Lighter-than-air
- 3 Parachutist/Skydiver
- 4 Ultralight/hang-glider/paraglider
- 5 Reserved
- 6 Unmanned Aerial Vehicle
- 7 Space/Transatmospheric Vehicle

ADSB EMT: (cont).

(c) Category set “C” code:

0 No ADS-B Emitter Category Information
1 Surface Vehicle - Emergency Vehicle
2 Surface Vehicle - Surface Vehicle
3 Fixed Ground or Tethered Obstruction
4-7 Reserved

(d) Category set “D” code:

0 No ADS-B Emitter Category Information
1-7 Reserved

OTHER:

Reserved for factory use only.

3.3 DETAILED OPERATING MODES

3.3.1 FUNCTIONAL MODES

The functional mode is selected by the mode select switch, see the display below. The following modes are available.

(a) OFF
(b) SBY (Standby)
(c) GND (Ground)
(d) ON (On)
(e) ALT (Altitude)
(f) FLT ID (Flight ID)
(g) TST (Test)

OFF:

The unit is not energized. When the unit is in the OFF mode the Backlighting will be illuminated if either the 14 VDC or 28 VDC lighting bus has power applied.

When the unit is powered up (switched from the OFF position to another mode) the following will occur:

(a) The unit will reply and/or squitter according to the selected mode within two (2) seconds.
(b) The display will show the information associated with the mode that it is in.

SBY: (see below)

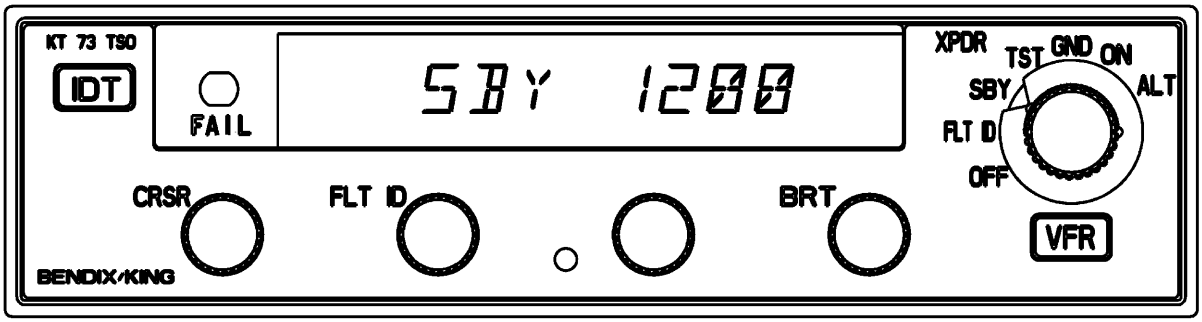


FIGURE 3-6 KT 73 STANDBY MODE

When the unit is in the SBY (Standby) mode:

(a) The unit is energized but inhibited from replying to any interrogation.

(b) "SBY" will be annunciated in the Altitude window.

(c) The 4096 code will be displayed in the Ident window.

(d) The unit will enter the next selected mode within 5 seconds of coming out of the STANDBY mode.

GND: (see below)

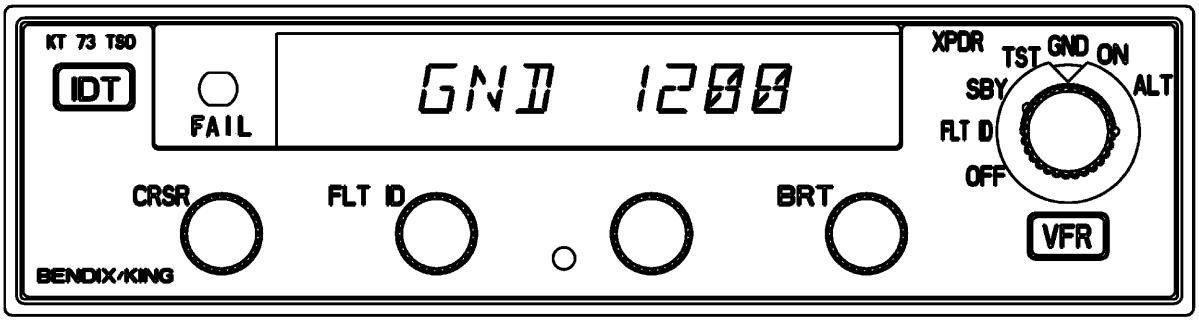


FIGURE 3-7 KT 73 GROUND MODE

NOTE:
This feature is controlled by the AUTOGND feature of the installation menu.

When the unit is in the GND (Ground) mode:

(a) The unit will inhibit replies to ATCRBS.
(b) The unit will inhibit replies to ATCRBS/Mode S All-Call.
(c) The unit will inhibit replies to Mode S-only All Call interrogations.
(d) The unit will generate Mode S squitter transmissions.
(e) The unit will reply to discretely addressed Mode S interrogations.
(f) The 4096 code will be displayed in the Ident window.
(g) "GND" will be displayed in the Altitude window.
(h) The unit will enter the next selected mode within 5 seconds of coming out of the GROUND mode.
(i) Altitude reporting will be enabled.

ON: (see below)

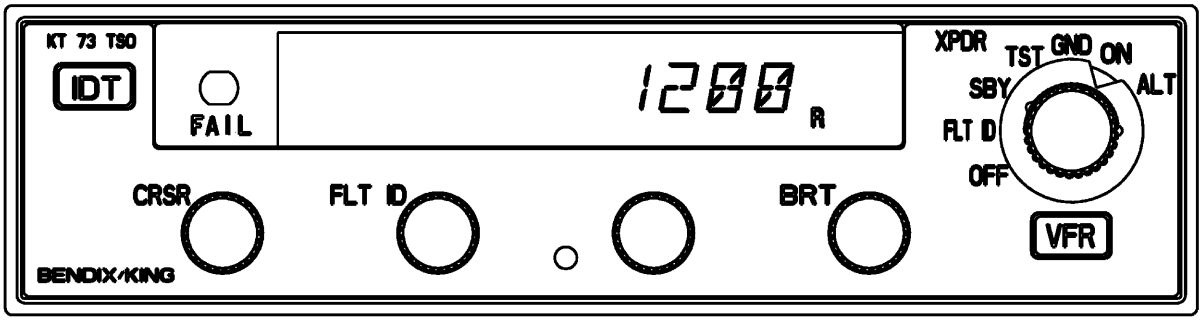


FIGURE 3-8 KT 73 ON MODE

When the unit is in the ON mode:

(a) The transmission of altitude information will be inhibited.
    1. The ATCRBS framing pulses in ATCRBS Mode C replies will be retained.
    2. All ZEROs will be transmitted in the altitude field of the Mode S replies.
(b) The altitude window will be blank.
(c) The 4096 code will be displayed in the Ident window.
(d) The unit will reply to ATCRBS.
(e) The unit will reply to ATCRBS/Mode S All-Call.
(f) The unit will reply to Mode S-only All Call interrogations.
(g) The unit will generate Mode S squitter transmissions.
(h) The unit will reply to discretely addressed Mode S interrogations.

ALT: (see below)

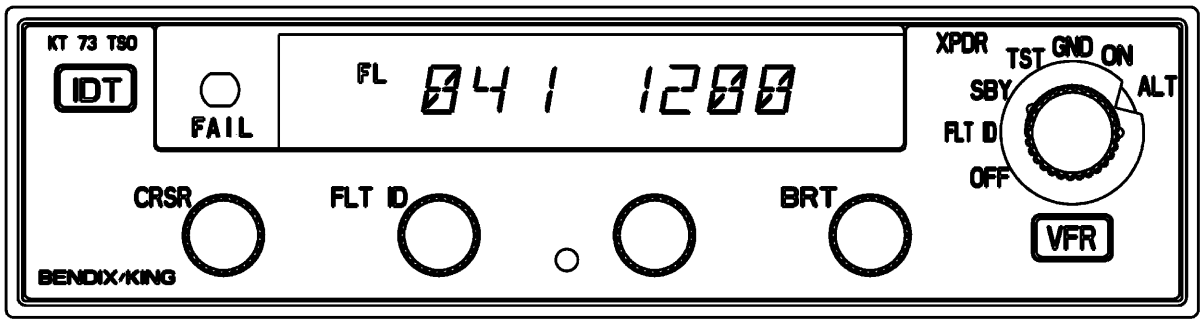


FIGURE 3-9 KT 73 ALTITUDE MODE

When the unit is in ALT (Altitude) mode:

(a) The unit will transmit altitude information according to DO-181C paragraph 2.2.13.1.2(a)(1) in response to accepted Mode C interrogations.

(b) The unit will transmit altitude information according to DO-181C paragraph 2.2.13.1.2(a)(2) in response to accepted Mode S interrogations.

(c) The unit will reply with selected 4096 Code according to DO-181C: 2.2.13.1.2.b in response to accepted Mode A interrogations.

(d) The unit will reply with framing pulses if the derived altitude is invalid / altitude not available in response to an accepted Mode C interrogation.

(e) The unit will transmit zeros in each of the 13 bits of the AC field if the derived altitude is invalid / altitude not available in response to an accepted Mode S interrogation.

(f) The unit will display altitude information according to Altitude Display parameters (see listing in section 3.2.2).

(g) The unit will display the 4096 Code in the Ident window.

NOTE:

The KT 73 will accept altitude from a Gillham source between the range of -1000 ft. to 62749 ft. The KT 73 will accept altitude from an ARINC/GAMA 429 source in the range of -1025 ft. to 62749 ft. All other altitude values are considered invalid.

FLT ID: (see below)

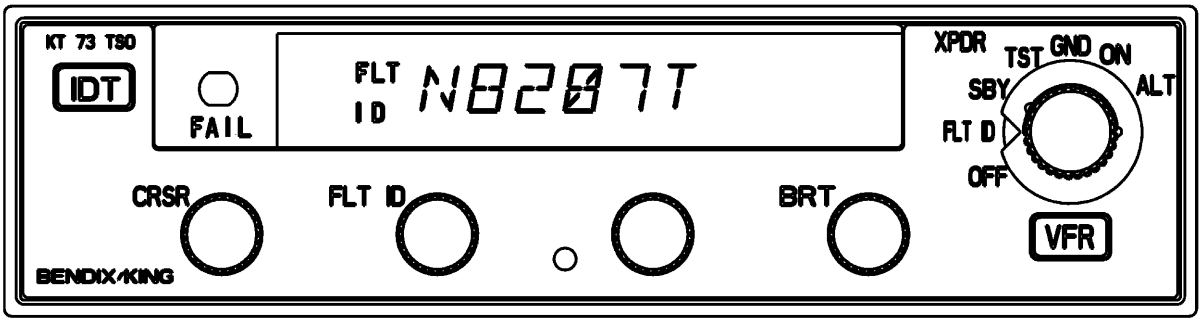


FIGURE 3-10 KT 73 FLIGHT ID MODE

When the unit is in FLT ID (Flight ID) mode:

(a) The 8 character Flight ID will be displayed.

(b) Each character of the Flight ID will be either a number, letter, or space.

(c) The "FLT ID" nomenclature will be displayed.

(d) The ability to modify the Flight ID will be provided only if Flight ID is not received from the ADLP source.

(e) The unit will not transmit.

(f) An asterisk will be displayed for characters that are not alphanumeric OR a space for Flight ID received from an ADLP.

NOTE:

Spaces will be removed from Flight ID when entered from the front panel.

TST: (see below)

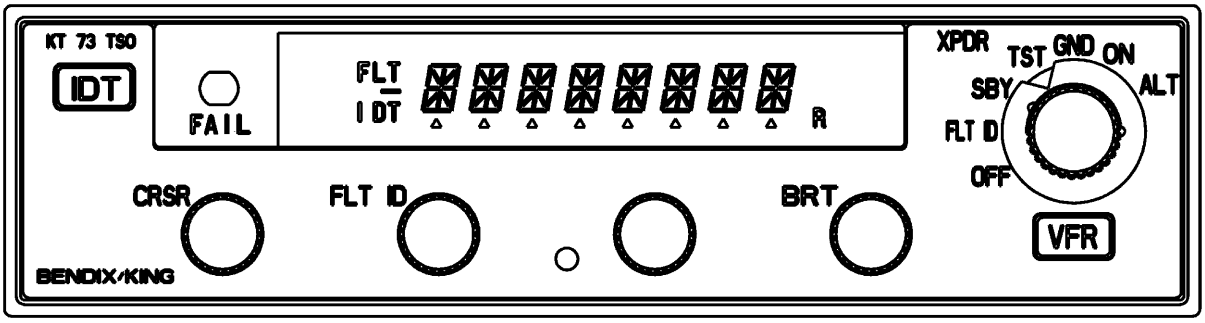


FIGURE 3-11 KT 73 TEST MODE

When the unit is in TST (Test) mode:

(a) The unit is inhibited from transmitting.

(b) The transponder illuminates all display segments for a minimum of 4 seconds.

(c) If no faults have been detected by BITE, "TEST" will be displayed in the altitude window and "OK" will be displayed in the ident window. The KT 73 will issue the audio message “TEST OK”.

(d) If one or more fault is detected by BITE, "SBY" will be displayed in the alt window. If the fault(s) are associated with external data (non-critical), the KT 73 will issue the audio message “CHECK FAULT CODES”.

(e) If one or more fault is detected by BITE, the fault(s) will be displayed in the ident window in the format FXYY (where X represents the primary fault and YY represents the secondary fault). The audio message “TRANSPONDER TEST FAIL” is issued if any critical fault exists.

(f) If more than one fault is detected by BITE, the ident window will cycle through detected fault codes.

(g) If BITE determines that a fault is not active, the ident window will display only the active faults.

(h) If BITE determines that all faults are cleared, “TEST” is displayed in the altitude window and “OK” is displayed in the ident window.

(i) All faults are logged.

NOTE:

Primary and secondary fault codes are listed in Table 3-1, BITE Fault Codes.

(j) If the VFR button is pushed, the Altitude window and Ident window will display the software revisions for a minimum of 4 seconds, each as follows:+

Altitude	Ident
APPL (Application SW)	xxxx (where xxxx is the revision code for each type of SW.
BOOT (Bootcode)	xxxx
FIRM (Firmware)	xxxx
VOIC (Voice messages)	xxxx

3.3.2 FRONT PANEL OPERATION

Refer to figure 3-1 for an illustration relating to front panel operation.

IDT (IDENT):

The KT 73's Ident pushbutton (marked IDT) is pressed when the ground control requests an "Ident" or "Squawk Ident" from the aircraft.

- An input pin is located on the rear connector for an external ident pushbutton.
- The external and front panel IDENT operate identically in all applicable modes of operation.
- The SPI pulse is not be transmitted when replying to Mode C interrogations.

(a) On/Altitude Mode

Depressing the "IDT" momentary contact switch while in the ON or ALTITUDE mode:

1. will cause the special position identification pulse (SPI) to be appended to Mode A replies for a period of 18 ± 1 seconds.
2. will be reflected in the Flight Status field of Mode S downlink format 4 and 5 replies for a period of 18 ± 1 seconds.
3. will cause the unit to display the "IDT" nomenclature for a period of 18 ± 1 seconds.
4. will be reflected in the ME field of Mode S downlink 17 for a period of 18 ± 1 seconds.

(b) Ground Mode

Depressing the "IDT" momentary contact switch while in the GROUND mode:

1. will cause the special position identification pulse (SPI) to be reflected in the Flight Status field of Mode S downlink format 4 AND 5 replies to discretely addressed Mode S interrogations for a period of 18±1 seconds.
2. will cause the unit to display the "IDT" nomenclature for a period of 18±1 seconds.

4096 ID CODE:

- While in the Standby, Ground, On, or Altitude modes, the 4096 code is displayed in the IDENT window on the right side of the display.
- Modification of the 4096 code is performed via the VFR push button or four Transponder Code Selector Knobs. Each knob selects a separate digit of the identification code.
- The 4096 Identification code digits range from 0 to 7.

(a) Code Entry

Upon entering a 4096 code:

1. The new 4096 ID code will be stored in EEPROM 3.5 ± 0.5 seconds after the entry is completed.
2. The new 4096 ID code will be transmitted 3.5 ± 0.5 seconds after the entry is completed.
3. If the "IDT" push-button is depressed, the chosen code will be immediately stored in EEPROM and transmitted along with the appropriate Mode A SPI pulse in response to a Mode A interrogation.

(b) Code restoration on Power-up

On power-up, the displayed code will be the last active code used before power was removed.

VFR OPERATION:

- Momentarily depressing the "VFR" pushbutton will cause the preprogrammed VFR code to supersede whatever 4096 Code was previously entered.
- The 4096 Code will be accepted for interrogation reply sequences.
- The 4096 Code will be stored as the last active 4096 Code just as if it were programmed from the front panel.

(a) VFR Programming

The VFR code will be programmable pending the following conditions:

1. The mode select knob indicates Standby mode.
2. The 4096 code to be programmed is displayed.
3. While the "IDT" pushbutton is latched, the “VFR” pushbutton is depressed.

(b) Last Code Reversion

1. Pressing the "VFR" Pushbutton for 2±0.5 seconds will display the last non-VFR 4096 code.
2. The non-VFR code will be transmitted 3.5±0.5 seconds after the code is displayed.

REPLY:

If the unit is replying to a valid Mode S interrogation, the reply nomenclature "R" will be illuminated twice per second. If the unit is replying to ATCRBS interrogations, the reply nomenclature "R" will be illuminated once per second.

ALTITUDE DISPLAY:

(a) When in the ALTITUDE mode, when an altitude source is available, and when the derived altitude is valid, the KT 73 will display the Flight Level altitude in the Altitude window of the display. The altitude will be displayed in hundreds of feet.

(b) When in the ALTITUDE mode the Flight Level nomenclature, "FL", will be illuminated.

NOTE:

Flight Level is a term to indicate that the altitude is not true altitude but barometric altitude which is not corrected for local pressure. For Example, "FL 040" corresponds to an altitude of 4000 feet, meaning sea level pressure of 29.92 inches of mercury.

(c) When in the ALTITUDE mode and an altitude source is unavailable, the altitude window will display dashes.

(d) When in the ALTITUDE mode and the derived altitude is invalid, the altitude window will display dashes.

NOTE:
The KT 73 will accept altitude from a Gillham source between the range of -1000 ft. to 62749 ft. The KT 73 will accept altitude from an ARINC/GAMA 429 or RS-232 source in the range of -1025 ft. to 62749 ft. All other altitude values are considered invalid.

DISPLAY BRIGHTNESS ADJUSTMENT:

(a) The display brightness is adjustable in the TEST mode.

(b) Eight carets are provided below the alpha-numeric display characters to indicate the brightness setting (relative to the photocell reading).

(c) Maximum brightness is indicated by all 8 carets being illuminated.

(d) Minimum brightness is indicated by no carets being illuminated.

(e) The factory default setting is indicated by 4 carets being illuminated.

(f) To adjust the display brightness, place the unit into TEST mode and rotate knob either clockwise or counterclockwise to adjust the brightness up or down, respectively.

INTERNAL EEPROM AND REMOTE CONFIGURATION MODULE:

(a) The KT 73 has the capability to utilize a configuration module if installed.

(b) The presence of the external configuration module is indicated by + 5 volts being present on Pin 2 of connector JKT73-2.

GAS DISCHARGE DISPLAY:

(a) The brightness of the display is determined by the photocell relative to the programmed brightness level.

(b) The illuminance is a function of the PHOTO_CEL voltage provided to the microcontroller from the photocell.

(c) When going from bright to dim, an approximate 6 $\pm$ 0.5 second time constant is used.

(d) When going from bright to dim, 63% of the change will take place in each time constant period.

3.3.3 BUILT IN TEST EQUIPMENT (BITE)

FAULT ANNUNCIATION:

Built In Test Equipment (BITE) failure parameters are monitored by a time averaging process to ensure that transient events, typical of the aircraft environment, are not the cause of fault annunciation.

The following list the fault annunciation parameters during STANDBY, GROUND, ON, and ALTITUDE modes.

Critical faults are defined as faults that may cause the transponder to behave in an undetermined manner. The following are critical and non-critical faults.

Primary Fault	Fault Code (X)	Secondary Fault	Fault Code (YY)	SEVERITY
Acquisition Squitter	1	Squitter Data	01	Critical
Acquisition Squitter	1	Squitter Rate	02	Critical
Extended Squitter	1	Squitter Data	03	Critical
Extended Squitter	1	Squitter Rate	04	Critical
Internal EEPROM	2	Internal EEPROM (write)	01	Critical
External EEPROM	2	External EEPROM (write)	02	Critical
External EEPROM	2	EEPROM Checksum	03	Critical
Internal EEPROM	2	SPR Read	04	Critical
Hardware	3	Boot ROM CRC	01	Critical
Hardware	3	Application ROM CRC	02	Critical
Hardware	3	Voice ROM CRC	03	Critical
Hardware	3	RAM Initial Verification	04	Critical
Hardware	3	RAM Verification	05	Critical
Hardware	3	+3.3V	06	Critical
Hardware	3	+5V	07	Critical
Hardware	3	+6V	08	Critical
Hardware	3	+12V	09	Critical
Hardware	3	+65V	10	Critical
Hardware	3	+95V	11	Critical
Hardware	3	-12V	12	Critical
Hardware	3	-90V	13	Critical
Hardware	3	-5V	14	Critical
Hardware	3	Suppression	15	Critical
Hardware	3	ATCRBS Tx Data	16	Critical
Mode S Address	4	Mode S Address/Max Airspeed	01	Critical
Non-critical	5	Gillham	01	Non-Critical
Non-critical	5	Executive	02	Non-Critical
Interface	6	Data Source - ALT. (429)	01	Non-Critical
Interface	6	Data Source - TIS (429)	02	Non-Critical
Interface	6	Data Source - ADLP (RS- 232)	03	Non-Critical
Interface	6	Data Source - GPS (RS- 232)	04	Non-Critical
Interface	6	Data Source - ALT. (RS- 232)	05	Non-Critical

TABLE 3-1 BITE FAULT CODES

TSO APPENDIX

ENVIRONMENTAL QUALIFICATION FORMS

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THIS PAGE IS RESERVED