



GAI-TRONICS®
A HUBBELL COMPANY

SP2 Zone 2/22 Weatherproof Handset/Speaker Amplifier Station

TABLE OF CONTENTS

<i>Confidentiality Notice</i>	1
<i>General Information</i>	1
Product Overview	1
Features	2
Options	2
<i>Installation</i>	3
Important Safety Instructions	3
Mounting the Enclosure	4
Cable Entries	4
Opening the Station	5
Field Wiring and Configuration	5
Station Ground	5
Termination PCBA Connections	6
Main PCBA.....	11
<i>Settings and Adjustments</i>	13
Opening the Station	13
Main PCBA Configuration	13
Write Protect (EEPROM) Jumper.....	13
WDOG Enable (Watchdog) Jumper	13
Boot Enable Jumper	13
Reset Switch.....	13
Speaker and 600-ohm Audio Output Volume.....	14
Receiver Volume	14
Group and Station Number Selector Switches.....	15
Main PCBA Indicators	15
Power LED.....	15
Heartbeat LED	15
Ethernet Connection LEDs	15
Five Configurable LEDs	15
Attaching the Front Cover	15
<i>Programming</i>	15
<i>Operation</i>	16
Standard Handset Paging	16

Party Line Communication	16
Headset Use	16
All-Call Button Use	17
Alternate-Page Destination Switch Use	17
<i>Maintenance</i>	<i>18</i>
Troubleshooting	18
Service and Spare Parts	19
<i>Specifications</i>	<i>19</i>
Power	19
Ethernet	19
RTU	19
Audio	20
Mechanical	21
Environmental	21
<i>Approvals</i>	<i>21</i>
<i>Reference Material</i>	<i>21</i>



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Confidentiality Notice

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General Information

Product Overview

The GAI-Tronics SP2 station is a modular industrial multicast VoIP (Voice over Internet Protocol) communication system. The standard SP2 Zone 2/22 configuration is an outdoor, multi-party, handset/speaker amplifier station using ac power with RTU control. They are constructed of black carbon-loaded, glass-reinforced polyester and are extremely weatherproof and corrosion resistant. A number of options are available to add to or modify station capabilities (see [Features and Options](#)).

SP2 stations connect to an Ethernet network so the loss of a single station will not adversely affect the system as a whole. The stations require a 100 Mbps link to a switch or router using Category 5 or better cable. To ensure the quality of SP2 audio, it is recommended that SP2 network traffic be isolated from other devices and that network switches and routers be properly configured 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.

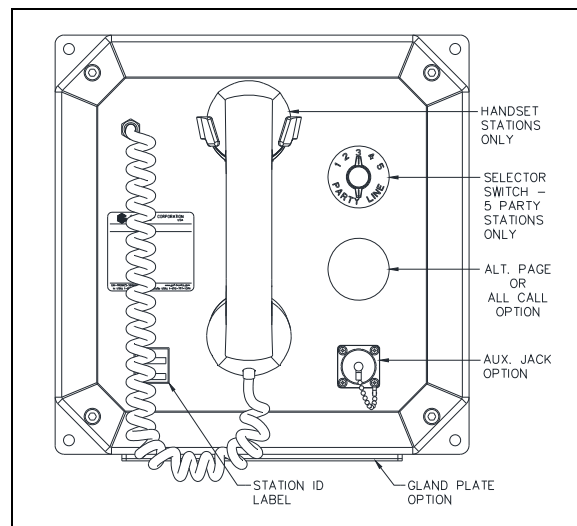


Figure 1. SP2 Zone 2/22 Weatherproof Station
Front Panel

Features

- flexible and highly configurable SMART technology featuring ALS (ambient level sensing), 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 with up to 30 watts of speaker output at 8 ohms
- 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 isolated 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 pre-announcement tone
- off-hook and page switch timeout functionality
- configurable virtual zoning ability
- USB interface for field or bench configuration
- universal ac power supply
- black carbon-loaded, glass-reinforced polyester enclosure

Options

All SP2 Station options are factory installed.



- 70/100V constant voltage termination board with 24-watt monitored output
- 24 V dc power supply
- speaker amplifier only (no handset)
- 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 Hytre[®] handset cords in 6-, 15-, or 25-foot lengths
- conformal coating for PCBA

Installation



Important Safety Instructions



This equipment is suitable for use in Zone 2/22 hazardous areas OR non-hazardous locations only. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.

- 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. Maximum system cable length is not to exceed two miles.
- 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.

 **WARNING**  —**POTENTIAL ELECTROSTATIC CHARGING HAZARD**—Model 10401-201 Headset and 10416-103 Extension Cord should be used in Group IIB or Group IIA areas only.

Capacitance values of 140 pF to 580 pF were measured on the external metallic unearthened components of this equipment. As such, special care must be taken in installation location and environment to address this hazard. See EN TR50404, “Electrostatics—Code of practice for avoidance of hazards due to static electricity” for additional information in regards to proper installation and potential hazards.

 **WARNING**  —**EXPLOSION HAZARD**—Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous. Avertissement—Risque d’explosion—Avant de débrancher l’équipement, couper le courant ou assurer que le secteur est su pour n’être pas hasardeux.

 **WARNING**  —In 24 V dc systems: Under NO condition should this equipment be operated from a battery charger without the batteries connected.

In 24 V dc systems, most chargers have an unloaded output of 35 to 45 volts that can quickly damage the equipment designed for nominal 24 volts. The maximum battery voltage should never exceed the maximum specified input voltage.

Mounting the Enclosure

Mount the enclosure using the four 0.31-inch (8 mm) diameter holes located on the mounting flanges with 5/16-inch (M6) hardware. The suggested mounting height for all SP2 station enclosures is 48 inches (1219 mm) to the center of the bottom mounting holes of the enclosure. The SP2 Zone 2/22 Station is not supplied with conduit or cable openings.

When mounting the enclosure, use caution to avoid damaging the internal components (see Figure 2 for specific details, including mounting hole dimensions).

Cable Entries

Stations can be supplied with or without a stainless steel gland plate located on the bottom of the rear enclosure. If no gland plate is present, remove the front panel and drill or punch wire entry openings in the rear enclosure. If the station does include a gland plate, it can be removed from the rear enclosure for ease of adding entry holes. Upon reinstalling the gland plate, torque the #6-32 nuts to 10–12 in·lb (1.13–1.36 N·m).

The recommended entry is via the enclosure bottom to prevent moisture from dripping onto the terminals. Top entry is not recommended (see Figure 2). There must be a minimum of ½ inch (13 mm) of material between entry holes.

Seal all unused openings with proper fittings per local standards. All metric cable entry devices and blanking elements shall be certified for Zone 2/22 applications with an IP66 rating, suitable for conditions of use, and correctly installed. Use field wiring suitable for the ambient temperature.

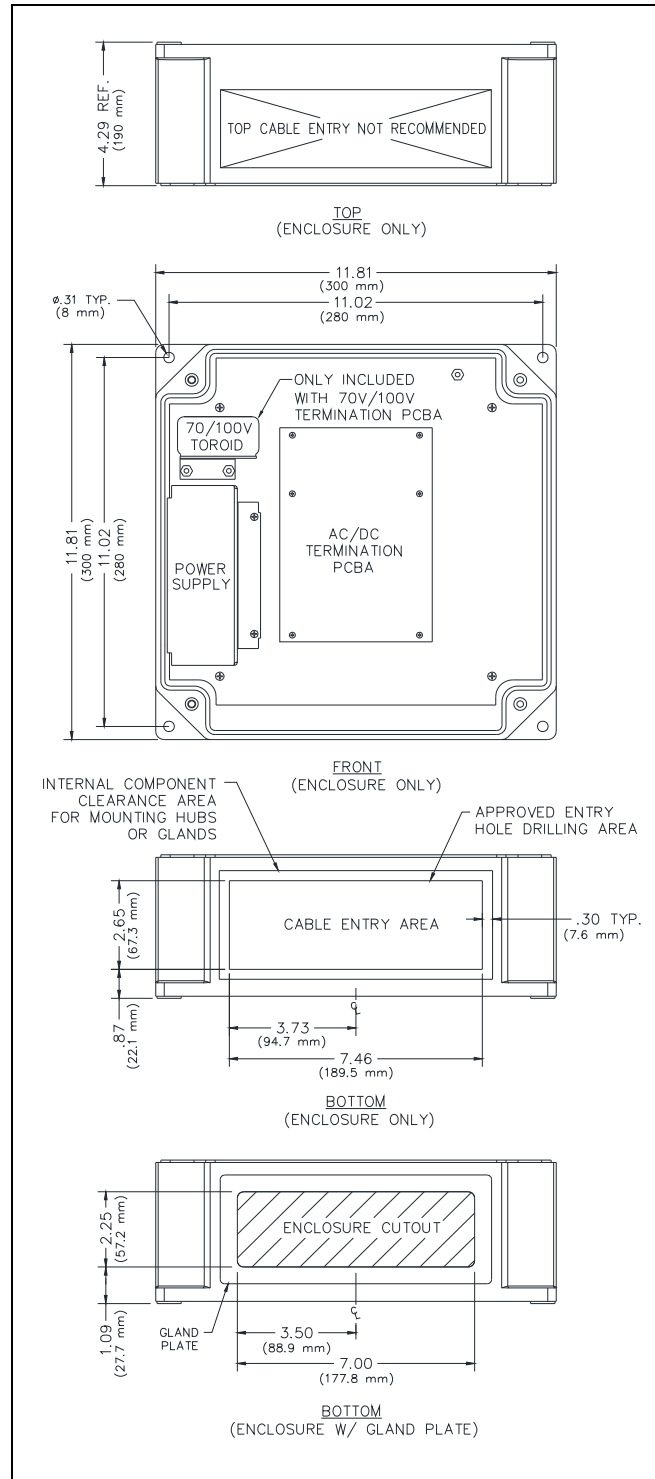


Figure 2. Mounting Details and Suggested Cable Entry Locations

Opening the Station

Complete the following steps to open the station:

1. Remove the four screws from the front cover and turn it to the left so that the interior surfaces face you.
2. Keep the wiring and ribbon cables connected.

This configuration presents the easiest access for cable termination and station configuration.

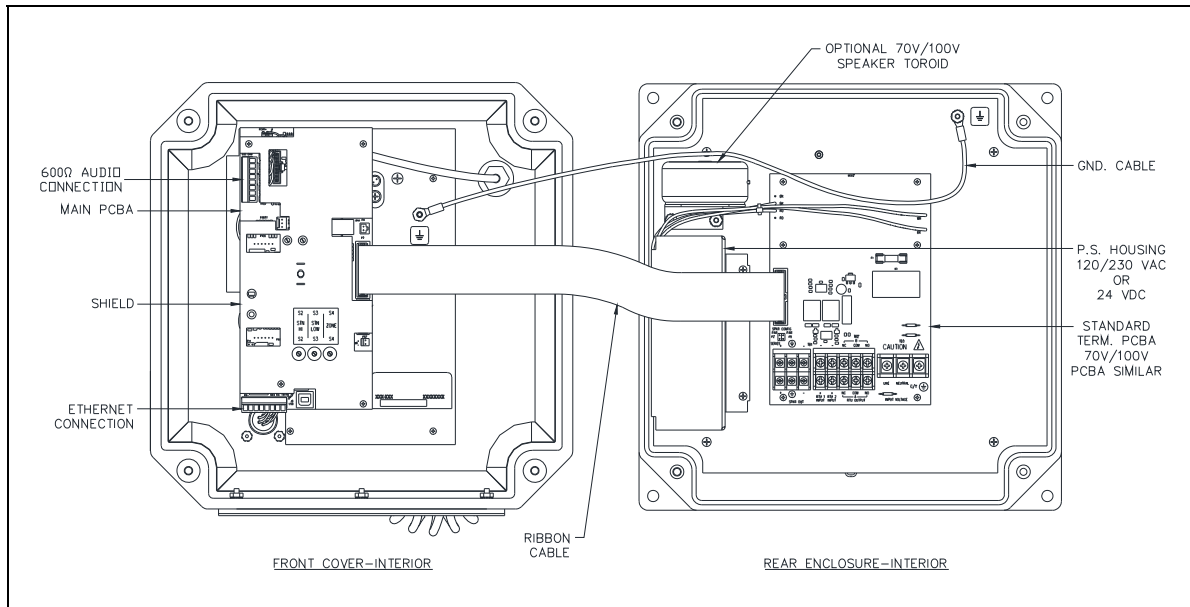


Figure 3. SP2 Zone 2 Station—Interior View

Field Wiring and Configuration

The Zone 2/22 SP2 Station provides terminal blocks on the Termination PCBA located in the rear of the enclosure for field wiring the power, speaker, and RTU connections. The Main PCBA, mounted to the back of the front panel, contains the 600-ohm audio and Ethernet connections.

All unused openings must be sealed with proper fittings per local standards. All metric cable entry devices and blanking elements shall be certified for Zone 2/22 applications with an IP66 rating suitable for conditions of use and correctly installed. Use field wiring suitable for the ambient temperature.

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 local and national codes. Class 2 circuit wiring must be performed in accordance with NEC 725.55.

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

Station Ground

The station enclosure must 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 upper right corner at the back of the rear enclosure (see [Figure 10](#)).

Termination PCBA Connections

Install all connections as indicated in the following sections:

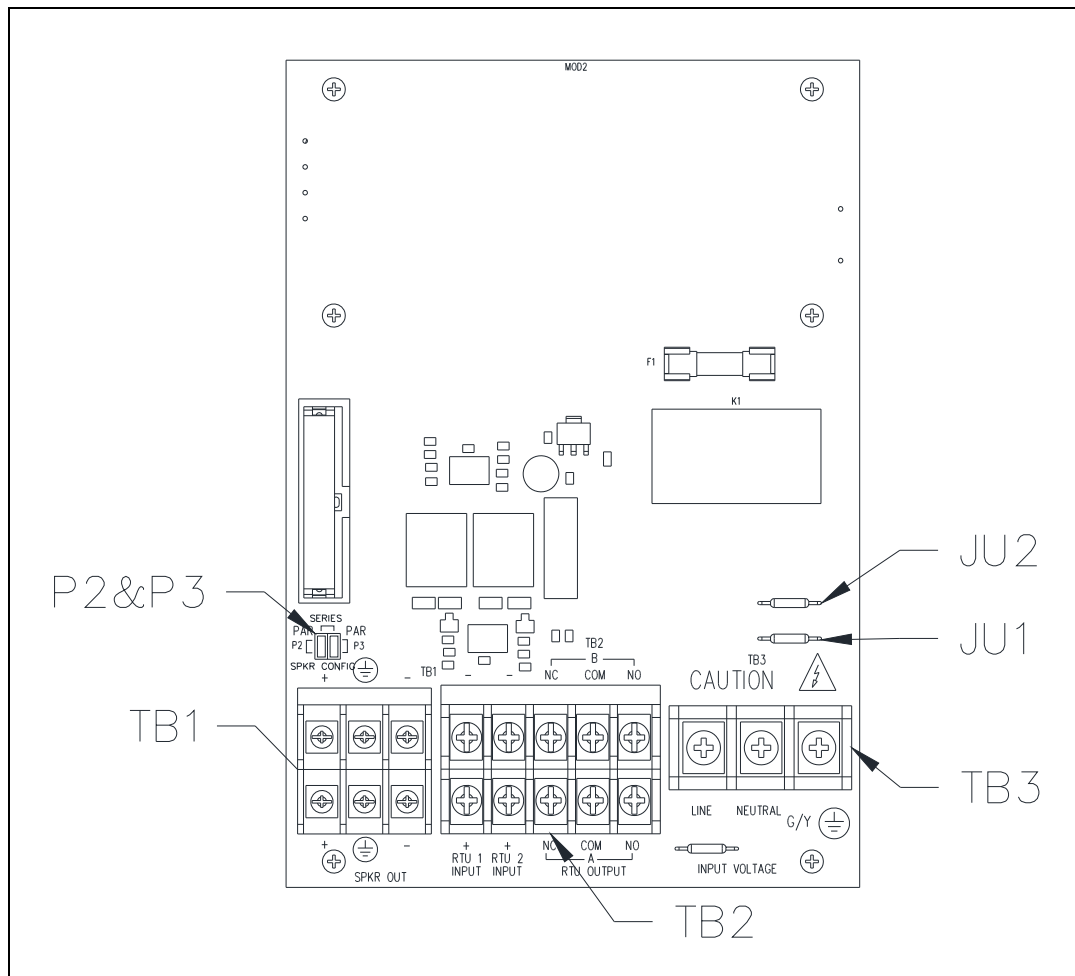


Figure 4. SP2 Standard Termination PCBA
(Optional 70V/100V Termination PCBA Similar)

Direct Speaker Connection and Jumper Settings

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

3. Pull the speaker cable(s) into the enclosure.
4. Connect spade lugs to the wires.
5. Install the speaker wires to terminal block TB1 in accordance with the table below.
6. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).
7. 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](#)).

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	+	Primary Parallel/SPEAKER A Series—Output
TB1-2	⊥	Earth Reference
TB1-3	-	Primary Parallel/SPEAKER A Series—Output
TB1-4	+	Secondary Parallel/SPEAKER B Series—Output
TB1-5	⊥	Earth Reference
TB1-6	-	Secondary Parallel/SPEAKER B Series—Output

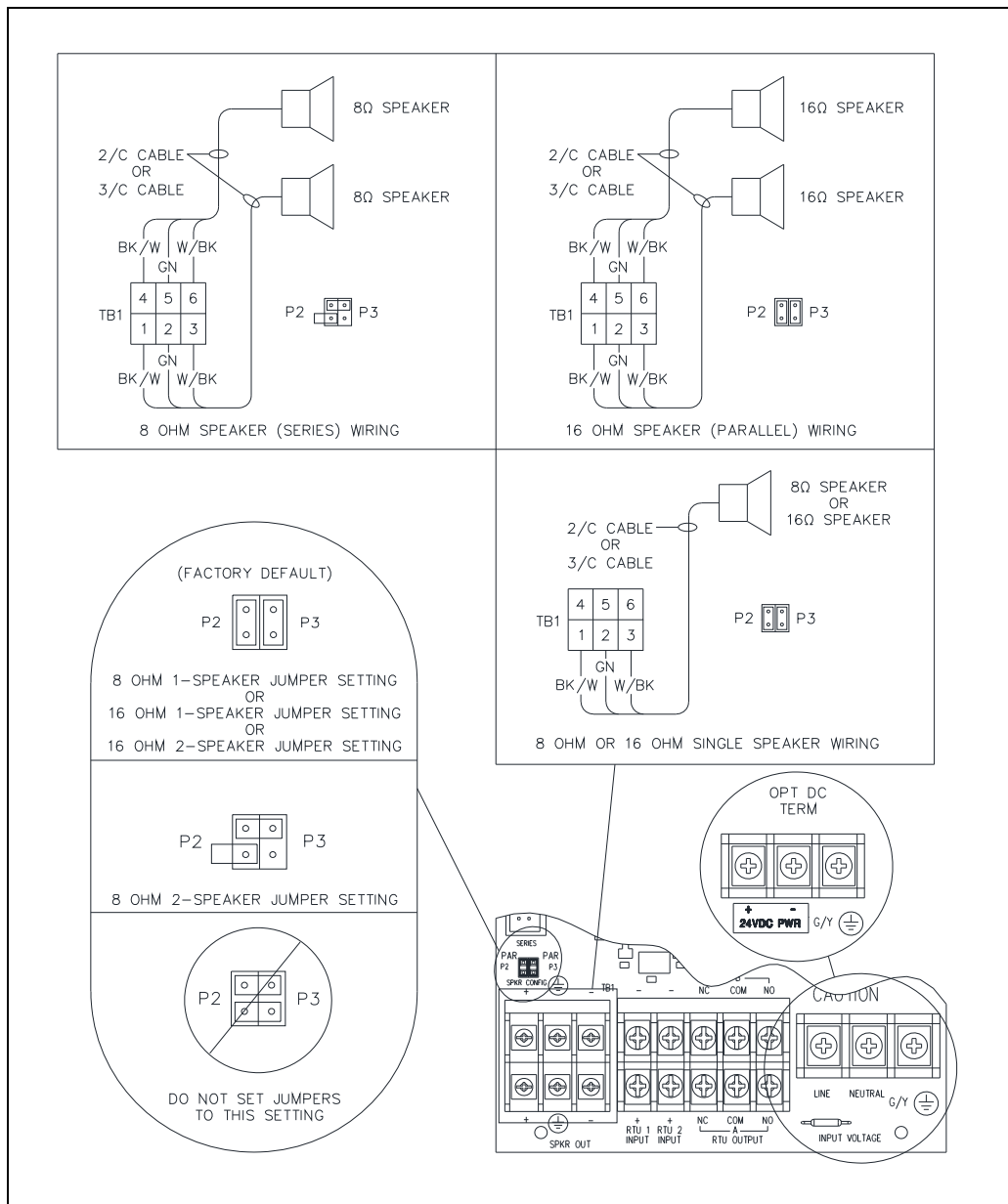


Figure 5. 8/16-ohm Speaker Impedance Configuration and AC/DC Termination at TB3

70 V / 100 V Termination Board Option—Speaker Connections with Monitoring

The optional 70V/100V Speaker Line Monitoring PCBA replaces the standard termination board and provides for connection of 70-volt and/or 100-volt speakers to the SP2 Station. Terminal block TB1 provides termination for the station’s speaker loop(s). All speakers must be wired in parallel. One speaker loop can be monitored by terminating the return cable to the LINE SPRVN terminals on TB2 (see Figure 6 and Table 2).

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 **TB1**. Connect 70-volt speakers between the 70V and COM terminals on TB1.

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

NOTE: An SP2 station can only monitor one speaker loop.

4. For speaker line supervision, connect the speaker return wires to the LINE SPRVN + and – terminals at **TB2** (see Table 4).
5. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).

NOTE: The combined wattage (tap settings) for all speakers must never exceed the amplifier power rating (24 W).

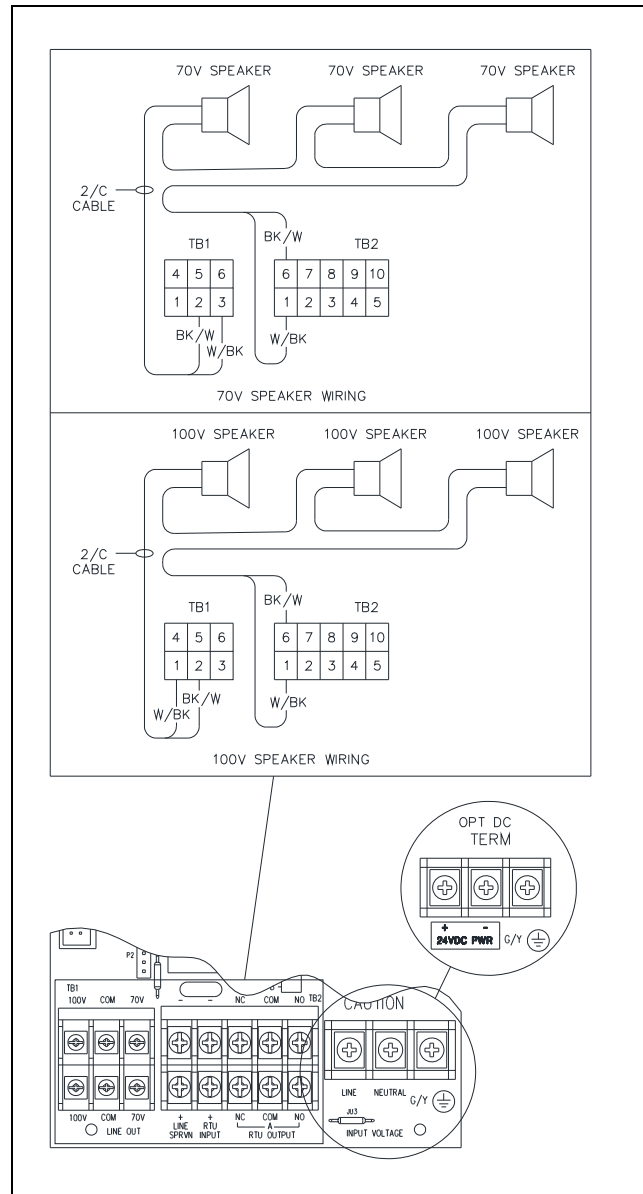


Figure 6. 70 V/100 V Termination Board Wiring

Table 2. 70 V/100 V Speaker Connections—TB1

Pin	Label	Description
TB1-1	100V	Primary 100 V Parallel Speakers—Output
TB1-2	COM	Earth Reference
TB1-3	70V	Primary 70 V Parallel Speakers—Output
TB1-4	100V	Secondary 100 V Parallel Speakers—Output
TB1-5	COM	Earth Reference
TB1-6	70V	Secondary 70 V Parallel Speakers—Output

RTU Inputs

The standard Termination PCBA contains two auxiliary RTU inputs. The optional 70V/100V termination board provides for speaker line monitoring and is equipped with just one auxiliary RTU input. These inputs are terminated at terminal block TB2 (see [Figure 5](#) or [Figure 6](#)).

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](#) or [Table 4](#)).
4. Torque the terminal block screws to 8–10 in·lb (0.90–1.13 N·m).
5. Install end-of-line resistors as shown to enable RTU input-cable monitoring (see [Figure 7](#)):

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 -

Table 4. 70V/100V Termination Board
Speaker Line Monitoring and RTU Input
Termination—TB2

Pin	Label	Function
TB2-1	+ LINE SPRVN	70 V/100 V Supervision +
TB2-2	-	70 V/100 V Supervision -
TB2-3	+ RTU INPUT	RTU Input +
TB2-4	-	RTU Input -

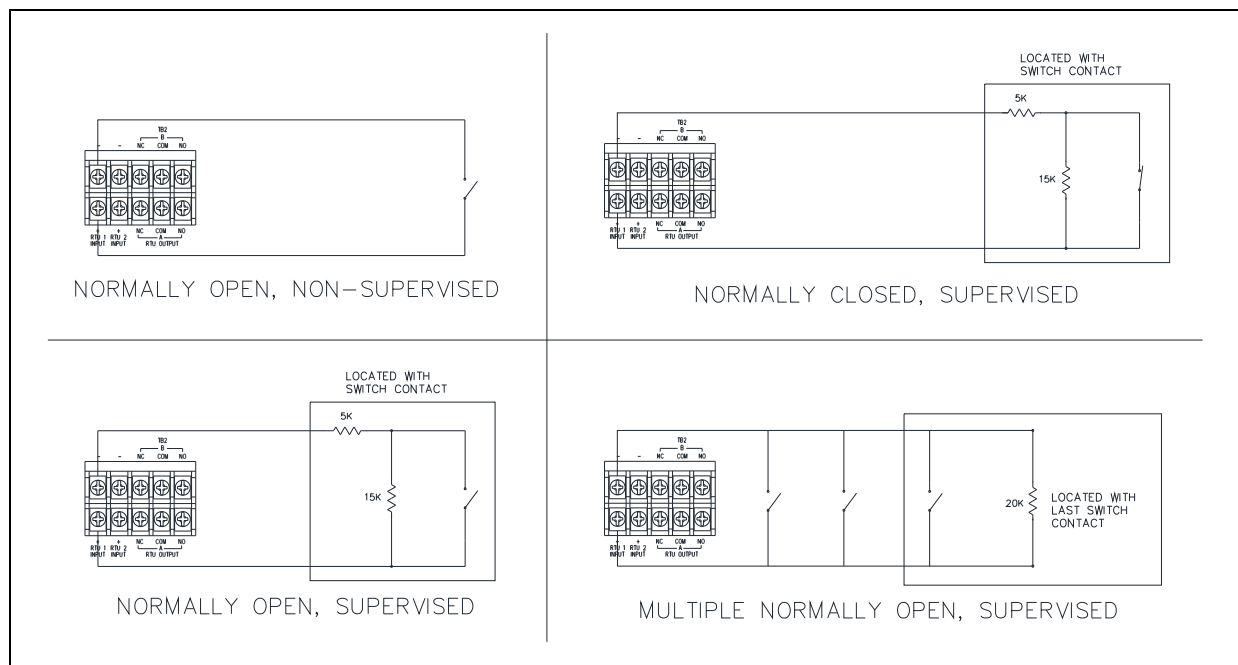


Figure 7. RTU Input Wiring Configurations for Cable Monitoring

RTU Output

Two Form “C” contacts are provided to power a beacon (see [Figure 8](#)). These outputs can be reconfigured for dry contact use by removing jumpers JU1 and JU2. Terminations for these outputs are provided at terminal board TB2 on the Termination PCBA (see [Figure 5](#) or [Figure 6](#)).

⚠ WARNING ⚠ —Line voltage is present at the NO contact until JU1 and JU2 are removed.

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

For beacon cable monitoring:

5. Install a 20-kilohm 10-watt resistor across the terminals of the beacon cable (see [Figure 8](#)).
6. Install jumpers at TB2 as shown below to enable cable monitoring.

NOTE: If an RTU Input is used to monitor beacon wiring then it is not available for other functions.

Table 5. 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

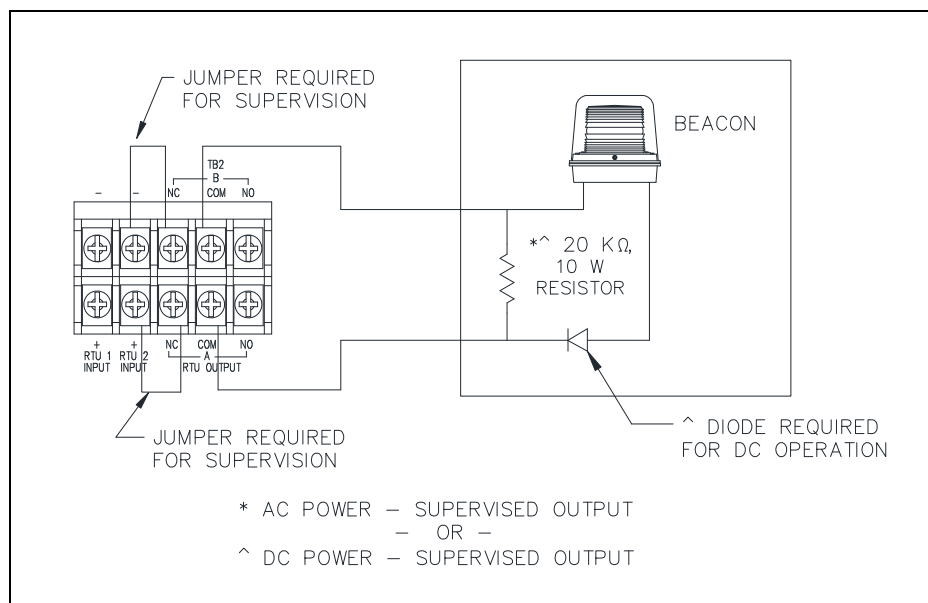


Figure 8. Supervised Output Wiring—TB2

Power

The ac or optional dc power supply is mounted in the Zone 2/22 enclosure. The termination PCBAs include terminal block TB3 for connecting the local power source to the station (see [Figure 5](#) or [Figure 6](#)):

1. Pull the cable from the power source into the enclosure.
2. Connect spade lugs to the wires.
3. Connect the conductors from the ac or dc power source to the appropriate terminals at terminal block TB3:

Table 6. AC Power—TB3

Pin	Label	Description
TB3-1	LINE	Positive
TB3-2	NEUTRAL	Negative
TB3-3	⊥	Earth ground

Table 7. DC Power—TB3

Pin	Label	Description
TB3-1	+	Positive
TB3-2	-	Negative
TB3-3		No Connection

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. A control input exists that 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 for sending page line audio to a remote audio amplifier. A solid state dry contact relay is provided that can be used 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 8](#) and [Figure 9](#)).
4. Connect the pluggable terminal block to terminal block receptacle TB1.

Table 8. 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

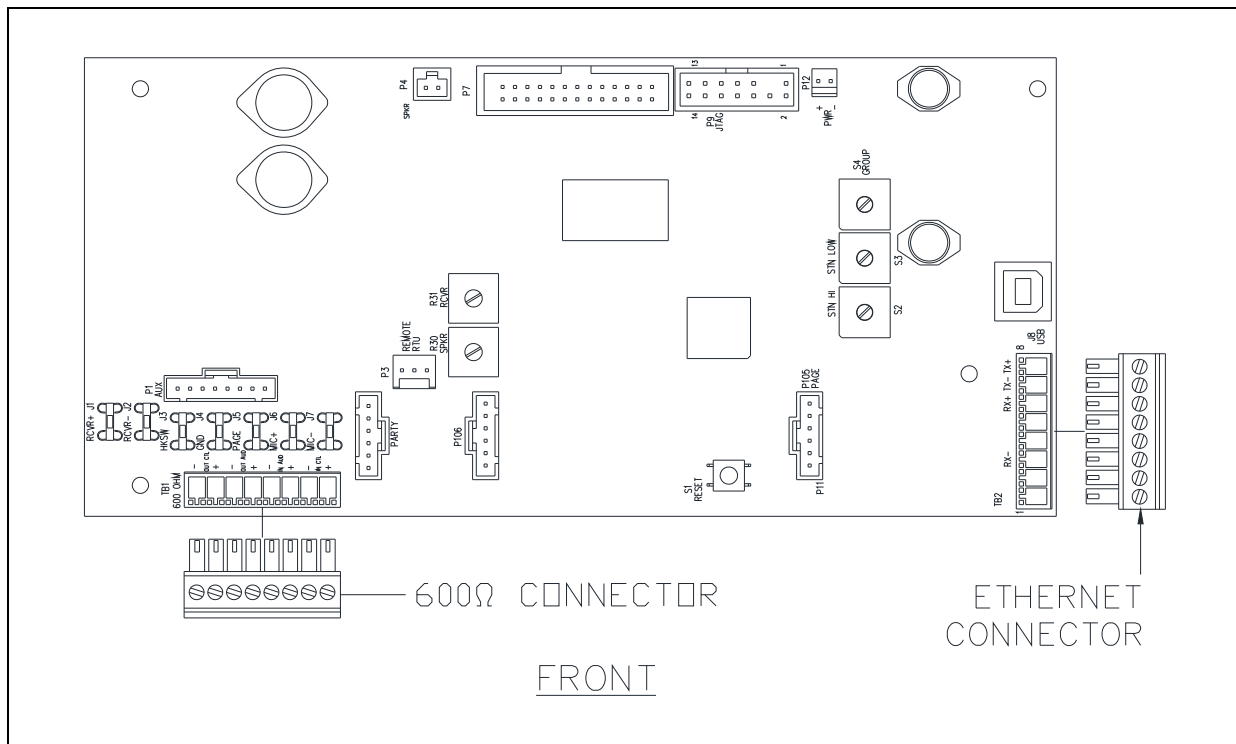


Figure 9. SP2 Main PCBA (Ethernet)

Ethernet Termination

1. Pull a dedicated category-5 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 Figure 9)
4. Connect the pluggable terminal block to the Main PCBA terminal block TB2 (see Figure 9).

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

Table 9. Ethernet Connection—TB2

Pin	Label	Description
TB2-1		Unused
TB2-2		Unused
TB2-3	Rx-	Data Receive -
TB2-4		Unused
TB2-5		Unused
TB2-6	Rx+	Data Receive +
TB2-7	Tx-	Data Transmit -
TB2-8	Tx+	Data Transmit +

Settings and Adjustments

Opening the Station

Complete the following steps to open the station:

1. Remove the four screws from the front cover and turn it to the left so that the interior surfaces face you.
2. Keep the wiring and ribbon cables connected.

This configuration presents the easiest access for cable termination and station configuration.

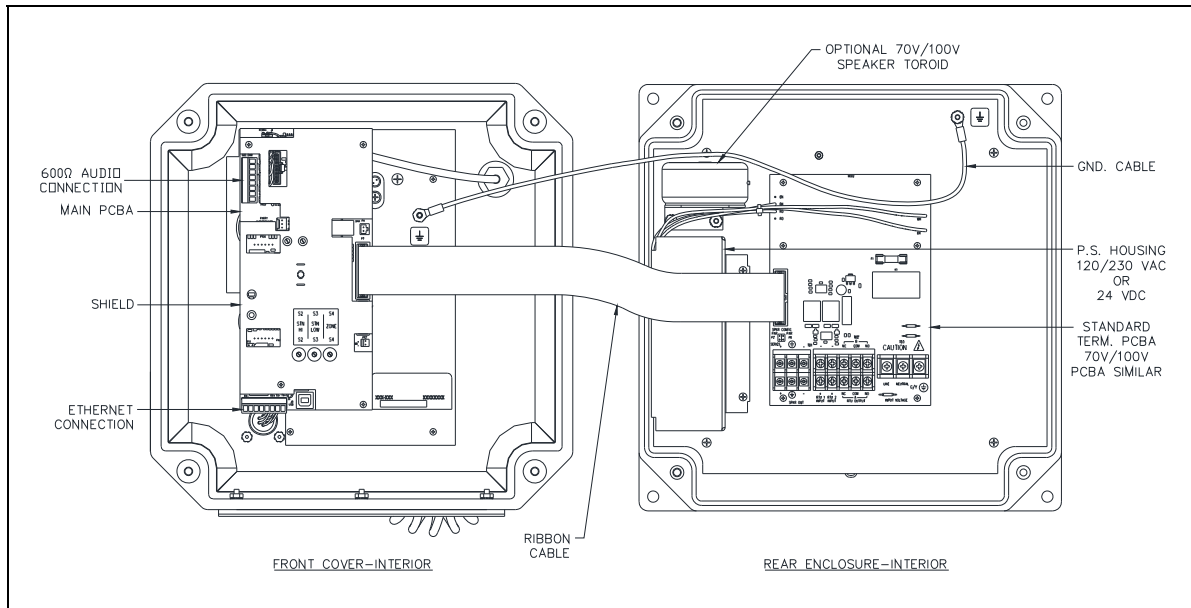


Figure 10. SP2 Zone 2 Station—Interior View

Main PCBA Configuration

Refer to [Figure 11](#) 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, allows for rebooting the station to its initial state. All of the latest configuration settings remain programmed.

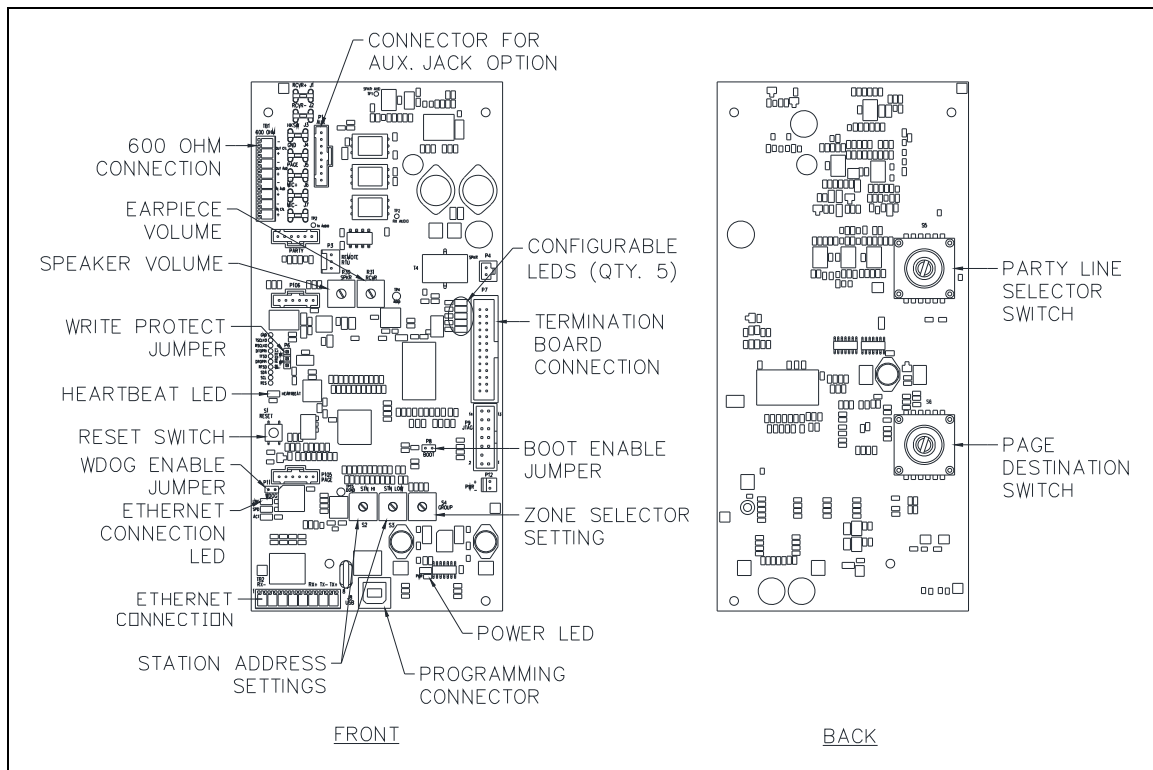


Figure 11. Main PCBA (Front and Rear Views)

Speaker and 600-ohm Audio Output Volume

The speaker volume potentiometer, R36, adjusts the signal level to the speaker from the page line. When 600-ohm audio is also connected, R36 will adjust the volume for both. If only 600-ohm audio is utilized then the volume for the 600-ohm audio must be configured via the CLI (Command Line Interface). 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 SPKR speaker volume potentiometer R36 fully counter-clockwise. An audible test-tone will be heard from the speaker.
2. Slowly turn R36 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.

Receiver Volume

The Receiver Volume is adjusted using the RCVR potentiometer R37. To adjust the volume for the handset:

1. Remove the handset from the cradle.
2. Turn the RCVR potentiometer R37 fully counter clockwise. An audible test-tone will be heard in the handset.
3. Slowly turn R36 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.

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 11](#)). 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 Document Center page of the GAI-Tronics website. The link to the document center is <https://www.gai-tronics.com/docs/default.htm>.

Main PCBA Indicators

Power LED

The Power LED located on the Main PCBA illuminates when power is applied to the station indicating the main board power supply is operational (see [Figure 11](#)).

Heartbeat LED

The Heartbeat LED located on the Main PCBA will flash once communication over the LAN is established to indicate the microprocessor is operational (see [Figure 11](#)).

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 that a 100 Mbs Ethernet link is active. The activity LED; ACT, will blink yellow to indicate Ethernet data activity (see [Figure 11](#)).

Five Configurable LEDs

Five LEDs are located on the Main PCBA (see [Figure 11](#)). 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 Document Center page of the GAI-Tronics website. The link to the document center is <https://www.gai-tronics.com/docs/default.htm>.

Attaching the Front Cover

After all adjustments have been completed, place the front cover onto the rear enclosure, being careful not to pinch any cables. Secure the front cover using the four screws and washers provided. 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. For custom configurations and larger system designs the stations may need to be reconfigured. Refer to Publication 42004-784A for detailed configuration instructions for setting SP2 configuration parameters. A list of reference documents is located in the reference section of this document.

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 party line conversation is desired, rotate the selector switch to an unoccupied party line.
3. Press and hold the **PUSH TO PAGE** button (not necessary when using the optional **ALL CALL** button).
4. After the short “wait” 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 **PUSH TO PAGE** button 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 and party line communication can occur.

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 rotating the selector switch to the party line in use.

Headset Use

When the optional headset feature is available, an operator can initiate a call as follows:

1. Attach the headset assembly to the station.
2. If party line conversation is desired, rotate the selector switch to an unoccupied party line.
3. Press and hold the **PUSH TO PAGE** button (not necessary when using the optional **ALL CALL** button).
4. After the short “wait” tone is heard (if configured), speak directly into the microphone to broadcast your page announcement.
5. Release the **PUSH TO PAGE** or headset pressbar.
6. Wait for a response on the party line (if requested).

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

All-Call Button Use

The ALL-CALL option allows an operator to page an alternate destination that has been programmed for the station (see [Figure 12](#)). 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.
4. After a short “wait” 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 or wait for a response on the party line (if requested).

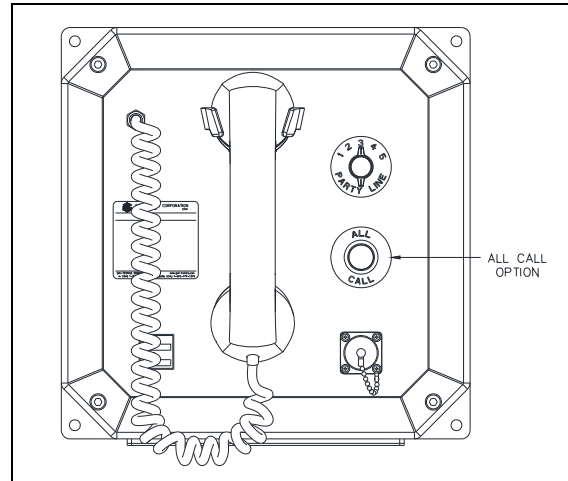


Figure 12. All-Call Option Location

Alternate-Page Destination Switch Use

The ALT-PAGE selector switch gives an operator the ability to page one of five destinations (see [Figure 13](#)). 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 PUSH TO PAGE button.
5. After the short “wait” 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 PUSH TO PAGE or headset pressbar.
7. Return the handset to the cradle or wait for a response on the party line (if requested).

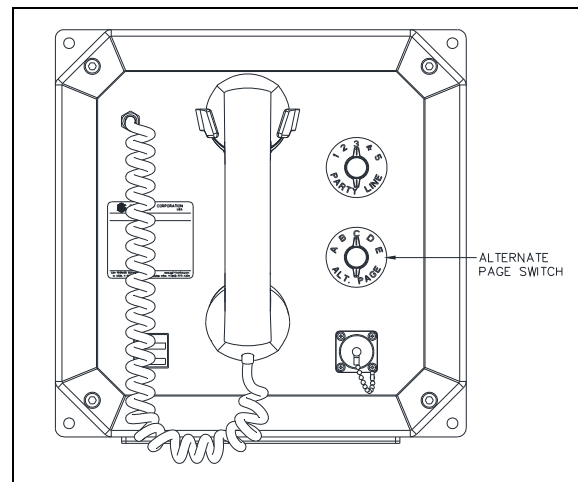


Figure 13. Alternate Page Switch Location

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"> • check wiring and cable terminations • check power supply voltage at TB3 on Termination PCBA • Power LED on Main PCBA illuminated • Heartbeat LED blinking once per second for normal operation
network communication not functional	<ul style="list-style-type: none"> • verify LNK LED on main PCBA is off • verify SPD LED on main PCBA is off • verify IP connection settings using telnet • ping station IP address from an admin PC • verify network switch settings for Internet Group Management Protocol (IGMP) snooping and multicast filtering
handset receiver audio is too high/low	<ul style="list-style-type: none"> • adjust the <u>Receiver Volume</u> • check potentiometer R37 setting • check handset connections • check cable terminations between the Termination and Main PCBAs • check hookswitch operation • replace handset
speaker volume is too high/low	<ul style="list-style-type: none"> • adjust the <u>Speaker and 600-ohm Audio Output Volume</u> • check potentiometer R36 setting • P2 and P3 Termination PCBA jumper positions incorrect (see <u>Figure 5</u>) • check speaker wiring configuration on TB1 • replace the speaker or driver
RTU output is not functional	<ul style="list-style-type: none"> • verify no monitored output faults exist • check fuse F1 on the Termination PCBA • check connected device operation
RTU input does not function	<ul style="list-style-type: none"> • verify no monitored input faults exist • check <u>RTU Inputs</u> on TB2 • check connected device operation

Service and Spare Parts

If the equipment requires service or spare parts, contact your Regional Service Center for assistance. If service is required, a return authorization number (RA#) will be issued. 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 GAI-Tronics' warranty policy. 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 Regional Service Center closest to you.

Specifications

Power

AC Input

Input voltage 120/230 V ac (nominal), 50/60 Hz
Power factor @ nominal 120 V ac 0.5

DC Input

Input voltage 24 V dc +/-20%

Power Consumed (8-ohm load)	120 V AC	230 V AC	24 V DC
Idle	80 mA/6.6 VA	50 mA/12 VA	165 mA/4.0 W
4-watt output (default setting)	150 mA/18 VA	110 mA/25 VA	460 mA/11.0 W
30-watt output	550 mA/65 VA	350 mA/80 VA	1.95 A/46.8 W
Maximum Current Consumed (8-ohm load)	108 V AC	253 V AC	19.2 V DC
30-watt output	600 mA/65 VA	370 mA/77 VA	2.44 A/46.8 W

Current/Power requirements (+/-10%)

Ethernet

Cable Category 5 or better
Speed 100 Mbps
Maximum Stations 4096

RTU

Output Control

Maximum load current 8 A OUTPUT 1A (unfused)
1.6 A OUTPUT 1B (fused)
Maximum in-rush current 15 A
Maximum voltage 250 V ac

Input Control

Switch type NO or NC dry contacts
End-of-line termination 20 kΩ, or 15 kΩ + 5.1 kΩ
Cable resistance 100 Ω maximum loop resistance

Contact closure resistance..... 1 k Ω maximum
 Open fault detection..... >65 k Ω
 Short fault detection..... <200 Ω

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 100 mV nominal, adjustable 50–200 mV

Speaker Amplifier

Maximum output:

8-ohm speaker..... 30 W into 8- Ω load with –6 dBfs data signal
adjustable to 30 W; default: 4 W @ 8 Ω
 16-ohm speaker..... 15 W into 16- Ω load with –6 dBfs data signal
adjustable to 15 W; default: 2 W @ 16 Ω
 Frequency response..... 250–3,000 Hz, +0/–3 dB ref. to 1 kHz
 Distortion <1% THD @ 1 kHz to 24 W
 <3% THD @ 1 kHz to 30 W

70V/100V Speaker Output

Maximum output..... 24 W
 Nominal output voltage..... 70.7 V or 100 V

600-ohm Audio Input

Audio level..... 1 V_(RMS) maximum
 Control type NO dry contact
 Control cable resistance 1 k Ω maximum loop resistance

600-ohm Audio Output

Frequency response..... 250–3,000 Hz, +0/–3 dB reference to 1 kHz
 Distortion <1% THD @ 1 kHz to 1 V_(RMS) into 600 Ω
 Audio level..... adjustable 100 mV_(RMS) to 1 V_(RMS) into 600 Ω
 Control type NO solid state relay, maximum on resistance; 35 Ω
 Control maximum load current..... 100 mA
 Control maximum load voltage..... 24 V ac/dc

Mechanical

Construction/finish..... black carbon-loaded, glass-reinforced polyester
 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 terminals for 600-Ω and Ethernet
 Dimensions 11.8 H × 11.8 W × 4.3 D in (300 × 300 × 109 mm)

External controls

Multi-party stations..... handset hookswitch and party line selector switch
 Multi-page stations..... page line selector switch
 All-Call stations All-Call pushbutton
 Headset stations headset page switch

Weights

Net weight..... standard amplifier: 13 lb
 70V/100V amplifier: 14 lb
 Shipping weight standard amplifier: 14 lb
 70V/100V amplifier: 15 lb

Environmental

Temperature range (operation and storage) -22 °F to 158 °F (-30 °C to 70 °C)
 Humidity 95% non-condensing
 Enclosure IP 66

Approvals

CE Mark
 Certificate No.
 DEMKO 10 ATEX 1010664x ...
 IECEX UL 10.0038x
 Ex ic nA IIC T4 Gc and Ex ic tb IIIC T135°C Dc IP66

Reference Material

Referenced documents are located on the Document Center page of the GAI-Tronics website at the following URL: <https://www.gai-tronics.com/docs/default.htm>.

SP2 Handset/Speaker Amplifier Station Configuration Guide 42004-784

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.