GAI-TRONICS®
A HUBBELL COMPANY

E3 Speaker
Master and Remote Modules

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General Information

Speaker Master Module

The Model 69679-001 Speaker Master Module (see Figure 2) works with speaker remote modules in an *Elemec3* system to monitor speaker coil integrity and to control volume levels at speakers driven from central amplifiers (see Figure 1). The *Elemec3* speaker master module changes individual loudspeaker power levels on command from a central location on a system-wide or individual speaker basis. The range of adjustment is in steps from off/mute to full power. The speaker master module transmits power level tap commands to the remote speaker modules and receives speaker coil health check status from the remote speaker modules. Each speaker master module controls up to four amplifier channels.

Speaker Remote Modules

Install the Model 13317-001 (8-ohm, 25-watt) or Model 13317-002 (16-ohm, 30-watt) Speaker Remote Module(s) with each speaker requiring remote adjustment and monitoring. The speaker remote modules receive health check requests/speaker tap control commands from the speaker master module via an RF data modem (see Figure 3). The speaker remote modules check loudspeaker integrity by sampling speaker voice coil continuity. The modules report their health status to an E3 controller via RF data modem. The maximum number of remote modules in each speaker loop is 24. Use 14 AWG (2.5mm^2) minimum, individually shielded twisted pair cable to wire the speaker remote modules.

System Requirements

E3 speaker master controllers communicate with the *Elemec3* controller via CAN bus. The devices receive power through the CAT5 power/CAN bus cable or from a separate 24 V dc power supply. The power requirement of the combined CAN bus devices must not exceed the CAN bus cable and/or separate 24 V dc power supply ratings.

The maximum number of remote modules in each speaker loop is 24. Use individually shielded twisted pair cable to wire the speaker loops. Connect the cable shield to earth ground at only one location (usually the amplifier location) to avoid the presence of ground loops.

E3 Module Location

Install the speaker master module(s) with other CAN bus devices in the same cabinet as the E3 controller. Install the modules horizontally in *snap-track* style mountings for optimum arrangement. Install the speaker remote modules at the speakers.
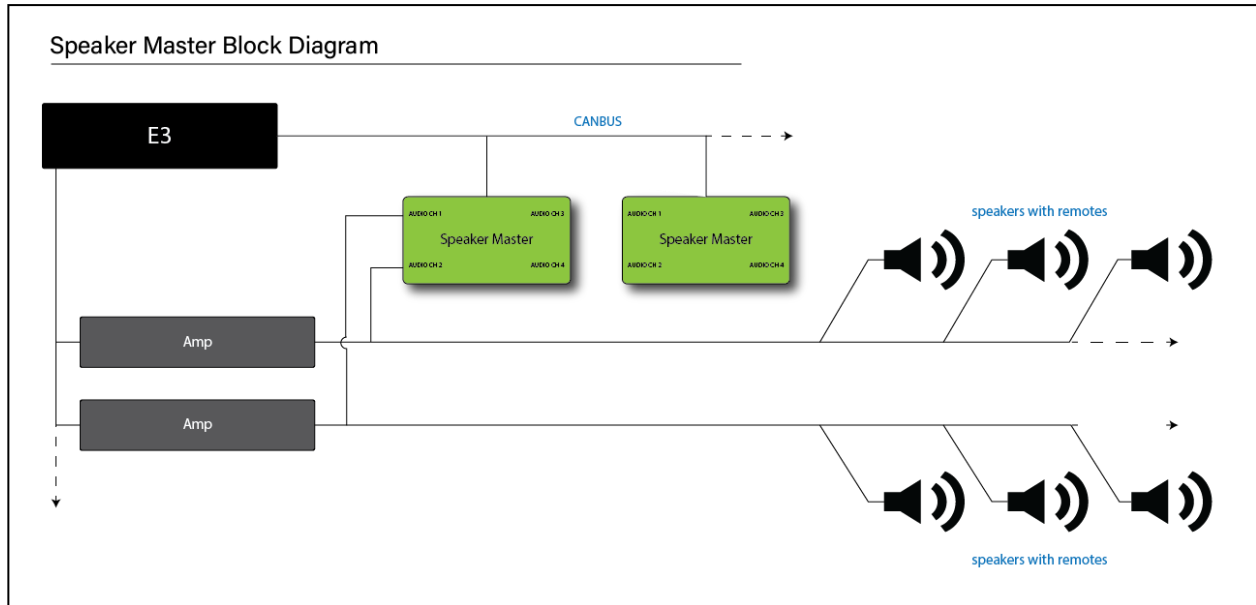

Figure 1. E3 Speaker Master and Remote Modules Block Diagram

Installation

Speaker Master Modules

1. Connect the CAN bus cable from the *Elemec3* controller to the CAN IN RJ-45 jack on the speaker master module.

   Daisy chain multiple CAN bus modules using the CAN IN and the CAN OUT connectors.

2. *For power from the CAN bus cable*: Move jumper, P5, to the CAN position.

NOTE: The current requirement of the connected devices must not exceed the CAN bus cable rating.

3. *For separate dc power (not over the CAN data link cable)*: Terminate the 24 V dc power supply at pluggable terminal block P1.

   1. Use pluggable terminal block P2 to connect 24 V dc power to the next speaker master controller, if necessary.

   2. Move jumper, P5, to the LCL position.

NOTE: The current requirement of the connected devices must not exceed the local power supply rating.

4. Make the speaker zone audio line (parallel) connections at TB1–TB4.

5. Configure the speaker master module and speaker remote modules in the E3 Console application.

   Instructions for using the E3 Console are in Pub. 42004-550, Elemec3 Console Manual—Version 3.0. GAI-Tronics' documentation is located on the GAI-Tronics website at https://www.gai-tronics.com.

6. Apply power to the central amplifier, speaker master module, and *Elemec3* controller.
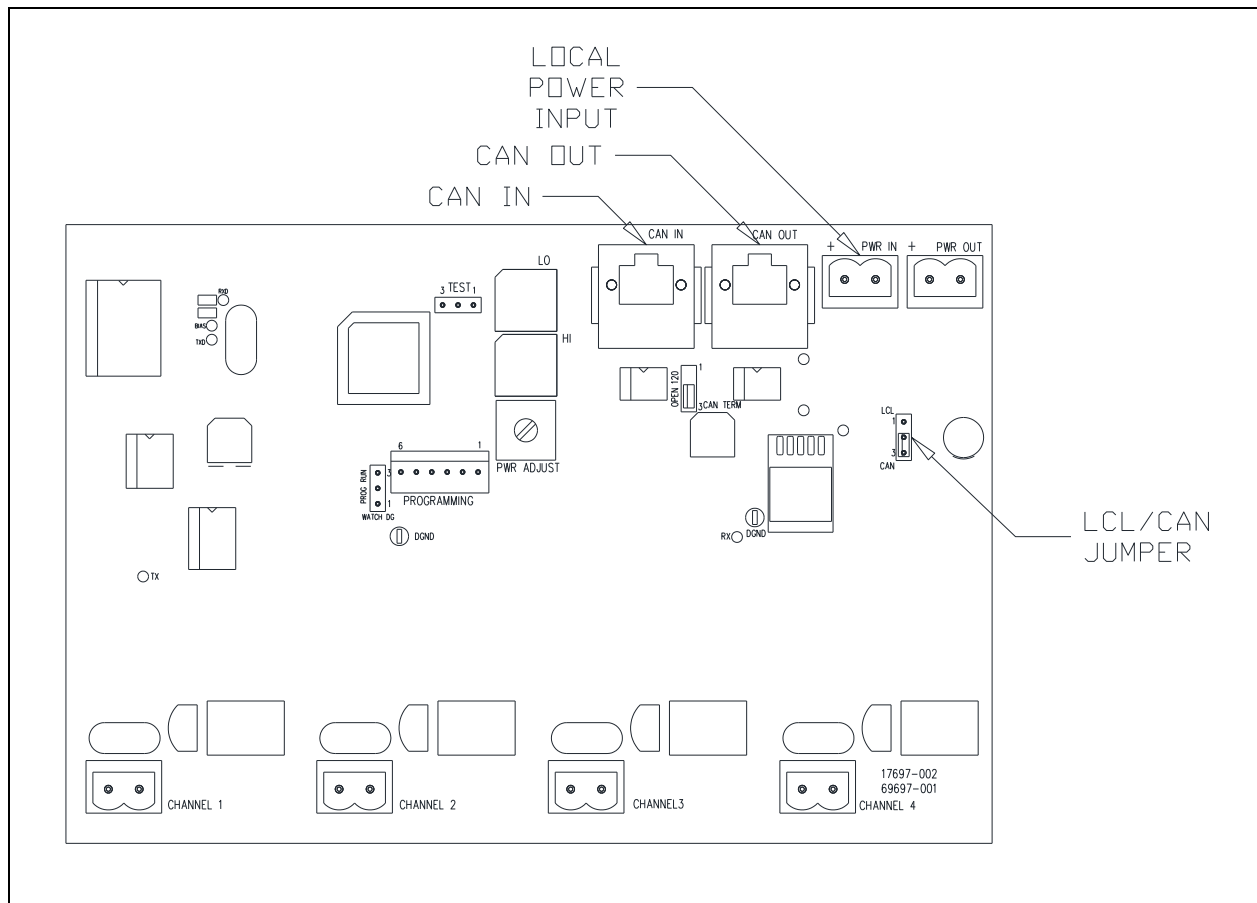
Figure 2. Speaker Master Module

Speaker Remote Modules

The speaker remote modules are in separate enclosures at the speaker location. Use 14 AWG (2.5 mm^2) (minimum) shielded twisted pair cable to wire the speaker remotes.

1. Mount the enclosure following the manufacturer's instructions.

2. Fit the board into the enclosure using appropriately sized stand-offs.

3. Connect the line input to terminals TB1-1 and TB1-2.

4. Connect the loudspeaker output to terminals TB3-1 and TB3-2.

Initial programming performed at time of manufacture is *flash* type for the internal microprocessor. The module receives commands through the speaker wiring to change its tap setting and adjust its address, based on the configuration settings in the *Elemec3* Console and *Elemec3* Portal applications.
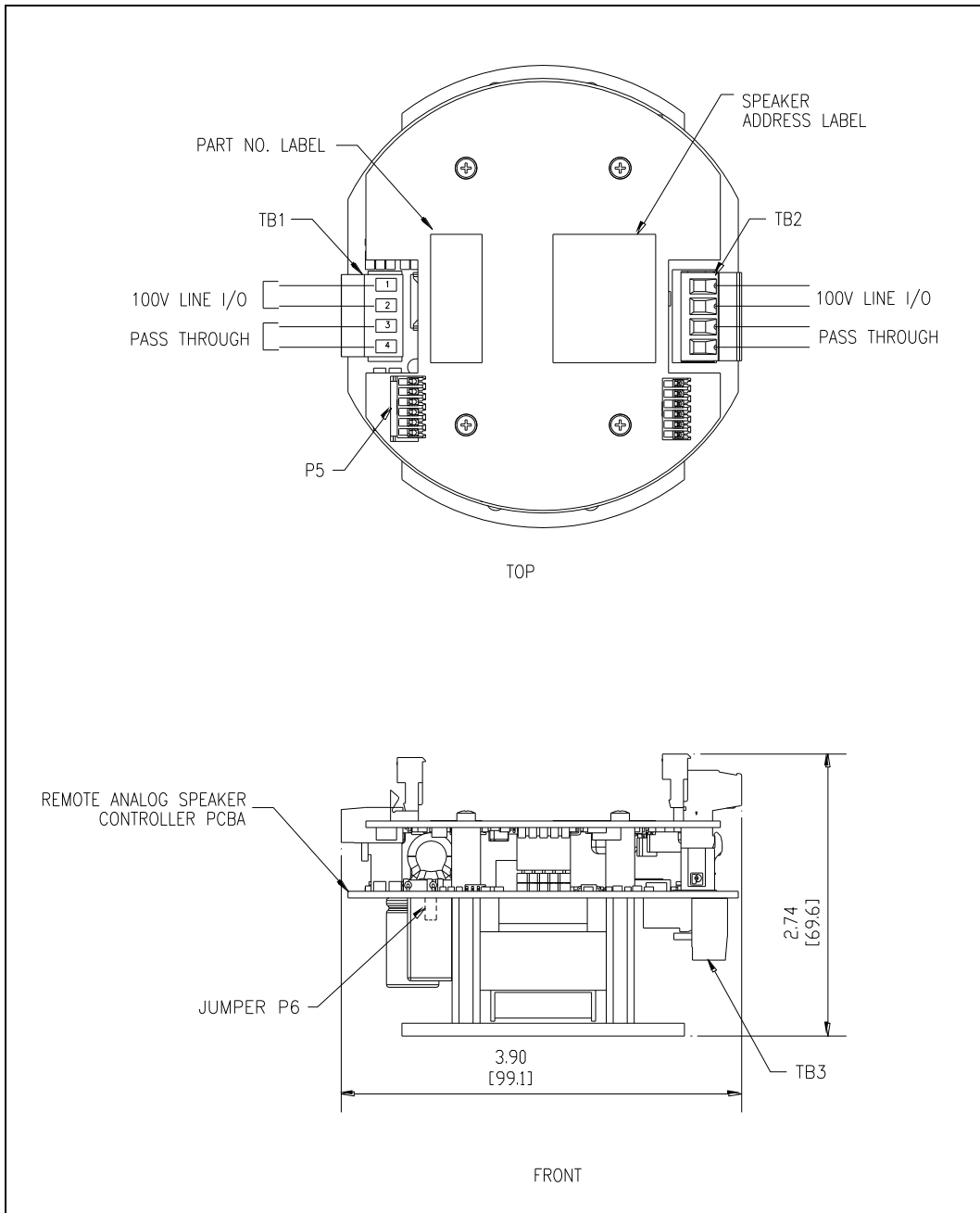
Figure 3. Speaker Remote Module

Operation

The speaker master module communicates with an E3 controller over a CAN bus interface on Category 5 or better cable. It transmits output speaker power level tap settings and page group control commands to speaker remote modules to control broadcast locations and speaker volume levels. The speaker master module receives acknowledgment messages and speaker integrity messages from the speaker remote modules.

The speaker master module has four channels and transmits and receives RF communication at 245 kHz. Each channel connects to the line output of an associated paging zone power amplifier.

Speaker Status

The E3 controller (when no audio is coming in) at the scheduled time (once per day or on demand) generates a 35-Hz signal to power the speaker remotes. The speaker master module receives the signal from the E3 controller to obtain status from the speaker remotes and set the speaker taps to the configured values. The speaker master returns health status to the E3 controller. This process repeats until all speaker remotes report their status. The E3 controller removes the 35-Hz signal and normal operation continues.

Speaker Remote Module

Speaker remote modules receive the 35-Hz signal from the speaker master to perform a speaker coil health check by monitoring the current into the loudspeaker. The transmission of acknowledgments and data back to the speaker master module occurs on command from the master module.

The speaker remote module provides both high and low output power settings. Set the high/low power setting using jumper P6. Configure the tap settings with the Elemec Console3 software package based on the jumper setting:

The speaker audio output power corresponds to the position of jumper P6 on the speaker remote module and the volume level selected in the E3 Console:

Table 1. Speaker Audio Output Power

Speaker Model	Jumper P6 Position	E3 Console Volume (TAP) Setting	Audio Output Power
13317-001 (8-ohm, 25-watt)	High	Highest Volume	25 W
		Mid Volume	12.5 W
		Lowest Volume	6.25 W
	Low	Highest Volume	6 W
		Mid Volume	3 W
		Lowest Volume	1.5 W
13317-002 (16-ohm, 30-watt)	High	Highest Volume	30 W
		Mid Volume	15 W
		Lowest Volume	7.5 W
	Low	Highest Volume	6 W
		Mid Volume	3 W
		Lowest Volume	1.5 W

Calibrate Channel Levels

Calibrate the amplifier channel levels to optimize communication between the speaker master and the speaker remotes on each amplifier channel. Always recalibrate the channel levels after channel wiring modifications or when adding or removing speakers from a channel. Adjust the amplifier level for initial installations. Configure the **LO** and **HI** hex switches for the address of the master controller before calibrating the speaker master module channels.

1. With power on, place a jumper on pins 2-3 of the TEST post.

2. Set the **LO** hex switch to the channel (1-4) to calibrate.

3. Set the **HI** hex switch to *E*.

4. Connect an RMS voltmeter to the most distant speaker remote.

5. Adjust the speaker master PWR ADJUST potentiometer to obtain 50 V $_{RMS}$ signal at that speaker remote.

6. Adjust the **LO** hex switch for the next channel and repeat Step 4.

7. Remove the test jumper from posts 2-3 and set the **LO** and **HI** hex switches back to the configured address.

Specifications

Speaker Master Module

Power input	24 V dc +/−20% @ 100 mA maximum
Physical size	4.00 W × 7.50 L × 1.25 D in
Operating environment	0 °C to 50 °C @ 95 % humidity (non-condensing)

Speaker Remote Module

Power input	page audio for speaker health-check, 35-Hz tone for data communication
Physical size	4.50 L × 3.90 H × ~2.8 D inches
Cable	shielded twisted pair 14 AWG (2.5 mm^2) minimum
Operating environment	−40 °C to 70 °C @ 95% humidity (non-condensing)

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.