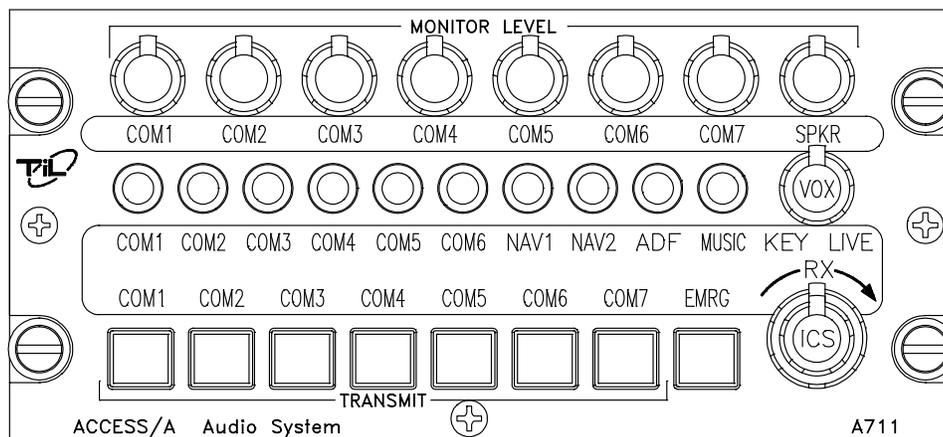
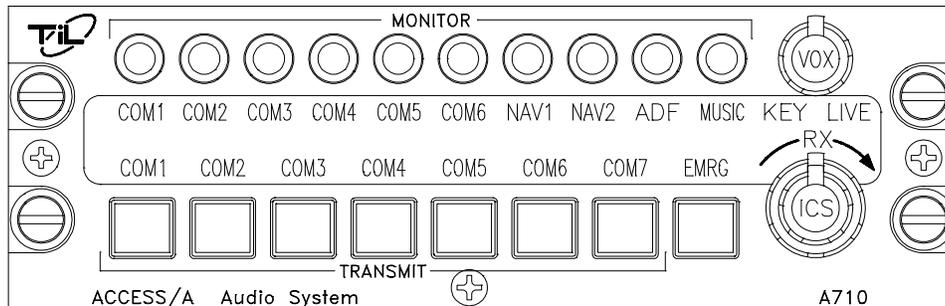




A710 & A711

ACCESS/A AUDIO CONTROL SYSTEM



Installation & Operating Instructions

TiL Document No. 96RE189

Rev. N/C

Issue 6

DECEMBER 1997

Technisonic Industries Limited

240 Traders Boulevard, Mississauga, Ontario L4Z 1W7

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REVISION HISTORY [96RE189]				
REV	PAGE	DESCRIPTION	DATE	EDITED BY
N/C – 1	2	Modified specifications according to TSO tests.	Dec. 1997	WS
	2	Update to comply with results of TSO tests.		
N/C – 2	5 & 6	Modified specifications according to results of tests for increased Temperature Range and Altitude.	May. 04, 1998	WS
N/C – 3	25	Added clarification for installation kit parts.	Jul. 08, 2009	WS
N/C – 4	All	Changed Format for Section Headers.	Oct. 20, 2015	AL
	All	Changed Issue Format *		
	All	Page Numbers are now sequential.		
	All	Corrected Spelling & Grammar throughout document.		
	i	Date on Front Page changed back to original release. Only Revisions require a date change.		
	v	Added Sections 1.6.1-1.6.7 to Table of Contents.		
N/C – 5	35	Corrections to Post-Installation Adjustments.	Jun. 03, 2016	AL
	49	Added Warranty Page.		
N/C – 6	v	Corrections to Table of Contents	Jul. 12, 2016	JW / AL
	All	Added Tone Alerting Section		

** Rev. N/C Issues 1, 2, and 3 were formerly 2.0, 2.1, and 2.2. To match Technisonic's current Revision / Issue update format, the names have been changed accordingly.*

NOTES

CAUTION STATIC SENSITIVE !



This unit contains static sensitive devices. Wear a grounded wrist strap and work at a static-safe workstation when handling internal printed circuit boards.

WARNING

Changes or modifications not expressly approved by Technisonic Industries could void the user's authority to operate the equipment.

WARRANTY INFORMATION

The Model A710 & A711 Audio Controllers are under warranty for one year from date of purchase. Failed units caused by defective parts or workmanship should be returned to:

Technisonic Industries Limited
240 Traders Boulevard
Mississauga, Ontario L4Z 1W7

Tel: (905) 890-2113
Fax: (905) 890-5338

TRADEMARK INFORMATION

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SECTION 1: GENERAL DESCRIPTION

1.1 INTRODUCTION

This publication provides operating and installation information on the Model A710 and A711, ACCESS/A Audio Control series manufactured by Technisonic Industries Limited. This unit is designed to provide high performance cockpit audio control in high noise installations. The unit is plug and pin compatible with the ACCESS/A family format, to allow fleet wide compatibility with all ACCESS/A installations. The A710 unit may be directly interchanged with an A711 in the same harness, but the units are *physically different in size*, and the A711 has individual volume controls for the transceiver inputs. Use of either of these boxes in an existing full stereo headset installation, such as with an A720 or A721, would require the use of a headset output plug adapter cable, although all other connections would be directly interchangeable.

1.2 DESCRIPTION

This high power audio controller delivers at least 332 mW of audio into 150 ohms at less than 2% total distortion to the pilot and co-pilot positions simultaneously. It can deliver lower output powers into 300 and 600 ohm headsets. The pilot's position may also be internally strapped to interface with 8-20 ohm headsets at the same power level. Push-button transmit selector switches allow immediate selection of any of the seven supported aircraft communications transceivers or PA amplifiers, while additional push-button audio input selector switches allow selection of any or all of the supported transceivers and Nav aids. ACCESS/A systems have auto-RX switching, when a transmitter is selected, to reduce pilot workload and avoid operational problems.

Both the A711 and A710 have front panel selectable and adjustable VOX, LIVE, or KEYED intercom (ICS) functions. An EMERGENCY mode push-button switch (switch and LED turn red-orange when activated) provides "straight through" or "fail-passive" transmit and receive audio for the pilot on the selected communications channel. This switch also provides an implicit pilot ISOLATION function, and allows the pilot to isolate himself from the co-pilot (and the ICS system), so that he may access different communications from the other users supported by this panel (in essence, an emergency link to the selected transceiver only). In the NORMAL position (switch turns black & LED green), the pilot's audio is provided as selected by all of the panel controls, and is part of the ICS system. Separate RX and ICS volume controls are provided on the panel along with an ICS VOX threshold control. These units can also provide ICS support and boom mic TX support for a complete aircraft crew, including the pilot, co-pilot, and up to 4-6 additional passengers.

1.3 PURPOSE OF THE EQUIPMENT

The A710 and A711 ACCESS/A Audio Controls are designed to provide centralized audio management and control within an airborne communications environment. This includes radio and transceiver selection, intercom, airframe threat alerting, and crew management. These units have been packaged to minimize size and weight characteristics and are ideally suited for helicopter installations or any other Dzus rail panel location. Both the A710 and A711 meet all of the current requirements of US Forest Service "contractor furnished avionics" and can be used in a dual control installation in conjunction with a TiL FM airborne transceiver to comply with all US Forest Service Contract Requirements. These products are also compliant with TSO-C50c. The units were tested according to RTCA/DO-214 and RTCA/DO-160C applicable categories with the exception of the RF Susceptibility Test, which is based upon the requirements of RTCA/DO-160A, and the Lightning Induced Transient Susceptibility Test which is not called out under RTCA/DO-170.

1.4 MODEL VARIATION

The A710 and A711 come in two basic lighting configurations: a +28 V_{DC} panel lighting version and a +5 V_{DC} panel lighting version. Operationally, the two are identical. The color of the solid-state backlighting is green-yellow, at approximately the 565 nm wavelength. Front panel color may be either Cessna Cadet gray or matte black. The default configuration is gray, with 28 V_{DC} backlighting. Units may also be supplied with or without internal voice alerting modules or alternatively the tone alerting module. See the ACCESS/A price list for model numbers and availability or different versions. The most common variations are summarized below:

A710 = 961068 - (dash number)

A711 = 961072 - (dash number)

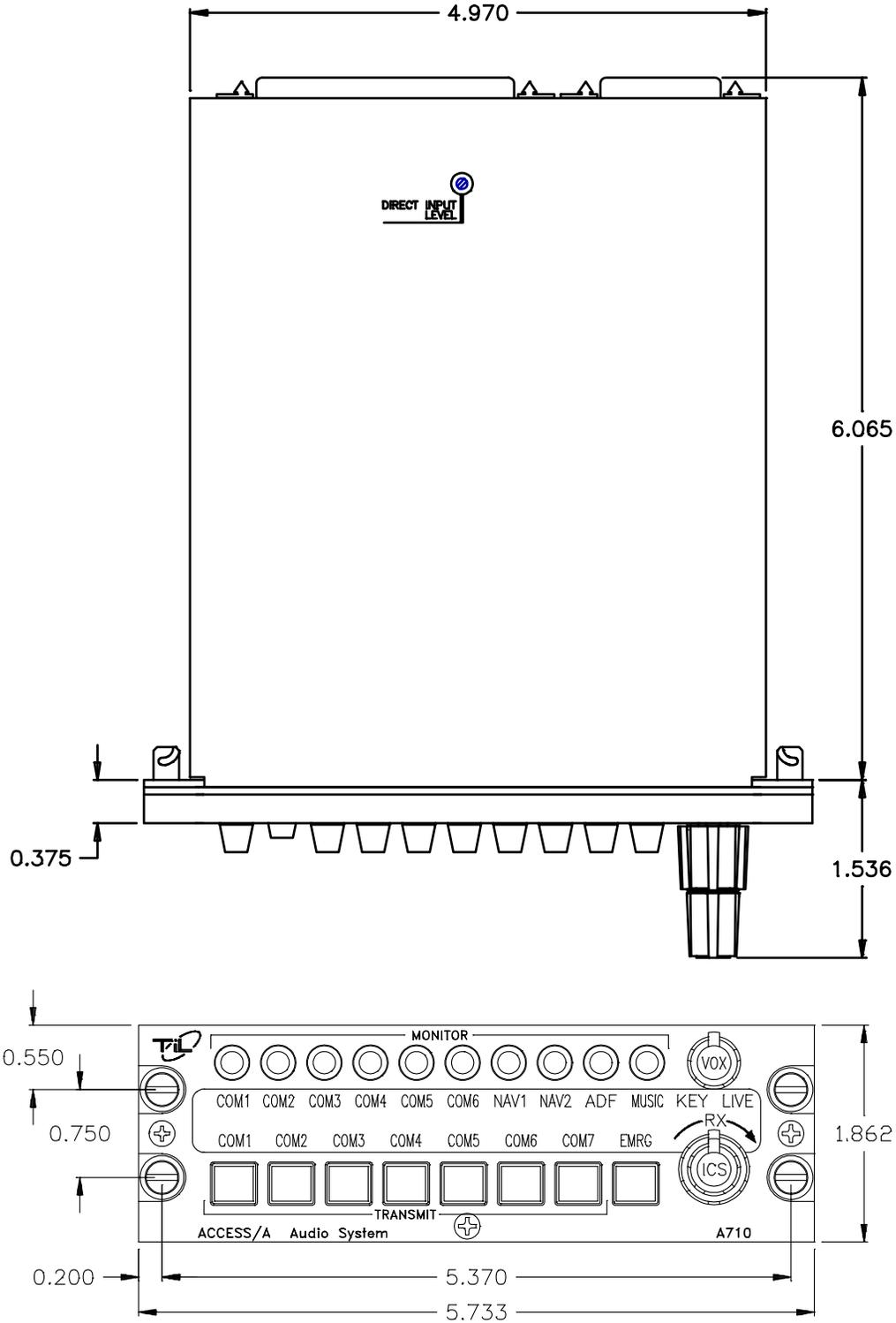
Dash Numbers:

-1	Gray Panel	28 V _{DC} Lighting
-2	Black Panel	28 V _{DC} Lighting
-3	Gray Panel	28 V _{DC} Lighting, includes A851 Voice Alerting (Obsolete)
-4	Black Panel	28 V _{DC} Lighting, includes A851 Voice Alerting (Obsolete)
-13	Gray Panel	28 V _{DC} Lighting, includes Tone Alerting
-14	Black Panel	28 V _{DC} Lighting, includes Tone Alerting

Special Order:

-5	Gray Panel	5 V _{DC} Lighting
-6	Black Panel	5 V _{DC} Lighting
-7	Gray Panel	5 V _{DC} Lighting, includes A851 Voice Alerting (Obsolete)
-8	Black Panel	5 V _{DC} Lighting, includes A851 Voice Alerting (Obsolete)
-17	Gray Panel	5 V _{DC} Lighting, includes Tone Alerting
-18	Black Panel	5 V _{DC} Lighting, includes Tone Alerting

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NOTE: Shows new case design (relocated Dzus fasteners) effective mid-1997. Previous release case is identical except for this change (edge Dzus fasteners).

FIGURE 1: A710 ACCESS/A Audio Controller – General View

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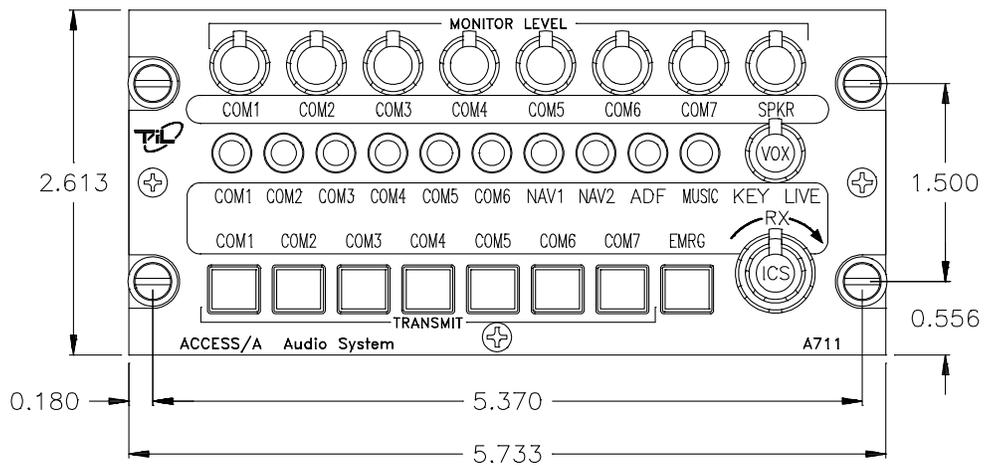
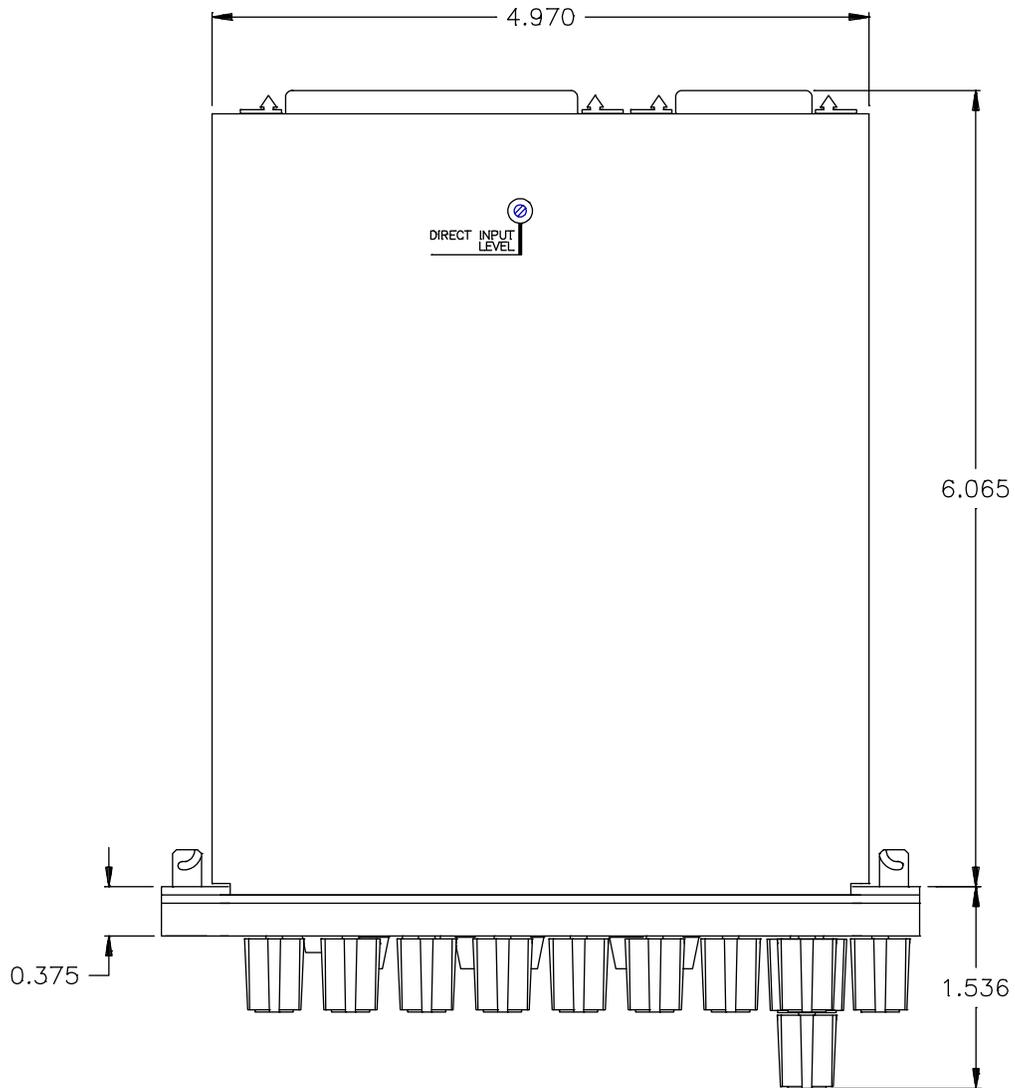


FIGURE 2: A711 ACCESS/A Audio Controller – General View

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1.5 TECHNICAL SUMMARY

A summary of the relevant electrical, operational, mechanical and physical characteristics of the control panels are given in **Table 1 and 2**, General Specifications.

MODEL A710 - ACCESS/A Audio Controller:	
PHYSICAL CHARACTERISTICS:	
Width (max.)	5.75 inches
Height (max.)	1.875 inches
Depth	6.07 inches
Weight (including alerting)	2.4 lbs. (1.09 Kg)
Mounting	Standard Dzus, 4 fasteners
POWER SOURCE REQUIREMENTS:	
DC Voltage (MIN, TYPICAL, MAX)	20.0 V, 28 V, 32.2 V (System performance will be degraded at upper and lower limits)
DC Current	1 A (6 users @ 150 Ω, + speaker @ 8 Ω)
Backlighting Input:	
Standard	28 V _{DC} @ 50 mA
Optional	5 V _{DC} @ 270 mA
TECHNICAL CHARACTERISTICS:	
Input Impedance (Normal Mode, any RX input)	1.55 k Ω (typical)
Input Impedance (Emergency Mode, Com1-7 RX Inputs)	50 Ω + Headset Z (typical)
Headset Channel Output Impedance	8 or 80 Ω (depending on settings)
H/S Audio Power Output	At least 332 mW (primary user) into 150 Ω with 6 headsets (150 Ω each) connected.
H/S Audio Power Output	At least 500 mW (pilot) into 8-20 Ω
H/S Audio Power Output	At least 1500 mW (total) into 6 users @ 150 Ω
Speaker Power Output	At least 2.5 W into 8 Ω
Audio Distortion (Speaker or H/S)	Less than 2% THD @ 1 kHz at total rated output
Audio Frequency Response (ICS)	Within 3 dB from 300 Hz to 6000 Hz
Audio Frequency Response (Rx & NAV)	Within 3 dB from 300 Hz to 3000 Hz
Hum and Noise Level	Better than -60 dB below 500 mW
Input Muting (when mike is keyed)	Adjustable
Input to Input Isolation	Better than -70 dB between inputs
Deselected Input Isolation	better than -65 dB
ENVIRONMENTAL:	
Temperature (operating)	-45°C to +70° Celsius
Temperature (survival non-operating)	-55°C to +85° Celsius
Humidity	95% Non-condensing
Shock	12 g (any axis)
Altitude	25,000 feet

TABLE 1: A710 General Specifications

MODEL A711 - ACCESS/A Audio Controller:

PHYSICAL CHARACTERISTICS:

Width (max.) 5.75 inches
 Height (max.) 2.625 inches
 Depth 6.07 inches
 Weight (including alerting) 3.0 lbs. (1.36 Kg)
 Mounting Standard Dzus, 4 fasteners

POWER SOURCE REQUIREMENTS:

DC Voltage (MIN, TYPICAL, MAX)..... 20.0V, 28 V, 32.2V
(System performance will be degraded at upper and lower limits)
 DC Current 1 A (6 users @150 Ω, + speaker @8 Ω)
 Backlighting Input:
 Standard..... 28 V_{DC} @ 70 mA
 Optional..... 5 V_{DC} @ 370 mA

TECHNICAL CHARACTERISTICS:

Input Impedance (Normal Mode, any RX input) 2K-1.5K Ω (approx.)
 Input Impedance (Emergency Mode, Com1-7 RX Inputs) 50 Ω + Headset Z (typical)
 Headset Channel Output Impedance 8 or 80 Ω (depending on settings)
 H/S Audio Power Output At least 332 mW (primary user) into 150 Ω
with 6 headsets (150 Ω each) connected.
 H/S Audio Power Output At least 500 mW (pilot) into 8-20 Ω
 H/S Audio Power Output At least 1500 mW (total) into 6 users @ 150 Ω
 Speaker Power Output At least 2.5 W into 8 Ω
 Audio Distortion (Speaker or H/S) Less than 2% THD @ 1 kHz at total rated output
 Audio Frequency Response (ICS) Within 3 dB from 300 Hz to 6000 Hz
 Audio Frequency Response (Rx & NAV) Within 3 dB from 300 Hz to 3000 Hz
 Hum and Noise Level Better than -60 dB below 500 mW
 Input Muting (when mike is keyed) Adjustable
 Input to Input Isolation Better than -70 dB between inputs
 Deselected Input Isolation Better than -65 dB

ENVIRONMENTAL:

Temperature (operating) -45°C to +70° Celsius
 Temperature (survival non-operating) -55°C to +85° Celsius
 Humidity 95% Non-condensing
 Shock 12 g (any axis)
 Altitude 25,000 feet

TABLE 2: A711 General Specifications

1.6 SYSTEM LIMITATIONS

A summary of the relevant system limitations is given below.

1.6.1 POWER LIMITATIONS

With Standard Set-up, which consists of six headsets connected, a power output of not less than 332 mW is delivered per headset (as represented by 150 ohms) provided that the Direct Alert Input is terminated in not less than 600 ohms and that nominal input voltages are applied at the applicable channel inputs. Nominal microphone input: 100 mV_{rms}; Nominal Communications/Navigational Input: 5.5 V_{rms}.

1.6.2 FREQUENCY RESPONSE LIMITATIONS

In accordance with the provisions made in RTCA/DO-214 Sections 2.8.1 and 1.5.1, the communications transmit out and receiver channels (communications and navigational) possess an effective bandwidth of 300 Hz-3000 Hz with a maximum amplitude variation of 3 dB within the frequency range.

1.6.3 CROSSTALK LIMITATIONS

To ensure that the crosstalk specifications are in accordance with the applicable sections of DO-214, it is essential that:

- 1) Manufacturer's maximum microphone input voltage of -4.7 dBu not be exceeded in order to avoid jeopardising input to microphone output crosstalk results, particularly at the low frequency end
- 2) in the instance where only two access units are daisy chained via their ICS tie-lines, a resistor of not greater than 600 ohms must be maintained across the ICS tie-line in order to avoid jeopardising station to station crosstalk results in Rx mode at the high frequency end.

The phenomenon of music appearing at the headset of the Second Station Panel (SSP or unit at which the crosstalk is measured) for station to station crosstalk considerations is a limitation of the A710/711 and for which crosstalk at high frequencies (6000 Hz and greater) can fall below 65 dB of attenuation. However music for most intents and purposes may be considered an optional feature, which may be turned off without a negative impact on the essential functioning of the access units.

Further, valid station to station crosstalk measurements were quoted in respect of a half power level at the headset at the First Station Panel (FSP or unit from which the crosstalk originates) as opposed to a half power level at the speaker output of the FSP because it is envisioned in the latter scenario that the substantial speaker level (which will also necessitate very large signal levels at the FSP headset) will have an impact on the listener at the SSP whether a crosstalk signal appears at the SSP listener's headset or not.

1.6.4 ISOLATION LIMITATIONS

When in Pilot Isolation Mode, the pilot microphone for ICS operation is rendered inactive. Consequently, neither co-pilot nor passengers can receive pilot intercom transmissions while the latter is in Isolation mode.

1.6.5 STANDARD SETTINGS UTILIZED THROUGHOUT TESTING

Pilot Headset Settings utilised throughout testing were for the standard 150 ohms impedance headset.

The PAL options utilised were applicable to the following configuration: Where Pilot or Co-pilot transmitted on the UUT ICS communication was possible only in the instance where the signal emanated from other unit(s) daisy chained to the UUT via the ICS tie-line. In this event, the UUT would receive the ICS transmissions from the other unit(s). It was not possible for the UUT, which transmitted, to export ICS communication to another unit nor was it possible for intra ICS communication to occur between users connected to UUT (i.e. Option 1 not implemented).

1.6.6 TRANSMISSION PRIORITY

Where Pilot and Co-pilot transmitted simultaneously, the Pilot transmissions took precedence over those of the Co-pilot. Co-pilot transmissions in this case would be rendered inactive.

1.6.7 INDUCED SIGNAL SUSCEPTIBILITY, RF SUSCEPTIBILITY, AND RF EMISSION

The wiring connections called out in the Installation and Operating Instructions, Chapter 2, describes shield terminations for minimum ground loop noise. The test harnesses used for RTCA/DO-160 sections 19, 20, and 21 – Induced Signal Susceptibility, RF Susceptibility, and Emission of RF Energy respectively - used shield terminations at both ends of the cable. Should RF susceptibility pose a problem in a particular installation, the installer may wish to try terminating shields at both ends of the cable. Further, if this does not produce satisfactory results, then double shielding may be required.

SECTION 2: INSTALLATION INSTRUCTIONS

2.1 GENERAL

This section contains information and instructions for the correct installation of the A710 and A711, ACCESS/A Audio Controllers.

Make certain that the unit is correctly operating in accordance with the equipment user's requirements and manufacturer's specifications prior to releasing the equipment for service.

2.2 EQUIPMENT PACKING LOG

Unpack the equipment and check for any damage that may have occurred during transit. Save the original shipping container for returns due to damage or warranty claims. Check that each item on the packing slip has been shipped in the container. Verify that the equipment's backlighting configuration is the *same as that required*.

2.3 WIRING REQUIREMENTS

Airframe wiring should be single conductor in accordance with MIL-W-22759 or multi-conductor in accordance with MIL-C-27500 or Raychem 44 (81044) or 55 single or multi-conductor and shielded wire. Heat shrink solder sleeves (such as Raychem or equivalent) should be utilized for shield termination.

All Microphone audio input and output line connections should be made with 2 conductor/twisted pair shielded cables as illustrated. Receiver audio input lines should also be 2 conductor twisted pair shielded cables. The power and ground lines should be a minimum of #22 AWG (#20 preferred). Keying and all audio lines may be #24 AWG or larger.

CAUTION:

DO NOT bundle any low level audio lines with RF coaxial cables, 60 Hz or 400 Hz AC inverter, motor, pump or blower wiring, which can cause noise coupling between the various systems, especially during RF transmission or pump/blower mechanical operation. Maintain as much distance as possible from these types of wire bundles.

Note that there is really no effective field-installable shielding for magnetic coupling (which occurs at high currents), and the only suitable prevention for this type of interference is distance between the interfering lines. Shielded wiring is effective only for electrostatic coupling or voltage driven interference.

2.4 ACCESS/A AUDIO PANEL INSTALLATION

The A710 and A711 ACCESS/A Audio Controls are designed to be Dzus mounted and should be installed in conjunction with an IN-A710 installation connector kit. See Figure 3 for an outline drawing of the units with dimensions, to facilitate the installation.

CABLE CLEARANCE:

Allow at least 2.5" of additional rear clearance for mating connectors and hoods (side routing) or 3.0" (back routing). Cables should be long enough to permit the unit to be removed from the panel, and the connectors to be easily disengaged. DO NOT dress or strap the mating cables so that front removal is impossible, or the unit cannot be removed for service or adjustment in the field.

ALERT OPERATION:

Voice alerting can be supplied with this unit from the factory (addition of an A850, A851, or A852 module and resulting dash number change), or it can be added in the field. Field installation must be done at a fully equipped service bench and requires a system functional test & re-certification.

Alternatively, 3 Tone alerting can be supplied with this unit from the factory instead. Tone frequency and cycle rate, as well as # 3 alert on-time, can be adjusted at the rear of the unit. Field installation of the tone option must be done at a fully equipped service bench and requires a system functional test & re-certification.

PANEL MODIFICATIONS:

Modified panel legends, panel lighting, NVG compatibility, or overlay colors are also possible. Please see the price list for a full summary of options and part numbers. Overlays and legends may be easily changed at low cost in the field with no special tools or service facilities required.

SHIELD GROUNDS:

Convenient shield ground connections are provided at each connector for the indicated input signal shield drains and will give the shortest possible return for these lines. These shield lines may be daisy chained together, and a single wire from each cable brought out to the connector pin.

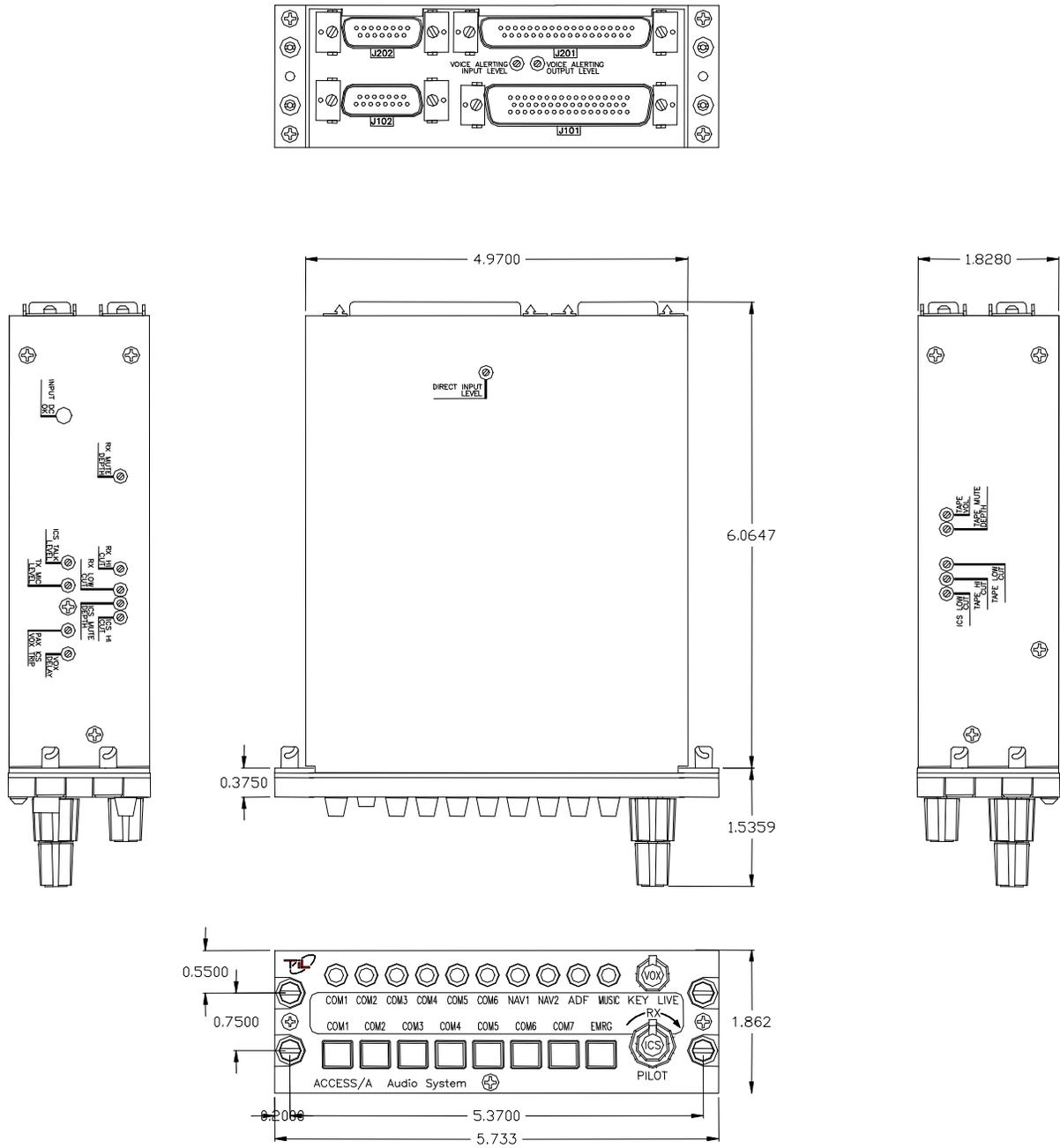
INTERNAL OPTIONS:

All configurable and variable options of the A710 and A711 (pilot H/S impedance, muting logic, included speaker audio lines, etc.) can be set or changed simply by altering internal jumpers, but these changes *require opening the unit for access* to the required connections.

DRAWINGS:

A full ACCESS/A (mono) system installation example is given in the multi-page sections of Section 2.

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NOTE: Shows new case design (relocated Dzus fasteners) effective mid-1997. Previous release case is identical except for this change (edge Dzus fasteners).

FIGURE 3: Outline Drawing for Model A710 ACCESS/A Audio Controller

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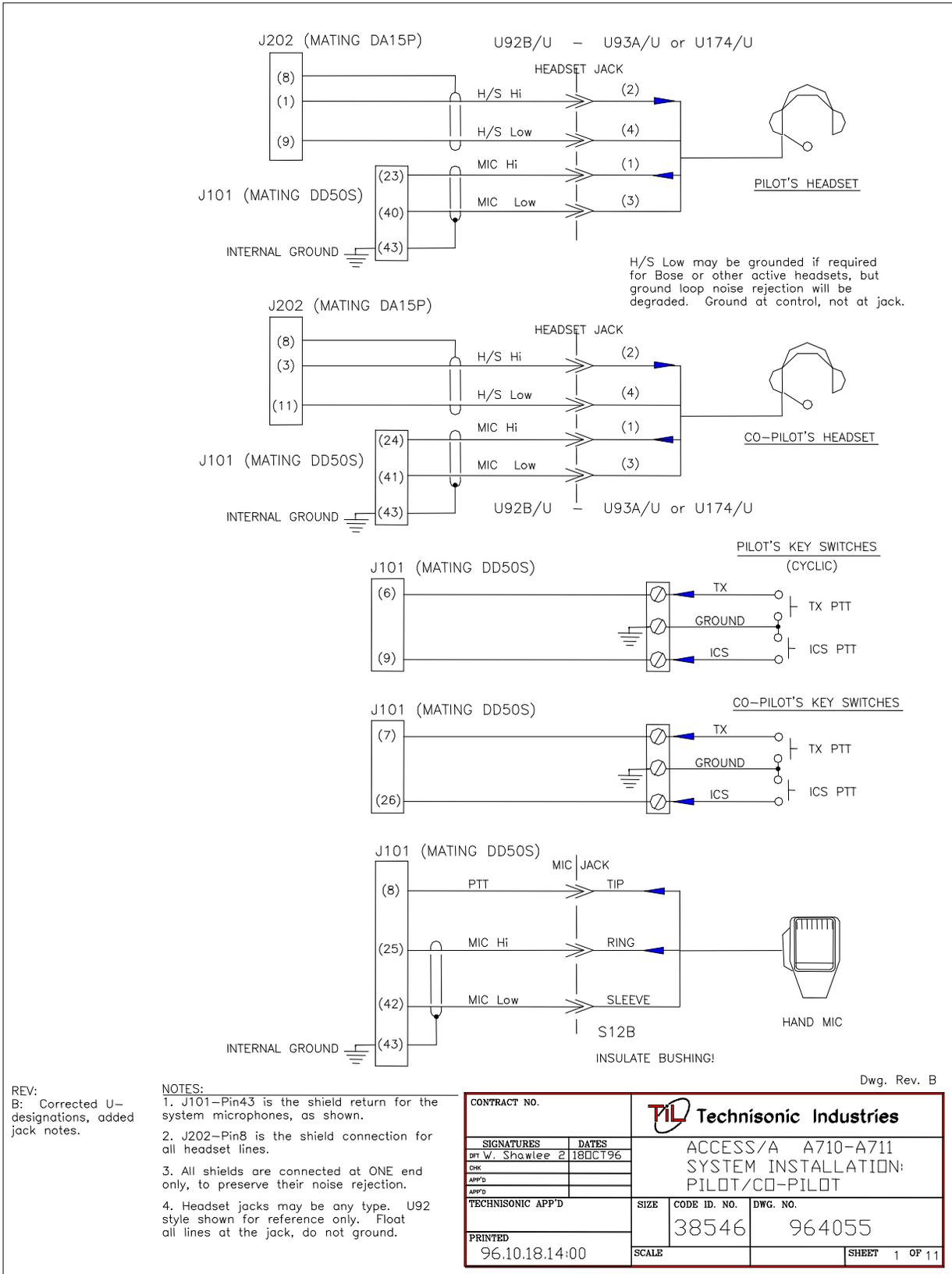


FIGURE 5: Pilot / Co-Pilot Wiring

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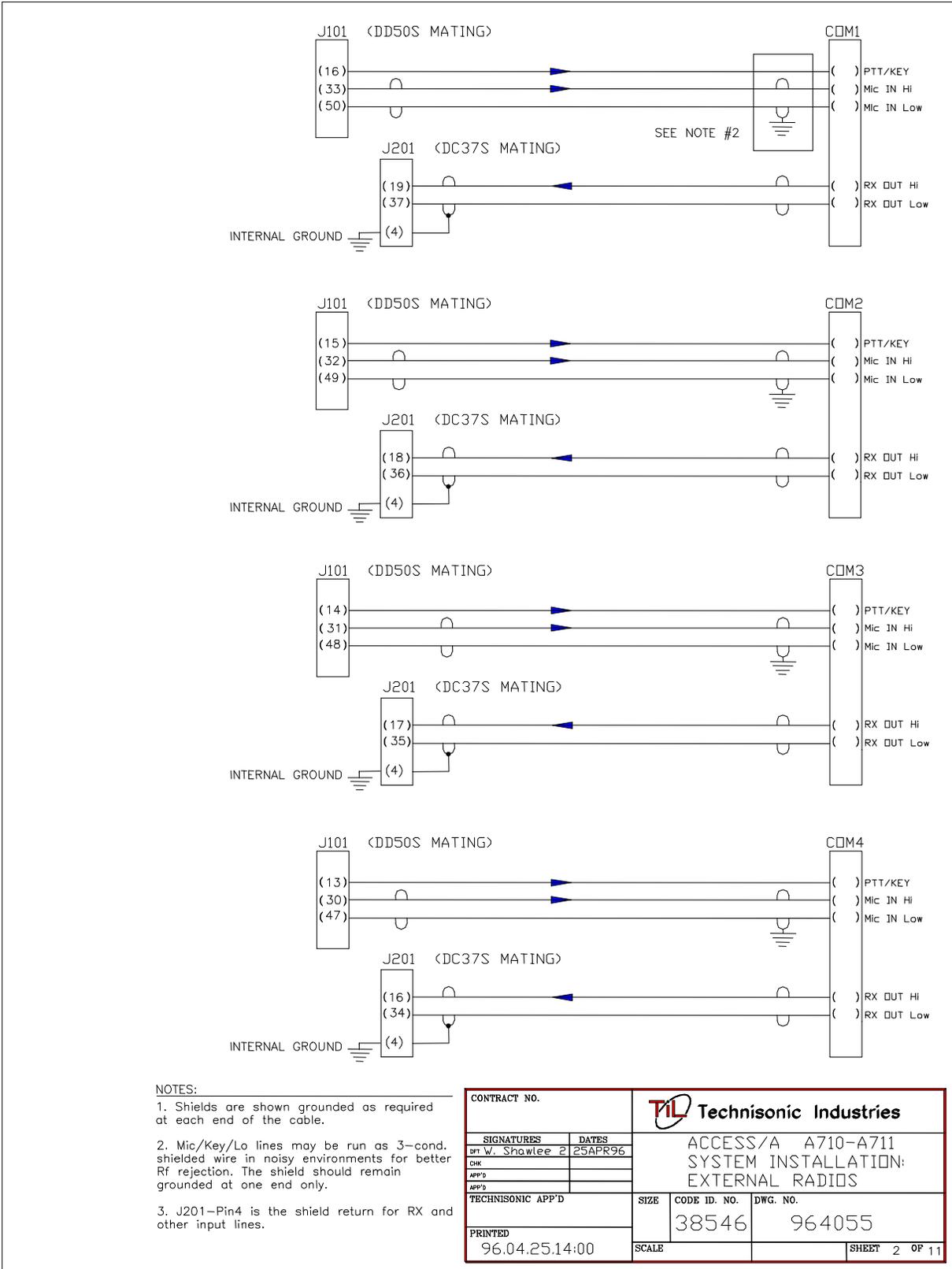


FIGURE 6: COM1-COM4 Wiring

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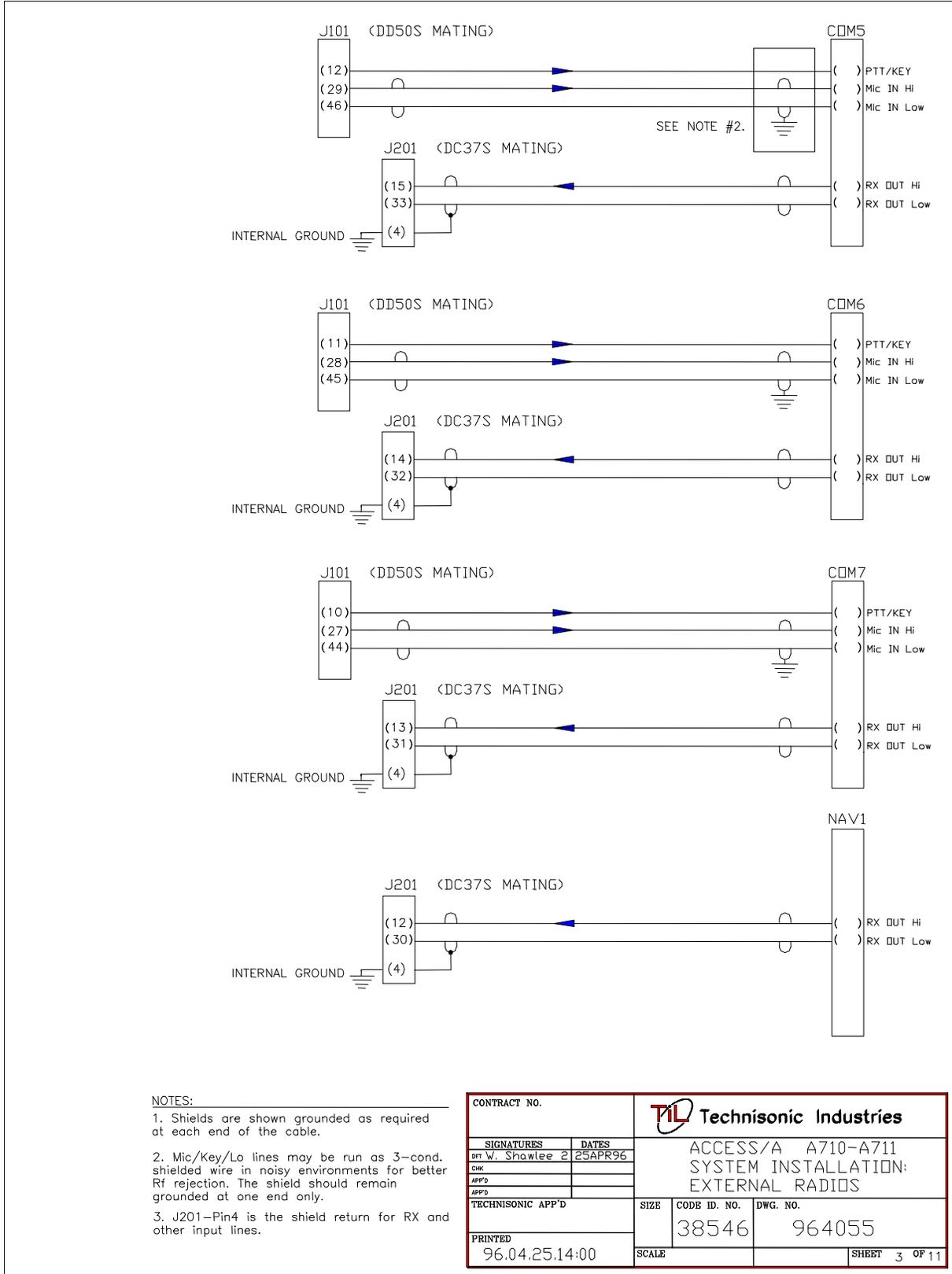


FIGURE 7: COM5-NAV1 Wiring

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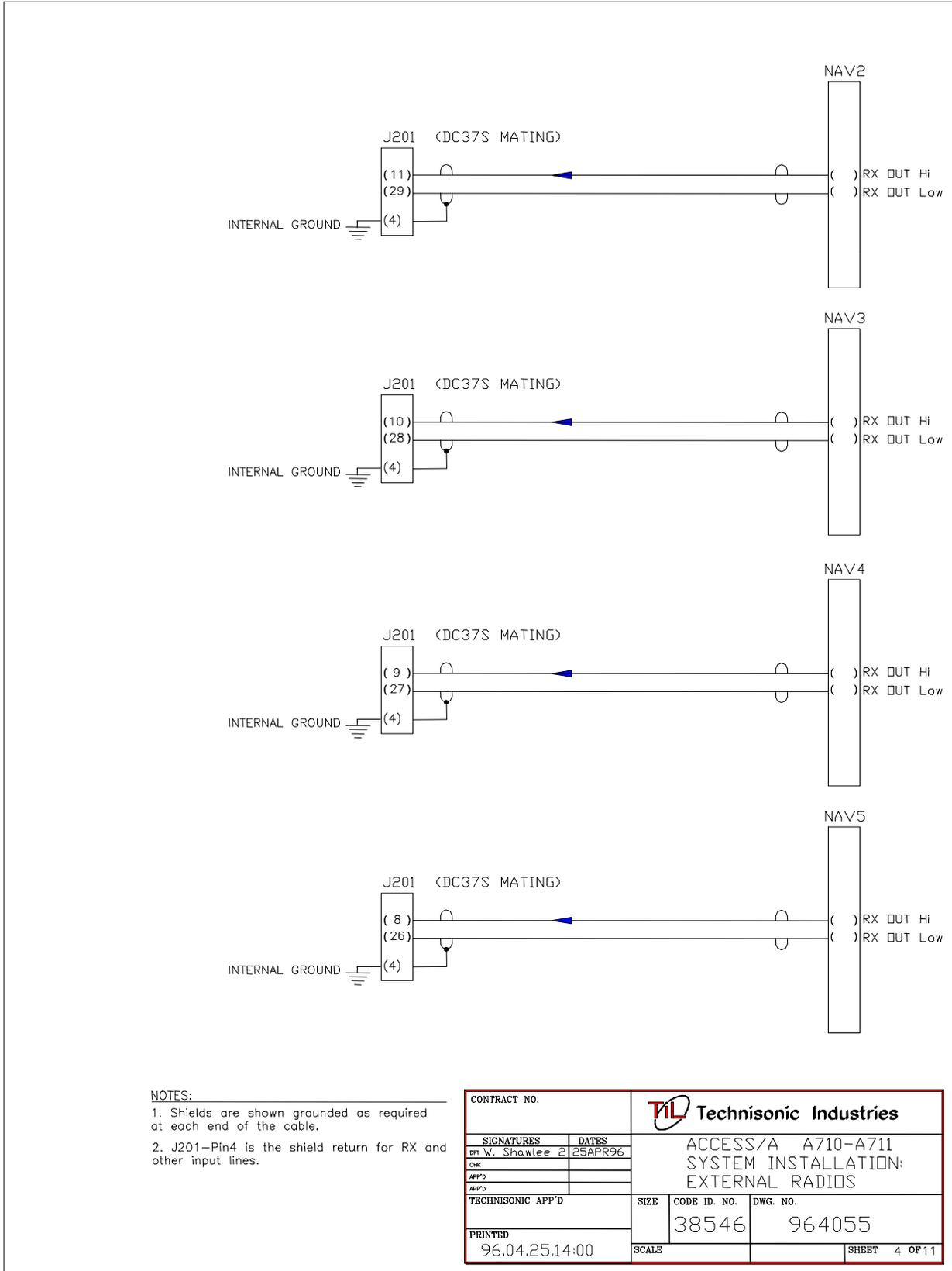


FIGURE 8: NAV2-NAV5 Wiring

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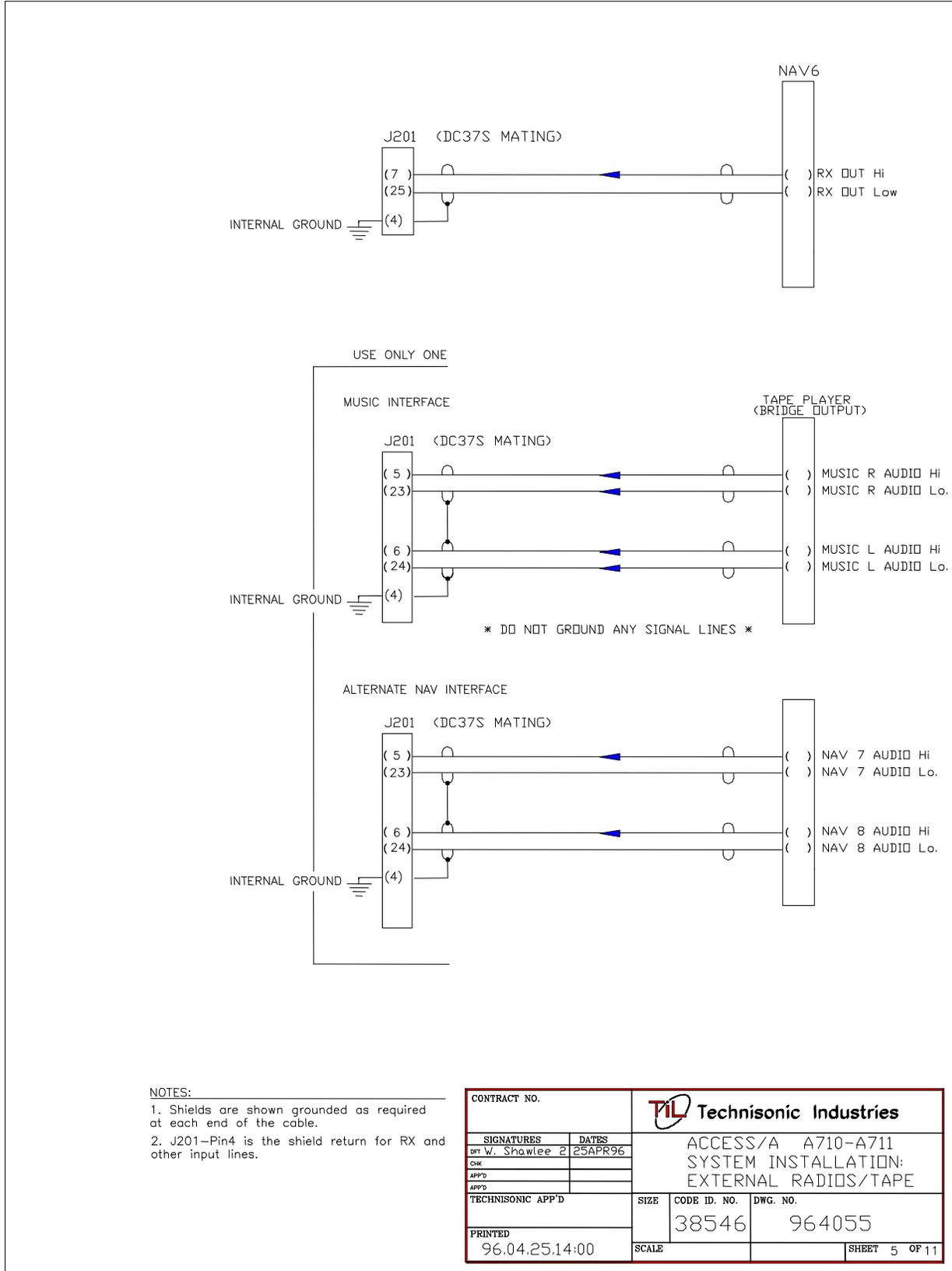


FIGURE 9: NAV6-NAV8 / Tape Wiring

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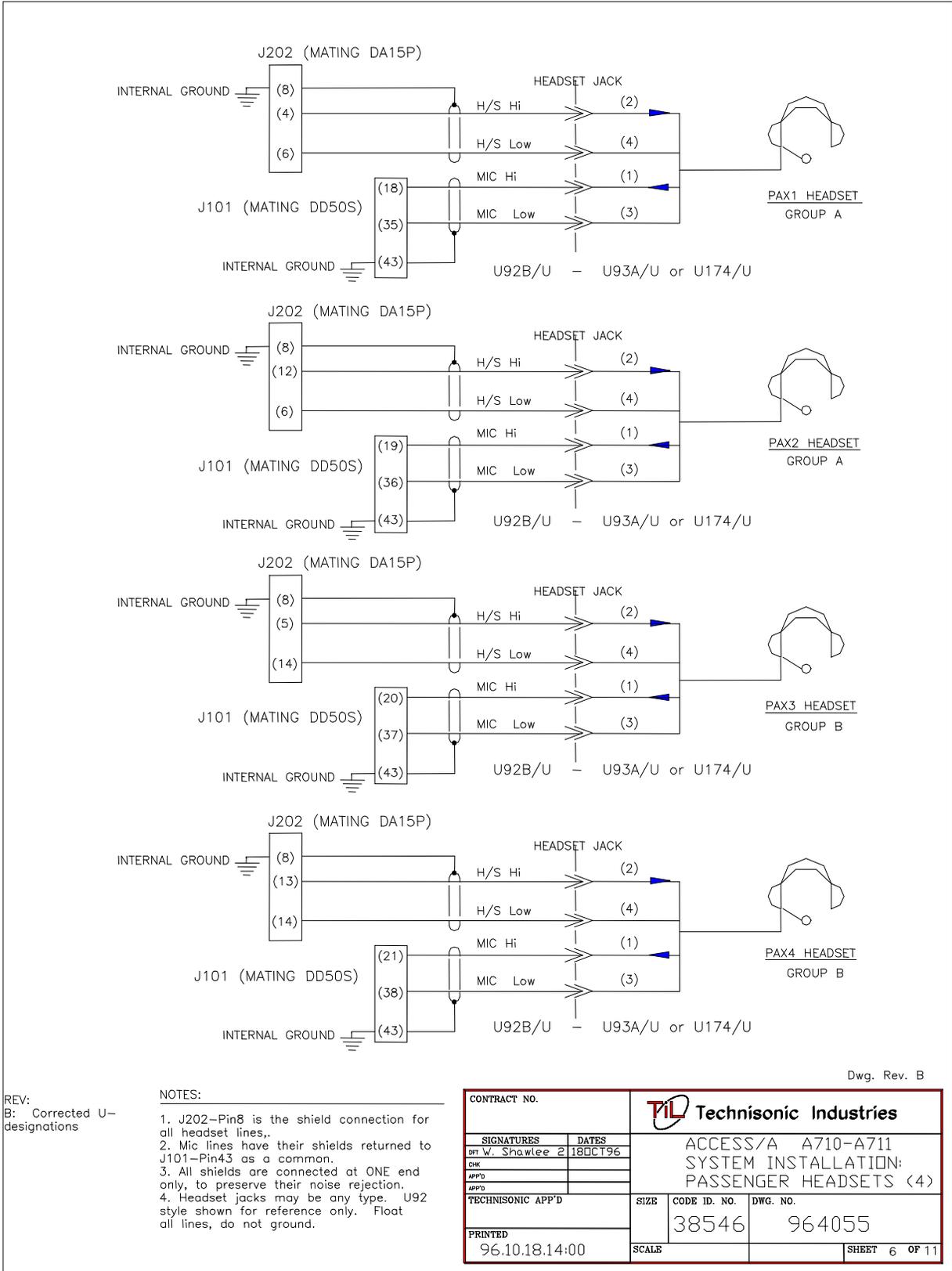


FIGURE 10: Passenger Wiring

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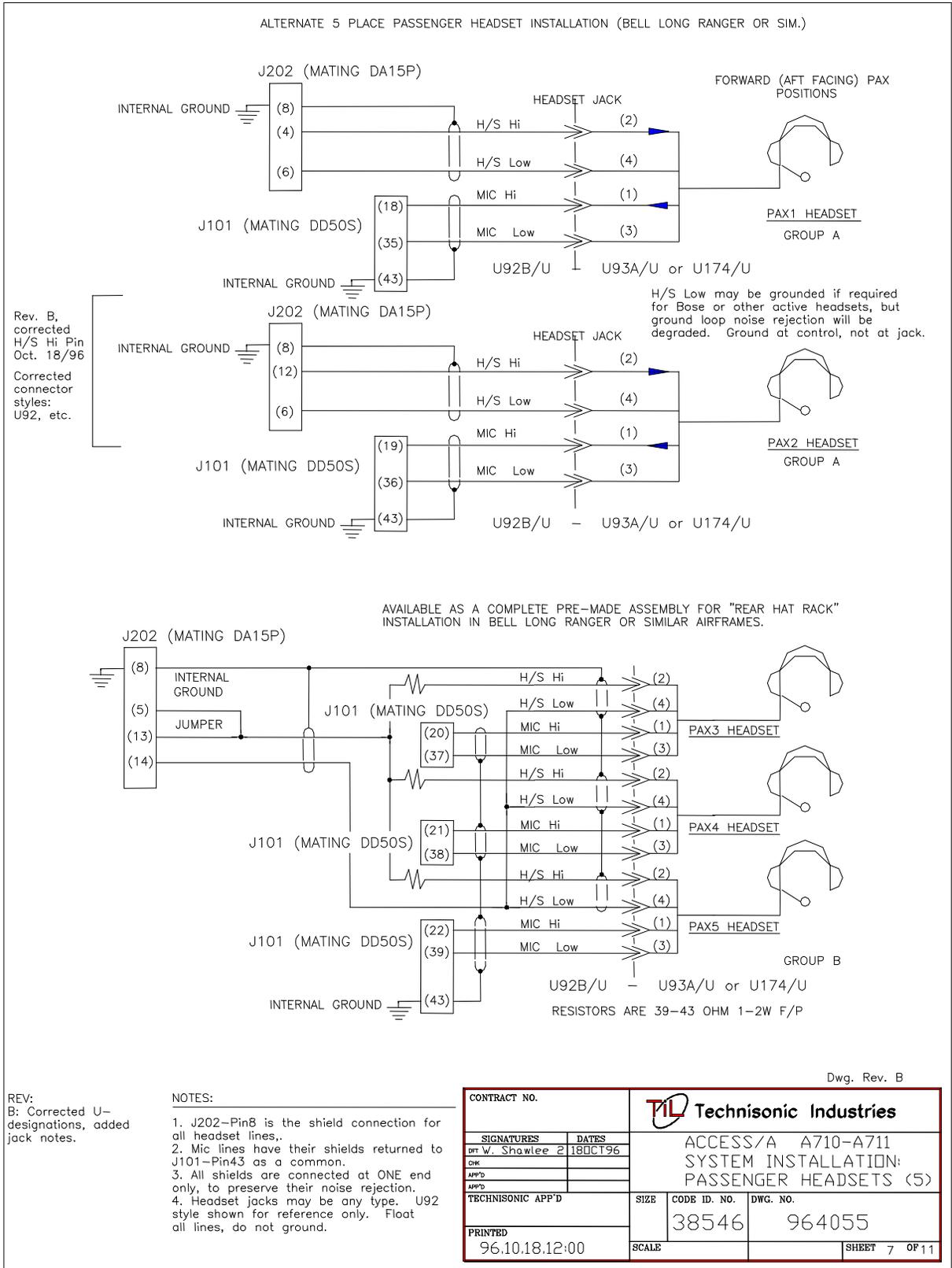


FIGURE 11: Alternate Passenger Wiring

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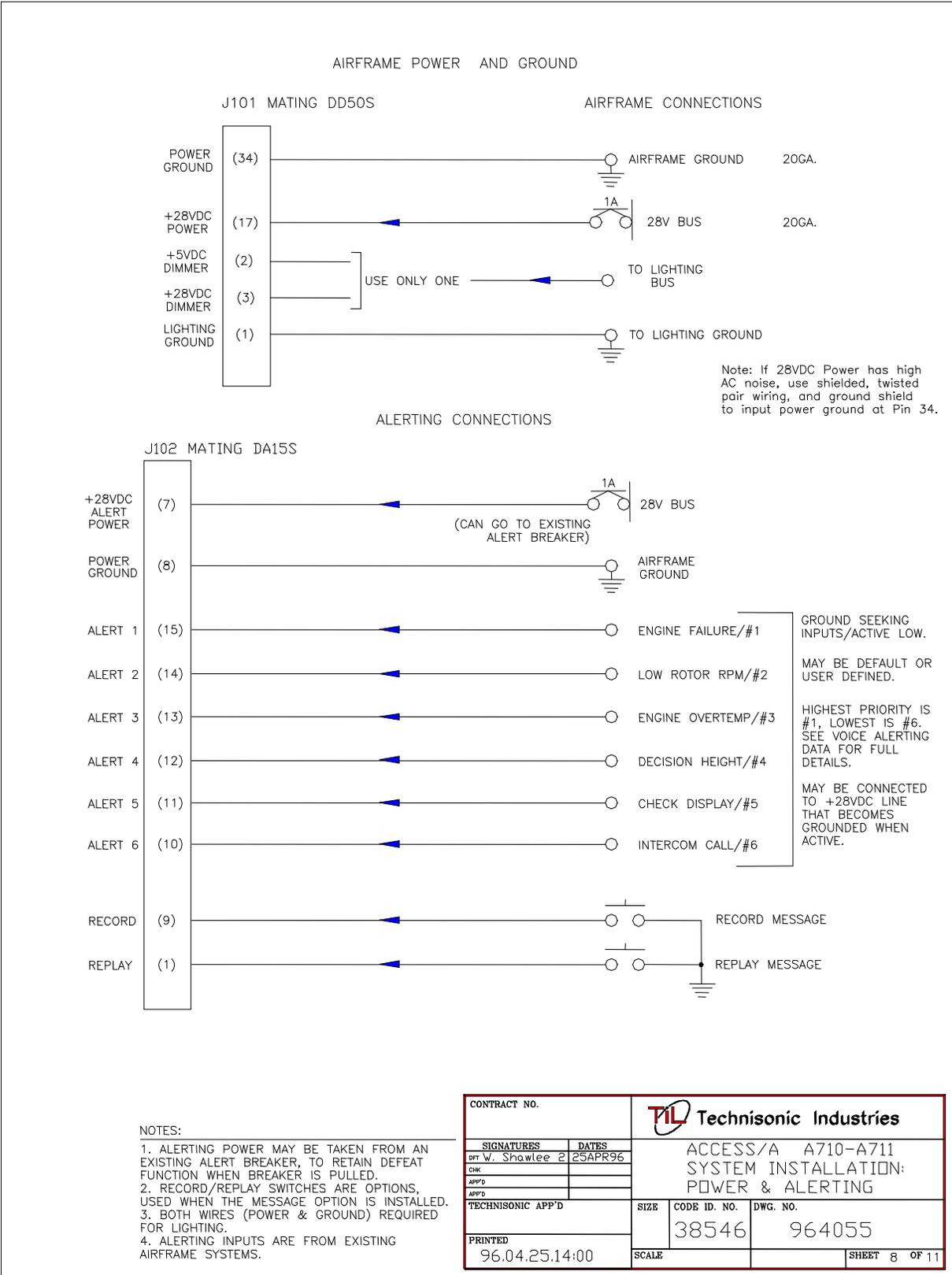


FIGURE 12: Power & Alerting Wiring (Voice Alerting Option)

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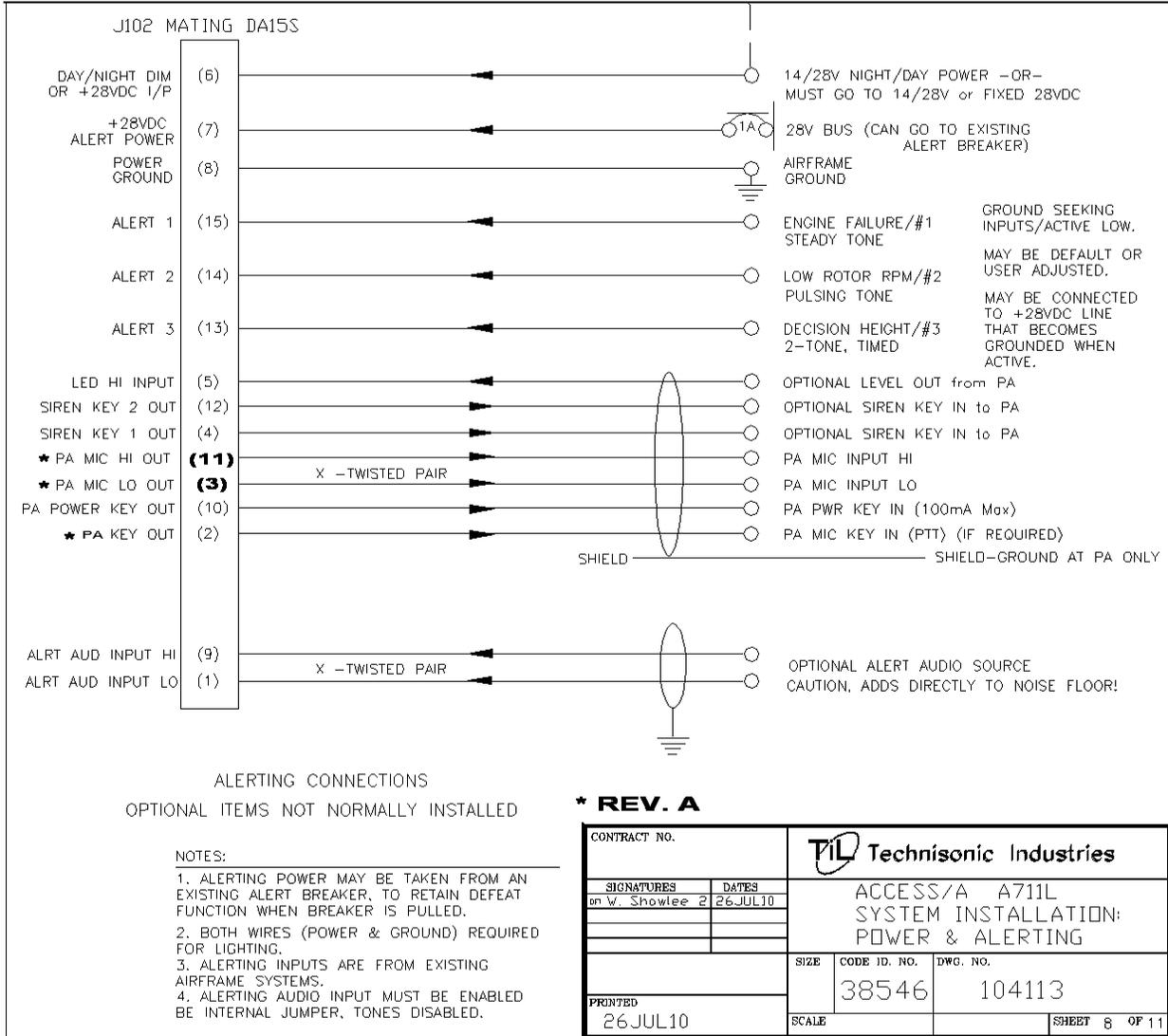


FIGURE 13: Alerting Wiring (Tone Alerting Option)

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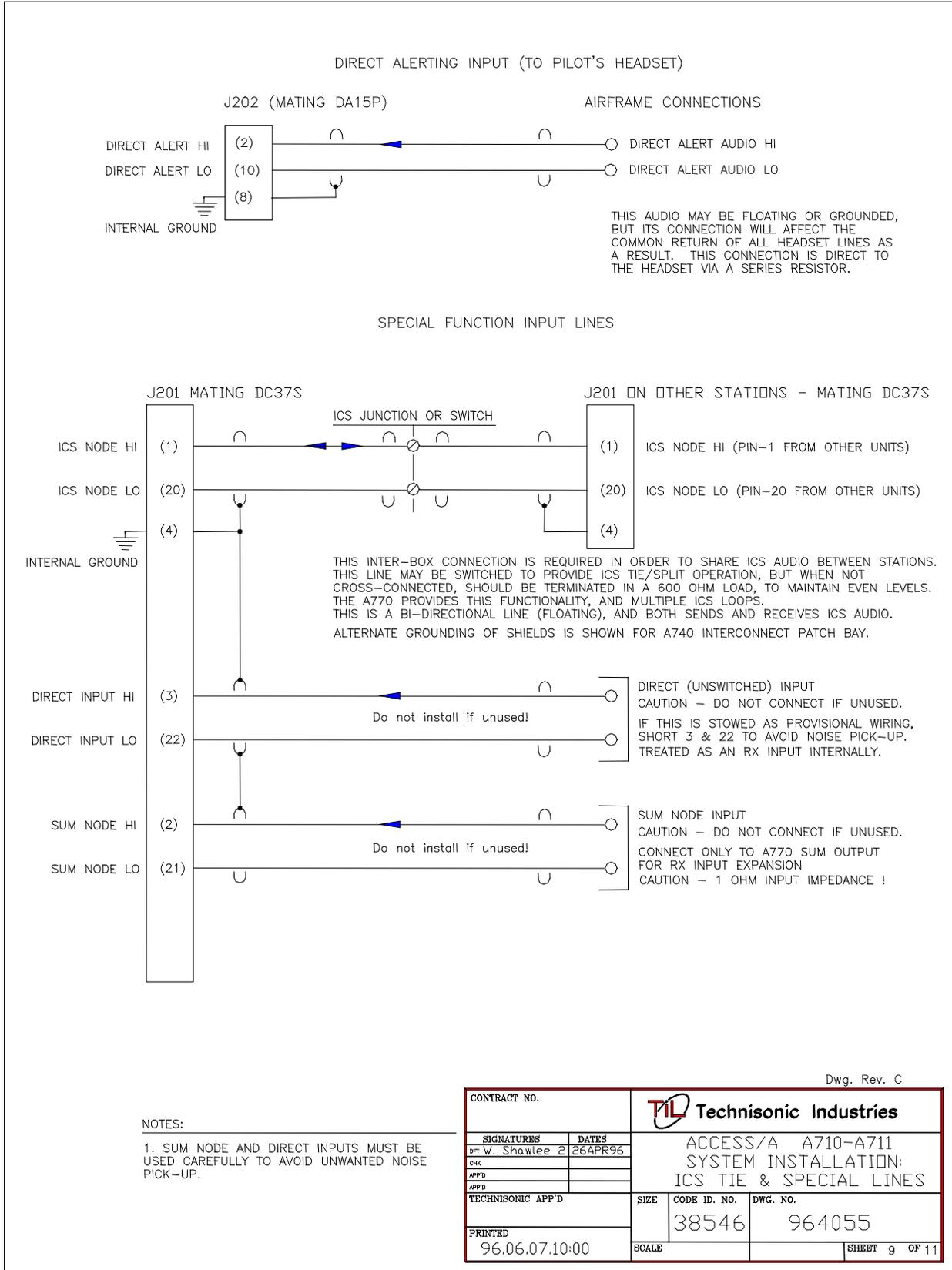


FIGURE 14: Direct Input Special Function Wiring

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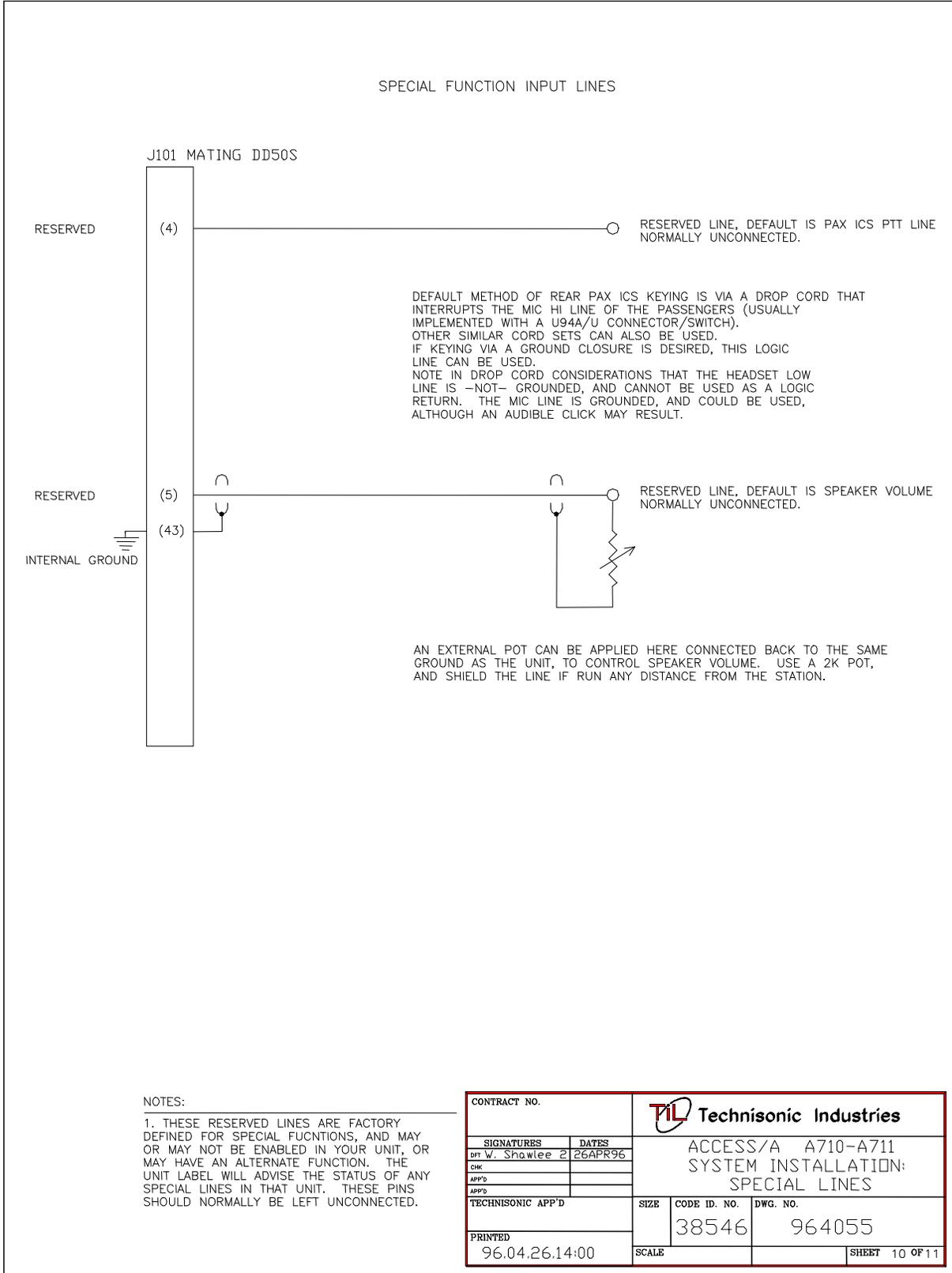
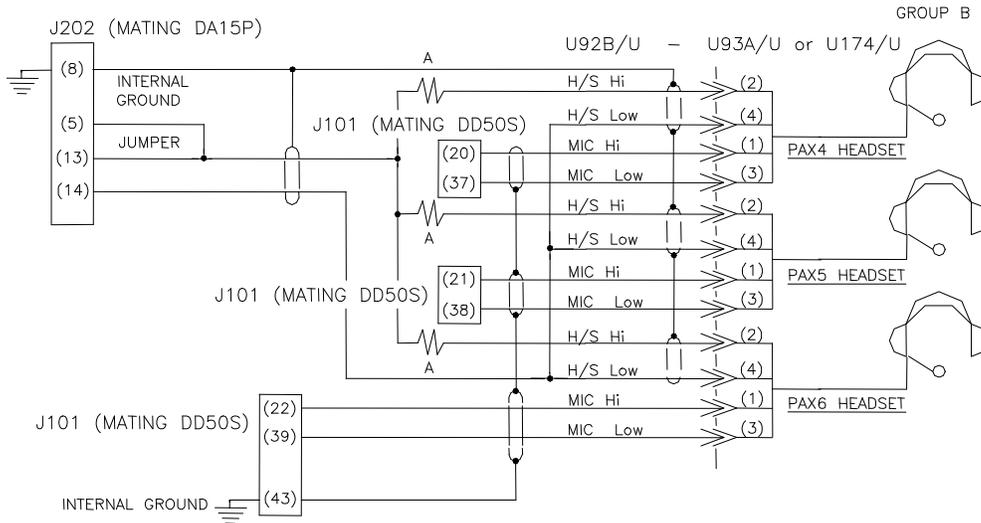
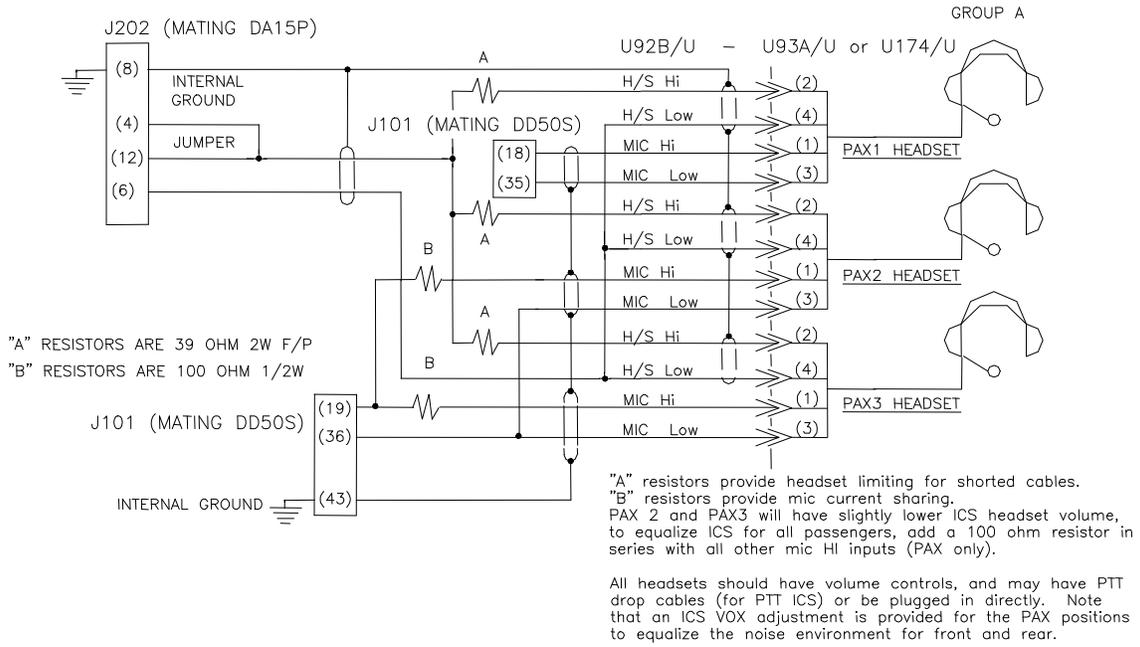


FIGURE 15: Reserved Wiring

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ALTERNATE 6 PLACE PASSENGER HEADSET INSTALLATION (MD900 OR SIM.)



NOTES:

1. J202-Pin8 is the shield connection for all headset lines..
2. Mic lines have their shields returned to J101-Pin43 as a common.
3. All shields are connected at ONE end only, to preserve their noise rejection.
4. Headset jacks may be any type. U92 style shown for reference only. Float all lines, do not ground.

CONTRACT NO.		TiL Technisonic Industries	
SIGNATURES	DATES	ACCESS/A A710-A711	
DR. W. Shawlee 2	18OCT96	SYSTEM INSTALLATION:	
CHK		PASSENGER HEADSETS (6)	
APP'D		SIZE	CODE ID. NO. DWG. NO.
TECHNISONIC APP'D			38546 964055
PRINTED		SCALE	SHEET 11 OF 11
96.10.18.12:00			

FIGURE 16: Special 6-Place Passenger Wiring

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2.5 INSTALLATION KIT - CONTENTS

The IN-A710 installation kit (used for both A710 & A711 units) consists of:

The default Installation Kit Part Number is 969680-1.

For model variant -13, -14, -17 and -18 (Tone Alerting) use Installation Kit 969680-2.

1. One **50 pin female** D-subminiature mating connector complete with crimp pins, V-locks and hood. (DD50S) **P101**
Positronics P/N SD50F00JVLX + 50 ea. FC7520D contacts or equiv.
2. One **37 pin female** D-subminiature mating connector complete with crimp pins, V-locks and hood. (DC37S) **P201**
Positronics P/N SD37F00JVLX + 37 ea. FC7520D contacts or equiv.
3. One **15 pin female** D-subminiature mating connector complete with crimp pins, V-locks (-1) or jackscrews (-2) as required and hood. (DA15S) **P102**
Positronics P/N SD15F00JVLX + 15 ea. FC7520D contacts or equiv.
4. One **15 pin male** D-subminiature mating connector complete with crimp pins, V-locks and hood. (DA15P) **P202**
Positronics P/N SD15M00JVLZ (or JVLX) + 15 ea. MC7520D contacts or equiv.

NOTE: The mating connectors use a “one-hand”, tool-free Positronics V-lock assembly for ease of airframe installation and removal.

To match approved installation agency standard practices, equivalent machined contact D-subminiature connectors from vendors such as AMP/Tyco, Cannon, Cinch, or Positronics, or those which are directly compatible with MIL-DTL-24308 may be substituted for the Positronics contacts and inserts shown, but the Positronics V-latch lock and hood must be retained in the final assembly for proper attachment to the A710/711 unit. Any crimp contact used must be installed with the proper crimping die, set to the correct wire size, and a pull test should be done on every wire after assembly. Solder contact versions of the D-subminiature family from the above suppliers may also be used, if every wire/contact junction is individually heat-shrink sleeved during assembly to prevent inter-contact shorts within the hood.

In addition, the following items are packed with each A710 unit:

1. This manual.
2. Warranty registration card.

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2.6 INSTALLATION – PIN LOCATIONS AND CONNECTIONS

The pin numbers and locations for the connectors located on the rear of the **A710/A711 ACCESS/A** Audio Control are shown in the following tables.

Bottom Connector J101 DD50P

Mating Cable Connector: DD50S
(50 pin Female)

COM	MIC	KEY	CONNECTION	NOTES
34			Power GROUND	Main Power Ground Line
35	18		PAX 1 Mic In	
36	19		PAX 2 Mic In	
37	20		PAX 3 Mic In	
38	21		PAX 4 Mic In	
39	22		PAX 5 Mic In	
		1	Lighting/Dimmer Common (GND)	Dimmer Lines
		2	+5 V _{DC} Dimmer Input	Dimmer Lines Use only one
		3	+28 V _{DC} Dimmer Input	Dimmer Lines Use only one
		4	Supplemental Control Line	Default = PAX ICS PTT ●
		5	Reserved Control Line	Default = speaker volume.
COM	MIC	KEY	CONNECTION	NOTES
40	23	6	Pilot's Mic In	
41	24	7	Co-Pilot's Mic In	
42	25	8	Hand Mic In	Emergency Hand Mic
		9	Pilot's ICS Key	Active when grounded
		26	C-Pilot's ICS Key	Active when grounded
43				Shield ground for mic lines
44	27	10	COM 7/PA TX Mic Out	
45	28	11	COM 6 TX Mic Out	
46	29	12	COM 5 TX Mic Out	
47	30	13	COM 4 TX Mic Out	
48	31	14	COM 3 TX Mic Out	
49	32	15	COM 2 TX Mic Out	
50	33	16	COM 1 TX Mic Out	
		17	+28 V _{DC} Power In	Main Power Input

● Grounding PAX ICS PTT line (Pin 4) will make the passenger headsets LIVE, if use of a drop cord is desired, that interrupts mic line to enable PAX ICS. Alternately, this line may be keyed by the drop cord to enable ICS (or no drop cord can be used), and the front panel VOX control can guide all ICS operation.

TABLE 3: J101 TX Bottom Connector Pin Assignments

View from solder side of MATING CABLE CONNECTOR DD50S:

1 17
18 33
34 50

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Top Connector J201 DC37P

Mating Cable Connector: DC37S
(37 Pin Female)

J201		Connector Pin Assignments	RX Connector
LOW	HIGH	CONNECTION	NOTES
20	1	ICS Node	ICS Tie Line Between Units
21	2	SUM Node Input	For connection to A770 expansion units only
22	3	Direct Input	Unswitched Direct Input
4		Shield ground	Shield drain for input lines.
23	5	Music R Audio (supports BRIDGE OUTPUT!)	Switch #4: Pin 23 is common Right-hand-most RX switch.
24	6	Music L Audio (supports BRIDGE OUTPUT!)	Switch #4: Pin 24 is common Right-hand-most RX switch.
25	7	NAV 6 RX Audio	Switch #3
26	8	NAV 5 RX Audio	Switch #3
27	9	NAV 4 RX Audio	Switch #2
28	10	NAV 3 RX Audio	Switch #2
29	11	NAV 2 RX Audio	Switch #1
30	12	NAV 1 RX Audio	Switch #1 Left-hand-most RX switch
31	13	COM 7 RX Audio	Not Used If PA Enabled. Can also be strapped "ON" internally. Right-hand-most TX switch.
32	14	COM 6 RX Audio	
33	15	COM 5 RX Audio	
34	16	COM 4 RX Audio	
35	17	COM 3 RX Audio	
36	18	COM 2 RX Audio	
37	19	COM 1 RX Audio	Left-hand-most TX switch

Common Lines	Floating above airframe ground in ACCESS systems, but serves as common signal low for corresponding input signal lines.
Common Lines	Floating above airframe ground in ACCESS systems, and not connected to any other common line in the system.

TABLE 4: J201 Connector Pin Assignments

View from solder side of DC37S MATING CONNECTOR:

1 19
20 37

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Top Connector J202 DA15S

Mating Cable Connector: DA15P
(15 Pin Male)

J202		Connector Pin Assignments	Headset Connector
LOW	HIGH	CONNECTION	NOTES
9	1	Pilot's H/S Audio	Can be set internally to either 8/20 or 150/600
10	2	Direct Alert Connection	High level headset direct audio (via pad)
11	3	Co-Pilot's H/S Audio	Group A
	4	PAX 1 H/S Audio	Group A
	5	PAX 2 H/S Audio	Group B
	12	PAX 3 H/S Audio	Group A
	13	PAX 4 H/S Audio	Group B
6		PAX H/S Common	
14		PAX H/S Common	
15	7	Speaker Output	8 Ohms min.
	8	Shield Ground	For connection to external floating shields

PAX Headset lines from the same GROUP may be connected in parallel to give more drive for a rear headset bus, but then must have isolation safety resistors installed (~47-51 ohms) in series with the rear headsets for accidental short circuit isolation. See installation drawings for full details.

Common Lines	Floating above airframe ground in ACCESS systems, but serves as common signal low for corresponding output signal lines <i>only</i> .
Common Lines	At Ground potential, but line must be connected here <i>only, not to airframe</i> .

TABLE 5: J202 Connector Pin Assignments

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Bottom Connector J102 DA15P
(Voice Alerting Option)

Mating Cable Connector: DA15S
(15 Pin Female)

The following is only applicable to -3, -4, -7 and -8 variants:

J102		Connector Pin Assignments	Alerting Connector
LOW	HIGH	CONNECTION	NOTES
	1	Play	Ground externally to activate last message replay function.
	2	Reset	
	3	CTS	These lines used only by the remote computer programmer
	4	Data	To create new alerting functions.
	5	Audio In	Not connected in the airframe.
	6	Audio Out	
	7	+28 V _{DC} In	Alert Power (may come from existing alert breaker)
8		Ground (Power)	Power ground return connection.
	9	Record	Ground externally to activate record function.
	10	Alert 6 (in)	Active when grounded. Accepts +28 V _{DC} .
	11	Alert 5 (in)	Active when grounded. Accepts +28 V _{DC} .
	12	Alert 4 (in)	Active when grounded. Accepts +28 V _{DC} .
	13	Alert 3 (in)	Active when grounded. Accepts +28 V _{DC} .
	14	Alert 2 (in)	Active when grounded. Accepts +28 V _{DC} .
	15	Alert 1 (in)	Active when grounded. Accepts +28 V _{DC} .

Programming Lines	Reserved for programming functions, do not use in the airframe.
--------------------------	--

TABLE 6: J102 Bottom Connector Pin Assignments (For -3, -4, -7, and -8 Variants)

Alerting may be either true voice, speech based alerting, or tone coded alerting, as specified by the installed alerting module.

Alerting has separate power and ground connections, unrelated to the rest of the audio system. Power may be taken from an existing alerting breaker, to retain the alerting defeat function by pulling one common breaker. Power consumption is very low, typically under 25mA.

Programming for both tones and true voice alerting is done with a PC, and a special TiL programming fixture. Contact TiL for full details.

View from solder side of DB15S MATING CONNECTOR:

1 8
9 15

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Bottom Connector J102 DA15P
(Tone Alerting Option)

Mating Cable Connector: DA15S
(15 Pin Female)

The following is only applicable to -13, -14, -17 and -18 variants:

J102		Connector Pin Assignments	Alerting Connector
LOW	HIGH	CONNECTION	NOTES
9	1	Alert Audio Input (Internal Jumper Selection)	Alternate alerting input (disables tone system if jumper selected)
	2	PA Key Output (Active Low)	To External PA system
3	11	PA Mic Out (Note: Rev. A)	To External PA System
	4	Siren Key 1 Output (Active Low)	Optional Function
	5	PA LED Hi Input (Level Indicator)	Optional Function
	6	Day/Night Annunciator Control (12/24 V _{DC} input) IMPORTANT, see NOTES!	Forces TX annunciators to day or night level. If NOT used, this line MUST be connected to J101, Pin 17 (28 V _{DC} power input), or TX annunciators will NOT light.
	7	+28 V _{DC} In	Alert Power (may come from existing alert breaker)
8		Ground (Power)	Power ground return connection.
	10	PA Power Key Output (Active Low)	100mA ground output when PA mode is selected, can be used to activate a remote PA system.
	12	Siren Key 2 Output (Active Low)	Optional Function
	13	Alert 3 (in) Two-Tone, Timed (Rad Alt DH)	Active when grounded. Accepts +28 V _{DC} .
	14	Alert 2 (in) Pulsing Tone (Low Rotor)	Active when grounded. Accepts +28 V _{DC} .
	15	Alert 1 (in) Steady Tone (Engine Fail)	Active when grounded. Accepts +28 V _{DC} .
Optional Lines		Normally NOT enabled, installed as factory installed options only.	

TABLE 7: J102 Bottom Connector Pin Assignments (For -13, -14, -17, and -18 Variants)

Alerting is tone based, with Alert 1 a steady tone, Alert 2 a pulsing tone, and Alert 3 a two-tone, timed signal. All tones are adjustable at the rear apron, to better match existing horns in the airframe. Alert 2 as priority over Alert 1, if both are activated at the same time. Alerting can be optionally installed or deleted.

Alerting has separate power and ground connections, unrelated to the rest of the audio system. Power may be taken from an existing alerting breaker, to retain the alerting defeat function by pulling one common breaker. Power consumption is very low, typically under 50mA. Alert inputs are optically coupled and may be routed to +28 V_{DC} or ground without damage.

Previous revision has corrected the reversal of pins 3 & 11, shown correctly above.

Day/Night annunciator control forces the annunciators to appropriate levels (external 12/24 V_{DC}). It must be tied to +28 V if not used in this way or if auto-dimming via J101 is used.

View from solder side of DB15S MATING CONNECTOR:

1 8
9 15

2.7 HEADPHONE INSTALLATION

The A710 & A711 ACCESS/A Audio Controls are intended for use with industry standard 150/600 ohm headphones. There is also provision for connection to an 8 ohm (minimum impedance) speaker for a supplemental cabin speaker output. The pilot's headset (only) may also be strapped internally for a standard low impedance headset (8-20 ohms) at the same power level.

In all cases, the headset lines should be run as *shielded, twisted pairs*, to avoid contamination (and resulting cross-talk) of companion low level mic lines or audio input lines. Failure to follow this wiring guideline will result in unwanted cross-talk and phantom audio that will appear to be transmit or intercom related.

The use of high quality headsets and "carbon-equivalent" boom microphones, such as David Clark or Bose, is strongly recommended. Mixed headset impedances within the same ship will give differing volume levels at the same A710/A711 control settings. The use of *headsets with individual volume controls is very useful* to permit level adjustment suitable to each position, due to differing headsets and the inevitable different hearing capability of individual users.

2.8 MICROPHONE INSTALLATION

All microphone connections to the A710 or A711 must be done with *shielded cables*. The inputs are intended for use with standard "carbon-equivalent" or amplified dynamic Microphones (such as the D/C M1, M4 M7, etc.). *Shielded, twisted pair* routing is strongly preferred for lowest noise pick-up, but single conductor shielded wiring generally gives adequate results in non-critical or single box installations, although noise floor and cross-talk will increase.

2.9 PTT CONNECTIONS

The Pilot, Co-pilot, and hand microphones require a PTT (Push To Talk) button or switch to key the transceivers as required. If a Hand-held microphone is used, tie the PTT button to the appropriate key line. If a boom microphone is incorporated into the headset, an external switch, such as the cyclic switch or yoke switch, will be required to key the transmitter. PTT lines should go directly to ground to activate the desired key function.

2.10 MAIN POWER +28 V_{DC}

The main power +28 V_{DC} ($\pm 20\%$) is connected to pin 17 of the 50 pin (lower) "D" connector.

As previously indicated, this connection should be made with at least #22 AWG wire, with #20 preferred. If from a very noisy source, with high levels of parasitic AC, shielding may improve rejection of this coupled AC into other low level audio lines.

2.11 BACKLIGHTING POWER +28 V_{DC} / + 5 V_{DC}

The backlighting power for the front panel of the A710 and A711 is supplied via pins 1, 2 & 3 of the 50 pin (lower) "D" connector. Unless ordered and indicated otherwise on the rear of the ACCESS/A A710, the unit is shipped with the +28 V_{DC} backlighting option. Note that different pins are used for 5V and 28V lighting and there is a dedicated lighting ground pin, which MUST be connected for the lighting to work. Lighting is isolated from other circuits in the system for noise reduction reasons.

2.12 GROUND

The A710 Audio Control is designed for full Ground Isolation from the Airframe. This is necessary in many cases where the Airframe Ground causes significant noise in the Audio system.

Main ground (power return) to the A710 and A711 is on pin 34 of the 50 pin "D" connector. All other groups of audio lines have their own "common" lines, which float above the airframe ground, to provide signal isolation. These common lines MUST be connected to the source audio or no signal flow will result, except for stray leakage.

2.13 STORAGE

When not in use, store the A710 and A711 in the original Anti-Static bag if possible and in a non-Humid place. Optimum storage temperatures for best shelf life should not exceed +35°C or be less than -10°C.

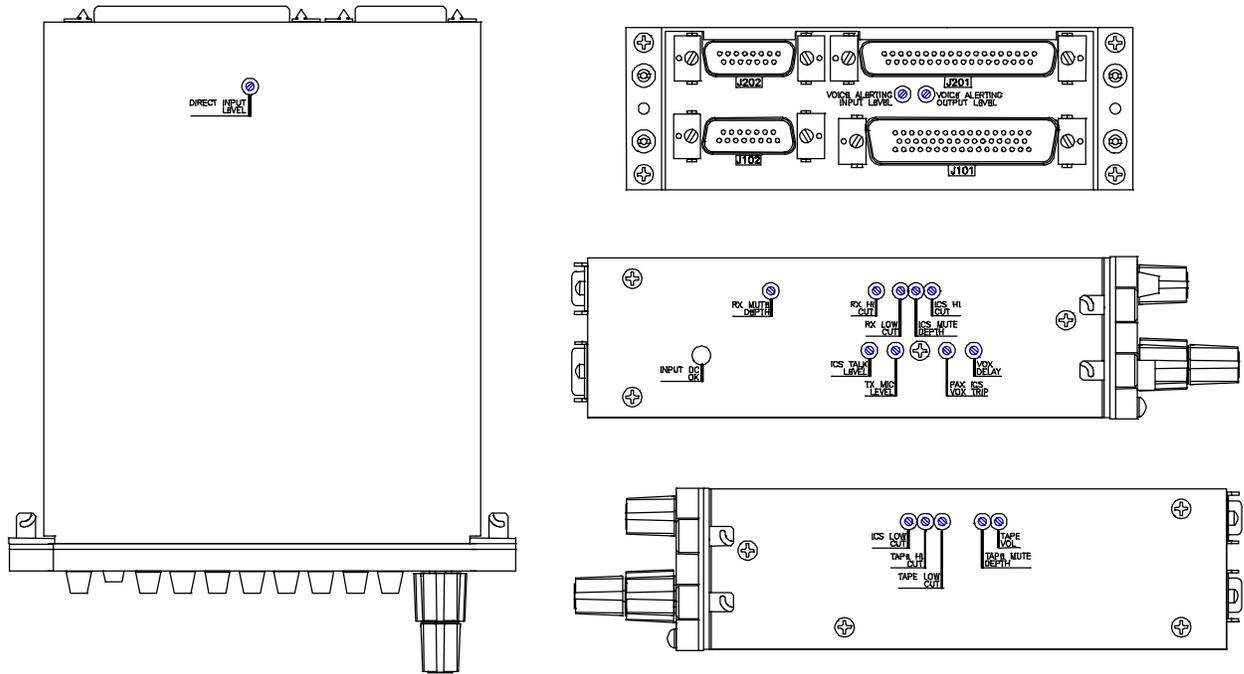


FIGURE 17: A710 Adjustment Locations

2.14 POST-INSTALLATION ADJUSTMENT LOCATIONS

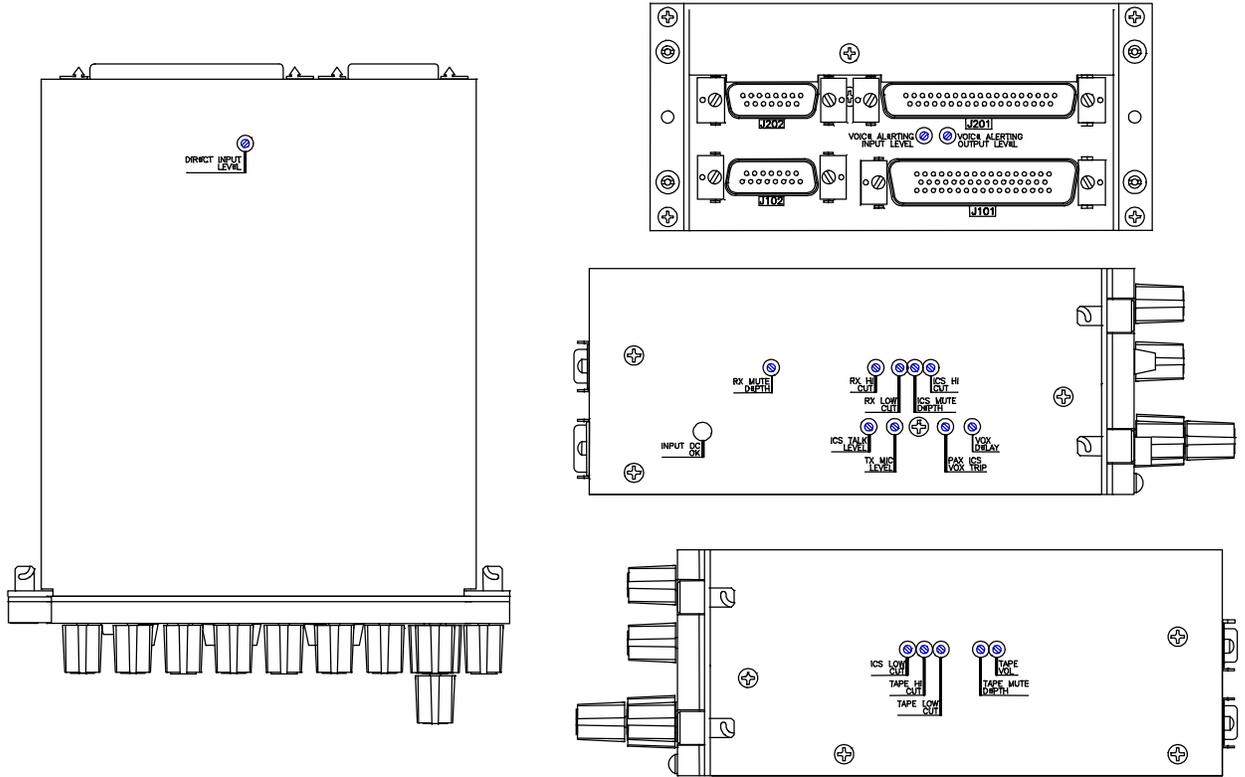


FIGURE 18: A711 Adjustment Locations

2.15 POST-INSTALLATION ADJUSTMENTS

After installation, the A710 and A711 may require adjustment of some functions to compensate for airframe and equipment specific issues, and to suit user tastes. Locations of these adjustments are as shown in Section 2.14 and are essentially identical for both units. All are 20-turn miniature trim pots, except as noted. "TAPE" input may be for any entertainment audio feed, such as CD, tuner, etc.

NOTE: Back adjustments (alerting) are NOT normally field adjusted, unless required. The 37 Pin connector (not required) above the adjustments may be removed to facilitate the adjustment of the alerting pots. Be extremely careful of any adjustments to these settings, as incorrect levels will be highly problematic in the airframe. These are normally bench adjustments.

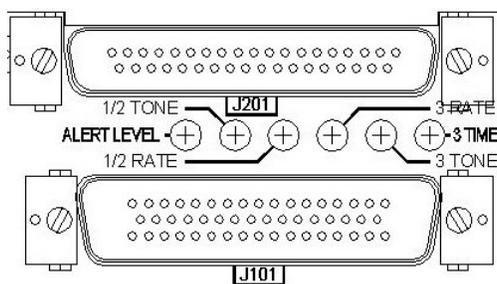
The unit adjustments are as follows:

ADJUSTMENT NAME	LOCATION	PROCEDURE / PURPOSE	NOTES
Direct Input Level	Top	Adjusts "Direct" input J210-3/22, an un-switched input, set as required. Often not used in installation.	Preset, Set to desired level, if required
Voice Alerting Input Level	Back	Adj. for comfortable voice recording level (record key pressed for sample, then playback to listen)	<input checked="" type="checkbox"/> Too sensitive will increase noise floor. Not normally a field setting. Only applicable to -3, -4, -7 and -8 variants.
Voice Alerting Output Level	Back	Adj. for comfortable alert playback level (activate any alert), and voice recording playback level.	<input checked="" type="checkbox"/> Too high will be disruptive for pilot. Too low will kill the voice alerting. Adjust with CAUTION! Not normally a field setting. Only applicable to -3, -4, -7 and -8 variants.
ICS Low Cut	R/H Side	Sets low frequency cut-off (BASS) of ICS audio. Useful for removing very high levels of cabin low frequency noise on the intercom.	Not normally a field setting.
TAPE Hi Cut	R/H Side	Sets high frequency cut-off (TREBLE) of TAPE audio.	Preset, Set to desired level, if required
TAPE Low Cut	R/H Side	Sets low frequency cut-off (BASS) of TAPE audio.	Preset, Set to desired level, if required
TAPE Mute Depth	R/H Side	Sets muting level of TAPE audio during ICS or TX operations. May be muted completely OFF, or set to a lower level during these operations.	Preset to OFF, Set to other desired level, if required.
TAPE Volume	R/H Side	Sets sensitivity of the TAPE audio input channels. Note that this input is NOT set by the front panel RX control.	Preset, Set to desired level, if required for specific system. Do not make too sensitive, or noise floor will suffer

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ADJUSTMENT NAME	LOCATION	PROCEDURE / PURPOSE	NOTES
RX Mute Depth	L/H Side Upper	Sets mute level of RX audio during TX operations (Sidetone).	Preset for 6 dB at mid-volume control. Set to other desired level, if required.
RX Hi Cut	L/H Side Upper	Sets high frequency cut-off (TREBLE) of RX audio.	Preset, Set to desired level, if required.
RX Low Cut	L/H Side Upper	Sets low frequency cut-off (BASS) of RX audio.	Preset, Set to desired level, if required.
ICS Mute Depth	L/H Side Upper	Sets Mute depth of ICS audio during TX operations.	Preset, Set to desired level, if required.
ICS Hi Cut	L/H Side Upper	Sets high frequency cut-off (TREBLE) of ICS audio. Useful for removing very high levels of cabin high frequency noise on the intercom.	Preset, Set to desired level, if required.
ICS Talk Level	L/H Side Lower	Sets ICS talk level and audio exported to other units in the airframe. Normally set to mid-position.	<input checked="" type="checkbox"/> Single-turn pot. Should be set to lowest level that is acceptable, to reduce ICS noise. Normally set to mid-position.
TX Mic Level	L/H Side Lower	Sets TX Mic level and audio exported to transceivers in the airframe. Normally set to mid-position.	<input checked="" type="checkbox"/> Single-turn pot. Should be set to lowest level that is acceptable, to reduce TX mic noise. Normally set to mid-position. Should be similar to level from pilot's Mic output during emergency operation.
PAX VOX Trip	L/H Side Lower	Sets VOX offset for passengers. Allows for differing Mics or ambient conditions. PAX VOX tracks front panel VOX control but is offset by this adjustment, which can be more or less sensitive. Normally set to mid-position.	<input checked="" type="checkbox"/> Single-turn pot. Should be set to mid-position unless change required.
VOX Delay	L/H Side Lower	Sets time dwell or delay of VOX circuit, once activated. Too short will result in choppy VOX operation, too long will allow VOX to remain open when no voice is present.	<input checked="" type="checkbox"/> Single-turn pot. Should be set to mid-position unless change required.

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J201 (above) may be removed to make these adjustments

FIGURE 19: Back - Alerting Adjustments

The following is only applicable to -13, -14, -17, and -18 variants:

ADJUSTMENT NAME	LOCATION	PROCEDURE / PURPOSE	NOTES
Alert Level	Back	Adj. for comfortable alert level, controls both direct input (option) and tone generator	<input checked="" type="checkbox"/> Too sensitive will increase noise floor. Not normally a field setting.
1 / 2 Tone	Back	Adj. for closest Alert 1 and Alert 2 tone match to existing alert horn sound.	<input checked="" type="checkbox"/> Not normally a field setting.
1 / 2 Rate	Back	Adj. for closest Alert 2 pulse rate match to existing alert horn sound.	<input checked="" type="checkbox"/> Not normally a field setting.
3 Tone	Back	Adj. for desired Alert 3 tone range.	<input checked="" type="checkbox"/> Not normally a field setting.
3 Rate	Back	Adj. for desired Alert 3 pulse rate.	<input checked="" type="checkbox"/> Not normally a field setting.
3 Time	Back	Adj. for desired Alert 3 activation interval.	<input checked="" type="checkbox"/> Not normally a field setting.

Testing or adjusting alerting functions requires airframe conditions to be set up to trigger the desired alerts, never perform adjustments in flight.

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Unit modifications that can be set in the field during installation:

Internal, removable jumpers may be set for the following items (**DEFAULT is BOLD**):

Main RX Board

PILOT HEADSET Impedance: **150/600** or 8/20 ohms

SPEAKER AUDIO: **RX Audio** **ON/OFF**
 TAPE Audio **ON/OFF**

HEADSET AUDIO: **TAPE Audio** **ON/OFF**

RX VOL MIIN: Set to **5%** or Set to 0%

Internal, removable jumpers may be set for the following items (**DEFAULT is BOLD**):

Mic Processor Board

PAL OPT 1: **Jumpered**

PAL OPT 2: **Jumpered**

OPT 3 (Pil. TX Muting) **Jumpered**

The following has a solderable jumper:

Main RX Board

COM7 RX Audio Set On, **Set Switched**, Set OFF

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SECTION 3: OPERATING INSTRUCTIONS

3.1 FRONT PANEL OPERATOR'S SWITCHES AND CONTROLS

This section explains the operation of the A710 & A711 ACCESS/A Audio Controls and how to use either system in a typical aircraft environment. Since the controls on the two units differ only in the extra receive monitor pots at the top of the A711, the A710 illustration is used for all of the explanations, except those specific to the A711. All normal user controls are on the front panel of the unit and are either variable rotating controls or selectable push-button switches.

The exact radio legends on the face of the A710 or A711 may vary from the illustration shown, due to customer specifications, and the final legend insert that is installed for the specific aircraft installation. A full view of the controls is given in Figure 19.

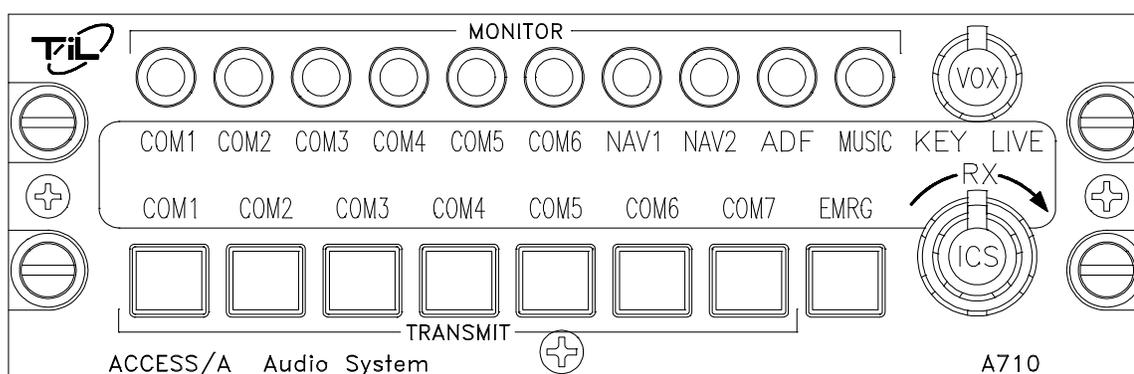


FIGURE 20: A710 Front Panel Operator's Switches and Controls

- The top row of round push-buttons selects the RX or RECEIVER audio to be sent to the crew headsets.
- The bottom row of square push-buttons selects the TX or TRANSCIEVER to be used when transmitting.
- Any combination of RX sources may be selected at one time, for system monitoring purposes.
- The corresponding RX audio of any TX selection is made *AUTOMATICALLY* whenever a TX button is depressed. This function is often referred to as Auto-RX select.
- The knobs at the right side of the unit adjust ICS VOLUME, RX VOLUME, and the trigger or VOX LEVEL of the INTERCOM, as well as its exact mode of operation.

3.1.1 INTERCOM KEYING MODE AND SENSITIVITY CONTROL

This adjustment selects how the intercom will activate. In the VOX (Voice Activated) mode, the audio produced by any of the microphones will break the squelch of the intercom and the audio will be routed through the system. The threshold audio level required to break the squelch is adjusted by this knob. Turning the knob *more clockwise* makes the system *more sensitive* to incoming mic audio. A *fully clockwise* setting on the knob will leave the intercom *on* at all times, giving LIVE or HOT MIC operation. When set *fully counter-clockwise*, in the switch detent position, the intercom is in the KEYED mode, will only produce audio when the intercom PTT line is keyed.

While the co-pilot, pilot, and passengers have *individual* mic VOX gates (3 in total), they are controlled from a *common front panel control*. Individual gating reduces the amount of unwanted noise when the intercom is triggered and makes intercom communication more intelligible as a result. The passengers may have their VOX threshold offset by an internal adjustment (PAX VOX) to accommodate differing headset types or ambient noise conditions.

With only a single A710 or A711 control, best operation of all ICS functions is obtained when the *microphones are all of the same type* (or have very similar characteristics). Headsets with significantly different microphones or earpiece efficiencies make it difficult to achieve satisfactory control adjustments for all users, unless they also have individual level controls. Good quality headsets, such as David Clark, Telex, or Bose, with noise reducing, amplified dynamic microphones and individual headset volume controls, give the most effective and user-adjustable performance, and minimal system difficulties. Use of “clone” headsets that visually resemble these higher quality units (but have much poorer electrical and acoustic performance) is strongly discouraged, as the entire system operation will suffer. This is especially true under high noise conditions or continuous rough use. Marginal headsets will compromise the ship’s entire audio system.

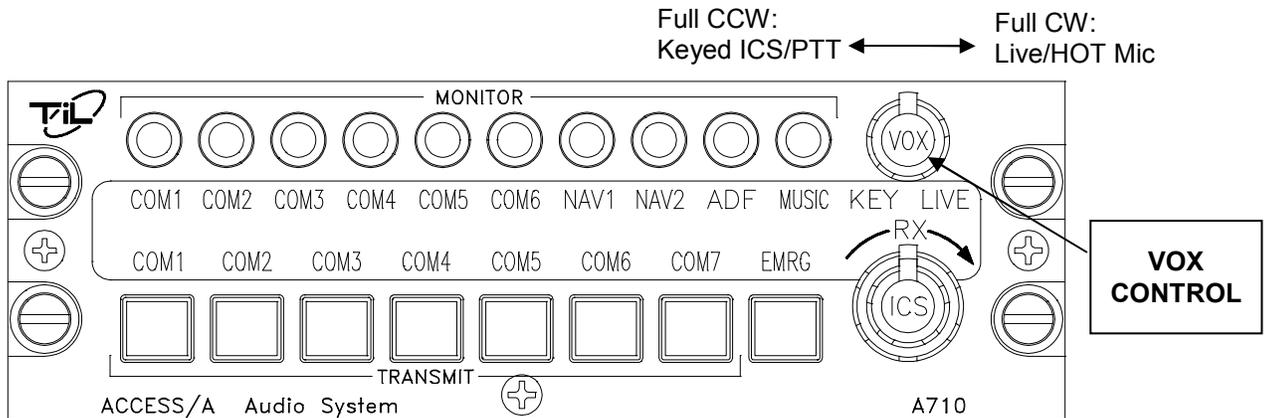


FIGURE 21: A710 ICS / INTERCOM Controls

3.1.2 ICS OR INTERCOM VOLUME CONTROL

The ICS LEVEL knob controls the intercom volume level for all users. Fully clockwise is the maximum volume level and counter-clockwise the minimum. The ICS volume can be set to zero, but has the internal capability to be preset to a low minimum value, if desired.

ICS audio is normally muted during TX operations, but may be adjusted internally for a user specified muting depth, or the muting function may be disabled by jumper selection.

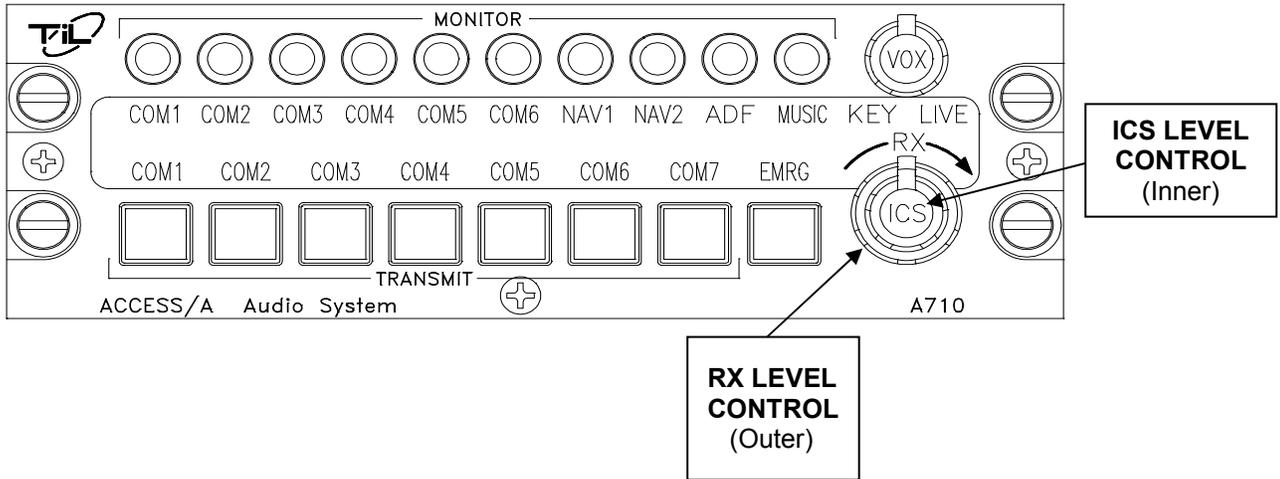


FIGURE 22: A710 LEVEL / VOLUME Controls

3.1.3 RX OR RECEIVE VOLUME CONTROL

The RX LEVEL knob controls the volume level of all the system receivers. Fully clockwise is the maximum volume level, and counter-clockwise the minimum. RX audio is derived from both the receivers (such as NAV aids) and the transceivers (Comms, etc.) in the system. The RX audio level *cannot* be set to zero and has an internal minimum level setting.

RX audio is normally partially muted during TX operations and is adjustable internally to the desired level for TX sidetone. Note that sidetone must come from the radio itself.

3.1.4 RX OR RECEIVE SELECTORS

These 10 push-button RX SELECTOR switches allow the crew to monitor any combination of the Receivers in the airframe system, independent of the setting of the transceiver selectors. The RX SELECTORS have an alternate action, *push in* to activate the audio and *push again* to have the switch return to the *out position and off*.

Any number or combination of RX switches may be used at the same time. Note that the corresponding RX audio is always *automatically selected* by a TX SELECTOR, and the matching RX switch does *not* have to be selected as well. Com7 (also the PA position) does not have a separate RX monitor switch; its audio is turned on *only when the TX selector for COM7 is pushed*.

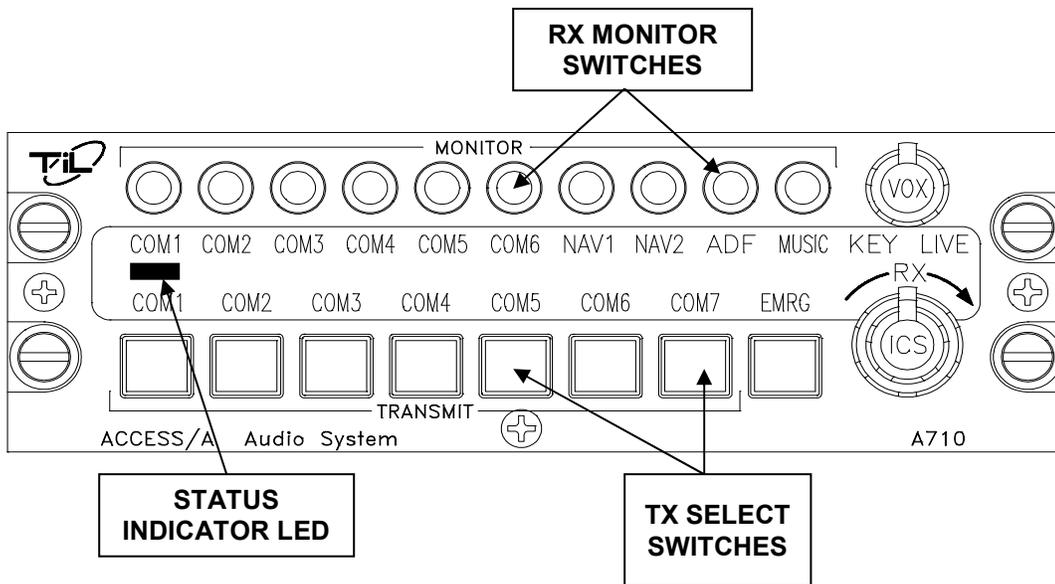


FIGURE 23: A710 RX & TX Selectors

3.1.5 TX OR TRANSCIVER SELECTORS

The setting of the TX SELECTOR switches determines *which transceiver will transmit* the activated microphone audio and which receiver the system will monitor, independent of the additional RX switch settings. The buttons have an *interlocking action*, and pressing one button will *automatically de-select* any other that is already activated. If two buttons are depressed at the same time, *simulcast operation* (on two radios) is enabled.

The buttons change from *black to white when activated*, and a corresponding STATUS LED *illuminates green* above the button. If a PA is installed, the button itself turns yellow to warn of potential live broadcast of audio outside the aircraft. The *LEDs turn yellow when the specific transmitter is activated by the A710/711*. All the LEDs will extinguish if all transmitter buttons are returned out to the off (black) position and no transmitter has been selected. This indicates that no valid TX mode has been selected by the crew.

In the EMERGENCY MODE, the radio(s) selected by this group of switches is *sent directly* to the *pilot's headset*, bypassing all of the internal power amplifiers and other electronics.

3.1.6 EMERGENCY SWITCH OPERATION & STATUS LEDs

The operation of the A710 control can be changed from NORMAL to EMERGENCY operation in two different ways. First, if *DC power fails* to the unit, the internal *auto-emergency function is enabled*, which transfers the unit to a passive emergency mode to enable critical communication to continue for the pilot. This auto-switch-over is indicated by all STATUS LEDs going black (including the one over the emergency switch).

Second, the PILOT EMERGENCY SWITCH can be depressed, (alternate action), which will force this transfer. In this mode, the STATUS LED above the switch changes from green to deep orange, and the button itself turns orange.

In either case, the PILOT (or primary user of the control) is *connected directly to the radio* that has been selected by the TX SELECTOR switch. Boom Mic Transmit operates normally, as does receive, but the headset power level is reduced to the passive (un-amplified) radio level. All internal electronics are bypassed for the pilot, which permits some level of operation even with massive equipment failure or loss of power.

When the pilot emergency switch is used to shift to emergency operation, the other users of the control are essentially un-affected, and continue to operate on the ICS & music circuit. This mode may also be used as a *“Pilot Isolate” function*, as all radio audio is disabled to the passengers and only the tape and ICS audio remain.

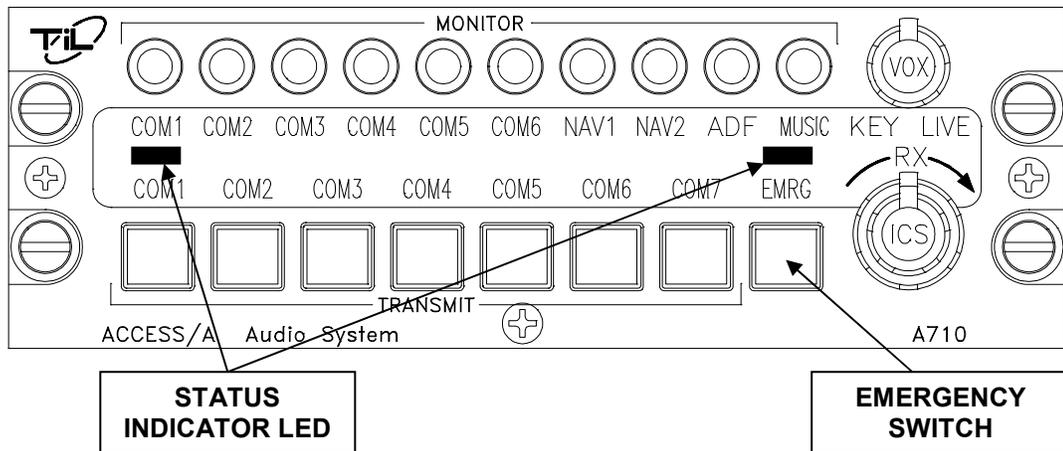


FIGURE 24: A710 Status LEDs & Emergency Switch

3.1.7 A711 RX MONITOR LEVEL CONTROLS

The operation of the A711 control differs slightly from the A710, in that *individual receive monitor controls* are provided to adjust the level for each of the 7 transceivers. In addition, an optional 8th control can be used to adjust either music or speaker level. These controls normally go to approximately 2-5% level at the minimum setting (not off) but can be strapped internally to go fully off, if required. Selecting the input “off” is normally done by the setting of the RX monitor switch, not the level control. This is a safety feature, to prevent accidental total loss of incoming communication due to an inadvertently low level pot setting.

If the 7th transceiver position is used for a PA, the 7th level control can be mapped to the corresponding COM7 RX position and internally set “ON”. This allows an AUX (un-switched) input to be supported via this control position.

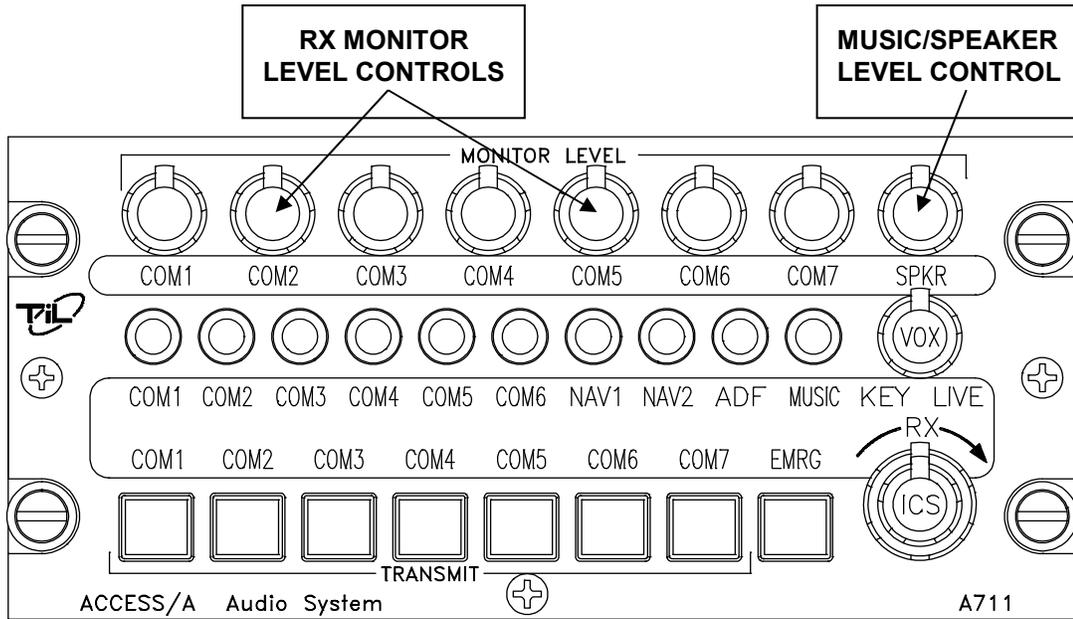


FIGURE 25: A711 RX Monitor Level Controls

3.2 SPECIAL SIGNAL CONSIDERATIONS

There are several special signals and lines related the A710 and A711, which require careful installation planning and understanding by the flight crew.

3.2.1 DIRECT AUDIO CONNECTIONS

The A710 has *two different un-switched, direct audio inputs*. One is routed *directly* to the *Pilot's headset output via a resistive pad*. This is used when an existing airframe threat alerting system must be tied directly to the pilot's headset. This function is active when in either the normal or emergency mode, and its volume is a function of the external generating source and the headset impedance. This should be tested (if implemented) to ensure adequate headset level is possible in the specific application. Note that this connection may be *unusable* in the LOW IMPEDANCE (8-20 ohm) headset mode, if the alerting system cannot deliver enough level. Excessive loading back through this connection may reduce headset volume, or adversely affect the pilot's headset, *so be certain this function is correctly implemented*.

The second direct input is un-switched only, and is *mixed with the regular RX audio bus*. It will be partially *muted* during TX operation, and must be used carefully to ensure correct system operation. This signal should *NOT be wired in the harness if not needed*, as it will serve merely as a source of noise if left stowed in the aircraft wiring. It cannot be switched off, and *will be lost during emergency operation, as only the 7 transceivers are routed to the emergency headset bus*.

3.2.2 SUM NODE

This line is used to *expand the RX input bus* of the A710 control and allows many supplemental receivers to be attached with high isolation from other signals. Use of either the A770 or A775 eyebrow expansion units is required to tie to this line. Signals directed to this input will be muted during TX operation, just as for any other RX input.

3.2.3 VOICE ALERTING (Applicable to –3, –4, –7, and –8 Variants Only)

The A710 supports the installation of an *optional alerting module* that can be either tone or “true voice” alerting, with spoken alert messages. The alerting voice messages function as follows:

Alerting messages are activated by a ground trigger at the corresponding input pin, and play the number of times, and in the way indicated, once the alert line is triggered.

The *highest priority message is played first, then succeeding messages in order*. An incoming higher priority message *interrupts a lower priority one immediately*. An incoming lower priority message plays once all higher priority messages have played first. The inter-message pause is 0.5 second. Multiple messages are sequenced starting with the highest priority, and going in order to the lowest.

ALERT MESSAGE	PRIORITY	FORMAT LENGTH	MESSAGE	INPUT PIN
Warning, Engine Failure	1, Critical	Repeat continuously	~2 sec.	Pin 15, Alert 1
Warning, Low Rotor RPM	2, Critical	Repeat continuously	~2 sec.	Pin 14, Alert 2
Warning, Engine Overtemp	3, Critical	Repeat continuously	~2 sec.	Pin 13, Alert 3
Caution, Decision Height	4	Repeat 2 times	~2 sec.	Pin 12, Alert 4
Caution, Check Display	5	Repeat 2 times	~2 sec.	Pin 11, Alert 5
Intercom Call	6	One time	~2 sec.	Pin 10, Alert 6

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A typical voice-alerting fault sequence is illustrated below:

An engine fails due to contaminated fuel or snow ingestion. The engine fails, followed by an eventual low rotor condition, and during descent, a decision height warning.

- **Event Starts:**
(engine failure detected), alerts begin:
- **Warning, Engine Failure** (pause) **Warning, Engine Failure** (pause)
Warning, Engine Failure

(Low rotor detected), new alert added, since higher priority has ***already played:***

- **Warning Low Rotor RPM** (pause) **Warning, Engine Failure** (pause)
- **Warning Low Rotor RPM** (pause) **Warning, Engine Failure** (pause)
- **Warning Low Rotor RPM**

(Decision height detected), new alert added, since higher priorities have already played. DH plays only twice:

- **Caution, Decision Height** (pause) **Warning, Engine Failure** (pause)
Warning Low Rotor RPM
- **Caution, Decision Height** (pause) **Warning, Engine Failure** (pause)
Warning Low Rotor RPM
- **Warning, Engine Failure** (pause) **Warning Low Rotor RPM**

In normal descent, the following is the Decision Height sequence:

(Decision height detected), alerts begin:

- **Caution, Decision Height** (pause) **Caution, Decision Height** (alert ends)

For an intercom call, the following is the call sequence:

(Press ICS call switch):

- **Intercom call** (alert ends)
(If no answer, pressed again)
- **Intercom call** (alert ends)

If user defined alerts are used, they default into these priorities, unless over-ridden at programming time to another pattern. In all cases, the priorities of alerts remains Alert 1 over all others, then Alert 2, etc. to Alert 6.

Tone alerting provides the following tones:

Continuous tone
Two-tone siren
Swept siren
Tone Pulses
Tone Pair Pulses
Chime

3.2.4 VOICE STORAGE FUNCTION

If the *voice alerting module is installed*, it is *also possible to store any audio in the system* as a voice message and play it back as required. Two external switches, RECORD and PLAYBACK are required in a convenient place, to control this function. A center-off, spring-loaded switch can be used for this function. Up to 30 seconds of audio may be stored in this way for later review at any time.

Voice storage is *non-volatile*, and remains in place even after powering down the unit, but is LOST if a new message is recorded, regardless of length. The audio may originate from the receivers or the intercom and this function may also be used as a voice notepad for recording in-flight notes, simply by hitting record while talking on the intercom.

This function can be very convenient for recording an in-flight observation, flight clearance, maintenance problem, or other data. The contents are over-written when the RECORD button is pressed again but may be replayed by the PLAYBACK switch an unlimited number of times.

3.2.5 TONE ALERTING (Applicable to -13, -14, -17, and -18 variants only)

The A711L supports the installation of *optional tone alerting*. The alerting tones function as follows:

Alerting tones are activated by a ground trigger at the corresponding input pin, and play once the alert line is triggered. The #3 (DH) alert is timed, and the #2 alert, (Low Rotor) over-rides tone #1 (Engine Failure). The tone level, frequency, pulse rate and time are all field adjustable for the best match to existing Sonalerts in the cockpit and user preferences. Always confirm alerting is working correctly and is at an acceptable level before completing any installation.

Alert Function	Corresponding Tone Input	Format	Input Pin
Engine Failure	1 (Steady tone)	Repeat continuously	Pin 15, Alert 1
Low Rotor RPM	2 (Pulsing tone)	Repeat continuously, over-rides tone 1	Pin 14, Alert 2
Decision Height	3 (Two-tone)	Timed, 2-3 sec. typical	Pin 1, Alert 3

3.2.6 SPEAKER AUDIO

The A710 and A711 have a speaker channel that may be used to provide cabin monitoring of signals when parked on the ramp, during troubleshooting, or for in-flight use if cabin noise permits. This is an *optional connection* and *does not have to be used*. The speaker level is driven by the same controls as the headset level, but it does not provide any microphone related audio (to avoid feedback), such as ICS.

The specific audio sources routed to the speaker channel may be programmed with jumpers internally, and it may be used as a “music only” feed for a passenger cabin area if desired. *Alerting is NOT routed to the speaker channel.*

3.3 CHANGING OVERLAY LIGHTING & RADIO LEGENDS

The legends on the A710 and A711 front panels, and the overlay color and lighting type, can all be easily changed in the field to suit special requirements. The entire lit overlay is changed by removing three screws, as illustrated below. Remove the knobs (using a 0.050" Allen/Hex key to undo the set screws) and the overlay assembly will pull off. A small polarized square plug on the rear mates with the lighting assembly and can be pulled off to allow the overlay to be completely removed and exchanged. If the lighting VOLTAGE is changed, the *internal connection must also be changed*, as well as the overlay. See the service manual for details.

The legend insert is adhesive and can be removed by lifting a corner free with a sharp X-acto knife blade, and then gently pulling the entire Lexan strip free. Remove the backing from a new legend strip (with the desired legends), line it up evenly, and press it into place on the overlay recess. The adhesive will cure fully in 48 hours. Be sure any bubbles are pressed out, and that all edges are firmly attached.

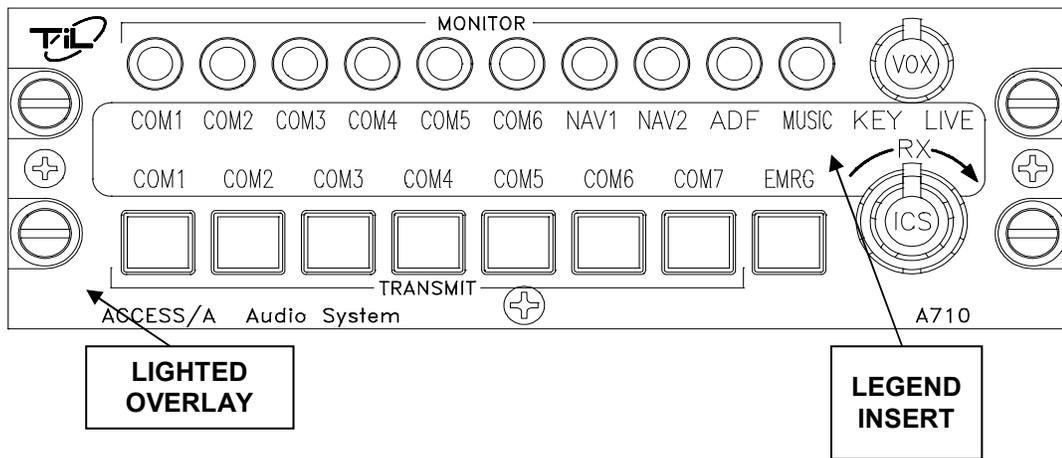


FIGURE 26: Overlay & Legend Insert

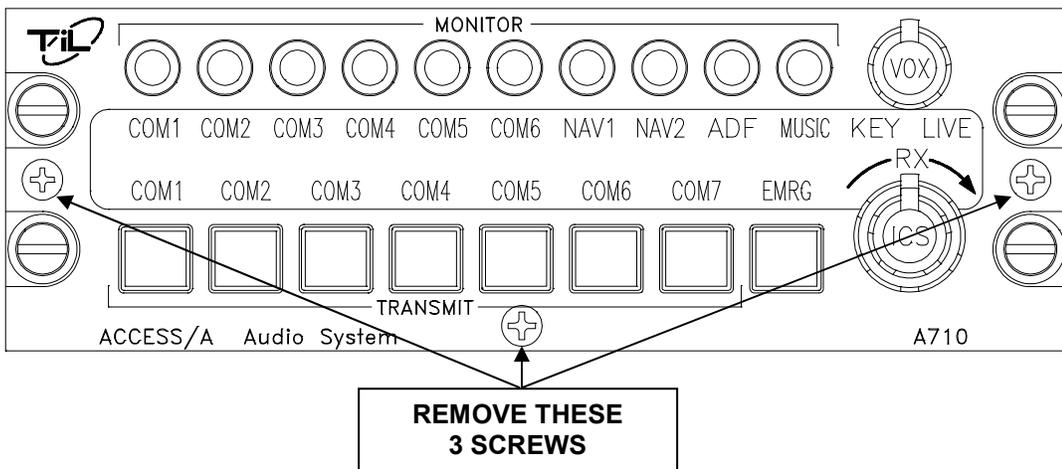


FIGURE 27: Removing the Entire Overlay Assembly

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**IMPORTANT
WARRANTY**

All communication equipment manufactured by Technisonic Industries Limited is warranted to be free of defects in Material or Workmanship under normal use for a period of one year from Date of Purchase by the end user.

Warranty will only apply to equipment installed by a factory approved and/or authorized facility in accordance with Technisonic published installation instructions. Equipment falling under the following is not covered by warranty:

- Equipment that has been repaired or altered in any way as to affect performance,
- Equipment that has been subject to improper installation,
- Equipment that has been used for purposes other than intended,
- Equipment that has been involved in any accident, fire, flood, immersion, or subject to any other abuse.

Expressly excluded from this warranty are changes or charges relating to the removal and re-installation of equipment from the aircraft. Technisonic will repair or replace (at Technisonic's discretion) any defective transceiver (or part thereof) found to be faulty during the Warranty Period.

Faulty equipment must be returned to Technisonic (or its authorized Warranty Depot) with transportation charges prepaid. Repaired (or replacement) equipment will be returned to the customer with collect freight charges. If the failure of a transceiver occurs within the first 30 days of service, Technisonic will return the repaired or replacement equipment prepaid.

Technisonic reserves the right to make changes in design, or additions to, or improvements in its products without obligation to install such additions and improvements in equipment previously manufactured. This Warranty is in lieu of any and all other warranties express or implied, including any warranty of merchantability or fitness, and of all other obligations or liabilities on the part of Technisonic.

This Warranty shall not be transferable or assignable to any other persons, firms, or corporations.

**For warranty registration, please complete the online
Warranty Registration Form found at www.til.ca.**