Honeywell

# SYSTEM INSTALLATION MANUAL

BENDIX/KING®

# MST 67A

## MODE S TRANSPONDER SYSTEM

*MANUAL NUMBER 006-00681-0006*
*REVISION 6, May 2004*

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# System Installation Manual

Part Number 006-00681-0006

MST 67A
Mode S Transponder System

Including:

MST 67A Mode S Transponder
Part Number 066-01143-()

KFS 578A Mode S/TCAS Control Unit
Part Number 071-01507-()

PS-578A Mode S/TCAS Control Panel
Part Number 071-01618-()

CD 671C Mode S/TCAS Control Unit
Part Number 071-01542-()

PS-550 Mode S/TCAS Control Panel
Part Number 071-01619-()

CTA-81A Mode S/TCAS Control Unit
Part Number 071-01503-()

CTA-81D Mode S/TCAS Control Unit
Part Number 071-01561-()

KA 60 Antenna
Part Number 071-01174-()

**NOTE**

IF ANY UNUSUAL OR SPECIFIC SERVICE PROBLEMS ARISE, CONTACT HONEYWELL, 23500 WEST 105TH STREET, OLATHE, KANSAS, 66061. NO EQUIPMENT SHALL BE RETURNED TO THE CUSTOMER SERVICE DEPARTMENT UNTIL A RETURN AUTHORIZATION (RA) FORM IS REQUESTED AND RECEIVED FROM HONEYWELL.

**PROPRIETARY NOTICE**

# REVISION HIGHLIGHTS

## REVISION No. 6
May/2004

Added KFS 578A/PS-578A cross reference chart. Added PS-578A configuration programming harness. Added configuration straps to pinout tables. Upgraded post-installation check.

## REVISION No. 5
Jan/2004

Added European ETSO 2C112a category for -2001, -2101 versions.

## REVISION No. 4
Dec/2003

Added MST 67A versions -2001, -2101 with upgraded Elementary Surveillance, including TCAS II Change 7, Flight ID; and Enhanced Surveillance.

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# INTRODUCTION

This manual contains information covering description and operation, installation, fault isolation, and flight-line checkout procedures for the MST 67A Mode S Transponder System.

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# DESCRIPTION AND OPERATION

## 1. System Components

This section contains system information, equipment part numbers, components, and specifications for the MST 67A Mode S transponder, the KFS 578A, PS-578A, CD 671C, PS-550, CTA-81( ) Mode S/TCAS control units, and optional L-Band omnidirectional antennas, components of the MST 67A Mode S Transponder System.

### 1.A. Purpose of Equipment

The Honeywell MST 67A is a remote mounted general aviation transponder designed to fulfill the role of the airborne beacon equipment. The transponder is designed to meet FAA TSO C112 and European ETSO 2C112a (-2001, -2101 versions only) specifications for the ATCRBS/Mode Select Airborne Transponder System. The transponder conforms to general and specific design guidelines as defined in RTCA Document DO-181/A/B/C.

The MST 67A -2001, -2101 versions are upgraded to meet European mandated changes for Elementary Surveillance including TCAS II Change 7 inter-operability, Surveillance Identifier code capability, and Downlink Aircraft Parameter Flight ID BDS 2,0 register capability.

The MST 67A -2001, -2101 versions are upgraded to meet Enhanced Surveillance mandates for Downlink Aircraft Parameters including:

- BDS 4,0 register capability

  Selected Altitude
  Barometric Pressure Setting

- BDS 5,0 register capability

  Roll Angle
  True Track Angle
  Ground Speed
  Track Angle Rate (not supported by MST 67A)
  True Air Speed

- BDS 6,0 register capability

  Magnetic Heading
  Indicated Air Speed

Mach
Barometric Altitude Rate
Inertial Vertical Velocity

Top and bottom antennas and associated antenna switching and signal processing features provide the diversity option (per DO-181/A/B/C) that allow compatibility with TCAS. The diversity option allows selection of signal receptions from either the top or the bottom antenna based on the characteristics of the received interrogation signals. This improves air-to-air surveillance and communication.

The required and optional Mode S Transponder system, including aircraft systems are:

- MST 67A Mode S transponder.
- Mode S/TCAS control unit: KFS 578A, PS-578A, CD 671C, PS-550, or optional CTA-81( ).
- Bottom-mounted omnidirectional antenna.
- Optional top-mounted omnidirectional antenna (required for diversity).

## 1.B. MST 67A System Configuration

The overall Mode S system configuration is dependent on the equipment available in the particular aircraft.

The following text and tables describe the available configurations and features for the basic MST 67A system. Included are the Mode S transponder, the antenna, and the control unit.

## 1.C. Equipment Part Numbers

Components of the MST 67A Mode S Transponder System are listed in table 1 below. The table includes Honeywell part numbers, equipment model numbers, and a brief description of the system components.

Table 1 MST 67A System Components

| EQUIPMENT TYPE | DESCRIPTION | PART NUMBER |
|---|---|---|
| MST 67A Mode S transponder | Mode S transponder with Mode A and Mode C capability per ARINC 718/735 | 066-01143-() |
| KFS 578A control unit | Controls one or two transponders/TCAS per ARINC 718 | 071-01507-() |
| PS-578A control panel | Controls one or two transponders/TCAS per ARINC 718 | 071-01618-() |
| CD 671C control unit | Controls one or two transponders/TCAS per ARINC 718 | 071-01542-() |
| PS-550 control panel | Controls one or two transponders/TCAS per ARINC 718 | 071-01619-() |
| CTA-81A control unit | Controls two transponders/TCAS per ARINC 718 | 071-01503-() |
| CTA-81D control unit | Controls two transponders/TCAS per ARINC 718 | 071-01561-() |
| KA 60 antenna | Omnidirectional antenna | 071-01174-() |

## 1.D. MST 67A System Accessories

Listed below are the accessories for the Mode S transponder and the Mode S/TCAS control units.

## 1.D.(1) MST 67A Mode S Transponder Installation Kit

Refer to table 2.

Table 2 MST 67A Installation Kit P/N 050-02979-0000 Rev 2

| ITEM | PART NUMBER | DESCRIPTION | UM | QTY |
|---|---|---|---|---|
| 1 | 030-00413-0000 | Size 1 RG 214 coax plugs, (P671B1/ P671B2). VPN - ITT Canon 249-5123-000 or Radial 610-108-001 | EA | 2 |
| 2 | 030-01311-0000 | Connector pins | EA | 106 |
| 3 | 030-03106-0000 | ARINC 404A, (P671A) Type DPX2MA, connector hood. VPN - Radial DSX 2H 24X 35X 00 01 | EA | 1 |
| 4 | 047-09406-0014 | Mounting rack | EA | 1 |
| 5 | 075-05090-0001 | Spacer | EA | 2 |
| 6 | 089-05909-0020 | PHP 8-32x1.25 screws, (rear) | EA | 2 |
| 7 | 089-06008-0007 | PHP 4-40x7/16 screws | EA | 4 |
| 8 | 089-06012-0004 | FHP 6-32x0.25 screws | EA | 2 |
| 9 | 089-06014-0020 | FHP 8-32x1.25 screws, (front) | EA | 2 |
| 10 | 090-00953-0000 | Rear hold down | EA | 1 |
| 11 | 092-05792-0002 | Hold down assembly | EA | 1 |

## 1.D.(2) KFS 578A/PS-578A Installation Kit

Refer to table 3.

Table 3 KFS 578A/PS-578A Installation Kit P/N 050-02934-0001 Rev 0

| ITEM | PART NUMBER | DESCRIPTION | UM | QTY |
|---|---|---|---|---|
| 1 | 030-01157-0011 | Connectors 20G | EA | 36 |
| 2 | 030-01171-0000 | 9 pin connector (P5782) | EA | 1 |
| 3 | 030-01174-0000 | 29 pin connector (P5781) | EA | 1 |
| 4 | 030-01188-0000 | Female polarizing pins | EA | 2 |
| 5 | 030-01222-0000 | 29 pin connector hood and lever | EA | 1 |
| 6 | 030-02351-0000 | 9 pin hood and lever assembly | EA | 1 |
| 7 | 092-00052-0002 | Nut anchors 6-32 | EA | 2 |

## 1.D.(3) PS-578A Configuration Programming Harness

Refer to table 4 and figure 1.

Table 4 PS-578A Configuration Programming Harness

| ITEM | PART NUMBER | DESCRIPTION | UM | QTY |
|---|---|---|---|---|
| 1 | 030-01174-0000 | Sub-D 29 pin female connector Positronic p/n RD29F00000-782.0 | EA | 1 |
| 2 | 030-01157-0011 | Crimp connector pins (female) 20G Positronic p/n FC6020D-14 | EA | 3 |
| 3 | 030-01188-0000 | Female polarizing pin Ted Mfg Corp p/n 104202 | EA | 1 |
| 4 | 030-01161-0000 | Sub-D 29 pin male connector Positronic p/n RD29M00000-782.0 | EA | 1 |
| 5 | 030-01184-0011 | Crimp connector pins (male) 20G Positronic p/n MC6020D-14 | EA | 2 |
| 6 | 030-01222-0000 (Optional) | Sub-D 29 pin connector hood and lever assy. Positronic p/n D29000JVL0 | EA | 2 |

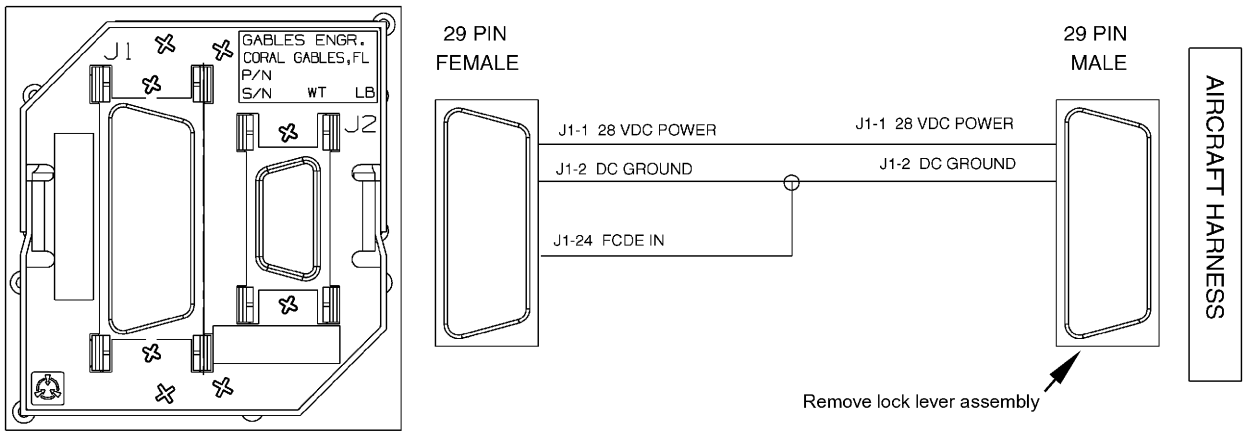


Figure 1 PS-578A Configuration Programming Harness

### 1.D.(4) CD 671C Installation Kit

Refer to table 5.

Table 5 CD 671C Installation Kit P/N 050-03206-0000 Rev 0

| ITEM | PART NUMBER | DESCRIPTION | UM | QTY |
|---|---|---|---|---|
| 1 | 030-01173-0000 | 25 pin sub-d connector (P6711) | EA | 1 |
| 2 | 030-01173-0000 | 25 pin sub-d connector (P6712) | EA | 1 |
| 3 | 030-01157-0011 | 20 G, socket crimp connector pins | EA | 48 |
| 4 | 030-01188-0000 | Female polarizing pins | EA | 2 |
| 5 | 030-02351-0002 | Hood and lever assemblies | EA | 2 |

### 1.D.(5) PS-550 Connector Assembly

Refer to table 6.

Table 6 PS-550 Connector Assembly

| ITEM | PART NUMBER | DESCRIPTION | UM | QTY |
|---|---|---|---|---|
| 1 | MS27484T20F2SA | 65 pin connector | EA | 1 |

### 1.D.(6) CTA-81A/D Installation Kit

Refer to table 7.

Table 7 CTA-81A/D Installation Kit P/N 050-02818-0000 Rev 0

| ITEM | PART NUMBER | DESCRIPTION | UM | QTY |
|---|---|---|---|---|
| 1 | 030-03051-0000 | One 24 pin connector (LP) | EA | 1 |
| 2 | 030-03051-0001 | One 24 pin connector (RP) | EA | 1 |

### 1.D.(7) Omnidirectional Antenna

Refer to paragraph 3.G. for omnidirectional antenna manufacturer and part number. Customer must obtain kit from the omnidirectional antenna manufacturer.

1.D.(8) Antenna Switch P/N 032-00145-0000

Dow-Key Microwave Corporation P/N 402-170, or equivalent; mating connector, AMPHENOL CORPORATION, P/N PT06A10E-6S.

## 2. Related Publications

Publications related to the MST 67A Mode S Transponder System are listed in table 8.

Table 8 Related Publications

| PUBLICATION | HONEYWELL PART NUMBER | ATA ID NUMBER |
|---|---|---|
| MST 67A Mode S Transponder Component Maintenance Manual | 006-05377-( ) | 34-54-02 |
| KFS 578A Mode S/TCAS Control Unit Component Maintenance Manual | 006-05378-( ) | 34-54-03 |
| CD 671C Mode S/TCAS Control Unit Component Maintenance Manual | 006-05375-( ) | 34-54-05 |
| Gold Crown III Pilot's Guide | 006-08420-0100 | N/A |
| CAS 66A TCAS I System Installation Manual | 006-05370-( ) | 34-40-00 |
| CAS 66A Pilot's Guide | 006-08746-( ) | N/A |
| CAS 67A TCAS II System Installation Manual | 006-05340-( ) | 34-40-01 |
| TCAS II Pilot's Guide Revision 2 or later | 006-08499-0000 | N/A |
| TRA-67A Mode S Transponder Maintenance Manual | I.B. 1167 | 34-54-11 |
| CAS-81 TCAS System Maintenance Manual includes installation data for ANT-81A, TPA-81A, IVA-81A/B, and ITA-81A. | I.B. 1181 | 34-45-00 |
| Collins TDR-94/94D Mode S Transponder Installation Manual (Contact Rockwell Collins, CAGE 13499) | 523-0775654 (Collins) | |
| (PS-578A) Installation Manual (Contact Gables, CAGE 99837) | IST.G7534-() (Gables) | N/A |
| (PS-550) Installation Manual (Contact Gables, CAGE 99837) | IST.G7514-() (Gables) | N/A |

## 3. Component Configurations

### 3.A. MST 67A Mode S Transponder Configurations

Refer to table 9 and table 10 for configurations and features.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 9 MST 67A Mode S Transponder Configurations P/N 066-01143-(),

| PART NUMBER 066-01143- | HIRF & LIGHTN | BITE | ANTENNA | TCAS II Compatible | BURST TUNING | REMOTE IDENT | DATA LINK | FLIGHT ID REPORTNG |
|---|---|---|---|---|---|---|---|---|
| -0201 | No | Limited | Single | No | No | No | Level 2 | No |
| -0301* | No | Extended | Diversity | Yes | No | No | Level 2 | No |
| -0601 | No | Extended | Diversity | Yes | Yes | Yes | Level 2 | No |
| -1101 | No | Limited | Diversity | Yes | No | No | Level 3 | Yes |
| -1201 | No | Limited | Single | No | No | No | Level 3 | Yes |
| -1301 | No | Extended | Diversity | Yes | No | No | Level 3 | Yes |
| -1602 | Yes | Extended | Diversity | Yes | No | No | Level 3 | Yes |
| -2001 | Yes | Extended | Single | No | Yes | Yes | Level 3s | Yes |
| -2101 | Yes | Extended | Diversity | Yes | Yes | Yes | Level 3s | Yes |
| *Version -0301 replaced by -0601. | | | | | | | | |

NOTE: Antenna diversity is necessary for a TCAS II configuration.

NOTE: The following versions of the MST 67A have been TSO certified but are not currently available:

Part numbers 066-01143: -0101, -0401, -0501.

Table 10 MST 67A Mode S Transponder Features

| FEATURE | DESCRIPTION |
|---|---|
| Basic Unit | Provides microprocessor-controlled processing of ATCRBS and Mode S interrogations and replies. Provides ATC transponder functions for ATCRBS Mode A, ATCRBS Mode C, and SPI. Processes Mode S interrogations and replies in accordance with RTCA DO-181/A/B/C and ARINC 718. Interfaces with various altitude data sources. Contains automatic self-test. |
| BITE | The Built In Test Equipment will annunciate faults. The faults will be displayed externally by the control panel or internally by an LED segment on the I/O processor board. |
| Antenna Diversity | Provides improved air-to-air surveillance and communication by employing two antennas; one mounted on the top, and the other mounted on the bottom. Antenna selection is automatic, and accomplished on the basis of the relative strengths of the detected interrogation signals. |
| TCAS II Compatible | These units are certified compatible for operation with TCAS II. |
| Burst Tuning | Compatible with "burst mode" control word format, where tuning data is transmitted only during tuning activity and not refreshed in between. |
| Remote Ident | Allows for IDENT transmission from a source other than a control unit. |
| Data Link | Limited Level 2 capability that supports TCAS only, as defined by DO-181A/B/C MOPS. |
| | Level 3 (Comm A/B and Comm C ELM) datalink and Flight ID Reporting. The MST 67A may have separate ADLP input/output ARINC 429 ports (ports are configurable as ADLP ports or Enhanced Surveillance General ports) as defined by DO-181A/B/C MOPS and ARINC 718. |
| Flight ID Reporting | Flight ID ARINC 429 input port, as defined by DO-181A/B/C MOPS and ARINC 718. |

## 3.B. KFS 578A Mode S/TCAS Control Unit Configurations

Refer to table 11 and table 12 for configurations and features.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 11 KFS 578A Control Unit Configurations P/N 071-01507-()

| PART NUMBER | FACE PLATE | ON/OFF SWITCH | TCAS | DUAL XPNDR 1/2 | LAMP VOLTAGE | RANGE CONTROL | TDR-94D COMPL. |
|---|---|---|---|---|---|---|---|
| -0901 | Black | Yes | No | Yes | 28 Vdc | N/A | No |
| -1001 | Gray | Yes | No | Yes | 28 Vdc | N/A | No |
| -1101 | Black | Yes | No | Yes | 5 V | N/A | No |
| -1201 | Gray | Yes | No | Yes | 5 V | N/A | No |
| -1301 | Black | Yes | No | No | 28 Vdc | N/A | No |
| -1401 | Gray | Yes | No | No | 28 Vdc | N/A | No |
| -1501 | Black | Yes | No | No | 5 V | N/A | No |
| -1601 | Gray | Yes | No | No | 5 V | N/A | No |
| -1701 | Black | No | II | Yes | 28 Vdc | Normal | No |
| -1801 | Gray | No | II | Yes | 28 Vdc | Normal | No |
| -1901 | Black | No | II | Yes | 5 V | Normal | No |
| -2001 | Gray | No | II | Yes | 5 V | Normal | No |
| -2201 | Gray | No | II | No | 28 Vdc | Normal | No |
| -2301 | Black | No | II | No | 5 V | Normal | No |
| -2501 | Black | No | No | Yes | 28 Vdc | N/A | No |
| -2901 | Black | No | No | No | 28 Vdc | N/A | No |
| -3201 | Gray | No | No | No | 5 V | N/A | No |
| -3502 | Black | Yes | II | Yes | 5 V | Extnd | No |
| -4102 | Black | No | II | Yes | 28 Vdc | Extnd | No |
| -4202 | Gray | No | II | Yes | 28 Vdc | Extnd | No |
| -4302 | Black | No | II | Yes | 5 V | Extnd | No |
| -4402 | Gray | No | II | Yes | 5 V | Extnd | No |
| -4902 | Black | Yes | II | Yes | 28 Vdc | No | No |
| -5002 | Gray | Yes | II | Yes | 28 Vdc | No | No |
| -5102 | Black | Yes | II | Yes | 5 V | No | No |

Table 11 KFS 578A Control Unit Configurations P/N 071-01507-()

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -5202 | Gray | Yes | II | Yes | 5 V | No | No |
| -3303 | Black | Yes | II | Yes | 28 Vdc | Extnd | Yes |
| -3403 | Gray | Yes | II | Yes | 28 Vdc | Extnd | Yes |
| -3503 | Black | Yes | II | Yes | 5 V | Extnd | Yes |
| -3603 | Gray | Yes | II | Yes | 5 V | Extnd | Yes |
| -4903 | Black | Yes | II | Yes | 28 Vdc | No | Yes |
| -5003 | Gray | Yes | II | Yes | 28 Vdc | No | Yes |
| -5103 | Black | Yes | II | Yes | 5 V | No | Yes |
| -5203 | Gray | Yes | II | Yes | 5 V | No | Yes |
| -5503 | Black | Yes | II | No | 5 V | No | Yes |
| -5603 | Gray | Yes | II | No | 5 V | No | Yes |
| -6503 | Black | Yes | I | Yes | 28 Vdc | Extnd | Yes |
| -6603 | Gray | Yes | I | Yes | 28 Vdc | Extnd | Yes |
| -6703 | Black | Yes | I | Yes | 5 V | Extnd | Yes |
| -6803 | Gray | Yes | I | Yes | 5 V | Extnd | Yes |
| -8103 | Black | Yes | I | Yes | 28 Vdc | No | Yes |
| -8203 | Gray | Yes | I | Yes | 28 Vdc | No | Yes |
| -8303 | Black | Yes | I | Yes | 5 V | No | Yes |
| -8403 | Gray | Yes | I | Yes | 5 V | No | Yes |
| -4304* | Black | No | II | Yes | 5 V | Extnd/ Slct | Yes |
| -4404* | Gray | No | II | Yes | 5 V | Extnd/ Slct | Yes |
| -7504* | Black | No | I | Yes | 5 V | Extnd/ Slct | Yes |
| -7604* | Gray | No | I | Yes | 5 V | Extnd/ Slct | Yes |
| *-XX04 software versions provide "POP-UP" display mode as a switched or strap option and “Select” range as a strap option. Refer to pinout table 2002, figure 2021, and figure 2022. | | | | | | | |

The following versions of the KFS 578A have been TSO certified but are not currently available. Part numbers 071-01507:

-0101/-0801, -2101,-2401, -2601/-2801, -3001/-3101;
-3302/-3402, -3602/-4002, -4502/-4802, -5302/-6402;
-3703/-4803, -5303/-5403, -5703/-6403, -6903/-8003, -8503/-9603;
-3304/-4204, -4504/-7404, -7704/-9604.

Table 12 KFS 578A Control Unit Features

| FEATURE | DESCRIPTION |
|---|---|
| Basic Unit | Microprocessor based control unit for controlling a transponder. The unit contains all controls required for transponder operation including: TEST, STANDBY, ON (transponder), ALTITUDE, VFR and IDENT. Some versions are compatible with the Collins TDR-94D. |
| Faceplate | A choice of faceplate colors are available. |
| ON/OFF Switch | Turns the control unit ON or OFF. |
| 1/2 Dual | Provides control of two, individually selected transponders. |
| TCAS Range Control Switch | Selects the TCAS traffic display range according to the KFS 578A version configuration:<br>-NORMAL 3, 5, 10, or 15 nm;<br>-EXTENDED (Extnd) 3, 5, 10, 15, 20, or 40 nm;<br>-SELECT (Slct) 5, 10, 20, or 40 nm. “Select” range is an installation strap option available on -XX04 versions. Refer to pinout table 2002, figure 2021, and figure 2022.<br>-NO RANGE control units annunciate on the display. |
| TCAS | The TCAS configuration contains the following elements: ABOVE/NORMAL/BELOW: Selects relative altitude display limits for non-threat category aircraft on traffic display. TA: Places the TCAS in the Traffic Advisory mode. TA/RA: Places the TCAS in the Traffic Advisory/Resolution Advisory mode. FL: TCAS Flight Level function causes the TCAS indicator to change displayed altitude from Relative Altitude (intruder to own aircraft) to absolute altitude. |
| POP-UP | On -XX04 units an external strap or switch is required to select one of two options: MANUAL or AUTO mode. In Honeywell EFIS installations, the Traffic display can be brought up on the Multi-Functional Display (MFD) by a deep toggle of the TCAS button located on the EFIS controller. If the "AUTO" mode is active, the Traffic display can "POP-UP", initiated by the presence of traffic. |
| Lamp Voltage | Lamps are powered by either 5 Vac/Vdc or 28 Vdc dimming source according to unit version. |

## 3.C. PS-578A Mode S/TCAS Control Panel Configurations

Refer to table 13 and table 14 for configurations and features.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 13 PS-578A Control Panel Configurations P/N 071-01618-()

| PART NUMBER | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | LAMP VOLTS |
|---|---|---|---|---|---|---|
| -0001 | Gray | White | Yes | Yes | No | 5vac/5vdc or 28vdc |
| -0002 | Black | White | Yes | Yes | No | 5vac/5vdc or 28vdc |
| -0003 | Gray | White | No | Yes | No | 5vac/5vdc or 28vdc |
| -0004 | Black | White | No | Yes | No | 5vac/5vdc or 28vdc |
| -0005 | Gray | White | Yes | No | No | 5vac/5vdc or 28vdc |
| -0006 | Black | White | Yes | No | No | 5vac/5vdc or 28vdc |
| -0007 | Gray | White | No | No | No | 5vac/5vdc or 28vdc |
| -0008 | Black | White | No | No | No | 5vac/5vdc or 28vdc |
| -0011 | Gray | White | Yes | Yes | 1 | 5vac/5vdc or 28vdc |
| -0012 | Black | White | Yes | Yes | 1 | 5vac/5vdc or 28vdc |
| -0013 | Gray | White | No | Yes | 1 | 5vac/5vdc or 28vdc |
| -0014 | Black | White | No | Yes | 1 | 5vac/5vdc or 28vdc |
| -0015 | Gray | White | Yes | No | 1 | 5vac/5vdc or 28vdc |
| -0016 | Black | White | Yes | No | 1 | 5vac/5vdc or 28vdc |

Table 13 PS-578A Control Panel Configurations P/N 071-01618-()

| | | | | | | |
|---|---|---|---|---|---|---|
| -0017 | Gray | White | No | No | 1 | 5vac/5vdc or 28vdc |
| -0018 | Black | White | No | No | 1 | 5vac/5vdc or 28vdc |
| -0021 | Gray | White | Yes | Yes | 2 | 5vac/5vdc or 28vdc |
| -0022 | Black | White | Yes | Yes | 2 | 5vac/5vdc or 28vdc |
| -0023 | Gray | White | No | Yes | 2 | 5vac/5vdc or 28vdc |
| -0024 | Black | White | No | Yes | 2 | 5vac/5vdc or 28vdc |
| -0025 | Gray | White | Yes | No | 2 | 5vac/5vdc or 28vdc |
| -0026 | Black | White | Yes | No | 2 | 5vac/5vdc or 28vdc |
| -0027 | Gray | White | No | No | 2 | 5vac/5vdc or 28vdc |
| -0028 | Black | White | No | No | 2 | 5vac/5vdc or 28vdc |
| -0101 | Gray | Amber | Yes | Yes | No | 5vac/5vdc or 28vdc |
| -0102 | Black | Amber | Yes | Yes | No | 5vac/5vdc or 28vdc |
| -0103 | Gray | Amber | No | Yes | No | 5vac/5vdc or 28vdc |
| -0104 | Black | Amber | No | Yes | No | 5vac/5vdc or 28vdc |
| -0105 | Gray | Amber | Yes | No | No | 5vac/5vdc or 28vdc |
| -0106 | Black | Amber | Yes | No | No | 5vac/5vdc or 28vdc |
| -0107 | Gray | Amber | No | No | No | 5vac/5vdc or 28vdc |
| -0108 | Black | Amber | No | No | No | 5vac/5vdc or 28vdc |
| -0111 | Gray | Amber | Yes | Yes | 1 | 5vac/5vdc or 28vdc |
| -0112 | Black | Amber | Yes | Yes | 1 | 5vac/5vdc or 28vdc |
| -0113 | Gray | Amber | No | Yes | 1 | 5vac/5vdc or 28vdc |

Table 13 PS-578A Control Panel Configurations P/N 071-01618-()

| | | | | | | |
|---|---|---|---|---|---|---|
| -0114 | Black | Amber | No | Yes | 1 | 5vac/5vdc or 28vdc |
| -0115 | Gray | Amber | Yes | No | 1 | 5vac/5vdc or 28vdc |
| -0116 | Black | Amber | Yes | No | 1 | 5vac/5vdc or 28vdc |
| -0117 | Gray | Amber | No | No | 1 | 5vac/5vdc or 28vdc |
| -0118 | Black | Amber | No | No | 1 | 5vac/5vdc or 28vdc |
| -0121 | Gray | Amber | Yes | Yes | 2 | 5vac/5vdc or 28vdc |
| -0122 | Black | Amber | Yes | Yes | 2 | 5vac/5vdc or 28vdc |
| -0123 | Gray | Amber | No | Yes | 2 | 5vac/5vdc or 28vdc |
| -0124 | Black | Amber | No | Yes | 2 | 5vac/5vdc or 28vdc |
| -0125 | Gray | Amber | Yes | No | 2 | 5vac/5vdc or 28vdc |
| -0126 | Black | Amber | Yes | No | 2 | 5vac/5vdc or 28vdc |
| -0127 | Gray | Amber | No | No | 2 | 5vac/5vdc or 28vdc |
| -0128 | Black | Amber | No | No | 2 | 5vac/5vdc or 28vdc |
| -0201 | Gray | NVIS | Yes | Yes | No | 5vac/5vdc or 28vdc |
| -0202 | Black | NVIS | Yes | Yes | No | 5vac/5vdc or 28vdc |
| -0203 | Gray | NVIS | No | Yes | No | 5vac/5vdc or 28vdc |
| -0204 | Black | NVIS | No | Yes | No | 5vac/5vdc or 28vdc |
| -0205 | Gray | NVIS | Yes | No | No | 5vac/5vdc or 28vdc |
| -0206 | Black | NVIS | Yes | No | No | 5vac/5vdc or 28vdc |
| -0207 | Gray | NVIS | No | No | No | 5vac/5vdc or 28vdc |
| -0208 | Black | NVIS | No | No | No | 5vac/5vdc or 28vdc |

Table 13 PS-578A Control Panel Configurations P/N 071-01618-()

| | | | | | | |
|---|---|---|---|---|---|---|
| -0211 | Gray | NVIS | Yes | Yes | 1 | 5vac/5vdc or 28vdc |
| -0212 | Black | NVIS | Yes | Yes | 1 | 5vac/5vdc or 28vdc |
| -0213 | Gray | NVIS | No | Yes | 1 | 5vac/5vdc or 28vdc |
| -0214 | Black | NVIS | No | Yes | 1 | 5vac/5vdc or 28vdc |
| -0215 | Gray | NVIS | Yes | No | 1 | 5vac/5vdc or 28vdc |
| -0216 | Black | NVIS | Yes | No | 1 | 5vac/5vdc or 28vdc |
| -0217 | Gray | NVIS | No | No | 1 | 5vac/5vdc or 28vdc |
| -0218 | Black | NVIS | No | No | 1 | 5vac/5vdc or 28vdc |
| -0221 | Gray | NVIS | Yes | Yes | 2 | 5vac/5vdc or 28vdc |
| -0222 | Black | NVIS | Yes | Yes | 2 | 5vac/5vdc or 28vdc |
| -0223 | Gray | NVIS | No | Yes | 2 | 5vac/5vdc or 28vdc |
| -0224 | Black | NVIS | No | Yes | 2 | 5vac/5vdc or 28vdc |
| -0225 | Gray | NVIS | Yes | No | 2 | 5vac/5vdc or 28vdc |
| -0226 | Black | NVIS | Yes | No | 2 | 5vac/5vdc or 28vdc |
| -0227 | Gray | NVIS | No | No | 2 | 5vac/5vdc or 28vdc |
| -0228 | Black | NVIS | No | No | 2 | 5vac/5vdc or 28vdc |

Table 14 PS-578A Control Panel Features

| FEATURE | DESCRIPTION |
|---|---|
| Basic Unit | Microprocessor based transponder control unit. The unit contains all controls required for transponder operation including: TEST, STANDBY, ON (transponder), ALTITUDE, VFR and IDENT. |
| Faceplate | A choice of faceplate colors are available. |
| ON/OFF Switch | Turns the control unit ON or OFF. |
| 1/2 Dual | Provides control of two, individually selected transponders. |
| TCAS Range Control Switch | Selects the TCAS traffic display range according to the emulated KFS 578A configuration:<br><br>-NORMAL 3, 5, 10, or 15 nm;<br>-EXTENDED 3, 5, 10, 15, 20, or 40 nm;<br>-SELECT 5, 10, 20, or 40 nm. “Select” range is an installation strap option available to units emulating KFS 578A -XX04 versions. Refer to pinout table 2003, figure 2021, and figure 2022.<br>-NO RANGE control units flash “RNG CNTRL” for 1 sec and “ON DSPL” for 1 sec when the Range rotary is activated. |
| TCAS | The TCAS configuration contains the following elements:<br><br>ABOVE/NORMAL/BELOW: Selects relative altitude display limits for non-threat category aircraft on traffic display.<br><br>TA: Places the TCAS in the Traffic Advisory mode.<br><br>TA/RA: Places the TCAS in the Traffic Advisory/Resolution Advisory mode.<br><br>FL: TCAS Flight Level function causes the TCAS indicator to change displayed altitude from Relative Altitude (intruder to own aircraft) to absolute altitude. |
| POP-UP | On units emulating KFS 578A -XX04 versions an external switch or strap is required to select one of two options: MANUAL or AUTO mode. In Honeywell EFIS installations, the Traffic display can be brought up on the Multi-Functional Display (MFD) by a deep toggle of the TCAS button located on the EFIS controller. If the "AUTO" mode is active, the Traffic display can "POP-UP," initiated by the presence of traffic. |
| FID Pushbutton | Allows entry of alpha numeric flight identification and annunciates “FID” on display. |
| Lamp Voltage | Lamps can be powered by 5 Vac, 5 Vdc, or 28 Vdc dimming source. |

NOTE: The PS-578A is configured by grounding (*FCDE) ATE Test J1 pin 24 using the configuration programming harness at initial power up, and dialing in a KFS 578A version number with the A/N/B Rotary Selector or Range Rotary Selector.

Refer to table 4 and figure 1 to fabricate the configuration programming harness. Refer to table 15 for compatible PS-578A replacements for KFS 578A units and for range control options.

NOTE: PS-578A versions that emulate KFS 578A -XX04 versions provide “Select” range and "POP-UP” display mode as installation strap or switch options. Refer to pinout table 2003, figure 2021, and figure 2022.

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -0901 | 28V | -0002 | BLK | White | YES | YES | No | N/A |
| | | -0102 | BLK | Amber | | | | |
| | | -0202 | BLK | NVIS | | | | |
| -1001 | 28V | -0001 | GRY | White | YES | YES | No | N/A |
| | | -0101 | GRY | Amber | | | | |
| | | -0201 | GRY | NVIS | | | | |
| -1101 | 5V | -0002 | BLK | White | YES | YES | No | N/A |
| | | -0102 | BLK | Amber | | | | |
| | | -0202 | BLK | NVIS | | | | |
| -1201 | 5V | -0001 | GRY | White | YES | YES | No | N/A |
| | | -0101 | GRY | Amber | | | | |
| | | -0201 | GRY | NVIS | | | | |

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -1301 | 28V | -0004 | BLK | White | NO | YES | No | N/A |
| | | -0104 | BLK | Amber | | | | |
| | | -0204 | BLK | NVIS | | | | |
| -1401 | 28V | -0003 | GRY | White | NO | YES | No | N/A |
| | | -0103 | GRY | Amber | | | | |
| | | -0203 | GRY | NVIS | | | | |
| -1501 | 5V | -0004 | BLK | White | NO | YES | No | N/A |
| | | -0104 | BLK | Amber | | | | |
| | | -0204 | BLK | NVIS | | | | |
| -1601 | 5V | -0003 | GRY | White | NO | YES | No | N/A |
| | | -0103 | GRY | Amber | | | | |
| | | -0203 | GRY | NVIS | | | | |
| -1701 | 28V | -0026 | BLK | White | YES | NO | 2 | Normal |
| | | -0126 | BLK | Amber | | | | |
| | | -0226 | BLK | NVIS | | | | |
| -1801 | 28V | -0025 | GRY | White | YES | NO | 2 | Normal |
| | | -0125 | GRY | Amber | | | | |
| | | -0225 | GRY | NVIS | | | | |
| -1901 | 5V | -0026 | BLK | White | YES | NO | 2 | Normal |
| | | -0126 | BLK | Amber | | | | |
| | | -0226 | BLK | NVIS | | | | |
| -2001 | 5V | -0025 | GRY | White | YES | NO | 2 | Normal |
| | | -0125 | GRY | Amber | | | | |
| | | -0225 | GRY | NVIS | | | | |

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -2201 | 28V | -0027 | GRY | White | NO | NO | 2 | Normal |
| | | -0127 | GRY | Amber | | | | |
| | | -0227 | GRY | NVIS | | | | |
| -2301 | 5V | -0028 | BLK | White | NO | NO | 2 | Normal |
| | | -0128 | BLK | Amber | | | | |
| | | -0228 | BLK | NVIS | | | | |
| -2501 | 28V | -0006 | BLK | White | YES | NO | No | N/A |
| | | -0106 | BLK | Amber | | | | |
| | | -0206 | BLK | NVIS | | | | |
| -2901 | 28V | -0008 | BLK | White | NO | NO | No | N/A |
| | | -0108 | BLK | Amber | | | | |
| | | -0208 | BLK | NVIS | | | | |
| -3201 | 5V | -0007 | GRY | White | NO | NO | No | N/A |
| | | -0107 | GRY | Amber | | | | |
| | | -0207 | GRY | NVIS | | | | |
| -3502 | 5V | -0022 | BLK | White | YES | YES | 2 | Extended |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -4102 | 28V | -0026 | BLK | White | YES | NO | 2 | Extended |
| | | -0126 | BLK | Amber | | | | |
| | | -0226 | BLK | NVIS | | | | |
| -4202 | 28V | -0025 | GRY | White | YES | NO | 2 | Extended |
| | | -0125 | GRY | Amber | | | | |
| | | -0225 | GRY | NVIS | | | | |

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -4302 | 5V | -0026 | BLK | White | YES | NO | 2 | Extended |
| | | -0126 | BLK | Amber | | | | |
| | | -0226 | BLK | NVIS | | | | |
| -4402 | 5V | -0025 | GRY | White | YES | NO | 2 | Extended |
| | | -0125 | GRY | Amber | | | | |
| | | -0225 | GRY | NVIS | | | | |
| -4902 | 28V | -0022 | BLK | White | YES | YES | 2 | No Range |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -5002 | 28V | -0021 | GRY | White | YES | YES | 2 | No Range |
| | | -0121 | GRY | Amber | | | | |
| | | -0221 | GRY | NVIS | | | | |
| -5102 | 5V | -0022 | BLK | White | YES | YES | 2 | No Range |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -5202 | 5V | -0021 | GRY | White | YES | YES | 2 | No Range |
| | | -0121 | GRY | Amber | | | | |
| | | -0221 | GRY | NVIS | | | | |
| -3303 | 28V | -0022 | BLK | White | YES | YES | 2 | Extended |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -3403 | 28V | -0021 | GRY | White | YES | YES | 2 | Extended |
| | | -0121 | GRY | Amber | | | | |
| | | -0221 | GRY | NVIS | | | | |

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -3503 | 5V | -0022 | BLK | White | YES | YES | 2 | Extended |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -3603 | 5V | -0021 | GRY | White | YES | YES | 2 | Extended |
| | | -0121 | GRY | Amber | | | | |
| | | -0221 | GRY | NVIS | | | | |
| -4903 | 28V | -0022 | BLK | White | YES | YES | 2 | No Range |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -5003 | 28V | -0021 | GRY | White | YES | YES | 2 | No Range |
| | | -0121 | GRY | Amber | | | | |
| | | -0221 | GRY | NVIS | | | | |
| -5103 | 5V | -0022 | BLK | White | YES | YES | 2 | No Range |
| | | -0122 | BLK | Amber | | | | |
| | | -0222 | BLK | NVIS | | | | |
| -5203 | 5V | -0021 | GRY | White | YES | YES | 2 | No Range |
| | | -0121 | GRY | Amber | | | | |
| | | -0221 | GRY | NVIS | | | | |
| -5503 | 5V | -0024 | BLK | White | NO | YES | 2 | No Range |
| | | -0124 | BLK | Amber | | | | |
| | | -0224 | BLK | NVIS | | | | |
| -5603 | 5V | -0023 | GRY | White | NO | YES | 2 | No Range |
| | | -0123 | GRY | Amber | | | | |
| | | -0223 | GRY | NVIS | | | | |

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -6503 | 28V | -0012 | BLK | White | YES | YES | 1 | Extended |
| | | -0112 | BLK | Amber | | | | |
| | | -0212 | BLK | NVIS | | | | |
| -6603 | 28V | -0011 | GRY | White | YES | YES | 1 | Extended |
| | | -0111 | GRY | Amber | | | | |
| | | -0211 | GRY | NVIS | | | | |
| -6703 | 5V | -0012 | BLK | White | YES | YES | 1 | Extended |
| | | -0112 | BLK | Amber | | | | |
| | | -0212 | BLK | NVIS | | | | |
| -6803 | 5V | -0011 | GRY | White | YES | YES | 1 | Extended |
| | | -0111 | GRY | Amber | | | | |
| | | -0211 | GRY | NVIS | | | | |
| -8103 | 28V | -0012 | BLK | White | YES | YES | 1 | No Range |
| | | -0112 | BLK | Amber | | | | |
| | | -0212 | BLK | NVIS | | | | |
| -8203 | 28V | -0011 | GRY | White | YES | YES | 1 | No Range |
| | | -0111 | GRY | Amber | | | | |
| | | -0211 | GRY | NVIS | | | | |
| -8303 | 5V | -0012 | BLK | White | YES | YES | 1 | No Range |
| | | -0112 | BLK | Amber | | | | |
| | | -0212 | BLK | NVIS | | | | |
| -8403 | 5V | -0011 | GRY | White | YES | YES | 1 | No Range |
| | | -0111 | GRY | Amber | | | | |
| | | -0211 | GRY | NVIS | | | | |

Table 15 PS-578A Replacements for KFS 578A Versions

| KFS 578A 071-01507 | KFS LAMP | PS-578A 071-01618 | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | ON/OFF SWITCH | TCAS | RANGE CONTROL |
|---|---|---|---|---|---|---|---|---|
| -4304 | 5V | -0026 | BLK | White | YES | NO | 2 | Extended /Select |
| | | -0126 | BLK | Amber | | | | |
| | | -0226 | BLK | NVIS | | | | |
| -4404 | 5V | -0025 | GRY | White | YES | NO | 2 | Extended /Select |
| | | -0125 | GRY | Amber | | | | |
| | | -0225 | GRY | NVIS | | | | |
| -7504 | 5V | -0016 | BLK | White | YES | NO | 1 | Extended /Select |
| | | -0116 | BLK | Amber | | | | |
| | | -0216 | BLK | NVIS | | | | |
| -7604 | 5V | -0015 | GRY | White | YES | NO | 1 | Extended /Select |
| | | -0115 | GRY | Amber | | | | |
| | | -0215 | GRY | NVIS | | | | |

## 3.D. CD 671C Mode S/TCAS Control Unit Configurations

Refer to table 16 and table 17.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 16 CD 671C Control Unit Configurations P/N 071-01542-()

| PART NUMBER | FACE PLATE | ON/OFF SWITCH | TCAS | DUAL XPNDR 1/2 | LAMP VOLTAGE | RANGE CONTROL | T/Wx SWITCH |
|---|---|---|---|---|---|---|---|
| -0101 | Black | Yes | I | Yes | 5vac/5vdc or 28vdc | Yes | Yes |
| -0201 | Black | Yes | I | Yes | 5vac/5vdc or 28vdc | No | Yes |
| -0301 | Black | Yes | I | Yes | 5vac/5vdc or 28vdc | Yes | No |
| -0401 | Black | Yes | I | Yes | 5vac/5vdc or 28vdc | No | No |
| -0501 | Black | Yes | No | Yes | 5vac/5vdc or 28vdc | No | No |
| -0601 | Black | Yes | II | Yes | 5vac/5vdc or 28vdc | Yes | Yes |
| -0701 | Black | Yes | II | Yes | 5vac/5vdc or 28vdc | No | Yes |
| -0801* | Black | Yes | II | Yes | 5vac/5vdc or 28vdc | Yes | No |
| -0901 | Black | Yes | II | Yes | 5vac/5vdc or 28vdc | No | No |
| -1101 | Black | Yes | I | No | 5vac/5vdc or 28vdc | Yes | Yes |
| -1201 | Black | Yes | I | No | 5vac/5vdc or 28vdc | No | Yes |
| -1301 | Black | Yes | I | No | 5vac/5vdc or 28vdc | Yes | No |
| -1401 | Black | Yes | I | No | 5vac/5vdc or 28vdc | No | No |
| -1501 | Black | Yes | No | No | 5vac/5vdc or 28vdc | No | No |
| -1601 | Black | Yes | II | No | 5vac/5vdc or 28vdc | Yes | Yes |
| -1701 | Black | Yes | II | No | 5vac/5vdc or 28vdc | No | Yes |

Table 16 CD 671C Control Unit Configurations P/N 071-01542-()

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -1801 | Black | Yes | II | No | 5vac/5vdc or 28vdc | Yes | No |
| -1901 | Black | Yes | II | No | 5vac/5vdc or 28vdc | No | No |
| -2101 | Gray | Yes | I | Yes | 5vac/5vdc or 28vdc | Yes | Yes |
| -2201 | Gray | Yes | I | Yes | 5vac/5vdc or 28vdc | No | Yes |
| -2301 | Gray | Yes | I | Yes | 5vac/5vdc or 28vdc | Yes | No |
| -2401 | Gray | Yes | I | Yes | 5vac/5vdc or 28vdc | No | No |
| -2501 | Gray | Yes | No | Yes | 5vac/5vdc or 28vdc | No | No |
| -2601 | Gray | Yes | II | Yes | 5vac/5vdc or 28vdc | Yes | Yes |
| -2701 | Gray | Yes | II | Yes | 5vac/5vdc or 28vdc | No | Yes |
| -2801 | Gray | Yes | II | Yes | 5vac/5vdc or 28vdc | Yes | No |
| -2901 | Gray | Yes | II | Yes | 5vac/5vdc or 28vdc | No | No |
| -3101 | Gray | Yes | I | No | 5vac/5vdc or 28vdc | Yes | Yes |
| -3201 | Gray | Yes | I | No | 5vac/5vdc or 28vdc | No | Yes |
| -3301 | Gray | Yes | I | No | 5vac/5vdc or 28vdc | Yes | No |
| -3401 | Gray | Yes | I | No | 5vac/5vdc or 28vdc | No | No |
| -3501 | Gray | Yes | No | No | 5vac/5vdc or 28vdc | No | No |
| -3601 | Gray | Yes | II | No | 5vac/5vdc or 28vdc | Yes | Yes |
| -3701 | Gray | Yes | II | No | 5vac/5vdc or 28vdc | No | Yes |
| -3801 | Gray | Yes | II | No | 5vac/5vdc or 28vdc | Yes | No |
| -3901 | Gray | Yes | II | No | 5vac/5vdc or 28vdc | Yes | No |
| *Dim Select | | | | | | | |

Table 17 CD 671C Control Unit Features

| FEATURE | DESCRIPTION |
|---|---|
| Basic Unit | Microprocessor based control unit for controlling a transponder. The unit contains all controls required for transponder operation including: TEST, STANDBY, ON (transponder), ALTITUDE, VFR and IDENT. Compatible with the COLLINS TDR-94D transponder. |
| 1/2 Dual | Provides control of two, individually selected transponders. |
| TCAS Range Switch | Selects nautical mile range for the traffic display. Nautical mile range scales are 3, 5, 10, 15, 20, or 40. |
| TCAS | The TCAS configuration contains the following elements:<br>ABOVE/NORMAL/BELOW: Selects relative altitude display limits for non-threat category aircraft on traffic display.<br>TA: Places the TCAS in the Traffic Advisory mode.<br>TA/RA: Places the TCAS in the Traffic Advisory/Resolution Advisory mode.<br>T/Wx: On the weather radar display selects Weather Only; or Weather with TCAS traffic; or Traffic Only mode.<br>FL: TCAS Flight Level function causes the TCAS indicator to change displayed altitude from Relative Altitude (intruder to own aircraft) to absolute altitude. |
| Lamp Voltage | The panel lamps can be powered by either 5 Vac, 5 Vdc, or 28 Vdc dimming source. |
| Dim Select | Provides for maximum brightness for display backlighting on selected versions. |

## 3.E. PS-550 Mode S/TCAS Control Panel Configurations

Refer to table 18 and table 19.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 18 PS-550 Control Panel Configurations P/N 071-01619-()

| PART NUMBER | FACE PLATE | DISPLAY COLOR | DUAL XPNDR 1/2 | OFF SWITCH | TCAS | LAMP VOLTS | RANGE CONTROL OPTION* |
|---|---|---|---|---|---|---|---|
| -0001 | Gray | White | Yes | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0002 | Black | White | Yes | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0003 | Gray | White | No | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0004 | Black | White | No | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0005 | Gray | White | Yes | No | No | 5vac/5vdc or 28vdc | N/A |
| -0006 | Black | White | Yes | No | No | 5vac/5vdc or 28vdc | N/A |
| -0007 | Gray | White | No | No | No | 5vac/5vdc or 28vdc | N/A |
| -0008 | Black | White | No | No | No | 5vac/5vdc or 28vdc | N/A |
| -0011 | Gray | White | Yes | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0012 | Black | White | Yes | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0013 | Gray | White | No | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0014 | Black | White | No | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0015 | Gray | White | Yes | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0016 | Black | White | Yes | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0017 | Gray | White | No | No | 1 | 5vac/5vdc or 28vdc | Yes |

Table 18 PS-550 Control Panel Configurations P/N 071-01619-()

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -0018 | Black | White | No | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0021 | Gray | White | Yes | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0022 | Black | White | Yes | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0023 | Gray | White | No | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0024 | Black | White | No | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0025 | Gray | White | Yes | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0026 | Black | White | Yes | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0027 | Gray | White | No | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0028 | Black | White | No | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0101 | Gray | Amber | Yes | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0102 | Black | Amber | Yes | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0103 | Gray | Amber | No | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0104 | Black | Amber | No | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0105 | Gray | Amber | Yes | No | No | 5vac/5vdc or 28vdc | N/A |
| -0106 | Black | Amber | Yes | No | No | 5vac/5vdc or 28vdc | N/A |
| -0107 | Gray | Amber | No | No | No | 5vac/5vdc or 28vdc | N/A |
| -0108 | Black | Amber | No | No | No | 5vac/5vdc or 28vdc | N/A |
| -0111 | Gray | Amber | Yes | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0112 | Black | Amber | Yes | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0113 | Gray | Amber | No | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0114 | Black | Amber | No | Yes | 1 | 5vac/5vdc or 28vdc | Yes |

Table 18 PS-550 Control Panel Configurations P/N 071-01619-()

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -0115 | Gray | Amber | Yes | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0116 | Black | Amber | Yes | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0117 | Gray | Amber | No | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0118 | Black | Amber | No | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0121 | Gray | Amber | Yes | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0122 | Black | Amber | Yes | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0123 | Gray | Amber | No | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0124 | Black | Amber | No | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0125 | Gray | Amber | Yes | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0126 | Black | Amber | Yes | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0127 | Gray | Amber | No | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0128 | Black | Amber | No | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0201 | Gray | NVIS | Yes | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0202 | Black | NVIS | Yes | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0203 | Gray | NVIS | No | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0204 | Black | NVIS | No | Yes | No | 5vac/5vdc or 28vdc | N/A |
| -0205 | Gray | NVIS | Yes | No | No | 5vac/5vdc or 28vdc | N/A |
| -0206 | Black | NVIS | Yes | No | No | 5vac/5vdc or 28vdc | N/A |
| -0207 | Gray | NVIS | No | No | No | 5vac/5vdc or 28vdc | N/A |
| -0208 | Black | NVIS | No | No | No | 5vac/5vdc or 28vdc | N/A |
| -0211 | Gray | NVIS | Yes | Yes | 1 | 5vac/5vdc or 28vdc | Yes |

Table 18 PS-550 Control Panel Configurations P/N 071-01619-()

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| -0212 | Black | NVIS | Yes | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0213 | Gray | NVIS | No | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0214 | Black | NVIS | No | Yes | 1 | 5vac/5vdc or 28vdc | Yes |
| -0215 | Gray | NVIS | Yes | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0216 | Black | NVIS | Yes | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0217 | Gray | NVIS | No | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0218 | Black | NVIS | No | No | 1 | 5vac/5vdc or 28vdc | Yes |
| -0221 | Gray | NVIS | Yes | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0222 | Black | NVIS | Yes | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0223 | Gray | NVIS | No | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0224 | Black | NVIS | No | Yes | 2 | 5vac/5vdc or 28vdc | Yes |
| -0225 | Gray | NVIS | Yes | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0226 | Black | NVIS | Yes | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0227 | Gray | NVIS | No | No | 2 | 5vac/5vdc or 28vdc | Yes |
| -0228 | Black | NVIS | No | No | 2 | 5vac/5vdc or 28vdc | Yes |

*Discrete options for TCAS traffic display range control include: Normal 3, 5, 10, 15 nm; Extended 3, 5, 10, 15, 20, 40 nm; or Range Disabled. Refer to table 2007, figure 2029, and figure 2030.

Table 19 PS-550 Control Panel Features

| FEATURE | DESCRIPTION |
|---|---|
| Basic Unit | Microprocessor based control unit for controlling a transponder. The unit contains all controls required for transponder operation including: TEST, STANDBY, ON (transponder), ALTITUDE, VFR and IDENT. Compatible with the COLLINS TDR-94D transponder. |
| 1/2 Dual | Provides control of two individually selected transponders. |
| TCAS Range Switch | Selects the TCAS nautical mile traffic display according to the installed discrete range option (see table 2007, figure 2029, figure 2030):<br>-NORMAL 3, 5, 10, 15 nm<br>-EXTENDED 3, 5, 10, 15, 20, 40 nm<br>-RANGE DISABLED. INOP is displayed as TCAS Range switch is rotated. |
| TCAS | The TCAS configuration contains the following elements:<br>ABOVE/NORMAL/BELOW: Selects relative altitude display limits for non-threat category aircraft on traffic display.<br>TA: Places the TCAS in the Traffic Advisory mode.<br>TA/RA: Places the TCAS in the Traffic Advisory/Resolution Advisory mode.<br>FL: TCAS Flight Level function causes the TCAS indicator to change displayed altitude from Relative Altitude (intruder to own aircraft) to absolute altitude. |
| MODE Pushbutton | ATC Mode - allows entry of the four-digit ATC code.<br>FID Mode - allows entry of alpha numeric flight identification and annunciates “FID” on display.<br>TFC Mode - (Collins TDR-94D) selects traffic display operating mode: pop-up (AUTO) or full-time display (ON) and annunciates on display.<br>FL Mode (Honeywell MST 67A) - allows selection of relative (REL) or absolute (ABS) altitude to be displayed.<br>ADC Mode - selects which air data computer is used by TCAS and annunciates “ADC” and “1” or “2” on display. |
| Lamp Voltage | Lamps can be powered by 5 Vac, 5 Vdc, or 28 Vdc dimming source. |
| Lighting Brightness Control | Dim and bright values for panel lighting and LCD backlighting may be adjusted independently. |

## 3.F. Optional CTA-81() Mode S/TCAS Control Unit Configurations

The following CTA-81( ) ARINC control units may be used with the MST 67A Mode S transponder. Please consult the TRA-67 Mode S Transponder System, Maintenance Manual, P/N I.B. 1167 for additional information.

### 3.F.(1) CTA-81A Control Unit Configurations

Refer to table 20 and table 21.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 20 CTA-81A Control Unit Configurations P/N 071-01503-()

| PART NUMBER | FACE PLATE | TCAS RANGE SWITCH | ABOVE/ NORM/ BELOW SWITCH | ALT 1/2 SWITCH | ATC FAIL LAMP | ATC FAIL LAMP VOLTAGE | XPNDR FAIL |
|---|---|---|---|---|---|---|---|
| -0101 | Black | 3-15 | Yes | No | Yes | 12-28 Vdc | Open |
| -0201 | Gray | 3-15 | Yes | No | Yes | 12-28 Vdc | Open |
| -1301 | Black | No | No | No | Yes | 12-28 Vdc | Open |
| -1401 | Gray | No | No | No | Yes | 12-28 Vdc | Open |
| -2101 | Black | 3-15 | No | Yes | Yes | 12-28 Vdc | Open |
| -2201 | Gray | 3-15 | No | Yes | Yes | 12-28 Vdc | Open |
| -2501 | Black | No | No | Yes | Yes | 12-28 Vdc | Open |
| -2601 | Gray | No | No | Yes | Yes | 12-28 Vdc | Open |
| -3801 | Gray | 5-40 | Yes | No | Yes | 12-28 Vdc | Open |
| -3901 | Gray | 5-40 | No | Yes | Yes | 12-28 Vdc | Open |
| -4001 | Black | 5-40 | Yes | No | Yes | 12-28 Vdc | Open |
| -4201 | Black | 5-40 | No | Yes | Yes | 12-28 Vdc | Open |
| -5901 | Gray | No | Yes | No | Yes | 12-28 Vdc | Open |

Table 21 CTA-81A Control Unit Features

| FEATURE | DESCRIPTION |
|---|---|
| Faceplate | A choice of faceplate colors are available. |
| Basic Unit | A microprocessor based transponder control panel for controlling two Mode S transponders and a TCAS processor. |
| ATC 1/2 Switch | Selects either transponder 1 or 2. |
| ATC FAIL Lamp | Lights when the selected transponder fails. 28 Vdc. |
| TCAS RANGE Switch | Four position rotary switch. Selects 3, 5, 10, or 15; or 5, 10, 20, or 40 nautical mile ranges for the traffic display. |
| ABOVE/NORM BELOW Switch | Selects relative altitude display limits; normal, above normal, or below normal. |
| ALT 1/2 Switch | Selects either altitude source 1 or 2. |
| ATC FAIL Lamp Voltage | The ATC FAIL lamp is powered by 12-28 Vdc (28 Vdc lamp operated at 28 Vdc for dimming purposes) |
| XPONDR FAIL | An open from the Transponder Fail discrete #2* causes the ATC FAIL lamp to light. |
| Dim Source | A choice of 5 Vac or dc dim power input. |
| *When used in configuration with transponders other than the MST 67A, transponder fail discretes #1 or #2 may be used. | |

### 3.F.(2) CTA-81D Mode S/TCAS Control Unit Configurations

Refer to table 22 and table 23.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 22 CTA-81D Control Unit Configurations P/N 071-01561-()

| PART NUMBER | FACE PLATE | TCAS RANGE SWITCH | ABOVE/ NORM/ BELOW SWITCH | ALT 1/2 SWITCH | ATC FAIL LAMP | ATC FAIL LAMP VOLT-AGE | XPNDR FAIL |
|---|---|---|---|---|---|---|---|
| -0101 | Gray | Yes | Yes | No | Yes | 12-28 Vdc | Open |
| -0201 | Gray | No | Yes | No | Yes | 12-28 Vdc | Open |

Table 23 CTA-81D Control Unit Features

| FEATURE | DESCRIPTION |
|---|---|
| Faceplate | A gray faceplate is available. |
| Basic Unit | A microprocessor based transponder control panel for controlling two Mode S transponders, compatible with the Collins TDR-94D. |
| TCAS RANGE Switch | Four position rotary switch. Selects 5, 10, 20, or 40 nautical mile ranges for the traffic display. |
| ABOVE/NORM BELOW Switch | Selects relative altitude display limits; normal, above normal, or below normal. |
| ALT ON/ALT OFF Switch | Selects altitude source. |
| ATC 1/2 Switch | Selects either transponder 1 or 2. |
| ATC FAIL Lamp Voltage | The ATC FAIL lamp is powered by 12-28 Vdc (28 Vdc lamp operated at 28 Vdc for dimming purposes) |
| XPONDR FAIL | An open from the Transponder Fail discrete #2* causes the ATC FAIL lamp to light. |
| Dim Source | A choice of 5 Vac or dc dim power input. |
| *When used in configuration with transponders other than the MST 67A, transponder fail discretes #1 or #2 may be used. | |

## 3.G. L-Band Omnidirectional Antenna Configurations

Refer to table 24 and table 25.

NOTE: Some part numbers may not be currently available. Please consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

Table 24 L-Band Omnidirectional Antenna Configurations

| VENDOR NAME | MODEL | VENDOR PART NUMBER | LRU DESCRIPTION | IMPEDANCE/ RF/DC | TSO COMPLIANCE |
|---|---|---|---|---|---|
| Honeywell | KA60 | 071-01174-0000* | L-Band | 50 ohm/Open | C66a, C74c |
| Dorne & Margolin | DMNI 50-Series | DMNI50-2-2 | L-Band | 50 ohm/Short | C66a, C74c |
| *Includes antenna, installation template, backing plate, and mounting hardware. | | | | | |

Table 25 L-Band Omnidirectional Antenna Features

| EQUIPMENT TYPE | DESCRIPTION |
|---|---|
| Antenna | L-band antenna, TSO C66a, or C74, C112, or C119 are required. Both top and bottom antennas must be identical. |
| | NOTE: If used with a Honeywell TPU 66A or TPU 67A TCAS processor the antenna must be a dc shorted type. |
| | Receives vertically polarized signals at 1030 MHz. |
| | Transmits vertically polarized signals at 1090 MHz. |
| | Match to 50 ohm coaxial cable with a VSWR less than 1.35:1 over frequency range. |

## 4. Component Leading Particulars

Leading particulars for the MST 67A Mode S transponder, the KFS 578A, PS-578A, CD 671C, PS-550, CTA-81A, and CTA-81D Mode S/TCAS control units, and the KA 60 antenna are described below.

Leading particulars for optional units are described in separate manuals (refer to Related Publications table 8). See original manufacturer's publications for non-Honeywell units.

### 4.A. MST 67A Mode S Transponder Leading Particulars

Refer to table 26.

Table 26 MST 67A Mode S Transponder Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| TSO Compliance | TSO C112:<br>2A1 101 011 (0101)<br>2A1 101 010 (0201)<br>2A1 101 011 (0301)<br>3A2 121 011 (1101)<br>3A2 121 010 (1201)<br>3A2 121 011 (1301)<br>3A2 121 011 (1602) |
| TSO/ETSO Compliance | TSO C112, ETSO 2C112a:<br>3A2 121 010 (2001)<br>3A2 121 011 (2101) |
| Form Factor | 4 MCU per ARINC 600 |
| Physical Dimensions | See outline/mounting figure 2010,<br>Dwg No. 155-05793-0000. |
| Weight | See outline/mounting figure 2010,<br>Dwg No. 155-05793-0000. |
| Power Input | 13.75-28 Vdc, 45 W |
| Cooling | No forced air cooling required |
| Connector | ARINC 404A. See figure 2002,<br>Dwg. No. 155-01626-0001. |
| Transmitter Power | 400 Watts (nominal) |
| Transmit Reply Rate Capability | Rate limits of replies: ATCRBS 750 PRF,<br>Mode S 50 PRF |
| Transmit Frequency | 1090 ±1 MHz |
| Input VSWR | 1.5:1 |
| Receiver Frequency | 1030 MHz ±0.2 MHz |

Table 26 MST 67A Mode S Transponder Leading Particulars

| | |
|---|---|
| Altitude Inputs | Dual ARINC 575 Air Data (ARINC 419), Dual ARINC 706 Air Data (ARINC 429), Dual Gillham (Mode C Gray Code) |
| Suppression | ARINC 718 |
| Control Inputs | Dual ARINC 718 (ARINC 429) |
| Maintenance Inputs | Per ARINC 604 (ARINC 429) |
| Datalink I/O | Per ARINC 718 (ARINC 429) |
| Flight ID Input | Per ARINC 718 (ARINC 429) |
| TCAS I/O | Per ARINC 735 (HI-SPEED 429) |
| Squitter | Transmitted at 1 ±0.2 sec. random, full self verification of every squitter's data and occurrence. |
| Receiver Sensitivity and Dynamic Range | The MTL for ATCRBS and ATCRBS/Mode S All-Call interrogations will be -73 ±4 dB. |
| | The MTL for Mode S format interrogations will be -74 ±3 dB. |
| | The reply efficiency will be at least 90% for all Mode S interrogations between MTL +3dB and -21dBm. |
| | The reply efficiency will not be more than 10% for interrogations at signals levels below -81 dBm. |
| | The variation of the MTL between ATCRBS Mode A and Mode C interrogations will not exceed 1 dB. |
| | The reply efficiency will be at least 90% for ATCRBS and ATCRBS/Mode S All-Call interrogations between MTL +3 dB and -21 dB. |
| Receiver Sensitivity Variations with Frequency | The RF input level required to produce 90% replies will not vary by more than 1 dB, nor will it increase above -69 dBm in level for standard ATCRBS interrogation signals in the frequency range between 1029.8 and 1030.2 MHz. |
| Receiver Selectivity | The 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. |
| Unwanted RF Output | When not transmitting, the transponder will not emit more than -70 dBm at any frequency within 3 MHz of 1090 MHz. This "not transmitting" period of time allows for 10 μsec transition zones preceding and following any transmission. |
| ATCRBS Reply Pulse Shape | All ATCRBS reply pulses and the SPI pulse will have rise times of between 0.05 and 0.1 μsec and decay time between 0.05 and 0.2 μsec. Each pulse will have a duration of 0.45 ±0.1 μsec. |

Table 26 MST 67A Mode S Transponder Leading Particulars

| | |
|---|---|
| ATCRBS Reply Pulse Amplitude Variation | The pulse amplitude of any one ATCRBS reply pulse relative to another in any one reply train will not exceed 1 dB. |
| Mode S Reply Pulse Amplitude | The pulse amplitude of any one Mode S reply pulse relative to another in any one reply train will not exceed 2 dB. |
| Mode S Reply Pulse Shape | All Mode S reply pulses will have a rise time of 0.1 μsec and a fall time of 0.2 μsec. Each pulse will have a duration of 0.5 ±0.05 μsec. The shape will also be consistent with the following spectrum requirements: |
| Deviation from Carrier (MHz)<br>1.3 ≤ Freq < 7.0<br>7.0 ≤ Freq < 23<br>23 ≤ Freq < 78<br>78 ≤ Freq | Relative Amplitude (dB)<br><br>3<br>20<br>40<br>60 |
| Performance Over Certified Environmental Conditions | See Environmental Certification Categories chart. |

## 4.B. KFS 578A Mode S/TCAS Control Unit Leading Particulars

Refer to table 27.

Table 27 KFS 578A Control Unit Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| Overall Dimensions | See outline/mounting figure 2011, Dwg No. 155-05789-0000. |
| Weight | See outline/mounting figure 2011, Dwg No. 155-05789-0000. |
| Mounting | Front panel rail mount |
| Power Requirements | 11.75 to 27.5 Vdc, 6 W<br>28 Vdc; 350 mA, 10 W<br>5 Vdc, or 5 Vac 400 Hz, or 28 Vdc lighting |
| Temperature<br>Operating<br>Storage | <br>-35 °C to +55 °C<br>-55 °C to +85 °C |
| Cooling | No forced cooling required |
| Connector | One 29-pin sub-D, one 9-pin sub-D. See figure 2003. |
| Operational Characteristics | ARINC 718 |
| Display and Panel Lighting | 27.5 V, 10.5 W<br>5 V, 300 mA, 1.5 W; 28 Vdc, 75 mA, 2.1 W |
| Data Output | Low-speed ARINC 429 |
| TSO Compliance | TSO C112 |
| Environmental Certification | See Environmental Certification Categories chart. |

## 4.C. PS-578A Mode S/TCAS Control Panel Leading Particulars

Refer to table 28.

Table 28 PS-578A Control Panel Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| Dimensions: | See outline/mounting figure 2012, Dwg No. G7534-()-Dim. |
| Weight: | See outline/mounting figure 2012, Dwg No. G7534-()-Dim. |
| Center of Gravity: | See outline/mounting figure 2012, Dwg No. G7534-()-Dim. |
| Power Requirements: | 28 Vdc at 7 watts, maximum. |
| Connector: | One 29-pin sub-D, one 9-pin sub-D. See figure 2004 and figure 2005. |
| Temperature:<br>Operating<br>Storage | <br>-20 °C to +70 °C<br>-55 °C to +85 °C |
| Cooling: | No forced cooling required. |
| TSO: | C112, C119b |
| Environmental Certification: | See Environmental Certification Categories chart. |

## 4.D. CD 671C Mode S/TCAS Control Unit Leading Particulars

Refer to table 29.

Table 29 CD 671C Control Unit Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| Overall Dimensions | See outline/mounting figure 2013, Dwg No. 155-06001-0000. |
| Weight | See outline/mounting figure 2013, Dwg No. 155-06001-0000. |
| Mounting | Front panel rail mount |
| Power Requirements | 11.75-27.5 Vdc<br>28 Vdc; 350 mA, 10 W<br>5 Vdc, or 5 Vac 400 Hz or 28 Vdc lighting |
| Temperature:<br>Operating<br>Storage | <br>-35 °C to +55 °C<br>-55 °C to +85 °C |
| Cooling | No forced cooling required |
| Display | Gas Discharge |
| Data Output | Low-speed ARINC 429 |
| Front-Mounted Range Control | Optional |
| Front-Mounted TCAS/WX Control | Optional |
| Connector | Dual filtered subminiature-D 25-pin female. See figure 2006. |
| TSO | C112 |
| Software Criticality Level | DO-178A, Level 2 (Essential) |
| Environmental Certification: | See Environmental Certification Categories chart. |

## 4.E. PS-550 Mode S/TCAS Control Panel Leading Particulars

Refer to table 30.

Table 30 PS-550 Control Panel Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| Dimensions: | See outline/mounting figure 2014, Dwg No. G7514-()-Dim. |
| Weight: | See outline/mounting figure 2014, Dwg No. G7514-()-Dim. |
| Center of Gravity: | See outline/mounting figure 2014, Dwg No. G7514-()-Dim. |
| Power Requirements: | 28 Vdc at 7 watts, maximum. |
| Connector: | One 65 pin. See figure 2007. |
| Temperature:<br>Operating<br>Storage | <br>-20 °C to +70 °C<br>-55 °C to +85 °C |
| Cooling: | No forced cooling required. |
| TSO: | C112, C119b |
| Environmental Certification: | See Environmental Certification Categories chart. |

## 4.F. CTA-81A and CTA-81D Mode S/TCAS Control Units Leading Particulars

Refer to table 31.

Table 31 CTA-81A and CTA-81D Control Unit Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| Operational Characteristics | ARINC 718/735 |
| Mounting | Dzus-mounted per ARINC 718 |
| Dimensions | See figure 2015 (CTA-81A), Dwg No. 155-05766-0000. See figure 2016 (CTA-81D), Dwg No. 155-06009-0000. |
| Weight | See figure 2015 (CTA-81A), Dwg No. 155-05766-0000. See figure 2016 (CTA-81D), Dwg No. 155-06009-0000. |
| Power Requirements | 115 Vac, 400 Hz, 6 W |
| Connector | Two 24-pin MIL-C-83723 Series 3. See figure 2008. |
| Display and Panel Lighting | 0-5 Vac 400 Hz, 10.5 W |
| Integrity Monitor Lamp | 12-28 Vdc or 5 Vac 400 Hz, 0.3 W |
| Data Output | ARINC 429, 12.5 to 14 kbits/sec |
| TSO Compliance | TSO C112 |
| Environmental Certification | See Environmental Certification Categories chart. |

## 4.G. KA 60 Antenna Leading Particulars

Refer to table 32.

Table 32 KA 60 Antenna Leading Particulars

| CHARACTERISTIC | DESCRIPTION |
|---|---|
| TSO Compliance | C66a, C74c |
| Physical Dimensions<br>Height:<br>Width:<br>Length: | <br>3.13 +/-0.2 inches (79.502 +/-5.08 mm)<br>0.95 +/-0.2 inches (24.13 +/-5.08 mm)<br>4.05 +/-0.2 inches (102.87 +/-5.08 mm) |
| Weight | 0.20 lbs (0.09 kg) |
| Temperature | -55 deg C to +71 deg C |
| Altitude | 55,000 feet |
| Vibration | 0.2 inch/ 2 g - 0.02 inch/ 5 g |
| Shock | Rigid mounting 6 G operational 15 G crash safety. |
| Environmental Certification | DO-160 D2A/JY/XXXXXXXXXXX |

## 4.H. Environmental Certification

Mode S transponder equipment meets the environmental conditions of the Radio Technical Commission for Aeronautics (RTCA) document number DO-160/A/B/C/D, "Environmental Conditions and Test Procedures for Airline Electronic/Electrical Equipment and Instruments" as specified in the Environmental Certification Categories table 33 below.

Refer to manuals listed in the Related Publications table 8 for Environmental Certification Categories for other Mode S related equipment.

Table 33 DO-160/B/C/D Environmental Certification Categories

| CATEGORY: | MST67A | MST67A -1602 -2001 -2101 | CD671C* | KFS578A | CT-81() | PS578A ** | PS550 ** |
|---|---|---|---|---|---|---|---|
| 4.TEMPERATURE AND ALTITUDE | A2F2 | A2F2 | A1D1 | A1D1 | A1 | A2D1 | A2D1 |
| 5.TEMPERATURE VARIATION | B | B | C | C | C | B | C |
| 6.HUMIDITY | A | A | A | A | A | A | A |
| 7.SHOCK | Ψ | Ψ | Ψ | Ψ | Ψ | B | B |
| 8.VIBRATION | MNO | MNO | PBS | K | K | UFF1 | UFF1 |
| 9.EXPLOSION PROOFNESS | E1 | E1 | X | X | X | X | X |
| 10.WATERPROOFNESS | X | X | X | X | X | X | X |
| 11.FLUIDS SUSCEPTIBILITY | X | X | X | X | X | X | X |
| 12.SAND AND DUST | X | X | X | X | X | X | X |
| 13.FUNGUS RESISTANCE | X | X | X | X | X | X | X |
| 14.SALT SPRAY | X | X | X | X | X | X | X |
| 15.MAGNETIC EFFECT | A | A | Z | Z | A | Z | Z |
| 16.POWER INPUT | A | A | AZ | A | E | BZ | BZ |
| 17.VOLTAGE SPIKES | A | A | AB | A | A | A | A |

Table 33 DO-160/B/C/D Environmental Certification Categories

| CATEGORY: | MST67A | MST67A -1602 -2001 -2101 | CD671C* | KFS578A | CT-81() | PS578A ** | PS550 ** |
|---|---|---|---|---|---|---|---|
| 18.AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY | A | A | AZ | Z | E | Z | Z |
| 19.INDUCED SIGNAL SUSCEPTIBILITY | Z* | Z* | Z | Z | Z | Z | Z |
| 20.RADIO FREQUENCY SUSCEPTIBILITY (RADIATED AND CONDUCTED) | Z | T | T | Z | Z | W | W |
| 21.EMISSION OF RADIO FREQUENCY ENERGY | Z | Z | Z | Z | X | M | M |
| 22.LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY | K* | AZZ2 | X | K | X | A3E3 | A3E3 |
| 23.LIGHTNING DIRECT EFFECTS | | | X | | | X | X |
| 24.ICING | | | X | | | X | X |
| 25.ELECTRICAL STATIC DISCHARGE | | | | | | A | A |
| Tested to DO-160B unless noted by * (DO-160C), Ψ (DO-160), or ** (DO-160D). | | | | | | | |
| NOTE: MST 67A -1602,-2001,-2101 tested to Category T (RF susceptibility) to 8 GHz (radiated) and Category AZZ2 (indirect effects of lightning). AZZ2 definition: AZ = Pin injection level A2 on all applicable pins except power lead and pin injection level A4 on power lead. Z2 = Cable bundle level E2 on shielded bundles. Unshielded bundle (power lead) cable bundle level C2. | | | | | | | |
| Ψ Tested per DO-160 section 7.0 (shock and crash safety): MST 67A/DO-160B sections 7.2.1 & 7.3: CD 671C/DO-160C sections 7.2 & 7.3: KFS 578A/DO-160B sections 7.2.1, 7.3.1, & 7.3.2: CTA-81()/DO-160B sections 7.2 & 7.3. | | | | | | | |
| When applicable, the software category for certification will be “Essential”: Level 2 as defined in document RTCA/DO-178A. PS-578A and PS-550 software is certified to RTCA/DO-178B Level C. | | | | | | | |

## 5. Equipment Controls and Indicators

The MST 67A Mode S transponder has no external controls.

### 5.A. General Controls

The primary manual controls used to operate the Mode S transponder/TCAS II system are contained on the Mode S/TCAS control unit.

NOTE: Controls and indicators of the KFS 578A, PS-578A, CD 671C, PS-550, CTA-81A, and CTA-81D control units are described in this section.

TCAS advisory and/or operational status indications are provided on the TA/VSI, RA/VSI, dedicated traffic display, cockpit audio system, transponder/TCAS control unit.

Control of traffic advisory display range selection can be provided remotely from the transponder/TCAS control unit or locally via a front panel range selector switch, or switches, depending upon type of display unit used and display unit configuration strapping.

### 5.B. System Input Power Control

Twenty eight volts dc or 115 Vac 400 Hz primary power; 26 Vac reference power; and 5 Vac, 5 Vdc, or 28 Vdc background panel lighting power are applied to the system by closing aircraft circuit breakers.

### 5.C. Mode S/TCAS Control Unit Functions

The KFS 578A, PS-578A, CD 671C, PS-550, and CTA-81( ) control units are the master controls for both transponder and TCAS. The KFS 578A, PS-578A, CD 671C, and PS-550 control units are available for single or dual Mode S transponder installations. The CTA-81A and CTA-81D control units are available for dual Mode S transponder installations. Figure 2, figure 3, figure 4, figure 5, figure 6, and table 34 below describe the functions of the controls and indicators on the control units.

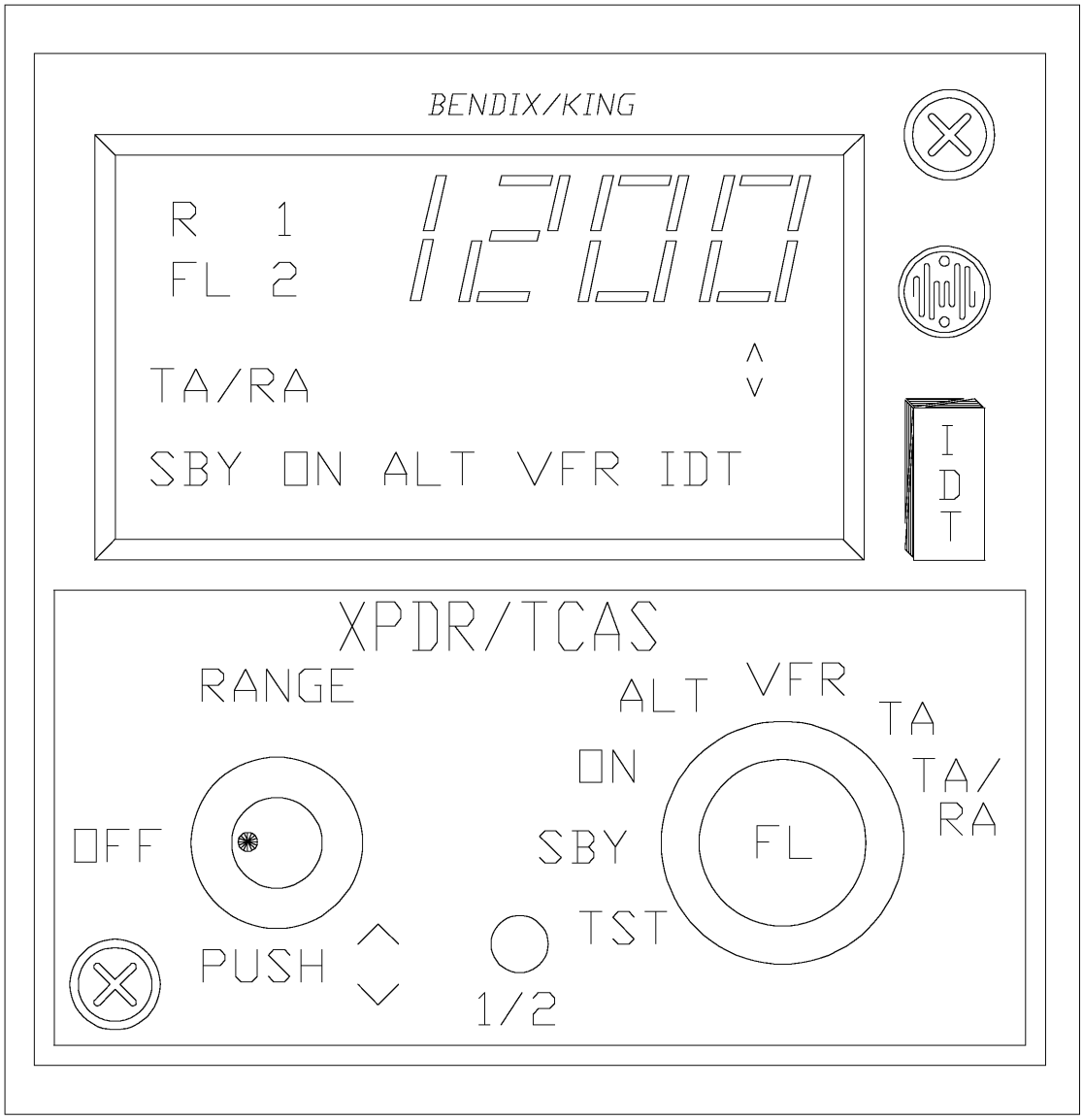


Figure 2 KFS 578A Control Unit Controls (Typical)

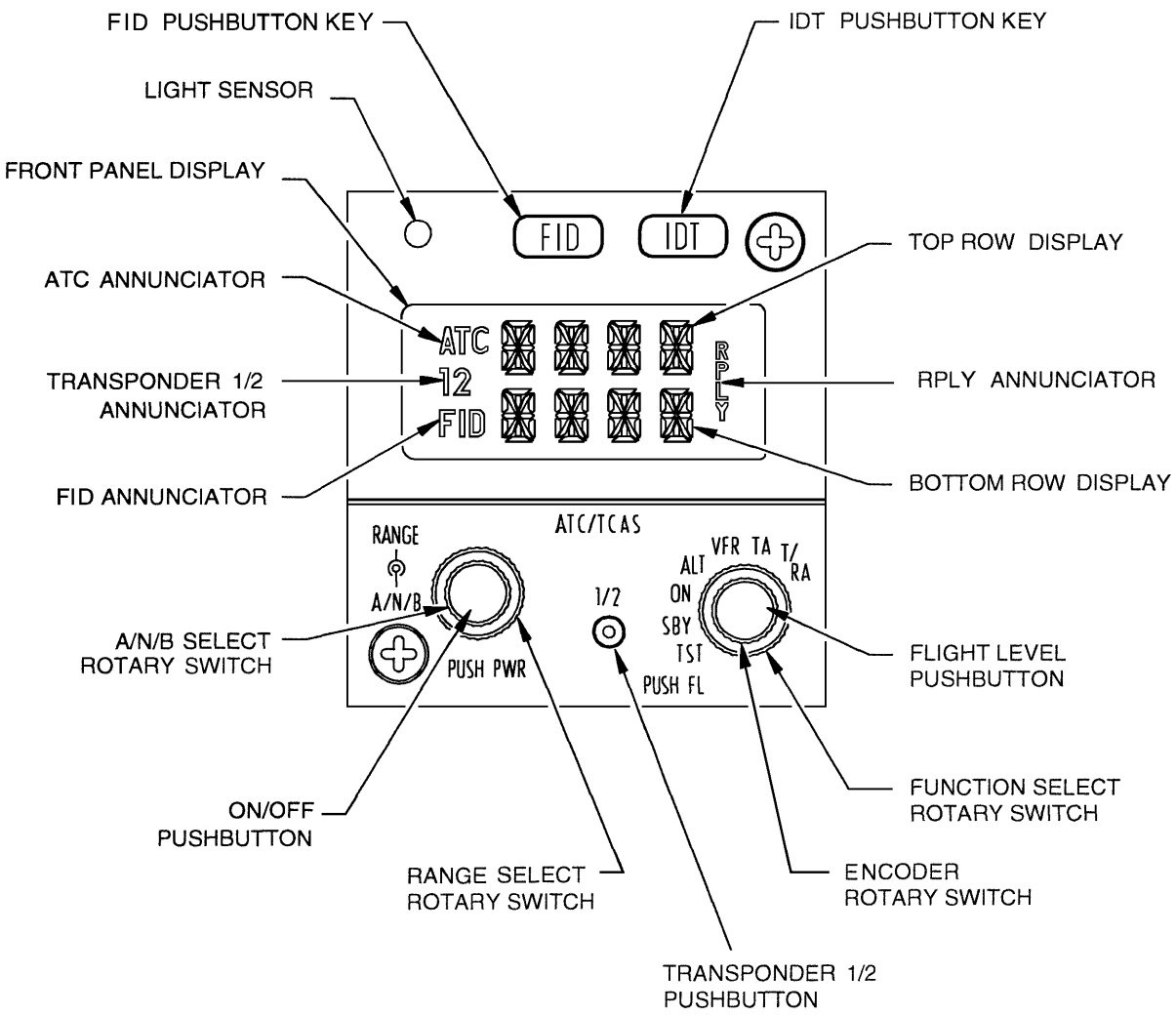


Figure 3 PS-578A Control Panel Controls (Typical)

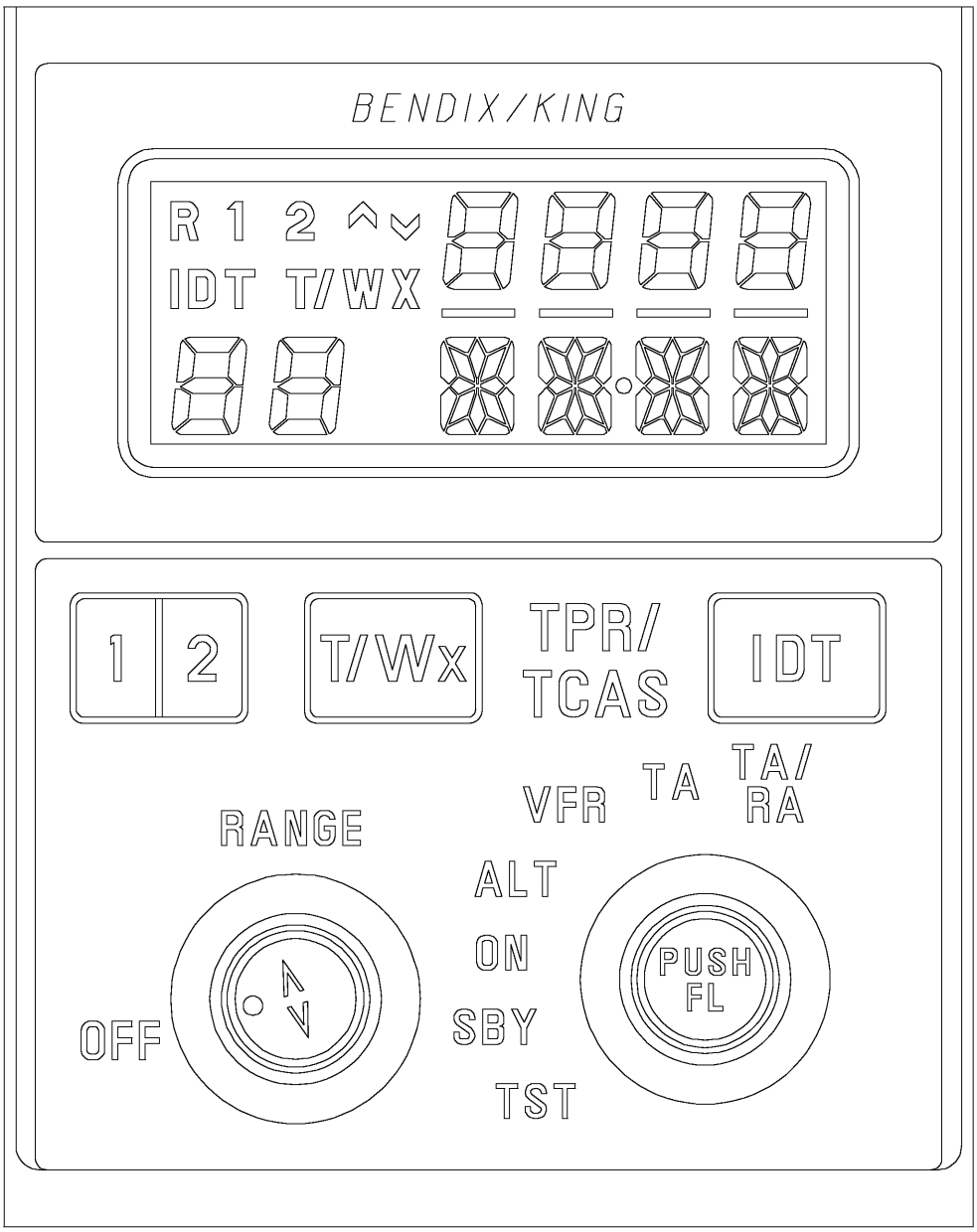


Figure 4 CD 671C Control Unit Controls (Typical)

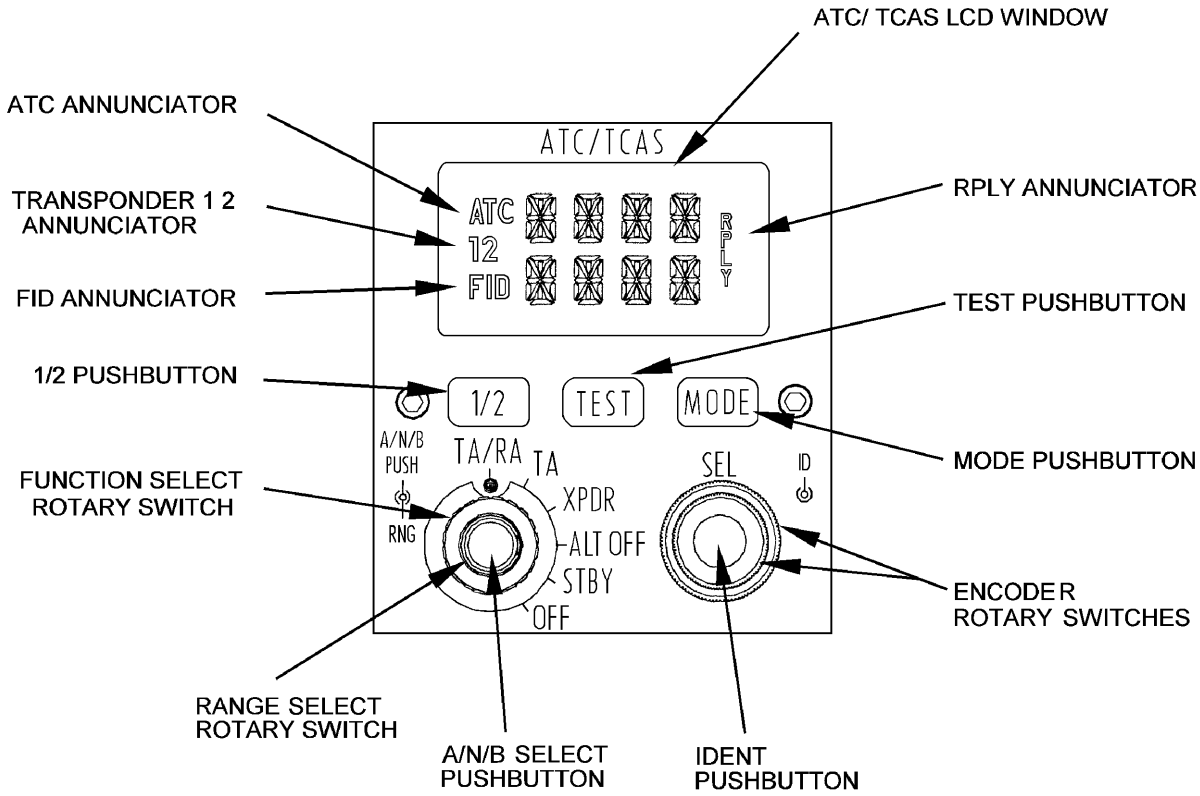


Figure 5 PS-550 Control Panel Controls (Typical)

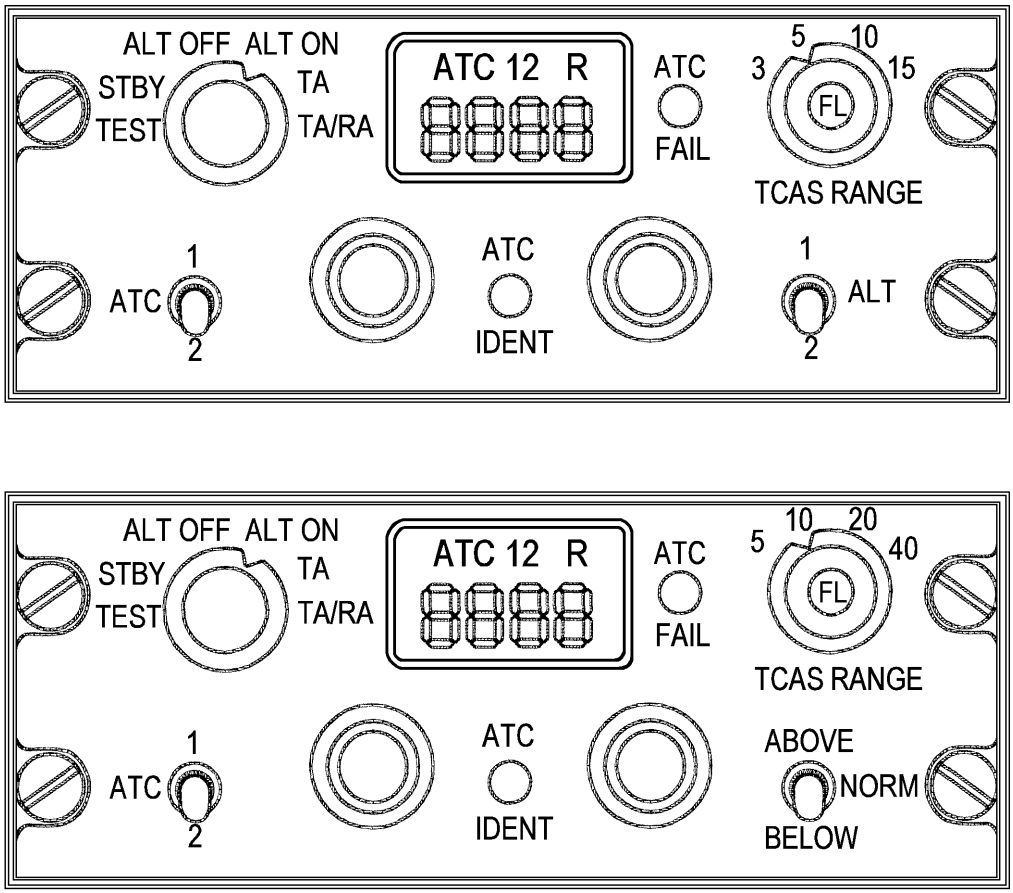


Figure 6 CTA-81( ) Control Unit Controls (Typical)

Table 34 Control Unit Control and Indicator Functions

| CONTROL/INDICATOR | FUNCTION |
|---|---|
| 1/2 Switch<br>KFS 578A,<br>PS-578A,<br>CD 671C,<br>PS-550<br>ATC 1-2 Switch<br>CTA-81A/D | Selects one of two Mode S transponders to be under control of the control unit. The non-selected Mode S transponder is placed in STANDBY mode. |
| ALT 1-2 Switch<br>CTA-81A/D | Selects one of two Mode S transponder altitude source input ports. |
| FL Switch<br>KFS 578A,<br>PS-578A,<br>CD 671C,<br>CTA-81A/D | Spring-loaded pushbutton switch. When pressed and released, replaces relative altitude annunciations for intruder aircraft on traffic display with own aircraft flight-level altitude annunciations for a period of 15 seconds. During the 15 second period, own aircraft flight-level altitude also appears on the traffic display. After 15 seconds, own aircraft flight-level altitude disappears from display and intruder aircraft altitude annunciations revert back to relative altitude annunciations. (See NOTE 3).<br><br>If during the 15 second period after the FL switch is pressed and released, a new RA or TA category aircraft is detected by TCAS, the 15 second flight-level display is disabled and relative altitudes reappear. |
| Function Select Switch: | Rotary switch that controls operating modes of Mode S transponder and requests TCAS operating modes (see NOTE 1). |
| TST/TEST Position | Initiates Mode S transponder and TCAS functional self-test. On the KFS 578A, PS-578A, CD 671C, PS-550 all of the display segments light for two seconds, then the squawk code will display flight Level (altitude) information for four seconds, then return to SBY mode. The flight level is displayed in units of one hundred feet, thus a display of 005 indicates 500 feet. If an altitude encoder is not included in the installation, dashes will appear in the squawk code display during TST mode. |

Table 34 Control Unit Control and Indicator Functions

| | |
|---|---|
| | If the transponder determines a failure that will cause the system to NOT function for ATC purposes, the control unit will illuminate FAIL (KFS 578A, CD 671C) or "XPDR FAIl" (PS-578A, PS-550) on the display or illuminate the ATC FAIL lamp (CTA-81A/D). The selected transponder will be placed in the SBY mode. The function switch will be disabled from going clockwise to other modes. TST and SBY will be the only modes allowed. A different transponder must be selected to get ATC functions to return. |
| | When the MST 67A transponder is not connected to the system ARINC 718 Transponder Fail #2 discrete communicates the lack of a transponder. Control units KFS 578A, PS-578A, CD 671C, PS-550 annunciate a transponder fail. |
| | If TCAS processor Functional Test Inhibit program pin is strapped, TCAS functional test is inhibited while aircraft is airborne. The TCAS flag displays TCAS on the RA/VSI display for the duration of the functional test (approximately 12 seconds). The traffic display displays TEST. A test pattern appearing on the traffic display allows verification of each type of intruder symbol. During the first three seconds a lamp test is performed on all segments of the RA/VSI. If a failure is detected during functional test, the TCAS flag continues to display TCAS. Following the lamp test, a test fixed command is displayed until end of test. |
| SBY/STBY Position | In-flight or on-the-ground places Mode S transponder and TCAS in STANDBY mode (TCAS sensitivity level #1). In STANDBY mode, transponder's power is turned on but transponder does not transmit squitters or reply to interrogations. In STANDBY mode, all TCAS broadcast, surveillance, and tracking operations are disabled and the traffic display is blanked except for a TCAS STBY mode annunciation. |
| ON Position<br>KFS 578A,<br>PS-578A,<br>CD 671C<br>ALT OFF Position<br>PS-550<br>CTA-81A/D | In-Flight - Turns on Mode S transponder to fully active state and places TCAS in STANDBY mode (TCAS sensitivity level #1). Mode S transponder transmits squitters and replies to Mode S and ATCRBS Mode C and Mode A interrogations. The Mode S transponder's reply to Mode C and Mode S interrogations does not contain an altitude report. The transponder's reply to Mode A interrogations contains the ATC transponder code (normal Mode A reply). All TCAS broadcasts, surveillance, and tracking functions are disabled. Traffic display screen is blanked except for a TCAS STBY mode annunciation. |

Table 34 Control Unit Control and Indicator Functions

| | |
|---|---|
| | On-the-Ground - Mode S transponder squitters and replies to Mode S interrogations. Depending on Mode S transponder strapping, transponder replies or does not reply to ATCRBS Mode C and Mode A interrogations. The transponder's reply to ATCRBS and Mode S interrogations does not contain an altitude report. The transponder's reply to Mode A interrogations contains the ATC transponder code. TCAS is in STANDBY mode (TCAS sensitivity level #1). Traffic display screen is blanked except for a TCAS STBY annunciation. |
| ALT Position<br>KFS 578A,<br>PS-578A,<br>CD 671C<br>XPDR Position<br>PS-550<br>ALT ON Position<br>CTA-81A/D | In-Flight - Same effect on Mode S transponder and TCAS as ON or ALT OFF position (in-flight) except Mode S transponder reports altitude in its Mode C and Mode S replies.<br><br>On-the-Ground - Same effect on Mode S transponder and TCAS as ON or ALT OFF position (on-the-ground) except transponder reports altitude in its Mode C and Mode S replies (if strapped to respond to Mode C when on-the-ground). |
| VFR Position<br>KFS 578A<br>PS-578A<br>CD 671C | Annunciates ATC and VFR, and displays stored ATC code. The ATC code can be changed by encoder knobs. |
| TA Position<br>(TA ONLY Mode) | In-Flight - Turns on Mode S transponder to fully active state and places TCAS in TA ONLY mode (traffic advisory only mode) (TCAS sensitivity level #2). Mode S transponder transmits squitters and replies fully to Mode S and ATCRBS Mode C and Mode A interrogations. TCAS broadcasts and performs all Mode S and ATCRBS surveillance and tracking functions. TCAS provides traffic displays for TA, proximity, and non-threat category aircraft (see NOTE 2 for exception) but does not categorize or display any aircraft as a RA threat symbol. TCAS provides traffic advisory alerts but does not issue resolution advisory alerts (i.e. voice RA alerts or RA indications on the traffic display are not generated). A TA ONLY annunciation appears on the traffic display.<br><br>On-the-Ground - Mode S transponder squitters and replies fully to Mode S interrogations. Depending on transponder strapping, transponder replies fully or does not reply to ATCRBS Mode C and Mode A interrogations. Depending on TCAS strapping, TCAS either goes into TA ONLY mode or STANDBY mode (traffic display screen is blanked except a TCAS STBY mode annunciation appears on traffic display). |

Table 34 Control Unit Control and Indicator Functions

| | |
|---|---|
| TA/RA Position | In-Flight - Turns on Mode S transponder to fully active state. If own aircraft is above 1000 feet AGL, TCAS enters sensitivity level #4 through #7 dependent on own aircraft altitude. The Mode S transponder transmits squitters and replies fully to Mode S and ATCRBS Mode C and Mode A interrogations. TCAS broadcasts and performs all Mode S and ATCRBS surveillance and tracking functions. TCAS provides traffic displays for RA, TA, proximity, and non-threat category aircraft (see NOTE 2), issues RA and TA alerts, and issues resolution advisories on the TA/VSI or RA/VSI. A TA/RA annunciation appears on the PPI or dedicated traffic display. A mode annunciation is not provided on the TA/VSI for TA/RA mode.<br>NOTE: If own aircraft is below 1000 feet AGL, TCAS defaults to TA ONLY mode.<br><br>On-the-Ground - Mode S transponder squitters and replies fully to Mode S interrogations. Depending on transponder strapping, transponder replies fully or does not reply to ATCRBS Mode C and Mode A interrogations or Mode S interrogations. TCAS defaults to TA ONLY mode (TCAS sensitivity level #2) and functions as described for the TA position (on-the-ground) of the Function Selector Switch in this table. |
| ATC IDENT<br>Code Display | Displays transponder ATC identification code selected by the Code Select Knobs and annunciates which transponder is selected by the ATC 1-2 Switch. |
| FAIL<br>KFS 578A,<br>CD 671C | Illuminates on the display for failure of the selected Mode S transponder. |
| CP FAIL<br>PS-578A,<br>PS-550 | Illuminates on the display for internal control panel fail modes. |
| XPDR FAIL<br>PS-578A,<br>PS-550 | Illuminates on the display for failure of the selected Mode S transponder. |
| ATC FAIL Lamp<br>CTA-81A/D | Illuminates (amber) for failure of the selected Mode S transponder. |
| T/Wx<br>CD 671C | Three position rotary switch used to control traffic advisories displayed on a weather radar indicator. The annunciations appearing on the weather radar display are WX for weather only; TCAS for TCAS only; T/WX for TCAS and weather information. |

Table 34 Control Unit Control and Indicator Functions

| | |
|---|---|
| ABOVE/NORM/BELOW<br>CTA-81()<br>KFS 578A,<br>PS-578A,<br>CD 671C,<br>PS-550 | Three position toggle switch (CTA-81()), pushbutton (KFS 578A, CD 671C, PS-550), or rotary switch (PS-578A) selects relative altitude display limits for non-threat category aircraft (open-white diamond symbols) on the traffic display (see NOTE 6). |
| ABOVE Position | Selects display of non-threat aircraft up to +8700 feet (+9000 feet MOPS Change 7) above own aircraft and down to -2700 feet below own aircraft. ABOVE is annunciated on screen of traffic display. |
| NORM Position | Selects display of non-threat aircraft up to +2700 feet above own aircraft and down to -2700 feet below own aircraft on traffic display. |
| BELOW Position | Selects display of non-threat aircraft down to -8700 feet (-9000 feet MOPS Change 7) below own aircraft and up to +2700 feet above own aircraft. BELOW is annunciated on screen of traffic display. |
| TCAS RANGE Switch | Rotary switch, selects 3 - 40 nautical mile range scaling for the traffic display. The selected display scaling is annunciated as 40 NM, 20 NM, 15 NM, 10 NM, 5, or 3 on the traffic display. (See NOTE 4, 5, and 7). |
| IDT Pushbutton<br>KFS 578A,<br>PS-578A,<br>CD 671C<br>SEL ID Pushbutton<br>PS-550<br>ATC IDENT<br>CTA-81A/D | When this Identification switch is pressed a Special Position Identifier (SPI) is inserted temporarily into Mode A and Mode S replies to interrogations from ground stations. The SPI pulse is not used by TCAS. |
| Code Select Knobs | Allows selection of transponder identification code. The transponder inserts this code into replies to Mode A interrogations and Mode S ATC identification requests from ground stations. The ATC IDENT code is not used by TCAS. |

Table 34 Control Unit Control and Indicator Functions

| | |
|---|---|
| MODE Pushbutton PS-550 | ATC Mode - (default mode) allows entry of the four-digit ATC code.<br><br>FID Mode - allows entry of alpha numeric flight identification and annunciates "FID" on display.<br><br>TFC Mode (Collins TDR-94D) - selects traffic display operating mode: pop-up (AUTO) or full-time display (ON) and annunciates on display.<br><br>FL Mode (Honeywell MST 67A) - allows selection of relative (REL) or absolute (ABS) altitude to be displayed.<br><br>ADC Mode - selects which air data computer is used by TCAS and annunciates "ADC" and "1" or "2" on display. |
| FID Pushbutton PS-578A | ATC Mode - (default mode) allows entry of the four-digit ATC code.<br><br>FID Mode - allows entry of alpha numeric flight identification and annunciates "FID" on display. |
| NOTE 1: | TCAS operating modes are requested from the transponder/TCAS control unit (i.e. TA/RA mode is requested by rotating function selector switch to TA/RA). The TCAS processor may or may not enter the requested mode dependent on prevailing conditions, i.e. if TA/RA mode is requested from the control unit and own aircraft is below 1000 feet AGL, TCAS automatically defaults to TA ONLY mode (TCAS sensitivity level #2) regardless of the TA/RA mode request from the panel. |
| NOTE 2: | TCAS can be strapped to display either all traffic all the time or only when a TA or RA is present. |
| NOTE 3: | Holding the FL switch pressed for longer than 15 seconds will not display flight level altitudes for any longer than 15 seconds. |
| NOTE 4: | The range at which resolution or traffic advisories are generated by TCAS is unaffected by the TCAS RANGE switch. |

Table 34 Control Unit Control and Indicator Functions

| | |
|---|---|
| NOTE 5: | The presence of intruder aircraft that are categorized as RA (resolution advisory threats) or TA (traffic advisories) that are beyond the selected display range is indicated by 1/2 target symbols at edge of screen. The position of the 1/2 symbol represents approximate bearing of the intruder. The 1/2 symbol color and shape represents whether the off-scale intruder is a RA; or TA (1/2 red square for off-scale RA; 1/2 yellow circle for off-scale TA). When this occurs, the aircraft symbol can be displayed by increasing the selected range on the TCAS RANGE switch. |
| NOTE 6: | RA (threat), TA (traffic advisory), and proximity category aircraft displays are unaffected by the ABOVE/NORM/BELOW switch. (RA and TA aircraft within ±8700 feet (±9000 feet MOPS Change 7) of own aircraft are displayed regardless of the ABOVE/NORM/BELOW switch position. Proximity category aircraft are always within 5 (TCAS I) or 6 (TCAS II) nm, ±1200 feet altitude of own aircraft.) |
| NOTE 7: | TCAS RANGE switch is not provided on all versions of the KFS 578A, PS-578A, CD 671C, PS-550, or CTA-81A/D. When a TA/VSI or dedicated traffic display having optional range selectors is used, range selection is made at the traffic display. Some versions have range selections to 40 nautical miles. |

## 6. System Description

Refer to the MST 67A Block Diagram. The basic MST 67A Mode S Transponder System is comprised of:

- MST 67A Mode S Transponder
- KFS 578A, PS-578A Control Unit (depending on the configuration, other control units may be used)
- L-band Omnidirectional Antenna
- Installation Hardware

Communication from the control to the remote transponder is by one-way ARINC 429 bus. If the transponder is part of a TCAS installation, two-way communication by ARINC 429 data bus is also utilized between the transponder and the TCAS. The operating modes for the transponder (TEST, STBY, ALT ON, and ALT OFF) and if applicable the operating modes for the TCAS (TEST, STBY, TA, and if TCAS II TA/RA) are selected from the control unit. The STBY mode is common to both the transponder and TCAS. The transponder will perform normal ATC functions whether it is or is not part of the TCAS system, however the TCAS II system cannot function without the transponder.

In addition to mode selection, the control unit also sends the 4096 transponder code on the ARINC 429 bus to the transponder. This code is manually selected by the operator using the control panel and displayed on the front panel display of the control unit. The code is four octal numbers that are selectable from 0 to 7. This provides a maximum of 4096 code selections.

The aircraft Mode S address is a 24-bit binary code set at the time of installation. The code is implemented in the aircraft by strapping certain pins on the transponder interconnect. Any MST 67A transponder installed in the aircraft after these pins are strapped will adopt this address. This 24-bit address is included in all Mode S transmissions as well as all TCASII Mode S transmissions.

The transponder receives aircraft barometric altitude data from existing onboard sensors. This altitude is reported by the transponder when responding to Mode S-formatted interrogations and ATCRBS-formatted interrogations required altitude in the reply. Altitude is also sent to the TCAS processor.

# 7. System Component Description

## 7.A. MST 67A Mode S Transponder Description

The microprocessor based transponder consists of an L-band receiver-transmitter, configured to operate in a single or dual antenna (nondiversity, diversity) configuration. A microprocessor is utilized for both signal processing and monitor functions. ARINC 429 interfaces are provided for two-way communications with TCAS and one-way receive communication from the control unit. A TEST pushbutton switch and an LED indicator inside the transponder indicate the operating condition of the unit. An internal antenna switch circuit feeds top and bottom antennas, both of which can be used to receive and transmit RF signals (but not simultaneously).

## 7.B. KFS 578A, PS-578A Control Unit Description

The KFS 578A, PS-578A is a microprocessor based transponder control panel for controlling one or two MST 67A transponder systems. The unit may also be used in a tandem configuration (two units controlling one transponder with each control unit displaying the same data). The unit contains all controls required for transponder operation.

An ON/OFF switch (optional) located in the lower left corner of the unit is used to turn the unit(s) and transponder(s) ON or OFF.

A rotary TCAS RANGE switch (optional) is located in the lower left corner of the unit. The TCAS RANGE switch selects TCAS traffic display nautical mile range according to the KFS 578A version or preselected version equivalent (PS-578A): Normal 3, 5, 10, 15 nm; Extended 3, 5, 10, 15, 20, 40 nm; Select 5, 10, 20, 40 nm; or NO RANGE control.

A pushbutton (KFS 578A) or rotary switch (PS-578A) cycles through A/N/B modes to select relative altitude TCAS ABOVE, NORM, and BELOW display limits for non-threat category aircraft (open-white diamond symbols) on the traffic display.

A rotary function switch located in the lower right corner of the unit is used to select transponder and TCAS operation modes. The TEST position is software controlled for momentary activation. A switch in the center of the function switch is momentarily depressed to select FL (Flight Level), altitude displays for TCAS.

The control unit has an ATC 1/2 select switch located below the function switch to select either transponder 1 or transponder 2.

The IDT (Identification) pushbutton switch inserts a Special Position Identifier (SPI) temporarily into Mode S replies to interrogations from ground stations when pressed.

The FID (Flight Identification) pushbutton switch (PS-578A) allows entry of alpha numeric flight identification and annunciates “FID” on display when pressed.

## 7.C. CD 671C Control Unit Description

The CD 671C is a microprocessor based transponder control panel for controlling one or two MST 67A transponder systems. The unit may also be used in a tandem configuration (two units controlling one transponder with each control unit displaying the same data). The unit contains all controls required for transponder operation.

An ON/OFF switch located in the lower left corner of the unit is used to turn the unit(s), transponder(s), and TCAS unit ON or OFF.

The functional mode of the transponder is controlled by the function switch located at the right corner of the unit, and is annunciated on the CD 671C display. The function switch is a continuous rotary switch (required for tandem control unit installations). The TEST position is software controlled for momentary activation. A switch in the center of the function switch is momentarily depressed to select FL (Flight Level), altitude displays for TCAS.

An continuous rotary TCAS RANGE switch (optional) is located in the lower left corner of the unit. The TCAS RANGE switch can select 3, 5, 10, or 15 nautical miles and 3, 5, 10, 15, 20, or 40 for extended range versions. An optional three position switch located in the center of the ON/OFF TCAS RANGE switch is for TCAS ABOVE, NORM, and BELOW traffic display select.

The CD 671C Control Unit may be optionally equipped with an altitude source select (ALT 1/2) switch.

An ATC IDENT pushbutton allows SPI (Special Position Identifier) pulses to be transmitted.

The control unit has an ATC 1/2 select switch (optional) located above the range switch to select either transponder 1 or transponder 2.

A T/WX switch selects the TCAS display mode, either TCAS (Annunciate "T", TCAS plus Weather Radar (Annunciate "T/WX"), or Weather Radar Only (Annunciate "WX").

7.D. PS-550 Control Panel Description

The PS-550 is a microprocessor based Mode S transponder/TCAS control panel for controlling one or two MST 67A transponder and TCAS systems.

The Function Select rotary switch is located at left side of the unit. It selects the basic function of the unit and is annunciated on the LCD display. Selectable functions include TA/RA, TA, XPDR, ALT OFF, STBY, and OFF (optional) Selection TA/RA puts the TCAS system and both transponders in traffic advisory and resolution advisory mode. Selection TA puts the TCAS system and both transponders in the traffic advisory mode. Selection XPDR activates transponder 1 or 2 as annunciated on the LCD panel. The non-selected transponder is placed in standby mode. ATC mode is activated and TCAS functions are disabled. Selection ALT OFF disables air traffic computers from transmitting altitude and location information to ground stations. ATC mode is activated and TCAS is disabled. Selection STBY puts both transponders in standby mode. ATC mode is activated and TCAS is disabled. Optional selection OFF causes the control panel to blank the LCD and de-energize the LCD backlighting. Serial data is not processed and only the Function Select rotary switch is active on the panel.

The Range Encoder switch knob located at the Function Select switch selects the ranges displayed for traffic advisory and resolution advisory information. The rear connector discretes program the available range selections. Ranges include 3, 5, 10, 15 nm and extended 20, 40 nm.

The concentric A/N/B pushbutton located in center of the Function Select switch selects the TCAS display mode for above, normal, or below the aircraft and annunciates ABV, NML, or BLW on the LCD display.

The Encoder Switch knobs at right side of unit enter ATC and Flight ID codes in ATC and FID modes. The Encoder

Switch knobs select the air computer in ADC mode and relative or absolute altitude in FL mode.

The ID pushbutton located at center of the right side Encoder Switch knobs causes the entered ATC code SPI (Special Position Identifier) pulses to be transmitted and causes the LCD panel to show "ID."

The "1/2" pushbutton (optional) at left center of unit selects Mode S transponder 1 or 2 and is annunciated in the LCD panel. The "1/2" pushbutton is active only in ATC mode while both transponders are on.

The TEST pushbutton at center of the unit activates functional test of the TCAS computer, air data computer, and transponders.

The MODE pushbutton at right center of unit sets the unit in ATC, FID, ADC, TFC, or FL operating mode and annunciates on the LCD panel. The ATC mode allows entry of the 4 digit ATC code. The FID mode allows entry of an alpha-numeric flight ID code. The ADC mode allows selection of air data computer 1 or 2. The TFC mode (Collins TDR-94D) allows selection of the traffic operating mode as Pop-Up (AUTO) or full time display (ON). The FL mode (Honeywell MST 67A) allows selection of relative (REL) or absolute (ABS) altitude to be displayed.

## 7.E. CTA-81A Control Unit Description

The CTA-81A is a microprocessor based transponder control panel for controlling two MST 67A Mode S transponders and a TPU 67A or TPA-81A TCAS processor.

A rotary function switch located in the upper left corner of the unit is used to select transponder and TCAS operation modes. The TEST position is spring loaded so when released it returns to the STBY position. The control unit has an ATC 1/2 select switch located below the function switch to select either transponder 1 or transponder 2.

An optional rotary TCAS RANGE switch is located in the upper right corner of the unit. The TCAS RANGE switch can select 3, 5, 10, or 15 nautical miles. A spring loaded switch in the center of the TCAS RANGE switch is momentarily depressed to select FL (Flight Level), altitude displays for TCAS. An optional three position switch located below the

TCAS RANGE switch is for TCAS ABOVE, NORM, and BELOW traffic display select.

The CTA-81A Control Unit may be optionally equipped with an altitude source select (ALT 1/2) switch. A pair of dual concentric rotary switches are used to select the 4096 code.

The right outer knob controls the least significant digit. The right inner knob controls the second least significant digit. The left inner knob controls the third least significant digit. The left outer knob controls the most significant digit. An ATC IDENT pushbutton allows SPI (Special Position Identifier) pulses to be transmitted.

A dichroic liquid crystal display (LCD) is used to display the selected 4096 code. ATC 1 or ATC 2 is displayed showing which transponder is selected. An ATC FAIL lamp is used to show when the selected transponder has failed.

NOTE: Refer to the CAS-81A Traffic Alert and Collision Avoidance System Maintenance Manual for a detailed description of the CTA-81A relationship to TCAS.

## 7.F. Antenna Requirements

The MST 67A system requires a minimum of one top-mounted and one bottom-mounted, L-band omnidirectional antenna, connected to the MST 67A Transponder. In dual installations, two top-mounted and two bottom-mounted antennas are normally used. If two antennas are not used, a coaxial antenna switch is required to connect the desired transponder to the shared antenna.

NOTE: The antenna switch must maintain insertion loss tolerances, operation voltage requirements must be observed, current requirements for actuation must not exceed control unit capability.

Installation requirements for the omnidirectional antennas used with the MST 67A system are described in the Maintenance Practices section of this manual.

# 8. Operation

## 8.A. Interrogation Processing

The transponder receives interrogations from ground ATC facilities and from TCAS-equipped aircraft, decodes and processes the data and transmits a reply if appropriate. The transponder has circuits to receive and process data and send data to on-board TCAS. The transponder receives control instructions from the control unit and air/ground status and barometric altitude from on-board sources. The aircraft's maximum airspeed and Mode S address are provided to the transponder as inputs strapped at the time of installation. Signals are received from either the aircraft's top or bottom antenna. Transmitted signals are directed to the top or bottom antennas. The received signal is centered on the 1030 MHz receive frequency. The transponder rejects noise and image frequencies outside the selected band.

External equipment onboard the aircraft that operates at a frequency close to the transponder frequency (e.g. DME and TCAS), sends a suppression signal to the transponder prior to transmitting. The transponder receives this suppression signal and causes suspension of transponder operations while the external equipment is transmitting. Likewise, prior to transmitting, the transponder sends a suppression signal to momentarily inhibit operation of the external equipment.

The transponder performs pulse amplitude comparisons on the received interrogation signals to determine if the aircraft is in the main lobe of the ground station transmitted signal or is in the side lobe. If it is determined that the signal is a side lobe transmission, it is interrupted as an invalid interrogation and is not processed.

The transponder determines if the received signal is Mode A, Mode C, or Mode S interrogation, and also determines if the signal is received by the top or the bottom antenna.

The transponder decodes the received phase shift modulated signal and converts it into a TTL-level signal that represents the 56 or 112 bit word from the air/ground transmitter. The last 24 bits of the signal is an encoded signal that represents the strapped address of the transmitter that sent the received signal. The transponder decodes this last 24 bits of the signal and then decodes the entire received message by means of a software routine.

## 8.B. Reply Transmissions

The transponder produces proper modulation and develops all the signals required for all transponder reply transmissions, including:

- ATCRBS Mode A 4096 code replies and SPI.
- ATCRBS Mode C altitude reporting.
- Mode S surveillance replies.
- Squitter transmissions.
- Mode S data link replies

The 1090 MHz signal from the transponder's transmitter is routed to either the top or bottom antenna for transmission.

On versions equipped with Level 3 data link capability, the transponder is strapped to provide either ADLP interface input or General Enhanced Surveillance input on 3 ports. The transponder acts as a modem, transferring data between an on-board Airborne Data Link Processor and ground stations or other aircraft. The communications with the ADLP are via transmit and receive high speed ARINC 429 busses utilizing protocol defined in ARINC-718. The RF protocols are the Comm A (for Standard Length Message uplinks), Comm B (for Standard Length Message downlinks) and Comm C (for Extended Length Message uplinks) protocols defined in RTCA/DO-181A/B/C.

Also on Level 3 versions, a low speed ARINC 429 bus accepts Flight ID information per ARINC-718 and inserts into a Comm B message when requested by the interrogator in accordance with RTCA/DO-181A/B/C.

## 8.C. Main Transponder Functions

- Process and output all transponder discrete and serial data.
- Process pressure altitude digital information.
- Convert the aircraft's altitude into formats required for TCAS, Mode S and ATCRBS replies.
- Generate Mode A and Mode C ATCRBS replies.

- Perform continuous built-in tests and supply failure warnings to Aircraft and Test Equipment (and TCAS if applicable).
- Supply system reset signal for the Real Time LSI.
- Assemble interrogation reply data.
- Update interrogation reply data.
- In TCAS equipped aircraft, perform TCAS-related processing including handling all two-way data communication between the Mode S transponder and TCAS.
- In Level 3 capable versions, provide Mode S data link communications between own aircraft and ground stations or other aircraft.

8.D. Elementary Surveillance (versions -2001, -2101 only)

- Reception of and automatic reporting of Aircraft ID.
- Transponder Capability Report.
- Altitude reporting in 25 ft. intervals if available on the aircraft.
- Flight Status.
- Surveillance Identifier Code Capability.
- TCAS II Change 7 (ACAS II) compatibility.

8.E. Enhanced Surveillance (versions -2001, -2101 only)

- Ability to interface to additional equipment to receive downlink aircraft parameters information.
- Redefinition of four 429 input channels:

  -Expanded definition of Flight ID channel to FMS input channel.

  -Dual definition of 429 port - ADLP Comm A/B or Enhanced Surveillance General Input 1.

  -Dual definition of 429 port - ADLP Comm C/D or Enhanced Surveillance General Input 2.

-Redefinition of spare port to GPS Input.

- Redefinition of reserved SDI input discretes to Enhanced Surveillance Enable and future spare. Enhanced Surveillance Enable discrete is used to define the state of dual definition ports listed above.

- Storing of received information into BDS registers (40, 50, and 60 HEX).

- Downlink Aircraft Parameters supported include:

  Selected Altitude, Barometric Pressure Setting, Roll Angle, True Track Angle, Ground Speed, Track Angle Rate (not supported by MST 67A), True Air Speed, Magnetic Heading, Indicated Air Speed, Mach, Barometric Altitude Rate, and Inertial Vertical Velocity.

# FAULT ISOLATION

1. Fault Isolation Description

System fault isolation is the process of locating the source of a failure at the assembly level or aircraft wiring level. Fault isolation involves performance of post-installation checks described in the maintenance section of this manual, observation of the failure indications, and then performance of appropriate assembly, removal, and replacement or aircraft wiring repair procedures to correct the problem.

Fault isolation is typically performed on-the-ground as a result of failures indicated during post-installation checkout, preflight testing, or malfunctions observed during in-flight operation.

The KFS 578A, PS-578A, CD 671C, PS-550 control unit will self test when the unit is placed in the "TST" mode. All the segments of the display will light for approximately three seconds, then the control unit will proceed with a system functional test (transponders and TCAS processor if installed).

NOTE: See the appropriate TCAS manual for details concerning TCAS fault isolation.

The MST 67A transponder's Built-In-Test equipment (BITE) continually monitors the equipment (both internal and external sources) and if a failure is detected will communicate the failure to the control unit via an ARINC 429 bus ("Control Data In").

If the transponder has a Control Data failure the fault codes will be viewed via the LED on the inside of the transponder.

The MST 67A transponder, when detecting a failure that will not affect the ATC surveillance function (i.e. Gillham Altitude Compare failure, 429 Altitude failure, TCAS failure, etc.), will communicate the failure to the KFS 578A, PS-578A, CD 671C, PS-550 over the ARINC 429 Control Data In bus. The control unit display will flash the current mode (i.e. "TST", "SBY", "ON", "ALT", "VFR", "TA", and "TA/RA") on the display to annunciate the failure.

NOTE: All modes of operation are allowed with a non-ATC failure. The KFS 578A, PS-578A, CD 671C, PS-550 does not have control over internal transponder or non-ATC failures. Only the remote transponder can determine there is a failure.

For either internal transponder or non-ATC failures, an error code describing the failure can be extracted by rotating the Function Switch of the control unit to place it into the "TST" mode. "PASS" or "FAIL" will be annunciated in the squawk code area. The failures being viewed are from the remote transponder, not the KFS 578A, PS-578A, CD 671C, PS-550.

NOTE: Using Remote Functional Test will put unit in "TST" mode, but the CURSOR/FL switch is ignored. The Function Switch "TST" must be used to view failure error codes. These are not ATE failures.

If "FAIL" is annunciated, press the Cursor/FL switch to extract the first error code. Continue to use the Cursor/FL switch to extract all of the failure error codes.

Pressing the "IDT" button while in Failure Annunciation will change flight legs so past failures can be viewed.

To exit Failure Annunciation, turn the Function switch clockwise. If a current failure is present while exiting, unit returns to the previously described conditions (i.e. flashing mode or flashing "FAIL" in "SBY" mode). If no current failures are present, the unit returns to normal operation.

System failure indications displayed are detected during Functional-Self-Test. The Functional-Self-Test is manually initiated from the TEST switch on the function switch on the control unit (a strapping pin on the control unit is provided for a remote TEST switch). For units not equipped with the TEST option an additional external switch is required.

2. Fault Isolation Procedures

MST 67A Mode S Transponder failure indication and associated corrective action procedures are described in table 1001.

NOTE: When corrective procedures require wiring checks, refer to interwiring diagrams at the rear of maintenance section for specific pin-to-pin information.

NOTE: When corrective action procedures include more than one step number (i.e. 1, 2, 3, etc.) perform the steps in numerical order and recheck the system by activating the TEST switch between each step.

Table 1001 System Fault Isolation

| ITEM | FAILURE INDICATION | PRIORITIZED CORRECTIVE ACTION |
|---|---|---|
| 1. | 28Vdc power is not present on aircraft power bus input to the transponder. | a. Check/repair 28Vdc aircraft power source and associated aircraft wiring.<br><br>b. Check/replace any external relays that may be present in the 28Vdc input lines to transponder (see interwiring diagram). |
| 2. | Aircraft power circuit breaker will not remain closed. | a. Check/repair aircraft lighting power source and/or associated aircraft wiring. |
| 3. | Proper panel background lighting and dimmer control is not present. | a. Check/repair short circuit in aircraft wiring or system equipment. |
| 4. | Without having pressed the TEST pushbutton on the control panel, a failure indication is present. | a. Replace transponder if a MST 67A transponder is being checked. Consult appropriate maintenance manual if failure indication appears on an ATCRBS transponder. |
| 5. | When TEST mode is initiated from the transponder control unit, all segments of the display do not light for first three seconds or remain lit. | a. Replace control unit. |
| 6. | Approximately six seconds after the TEST pushbutton on the front of the control unit is pressed and held, a "PASS" indication is not present on the display or a "FAIL" indication is present. | a. Remove and replace the MST 67A transponder that is selected on control unit or replace ATCRBS transponder if ATCRBS transponder is selected from control unit. |
| 7. | FAIL annunciation remains lit on transponder control unit. | a. Replace control unit. |
| 8. | ATC 1 or ATC 2 annunciation does not appear on control unit display window when transponder #1 (ATC 1) is selected from control unit. | a. Replace control unit. |
| 9. | ATC Code Select switches on the control unit do not properly control the ATC Code display on the control unit. | a. Replace control unit. |

Table 1001 System Fault Isolation

| ITEM | FAILURE INDICATION | PRIORITIZED CORRECTIVE ACTION |
|---|---|---|
| 10. | During Mode C ramp tests, proper altitude reports are not displayed on ramp tester. | a. View control unit for altitude data failures, if an MST 67A transponder is selected on the control unit. If an ATCRBS transponder is selected from the control unit, consult associated ATCRBS transponder maintenance manual.<br><br>b. Check/replace altitude source.<br><br>c. Check ramp tester. |
| 11. | During Mode C ramp tests, the ramp tester indicates that the transponder's transmit frequency is not within 1090 ± 1 MHz. | Same as Item 10. |
| 12. | During Mode A ramp tests proper ATC Code is not displayed on ramp tester. | Same as Item 10. |
| 13. | During Mode A ramp tester indicates that the transponder transmit frequency is not within 1090 MHz ± 1 MHz. | Same as Item 10. |
| 14. | When the appropriate control unit switch is set to inhibit altitude reporting during ramp testing, an altitude report display is visible on ramp tester. | a. Replace control unit.<br><br>b. Replace transponder.<br><br>c. Check/repair Altitude Reporting ON/OFF signal wiring between the control unit and the transponder. (The MST 67A transponder receives its Altitude Reporting directive input via the ARINC 429 bus; an ATCRBS transponder receives a discrete Altitude Reporting ON/OFF signal input.) |

Table 1002 is a list of the transponder fault codes:

Table 1002 MST 67A Built-In-Test Fault Codes

| Fault Code | Failed Assembly | Failure System |
|---|---|---|
| 00H | None | No Faults |
| 10H | Pwr Supply | +5 Vdc |
| 17H | IOP/DLP Board | Power Fail Stuck Hi |
| 18H | None | Illegal Mode S Address* |
| 16H | IOP/DLP Board | Int Suppression Stuck Hi |
| 20H | IOP/DLP Board | RAM Read/Write Failure |
| 21H | IOP/DLP Board | ROM Checksum Failure |
| 23H | IOP/DLP Board | RLSI Failure |
| 24H | IOP/DLP Board | EEPROM Read/Write Failure |
| 27H | IOP/DLP Board | Squitter Tx Data Failure |
| 28H | IOP/DLP Board | Squitter Rate Out of Spec |
| 29H | IOP/DLP Board | TCAS 429XT Loopback Failure |
| 31H | TX Assembly | Transmitter Failure |
| C0H | Strap Data | Illegal Mode S Address** |
| C1H | Strap Data | Changed Mode S Address** |
| D0H | IOP/DLP Board | Comm A/B Bus Failure |
| D1H | IOP/DLP Board | Comm C Bus Failure |
| E3H | Control Panel | No Control Data |
| F1H | TCAS | TCAS Interface Failure |
| F4H | Altitude-706 | 706 Air Data Failure |
| F5H | Altitude-575 | 575 Air Data Failure |
| F9H | Altitude-Gillham | Gillham Compare Fail & Invalid |
| FAH | Altitude-Gillham | Gillham Data Invalid |

*-1101,-1201,-1301,-1602 versions only.
**-2001,-2101 versions only.

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# INSTALLATION AND MAINTENANCE PRACTICES

## 1. System Components

### 1.A. MST 67A Transponder Installations

The purpose of this section is to provide service personnel with installation and maintenance information pertaining to the MST 67A Mode S Transponder System. The information pertains to the following MST 67A components shown in figure 2001.

- MST 67A Mode S Transponder
- Bottom mounted L-band Omnidirectional Antenna (non-diversity installations)
- Top mounted L-band Omnidirectional Antenna (diversity installations)
- KFS 578A, PS-578A Mode S control unit.

### 1.B. TCAS installations:

- KFS 578A, PS-578A Mode S/TCAS control unit or
- CD 671C, PS-550 Mode S/TCAS control unit or
- CTA-81A Mode S/TCAS control unit.

### 1.C. Collins TDR-94D Transponder Installations:

- CD 671C, PS-550 or CTA-81D Mode S/TCAS control units or
- Versions of the KFS 578A, PS-578A units compatible with the Collins TDR-94D transponder.

Installation instructions are supported by mechanical outline drawings and electrical interconnection drawings. These drawings located at the back of this section, should be reviewed by the installing agency and requirements peculiar to the particular airframe established before installation is begun.

Figure 2001 shows the MST 67A Mode S units required to meet minimum system requirements and shows optional units that can augment or replace the minimum system units.

2. Unpacking

Use care when unpacking the system components. Open shipping cartons and carefully remove all items. Check the components to insure that all items identified on the packing list are included. Visually inspect each component for damage incurred during shipment, i.e. inspect for dents, deep abrasions, chipped paint etc. If any component is damaged, notify the transportation carrier immediately.

3. Pre-Installation Testing

Honeywell components of the Mode S transponder system have been tested prior to shipment, pre installation testing is not required. If pre installation testing is desired, however, reference should be made to Section 1000, TESTING and FAULT ISOLATION, of the Component Maintenance Manual for the particular unit. Refer to the Related Publications table in the SYSTEM OPERATION section of this manual for a list of Component Maintenance Manuals.

4. Equipment Changes and Markings

Honeywell uses a standardized marking system to identify equipment that has changes incorporated. Refer to the appropriate Publications Index for a list of service bulletins affecting these units.

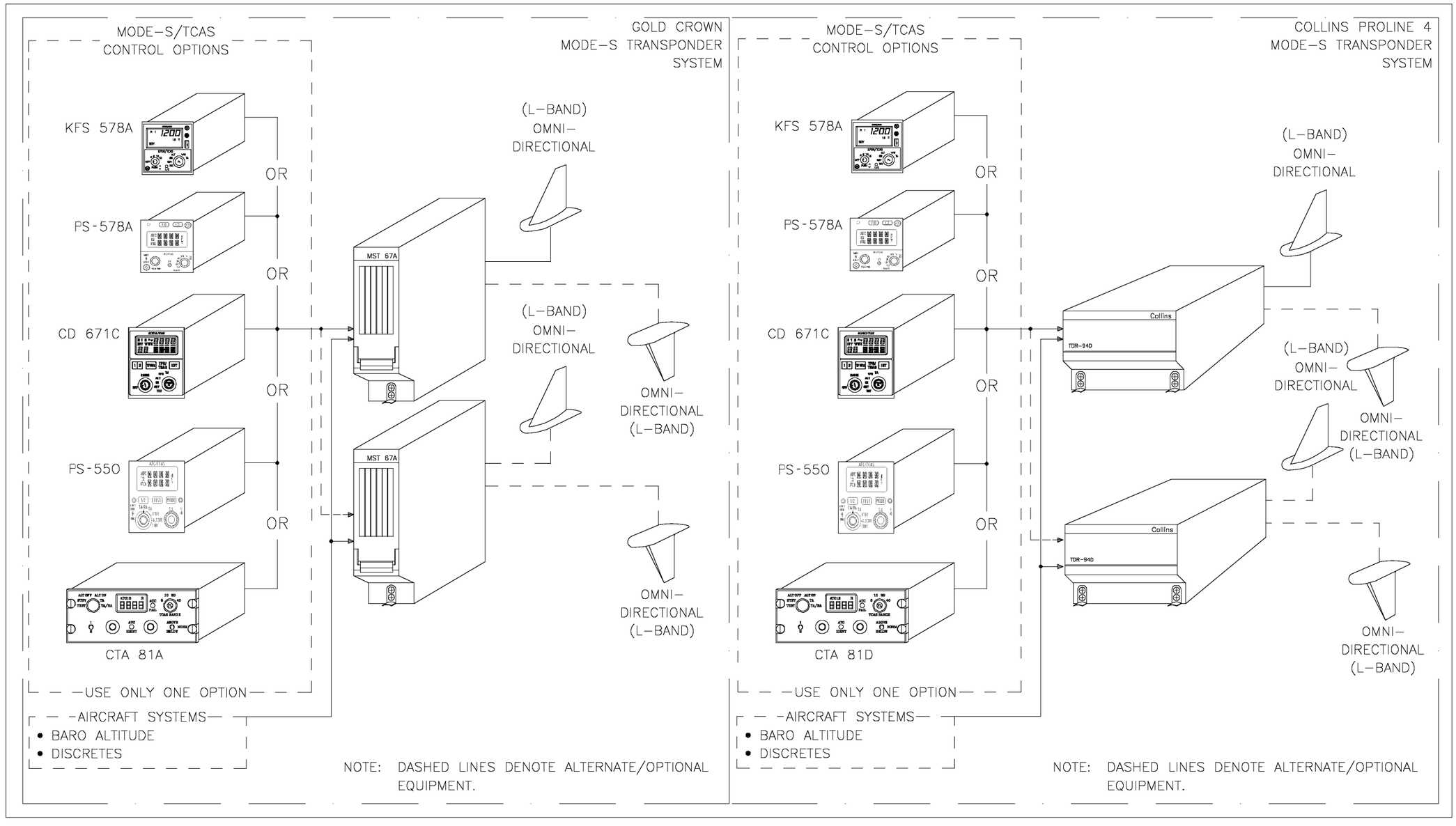


Figure 2001 Mode S Transponder Equipment Set and Options

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# 5. Installation

## 5.A. General Procedures

The following paragraphs contain information pertaining to the initial installation of the MST 67A Mode S Transponder System, including instructions concerning the location and mounting of the system components.

The conditions and tests required for TSO/ETSO 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/ETSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

The system 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 and Advisory Circular AC 43-13. To ensure the system has been properly and safely installed in the aircraft, the installer should make a thorough visual inspection and conduct an overall operational check of the system on the ground prior to flight.

AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, A CHECK SHOULD BE MADE WITH AIRCRAFT PRIMARY POWER SUPPLIED TO THE MOUNT CONNECTOR TO ENSURE THAT POWER IS APPLIED ONLY TO THE PINS SPECIFIED IN THE INTERWIRING DIAGRAMS.

## 5.B. Location of Equipment

### 5.B.(1) L-Band Omnidirectional Antenna Locations

The non-diversity Mode S transponder installations require one bottom transmit/receive L-band omni antenna.

In a Mode S/TCAS environment the MST 67A Mode S Transponder system requires both a top and a bottom transmit/receive L-band omni antenna.

The dimensions and footprint pattern for the ARINC 718/735 L-band blade antenna is provided by the manufacturer.

The location selected for the two L-band transponder antennas should meet the following requirements:

5.B.(1)(a) If it is anticipated that TCAS II will be installed on the aircraft, the following TCAS II antenna location requirements must be considered when installing the transponder omni antennas: TCAS II requires a top and bottom antenna on the aircraft. The TCAS antennas should be mounted as far forward as possible on the constant radius portion of the aircraft. Obstructions such as other antennas should not be present in the forward direction of the TCAS antennas.

Therefore, if the aircraft is to be TCAS II equipped, the transponder top and bottom antennas must be mounted far enough behind the forward location of the TCAS antennas to provide a minimum separation of 30 inches between the rear edge of the TCAS antenna and the front edge of the transponder antenna. Thirty inches provides a minimum 20 dB of isolation (2.5 wavelengths at 1090 MHz).

5.B.(1)(b) The transponder top and bottom antennas should not be mounted closer than 30 inches to any other antenna on the aircraft.

5.B.(1)(c) The transponder antenna should be mounted within 5° of the centerline of the aircraft and as far forward on the constant radius portion of the fuselage as possible without violating the TCAS antenna mounting requirement described in (a) above.

5.B.(1)(d) The transponder bottom antenna should be located within 5° of the centerline of the aircraft and as close as possible to the vertical frame station location of the top antenna but can vary up to a maximum of 25 feet longitudinally from the top antenna.

NOTE: Transponders that do not meet the requirements of DO-181A for TCAS must have at least 40 dB of isolation between the TCAS antenna and the transponder antenna. This is approximately eight feet. Check with the manufacturer of the transponder for compliance with the DO 181A specifications.

NOTE: Except for the above mentioned installation considerations, the location of the MST 67A

system (LRU's) equipment is not critical, as long as the environment is compatible with that to which the equipment was designed (refer to Leading Particulars tables in the "Description and Operation" section in this manual). The location of system components will vary with different aircraft types.

Care should be exercised to avoid mounting the 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 free from excessive vibration, heat, and noise generating sources.

5.B.(2) Antenna Switch Locations

Antenna coaxial switches are shown on interwiring diagram figure 2021, figure 2022, figure 2023, and figure 2027. An antenna switch is required for each L-band antenna that is shared by more than one transponder. Antenna switches are OEM equipment and the part number is listed in the "Installation Kit" table in the Description and Operation section of this manual.

It is recommended that the antenna coaxial switches, if used, be mounted in an easily accessible location, close to the two transponder units.

NOTE: Independent dedicated top and bottom antennas can be installed for each transponder, in which case, antenna coaxial switches are not required.

NOTE: The dB loss imposed by an antenna switch must not cause more than a 3 dB loss between the transponder and antenna. [The 3 dB maximum requirement is explained in paragraph 5.C.(4)].

5.B.(3) Transponder and Mounting Tray Locations

The tray-mounted MST 67A Mode S Transponder can be installed in any convenient location that is free of excessive heat and vibration and which provides reasonable access for inspection and maintenance. To achieve maximum performance, the MST 67A should be installed adja-

cent to other receivers or boxes with similar functions. Except for the antenna cables, the length of cables from the MST 67A transponder mounting tray connector to the other system units is not critical because unit interfaces are designed with high impedance inputs, low impedance outputs, and low noise susceptibility characteristics. Forced-air cooling can be provided but is not a requirement. The mounting tray is shown in figure 2009 and outline drawing figure 2010 shows transponder dimensions.

5.B.(4) Control Unit Location

The KFS 578A, PS-578A, CD 671C, PS-550, and CTA-81( ) control units should be installed in any suitable location in the cockpit, giving considerations to viewing and ease of operation. Outline drawing figure 2011, figure 2012, figure 2013, figure 2014, figure 2015, and figure 2016 show control unit dimensions and mounting hole requirements.

5.C. Interwiring and Cable Fabrication

5.C.(1) General

Figure 2017, figure 2018, figure 2019, figure 2020, figure 2021, figure 2022, figure 2023, figure 2024, figure 2025, figure 2026, figure 2027, figure 2028, figure 2029, and figure 2030 are detailed system interwiring diagrams for ARINC 718 installations. The interwiring diagrams require thorough study before installation of the aircraft wiring.

The installer must determine the types of external avionics equipment and associated interconnects that can be connected to the MST 67A transponder and control units.

Cabling must be fabricated in accordance with system interwiring diagrams. 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 interwiring diagram be included in the fabricated 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 are incorporated.

When the cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chafing. Additional protection should be provided in all locations where the cables may be subject 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 airframe, the cables should cross high-level lines at a right angle.

The installer must be knowledgeable of any system variations peculiar to the installation, such as the system strapping requirements (i.e. the Mode S address, aircraft maximum cruise speed, altitude type select, etc.). Strapping is described in paragraph 5.C.(6). Furthermore, the installer should use ARINC 718/735 as a guide and reference throughout the fabrication and installation of the cabling in the aircraft.

Notes on the system interwiring diagrams describe particulars related to the system interwiring.

Antenna cabling which has some unique system requirements is described in Paragraph 5.C.(4) below.

5.C.(2) Primary Power and Circuit Breaker Requirements and Wiring

The MST 67A transponder, KFS 578A, PS-578A, and CD 671C, PS-550, receive primary power from an aircraft 28 Vdc power source by aircraft circuit breakers. The CTA-81( ) control units receive primary power from an aircraft 115 Vac, 400 Hz power source by aircraft circuit breakers. The control units also receive lighting power from the aircraft dimmer bus and the aircraft day/night lighting power source.

Power connections and circuit breaker requirements are shown on system interwiring diagrams.

5.C.(3) Suppression Pulse Requirements and Wiring

Connections for the suppression pulse (J671A-pin 2) from the transponder (see figure 2021, figure 2022, figure 2023, figure 2027) are dependent on aircraft equipment and wiring. Typically, the suppression pin is connected from the MST 67A transponder to the suppression inputs

on the L-band equipment (i.e. TCAS processor and DME equipment).

5.C.(4) Antenna Cable Type Selection

NOTE: Always verify the following information against the aircraft system interwiring diagrams.

The following transponder-to-omni-antenna cable installation requirements must be adhered to throughout the following procedure:

The total db losses in the coaxial cable run and interconnects between the MST 67A transponder and each omni antenna must not be less than 1 dB and must not be greater than 3 dB at 1030 Mhz.

The round-trip (receive/transmit) delay imposed by the cable run and interconnect between the transponder and the top antenna as opposed to the round-trip (receive/transmit) delay imposed by the cable run and interconnects between the transponder and the bottom antenna must be seen by the transponder as an effective delay difference of less than 50 nanoseconds. The procedure for selecting the type of transponder-to-antenna coaxial cable, connectors, and coaxial antenna switches required to satisfy the aforementioned installation requirements is as follows:

5.C.(4)(a) Determine routing for the cable runs to be used from the MST 67A transponder to each omni antenna. Measure the length of these cable runs. Log these figures for future reference.

5.C.(4)(b) Determine the interconnects (including antenna switches) that will exist between the MST 67A transponder and each omni antenna. The antenna connection between the MST 67A rear connector and the transponder mounting tray connector is considered to be one interconnect; the TNC coaxial connection at the antenna is considered to be another interconnect.

5.C.(4)(c) Determine the manufacturer's type of connectors and the antenna switches that will exist at each interconnect between the transponder and each antenna. Check the manufacturer's specifications for each connector (and antenna switch if applicable) and determine the

associated dB loss that will exist per interconnect. Log these figures for future reference.

5.C.(4)(d) Total the dB losses for all interconnects between the transponder and the top antenna. Total all the dB losses for all interconnects between the transponder and the bottom antenna. Log these figures for future reference.

5.C.(4)(e) If the total dB interconnect loss between transponder and top or bottom antenna exceeds 3 dB, the loss caused by interconnections must be reduced or the number of interconnects must be limited so that insertion loss tolerances can be maintained.

5.C.(4)(f) If total connector and antenna switch dB losses between transponder and the top or bottom antenna is greater than 1 dB and less than 3 dB, subtract that total loss from 3 dB. This difference is the maximum allowable dB loss that can be imposed by the coaxial cable run from the transponder to that antenna. In this case, minimum cable loss is not applicable. Log this maximum allowable loss for future reference.

5.C.(4)(g) If total connector and antenna switch dB losses between transponder and the top or bottom antenna is less than 1 dB, subtract that total loss from 1 dB. This remainder is the minimum amount of dB loss that must be imposed by the coaxial cable run from the transponder to that antenna. Then, subtract the total dB loss between the transponder and the top and bottom antenna from 3 dB. The remainder after this subtraction is the maximum allowable dB loss that can be imposed by the coaxial cable run from the transponder to that top and/or bottom antenna. Log both the required minimum loss and the maximum allowable loss for future reference.

NOTE: At this point the installer has determined the physical length of the cables to the top and bottom antenna and has calculated the dB loss limitations of the cable runs. Top and bottom antenna cables must be selected that meet the 2 dB ± 1 dB requirement and do not exceed the 50 nanosecond maximum delay difference requirement between the top and bottom antenna cable runs.

5.C.(4)(h) Consult manufacturer's coaxial cable data sheet specifications. Using the length of the top and bottom antenna cables measured in step (a) and the manufacturer specified dB loss per foot of cable type, select a particular type or types of cable that meet the top and bottom cable loss limitations calculated in steps (f) and (g). In anticipation of aging factors, it is advisable to select a cable type that has an insertion loss that when combined with interconnect losses will equal a dB loss as close as practical to 2 dB.

NOTE: It is conceivable that the type of cable selected to meet the dB loss requirements of the top antenna cable will be different than the type of cable selection required to meet the dB loss requirements of the bottom antenna. For example: if the antenna run to one antenna is lengthy, and the antenna run to the other antenna is short, the long run may require low loss antenna cable to meet the less than 3 dB antenna cable/interconnect requirement while the short run may require a relatively high loss cable to exceed the 1 dB antenna cable/interconnect loss requirement.

5.C.(4)(i) Consult manufacturer's data sheets to determine the nanosecond delay per foot (at 1030 MHz) for the type or types of cable selected in Step (h).

5.C.(5) Connectors

Mating connectors for the MST 67A Mode S Transponder System units are identified in the "Installation Kit" table of the Description and Operation section and in some cases are on the unit's outline and mounting drawing.

5.C.(5)(a) Transponder Connector

The transponder connector is mounted on the center grid of the transponder rear panel. The connector is a low-insertion-force connector with polarization projections that prevent improper insertion.

The mating connector for the transponder is specified in the transponder installation kit and is part of the mounting tray.

The transponder connector shown in figure 2002 is divided into two sections; top plug section (J671A) and bottom plug section (J671B). The top section of this connector contains 106 socket-type contacts and the bottom section contains two small-diameter coaxial contacts. Figure 2002 and system interconnect diagrams define the input or output connections to each pin in each of the two connector sections.

5.C.(5)(b) L-Band Antenna Connectors

The coaxial cable connector J671B/Port 1 on the bottom plug section of the MST 67A transponder rear connector (see figure 2002) connects to the bottom-mounted L-band, omni, antenna by a coaxial cable and TNC connector. The coaxial cable connector J671B/Port 2 on the bottom plug section of the rear connector (see figure 2002) connects to the top-mounted L-band, omni, antenna by another coaxial cable and TNC connector.

NOTE: If transponders share omni antennas, the antenna coaxial cable outputs from each transponder are connected to the antennas through a coaxial switch. The type of connector on the transponder end of the coaxial cables is dependent on the coaxial cable type chosen for each installation.

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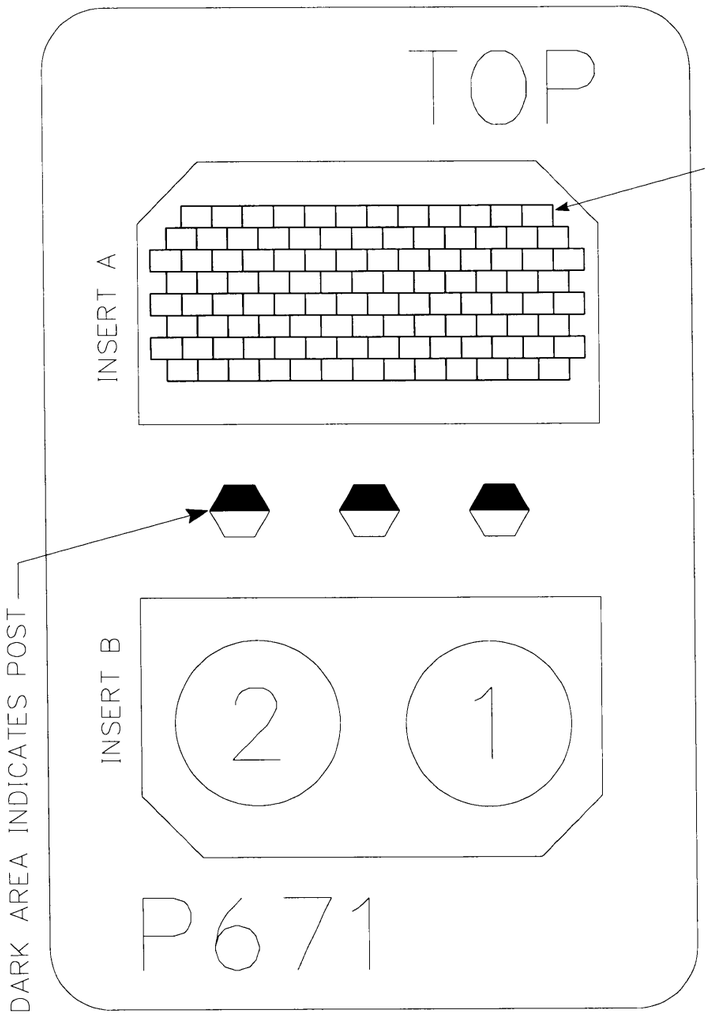
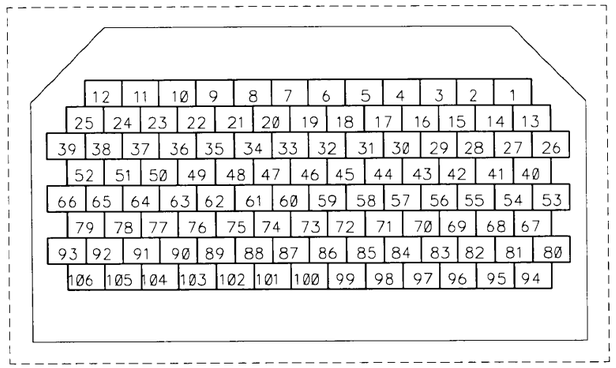



CONNECTOR KEYING & PIN LOCATION
(FRONT VIEW OF RACK CONNECTOR)
SEE DETAIL A FOR PINOUT INFORMATION




DETAIL A

Dwg 155-01626-0001 Rev AA Sht 2

Figure 2002 MST 67A Mode S Transponder Pinout Diagram (Sheet 1 of 2)
(Dwg. No. 155-01626-0001, Rev AA)

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| P671A | | P671A | | P671B | |
|---|---|---|---|---|---|
| 1 | AIR DATA/CONTROL DATA/SUPPRESSION SHIELD | 54 | ON(NOT)/OFF | 1 | BOTTOM ANTENNA PORT |
| 2 | SUPPRESSION | 55 | STANDBY(NOT)/ON INPUT | 2 | TOP ANTENNA PORT |
| 3 | 706/575 AIR DATA INPUT PORT 1A | 56 | TRANSPONDER FAIL #2 DISCRETE OUTPUT | | |
| 4 | 706/575 AIR DATA INPUT PORT 1B | */# 57 | CROSS-SIDE OUTPUT/RF REPLY OUTPUT | | |
| 5 | MODE S ADDRESS BIT 1 | 58 | MODE C PULSE C1 PORT 1 | | |
| 6 | MODE S ADDRESS BIT 2 | 59 | MODE C PULSE C2 PORT 1 | | |
| 7 | MODE S ADDRESS BIT 3 | 60 | MODE C PULSE C4 PORT 1 | | |
| 8 | MODE S ADDRESS BIT 4 | 61 | MODE C PULSE D2 PORT 1 | | |
| 9 | MODE S ADDRESS BIT 5 | 62 | MODE C PULSE D4 PORT 1 | | |
| 10 | MODE S ADDRESS BIT 6 | 63 | MODE C PULSE A1 PORT 2 | | |
| 11 | MODE S ADDRESS BIT 7 | 64 | MODE C PULSE A2 PORT 2 | | |
| 12 | MODE S ADDRESS BIT COMMON 1 | 65 | MODE C PULSE A4 PORT 2 | | |
| 13 | 706/575 AIR DATA INPUT PORT 2A | 66 | AIRSPEED/ADDRESS COMMON | | |
| 14 | 706/575 AIR DATA INPUT PORT 2B | 67 | DATA LINK COMM A/B OUTPUT A | | |
| 15 | CONTROL DATA INPUT PORT 1A | 68 | DATA LINK COMM A/B OUTPUT B | | |
| 16 | CONTROL DATA INPUT PORT 1B | 69 | DATA LINK COMM A/B INPUT A/# ENHANCED SURV. GENERAL INPUT 1-A | | |
| 17 | MODE S ADDRESS BIT 8 | 70 | DATA LINK COMM A/B INPUT B/# ENHANCED SURV. GENERAL INPUT 1-B | | |
| 18 | MODE S ADDRESS BIT 9 | 71 | MODE C PULSE B1 PORT 2 | | |
| 19 | MODE S ADDRESS BIT 10 | 72 | MODE C PULSE B2 PORT 2 | | |
| 20 | MODE S ADDRESS BIT 11 | 73 | MODE C PULSE B4 PORT 2 | | |
| 21 | MODE S ADDRESS BIT 12 | 74 | MODE C PULSE C1 PORT 2 | | |
| 22 | MODE S ADDRESS BIT 13 | 75 | MODE C PULSE C2 PORT 2 | | |
| 23 | MODE S ADDRESS BIT 14 | 76 | MODE C PULSE C4 PORT 2 | | |
| 24 | MODE S ADDRESS BIT 15 | 77 | MODE C PULSE D2 PORT 2 | | |
| 25 | MODE S ADDRESS BIT 16 | 78 | MODE C PULSE D4 PORT 2 | | |
| */# 26 | !SPECIAL | 79 | AIR/GROUND ATCRBS INHIBIT(NOT) DISCRETE INPUT | | |
| 27 | CONTROL DATA INPUT PORT 2A | 80 | TCAS XT COORDINATION A | | |
| 28 | CONTROL DATA INPUT PORT 2B | 81 | DATA LINK COMM C OUTPUT A | | |
| 29 | CONTROL DATA OUTPUT A | 82 | DATA LINK COMM C OUTPUT B | | |
| 30 | CONTROL DATA OUTPUT B | 83 | DATA LINK COMM C INPUT A/# ENHANCED SURV. GENERAL INPUT 2-A | | |
| 31 | MODE S ADDRESS BIT 17 | 84 | DATA LINK COMM C INPUT B/# ENHANCED SURV. GENERAL INPUT 2-B | | |
| 32 | MODE S ADDRESS BIT 18 | 85 | ALTITUDE TYPE SELECT A | | |
| 33 | MODE S ADDRESS BIT 19 | 86 | ALTITUDE TYPE SELECT B | | |
| 34 | MODE S ADDRESS BIT 20 | 87 | ALTERNATE AIR DATA SOURCE SELECT 1/2(NOT) | | |
| 35 | MODE S ADDRESS BIT 21 | 88 | GILLHAM COMPARE(NOT) | | |
| 36 | MODE S ADDRESS BIT 22 | 89 | ANTENNA PROGRAM INPUT | | |
| 37 | MODE S ADDRESS BIT 23 | */# 90 | VALID OUTPUT/ SPARE DISCREET INPUT #1 | | |
| 38 | MODE S ADDRESS BIT 24 | 91 | RESERVED (SDI INPUT B)/# FUTURE-EXT. SQUITER DISABLE | | |
| 39 | MODE S ADDRESS BIT COMMON 2 | 92 | RESERVED (SDI INPUT A)/# ENHANCED SURVEILANCE ENABLE | | |
| */# 40 | CONTROL INPUT PORT C-B/GPS-B | 93 | MODE C PULSE COMMON | | |
| */# 41 | CONTROL INPUT PORT C-A/GPS-A | 94 | DATA LINK/TCAS SHIELD | | |
| 42 | CONTROL DATA PORT SELECT 1(NOT)/2 | 95 | TCAS XT COORDINATION B | | |
| 43 | GILLHAM COMPARE FAIL DISCRETE OUTPUT | 96 | TCAS TX COORDINATION A | | |
| 44 | MODE C PULSE A1 PORT 1 | 97 | TCAS TX COORDINATION B | | |
| 45 | MODE C PULSE A2 PORT 1 | */# 98 | CROSS-SIDE INPUT/ SPARE DISCREET INPUT #2 | | |
| 46 | MODE C PULSE A4 PORT 1 | */#/† 99 | CONTROL INPUT PORT A-A / FMS INPUT A / FLIGHT IDENTIFICATION INPUT A | | |
| 47 | MODE C PULSE B1 PORT 1 | */#/† 100 | CONTROL INPUT PORT A-B / FMS INPUT B / FLIGHT IDENTIFICATION INPUT B | | |
| 48 | MODE C PULSE B2 PORT 1 | 101 | ALTITUDE DISCRETE/ANTENNA PROGRAM COMMON | | |
| 49 | MODE C PULSE B4 PORT 1 | */# 102 | !(REMOTE IDENT) | | |
| 50 | MAXIMUM AIR SPEED -R115 | 103 | AIRCRAFT POWER | | |
| 51 | MAXIMUM AIR SPEED -R116 | 104 | AIRCRAFT POWER | | |
| 52 | MAXIMUM AIR SPEED -R117 | 105 | AIRCRAFT GROUND | | |
| ~~53~~ | ~~SIGNAL GROUND~~ | ~~106~~ | ~~AIRCRAFT GROUND~~ | | |

NOTE:

* THESE PIN ASSIGNMENTS ARE ONLY AVAILABLE TO UNITS P/N 066-01143-0401/0501/0601.

† THESE PIN ASSIGNMENTS ARE ONLY AVAILABLE TO UNITS P/N 066-01143-1101/1201/1301/1602.

\# THESE PIN ASSIGNMENTS ARE ONLY AVAILABLE TO UNITS P/N 066-01143-2001/2101.

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Figure 2002 MST 67A Mode S Transponder Pinout Diagram (Sheet 2)
(Dwg. No. 155-01626-0001, Rev AA)

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## 5.C.(5)(c) KFS 578A Mode S/TCAS Control Unit Connectors

The KFS 578A Control Unit has one 29-pin (P5781) and one 9-pin (P5782) connector mounted on the rear of the unit. The connectors are keyed to prevent improper connector insertion. The connectors are shown in figure 2003 and the signals connected to each pin are defined in table 2001 and table 2002.

The interwiring diagrams define the input and output signal connections to the Mode S/TCAS control unit connectors.

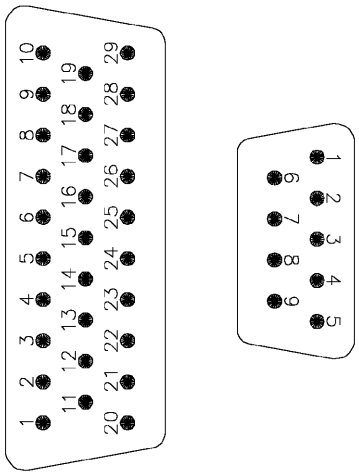



Figure 2003 KFS 578A Mode S/TCAS Control Unit Rear Connector

Table 2001 KFS 578A Control Unit Connector (P5782) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | Shield Ground/429 Common | I | ARINC 429 common |
| 2 | Polarizer Key | | Polarizer key |
| 3 | 429 Input #1 (A) | I | Low speed ARINC 429 |
| 4 | 429 Input #1 (B) | I | Low speed ARINC 429 |
| 5 | 429 Input #2 (A) | I | Low speed ARINC 429 |
| 6 | 429 Input #2 (B) | I | Low speed ARINC 429 |
| 7 | 429 Output (A) | O | Low speed ARINC 429 |
| 8 | 429 Output (B) | O | Low speed ARINC 429 |
| 9 | | | Spare |

Table 2002 KFS 578A Control Unit Connector (P5781)
Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | 28Vdc Unit Power | I | 28 Vdc power input |
| 2 | Aircraft Ground | I | Aircraft ground |
| 3 | 28Vdc Lighting | I | 28 Vdc A/C lighting bus input |
| 4 | 5Vdc Lighting | I | 5 Vdc/Vac A/C lighting bus in |
| 5 | Low Lighting | I | Lighting bus common |
| 6 | Antenna Transfer #1 Output | O | Gnd = Xpndr #1 Selected/Active<br>Open = Xpndr #1 Not Selected |
| 7 | Standby(not)/On #1 | O | Gnd = Xpndr #1 Standby/Active<br>Open = Xpndr #1 On |
| 8 | Standby(not)/On #2 | O | Gnd = Xpndr #2 Standby/Active<br>Open = Xpndr #2 On |
| 9 | Remote Function Test(not)/<br>(External Range Configuration) | I | Remote Function Test:<br>Gnd = Activated<br>Open = Not Activated.<br><br>External Range Configuration:<br>(-XX04 unit versions)<br>Gnd = Select Range<br>Open = Extended Range. |
| 10 | | I | Reserved - Reply Input |
| 11 | Control Disable(not) | I | Control Unit Disable:<br>Gnd = Activated<br>Open = Not Activated. |
| 12 | Master(not)/Slave | I | Gnd = Master<br>Open = Slave |
| 13 | Emergency(not) | I | Squawk Code 7700:<br>Gnd = Activated<br>Open = Not Activated. |
| 14 | | | Spare |
| 15 | External Standby/<br>(Manual/Auto) | I | External Standby:<br>Gnd = Standby Active<br>Open = Inactive<br><br>Manual/Auto:<br>(-XX04 Unit versions)<br>Gnd = Auto Pop-Up<br>Open = Manual |
| 16 | Dim Select | I | Gas Discharge Display Dimming:<br>Gnd = Follows A/C lighting bus<br>Open = Follows photocell<br>+28 Vdc = Maximum brightness. |

Table 2002 KFS 578A Control Unit Connector (P5781)
Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 17 | | | |
| 18 | | | |
| 19 | Transponder 1 Fail DSC #2 | I | Gnd = Normal operation<br>Open = Transponder 1 failure |
| 20 | Transponder 2 Fail DSC #2 | I | Gnd = Normal operation<br>Open = Transponder 2 failure |
| 21 | External Ident | I | Gnd = Activated<br>Open = Not Activated |
| 22 | | | Spare |
| 23 | | | Spare |
| 24 | ATE Test | I | Gnd = Activated<br>Open = Not Activated |
| 25 | Warning and Caution(not) | O | A/C Warning/Caution Panel:<br>Gnd = Unit Failure<br>Open = Valid (No Failure) |
| 26 | Polarizer Key | | Polarizer key |
| 27 | Antenna Transfer #2 output | O | Gnd = Xpndr #2 Selected/Active<br>Open = Xpndr #2 Not Selected |
| 28 | On #1(not) | O | On transponder #1 |
| 29 | On #2(not) | O | On transponder #2 (dual) |

## 5.C.(5)(d) PS-578A Mode S/TCAS Control Panel Connectors

The PS-578A Control Panel has one 29-pin (J1) and one 9-pin (J2) connector mounted on the rear of the unit. The connectors are keyed to prevent improper connector insertion. The connectors are shown in figure 2004 and figure 2005 and the signals connected to each pin are defined in table 2003 and table 2004.

The interwiring diagrams define the input and output signal connections to the Mode S/TCAS control panel connectors.

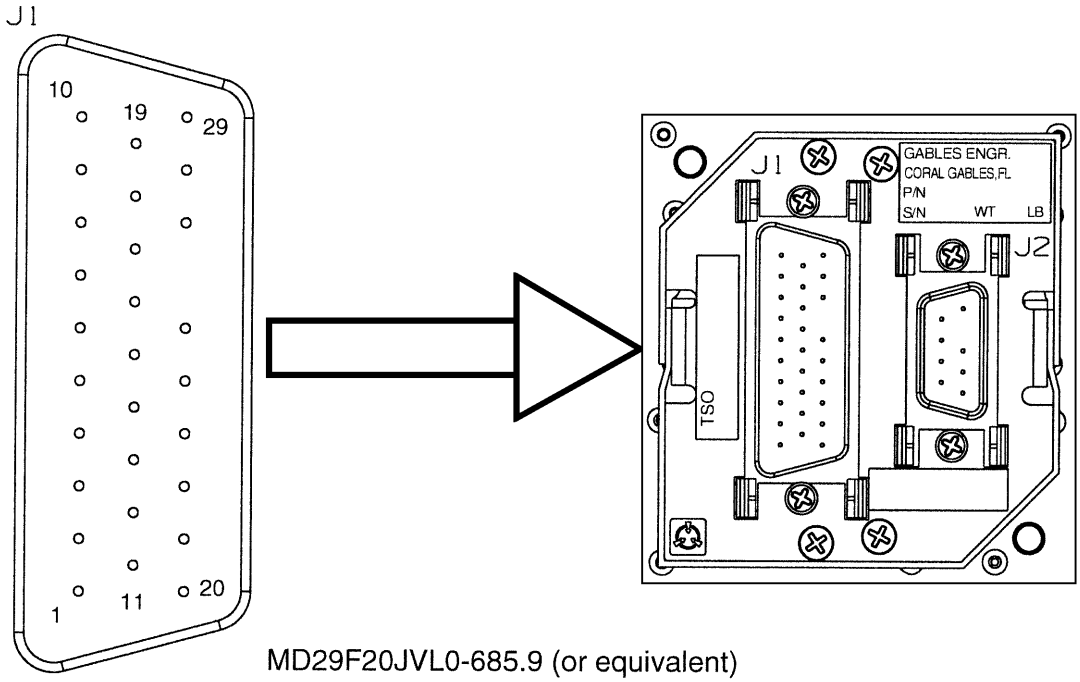



Figure 2004 PS-578A Mode S/TCAS Control Panel Rear Connector (J1)

Table 2003 PS-578A Control Panel Connector (J1) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | 28Vdc Unit Power | I | 28 Vdc power input |
| 2 | Aircraft Ground | I | Aircraft ground |
| 3 | 28Vdc Lighting | I | 28 Vdc A/C lighting bus input |
| 4 | 5Vdc Lighting | I | 5 Vdc/Vac A/C lighting bus in |
| 5 | Low Lighting | I | Lighting bus common |
| 6 | Antenna Transfer #1 Output | O | Gnd = Xpndr #1 Selected/Active<br>Open = Xpndr #1 Not Selected |
| 7 | Standby(not)/On #1 | O | Gnd = Xpndr #1 Standby/Active<br>Open = Xpndr #1 On |
| 8 | Standby(not)/On #2 | O | Gnd = Xpndr #2 Standby/Active<br>Open = Xpndr #2 On |
| 9 | Remote Function Test(not)/<br>(External Range Configuration) | I | Remote Function Test:<br>Gnd = Activated<br>Open = Not Activated.<br><br>External Range Configuration:<br>(KFS 578A -XX04 emulations)<br>Gnd = Select Range<br>Open = Extended Range. |
| 10 | | I | Reserved - Remote Reply In |
| 11 | Control Disable(not) | I | Control Unit Disable:<br>Gnd = Activated<br>Open = Not Activated. |
| 12 | Master(not)/Slave | I | Gnd = Master<br>Open = Slave |
| 13 | Emergency(not) | I | Squawk Code 7700:<br>Gnd = Activated<br>Open = Not Activated. |
| 14 | | | Spare |
| 15 | External Standby/<br>(Manual/Auto) | I | External Standby:<br>Gnd = Standby Active<br>Open = Inactive<br><br>Manual/Auto:<br>(KFS 578A -XX04 emulations)<br>Gnd = Auto Pop-Up<br>Open = Manual |
| 16 | Dim Select | I | Display Brightness:<br>Gnd = Follows A/C lighting bus<br>Open = Follows photocell |
| 17 | | | |

Table 2003 PS-578A Control Panel Connector (J1) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 18 | | | |
| 19 | Transponder 1 Fail DSC #2 | I | Gnd = Normal operation<br>Open = Transponder 1 failure |
| 20 | Transponder 2 Fail DSC #2 | I | Gnd = Normal operation<br>Open = Transponder 2 failure |
| 21 | External Ident | I | Gnd = Activated<br>Open = Not Activated |
| 22 | | | Spare |
| 23 | | | Spare |
| 24 | (*FCDE)/ ATE Test | I | (*FCDE):<br>Gnd (at power On) = Activated. Rotate Range or A/N/B knobs to emulate KFS 578A version #.<br><br>ATE Test:<br>Gnd = Activated<br>Open = Not Activated |
| 25 | Warning and Caution(not) | O | A/C Warning/Caution Panel:<br>Gnd = Unit Failure<br>Open = Valid (No Failure) |
| 26 | Polarizer Key | | Polarizer key |
| 27 | Antenna Transfer #2 output | O | Gnd = Xpndr #2 Selected/Active<br>Open = Xpndr #2 Not Selected |
| 28 | On #1(not) | O | On transponder #1 |
| 29 | On #2(not) | O | On transponder #2 (dual) |

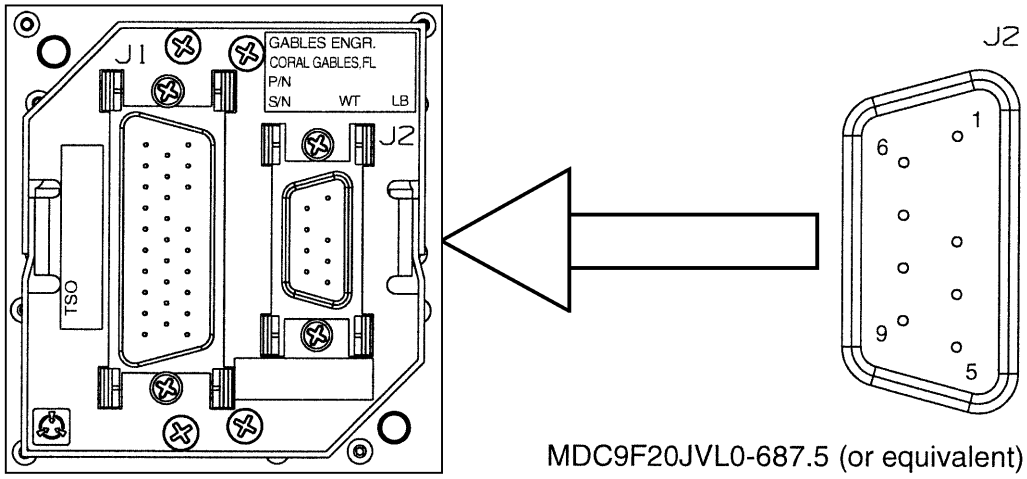



Figure 2005 PS-578A Mode S/TCAS Control Panel Rear Connector (J2)

Table 2004 PS-578A Control Panel Connector (J2) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | Shield Ground/429 Common | I | ARINC 429 common |
| 2 | Polarizer Key | | Polarizer key |
| 3 | 429 Input #1 (A) | I | Low speed ARINC 429 |
| 4 | 429 Input #1 (B) | I | Low speed ARINC 429 |
| 5 | 429 Input #2 (A) | I | Low speed ARINC 429 |
| 6 | 429 Input #2 (B) | I | Low speed ARINC 429 |
| 7 | 429 Output (A) | O | Low speed ARINC 429 |
| 8 | 429 Output (B) | O | Low speed ARINC 429 |
| 9 | | | Spare |

## 5.C.(5)(e) CD 671C Mode S/TCAS Control Unit Connectors

The two 25-pin electrical connectors for the CD 671C control unit are mounted on the rear panel of the unit. The connectors are keyed (P6712-2, P6711-25) to prevent improper connector insertion. The connectors are shown in figure 2006 and the signals connected to each pin are defined in table 2005 and table 2006.

The interwiring diagrams define the input and output signal connections to the control unit connectors.

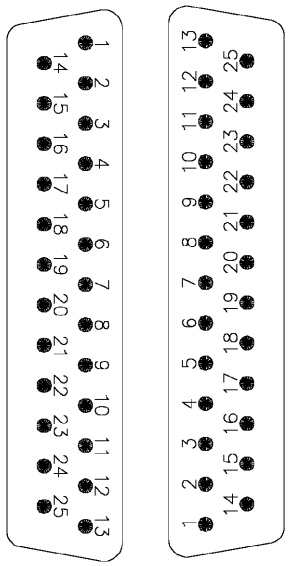



Figure 2006 CD 671C Mode S/TCAS Control Unit Rear Connector

Table 2005 CD 671C Control Unit Connector (P6711) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | Antenna Transfer #1 Output | O | Antenna switching |
| 2 | Standby(not)/On #1 | O | Standby switching |
| 3 | Transponder 2 Fail DSC #3 | I | Transponder Fail DSC #3 = Open; No Fail = 18-33 Vdc |
| 4 | Standby(not)/On #2 | O | Standby switching (dual) |
| 5 | Transponder 1 Fail DSC #3 | I | Transponder Fail DSC #3 = Open; No Fail = 18-33 Vdc |
| 6 | Warning and Caution(not) | O | Warning and caution (computer) |
| 7 | Transponder 2 Fail DSC #2 | I | Transponder Fail DSC #2 = Open |
| 8 | Antenna Transfer #2 Output | O | Antenna switching |
| 9 | Transponder 1 Fail DSC #2 | I | Transponder Fail DSC #2 = Open |
| 10 | On #2(not) | O | On transponder #2 (dual) |
| 11 | Aircraft Ground | I | Aircraft ground |
| 12 | | | Transponder 2 Fail DSC #1 = 5V |
| 13 | Aircraft Ground | I | Aircraft ground |
| 14 | | | Transponder 1 Fail DSC #1 = 5V |
| 15 | ATE Test | I | External ATE test enable |
| 16 | Aircraft Ground | I | Aircraft ground |
| 17 | | I | Reserved - Reply Input |
| 18 | External Ident | I | External ident |
| 19 | Aircraft Ground | I | Aircraft ground |
| 20 | Control Disable(not) | I | Control unit disable |
| 21 | Aircraft Ground | I | Aircraft ground |
| 22 | | | Spare Input Discrete #2 |
| 23 | Aircraft Ground | I | Aircraft ground |
| 24 | Emergency(not) | I | Squawk code 7700 |
| 25 | | | Polarizer key |

Table 2006 CD 671C Control Unit Connector (P6712) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | 429 Input #1 (A) | I | Low speed ARINC 429 |
| 2 | | | Polarizer key |
| 3 | 429 Input #1 (B) | I | Low speed ARINC 429 |
| 4 | 429 Input #2 (A) | I | Low speed ARINC 429 |
| 5 | Aircraft Ground | I | Aircraft ground |
| 6 | 429 Input #2 (B) | I | Low speed ARINC 429 |
| 7 | 429 Output (A) | O | Low speed ARINC 429 (Altitude) |
| 8 | Aircraft Ground | I | Aircraft ground |
| 9 | 429 Output (B) | O | Low speed ARINC 429 (Altitude) |
| 10 | Aircraft Ground | I | Aircraft ground |
| 11 | External Standby Input | I | External standby |
| 12 | Aircraft Ground | I | Aircraft ground |
| 13 | | | Master/Slave |
| 14 | Remote Functional Test(not) | I | Remote functional test |
| 15 | Aircraft Ground | I | Aircraft ground |
| 16 | Spare Discrete/ ($\overline{\text{Day}}$/Night) | I | *$\overline{\text{Day}}$/Night (-0801 version) |
| 17 | Aircraft Ground | I | Aircraft ground |
| 18 | 28Vdc Lighting | I | 28 Vdc lighting bus |
| 19 | 5Vdc Lighting | I | 5 Vdc lighting bus |
| 20 | Low Lighting | I | Lighting Common |
| 21 | 5Vac Lighting | I | 5 Vac lighting bus |
| 22 | On #1(not) | O | On transponder #1 (dual) |
| 23 | Aircraft Ground | I | Aircraft ground |
| 24 | 28Vdc Unit Power | I | 28 Vdc aircraft power |
| 25 | Aircraft Ground | I | Aircraft ground |

*Pin 16 on the -0801 version only = $\overline{\text{Day}}$/Night: open = LCD display back-lighting follows aircraft lighting bus voltage; gnd= display backlight full intensity.

## 5.C.(5)(f) PS-550 Mode S/TCAS Control Panel Connector

The electrical connector for the PS-550 control panel are mounted on the rear panel of the unit. The connector (J1) is keyed to prevent improper connector insertion. The connector is shown in figure 2007 and the signals connected to each pin are defined in table 2007.

The interwiring diagrams define the input and output signal connections to the control panel connector.

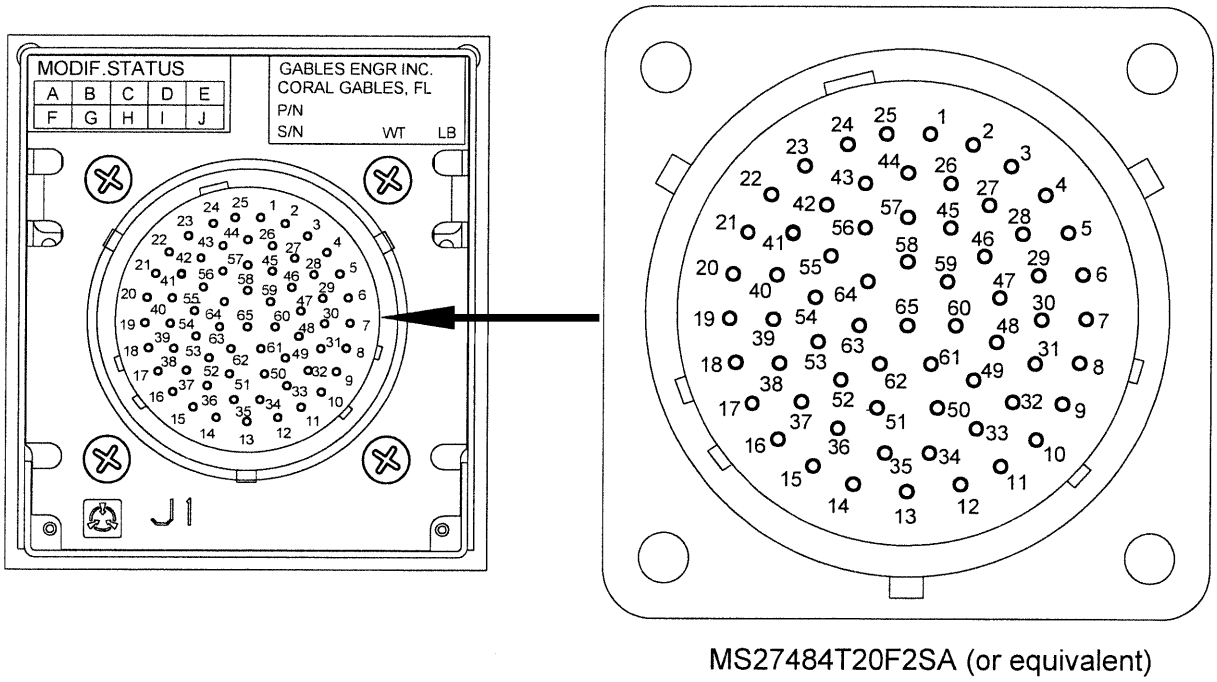



Figure 2007 PS-550 Mode S/TCAS Control Panel Rear Connector

Table 2007 PS-550 Control Panel Connector (J1) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | 28Vdc Unit Power | I | +28 Vdc aircraft power |
| 2 | | | |
| 3 | 28Vdc Unit Power | I | +28 Vdc aircraft power |
| 4 | 429 Output (B) | O | Low speed ARINC 429 |
| 5 | 429 Output (A) | O | Low speed ARINC 429 |
| 6 | | | Reserved |
| 7 | | | Reserved |
| 8 | Antenna Transfer #2 Output | O | |
| 9 | Antenna Transfer #1 Output | O | Gnd = Xpndr #1 Selected/Active<br>Open = Xpndr #1 Not Selected |
| 10 | 429 Input #1 (B) | I | Low speed ARINC 429 |
| 11 | 429 Input #1 (A) | I | Low speed ARINC 429 |
| 12 | 429 Input #2 (B) | I | Low speed ARINC 429 |
| 13 | 429 Input #2 (A) | I | Low speed ARINC 429 |
| 14 | | | Reserved |
| 15 | | | Reserved |
| 16 | | | Reserved |
| 17 | | | Reserved |
| 18 | Transponder 2 Fail DSC #2 | I | Gnd = Normal operation<br>Open = Transponder 2 failure |
| 19 | Transponder 1 Fail DSC #2 | I | Gnd = Normal operation<br>Open = Transponder 1 failure |
| 20 | Remote Functional Test(not)/<br>Ext Range Config | I | Remote Test (Pin 24 Open):<br>Gnd = Remote Test active<br>Open = Normal operation<br><br>Extended Range (Pin 24 Gnd):<br>Gnd = Extended Range active<br>Open = Normal Range |
| 21 | External Ident | I | Gnd = Activated<br>Open = Not Activated |
| 22 | | | Reserved |
| 23 | | | Reserved |

Table 2007 PS-550 Control Panel Connector (J1) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 24 | Software 040X In | I | Gnd (power On) = Activated:<br>pin 20 = Extended Range<br>pin 53 = Manual/Auto mode.<br><br>Open (power On) = Not Active:<br>pin 20 = Remote Funct Test<br>pin 53 = Standby. |
| 25 | | | Reserved |
| 26 | Standby(not)/On #2 | O | Standby switching (dual) |
| 27 | Strap Common | I | Ground |
| 28 | | | Reserved |
| 29 | | | Reserved |
| 30 | | | Reserved |
| 31 | | | Reserved |
| 32 | Aircraft Ground | I | Ground |
| 33 | | | Reserved |
| 34 | | | Reserved |
| 35 | | | Reserved |
| 36 | | | Reserved |
| 37 | | | Reserved |
| 38 | Chassis Ground | I | Ground |
| 39 | | | Reserved |
| 40 | | | Reserved |
| 41 | Warning and Caution(not) | O | A/C Warning/Caution Panel:<br>Gnd = Unit Failure<br>Open = No Failure |
| 42 | Range Control Enable In | I | Open = Normal 3, 5, 10, 15 nm.<br><br>Open (+Pin 24 Gnd, +Pin 20 Gnd) = Extended 3,5,10,15,20,40 nm.<br><br>Gnd = Range control disabled. |
| 43 | Aircraft Ground | I | Ground |
| 44 | Standby(not)/On #1 | O | Standby switching |
| 45 | FCDE Test | I | External ATE bench test enable |

Table 2007 PS-550 Control Panel Connector (J1) Pin Name Definitions

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 46 | On #2(not) | O | On transponder #2 (dual) |
| 47 | Emergency(not) | I | Squawk Code 7700:<br>Gnd = Activated<br>Open = Not Activated. |
| 48 | 28Vdc Lighting | I | +28 Vdc lighting bus |
| 49 | | | Reserved |
| 50 | 5Vdc Lighting | I | +5 Vdc lighting bus |
| 50 | 5Vac Lighting | I | 5 Vac lighting bus |
| 51 | | | |
| 52 | Remote Reply In | I | Reply outputs from transponder |
| 53 | External Standby Input/<br>(Manual/Auto Input) | I | Ext Standby (Pin 24 Open):<br>Gnd = Standby activated<br>Open = Standby not activated.<br><br>Manual/Auto (Pin 24 Gnd):<br>Gnd = Manual Traffic activated<br>Open = Auto Traffic activated. |
| 54 | | | Reserved |
| 55 | | | Reserved |
| 56 | Honeywell/Collins Configura-<br>tion In | I | Gnd = Honeywell (MST 67A)<br>Open = Collins (TDR-94D) |
| 57 | | | Reserved |
| 58 | | | Reserved |
| 59 | Aircraft Ground | | Ground |
| 60 | | | Spare |
| 61 | | | Reserved |
| 62 | Low Lighting | I | Lighting Common |
| 63 | | | |
| 64 | | | |
| 65 | On #1(not) | O | On Transponder #1 |

5.C.(5)(g) CTA-81( ) Mode S/TCAS Control Unit Connectors

CTA-81( ) control unit has two 24-pin rear connectors; one mounted on the left side and the other mounted on the right side of the rear panel. The left rear connector transfers control signals to Mode S transponder #1. The right rear connector transfers control signals to Mode S transponder #2.

The CTA-81( ) control unit connectors meet the requirements of MIL-C-83723 Series 3 Connectors. Both connectors pin configuration are the same but they are keyed differently. The connector is shown in figure 2008 and the signals connected to each pin are defined in table 2008 and table 2009.

System interwiring diagrams define the input and output signal connections to the control panel connectors.

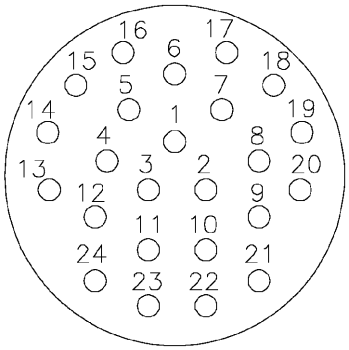



Figure 2008 CTA-81( ) Mode S/TCAS Control Unit Rear Connector

Table 2008 CTA-81( ) Control Unit (Left Plug) Pin Assignments

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1<br>2 | 5 Vac Panel Lighting (H)<br>5 Vac Panel Lighting (C) | I | Lighting power bus for LCD and backlighting |
| 3<br>4 | 115 Vac Primary Power (H)<br>115 Vac Primary Power (C) | I | Main Power bus |
| 5 | Antenna Transfer Switch | O | Antenna transfer |
| 6 | Aircraft dc Ground | I | Unit Ground |
| 7 | $\overline{\text{Standby}}$/On | O | Places unit in Standby (ground) ON (open) |
| 8 | Aircraft Chassis Ground | I | Chassis Ground |
| 9 | Remote Functional Test | I | Remote activation of self-test |
| 10 | Warning and Caution | I | Transponder Fail from Xpndr |
| 11 | Reserved | | |
| 12 | Transponder #2 Fail Discrete | I | Monitor for transponder #2 |
| 13<br>14 | 5 Vac Monitor Lamp Power (H)<br>5 Vac Monitor Lamp Power (C) | I | Lamp power for ATC FAIL |
| 15 | Air/Ground Switched Discrete | O | Air/Ground or Squat/Strut switch aircraft on ground or in air |
| 16 | Air Data Source Select | O | Select active port for alti-tude data |
| 17 | Altitude Comparison $\overline{\text{ON}}$/OFF | O | Enable or inhibit Gillham source compare |
| 18 | 12/28 Vdc Monitor Lamp Power | I | dc power for ATC FAIL monitor |
| 19 | Altitude Comparison Fail Discrete | I | To remote monitor for gillham source |
| 20 | Transponder Fail #1 Discrete | I | Transponder #1 fail |
| 21 | Monitor Test Switch | O | ATC FAIL Lamp test |
| 22 | ARINC 429 Control Data (A) | O | Control data |
| 23 | ARINC 429 Control Data (B) | O | Control data |
| 24 | Air/Ground Discrete | I | Airborne or on Ground |

Table 2009 CTA-81( ) Control Unit (Right Plug) Pin Assignments

| PIN | SIGNAL NAME | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | Not Used | | |
| 2 | Not Used | | |
| 3 | 115 Vac Primary Power | I | Unit Power |
| 4 | 115 Vac Primary Power (C) | I | Unit Power |
| 5 | Antenna Transfer Switch | O | Antenna switching |
| 6 | Aircraft dc Ground | I | Aircraft Ground |
| 7 | $\overline{\text{Standby}}$/On Output | O | Standby Switching |
| 8 | Aircraft Chassis Ground | I | Chassis Ground |
| 9 | Not Used | | |
| 10 | Not Used | | |
| 11 | Reserved | | |
| 12 | Transponder #2 Fail | I | Transponder Fail |
| 13 | Not Used | | |
| 14 | Not Used | | |
| 15 | Air/Ground Switched Discrete | O | Air/Ground Switching |
| 16 | Air Data Source Select | O | Activates port for air data source |
| 17 | Altitude Comparison $\overline{\text{ON}}$/OFF | O | Activates Gillham source comparison |
| 18 | Not Used | | |
| 19 | Altitude Comparison Fail | I | To remote monitor for gillham source |
| 20 | Monitor Lamp "B" Transponder Fail #1 Discrete | I | Transponder Fail #1 |
| 21 | Not Used | | |
| 22 | ARINC 429 Control Data (A) To Mode S XPDR 2 | O | Transponder #2 control data |
| 23 | ARINC 429 Control Data (B) To Mode S XPDR 2 | O | Transponder #2 control data |
| 24 | Air/Ground Discrete | I | Airborne or on Ground |

5.C.(6) Wire Strapping Options

MST 67A Mode S Transponder System wire strapping options are implemented by externally connecting pins on the rear connector of the MST 67A transponder and one connector of the control unit. The configurations of the straps are routinely read and identified by the software in the particular unit. In most cases, the selected strap is connected to a common ground pin on the associated connector but in some instances may be connected to aircraft ground. The actual strapping connections are normally implemented at the mating connector on the aircraft side of the transponder interconnect.

5.C.(6)(a) Single/Dual Antenna Program Strap

The MST 67A system can operate with one or two L-band antennas. (For compatibility with the space diversity requirements of TCAS II, two L-band antennas are required).

The antenna program input on connector J671A pin 89 identifies whether one or two antennas are used in the installation. Connector pin 89 is strapped to aircraft ground if only one transponder L-band is used. The antenna is mounted on the bottom in a one antenna installation. Connector pin 89 is left open for a dual (top and bottom) antenna installation. Refer to interwiring diagrams for additional strapping details.

5.C.(6)(b) Altitude Type Select Program Straps

The MST 67A Mode S transponder can accept the following three types of barometric altitude input data: ARINC 429 digital, ARINC 575 digital, and 12-bit Gillham code.

The altitude type select program pins on connector J671A pins 85 and 86 are selectively strapped to a common connection on J671A, pin 101, to identify the type of altitude data input to the transponder. An altitude type selection table on the interwiring diagrams provides specific type strapping information.

5.C.(6)(c) Airspeed Program Straps

The RI field in some Mode S replies from the MST 67A transponder can contain information relating to the

designed maximum cruising airspeed capability of the associated aircraft.

The maximum cruising airspeed is specified by selectively strapping the airspeed program, pins (J671A) 50, 51, and 52 to a common connection on connector J671A pin 66. Specific airspeed program pin strapping is specified in a maximum airspeed capability strapping table on interwiring diagrams.

5.C.(6)(d) Mode S Straps

Each aircraft equipped with a Mode S transponder (i.e. MST 67A transponder) is assigned a unique Mode S address. This address is part of the data in Mode S interrogation messages to Mode S transponders and reply messages from Mode S transponders. The 24 bits allow assignment of more than 16 million different combinations of Mode S address identifiers. This address MUST be obtained from the FAA Aeronautical Center, Oklahoma City, Oklahoma, prior to transponder installation in any U.S. registered aircraft. The address 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.

The Mode S address is implemented by selectively strapping the 24 Mode S address pins on connector J671A pins 5 through 11, 17 through 25, and 31 through 38 to a common connection on J671A pin 12 and/or pin 39.

Table 2010 is furnished as a tool to determine the proper strapping. To use this table, enter the assigned 8-digit octal code in the spaces at the top of the columns, one digit in each space, in the order given. Then read down each column to the row corresponding with the value entered at the top. The pins on connector P671A listed at that point are to be strapped.

Detailed Mode S address and associated strapping configurations are provided by the F.A.A. Refer to interwiring diagrams, for additional information.

Table 2010 Octal Code to Mode S Address Conversion Strapping

| Enter Your FAA Assigned 8-Digit Code Below | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Octal Digit | | | | | | | | |
| 0 | None | None | None | None | None | None | None | None |
| 1 | 7 | 10 | 18 | 21 | 24 | 32 | 35 | 38 |
| 2 | 6 | 9 | 17 | 20 | 23 | 31 | 34 | 37 |
| 3 | 6<br>7 | 9<br>10 | 17<br>18 | 20<br>21 | 23<br>24 | 31<br>32 | 34<br>35 | 37<br>38 |
| 4 | 5 | 8 | 11 | 19 | 22 | 25 | 33 | 36 |
| 5 | 5<br>7 | 8<br>10 | 11<br>18 | 19<br>21 | 22<br>24 | 25<br>32 | 33<br>35 | 36<br>38 |
| 6 | 5<br>6 | 8<br>9 | 11<br>17 | 19<br>20 | 22<br>23 | 25<br>31 | 33<br>34 | 36<br>37 |
| 7 | 5<br>6<br>7 | 8<br>9<br>10 | 11<br>17<br>18 | 19<br>20<br>21 | 22<br>23<br>24 | 25<br>31<br>32 | 33<br>34<br>35 | 36<br>37<br>38 |

5.C.(6)(e) !Special Discrete Strap
(-0401, -0501, -0601, -2001, -2101 units only)

!Special discrete input is J671A pin 26. During installation of the unit, this input is strapped to ground (active) for the MST 67A to operate in the 'special' mode or left open (inactive) for the MST 67A to operate in its native mode.

In !Special mode of operation, the transponder may be in one of two tuning modes: RTI (Remote Tuning Inhibit) or RTE (Remote Tuning Enable).

The transponder determines the tuning mode by monitoring Label 031 input data rate at the selected control port (#1 or #2). If the label is constantly refreshed, transponder will operate in RTI mode.

If Label 031 is absent or if it only appears as bursts with silence in between, transponder will operate in RTE mode. Once operating in RTE mode the Control Data

Port Select input will be ignored and data may be received on either Port #1 or Port #2.

5.C.(7) Transponder/Control Unit FAIL #2 Wiring

The ARINC Characteristic 718 defines options concerning the logic states for a transponder fail condition. The MST 67A transponder supplies Transponder Fail Discrete #2 output. Transponder FAIL #2 pin J671A-56 is wired to the control unit to light the ATC FAIL annunciation when a fault condition exists. FAIL #2 for transponder #1 connects to pin J5781-19 and FAIL #2 for transponder #2 connects to pin J5781-20 on the KFS 578A; FAIL #2 for transponder #1 connects to pin P6712-9 and FAIL #2 for transponder #1 connects to pin P6712-7 on the CD 671C; P2(right plug) pin 12 and P1(left plug) pin 12 on the CTA-81A If FAIL #1 pin 20 is used ground pin 12. The logic of FAIL #2 follows:

FAIL #2; open = failed transponder
ground = good transponder

Various control units have different FAIL #1/FAIL #2 requirements or considerations as shown below.

Transponder FAIL #2 can be connected to control unit pin 12, then pin 20 must be open.

5.D. Equipment Mounting

All mechanical installation drawings, connector assembly diagrams, interwiring diagrams, and connector pin assignment tables referenced in this section are located at the end of this section of the manual. Determine the mounting location for system components per Paragraph 5.B.

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 continuing installation.

5.D.(1) Transponder Mounting Tray

The mounting tray for the transponder should be rack mounted using dimensions specified in the manufacturer's applicable outline drawing. The mounting tray should be wired according to the system interwiring diagrams and tray manufacturers instructions.

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 connector assembly is removed the rear connector 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 connector.

The tray mounting hole location and dimensions are aircraft-type-dependent and must be determined prior to installation. When locating the mounting tray location in the aircraft, allow at least two inches free space on the top and sides of unit to provide sufficient clearance for sway and ease of removal of the transponder. Clean all surfaces prior to placing the mount in place.

### 5.D.(2) Transponder Mounting

Place the MST 67A transponder on the mounting base and slide it forward until the electrical connector is fully engaged in the tray connector. Then secure the front of the unit to the mount by tightening the knurled hold down clamp P/N 092-05792-0000 (located on the front of the mount) until it is firmly seated over the hold-down-hook on the front of the transponder.

### 5.D.(3) Control Unit Mounting

The control units should be installed in any suitable location in the cockpit panel that is clearly visible and within easy access to the pilot. Allow three inches (7.5 cm) clearance at the rear of the unit for plug connections.

The control unit uses Dzus fasteners to secure them to the instrument panel. Use the applicable outline drawings as a guide to position the control panels and to cut and drill the instrument panel. Attach the Dzus fastener brackets behind the instrument panel in the proper locations shown on the outline drawing. Some panels have two, others have four Dzus fasteners. After connecting the cable assemblies to the rear connectors, insert the control panel into the instrument panel. Make certain the cable assembly is not pinched or severely twisted before tightening the Dzus fasteners.

5.D.(4) Antennas

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

## 6. Post Installation Procedures

### 6.A. System Checkout

Installation of the transponder system requires three stages of checkout to ensure proper operation of the Mode S transponders. (1) A system Interwiring Check is performed prior to installation of the transponders and control unit, before power is applied, to verify that aircraft and transponder system interconnections are correct. (2) A Visual Inspection of the equipment and connections is made after the units are installed. (3) A Functional Test is used to check system operation with power applied. Successful completion of the Functional Test verifies the proper operation of the MST 67A Mode S Transponder System on the ground. (4) A Taxi-Run/Flight Test is also provided.

NOTE: If the aircraft is equipped with TCAS, refer to the appropriate Traffic Alert and Collision Avoidance System Maintenance Manual for the Mode S/TCAS integrated checkout procedures.

### 6.B Interwiring Check

Check that all cables and interwiring are installed in accordance with the Interwiring and Cable Fabrication instructions (paragraph 5.C.).

6.B.(1) Configuration Straps

Check the aircraft system configuration straps:

- Single/Dual Antenna Program.
- Altitude Type Select Program.
- Airspeed Program.
- Mode S Address.
- Suppression Pulse.

- !Special Mode Discrete.
- Mode S Datalink Enable (versions -2001, -2101).

6.B.(2) Wiring

Check wiring for proper destinations, opens, and shorts per interconnect diagrams.

6.B.(3) RF Cables

Check rf cables for insertion loss and VSWR.

6.C. Visual Inspection

Table 2011 is a visual inspection/check procedure that should be performed after system installation as part of a system checkout. In addition, the procedure should be used as a periodic maintenance inspection check.

Table 2011 Inspection/Check Procedure

| EQUIPMENT | INSPECTION/CHECK PROCEDURE |
|---|---|
| MST 67A Transponder | (a) Inspect external surface for damage.<br>(b) Check that the unit is properly installed and that retaining mechanism is securely tightened.<br>(c) Ensure that all connections into the mounting tray are properly mounted and secure. |
| KFS 578A, PS-578A, CD 671C, PS-550. CTA-81() Control Units | (a) Inspect external surface for damage.<br>(b) Check that the unit is properly installed and that Dzus fasteners are tightened.<br>(c) Check all control panel knobs and switches for security and positive operation in all positions.<br>(d) Ensure that rear connectors are properly mated and secure. |
| Antennas | (a) Inspect external surfaces for damage.<br>(b) Check that antenna is properly mounted and mounting screws are tight.<br>(c) Ensure that antenna coaxial cable connector is properly mated and secure. |

## 6.D. FUNCTIONAL TEST

The functional test verifies the operation of the MST 67A Mode S Transponder System upon installation, and is an operational check thereafter. It includes a pretest setup, transponder self test, control unit test, and ramp test. The tests are performed on the ground and do not check TCAS functions.

## 6.E. PRETEST SETUP

The following steps check/apply MST 67A system input power, configure the operational controls, and verify the system is ready for testing.

### 6.E.(1) Check Source Power

6.E.(1)(a) Confirm that 28 Vdc is available on aircraft power bus meter. Confirm that 115 Vac, 400Hz is available for CTA-81( ) control unit, as applicable.

6.E.(1)(b) Adjust the cockpit panel lighting dimmer to confirm the aircraft panel light power source.

### 6.E.(2) Control Unit Set-up KFS 578A, PS-578A, CD 671C, PS-550

6.E.(2)(a) Set the rotary function selector switch to SBY or STBY and, if equipped, the ON/OFF power switch to ON.

6.E.(2)(b) Set 1/2 pushbutton to 1 (selects transponder #1).

6.E.(2)(c) If equipped with ADC 1/2 (PS-550), press MODE for ADC, set 1/2 switch to 1.

### 6.E.(3) Control Unit Set-up CTA-81( )

6.E.(3)(a) Set the rotary function selector switch to STBY.

6.E.(3)(b) Set ATC 1/2 toggle switch to ATC 1 (selects transponder #1).

6.E.(3)(c) Set ALT 1/2 toggle switch to ALT 1, if equipped with ALT 1/2.

### 6.E.(4) Apply Power

Apply power to the system with appropriate aircraft circuit breakers and switches:

6.E.(4)(a) Apply 28 Vdc to transponder #1 and 28 Vdc to transponder #2, if applicable.

6.E.(4)(b) Apply 28 Vdc to KFS 578A, PS-578A, CD 671C, PS-550. Apply 115 Vac, 400 Hz to CTA-81( ) transponder control unit.

6.E.(4)(c) Apply primary power inputs to all equipment that interface with the transponder(s) per system configuration.

6.E.(5) Check Circuit Breakers

Verify that all MST 67A transponder system circuit breakers remain closed.

6.E.(6) Warm Up

Allow one minute for warm-up.

6.E.(7) Verify Annunciations

6.E.(7)(a) On control unit, verify SBY or STBY and 1 or ATC 1 is annunciated on the display.

6.E.(7)(b) Verify FAIL, CP FAIL, XPDR FAIL, ATC FAIL indicators are NOT annunciated.

6.F. TRANSPONDER SELF-TEST

The MST 67A transponder self-test is initiated from the control unit.

6.F.(1) Transponder Self Test (from KFS 578, PS-578A, CD 671C, PS-550)

On KFS 578, PS-578A, CD 671C control units rotate function switch to TST. On PS-550 press TEST button. Verify the following:

6.F.(1)(a) All segments light for approximately 2 seconds on the code display.

6.F.(1)(b) FL is annunciated and the flight level (altitude) is displayed in units of one hundred feet on the code display for approximately 3 seconds, and unit returns to standby. If an altitude encoder is not included in

the installation, FL and dashes will be displayed. The transmitter is inhibited during self test.

6.F.(2) Transponder Self Test (from CTA-81( ))

On CTA-81( ) ARINC control unit, rotate and hold the function switch to TEST for 1 second and release. Verify the following:

6.F.(2)(a) 8888 is annunciated on the code display.

6.F.(2)(b) ATC 12 and R are displayed during the test.

6.G. CONTROL UNIT TEST - KFS 578A, PS-578A, CD 671C

Control unit modes, encoding, and display are checked in this test.

6.G.(1) Standby Mode

6.G.(1)(a) Set rotary function selector to SBY and, if equipped, the ON/OFF power switch to ON. Verify SBY or STBY is annunciated on display. Both transponders are in standby.

6.G.(1)(b) Verify FAIL, CP FAIL, or XPDR FAIL indicators are NOT annunciated.

6.G.(2) Transponder 1/2

6.G.(2)(a) Verify 1 is annunciated on the display and XPDR FAIL is NOT annunciated.

6.G.(2)(b) Press 1/2 button. Verify 2 is annunciated in dual installations and XPDR FAIL is NOT annunciated.

6.G.(2)(c) Verify 2 is NOT annunciated in single installations and NO XPDR is annunciated for approximately 3 seconds.

6.G.(3) ON Mode

6.G.(3)(a) Set rotary function selector to ON. Verify ON is annunciated on display.

6.G.(3)(b) This mode is ATC only, TCAS is disabled. Transponder replies to interrogations, but no squitter, and no FL reporting.

6.G.(4) ALT Mode

6.G.(4)(a) Set rotary function selector to ALT. Verify ALT is annunciated on display.

6.G.(4)(b) This mode is ATC only, TCAS is disabled. Transponder is enabled, with FL altitude reporting.

6.G.(5) VFR Mode

Set rotary function selector to VFR. Verify VFR is annunciated on display and the stored ATC code is displayed.

6.G.(6) ATC Code Entry

6.G.(6)(a) Momentarily press the encoder knob to select the most significant digit (left side). Rotate the encoder knob to change the numerical value of the selected digit. Clockwise rotation increases the digit and counter-clockwise decreases the digit. The entry will be accepted after a few seconds if no other change is made. The entry will be accepted immediately if mode selector, range selector, A/N/B selector is rotated or IDT, or FID is pressed. Verify ATC encoding and display for the most significant digit.

6.G.(6)(b) Repeat step (a) to verify second most significant digit response is correct.

6.G.(6)(c) Repeat step (a) to verify third most significant digit response is correct.

6.G.(6)(d) Repeat step (a) to verify least significant digit response is correct.

6.G.(7) FID Mode (PS-578A)

6.G.(7)(a) Press FID button for flight ID code entry. Verify FID is annunciated on the display.

6.G.(7)(b) Momentarily press the encoder knob to select the most significant digit (left side) and rotate the encoder knob to change the alpha-numeric value of the selected digit. Clockwise rotation increases the digit and counter-clockwise decreases the digit. The entry will be accepted after a few seconds if no other change is made. The entry will be accepted immediately if FID

or IDT is pressed, FL button is held for 3 seconds, range knob rotated, or A/N/B selected. Verify encoding and display for the most significant digit.

6.G.(7)(c) Repeat step (b) to verify second most significant digit response is correct.

6.G.(7)(d) Repeat step (b) to verify third most significant digit response is correct.

6.G.(7)(e) Repeat step (b) to verify least significant digit response is correct.

6.G.(8) FL Reporting

Press FL button for 3 seconds. FL illuminates on screen if equipped for Absolute FL reporting. PS-578A displays INOP FL if not equipped.

6.G.(9) A/N/B Select

Rotate or press A/N/B select knob for Above, Normal, Below TCAS mode. Equipped variants display ABV, NML, BLW on screen. Non-equipped versions display NO ANB for approximately 2 seconds (PS-578A).

6.G.(10) TA Mode

Rotate function select to TA mode. TA illuminates on screen and on TCAS display.

6.G.(11) TA/RA Mode

Rotate function select to TA/RA or T/RA mode. TA/RA or T/RA illuminates on screen and on TCAS display.

6.G.(12) Transponder Self Test

Repeat Transponder Self Test procedure 6.F.

6.H. CONTROL UNIT TEST - PS-550, CTA-81()

Control unit modes, encoding, and display are checked in this test.

6.H.(1) Standby Mode

6.H.(1)(a) Set rotary function selector to STBY. Verify STBY is annunciated on display. Both transponders are in standby.

6.H.(1)(b) Verify FAIL, CP FAIL, XPDR FAIL, or ATC FAIL indicators are NOT annunciated.

6.H.(2) Transponder 1/2

6.H.(2)(a) Verify 1 is annunciated on the display and XPDR FAIL or ATC FAIL is NOT annunciated.

6.H.(2)(b) Press 1/2 or switch ATC 1/2. Verify 2 is annunciated in dual installations and XPDR FAIL or ATC FAIL is NOT annunciated.

6.H.(2)(c) Verify 2 is NOT annunciated in single installations. Verify NO XPDR is annunciated for approximately 3 seconds on PS-550.

6.H.(3) ALT OFF Mode

6.H.(3)(a) Set rotary function selector to ALT OFF. Verify ATC is annunciated on display.

6.H.(3)(b) This mode is ATC only, TCAS is disabled. Transponder replies to interrogations, but no squitter, and no FL reporting.

6.H.(4) XPDR Mode (PS-550)

Set rotary function selector to XPDR. Verify ATC 1 or 2 are annunciated on display. This mode is ATC only, TCAS is disabled. Transponder is enabled, with FL altitude reporting.

6.H.(5) ALT ON Mode - CTA-81( )

Set function to ALT ON. Verify ATC code is displayed. This mode is ATC only, TCAS is disabled. Transponder is enabled, with FL altitude reporting.

6.H.(6) ATC Code Entry - CTA-81( )

6.H.(6)(a) Rotate outer concentric knob on left ATC code control. Verify the most significant digit (left side) increas-

es for clockwise rotation and decreases for counter-clockwise rotation.

6.H.(6)(b) Repeat step (a) for the left inner knob, verify second most significant digit response is correct.

6.H.(6)(c) Repeat step (a) for the right inner knob, verify third most significant digit response is correct.

6.H.(6)(d) Repeat step (a) for the right outer knob, verify least significant digit response is correct.

6.H.(7) ATC Code Entry (PS-550)

6.H.(7)(a) Press MODE button, select ATC for code entry. Verify ATC 1 or 2 is annunciated on display and the stored ATC code is displayed.

6.H.(7)(b) Turn the outer encoder knob to select the most significant digit (left side). Rotate the inner encoder knob to change the numerical value of the selected digit. Clockwise rotation increases the digit and counter-clockwise decreases the digit. The entry will be accepted after a few seconds if no other change is made. The entry will be accepted immediately if IDENT, MODE, or A/N/B is pressed, or function selector, or range knob rotated. Verify most significant digit response is correct.

6.H.(7)(c) Repeat step (b) to verify second most significant digit response is correct.

6.H.(7)(d) Repeat step (b) to verify third most significant digit response is correct.

6.H.(7)(e) Repeat step (b) to verify least significant digit response is correct.

6.H.(8) FID Code Entry (PS-550)

6.H.(8)(a) Press MODE button, select FID for flight ID code entry. Verify FID is annunciated on the display.

6.H.(8)(b) Turn the outer encoder knob to select the most significant digit (left side). Rotate the inner encoder knob to change the alpha-numeric value of the selected digit. Clockwise rotation increases the digit and counter-clockwise decreases the digit. The entry will

be accepted after a few seconds if no other change is made. The entry will be accepted immediately if IDENT, MODE, or A/N/B is pressed, or function selector, or range knob rotated. Verify most significant digit response is correct.

6.H.(8)(c) Repeat step (b) to verify second most significant digit response is correct.

6.H.(8)(d) Repeat step (b) to verify third most significant digit response is correct.

6.H.(8)(e) Repeat step (b) to verify least significant digit response is correct.

6.H.(9) ADC Select (PS-550)

Press MODE, select ADC. Press 1 button and 2 button to annunciate ADC 1 and ADC 2 on display. This selects which air data computer is used by TCAS.

6.H.(10) FL Reporting

Press MODE, select FL (PS-550) or press FL button for 3 seconds (CTA-81A()). FL illuminates on screen if equipped for Absolute FL reporting. PS-550 displays INOP FL if not equipped.

6.H.(11) Range Select (PS-550)

Rotate range select knob. Equipped variants display R and range value on screen for approximately 2 seconds. Non-equipped versions show RNG CNTRL for approximately 1 second plus ON DSPL for approximately 1 second.

6.H.(12) A/N/B Select

Press or switch A/N/B for Above, Normal, Below TCAS mode. Equipped variants display ABV, NML, BLW on screen. Non-equipped versions display NO ANB for approximately 2 seconds (PS-550).

6.H.(13) TA Mode

Rotate function select to TA mode. TA illuminates on screen and on TCAS display.

6.H.(14) TA/RA Mode

Rotate function select to TA/RA mode. TA/RA illuminates on screen and on TCAS display.

6.H.(15) Transponder Self Test

Repeat Transponder Self Test procedure 6.F.

6.I. RAMP TEST (Optional)

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. Use the ATC 1/2 switch to select transponders and the ALT SOURCE 1/OFF/2 switch to select altitude inputs. Table 2012 lists the tests that shall be performed during ramp testing. In addition, it contains a brief description of each test and the pass/fail criteria.

Table 2012 Ramp Tests

| TEST | DESCRIPTION | PASS/FAIL CRITERIA |
|---|---|---|
| Rf Power Output | Measures the effective radiated power output from both the top and bottom antennas. | Between 48.5 and 57.0 dBm. |
| Antenna Diversity | Measures the rf output power level difference between the ON and OFF antennas. | 20 dB minimum |
| RF Frequency | Measures the transmit frequency | 1090 ± 1 MHz |
| Receiver Sensitivity | Measures the receiver minimum triggering level (MTL) for a 90% reply rate. | -74 ± 3.0 dBm. |
| Mode S Reply Delay | Measures the time difference between the interrogation and the transponder reply. | 128 ± 0.25 µsec (reply delay minus range). |
| Mode S Reply Jitter | Measures transmitted reply jitter time variations. | ± 0.08 µsec. |
| ATCRBS SLS Level | Checks sidelobe suppression function by varying the SLS pulse level and monitoring transponder reply rates. | Reply = -9 dB or less. No Reply = 0 dB or more. |

Table 2012 Ramp Tests

| TEST | DESCRIPTION | PASS/FAIL CRITERIA |
|---|---|---|
| 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 ± 0.1 μsec. F1 and F2 pulse width, 0.45 ± 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. |
| Mode S Up Field 0 | Verifies that the transponder replies to a Mode S UF 0 interrogation with the correct altitude, address, and format. | Proper reply. |
| Mode S Up Field 4 | Verifies that the transponder replies to a Mode S UF 4 interrogation with the correct altitude, address, and format. | Proper reply. |
| Mode S Up Field 5 | Verifies that the transponder replies to a Mode S UF 5 interrogation with the correct ID code, address, and format. | Proper reply. |
| Mode S Up Field 11 | Verifies that the transponder replies to a Mode S UF 11 interrogations with the correct address and format. | Proper reply. |
| Mode S Up Field 16 | Verifies that the transponder replies to a Mode S UF 16 interrogation with the altitude, address, and format. | Proper reply (if received). |
| Mode S Up Field 20 | Verifies that the transponder replies to a Mode S UF 20 interrogation with the correct altitude, address and format. | Proper reply (if received). |
| Mode S Up Field 21 | Verifies that the transponder replies to a Mode S UF 21 interrogation with the correct ID code, address, and format. | Proper reply (if received). |
| Squitter | Verifies squitters are transmitted from the transponder at varying intervals about a one second rate. | 1 second (0.8 to 1.2 seconds). |

6.J. Taxi-Run/Flight Test

NOTE: If aircraft is equipped with TCAS, refer to the appropriate Traffic Alert and Collision Avoidance System Installation Manual for total Mode S/TCAS integrated system checkout procedures.

NOTE: Perform the following test after the functional test and preflight checks indicate that normal operation is possible.

CAUTION: DURING ENGINE START-UP PROCEDURES, KEEP ALL NAVIGATION - COMMUNICATION - RADAR EQUIPMENT TURNED OFF. LARGE VOLTAGE SPIKES MAY BE GENERATED WHICH COULD DAMAGE TRANSISTOR AND INTEGRATED CIRCUIT EQUIPMENT.

6.J.(1) Select Transponder

During the taxi run, select transponder #1 and place transponders in standby mode by setting the proper control unit controls.

NOTE: Placing the transponders in the standby mode during the taxi run reduces unnecessary clutter on the ATC scopes.

6.J.(2) Transponder Self Test -KFS 578, PS-578A, CD 671C, PS-550

On KFS 578, PS-578A, and CD 671C control units initiate self test by selecting the TST position on the Function Selector switch. On the PS-550 press the TEST pushbutton. This provides a preflight check of the transponder operation. This check is independent of any ground interrogation.

All segments of the display light for approximately 2 seconds, then flight level (altitude) information is displayed for approximately 3 seconds, then returns to Standby (SBY or STBY) mode. If an encoder is not included in the installation, dashes will be displayed in the squawk code display. The transmitter is inhibited during the test function.

6.J.(3) Transponder Self Test - CTA-81( )

On CTA-81( ) ARINC transponder control unit, initiate the self test by rotating the spring-loaded function se-

lector switch to the TEST position for 1 second and then release the switch.

8888 should be displayed on the ATC IDENT CODE display window.

ATC 12 and R should be displayed.

6.J.(4) ATC Code

On control unit, rotate the encoder knob(s), to enter the ATC assigned transponder code into the display window of the control unit.

6.J.(5) IDENT

NOTE: Do not press the ATC IDENT pushbutton on the control unit unless requested to do so by ATC. When ATC IDENT switch is pressed a special pulse is generated to enlarge and brighten the aircraft reply on the ground controller's scope.

When IDT or IDENT is pressed, IDT or ID is illuminated on the control panel for 18 seconds after release. When outside ATC mode, a press of IDT or IDENT will place the system into ATC mode.

6.J.(6) Flight ID

On control unit press FID (PS-578A) or press MODE, select FID (PS-550) for flight ID mode. Rotate the encoder knob to enter the flight ID into the display window of the control unit.

6.J.(7) FL Reporting

Prior to take-off run, turn on transponder #1 and enable altitude reporting as follows:

6.J.(7)(a) On KFS 578A, PS-578A, CD 671A control unit, rotate the function selector switch to ALT position.

6.J.(7)(b) On PS-550 control unit, rotate the function selector switch to XPDR position.

6.J.(7)(c) On CTA-81A or CTA-81D control unit, rotate the function selector switch to ALT ON position.

6.J.(8) ATC Operation

Once airborne, check for proper transponder operation by communicating with ATC to verify the ATC code is being transmitted in response to Mode A interrogations, that altitude is being transmitted in response to Mode C interrogations, and that Flight ID is being transmitted (on equipped versions).

6.K. Transponder Failure Annunciations

6.K.(1) Internal Transponder Failures

Table 1002 contains a brief description of the fault codes.

The Transponder Fail control line will become active when the remote transponder senses a failure that will cause the system NOT to function for Air Traffic Control (ATC) purposes. The control unit will illuminate FAIL (KFS 578A, CD 671C) or XPDR FAIl (PS-578A, PS-550) on the display or illuminate the ATC FAIL lamp (CTA-81A/D) to annunciate a transponder failure and put the selected transponder in SBY mode. The function switch will be disabled from going clockwise to other modes. TST and SBY will be the only modes allowed with this kind of failure. A different transponder must be selected to get ATC functions back.

6.K.(2) Non ATC Failures

The MST 67A Mode S Transponder, when sensing a failure that will not affect the ATC surveillance function (i.e. Gillham Altitude Compare failure, 429 Altitude failure, TCAS failure, etc.), will communicate the failure to the KFS 578A, PS-578A, CD 671C, PS-550 over the ARINC 429 Control Data In bus. The control unit display will flash the current mode (TST, SBY, STBY, ON, ALT OFF, ALT, VFR, XPDR, TA, TA/RA, or T/RA) on the display to annunciate the failure.

NOTE: All modes of operation are allowed with non ATC failure. The KFS 578, PS-578A, CD 671C, PS-550 do not have control over internal transponder or non ATC failures. Only the remote transponder can determine there is a failure.

6.K.(3) Viewing Failures

For either internal transponder or non ATC failures, an error code describing the failure can be extracted by rotating the Function Select switch of the control unit to the TST mode (or TEST pushbutton PS-550) and rotating the inner Code Adjust/FL switch (or Range Encode switch PS-550) before the 6 second timeout of TST mode. PASS or FAIL will be annunciated in the squawk code area.

The failures being viewed are from the remote transponder, not the KFS 578A, PS-578A, CD 671C, PS-550.

NOTE: Using Remote Functional Test will put the unit in TST mode, but the inner Code Adjust/FL switch is ignored. The Function switch TST mode must be used to view failure error codes.

If FAIL is annunciated, a press of the Cursor/FL switch will extract the first error code of the current flight leg. The flight leg and error code will be displayed in the squawk code area. Additional presses of the Cursor/FL switch will extract additional error codes, if any.

Pressing the IDT button while in Failure Annunciation will change flight legs so past failures can be viewed.

6.K.(4) Exiting Failure Annunciation

To exit Failure Annunciation, turn the Function switch clockwise. If a current failure is present while exiting, the unit returns to the previously described conditions (i.e. flashing FAIL in SBY mode). If no current failures are present, the unit returns to normal operation.

7. Removal and Replacement

7.A. Transponder

7.A.(1) Removal

7.A.(1)(a) Loosen retaining mechanism (located on front of mount) that secures transponder to mounting tray.

7.A.(1)(b) Gently pull the transponder forward until it disconnects from rear connector on the mounting tray and

slips out of guide pins. Remove unit from mounting tray.

7.A.(2) Re-Installation

7.A.(2)(a) Slide the transponder onto mounting tray and then gently push unit toward rear until guide pins are aligned and connector is fully engaged.

7.A.(2)(b) Engage and tighten retaining mechanism to hold unit firmly in place on the mounting tray.

7.B. Control Unit

7.B.(1) Removal

7.B.(1)(a) Loosen the fasteners (located on control unit front panel) that secure the control unit to mounting surface.

7.B.(1)(b) Gently pull control unit forward to expose rear connector.

7.B.(1)(c) Disconnect control unit connector.

7.B.(2) Re-installation

7.B.(2)(a) Reconnect connector to rear of control unit.

7.B.(2)(b) Carefully slide control unit into position and tighten the fasteners to hold unit firmly in place.

7.C. Antennas

For antenna removal and re-installation procedures refer to manufacturer's documentation.

7.D. Antenna Switches (If applicable to the installation)

For antenna switch removal and replacement procedures refer to manufacturer's documentation.

## 8. Maintenance Procedures

### 8.A. In-Aircraft Adjustments

There are no in-aircraft adjustments for the transponder. All alignment and adjustment must be done during shop maintenance.

The KFS 578A has a display adjust feature which allows for display balancing with other gas discharge displays. To utilize this mode first place the unit in the TST mode by rotating the function select knob counter-clock-wise, then press and hold the IDT button for 3 seconds. An "A" followed by a number between one and eight is displayed. Rotate the Cursor/FL knob to change the number which also adjusts the delay time for the automatic display brightness adjust to react to changes in ambient light levels. Push the Cursor/FL knob to display a "b" followed by a number between zero and 64. Change this number and the display brightness by rotating the Cursor/FL knob.

This adjustment is typically made at initial installation for balancing with other gas discharge displays in the cockpit. Push the Cursor/FL knob again to display a "C" plus a number between zero and 255. This number and the display brightness can also be changed by rotating the Cursor/FL knob. This adjustment is typically made after initial installation for fine adjustment of the display brightness. Press the IDT button to exit the display adjust mode.

Certain versions of the CD 671C and PS-550 have a strapping option to provide for maximum brightness of the display backlighting. Check the CD 671C and PS-550 pin diagrams for configuration of this option.

### 8.B. System Protection

The transponder contains an internal seven ampere fuse located in the power input. If antenna switches are used, aircraft circuit breakers should be installed on the input power to each antenna switch. The rating of the antenna switch circuit breaker will depend on the type of antenna switch used. The system is externally protected by a five ampere circuit breaker located in the aircraft's circuit breaker panel.

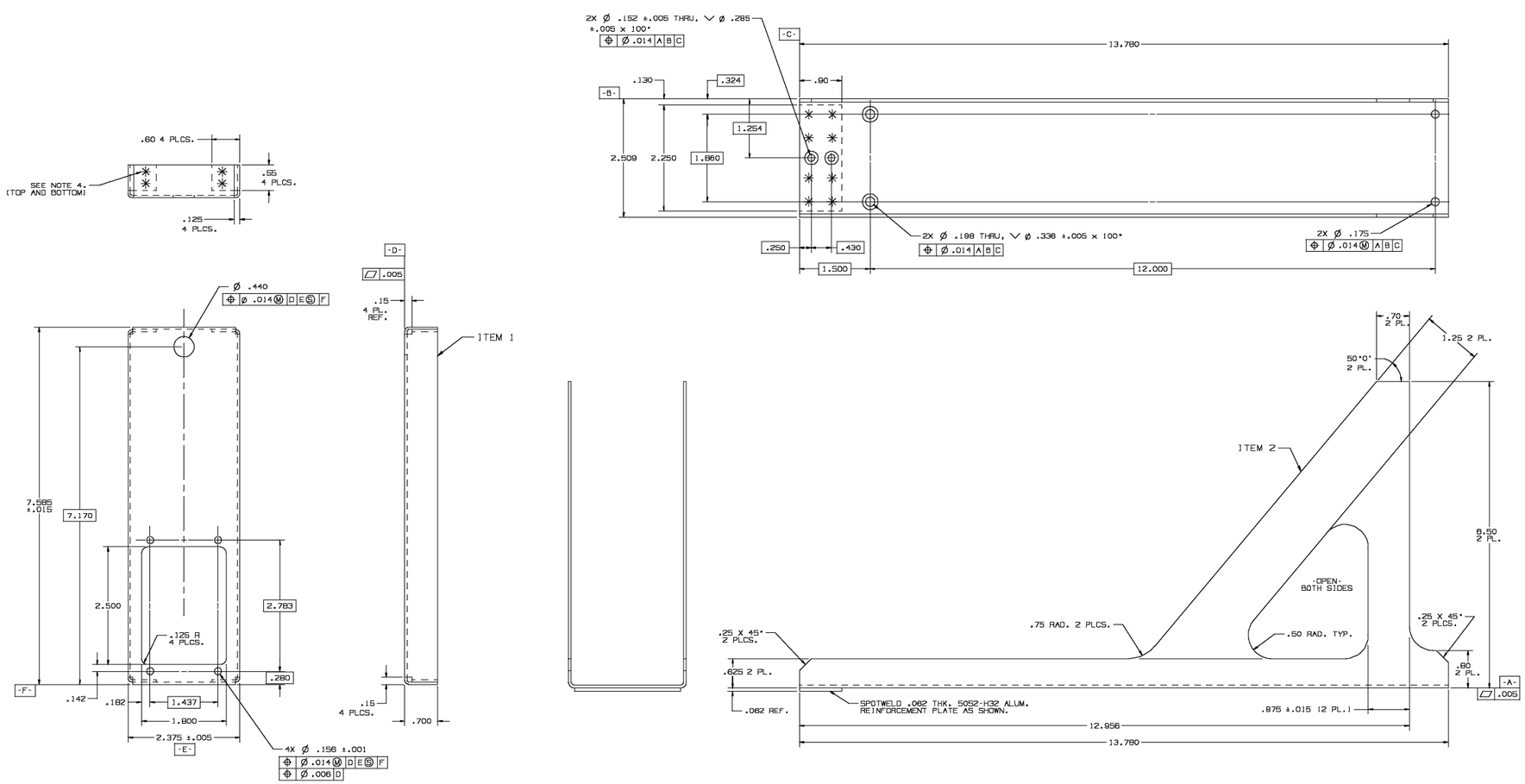
If antenna switches are used, aircraft circuit breakers should be installed on the high side of the input power to each antenna switch.

8.C. Lubrication

There are no moving parts in the transponder, so lubrication is not required.

8.D. Cleaning

After shop maintenance or storage, equipment exterior surfaces should be cleaned prior to installation. Use a lint-free cloth dampened with an approved cleaning agent such as denatured alcohol.




NOTES:

1. MATERIAL:
   ITEM 1: .050 THK. 5052-H32 ALUMINUM.
   ITEM 2: .062 THK. 5052-H32 ALUMINUM.
2. BEND RADIUS:
   ITEM 1: .035 R. MAX.
   ITEM 2: .070 R. MAX.
3. DEBURR: REMOVE SHARP CORNERS.
4. SPOTWELD AS SHOWN (SEE ALSO PAGE 2) PER GOOD COMMERCIAL PRACTICE.
5. COMPOSITE POSITIONAL TOLERANCE IS DESIGNATED BY: ⌖ / ⌖
6. MARK "047-09406-0014" (3/16" NUMERALS) WITH WATERPROOF INK ON FARSIDE IN APPROX. POSITION SHOWN.

Figure 2009 MST 67A Mode S Transponder Mounting Rack Drawing (Sheet 1 of 2)
(Dwg. No. 047-09406-0010, Rev 4)

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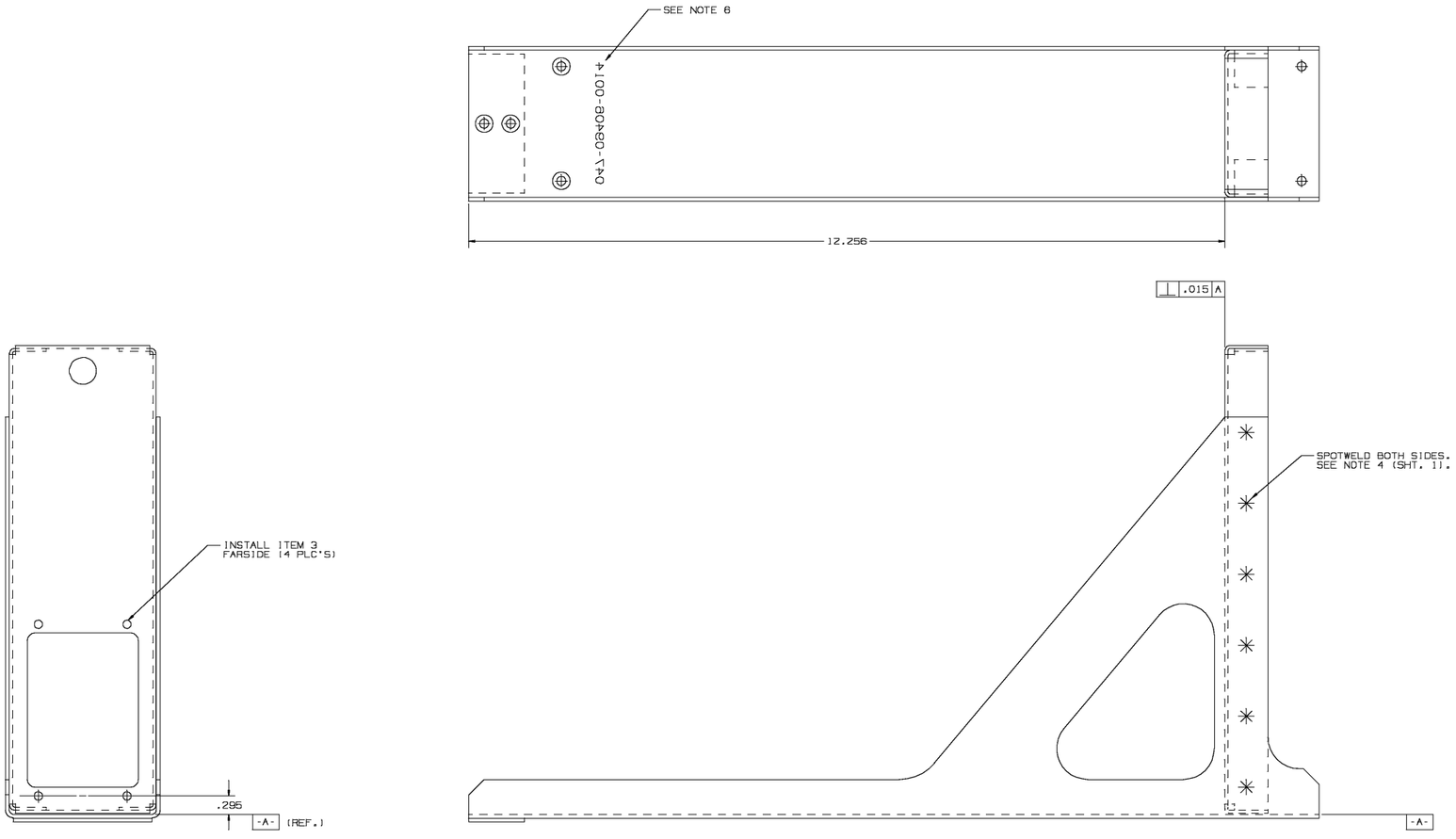


Figure 2009 MST 67A Mode S Transponder Mounting Rack Drawing (Sheet 2)
(Dwg. No. 047-09406-0010, Rev 4)

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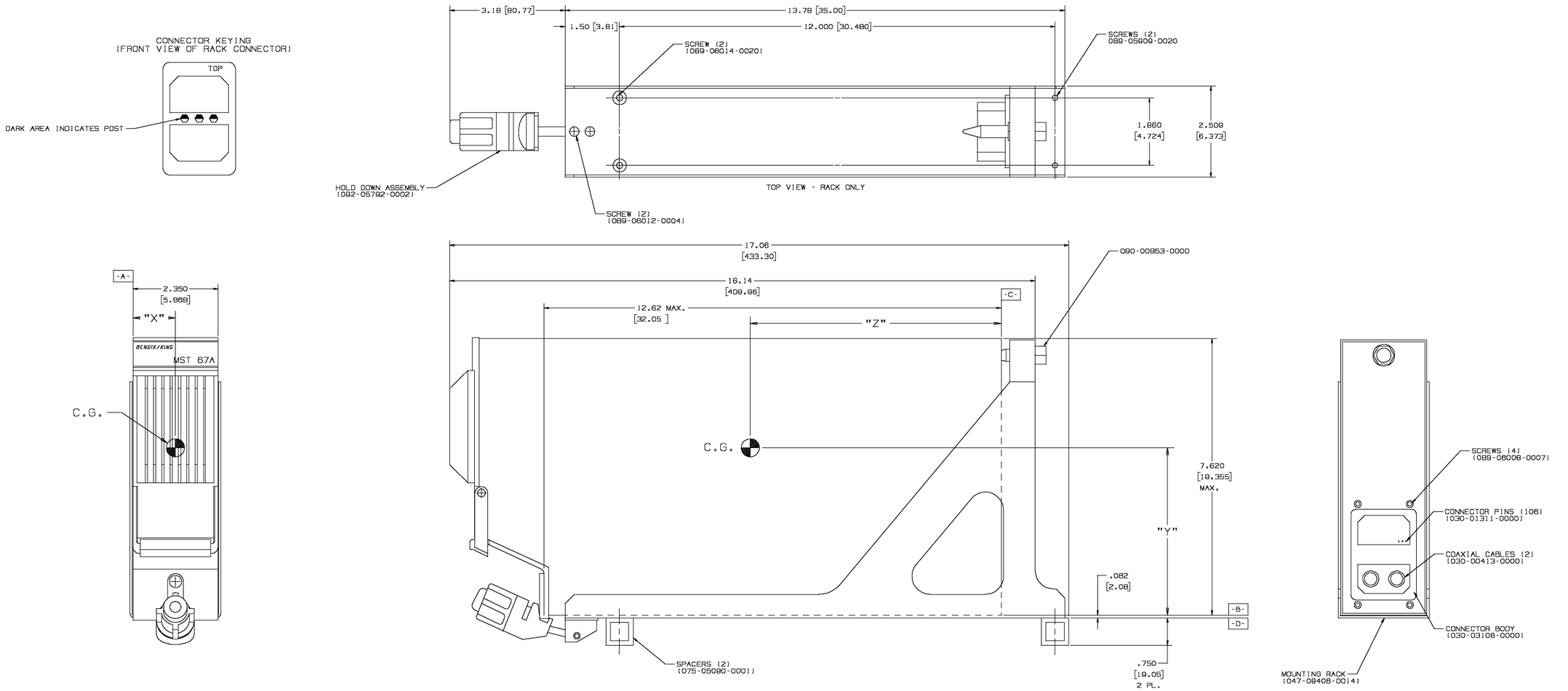


NOTES:

1. DIMENSIONS: INCHES [CENTIMETERS].
2. UNIT SIZE: 1/4 ATR SHORT PER ARINC 404A.
3. DATUMS A,B, AND C ARE UNIT DATUMS, DATUM D IS NORMAL RACK MOUNTING SURFACE (WITHOUT SPACERS).
4. C.G. IS CENTER OF GRAVITY OF THE UNIT ONLY.
5. RACK WEIGHT (INCLUDES CONNECTORS): 1.2 LBS. (.545 kg)

| | | CENTER OF GRAVITY (in/[cm]) | | |
|---|---|---|---|---|
| UNIT | WEIGHT | X | Y | Z |
| MST 67A | 8.7 lbs. | 1.1/[2.8] | 4.1/[10.4] | 7.0/[17.8] |

REFERENCE:

PRODUCT STRUCTURE DIAGRAM: 000-00813-XXXX
INSTALLATION KIT: 050-02979-0000

Figure 2010 MST 67A Mode S Transponder Outline and Mounting Drawing
(Dwg. No. 155-05793-0000, Rev 1)

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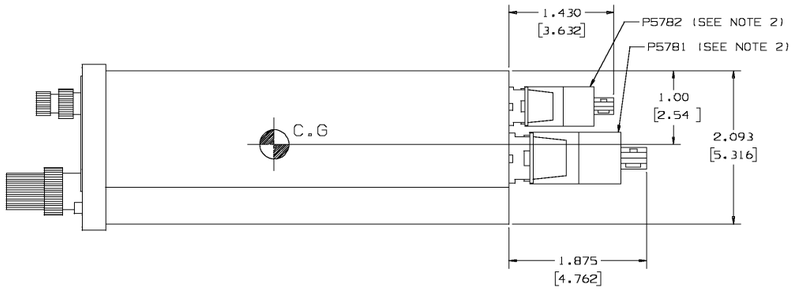
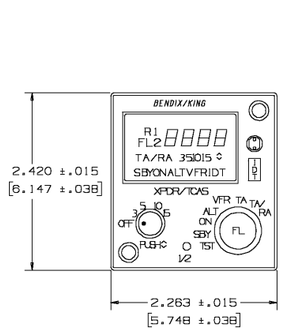
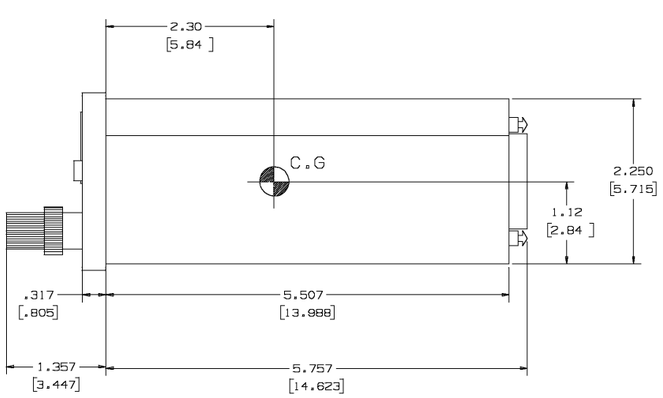
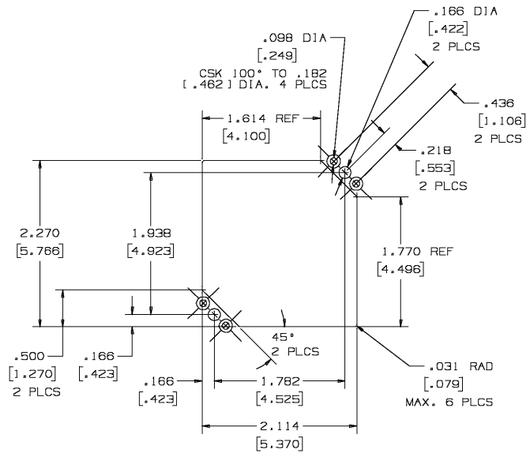



NOTES:

1. MOUNTING PATTERN FOR KFS 578A WITH ANCHOR-NUTS (KPN 092-00052-0002).
2. SEE INSTALLATION KIT FOR KING PART NUMBER OF CONNECTOR.
3. DIMENSION IN PARENTHESIS ARE IN CENTIMETERS.
4. PUNCH NO. 071-06042-0015
5. DECAL NO. 057-02105-0015
6. FILE TEMPLATE NO. 071-06039-00015
7. WEIGHT = 0.86 LBS. (0.39 KGRAMS) MAX.




REFERENCE:

INSTALLATION KIT (SOLDER CONTACTS): 050-02934-0000
INSTALLATION KIT (CRIMP CONTACTS): 050-02394-0001

Figure 2011 KFS 578A Mode S/TCAS Control Unit, Outline and Mounting Drawing (Dwg. No. 155-05789-0000, Rev 1)

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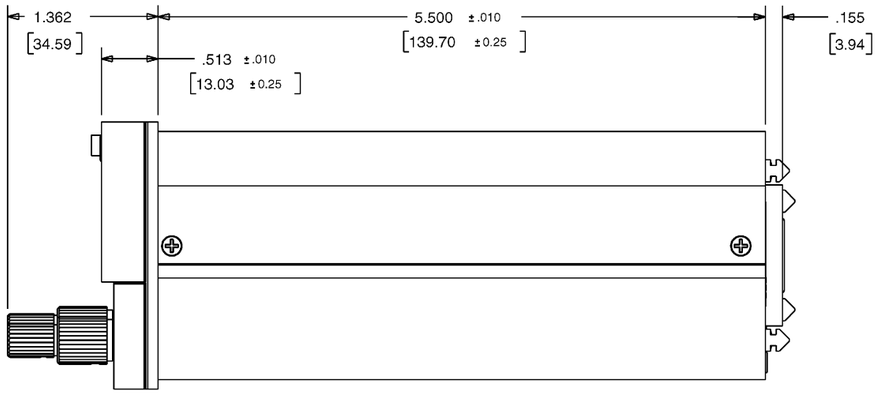
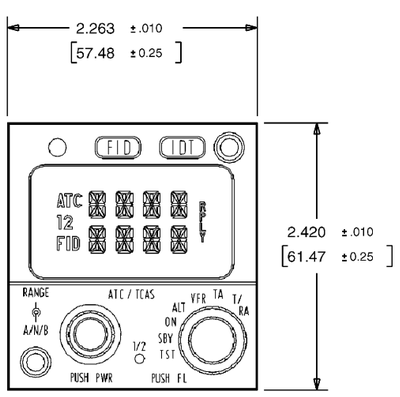
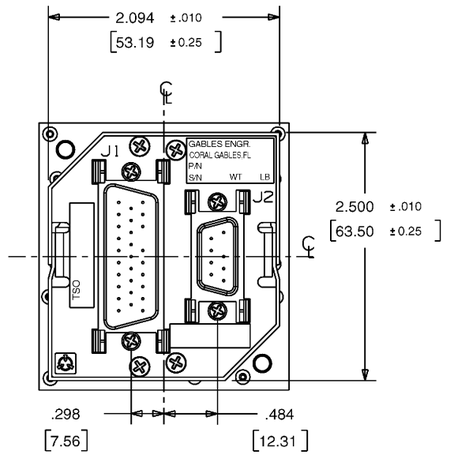



SIDE-VIEW




FRONT-VIEW




BACK-VIEW

Dimensions shown in inches. Bracketed dimensions in millimeters.

Figure 2012 PS-578A Mode S/TCAS Control Panel Outline and Mounting Drawing

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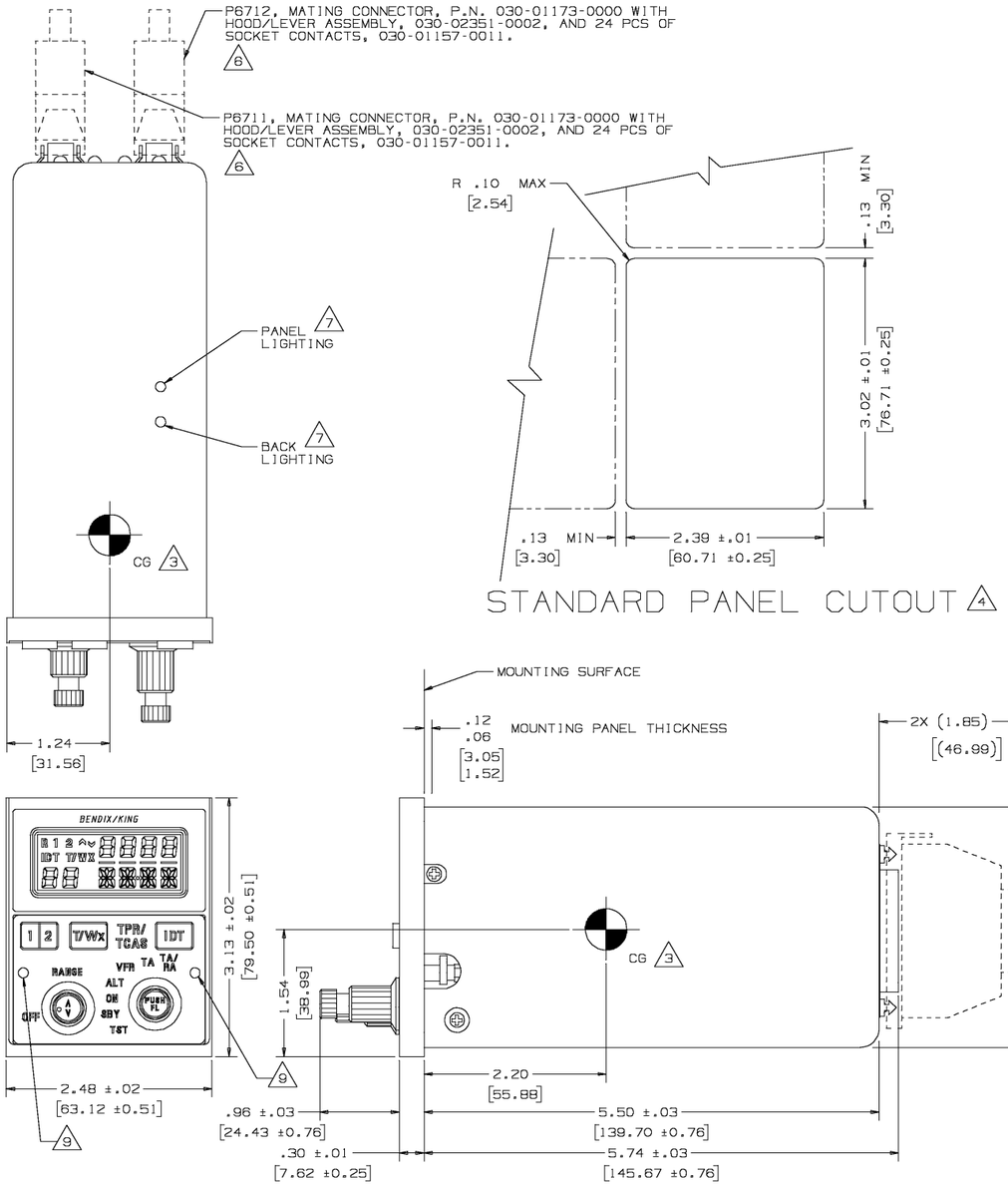


NOTES:

1. DIMENSIONS ENCLOSED IN BRACKETS ARE IN MILLIMETERS.
2. WEIGHT = 1.1 LBS. [0.50 KGRAMS] MAX.
3. CENTER OF GRAVITY (CG) AND WEIGHT ARE APPROXIMATE AND DO NOT INCLUDE MATING CONNECTORS.
4. UNIT MAY BE MOUNTED ON 2.52 [64.0] MIN PITCH HORIZONTALLY AND 3.15 [80.0] MIN PITCH VERTICALLY.
5. INSTALL UNIT USING INSTALLATION KIT, P.N. 050-03206-0000.
6. USE 20 AWG FOR P6712-24, 25 AND P6711-23. ALL OTHERS USE 22 AWG EXCEPT INSERT KEYING PIN, P.N. 030-01188-0000, INTO P6711-25 AND P6712-2.
7. BRIGHTNESS MAY BE CONTROLLED BY ADJUSTING THESE VARIABLE RESISTORS AT INSTALLATION.
8. UNLESS OTHERWISE SPECIFIED, ALL PART NUMBERS (P.N.s) SHOWN ON THIS DRAWING ARE BENDIX/KING P.N.'S.
9. WARNING: INSTALLATION TOOL MUST NOT SCRATCH OR IN ANY WAY MAR THE FINISH INSIDE OR AROUND LOCKING PAWL HOLES.

Figure 2013 CD 671C Mode S/TCAS Control Unit Outline and Mounting Drawing
(Dwg. No. 155-06001-0000, Rev 1)

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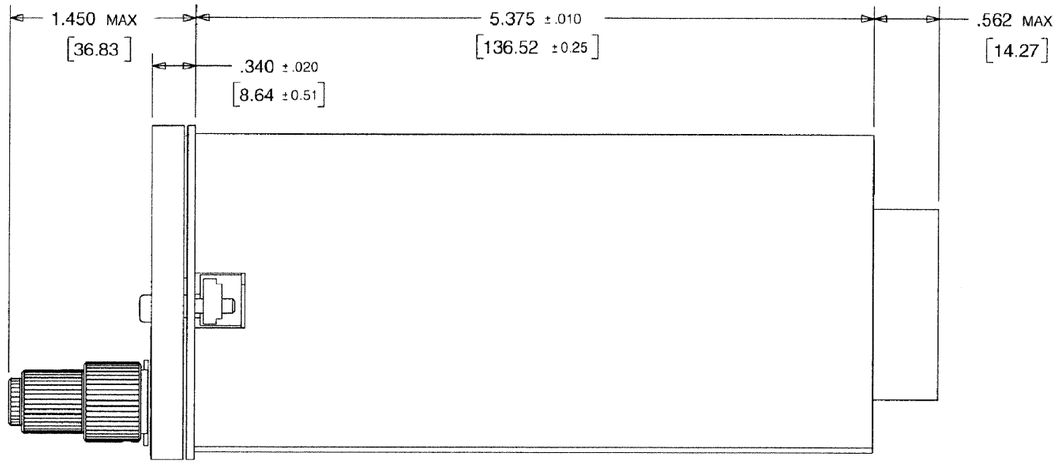
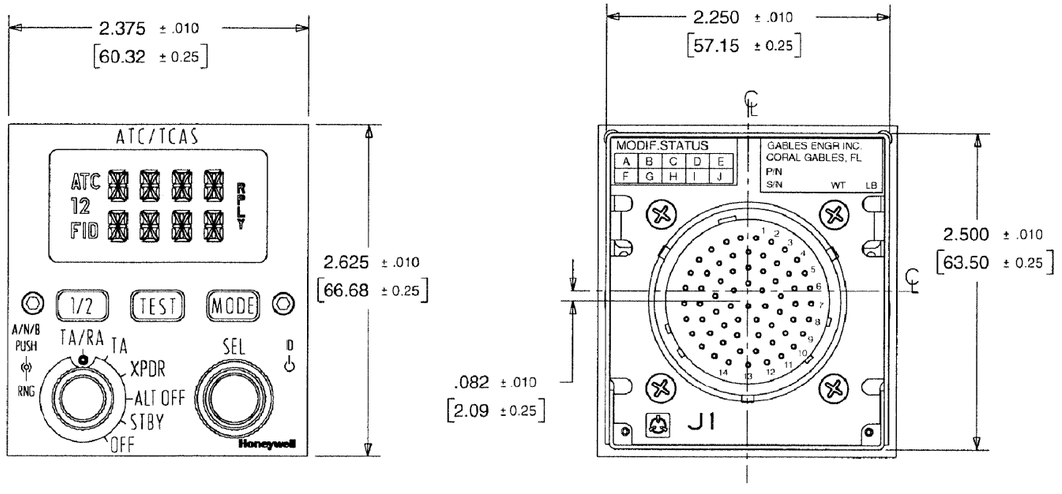



Side View




Front View

Back View

Dimensions shown in inches. Bracketed dimensions in millimeters.

Figure 2014 PS-550 Mode S/TCAS Control Panel Outline and Mounting Drawing

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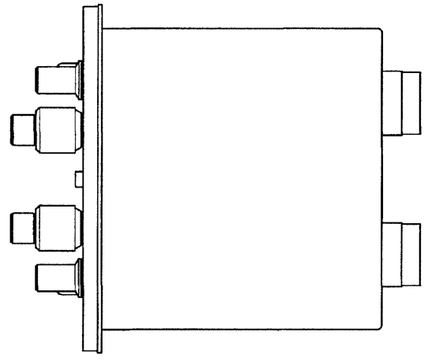
## TABLE A
UNIT CONFIGURATIONS
SEE NOTE 3

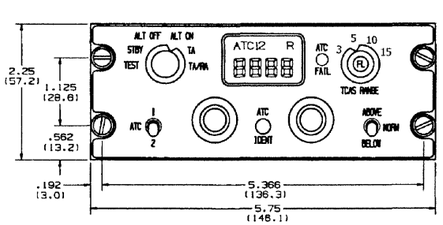
| FINAL ASSY NO. | LIGHTPLATE COLOR |
|---|---|
| 071-01477-0000/0050 | BLACK #37038 |
| 071-01477-0001/0051 | BOEING GRAY #703 |
| 071-01477-0002/0052 | BOEING BROWN #8328 |
| 071-01477-0003/0053 | BLUE #35164 |
| 071-01477-0004/0054 | BLACK #37038 |
| 071-01477-0005/0055 | BOEING GRAY #703 |
| 071-01477-0006/0056 | BOEING BROWN #8328 |
| 071-01477-0007/0057 | BLUE #35164 |
| 071-01477-0008/0058 | BLACK #37038 |
| 071-01477-0009/0059 | BOEING GRAY #703 |
| 071-01477-0010/0060 | BOEING BROWN #8328 |
| 071-01477-0011/0081 | BLUE #35164 |
| 071-01477-0012/0062 | BLACK #37038 |
| 071-01477-0013/0063 | BOEING GRAY #703 |
| 071-01477-0014/0084 | BOEING BROWN #8328 |
| 071-01477-0015/0065 | BLUE #35164 |
| 071-01477-0016/0066 | BOEING BROWN #8328 |
| 071-01477-0017 | BOEING GRAY #703 |
| 071-01477-0018 | BOEING GRAY #703 |
| 071-01477-0019 | BLACK #37038 |
| 071-01477-0020/0070 | BLACK #37038 |
| 071-01477-0021/0071 | BOEING GRAY #703 |
| 071-01477-0022/0072 | BOEING BROWN #8328 |
| 071-01477-0023/0073 | BLUE #35164 |
| 071-01477-0024/0074 | BLACK #37038 |
| 071-01477-0025/0075 | BOEING GRAY #703 |
| 071-01477-0026/0076 | BOEING BROWN #8328 |
| 071-01477-0027/0077 | BLUE #35164 |
| 071-01477-0028 | BOEING BROWN #8328 |
| 071-01477-0029 | BLACK #37038 |
| 071-01477-0030 | BOEING BROWN #8328 |
| 071-01477-0036 | BOEING GRAY #703 |

| FINAL ASSY NO. | LIGHTPLATE COLOR |
|---|---|
| 071-01503-0101 | BLACK #37038 |
| 071-01503-0201 | BOEING GRAY #703 |
| 071-01503-0301 | BOEING BROWN #8328 |
| 071-01503-1301 | BLACK #37038 |
| 071-01503-1401 | BOEING GRAY #703 |
| 071-01503-1501 | BOEING BROWN #8328 |
| 071-01503-1801 | BLUE #35164 |
| 071-01503-2101 | BLACK #37038 |
| 071-01503-2201 | BOEING GRAY #703 |
| 071-01503-2301 | BOEING BROWN #8328 |
| 071-01503-2501 | BLACK #37038 |
| 071-01503-2601 | BOEING GRAY #703 |
| 071-01503-2701 | BOEING BROWN #8328 |
| 071-01503-2801 | BLUE #35164 |
| 071-01503-2901 | BOEING BROWN #8328 |
| 071-01503-3001 | BLUE #35164 |
| 071-01503-3101 | BOEING GRAY #703 |
| 071-01503-3201 | BLACK #37038 |
| 071-01503-3701 | BOEING GRAY #703 |
| 071-01503-3801 | BOEING GRAY #703 |
| 071-01503-3901 | BOEING GRAY #703 |
| 071-01503-4001 | BLACK #37038 |
| 071-01503-4101 | BOEING BROWN #8328 |
| 071-01503-4201 | BLACK #37038 |
| 071-01503-4301 | BOEING BROWN #8328 |
| 071-01503-4601 | BOEING GRAY #703 |
| 071-01503-4701 | BLACK #37038 |
| 071-01503-5901 | BOEING GRAY #703 |
| 071-01503-6001 | BOEING BROWN #8328 |
| 071-01503-6101 | BLACK #37038 |



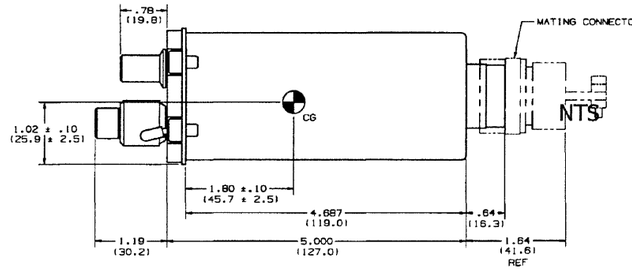
THIS DRAWING WAS PREVIOUSLY A COMPOSITE OF A MASTER PART DRAWING FILE RELEASED TO UNIGRAPHICS ARCHIVE AND PANEL ARTWORK POSITIVE REPRODUCTIONS ON CLEAR MYLAR. THIS WAS CHANGED WITH THE ELEVENTH ECO ISSUED FOR THE DRAWING. WITH CHANGES IN THE UNIGRAPHICS SYSTEM IT WAS POSSIBLE TO PRODUCE THE PANEL MARKINGS AS PART OF THE FILE. IT REMAINES VERY IMPORTANT THAT ANY CHANGES TO THE ARTWORK ILLUSTRATED IN THIS DRAWING BE PROPERLY COORDINATED WITH THE ACTUAL ARTWORK FILE. THESE ARE AS FOLLOWS.

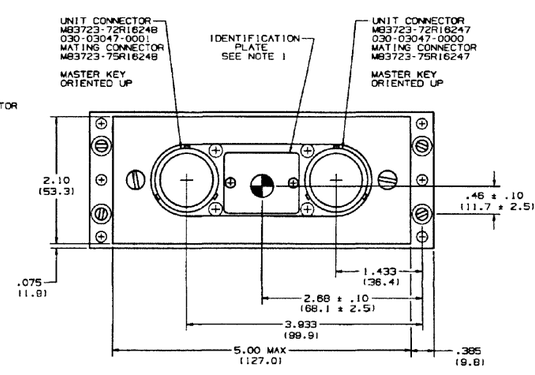
| FINAL ASSEMBLY NUMBER | PANEL ARTWORK NUMBER |
|---|---|
| 071-01477-0000/0003 AND -0050/0053 | 003-03020-0017 |
| 071-01477-0004/0007 AND -0054/0057 | 003-03020-0015 |
| 071-01477-0008/0011 AND -0058/0081 | 003-03020-0013 |
| 071-01477-0012/0015 AND -0062/0065 | 003-03020-0011 |
| 071-01477-0016 AND -0066 | 003-03044-0011 |
| 071-01477-0017, -0019, AND -0028 | 003-03020-0117 |
| 071-01477-0018, -0029, AND -0030 | 003-03020-0127 |
| 071-01477-0020/0023 AND -0070/0073 | 003-03020-0027 |
| 071-01477-0024/0027 AND -0074/0077 | 003-03020-0023 |
| 071-01477-0036 | 003-03044-0013 |
| 071-01503-0101/0301 | 003-03020-0017 |
| 071-01503-1301/1801 | 003-03020-0011 |
| 071-01503-2101/2401 | 003-03020-0027 |
| 071-01503-2501/2801, -4801, AND -4701 | 003-03020-0023 |
| 071-01503-3701 | 003-03044-0013 |
| 071-01503-3801, -4001, AND -4101 | 003-03020-0117 |
| 071-01503-3901, -4201, AND -4301 | 003-03020-0127 |
| 071-01503-5901, -6001, -6101 | 003-03020-0013 |
| 071-01503-3001, -3101, -3201, -2901 | 003-03020-0210 |




-0000, -0001, -0002 AND -0003 SHOWN
-0050, -0051, -0052 AND -0053 SHOWN
-0101, -0201, AND -0301 SHOWN
SEE TABLE A

SEE SHEET 2 FOR ADDITIONAL CONFIGURATIONS




NOTES:

1. APPROPRIATE DASH NUMBER, WEIGHT AND SERIAL NUMBER SHALL BE STAMPED ONTO IDENTIFICATION PLATE PRIOR TO SHIPMENT.
2. NOMENCLATURE FONT AND SIZE IS FUTURA MEDIUM CONDENSED, 12 POINT.
3. THE LIGHTPLATE COLORS LISTED IN TABLE A ARE PER FED-STD 595A AND/OR BOEING PAINT COLOR SPECIFICATIONS.
4. ATC FAIL LAMP VOLTAGE: -0000 THRU -0030, 12-28 VDC.
   -0050 THRU -0077, 5 VAC.
   -0036 ; N/A
   -2901 THRU -3201, N/A
   -3701 ; N/A
   -0101 THRU -2801, 12-28 VDC
   -3801 THRU -4301, 12-28 VDC
   -4601 AND -4701, 12-28 VDC
   -5901 THRU -6101, 12-28 VDC
5. UNIT WEIGHT: 1.8 LBS. ± .2 LB (1.82 KG. ± .09 KG.)
6. DIMENSIONS SHOWN ARE IN INCHES AND (MILLIMETERS).

Dwg 155-05766-0000 RevAC Sht 1

Figure 2015 CTA-81A Mode S/TCAS Control Unit Outline and Mounting Drawing (Sheet 1 of 2)
(Dwg. No. 155-05766-0000, Rev AC)

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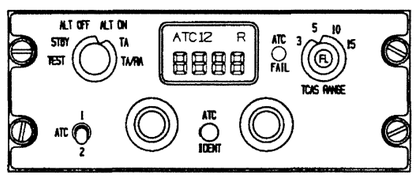
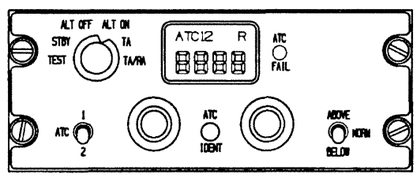


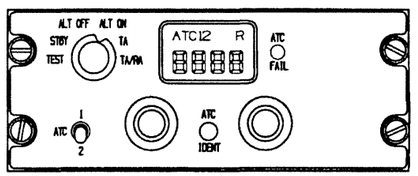

-0004, -0005, -0006 AND -0007 SHOWN
-0054, -0055, -0056 AND -0057 SHOWN

SEE TABLE A
SHEET 1



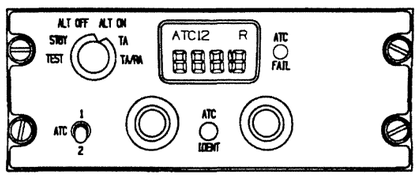

-0008, -0009, -0010 AND -0011 SHOWN
-0058, -0059, -0060 AND -0061 SHOWN
-6101, -5901, -6001 SHOWN

SEE TABLE A
SHEET 1



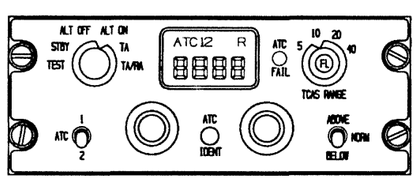

-0012, -0013, -0014 AND -0015 SHOWN
-0062, -0063, -0064 AND -0065 SHOWN
-1301, -1401, -1501 AND -1601 SHOWN

SEE TABLE A
SHEET 1



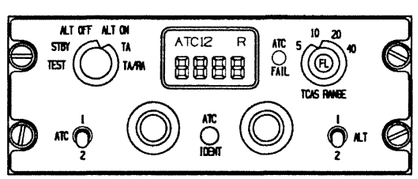

-0016 SHOWN
-0066 SHOWN

SEE TABLE A
SHEET 11



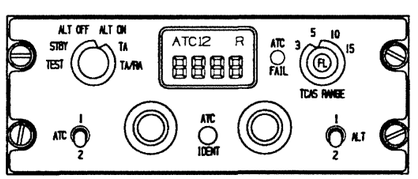

-0017, -0019 AND -0028 SHOWN
-3801, -4001 AND -4101 SHOWN

SEE TABLE A
SHEET 1



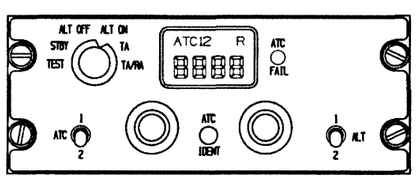

-0018, -0029 AND -0030 SHOWN
-3801, -4201 AND -4301 SHOWN

SEE TABLE A
SHEET 1



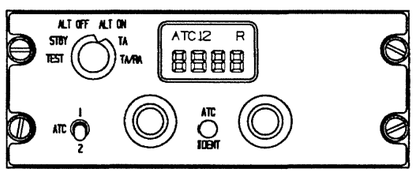

-0020, -0021, -0022 AND -0023 SHOWN
-0070, -0071, -0072 AND -0073 SHOWN
-2101, -2201, -2301 AND -2401 SHOWN

SEE TABLE A
SHEET 1



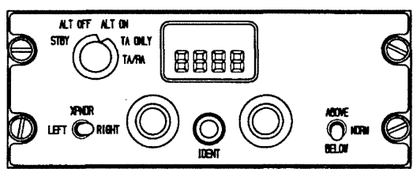

-0024, -0025, -0026 AND -0027 SHOWN
-0074, -0075, -0076 AND -0077 SHOWN
-2501, -2601, -2701 AND -2801 SHOWN
-4601 AND -4701 SHOWN

SEE TABLE A
SHEET 11




-0036 SHOWN
-3701 SHOWN

SEE TABLE A
SHEET 1




-2901, -3001, -3101 AND -3201 SHOWN

SEE TABLE A
SHEET 1

Dwg 155-05766-0000 RevAC Sht 2

Figure 2015 CTA-81A Mode S/TCAS Control Unit Outline and Mounting Drawing (Sheet 2)
(Dwg. No. 155-05766-0000, Rev AC)

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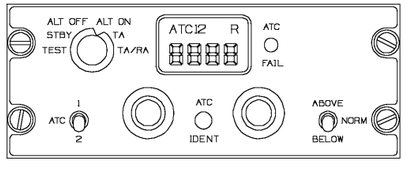
TABLE A
UNIT CONFIGURATIONS
SEE NOTE 3

| FINAL ASSY NO. | LIGHTPLATE COLOR |
|---|---|
| 071-01561-0101 | BOEING GRAY #703 |
| 071-01561-0201 | BOEING GRAY #703 |
| | |
| | |
| | |




-0201 SHOWN
SEE TABLE A

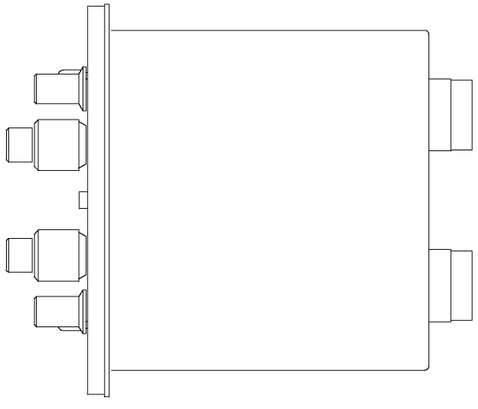
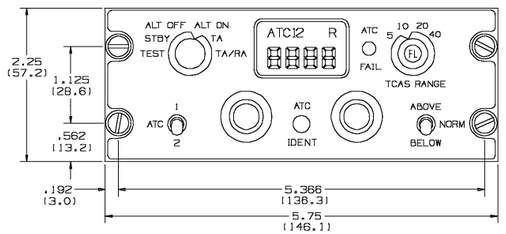
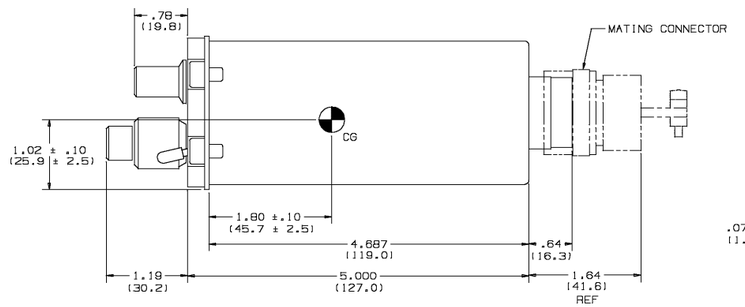


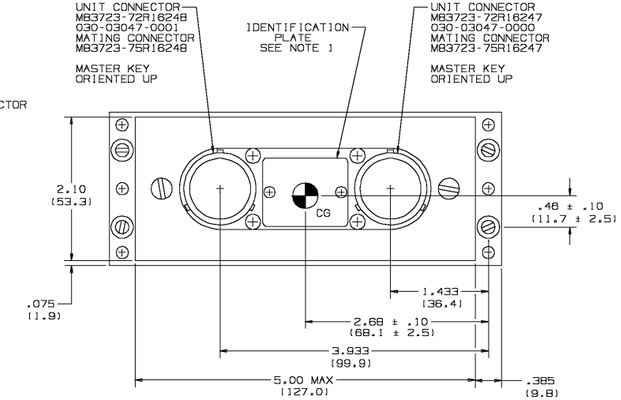
TABLE B

| FINAL ASSY NUMBER | PANEL ARTWORK NUMBER |
|---|---|
| 071-01561-0101 | 003-03020-0117 |
| 071-01561-0201 | 003-03020-0013 |
| | |
| | |
| | |




-0101 SHOWN
SEE TABLE A




NOTES:

1. APPROPRIATE DASH NUMBER, WEIGHT AND SERIAL NUMBER SHALL BE STAMPED ONTO IDENTIFICATION PLATE PRIOR TO SHIPMENT.
2. NOMENCLATURE FONT AND SIZE IS FUTURA MEDIUM CONDENSED, 12 POINT.
3. THE LIGHTPLATE COLORS LISTED IN TABLE A ARE PER FED-STD 595A AND/OR BOEING PAINT COLOR SPECIFICATIONS.
4. ATC FAIL LAMP VOLTAGE FOR -0101 AND -0201 = 28VDC.
5. UNIT WEIGHT: 1.8 LBS. (.82 KG.)
6. DIMENSIONS SHOWN ARE IN INCHES AND (MILLIMETERS).

Figure 2016 CTA-81D Mode S/TCAS Control Unit Outline and Mounting Drawing
(Dwg. No. 155-06009-0000, Rev 0)

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NOTES:

1. MODE S ADDRESS STRAP LOGIC
   1 = PIN CONNECTED TO MODE S COMMON (MST 67A/P671A-12,39; TDA-67A/MP-32)
   Ø = PIN LEFT OPEN

2. THESE PINS ASSIGNMENTS ARE ONLY AVAILABLE TO MST 67A UNITS
   KPN 066-Ø1143-Ø4Ø1/Ø5Ø1/Ø6Ø1

3. MAX AIR SPEED RI15 RI16 RI17 (MST 67A/P671A-5Ø,51,52; TRA-67A/TP-5C,5B,5A)

| | | |
|---|---|---|
| G | G | G - NOT ASSIGNED |
| G | G | O - AIRSPEED > 12ØØ KNOTS |
| G | O | G - 6ØØ < AIRSPEED <= 12ØØ KNOTS |
| G | O | O - 3ØØ < AIRSPEED <= 6ØØ KNOTS |
| O | G | G - 15Ø < AIRSPEED <= 3ØØ KNOTS |
| O | G | O - 75 < AIRSPEED <= 15Ø KNOTS |
| O | O | G - AIRSPEED <= 75 KNOTS |
| O | O | O - NO MAXIMUM AIRSPEED AVAILABLE |

   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED TO MAX AIRSPEED COMMON (MST67A/P671A-66;TRA-67A/TP-5D)

4. VALID OUTPUT (MST 67A/P671A-9Ø)
   +28VDC (NOMINAL), 5ØmA DC MAX. = NORMAL OPERATION
   OPEN = TRANSPONDER FAILURE

5. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

6. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

7. CABLE DELAY PROGRAM A B (TRA-67A/TP-3D,3E)

| TP-3D A | TP-3E B | CABLE LENGTH DIFFERENCE BETWEEN TOP & BOTTOM ANTENNA (FEET) | ADD DELAY (nSEC) |
|---|---|---|---|
| O | O | Ø - 5Ø | Ø |
| O | G | 51 - 15Ø | 1ØØ |
| G | O | 151 - 25Ø | 2ØØ |
| G | G | 251 - 35Ø | 3ØØ |

   CABLE DELAY PROGRAM TOP/BOTTOM (TRA-67A/TP-3C)
   GROUND = ADD DELAY TO TOP ANTENNA
   OPEN = ADD DELAY TO BOTTOM ANTENNA
   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED CABLE DELAY PROGRAM COMMON(TRA-67A/TP-3F)

8. SDI STRAP A B (TRA-67A/TP-3G,3H)

| | | |
|---|---|---|
| O | O | - ALL CALL |
| O | G | - TRANSPONDER #1 |
| G | O | - TRANSPONDER #2 |
| G | G | - TRANSPONDER #3 |

   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED SDI STRAP COMMON(TRA-67A/TP-3J)

9. ALT TYPE SEL A B (MST 67A/P671A-85,86; TRA-67A/MP-6G,6F)

| | | |
|---|---|---|
| G | G | - GILLHAM AIR DATA |
| G | O | - SYNCHRO DATA (TRA-67A ONLY) |
| O | G | - ARINC 575 (419) AIR DATA |
| O | O | - ARINC 7Ø6 (429) AIR DATA |

   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED TO ALT SEL TYPE COMMON
   (MST 67A/P671A-1Ø1;TRA-67A/MP-6H)

1Ø. ALTITUDE COMPARISION FAILURE DISCRETE #1 (MST 67A/P671A-3J; TRA-67A/MP-3J)
   GROUND = NO GILLHAM ALTITUDE DISCREPANCY
   OPEN = GILLHAM ALTITUDE FAILURE/DISCREPANCY

11. TRANSPONDER FAILURE DISCRETE #1 (TRA-67A/MP-3K)
   +5VDC = TRANSPONDER FAILURE
   OPEN = NORMAL OPERATION

12. TRANSPONDER FAILURE DISCRETE #2 (MST 67A/P671A-56; TRA-67A/TP-3B)
   GROUND = NORMAL OPERATION
   OPEN = TRANSPONDER FAILURE

13 THESE PIN ASSIGNMENTS ARE ONLY AVAILABLE TO MST UNITS
   KPN 066-01143-0401/0501/0601/2001/2101.

14. ENHANCED SURVEILLANCE ENABLE (MST UNITS -2001/2101 ONLY)
   GROUND - ENABLES ENHANCED SURV. GENERAL & GPS INPUT PORTS
   OPEN - ENABLES DATALINK COMM A/B, DATALINK COMM C INPUT PORTS

Dwg 155-01626-0003 Rev AA Sht 1

Figure 2017 MST 67A Mode S Transponder Discrete Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0003, Rev AA)

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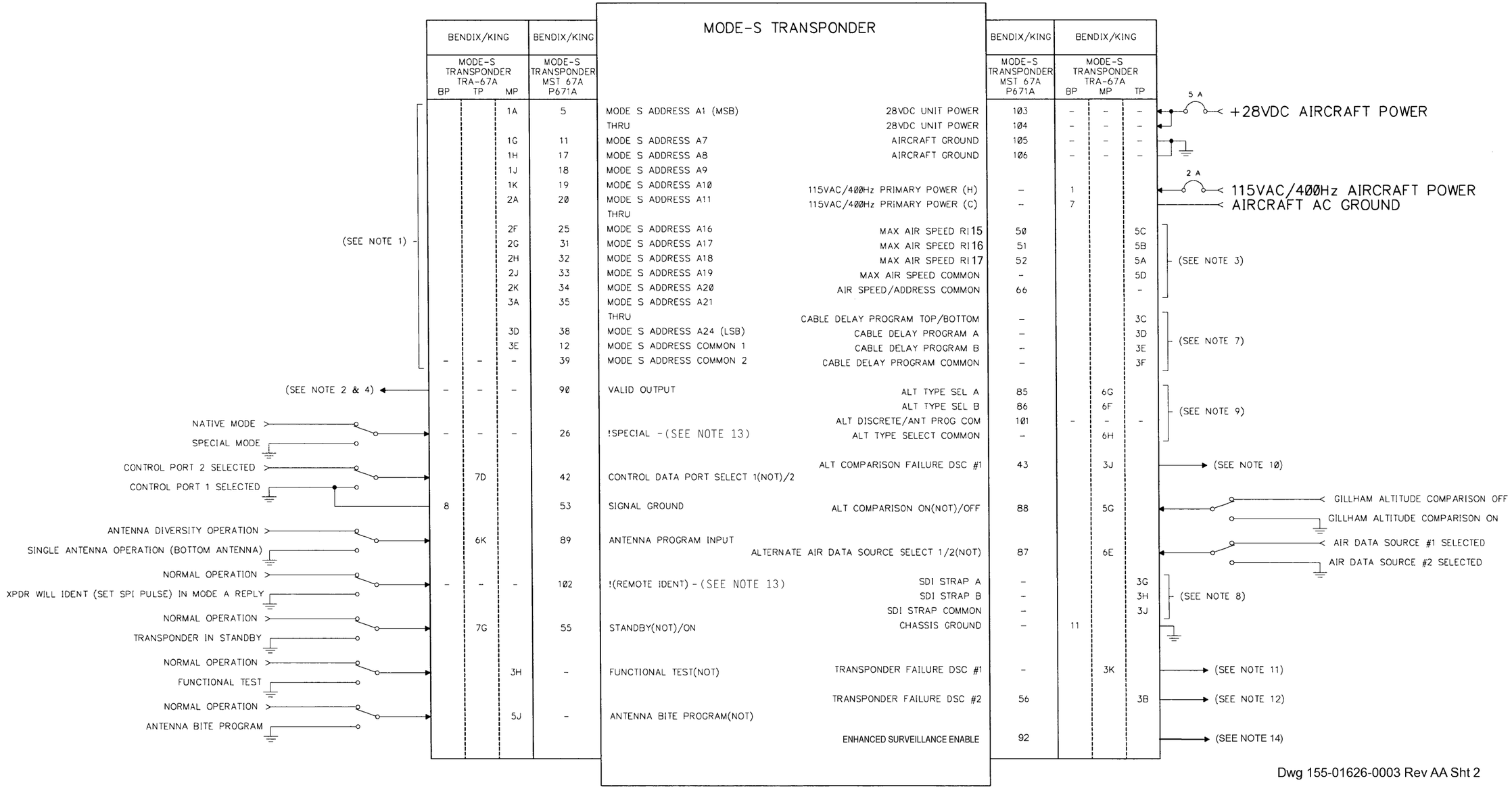


Figure 2017 MST 67A Mode S Transponder Discrete Interface (Sheet 2)
(Dwg. No. 155-01626-0003, Rev AA)

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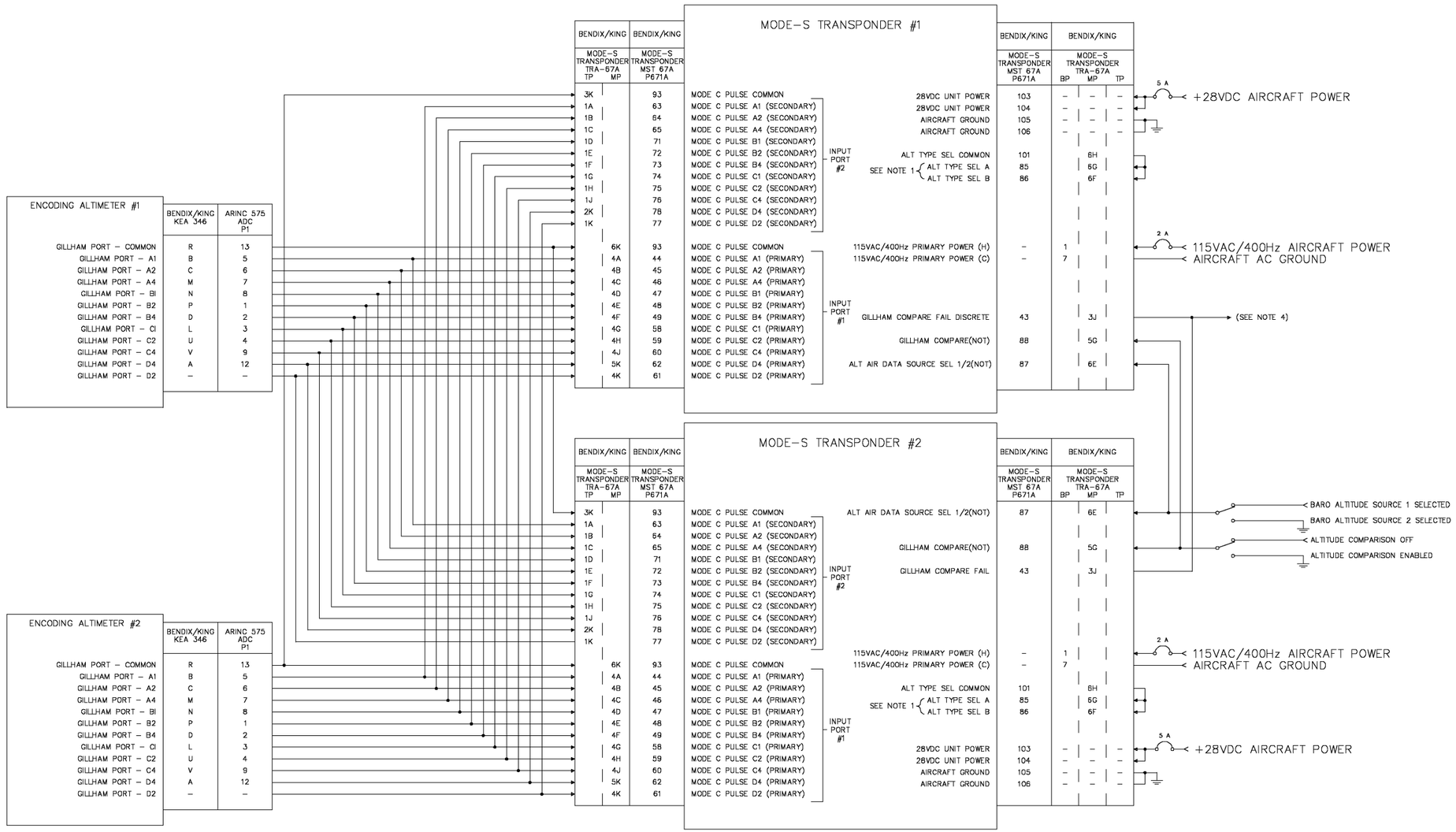


NOTES:

1. ALT TYPE SEL A B (MST 67A/P671A-85,86; TRA-67A/MP-6G,6F)
   G G - GILLHAM AIR DATA
   G O - SYNCHRO DATA (TRA-67A ONLY)
   O G - ARINC 575 (419) AIR DATA
   O O - ARINC 706 (429) AIR DATA
   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED TO ALT SEL TYPE COMMON (MST 67A/P671A-101; TRA-67A/MP-6H)
2. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.
3. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. GILLHAM COMPARE FAIL DISCRETE (MST 67A/P671A-43; TRA-67A/MP-3J)
   (TO REMOTE MONITOR LAMP)
   GROUND = NO ALTITUDE COMPARISON DISCREPANCY
   OPEN = ALTITUDE COMPARISON DISCREPANCY
5. #1 - INDICATES PILOT'S UNITS
   #2 - INDICATES COPILOT'S UNITS

Figure 2018 MST 67A Mode S Transponder Gillham Barometric Altitude Interface
(Dwg. No. 155-01626-0004, Rev 0)

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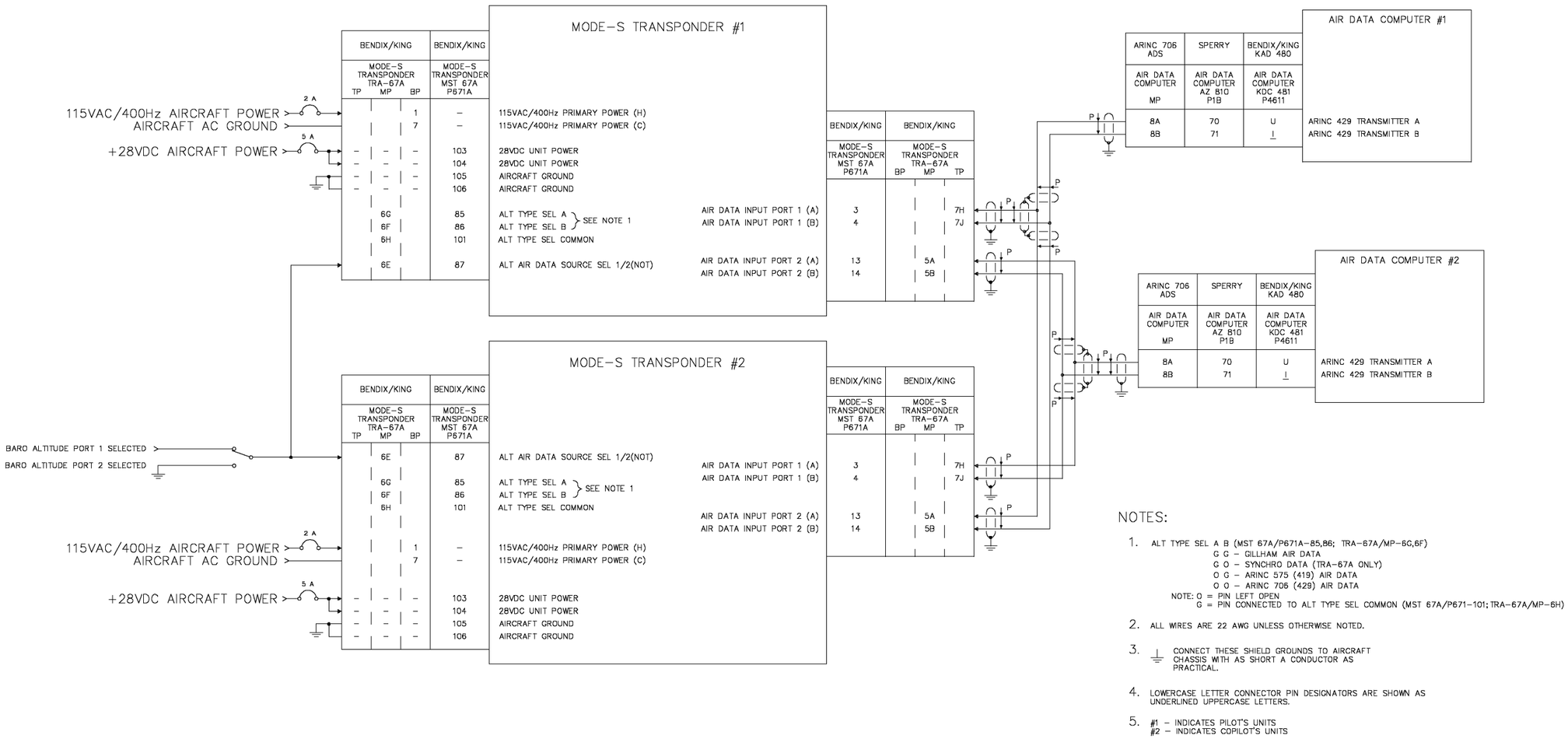


NOTES:

1. ALT TYPE SEL A B (MST 67A/P671A-85,86; TRA-67A/MP-6G,6F)
   G G - GILLHAM AIR DATA
   G O - SYNCHRO DATA (TRA-67A ONLY)
   O G - ARINC 575 (419) AIR DATA
   O O - ARINC 705 (429) AIR DATA
   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED TO ALT TYPE SEL COMMON (MST 67A/P671-101; TRA-67A/MP-6H)
2. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.
3. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. LOWERCASE LETTER CONNECTOR PIN DESIGNATORS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.
5. #1 - INDICATES PILOT'S UNITS
   #2 - INDICATES COPILOT'S UNITS

Figure 2019 MST 67A Mode S Transponder ARINC 706 (429) Air Data Computer Interface
(Dwg. No. 155-01626-0005, Rev 0)

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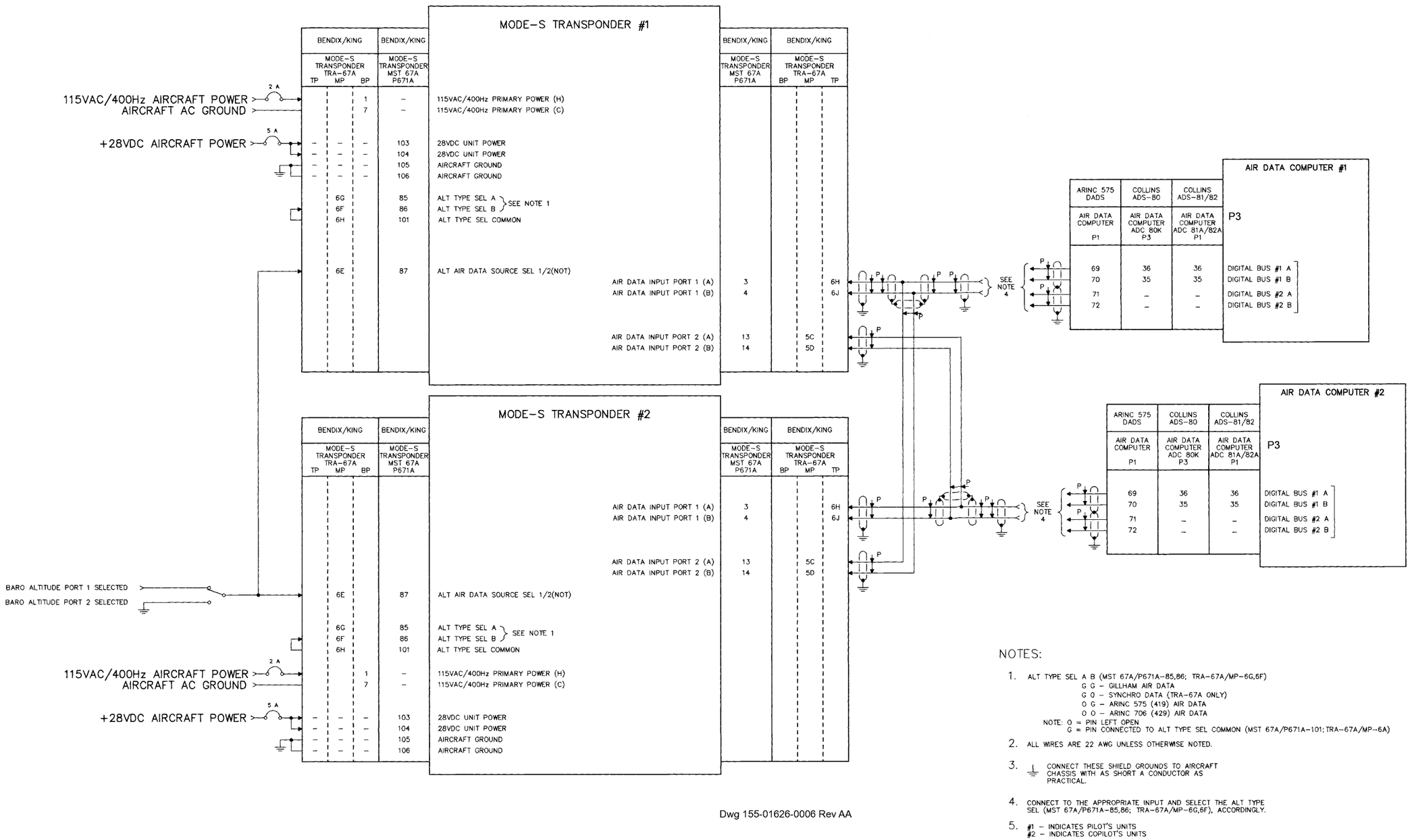


Dwg 155-01626-0006 Rev AA

NOTES:

1. ALT TYPE SEL A B (MST 67A/P671A-85,86; TRA-67A/MP-6G,6F)
   G G – GILLHAM AIR DATA
   G O – SYNCHRO DATA (TRA-67A ONLY)
   O G – ARINC 575 (419) AIR DATA
   O O – ARINC 706 (429) AIR DATA
   NOTE: O = PIN LEFT OPEN
   G = PIN CONNECTED TO ALT TYPE SEL COMMON (MST 67A/P671A-101; TRA-67A/MP-6A)
2. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.
3. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
4. CONNECT TO THE APPROPRIATE INPUT AND SELECT THE ALT TYPE SEL (MST 67A/P671A-85,86; TRA-67A/MP-6G,6F), ACCORDINGLY.
5. #1 – INDICATES PILOT'S UNITS
   #2 – INDICATES COPILOT'S UNITS

Figure 2020 MST 67A Mode S Transponder ARINC 575 (419) Air Data Computer Interface (Dwg. No. 155-01626-0006, Rev AA)

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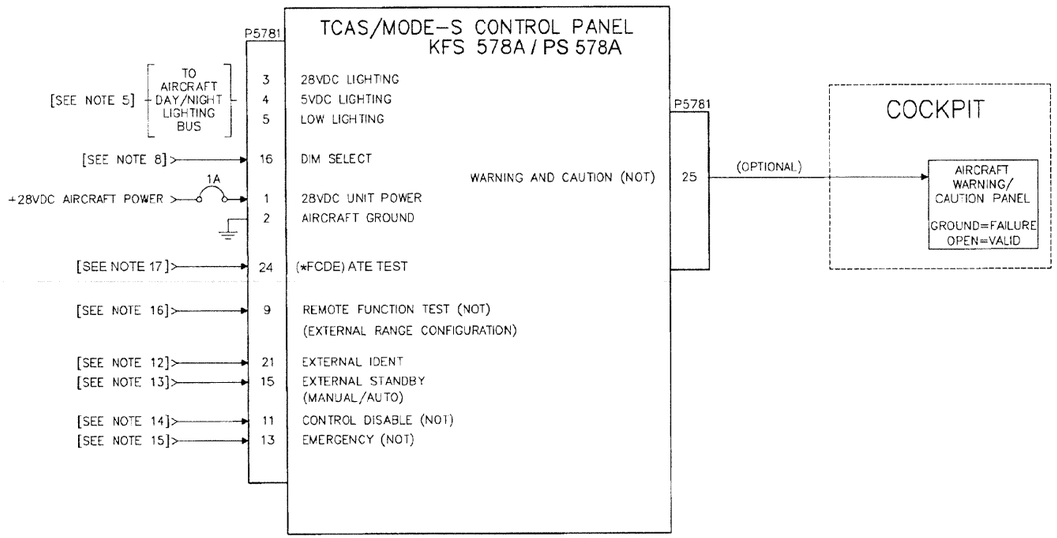


NOTES:

1. ANTENNA RELAYS ARE NOT REQUIRED IF DEDICATED TRANSPONDER ANTENNAS ARE USED.

2. $\overline{\text{STANDBY}}$/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (10mA DC MAX)
   OPEN = XPNDR ON

3. TRANSPONDER FAIL DISCRETE #2 OPEN = TRANSPONDER FAILURE
   GROUND = NORMAL OPERATION

4. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. THE CONTROL PANEL DASH NUMBER DETERMINES THE DAY/NIGHT BUS VOLTAGE.

6. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS.

   ANTENNA TRANSFER #1 (P5781-6)
   GROUND = TRANSPONDER #1 SELECTED/ACTIVE STATE (125mA DC MAX)
   OPEN = TRANSPONDER #1 NOT SELECTED

7. AIR/$\overline{\text{GND}}$ DISCRETE IS CONNECTED TO A 'REMOTE AIR/GROUND' OR 'SQUAT/STRUT' SWITCH. AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.

8. DIM SELECT
   A/C GND - FOLLOW LIGHTING BUS FOR GAS DISCHARGE DISPLAY DIMMING
   OPEN (N/C) - FOLLOW PHOTOCELL FOR GAS DISCHARGE DISPLAY DIMMING
   +28VDC - PUT GAS DISCHARGE DISPLAY AT MAXIMUM BRIGHTNESS
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED
   INPUT IMPEDANCE: LESS THAN 1000 OHMS

9. #1 - INDICATES PILOT'S UNIT
   #2 - INDICATES COPILOT'S UNIT

10. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

11. FOR CONTINUOUS ON OPERATION OF BOTH MST 67s. DISCONNECT THE WIRES BETWEEN PINS P5781-28 & P671A-54 ON XPNDR #1 and P5781-29 & P671A-54 ON XPNDR #2, AND GROUND P671A-54 ON XPNDR #1 & #2.

12. XPNDR WILL IDENT IF NOT IN 'TST' OR 'SBY' MODE
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED

13. EXTERNAL STANDBY
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    (MANUAL/AUTO)
    GROUND = AUTO
    OPEN = MANUAL
    FOR UNIT VERSIONS 4304, 4404, 7504, AND 7604, EXTERNAL STANDBY IS DISABLED, MANUAL/AUTO IS ENABLED, AND AUTO MODE PROVIDES A POP-UP FEATURE REQUIRED WITH INSTALLATIONS USING A HONEYWELL TCAS DISPLAY UNIT (I.E. CITATION VB ULTRA).

14. CONTROL DISABLE
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED

15. SQUAWK CODE 7700
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED

16. REMOTE FUNCTION TEST
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    (EXTERNAL RANGE CONFIGURATION)
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    FOR UNIT VERSIONS 4304, 4404, 7504, AND 7604, REMOTE FUNCTION TEST IS DISABLED, EXTERNAL RANGE CONFIGURATION IS ENABLED, AND IT PROVIDES RANGE SELECTION AS FOLLOWS: IF ACTIVATED, RANGES OF 5, 10, 20, AND 40 NM ARE AVAILABLE. IF NOT ACTIVATED, RANGES OF 3, 5, 10, 15, 20, AND 40 NM ARE AVAILABLE.

17. (*FCDE) ATE TEST
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    IF ACTIVATED AT POWER ON, THE CONFIGURABLE OPTIONS OF THE PS-578A MAY BE SELECTED BY ROTATING RANGE OR A/N/B KNOBS TO SELECT FLAVOR OF KFS-578A UNIT TO EMULATE.
    (*PS-578A UNITS ONLY)

Dwg 155-01626-0010 Rev AB Sht 1

Figure 2021 KFS 578A, PS-578A/Dual MST 67A Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0010, Rev AB)

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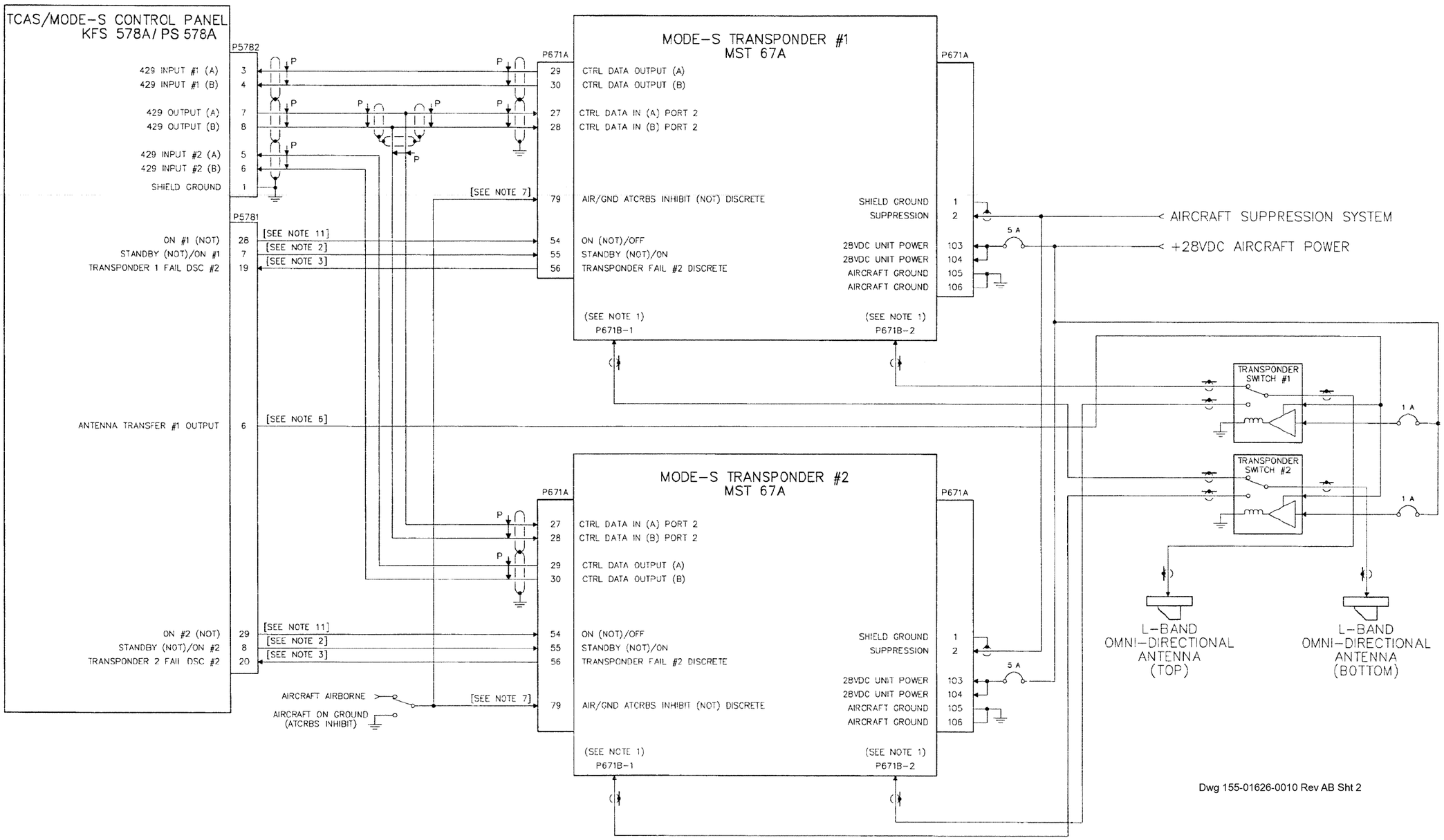


Figure 2021 KFS 578A, PS-578A/Dual MST 67A Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0010, Rev AB)

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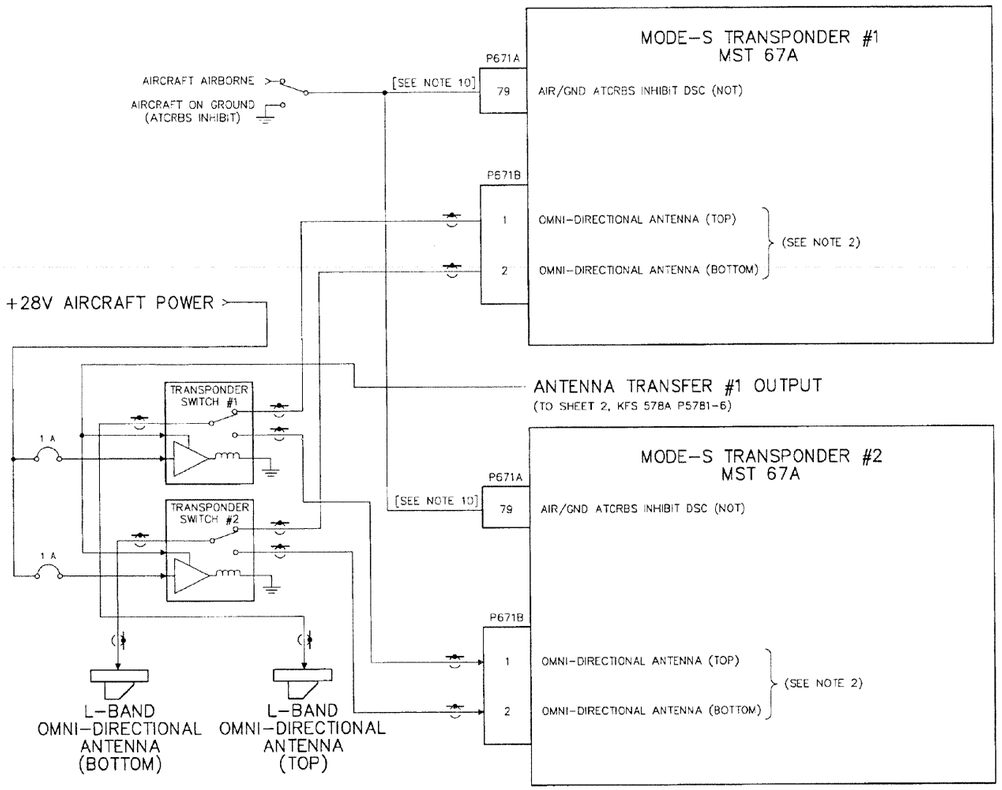


NOTES:

1. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO "AC" LOADS.
   ANTENNA TRANSFER
   GROUND = ATC SELECTED/ACTIVE STATE (125mA DC MAX)
   OPEN = ATC NOT SELECTED

2. ANTENNA RELAYS ARE NOT REQUIRED IF DEDICATED TRANSPONDER ANTENNAS ARE USED.

3. XPNDR WILL IDENT IF NOT IN "TST" OR "SBY" MODE
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

4. CONTROL DISABLE
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

5. MASTER/SLAVE
   GROUND = MASTER
   OPEN = SLAVE

6. SQUAWK CODE 7700
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

7. EXTERNAL STANDBY
   GROUND = STANDBY ACTIVE
   OPEN = INACTIVE
   (MANUAL/AUTO)
   GROUND = AUTO
   OPEN = MANUAL
   FOR UNIT VERSIONS 4304, 4404, 7504, AND 7604, EXTERNAL STANDBY IS DISABLED, MANUAL/AUTO IS ENABLED, AND AUTO MODE PROVIDES A POP-UP FEATURE REQUIRED WITH INSTALLATIONS USING A HONEYWELL TCAS DISPLAY UNIT (I.E. CITATION VB ULTRA).

8. STANDBY (NOT)/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (10mA MAX)
   OPEN = XPNDR ON

9. TRANSPONDER FAIL DISCRETE
   +5VDC = TRANSPONDER FAILURE
   GROUND = NORMAL OPERATION

10. AIR/GROUND DISCRETE IS EQUIVALENT TO "SQUAT/STRUT SWITCH". AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.

11. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

12. FOR CONTINUOUS ON OPERATION OF BOTH MST 67As. DISCONNECT THE WIRES BETWEEN PINS P5781-28 & P671A-54 ON XPNDER #1 and P5781-29 & P671A-54 ON XPNDER #2, AND GROUND P671A-54 ON XPNDR #1 & #2.

13. AIRCRAFT WARNING/CAUTION PANEL
    OPEN = NO FAILURE
    GROUND = UNIT FAILURE

14. REMOTE FUNCTION TEST
    GROUND = ACTIVATED (FUNCTIONAL TEST)
    OPEN = NOT ACTIVATED (NORMAL OPERATION)
    (EXTERNAL RANGE CONFIGURATION)
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    FOR UNIT VERSIONS 4304, 4404, 7504, AND 7604, REMOTE FUNCTION TEST IS DISABLED, EXTERNAL RANGE CONFIGURATION IS ENABLED, AND IT PROVIDES RANGE SELECTION AS FOLLOWS: IF ACTIVATED, RANGES OF 5, 10, 20, AND 40 NM ARE AVAILABLE. IF NOT ACTIVATED, RANGES OF 3, 5, 10, 15, 20, AND 40 NM ARE AVAILABLE.

15. THE CONTROL PANEL DASH NUMBER DETERMINES THE DAY/NIGHT BUS VOLTAGE.

16. DIM SELECT
    A/C GND – FOLLOW LIGHTING BUS FOR GAS DISCHARGE DISPLAY DIMMING
    OPEN N/C – FOLLOW PHOTOCELL FOR GAS DISCHARGE DISPLAY DIMMING
    +28VDC – PUT GAS DISCHARGE DISPLAY AT MAXIMUM BRIGHTNESS
    ACTIVATED = GROUND
    NOT ACTIVATED = OPEN
    INPUT IMPEDANCE: LESS THAN 1000 OHMS

17. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

18. (*FCDE) ATE TEST
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    IF ACTIVATED AT POWER ON, THE CONFIGURABLE OPTIONS OF THE PS-578A MAY BE SELECTED BY ROTATING RANGE OR A/N/B KNOBS TO SELECT FLAVOR OF KFS-578A UNIT TO EMULATE.
    (*PS-578A UNITS ONLY)

Dwg 155-01626-0011 Rev AB Sht 1

Figure 2022 Dual KFS 578A, PS-578A/Dual MST 67A Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0011, Rev AB)

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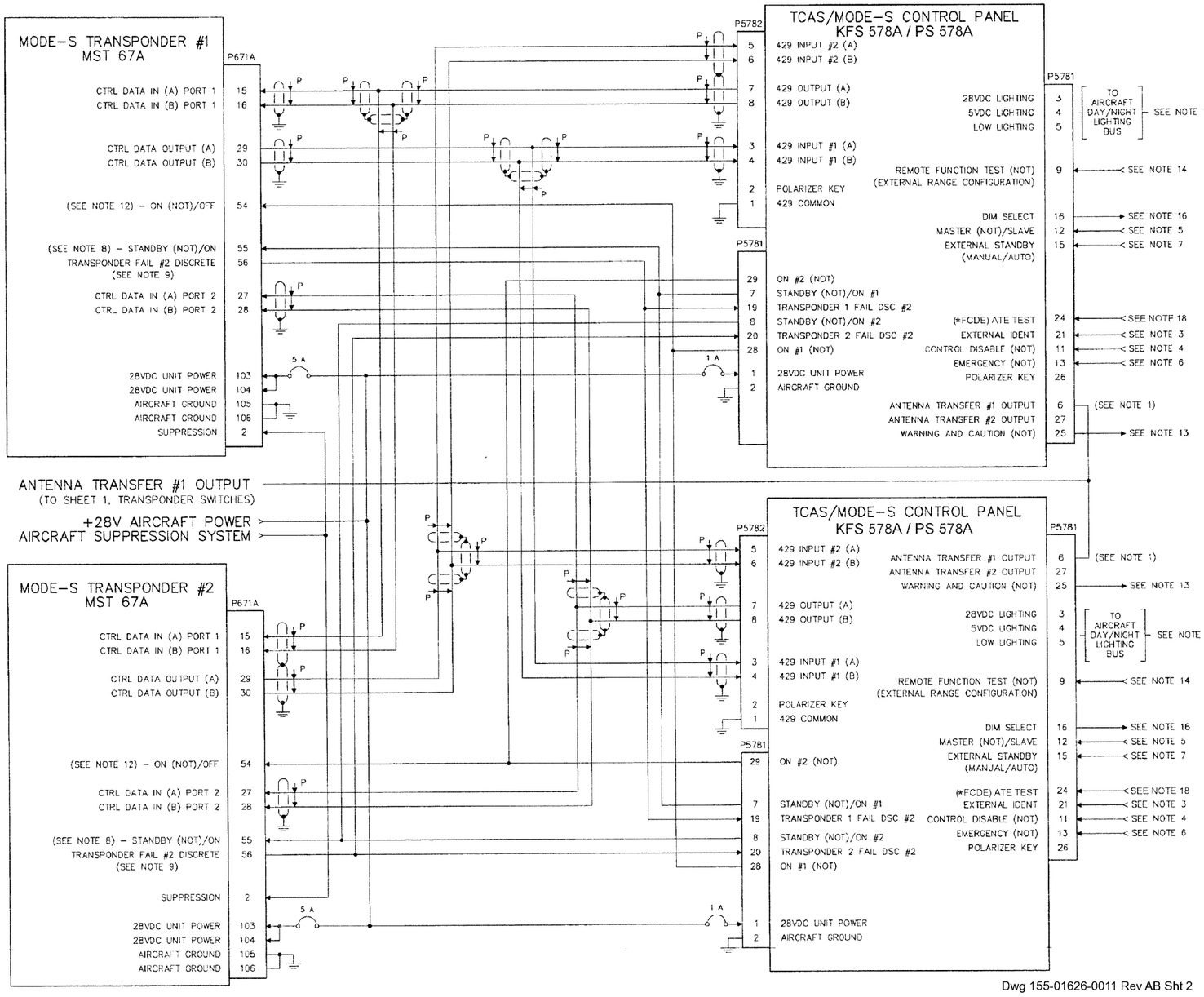


Figure 2022 Dual KFS 578A, PS-578A/Dual MST 67A Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0011, Rev AB)

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NOTES:

1. ANTENNA RELAYS ARE NOT REQUIRED IF DEDICATED TRANSPONDER ANTENNAS ARE USED.

2. $\overline{\text{STANDBY}}$/ON (P1-7/P2-7)
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (500mA DC MAX)
   OPEN = XPNDR ON

3. TRANSPONDER FAIL DISCRETE #2
   OPEN = TRANSPONDER FAILURE
   GROUND = NORMAL OPERATION

4. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. THE CONTROL PANEL DASH NUMBER DETERMINES THE DAY/NIGHT BUS VOLTAGE.

6. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS. GROUND = ACTIVE STATE (CONTROL PANELS WITH MOD 1 STATUS ARE 125mA DC MAX; OTHERWISE, 50mA DC MAX).

   ANTENNA TRANSFER (P1-5)
   GROUND = TRANSPONDER #1 SELECTED
   OPEN = TRANSPONDER #1 NOT SELECTED

   ANTENNA TRANSFER (P2-5)
   GROUND = TRANSPONDER #2 SELECTED
   OPEN = TRANSPONDER #2 NOT SELECTED

7. AIR/$\overline{\text{GND}}$ DISCRETE IS CONNECTED TO A 'REMOTE AIR/GROUND' OR 'SQUAT/STRUT' SWITCH.

8. CTA-81A/CNA-67A ROUTES THE AIR/$\overline{\text{GND}}$ DISCRETE DIRECTLY THROUGH THE CONTROL PANEL.

9. #1 - INDICATES PILOT'S UNIT
   #2 - INDICATES COPILOT'S UNIT

10. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

11. ALL DISCRETE OUTPUTS FROM THE CTA-81A CONTROL PANEL CAN BE INTERFACED DIRECTLY TO TRANSPONDERS WHOSE DISCRETE INPUT CIRCUITRY MEET THE STANDARDS SET IN ARINC 410 or 720 (POSITIVE DC VOLTAGES).

12. ALTERNATE AIR DATA SOURCE SELECT (P1-16)
    GROUND = ALTITUDE SOURCE #2 SELECTED/ACTIVE STATE (125mA DC MAX)
    OPEN = ALTITUDE SOURCE #1 SELECTED

    ALTERNATE AIR DATA SOURCE SELECT (P2-16)
    GROUND = ALTITUDE SOURCE #1 SELECTED/ACTIVE STATE (125mA DC MAX)
    OPEN = ALTITUDE SOURCE #2 SELECTED

13. WARNING AND CAUTION (P1-10)
    CTA-81A P/N 071-01503-4601 AND -4701 ONLY, ACTIVE STATE (125mA DC MAX); OTHERWISE, ACTIVE STATE (10mA DC MAX).

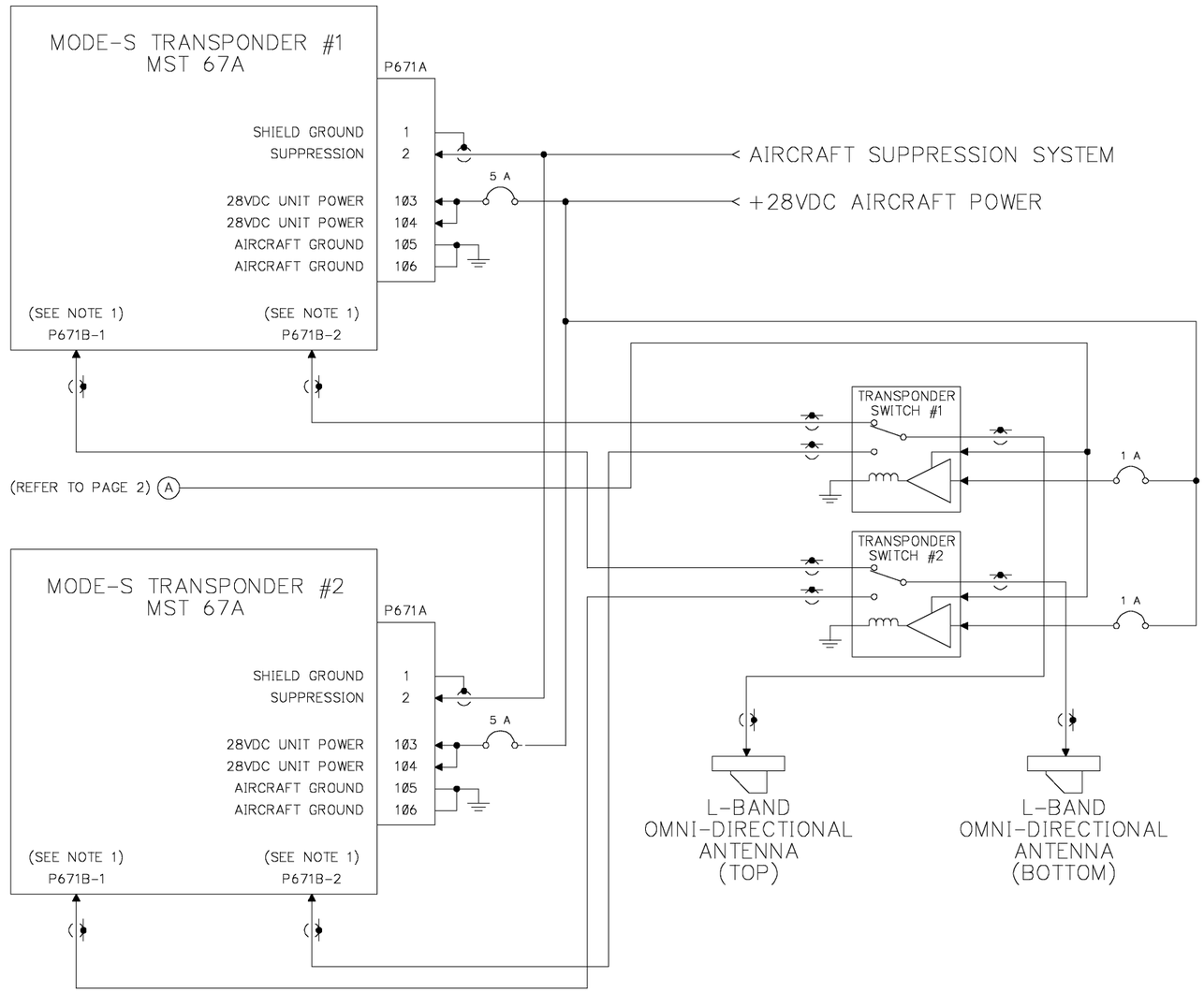


Figure 2023 CTA-81A/Dual MST 67A Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0030, Rev 2)

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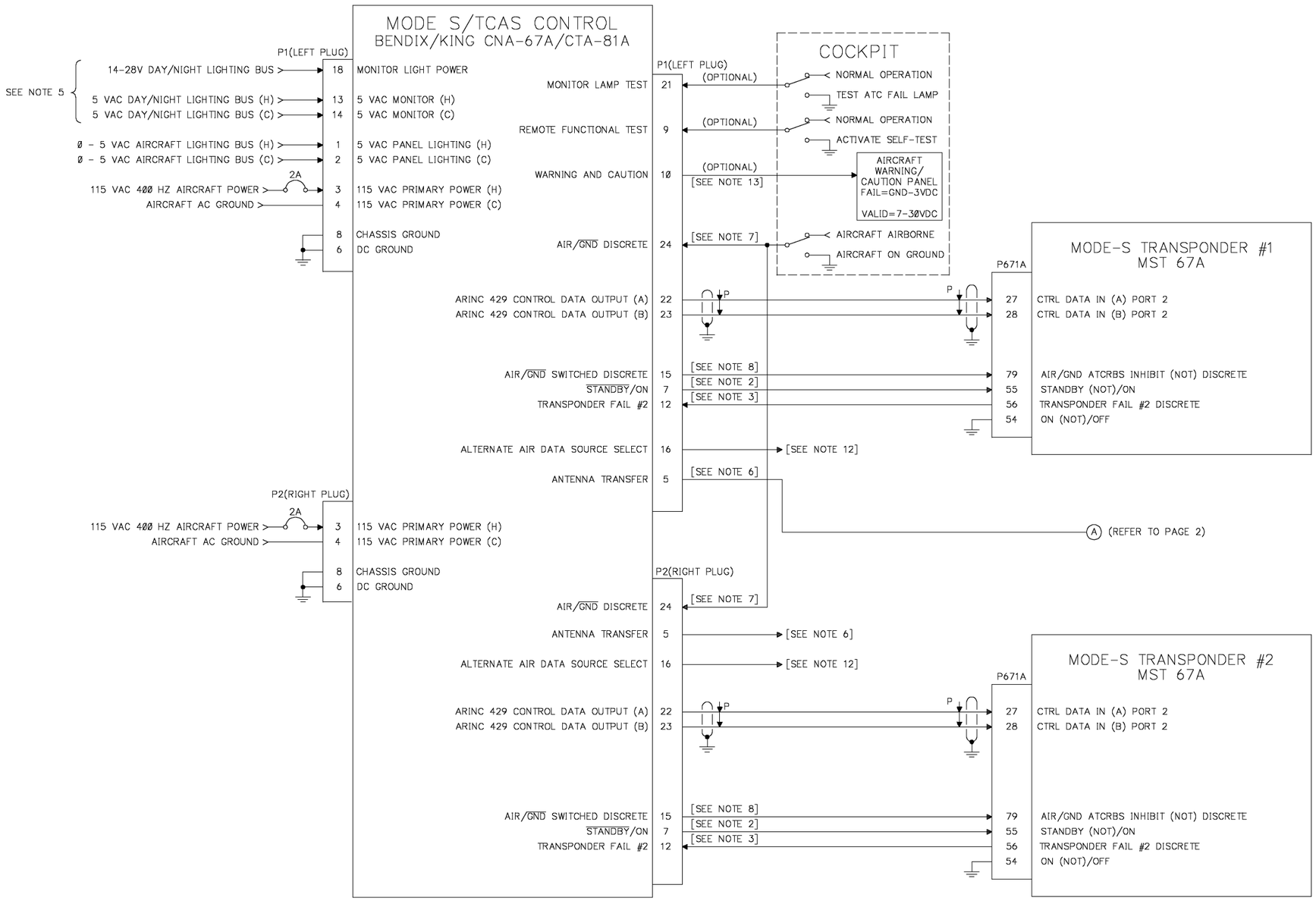


Figure 2023 CTA-81A/Dual MST 67A Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0030, Rev 2)

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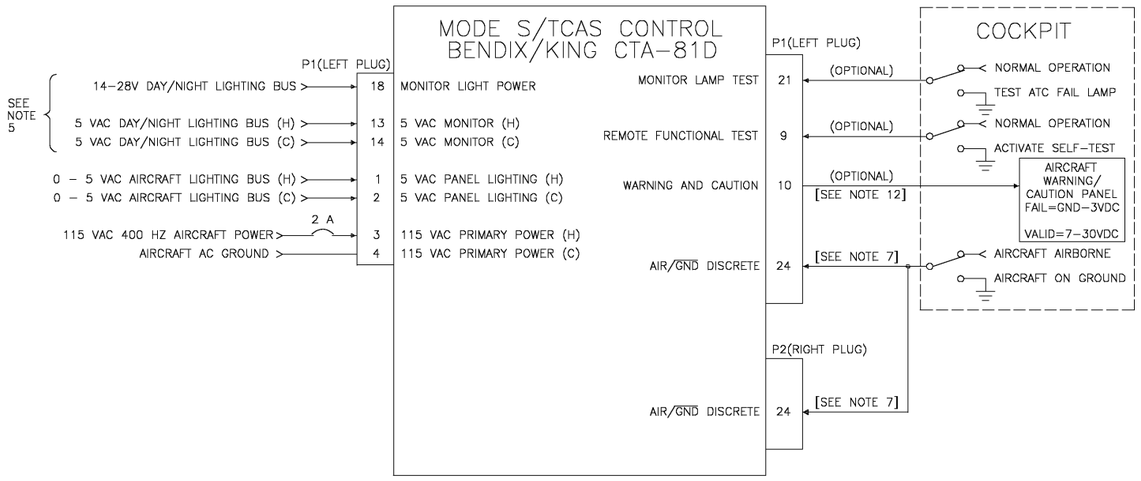


NOTES:

1. FAULT MONITOR OUTPUT
   28 VDC = VALID (200mA DC MAX)

2. STANDBY/ON (P1-7/P2-7)
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (500mA DC MAX)
   OPEN = XPNDR ON.

3. REFER TO COLLINS TDR-94/94D MODE S TRANSPONDER SYSTEM INSTALLATION MANUAL 523-0775654 FOR THE ANTENNA INSTALLATION AND FOR WIRING DETAILS TO SELECT THE ADC SOURCE TYPE, THE SYSTEM SOURCE IDENTIFIER, AIRSPEED STRAPS, AND MODE-S STRAPS. CROSS-SIDE CONNECTIONS ARE REQUIRED ONLY IF ARINC 429 BURST TUNING IS USED; REFER TO INSTALLATION MANUAL FOR FURTHER DETAILS.

4. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. THE CONTROL PANEL DASH NUMBER DETERMINES THE DAY/NIGHT BUS VOLTAGE.

6. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS. GROUND = ACTIVE STATE (CONTROL PANELS WITH MOD 1 STATUS ARE 125mA DC MAX; OTHERWISE, 50mA DC MAX).

   ANTENNA TRANSFER (P1-5)
   GROUND = TRANSPONDER #1 SELECTED
   OPEN = TRANSPONDER #1 NOT SELECTED

   ANTENNA TRANSFER (P2-5)
   GROUND = TRANSPONDER #2 SELECTED
   OPEN = TRANSPONDER #2 NOT SELECTED

7. AIR/GND DISCRETE IS CONNECTED TO A 'REMOTE AIR/GROUND' OR 'SQUAT/STRUT' SWITCH.

8. CTA-81D ROUTES THE AIR/GND DISCRETE DIRECTLY THROUGH THE CONTROL PANEL.

9. #1 - INDICATES PILOT'S UNIT
   #2 - INDICATES COPILOT'S UNIT

10. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

11. ALTERNATE AIR DATA SOURCE SELECT (P1-16)
    GROUND = ALTITUDE SOURCE #2 SELECTED/ACTIVE STATE (125mA DC MAX)
    OPEN = ALTITUDE SOURCE #1 SELECTED

    ALTERNATE AIR DATA SOURCE SELECT (P2-16)
    GROUND = ALTITUDE SOURCE #1 SELECTED/ACTIVE STATE (125mA DC MAX)
    OPEN = ALTITUDE SOURCE #2 SELECTED

12. WARNING AND CAUTION (P1-10)
    CTA-81A P/N 071-01503-4601 AND -4701 ONLY, ACTIVE STATE (125mA DC MAX); OTHERWISE, ACTIVE STATE (10mA DC MAX).

13. SDI INPUT, A/B (P2-46/P2-47)

| P2-46 | P2-47 | SDI FUNCTION |
|---|---|---|
| OPEN | OPEN | NOT USED |
| OPEN | GROUND | SIDE 1 |
| GROUND | OPEN | SIDE 2 |
| GROUND | GROUND | NOT USED |

    [GROUND TO P2-50, SDI INPUT (STRAP COMMON)]

14. THIS IS THE TCAS COORDINATION INTERFACE; REFER TO THE TCAS INTERCONNECTION DRAWINGS FOR DETAILS.

15. TRANSPONDER FAIL DISCRETE #2.
    GROUND = NORMAL OPERATION
    OPEN = TRANSPONDER FAILURE

Figure 2024 CTA-81D/Dual Collins TDR-49D Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0060, Rev 2)

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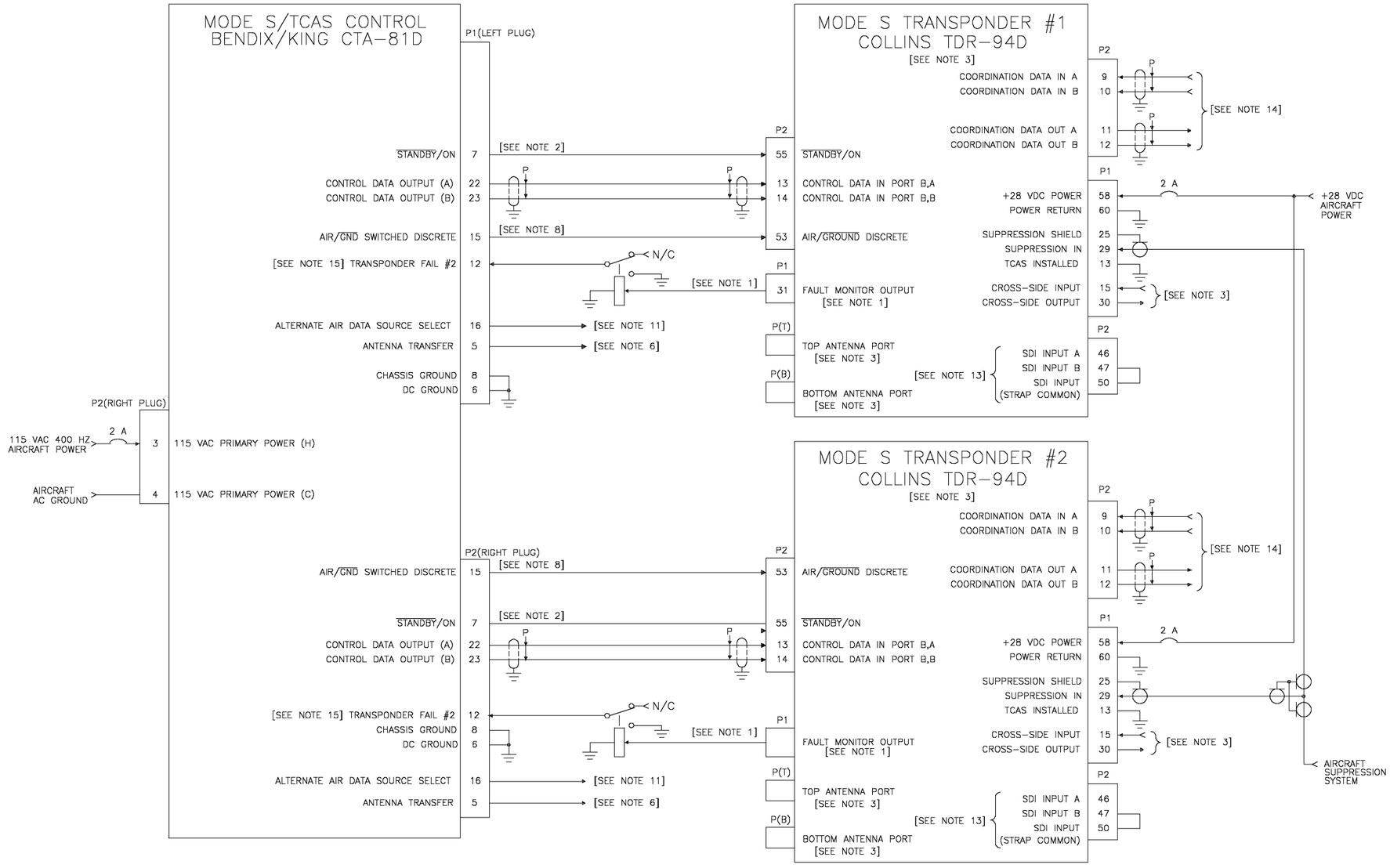


Figure 2024 CTA-81D/Dual Collins TDR-49D Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0060, Rev 2)

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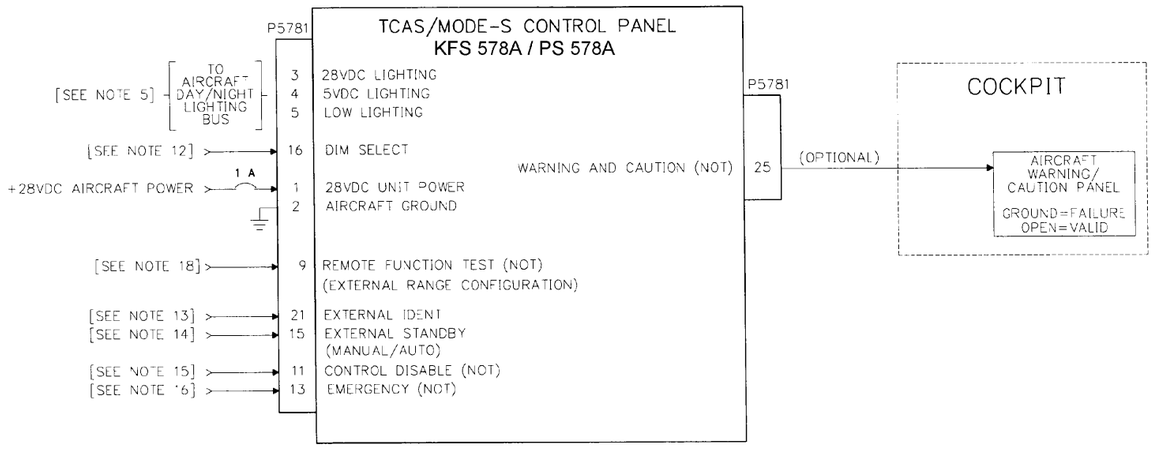


NOTES:

1. FAULT MONITOR OUTPUT
   28 VDC = VALID (200mA DC MAX)

2. $\overline{\text{STANDBY}}$/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (100mA DC MAX)
   OPEN = XPNDR ON

3. TRANSPONDER FAIL DISCRETE #2
   GROUND = NORMAL OPERATION
   OPEN = TRANSPONDER FAILURE

4. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

5. THE CONTROL PANEL DASH NUMBER DETERMINES THE DAY/NIGHT BUS VOLTAGE.

6. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

7. GROUND THE 'TCAS INSTALLED' INPUT ONLY IF TCAS INSTALLED.

8. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS.

   ANTENNA TRANSFER #1 (P5781-6)
   GROUND = TRANSPONDER #1 SELECTED/ACTIVE STATE (100mA DC MAX)
   OPEN = TRANSPONDER #1 NOT SELECTED

   ANTENNA TRANSFER #2 (P5781-27)
   GROUND = TRANSPONDER #2 SELECTED/ACTIVE STATE (100mA DC MAX)
   OPEN = TRANSPONDER #2 NOT SELECTED

9. AIR/$\overline{\text{GND}}$ DISCRETE IS CONNECTED TO A 'REMOTE AIR/GROUND' OR 'SQUAT/STRUT' SWITCH. AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.

10. #1 - INDICATES PILOT'S UNIT
    #2 - INDICATES COPILOT'S UNIT

11. THIS IS THE TCAS COORDINATION INTERFACE; REFER TO THE TCAS INTERCONNECT DRAWINGS FOR DETAILS.

12. DIM SELECT (P5781-16)
    GROUND = DISPLAY BRIGHTNESS FOLLOWS PANEL LIGHTING VOLTAGE
    OPEN (N/C) = DISPLAY BRIGHTNESS FOLLOWS AMBIENT LIGHT LEVEL (PHOTOCELL)
    +28VDC = DISPLAY BRIGHTNESS IS SET TO MAXIMUM BRIGHTNESS

13. EXTERNAL IDENT (P5781-21)
    GROUND = IDENT ACTIVE
    OPEN = INACTIVE

14. EXTERNAL STANDBY (P5781-15)
    GROUND = STANDBY ACTIVE
    OPEN = INACTIVE
    (MANUAL/AUTO)
    GROUND = AUTO
    OPEN = MANUAL
    FOR UNIT VERSIONS 4304, 4404, 7504, AND 7604,
    EXTERNAL STANDBY IS DISABLED, MANUAL/AUTO IS ENABLED,
    AND AUTO MODE PROVIDES A POP-UP FEATURE REQUIRED WITH
    INSTALLATIONS USING A HONEYWELL TCAS DISPLAY UNIT
    (I.E. CITATION VB ULTRA)

15. CONTROL DISABLE (P5781-11)
    GROUND = CONTROL DISABLED
    OPEN = CONTROL ENABLED

16. SQUAWK CODE 7700/EMERGENCY (P5781-13)
    GROUND = EMERGENCY ACTIVE
    OPEN = INACTIVE

17. SDI INPUT, A/B (P2-46/P2-47)

| P2-46 | P2-47 | SDI FUNCTION |
|---|---|---|
| OPEN | OPEN | NOT USED |
| OPEN | GROUND | SIDE 1 |
| GROUND | OPEN | SIDE 2 |
| GROUND | GROUND | NOT USED |

[GROUND TO P2-50, SDI INPUT (STRAP COMMON)]

18. REMOTE FUNCTION TEST (P5781-9)
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    (EXTERNAL RANGE CONFIGURATION)
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    FOR UNIT VERSIONS 4304, 4404, 7504, AND 7604, REMOTE FUNCTION TEST IS DISABLED, EXTERNAL RANGE CONFIGURATION IS ENABLED, AND IT PROVIDES RANGE SELECTION AS FOLLOWS: IF ACTIVATED, RANGES OF 5, 10, 20, AND 40 NM ARE AVAILABLE. IF NOT ACTIVATED, RANGES OF 3, 5, 10, 15, 20, AND 40 NM ARE AVAILABLE.

19. REFER TO COLLINS TDR-94/94D MODE S TRANSPONDER SYSTEM INSTALLATION MANUAL 523-0775654 FOR THE ANTENNA INSTALLATION AND FOR WIRING DETAILS TO SELECT THE ADC SOURCE TYPE, THE SYSTEM SOURCE IDENTIFIER, AIRSPEED STRAPS, AND MODE-S STRAPS. CROSS-SIDE CONNECTIONS ARE REQUIRED ONLY IF ARINC 429 BURST TUNING IS USED; REFER TO INSTALLATION MANUAL FOR FURTHER DETAILS.

Dwg 155-01626-0061 Rev AA Sht 1

Figure 2025 KFS 578A, PS-578A/Dual Collins TDR-49D Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0061, Rev AA)

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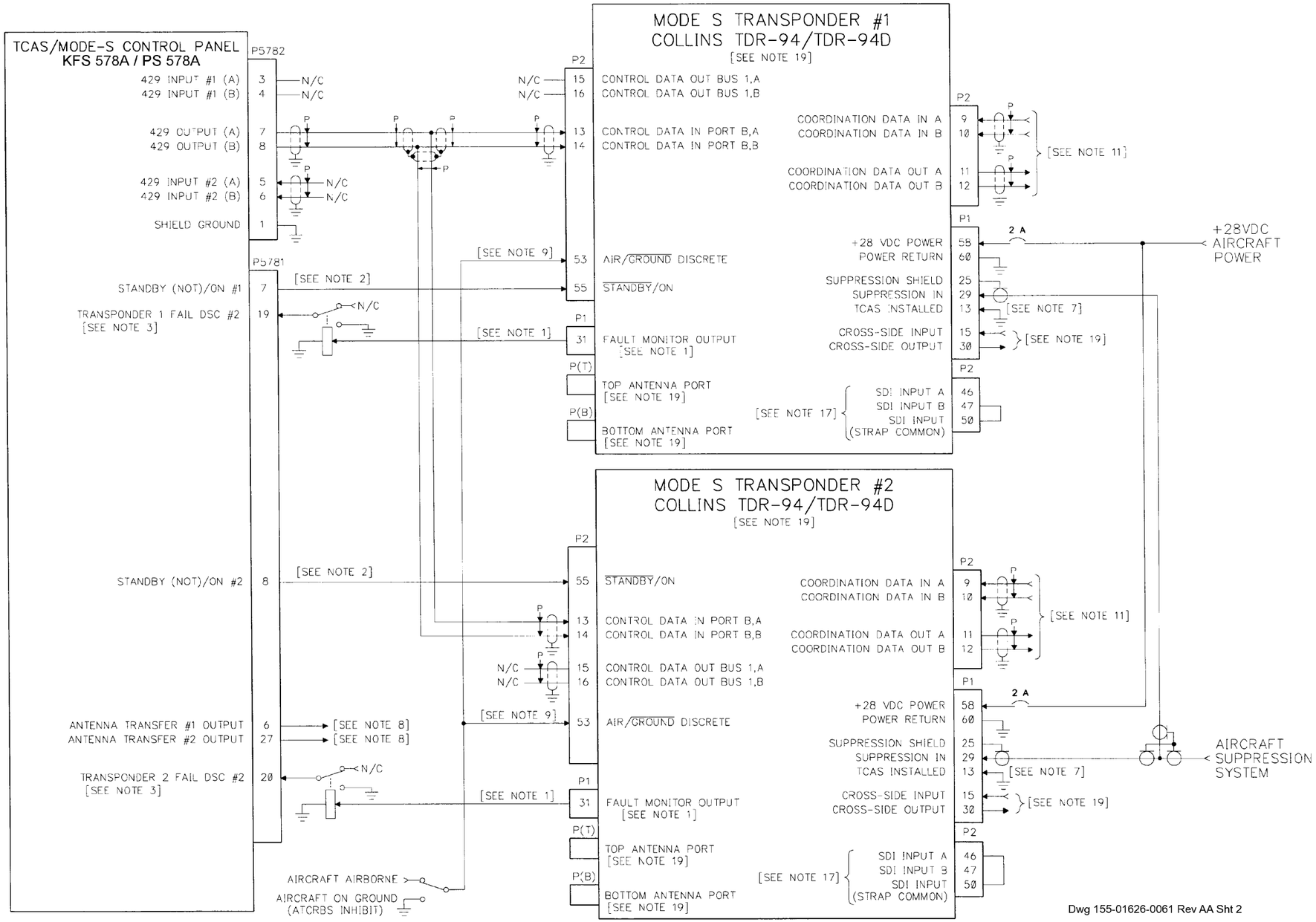


Figure 2025 KFS 578A, PS-578A/Dual Collins TDR-49D Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0061, Rev AA)

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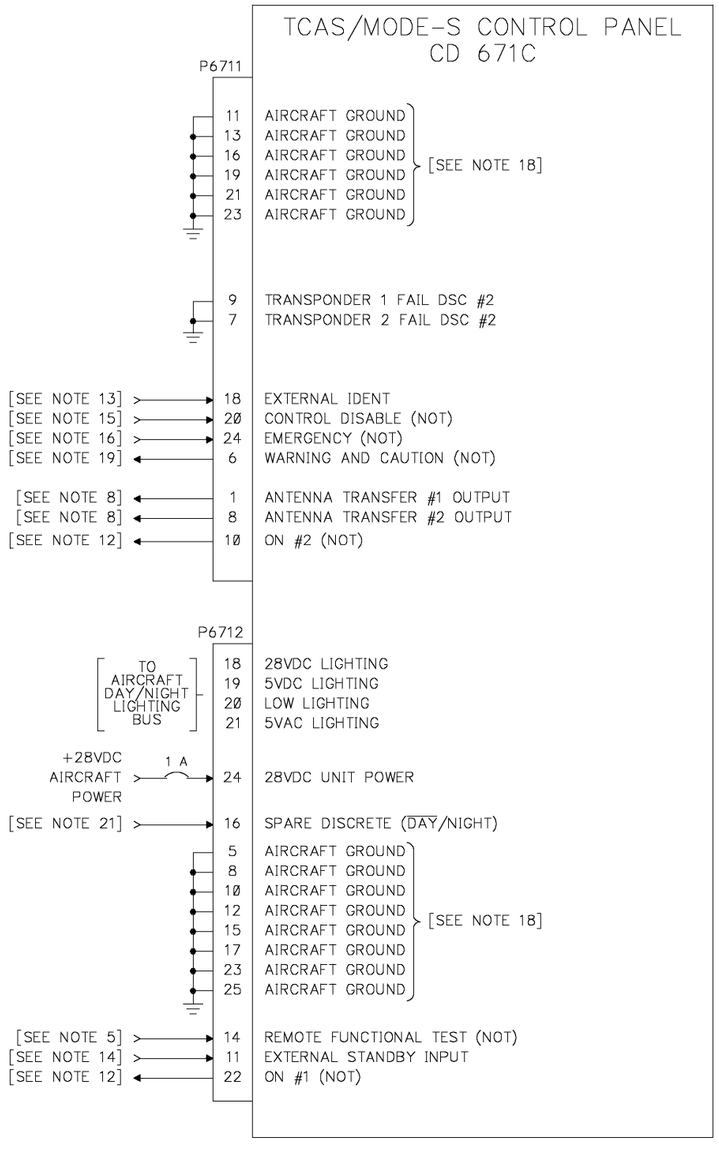


NOTES:

1. FAULT MONITOR OUTPUT
   28 VDC = VALID (200mA DC MAX)
2. STANDBY/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (100mA DC MAX)
   OPEN = XPNDR ON
3. TRANSPONDER FAIL DISCRETE #3
   +28 VDC = NORMAL OPERATION
   OPEN = TRANSPONDER FAILURE
4. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
5. REMOTE FUNCTIONAL TEST (P6712-14)
   OPEN = NORMAL OPERATION
   GROUND = FUNCTIONAL TEST
6. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.
7. GROUND THE 'TCAS INSTALLED' INPUT ONLY IF TCAS INSTALLED.
8. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS.
   ANTENNA TRANSFER #1 (P6711-1)
   GROUND = TRANSPONDER #1 SELECTED/ACTIVE STATE (100mA DC MAX)
   OPEN = TRANSPONDER #1 NOT SELECTED
   ANTENNA TRANSFER #2 (P6711-8)
   GROUND = TRANSPONDER #2 SELECTED/ACTIVE STATE (100mA DC MAX)
   OPEN = TRANSPONDER #2 NOT SELECTED
9. AIR/GND DISCRETE IS CONNECTED TO A 'REMOTE AIR/GROUND' OR 'SQUAT/STRUT' SWITCH. AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.
10. #1 - INDICATES PILOT'S UNIT
    #2 - INDICATES COPILOT'S UNIT
11. THIS IS THE TCAS COORDINATION INTERFACE; REFER TO THE TCAS INTERCONNECT DRAWINGS FOR FOR DETAILS.
12. ON #1/#2 DISCRETES (P6712-22/P6711-10)
    GROUND = TRANSPONDER SELECTED
    OPEN = TRANSPONDER NOT SELECTED
13. EXTERNAL IDENT (P6711-18)
    GROUND = IDENT ACTIVE
    OPEN = INACTIVE
14. EXTERNAL STANDBY (P6712-11)
    GROUND = STANDBY ACTIVE
    OPEN = INACTIVE
15. CONTROL DISABLE (P6711-20)
    GROUND = CONTROL DISABLED
    OPEN = CONTROL ENABLED
16. SQUAWK CODE 7700/EMERGENCY (P6711-24)
    GROUND = EMERGENCY ACTIVE
    OPEN = INACTIVE
17. REFER TO COLLINS TDR-94/94D MODE S TRANSPONDER SYSTEM INSTALLATION MANUAL 523-0775654 FOR THE ANTENNA INSTALLATION AND FOR WIRING DETAILS TO SELECT THE ADC SOURCE TYPE, THE SYSTEM SOURCE IDENTIFIER, AIRSPEED STRAPS, AND MODE S STRAPS. CROSS-SIDE CONNECTIONS ARE REQUIRED ONLY IF ARINC 429 BURST TUNING IS USED; REFER TO INSTALLATION MANUAL FOR FURTHER DETAILS.
18. ONLY ONE OF THE 'AIRCRAFT GROUND' SIGNALS IS REQUIRED TO BE TIED TO THE AIRCRAFT CHASSIS, BUT THE REFLECTED DRAWING IS DESIRED.
19. WARNING AND CAUTION (P6711-6)
    OPEN = NO FAILURE
    GROUND = UNIT FAILURE
20. SDI INPUT, A/B (P2-46/P2-47)

| P2-46 | P2-47 | SDI FUNCTION |
|---|---|---|
| OPEN | OPEN | NOT USED |
| OPEN | GROUND | SIDE 1 |
| GROUND | OPEN | SIDE 2 |
| GROUND | GROUND | NOT USED |

    [GROUND TO P2-50, SDI INPUT (STRAP COMMON)]
21. P6712-16 ON THE CD 671C/-0801 VERSION ONLY = DAY/NIGHT.
    OPEN = LCD DISPLAY BACK LIGHTING FOLLOWS AIRCRAFT LIGHTING BUS VOLTAGE.
    GROUND = DISPLAY BACKLIGHTING FULL INTENSITY.

Figure 2026 CD 671C/Dual Collins TDR-49D Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0062, Rev 1)

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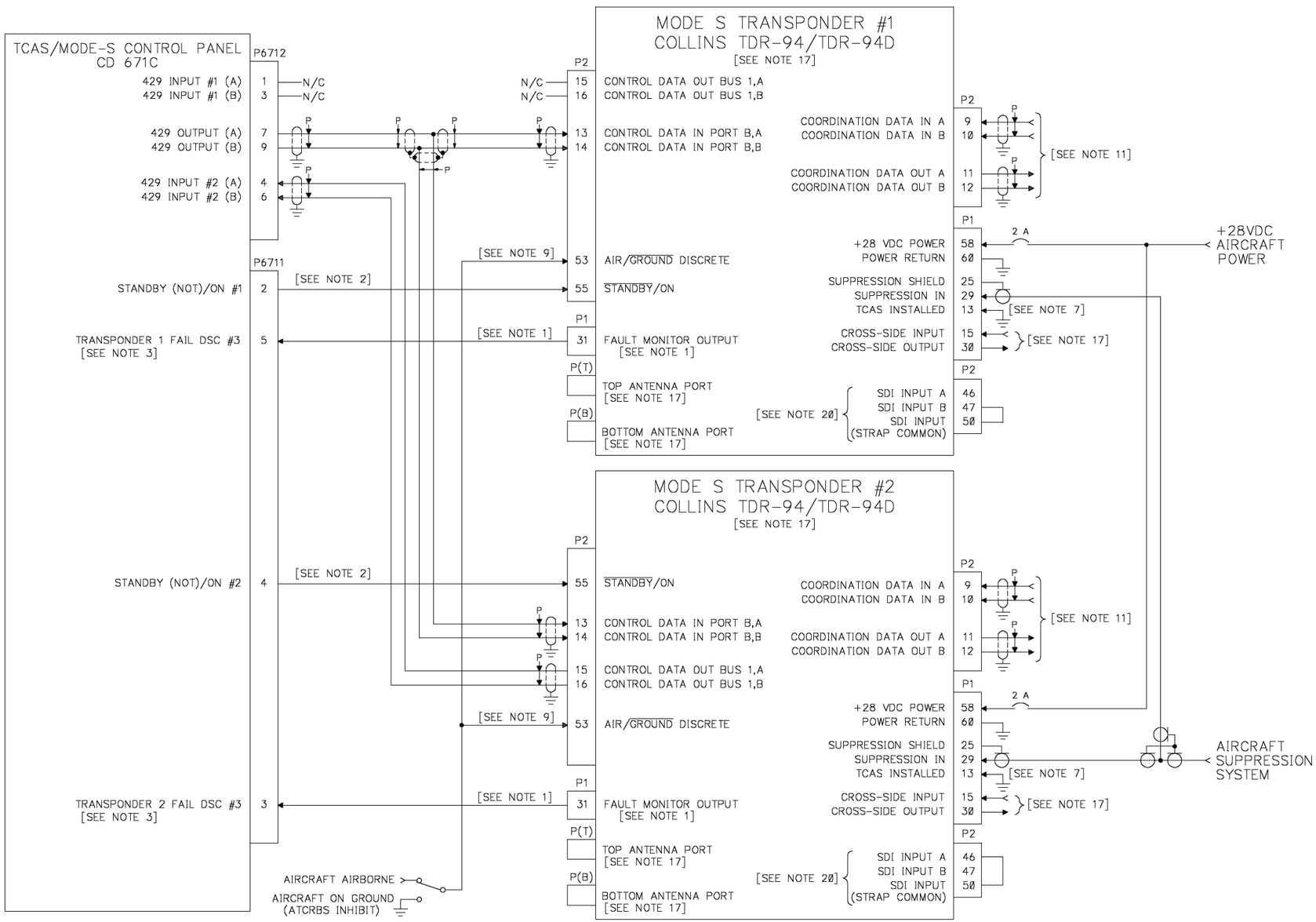


Figure 2026 CD 671C/Dual Collins TDR-49D Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0062, Rev 1)

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NOTES:

1. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS.
   ANTENNA TRANSFER
   GROUND = ATC SELECTED/ACTIVE STATE (125mA DC MAX)
   OPEN = ATC NOT SELECTED
2. ANTENNA RELAYS ARE NOT REQUIRED IF DEDICATED TRANSPONDER ANTENNAS ARE USED.
3. XPNDR WILL IDENT IF NOT IN 'TST' OR 'SBY' MODE
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED
4. CONTROL DISABLE
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED
5. REMOTE FUNCTIONAL TEST SWITCH
   OPEN = NORMAL OPERATION
   GROUND = FUNCTIONAL TEST
6. SQUAWK CODE 7700
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED
7. EXTERNAL STANDBY
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED
8. STANDBY (NOT)/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (10mA DC MAX)
   OPEN = XPNDR ON
9. TRANSPONDER FAIL DISCRETE
   +5VDC = TRANSPONDER FAILURE
   GROUND = NORMAL OPERATION
10. AIR/GROUND DISCRETE IS EQUIVALENT TO "SQUAT/STRUT SWITCH". AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.
11. XPNDR FAIL MONITOR #1 or #2 MUST BE CONNECTED TO THE RESPECTIVE PIN ON THE MST 67A. IF FAIL #1 IS USED, THEN FAIL #2 MUST BE CONNECTED TO DC GND.
12. FOR CONTINUOUS ON OPERATION OF BOTH MST 67As. DISCONNECT THE WIRES BETWEEN PINS P6712-22 & P671A-54 and P6711-10 & P671A-54, AND GROUND P671A-54 ON XPNDR #1 & #2.
13. AIRCRAFT WARNING/CAUTION PANEL
    OPEN = NO FAILURE
    GROUND = UNIT FAILURE
14. #1 - INDICATES PILOT'S UNIT
    #2 - INDICATES COPILOT'S UNIT
15. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.
16. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
17. ONLY ONE OF THE 'AIRCRAFT GROUND' SIGNALS IS REQUIRED TO BE TIED TO AIRCRAFT CHASSIS, BUT THE REFLECTED DRAWING IS DESIRED.
18. P6712-16 ON THE CD 671C/ -0801 VERSION ONLY = $\overline{\text{DAY}}$/NIGHT
    OPEN = LCD DISPLAY BACK LIGHTING FOLLOWS AIRCRAFT LIGHTING BUS VOLTAGE.
    GROUND = DISPLAY BACK LIGHTING AT FULL INTENSITY.

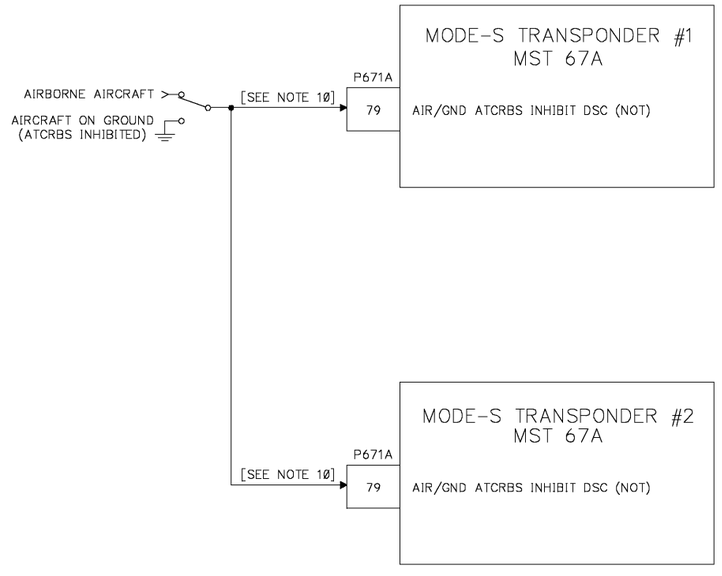


Figure 2027 CD 671C/Dual MST 67A Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0081, Rev 3)

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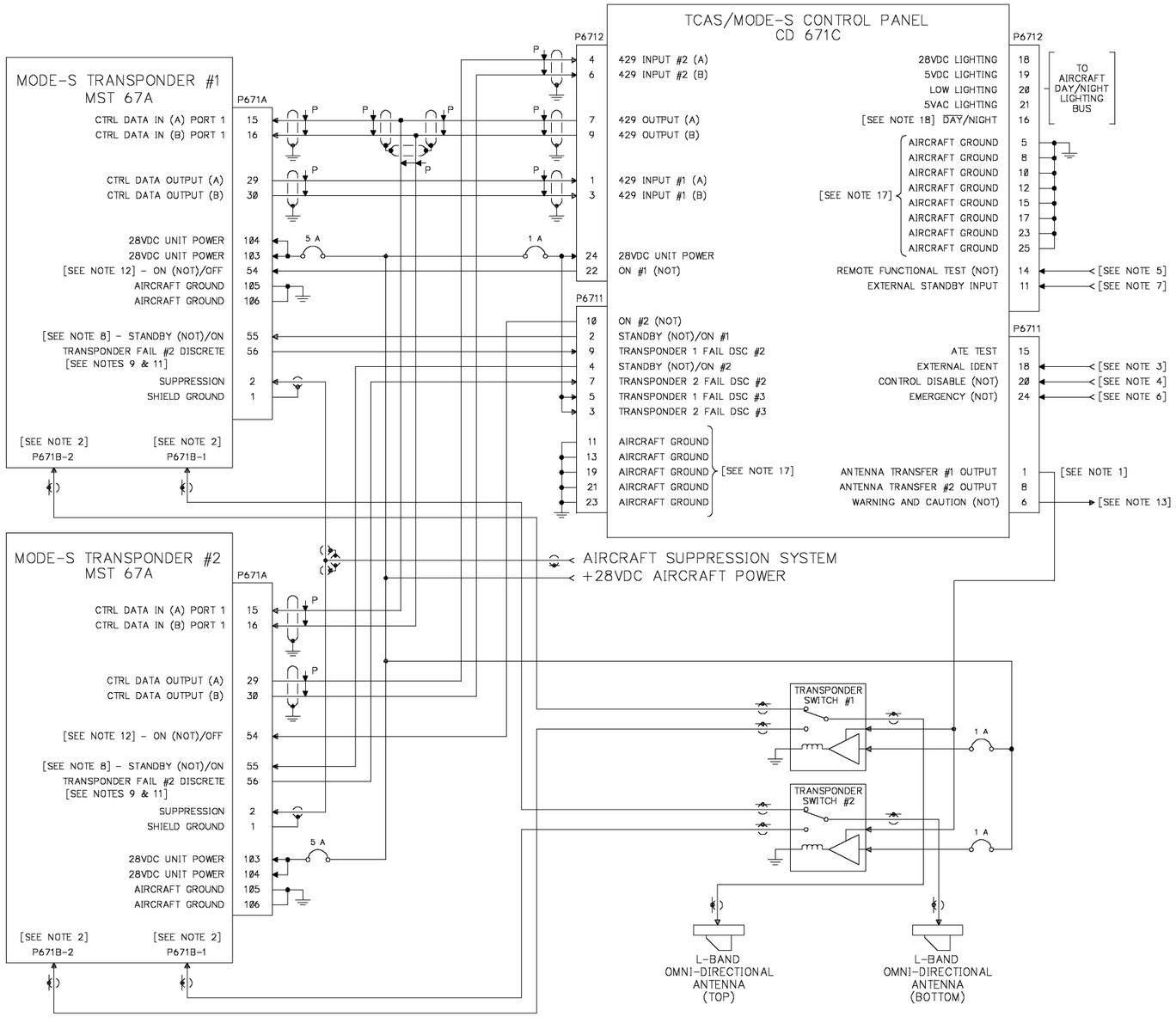


Figure 2027 CD 671C/Dual MST 67A Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0081, Rev 3)

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NOTES:

1) The Enhanced Surveillance Interface is the means to provide the transponder with the required downlink aircraft parameters to meet the Enhanced Surveillance requirements. The interface varies based on the data being stored. Each parameter stored is on an individual priority scheme utilizing the source of the data as well as the label received in some cases. Care should be taken to ensure the most desirable source is being utilized by the transponder.

a) BDS register $20_{HEX}$ contains Flight Identification.

The port priority shall be as follows:

| Priority | 429 Input Port |
|---|---|
| 1 | Control #1 or #2 |
| 2 | FMS In |
| 3 | ADLP |

b) BDS register $40_{HEX}$ contains Aircraft Intention Information. This information includes MCP/FCU Selected Altitude, FMS Selected Altitude, and Barometric Pressure Setting.

Port priority shall be given higher priority than label priority.
The port priority for MCP/FCU Selected Altitude labels shall be as

| Priority | 429 Input Port |
|---|---|
| 1 | Enhanced Surveillance Gen Input 1 |
| 2 | Enhanced Surveillance Gen Input 2 |
| 3 | GPS |

The FMS Selected Altitude shall only be filled in if data is received on FMS input port.
The port priority for label Barometric Altitude Setting shall be as follows:

| Priority | 429 Input Port |
|---|---|
| 1 | Enhanced Surveillance Gen Input 1 |
| 2 | Enhanced Surveillance Gen Input 2 |
| 3 | GPS |

Label priority for Selected Altitude shall be as follows:

| Priority | Label | Description |
|---|---|---|
| 1 | 102 | Selected Altitude |
| 2 | 025 | Selected Altitude |

c) Track and Turn Information output in BDS register $50_{HEX}$. This information includes Roll Angle, True Track Angle, Ground Speed, Track Angle Rate, True Airspeed.

Port Priority shall be given higher priority than label priority.
The port priority for Roll Angle, True Track Angle, Ground Speed and Track Angle Rate shall be as follows:

| Priority | 429 Input Port |
|---|---|
| 1 | Enhanced Surveillance Gen Input 1 |
| 2 | FMS In |
| 3 | Enhanced Surveillance Gen Input 2 |
| 4 | GPS |

The port priority for True Airspeed shall be as follows:

| Priority | 429 Input Port |
|---|---|
| 1 | Selected ADS |
| 2 | Enhanced Surveillance Gen Input 1 |
| 3 | FMS IN |
| 4 | Enhanced Surveillance Gen Input 2 |
| 5 | GPS |

Label Priority for Track Angle shall be as follows:

| Priority | Label | Description |
|---|---|---|
| 1 | 313 | True Track Angle (BNR) |
| 2 | 013 | True Track Angle (BCD) |
| 3 | 103 | GNSS Track Angle |

Label Priority for Ground Speed shall be as follows:

| Priority | Label | Description |
|---|---|---|
| 1 | 312 | Ground Speed (BNR) |
| 2 | 012 | Ground Speed (BCD) |
| 3 | 112 | GNSS Ground Speed |

Label Priority for True Air Speed shall be as follows:

| Priority | Label | Description |
|---|---|---|
| 1 | 210 | True Air Speed (BNR) |
| 2 | 230 | True Air Speed (BCD) |

d) Heading and Speed Information output in BDS register $60_{HEX}$. This information includes Magnetic Heading, Indicated Airspeed, Mach, Barometric Altitude Rate, Inertial Vertical Velocity.

Port Priority shall be given higher priority than label priority.

The port priority for Magnetic Heading and Inertial Vertical Velocity shall be as follows:

| Priority | 429 Input Port |
|---|---|
| 1 | Enhanced Surveillance Gen Input 1 |
| 2 | FMS In |
| 3 | Enhanced Surveillance Gen Input 2 |
| 4 | GPS |

The port priority for Indicated Air Speed, Mach, and Barometric Altitude Rate shall be as follows:

| Priority | 429 Input Port |
|---|---|
| 1 | Selected ADS |
| 2 | Enhanced Surveillance Gen Input 1 |
| 3 | FMS IN |
| 4 | Enhanced Surveillance Gen Input 2 |
| 5 | GPS |

Label priority for Magnetic Heading shall be as follows:

| Priority | Label | Description |
|---|---|---|
| 1 | 320 | Magnetic Heading (BNR) |
| 2 | 014 | Magnetic Heading (BCD) |

NOTES CONTINUED ON SHT. 2

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Figure 2028 MST 67A Mode S Transponder Enhanced Surveillance Interface (Sheet 1 of 3)
(Dwg. No. 155-01626-0100, Rev A)

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2) This input is used to determine the type of data that is received on dual-purpose 429 input channels. When the input is grounded, pins 69/70, 83/84, and 40/41 will be configured as Enhanced General Input Ports 1, 2, and GPS, respectively. When the input is open, the inputs will be configured as Datalink Comm A/B, Datalink Comm C and Spare, respectively

| PIN | PIN 92 | DESCRIPTION | ARINC 429 BUS | LABELS RECEIVED |
|---|---|---|---|---|
| 40 | Open | GPS (B) | 12.5 or 100 kHz | All Enhanced Surveillance (see note 3) |
| | Gnd | Spare | | |
| 41 | Open | GPS (A) | 12.5 or 100 kHz | All Enhanced Surveillance (see note 3) |
| | Gnd | Spare | | |
| 69 | Open | Enhanced Surveillance General Input Port 1 (A) | 12.5 or 100 kHz | All Enhanced Surveillance (see note 3) |
| | Gnd | Data Link Comm A/B Input (A) | 100 kHz | |
| 70 | Open | Enhanced Surveillance General Input Port 1 (B) | 12.5 or 100 kHz | All Enhanced Surveillance (see note 3) |
| | Gnd | Data Link Comm A/B Input (B) | 100 kHz | |
| 83 | Open | Enhanced Surveillance General Input Port 2 (A) | 12.5 or 100 kHz | All Enhanced Surveillance (see note 3) |
| | Gnd | Data Link Comm C Input (A) | 100 kHz | |
| 84 | Open | Enhanced Surveillance General Input Port 2 (B) | 12.5 or 100 kHz | All Enhanced Surveillance (see note 3) |
| | Gnd | Data Link Comm C Input (B) | 100 kHz | |

3) Enhanced Surveillance General inputs and GPS inputs can vary greatly based on the installations. Examples of such sources are Flight Management Computers, Inertial Reference Systems, Flight Control Computer, Mode Control Computer, etc. Enhanced Surveillance General input labels are listed below.

| LABEL | ENHANCED SURVEILLANCE | REGISTER |
|---|---|---|
| 210 | True Airspeed (BNR) | BDS 5,0 |
| 312 | Ground Speed (BNR) | BDS 5,0 |
| 313 | True Track Angle (BNR) | BDS 5,0 |
| 320 | Own Magnetic Heading (BNR) | BDS 6,0 |
| 102 | Selected Altitude (BNR) | BDS 4,0 |
| 025 | Selected Altitude (BCD) | BDS 4,0 |
| 234 | Barometric Pressure Setting (BCD) | BDS 4,0 |
| 325 | Roll Angle (BNR) | BDS 5,0 |
| 013 | True Track Angle (BCD) | BDS 5,0 |
| 103 | GNSS Track Angle (BNR) | BDS 5,0 |
| 112 | GNSS Ground Speed (BNR) | BDS 5,0 |
| 012 | Ground Speed (BCD) | BDS 5,0 |
| 335 | Track Angle Rate (Not supported by MST 67A) | BDS 5,0 |
| 230 | True Airspeed (BCD) | BDS 5,0 |
| 014 | Own Magnetic Heading (BCD) | BDS 6,0 |
| 206 | Indicated Airspeed (BNR) | BDS 6,0 |
| 205 | Mach (BNR) | BDS 6,0 |
| 212 | Barometric Altitude Rate (BNR) | BDS 6,0 |
| 365 | Inertial Vertical Velocity (BNR) | BDS 6,0 |

4) Pin 99/100 Flight Management System (Flight ID) inputs:

| PIN | DESCRIPTION | ARINC 429 BUS | LABELS RECEIVED |
|---|---|---|---|
| 99 | Flight Management System (Flight ID) | 12.5 or 100 kHz | Flight ID labels 233, 234, 235, 236. All Enhanced Surveillance except label 234 Barometric Pressure Setting (see note 3). |
| 100 | Flight Management System (Flight ID) | 12.5 or 100 kHz | Flight ID labels 233, 234, 235, 236. All Enhanced Surveillance except label 234 Barometric Pressure Setting (see note 3). |

Dwg 155-01626-0100 Rev A Sht 2

Figure 2028 MST 67A Mode S Transponder Enhanced Surveillance Interface (Sheet 2)
(Dwg. No. 155-01626-0100, Rev A)

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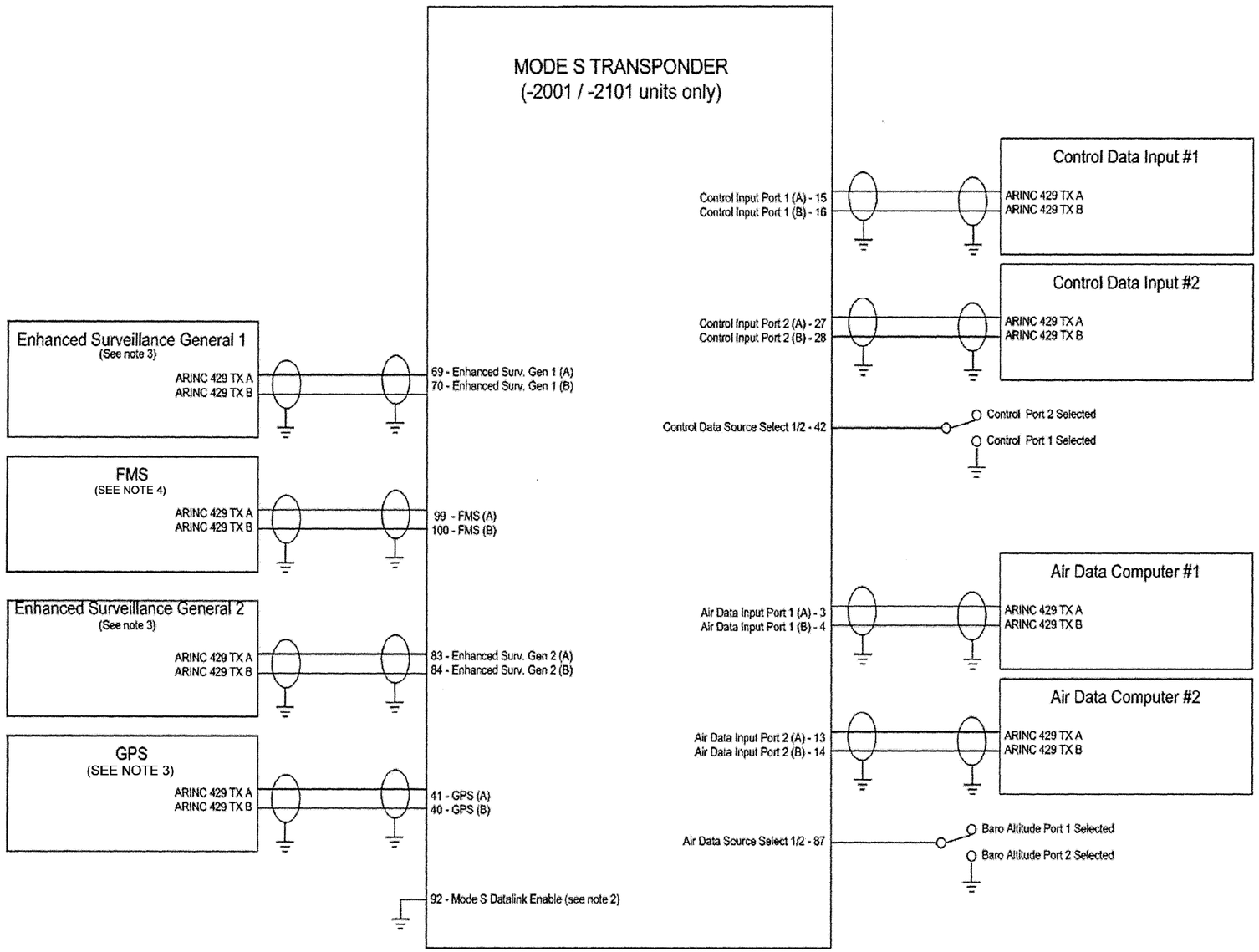


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* SEE ATTACHED NOTE 1 FOR DESCRIPTION ON HOW ENHANCED SURVEILANCE INFORMATION IS UTILIZED BY THE MST 67A TRANSPONDER.

Figure 2028 MST 67A Mode S Transponder Enhanced Surveillance Interface (Sheet 3)
(Dwg. No. 155-01626-0100, Rev A)

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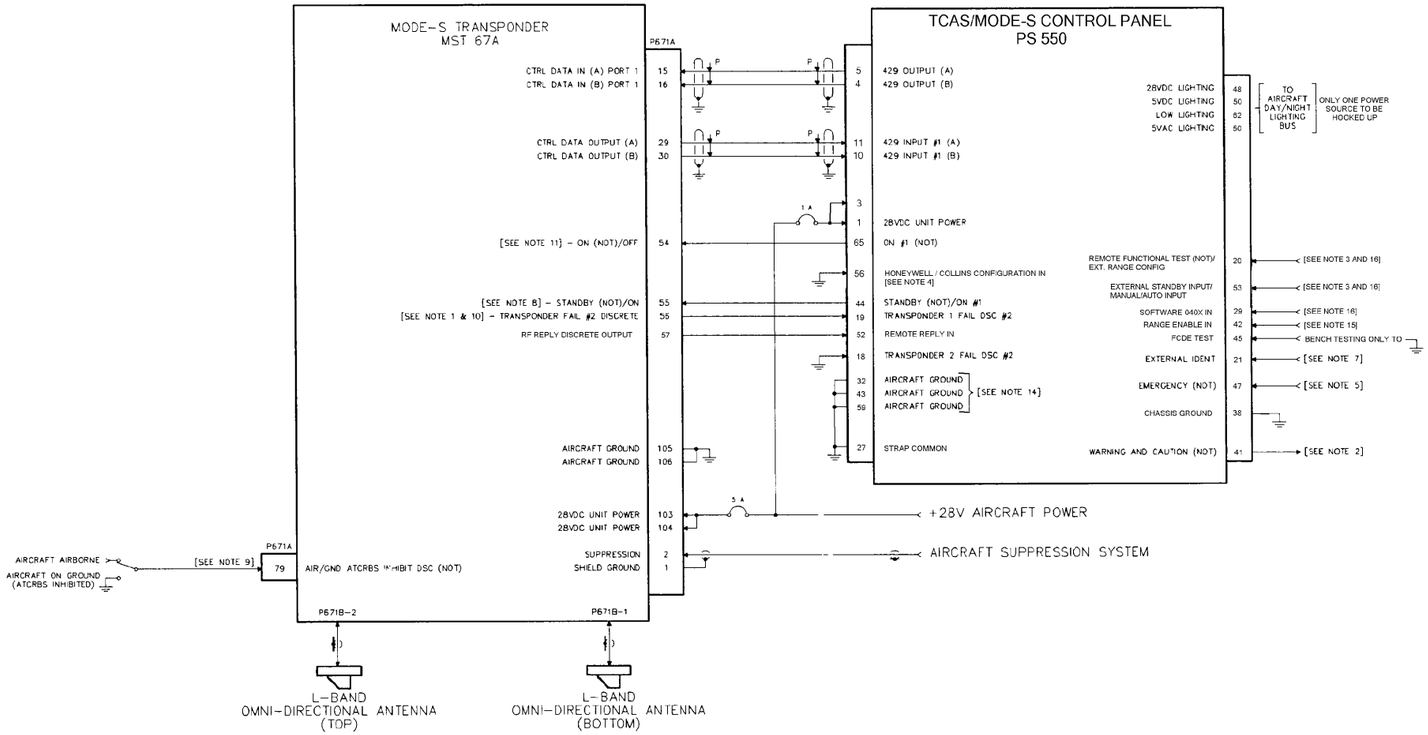


NOTES:

1. TRANSPONDER FAIL DISCRETE
   +5VDC = TRANSPONDER FAILURE
   GROUND = NORMAL OPERATION

2. AIRCRAFT WARNING/CAUTION PANEL
   OPEN = NO FAILURE
   GROUND = UNIT FAILURE

3. REMOTE FUNCTIONAL TEST SWITCH OR EXT RANGE CONFIG IN (SEE NOTE 16.)
   GROUND = FUNCTIONAL TEST ACTIVE OR EXTENDED RANGE
   OPEN = NORMAL OPERATION OR NORMAL RANGE

4. HONEYWELL / COLLINS CONFIGURATION IN
   GROUND = HONEYWELL CONFIGURATION (MST 67A)
   OPEN = COLLINS CONFIGURATION (TDR 94D)

5. SQUAWK CODE 7700
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

6. EXTERNAL STANDBY OR MANUAL/AUTO IN (SEE NOTE 16)
   GROUND = STANDBY ACTIVATED OR MANUAL TRAFFIC MODE
   OPEN = STANDBY NOT ACTIVATED OR AUTO TRAFFIC MODE

   THE FOLLOWING TABLE OUTLINES THE DEFINITION OF BIT 13, 14 IN LABEL 016 FOR EACH STATE.

| CP MODE: | MANUAL LABEL 016 BIT 13 | BIT14 | AUTO LABEL 016 BIT 13 | BIT14 |
|---|---|---|---|---|
| TEST | 0 | 1 | 0 | 0 |
| STBY | 0 | 1 | 0 | 1 |
| ALT OFF | 0 | 1 | 0 | 1 |
| XPDR | 0 | 1 | 0 | 1 |
| TA | 0 | 1 | 0 | 0 |
| TA/RA | 0 | 1 | 0 | 0 |

7. XPNDR WILL IDENT IF NOT IN 'TST' OR 'SBY' MODE
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

8. STANDBY (NOT)/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (10mA DC MAX)
   OPEN = XPNDR ON

9. AIR/GROUND DISCRETE IS EQUIVALENT TO "SQUAT/STRUT SWITCH". AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.

10. XPNDR FAIL MONITOR #1 or #2 MUST BE CONNECTED TO THE RESPECTIVE PIN ON THE MST 67A. IF FAIL #1 IS USED, THEN FAIL #2 MUST BE CONNECTED TO DC GND.

11. FOR CONTINUOUS ON OPERATION OF THE MST 67A. DISCONNECT THE WIRE BETWEEN PINS P6712-22 & P671A-54, AND GROUND P671A-54 ON THE XPNDR.

12. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

13. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

14. ONLY ONE OF THE 'AIRCRAFT GROUND' SIGNALS IS REQUIRED TO BE TIED TO AIRCRAFT CHASSIS, BUT THE REFLECTED DRAWING IS DESIRED.

15. RANGE ENABLE IN
    OPEN = ENABLES RANGE ON CONTROL HEAD
    GROUND = DISABLES RANGE ON CONTROL HEAD (RANGE CONTROLLED ELSEWHERE)

16. SOFTWARE 040X CONFIG IN
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    THIS DISCRETE IS PROCESSED ON POWER UP ONLY. THE STATE OF THIS INPUT DEFINES THE FUNCTIONALITY OF TWO OTHER DISCRETE INPUTS. WHEN ACTIVATED, PIN 20 IS DEFINED AS EXT. RANGE AND PIN 53 AS MANUAL/AUTO. WHEN INACTIVE, PIN 20 IS DEFINED AS REMOTE FUNCTIONAL TEST AND PIN 53 IS DEFINED AS STANDBY.

Dwg 155-01626-0110 Rev A

Figure 2029 PS-550/MST 67A Mode S Transponder Interface
(Dwg. No. 155-01626-0110, Rev A)

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NOTES:

1. CONTROL PANEL DISCRETE OUTPUT MUST NOT BE CONNECTED TO 'AC' LOADS

   ANTENNA TRANSFER
   GROUND = ATC SELECTED/ACTIVE STATE (125mA DC MAX)
   OPEN = ATC NOT SELECTED

2. ANTENNA RELAYS ARE NOT REQUIRED IF DEDICATED TRANSPONDER ANTENNAS ARE USED.

3. XPNDR WILL IDENT IF NOT IN 'TST' OR 'SBY' MODE
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

4. HONEYWELL / COLLINS CONFIGURATION IN
   GROUND = HONEYWELL CONFIGURATION (MST67A)
   OPEN = COLLINS CONFIGURATION (TDR 94D)

5. REMOTE FUNCTIONAL TEST SWITCH OR EXT RANGE CONFIG IN (SEE NOTE 20)
   GROUND = FUNCTIONAL TEST ACTIVE OR EXTENDED RANGE
   OPEN = NORMAL OPERATION OR NORMAL RANGE

6. SQUAWK CODE 7700
   GROUND = ACTIVATED
   OPEN = NOT ACTIVATED

7. EXTERNAL STANDBY OR MANUAL/AUTO IN (SEE NOTE 20)
   GROUND = STANDBY ACTIVATED OR MANUAL TRAFFIC MODE
   OPEN = STANDBY NOT ACTIVATED OR AUTO TRAFFIC MODE

   THE FOLLOWING TABLE OUTLINES THE DEFINITION OF BIT 13, 14 IN LABEL 016 FOR EACH STATE.

| CP MODE | MANUAL LABEL 016 BIT 13 | MANUAL LABEL 016 BIT 14 | AUTO LABEL 016 BIT 13 | AUTO LABEL 016 BIT 14 |
|---|---|---|---|---|
| TEST | 0 | 1 | 0 | 0 |
| STBY | 0 | 1 | 0 | 1 |
| ALT OFF | 0 | 1 | 0 | 1 |
| XPDR | 0 | 1 | 0 | 1 |
| TA | 0 | 1 | 0 | 0 |
| TA/RA | 0 | 1 | 0 | 0 |

8. STANDBY (NOT)/ON
   GROUND = XPNDR IN STANDBY/ACTIVE STATE (10mA DC MAX)
   OPEN = XPNDR ON

9. TRANSPONDER FAIL DISCRETE
   +5VDC = TRANSPONDER FAILURE
   GROUND = NORMAL OPERATION

10. AIR/GROUND DISCRETE IS EQUIVALENT TO "SQUAT/STRUT SWITCH". AN OVERRIDE NEEDS TO BE INCORPORATED TO ALLOW FOR GROUND TEST.

11. XPNDR FAIL MONITOR #1 or #2 MUST BE CONNECTED TO THE RESPECTIVE PIN ON THE MST 67A. IF FAIL #1 IS USED, THEN FAIL #2 MUST BE CONNECTED TO DC GND.

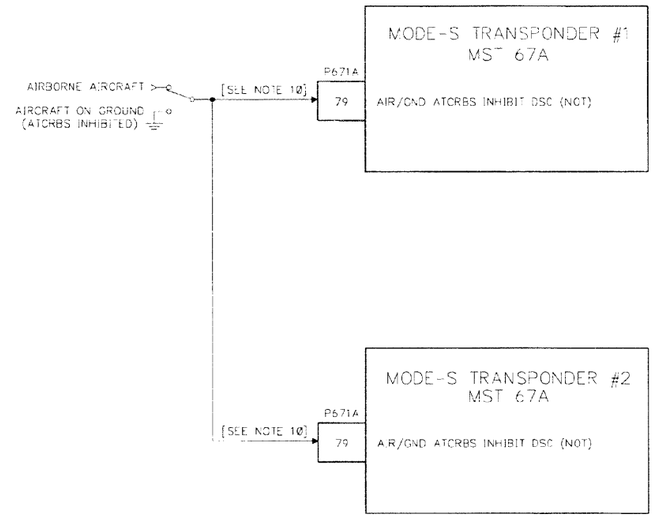
12. FOR CONTINUOUS ON OPERATION OF BOTH MST 67As: DISCONNECT THE WIRES BETWEEN PINS P671A-22 & P671A-54 and P671A-10 & P671A-54, AND GROUND P671A-54 ON XPNDR #1 & #2.

13. AIRCRAFT WARNING/CAUTION PANEL
    OPEN = NO FAILURE
    GROUND = UNIT FAILURE

14. #1 = INDICATES PILOT'S UNIT
    #2 = INDICATES COPILOT'S UNIT

15. ALL WIRES ARE 22 AWG UNLESS OTHERWISE NOTED.

16. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.




17. ONLY ONE OF THE 'AIRCRAFT GROUND' SIGNALS IS REQUIRED TO BE TIED TO AIRCRAFT CHASSIS, BUT THE REFLECTED DRAWING IS DESIRED.

18. RANGE ENABLE IN
    OPEN = ENABLES RANGE ON CONTROL HEAD
    GROUND = DISABLES RANGE ON CONTROL HEAD (RANGE CONTROLLED ELSEWHERE)

19. REPLY OUTPUTS FROM TRANSPONDER MUST BE WIRED OR'ED TOGETHER TO SINGLE REPLY INPUT DISCRETE.

20. SOFTWARE 040X CONFIG IN
    GROUND = ACTIVATED
    OPEN = NOT ACTIVATED
    THIS DISCRETE IS PROCESSED ON POWER UP ONLY. THE STATE OF THIS INPUT DEFINES THE FUNCTIONALITY OT TWO OTHER DISCRETE INPUTS. WHEN ACTIVATED, PIN 20 IS DEFINED AS EXT. RANGE AND PIN 53 AS MANUAL/AUTO. WHEN INACTIVE, PIN 20 IS DEFINED AS REMOTE FUNCTIONAL TEST AND PIN 53 IS DEFINED AS STANDBY.

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Figure 2030 PS-550/Dual MST 67A Mode S Transponder Interface (Sheet 1 of 2)
(Dwg. No. 155-01626-0111, Rev A)

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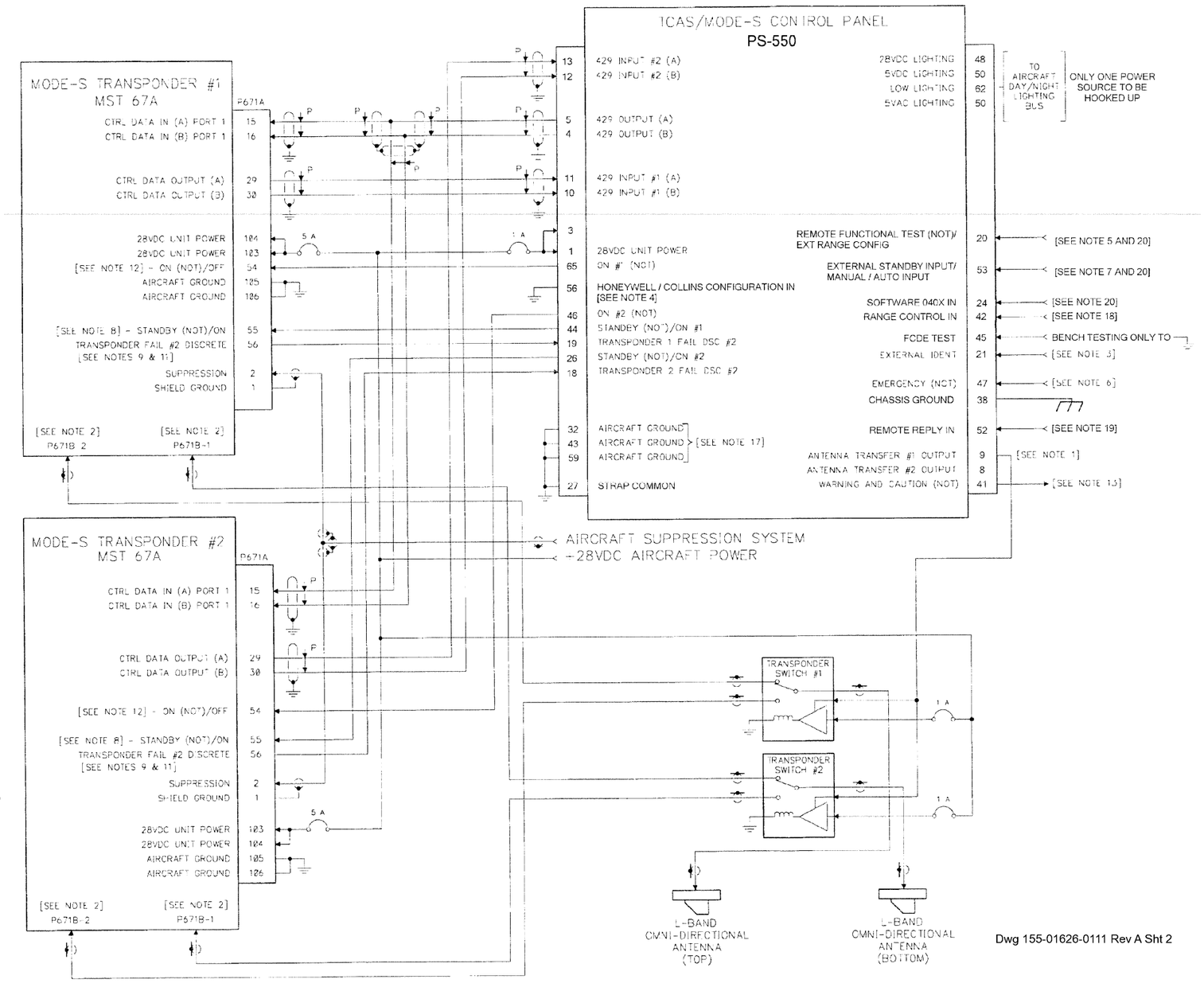


Figure 2030 PS-550/Dual MST 67A Mode S Transponder Interface (Sheet 2)
(Dwg. No. 155-01626-0111, Rev A)

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