



GAI-TRONICS®
A HUBBELL COMPANY

701-904 SmartSeries® Handset/Speaker Amplifier with Auxiliary Jack

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Confidentiality Notice

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The following are trademarks of GAI-Tronics Corporation:

SmartSeries®

Page/Party®

ADVANCE™

SmartVolume™

General Information

The Model 701-904 SmartSeries Handset/Speaker Amplifier with auxiliary jack provides the following functions:

- one-way page announcements over system speakers
- amplifies broadcast page announcements over the station's speaker
- party-line (two-way) communication with other system users
- attachment of an auxiliary headset
- control interface for optional devices such as the party line end-of-line module or the SmartSeries station RTU (remote terminal unit) when installed in a SmartSeries RTU enclosure.

Product Usage

The Model 701-904 SmartSeries Handset/Speaker Amplifier with auxiliary jack is an intelligent handset/speaker amplifier for use with GAI-Tronics' system cable in either standard Page/Party or ADVANCE systems.

Features and Options

- page and party line communication from the integral handset or an auxiliary headset
- ALS (Ambient Level Sensing) automatically adjusts speaker volume relative to ambient noise
- *handset and auxiliary connections (if equipped) monitoring and control
- *local speaker supervision
- *optional SmartSeries station RTU with supervision of input and output devices
- *optional party line *end-of-line* module for supervision of party line one
- *data and audio transmission on the system cable.
- *VLC (Volume Level Control) adjust volume to a predefined level for priority pages

Requires installation in a system with an ADVANCE head end.

External Components

The handset/speaker amplifier assembly includes a handset and cradle (see Figure 1). A hookswitch (magnetic reed switch) in the cradle signals the appropriate *off-hook* status to the microcontroller in the assembly when the handset is removed from or placed in the cradle.

The user level adjustment control is located under the GAI-Tronics nameplate to the right of the cradle. The Model 701-904 SmartSeries Handset/Speaker Amplifier also contains an auxiliary jack for a No. 10401-201 Headset/Microphone Assembly and a No. 10416-103 Extension Cable.

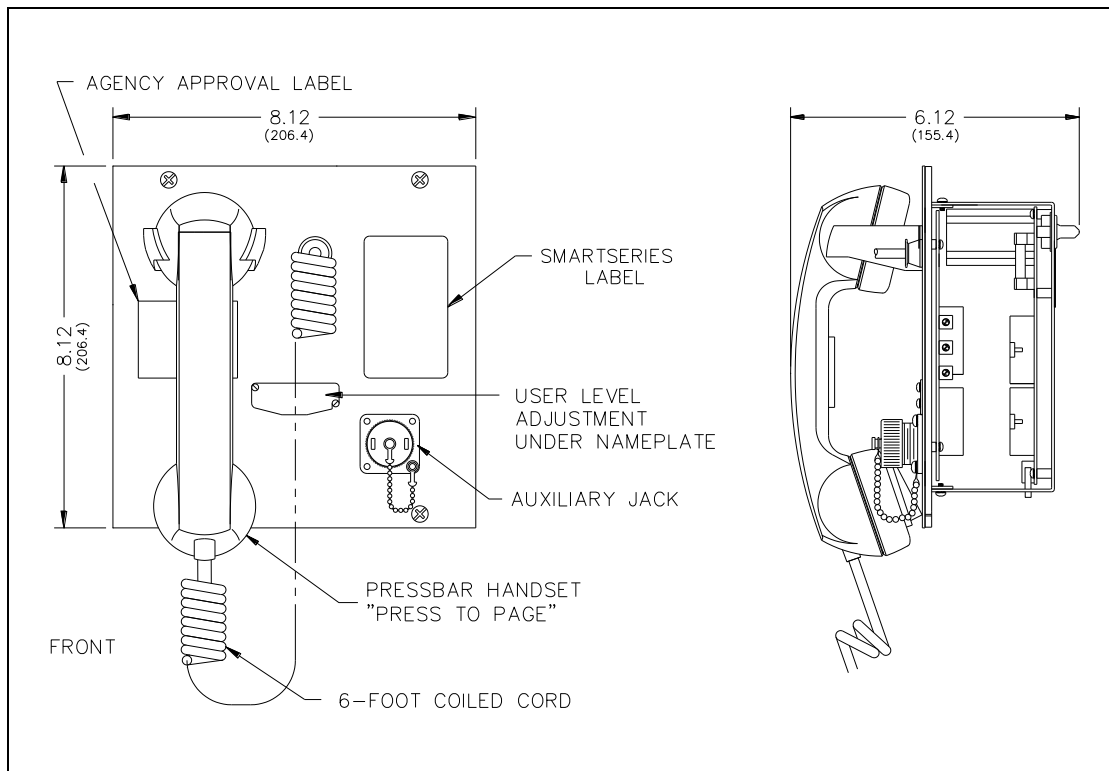


Figure 1. Front View

Internal Components

The assembly contains the following internal components or subassemblies (see [Figure 2](#)):

- chassis
- front panel attached to the front of the chassis
- handset amplifier/FSK/ μ P PCBA (printed circuit board assembly) (Ref. 15) attached to the rear of the front panel
- speaker amplifier/power supply PCBA (Ref. 14) attached to the rear of the chassis, with a plug (P1) at the top, pointing to the rear

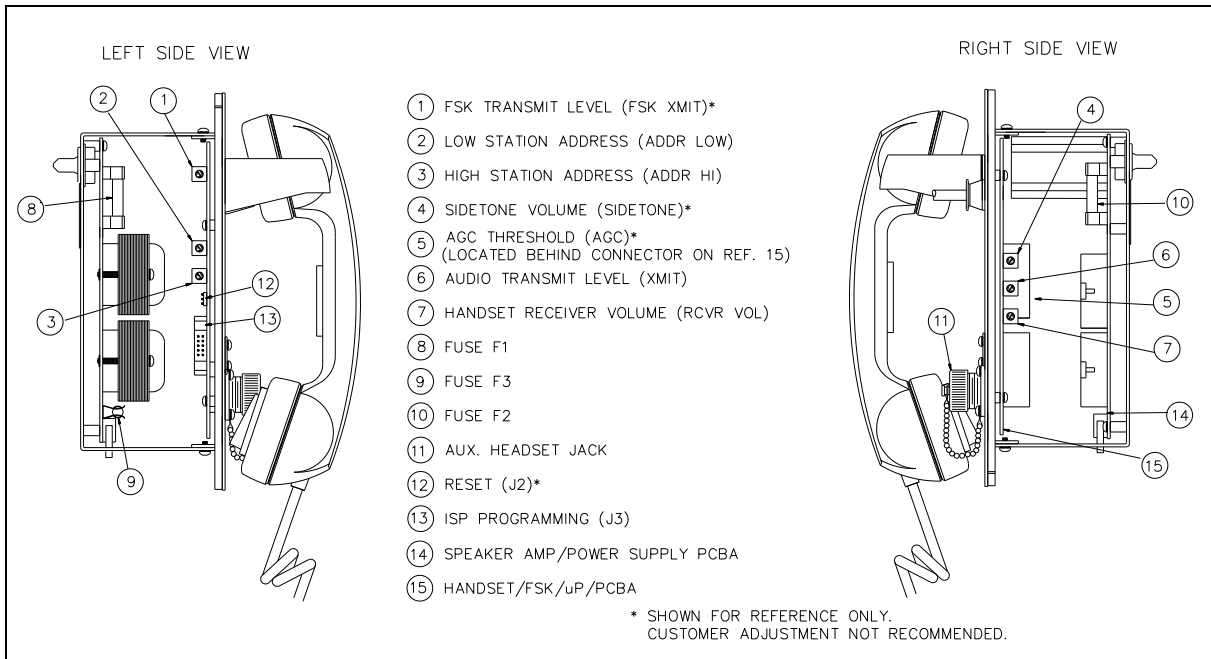


Figure 2. Side View

Block Diagram

The P1 connector on the back of the speaker amplifier/power supply PCBA plugs into a socket in an enclosure connected to the system cable, accessing the Page/Party lines and ac power (see [Figure 3](#)). The speaker amplifier/power supply PCBA contains the low voltage power supplies and the speaker amplifier circuitry.

Connector J1A and J1B on the speaker amplifier/power supply PCBA connects regulated +5 V dc, ± 15 V dc, and V_{RLY} voltages along with control, monitoring, and line signals to J1A and J1B on the handset amplifier/FSK/ μ P PCBA. Connector J2 of the speaker amplifier/power supply PCBA connects to optional external devices.

The handset amplifier/FSK/ μ P PCBA has connections to the handset and the hookswitch via spade terminal connectors E1 through E7 and connections to the optional front panel auxiliary connector via J4.

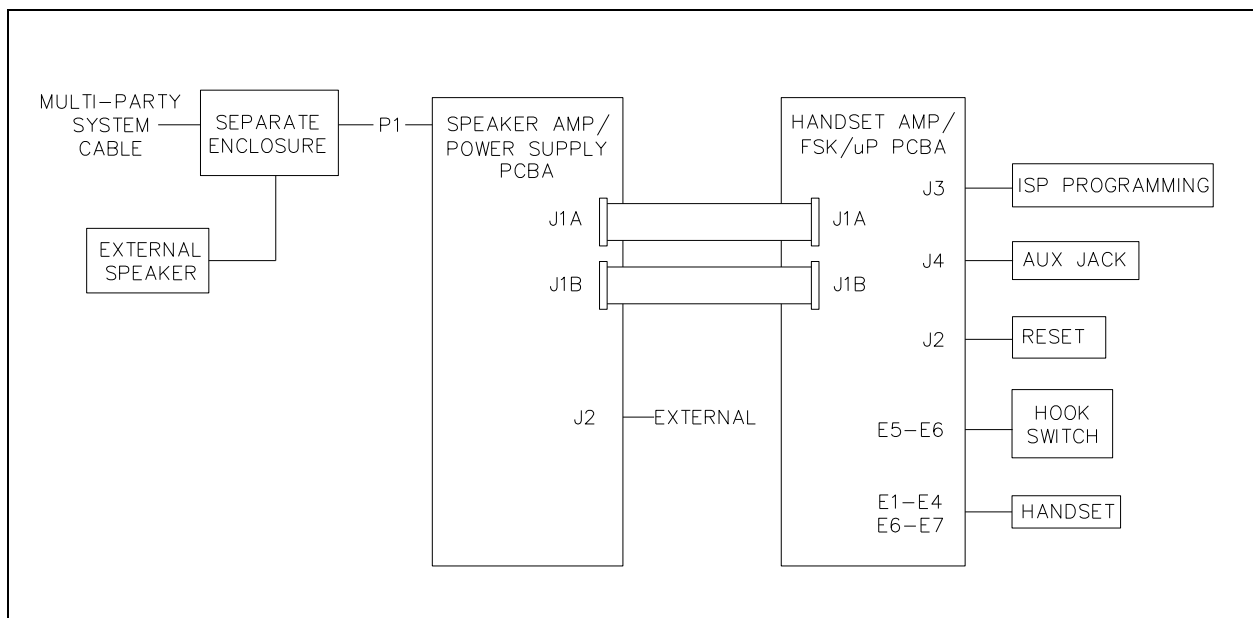


Figure 3. Block Diagram

Interfaces

The assembly connects to the system cable, an external loudspeaker, and any auxiliary devices via the 16-pin connector, P1, located on the speaker amplifier/power supply PCBA. Connector J2, on the bottom of the speaker amplifier/power supply PCBA connects to optional devices such as the SmartSeries RTU (remote terminal unit) installed in specially designed enclosures. Other connections on the speaker amplifier/power supply PCBA provide quick connect/disconnect of subassemblies.

All connections to the system cable must be made by qualified installation technicians. Direct questions about these connections to GAI-Tronics' Field Service Department at 800-492-1212 inside the USA or 610-777-1374 outside the USA.

Installation

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

WARNING —Do not disconnect equipment while energized.

The Model 701-904 SmartSeries Handset/Speaker Amplifier with auxiliary jack assembly plugs directly into any standard GAI-Tronics 700 series enclosure. It also plugs into the following specialized SmartSeries enclosures:

- SmartSeries station RTU enclosure
- EPL (Emergency Party Line) enclosure
- EOL (End-of-Line) party-line module enclosure

1. Connect the 10-conductor keyed ribbon cable to J2 on the bottom of the speaker amplifier/power supply PCBA with the red trace on the ribbon cable edge lined up with J2, pin one.

This is required when these amplifiers are installed in a SmartSeries enclosure.

NOTE: Do not damage the protruding latch wings of connector J2 located on the bottom edge of the amplifier during installation.

2. Configure the station address (see the Station Address section).
3. Ensure that connector P1 mates securely with the receptacle in the enclosure and then tighten the four screws at the corners of the amplifier's front panel.
4. Make all necessary audio level adjustments (see the External Adjustments and Internal Adjustments sections).
5. *For SmartSeries installations in an ADVANCE system:* Configure the station address (see the Station Address section).

Operation

This section describes the operation of the SmartSeries Handset/Speaker Amplifier with Auxiliary Jack with either the handset or the auxiliary headset, if equipped. Operation of this unit is dependent on the system type where it is installed. The amplifier acts as a standard Page/Party amplifier with ALS functionality when installed in a No 700 series enclosure in a Page/Party system. All optional functions are available when installed in a SmartSeries enclosure in an ADVANCE system.

Note regarding the busy tone: A busy tone is heard in the receiver when either of the following occurs:

- a page of a higher priority is in progress
- a page is attempted within one second of a previous page

Handset Operation

The handset allows the user to make page announcements and conduct party-line conversations.

Page Announcement

To make a page announcement:

1. Lift the handset from the cradle.
2. Select an available party line using the five-position rotary selector switch if party-line conversation is desired.
3. Press the handset pressbar.
4. Make your announcement when the wait tone stops. If the page resource is already in use, you hear a busy tone. Release the handset pressbar, then try again.
5. Release the handset pressbar.
6. When the party answers conduct your conversation.
7. Replace the handset in the cradle at the end of the conversation.

Party-Line Conversation

To conduct a party-line conversation perform the following steps:

1. For a multi-party enclosure select the appropriate party line.
2. Lift the handset from the cradle.
3. Conduct your conversation.
4. Replace the handset in the cradle when the conversation is finished.

Auxiliary Headset Operation

The auxiliary headset allows an operator to make page announcements and conduct party-line conversations hands-free, up to 30 feet from the station, while providing noise reduction for hearing protection. When an auxiliary headset/cable assembly is plugged into the auxiliary jack, a party-line connection is automatically established (the same as lifting the handset).

NOTES:

- Allowing the auxiliary headset to remain plugged in for a long period of time may disable party-line communication. This condition is controlled by the off-hook time-out setting, which can be programmed for 1 to 25 minutes in 1-minute steps (the factory default is 8 minutes) or it can be disabled. This feature ensures that a station unintentionally left connected to a party line will not induce unwanted background noise onto the party line. If party-line communication is disabled, unplug the auxiliary headset, then plug it back in.
- The auxiliary headset has priority over the handset. When the user lifts the handset from the cradle while the auxiliary headset is in use, the handset's microphone and page switch are disabled, but the handset receiver remains active.
- This application requires the GAI-Tronics 10401-201 Headset/Microphone Assembly and 10416-103 Extension Cable.

Page Announcement

To make a page announcement for a party-line conversation, perform the following steps:

1. Plug the auxiliary headset/cable assembly into the auxiliary jack on the front panel.
2. Press the headset page switch.
3. Make your announcement when the wait tone stops.
If the page resource is already in use you hear a busy tone. Release the headset page switch, then try again.
4. Release the headset page switch.
5. When the party answers, conduct your conversation.
6. Unplug the auxiliary headset/cable assembly when the conversation has ended.

Party-Line Conversation

To conduct a party-line conversation, perform the following steps:

1. For a multi-party enclosure, select the appropriate party line.
2. Plug the auxiliary headset/cable assembly into the auxiliary jack on the front panel.
3. Conduct your conversation.
4. When you are finished, unplug the auxiliary headset/cable assembly.



Optional Features

The following features are available as options to the standard configuration of a station used in an ADVANCE system and installed in a standard SmartSeries or a custom enclosure. These features can be configured. Contact the GAI-Tronics Field Service Department at 800-492-1212 inside the USA or 610-777-1374 outside the USA for further information about these features.

- The selected page destination feature allows the manual selection of one of four paging destinations.
- The supervised input feature allows the monitoring and supervision of one or two initiating device circuits (IDCs), initiating an alarm when the supervised device is activated.
- The power relay module provides a relay contact output, typically to switch power to a visual signaling device, for directed or relay group operation. Supervision of the controlled device's cable can also be enabled.
- The station emergency party line feature supports annunciation for two party lines.

Maintenance

Contact a Regional Service Center for assistance if the equipment requires service or spare parts. A return authorization number (RA#) will be issued if service is required. Equipment must be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. Repairs or a replacement will be made in accordance with GAI-Tronics' warranty policy if the equipment is under warranty. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts. Call 800-492-1212 inside the USA or 610-777-1374 outside the USA for help with identifying the Regional Service Center closest to you.

 **WARNING**  — **Remove all power from the station before performing any of the following preventive maintenance steps.**

1. Inspect and replace frayed or cracked wiring.
2. Secure/replace loose wires and spade terminals.
3. Remove corrosion from terminals.

There are three replaceable fuses (F1, F2, and F3) mounted on the Speaker Amp/Power Supply PCBA (see [Figure 2](#)).

- Fuse F1 protects the low voltage power supply circuits. Replace with GAI-Tronics part number 51801-027.
- Fuse F2 protects the current to the speaker amplifier. Replace with GAI-Tronics part number 51801-003.
- Fuse F3 limits the amount of current to any external device connected to J2. Replace with GAI-Tronics part number 51801-024.

External Adjustments

The user level adjustment control is located on the front panel behind the GAI-Tronics nameplate (see Figure 1).

1. Loosen the two screws on the GAI-Tronics nameplate and rotate it counterclockwise to access the adjustment hole.
2. Insert a 1/8-inch flat blade screwdriver through the access hole and into the potentiometer located directly behind the hole to adjust the level.

Use the user adjustment control potentiometer to make three separate adjustments:

- minimum speaker amplifier output level setting
- offset amplifier level (difference between the ambient noise and the amplifier output levels)
- VLC (volume level control) adjustment (sets a preset speaker level to override the normal volume control setting).

Minimum Level Adjustment

The factory default setting for minimum level is 4.0 watts nominal. To set the minimum amplifier output level:

1. Loosen the two screws on the GAI-Tronics nameplate and rotate it counterclockwise.
2. Insert a 1/8-inch flat blade screwdriver through the access hole and into the potentiometer.
3. Turn the user adjustment control fully counterclockwise.
4. 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.

5. Turn the adjustment potentiometer clockwise for the desired output.

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

Offset Level Adjustment

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

1. Loosen the two screws on the GAI-Tronics nameplate and rotate it counterclockwise.
2. Insert a 1/8-inch flat blade screwdriver through the access hole and into the potentiometer.
3. Turn the user adjustment control fully clockwise.
4. Listen for two beep tones indicating that the station is in offset 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 offset level to the desired volume.

5. Turn the adjustment potentiometer counterclockwise to the desired output level.

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

VLC (Volume Level Control) Adjustment (ADVANCE Systems only)

VLC overrides the normal volume control setting. This allows changing the amplifier level to a preset level during an emergency page. The factory default setting for the VLC level is 10% of maximum power (nominally 1.2 watts).

NOTE: The system must be equipped with a SmartSeries MCU (Master Control Unit) to activate the VLC function.

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. Turn the user adjustment control fully counterclockwise during the page.
3. Listen for two beep tones through the page speaker indicating VLC adjustment mode is active.
4. Turn the user adjustment control 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.

Internal Adjustments

The station address, sidetone volume level, and handset receiver volume level are adjusted internally (see [Figure 2](#)). Turn the control clockwise to increase the volume or threshold; turn it counterclockwise to decrease the volume or threshold.

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 2](#)).

- 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.

Handset Receiver and Sidetone Volume Adjustments

The handset receiver volume and sidetone volume levels are set internally.

NOTE: The following level adjustments are not typically required.

It is necessary to remove the assembly from its enclosure and make a temporary connection between the assembly and the enclosure to make an adjustment (see [Figure 2](#) for the reference numbers and locations of the adjustment controls). Turn each control clockwise to increase the volume or threshold; turn it counterclockwise to decrease the volume or threshold.

Handset Receiver Volume

Use the control labeled RCVR VOL (see [Figure 2](#), Ref. 7, on the Handset/FSK/μP PCBA) to adjust the handset receiver volume to the desired level for voice signals from a party line.

Sidetone Volume

The control labeled SIDETONE (see [Figure 2](#), Ref. 4, on the Handset/FSK/μP PCBA) adjusts the handset/headset sidetone. Perform the following steps to adjust the handset receiver or sidetone volume:

NOTE: Use a small flat-blade screwdriver with an insulated shaft.

1. Loosen the four screws that secure the front panel.
2. Remove the assembly from the enclosure.

NOTE: Do not disconnect the ribbon cable from connector J2 of the speaker amplifier/power supply PCBA if the enclosure is equipped with an optional EOL module or SmartSeries station RTU.

3. Connect the assembly to the enclosure using a No. 10440-002 maintenance cable between P1 on the assembly and J1 on the enclosure.
4. Locate and adjust the control on the appropriate PCBA.
5. When finished with the adjustment:
 1. Disconnect the 10440-002 maintenance cable.
 2. Insert the assembly into the enclosure.
 3. Tighten the four screws.

Troubleshooting

The following table lists some hints to aid technicians in troubleshooting:

Problem	Possible Solution
Any problem with station performance	<p>Remove the assembly from the enclosure and examine it carefully for obvious faults such as unconnected plugs, loose connections where the wires from the handset and hookswitch connect to the Handset/FSK/μP PCBA, and so on. Determine whether the fault is in the assembly, or in the system, by plugging in a known good spare assembly (set to the same address as the assembly removed). If the fault is in the assembly, remove it for repair.</p> <p>NOTE: When replacing the assembly, perform the following steps:</p> <ol style="list-style-type: none"> 1. Set the address on the new assembly to 0, 3. 2. Plug the assembly into the enclosure. 3. After about 10 seconds, remove the assembly. The station is now set up to request a download of configuration variables from the MCU. 4. Set the unit to the correct address. Set the address to 04 for conventional Page/Party operation or consult the ADVANCE system manual for address assignment information. 5. Plug the assembly back into the enclosure. The station initiates a configuration download request (ADVANCE systems only). The time required to complete the download depends upon system configuration and system activity, but several seconds is typical.
Speaker volume needs adjustment	Use the USER ADJ control to adjust the minimum level, offset level, or VLC level (as appropriate) (see the External Adjustments section).
Incoming handset speech level needs adjustment	Use the RCVR VOL control to adjust the handset receiver volume (see the Handset Receiver Volume section).
Acoustic feedback or speech distortion during page or party operation or The user hears himself when speaking	<ul style="list-style-type: none"> • If the problem affects all stations, the line may not be terminated correctly, may have loose connections, or a short to ground. Line balance connections are critical. • If the problem affects only this assembly, the problem may be with its sidetone setting. Contact the GAI-Tronics Field Service Department.
Feedback during page only	<ul style="list-style-type: none"> • Check within the enclosure for a purple wire on terminal 7: this is the default setting for local speaker mute. If the wire is on terminal 8, then the speaker is unmuted and may be causing feedback. Connect the wire to terminal 7. • An adjacent speaker could be causing feedback. If an adjacent speaker is the source of the feedback, adjust the orientation of the speaker so that it is not aimed directly at the station. As a last resort, enable the mutual muting function of the station. This is done by interconnecting terminal 7 of the two stations with the spare orange wire in the system cable (if this wire is available).
Crosstalk	Likely to be external to the assembly and related to system cable faults.

How to Diagnose Assembly Faults

When the assembly is in an ADVANCE system that includes a vacuum fluorescent display (VFD), faults may be automatically detected, transmitted to the MCU in data messages, and displayed or printed. Fault messages and possible solutions for their causes are described in the table below.

Fault Message	Cause and Effect	Possible Solution
Watch-Dog timer Processor has Reset <i>xd</i> times (Where <i>x</i> is the decimal number of times the watchdog timer has reset the processor.)	<p>Cause—The watchdog timer has forced the processor to reset. This occurs when the reset pins (J2) on the Handset/FSK/μP PCBA are temporarily shorted or when the watchdog timer does not receive regular status pulses from U4 on the Handset/FSK/μP PCBA.</p> <p>Effect—The processor maintains a count of the number of resets. If the station is powered down, the count restarts at zero. The station still amplifies incoming pages. For the fourth and subsequent resets, the count is zero.</p>	<ul style="list-style-type: none"> • Verify that the reset pins 2 and 3 (J2) on the Handset/FSK/μP PCBA are not shorted. • Replace the Handset/FSK/μP PCBA.
Stuck Contact on Polled Device Paging Pressbar Depressed	<p>Cause—The station has been in page mode longer than the configured page limit.</p> <p>Effect—Station page is cut off. When the pressbar is released, a restore message is sent to the MCU. The station then resumes normal operation.</p>	<ul style="list-style-type: none"> • Verify that the handset pressbar and the headset page switch are not stuck. • Replace the Handset/FSK/μP PCBA. • Replace the Speaker Amp/Power Supply PCBA.
Stuck Contact on Polled Device Handset Off-hook	<p>Cause—The station has been in the off-hook state longer than the configured time limit.</p> <p>Effect—Station handset/headset operation is cut off. When the station is returned to the on-hook state, a restore message is sent to the MCU. The station then resumes normal operation.</p>	<ul style="list-style-type: none"> • Verify that the handset is on-hook and the headset is <u>not</u> connected. • Replace the Handset/FSK/μP PCBA, or cradle. • Replace the Speaker Amp/Power Supply PCBA.
Supervised Audio Path Handset	<p>Cause—The station failed its internal health check of the Handset/FSK/μP PCBA.</p> <p>Effect—The station disables the handset amplifier health-check function after the first failure.</p>	<ul style="list-style-type: none"> • Replace the Handset/FSK/μP PCBA. • Replace the Speaker Amp/Power Supply PCBA.
Supervised Audio Path Page Amp	<p>Cause—The station failed its internal speaker amplifier health check.</p> <p>Effect—The station disables the speaker amplifier health-check function after the first failure.</p>	Replace the Speaker Amp/Power Supply PCBA.

Fault Message	Cause and Effect	Possible Solution
Supervised Audio Path Speaker Voice Coil	<p>Cause—The station is detecting no ambient noise at the speaker or is detecting an ambient noise lower than the configured failure threshold. This may occur if there is a fault in the speaker wire or a fault at the voice coil. This also may occur if the ambient noise at the speaker is too low, as is the case in a quiet room.</p> <p>Effect—The station continues measuring speaker ambient noise. When acceptable noise levels are subsequently measured, a restore message is sent to the MCU.</p>	<ul style="list-style-type: none"> • Verify that the speaker wire is connected and intact. • Verify that the voice coil is connected and intact. • Replace the Speaker Amp/Power Supply PCBA. • Replace Handset/FSK/μP PCBA.
Polled device	<p>Cause—This message is output by the MCU when it loses communication with the station. This may occur if there is a fault in the page line, if the station is powered-down, or if there is some fatal malfunction within the station.</p> <p>Effect—The MCU continues to attempt communication with the station. When communication is resumed, a restore message is sent to the MCU.</p>	<ul style="list-style-type: none"> • Verify that the page line is connected and intact. • Verify that the station is installed correctly. • Replace the Handset/FSK/μP PCBA.
Polled End-of-line device	<p>Cause—This message is the same as the “Polled device” fault, except that the affected station has been defined as an end-of-line station in the MCU configuration.</p> <p>Effect—When this fault occurs, the red EOL FLT LED on the PPI bezel lights. When communication is resumed, the LED extinguishes and a restore message is sent to the MCU.</p>	<ul style="list-style-type: none"> • Verify that the page line is connected and intact. • Verify that the station is installed correctly. • Replace the station assembly.

Replacement Parts

Model No	Description
10112-201	Handset Assembly, black
46101-012	Amplifier Enclosure Mounting Hardware
13204-001-00	Dynamic Transmitter and Cap, black
12523-001	GAI-Tronics Nameplate Kit
69383-003	Handset/FSK/ μ P/Aux PCBA
69382-001	Speaker Amp/Power Supply PCBA
13204-001-002	Receiver Cap, black
51008-004	Pressbar Switch, black
12514-010	6-foot Hytrel Cord and Bushing, black
12514-107	6-foot PVC Cord with Bushing, black
12502-101	Replacement Receiver Kit
12512-008	Hookswitch/Cradle Kit

Specifications

Electrical

Supply voltage 90 to 140 V ac (120 V ac nominal), 50/60 Hz

Power consumed @ nominal ac Zero/maximum signal (12 W): 15 VA, 9 W/59 VA, 32 W

Speaker Amplifier

Output 12 W minimum, with nominal supply voltage

Frequency response 350 to 6,500 Hz, +0/-3 dB, ref. to 1 kHz

Distortion 1% maximum THD @ 1 kHz, 12 W

SmartVolume™

Monitor range (low gain) 62 to 100 dB SPL

Offset (above ambient) User Level Adjustment 0 to 48 dB

Minimum User Level Adjustment Off; 85 to 125 dB SPL

Handset Amplifier

Output 1.5 V_{RMS} nominal into 33- Ω load

Frequency response with 5 mV_{RMS} input (AGC on) 350 to 6,500 Hz, +0/-3 dB ref. to 1 kHz

Distortion 1.5% maximum THD @ 1 kHz

Mechanical

Dimensions 8.12 H \times 8.12 W \times 6.12 D in (206 \times 206 \times 155 mm), overall

Shipping weight 7.1 lb (3.2 kg)

Net weight 6.1 lb (2.8 kg)

Environmental

Temperature range -22 °F to +158 °F (-30 °C to +70 °C), operating and storage

Humidity 95%, non-condensing

Approvals

NRTL Listed for USA and Canada..... Class I, Div. 2, Groups A, B, C, D;
when used with listed GAI-Tronics 702 and 703 series enclosures
.....Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III, Div. 2
when used with listed GAI-Tronics 732, 733, 7325, and 7335 series enclosures

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.