SP2 Hazardous Area Handset/Speaker Amplifier Station

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SP2 Hazardous Area Handset/Speaker Amplifier Station

Confidentiality Notice

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General Information

Product Overview

The GAI-Tronics SP2 station is a modular industrial multicast Voice over Internet Protocol (VoIP) communications system that can include from two to 4096 stations. The standard SP2 hazardous area configuration is an outdoor, multi-party, handset/speaker amplifier station using ac power with RTU control. They are constructed of cast aluminum and are extremely weatherproof and corrosion-resistant. A number of options are available to add to or modify station capabilities. See the Features and Options sections below for more details.

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 Internet Group Management Protocol (IGMP) 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 Hazardous Area Station Front Panel with all Options

Features

- Flexible and highly configurable SMART technology featuring Ambient Level Sensing (ALS), real time self diagnostics of audio path connectivity with health check output via SMTP, and available remote monitoring.

- Real-time operation providing instantaneous page and party line communication without the delays associated with conventional networked communications requiring a SIP server or conference bridge.

- One-way live paging and alarm annunciation over system speakers without the delays associated with record/playback paging systems.

- Distributed amplifier topology so that the loss of a single amplifier shall not adversely affect the system as a whole.

- High efficiency (>80%) Class D paging amplifier provides 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

- Configurable priority scheme to allow urgent/emergency pages to override less important pages.

- Configuration stored in non-volatile memory eliminating the need to reprogram after power failures.

- Field adjustable volume control for handset earpiece and speaker amplifier.

- Configurable local speaker and nearby speaker mutual muting to prevent acoustic feedback of live pages.
- Off-hook and page switch timeout functionality.
- Configurable virtual zoning ability.
- Mutual provisioning mode allows easy system deployment.
- USB interface for field or bench configuration.
- Universal ac power supply.
- Durable cast aluminum enclosure.

**Options**

- Available speaker amplifier only (no handset) model.
- 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.
- Configurable pre-announcement tone.

**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.

**Specific Conditions of Use:** Flameproof joints are not to be repaired in the field. If the flame path is damaged, the enclosure is to be removed from service and replaced with a new properly working enclosure. The screws used for the body to cover must have a yield stress equal to or greater than 1100 MPa.

⚠️ 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.
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.

⚠️ WARNING ⚠️ Do not install this equipment in hazardous areas other than those indicated on the approval listing in the “Specifications” section of this manual. Such installation may cause a safety hazard and consequent injury or property damage.

The mounting location must be flat and provide proper clearance, rigidity and strength to support the enclosure and all contained devices. The enclosures are equipped with factory-installed hinges. The enclosures should be mounted with hinges on the left.

⚠️ WARNING ⚠️ Do not mount the enclosure with hinges on the top or bottom side.

Securely fasten the enclosure to the mounting location, using 3/8-inch (10mm) diameter steel mounting bolts and washers, or washer head bolts.

⚠️ WARNING ⚠️

Do not disconnect equipment while energized.

Ensure proper grounding to protective earthing.

Inspect and clean the machined flange flame joint surfaces of both the cover and box. Surfaces must be smooth, free of nicks, scratches, dirt or any foreign particle build-up that would prevent a proper seal. Surfaces must seat fully against each other to provide a proper explosion-proof joint. Clean surfaces by wiping with a clean lint-free cloth.

Apply a light coat of Killark “LUBG” lubricant to flange surfaces and close the cover. Install and tighten all cover bolts to 30 ft-lb. Make certain no cover bolts are omitted. Use only those bolts supplied with the enclosure.
Mounting the Enclosure

NOTE: The mounting surface must be able to support the weight of the aluminum enclosure. See the Specification section for the weights and dimensions of the unit.

Figure 3. Enclosure Mounting Details

The enclosure must be securely fastened with 3/8-inch (10mm) diameter steel mounting bolts located on all four mounting feet. Stainless steel hardware is recommended in outdoor applications.

NOTE: Refer to the Killark Installation, Operation, and Maintenance Data Sheet enclosed with the unit for additional information.

The suggested mounting height for all station enclosures is 48 inches (1219 mm) to the bottom of the enclosure.
Cable Entries

Refer to Figure 4 for the standard NPT conduit entries, and Figure 5 for the standard metric cable gland entries. Ensure any unused openings are sealed with proper fittings per local standards. All metric cable entry devices and blanking elements shall be certified in type of explosion protection flameproof enclosure “d” with an IP66 rating, suitable for conditions of use and correctly installed. Use field wiring suitable for the ambient temperature. Any conduit NPT plugs (blanking elements) will need to be explosion-proof with a Type 4X rating.

Figure 4. Standard NPT Conduit Entries

Figure 5. Standard Metric Cable Gland Entries
Opening the Station

⚠️ WARNING ⚠️ Before performing any of the following settings and adjustments, remove all power from the station.

⚠️ WARNING ⚠️ Disconnect the equipment from the supply circuit before making any adjustments to the amplifier’s handset level.

Remove all cover bolts from the enclosure. Swing the front door open to access the internal PCBAs.

Field Wiring and Configuration

The SP2 Station provides terminal blocks for field wiring on the Termination PCBA located in the rear enclosure, including power, speaker wiring, and RTU connections. The Main PCBA, mounted to the back of the front panel, provides the Ethernet network connection.

For field wiring, connect spade lugs to the wires before attachment to the terminal blocks for the most secure connection. Torque the terminal block screws to 8–10 in-lb (0.90–1.13 Nm) when attaching the spade lugs.

After all the field wires are pulled into the rear enclosure, install all connections as indicated below.
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.

Termination PCBA

Figure 7. Termination PCBA Detail
Power

The ac power supply is included on the termination PCBA. The termination PCBA includes a terminal block, TB3, for connection of local power to the station. Connect the power conductors in accordance with Table 1 below. Refer to Figure 7 for the location of TB3.

Table 1. AC Power—TB3

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB3-1</td>
<td>LINE</td>
<td>Positive</td>
</tr>
<tr>
<td>TB3-2</td>
<td>NEUTRAL</td>
<td>Negative</td>
</tr>
<tr>
<td>TB3-3</td>
<td>⚡</td>
<td>Earth ground</td>
</tr>
</tbody>
</table>

Direct Speaker Connection and Jumper Settings

Terminal block TB1 provides connection termination for the station speaker output to remote speaker(s). There is a redundant set of terminals for a second speaker branch to be connected in series or parallel with the primary speaker. Configure the speaker jumpers P2 and P3 for the appropriate impedance for use with 8-ohm or 16-ohm speakers as shown in Figure 8. The following table provides the proper terminations for the external speaker(s).

Table 2. Speaker Connections—TB1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1-1</td>
<td>+</td>
<td>Primary Parallel/Speaker A Series—Output</td>
</tr>
<tr>
<td>TB1-2</td>
<td>⚡</td>
<td>Earth Reference</td>
</tr>
<tr>
<td>TB1-3</td>
<td>–</td>
<td>Primary Parallel/Speaker A Series—Output</td>
</tr>
<tr>
<td>TB1-4</td>
<td>+</td>
<td>Secondary Parallel/Speaker B Series—Output</td>
</tr>
<tr>
<td>TB1-5</td>
<td>⚡</td>
<td>Earth Reference</td>
</tr>
<tr>
<td>TB1-6</td>
<td>–</td>
<td>Secondary Parallel/Speaker B Series—Output</td>
</tr>
</tbody>
</table>
Figure 8. Speaker Impedance Jumper Configuration for 8-ohm or 16-ohm Speakers
RTU Input

Two auxiliary inputs have been provided for customer use. Terminations for these inputs are provided on TB2 of the Termination PCBA. For detailed RTU field wiring configurations, see Figure 9.

Table 3. Auxiliary Inputs—TB2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB2-1</td>
<td>+ RTU 1 INPUT</td>
<td>RTU Input 1 +</td>
</tr>
<tr>
<td></td>
<td>−</td>
<td>RTU Input 1 −</td>
</tr>
<tr>
<td>TB2-3</td>
<td>+ RTU 2 INPUT</td>
<td>RTU Input 2 +</td>
</tr>
<tr>
<td></td>
<td>−</td>
<td>RTU Input 2 −</td>
</tr>
</tbody>
</table>

Figure 9. RTU Input Wiring Configurations
RTU Output

Two Form “C” outputs are provided to power a beacon as shown in Figure 10. These outputs can be reconfigured for customer use by removing jumpers JU1 and JU2. Terminations for these outputs are provided on TB2 of the Termination PCBA.

Table 4. Output Contacts—TB2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB2-5</td>
<td>NC A</td>
<td>Normally Closed Output A</td>
</tr>
<tr>
<td>TB2-6</td>
<td>NC B</td>
<td>Normally Closed Output B</td>
</tr>
<tr>
<td>TB2-7</td>
<td>COM A</td>
<td>Common Output A</td>
</tr>
<tr>
<td>TB2-8</td>
<td>COM B</td>
<td>Common Output B</td>
</tr>
<tr>
<td>TB2-9</td>
<td>NO A</td>
<td>Normally Open Output A</td>
</tr>
<tr>
<td>TB2-10</td>
<td>NO B</td>
<td>Normally Open Output B</td>
</tr>
</tbody>
</table>

*NOTE 1: Input 2 is used to monitor the beacon wiring and is not available for other functions.

**NOTE 2: Attention: 20 k-ohm, 10-watt supervision resistor is required.
Ethernet Connection Termination

Connect a dedicated category-5 or category-5e cable to the 8-position pluggable terminal block as shown in Table 5 to the Main PCBA located on the rear of the front panel. See Figure 11 for the connector location.

Table 5. Ethernet Connection—TB2

<table>
<thead>
<tr>
<th>Pin</th>
<th>Label</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB2-1</td>
<td></td>
<td>Unused</td>
</tr>
<tr>
<td>TB2-2</td>
<td></td>
<td>Unused</td>
</tr>
<tr>
<td>TB2-3</td>
<td>Rx-</td>
<td>Data Receive −</td>
</tr>
<tr>
<td>TB2-4</td>
<td></td>
<td>Unused</td>
</tr>
<tr>
<td>TB2-5</td>
<td></td>
<td>Unused</td>
</tr>
<tr>
<td>TB2-6</td>
<td>Rx+</td>
<td>Data Receive +</td>
</tr>
<tr>
<td>TB2-7</td>
<td>Tx-</td>
<td>Data Transmit −</td>
</tr>
<tr>
<td>TB2-8</td>
<td>Tx+</td>
<td>Data Transmit +</td>
</tr>
</tbody>
</table>
Settings and Adjustments

Opening the Station

⚠️ WARNING ⚠️ Before performing any of the following settings and adjustments, remove all power from the station.

⚠️ WARNING ⚠️ Disconnect the equipment from the supply circuit before making any adjustments to the amplifier’s handset level.

Remove all cover bolts from the enclosure. Swing the front door open to access the internal PCBAs.

Figure 12. SP2 Hazardous Area Station—Interior View
Main PCBA Configuration

![PCBA Diagram]

Figure 13. Main PCBA (Front and Rear Views)

**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. Refer to Figure 13 for the location of this switch.

**Speaker Volume**

The speaker volume potentiometer, R36, adjusts the signal level to the speaker from the page line. 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.

This setting can also be configured via USB or Ethernet connection using the command line interface.
**Receiver Volume**

Receiver volume potentiometer, R37, adjusts the audio signal level supplied to the handset earpiece. To adjust the volume for the handset, remove the handset from the cradle, turn the RCVR potentiometer R37 fully counter clockwise then adjust the potentiometer while listening in the earpiece for the appropriate test tone level required.

This setting can also be configured via USB or Ethernet connection using the command line interface.

**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. Refer to Figure 13 on page 15 for the location of the power LED.

**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. Refer to Figure 13 on page 15 for location.

**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. Refer to Figure 13 on page 15 for location.

**Five Generic LEDs**

Five LEDs are located on the Main PCBA and are configured through firmware. Refer to Figure 13 on page 15 for the location of these LEDs. Additional information for configuring these LED indicators is provided in the SP2 software configuration manual. Please see the reference section for a listing of applicable publications.

**Attaching the Front Cover**

After all adjustments have been completed, inspect and clean the machined flange joint surfaces of both the cover and box. Surfaces must be smooth, free of nicks, scratches, dirt or any foreign particle build-up that would prevent a proper seal. Surfaces must seat fully against each other to provide a proper explosion-proof joint. Clean surfaces by wiping with a clean lint-free cloth.

Apply a light coat of Killark “LUBG” lubricant to flange surfaces and close the cover. Install and tighten all cover bolts to 30 ft-lb Make certain no cover bolts are omitted. Use only those bolts supplied with the enclosure.

It may become necessary to re-terminate some or all of the enclosures in a system. If so, strip the wires back to clean copper and connect only one wire to each connector to allow for easier future troubleshooting.

**NOTE:** Refer to the Killark Installation, Operation, and Maintenance Data Sheet enclosed with the unit for additional information.
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

Page and Party Line Operation with Standard Handset

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

1. Lift the handset from the cradle.

2. Rotate the ALT PAGE selector switch (if available) to the desired multicast channel, or press the ALL CALL button (if available) to select the desired optional destination for the page announcement.

3. If party line conversation is desired, rotate the selector switch to an unoccupied party line.

4. Press and hold the PUSH TO PAGE button (not necessary when using the optional ALL CALL button).

5. After the short “wait” tone is heard (if configured), speak directly into the microphone to broadcast your page announcement.

6. Release the PUSH TO PAGE button and wait for a response on the party line (if requested).

The paged individual(s) respond by picking up a station handset and turning the selector switch to the requested party line. Party line communication is not broadcast over the system speakers. Other individual(s) can also pick up a handset and join the conversation at any time. Always return the handset to the cradle following a page or a party line conversation.
Options

All SP2 Station options are factory installed.

All-Call

The All Call option allows an operator to page an alternate destination that has been programmed for the station. Pressing the All Call button eliminates the need for pressing the handset pressbar. The All Call option must be software configured for a SP2 station. Refer to Figure 14 for the location of this button.

Alternate Page Destination

The optional alternate page selector switch gives an operator the ability to page one of five alternate destinations. To use this feature, the desired alternate destination must be selected before pressing the PUSH TO PAGE button. Alternate page destinations must be software configured for SP2 Stations. Refer to Figure 15 for the location of the alternate page selector switch.
## Troubleshooting

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

<table>
<thead>
<tr>
<th>Problem</th>
<th>Suggested Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station not functional</td>
<td>• Check for proper wiring and cable terminations.</td>
</tr>
<tr>
<td></td>
<td>• Verify incoming ac power supply voltage at TB3 on the Termination PCBA.</td>
</tr>
<tr>
<td></td>
<td>• Verify that the power LED on the main PCBA is illuminated.</td>
</tr>
<tr>
<td></td>
<td>• Verify that that heartbeat LED is blinking once per second for normal operation.</td>
</tr>
<tr>
<td>Network communication not</td>
<td>• Verify LNK LED on main PCBA is off.</td>
</tr>
<tr>
<td>functional</td>
<td>• Verify SPD LED on main PCBA is off.</td>
</tr>
<tr>
<td></td>
<td>• Verify IP connection settings using telnet.</td>
</tr>
<tr>
<td></td>
<td>• Ping station IP address from an admin PC.</td>
</tr>
<tr>
<td></td>
<td>• Verify network switch settings for Internet Group Management Protocol (IGMP) snooping and multicast filtering.</td>
</tr>
<tr>
<td>Handset receiver audio is too</td>
<td>• Refer to “Receiver Volume” on page 16.</td>
</tr>
<tr>
<td>high/low.</td>
<td>• Check the potentiometer settings at R37.</td>
</tr>
<tr>
<td></td>
<td>• Check handset connections.</td>
</tr>
<tr>
<td></td>
<td>• Check proper cable terminations between Termination and Main PCBAs.</td>
</tr>
<tr>
<td></td>
<td>• Check operation of hookswitch.</td>
</tr>
<tr>
<td></td>
<td>• Replace handset.</td>
</tr>
<tr>
<td>Speaker volume is too high/low.</td>
<td>• Refer to “Speaker Volume” on page 15</td>
</tr>
<tr>
<td></td>
<td>• Check the pot settings at R36.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that jumpers P2 and P3 are in the correct position on the termination board for the speaker configuration. See Figure 8.</td>
</tr>
<tr>
<td></td>
<td>• Ensure the speaker wiring configuration is correct on TB1.</td>
</tr>
<tr>
<td></td>
<td>• Replace the speaker or driver.</td>
</tr>
<tr>
<td>RTU output is not functional.</td>
<td>• For supervised output, ensure no monitored output faults exist.</td>
</tr>
<tr>
<td></td>
<td>• Check fuse F1 on the termination PCBA.</td>
</tr>
<tr>
<td></td>
<td>• Check the operation of connected device.</td>
</tr>
<tr>
<td>RTU input does not function.</td>
<td>• For supervised input, ensure no monitored input faults exist.</td>
</tr>
<tr>
<td></td>
<td>• Check RTU terminal connections on TB2. Refer to Figure 9.</td>
</tr>
<tr>
<td></td>
<td>• Check operation of connected device.</td>
</tr>
</tbody>
</table>
Specifications

Power Requirements

AC Power Supply

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

Current/Power requirements (+/−10%)

<table>
<thead>
<tr>
<th>Power Consumed (8-ohm load)</th>
<th>120 V AC</th>
<th>230 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle</td>
<td>80 mA/6.6 VA</td>
<td>50 mA/12 VA</td>
</tr>
<tr>
<td>4-watt output (default setting)</td>
<td>150 mA/18 VA</td>
<td>110 mA/25 VA</td>
</tr>
<tr>
<td>30-watt output</td>
<td>550 mA/65 VA</td>
<td>350 mA/80 VA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum Current Consumption (8-ohm load)</th>
<th>108 V AC</th>
<th>253 V AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-watt output</td>
<td>600 mA/65 VA</td>
<td>370 mA/77 VA</td>
</tr>
</tbody>
</table>

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 (below compression level)
Receiver level .......................................................... 200 mV RMS, nominal
Adjustable 150–400 mV RMS

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-ohm 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

*See Figure 16 on Page 22.
**Enclosure Specifications**

Construction/finish................................................. Cast aluminum/gray epoxy powder coat
Mounting................................................................. Wall or column, four 3/8-inch (10mm) mounting feet with slots
Termination connections............................................. Screw-type barrier terminal blocks for power, speaker, and RTU Phoenix connector pluggable terminals for 600 Ω and Ethernet

Dimensions ......................................................... 14.31 H × 12.88 W × 11.68 D in (363.6 × 327.2 × 296.6 mm)
Temperature range (operating and storage) .............. −4 °F to +140 °F (−20 °C to +60 °C)
Shipping weight ..................................................... 49 lb (22.2 kg)
Net weight ............................................................... 47 lb (21.3 kg)
Enclosure ..................................................................... IP66/Type 4X

**RTU Option Specifications**

**Output Relay**
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................................................................. Normally open (N.O.) or normally closed (N.C.) 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 kΩ maximum
Open fault detection ..................................................... > 65 kΩ
Short fault detection ..................................................... < 200 Ω

**Approvals**

NRTL listed ................................................................. Hazardous locations Class I, Div. 1, Groups B, C & D;
(USA and Canada) Class II, Div. 1, Groups F & G;
Class III, Div. 1 T6, Type 4X

International Certification
DEMKO 09 ATEX 0909372X (ATEX) ......................... II 2 G Ex db [ib] IIB + H2 T6 Gb
IECEx UL 09.0009X (IECEx) ....................................... Ex db [ib] IIB + H2 T6 Gb
Figure 16. Typical Continuous Speaker Output Power Derating
1 kHz Sinewave into an 8-ohm Load

Tabulation of Additional Previous Editions Applied

| EXB-8106 N34 empty enclosures, manufactured by Killark | IEC 60079-0:2004  
|                                                    | IEC 60079-1:2003  
| Model Nos. GO1-13-N34 and GO1-KX1C-N34, manufactured by Killark | IEC 60079-0:2004  
|                                                    | IEC 60079-1:2003  

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.

Reference

Referenced documents are located on the GAI-Tronics website at the following URL: https://www.gatronics.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.

(Rev. 10/06)