GAI-TRONICS®
A HUBBELL COMPANY

69439-001
External Audio Interface

Confidentiality Notice

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General Information

The Model 69439-001 External Audio Interface (EAI) allows multiple audio paths to be interfaced to a SmartSeries system. It is installed in a 10457 Series Card Rack and is controlled by a 69440 Master Control Unit (MCU) installed in that same card rack. The EAI is designed exclusively for use in a SmartSeries system, and is not intended for use with other types of equipment.

Description of Major Components

The EAI Front Panel LEDs

The following table describes the EAI front panel LEDs and their functions:

LED	Status	Description
ON LINE	On	The MCU is communicating properly with the EAI, and the MCU is configured to recognize the EAI.
	Flashing	The MCU is not communicating properly with the EAI. **NOTE:** The flashing rate is approximately 1 Hz.
	Off	EAI is not receiving power from the card rack <u>or</u> the MCU is not properly configured to recognize the EAI.
PRI ACT	On	The Audio Messenger Interface (AMI) acting as the primary audio generator is active (playing a message for a purpose other than supervision).
	Off	The "On" condition is not occurring.
SEC ACT	On	The AMI acting as the secondary audio generator is active.
	Off	The "On" condition is not occurring.

LED	Status	Description
PRI FLT	On	MCU detects at least one fault in either the AMI acting as the primary audio generator, or in that AMI's associated audio paths.
	Off	The "On" condition is not occurring.
SEC FLT	On	MCU detects at least one fault in either the AMI acting as the secondary audio generator, or in that AMI's associated cabling.
	Off	The "On" condition is not occurring.
AUD IN #1, AUD IN #2, AUD IN #3, or, AUD IN #4	On	The EAI detects a signal on the associated 600-ohm audio input. **NOTE:** The LED labeled AUD IN #1 is associated with 600-ohm audio input 1; the LED labeled AUD IN #2 is associated with 600-ohm audio input 2, etc.
	Off	The "On" condition is not occurring.

Connections to the Field Wiring Terminal Blocks

Connections to the EAI card are typically accessed via two 26-pin terminal block modules mounted inside the system's control cabinet. A ribbon cable connects each terminal block module to the rear of the card rack housing the EAI card. The actual location of the terminals is shown on the control cabinet outline and connection drawings. Figure 1 illustrates the terminal block assignments.
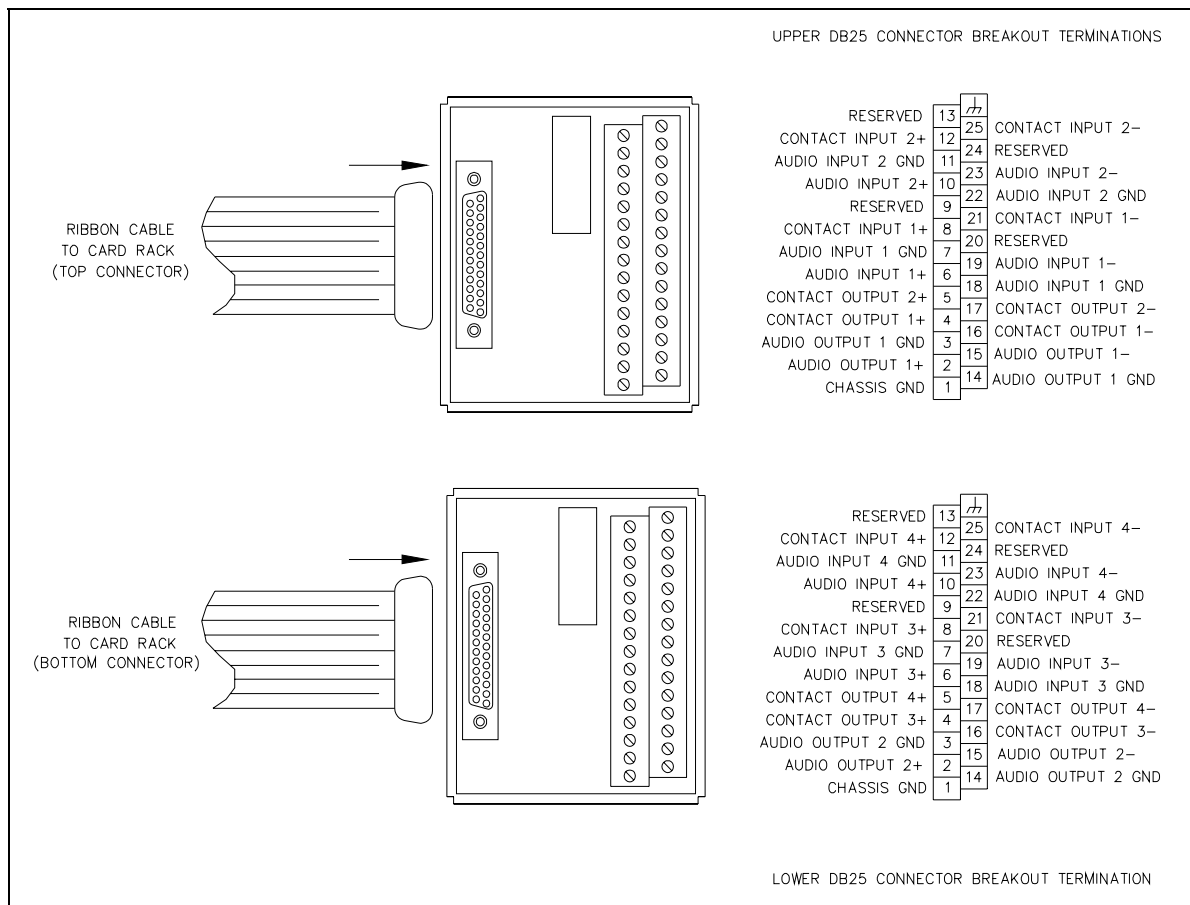

Figure 1.

Audio Inputs

The *600-ohm audio input 1*, *600-ohm audio input 2*, *600-ohm audio input 3*, and *600-ohm audio input 4* provide four audio inputs to the system. These inputs may be independently routed to one of the following five card rack audio busses: evacuation, page resource 1, page resource 2, party line 1, or party line 2. The EAI is not able to mix audio sources, therefore only one audio input may be connected to a particular card rack audio bus at a time. The EAI constantly checks for the presence of a signal on these inputs and updates the state of its corresponding status LED mounted on the front panel.
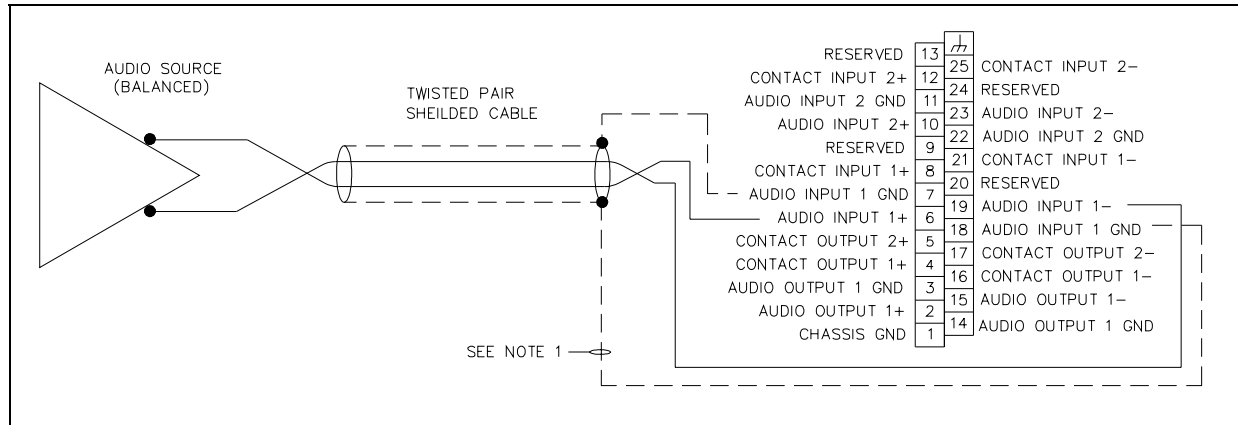

Figure 2. Typical audio input connection

Audio Outputs

The *600-ohm audio output 1* and *600-ohm audio output 2* provide two audio outputs from the system. These outputs may be independently routed from one of the following four card rack audio busses: page resource 1, page resource 2, party line 1, or party line 2. The EAI is not able to mix audio sources, therefore only one card rack audio bus may be connected to a particular audio output at a time. Each audio output requires an external 600-ohm load resistor for proper operation.
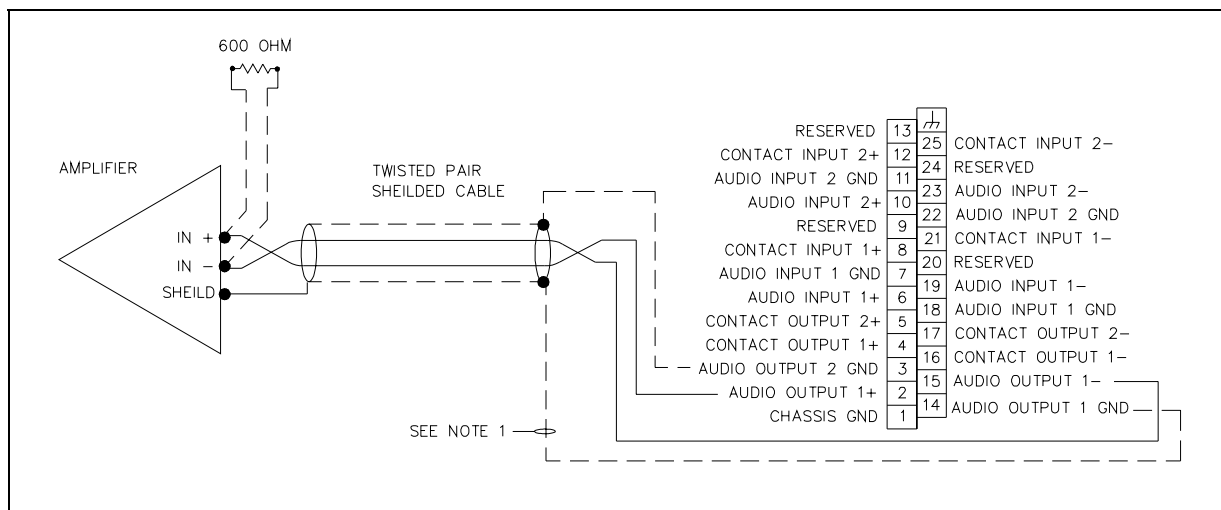

Figure 3. Typical audio output connection

NOTE 1: The audio output "shield" terminal is coupled to ground by an internal capacitor on the EAI card. This is done to suppress any high frequency noise, which may be induced on the cable. Do not add any external capacitors when terminating the cable shield.

Contact Inputs

The *contact closure input 1*, *contact closure input 2*, *contact closure input 3*, and *contact closure input 4* provide four supervised contact closure inputs to the system. Each input is activated by a switch closure. The switch wiring is monitored for open or short circuit faults. A resistor network must be installed at the switch to enable the cable monitoring. These inputs are typically used in conjunction with an audio input and are used to assign a broadcast destination and a paging priority to the audio source. Actual wiring of the input circuits is detailed on the connection diagram of the system control cabinet.
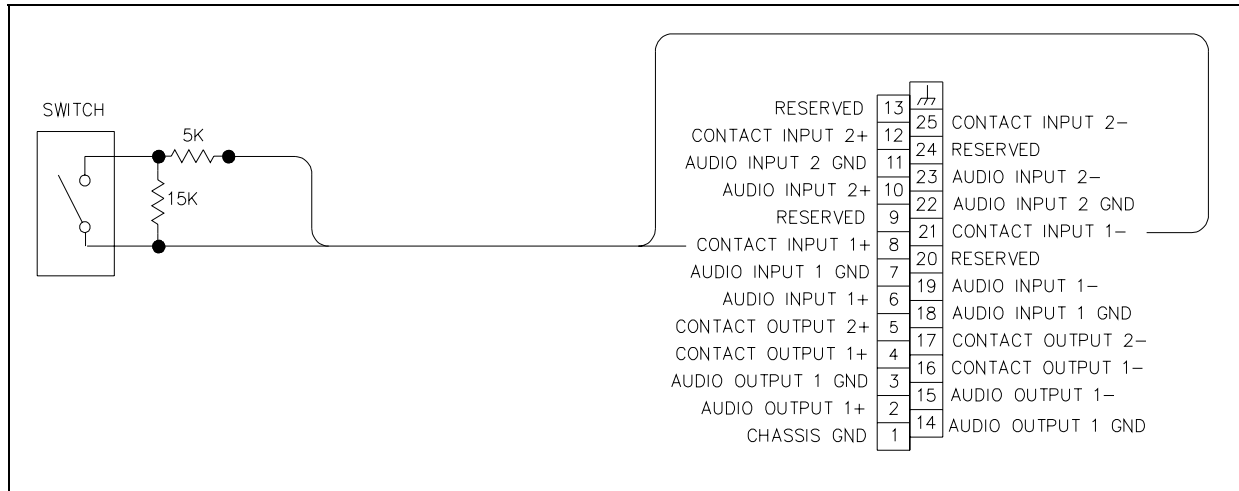

Figure 4. Typical contact input connection

Contact Outputs

The *contact closure output 1*, *contact closure output 2*, *contact closure output 3*, and *contact closure output 4* provide four voltage-free, solid-state contact closure outputs from the system. Each output can switch a maximum load current of 50 mA. The output activation is controlled by the system MCU. The activation times are defined by the system's software programming. Actual wiring and operation of the output circuits is detailed on the connection diagram and operating manuals of the system control cabinet.

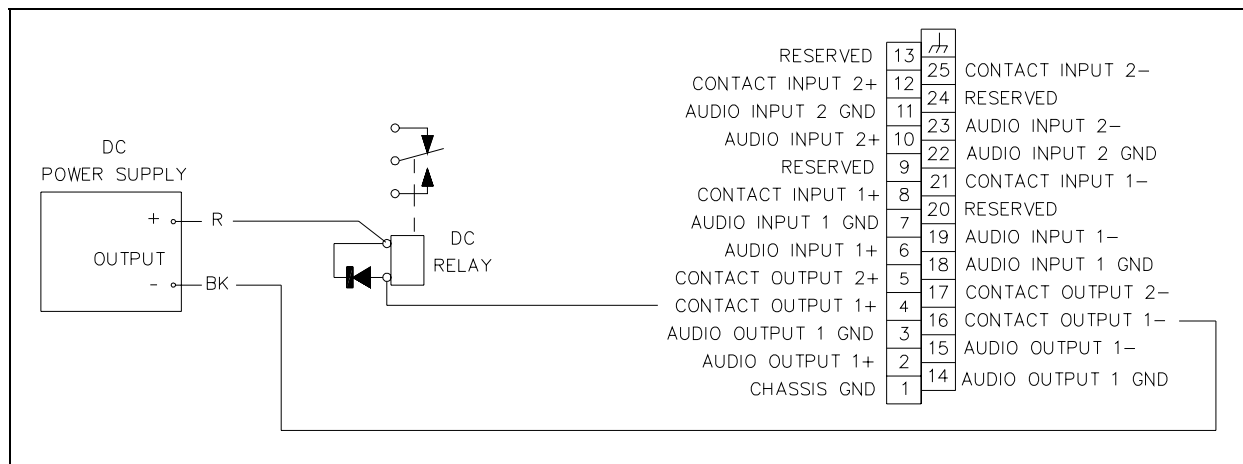**NOTE:** If the EAI's ON LINE LED is flashing, then all contact outputs will be open.

Figure 5. Typical contact output connection

Switch and Jumper Settings

Several switch and jumper setting are required for proper operation of the EAI Card. The following settings are set during the system commissioning and programming and should not be changed. If replacing an existing EAI card for maintenance purposes, be sure to duplicate the switch and jumper settings of the card being replaced. Refer to Figure 6 for switch and jumper locations.

The *2xx/3xx Address* (P1) shorting clip selects part of the base input/output port address used by the MCU when accessing the EAI.

The *Board Address* (S3) rotary switch selects part of the base input/output port address used by the MCU when accessing the EAI.

The *Board Identification* (S4) rotary switch lets the MCU distinguish between multiple EAIs installed in the same card rack.

The *Test Enable* (S1) rotary switch is used during production testing of the board. Set this rotary switch to "0" during normal operation.

The *Register Address* (S2) rotary switch is used during production testing of the board. Set this rotary switch to "0" during normal operation.

Internal Features

The EAI contains a *1.00 kHz sine wave detector* for use in the supervision of several internal audio paths.

The EAI contains two *2-wire to 4-wire conversion circuits* for accessing the party line 1 and party line 2 card rack audio busses. Each of those two card rack busses has a dedicated circuit.

Operation

After installation, the Model 69439-001 External Audio Interface (EAI) should start automatically. The EAI requires no direct user intervention during normal operations. See your system manual for more information on how the EAI operates in your customized system.
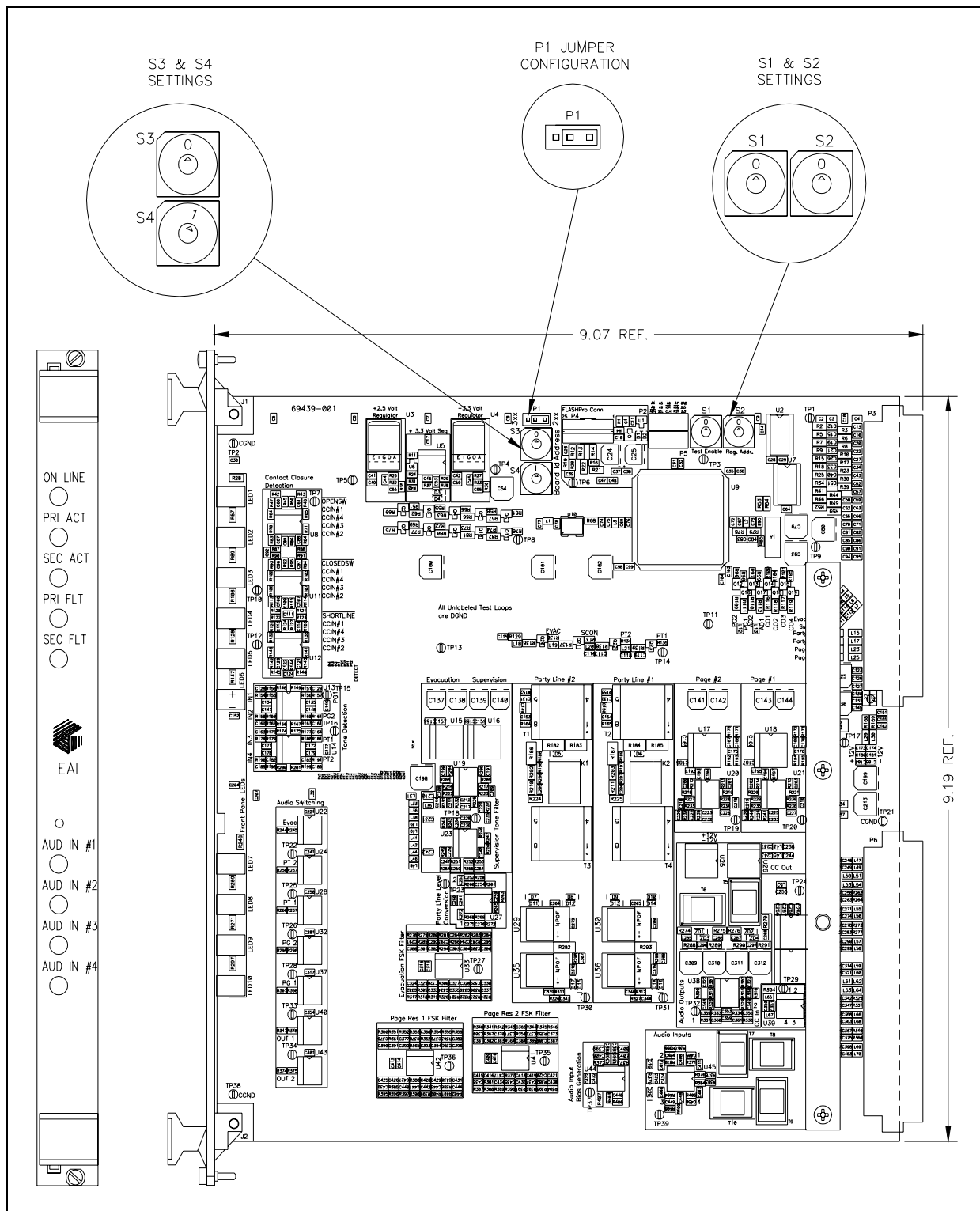
Figure 6. Model 69439-001 External Audio Interface

Installation and Maintenance

Direct questions about installation of this product to the GAI-Tronics Field Service Department at 800-492-1212 inside the USA or 610-777-1374 outside the USA.

Installation Guidelines

⚠**WARNING** ⚠ **Disconnect power to the card rack before performing any maintenance.**

⚠ Warning: Observe precautions for handling electrostatic sensitive devices.

Installation Instructions

1. Remove the EAI from its protective carton.

2. Verify that power is disconnected to the card rack prior to installation.

3. Verify that the five board switch and jumper settings described in the Switch and Jumper Settings section on page 5 are set in accordance with the instructions in your system manual.

4. Align the EAI into the upper and lower tracks for the card rack slot.

5. Slide the EAI toward the rear of the card rack until it comes in contact with the connector on the backplane.

6. Firmly press on the front bezel until the EAI is seated in the backplane connector, and tighten the two screws located on the front bezel to secure it to the card rack.

Removing the EAI Card from Card Rack

1. Remove power from the card rack.

2. Remove the two screws on the front bezel that secures the EAI to the card rack.

3. Gently disengage the EAI from the connector on the backplane and slide the EAI out of the card rack.

Frequently Asked Questions

Q: When the card rack is powered, but the MCU is either not installed or not properly configured, is there some feature of the EAI that can aid in determining if a connection to one of the audio inputs is properly wired?

A: Yes. The bottom four LEDs, labeled AUD IN #1, AUD IN #2, AUD IN #3, and AUD IN #4, are controlled by the EAI independently of the MCU. Each LED shows the detected audio status of the 600-ohm audio input corresponding to the LED's label. After injecting a signal on a wire in question, one can use the associated LED to tell if the wire is connected.

Q: Is there a common reason why one of the bottom four LEDs, labeled AUD IN #1, AUD IN #2, AUD IN #3, and AUD IN #4, may never turn off?

A: Yes. The 600-ohm audio input corresponding to the LED might be detecting excessive noise. One common cause of this excessive noise is a ground problem.

Q: Why are the levels on the audio outputs 6 dB higher than specified?

A: A 600-ohm resistor is not connected across the audio output.

Q: Must the resistor network be installed when using the contact input terminals?

A: Yes; if not, the system will report a fault condition.

Specifications

Electrical

Board

Power .... 575 mA maximum @ +5 V dc ±10%
150 mA maximum @ +12 V dc ±10%
150 mA maximum @ −12 V dc ±10%

1.0 kHz Sine Wave Detectors

NOTE: Use a card rack audio bus when measuring amplitude.

In-range frequency .... (within) inside 1.00 kHz ±1%

In-range amplitude on card rack audio bus .... inside 4.24 Vp-p (1.50 Vrms) ±1.5 dB

Out-of-range frequency .... (beyond) outside 1.00 kHz ±3%

Out-of-range amplitude on card rack audio bus .... outside 4.24 Vp-p (1.50 Vrms) ±4.5 dB

600-Ohm Audio Input

Audio input voltage .... 2.82 Vp-p (1.00 Vrms) maximum

Audio input to card rack audio path frequency response .... 250 Hz to 12.0 kHz ±1.5 dB

Audio input to card rack audio path distortion + noise .... THD + noise <0.5% @ 1.00 kHz

Audio input impedance .... ≥24 kΩ from 250 Hz to 12.0 kHz

Audio detect level for LED .... 282 mVp-p (100 mVrms) maximum

Audio not detected threshold for LED .... 28.2 mVp-p (10.0 mVrms) minimum

600-Ohm Audio Output

NOTE: Each audio output requires an external 600 Ω load resistor for proper operation.

Audio output voltage .... 2.82 Vp-p (1.00 Vrms) ±1.5 dB

Card rack audio path to audio output frequency response .... 250 Hz to 12.0 kHz ±1.5 dB

Card rack audio path to audio output distortion + noise .... THD + noise <0.5% @ 1.00 kHz

Audio output impedance .... 600 Ω nominal

Contact Closure Output

Open resistance .... ≥1.0 MΩ

Closed resistance .... ≤50 Ω

Load voltage .... 350 Vp (245 Vrms) maximum

Load current .... 71 mAp (50.0 mArms) maximum

Contact Closure Input

Open resistance .... 20 kΩ ±10%

Closed resistance .... 5.0 kΩ ±10%

Environmental

Temperature range (operating/storage) .... +32° F to +122° F (0° C to +50° C)

Relative humidity: .... 10–85% non-condensing

Mechanical

Unit dimensions .... 10.3 H × 0.780 W × 9.07 D inches (262 × 19.9 × 231 mm)

Unit weight .... 0.892 lbs. nominal (0.405 kg)

Approval

CE Mark

Replacement Parts

The EAI has no field replaceable components.

Warranty

Equipment. GAI-Tronics warrants for a period of one (1) year from the date of shipment, that any GAI-Tronics equipment supplied hereunder shall be free of defects in material and workmanship, shall comply with the then-current product specifications and product literature, and if applicable, shall be fit for the purpose specified in the agreed-upon quotation or proposal document. If (a) Seller's goods prove to be defective in workmanship and/or material under normal and proper usage, or unfit for the purpose specified and agreed upon, and (b) Buyer's claim is made within the warranty period set forth above, Buyer may return such goods to GAI-Tronics' nearest depot repair facility, freight prepaid, at which time they will be repaired or replaced, at Seller's option, without charge to Buyer. Repair or replacement shall be Buyer's sole and exclusive remedy. The warranty period on any repaired or replacement equipment shall be the greater of the ninety (90) day repair warranty or one (1) year from the date the original equipment was shipped. In no event shall GAI-Tronics warranty obligations with respect to equipment exceed 100% of the total cost of the equipment supplied hereunder. Buyer may also be entitled to the manufacturer's warranty on any third-party goods supplied by GAI-Tronics hereunder. The applicability of any such third-party warranty will be determined by GAI-Tronics.

Services. Any services GAI-Tronics provides hereunder, whether directly or through subcontractors, shall be performed in accordance with the standard of care with which such services are normally provided in the industry. If the services fail to meet the applicable industry standard, GAI-Tronics will re-perform such services at no cost to buyer to correct said deficiency to Company's satisfaction provided any and all issues are identified prior to the demobilization of the Contractor's personnel from the work site. Re-performance of services shall be Buyer's sole and exclusive remedy, and in no event shall GAI-Tronics warranty obligations with respect to services exceed 100% of the total cost of the services provided hereunder.

Warranty Periods. Every claim by Buyer alleging a defect in the goods and/or services provided hereunder shall be deemed waived unless such claim is made in writing within the applicable warranty periods as set forth above. Provided, however, that if the defect complained of is latent and not discoverable within the above warranty periods, every claim arising on account of such latent defect shall be deemed waived unless it is made in writing within a reasonable time after such latent defect is or should have been discovered by Buyer.

Limitations / Exclusions. The warranties herein shall not apply to, and GAI-Tronics shall not be responsible for, any damage to the goods or failure of the services supplied hereunder, to the extent caused by Buyer's neglect, failure to follow operational and maintenance procedures provided with the equipment, or the use of technicians not specifically authorized by GAI-Tronics to maintain or service the equipment. THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Return Policy

If the equipment requires service, contact your Regional Service Center for a return authorization number (RA#). Equipment should be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. If the equipment is under warranty, repairs or a replacement will be made in accordance with the warranty policy set forth above. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts.

Call 800-492-1212 (inside the USA) or 610-777-1374 (outside the USA) for help identifying the Regional Service Center closest to you.