**GAI-TRONICS®**
A HUBBELL COMPANY

# Model 780-301 and 7805-301 Page/Party®
# Handset Stations
# for Cenelec Zone 1 Applications

## Confidentiality Notice

This manual is provided solely as an operational, installation, and maintenance guide and contains sensitive business and technical information that is confidential and proprietary to GAI-Tronics. GAI-Tronics retains all intellectual property and other rights in or to the information contained herein, and such information may only be used in connection with the operation of your GAI-Tronics product or system. This manual may not be disclosed in any form, in whole or in part, directly or indirectly, to any third party.

## General Information

The assembly described in this manual is a speaker/amplifier housed in an explosion-proof cast aluminum enclosure equipped with a handset. The assembly is designed to be installed in hazardous areas where combustible gases exist or may exist.

The aluminum enclosure, while not gas tight, is designed to withstand repeated internal explosions without expelling gases hot enough to ignite the external atmosphere. This is accomplished through the use of a precision machined flame-path opening that cools the exiting gases to a temperature below the flash point of the external, explosive atmosphere.

## Application

The hazardous area Page/Party® Handset Station provides clear paging communications even in high noise areas where explosive atmospheres exist or may exist. The Model 780-301 Single Party Handset Station and Model 7805-301 Multi-party Handset Station are BASEEFA approved to CENELEC Standards Ex dib for Zone 1 Group IIC T5.

# Hardware Configuration

## External

When the handset is removed from the cradle, a magnetic reed switch in the cradle takes the station off-hook.  In addition to the handset and cord, a push-to-page button and a label are located on the front cover.  On the multi-party stations, a 5-party line selector switch is also included.  See Figure 1.
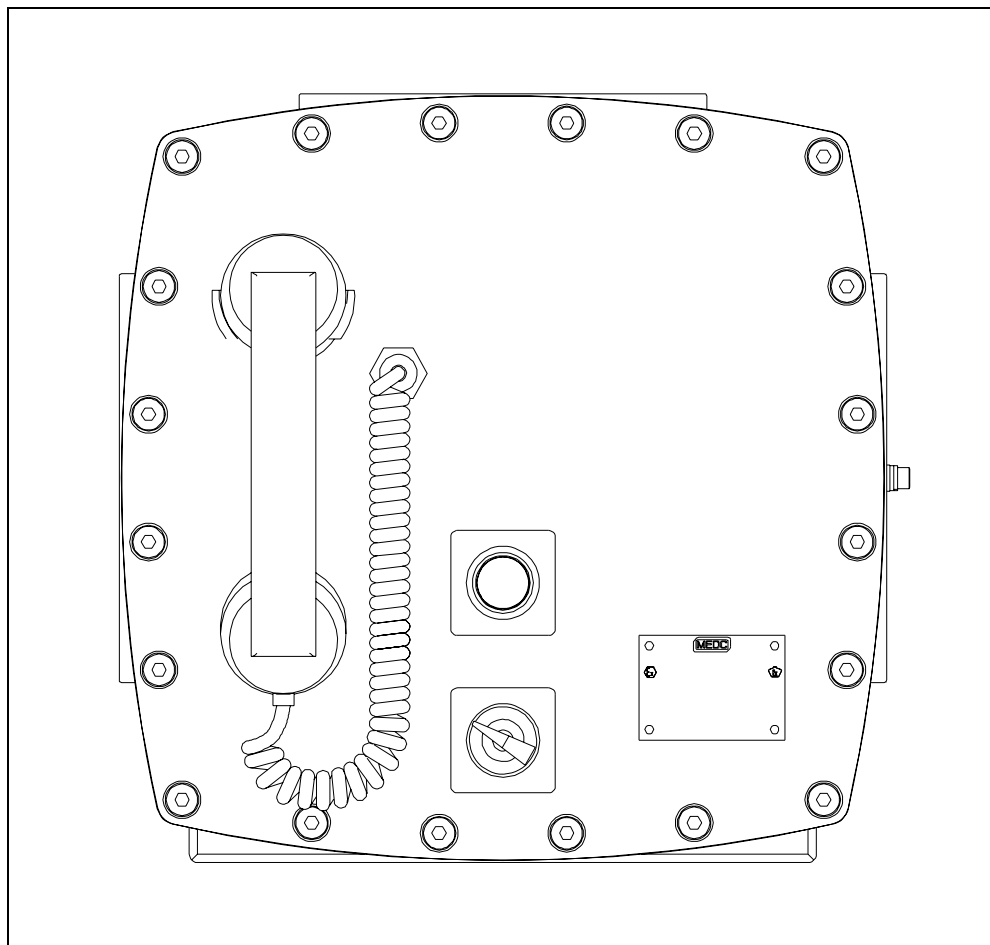


Figure 1.  Model 7805-301 Page/Party® Handset Station - Front View

The cable gland entries for Models 780-301-and 7805-301 are shown in Figure 2.  The following entries are on the base: three M25 entries (two fitted with plugs); and one M16 entry.
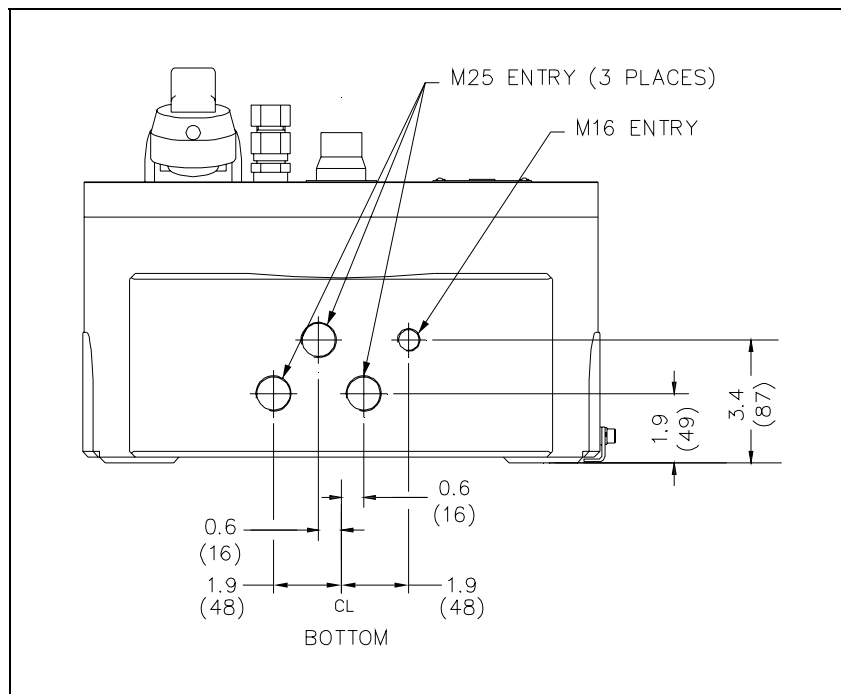
Figure 2.  Models 780-301 and 7805-301 Cable Gland Entries - Bottom View

**NOTE:**  Ensure any unused openings are sealed with proper fittings per local standards.
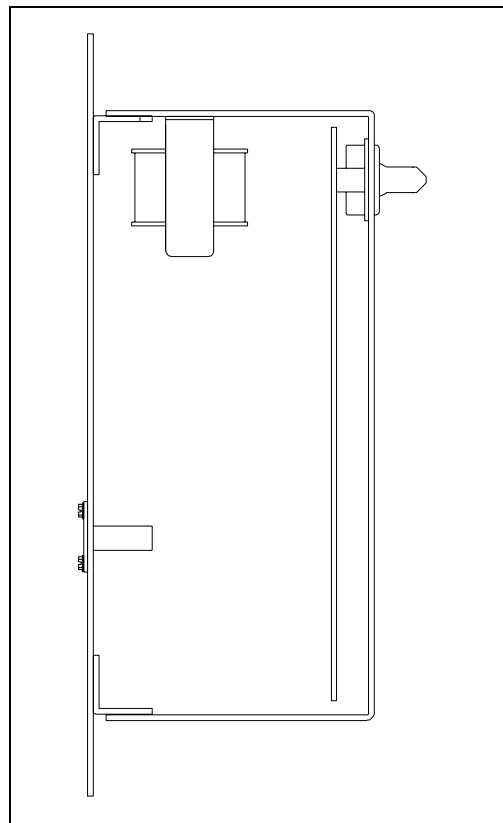


Figure 3.  Plug-in Amplifier - Side View
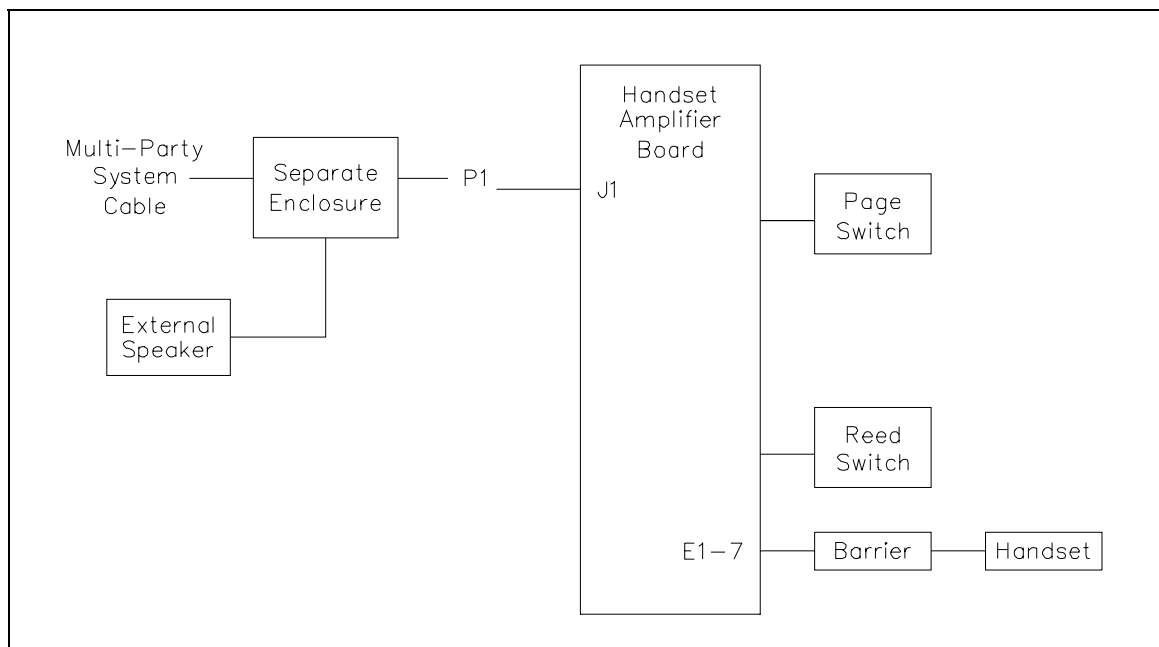
## Block Diagram



Figure 4.  Model 701-202-EX Handset Station Block Diagram

P1 is the 16-pin male connector located on the back of the Base-16 printed circuit board assembly (PCBA).  It plugs into the socket located inside the enclosure.  The socket provides connection to the multi-party or single party cable containing the Page/Party® lines and ac power.  The handset amplifier PCBA connects to the handset and reed switch using lug connections E1 to E7.  See Figure 4.

## Interfaces

The assembly interfaces to the multi-party cable and the external loudspeaker via P1, the 16-pin connector, and connector J1.  The pin functions for connector P1 are described below:

| Pin No. | Function | Description | Pin No. | Function | Description |
|---------|----------|-------------|---------|----------|-------------|
| 1 | PL_L1 | Party line (L1) | 9 | PL_L2 | Party line (L2) |
| 2 | PG_L1 | Page line (L1) | 10 | PG_L2 | Page line (L2) |
| 3 | MT_L1 | Mute (L1) | 11 | MT_L2 | Mute (L2) |
| 4 | N/C | No connection | 12 | N/C | No connection |
| 5 | SPKR_8 | Speaker (8-ohm) | 13 | EGND | Earth ground |
| 6 | SPKR_16 | Speaker (16-ohm) | 14 | SPKR_C | Speaker (common) |
| 7 | N/C | No connection | 15 | N/C | No connection |
| 8 | AC_N | AC neutral | 16 | AC_H | AC hot |

# Installation

Before installing Page/Party® equipment, design the system layout taking into consideration personnel safety, operational function, convenience, and power cable length.  In general, for 115 V ac systems the total cable length should not exceed one mile (1.6 kilometer), but the length of cable between the stations is not a critical factor.

A separate power feed is recommended to each station located in hazardous areas.  With a separate feed, individual stations can be de-energized for service or maintenance without affecting the power supply and operation of the other stations in the hazardous area.
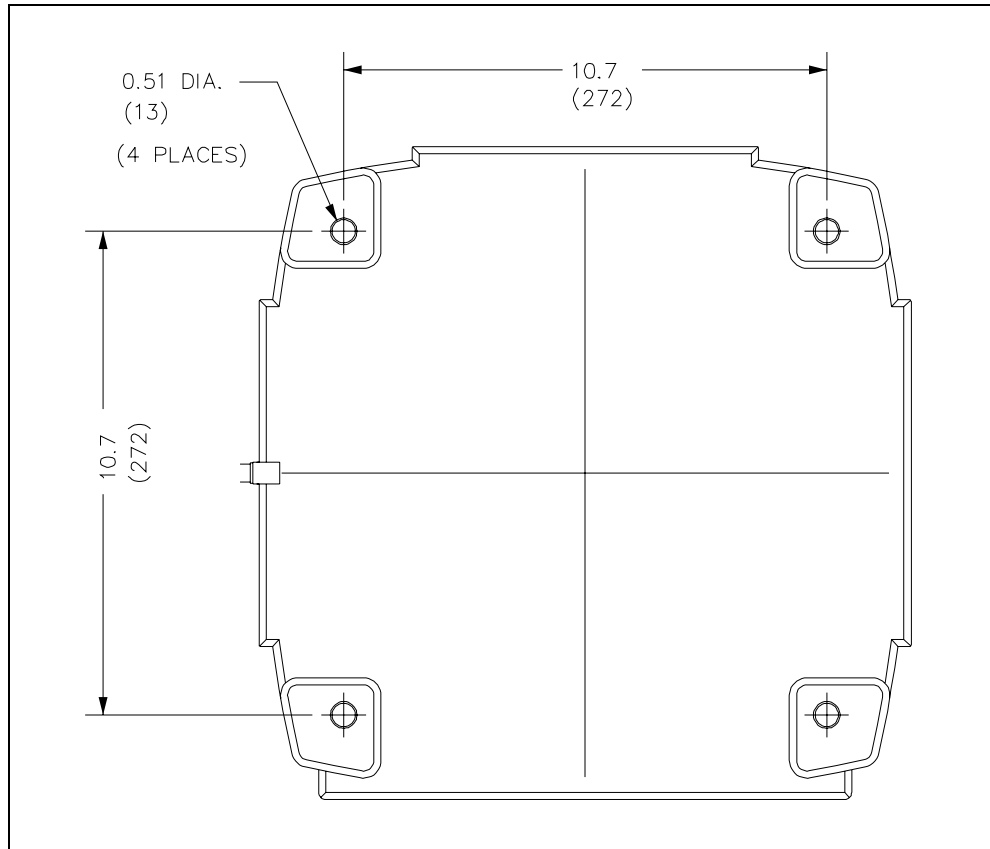


0.51 DIA.
(13)
(4 PLACES)

10.7
(272)

10.7
(272)

Figure 5.  Mounting holes with dimensions in inches (mm)

## Mounting

**NOTE: The mounting surface must be able to support 55 lbs. (25 kg). The explosion-proof enclosure is very heavy. Handle carefully to avoid damage to the unit and personnel injury.**

1. Remove the cast aluminum front panel. Allow it to hang from the rear of the enclosure by means of two retaining straps during installation. The straps serve as personnel safety feature and as a safeguard designed to ensure the flame path opening is not nicked, dented or otherwise damaged while mounting the enclosure.

2. To maintain the explosion-proof integrity of the enclosure, all mounting hardware is located in non-intrusive mounting holes under the front panel. The suggested mounting height of the station is 54 inches (137 cm) to the centerline of the enclosure. Use standard 1/2-inch socket head cap screws or M12 bolts to secure the enclosure to a flat mounting surface.

3. After the enclosure is securely mounted, remove the plug-in amplifier as follows:

   • Disengage the 24-pin connector between the aluminum front cover and the plug-in amplifier.

   • Remove the four screws that secure the amplifier to the standoffs, and retain.

   • Pull the amplifier straight toward you to disengage the 16-pin connector from the enclosure.

   • Set the amplifier aside in a safe place while completing the installation.

4. Make up cable core ends as required for connection to the terminal blocks in the enclosure base.

5. Dismantle the outer parts of the 25 mm Ex 'd' cable gland(s) for the system cable and 16 mm Ex 'd' cable gland for the speaker cable and thread them onto the cable(s) in the correct order.

6. Feed the cable end(s) into the enclosure through the gland body or bodies and reassemble the outer gland parts as directed by the manufacturer. Check that the slack in the cable inside the enclosure is adequate but not excessive before tightening of the gland assembly.

7. Connect cable cores to terminals following the wire colors as illustrated in Figure 6 for single party and Figure 7 for multi-party systems. The wire colors correspond to GAI-Tronics 60071 and 60072 Series System Cable and 60070 Speaker Cable. Connect the wires carefully and completely to the terminal block. An improper termination may result in diminished station performance.

   **NOTE:** Determine if acoustical feedback is likely to be a problem, and adjust the speaker orientation, if necessary. As a last resort, the associated speaker can be muted by moving the violet wire on the enclosure on TB1 to terminal 7.

8. Install the amplifier by aligning the 16-pin connector to the enclosure socket and pushing straight in. Install the four screws retained previously.

9. Inspect the gasket and machined rim of both the cover and the enclosure for nicks, scratches, or other damage that could compromise the integrity of the flame path seal. If damaged, the cover may have to be replaced.

10. Reconnect the 24-pin connector to the aluminum front cover and to the plug-in amplifier.

11. Secure the front cover to the cast aluminum enclosure using the bolts provided. Tighten the bolts alternately with bolts that are diagonally opposite to ensure that the cover is evenly sealed.
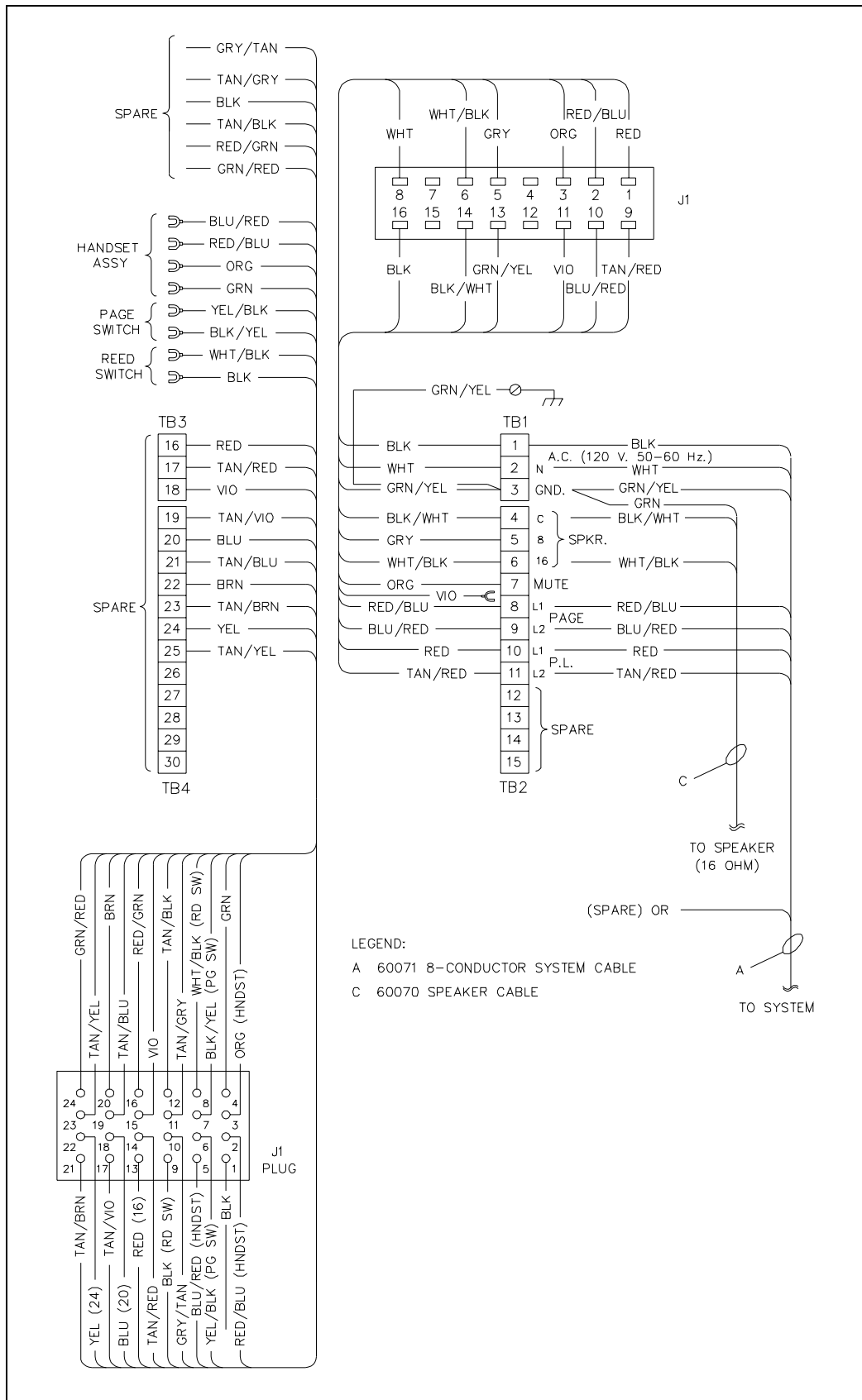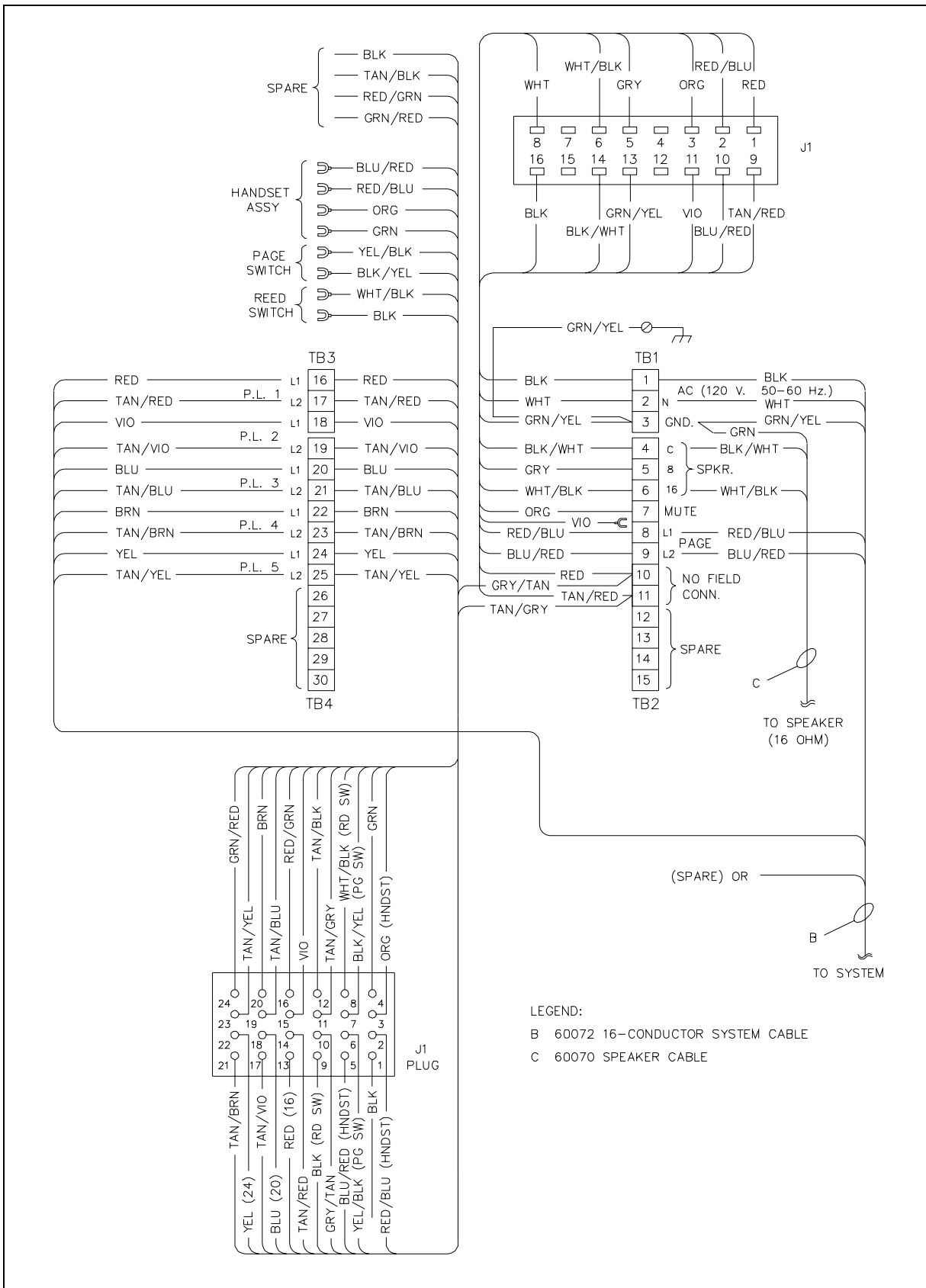
Figure 6.  Single Party Wiring Detail

Figure 7.  Multi-Party Wiring Detail

# Operation

GAI-Tronics offers two types of Page/Party® systems: Page/Single-Party with one party line and one page line, and Page/Multi-Party with five party lines and one page line allowing up to five simultaneous two-way conversations.

For *Page/Single-Party,* complete the following steps to make a page announcement:

1. Lift the handset from the cradle.

2. Depress and hold the press-to-page button on the front cover.

3. Speak directly into the microphone to broadcast your announcement over the loudspeakers.

4. Release the press-to-page button, and if requested, wait for a response.

   The paged individual(s) responds by picking up a handset at any station and beginning communications.

For *Page/Multi-Party,* complete the following steps to make a page announcement:

1. Lift the handset from the cradle.

2. If party line conversation is desired, rotate the selector switch on the front cover to an unoccupied party line.

3. Depress and hold the press-to-page button on the front cover.

4. Speak directly into the microphone to broadcast your announcement over the loudspeakers.

5. Release the press-to-page button, and if requested, wait for a response.

   The paged individual(s) responds by picking up a station handset and turning the selector switch to the requested party line.

With either type of equipment, the full duplex party line communication is not broadcast over the system speakers. Other individuals can also pick up and join the conversation at any time. Always return the handset to the cradle following a page or a party line conversation.

## Adjustments

⚠ **CAUTION** ⚠

**It is necessary to open the explosion-proof enclosure to make adjustments.  Make adjustments only when the conditions at your facility are such that <u>no</u> explosive atmospheres can be present.**

Any adjustment requires the removal of the cast aluminum cover.  The speaker amplifier assembly inside includes one control that permits adjustment while the assembly is still mounted in its enclosure, and several internal controls that are accessible only by removing the assembly from the enclosure.

### Adjustment with Speaker Amplifier Installed

The User Level Adjustment (labeled USER ADJ) controls the volume of the associated speaker.  It is located under the nameplate on the front panel of the speaker amplifier.  Use a small flat-blade screwdriver with an insulated shaft at least 4 inches long to make adjustment.

1.  To access the USER ADJ control loosen (do not remove) the two screws that secure the nameplate.

2.  Pivot the nameplate counterclockwise, exposing the access hole.  A guide behind the access hole helps direct the screwdriver to the USER ADJ control.

3.  Rotate the screwdriver clockwise to increase the volume, or counterclockwise to decrease the volume.

4.  After completing the adjustment, pivot the nameplate clockwise back into position, then tighten the two screws.

### Adjustments with Speaker Amplifier Removed

Although they typically require no adjustments, the Speaker Amplifier Level, Receiver Sidetone Level, Audio Transmit (Microphone Gain) Level, and Handset Receiver Volume can be set with internal controls.  Each adjustment is clearly labeled:

*   *Speaker Amplifier:* adjusts the speaker volume.  It is also accessible without removing the speaker amplifier.  (See instructions for USER ADJ above.)

*   *Receiver Sidetone:* the amount of signal transmitted from the microphone to the receiver of the handset.

*   *Microphone Gain:* adjusts the gain level from the microphone signal to the page or party lines.

*   *Receiver Volume:* adjusts the gain level from a party line to the receiver.

To make these adjustments, remove the assembly from its enclosure and make a temporary connection between the assembly and the enclosure as described in the following steps:

1.  Loosen the four captive screws that secure the front panel.

2.  Remove the assembly from the enclosure.

3.  Connect the assembly to the enclosure using a Model 10440-002 Maintenance Cable between P1 on the assembly and J1 on the enclosure.

4.  Locate the control on the appropriate PCBA.  Using a small flat-blade screwdriver with an insulated shaft, turn a control clockwise to increase the volume or threshold; turn it counterclockwise to decrease the volume or threshold.

5.  When you are done with the adjustment:

    a)  Disconnect the Model 10440-002 Maintenance Cable.

    b)  Insert the assembly into the enclosure.

    c)  Tighten the four screws.

# Maintenance

In order to verify and ensure explosion-proof integrity, perform regular preventive maintenance and inspection checks on the GAI-Tronics explosion-proof enclosure.  The GAI-Tronics Field Service Department can formulate a service contract to suit specific preventive maintenance needs.

⚠ **CAUTION** ⚠

**Remove power from the enclosure before performing any maintenance.**

Use the following procedures to ensure reliable operation of your equipment:

1.  Remove power from the enclosure.

2.  Unbolt the cover, and remove the amplifier from the enclosure.

3.  Visually check the interior of the enclosure for signs of contamination.  Contamination inside the enclosure could mean that the conduit seals or cable gland seals have been compromised.

4.  Ensure the gasket and hardware are in place and in good condition.  Restore power to the unit.

In certain circumstances, it may be necessary to re-terminate wire connections to some or all of the enclosures in a system.  When this is done, strip the wires back to clean copper, reconnect to each terminal.

## Troubleshooting

The table below describes possible solutions for some common problems.

| Problem | Solution |
|---|---|
| Speaker level requires adjustment. | Adjust the Speaker Volume Control, labeled USER ADJ, at the amplifier. |
| Outgoing conversation level requires adjustment. | Adjust Microphone Gain at the amplifier. |
| Incoming conversation level requires adjustment. | Adjust the Receiver Volume Control at the amplifier. |
| Feedback/distortion (a hum or buzz on the line) occurs during all Page/Party® station operation. | 1. Adjust the Receiver Volume Control at the amplifier.<br>2. The line may be improperly terminated. Inspect the system cable for loose connections, shorts, and grounds. Line balance assembly connections are critical. |
| Sidetone* requires adjustment.<br><br>*Hearing one's own voice in the receiver of the handset. | 1. Adjust the Receiver Sidetone at the amplifier.<br>2. Check that the system cable connections to the resistors in the line balance assembly are properly connected to the line balance assembly resistors. |
| Crosstalk occurs. | One or more system cable pairs may be improperly terminated. Visually inspect the system cable connections for accidental crossing of the cable pairs or grounds. |
| Feedback during page of nearby handset station. | Use the muting feature in the amplifier enclosure at the terminal blocks. |

# Specifications

### Electrical

Voltage ............................................................................. 90 to 140 V ac (120 V ac nominal) 50/60 Hz

Power Consumed ........................ Zero/maximum signal (12 watts): 15 VA, 10.5 watts; 53 VA, 34 watts

### Speaker Amplifier

Output:.......................................................... 12 watts minimum, with nominal supply voltage

Output limiter:.....................................................................2.16 Vpeak (adjustable via configuration)

Voltage gain ............................................................................26 dB maximum, adjustable

Frequency response ...............................................................250–4000 Hz, +0 dB, -3 dB ref. to 1 kHz

Distortion ........................................................................1% maximum THD @ 1 kHz, 12 watts

Input Impedance............................................................................................. 50k ohms nominal

Audio input from line .......................................... 1.5 Vrms nominal (depends on distance) from 33 ohm

### Handset

Output..........................................................................1.5 Vrms nominal into 33-ohm load

Output limiter.................................................................................................... 1.5 Vrms nominal

Gain ........................................................ 55 dB nominal (below limiter level) adjustable from 40-63 dB

Frequency response ...............................................................325–7000 Hz, +0 dB, -3 dB ref. to 1 kHz

Distortion ....................................................................................1.5% maximum THD @ 1 kHz

Recommended environment .........................................................................Greater than 50 dB SPL

### Mechanical

Dimensions ..........................................14.4 H × 14.4 W × 7.83 D inches (367 × 367 × 199 mm) overall

Enclosure material.................................................................................................LM25TF, Epoxy

Handset material.................................................................................................Gray ABS

Handset microphone......................................................................... Dynamic, noise canceling

Handset receiver....................................................Dynamic, hearing aid compatible per FCC part 68

Cable...............................................................Hytrel®, Retractile, 6-foot (1.8m) when extended

Cradle ..................................................................................... Fixed; built-in off-hook detector

External controls .........................................................Press-to-page switch; party line selector switch

Internal controls .......................... Tone adjust, sidetone, handset receiver volume, line level, AGC level

### Environmental

Temperature range........................................ -4° F to +151° F (-20° C to +66° C), Operating and storage

Humidity................................................................................................. 95% non-condensing

## Replacement Parts

| Model Number | Description |
|---|---|
| 10111-007 | Handset Assembly with 6-foot Hytrel® Cord |
| 12511-001 | Dynamic Transmitter and Cap |
| 12530-001 | Transformer/Connector Subassembly |
| 13204-002 | Receiver Cap |
| 701-202-EX | Amplifier Assembly |

# Reference Material

## Reference to Assembly/Model Drawings

| Published by | Title | GAI-Tronics Ref. No. |
|---|---|---|
| GAI-Tronics | Single Party Handset Station Outline Dwg. | 222-147 |
| GAI-Tronics | Multi-Party Handset Station Outline Dwg. | 222-148 |
| GAI-Tronics | Plug-in Amplifier Outline Dwg. | 72009 |

# 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.