



**GAI-TRONICS®**  
A HUBBELL COMPANY

# SP2 POE Handset/Speaker Amplifier Station

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# SP2 POE Handset/Speaker Amplifier Station

## Confidentiality Notice

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## General Information

### Product Overview

The GAI-Tronics SP2 POE station is part of a modular industrial multicast VoIP (Voice over Internet Protocol) communication system. The standard SP2 POE configuration is an indoor, multi-party, handset/speaker amplifier station using POE (Power over Ethernet) with RTU control. They are constructed of cold rolled steel with a gray or safety orange powder-coat finish. A number of options are available to add to or modify station capabilities (see the Features and Options sections below).

SP2 stations connect to an Ethernet network so the loss of a single station will not adversely affect the entire system. The stations require a 100 Mbps link to a switch or router using category 5e or better Ethernet cable. Isolate SP2 network traffic from other network devices to ensure the quality of SP2 audio. Properly configure network switches and routers for IGMP (Internet Group Management Protocol) snooping and multicast filtering. Maximum cable runs between SP2 stations and network switches are limited to 100 meters to comply with Ethernet standards.

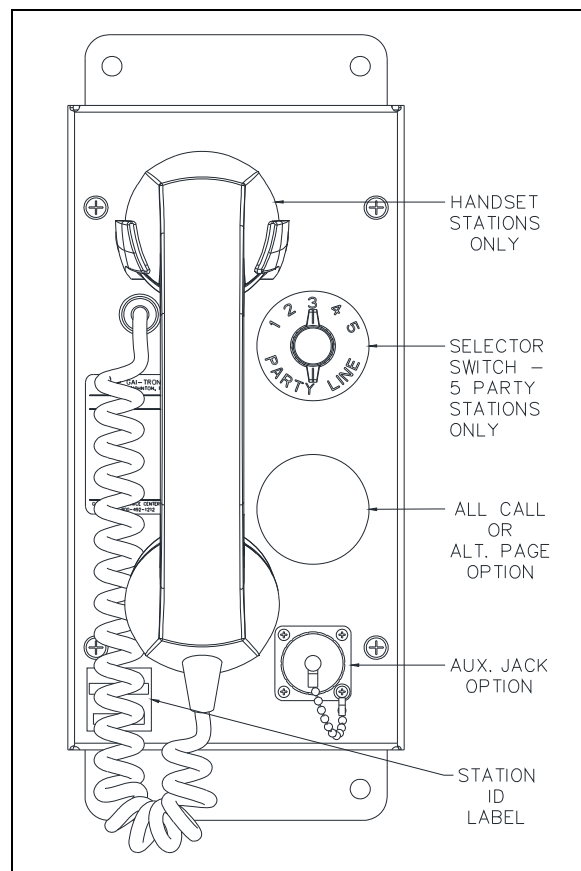


Figure 1. SP2 Station Front Panel

## Features

- flexible and highly configurable SMART technology featuring Ambient Level Sensing (ALS), real time self-diagnostics, and available remote monitoring
- real-time operation providing instantaneous page and party line communication
- no SIP server or conference bridge requirement
- one-way live paging and alarm annunciation over system speakers
- distributed amplifier topology—loss of an individual amplifier will not adversely affect the system as a whole
- mutual provisioning mode allows easy system deployment
- high efficiency (>80%) Class D paging amplifier provides up to 14 watts of speaker output at 8  $\Omega$  when powered by POE Plus, 6 watts of speaker output when powered via POE.
- five configurable multicast channels for full-duplex conference communication with party line selector switch
- eight configurable multicast channels for receiving page announcements
- one isolated output for beacon activation
- two contact inputs
- 600-ohm audio I/O with control
- configurable priority scheme to allow urgent/emergency pages to override less important pages
- configuration stored in non-volatile memory
- field adjustable volume control for handset earpiece, headset earpiece, and speaker amplifier
- configurable local and nearby speaker mutual muting to prevent acoustic feedback of live pages
- configurable preannouncement tone
- off-hook and page switch timeout functionality
- configurable virtual zoning ability
- USB interface for field or bench configuration
- durable, high-visibility safety orange powder coat finish



## Options

- speaker amplifier only (no handset)
- 70-volt/100-volt constant voltage speaker termination (requires factory installation of the 70-volt/100-volt toroid on the termination PCBA)
- headset with page pressbar for loud environments
- five configurable multicast channels for alternate page destinations with page line selector
- All-Call push button for secondary page destination
- PVC or Hytrel® handset cords in 6-, 15-, or 25-foot lengths
- conformal coating for PCBA
- gray powder-coat finish

# Installation

## Important Safety Instructions

- **Read, follow, and retain instructions**—All safety and operating instructions should be read and followed before operating the unit. Retain instructions for future reference.
- **Heed warnings**—Adhere to all warnings on the unit and in the operating instructions.
- **Attachments**—Attachments not recommended by the product manufacturer should not be used, as they may cause hazards.
- **Servicing**—Do not attempt to service this unit by yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

 **ATTENTION**  —Install equipment without modification and according to all applicable local, national, and international electrical codes. North America—Consult the National Electrical Code (NFPA 70), Canadian Standards Association (CSA 22.1), and local codes for specific requirements regarding your installation. Class 2 circuit wiring must be performed in accordance with NEC 725.55.

 **WARNING**  —**Do not disconnect equipment while energized.**  
**Ensure proper grounding to protective earthing.**

These enclosures must be installed by trained, qualified, and competent personnel. Installation must comply with state and national regulations, as well as safety practices for this type of equipment. The mounting location must be flat and provide proper clearance, rigidity, and strength to support the enclosure and all contained devices.

## Enclosure Mounting and Cable Entries

The mounting location must be flat and provide proper clearance, rigidity, and strength to support the enclosure and all contained devices.

1. Mount the enclosure using the four 0.312-inch (8 mm) diameter holes located on the mounting flanges with ¼-inch (M6) hardware (see Figure 2).

- The suggested mounting height for all station enclosures is 48 inches (1219 mm) to the center of the bottom mounting holes of the enclosure.
- SP2 stations are not supplied with conduit or cable openings.

2. Remove the front panel.
3. Drill or punch entry openings in the rear section of the enclosure (see Figure 2).

- The station is suitable for top and/or bottom entry.
- Bottom entry is recommended to prevent moisture from dripping onto the termination board.
- There must be a minimum of ½ inch (13 mm) of material between entry holes.

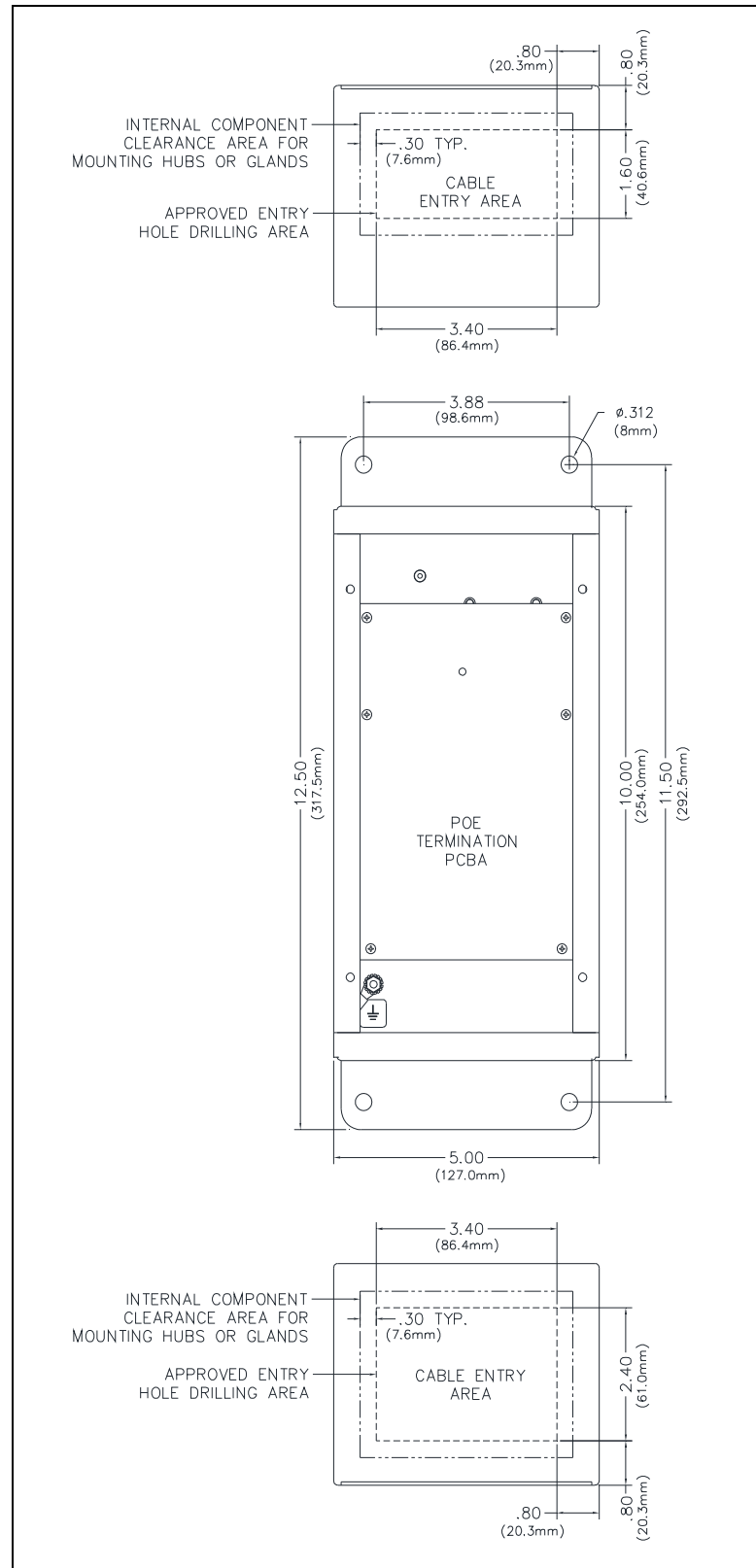


Figure 2. Suggested Wire Entry Locations

## Open the Station

Complete the following steps to open the station:

1. Remove the four screws from the front panel and turn it to the left to expose the interior surfaces.
2. Keep the wiring and ribbon cables connected.
3. Mount the front panel to the back-box's left-side mounting holes using two of the screws just removed.

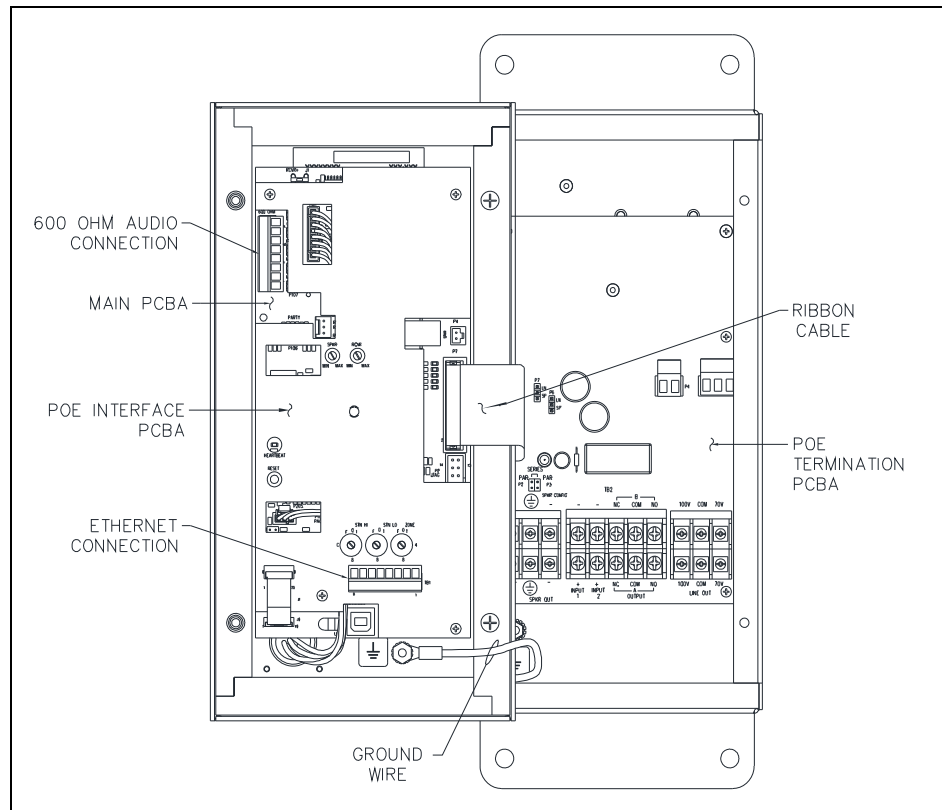


Figure 3. SP2 POE Station—Interior View

## Field Wiring and Configuration

The SP2 POE station provides terminal blocks on the termination PCBA located in the rear of the enclosure for field wiring the speaker, input/output connections, and optional 70-volt/100-volt speakers. The main PCBA, mounted to the back of the front panel, contains the 600-ohm audio connection. The Ethernet connection is located on the POE interface PCBA, mounted on top of the main PCBA.

**NOTE:** Consult the National Electrical Code (NFPA 70), Canadian Standards Association (CSA 22.1), and local codes for the specific requirements regarding your installation. Install all equipment without modification and according to the local and national codes. Class 2 circuit wiring must be performed in accordance with the NEC.

### Station Ground

The station enclosure should be connected to earth ground:

1. Install a #6 ring lug on the ground conductor.
2. Secure it to the ground terminal located in the lower left corner at the back of the rear enclosure (see [Figure 3](#)).

## Termination PCBA Connections

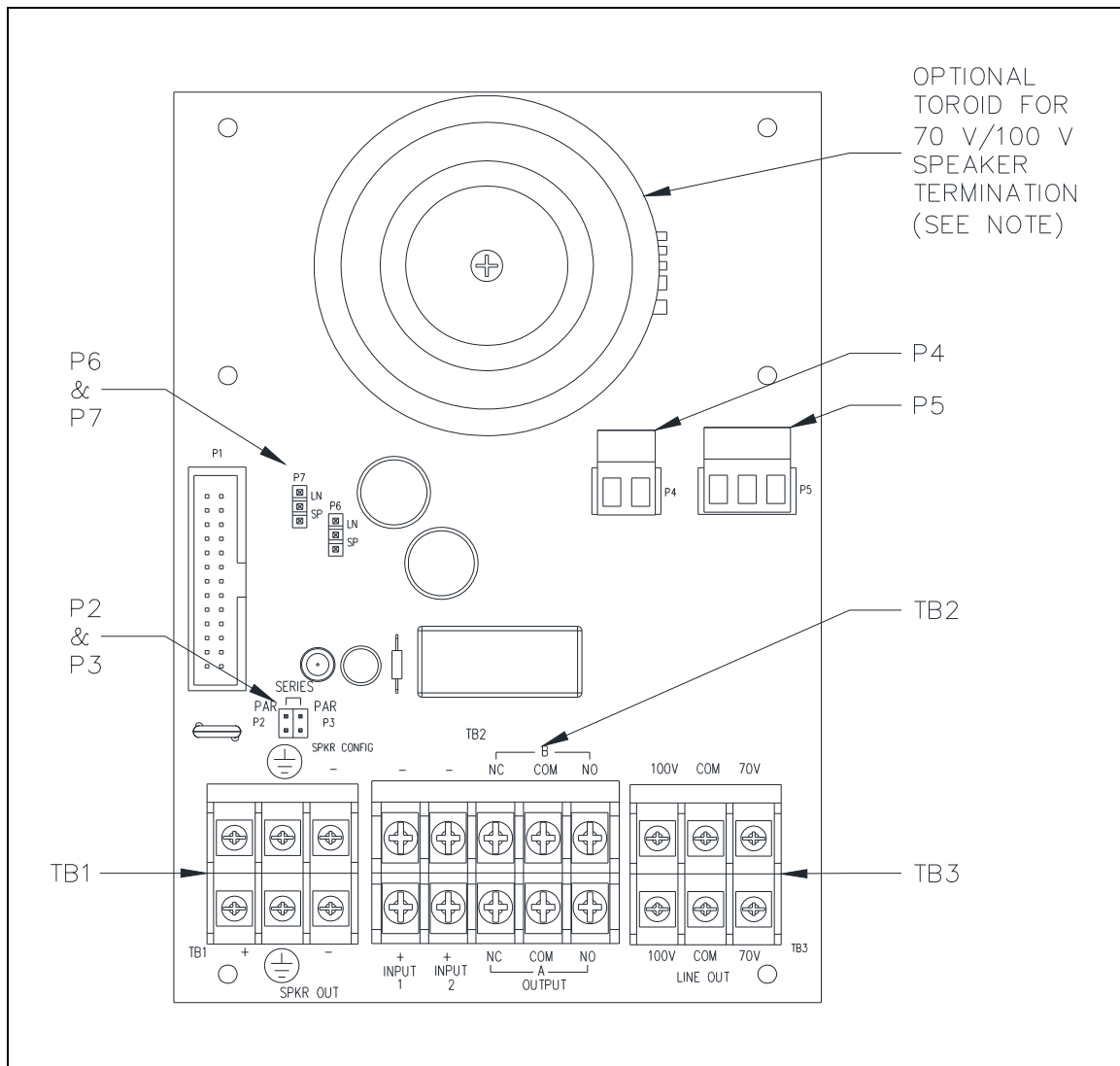


Figure 4. SP2 Termination PCBA (POE Stations)

**NOTE:** Installation of 70-volt/100-volt speakers requires factory installation of the 70-volt/100-volt toroid on the termination PCBA.

### Direct Speaker Connection and Jumper Settings

Terminal block TB1 provides termination for the station's 8 or 16-ohm remote speaker(s).

1. Pull the speaker cable(s) into the enclosure.
2. Install spade lugs on the wires.
3. Connect the speaker wires to terminal block TB1 (see Table 1).
4. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).
5. Configure the speaker jumpers; P2 and P3, for the appropriate impedance for use with 8-ohm or 16-ohm speakers (see Figure 4 and Figure 5).
6. Configure jumpers P6 and P7 to short the pins in the SP position for normal speaker operation.

A redundant set of terminals is provided for a second speaker branch that can be connected in series or parallel with the primary speaker.



Table 1. Direct Speaker Connections—TB1

Pin	Label	Description
TB1-1	+	Parallel/SPEAKER A Series—Output
TB1-2	$\equiv$	Common
TB1-3	-	Parallel/SPEAKER A Series—Output
TB1-4	+	Parallel/SPEAKER B Series—Output
TB1-5	$\equiv$	Common
TB1-6	-	Parallel/SPEAKER B Series—Output

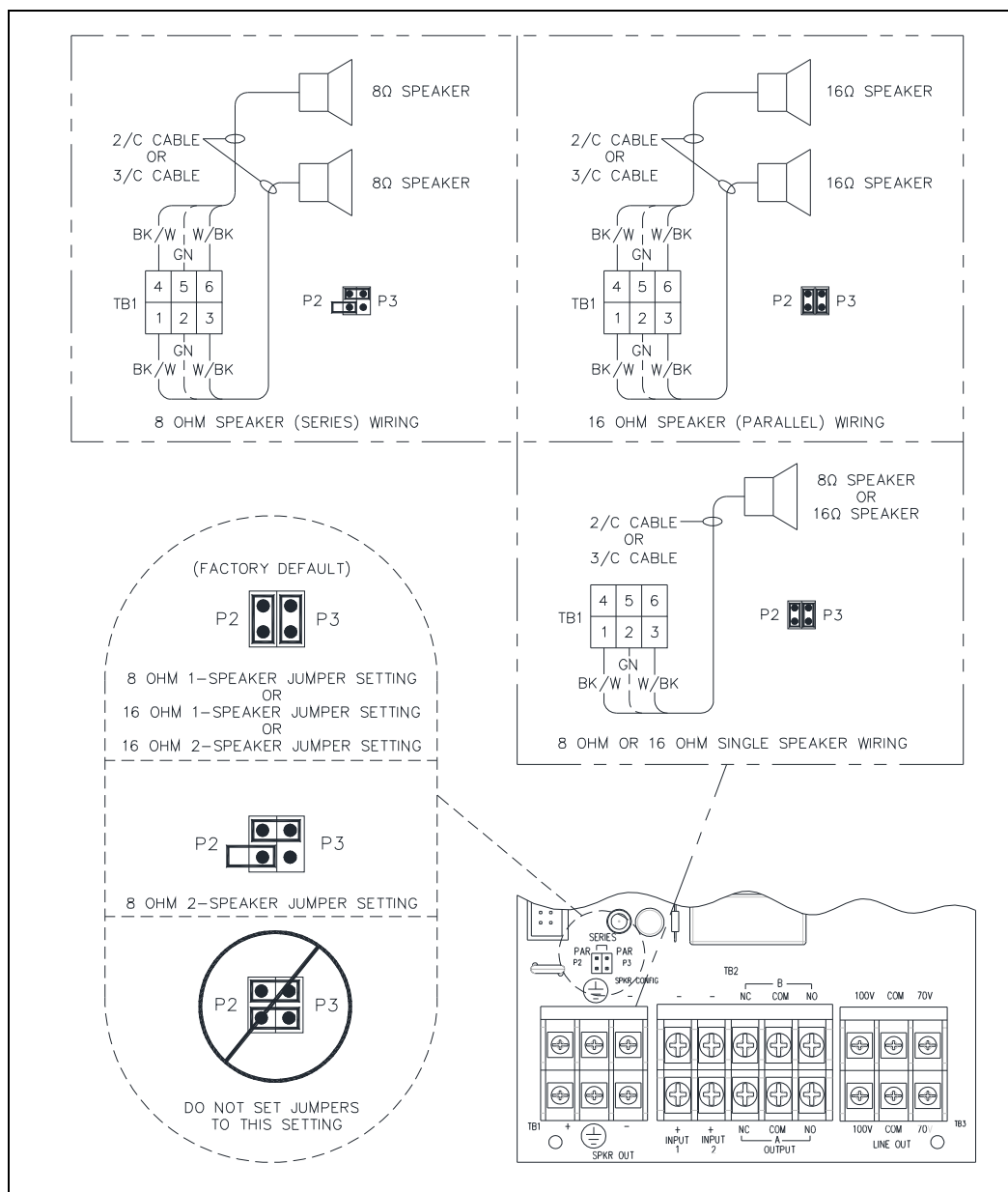


Figure 5. 8/16-ohm Speaker Impedance Configuration

### Optional 70 V/100 V Speaker Termination

Terminal block TB3 on the termination PCBA permits connection of 70-volt and/or 100-volt speakers. All speakers must be wired in parallel (see [Figure 4](#) and [Table 2](#)).

**NOTE:** Installation of 70-volt/100-volt speakers requires factory installation of the 70-volt/100-volt toroid on the termination PCBA.

1. Pull the 70-volt and/or 100-volt speaker cable(s) into the enclosure.
2. Connect spade lugs to the wires.
3. Connect 100-volt speakers to the 100V and COM terminals on TB3. Connect 70-volt speakers between the 70V and COM terminals on TB3.

Two sets of terminals exist for the 70 V and 100 V speaker loops, providing termination for additional speaker loops.

4. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).
5. Configure jumpers P6 and P7 for 70-volt/100-volt operation by moving them to the LN position from the SP position (see [Figure 4](#)).

**NOTE:** The combined wattage (tap settings) for the connected speakers must be less than or equal to 20 watts for 70-volt speakers or 36 watts for 100-volt speakers.

Table 2. 70 V/100 V Speaker Connections—TB3

Pin	Label	Description
TB3-1	100V	100 V Parallel Speakers—Output
TB3-2	COM	Earth Reference
TB3-3	70V	70 V Parallel Speakers—Output
TB3-4	100V	100 V Parallel Speakers—Output
TB3-5	COM	Earth Reference
TB3-6	70V	70 V Parallel Speakers—Output

### RTU Inputs

The termination PCBA contains two unsupervised auxiliary RTU inputs. Terminate the inputs at terminal block TB2 (see [Figure 4](#)).

1. Pull the RTU input cable(s) into the enclosure.
2. Connect spade lugs to the wires.
3. Install the RTU input wires to terminal block TB2 (see [Table 3](#)).
4. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).

Table 3. Standard Termination Board RTU Input Termination—TB2

Pin	Label	Function
TB2-1	+ RTU 1 INPUT	RTU Input 1 +
TB2-2	–	RTU Input 1 –
TB2-3	+ RTU 2 INPUT	RTU Input 2 +
TB2-4	–	RTU Input 2 –

### RTU Output

A single output relay provides two form “C” contacts to switch external power to a beacon (see [Figure 6](#)). Terminate the output at terminal block TB2 on the termination PCBA (see [Figure 4](#)).

1. Pull the RTU output cable and power source cable into the enclosure.
2. Connect spade lugs to the wires.
3. Install the RTU output wires to terminal block TB2 (see [Table 4](#) and [Figure 6](#)).
4. Terminate the power source cables to terminal block TB2.
5. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).

Table 4. RTU Output Contacts—TB2

Pin	Label	Description
TB2-5	NC A	Normally Closed Output A
TB2-6	NC B	Normally Closed Output B
TB2-7	COM A	Common Output A
TB2-8	COM B	Common Output B
TB2-9	NO A	Normally Open Output A
TB2-10	NO B	Normally Open Output B

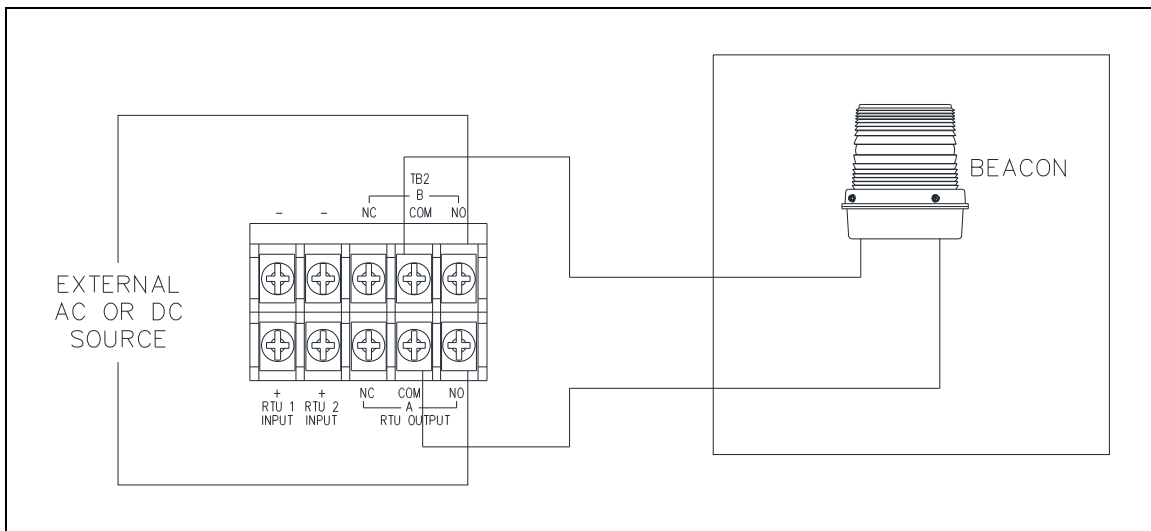


Figure 6. RTU Output Wiring—TB2

### Main PCBA—600-Ohm Audio I/O with Control

SP2 stations provide a 600-ohm audio input to facilitate broadcasting line level audio over the page line. The input control requires a normally open dry contact closure to enable the station to broadcast the 600-ohm input audio. SP2 stations also provide a 600-ohm audio output to send page line audio to a remote audio amplifier. A solid-state dry contact output is provided to control when the remote audio amplifier plays the audio.

1. Pull the cable for the 600-ohm audio I/O into the enclosure.
2. Install ferrules onto the wire ends.
3. Connect the 600-ohm audio wires to the pluggable terminal block for the 600-ohm audio I/O connection (see Table 5 and Figure 7).
4. Connect the pluggable terminal block to terminal block receptacle TB1.

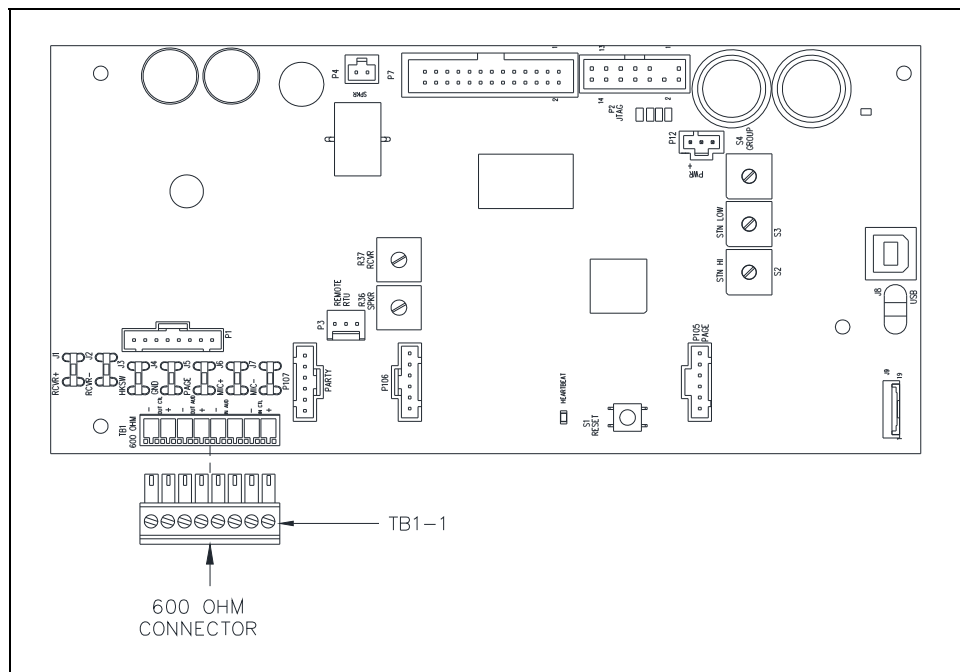


Figure 7. SP2 Main PCBA (POE)

Table 5. 600-Ohm Audio I/O Interface Connections—TB1

Pin	Label	Description
TB1-1	IN CT1+	Input Control Positive
TB1-2	IN CT1-	Input Control Negative
TB1-3	IN AUD+	Input Audio Positive
TB1-4	IN AUD-	Input Audio Negative
TB1-5	OUT AUD+	Output Audio Positive
TB1-6	OUT AUD-	Output Audio Negative
TB1-7	OUT CT1+	Output Control Positive
TB1-8	OUT CT1-	Output Control Negative

### POE Interface PCBA

The POE interface PCBA is mounted on top of the main PCBA. Terminate the Ethernet cable to terminal block TB1 on the POE interface PCBA (see Figure 8):

1. Pull a dedicated category-5e or better Ethernet cable into the rear enclosure.
2. Install ferrules onto the wire ends.
3. Connect the Ethernet cable to the 8-position pluggable terminal block (see Table 6).
4. Connect the pluggable terminal block to the POE interface PCBA (see Figure 8).
5. Connect the other end of the Ethernet cable to an 802.af (POE) or 802.at (POE Plus) compliant switch.

**NOTE:** Shielded Ethernet cable or metallic conduit is required for installation.

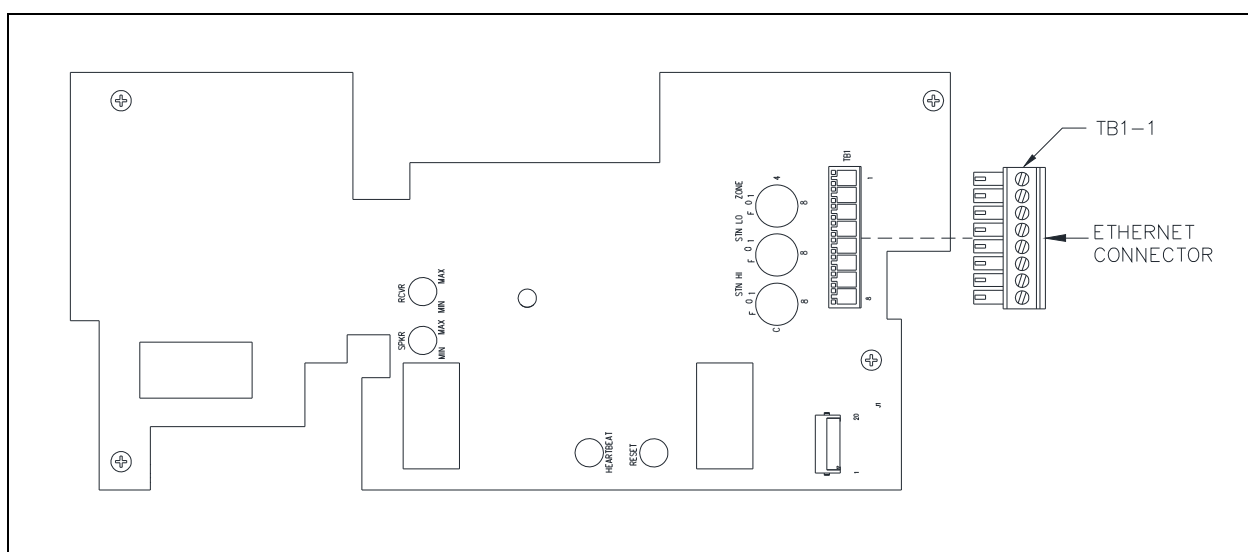


Figure 8. POE Interface PCBA

Table 6. Ethernet Connection—TB1

Pin	Label	Description
TB1-1	DC-	Negative dc voltage
TB1-2	DC-	Negative dc voltage
TB1-3	RX-	Data Receive -
TB1-4	DC+	Positive dc voltage
TB1-5	DC+	Positive dc voltage
TB1-6	RX+	Data Receive +
TB1-7	TX-	Data Transmit -
TB1-8	TX+	Data Transmit +

## Settings and Adjustments

### Open the Station

1. Remove the four screws from the front panel and turn it to the left to expose the interior surfaces.
2. Keep the wiring and ribbon cables connected.
3. Mount the front panel to the rear enclosure using two of the screws just removed (see Figure 9).

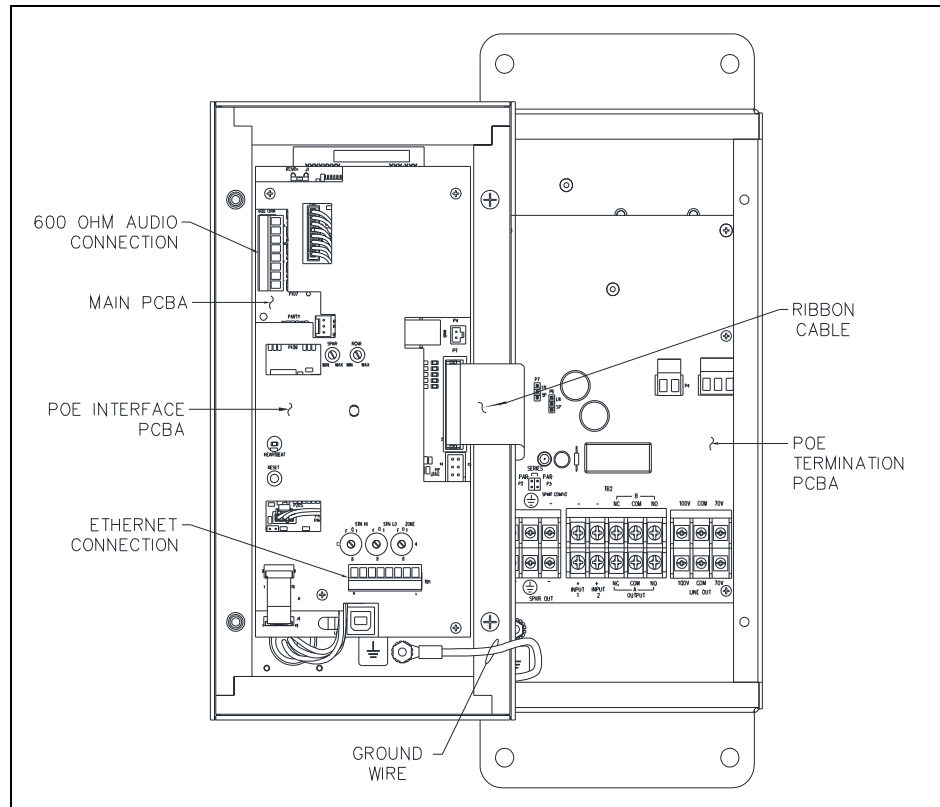


Figure 9. SP2 POE Station—Interior View

## Main PCBA Configuration

Refer to [Figure 10](#) for the switch, jumper, and LED locations on the Main PCBA.

### Write Protect (EEPROM) Jumper

**NOTE:** This jumper should not be changed in the field.

### WDOG Enable (Watchdog) Jumper

Watchdog jumper, P11, enables a watchdog feature for software purposes and should not be adjusted in the field. The default setting is installed.

### Boot Enable Jumper

Jumper P8 – BOOT, is required for development purposes and should not be adjusted in the field. The default setting for this jumper is open.

### Reset Switch

Reset switch, S1 reboots the station to its initial state. All configuration settings remain programmed.

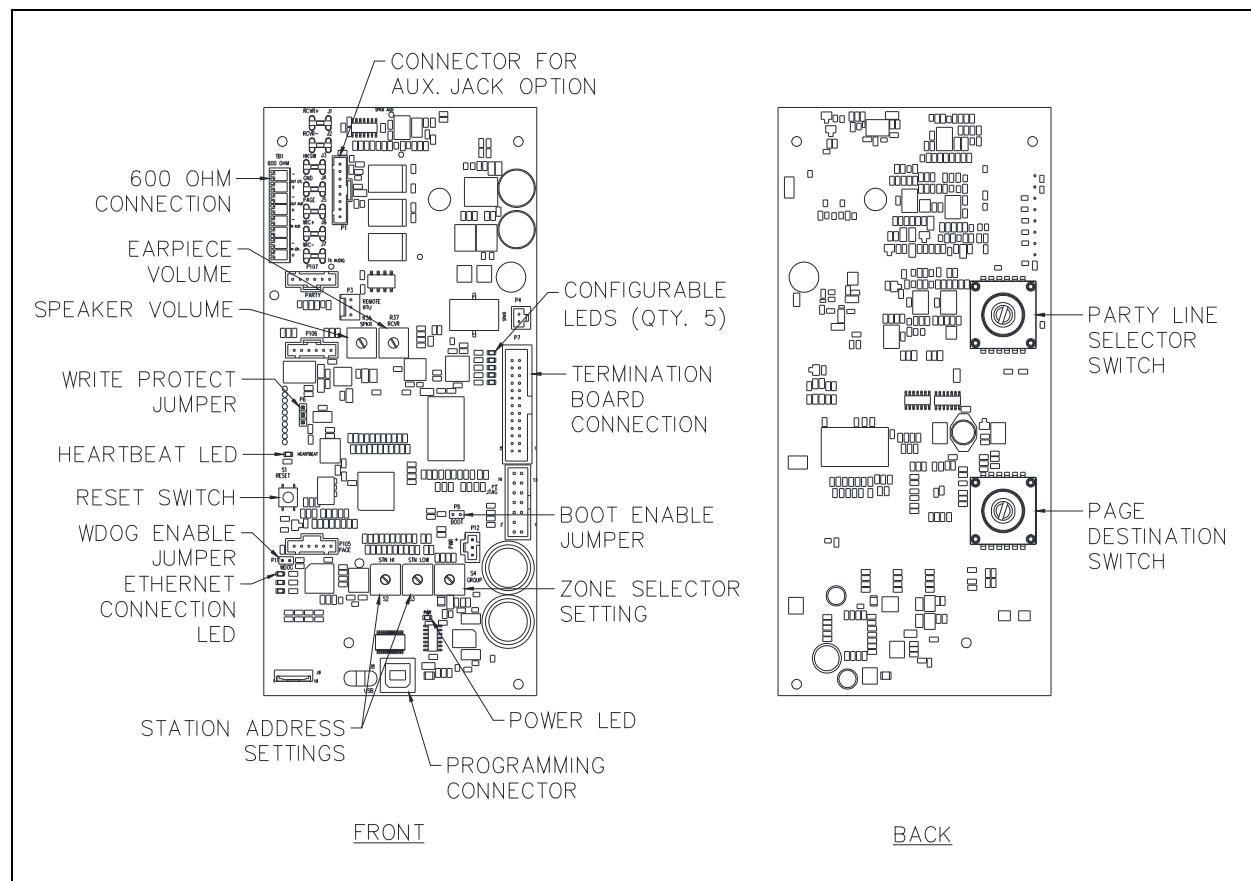




Figure 10. Main PCBA (Front and Rear Views)

## Speaker and 600-ohm Audio Output Volume

The speaker volume potentiometer, R36, adjusts the signal level to the speaker from the page line (see Figure 10). When 600-ohm audio is also connected, R36 will adjust the volume for both. Use the CLI (Command Line Interface) to configure the output level when only 600-ohm audio is used. The default setting is 4 watts from an 8-ohm speaker and 2 watts from a 16-ohm speaker.

 **WARNING**  —Maximum output power may exceed rated speaker wattage resulting in speaker damage.

To adjust the speaker or speaker and 600-ohm output volume:

1. Turn the speaker volume potentiometer, R36, fully counterclockwise.

The speaker emits an audible test-tone.

2. Slowly turn R36 clockwise until the desired output volume is reached.

The test-tone ceases three seconds after no adjustment is made.

This setting can also be configured via USB or Ethernet connection using the CLI.

**NOTE:** This setting is overridden if it is configured for the station using the SP2 Console in a mutually provisioned system. See the SP2 Configuration Guide, Pub. 42004-784 (see the [Reference Documentation](#) section).

## Receiver Volume

Adjust the receiver volume using the RCVR potentiometer R37 (see Figure 10). To adjust the volume for the handset:

1. Remove the handset from the cradle.
2. Turn the RCVR potentiometer, R37, fully counterclockwise. An audible test-tone will be heard in the handset.
3. Slowly turn R37 clockwise until the desired output volume is reached. The test-tone ceases three seconds after no adjustment has been made.

This setting can also be configured via USB or Ethernet connection using the CLI.

**NOTE:** This setting will be overridden if it is configured for the station using the SP2 Console in a mutually provisioned system. See the SP2 Configuration Guide, Pub. 42004-784.

## Group and Station Number Selector Switches

One group-number and two station-number hex-selector switches are used to configure SP2 stations for *mutual provisioning* (see Figure 10). Each hex switch has a small arrow to indicate the current setting.

1. Adjust the position of the group-number selector switch to the desired group [0-F].
2. Adjust the two station-number switches to assign the station number [00-FF]. No two stations can be assigned the same address.

At least one SP2 station must be configured as a master station to utilize mutual provisioning in an SP2 system. Master stations must be assigned addresses [0.01], [0.02], or [0.03] using the selector switches. Master station(s) store the configuration of all SP2 stations on the network. As SP2 stations are powered on, they retrieve the mutual provisioning configuration from the master station. See Pub. 42004-784, SP2 Configuration Guide, for detailed information on configuring SP2 stations and SP2 system mutual provisioning. GAI-Tronics' product documentation is located on the GAI-Tronics website at <https://www.gai-tronics.com>.



## Main PCBA Indicators

### Power LED

The Power LED illuminates when power is applied to the station, indicating the main board power supply is operational (see [Figure 10](#)).

### Heartbeat LED

The heartbeat LED flashes after the microprocessor is operational (see [Figure 10](#)). It flashes once per second to indicate normal operation and 250 ms on/off when a fault is detected in the station.

### Ethernet Connection LEDs

Three Ethernet connection LEDs are located on the main PCBA; Link (LNK), Link Speed (SPD), and Activity (ACT). The LNK LED is blue, the SPD LED is green, and the ACT LED is yellow. The LNK and SPD LEDs must be off to indicate an active 100 Mbps Ethernet link. The activity LED; ACT, will blink yellow to indicate Ethernet data activity (see [Figure 10](#)).

### Five Configurable LEDs

Five LEDs are located on the main PCBA (see [Figure 10](#)). These LEDs are configured through firmware. Information for configuring these LED indicators is provided in the SP2 Configuration Guide, Pub. 42004-784. GAI-Tronics' product documentation is located on the GAI-Tronics website at <https://www.gai-tronics.com>.

## Front Cover Installation

After all adjustments have been completed:

1. Place the front cover onto the rear enclosure.  
Do not pinch any cables.
2. Secure the front cover using the four screws and washers provided.
3. Torque the screws to 50 in·lb (5.65 N·m).

## Programming

SP2 stations are factory configured to provide basic Page/Party® functions upon power-up. The stations may need to be reconfigured for custom configurations and larger system designs. Refer to Publication 42004-784, SP2 Configuration Guide (see the [Reference Documentation](#) section).

# Operation

## Standard Handset Paging

Complete the following steps to make a page announcement from an SP2 handset station:

1. Lift the handset from the cradle.
2. *If requesting conversation*: rotate the five-position selector switch (if equipped) to select an unoccupied party line.
3. Press and hold the handset pressbar (not necessary when using the optional ALL-CALL button).
4. After a short *preannouncement* tone is heard (if configured), speak directly into the microphone to broadcast the page announcement.

**NOTE:** SP2 stations incorporate a noise-canceling microphone to reduce transmitted ambient noise. This requires the user to place the microphone as close as possible to their mouth.

5. *If requesting conversation*:
  1. Designate the party line selected in Step 2.
  2. Wait for the designated individual(s) to respond.Full-duplex communication takes place on the party line without broadcasting over the system's speakers.
6. Release the handset pressbar and wait for a response on the party line (if requested) or replace the handset in the cradle.

## Party Line Communication

To respond to a page:

1. Turn the selector switch on any SP2 station in the system to the requested party line.
  2. Pick up the station handset.
- Full-duplex communication takes place on the party line without broadcasting over the system's speakers.

**NOTE:** SP2 stations incorporate a noise-canceling microphone to reduce transmitted ambient noise. This requires the user to place the microphone as close as possible to their mouth.

3. Return the handset to the cradle following the party line conversation.

Party line conversations are not broadcast over the system speakers. Other individuals can join the conversation at any time by picking up a handset and rotating the selector switch to the party line in use.

## All-Call Button Use

Use the ALL-CALL option button to page an alternate destination that has been programmed for the station (see Figure 11). The ALL-CALL option must be software configured for the SP2 station. To initiate a page using the ALL-CALL feature:

1. Lift the handset from the cradle.
2. If party line conversation is desired, rotate the selector switch to an unoccupied party line.

3. Press and hold the ALL-CALL button.

The ALL-CALL button eliminates the need to press the handset or headset (if equipped) pressbar.

4. After the short *preannouncement* tone is heard (if configured), speak directly into the microphone to broadcast your page announcement.

**NOTE:** SP2 stations incorporate a noise-canceling microphone to reduce transmitted ambient noise. This requires the user to place the microphone as close as possible to their mouth.

5. Release the ALL-CALL button and wait for a response on the party line (if requested).
6. Return the handset to the cradle when finished.

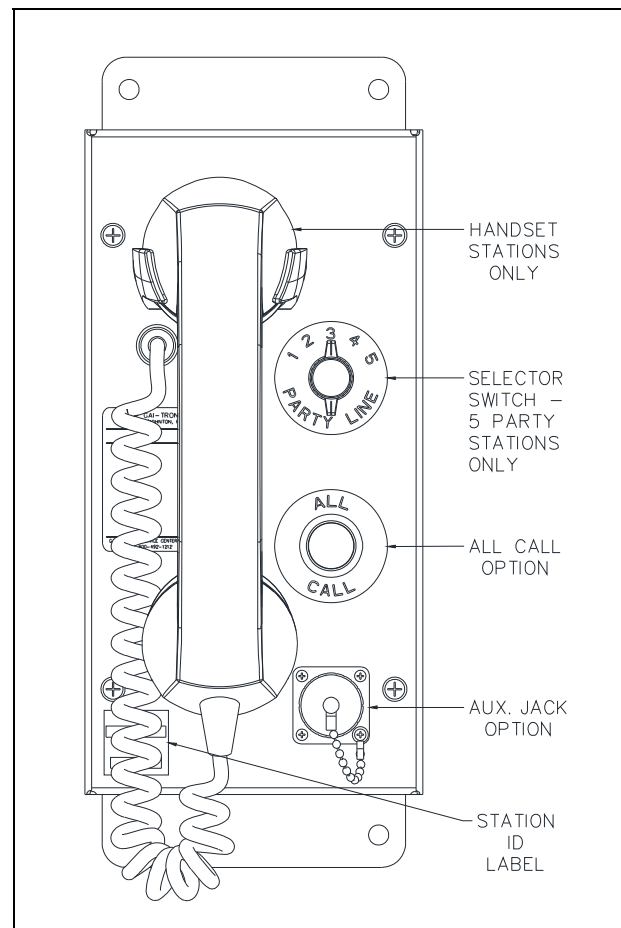


Figure 11. All-Call Button Location

## Alternate-Page Destination Switch Use

Use the ALT-PAGE option selector switch to page one of five alternate destinations that have been programmed for the station (see Figure 12). Alternate page destinations must be software configured for the SP2 station. To initiate a page using the Alt-Page selector switch:

1. Lift the handset from the cradle.
  2. If party line conversation is desired, rotate the selector switch to an unoccupied party line.
  3. Select the desired page destination using the ALT-PAGE selector switch.
  4. Press and hold the handset pressbar.
  5. After the short *preannouncement* tone is heard (if configured), speak directly into the microphone to broadcast your page announcement.
- NOTE:** SP2 stations incorporate a noise-canceling microphone to reduce transmitted ambient noise. This requires the user to place the microphone as close as possible to their mouth.
6. Release the handset pressbar.
  7. Return the handset to the cradle or wait for a response on the party line (if requested).

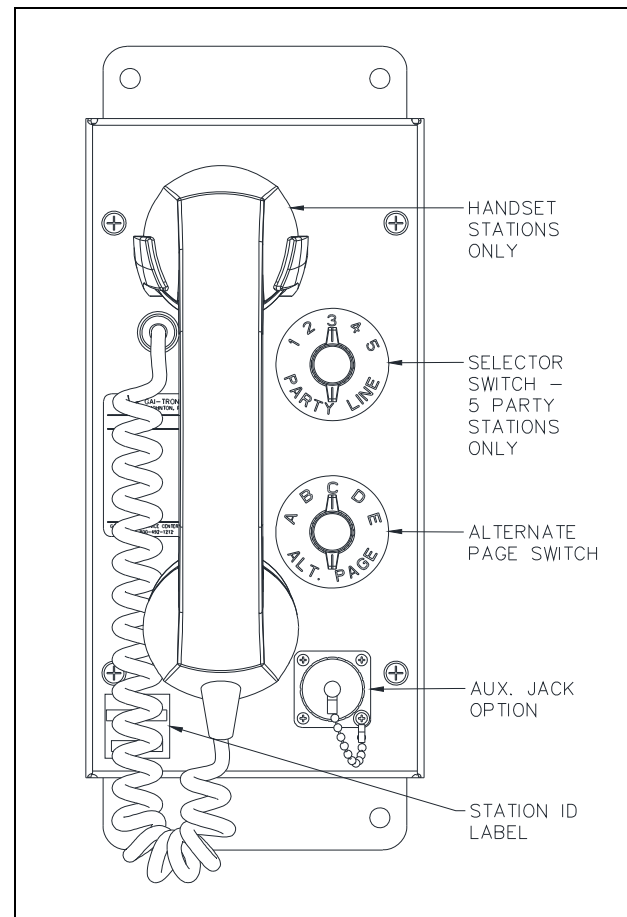


Figure 12. Alternate-Page Switch Location

## Headset Use

Initiate a call with the optional headset feature as follows:

1. Attach the headset assembly to the auxiliary jack on the station (see Figure 11 or Figure 12).
2. If party line conversation is desired, rotate the selector switch to an unoccupied party line.
3. Rotate the ALT-PAGE selector switch (if available) or press the ALL-CALL button (if available) to select the desired optional destination for the page announcement.
4. Press and hold the headset pressbar (not necessary when using the optional ALL-CALL button).
5. After the short *preannouncement* tone is heard (if configured), speak directly into the microphone to broadcast your page announcement.
6. Release the headset pressbar.
7. Wait for a response on the party line (if requested).

**NOTE:** For stations with an auxiliary jack, the Model 10401-201 Headset and 10416-103 Extension Cord allow the user to be hands-free and mobile while maintaining communication. When connected, the handset microphone is disabled.

# Maintenance

## Troubleshooting

The following table is provided to aid qualified service personnel in troubleshooting problems with the SP2 station.

Problem	Solution
station not functional	<ul style="list-style-type: none"> <li>• check wiring and cable terminations</li> <li>• check the POE settings on the Ethernet switch</li> <li>• power LED on Main PCBA illuminated</li> <li>• heartbeat LED blinks once per second for normal operation</li> <li>• heartbeat LED blinks 250 ms on/off when a fault is detected</li> </ul>
network communication not functional	<ul style="list-style-type: none"> <li>• verify LNK LED on main PCBA is off</li> <li>• verify SPD LED on main PCBA is off</li> <li>• verify IP connection settings using telnet</li> <li>• ping station IP address from an admin PC</li> <li>• verify network switch settings for Internet Group Management Protocol (IGMP) snooping and multicast filtering</li> </ul>
handset receiver audio too high/low	<ul style="list-style-type: none"> <li>• adjust the <u>Receiver Volume</u>.</li> <li>• check potentiometer R37 setting</li> <li>• check handset connections</li> <li>• check cable terminations between the main and termination PCBAs</li> <li>• check hookswitch operation</li> <li>• replace handset</li> </ul>
speaker volume too high/low	<ul style="list-style-type: none"> <li>• adjust the <u>Speaker and 600-ohm Audio Output Volume</u></li> <li>• check potentiometer R36 setting</li> <li>• P2 and P3 Termination PCBA jumper positions incorrect (see <u>Figure 5</u>)</li> <li>• check speaker wiring configuration on TB1</li> <li>• replace the speaker or driver</li> </ul>
RTU output not functional	<ul style="list-style-type: none"> <li>• verify no output faults exist</li> <li>• check connected device operation</li> </ul>
RTU input not functional	<ul style="list-style-type: none"> <li>• verify no input faults exist</li> <li>• check operation of connected device</li> </ul>

## Service and Spare Parts

Contact a regional service center for an RA# (return authorization number) if the equipment requires service. Equipment must be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. Repairs or a replacement will be made in accordance with GAI-Tronics' warranty policy if the equipment is under warranty. 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 with identifying the closest regional service center.

Table 7. Replacement Parts

Part No.	Description
12508-002	Screw Kit (Qty. 32)

## Specifications

### Power Consumption

POE, IEEE 802.23af Class 0.....4 W/12.95 W (idle/maximum)  
POE Plus, IEEE 802.3a+ Class 4.....4 W/25.5 W (idle/maximum)

### Ethernet

Cable ..... Category 5e or better  
Speed..... 100 Mbps  
Maximum Stations ..... 4096  
Maximum cable length ..... 100 m

### RTU

#### Output Control

Maximum load current..... 8.0 A  
Maximum in-rush current ..... 15 A  
Maximum voltage ..... 250 V ac

#### Input Control

Switch type..... NO or NC dry contacts  
Cable resistance ..... 100  $\Omega$  maximum loop resistance  
Contact closure resistance ..... 1 k $\Omega$  maximum

### Audio

#### Handset

Microphone ..... dynamic, noise-canceling  
Receiver ..... dynamic, hearing aid compatible  
Cord ..... retractile, 6-foot extended, PVC  
Material ..... ABS

#### Handset Amplifier

Frequency response..... 250–3,000 Hz, +0/–3 dB ref. to 1 kHz  
Distortion ..... <1.5% THD @ 1 kHz  
Receiver level..... 200 mV nominal, adjustable 100–350 mV

**Headset Earpiece**

Level ..... 125 mV nominal, adjustable 50–200 mV

**Speaker Amplifier**

Maximum output:

8-ohm speaker\*

POE Plus..... 14 W  $\pm$ 1.0 dB into 8- $\Omega$  load with  $-6$  dBFs data signal, default: 4 W @ 8  $\Omega$

POE ..... 6 W  $\pm$ 1.0 dB into 8- $\Omega$  load with  $-6$  dBFs data signal, default 4 W @ 8  $\Omega$

16-ohm speaker\*

POE Plus..... 7 W  $\pm$ 1.0 dB into 16- $\Omega$  load with  $-6$  dBFs data signal, default: 2 W @ 16  $\Omega$

POE ..... 3 W  $\pm$ 1.0 dB into 16  $\Omega$  load with  $-6$  dBFs data signal, default: 2 W @ 16  $\Omega$

\* 100 m maximum cable length with minimum category 5e Ethernet cable.

Frequency response..... 250–3,000 Hz,  $\pm 0/-3$  dB ref. to 1 kHz

Distortion .....  $<3\%$  THD @ 1 kHz to 14 W

**70-volt Line Audio Output**

Audio Level

POE Plus..... 53 V<sub>(RMS)</sub> (typical)

POE ..... 36 V<sub>(RMS)</sub> (typical)

Minimum Load

POE Plus..... 249  $\Omega$

POE ..... 249  $\Omega$

Maximum Wattage (Tap Setting)

POE Plus..... 20 W (11.2 W typical)

POE ..... 20 W (5.2 W typical)

**100-volt Line Audio Output**

Audio Level

POE Plus..... 56 V<sub>(RMS)</sub> (typical)

POE ..... 38 V<sub>(RMS)</sub> (typical)

Minimum Load

POE Plus..... 277  $\Omega$

POE ..... 263  $\Omega$

Maximum Wattage (Tap Setting)

POE Plus..... 36 W (11.3 W typical)

POE ..... 36 W (5.5 W typical)

**600-ohm Audio Input**

Audio Level ..... 1 V<sub>(RMS)</sub> maximum

Control type ..... NO dry contact

Control cable resistance ..... 1 k $\Omega$  maximum loop resistance

**600-ohm Audio Output**

Frequency response..... 250–3,000 Hz,  $\pm 0/-3$  dB reference to 1 kHz

Distortion .....  $<1\%$  THD @ 1 kHz to 1 V<sub>(RMS)</sub> into 600  $\Omega$

Audio level..... adjustable 100 mV<sub>(RMS)</sub> to 1 V<sub>(RMS)</sub> into 600  $\Omega$

Control type ..... N.O. solid-state output, maximum on resistance; 35  $\Omega$

Control maximum load current ..... 100 mA

Control maximum load voltage..... 24 V ac/dc

## Mechanical

Construction/finish..... 16-gauge cold-rolled steel; safety orange polyurethane

Mounting..... wall or column, four 0.31-inch (7.8 mm) mounting holes

Termination connections..... screw-type barrier terminal blocks for power, speaker, and RTU

Phoenix connector pluggable terminal blocks for 600- $\Omega$  audio and Ethernet

### Dimensions:

Enclosure ..... 10.00 H  $\times$  5.00 W  $\times$  4.00 D in (254.0  $\times$  127.0  $\times$  101.6 mm)

Overall..... 12.50 H  $\times$  5.25 W  $\times$  7.34 D in (317.5  $\times$  133.4  $\times$  188.4 mm)

### External controls:

Multi-party stations ..... handset hookswitch and party line selector switch

Multi-page stations ..... page line selector switch

Net weight..... standard amplifier: 6.0 lb

..... multi-party and options stations: 7.0 lb

Shipping weight ..... standard amplifier: 7.0 lb

..... multi-party and options stations: 8.0 lb

## Environmental

Temperature range (operation and storage) ..... -22 °F to 140 °F (-30 °C to 60 °C)

Humidity ..... 95% non-condensing

## Reference Documentation

SP2 Configuration Guide ..... 42004-784

## Approvals

Electrical Safety ..... UL60950

CAN/CSA-22.2 No. 60950



# Warranty

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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

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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.