GAI-TRONICS®
A HUBBELL COMPANY

Industrial Communication System Off-Shore Page/Party® Station

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Confidentiality Notice

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General Information

Product Overview

The GAI-Tronics ICS (Industrial Communication System) Off-Shore Page/Party Station is a component of a modular industrial communication system. All stations are wired in parallel. Add additional stations to the system at any time.

The ICS Off-Shore Page/Party Station is designed to maximize the number of cable entries and wiring termination points. The station's design utilizes two enclosures attached via a wire-way. The top non-metallic enclosure contains all the ICS control PCBAs.

The bottom enclosure is constructed of stainless steel with a hinged stainless-steel door. The door contains four captive screws to simplify access. This enclosure houses four 11-point terminal blocks for wiring terminations and a gland plate with removable captive screws for entry hole punching and drilling.

The standard configuration of the ICS Off-Shore Page/Party Station is an outdoor, multi-party, handset/speaker amplifier station using ac power. A number of options are available to add to station capabilities (see the Features and Options sections).

Figure 1. ICS Off-Shore Station with doors open and all options shown

The ICS Off-Shore Page/Party Station is compatible with existing GAI-Tronics 700 series Page/Party systems. ICS Off-Shore Page/Party stations can replace or be added to existing Page/Party systems.

Features

- one-way page announcements over system speakers

- high efficiency (>80%) Class D paging amplifier provides up to 30 watts of speaker output

- full-duplex party line communication on five party lines

- universal ac power supply with power factor correction

- field upgradeable options

- durable glass-reinforced engineered plastic enclosure with high-visibility safety-orange powder coat finish, interior front panel

- factory-installed stainless-steel junction box with external customer ground

- two-point terminal blocks

Options

- single party line

- speaker amplifier only (no handset)

- alternate page destination

- All-Call

- weatherproof and desktop stations

- auxiliary jack for headset operation

- hazardous area approvals

- PVC or Hytrel® handset cords in 6-, 15-, or 25-foot lengths

- conformal coating for PCBA

- 24 V dc power

- VLC (Volume Level Control) technology for alternate page volume

- SmartSeries® technology featuring ALS (Ambient Level Sensing) and available remote monitoring

- EPL (Emergency Party Line)

- RTU (Remote Terminal Unit) operation

Installation

Important Safety Instructions

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D, Class II Division 2, Groups F, and G, Class III, 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.

This permanently connected apparatus must have a UL Listed 15-amp circuit breaker incorporated in the electrical installation of the building.

⚠**WARNING** ⚠ —**EXPLOSION HAZARD**—Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous. Averttissement— Risque d'explosion—avant de déconnector l'equipment, couper le courant ou s'assurer que l'emplacement est désigné non dangereux.

USA and Canada 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** ⚠ —*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.

⚠**WARNING** ⚠ —Do <u>not</u> apply power to the station without a ground connection. Do <u>not</u> apply power with any wires between the front panel and rear enclosure disconnected.

Junction Box Access

All field wiring terminations are made in the lower stainless-steel junction box (see <u>Figure 2</u>). To open the junction box enclosure:

1. Loosen the four captive screws securing the lower enclosure door.

2. Swing the door open to the left.

The terminal blocks in the lower enclosure are now accessible.
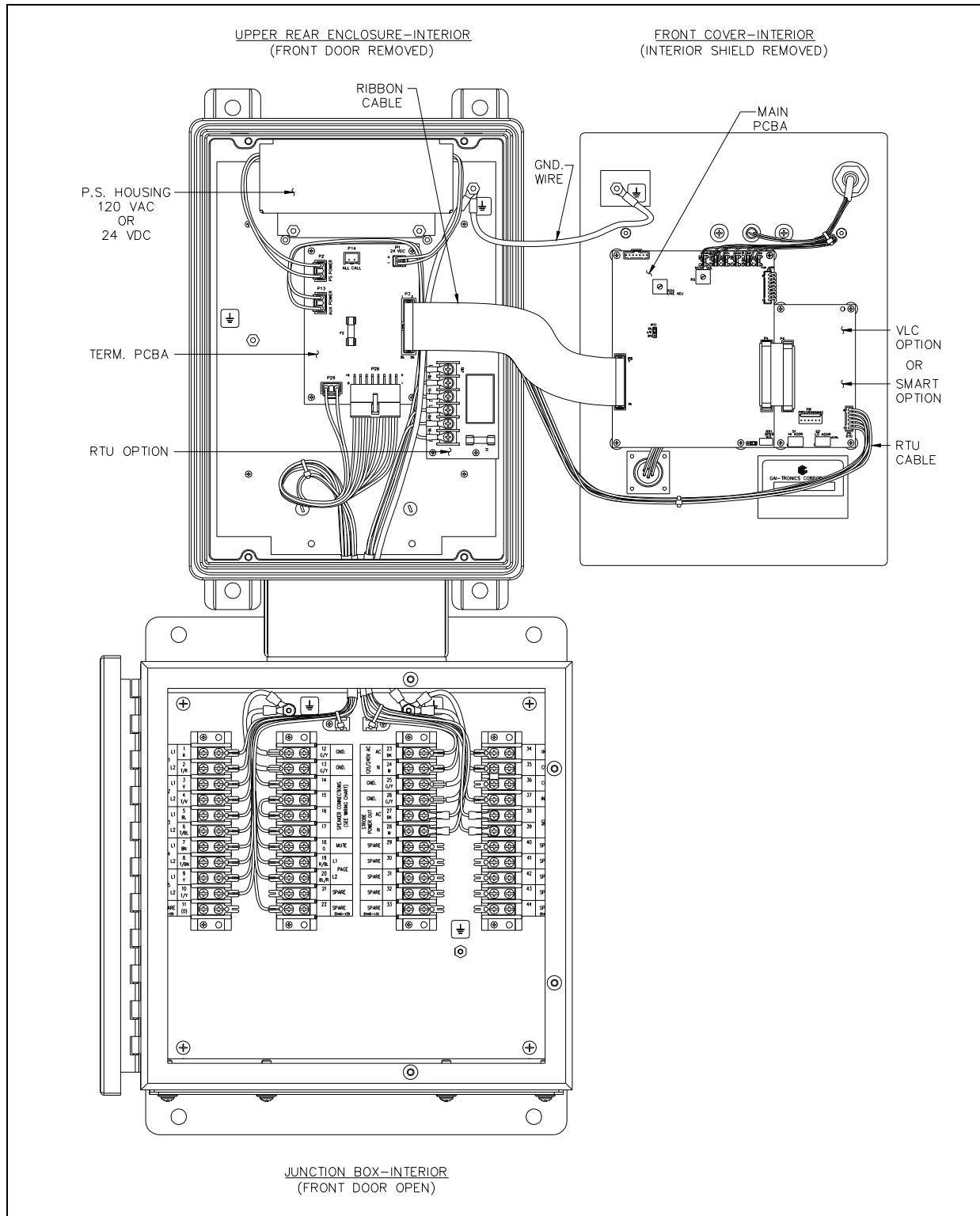
Figure 2. ICS Off-Shore Page/Party Station—Interior View

Cable Entries

The ICS Off-Shore station includes a bottom gland plate on the junction box for punching or drilling.

- Make all cable entries in the lower enclosure.

- The recommended entry is via the lower enclosure (junction box) bottom gland plate (see Figure 3).

- Side entry is possible by drilling or punching the lower enclosure itself. There are no gland plates on the sides of the bottom enclosure.

- Top entry is not possible.

- There must be a minimum of ½ inch (13 mm) of material between entry holes.

Drill or punch the necessary cable entries.

Enclosure Installation

The suggested mounting height for all station enclosures is 48 inches (1219 mm) to the center of the bottom mounting holes of the upper non-metallic enclosure.

Mount the enclosure using the eight 0.437-inch (11 mm) diameter holes located on the mounting flanges with 3/8-inch (M8) hardware.
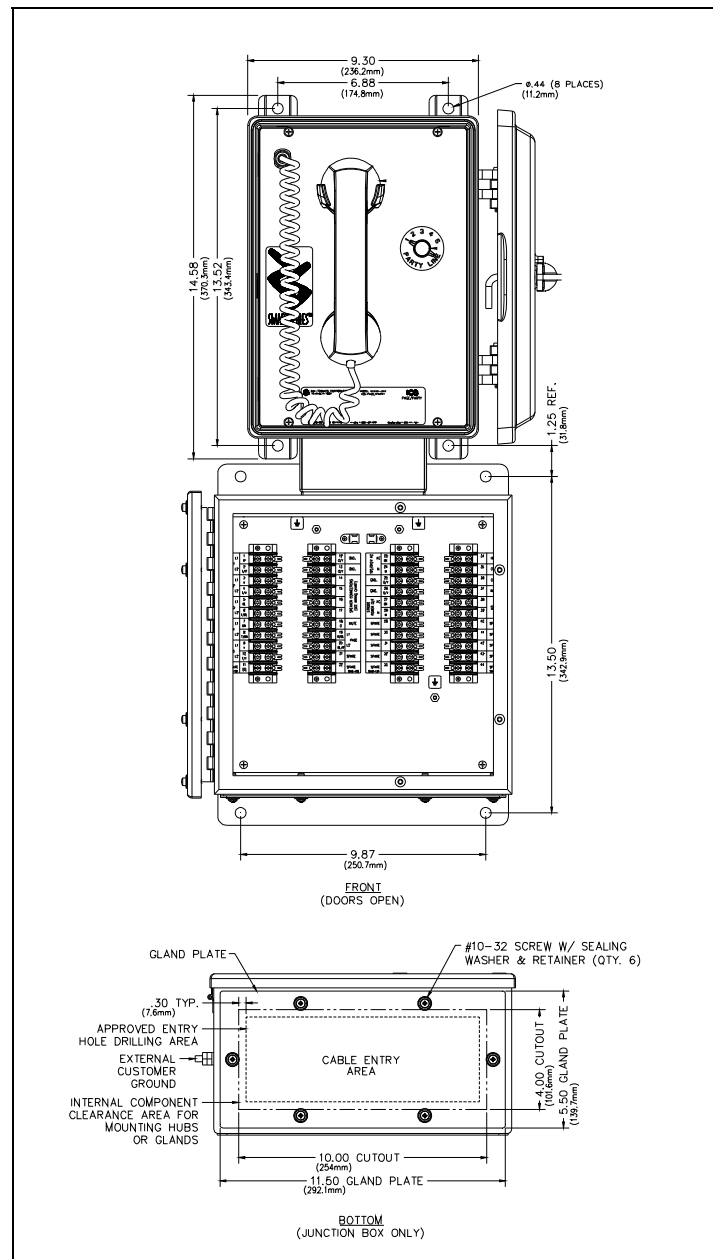
Figure 3. Cable Entries and Enclosure Installation

Field Wiring

The ICS Off-Shore Page/Party station is equipped with terminal blocks in the lower stainless-steel enclosure (junction box) for field connection of the Page/Party system cable. Two sets of terminals are provided for each connection of the system cable for daisy-chain wiring. The terminal blocks on the termination PCBA are labeled to coincide with the color coding used on GAI-Tronics No. 60029 series multi-party cable or No. 60038 series single party cable (see Figure 4).

1. Attach #6 ring lugs to the power conductors of the No 60029 series or No. 60038 series system cable.

2. Attach #6 spade lugs to all the remaining conductors of the system cable.

3. Attach the wires to the terminal blocks.

4. Torque the terminal block screws to 10 to 12 lb·in (1.13 to 1.36 N·m).

   Paging audio may induce feedback in certain circumstances. Muting the speakers of two or more local stations during a page, referred to as *mutual muting*, can eliminate these feedback problems.

5. *If paging audio induces feedback*: Mute the speakers of the affected stations by moving the spare orange wire between two or more adjacent stations to terminal TB2-18 (MUTE).

   This mutes the station speakers that have the orange wire terminated in common to TB2-18.
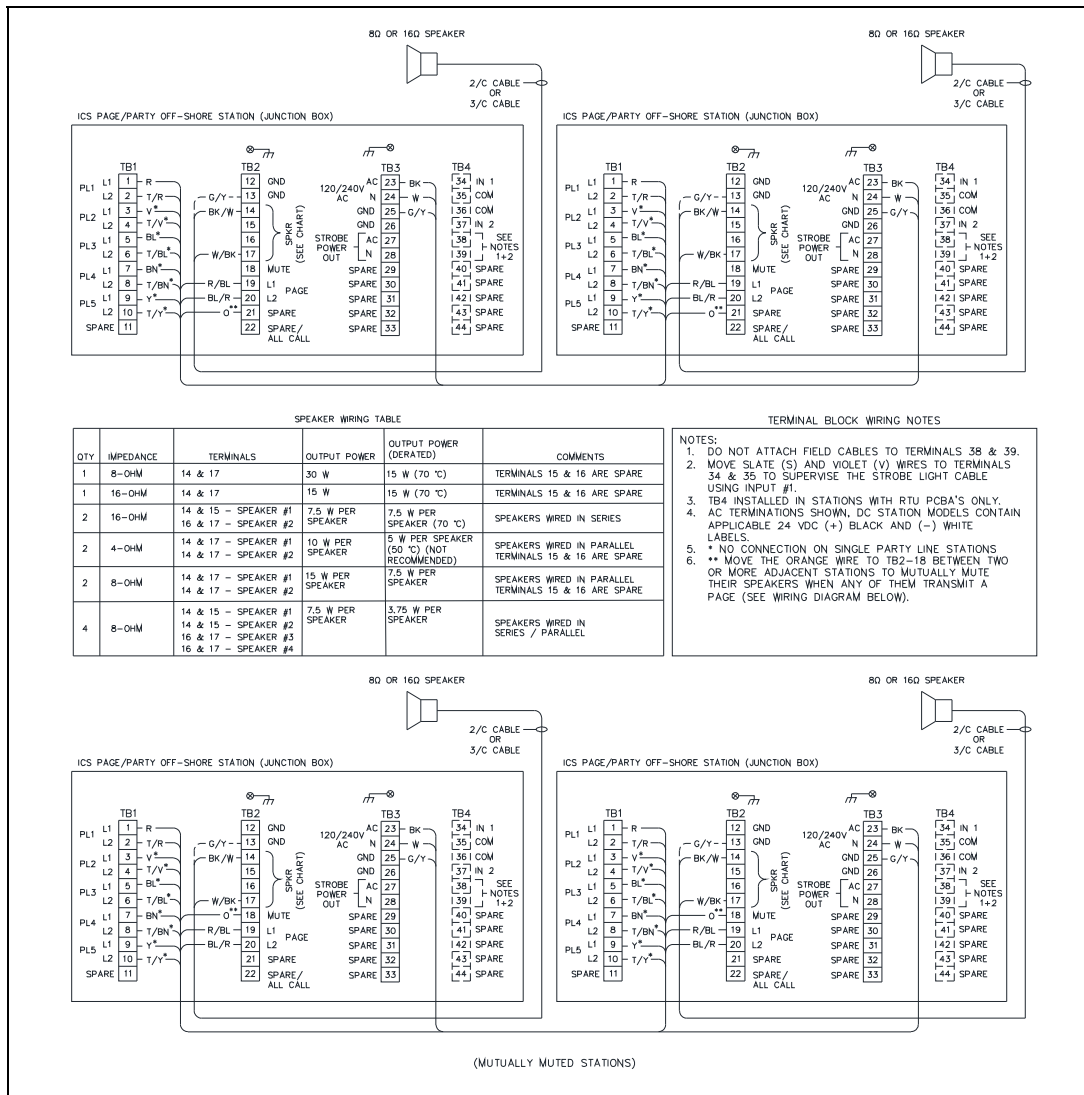
Figure 4. Typical ICS Off-Shore Page/Party Station Wiring Diagram

Speaker Impedance Configuration

The speaker impedance configuration is determined by the speaker wiring termination (see Figure 5). Terminate the speaker wires based on the impedance (8-ohm or 16-ohm) of the installed speakers.
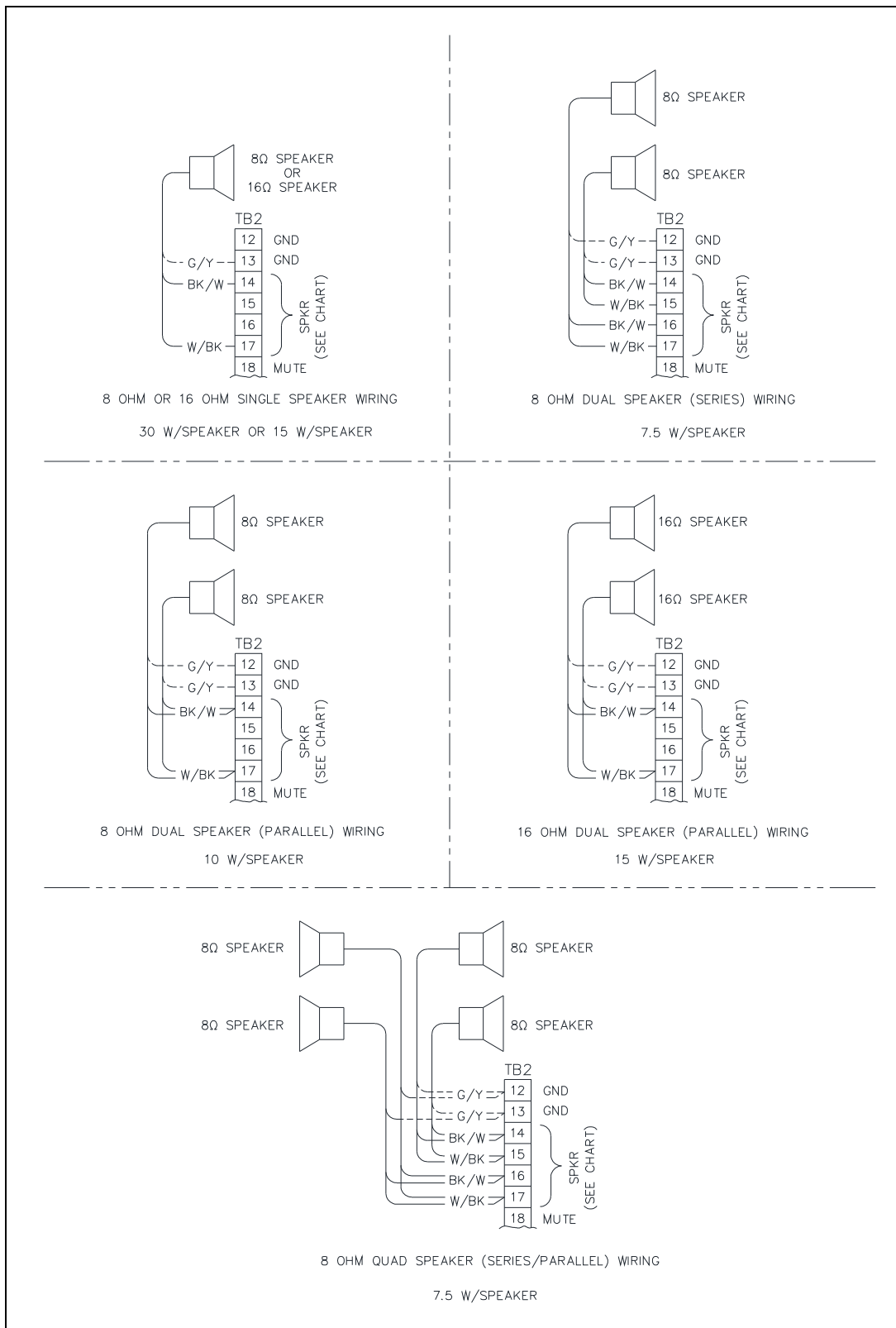
Figure 5. Wiring Configurations for 8-ohm or 16-ohm Speaker Impedance

Junction Box Closure

After all wiring and cable connections are complete:

1. Close the front door on the junction box.

   Do not to pinch any cables.

2. Secure the front door with the four captive screws and washers.

3. Torque the screws to 10 to 12 lb·in (1.13 to 1.36 N·m).

Configuration

Upper Enclosure Front Panel Removal

Make all PCBA adjustments in the non-metallic upper enclosure. To open the upper enclosure:

1. Remove the four screws from the front panel.

2. Turn the front panel to the right.

   Keep all wiring and the ribbon cable connected.

3. Hang the front panel from the enclosure by hooking a small piece of wire in the mounting holes of the panel.

   The front panel and the back box interior surfaces are now exposed (see Figure 2).

Jumper Configuration
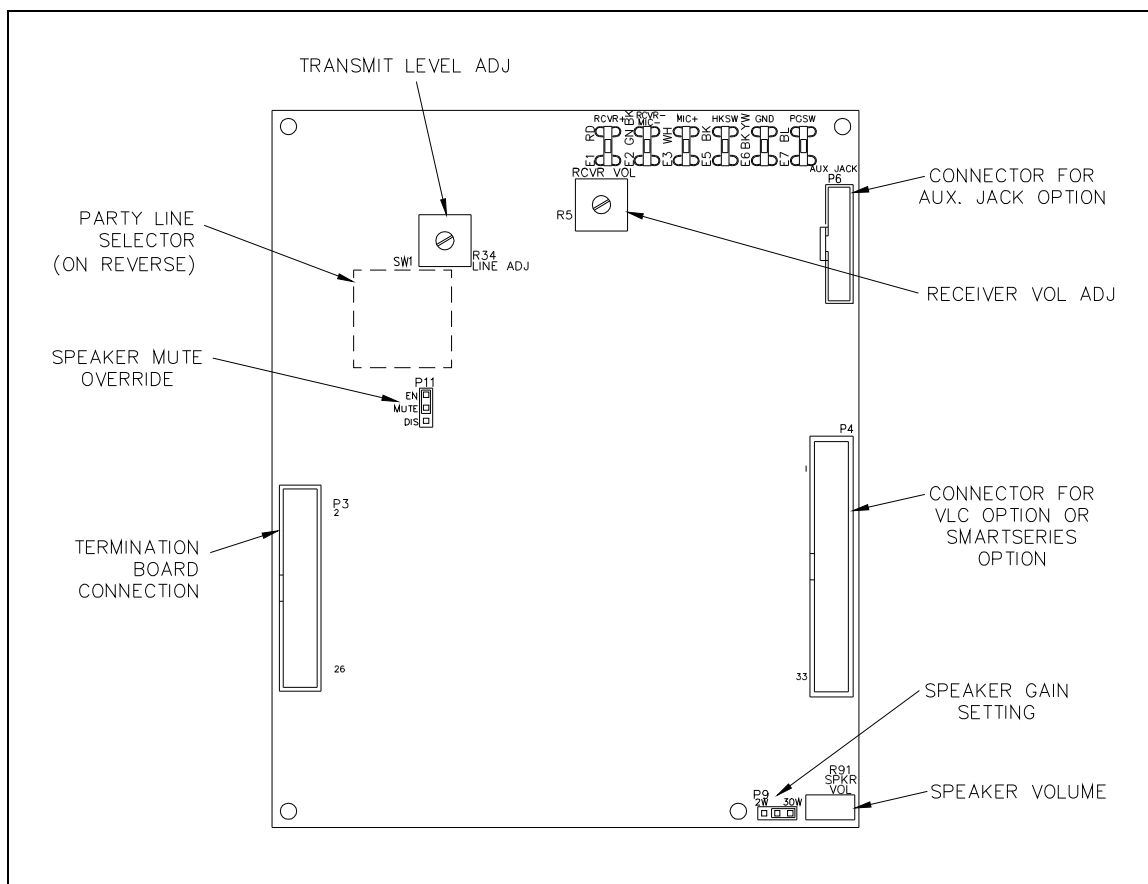
Figure 6. No. 69557 Series Main PCBA

Speaker Mute

The station can mute the speaker amplifier during page operation to eliminate feedback. Adjust jumper P11, if necessary, to mute the local speaker when paging from that station (see Figure 6).

- P11 in the **EN** position (default) mutes the speaker during page activation.

- P11 in the **DIS** position allows broadcast to the speaker during paging.

Speaker Gain

P9 sets the maximum speaker output level (see Figure 6).

- P9 in the **HI** position (default) represents a 30-watt maximum output.

- P9 in the **LO** position represents a 2-watt maximum output.

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

Level Adjustments

Transmit Level

Use the transmit-level potentiometer, R34, to adjust the signal level from the handset or optional auxiliary headset microphone to the page or party lines (see Figure 6).

Receiver Volume

Use the receiver volume potentiometer, R5, to adjust the signal level to the handset receiver from the page or party lines (see Figure 6). This does not adjust the signal level to the optional auxiliary headset.

Speaker Volume

Use the speaker volume potentiometer, R91, to adjust the signal level to the speaker from the page line (see Figure 6). The default setting is 4 watts for an 8-ohm speaker and 2 watts for a 16-ohm speaker.

1. Turn the speaker volume potentiometer, R91, (on the main PCBA) fully counterclockwise (see Figure 6).

2. Listen for a single beep from the speaker indicating the speaker amplifier is in the minimum level adjustment mode.

   If the page line is in use immediately after the beep tone is heard: use the page signal as the reference to adjust the speaker volume level.

   If the page line is inactive following the beep tone: a continuous tone is activated to make the minimum level adjustment. All page line activity is ignored until completion of the adjustment once the tone is activated. Use the test tone as a reference to adjust the speaker amplifier output level to the desired volume.

3. Adjust the speaker volume potentiometer, R91, to the desired output (see Figure 6).

   The test tone automatically shuts off 5 seconds after the last adjustment.

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

Upper Enclosure Front Panel Installation

After all adjustments have are complete:

1. Place the front cover in 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 10 to 12 lb·in (1.13 to 1.36 N·m).

Operation

For paging and subsequent party line conversation:

1. Lift the handset or connect the optional headset

2. Select a free party line using the five-position rotary selector switch (if equipped).

3. Press the handset pressbar or headset page switch.

4. Page the desired individual, designating the party line that the individual should respond on.

5. Place the handset back on hook or disconnect the headset after the conversation is complete or after paging if no party line conversation is necessary.

To respond to a page:

1. Approach the nearest ICS Page/Party station.

2. Select the appropriate party line.

3. Lift the handset or connect a headset.

    Full-duplex communication can take place on the party line without broadcasting over the speakers.

4. Place the handset back on hook or disconnect the headset after the conversation is complete.

NOTES:

- The ICS Page/Party station incorporates a noise-canceling microphone to reduce transmitted ambient noise. This requires the user to place their mouth as close to the microphone as possible.

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

- Stations with the alternate page destination option can select additional programmed page zones using the alternate page selector switch. The alternate page destinations must be software configured in the central control cabinet of a GAI-Tronics ADVANCE system.

Options

The ICS SmartSeries, VLC, and RTU station options are factory or field installed. All remaining options are factory installed.

ICS SmartSeries

General

The No. 69552 SmartSeries PCBA (see Figure 7) adds microprocessor control to the ICS Page/Party station, providing additional sensor and monitoring capabilities.

NOTE: SmartSeries and VLC PCBAs cannot be installed in the same station.

Features

When used with or without ADVANCE head-end equipment:

- ALS (Ambient Level Sensing) circuitry—automatically changes the local speaker's paging volume in response to varying background noise

- off-hook timeout—prevents noise from being introduced to a party line by electronically placing the handset *on-hook* after 8 minutes

- page timeout—limits a single page broadcast to two minutes, freeing the page line for emergencies

When used with ADVANCE head-end equipment:

- station monitoring of key components (including handset, amplifier and local speaker)—provides fast notification of any faults

- ability to accept supervised contact closure inputs and provide a supervised relay output (requires RTU option)
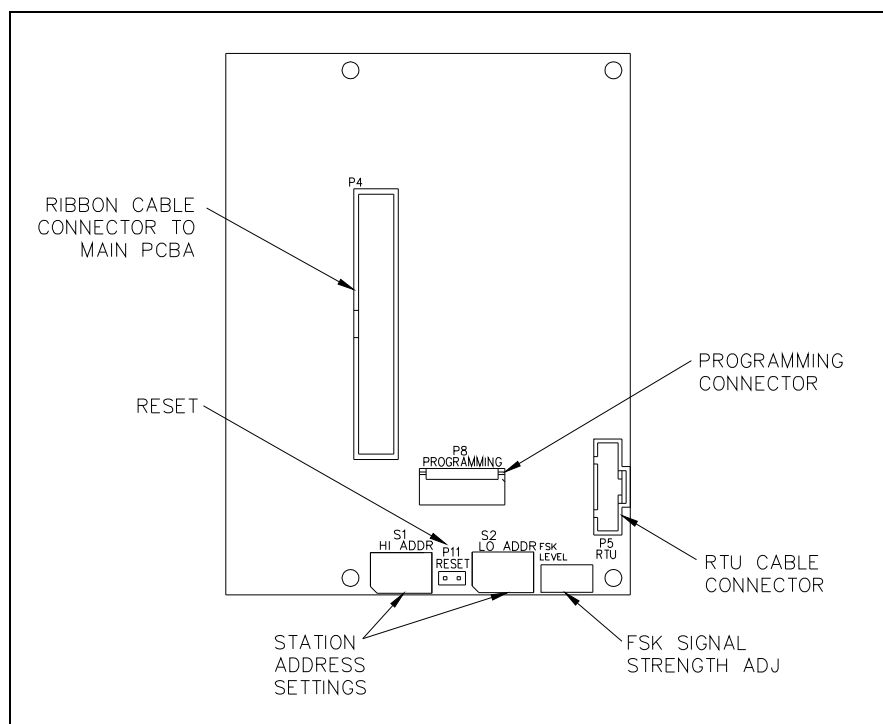
Figure 7. No. 69552 SmartSeries PCBA

Installation

Upper Enclosure Front Panel Removal

All PCBA adjustments are made in the non-metallic upper enclosure. To open the upper enclosure:

1. Remove the four screws from the front panel.

2. Turn the front panel to the right.

   Keep all wiring and the ribbon cable connected.

3. Hang the front panel from the enclosure by hooking a small piece of wire in the mounting holes of the panel.

   The front panel and the back box interior surfaces are now exposed (see Figure 2).

SmartSeries PCBA Installation

1. Remove power from the station.

2. Remove all jumpers on the main PCBA P4 connector (see Figure 6).

3. Align the SmartSeries PCBA with the four mounting holes to the right of the main PCBA with the edge of the SmartSeries board under the main PCBA.

4. Secure the SmartSeries PCBA with the four screws provided.

5. Install the provided 34-pin ribbon cable from P4 of main PCBA to P4 of SmartSeries PCBA.

6. Apply the included upgrade sticker to the power supply housing.

7. Reapply power to the station.

Configuration

Station Address

SmartSeries stations in ADVANCE systems must be assigned a unique address using the hexadecimal switches, S1 (Hi Address) and S2 (Lo Address) for the SmartSeries option to function properly (see Figure 7).

- Each switch contains 16 settings, labeled 0–F. A small arrow on each switch indicates the setting.

- The station address is determined by the high address setting followed by the low address setting.

  For example, to assign an address of 05, the high station address switch, S1, is set to 0 and the low address switch, S2, is set to 5.

- Valid address settings are 05 to FE.

- Record the address assigned to each station in the system.

Set the address to 04 (default) if the SmartSeries PCBA is installed in a system without an ADVANCE head end.

ALS Minimum Level

The ALS minimum level is the lowest speaker output level that the station will maintain. The factory default setting for minimum level is 4.0 watts nominal into an 8-ohm load. To set the ALS minimum level:

1. Turn the speaker volume potentiometer, R91, (on the main PCBA) <u>fully counterclockwise</u> (see Figure 6).

2. Listen for a single beep from the speaker indicating the speaker amplifier is in the Minimum Level Adjustment mode.

   If the page line is in use immediately after the beep tone is heard: Use the page signal as the reference to adjust the speaker volume minimum level.

   If the page line is inactive following the beep tone: A continuous tone is activated to make the minimum level adjustment. All page line activity is ignored until completion of the adjustment once the tone activates. Use the test tone as a reference to adjust the speaker amplifier output level to the desired volume.

3. Adjust the speaker volume potentiometer, R91, to the desired output.

   The test tone automatically shuts off 5 seconds after the last adjustment.

ALS Offset Level

The ALS offset level allows the output of the speaker amplifier to maintain a set difference or *offset* between the ambient noise level and the speaker output level. To set the ALS offset level:

1. Turn the speaker volume potentiometer, R91, (on the main PCBA) <u>fully clockwise</u> (see Figure 6).

2. Listen for two beep tones indicating that the station is in the offset adjustment mode.

   If the page line is in use immediately after the two beep tones are heard: the page signal should be used to make the offset level adjustment.

   If the page line is inactive immediately following the beep tones: a continuous tone is activated to make the offset level adjustment. After the tone is activated, all page line activity is ignored until completion of the adjustment.

3. Adjust the speaker volume potentiometer, R91, to the desired offset level.

NOTE: This adjustment should be made under maximum ambient noise level. The ALS offset level must always be set higher than the ALS minimum level setting.

SmartSeries VLC Level

When activated, the VLC overrides the ALS minimum level setting allowing the speaker volume to change to a preset level during an emergency page. To adjust the VLC Level:

1. Force the station into the VLC mode by executing a page from a station programmed by the MCU to activate the VLC function.

2. During the page, turn the speaker volume potentiometer, R91, <u>fully counterclockwise</u> (see Figure 6).

3. Listen for two beep tones through the page speaker that indicate the VLC adjustment mode is activated.

4. After the two beep tones, turn the speaker volume potentiometer, R91, to the desired speaker level using the live paging signal to adjust the level.

The station automatically exits the VLC adjustment mode and reverts to normal operation 5 seconds after the last potentiometer adjustment.

NOTE: The system must have an ADVANCE head end to activate the VLC function.

Speaker Impedance Supervision

Speaker impedance supervision enables an ICS station to supervise the connected speaker line for changes in the speaker line impedance.

- The station must be calibrated for the impedance of the attached speaker(s) to perform this function.

- A station that has never been calibrated will report a speaker fault within 15 minutes of being configured for this feature in the ADVANCE system.

- Stations are calibrated either *locally* at the station or *remotely* by a system command from the ADVANCE head end. See the ADVANCE System Programming Manual for instructions on performing *remote* calibration.

To perform a *local* calibration:

1. Configure the station for speaker impedance supervision.

2. Set the station's address to **0x02**.

3. Wait until you hear a single-beep tone at the attached speaker.

   This should occur within 20 seconds.

   The single beep tone indicates that a successful calibration was performed. A double-beep tone indicates that the station attempted to calibrate but was unsuccessful (the attached impedance is out-of-range). If no tone is heard, the station may not be configured for speaker impedance supervision or there is an open connection to the speaker.

4. Set the address back to its original value to resume normal station operation with the new calibration value after hearing the single beep tone.

NOTE: Jumper P9 on the main PCBA must be in the HI (default) position if this feature is used.

FSK (Frequency Shift Keying) Signal Gain

The FSK signal gain potentiometer, R13, adjusts the FSK transmit signal strength. This setting is factory configured and <u>must not</u> be adjusted by the installer.

Upper Enclosure Front Panel Installation

After all adjustments have been completed:

1. Place the front cover in 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 10 to 12 lb·in (1.13 to 1.36 N·m).

Operation

Paging with ADVANCE Head End

Paging and party line operation with the ICS SmartSeries option is similar to standard station operation with the following differences:

- A steady *page-confirmation* tone is heard in the handset/headset earpiece when the handset pressbar or the headset page switch is pressed.

- A page *pre-announcement* tone, if programmed, will sound when the page-confirmation tone ends, and the operator can make a page.

- A *busy* tone heard in the handset/headset earpiece indicates that the system is busy, and the page is denied.

Paging without ADVANCE Head End

Paging and party line operation is the same as standard station operation (see the Operation section).

Station Time-out Features

The ICS SmartSeries option supports a *page-duration* limit that sets the maximum duration of each page.

- A page is terminated if the page is still active when the page-duration limit is reached.

- The page-duration limit is fixed at 2 minutes when used without an ADVANCE head end.

The ICS SmartSeries option supports an *off-hook* limit that sets the maximum duration that the station may be kept off-hook.

- The station is placed electrically on hook if the off-hook limit is reached.

- The handset must be physically placed on hook momentarily to reset the timeout condition.

- The off-hook limit is fixed at 8 minutes when used without an ADVANCE head end.

EPL (Emergency Party Line)

The EPL option enables ICS SmartSeries Stations connected to an ADVANCE control cabinet to automatically report the following information when the handset is taken off-hook:

- zone number

- station address

- party line (one or two)

All-Call Paging utilizing a Merge/Isolate Cabinet

Merge/Isolate (M/I) cabinets contain switching relays that are energized by a control signal from Page/Party stations. The relays merge (connect) the page lines of multiple Page/Party systems when energized. This allows voice pages to be broadcast from all the systems connected to the M/I cabinet. ICS handset stations with the All-Call feature contain a push-button switch on the front panel for activating an M/I cabinet (see Figure 8).

Paging with Alternate Page Destination Utilizing ADVANCE Head End

Access additional programmed page zones with the alternate page selector switch on stations with the alternate page destination option (see Figure 9). The alternate page destinations must be software configured in the central control cabinet of a GAI-Tronics ADVANCE system.
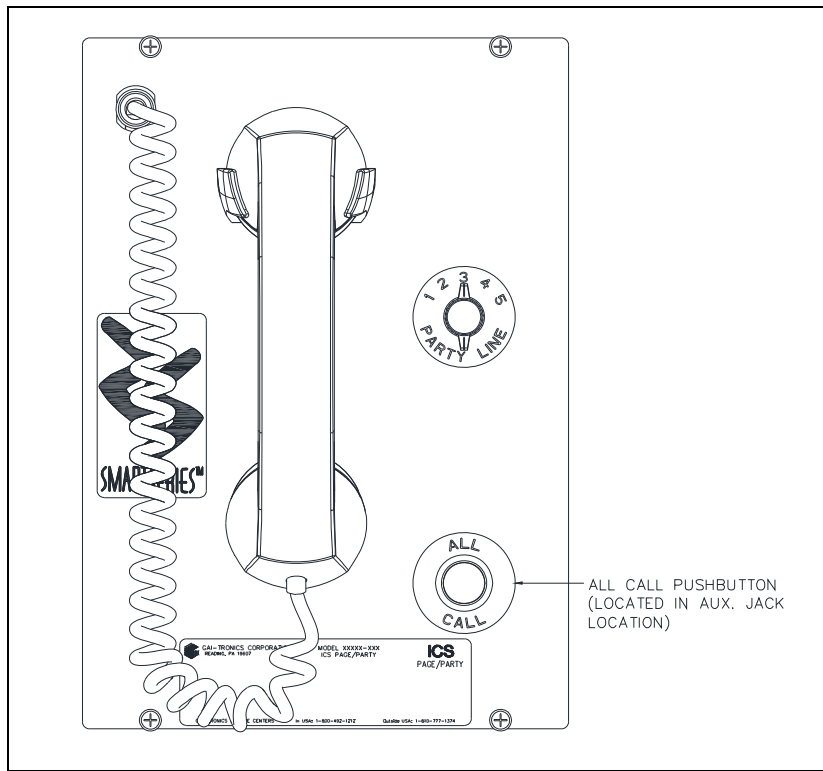
Figure 8. All Call Selector Switch Location (Only the Upper Enclosure Panel is shown.)
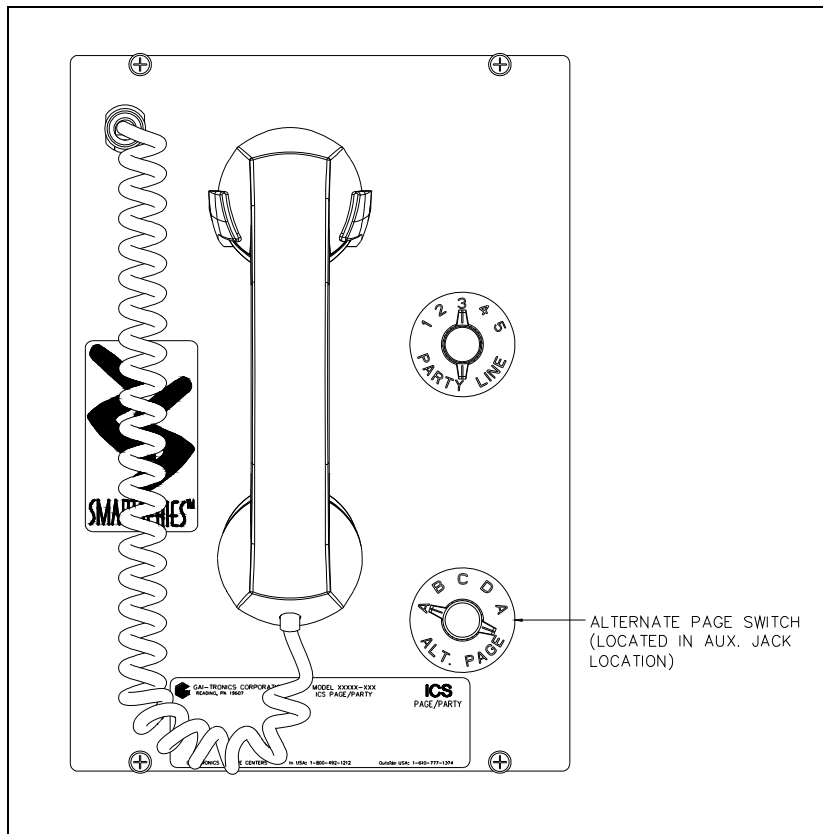
Figure 9. Alternate Page Selector Switch Location

VLC

General

The No. 69553 VLC (Volume Level Control) PCBA (see Figure 10) adds the capability to remotely control the local speaker volume level. A remote device transmits a 50 kHz signal over the page line while VLC is active. The station detects the 50 kHz signal and switches to an alternate speaker volume setting.

NOTE: VLC and SmartSeries options cannot be used in the same station.

Features

- provides an *alternate* speaker volume setting that is activated by receiving a 50 kHz signal on the page line

- allows office or crew quarters speakers to be muted until a high priority message or alarm is broadcast

- prevents local handset paging during emergency situations

- enables outdoor speaker volume to be reduced at night

- adds the ability to provide a relay output (requires RTU option)
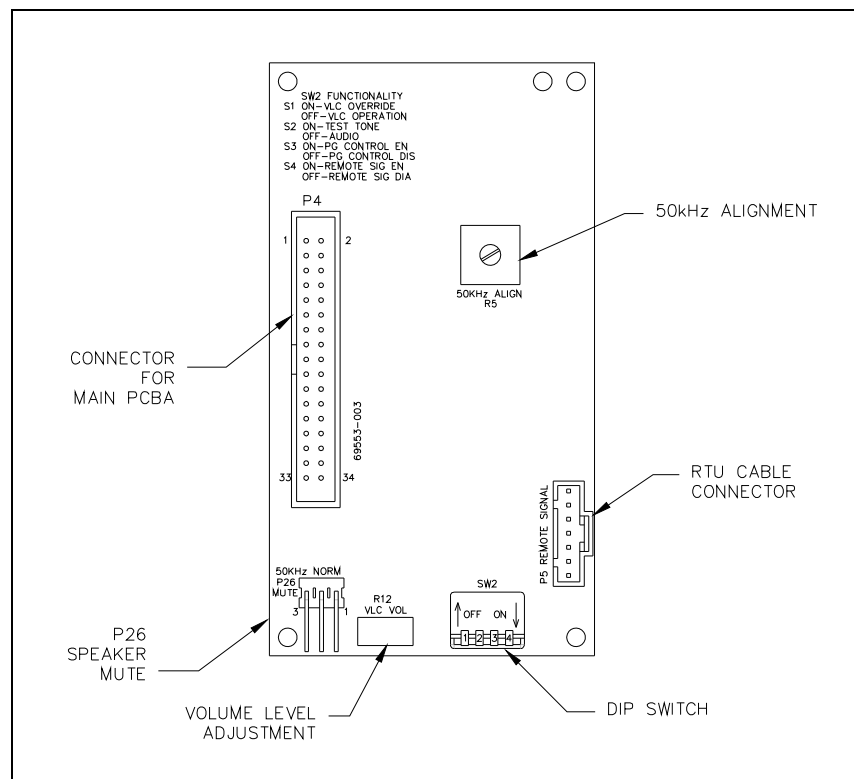
Figure 10. No. 69553 Series VLC PCBA

Installation

Upper Enclosure Front Panel Removal

All PCBA adjustments are made in the non-metallic upper enclosure. To open the upper enclosure:

1. Remove the four screws from the front panel.

2. Turn the front panel to the right.

   Keep all wiring and the ribbon cable connected.

3. Hang the front panel from the enclosure by hooking a small piece of wire in the mounting holes of the panel.

   The front panel and the back box interior surfaces are now exposed (see Figure 2).

VLC PCBA Installation

1. Remove power from the station.

2. Remove all jumpers on the main PCBA P4 connector (see Figure 6).

3. Align the VLC PCBA with the four mounting holes to the right of the main PCBA board.

4. Secure the VLC PCBA with the four screws provided.

5. Install the provided 34-pin ribbon cable from P4 on the main PCBA to P4 on the VLC PCBA.

6. Apply the included upgrade sticker to the power supply housing.

7. Reapply power to the station.

Configuration

50 kHz Alignment

The 50 kHz alignment potentiometer, R5, adjusts the receiver's frequency for VLC operation. It is set at the factory and must not be adjusted by the installer.

Speaker Mute

Jumper P26 (see Figure 10) enables muting the speaker audio during VLC or normal operation:

- Audio is muted during a VLC broadcast with jumper P26 in the **50kHz** position.

- Audio is muted during normal operation with jumper P26 in the **NORM** position.

- Remove jumper P26 to operate the unit without the muting feature.

Audio Alignment

To set the normal speaker output level (see Figure 10):

1. Set DIP switch SW2-1 to the off position.

2. Set DIP switch SW2-2 to the on position to enable a reference test tone.

3. Adjust the speaker volume potentiometer, R91, (on the Main PCBA) to the desired audio level (see Figure 6).

4. Turn the speaker volume potentiometer, R91, fully counterclockwise to mute the audio.

NOTE: The adjustment cannot be made if LED2 on the VLC PCBA is on; indicating the system VLC tone is present.

To set the VLC controlled speaker output level (see Figure 10):

1. Set SW2-1 to the on position.

2. Set SW2-2 to the on position to enable a reference test tone.

3. Adjust the VLC volume level potentiometer, R12, (on the VLC PCBA) to the desired audio level.

4. Turn the VLC volume level potentiometer, R12, fully counterclockwise to mute the audio.

5. Set SW2-1 and SW2-2 to the off position to return to normal system operation.

Page Disable Control

Set SW2-3 (see Figure 10) to the on position to disable local paging when the system VLC tone is present.

Remote Output Switching (Available with RTU Only)

Set SW2-4 (see Figure 10) to the on position to activate the RTU relay when the system VLC tone is present.

Upper Enclosure Front Panel Installation

After all adjustments have been completed:

1. Place the front cover in 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 10 to 12 lb·in (1.13 to 1.36 N·m).

RTU

General

The No. 69627 RTU (Remote Terminal Unit) PCBA (see Figure 11) adds remotely controlled dry contact relay outputs to an ICS Page/Party station equipped with either a VLC PCBA or a SmartSeries PCBA in conjunction with an ADVANCE head end. Two supervised inputs are also available when installed with the SmartSeries PCBA in conjunction with an ADVANCE head end.

Features

With SmartSeries PCBA and ADVANCE Head End

- two dry-contact input circuits (input cable supervision is optional)

- input status monitoring to trigger an action in the ADVANCE head end

- double pole, Form C relay contact (output cable supervision is available)

- one fuse-protected relay contact
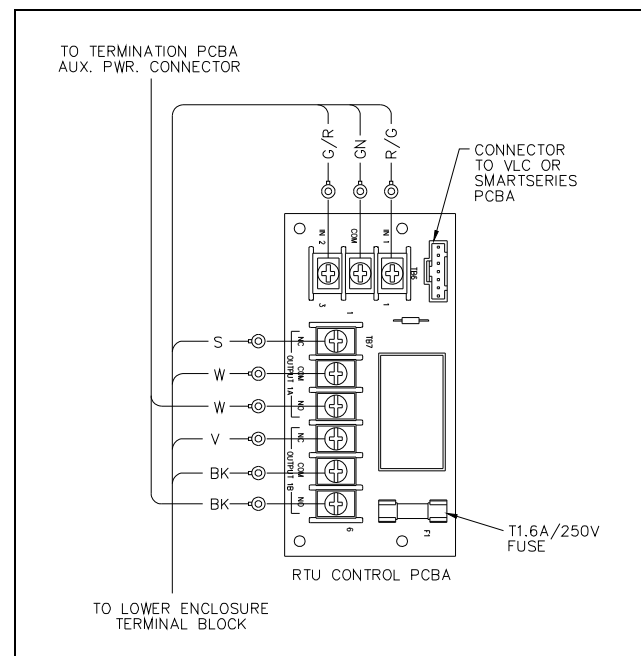
Figure 11. No. 69627 Series RTU PCBA

With VLC PCBA

- double-pole, Form C relay contacts

- one fuse-protected relay contact

Installation and Configuration

Upper Enclosure Front Panel Removal

To open the upper enclosure:

1. Remove the four screws from the front panel.

2. Turn the front panel to the right.

   Keep all wiring and the ribbon cable connected.

3. Hang the front panel from the enclosure by hooking a small piece of wire in the mounting holes of the panel.

   The front panel and the back box interior surfaces are now exposed (see Figure 2).

RTU PCBA Installation (Upper Enclosure)

1. Remove power from the station.

2. Install the four provided standoffs onto the four studs located adjacent to the power supply.

3. Align the RTU PCBA over the four standoffs with TB7 oriented toward the termination PCBA (see Figure 2).

4. Secure the RTU PCBA with the four screws provided.

5. Install the provided six-conductor harness from P5 on the SmartSeries or VLC PCBA to P5 on the RTU PCBA.

6. Install the provided two-conductor harness from P13 of the termination PCBA to the NO (Normally Open) contacts of TB7 on the RTU PCBA.

7. Apply the included upgrade sticker to the power supply housing.

Upper Enclosure Front Panel Installation

After all adjustments are complete:

1. Place the front cover in 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 10 to 12 lb·in (1.13 to 1.36 N·m).

Junction Box Access

To open the junction box enclosure:

1. Loosen the four captive screws securing the lower enclosure door.

2. Swing the door open to the left.

   The terminal blocks in the lower enclosure are now accessible.

RTU Terminal Block—TB4 Installation (Lower Enclosure)

1. Remove power from the station.

2. Align the terminal block wiring harness with the threaded holes on the right side of the enclosure.

3. Secure the terminal block with the two screws provided.

4. Connect the ring lugged cable harness to the RTU PCBA in the upper enclosure (see Figure 11).

5. Attach the black wire to **TB3-27** and the white wire to **TB3-28** in the lower enclosure.

6. Reapply power to the station.

Field Wiring

The RTU PCBA provides terminal blocks for field wiring the I/O circuits. Attach spade lugs to the wires before connection to the terminal blocks.

OUTPUT 1A and OUTPUT 1B are activated by either the VLC or SmartSeries PCBA. OUTPUT 1B is fused on the NO (normally open) contact with a T1.6-amp fuse.

Non-supervised Output Wiring Configuration
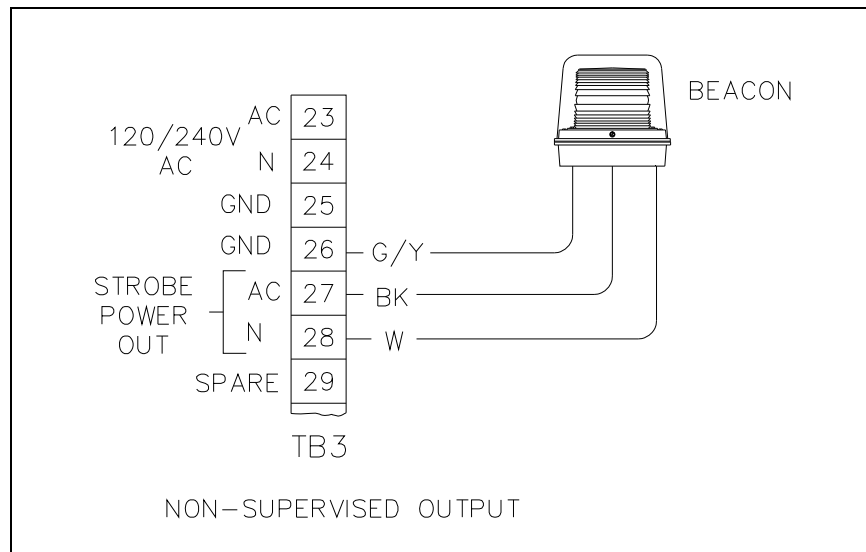
Figure 12. Non-supervised Output with the VLC or SmartSeries Option

Supervised Output Wiring Configurations with SmartSeries Option

⚠**WARNING**⚠ —Installation of this component shall be carried out by suitably-trained personnel in accordance with the applicable code of practice concerning equipment and protective systems intended for use in potentially Explosive Atmospheres. This component must be in a suitable enclosure for the potentially Explosive Atmosphere. During normal operation at 230 V this component can support a temperature code of T4. This component shall be installed at a location acceptable to the authority having jurisdiction.
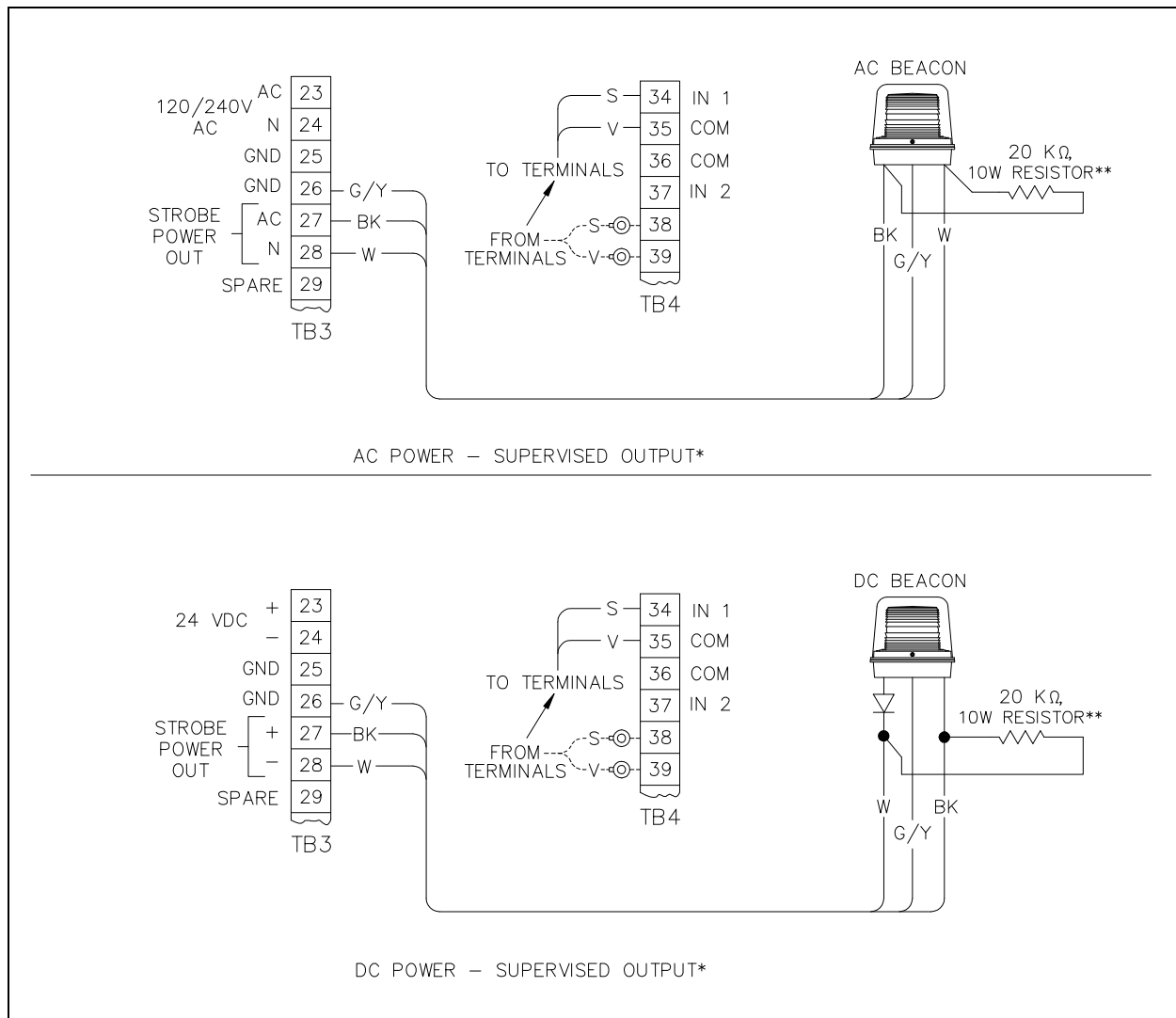
Figure 13. Supervised Output Wiring with SmartSeries Option

***NOTE 1:** Input one is used to monitor output one and is not available for other functions.

****NOTE 2:** 20-kilohm, 10-watt supervision resistor

Input 1 or 2 Wiring Configuration with the SmartSeries Option
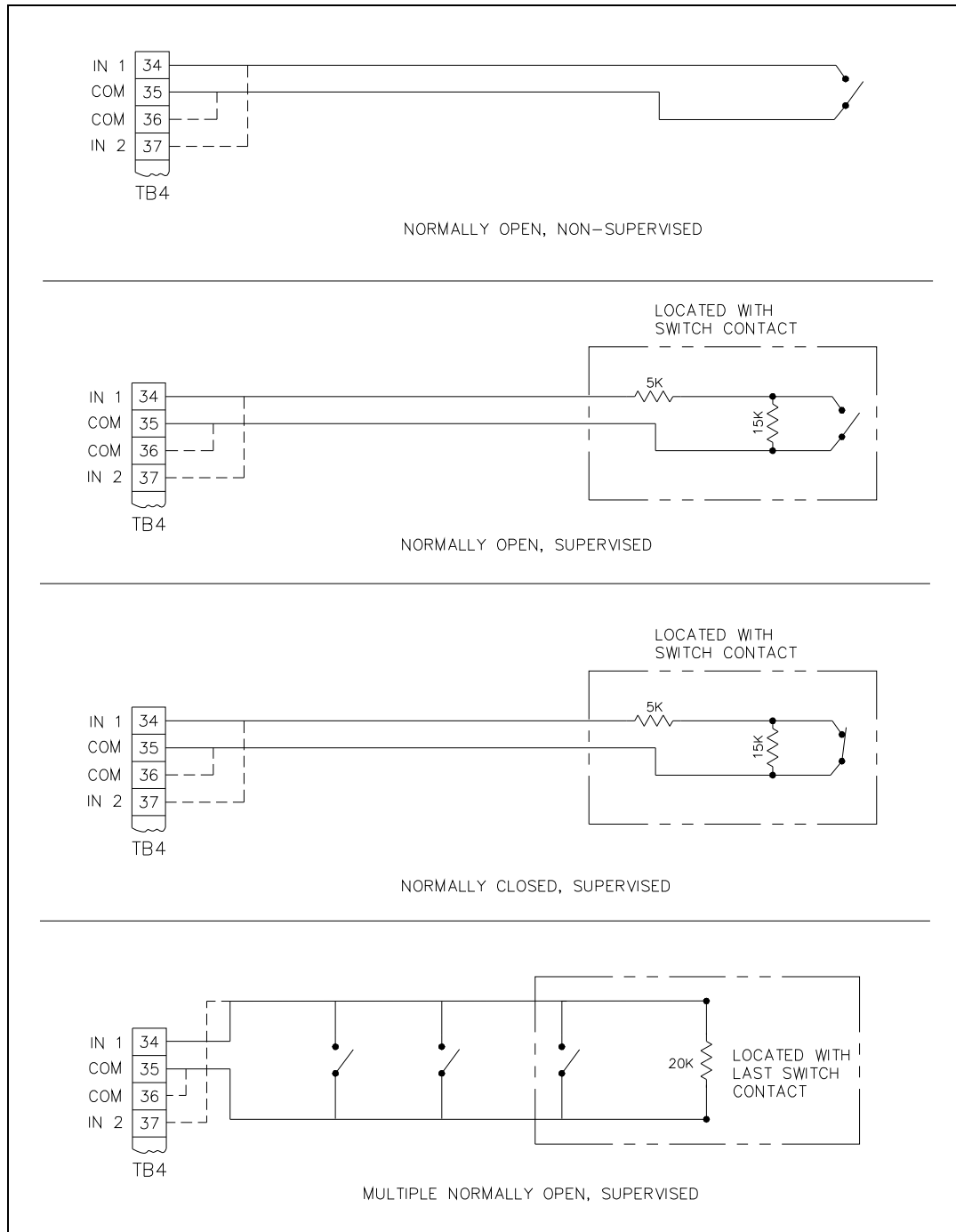
Figure 14. Input Wiring Configuration with the SmartSeries Option

Junction Box Closure

After all wiring and cable connections are complete:

1. Close the front door on the junction box.

    Do not to pinch any cables.

2. Secure the front door with the two captive screws and washers.

3. Torque the screws to 10 to 12 lb·in (1.13 to 1.36 N·m).

Troubleshooting

Upper Enclosure Front Panel Removal

All PCBA adjustments are made in the non-metallic upper enclosure. To open the upper enclosure:

1. Remove the four screws from the front panel.

2. Turn the front panel to the right.

    Keep all wiring and the ribbon cable connected.

3. Hang the front panel from the enclosure by hooking a small piece of wire in the mounting holes of the panel.

    The front panel and the back box interior surfaces are now exposed (see Figure 2).

Front Panel PCBA Jumper Configuration

The front panel PCBAs are protected by a universal shield. Most potentiometer adjustments and jumper settings are made without removing the shield (see Figure 15 for adjustment locations).

P4 Standard Jumper Configuration:

ICS stations without options require the default installation of jumper P4 for proper operation (see Figure 15).
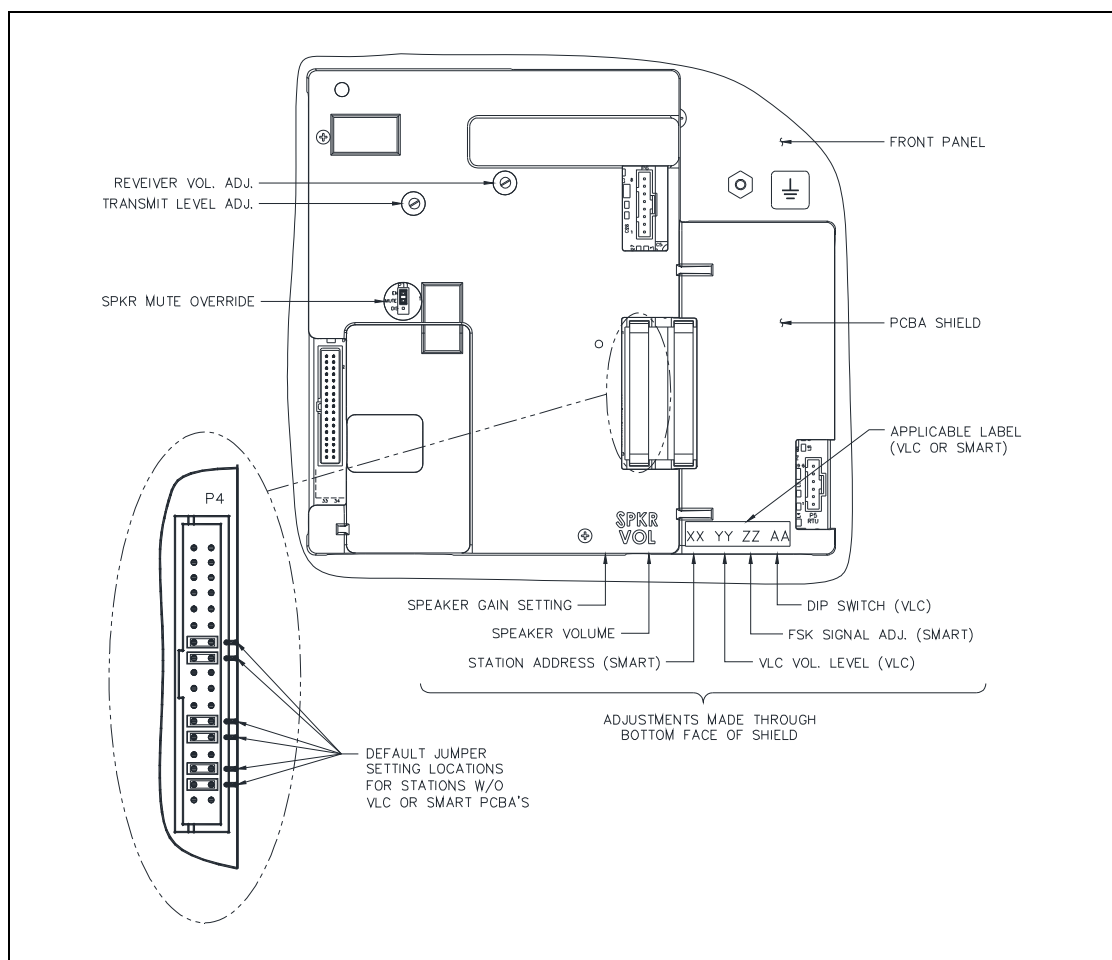
Figure 15. P4 Jumper Default Settings

The following tables are provided to aid qualified service personnel in troubleshooting problems with the ICS Page/Party Station.

Table 1. General Troubleshooting

Problem	Potential Cause
station not functional	- See the Field Wiring section for proper terminations. - Verify incoming supply voltage at TB2 or TB3 on the termination PCBA. - Verify regulated 24 V dc at P1 on the termination PCBA. ⚠ **CAUTION** ⚠ —Supply voltage is present at P2.
excessive hum or buzz during station operation	Inspect the Page/Party lines for proper line terminations, shorts, and grounds.
crosstalk occurs between Page/Party lines	- Inspect the Page/Party lines for proper line terminations, shorts, and grounds. - Inspect the party line connections for crossing of the cable pairs.
feedback occurs during page	- Check the location and orientation of the speakers in the area. - See the Field Wiring section, Step 4, mutual muting. - See the Speaker Mute section.
squeal in handset receiver	- Verify proper termination of the Page/Party lines. - Verify the system line balance is connected.
handset microphone audio is too low/loud	- Disconnect the headset, if connected. - See the Transmit Level section. - Check jumper settings or cable connections at P4. - Verify proper termination of the Page/Party lines. - Check handset connections. - Check for proper cable terminations between the termination and main PCBAs. - Check the operation of the hookswitch. - Replace the handset.
handset receiver audio is too low/loud	- See the Receiver Volume section. - Check the jumper settings or cable connections at P4. - Verify proper termination of the Page/Party lines. - Check the handset connections. - Check for proper cable terminations between the termination and main PCBAs. - Check the operation of the hookswitch. - Replace the handset.

Table 2. Troubleshooting Standard/VLC Configurations

Problem	Potential Cause
speaker volume too low/loud	• See the Speaker Volume section; for VLC, the Audio Alignment section. • Verify jumpers P15 and P16 are in the correct position for the application. • Verify the speaker wiring configuration is correct. • Verify the nominal page line level is correct. • Replace the speaker or driver.
cannot place a page	• For VLC, see the Audio Alignment and Page Disable Control sections. • Check the handset connections. • Check for proper cable terminations between the main and termination PCBAs. • Check the jumper settings or cable connection at P4. • Replace the handset.
RTU output not functional	• Verify the VLC PCBA is installed and operational. See the Remote Output Switching (Available with RTU Only) section. • Check fuse F1 on the RTU PCBA. • Check the cable connection at P5 on the RTU and VLC PCBAs. • Check the RTU terminal connections at TB7 (see Figure 12) • Check the operation of the connected device.
RTU input not functional	Inputs are only available with the SmartSeries option.

Table 3. Troubleshooting SmartSeries Configurations

Problem	Potential Cause
speaker volume is too low/loud	• See the ADVANCE System Programming manual, Pub. 42004-700L2, for station configuration. • See the ALS Minimum Level, ALS Offset Level, and SmartSeries VLC Level sections. • Check the cable connection at P4. • Verify jumpers P15 and P16 are in the correct position for the application. • Verify the speaker wiring configuration is correct. • Verify the nominal page line level is correct. • Replace the speaker or driver.
Page/Party operation not functional	• See the Station Address section. • Check the cable connection at P4. • Check for proper cable terminations between the termination and main PCBAs. • Verify proper termination of the Page/Party lines.
RTU output not functional	• For supervised output, verify that no monitored output faults exist. • Check fuse F1 on the RTU PCBA. • Check the cable connection at P5 on the RTU and SmartSeries PCBAs. • Check RTU terminal connections at TB6 and TB7 (see Figure 12 and Figure 13) • Check for operation of the connected device.
RTU input not functional.	• For supervised input, verify no monitored input faults exist. • Check the cable connection at P5 on the RTU and SmartSeries PCBAs. • Check the RTU terminal connections on TB6 (see Figure 14). • Check for operation of the connected device.

Upper Enclosure Front Panel Installation

After all adjustments have been completed:

1. Place the front cover in 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 10 to 12 lb·in (1.13 to 1.36 N·m).

   Service and Spare Parts

Service and Spare Parts

Contact a regional service center for assistance if the equipment requires service or spare parts. An RA# (return authorization number) will be issued if service is required. Equipment must be shipped prepaid to GAI-Tronics with an RA# 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 nearest regional service center.

Specifications

Power Requirements

AC/DC Input

AC Power Supply

Input voltage .... 90 to 264 V ac (operating), 50/60 Hz

Power factor @ nominal 120 V ac 0.98

DC Power Supply

Input voltage .... 24 V dc +/−20%

Current/Power requirements (+/−10%)

Power Consumed (8-ohm load)	24 V DC	120 V AC	230 V AC
Idle	165 mA/4.0 W	70 mA/8.4 VA	90 mA/20.7 VA
4-watt output (default setting)	460 mA/11.0 W	120 mA/14.4 VA	110 mA/25.3 VA
12-watt output	900 mA/21.6 W	200 mA/24.0 VA	160 mA/36.8 VA
30-watt output	1.95 A/46.8 W	400 mA/48.0 VA	220 mA/50.6 VA
Max Current Consumption (8-ohm load)	19.2 V DC	90 V AC	253 V AC
30-watt output	2.44 A/46.8 W	520 mA/46.5 VA	230 mA/61.0 VA

Handset

Microphone .... dynamic, noise-canceling

Receiver .... dynamic, hearing aid compatible

Cord .... retractile, 6-foot extended, PVC

Material .... ABS

External control .... push-to-page handset pressbar

Handset Amplifier

Output level (compression controlled)... 1.5 V $_{RMS}$ nominal into 33 Ω load

adjustable, 0 to 2.1 V $_{RMS}$

Frequency response.. 250 to 6,500 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 to 400 mV $_{RMS}$

Speaker Amplifier

Maximum output:

8-ohm speaker*..30 W into 8 Ω load with 1.5 V $_{RMS}$ input page level

adjustable to 30 W; default: 4 W @ 8 Ω

16-ohm speaker..15 W into 16 Ω load with 1.5 V $_{RMS}$ input page level

adjustable to 15 W; default: 2 W @ 16 Ω

Frequency response.. 250 to 6,500 Hz, +0/−3 dB ref. to 1 kHz

Distortion .... <1% THD @1 kHz to 24 W

<3% THD @ 1 kHz to 30 W

Input impedance... 50 kΩ

16 kΩ with SmartSeries option

SmartSeries offset level adjustment range .... 0 to 30 dB

*See Figure 16 and Figure 17.

Enclosure

Construction/finish

Upper enclosure...engineered glass-reinforced plastic

Lower enclosure .... 316 stainless steel, 0.060 in thick

Mounting.. wall or column, eight 0.44-in (11 mm) mounting holes

Termination connections.. screw-type barrier terminal blocks

Dimensions ....29.3 H × 12.1 W × 10.5 D in (744.2 × 307.3 × 266.7 mm)

External control..........................handset hookswitch and party line selector switch on multi-party stations

Shipping weight .... 30.0 lb (13.6 kg)

Net weight.. 28.0 lb (12.7 kg)

VLC Option

VLC minimum input level ....50 mV $_{RMS}$

VLC tolerance...50 kHz +/−4%

All-Call Option

All-Call control output... sink 50 mA maximum to circuit common

pulled up to 24 V dc maximum

RTU Option

Output Relay

Maximum load current.. 8.0 A output 1A (unfused)

1.6 A output 1B (fused)

Maximum in-rush current .... 15 A

Maximum voltage ....250 V ac

RTU Input Control (with SmartSeries Option)

Switch type .... NO (normally open) or NC (normally closed) 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

Environmental

Temperature range (operation and storage) .... −22 ºF to 158 ºF (−30 ºC to 70 ºC)

Humidity .... 95% non-condensing

Outdoor environmental rating .... Type 4X with doors closed

Approvals

NRTL Listed for USA and Canada .... Class I, Groups A, B, C, and D, Division 2

.... Class II, Groups F and G, Division 2

.... Class III, Division 2 Hazardous Locations

.... Temperature Code, T4A—USA

.... T3C—Canada
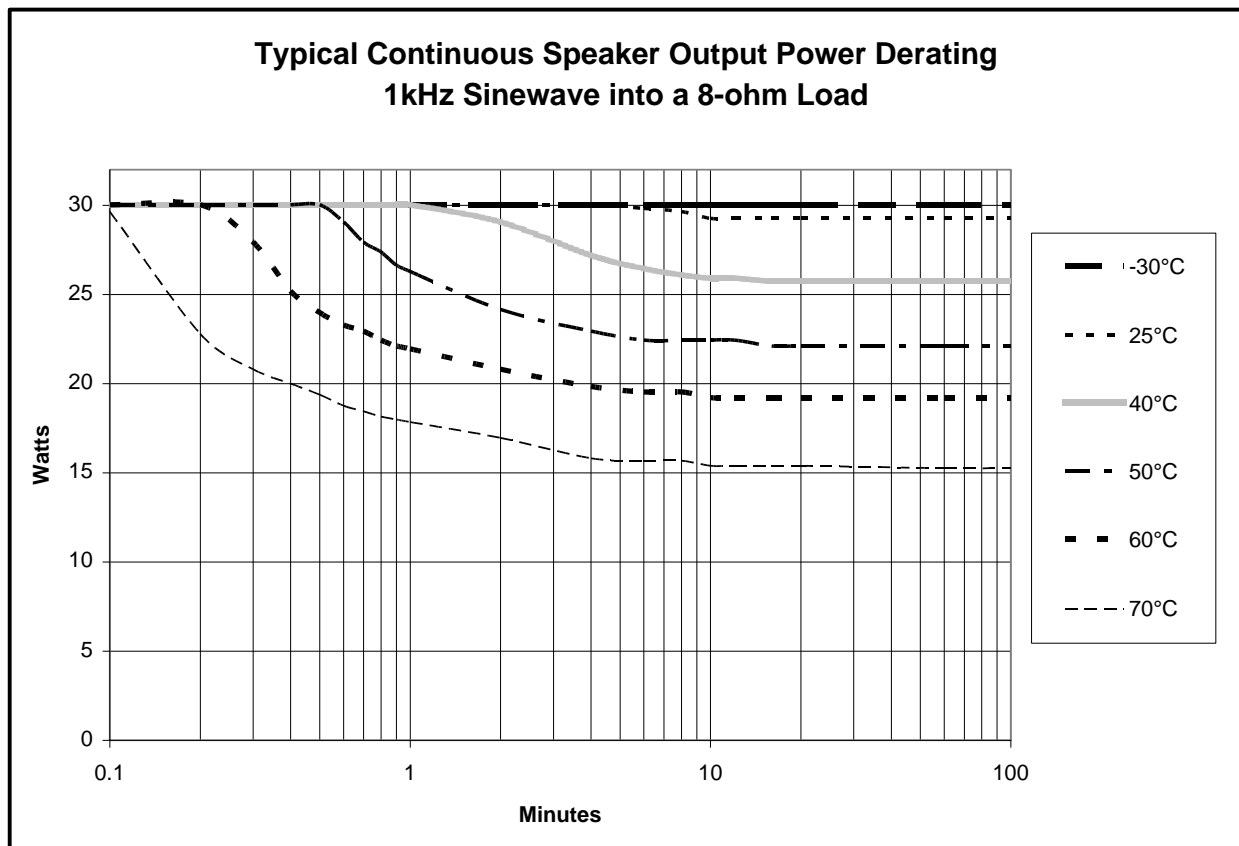

Figure 16. Typical Continuous Speaker Output Power Derating
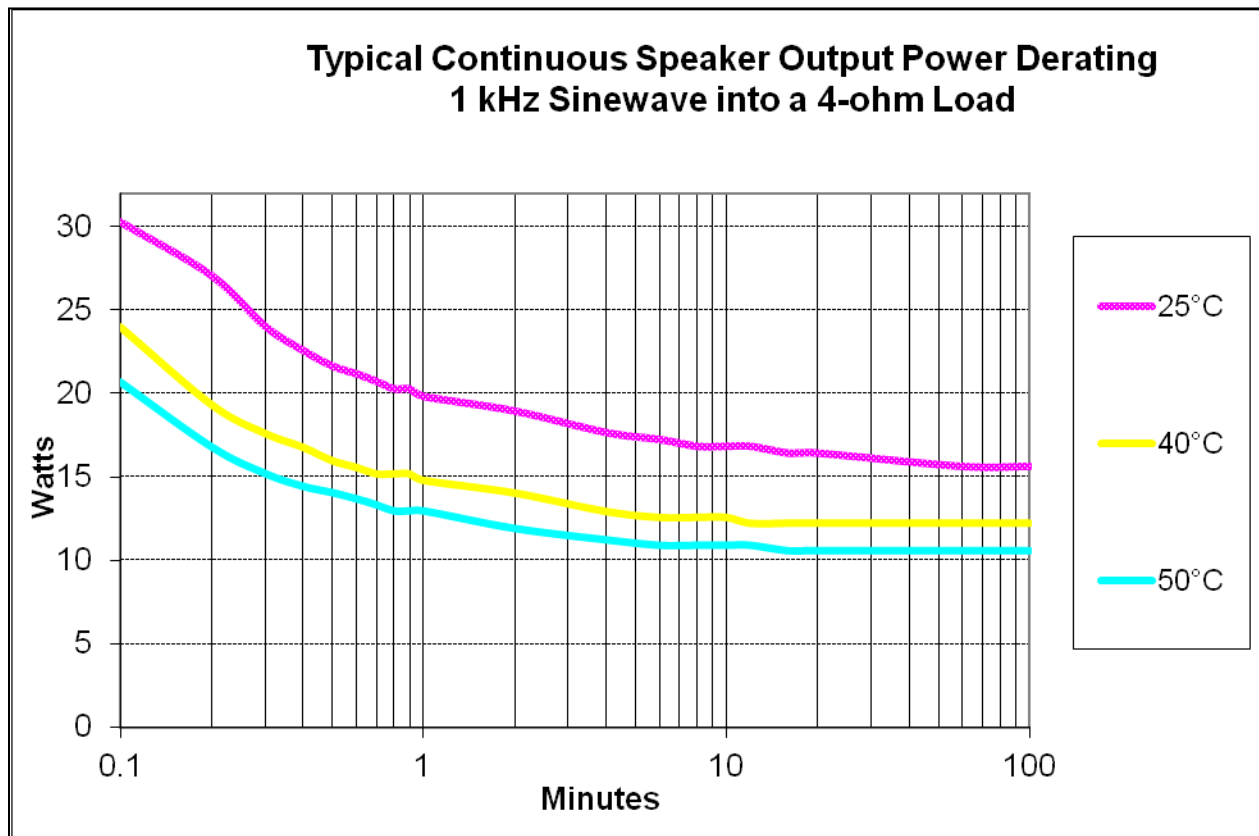1 kHz Sine Wave into an 8-ohm Load

Figure 17. Typical Continuous Speaker Output Power Derating
1 kHz Sine Wave into a 4-ohm Load

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.