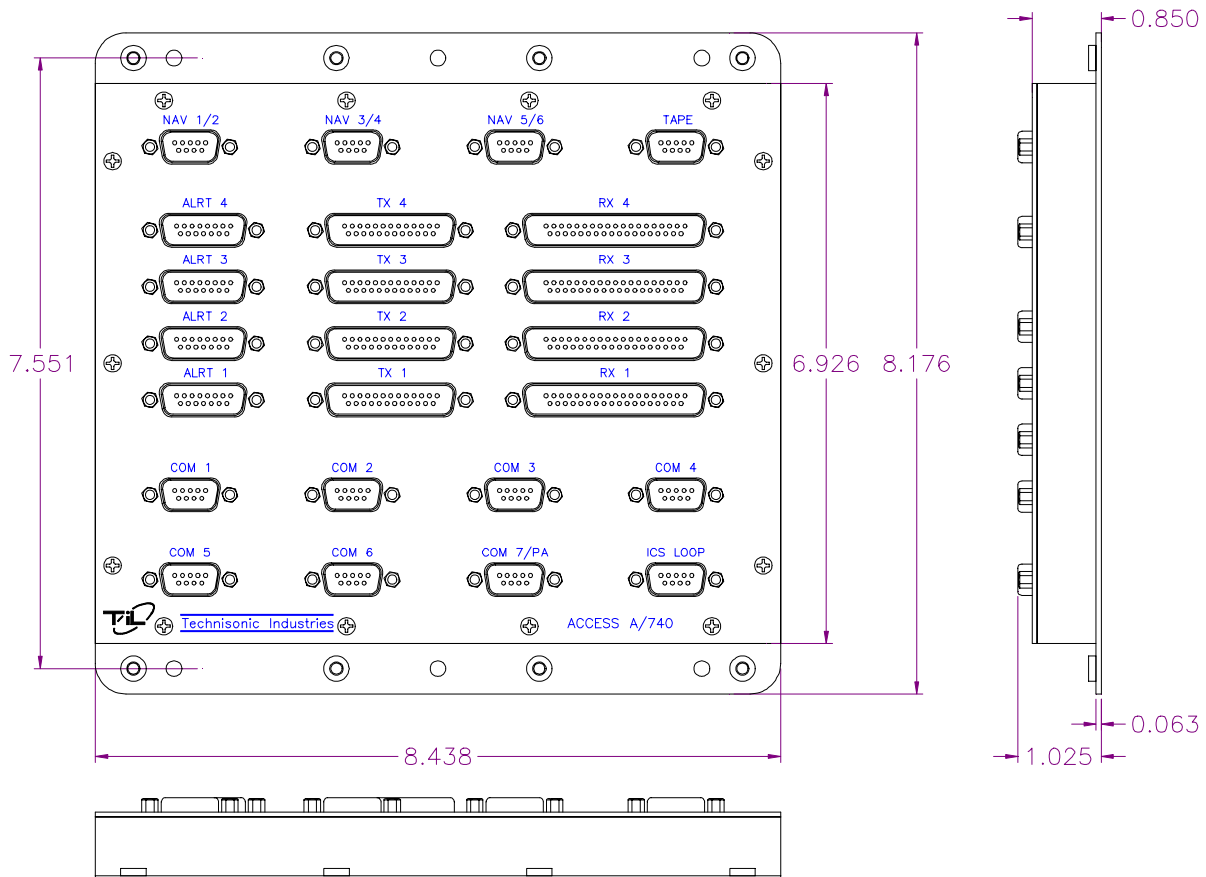


# ACCESS/A™ AUDIO CONTROL SYSTEM

## MODEL: A740



## Installation and Operating Instructions

TiL Document No. 98RE238

Rev. 1.3

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### Technisonic Industries Limited

240 Traders Blvd, Mississauga, Ontario L4Z 1W7 Tel: (905) 890-2113 Fax: (905) 890-5338

3840 East Robinson Road, Suite 214, Amherst, New York 14228 Tel: (716) 691-0669

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| 1.2              | 1-3         | Added dimensions & weight to specs             | 30 MAY 00   |                 |
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|                  | iii         | new address                                    |             |                 |
|                  | 1-2         | delete TSO / DO-214 / DO-160c references       |             |                 |
|                  | 2-3         | add installation kit part numbers              |             |                 |
|                  | 2-8         | correct Alert-5/Alert-6 and ground pin numbers |             |                 |

 **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**  
240 Traders Blvd  
Mississauga, Ontario L4Z 1W7

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

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**SECTION 1****GENERAL DESCRIPTION****1.1 INTRODUCTION**

This publication provides operating and installation information on the Model **A740, ACCESS/A** Interface Patch Bay, manufactured by Technisonic Industries Limited. This unit is designed to provide high performance audio wiring termination, and will work with both TiL **ACCESS/A** and other vendor's audio systems. The unit is plug and pin compatible with the **ACCESS/A** family format, to allow fleet wide compatibility with all **ACCESS/A** installations. This unit also incorporates RF hardening, common ground return management, audio line terminations, and a simple upgrade or expansion path for system installations as new items are added.

**1.2 DESCRIPTION**

The A740 has 24 industry standard D-subminiature connectors, using machined pin construction, heavy gold plating and jackpost style connector locks. They are internally mapped to provide 4 parallel connector groups for up to 4 separate audio stations, 7 plugs for transceiver/PA attachment, 3 plugs for nav aid interfacing, a dedicated tape player (entertainment) connection, and an ICS tie line management connector for intercom loop control.

When using **ACCESS/A** controls, the fully floating interface is correctly maintained, and a floating, isolated, bridge-compatible interface is also maintained for stereo tape players. When other manufacturer's audio systems are used, the tape interface must be considered carefully, as lines may become grounded in an unwanted manner by the internal grounding of the specific controls used.

Each radio port allows the correct termination of shields and (if desired) audio line common grounding points. An audio line termination is also provided for RX audio (1K), and RFI suppression is provided across the mic line with a 0.022uF capacitor shunt. If all the default wiring is installed during the initial installation, then adding a new radio to the ship becomes a simple matter of plugging in the radio port connector, and routing those wires to the new radio. All signal distribution to other system locations is then managed by the A740.

The ICS Tie line port allows loop control of the ship, and can be configured by an **ACCESS/A A770** eyebrow panel, external switches, or another vendor's loop control system. An internal load (1K) may be added to the system for line levelling, or disabled. The unit is shipped with this load disabled.

The Tape Player port accepts stereo music inputs, and has a DC load (100 ohms/1W), and series elements (2x 1K) to prevent accidental tape unit damage from wiring problems or shorts. The resistors can be altered, removed or tied together in other way (to provide a mono output, for example) within the A740, if required. A line is also brought to this connector for a logic line, usually dedicated to ICS call alerting, and routed to the alerting connectors.

A massive, consolidated common ground is also provided in the A740 via the case return, if needed for a "common ground" audio return point.

### 1.3 PURPOSE OF THE EQUIPMENT

The **A740 ACCESS/A** Interface Patch Bay is designed to provide centralized audio wiring interconnection within an airborne communications environment. This includes radio and transceiver selection, intercom, airframe threat alerting, and crew management. The unit has been packaged to minimize size and weight characteristics and is ideally suited for helicopter installations, where it can be conveniently be located at the end of the central control console. The product is an interconnect device only, and provides no other signal processing or control functions.

### 1.4 MODEL VARIATION

The A740 currently comes in one basic configuration, which supports four audio control stations.

The mounting brackets may be attached to either side of the unit, for orientation as needed in the airframe, and the brackets support attachment from either the front (with up to AN3/10-32 bolts or screws) or rear surface with pre-fixed 8-32 PEM nuts.

**1.5 TECHNICAL SUMMARY**

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

| <b>TABLE 1-1 GENERAL SPECIFICATIONS</b>     |  |
|---|--|
| MODEL A740<br>ACCESS/A INTERFACE PATCH BAY: |  |
| <b>PHYSICAL CHARACTERISTICS:</b>            |  |
| Width .....                                 | 8.438 inches   |
| Height .....                                | 8.176 inches   |
| Depth .....                                 | 1.025 inches   |
| Weight .....                                | 2.0 lbs. (0.91 Kg)   |
| Mounting .....                              | Bulkhead mounting, min. 4 x 8-32/10-32 screws/bolts              |
| <br><b>POWER SOURCE REQUIREMENTS:</b>       |  |
| DC Voltage (Negative Ground) .....          | Not Required   |
| DC Current .....                            | Not Required   |
| <br><b>TECHNICAL CHARACTERISTICS:</b>       |  |
| RX Input Impedance .....                    | Default 1K Ohms (can be removed)                                 |
| Microphone RFI Bypass .....                 | 0.022uF/100V   |
| ICS Bus Load .....                          | Optional 1K  |
| Tape Player Load .....                      | 100 Ohms/1W, plus 2 ea. 1K (series) elements in each bridge line |
| Transceiver Locations .....                 | 7 with TX and RX capability                                      |
| Receiver Locations .....                    | 6 predefined RX capability, plus up to 6 aux RX lines            |
| Audio Frequency Response (all lines) .....  | within 3 dB from 300 Hz to 6000 Hz                               |
| Hum and Noise Level .....                   | better than 70 dB  |
| RX Input isolation (300-6000Hz) .....       | > 70 dB between inputs   |
| <br><b>ENVIRONMENTAL:</b>                   |  |
| Temperature (operating) .....               | -40°C to +70° Celsius  |
| Temperature (survival non-operating) .....  | -55°C to +85° Celsius  |
| Humidity .....                              | 95% Non-condensing   |
| Shock .....                                 | 12 g (any axis)  |
| Altitude .....                              | 30,000 feet  |

**SECTION 2****INSTALLATION INSTRUCTIONS****2.1 GENERAL**

This section contains information and instructions for the correct installation of the **A740, ACCESS/A** Interconnect Patch Bay.

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.

**2.3 WIRING REQUIREMENTS**

Airframe wiring should be MS22759 Tefzel or Raychem 44 (81044) or 55 single 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 or 3 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, 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 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 INTERCONNECT PATCH BAY INSTALLATION**

The **A740 ACCESS/A Interface Patch Bay** is designed to be bulkhead mounted and should be installed in conjunction with an **IN-A740** installation kit



**CABLE CLEARANCE:**

Allow **at least 2.5” of additional height clearance** for mating connectors and hoods (side routing), or 3.0” (back routing). Cables should only be long enough to **reach the intended mating plug, to avoid accidental mis-mating later**. Cables should be tagged with the mating connector location (J2003, etc.) for greater clarity.

**ALERT OPERATION:**

Alerting, if routed through this system, is normally taken from one of the rear station plugs.

**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. The return for these lines is the chassis of the A740 unit.

**INTERNAL OPTIONS:**

The internal loads may be manually removed from any RX line, if desired. The ICS load is jumperable (with a patch plug).

## 2.5 INSTALLATION KIT - CONTENTS

The **IN-A740** installation kit consists of:

- **Ten (10ea.)** 9-pin D-subminiature mating connector (**female**)
- complete with crimp pins, screw locks and clamshell hoods.
- **DE9S** or equiv. P1001-1007 & P1009-1011  
Amp p/n 205555-2 or M24308/2-1F connector and pins  
Amp p/n 205729-1 cable clamp kit  
Amp p/n 211883-5 screw retainer kit
- **One (1 ea.)** 9-pin D-subminiature mating connector (**male**)
- complete with crimp pins, screw locks, and clamshell hood.
- **DE9P** or equiv. P1008  
Amp p/n 205556-2 or M24308/4-1F connector and pins  
Amp p/n 205729-1 cable clamp kit  
Amp p/n 211883-5 screw retainer kit
- **One (1 ea.)** 9-pin D-subminiature mating connector (**female**)
- complete with crimp pins, screw locks, clamshell hood, and a blanking plug or lock out for **pin 3**.
- **DE9S** or equiv. P1012  
Amp p/n 205555-2 or M24308/2-1F connector and pins  
Amp p/n 205729-1 cable clamp kit  
Amp p/n 211883-5 screw retainer kit
- **Four (4ea.)** 37-pin D-subminiature mating connectors (**male**)
- complete with crimp pins, screw locks and clamshell hoods.
- **DC37P** or equiv. P2001-2004  
Amp p/n 205562-2 or M24308/4-4F connector and pins  
Amp p/n 205731-1 cable clamp kit  
Amp p/n 211883-5 screw retainer kit
- **Four (4ea.)** 25-pin D-subminiature mating connectors (**male**)
- complete with crimp pins, screw locks and clamshell hoods.
- **DB25P** or equiv. P3001-3004  
Amp p/n 205560-2 or M24308/4-3F connector and pins  
Amp p/n 205718-1 cable clamp kit  
Amp p/n 211883-5 screw retainer kit
- **Four (4ea.)** 15-pin D-subminiature mating connectors (**male**)
- complete with crimp pins, screw locks and clamshell hoods.
- **DA15P** or equiv. P4001-4004  
Amp p/n 205558-2 or M24308/4-2F connector and pins  
Amp p/n 205730-1 cable clamp kit  
Amp p/n 211883-5 screw retainer kit

In addition, the A740 unit itself comes with:

1. This manual.
2. Warranty registration card.

## 2.6 INSTALLATION - PIN LOCATIONS AND CONNECTIONS

### A740 Interconnect Patch Bay

- The A740 may be used to reduce installation problems in the airframe, and provides a simple and easily updated central interconnect for the ship's audio system. If all default wiring is in place, then adding new radios is a simple matter of plugging them into the designated A740 connector, and they are then distributed correctly to all other stations in the airframe.
- The A740 has plugs for each of up to **4 ACCESS/A stations**, which carry the common radio signals, alerting and ICS data. In addition, it has individual plugs for each of up to 7 transceivers (and/or PA), a common ICS Tie connector for ICS loop control, a connector for a bridge style Tape Player for entertainment, and three connectors for the six (2 per plug) default Nav aids.
- Wiring is detailed in the following section as to how the units are connected together via the A740, and maps are provided for each connector type.
- Internally, the A740 contains a load resistor for each source (1K for radios), to stabilize the line, and give some constant loading. The Tape player contains a pad for each line, to prevent accidental damage via inadvertent line shorts elsewhere in the interconnect (for bridge lines), and will support fully floating tape player lines **without any additional interface hardware**.
- The Aux/Alerting plug bus is provided for those instances where some common connections are needed, and use of an external matrix block is not desired. Normally, only the pilot/co-pilot positions require these connections. Spare pins may be used for other parallel lines, but these must be low-level and not power lines.
- Mic wiring contains RFI filtering (0.022uF bypassing) to reduce interference effects.

These definitions are **NORMALLY** used with the A740:

| RX Lines | TX Lines | Alerting | Definition   |
|----------|----------|----------|--|
| J2001,   | J3001,   | J4001    | Pilot's Position   |
| J2002,   | J3002,   | J4002    | Co-Pilot's Position  |
| J2003,   | J3003,   | J4003    | Rear Station<br>(or J4003 may be used for alerting/Nav inputs) |
| J2004,   | J3004,   | J4004    | Rear Station<br>(or J4004 may be used for alerting/Nav inputs) |

**IMPORTANT!**

Plugs may be interchanged for testing or other operations without damage, but the mapping of ICS Tie signals ***will be affected*** at connector **J1008** as these cables are moved to other stations.

Likewise, radio plugs may be changed for trouble-shooting purposes, but the mapping to specific switches on a control station ***will then be changed***.

***NEVER exchange transceiver and receiver connectors***, as they have different signals on their pins, and loss of functionality will result.

Tape player connector J1012 is KEYED with a ***blocking pin*** to prevent mis-mating, as this line can be ***damaged by incorrect installation*** at the A740.

For best results, the ***cables should be dressed at the A740 so that the correct A740 location is clear by cable length and location***, as well as a connector label tag on each plug.

## A740 Interconnect Patch Bay

RX Connector J2001 through J2004 DC37S

Mating Cable Connector: DC37P (37 Pin Male)

| J2001J<br>2004 |      | Connector Pin Assignments                               | RX Connector  |
|----------------|------|---|---|
| Low            | High | Connection  | Notes   |
| 20             | 1    | ICS Node  | ICS Tie Line Between Units  |
| 21             | 2    | Can be used for additional Shield grounds, if required. | Sum Line need NOT brought out to these pins, but routed to an A770 eyebrow unit ONLY! Tied to ground at A740. |
| 22             | 3    | Direct Input  | Unswitched Direct Input   |
| 4              |      | Shield Ground   | Airframe ground   |
| 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.<br>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 <b><i>not connected</i></b> to any other common line in the system. |

**These lines are connected Pin-for-Pin from J201 on ACCESS/A panels, EXCEPT for pins 2 & 21, which are not brought out to this connector.**

**View from solder side of DC37P MATING CONNECTOR:**

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

## A740 Interconnect Patch Bay

---

TX Connector J3001 through J3004 DB25S

Mating Cable Connector: DB25P (25 Pin Male)

| J3001-3004 TX Connector Pin Assignments |     |       |   | ACCESS/A System              |
|---|-----|-------|---|------------------------------|
| Com                                     | Mic | Key   | Connection                                | Notes                        |
| 14                                      | 1   | 2     | COM 7/PA TX Mic Out                       |                              |
| 3                                       | 15  | 16    | COM 6 TX Mic Out                          |                              |
| 17                                      | 4   | 5     | COM 5 TX Mic Out                          |                              |
| 6                                       | 18  | 19    | COM 4 TX Mic Out                          |                              |
| 20                                      | 7   | 8     | COM 3 TX Mic Out                          |                              |
| 9                                       | 21  | 22    | COM 2 TX Mic Out                          |                              |
| 23                                      | 10  | 11    | COM 1 TX Mic Out                          |                              |
|   |     | Spare |   |                              |
|   |     | 24    | Spare parallel line                       | use if needed between units. |
|   |     | 25    | Spare parallel line                       | use if needed between units. |
|   |     | 12    | Spare parallel line                       | use if needed between units. |
| 13                                      |     |       | Chassis Ground, for Shields, if required. |                              |

**These lines are connected functionally, from the corresponding functional equivalent on J101 (i.e., COMM 7 Key to COMM7 Key) on ACCESS/A panels. The other pins on J101 ( a 50 pin plug) are *not routed to this plug*, as they are *local system connections only*.**

**The particular pattern shown is used to maximize isolation between mic lines (by inserting common/ground or PTT lines between audio signals), and should be modified with care, or increased cross-talk may result.**

**View from solder side of MATING CABLE CONNECTOR DB25P:**

13.....1  
25.....14

## A740 Interconnect Patch Bay

TX Connector J4001 through J4004 DA15S

Mating Cable Connector: DA15P (15 Pin Male)

This is an optional patch connection, if required. It may be used for common alerting, or other functions that are low level signals ONLY. Use caution with audio lines, and be sure common/ground lines are interleaved between signals to provide shielding. All connector lines are in parallel, and pin 8 is connected to chassis ground for a shield connection, if required.

| J4001<br>J4004 |      | Connector Pin Assignments                  | Alerting Connector   |
|----------------|------|--|--|
| Low            | High | Connection                                 | Notes  |
|                | 1    | <i>Possible</i> alerting connections       |  |
|                | 2    | Alert 1 (in)                               | Active when grounded. Accepts +28VDC.  |
|                | 3    | Alert 2 (in)                               | Active when grounded. Accepts +28VDC.  |
|                | 4    | Alert 3 (in)                               | Active when grounded. Accepts +28VDC.  |
|                | 5    | Alert 4 (in)                               | Active when grounded. Accepts +28VDC.  |
|                | 7    | Alert 5 (in)                               | Active when grounded. Accepts +28VDC.  |
|                | 6    | Alert 6 (in)                               | Active when grounded. Accepts +28VDC.<br>Tied to pin 2 on J1012 (Tape Plug) for common ICS call connections. |
| <b>8</b>       |      | <b>Shield Ground (Chassis) if Required</b> | <b>Airframe ground</b>   |
|                |      | <i>Possible</i> audio connections          |  |
| <b>9</b>       | 1    | Aux Audio #1                               | see notes below.   |
| <b>10</b>      | 2    | Aux Audio #2                               | see notes below  |
| <b>11</b>      | 3    | Aux Audio #3                               | see notes below  |
| <b>12</b>      | 4    | Aux Audio #4                               | see notes below  |
| <b>13</b>      | 5    | Aux Audio #5                               | see notes below  |
| <b>14</b>      | 6    |  | Do not use for audio, due to line connected to J1012, this is a signaling connection ONLY.                   |
| <b>15</b>      | 7    | Aux Audio #6                               | see notes below  |

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.

**These alerting lines (if required) can be connected function for function from J102 on ACCESS/A panels.**

**IMPORTANT!**

This connector array may also be used for supplemental Nav Aids (beyond the 6 default lines & tape lines) to flight crew positions. In this case, one of the rear crew plugs is used as the *feed point* for those systems. These lines may be routed to an A770 eyebrow expansion unit to give additional switched system inputs. The mechanical internal mapping (for lowest coupling and cross-talk) is to use a pin from one row (1-7), then the adjacent one from the other row (9-15), alternating high and low lines, as with the other plugs. Pin 8 is already tied to ground for a shield drain. For example, Aux #1, Pin 1 hi, Pin 9 lo; Aux #2, Pin 2 hi, Pin 10 lo, etc.

**View from solder side of DB15P MATING CONNECTOR:**

8.....1  
15.....9



## A740 Interconnect Patch Bay

### Radio (Transceiver) Connectors J1001 through J1007 DE9P

#### Mating Cable Connector: DE9S (9 Pin Female)

These are the plugs for connection to individual system Transceivers (or PA systems). In addition to the TX and RX audio and PTT Keylines, connections are provided for protective shields and an optional “ground” return for the RX audio low line. This ground jumper, if installed, will return the low side of the RX audio line to the local airframe ground, which may (in some circumstances) improve cross-talk or noise floor. ***This jumper should be left out initially***, but may be helpful during installation check-out to improve noise levels due to airframe specific wiring issues. If the radio sources are all floating, and single conductor shielded wiring has been used (physically possible, but not recommended), then these ground jumper lines should be installed for ***each radio***.

All plugs are wired identically, but are mapped through the appropriate lines and RX & TX plugs, back to individual stations.

| J1001<br>J1007 |      | Connector Pin Assignments | Transceiver Connector                  |
|----------------|------|---------------------------|--|
| Low            | High | Connection                | Notes                                  |
| 6              | 1    | RX Audio                  | Always use both lines.                 |
| 2              |      | RX Ground Jumper          | Connect 2 & 3 to ground RX Low Line.   |
| 3              |      | RX Ground Jumper          | Local Ground                           |
|                | 4    | TX PTT                    | Radio Key Line                         |
| 9              | 5    | TX Audio                  | Radio Mic Line, always use both lines. |
| 7              |      | RX Shield                 | Connected to local ground              |
| 8              |      | TX Shield                 | Connected to local ground              |
|                |      |                           |  |

#### Interconnect Patch Bay Plug Assignments:

|       |                   |
|-------|-------------------|
| J1001 | COM1              |
| J1002 | COM2              |
| J1003 | COM3              |
| J1004 | COM4              |
| J1005 | COM5              |
| J1006 | COM6              |
| J1007 | COM7 or PA System |

#### View from solder side of DE9S MATING CONNECTOR:

1.....5  
6.....9

## A740 Interconnect Patch Bay

ICS Connector J1008 DE9S

**Mating Cable Connector: DE9P (9 Pin Male)**

This plug is for attachment to an additional ICS LOOP CONTROL system, or the tie/split functions of an A770 eyebrow panel. If no connection is made to these pins, there will be **NO ICS SIGNALS IN THE AIRFRAME!** It is important to *at least* jumper the lines here together, to insure that common ICS Audio is shared between stations. If an A770 is used to route and split the ICS audio, it will perform this signal combining function internally.

| J1008 |      | Connector Pin Assignments                            | ICS Connector   |
|-------|------|--|---|
| Low   | High | Connection   | Notes   |
| 6     | 1    | J2003 & 2004 ICS Line (rear stations)                | Route to A770 (rear position). Or:<br><b>Jumper 1, 2, &amp; 3 together for common ICS</b>   |
| 7     | 2    | J2002 ICS Line (usually the co-pilot)                | Route to A770 (crew position), Or:<br><b>Jumper 1, 2, &amp; 3 together for common ICS</b>   |
| 8     | 3    | J2001 ICS Line (usually the pilot)                   | Route to A770 (pilot position), Or:<br><b>Jumper 1, 2, &amp; 3 together for common ICS</b>  |
| 4     |      | <b>Shield Ground line, attached to local ground.</b> | To common shields of these twisted pair lines.  |
| 9     | 5    | <b>Direct Input (unswitched)</b>                     | To a signal source desired to be unswitched in the audio system. Note that this line is partially muted to sidetone level during TRANSMIT operation within a given station. |
|       |      |  | <b>6,7, &amp; 8 are already internally common.</b>  |
|       |      |  |   |

To add an external ICS Loop device, it is normally tied to the common bus of these pins for fully shared ICS audio. The external loop usually supports rear passengers, and is most logically grouped with the rear stations for tie/split bus operation. These line usually go to an A770 eyebrow panel for loop control, but can be bussed as desired at the A740, if no separate control is used. For ICS audio to pass between stations, they **MUST** have this line connected together.

The direct input may be sent to any desired source, but is UN-switched at all stations, and **will always be heard regardless of panel switch settings**. If this line is not used, it should either be **left out of the harness altogether**, or jumpered pin 9 to 5 at this plug, to reduce noise pick-up. **This line may be the source of considerable system noise, if terminated incorrectly.**

**View from solder side of DE9P MATING CONNECTOR:**

5.....1  
9.....6

## A740 Interconnect Patch Bay

Radio (Receiver) Connectors J1009 through J1011 DE9P

**Mating Cable Connector: DE9S (9 Pin Female)**

These are the plugs for connection to individual receivers or Nav aids. In addition to two sets of RX audio lines, connections are provided for shields and a “ground” return for the RX audio low lines. This ground jumper, if installed, will return the low side of the RX audio line to the local ground, which may (in some circumstances) improve cross-talk or noise floor. ***This jumper should be left out initially***, but may be helpful during installation check-out to improve noise levels due to airframe specific wiring issues. If the radio sources are all floating, and single conductor shielded wiring has been used (possible, but not recommended), then these jumper lines should be installed for each radio.

All three plugs are wired identically, but are mapped on the appropriate lines back to the RX plugs, and back to individual stations.

| J1009<br>J1011 |      | Connector Pin Assignments      | RX Connector                           |
|----------------|------|--------------------------------|--|
| Low            | High | Connection                     | Notes                                  |
| 6              | 1    | RX Audio A (odd numbered Nav)  | Always use both lines.                 |
| 2              |      | RX Ground Jumper               | Connect 2 & 3 to ground RX A Low Line. |
| 3              |      | RX Ground Jumper               | Local Ground                           |
| 4              |      | RX Ground Jumper               | Connect 3& 4 to ground RX B Low Line   |
| 9              | 5    | RX Audio B (even numbered Nav) | Always use both lines.                 |
| 7              |      | RX A Shield                    | Connected to local ground              |
| 8              |      | RX B Shield                    | Connected to local ground              |
|                |      |                                |  |

**Interconnect Patch Bay Plug Assignments:**

|       |      |      |
|-------|------|------|
| J1009 | NAV1 | NAV2 |
| J1010 | NAV3 | NAV4 |
| J1011 | NAV5 | NAV6 |

**View from solder side of DE9S MATING CONNECTOR:**

1.....5  
6.....9

## A740 Interconnect Patch Bay

### Tape Player Connector J1012 DE9P

#### Mating Cable Connector: DE9S (9 Pin Female) with keying pin @ pin 3

This plug is for connection to a “bridge type” tape player to provide entertainment audio to the aircraft. It will support grounded output players as well, but it can also **accept floating bridge lines with no additional circuitry**. Be certain **phasing is correct** and identical for both channels to avoid audio cancellation and distortion in recorded music material.

These input lines contains a DC load and isolation pad, to provide system stability, and reduce the chance of tape player damage (bridge type) by accidental wire shorts from the low line to airframe ground. An additional connection is also provided on this plug for the ICS Alerting Input.

| J1012 |      | Connector Pin Assignments | RX Connector  |
|-------|------|---------------------------|---|
| Low   | High | Connection                | Notes   |
| 6     | 1    | Tape Player Left Audio    | Always use both lines.  |
|       | 2    | ICS Alerting Input        | Used if required for common ICS call annunciation. Requires optional voice or tone alerting module to be installed. |
| 3     |      | no connection             | <b>LOCKED OUT—Keying Pin</b>  |
| 4     |      | no connection             |   |
| 9     | 5    | Tape Player Right Audio   | Always use both lines.  |
| 7     |      | Left Shield               | Connected to local airframe ground  |
| 8     |      | Right Shield              | Connected to local airframe ground  |
|       |      |                           |   |

Note that Pin 3 is locked out on the mating connector, and is removed from the A740 connector. This is deliberate, and is used to prevent accidental mis-mating of this plug with another RX or TX input, which would damage the tape source. Never ground any audio low lines routed to this plug, or bridge-type tape sources will be damaged.

These lines may also be mapped internally inside ACCESS/A stations to be used as **additional Nav aids**. In this case, J1012 is then the feed point for those systems, rather than for a tape source. ‘Left’ audio is Nav 7, ‘right’ audio is Nav 8.

#### View from solder side of DE9S MATING CONNECTOR:

1.....X.....5  
6.....9



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](http://www.til.ca)

### 3<sup>rd</sup> 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

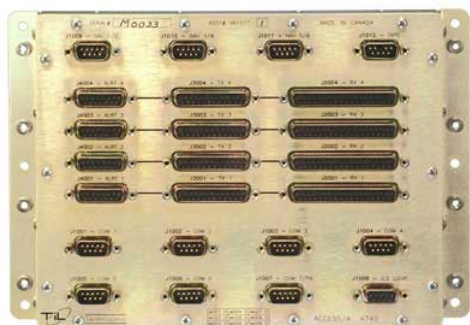
**ICS LOOP CONTROL:** Often, a ship has to be broken into isolated intercom circuits, such as Medevac applications, where the medical crew needs to work isolated from the flight crew. Using the ACCESS/A A770 eyebrow unit, additional receiver inputs, and full tie/split ICS loop control can be easily implemented.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