

ACCESS/A A710/A711

TSO'd High Performance Airborne Audio Systems



A710



A711

Technisonic High Performance Audio Control Stations

The ACCESS/A system is based on an integrated family of modular, field configurable, panel mounted controls, coupled with external special function units, which produce a complete airborne communications suite. This flexible audio system architecture supports extensive transceiver support, multiple ICS busses, alerting, warning and signaling functions, voice message storage, partitioned crews, and greatly expanded interface capabilities.

ACCESS/A is the physical layer of interconnection and interface between airborne crews and their radio systems, as well as providing internal intercom, internal and external paging, airframe alerting, music and entertainment functions. ACCESS/A makes multiple independent crew groups with cross-linking easy to implement for applications like emergency medevac or forestry aircraft, and delivers high performance solutions for the complex multi-transceiver communications found in SAR, customs, emergency services and police aircraft.

Compare These Features

Unlike many existing systems, ACCESS/A A710 and A711 controls are designed to be continuously expanded, relabeled and upgraded in the field, and can be easily re-configured as the aircraft systems are changed or improved. Up to 10 crew stations, and up to 6 crew members per crew station can be supported within a single aircraft. Many special modes and functions such as voice alerting, voice storage, NVG compatibility and custom panel legends can be implemented to provide a very high level of completion center customization, and the modular construction permits easy "one-shot" solutions for unusual mission specific problems.

Support for all common aircraft headset impedances is standard, including 8, 20, 150, 300 and 600 headsets, as is "fail-passive" emergency headset and boom microphone operation. Carbon-equivalent, amplified dynamic and amplified electret microphones are supported, and an optional external module can be installed for un-amplified low impedance dynamic microphone support.

To address installation concerns and costs, ACCESS/A systems include A740 interconnect bays and modules that reduce the labor, time and expense of configuring complex ship installations. A740 junction bays, to simplify wiring and harness fabrication, packaged micro-speakers and user station jack & switch units are all available to solve these problems quickly and inexpensively.

A710/A711 ACCESS/A stations support both speaker and headset based installations, and can provide internal paging as well as interfaces to commercially available external paging systems.

General Specifications

Model A710/A711

| | |
|----------------------------|--|
| Power requirements: | Aircraft 28 VDC supply (-20% +15 %), 350 mA nominal load. Meets TSO transient schedule, over voltage and brownout conditions. 28 Volt lighting @ 100 mA, 5 Volt lighting @ 340 mA. |
| Size and weight: | A710 Dzus panel, (5.75" wide x 1.875" high x 6.07" deep). Weight 2.4 lbs. A711 Dzus panel, (5.75" wide x 2.625" high x 6.07" deep). Weight 3.0 lbs. Weights shown include optional alerting module. |
| Environmental: | -40C/+70C operating, -55C/+85C survival temperature. Humidity maximum 96% non condensing. Shock 12g, any axis Altitude, to 25,000 feet. (cat. B2) DO-160C ENV. CAT. (A2B2)-CA(BMN)XXXXXXABBBAXZXXXXXX |
| Cosmetic: | Panel color either Flat Black or Cessna Cadet Flat Gray. Radio legends are field replaceable Lexan overlays. |
| System Features: | One to six users per control station. Direct push-button Tx function selection, no rotary switches. A711 has individual transceiver volume controls, A710 does not. Supports all headset impedance's from 8 to 600 ohms. Optional voice alerting functions with priority. Optional voice message storage/replay function. Six transceiver support, plus PA. Headset and Speaker Outputs. Soft music muting and stereo music input capability. VOX, PTT or LIVE ICS modes Individual Tx status enunciation. High cross-talk and ground loop rejection. Split ICS/Rx volume controls. Emergency Rx/Tx capability, including boom mic support. Changeable front panel legend system. Long-life solid state panel lighting system, NVG option. Configurable ICS loops. Designed and TSO'd to RTCA C50c audio standard. Supports multiple transmitter SIMULCAST operation. |
| Interface Data: | At least 500 mW into 150 ohms (per primary user). At least 1500 mW total into all users (150 ohms). Distortion less than 2% THD at 1 kHz at total rated output. Speaker output at least 2.5 Watts into 8 ohms. Input to input isolation better than -70dB between radio inputs. Deselected input isolation better than -65 dB. Hum and noise better than -60dB below 500 mW. Frequency response within 6dB from 300 Hz to 6000 Hz. Up to 10 stations per system. Floating input and output connections. Ground seeking key and alert lines. |

Note: Specifications are subject to change without notice

Technisonic Industries Ltd.
240 Traders Blvd, Mississauga, Ontario L4Z 1W7 CANADA
Ph: 905 890-2113 Fax: 905 890-5338 www.til.ca



A710

Understanding ACCESS/A Audio



A711



Technisonic Industries Ltd.

240 Traders Blvd.

Mississauga, ON Canada

L4Z 1W7

☎ (905) 890-2113

✉ (905) 890-5338

www.til.ca

3rd Generation Advanced Analog Systems

Rev. 1.1 March, 2009

USERS: One ACCESS/A A710 or A711 station can support up to **6 headset positions** in an aircraft, 2 flight crew (pilot/co-pilot) with full transmit and ICS capability, and 4 passengers with radio monitor and ICS operation. Passenger operation can also be extended to 5 or 6 positions if required, simply by adding resistors.

INTERCONNECT: Unlike earlier generation designs like the KMA24, AA95, and AMS40 series, the interconnect in this system is **FULLY FLOATING**, which means that **no audio lines use the airframe ground** as an audio return, thus avoiding noise, cross-talk and unwanted signal contamination. ACCESS/A systems offer as much as **35dB of improvement** in cross-talk (rejection of unwanted signals), a very important consideration in multi-station systems. Up to 10 A71X-series stations can be used in a single network, and they can be configured to have multiple ICS (Intercom System) loops.

POWER: Headset output level is a significant problem in many applications, as flight crews are now often using inefficient helmets and earplugs. ACCESS/A systems offer the highest headset drive currently available in a panel-mounted system, 1,500mW total. This is considerably more power than earlier generation systems of 100-500mW. In addition, these systems also have a 2.5W speaker output for radio monitoring when headsets are off.

CUSTOMIZATION: Customization is always a problem in the audio world. Every ship seems to have some custom issue that needs to be addressed in the audio system. ACCESS/A systems use an easily changed backlit polycarbonate overlay inset that allows rapid customization of any panel **without costly faceplate changes**. Systems already installed can be changed at any time, and custom new installations can be made quickly with stock units and custom overlays. Faceplate lighting can be 28V or 5V, and NVG compatible lighting is available. Extensive and convenient cosmetic options are available to the installer at very low cost.

SIMULCAST: Unlike rotary control audio systems, the pushbutton design and high powered mic driver of the ACCESS/A A710 and A711 controls supports simulcast, allowing multiple radios to be used at once, often an important operational requirement.

ALERTING: The ship's audio system serves as the focal point for audible alerting signals passed to the flight crew. Earlier generation system had limited connections for this, or a few tones that could be generated. ACCESS/A systems have **true voice alerting, with 6 spoken, prioritized messages**, and the ability to record and replay incoming audio. In addition, a direct headset alerting connection is also provided for existing shipboard systems. Alert messages can also be recorded in any language on a custom basis.

EXPANSION: ACCESS/A controls support 7 TX positions, which can be 6 radios and a PA, or 7 transceivers. Not enough? Need more inputs? Need more variable controls? The ACCESS/A architecture has special sum node connections that allow inputs and transceivers *to be expanded indefinitely* either using ACCESS/A system elements, or your custom external wiring.



A711X Transceiver expansion unit



A775 Receiver Expansion unit

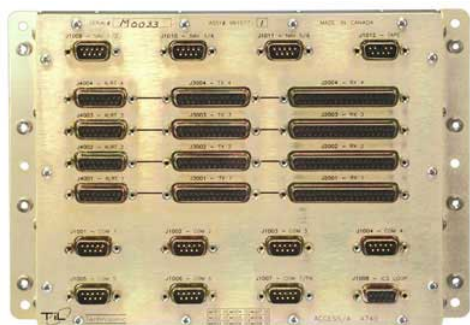
ICS LOOP CONTROL: Often, a ship has to be broken into isolated intercom circuits, such as Medevac applications, where the medical crew needs to work isolated from the flight crew. Using the ACCESS/A A770 eyebrow unit, additional receiver inputs, and full tie/split ICS loop control can be easily implemented. And in only 3 Dzus holes of panel space!



The **A770** provides additional audio inputs, ICS loop control with calling, and speaker volume. Many custom variations are possible.

EMERGENCY OPERATION: One huge benefit of analog audio systems is their implicit ability to have extensive “fail-passive” operation that permits radio operation even if there is serious internal failure, or power is lost to the box. ACCESS/A systems allow the pilot to have full control of ALL transceivers, and continued cyclic TX control even in this faulted condition or without power, a unique ACCESS/A feature. This mode can also be used to provide an isolated radio-only mode for the pilot away from the rest of the users.

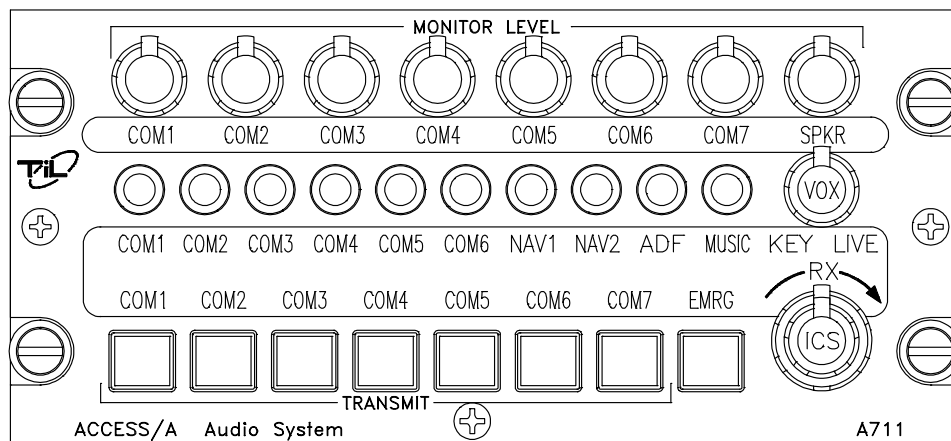
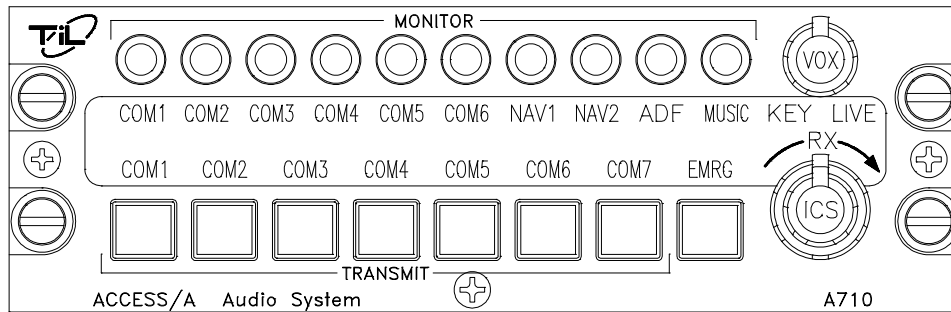
INTERCONNECT: Airframe interconnect is always time consuming and irritating, but ACCESS/A systems can use the A740 interconnect patch bay to speed up harnessing, and provide for very clean cable fabrication with convenient break and test points. All the connectors in the ACCESS/A system have fully mapped interconnect that has logical pin assignments and easily followed connections.



The **A740** provides a very easy way to manage complex audio installations of up to 4 stations.

ACCESS/A™ AUDIO CONTROL SYSTEM

MODELS: A710 & A711



Installation and Operating Instructions

TiL Document No.
96RE189
Rev. 2.2
July 2009

Technisonic Industries Limited

240 Traders Blvd. E., Mississauga, Ontario L4Z 1W7 Tel:(905)890-2113 Fax:(905)890-5338
www.til.ca

| REVISIONS | | | | |
|------------------|---------------------------|---|------------------|-----------------|
| Revision | Page | Description | Date | Approved |
| 2.0 | Sec. 1 Sec. 2 | Modified specifications according to TSO tests. Update to comply with results of TSO tests. | DEC 97 DEC 97 | |
| 2.1 | Sec. 1 Pg.1-6 & 1-7 | Modified specifications according to results of tests for increased Temperature Range and Altitude. | 04 MAY 98 | |
| 2.2 | Sec. 2 Pg. 2- 16 | Added clarification for installation kit parts. | 08 JULY 09 | |

 **CAUTION**

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

 **WARRANTY INFORMATION**

The Model A710 Audio Controller is under warranty for one year from date of purchase. Failed units caused by defective parts or workmanship should be returned for warranty service to:

Technisonic Industries Limited
250 Watline Avenue
Mississauga, Ontario L4Z 1P4

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

Technisonic Industries Limited
3840 East Robinson Road, Suite 214
Amherst, New York 14228

Tel: (716) 691-0669

 **TRADEMARK INFORMATION**

ACCESS/A, ACCESS/D, ACCESS/R & ACCESS/F are all trademarks of Technisonic Industries Ltd. and Sphere Research Corporation. All rights reserved.

TABLE OF CONTENTS

| | | TiL DOCUMENT | 96RE189 |
|--|--|--------------|---------|
| SECTION 1 GENERAL DESCRIPTION | | | |
| 1.1 | Introduction..... | | 1-1 |
| 1.2 | Description | | 1-1 |
| 1.3 | Purpose of Equipment..... | | 1-2 |
| 1.4 | Model Variations..... | | 1-2 |
| 1.5 | Technical Summary..... | | 1-5 |
| 1.6 | System Limitations | | 1-6 |
| SECTION 2 INSTALLATION INSTRUCTIONS | | | |
| 2.1 | General..... | | 2-1 |
| 2.2 | Equipment Packaging Log | | 2-1 |
| 2.3 | Wiring Requirements..... | | 2-1 |
| 2.4 | Audio Panel Installation & Drawings | | 2-1 |
| 2.5 | Kit Contents..... | | 2-16 |
| 2.6 | Pin Connections and Locations..... | | 2-17 |
| 2.7 | Headphones..... | | 2-21 |
| 2.8 | Microphones..... | | 2-21 |
| 2.9 | PTT..... | | 2-21 |
| 2.10 | Main Power | | 2-21 |
| 2.11 | Backlighting Power..... | | 2-22 |
| 2.12 | Ground | | 2-22 |
| 2.13 | Storage..... | | 2-22 |
| 2.14 | Post Installation Adjustment Locations | | 2-23 |
| 2.15 | Post Installation Adjustments | | 2-24 |
| SECTION 3 OPERATION | | | |
| 3.1 | Front Panel Operator's Switches & Controls..... | | 3-1 |
| 3.1.1 | Intercom Keying Mode & Sensitivity Control | | 3-2 |
| 3.1.2 | ICS or Intercom Volume Control | | 3-3 |
| 3.1.3 | RX or Receive Volume Control | | 3-3 |
| 3.1.4 | RX or Receive Selectors | | 3-4 |
| 3.1.5 | TX or Transceiver Selectors..... | | 3-4 |
| 3.1.6 | Emergency Switch Operation & Status LEDs | | 3-5 |
| 3.1.7 | A711 RX Monitor Level Controls..... | | 3-6 |
| 3.2 | Special Signal Considerations | | 3-7 |
| 3.2.1 | Direct Audio Connections..... | | 3-7 |
| 3.2.2 | Sum Node | | 3-7 |
| 3.2.3 | Alerting | | 3-8 |
| 3.2.4 | Voice Storage Function..... | | 3-10 |
| 3.2.5 | Speaker Audio..... | | 3-10 |
| 3.3 | Changing Overlay Lighting & Radio Legends | | 3-11 |

LIST OF TABLES

| | | |
|-----|----------------------------------|-----|
| 1-1 | A710 General Specifications..... | 1-4 |
| 1-2 | A711 General Specifications..... | 1-5 |

LIST OF ILLUSTRATIONS

| | | |
|------|---|------|
| 1-1 | A710 Audio Control - General View..... | 1-3 |
| 1-2 | A711 Audio Control - General View..... | 1-4 |
| 2-1A | A710 Outline Drawing | 2-3 |
| 2-1B | A711 Outline Drawing | 2-4 |
| 2-2 | System Installation Drawings- Pilot/Co-Pilot Wiring..... | 2-5 |
| 2-3 | System Installation Drawings- COM1-COM4 Wiring | 2-6 |
| 2-4 | System Installation Drawings- COM5-NAV1 Wiring | 2-7 |
| 2-5 | System Installation Drawings- NAV2-NAV5 Wiring | 2-8 |
| 2-6 | System Installation Drawings- NAV6-NAV8/Tape Wiring..... | 2-9 |
| 2-7 | System Installation Drawings- Passenger Wiring | 2-10 |
| 2-8 | System Installation Drawings- Alternate Passenger Wiring | 2-11 |
| 2-9 | System Installation Drawings- Power & Alerting Wiring | 2-12 |
| 2-10 | System Installation Drawings- Direct Input/Special Function Wiring..... | 2-13 |
| 2-11 | System Installation Drawings- Reserved Wiring | 2-14 |
| 2-11 | System Installation Drawings- Special 6-Place Passenger Wiring..... | 2-15 |
| 3-1 | Front Panel Operators Switches and Controls..... | 3-1 |
| 3-2 | ICS/Intercom Controls | 3-2 |
| 3-3 | Level/Volume Controls | 3-3 |
| 3-4 | RX & TX Selectors | 3-4 |
| 3-5 | Status LEDs & Emergency Switch | 3-5 |
| 3-6 | A711 RX Monitor Level Controls | 3-6 |
| 3-7 | Overlay & Legend Insert | 3-11 |
| 3-8 | Removing the Overlay Assembly..... | 3-11 |

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

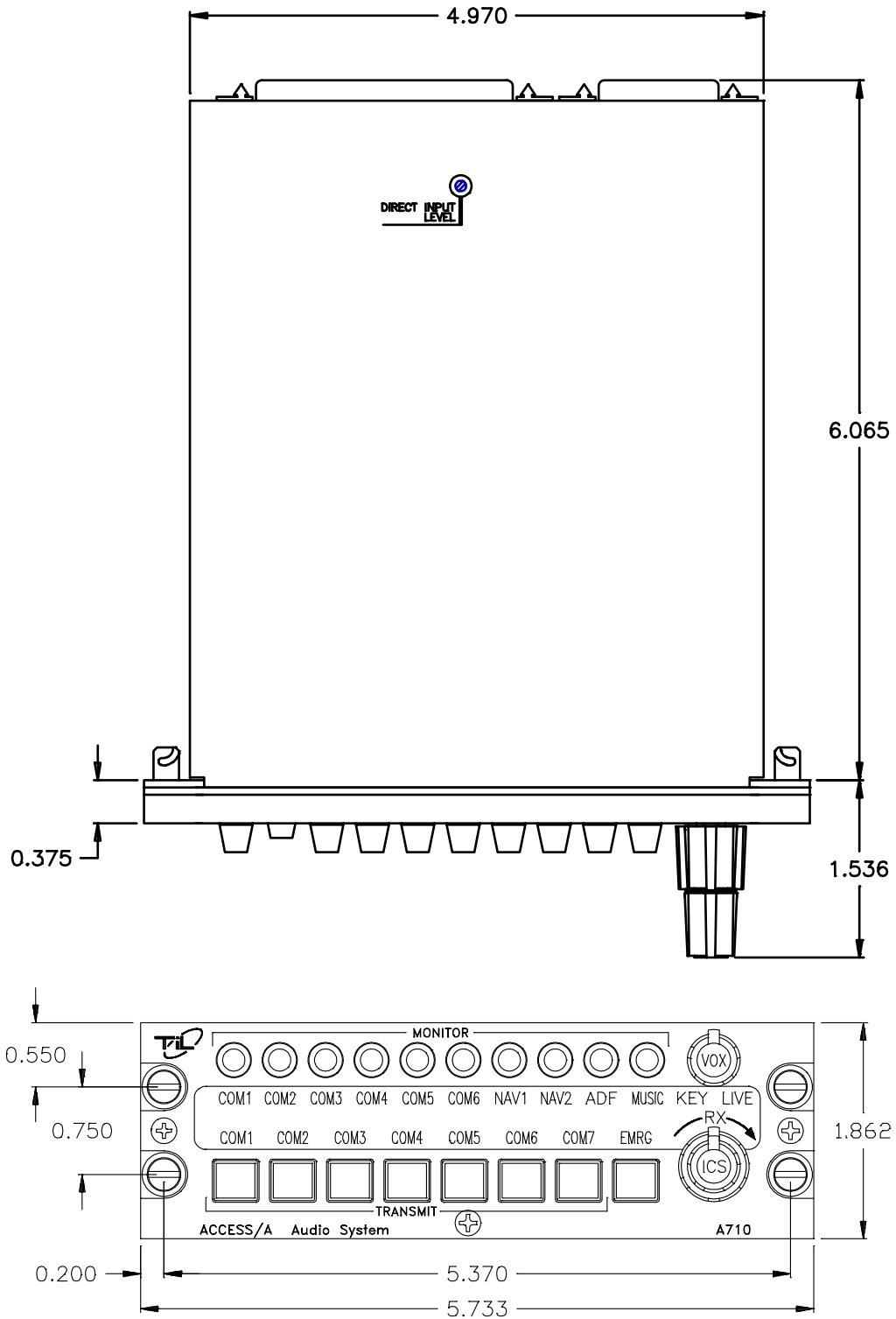
A710 = 961068 - (dash number)
A711 = 961072 - (dash number)

Dash Numbers:

| | | |
|-----------|-------------|--|
| -1 | Gray Panel | 28VDC Lighting |
| -2 | Black Panel | 28VDC Lighting |
| -3 | Gray Panel | 28VDC Lighting, includes A851 Voice Alerting |
| -4 | Black Panel | 28VDC Lighting, includes A851 Voice Alerting |

special order:

| | | |
|-----------|-------------|---|
| -5 | Gray Panel | 5VDC Lighting |
| -6 | Black Panel | 5VDC Lighting |
| -7 | Gray Panel | 5VDC Lighting, includes A851 Voice Alerting |
| -8 | Black Panel | 5VDC Lighting, includes A851 Voice Alerting |



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

FIGURE 1-1 A710 ACCESS/A AUDIO CONTROLLER - GENERAL VIEW

ACCESS/A A710/A711 Installation & Operating Instructions
 96RE189

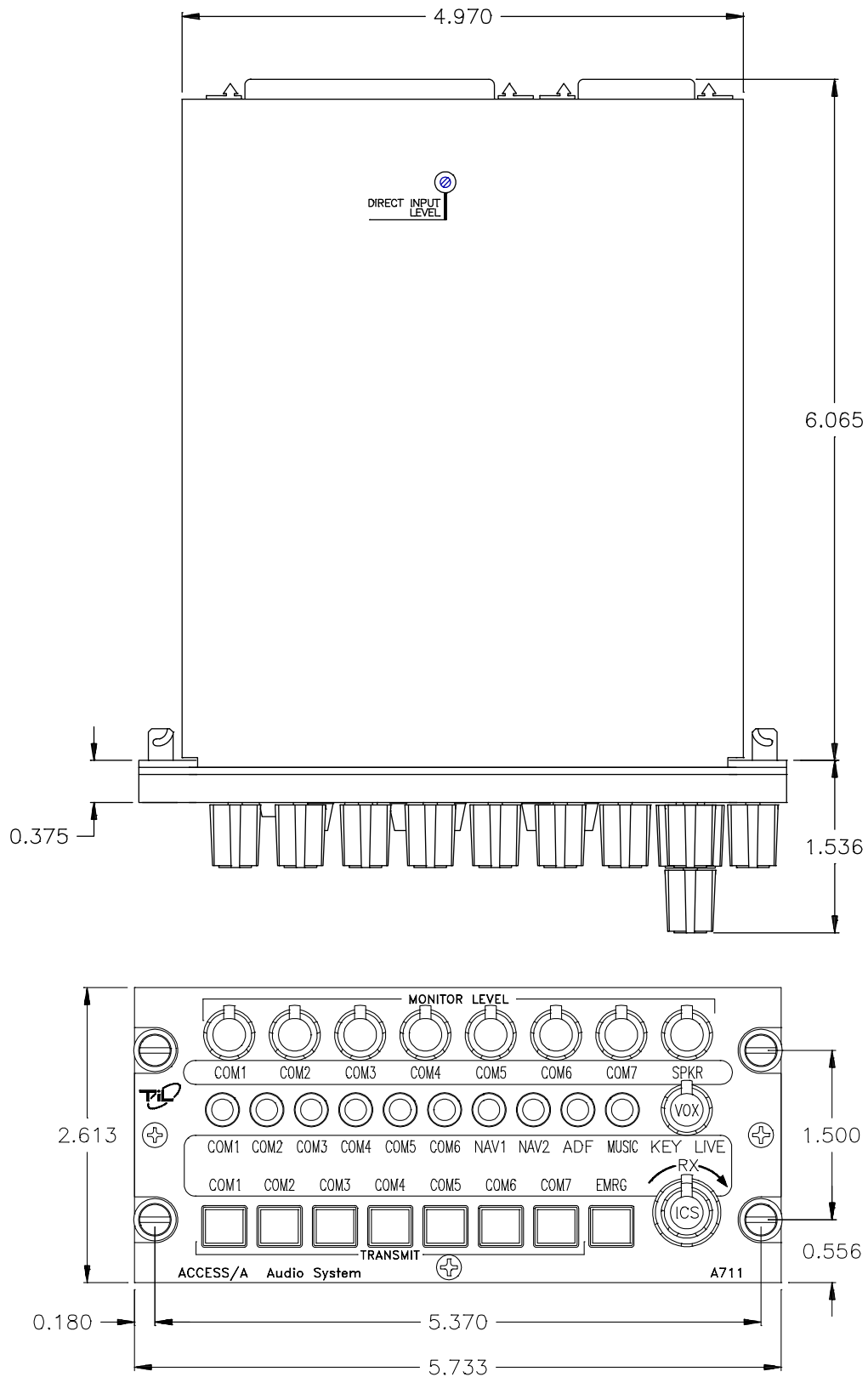


FIGURE 1-2 A711 ACCESS/A AUDIO CONTROLLER - GENERAL VIEW

1.5 TECHNICAL SUMMARY

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

TABLE 1-1 A710 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) | 2.4lbs. (1.09Kg) |
| 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 Vdc @ 50 mA |
| Optional | 5 Vdc @ 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 @1kHz 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 1-2 A711 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 Vdc @ 70 mA |
| Optional | 5 Vdc @ 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 @ 1kHz 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 |

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 Utilised Throughout Testing

Pilot Headset Settings utilised throughout testing was 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. Heatshrink 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.

 CAUTIONS:

DO NOT bundle **any low level audio lines with RF coaxial cables, 60 Hz or 400Hz 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 2-1** 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.

☑ 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 **Figure 2-x**. These installation and mechanical drawings are available as **AutoCAD files** (“DWG”/R12 format, Windows Metafile “WMF” or “DXF” format) free of charge to authorized TiL dealers and completion centers.

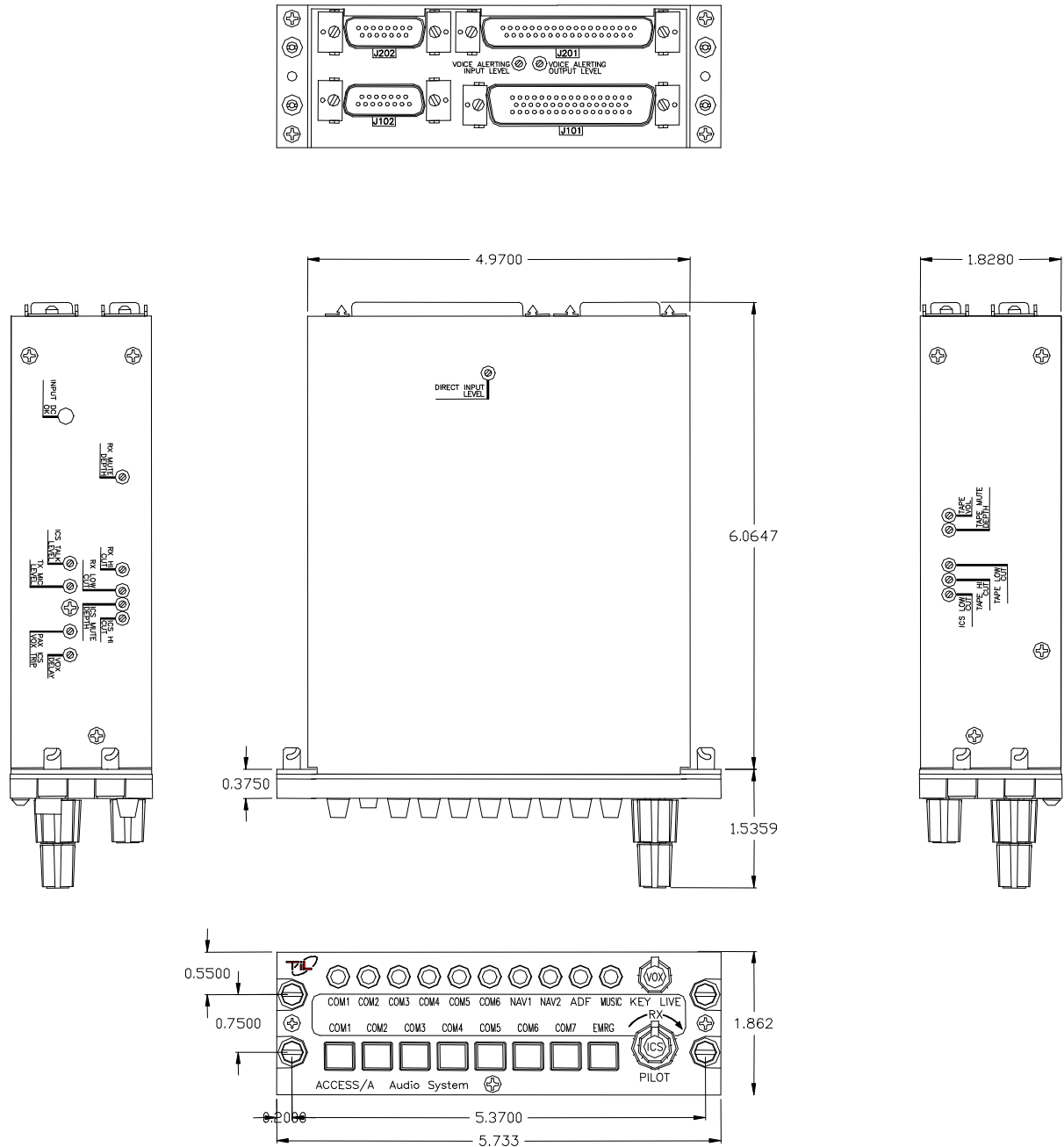


FIGURE 2-1A Outline Drawing for Model A710 ACCESS/A Audio Controller

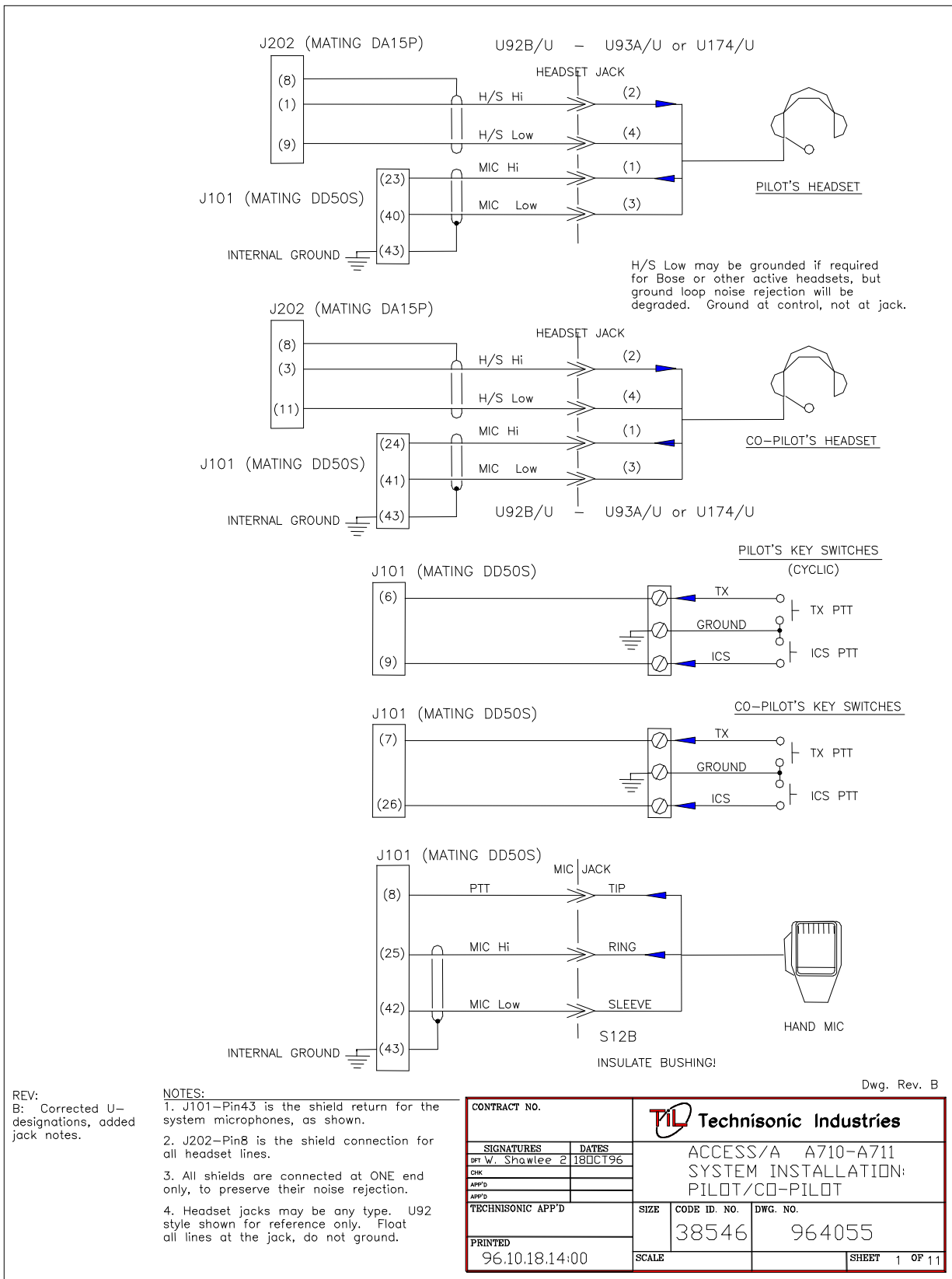


Figure 2-2 PILOT/CO-PILOT WIRING

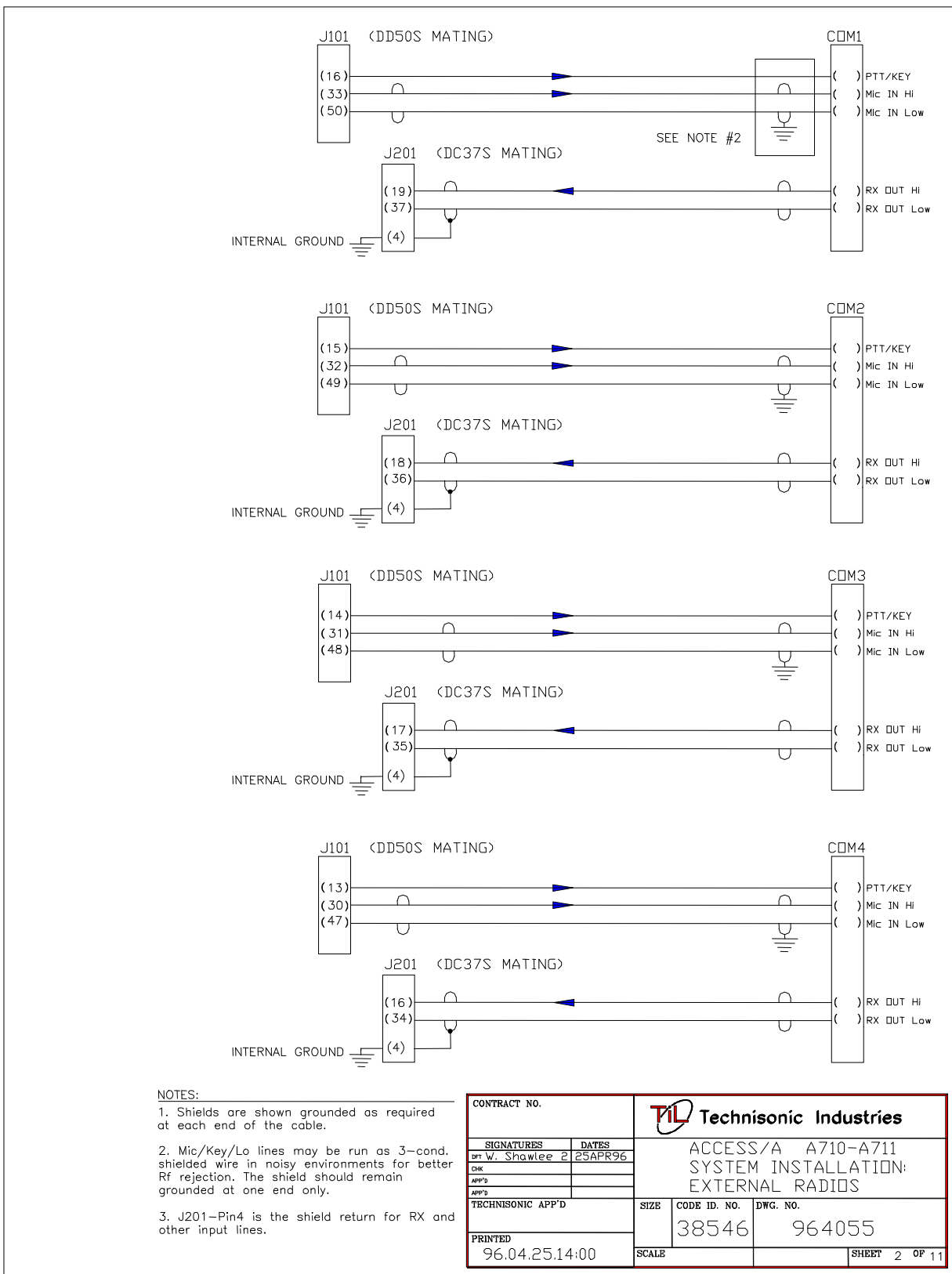


Figure 2.3 COM1-COM4 WIRING

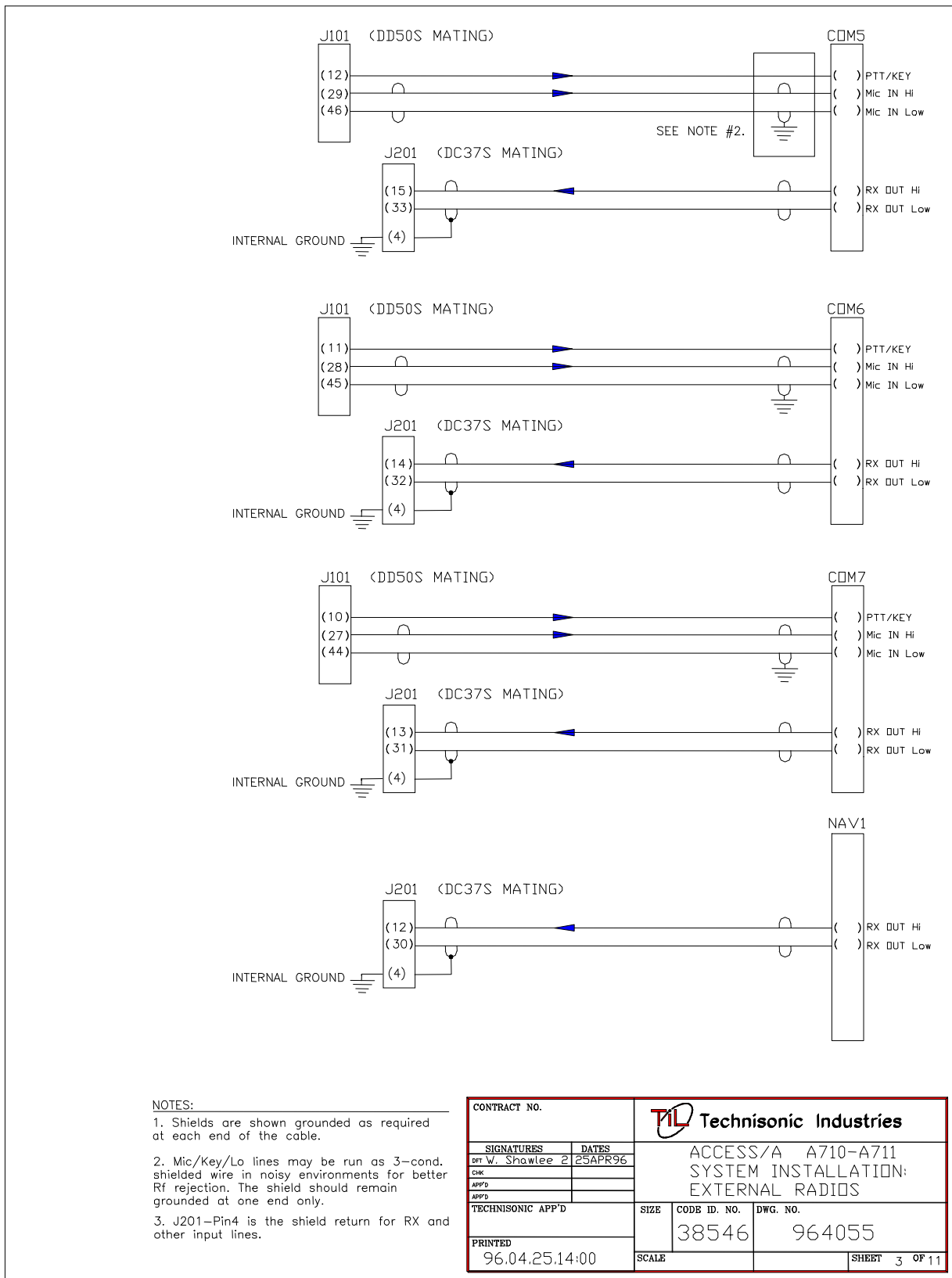
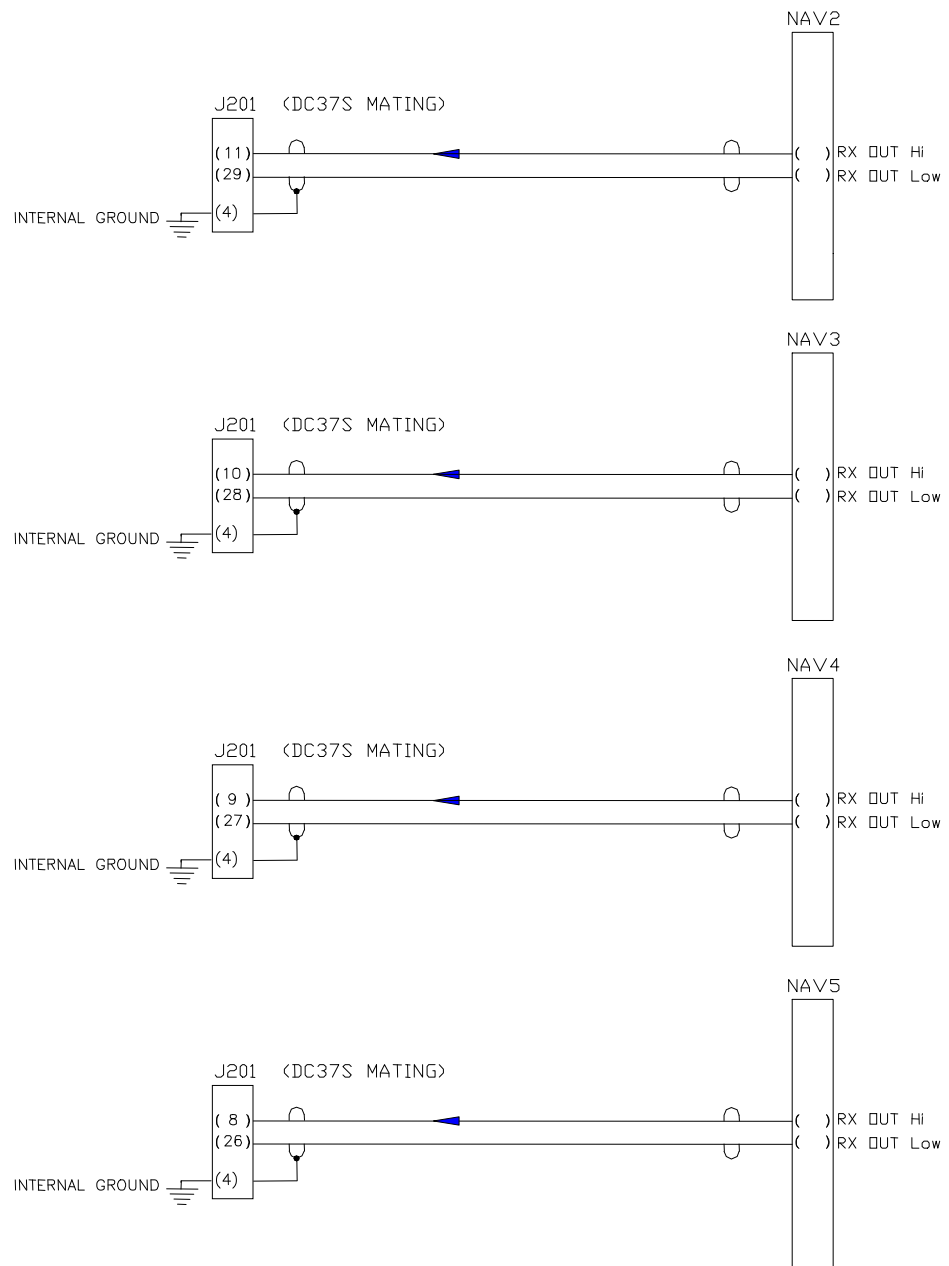


Figure 2-4 COM5-NAV1 WIRING



- NOTES:
1. Shields are shown grounded as required at each end of the cable.
 2. J201-Pin4 is the shield return for RX and other input lines.

| | | | |
|-------------------|--|-----------------------------------|---------------|
| CONTRACT NO. | | TIL Technisonic Industries | |
| SIGNATURES | | ACCESS/A A710-A711 | |
| DATE | | SYSTEM INSTALLATION: | |
| DFT W. Shawlee 2 | | EXTERNAL RADIOS | |
| CHK | | | |
| APP'D | | | |
| TECHNISONIC APP'D | | SIZE | CODE ID. NO. |
| | | | 38546 |
| PRINTED | | DWG. NO. | 964055 |
| 96.04.25.14:00 | | SCALE | SHEET 4 OF 11 |

Figure 2-5 NAV2-NAV5 WIRING

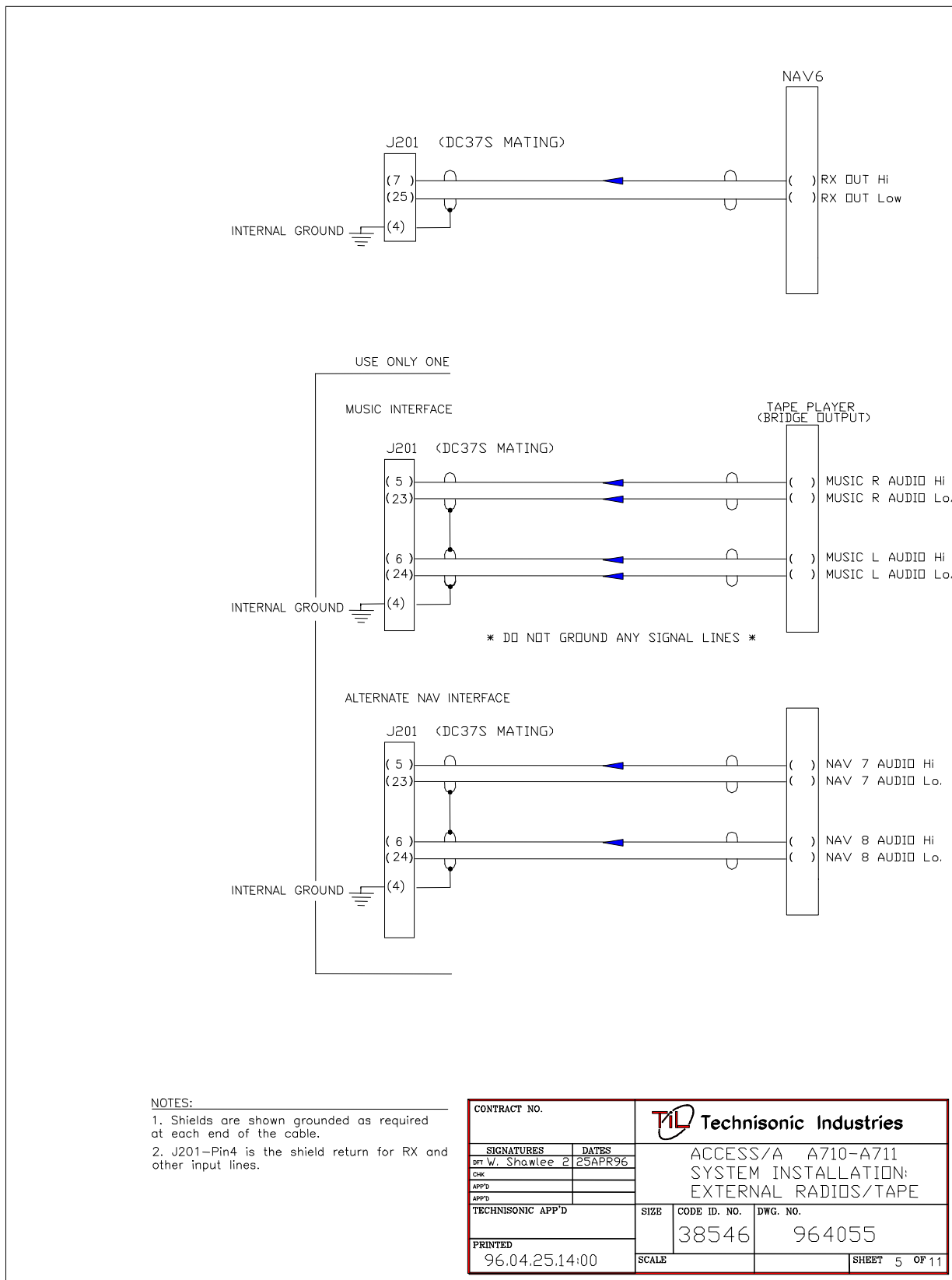


Figure 2-6 NAV6-NAV8/TAPE WIRING

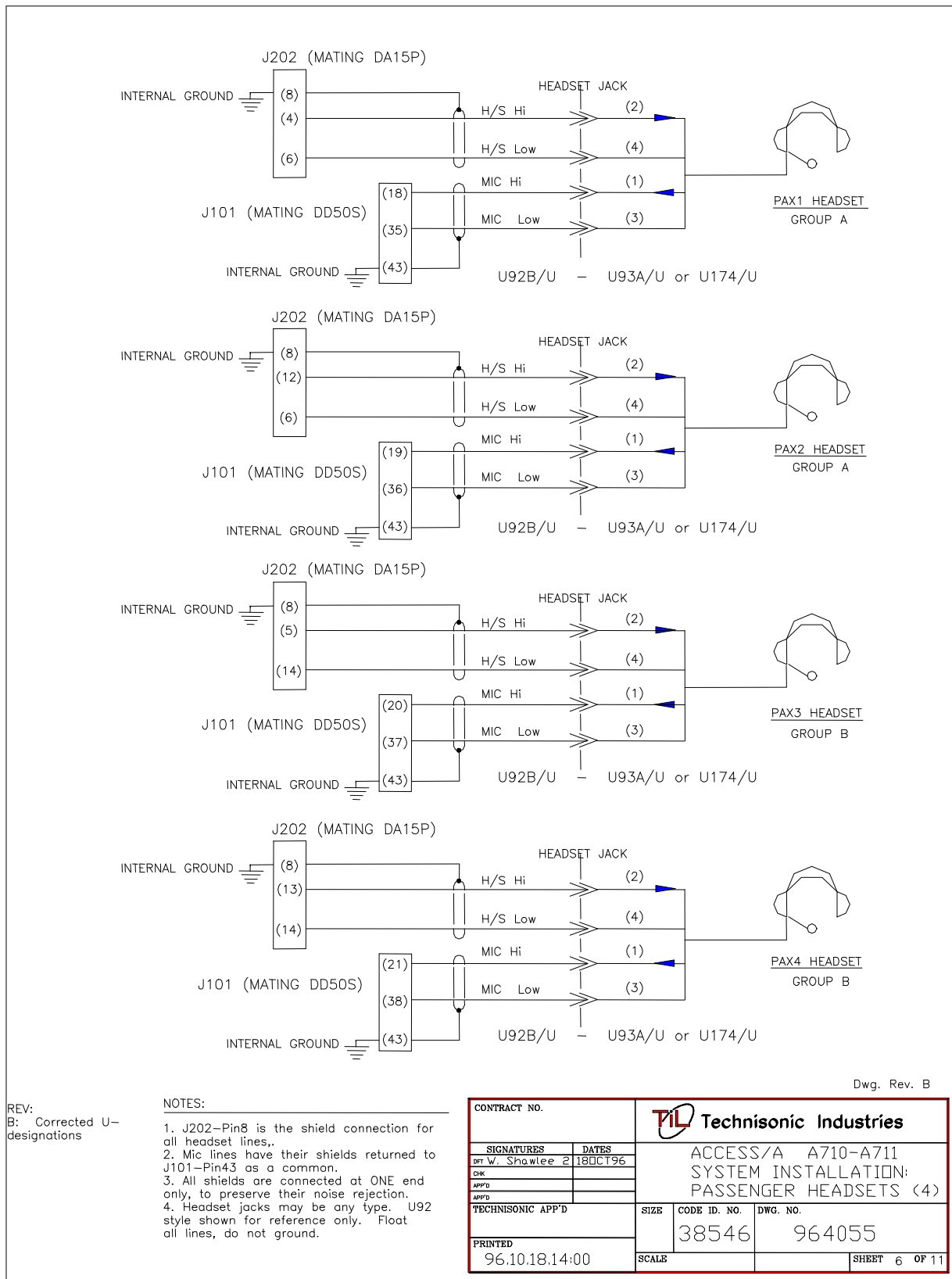


Figure 2-7 PASSENGER WIRING

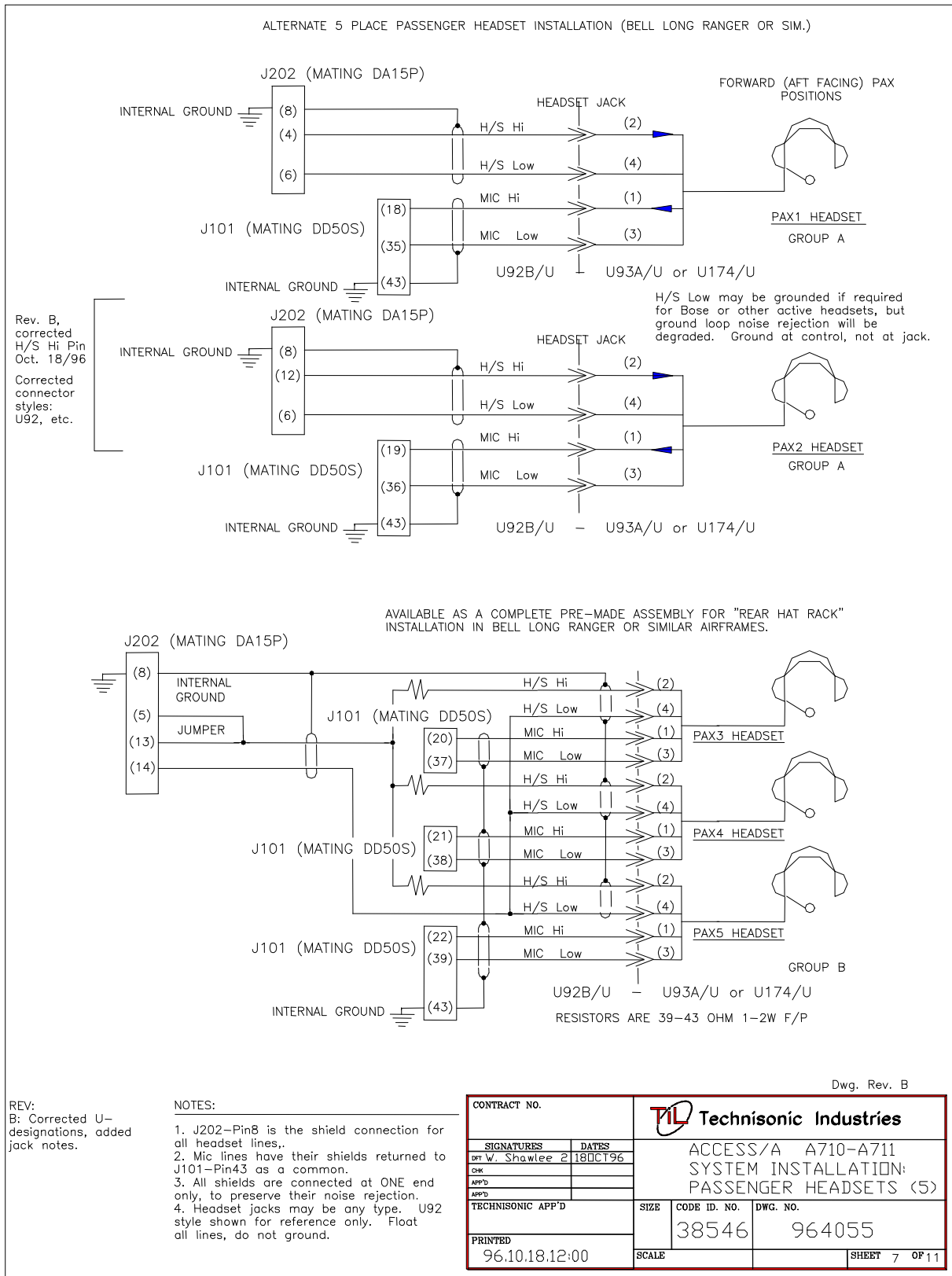


Figure 2-8 ALTERNATE PASSENGER WIRING

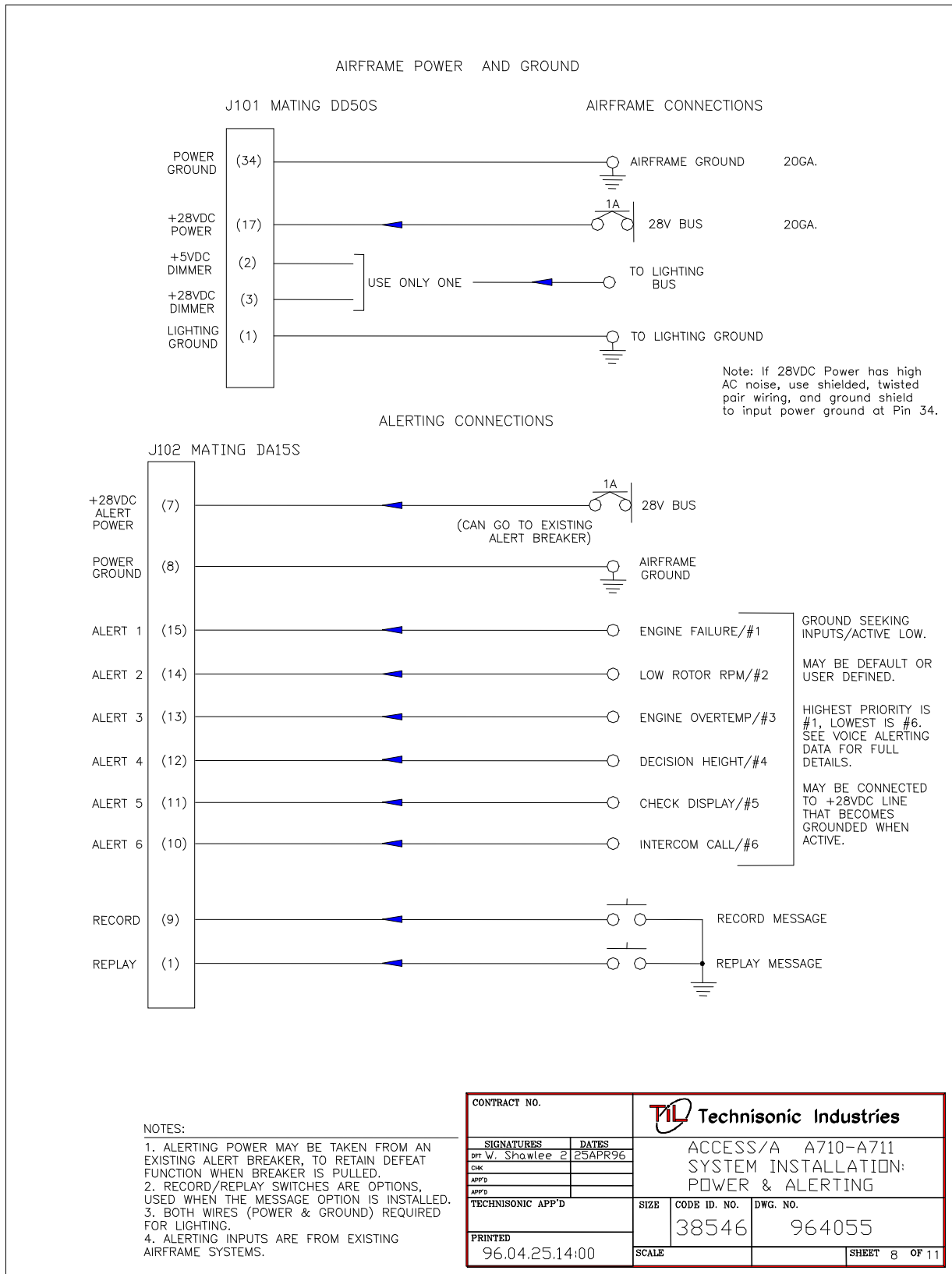
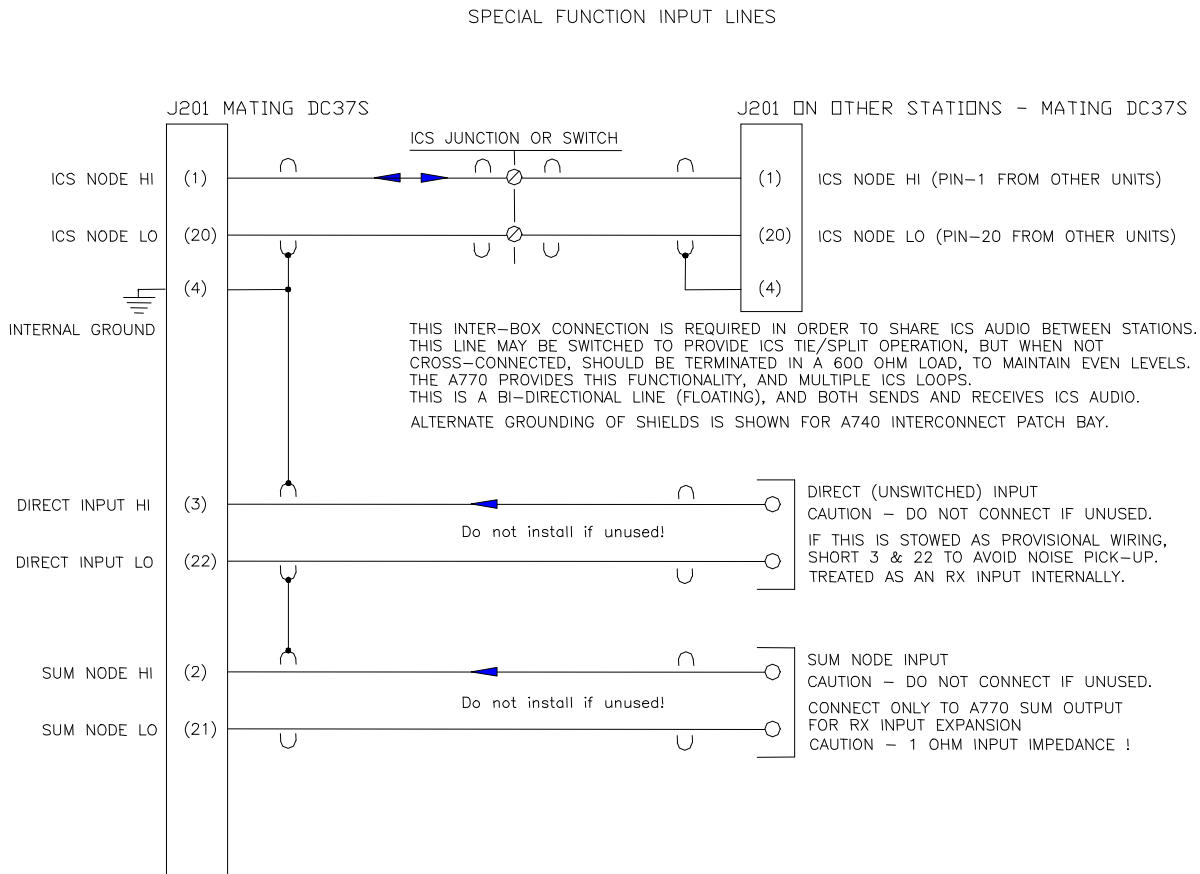
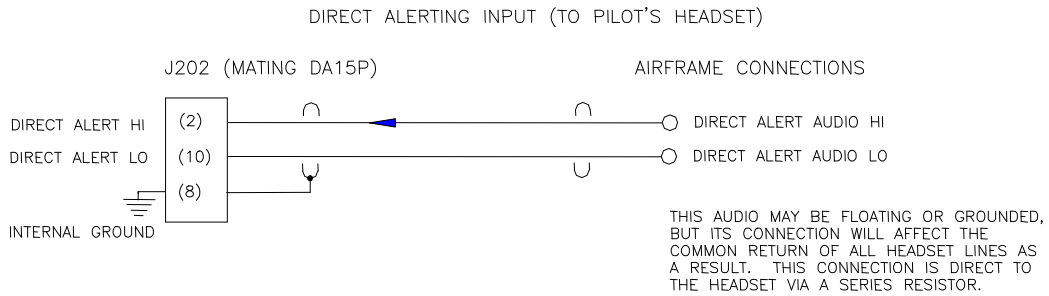


Figure 2-9 POWER & ALERTING WIRING



NOTES:
 1. SUM NODE AND DIRECT INPUTS MUST BE USED CAREFULLY TO AVOID UNWANTED NOISE PICK-UP.

Dwg. Rev. C

| | | | |
|-------------------|--|-----------------------------------|-----------------------|
| CONTRACT NO. | | TIL Technisonic Industries | |
| SIGNATURES | | DATES | |
| DRF. W. Shawlee 2 | | 26APR96 | |
| CHK | | | |
| APP'D | | | |
| TECHNISONIC APP'D | | SIZE | CODE ID. NO. DWG. NO. |
| PRINTED | | | 38546 964055 |
| 96-06-0710:00 | | SCALE | SHEET 9 OF 11 |

Figure 2-10 DIRECT INPUT/SPECIAL FUNCTION WIRING

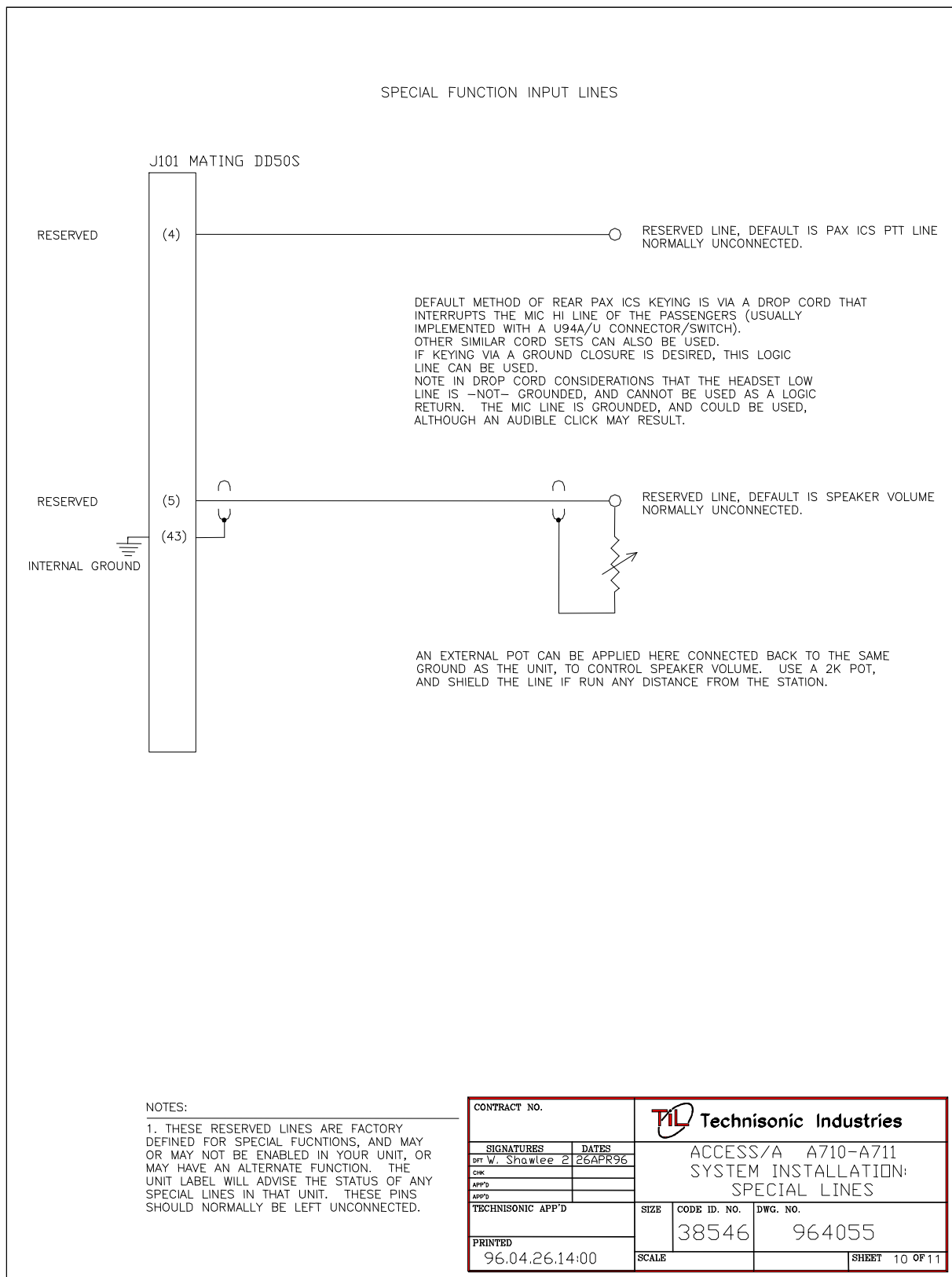


Figure 2-11 RESERVED WIRING

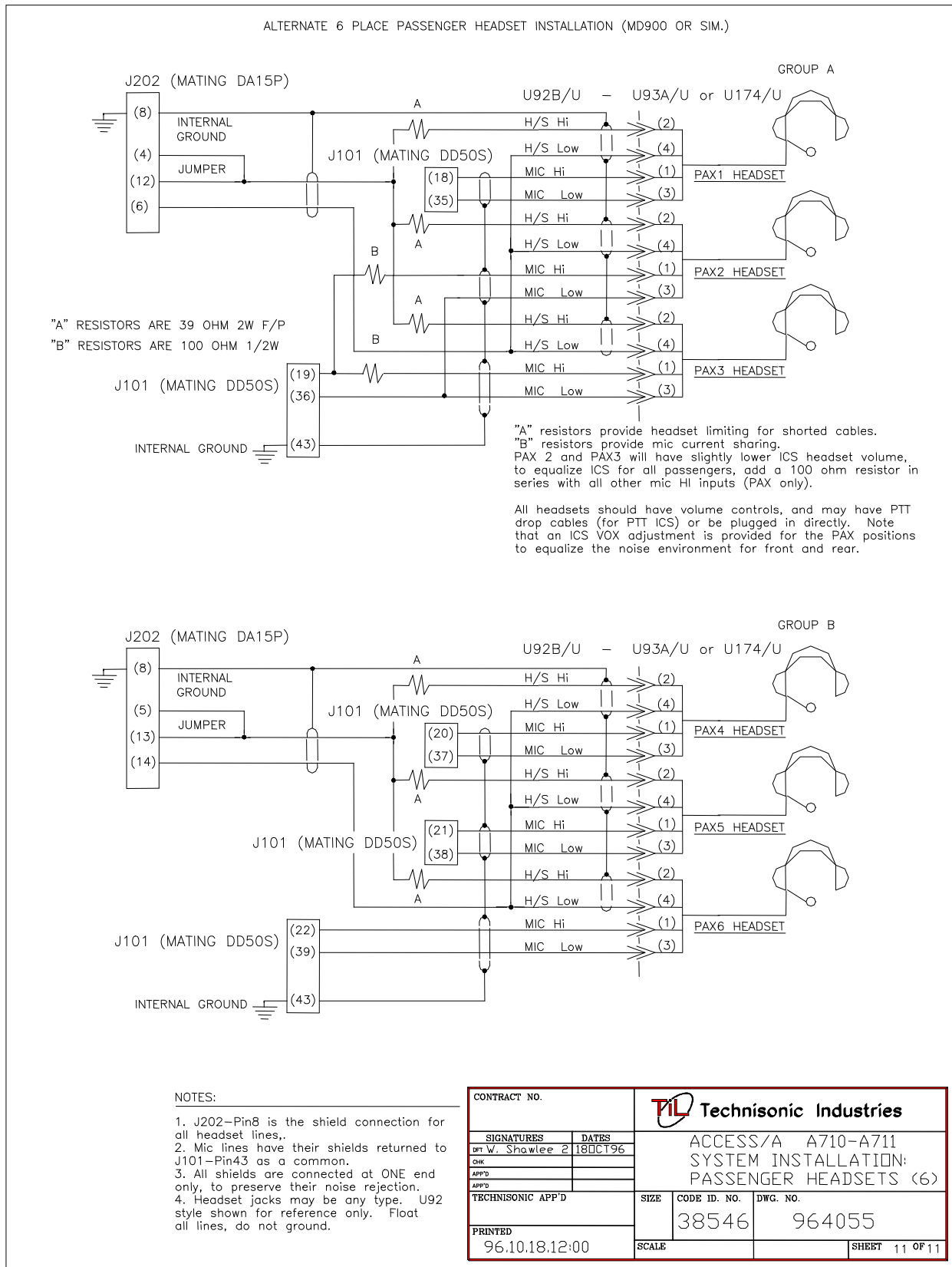


Figure 2-12 SPECIAL 6-PLACE PASSENGER WIRING

2.5 INSTALLATION KIT - CONTENTS

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

1. One **50 pin female** D-subminiature mating connector complete with crimp pins, V-locks and hood. (DD50S) **P101**
Positronics p/n SD50F00JVLX + 50ea. 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 + 37ea. FC7520D contacts or equiv.
3. One **15 pin female** D-subminiature mating connector complete with crimp pins, V-locks and hood. (DA15S) **P102**
Positronics p/n SD15F00JVLX + 15ea. 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) + 15ea. 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.

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)

| J101 TX Connector Pin Assignments | | | | ACCESS/A System |
|--|------------|------------|------------------------------|----------------------------------|
| 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 | +5VDC Dimmer Input | Dimmer Lines Use only one |
| | | 3 | +28VDC 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 | +28VDC 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.

View from solder side of MATING CABLE CONNECTOR DD50S:

1.....17
18.....33
34.....50

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. |

View from solder side of DC37S MATING CONNECTOR:

1.....19
20.....37

Top Connector J202 DA15S

Mating Cable Connector: DA15P
(15 Pin Male)

Note: this is the only male cable connector on the control

| J202 | | Connector Pin Assignments | Headset Connector |
|------|----|---------------------------|---|
| Low | Hi | 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** (~47-51ohms) 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 only . |
| Common Lines | At Ground potential, but line must be connected here only, not to airframe . |

View from solder side of DA15P MATING CONNECTOR:



Bottom Connector J102 DA15P

Mating Cable Connector: DA15S (15 Pin Female)

| 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 to create new alerting functions. |
| | 4 | Data | Not connected in the airframe. |
| | 5 | Audio In | |
| | 6 | Audio Out | |
| | 7 | +28VDC 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 +28VDC. |
| | 11 | Alert 5 (in) | Active when grounded. Accepts +28VDC. |
| | 12 | Alert 4 (in) | Active when grounded. Accepts +28VDC. |
| | 13 | Alert 3 (in) | Active when grounded. Accepts +28VDC. |
| | 14 | Alert 2 (in) | Active when grounded. Accepts +28VDC. |
| | 15 | Alert 1 (in) | Active when grounded. Accepts +28VDC. |

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

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

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 +28VDC

The main power +28VDC ($\pm 20\%$) 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 +28VDC / +5VDC**

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 +28VDC 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**.

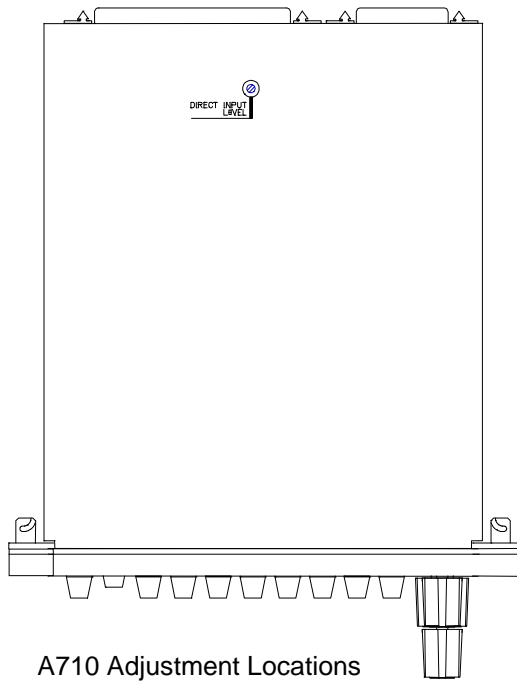
2.12 **GROUND**

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.

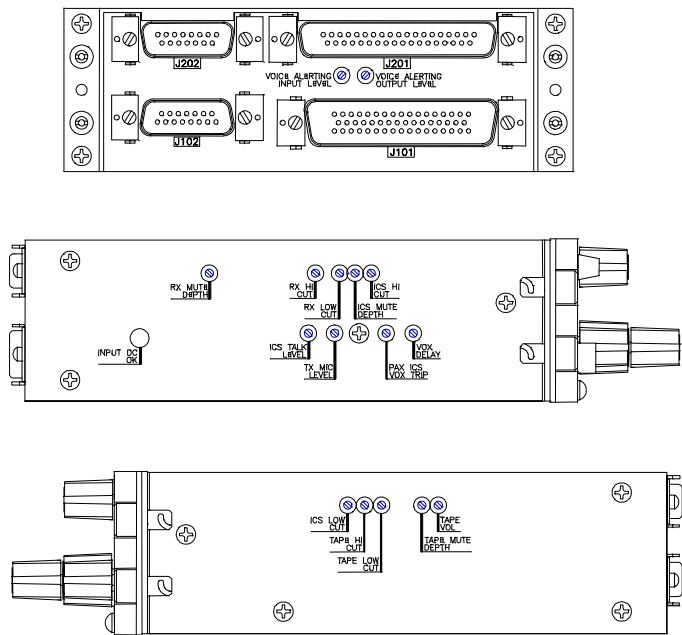
Main ground (power return) to the **A710 and A711** is on pin **34** of the 50 pin "D" connector. All other groups of audio lines have their own "common" lines, which float above the airframe ground, to provide signal isolation. These common lines **MUST** be connected to the source audio, or no signal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

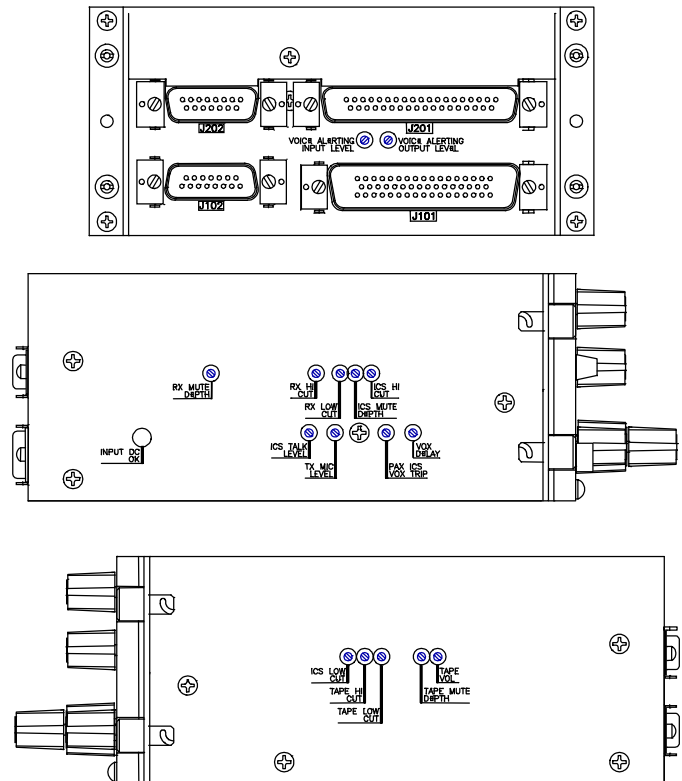
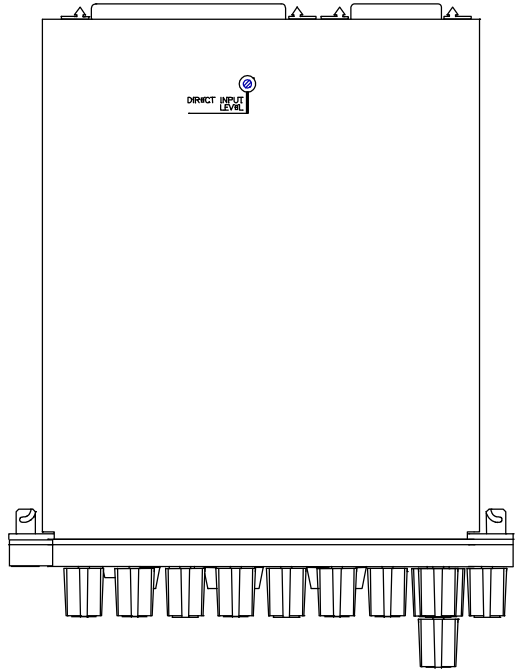


A710 Adjustment Locations



2.14 POST-INSTALLATION ADJUSTMENT LOCATIONS

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 these adjustments may be removed to facilitate the adjustment of these 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. |
| 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. |
| 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 |

| 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 6dB 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 hi 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. |

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

SECTION 3

OPERATING INSTRUCTIONS

3.1 FRONT PANEL OPERATORS 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 3-1**.

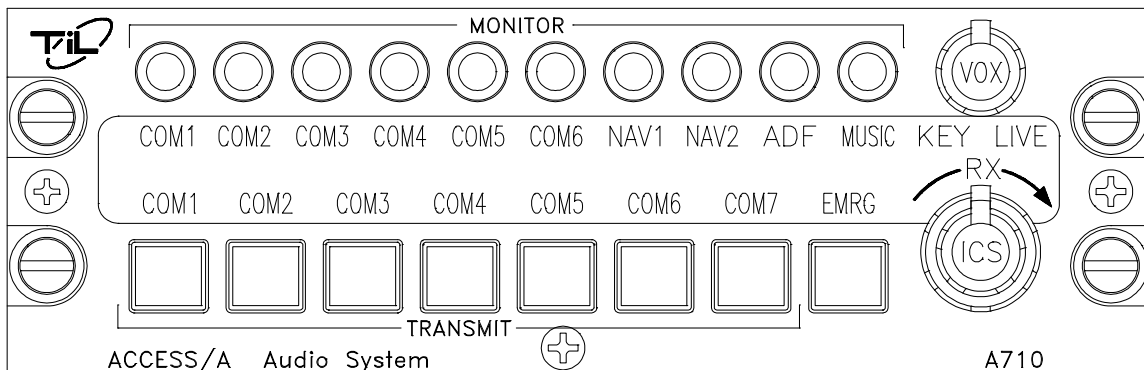


FIGURE 3-1 A710 FRONT PANEL OPERATOR'S SWITCHES AND CONTROLS

- 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.

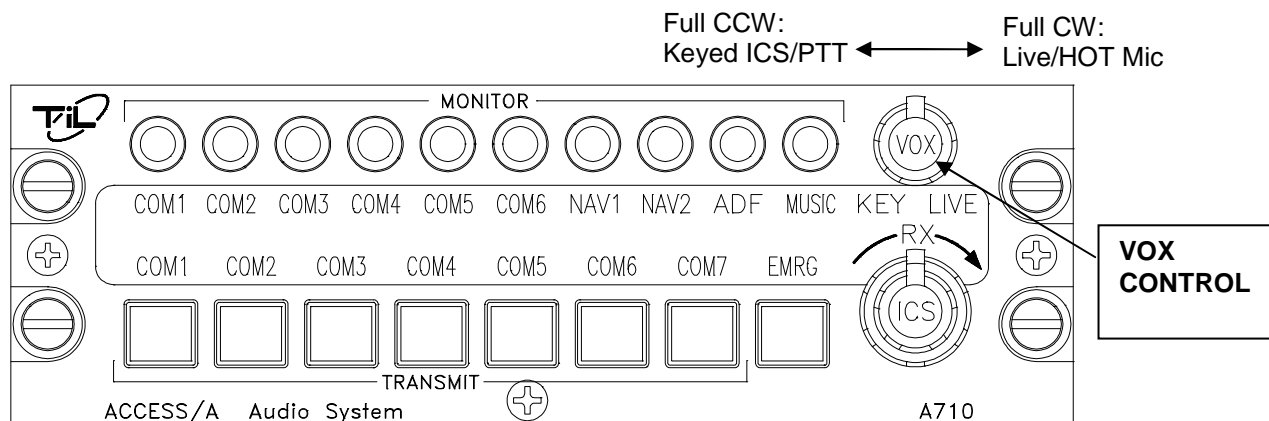


FIGURE 3-2 A710 ICS/INTERCOM CONTROLS

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.

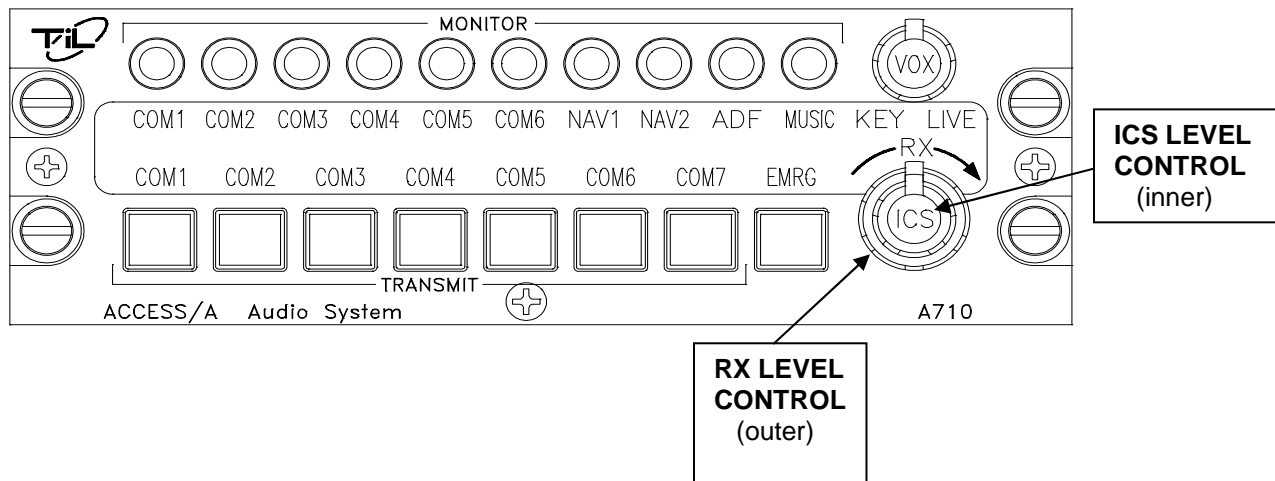


FIGURE 3-3 A710 LEVEL/VOLUME CONTROLS

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, **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. Com 7 (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**.

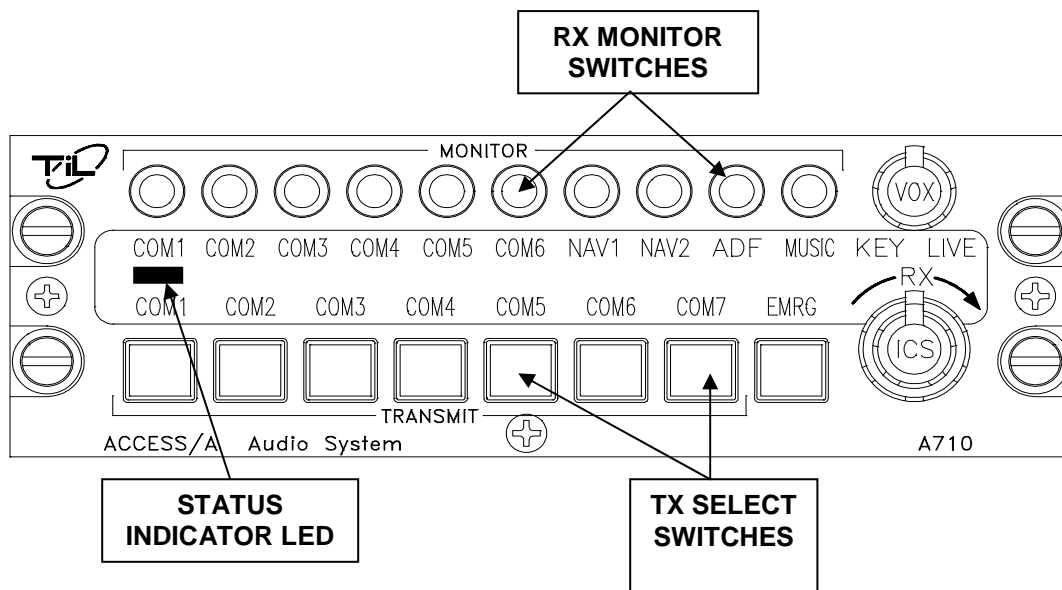


FIGURE 3-4 A710 RX & TX SELECTORS

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**, and 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.

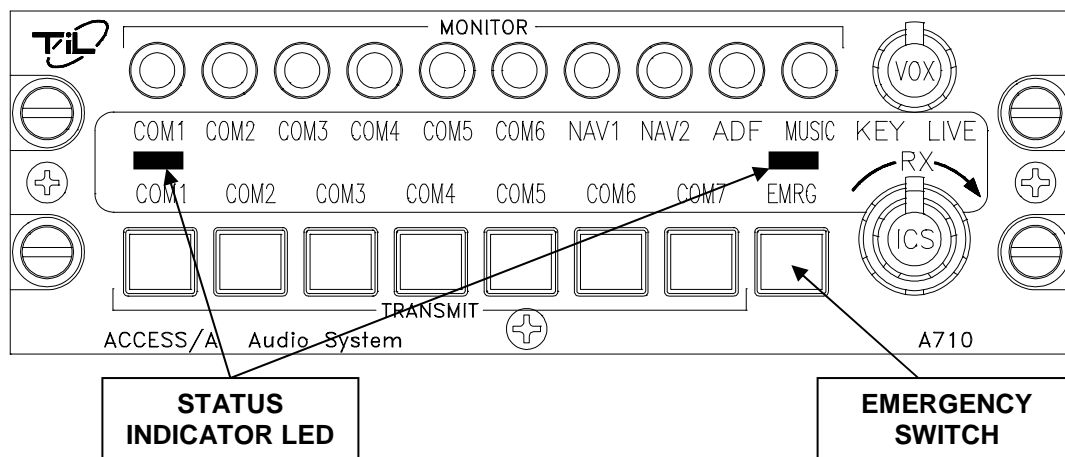


FIGURE 3-5 A710 STATUS LEDs & EMERGENCY SWITCH

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.

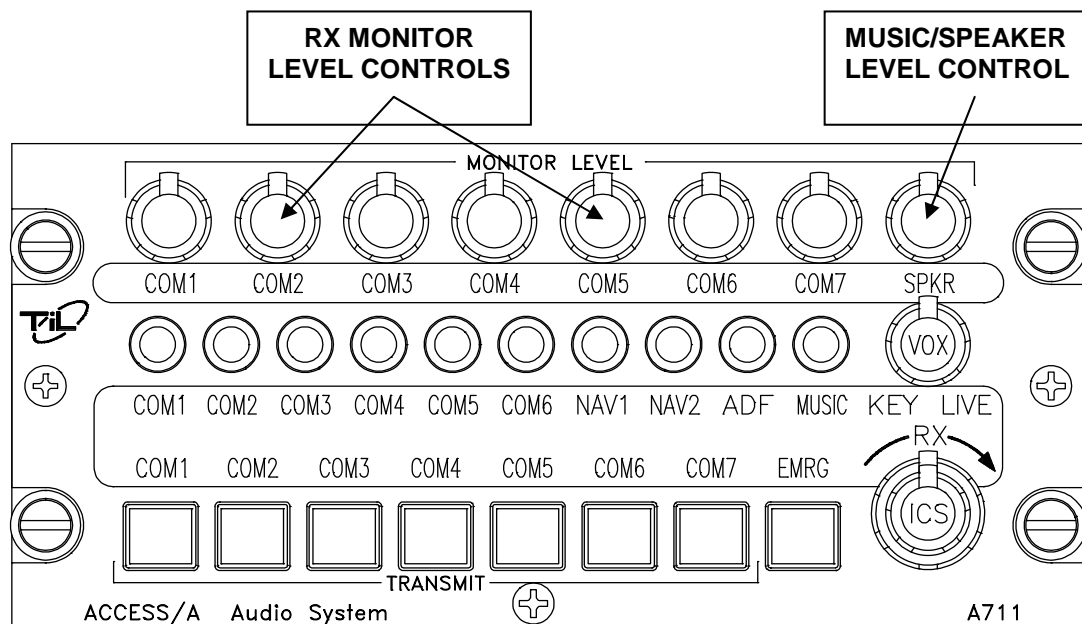


FIGURE 3-6 A711 RX MONITOR LEVEL CONTROLS

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 insure 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 insure 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 ALERTING

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 |

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)
- **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 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 lighted overlay is changed by removing three screws, as illustrated below. Remove the knobs (use 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.

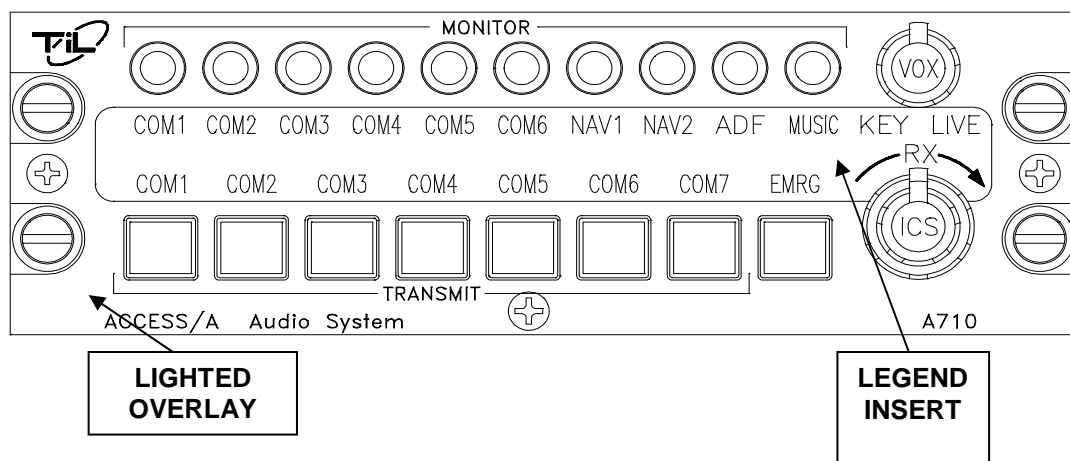


FIGURE 3-7 OVERLAY & LEGEND INSERT

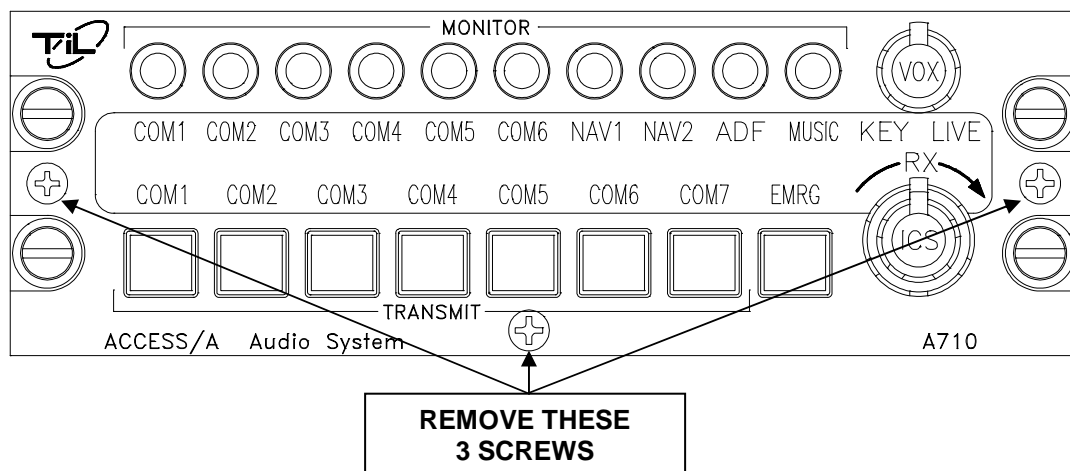


FIGURE 3-8 REMOVING THE ENTIRE OVERLAY ASSEMBLY