Cautions, warnings, and regulatory information

READ AND SAVE THESE INSTRUCTIONS Follow the instructions in this installation manual. These instructions must be followed to avoid damage to this product and associated equipment. Product operation and reliability depend upon proper installation.



DO NOT INSTALL ANY SIMPLEX™ PRODUCT THAT APPEARS DAMAGED Upon unpacking your Simplex product, inspect the contents of the carton for shipping damage. If damage is apparent, immediately file a claim with the carrier and notify an authorized Simplex product supplier.



ELECTRICAL HAZARD Disconnect electrical field power when making any internal adjustments or repairs. All repairs should be performed by a representative or an authorized agent of your local Simplex product supplier.



STATIC HAZARD Static electricity can damage components. Handle as follows:

- Ground yourself before opening or installing components.
- Prior to installation, keep components wrapped in anti-static material at all times.



EYE SAFETY HAZARD Under certain fibreoptic application conditions, the optical output of this device may exceed eye safety limits. Do not use magnification (such as a microscope or other focusing equipment) when viewing the output of this device.

FCC RULES AND REGULATIONS – PART 15. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

SYSTEM REACCEPTANCE TEST AFTER SOFTWARE CHANGES To ensure proper system operation, this product must be tested in accordance with NFPA72 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

NFPA 72® is a registered trademark of the National Fire Protection Association.

Introduction

This publication describes the installation procedure for Transponder Interface Cards (TICs), Audio Riser Modules, and the Network Audio Riser Controller Module for installation in 4100U and 4100ES Fire Alarm Control Units.

This product is compatible with 4100U and 4100ES Fire Alarm Control Units (FACU).

This publication also includes connections that provide the Non-Alarm Audio (NAA) Interface feature.

Important: Verify FACU System Programmer, Executive, and Slave Software compatibility when installing, or replacing system components. Refer to the Technical Support Information and Downloads website for compatibility information.

TICs and audio riser modules

Overview

The following TICs, audio risers, and audio riser controller modules are available for a 4100U/4100ES Fire Alarm Control Unit (FACU) as well as for a 4100U/4100ES MINIPLEX system:

- Basic Transponder Interface Card (TIC) Module
- Local Mode TIC Module
- Analog Audio Riser Module
- Digital Audio Riser Module (also known as DARIC, Digital Audio Riser Interface Card)
- Network Audio Riser Controller Module
- Multiple Command Center Digital Audio Riser Module (also known as MCC DARIC)

TICs receive data from the host panels allowing remote locations to perform fire alarm functions. TIC modules are optionally available with local mode operation that provides basic (degraded mode) system functions in the event of a communication loss with the master panel. TICs receive communications from the host panel using Remote Interface (RUI) communications with either Style 4 or Style 7 wiring.

For audio systems, audio riser modules are required and are connected directly to TIC modules using ribbon cable. Audio riser modules support Class A and Class B analog wiring, as well as Style 4 and Style 7 digital audio wiring.

Note: Old legacy Basic, Local Mode and Network TIC were replaced due to component obsolescence. The replacement boards are functionally equivalent to the legacy boards. Replacement boards are as follows.

PID list

Table 1: Obsolete legacy TIC and replacements

Name	Legacy Board	Replacement Board
Basic Transponder Interface Card	0566-093	0566-1166
Local Transponder Interface Card	0566-094	0566-1167
Network Audio Riser Controller Module	0566-249	0566-1169

Table 2: TIC, Audio riser, and riser controller PIDS

PID	Description	Part Number
4100-9600	Basic Transponder (Expansion Bay with PDI and Basic TIC)	742-866
4100-9601	Local Mode Transponder (Expansion Bay with PDI and Local Mode TIC)	742-867
4100-0620	Basic Transponder Interface Card (TIC)	742-520
4100-0621	Analog Audio Riser Module	742-534
4100-0622	Digital Audio Riser Module	742-535
4100-1341	MCC Digital Audio Riser	743-850
4100-0623	Network Audio Riser Controller Module	742-522
4100-0625	Local Mode TIC	742-521
4100-0632	Terminal Block Utility Module	742-695
4100-0633	Transponder Cabinet Tamper Switch	742-738

The basic TIC

The basic TIC is an addressable device that contains an RUI input, audio riser module interface, and a port for connecting to other transponder modules.

The local mode TIC

The local mode TIC contains an RUI input, audio riser module interface, port for connecting to other transponder modules, and terminal block for connecting to an optional Local Mode Controller.

Local Mode Controllers are mounted remotely from the transponder and are available in red or beige (flush or surface mount). The model numbers are 4601-9108, 4601-9109, 4601-9110, & 4601-9111. The local mode controller is wired from the local mode TIC, TB2. The outputs for the three control switches, three LEDs, piezo sounder and power (+24V / 0V) must be connected to the local mode controller.

A local mode TIC is a controller for the transponder cabinet if the TIC loses communication with the Master Controller. When operating in local mode, an alarm on any fire alarm input circuit causes all alarm notification appliance circuits to activate. Relays and other auxiliary control outputs do not activate. The local mode controller is limited to alarm functions.

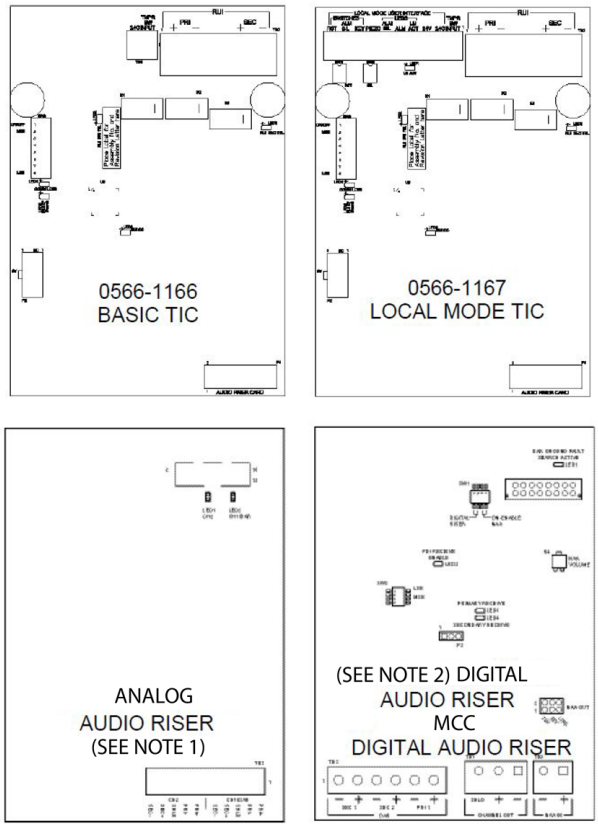


Figure 1: TICs and audio riser modules

Note:

1. Figure shows 4100-0621 analog audio riser.
2. Figure shows 4100-0622 digital audio riser and 4100-1314 MCC digital audio riser.

Environmental specifications

Table 3: Environmental specifications

Environmental Specifications (all PIDs)	
Operating Temperature	32° to 120° F (0° to 49° C)
Humidity	Up to 93% relative humidity at 90° F (32° C)

TIC LEDs

TIC module LEDs provide the following status information:

- **LED1.** Illuminates to indicate communication loss with the host panel.
- **LED2.** Illuminates when an RUI ground fault search is active.
- **LED3.** Illuminates when Local Mode is active (4100-0625 Local Mode TIC only).
- **LED4.** Illuminates to indicate an RUI Style 7 primary trouble.
- **LED5.** Illuminates to indicate an RUI Style 7 secondary trouble.
- **LED6.** Illuminates to indicate 4100 communications are in overcurrent.

TIC specifications

Table 4: TIC (4100-0620, 4100-0625) Specifications

Electrical Specifications	
Rated voltage	24 VDC
Operating voltage	18-33 VDC
Output voltage	8 V @ 1 A; 100 mV p-p ripple
Input Current	4100-0620: 36 mA maximum with no attachments (no 8V load) 4100-0625: 38 mA maximum with no attachments (no 8V load), 82 mA maximum with local mode controller (no 8V load) With 100 mA load on 8V output – Add 50 mA @ 24VDC, 60 mA maximum over range With 300 mA load on 8V output – Add 110 mA @ 24 VDC, 155 mA maximum over range With 1.0 A load on 8V output – Add 375 mA @ 24 VDC, 515 mA maximum over range

Local mode

- Local mode operation is limited to general alarm. Any point type listed in Table 5 is valid for local mode alarm operation. Note that the point must be an alarm-type point. On any alarm input, all circuits listed in Table 6 will activate.
- **Input operation:** During local mode operation, TrueAlarm initiating devices connected to the transponder will cause an alarm at their least sensitive alarm threshold.
  - Photoelectric sensors alarm at 3.7%/ft smoke obscuration
  - Ionization sensors alarm at 1.3%/ft obscuration
  - Heat sensors alarm at a fixed temperature of 135° F (57° C).
- **Notification operation:** Notification appliance circuits operate according to the point type selected in the programmer, with the exception of 20 BPM march time, which operates at 60 BPM. If a NAC is programmed for SQALERT point type, the audible appliances will sound as programmed and the strobes will flash synchronized at 1 Hz. Voice NACs play the horn tone at temporal-coded cadence.
- TrueAlarm sounder bases are limited to "on steady" operation. A coded NAC is used to drive the 24V power to the sounder base if coding is necessary. TrueAlarm device LEDs operate as usual.

Table 5: Alarm input devices

Point Type	Description	Curr. Lim.	Short
FIRE	Fire alarm (generic)	Alarm	Alarm
WATER	Waterflow switch	Alarm	Alarm
HEAT*	Heat detector	Alarm	Alarm
DUCT*	Duct detector	Alarm	Alarm
FLAME	Flame detector	Alarm	Alarm
PULL	PULL	Alarm	Alarm
SMOKE*	Smoke detector	Alarm	Alarm
VSMOKE*	Verified smoke detector	Alarm	Alarm
EMERG	Combination fire/emergency	Supv	Alarm
SFIRE	Combination smoke/fire	Alarm	Alarm
VSFIRE	Verified combination smoke/fire	Alarm	Alarm
SPULL	Combination smoke/pull	Alarm	Alarm
VSPULL	Combination verified smoke/pull	Alarm	Alarm S2STAGE
S2STAGE	2-stage monitor	Alarm	Alarm
WSO	Combination waterflow/tamper	Supv	Alarm
WSC	Combination waterflow/tamper	Normal	Alarm
GVMON*	Generic verified monitor	Alarm	Alarm
STYLEC	Style-C monitor	Alarm	Trouble
GENFS	Generic fire/supervisory (normally open)	Supv	Alarm
SUPDET	Suppression agent monitor zone	Alarm	Alarm
SUPDUMP	Suppression agent manual dump	Alarm	-
SUPPRES	Suppression pressure switch monitor	Alarm	Trouble

Table 6: Notification appliance circuit types

Point Type	Description
SSIGNAL	Alarm signal (will activate to Programmer specified default coding)
RSIGNAL	Alarm signal (will activate to Programmer specified default coding)
SVISUAL	Visual signal (will activate on steady)
RVISUAL	Visual signal (will activate on steady)
SPEAKER	Speaker circuit (will turn on steady – temporal horn tone from local tone generator)
SQALERT	Signal/Visual on until silence (horn will activate on steady)
SSYNVIS	Strobes on until silence
RSYNVIS	Strobes on until reset

All TrueAlert visual devices code according to their configuration before local mode is activated (no virtual NAC support).

System guidelines

RUI guidelines

- All wiring is 18 AWG (0.8231 mm²) (minimum) and 12 AWG (3.309 mm²) (maximum).
- All wiring is supervised and power-limited.
- All wiring that leaves the building requires overvoltage protection. Install the module inside an UL-Listed electrical box wherever wire enters or exits the building. A maximum of four 2081-9044 modules can be connected to one channel. The 2081-9044 is rated for 200 mA (maximum).
- For Class B (Style 4) operation:
  - The maximum distance to any device is 2,500 feet (762 m).
  - "T" taps are allowed.
  - The total maximum cable load is 10,000 ft (3,048 m), including t-taps and all parallel c connections. Use .29 pF/ Ft shielded cable to meet capacitance specifications.
- For Style 4, 6 or 7 operation:
  - The maximum allowed line-to-line capacitance (“+” to “-” terminals) is 0.58 uF.
  - For applications with shielded wire, ensure that the total capacitance from line to line plus the shield to either line is no more than 0.58 uF.
- For Class A (Style 6 or Style 7) operation, the maximum loop distance is 2,500 feet (762 m). "T" taps are not allowed.
- RUI comms are wired to remote cabinets from the CPU motherboard to the transponder interface cards: 4100-0620 or 4100-0625.
- Transponder interface cards operate with a single open or a single short circuit when wired Class A (Style 7).
- The master control unit must be a 4100U Fire Alarm Control Unit or a 4100ES Fire Alarm Control Unit.
- If 4602 and 4603 serial annunciators are present, the circuit can be Style 4 or Style 6. Annunciators do not isolate a short circuit fault, making Style 7 not possible.
- Use up to 4 RUI cards in the 4100ES/4100U Control Unit to distribute transponder wiring in different directions or for supporting different wiring requirements.
- The 4100ES/4100U Control Unit controls up to 31 transponders from the 4100 Control Unit, and can be distributed as required among the RUI cards.
- Wire a maximum of 30 RUI devices between two TICs.

Network audio riser controller module

Audio network configuration

An audio network contains one node with an audio controller module (4100-1210 Analog Controller Board or 4100-1211 [or 4100-1311] Digital Controller Board), and local analog or digital amplifiers. Some configurations may have an audio controller module located in a transponder end node; for example, an application with backup local audio in a non-head end node or an application with distributed microphones.

The other nodes only contain amplifiers, the audio riser interface (a 4100-0621 Analog Audio Riser, a 4100-0622 Digital Audio Riser or a 4100-1341 MCC Digital Audio Riser), and the 4100-0623 Network Audio Riser Controller Module.

The 4100-0623 Network Audio Riser Controller Module supports audio interconnections when connected to 4100-0621 Analog Audio Risers, 4100-0622 Digital Audio Risers or 4100-1341 MCC Digital Audio Risers. It is a version of the Basic TIC that doesn't have RUI input. It communicates through internal communications and is used to control audio riser interface modules in network nodes that are stand-alone fire alarm control units.

Locations on the network audio riser controller module

Figure 2 shows DIP switch, LED, and connector locations on the 4100-0623 Network Audio Riser Controller Module.

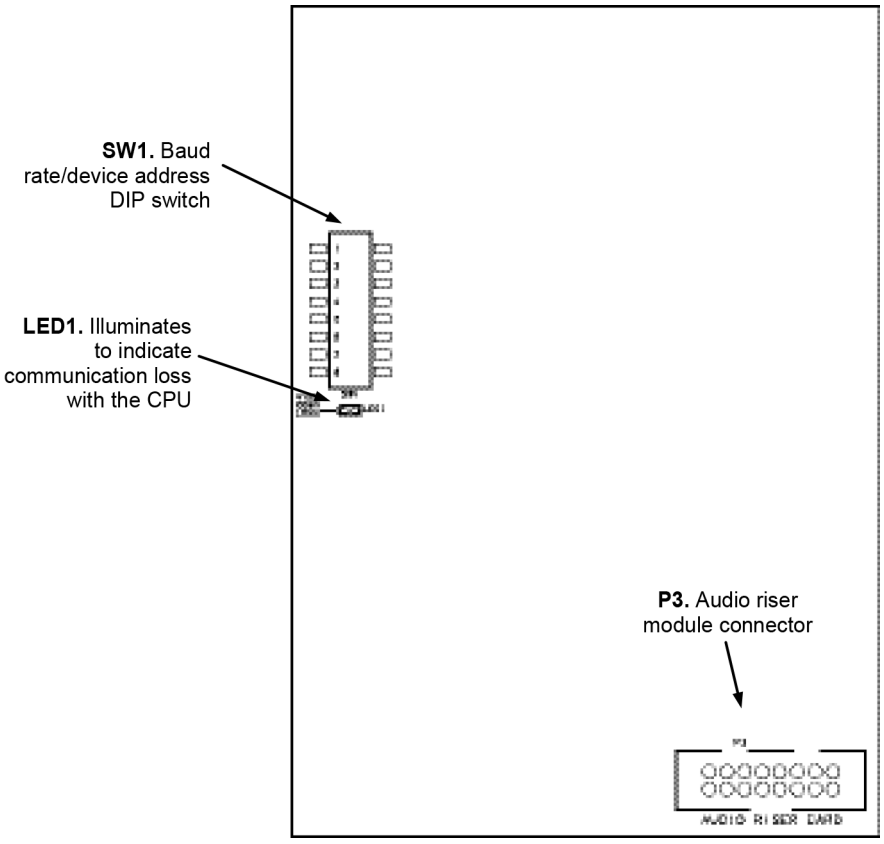


Figure 2: Network audio riser controller module

Network audio riser controller module specifications

Table 7: Network audio riser controller specifications

Electrical Specifications (4100-0623)	
Input voltage	18-33 VDC
Input current	14 mA maximum
Electrical Specifications (4100-0621)	
Input voltage	18-33 VDC
Input current	15 mA maximum

Configuration

The TIC and all other modules to be mounted in the transponder cabinet and attached expansion bays must be configured to operate correctly in the system through their DIP switch and jumper ports. This section describes the hardware configuration for TICs and the Network Audio Riser Controller Module.

Setting the address

The TIC and Network Audio Riser Controller Module device addresses are set through DIP switch SW1, which is a bank of eight switches. From left to right (see Figure 3) these switches are designated as SW1-1 through SW1-8. The function of these switches is as follows:

- **SW1-1.** Set this switch to ON.
- **SW1-2 through SW1-8.** These switches select the module's address. Refer to Figure 4 for a complete list of the switch settings for all of the possible module addresses.

Note: Set these switches to the value assigned to the module by the Programmer.

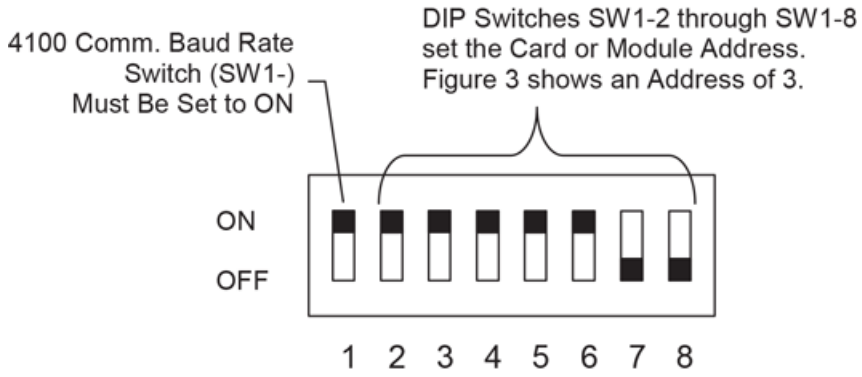


Figure 3: DIP switch SW1

Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8	Address	SW 1-2	SW 1-3	SW 1-4	SW 1-5	SW 1-6	SW 1-7	SW 1-8
1	ON	ON	ON	ON	ON	ON	OFF	61	ON	OFF	OFF	OFF	OFF	ON	OFF
2	ON	ON	ON	ON	ON	OFF	ON	62	ON	OFF	OFF	OFF	OFF	OFF	ON
3	ON	ON	ON	ON	ON	OFF	OFF	63	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	ON	ON	ON	ON	OFF	ON	ON	64	OFF	ON	ON	ON	ON	ON	ON
5	ON	ON	ON	ON	OFF	ON	OFF	65	OFF	ON	ON	ON	ON	ON	OFF
6	ON	ON	ON	ON	OFF	OFF	ON	66	OFF	ON	ON	ON	ON	OFF	ON
7	ON	ON	ON	ON	OFF	OFF	OFF	67	OFF	ON	ON	ON	ON	OFF	OFF
8	ON	ON	ON	OFF	ON	ON	ON	68	OFF	ON	ON	ON	OFF	ON	ON
9	ON	ON	ON	OFF	ON	ON	OFF	69	OFF	ON	ON	ON	OFF	ON	OFF
10	ON	ON	ON	OFF	ON	OFF	ON	70	OFF	ON	ON	ON	OFF	OFF	ON
11	ON	ON	ON	OFF	ON	OFF	OFF	71	OFF	ON	ON	ON	OFF	OFF	OFF
12	ON	ON	ON	OFF	OFF	ON	ON	72	OFF	ON	ON	OFF	ON	ON	ON
13	ON	ON	ON	OFF	OFF	ON	OFF	73	OFF	ON	ON	OFF	ON	ON	OFF
14	ON	ON	ON	OFF	OFF	OFF	ON	74	OFF	ON	ON	OFF	ON	OFF	ON
15	ON	ON	ON	OFF	OFF	OFF	OFF	75	OFF	ON	ON	OFF	ON	OFF	OFF
16	ON	ON	OFF	ON	ON	ON	ON	76	OFF	ON	ON	OFF	OFF	ON	ON
17	ON	ON	OFF	ON	ON	ON	OFF	77	OFF	ON	ON	OFF	OFF	ON	OFF
18	ON	ON	OFF	ON	ON	OFF	ON	78	OFF	ON	ON	OFF	OFF	OFF	ON
19	ON	ON	OFF	ON	ON	OFF	OFF	79	OFF	ON	ON	OFF	OFF	OFF	OFF
20	ON	ON	OFF	ON	OFF	ON	ON	80	OFF	ON	OFF	ON	ON	ON	ON
21	ON	ON	OFF	ON	OFF	ON	OFF	81	OFF	ON	OFF	ON	ON	ON	OFF
22	ON	ON	OFF	ON	OFF	OFF	ON	82	OFF	ON	OFF	ON	ON	OFF	ON
23	ON	ON	OFF	ON	OFF	OFF	OFF	83	OFF	ON	OFF	ON	ON	OFF	OFF
24	ON	ON	OFF	OFF	ON	ON	ON	84	OFF	ON	OFF	ON	OFF	ON	ON
25	ON	ON	OFF	OFF	ON	ON	OFF	85	OFF	ON	OFF	ON	OFF	ON	OFF
26	ON	ON	OFF	OFF	ON	OFF	ON	86	OFF	ON	OFF	ON	OFF	OFF	ON
27	ON	ON	OFF	OFF	ON	OFF	OFF	87	OFF	ON	OFF	ON	OFF	OFF	OFF
28	ON	ON	OFF	OFF	OFF	ON	ON	88	OFF	ON	OFF	OFF	ON	ON	ON
29	ON	ON	OFF	OFF	OFF	ON	OFF	89	OFF	ON	OFF	OFF	ON	ON	OFF
30	ON	ON	OFF	OFF	OFF	OFF	ON	90	OFF	ON	OFF	OFF	ON	OFF	ON
31	ON	ON	OFF	OFF	OFF	OFF	OFF	91	OFF	ON	OFF	OFF	ON	OFF	OFF
32	ON	OFF	ON	ON	ON	ON	ON	92	OFF	ON	OFF	OFF	OFF	ON	ON
33	ON	OFF	ON	ON	ON	ON	OFF	93	OFF	ON	OFF	OFF	OFF	ON	OFF
34	ON	OFF	ON	ON	ON	OFF	ON	94	OFF	ON	OFF	OFF	OFF	OFF	ON
35	ON	OFF	ON	ON	ON	OFF	OFF	95	OFF	ON	OFF	OFF	OFF	OFF	OFF
36	ON	OFF	ON	ON	OFF	ON	ON	96	OFF	OFF	ON	ON	ON	ON	ON
37	ON	OFF	ON	ON	OFF	ON	OFF	97	OFF	OFF	ON	ON	ON	ON	OFF
38	ON	OFF	ON	ON	OFF	OFF	ON	98	OFF	OFF	ON	ON	ON	OFF	ON
39	ON	OFF	ON	ON	OFF	OFF	OFF	99	OFF	OFF	ON	ON	ON	OFF	OFF
40	ON	OFF	ON	OFF	ON	ON	ON	100	OFF	OFF	ON	ON	OFF	ON	ON
41	ON	OFF	ON	OFF	ON	ON	OFF	101	OFF	OFF	ON	ON	OFF	ON	OFF
42	ON	OFF	ON	OFF	ON	OFF	ON	102	OFF	OFF	ON	ON	OFF	OFF	ON
43	ON	OFF	ON	OFF	ON	OFF	OFF	103	OFF	OFF	ON	ON	OFF	OFF	OFF
44	ON	OFF	ON	OFF	OFF	ON	ON	104	OFF	OFF	ON	OFF	ON	ON	ON
45	ON	OFF	ON	OFF	OFF	ON	OFF	105	OFF	OFF	ON	OFF	ON	ON	OFF
46	ON	OFF	ON	OFF	OFF	OFF	ON	106	OFF	OFF	ON	OFF	ON	OFF	ON
47	ON	OFF	ON	OFF	OFF	OFF	OFF	107	OFF	OFF	ON	OFF	ON	OFF	OFF
48	ON	OFF	OFF	ON	ON	ON	ON	108	OFF	OFF	ON	OFF	OFF	ON	ON
49	ON	OFF	OFF	ON	ON	ON	OFF	109	OFF	OFF	ON	OFF	OFF	ON	OFF
50	ON	OFF	OFF	ON	ON	OFF	ON	110	OFF	OFF	ON	OFF	OFF	OFF	ON
51	ON	OFF	OFF	ON	ON	OFF	OFF	111	OFF	OFF	ON	OFF	OFF	OFF	OFF
52	ON	OFF	OFF	ON	OFF	ON	ON	112	OFF	OFF	OFF	ON	ON	ON	ON
53	ON	OFF	OFF	ON	OFF	ON	OFF	113	OFF	OFF	OFF	ON	ON	ON	OFF
54	ON	OFF	OFF	ON	OFF	OFF	ON	114	OFF	OFF	OFF	ON	ON	OFF	ON
55	ON	OFF	OFF	ON	OFF	OFF	OFF	115	OFF	OFF	OFF	ON	ON	OFF	OFF
56	ON	OFF	OFF	OFF	ON	ON	ON	116	OFF	OFF	OFF	ON	OFF	ON	ON
57	ON	OFF	OFF	OFF	ON	ON	OFF	117	OFF	OFF	OFF	ON	OFF	ON	OFF
58	ON	OFF	OFF	OFF	ON	OFF	ON	118	OFF	OFF	OFF	ON	OFF	OFF	ON
59	ON	OFF	OFF	OFF	ON	OFF	OFF	119	OFF	OFF	OFF	ON	OFF	OFF	OFF
60	ON	OFF	OFF	OFF	OFF	ON	ON								

Figure 4: TIC & network audio riser controller module addresses

Mounting

Mounting instructions

TICs, Audio Riser Modules, and Network Audio Riser Controller Modules are 4" X 5" modules and are mounted according to the following information.

Important: The TIC or Network Audio Riser Controller Module should be mounted in the upper left position of the bay. The audio riser module must be mounted directly below the TIC or Network Audio Riser Controller Module.

1. Screw two standoffs and washers to the appropriate holes in the back of the cabinet. These holes must line up with the screw holes in the 4 X 5 card. See Figure 5.
2. Plug the 4" X 5" card into the top left PDI connector (P8).
3. Secure the top of the card to the standoffs with two six torx screws and washers.

   Note: Figure 5 is a general-purpose illustration that applies to most 4" X 5" cards.

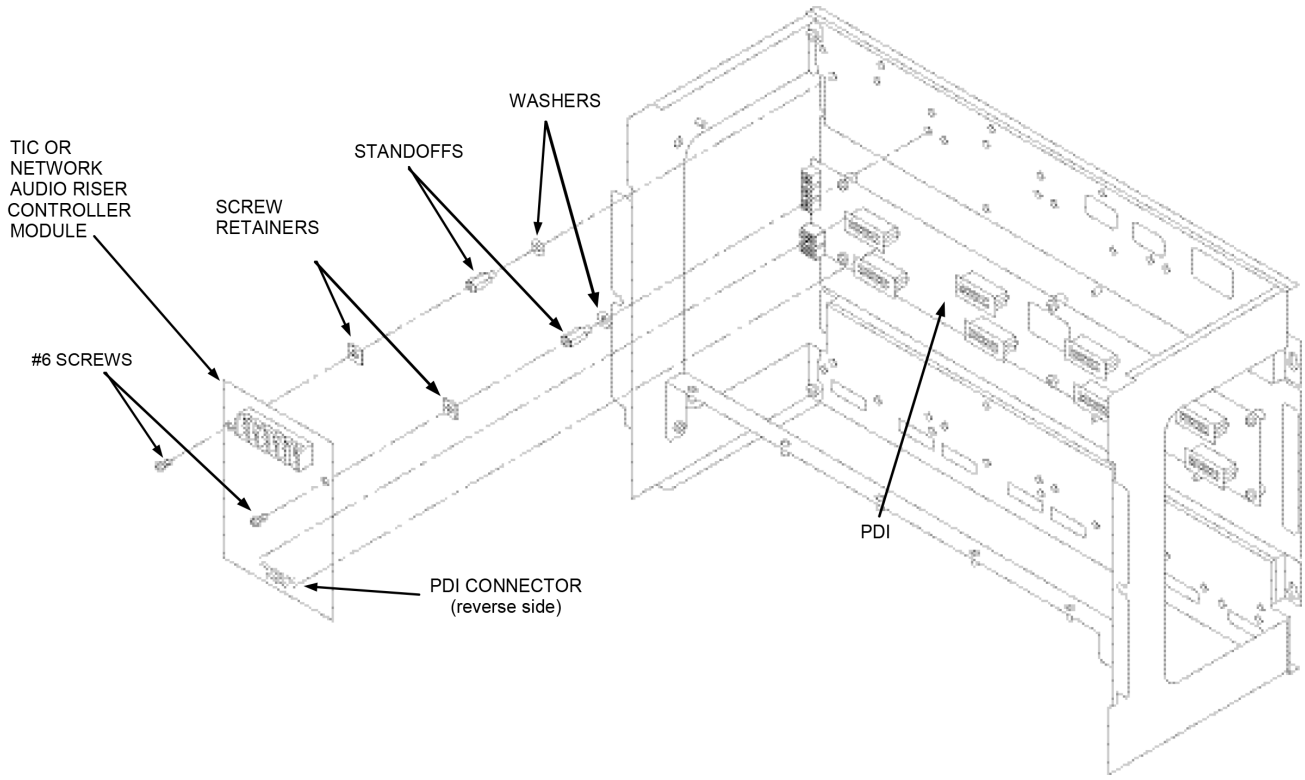


Figure 5: TIC or network audio riser controller module mounting

Wiring

TIC/motherboard interconnections

Use Figure 6 to connect the TIC to a motherboard in another bay.

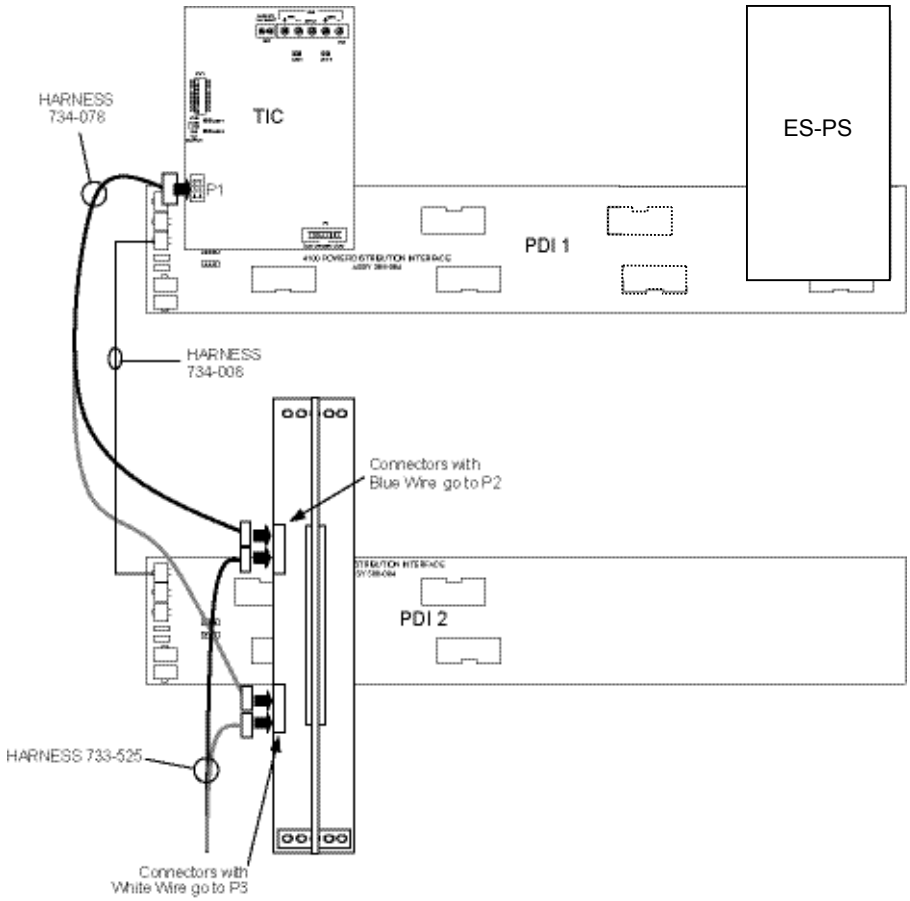


Figure 6: TIC/motherboard interconnections

PDI Jumpers

P4 and P5 on the PDI must be configured to provide power to the TIC.

- If there is a Power Supply in Bay 1,
  - Set Jumpers P4 and P5 in Bay 1 to Positions 2 and 3.
- If there is no Power Supply in Bay 1 with the TIC, you must obtain power from Bay 2 or Bay 3.

  Option 1
  - Set Jumpers P4 and P5 in Bay 1 to Positions 1 and 2.
  - Connect one end of Harness 734-008 to Power/Comm plug on the ES Power Supply, SPS or RPS (P6) (or P2 on XPS) located in Bay 2 or Bay 3 in legacy systems. Connect the other end of the harness to P1 in Bay 1.

  Option 2
  - Set Jumpers P4 and P5 in Bay 1 to Positions 1 and 2.
  - Set Jumpers P4 and P5 to Positions 2 and 3 in bay with power supply that will provide power to the TIC in Bay 1.
  - Connect one end of Harness 734-008 to P2 of the PDI in the bay that powers the TIC. Connect the other end of the harness to P1 in Bay 1.

RUI wiring configurations

Overview

The TIC (except for the Network Audio Riser Controller Module) must be connected to the host panel using RUI cabling. This section explains how to wire the two together, and how to set up a system with multiple transponders connected to the same host panel.

RUI wiring configurations

RUI cabling can be accomplished either through Class A or Class B wiring.

With Class A wiring, transponder cabinets can communicate with the FACU even in the event of an open circuit somewhere in the loop. Class A wiring requires that two wires are routed from the CPU motherboard to each TIC, and then back again to the CPU motherboard.

With Class B wiring, "T" tapping is possible, which requires less wiring distance for installation than Class A. Additionally, Class B wiring does not require end-of-line resistors, because each TIC communicates directly to the CPU.

Figure 7 shows both types of wiring.

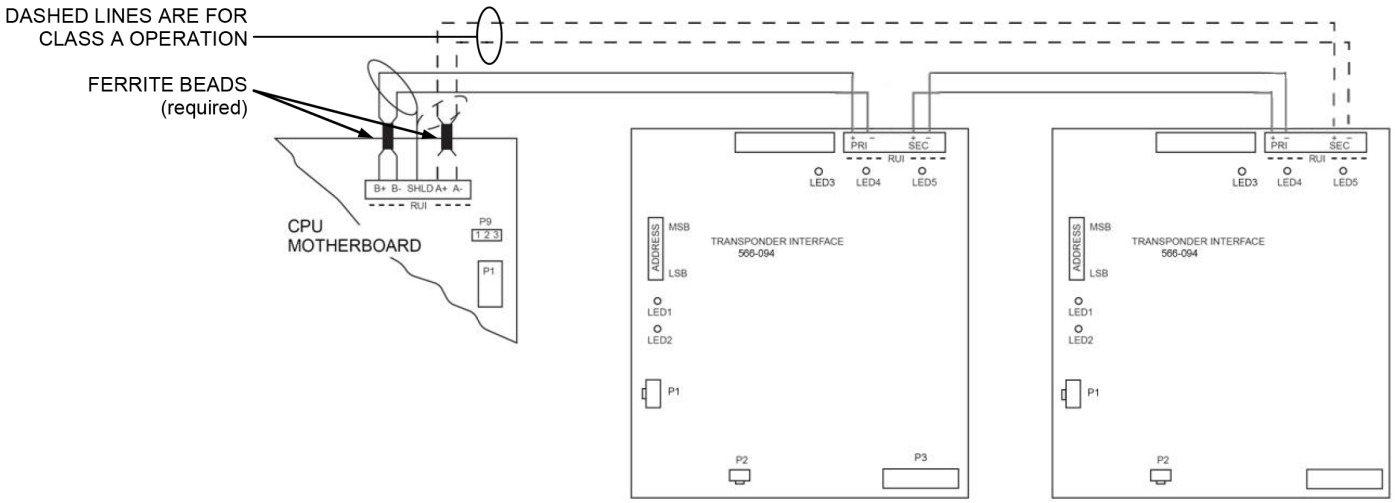


Figure 7: TIC wiring to the host panel

Note:

- The wire size must be between 18 AWG (0.8231 mm²) and 12 AWG (3.309 mm²).
- The maximum wiring distance: 2,500 feet (762 m).
- The maximum "T" tapping length: 10,000 feet (3,048 m).
- Maintain correct polarity on terminal connections.
- Do not loop wires under terminals.

Overview

This section describes the Class A and Class B connections from audio controllers to audio risers, which in turn connect to a TIC or Network Audio Riser Controller Module. Wiring configurations are shown for both analog and digital controllers and risers.

Analog interconnections

The figure is an illustration of Class A and Class B analog wiring from the analog audio controller to audio risers connected to TICs or the Network Audio Riser Controller Module.

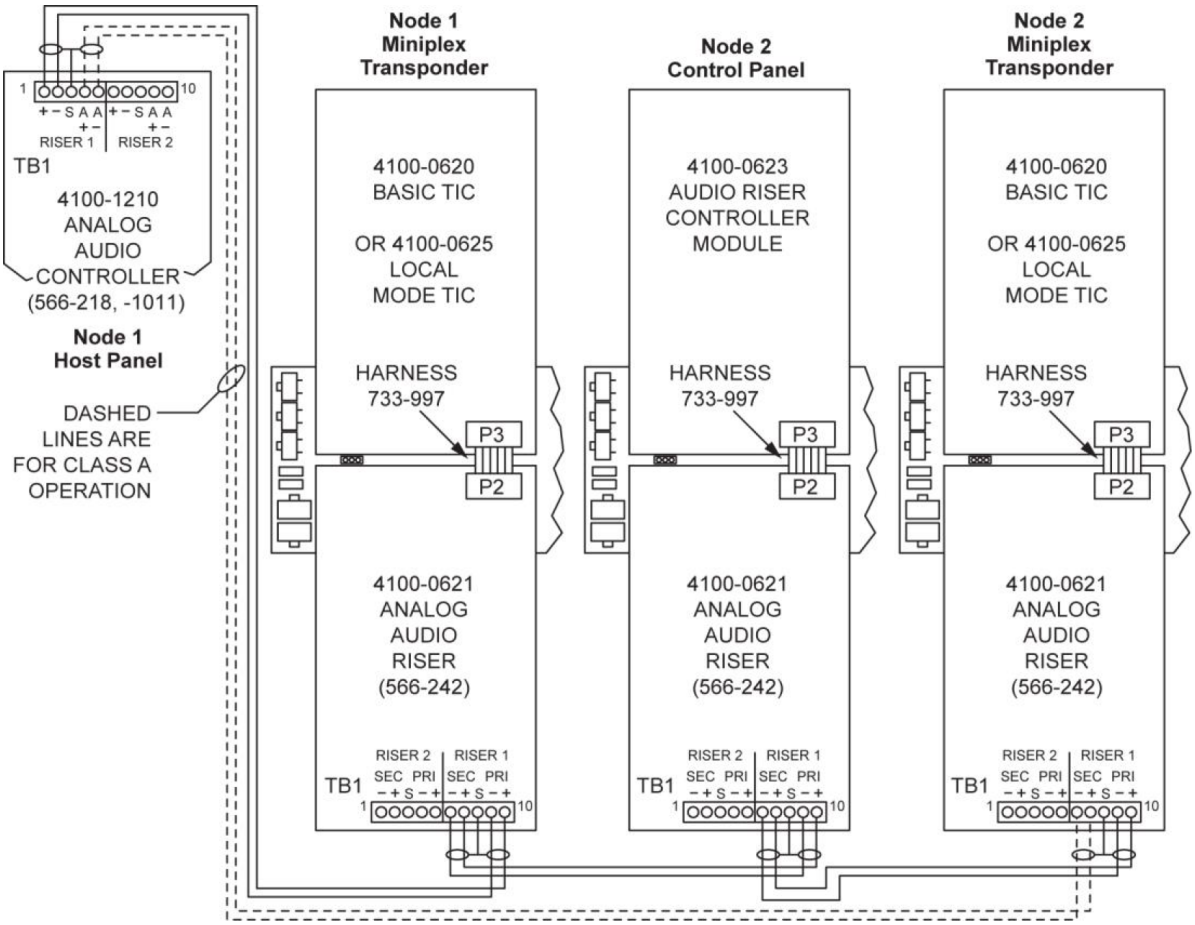


Figure 8: Analog interconnections

Note:

1. Leave the 4.7 K, ½ W resistors (378-056; yellow/violet/red) on the "+" to "-" terminals of unused contacts.
2. All wiring is 18 AWG (0.8321 mm2) to 14 AWG (2.081 mm2), twisted-shielded pair.
3. Do not mix audio wiring in the same jacket with other wiring (including other audio wiring).
4. AC voltage rating: 10 VRMS (maximum).
5. DC voltage rating: 1 VDC (maximum).
6. The maximum number of analog interface cards per audio riser: 98.
7. All wiring that leaves the building requires the 2081-9044 Overvoltage Protector at each entry or exit to the building.
8. The maximum wire distance: 10,000 feet (3,048 meters).
9. Wiring must be free of all grounds.
10. Set the audio input card jumpers as shown in "Configuring the Audio Input Card."
11. All riser wiring is supervised and power-limited.
12. The figure shows the following products:
    - 4100-0620 basic TIC or 4100-0625 local mode TIC
    - 4100-0623 audio riser controller module
    - 4100-0621 analog audio riser
    - 4100-1210 analog audio controller

Connecting the 4100U/4100ES analog riser to legacy 4100

The 4100U or 4100ES may be connected to the 4100 Legacy Audio Controller using the 4100U Audio Riser and the Network input on the Legacy Controller. The 4100U and 4100ES use a 10VRMS Analog Audio riser. In order to interface to a legacy 4100 Audio Controller Network input, an isolation/step-down transformer must be used. This is an existing product, the Audio Isolator Assembly, PN 742-302. The setup is different from the instructions that are supplied with the module. Following are the modified installation instructions:

1. Connect the incoming nominal 10 VRMS 4100U/4100ES Audio Riser wiring to TB1 on the audio isolator. If the installation requires IN and OUT wiring, two wires may be installed under each screw of TB1.

   Note: The in and out wiring must be two separate wires. Do not loop the wire around the TB1 screws.

2. If there is only one audio wire pair coming into the panel, isolate and tape back the shield with high quality electrical tape.
3. If the installation requires IN and OUT wiring, install as indicated in Step 1 above, connect the shields of the incoming and outgoing wires together to maintain continuity of the shield. The preferable method is to twist the shields together, solder and cover with a high quality electrical tape.

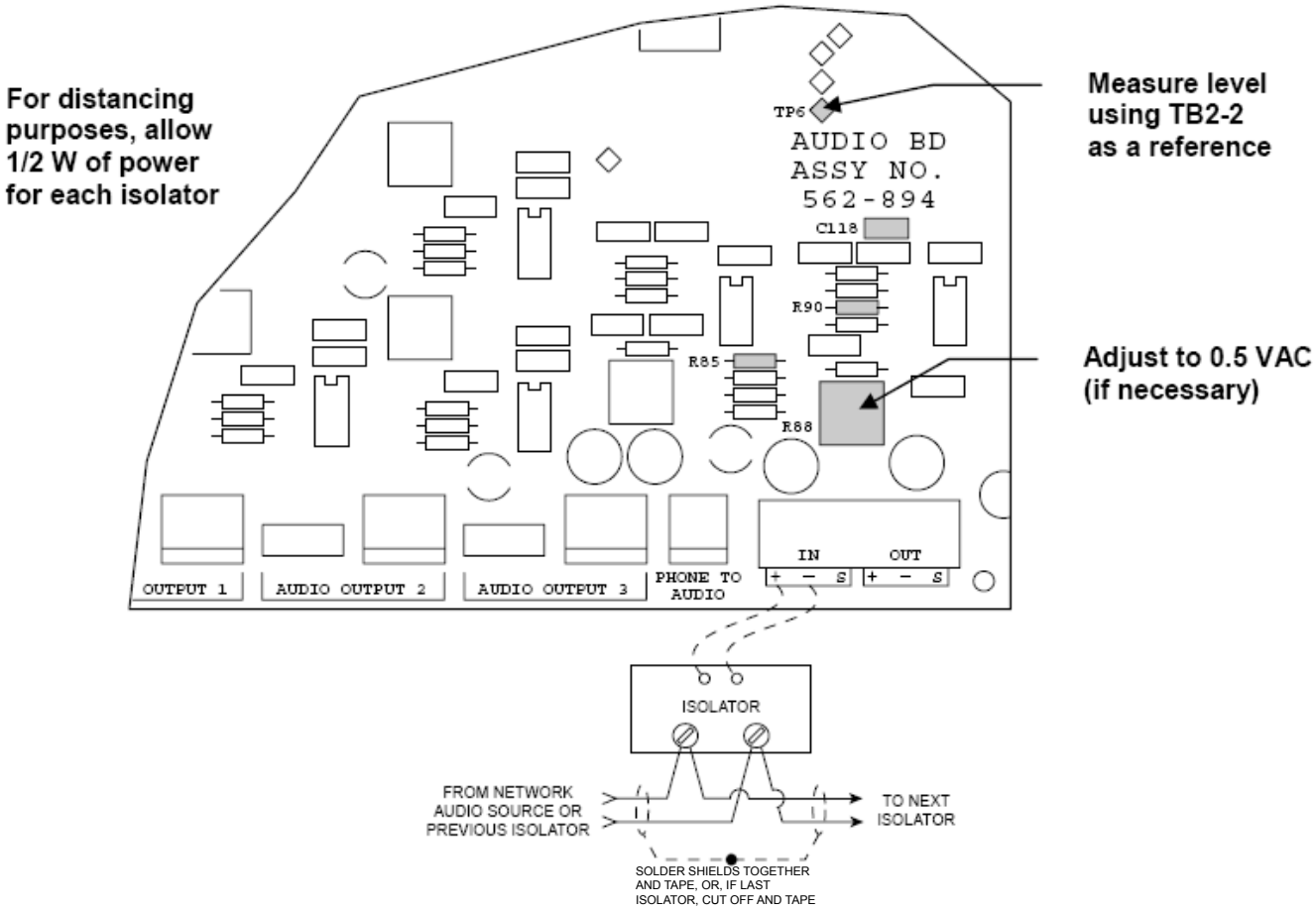


Figure 9: Audio board controller configuration

Aligning the audio controller

Follow Steps 1 through 5 and Figure 9 to properly align the audio controller board after installing the audio isolator:

1. Ensure the jumper wire on the isolator assembly is connected to Post D.
2. Remove R85, R90, and C118 from the Audio Controller Board (562-894).
3. Verify there is a nominal 10 VRMS riser supervisory signal (1 KHz Sine Wave) into the isolator.
4. Using the AC scale of an appropriate meter (e.g., Fluke 12, Fluke 75) measure the level at TP6 using TB2-2 of the audio controller as a reference.
5. If needed, adjust R88 on the audio controller for a level of 0.5 VAC.

Amplifier and harness connections

The low level (1Vp-p) audio output from the legacy controller to the local amplifiers must be converted from an unbalanced signal, to a balanced signal, in order to pass the distortion requirements for this configuration. This is accomplished by a new Isolation Transformer harness, PN 0734-231. This is required in order to pass the distortion requirements for this configuration. If there is more than one amplifier on a channel, additional isolator harnesses must be added between each link in the audio distribution. If the Legacy Controller uses two channel audio, isolation harnesses is required for the second channel. See Figure 10.

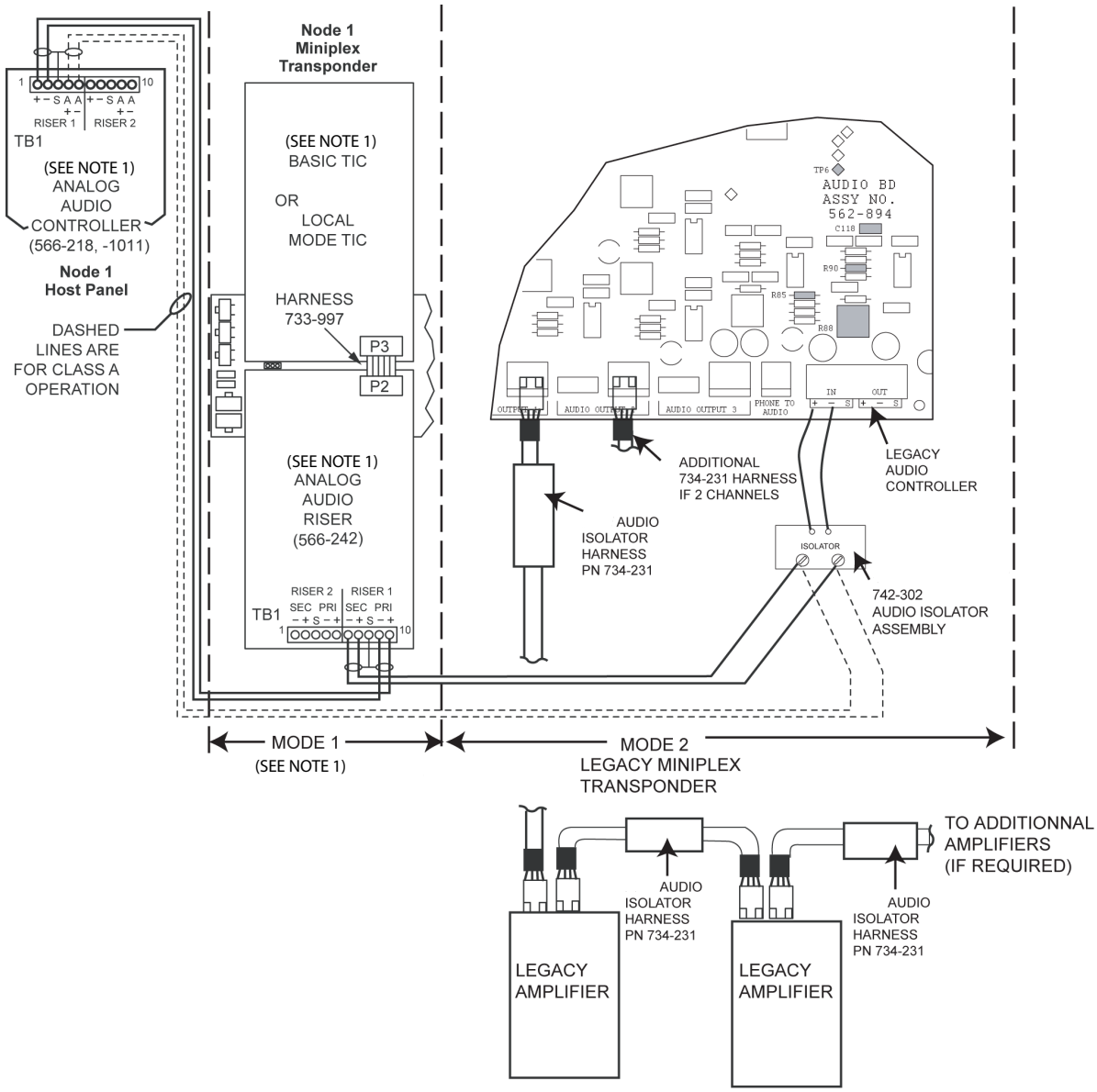


Figure 10: Amplifier and harness connections

Note:

Figure features the following products:

- 4100-0620 basic TIC or 4100-0625 local mode TIC.
- 4100-1210 analog audio controller.
- 4100-0621 analog audio riser.
- 4100U/4100ES miniplex transponder.

Digital interconnections (4100-1311 Digital Audio Controller [Constant Supervision Applications])

For Constant Supervision applications with 4100U Master Firmware Revision 11.08 or later, or all versions of 4100ES Master Firmware. Figure 11 is an illustration of Class A and Class B digital wiring from the digital audio controller to risers connected to TICs or the Network Audio Riser Controller Module.

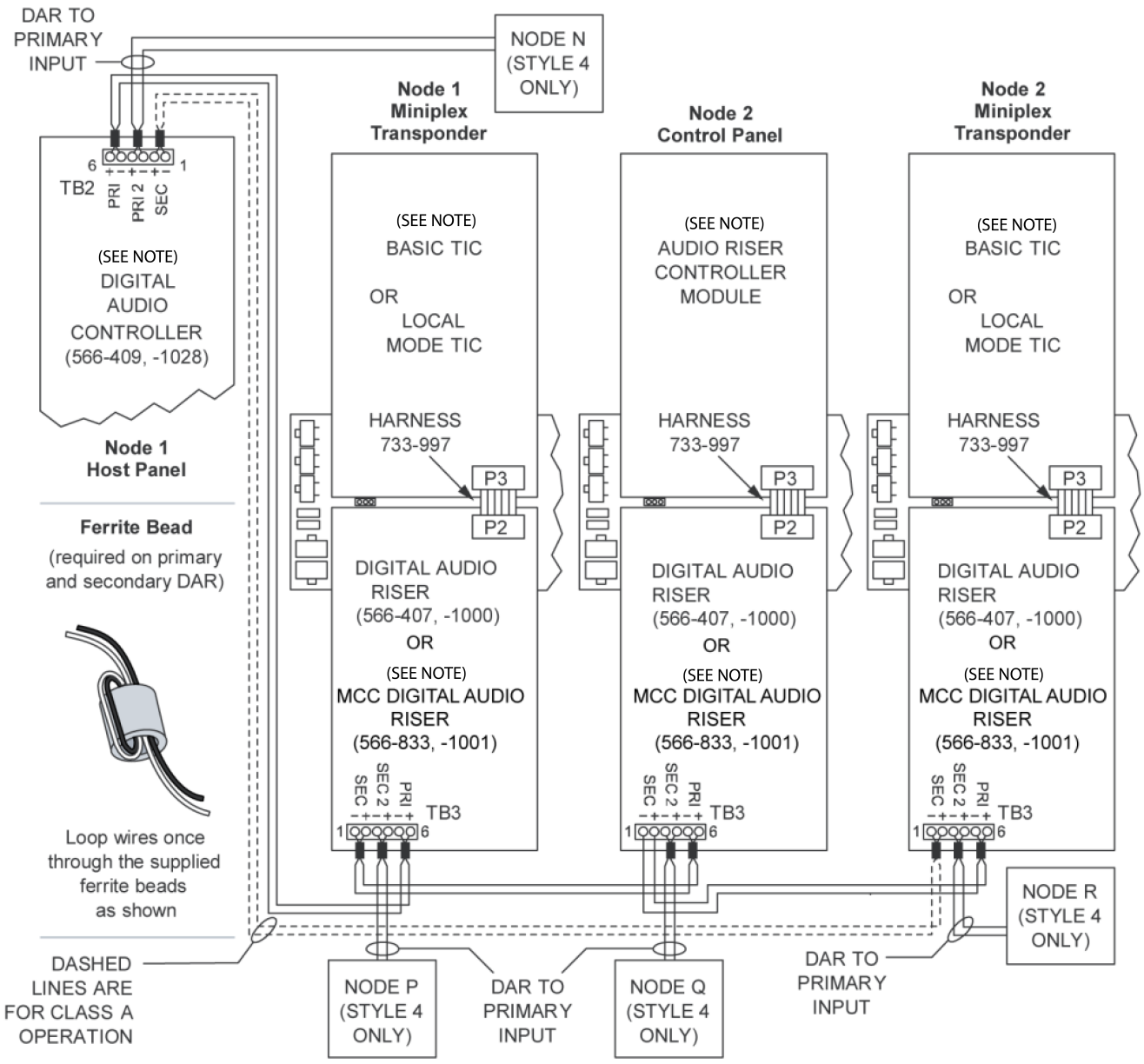


Figure 11: Digital interconnections (4100-1311 Digital Audio Controller)

Note: Figure shows the following products:

- 4100-1311 digital audio controller.
- 4100-0620 basic TIC or 4100-0625 local mode TIC.
- 4100-0623 audio riser controller module.
- 4100-0622 digital audio riser, or 4100-1341 MCC digital audio riser.

1. All wiring is 24 AWG (0.2047 mm²) to 18 AWG (0.8321 mm²), twisted-pair. Unshielded wiring is preferred. If shielded wiring is used (retrofit or outside wiring) terminate as indicated in note 4.
2. If the length of the primary cable is greater than 500ft (152m), set Digital Audio Riser jumpers P6 and P7 to position 2-3. If the length of the secondary cable is greater than 500ft (152m), set jumpers P8 and P9 to position 2-3.
   - Maximum wire distance: 2,500 ft (762 m) for unshielded cables or 1000ft (304m) for shielded cables from the digital audio controller primary to the digital audio riser card.
   - Maximum line resistance and capacitance between nodes:
     - 18 AWG (0.8321 mm²): 40 Ohms maximum 0.055 µF maximum
     - 24 AWG (0.2047 mm²): 135 Ohms maximum 0.055 µF maximum
3. If the length of the primary cable is less than 500ft, set Digital Audio Riser jumpers P6 and P7 to position 1-2. If the length of the secondary cable is less than 500ft, set jumpers P8 and P9 to position 1-2.
   - Maximum wire distance: 500 ft (152 m) for unshielded cables or 500 ft (152 m) for shielded cables from digital audio controller primary to the digital audio riser card.
   - Maximum line resistance and capacitance between nodes:
     - 18 AWG (0.8321 mm²): 40 Ohms maximum 0.02 µF maximum
     - 24 AWG (0.2047 mm²): 135 Ohms maximum 0.02 µF maximum
4. All wiring that leaves the building requires the 2081-9044 Overvoltage Protector at each entry or exit to the building. A maximum of four overvoltage protectors are allowed. Each 2081-9044 adds 6 Ohms and 0.006 µF. External wiring must be twisted shielded. Connect the primary cable's shield to the chassis ground at the DAR Controller and connect the shield of the secondary cable to the chassis ground at the remote DARIC cabinets.
5. Wiring must be free of all grounds.
6. The maximum number of digital interface cards per digital audio riser: 31.
7. All riser wiring is supervised and power-limited.
8. Do not mix audio wiring in the same jacket with other wiring (including other audio wiring).
9. In applications where no Digital Audio Controller is connected to the field wiring (such as a synchronized audio application or a non-synchronized application with multiple network microphones), all DAR interface cards are wired secondary to primary.

Distributed microphone interconnections

A Distributed Microphone is used between audio nodes in a network system where each node has its own local audio (its own Digital Audio Controller), but needs to be able to play the microphone channel from a separate node's Digital Audio Controller.

For a distributed microphone application, the 4100-0622 Digital Riser Interface (566-407, 566-1000) has a single digital to analog converter that can be set to convert any single channel of the Digital Audio Riser (DAR) stream to analog. This analog output is connected to a second Digital Audio Controller's remote microphone input, or to the microphone input of a 4100-1240 Input Option Card (566-037). DIP switches configure the channel selection and density.

Figure 12 is an illustration of the distributed microphone application wiring. Refer to the Switches and Indicators section for switch settings to configure the distributed microphone channel output.

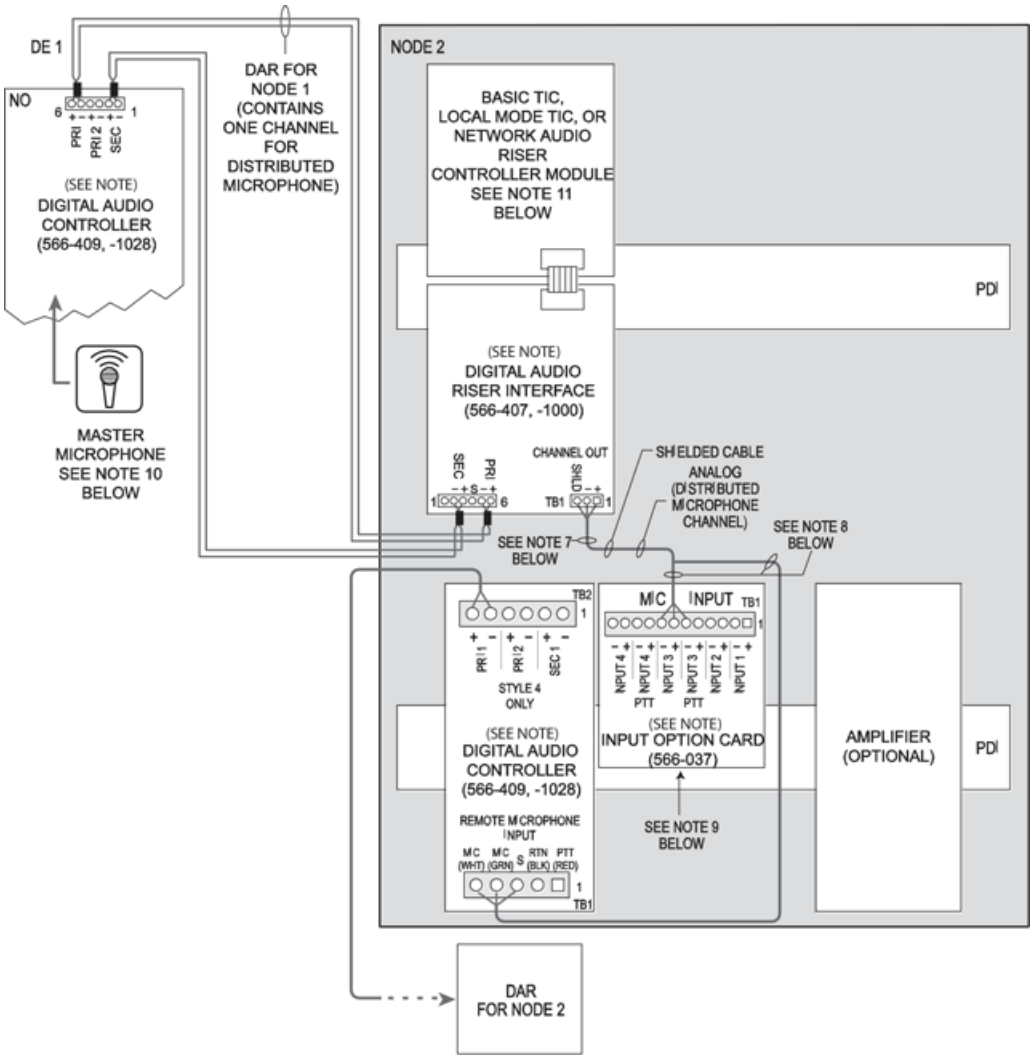


Figure 12: Distributed microphone interconnections

Note: Figure shows the following products:

- 4100-1311 digital audio controller.
- 4100-0622 digital audio riser interface.
- 4100-1240 input option card.

1. All wiring is 24 AWG (0.2047 mm²) to 18 AWG (0.8321 mm²) twisted pair.
2. Maximum distance between subsequent nodes: 2,500 feet (762 meters).
3. Maximum line resistance and capacitance between nodes:
   18 AWG (0.8321 mm²): 40 Ohms maximum,
   0.055 µF maximum
   24 AWG (0.2047 mm²): 135 Ohms maximum,
   0.055 µF maximum
4. All wiring that leaves the building requires the 2081-9044 Over voltage Protector at each entry and exit to the building. A maximum of four overvoltage protectors are allowed. Each Overvoltage Protector adds 6 Ohms and 0.006 µF.
5. Wiring must be free of all grounds.
6. Do not mix audio wiring in the same jacket with other wiring (including other audio wiring).
7. You also can connect the Mic Input to Input 4 (TB1-11 & TB1-12) instead of Input 3 (TB1-7 & 1-8). (Connection to Input 3 is shown.)
8. Connects to either Option Card or Controller (one of these two wires).
9. When using the Option Card for a Distributed Microphone application, you must configure the card for a microphone level input. See the Option Card manual (579-160) for details.
10. Typically, the Master Microphone is located in Node 1 but could be in a different node depending on the application.
11. Basic TIC is 4100-0620; Local Mode TIC is 4100-0625; and Network Audio Riser Controller Module is 4100-0623.

Multiple digital command center interconnections

A distributed line level signal is used between audio nodes in a Multiple Digital Command Centre (MCC) network system where nodes have local analog audio but need to be able to play the microphone, the tones, and the messages from a separate node's Digital Audio Controller.

For this MCC application, the 4100-1341 Digital Riser Interface (566-833, -1001) has a single digital to analog converter that can be set to convert any single channel of the Digital Audio Riser (DAR) stream to line level analog. This analog output is connected to an Analog Audio Controller's input option cards (4100-1240, 566-037) line level input. DIP switches configure the channel selection and density.

Figure 13 is an illustration of this MCC application wiring. Refer to the Switches and Indicators section for switch settings to configure the MCC DARICs channel output.

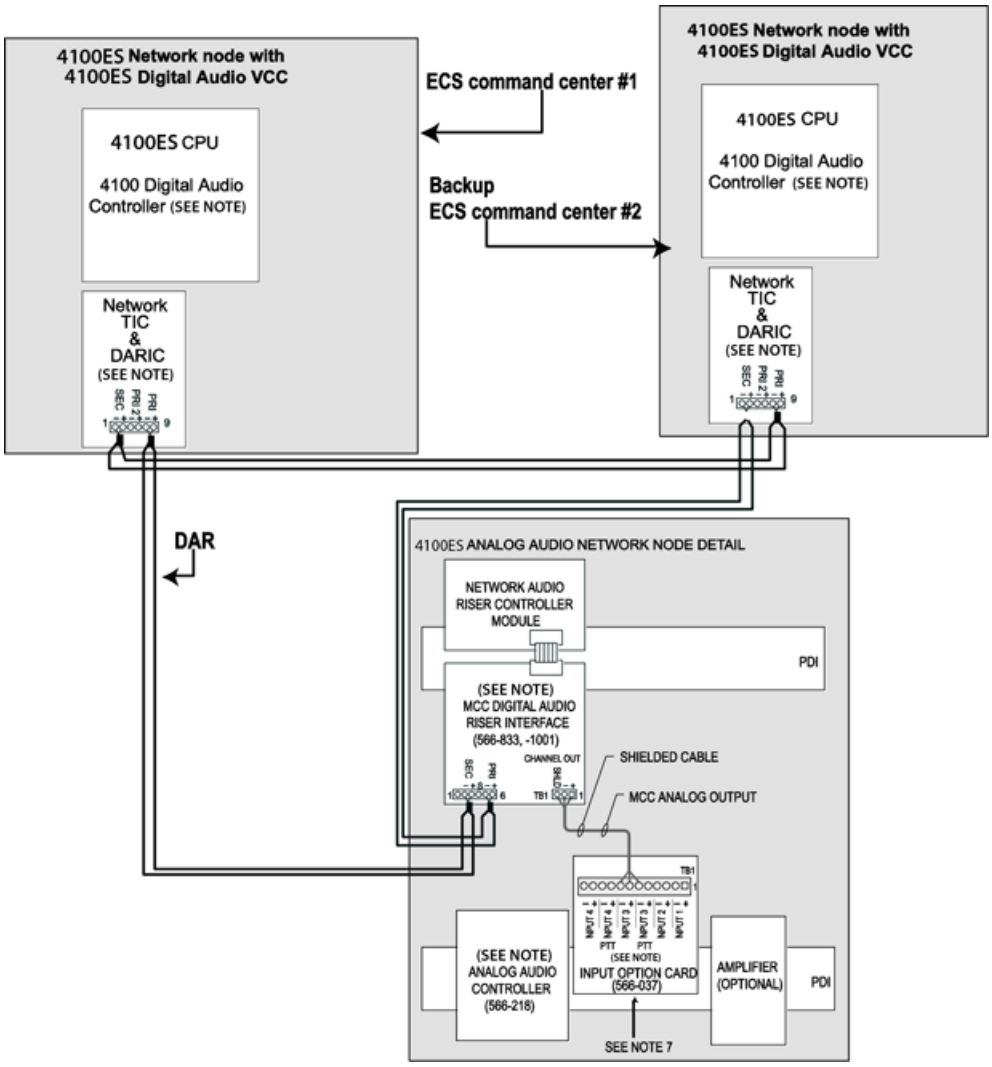


Figure 13: Multiple digital command center (4100ES FACU shown)

Note: Figure 13 shows the following products:

- Network TIC and DARIC 4100-0622.
- 4100 digital audio controller 4100-1311.
- 4100-1341 MCC digital audio riser interface.
- 4100-1210 analog audio controller.
- 4100-1240 input option card.

1. All wiring is 24 AWG (0.2047 mm²) to 18 AWG (0.8321 mm²), twisted pair. .
2. The maximum distance between subsequent nodes: 2,500 feet (762 meters).
3. The maximum line resistance and capacitance between nodes:

18 AWG (0.8321 mm²): 40 Ohms maximum,
0.055 µF maximum
24 AWG (0.2047 mm²): 135 Ohms maximum,
0.055 µF maximum.

4. All wiring that leaves the building requires the 2081-9044 Overvoltage Protector at each entry or exit to the building. A maximum of four overvoltage protectors are allowed. Each 2081-9044 adds 6 Ohms and 0.006 µF.
5. Wiring must be free of all grounds.
6. Do not mix audio wiring in the same jacket with other wiring (including other audio wiring).
7. When using the Option Card for a MCC, you must configure the card for a line level input. See the Option Card manual (579-160) for details.
8. The Master Microphone is located in Node 1 but could be in a different node depending on the application.

Digital audio riser module (566-407, 566-833, 566-1000, 566-1001)

This section describes configuration settings for the 4100-0622 Digital Audio Riser (DAR) Module (566-407, 566-1000) and the 4100-1341 MCC Digital Audio Riser Module (566-833, 566-1001).

Locations on the digital audio riser module

Figure 14 shows the important component locations on the 4100-0622 Digital Audio Riser (DAR) Module.

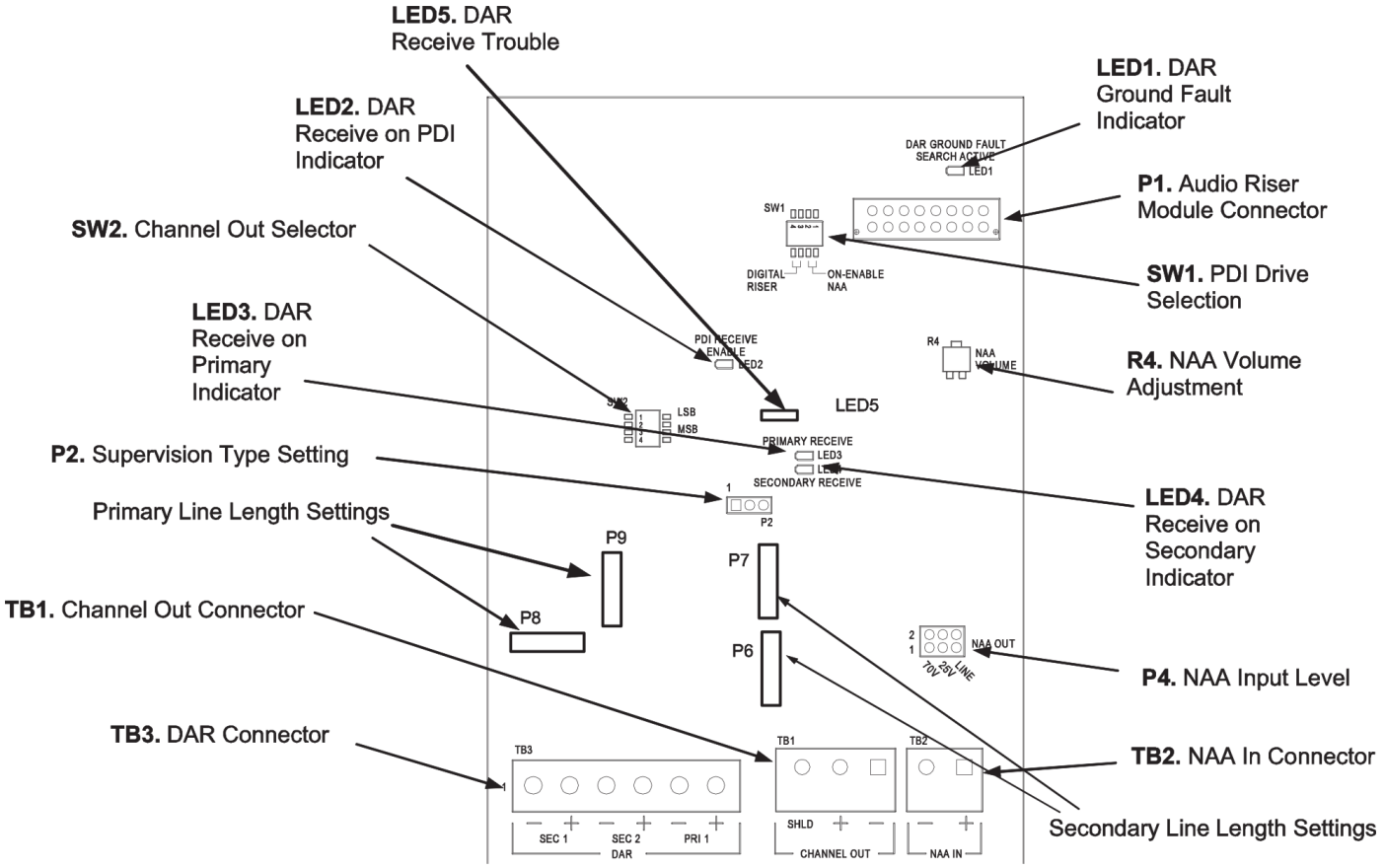


Figure 14: Digital audio riser module

Note: For NAA volume adjustment see caution note in Switches and indicators

Digital Audio Riser Module Specifications

Table 8 lists specifications for the Digital Audio Riser Module.

Table 8: Digital Audio Riser Module (4100-0622, 4100-1341) Specifications

Electrical specifications	
Input voltage	19-33 VDC
Input Current (Supervision or Alarm)	With no secondary wiring: 70 mA maximum
	Add 8 mA for each secondary in use

Switches and indicators

DIP Switches

Two 4-position switches (SW1 & SW2) allow for configuration of the D to A channel, DAR density, and module outputs for the 4100-0622, 4100-1341 Digital Audio Riser Module. See Table 9 and Table 10.

Switch Positions for the 4100-0622, 4100-1341 Digital Audio Riser Module:

Table 9: Switch positions SW1

SW1 (See Caution below)		
Position	**Function**	**State**
*1 & 2	NAA Output Enable	ON = Enable; OFF = Disable
**3 & 4	Digital PDI Drive	ON = Enable; OFF = Disable

*ON selection disallows use of this module in the same bay as a 4100-1265 Degraded Fail-Safe Mode Microphone Preamp (566-510) or a 4100-1210 Analog Audio Controller (566-218, 566-1011).

**Disable the Digital PDI Drive for an analog audio system, in a distributed microphone or distributed line level application where the head-end audio never is used by the local panel.

Table 10: Switch positions SW2

SW2					
Postition				**Channel Out**	**DAR Density**
***4**	**3**	**2**	**1**		
OFF	OFF	OFF	OFF	1	8 ksps
OFF	OFF	OFF	ON	2	
OFF	OFF	ON	OFF	3	
OFF	OFF	ON	ON	4	
OFF	ON	OFF	OFF	5	
OFF	ON	OFF	ON	6	
OFF	ON	ON	OFF	7	
OFF	ON	ON	ON	8	
ON	OFF	OFF	OFF	1	16 ksps
ON	OFF	OFF	ON	2	
ON	OFF	ON	OFF	3	
ON	OFF	ON	ON	4	
*Switch SW2-4 selects DAR density.					

CAUTION:

1. All four positions of Switch 1 are set to OFF at the factory to avoid module output damage. Positions 3 and 4 are only ON for Digital Systems. For Analog Systems, Positions 3 and 4 MUST REMAIN OFF to avoid DAR damage.
2. If the 4100-0622 DAR Module is installed in a bay where PDI Channel 2 is driven by a 4100-1210 Analog Audio Controller or a 4100-1265 Degraded Fail-Safe Mode Microphone Preamp, Switch Positions 1 and 2 MUST BE OFF to avoid damaging the NAA output.

Table 11: DAR communications line length jumper settings

Line	Jumpers	Pos <500 ft	Pos >500 ft
Primary	P8, P9	1-2	2-3
Secondary	P6, P7	1-2	2-3

Jumpers

Two jumpers allow for configuration of the 4100-0622, 4100-1341 Digital Audio Riser Module (566-407, -833, -1000, -1001 respectively) as shown in Table 12.

Table 12: P4: Analog Audio input level (for Non-Alarm Audio [NAA] Application)

Position	Audio Input Level
1-2	70.7 Vrms
3-4	25 Vrms
5-6	Line level (1-2V peak to peak)

Table 13: P2: Supervision Type

Position	Function
1-2	Silence supervision*
2-3	Constant supervision

*When the Supervision Type jumper is set to "Silence Supervision," the additional routing options offered by this module are not available except for allowing backward compatibility with the 566-033 version of the Digital Audio Controller. Ensure that you set this jumper to "Silence Supervision" if this module is used in a system with the 566-033 version of the Digital Audio Controller or the 566-243 version of the Digital Audio Riser Interface Card.

Potentiometer R4:

Using the Potentiometer R4 on the 4100-0622, 4100-1341 Module, you can adjust the volume of the Non-Alarm Audio (NAA). It has a range from zero (volume can be completed silenced) to full scale. The initial factory setting is approximately one-half of full scale.

Adjust the NAA volume so that it never produces overly high output that overdrives the amplifiers. To adjust the output, set the customer equipment so that its output is at its maximum normal operating level. Then adjust the riser module's trim pot (R4 in Figure 14) so that the output of the amplifier is not distorted (as heard at the building speakers). Then set the output of the customer equipment to a comfortable listening level LEDs:

LEDs:

LEDs indicate routing status or mode of the 4100-0622, 4100-1341 Modules as well as the ground fault search status. See Table 14.

Table 14: LED functions for the 4100-0622, -1341 digital audio riser module

LED	Color	Function
LED1	Yellow	DAR Ground fault search active
LED2	Green	DAR receive on PDI
LED3	Green	DAR receive on primary
LED4	Green	DAR receive on secondary
LED5	Yellow	DAR Listen (On = DAR receive trouble)

The following information interprets the LEDs with respect to module mode. Note that LED2 usually indicates the mode of the PDI transceiver rather than the DAR source.

- If either LED3 or LED4 is illuminated, that input is the receive input to the module.
- If the LED2 is illuminated while either LED3 or LED4 is illuminated, the PDI drive is disabled (the transceiver is in the receive mode but the input is ignored). If LED2 is illuminated while LED3 or LED4 is not illuminated, the PDI is the DAR source for the module.
- A flashing LED3 indicates that the input is the supervised Style 7 return to the module (causes a trouble without input).

Non-Alarm audio (NAA) interface

This section describes the Non-Alarm Audio (NAA) Interface using a circuit on the 4100-0622 Digital Audio Riser (DAR) Module (566-407, 566-1000) or the 4100-1341 MCC Digital Audio Riser module (566-833, 566-1001).

This function provides a way to interface a non-alarm audio source to Channel 2 of the Power Distribution Interface (PDI). If you use this module as a NAA interface only (analog system only), use it without a TIC or 4100-0623 Audio Riser Controller Module.

Important: DO NOT install a 4100-0622, 4100-1341 Digital Audio Riser Module using the NAA interface IN THE SAME BAY with an Analog Audio Controller Module (or any module that would control Channel 2 of the PDI). Both modules would try unsuccessfully to control the PDI's Channel 2.

If the modules are installed in the same box, they must be in separate bays, and have an audio harness connecting them without Channel 2 connections being made. The connecting audio harness may be a modified harness (734-167) available from the factory or a standard audio harness (734-052) that you modify as shown in Figure 15. Figure 15 shows two wires on the left that are cut close to the connector and discarded. The two cut wires were formerly connected to Pins 3 & 6 of the PDI audio connector.

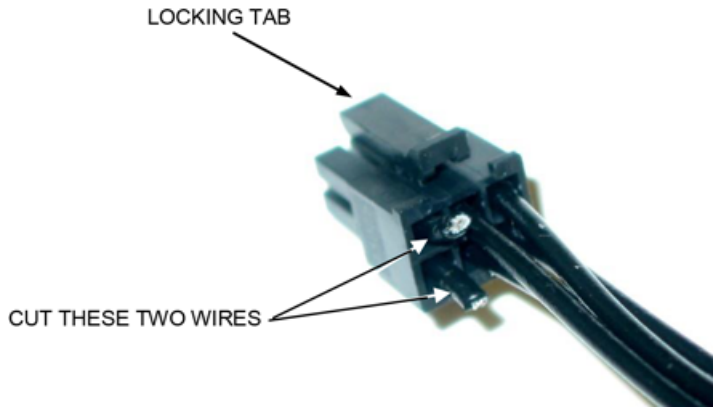


Figure 15: Modified standard audio harness for specific NAA application

NAA wiring

Refer to Figure 16 to wire for the NAA Interface application

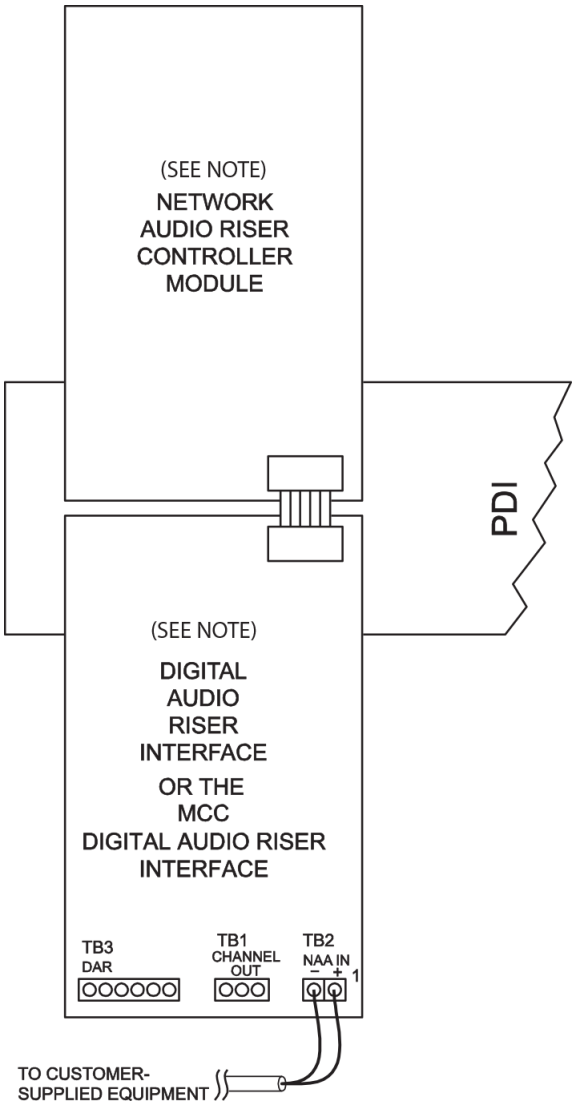


Figure 16: Wiring for the non-alarm audio (NAA) interface application

Note: Figure 16 shows the 4100-0623 network audio riser controller module and the 4100-0622 digtal audio riser interface or 4100-1341 MCC digital audio riser interface.

Field replacement of the digital audio riser module (566-243)

This section applies only to the field replacement of the Digital Audio Riser (DAR) Module (566-243) with the later version of this module (566-407, 566-1000).

Configuration and wiring of the digital audio riser module

The following configuration and wiring information applies to replace the 566-243 module with the 566-407 or 566-1000 module.

Table 15: Digital audio riser module (566-243) configuration & wiring

Configuration (Jumpers, Switches, and Potentiometer)	
Constant Supervision Jumper (P2)	Position 1-2 to silence supervision
NAA Input Level (P4)	Any position (not used)
NAA & PDI Outputs (SW1)	Positions 1 & 2 OFF (Disables NAA Outputs)
	Positions 3 & 4 ON (Enables PDI Outputs)
D to A channel & DAR density (SW2)	Any position (not used)
NAA Volume (Potentiometer R4)	Any position (not used)
Wiring	
NAA Input (TB2)	Not used
Channel Output (TB1)	Not used
DAR Wiring (TB3)	Wire to primary and secondary (SEC1) like 566-243. Do not use SEC2. Refer to Figure 9 for details.

Digital audio PDI termination plug

A Digital Audio Riser Termination Plug (734-183) is provided with every Digital Audio Controller or Digital Audio Riser Module. You must use this termination plug to properly terminate the Digital Audio Signal on the PDI.

Installing a digital audio PDI termination plug

To properly terminate the Digital Audio Signal on the PDI, install the termination plug into P7 of the Node's last bay that has Digital Audio. The Digital Audio Controller should be the first item and the Digital Audio Termination Plug the last item in the Digital Audio PDI Bay-to-Bay wiring. See Figure 17.

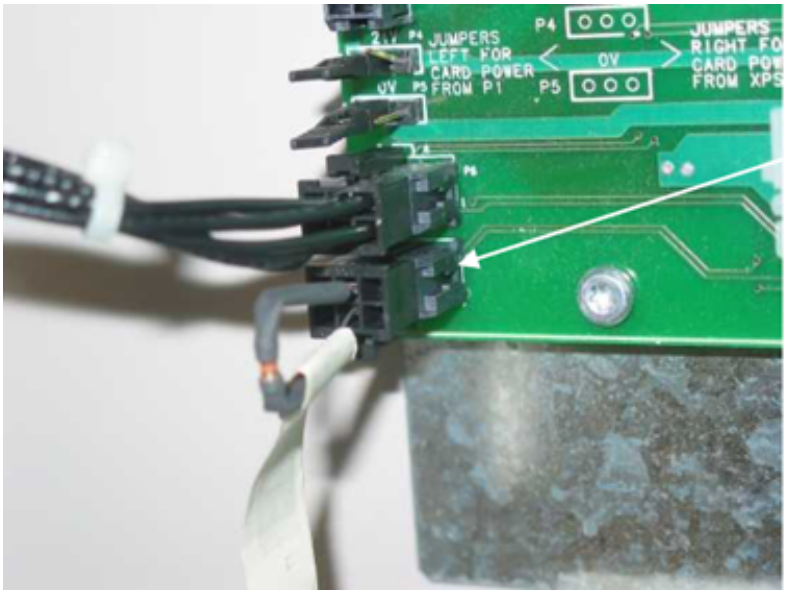


Figure 17: Installing a digital audio PDI termination plug

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