



GAI-TRONICS®
A HUBBELL COMPANY

Industrial Communications System

AC-Powered Page/Party® Plug-in Amplifiers

TABLE OF CONTENTS

<i>Confidentiality Notice</i>	1
<i>General Information</i>	1
Product Overview	1
Model Chart	2
Features.....	2
<i>Important Safety Instructions</i>	2
<i>General Operation</i>	3
<i>Installation</i>	3
Installing the ICS Page/Party® Plug-in Amplifier.....	3
Enclosure RTU Connection (if applicable).....	4
<i>ICS AC-Powered Page/Party® Plug-in Amplifiers</i>	5
Models 751-001ICS, 701-302ICS & 701-304ICS.....	5
Opening and Closing the Amplifier.....	5
Speaker Settings and Adjustments.....	6
Speaker Volume.....	6
Speaker Mute	6
Speaker Gain Setting.....	7
Handset Level Settings and Adjustments (Models 701-302ICS & 701-304ICS Only).....	7
Transmit Level.....	7
Receiver Volume	7
<i>ICS AC-Powered Page/Party® Plug-in Amplifiers with VLC</i>	8
Models 751-001ICSV, 701-302ICSV & 701-304ICSV.....	8
Opening and Closing the Amplifier.....	8
Speaker Settings and Adjustments.....	9
Speaker Volume.....	9
Speaker Mute	9
Speaker Gain Setting.....	10
Handset Level Settings and Adjustments (Models 701-302ICSV & 701-304ICSV Only)	10
Transmit Level.....	10
Receiver Volume	10
Audio Alignment	10
Page Disable Control	10
Remote Output Switching (Available with RTU Only).....	10
<i>ICS SmartSeries AC-Powered Plug-in Amplifiers</i>	11

Models 751-901ICS, 701-902ICS & 701-904ICS	11
Opening and Closing the Amplifier	11
Setting the Address	12
Level Adjustments	13
Speaker Mute	13
Speaker Gain Setting.....	13
Transmit Level.....	13
Receiver Volume	13
ALS Minimum Level.....	14
ALS Offset Level.....	14
SmartSeries VLC Level	14
FSK Signal Gain	14
Paging with ADVANCE Head End	15
Paging without ADVANCE Head End	15
Station Time-out Features	15
<i>Troubleshooting</i>	<i>15</i>
<i>Specifications</i>	<i>18</i>



GAI-TRONICS®
A HUBBELL COMPANY

Industrial Communications System AC-Powered Page/Party® Plug-in Amplifiers

Confidentiality Notice

This manual is provided solely as an installation, operation, and maintenance guide, which 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

Product Overview

The GAI-Tronics ICS Page/Party® System is a modular industrial communications system that can include from two to possibly hundreds of stations. All stations are wired in parallel.

The GAI-Tronics ICS Page/Party® Plug-in Amplifier is an important component of the 700 Series Page/Party® system. The handset/speaker amplifier mates directly with the 702, 703, 732, and 733 Series amplifier enclosures and is suitable for indoor or outdoor use.

This manual covers the nine ICS AC-Powered Page/Party® Plug-in Amplifiers that are direct replacements for existing 700 Series amplifiers. Refer to the model chart below.

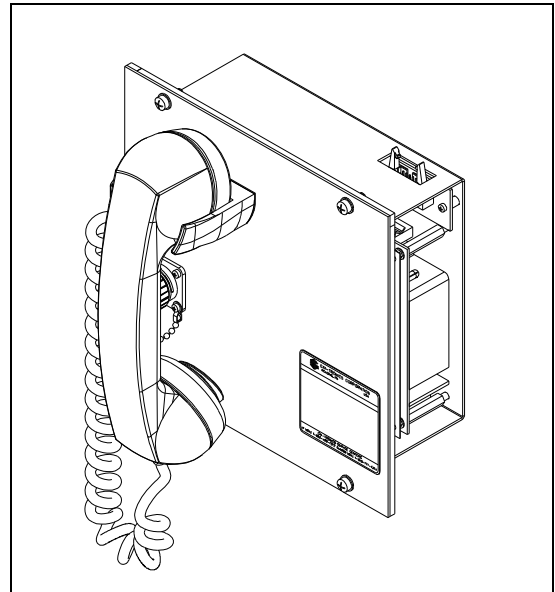


Figure 1. Model 701-304ICS Handset/Speaker Amplifier

Model Chart

ICS Page/Party® Model	Description	Replacement for 700 Series:
751-001ICS	Speaker Amplifier	751-001
701-302ICS	Handset/Speaker Amplifier	701-302
701-304ICS	Handset/Speaker Amplifier with Auxiliary Jack	701-304
751-001ICSVC	Speaker Amplifier with VLC	751-001VC
701-302ICSVC	Handset/Speaker Amplifier with VLC	701-302VC
701-304ICSVC	Handset/Speaker Amplifier with Auxiliary Jack and VLC	701-304VC
751-901ICS	SmartSeries Speaker Amplifier	751-901
701-902ICS	SmartSeries Handset/Speaker Amplifier	701-902
701-904ICS	SmartSeries Handset/Speaker Amplifier with Auxiliary Jack	701-904

Features

- Direct replacement for existing GAI-Tronics 700 Series plug-in amplifiers
- Suitable for indoor or outdoor use
- Single party or multi-party operation depending on the enclosure
- Speaker volume adjustment
- Line adjustment
- Receiver volume adjustment
- Conformal PCBA coating available
- Hytrel or PVC coil cord available for handset models

Important Safety Instructions

- Read, follow, and retain instructions – All safety and operating instructions should be read and followed before operating the unit. Retain instructions for future reference.
- Heed warnings – Adhere to all warnings on the unit and in the operating instructions.
- Attachments – Attachments not recommended by the product manufacturer should not be used, as they may cause hazards.
- Servicing – Do not attempt to service this unit by yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
- This permanently connected apparatus must have a UL Listed 15-amp circuit breaker incorporated in the electrical installation of the building.

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.

General Operation

After installing the ICS Page/Party® Plug-in Amplifier in the appropriate 702, 703, 732 or 733 Series Enclosure, the operation is as follows:

Single party operation (multi-party operation in parentheses):

For paging and subsequent party line conversation, lift the handset or connect the headset, (select a free party line using the five-position rotary switch.) Press the handset pressbar or headset switch, page the desired individual (indicating which party line and) release the pressbar or headset switch. To reply, the paged individual (selects the party line and) lifts the handset. Full-duplex communication can then be held on the party line without broadcasting over the speakers. After the conversation is complete, all parties place their handsets back on-hook.

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

NOTE: An ICS plug-in amplifier model equipped with an auxiliary jack allows the user to be hands-free and mobile while maintaining communication when used with the Model 10401-201 Headset and 10416-103 Extension Cord. When connected, the handset microphone is disabled.

Installation

 **CAUTION**  **Do not install this equipment in hazardous areas other than those on the equipment approval list in the “Specifications” section. Such installation may cause a safety hazard and consequent injury or property damage.**

The ICS AC-powered Page/Party® Plug-in Amplifier plugs directly into the enclosure. Figure 2 shows installation details. Please refer to the applicable amplifier section when you are installing and adjusting the amplifier. Use extra caution not to damage the protruding latch wings of connector P6 located on the top right edge of the amplifier during installation and removal.

Installing the ICS Page/Party® Plug-in Amplifier

1. Plug the amplifier directly into the enclosure.
2. Attach the amplifier to the enclosure with the hardware provided. See Figure 2.
3. Apply power to the station.

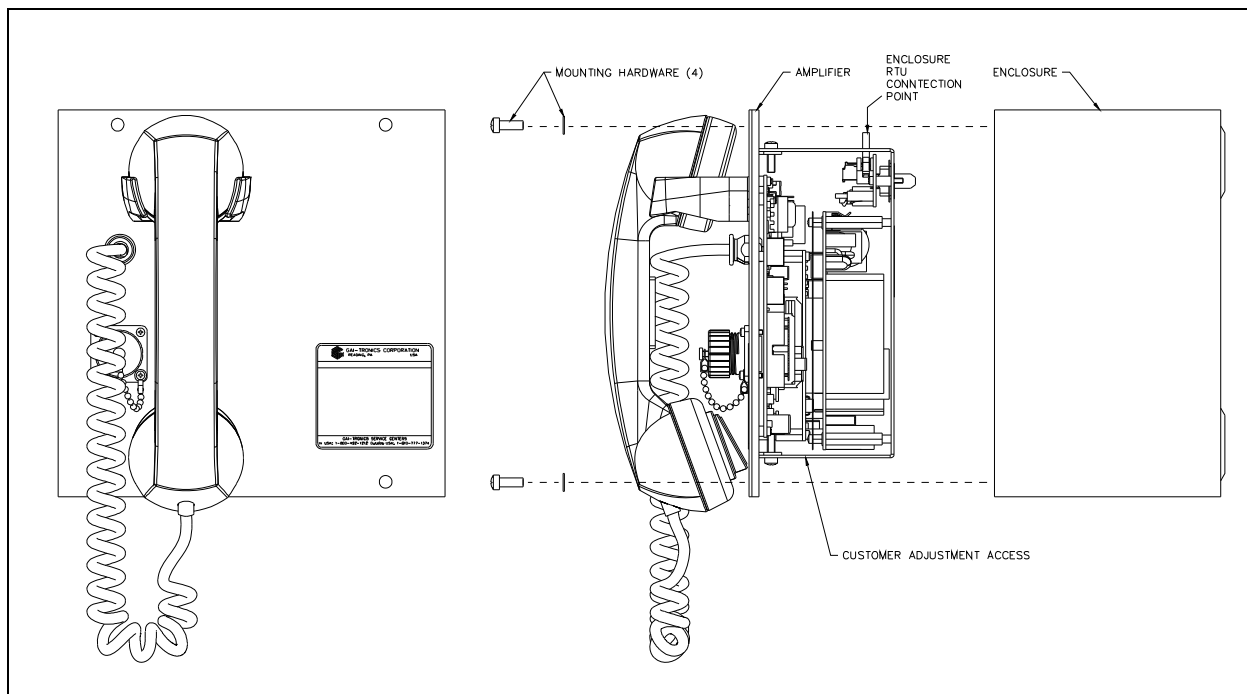


Figure 2. Installation Detail

Enclosure RTU Connection (if applicable)

Amplifiers with VLC or SmartSeries PCBAs can be connected via an enclosure ribbon cable to provide a double-pole, Form “C” relay and one fuse-protected contact. If an RTU is present in the enclosure, connect the ribbon cable provided to the receptacle on the top side of the amplifier.

NOTE: When the SmartSeries PCBA is installed with an ADVANCE head end connection, the RTU provides monitoring of the input status (to trigger action in the ADVANCE head end), a double-pole, Form “C” relay contact (output cable supervision is optional) and one fuse-protected contact.

ICS AC-Powered Page/Party® Plug-in Amplifiers

Models 751-001ICS, 701-302ICS & 701-304ICS

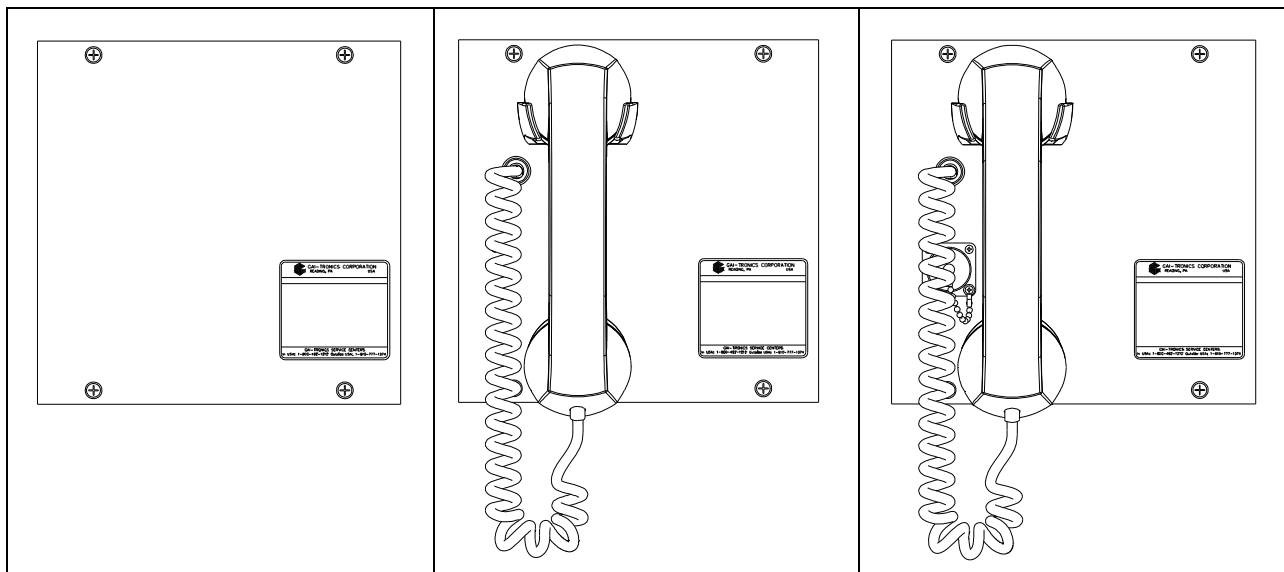


Figure 3. Model 751-001ICS
Speaker Amplifier

Figure 4. Model 701-302ICS
Handset/Speaker Amplifier

Figure 5. Model 701-304ICS
Handset/Speaker Amplifier with
Auxiliary Jack

Opening and Closing the Amplifier

The setting and adjustments vary with each model. Refer to the appropriate section of this manual for the specific instructions for the applicable model. In some cases, the amplifier must be opened to gain access to the PCBAs inside. Opening and closing the amplifier is as follows:

1. Place the amplifier on a flat surface and loosen, but do not remove, the two sets of rear cover screws located on the top and bottom L-shaped slots. See Figure 6.
2. Slide the front panel with the screws sideways and then pull up to separate the front panel from the rear section. The two sections are connected by a ribbon cable.
3. Lay the rear section to the left and the front section to the right with the PCBAs facing upward for access to the applicable adjustments.
4. After the adjustments and settings have been made, slide the rear cover L-shaped slots over the top and bottom screws ensuring no cables are being pinched. Tighten the screws.

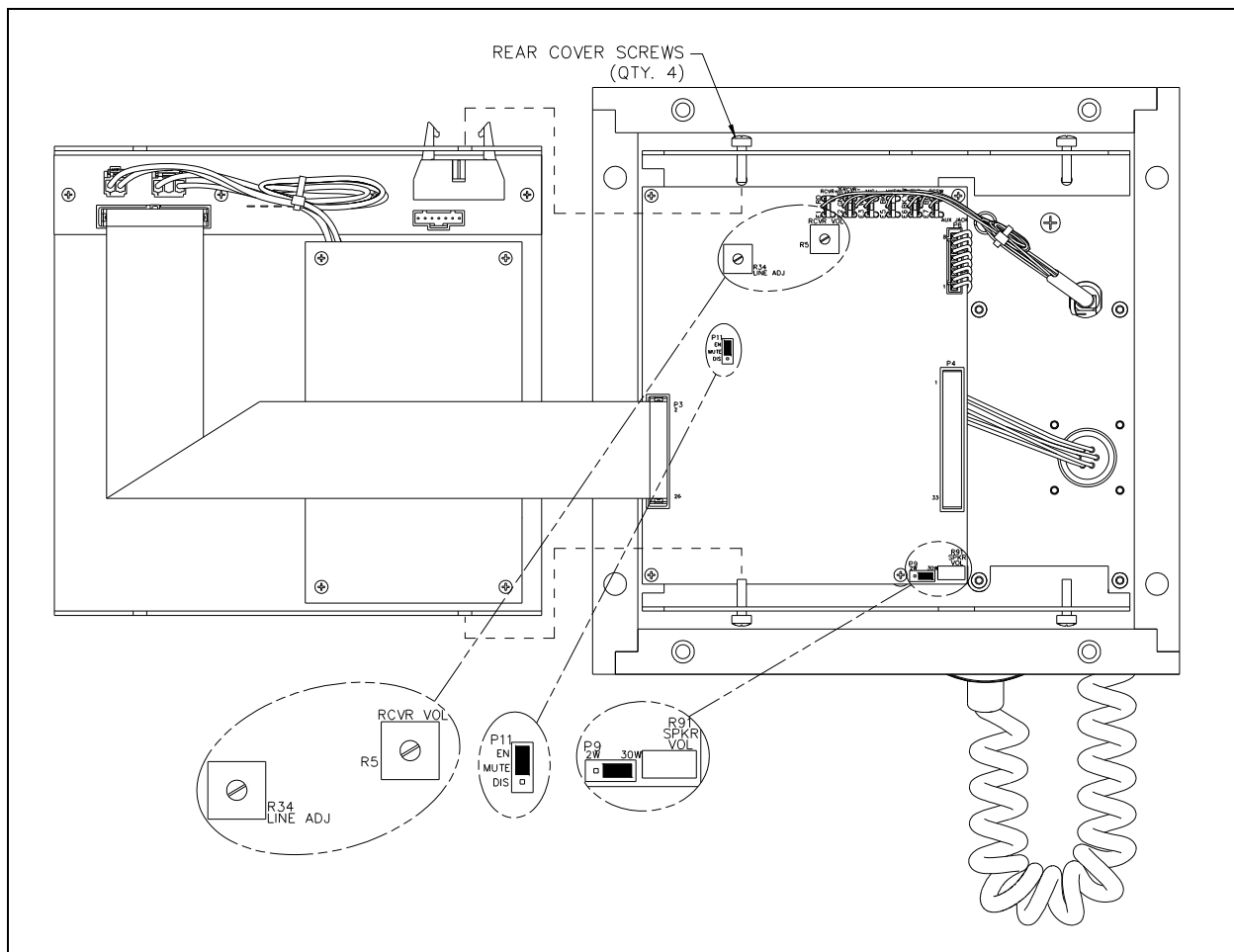


Figure 6. View of Open AC-Powered ICS Page/Party® Amplifier

Speaker Settings and Adjustments

Refer to Figure 6 for locations. It is recommended to use a No. 10440-002 Maintenance Cable (sold separately) to perform the following adjustments.

Speaker Volume

The Speaker Volume potentiometer, R91, adjusts the signal level to the speaker from the page line. It is accessible through a small hole in the bottom of the amplifier so there is no need to open the amplifier to make this adjustment. The default setting is 4 watts for an 8-ohm speaker and 2 watts for a 16-ohm speaker.

Warning: – Maximum output power may exceed rated speaker wattage resulting in speaker damage.

Speaker Mute

The amplifier can mute the associated speaker during page operation to eliminate feedback. To mute the associated speaker, remove the amplifier from the enclosure, if installed. Open the amplifier as previously described. P11 on the Main PCBA mutes the speaker during page activation when in the EN position (default). P11 in the DIS position allows broadcast to the speaker during paging.

Speaker Gain Setting

P9 on the Main PCBA can limit the maximum speaker output level. To change the speaker gain setting, remove the amplifier from the enclosure. Open the amplifier as previously described. P9 in the 30W position (default) represents a 30-watt maximum output. P9 in the 2W position represents a 2-watt maximum output.

Warning: Maximum output power may exceed rated speaker wattage resulting in speaker damage.

Handset Level Settings and Adjustments (Models 701-302ICS & 701-304ICS Only)

Refer to Figure 6 for locations.

Transmit Level

If the signal level from the handset to the page or party lines requires adjustment, remove the amplifier from the enclosure and place it on a stable surface. Open the amplifier as previously described. Use the LINE ADJ potentiometer, R34, on the Main PCBA to make the adjustment.

Receiver Volume

If the receiver volume requires adjustment, remove the amplifier from the enclosure. Open the amplifier as previously described. Use the Receiver Volume potentiometer, R5 on the Main PCBA to adjust the signal level to the handset receiver from the page or party lines.

NOTE: It does not adjust the signal level to the Model 701-304ICS auxiliary headset.

ICS AC-Powered Page/Party® Plug-in Amplifiers with VLC

Models 751-001ICSVC, 701-302ICSVC & 701-304ICSVC

The Volume Level Control (VLC) PCBA allows the amplifier to remotely control the local speaker volume level. When VLC is activated, a remote device transmits a 50 kHz signal over the page line. The station detects the 50 kHz signal and switches to an alternate speaker volume setting.

VLC provides an “alternate” speaker volume setting that is activated by receiving a 50 kHz signal on the page line. Examples of its use are muting office or crew quarters speakers until a high priority message or alarm is broadcast and/or reducing outdoor speaker volume at night. It can prevent local handset paging during emergency conditions, and can also provide a relay output, which requires an RTU configuration.

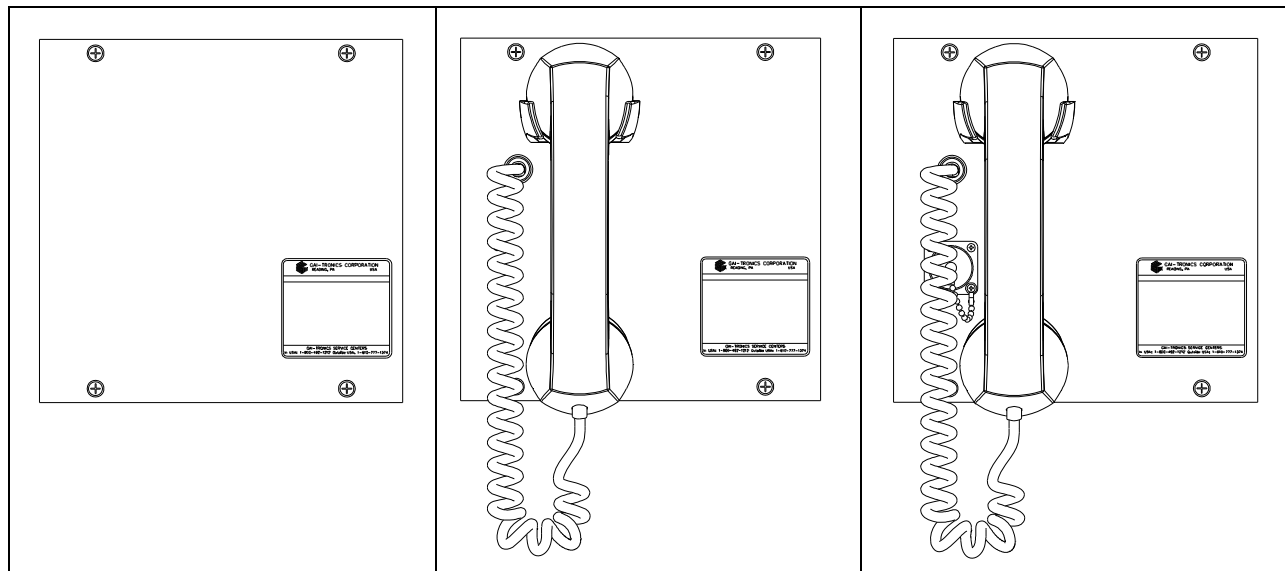


Figure 7. Model 751-001ICSVC
Speaker Amplifier

Figure 8. Model 701-302ICSVC
Handset/Speaker Amplifier

Figure 9. Model 701-304ICSVC
Handset/Speaker Amplifier with
Auxiliary Jack

Opening and Closing the Amplifier

The setting and adjustments vary with each model. Refer to the appropriate section of this manual for the specific instructions for the applicable model. In some cases, the amplifier must be opened to gain access to the PCBAs inside. Opening and closing the amplifier is as follows:

1. Place the amplifier on a flat surface and loosen, but do not remove, the two sets of rear cover screws located on the top and bottom L-shaped slots. See Figure 10.
2. Slide the front panel with the screws sideways and then pull up to separate the front panel from the rear section. The two sections are connected by a ribbon cable.
3. Lay the rear section to the left and the front section to the right with the PCBAs facing upward for access to the applicable adjustments.
4. After the adjustments and settings have been made, slide the rear cover L-shaped slots over the top and bottom screws ensuring no cables are being pinched. Tighten the screws.

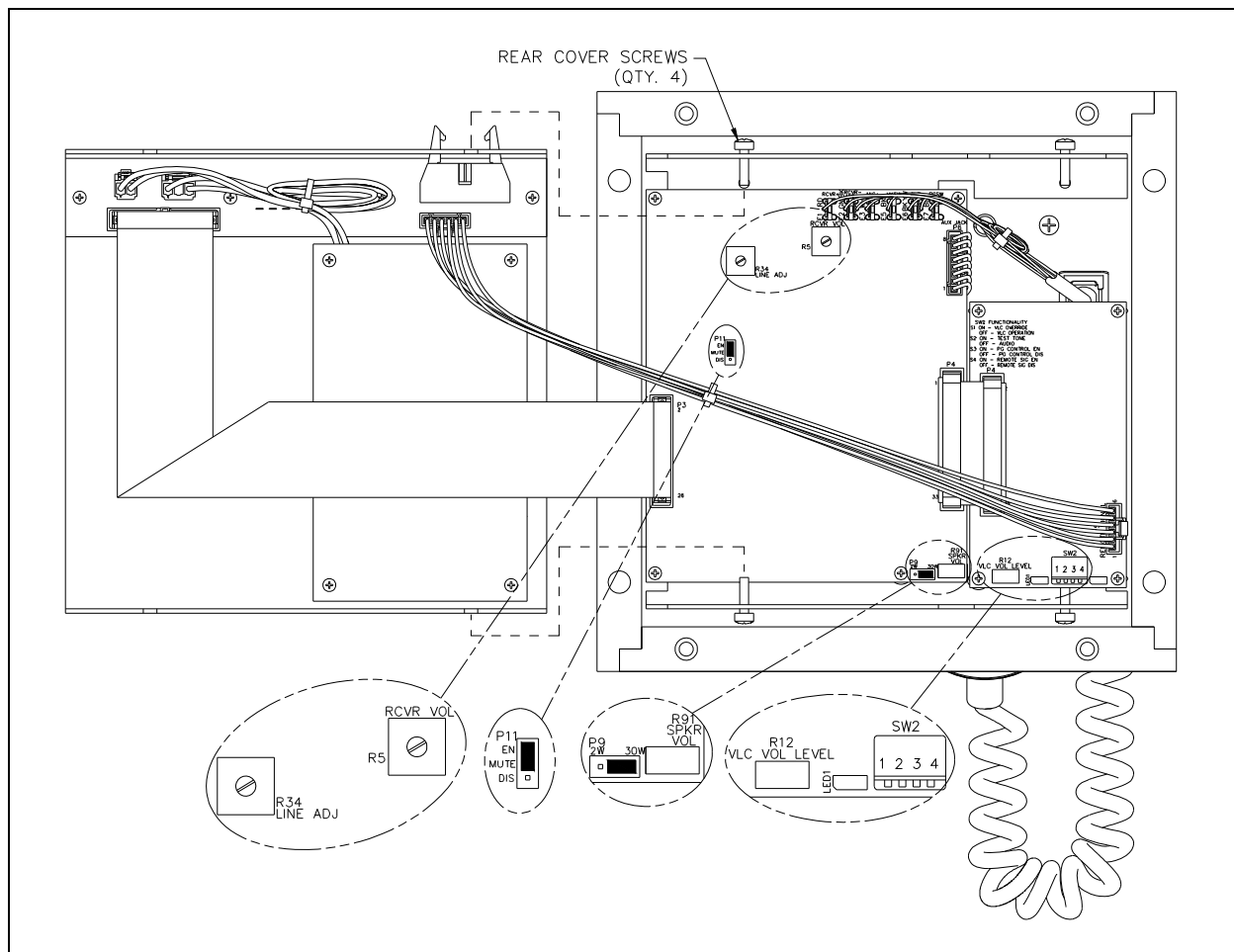


Figure 10. View of Open Amplifier for Setting and Adjustments.

Speaker Settings and Adjustments

Refer to Figure 10 for locations. It is recommended to use a No. 10440-002 Maintenance Cable (sold separately) to perform the following adjustments.

Speaker Volume

The Speaker Volume potentiometer, R91, adjusts the signal level to the speaker from the page line. It is accessible through a small hole in the bottom of the amplifier so there is no need to open the amplifier to make this adjustment. The default setting is 4 watts for an 8-ohm speaker and 2 watts for a 16-ohm speaker.

Warning: Maximum output power may exceed rated speaker wattage resulting in speaker damage.

Speaker Mute

The amplifier can mute the associated speaker during page operation to eliminate feedback. To mute the associated speaker, remove the amplifier from the enclosure, if installed. Open the amplifier as previously described. P11 on the Main PCBA mutes the speaker during page activation when in the EN position (default). P11 in the DIS position allows broadcast to the speaker during paging.

Speaker Gain Setting

P9 on the Main PCBA can limit the maximum speaker output level. To change the speaker gain setting, remove the amplifier from the enclosure. Open the amplifier as previously described. P9 in the 30W position (default) represents a 30-watt maximum output. P9 in the 2W position represents a 2-watt maximum output.

Warning: Maximum output power may exceed rated speaker wattage resulting in speaker damage.

Handset Level Settings and Adjustments (Models 701-302ICSVC & 701-304ICSVC Only)

Refer to Figure 10 for locations. It is recommended to use a No. 10440-002 Maintenance Cable (sold separately) to perform the following adjustments.

Transmit Level

If the signal level from the handset to the page or party lines requires adjustment, remove the amplifier from the enclosure and place it on a stable surface. Open the amplifier as previously described. Use the LINE ADJ potentiometer, R34, on the Main PCBA to make the adjustment.

Receiver Volume

If the receiver volume requires adjustment, remove the amplifier from the enclosure. Open the amplifier as previously described. Use the Receiver Volume potentiometer, R5, on the Main PCBA to adjust the signal level to the handset receiver from the page or party lines.

NOTE: It does not adjust the signal level to the Model 701-304ICSVC auxiliary headset.

Audio Alignment

Use the access hole located on the bottom of the amplifier to make the following adjustments with a small screwdriver:

To set the normal speaker output level, on the VLC PCBA set DIP switch SW2-1 to the “off” position. Set SW2-2 to the “on” position to enable a reference test tone. Adjust R91 on the Main PCBA to the desired audio level. To mute the audio, turn R91 fully counterclockwise.

To set the VLC controlled speaker output level, set SW2-1 on the VLC PCBA to the “on” position. Set SW2-2 to the “on” position to enable a reference test tone. Adjust R12 on the VLC PCBA to the desired audio level. To mute the audio, turn R12 fully counterclockwise.

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

Page Disable Control

To disable local paging when the system VLC tone is present, set SW2-3 on the VLC PCBA to the “on” position.

Remote Output Switching (Available with RTU Only)

To activate the RTU relay when the system VLC tone is present, set SW2-4 on the VLC PCBA to the “on” position.

ICS SmartSeries AC-Powered Plug-in Amplifiers

Models 751-901ICS, 701-902ICS & 701-904ICS

The SmartSeries PCBA adds microprocessor control to the Page/Party® station, providing additional sensor and monitoring capabilities, such as Ambient Level Sensing (ALS) circuitry that changes the local speaker's paging volume in response to varying background noise, an off-hook timeout feature that prevents noise being introduced to a party line by electronically placing the handset "on-hook" after eight minutes, and a page timeout limits a single page broadcast to two minutes, freeing the page line for emergencies.

When used with ADVANCE head-end equipment, the amplifier can monitor key components (including handset, amplifier and local speaker) providing fast notification of any faults. In addition, it can accept supervised contact closure inputs and provide a supervised relay output (requires RTU option).

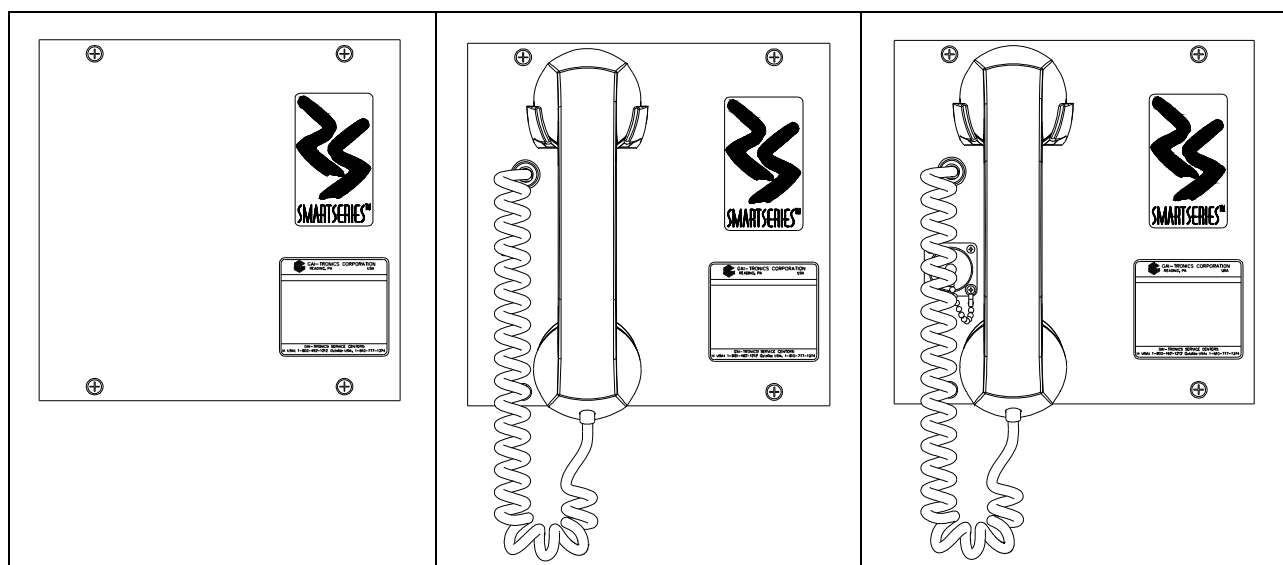


Figure 11. Model 751-901ICS
SmartSeries Speaker Amplifier

Figure 12. Model 701-902ICS
SmartSeries Handset/Speaker
Amplifier

Figure 13. Model 701-904ICS
SmartSeries Handset/Speaker
Amplifier with Auxiliary Jack

Opening and Closing the Amplifier

The setting and adjustments vary with each model. Refer to the appropriate section of this manual for the specific instructions for the applicable model. In some cases, the amplifier must be opened to gain access to the PCBAs inside. Opening and closing the amplifier is as follows:

1. Place the amplifier on a flat surface and loosen, but do not remove, the two sets of rear cover screws located on the top and bottom L-shaped slots. See Figure 14.
2. Slide the front panel with the screws sideways and then pull up to separate the front panel from the rear section. The two sections are connected by a ribbon cable.
3. Lay the rear section to the left and the front section to the right with the PCBAs facing upward for access to the applicable adjustments.
4. After the adjustments and settings have been made, slide the rear cover L-shaped slots over the top and bottom screws ensuring no cables are being pinched. Tighten the screws.

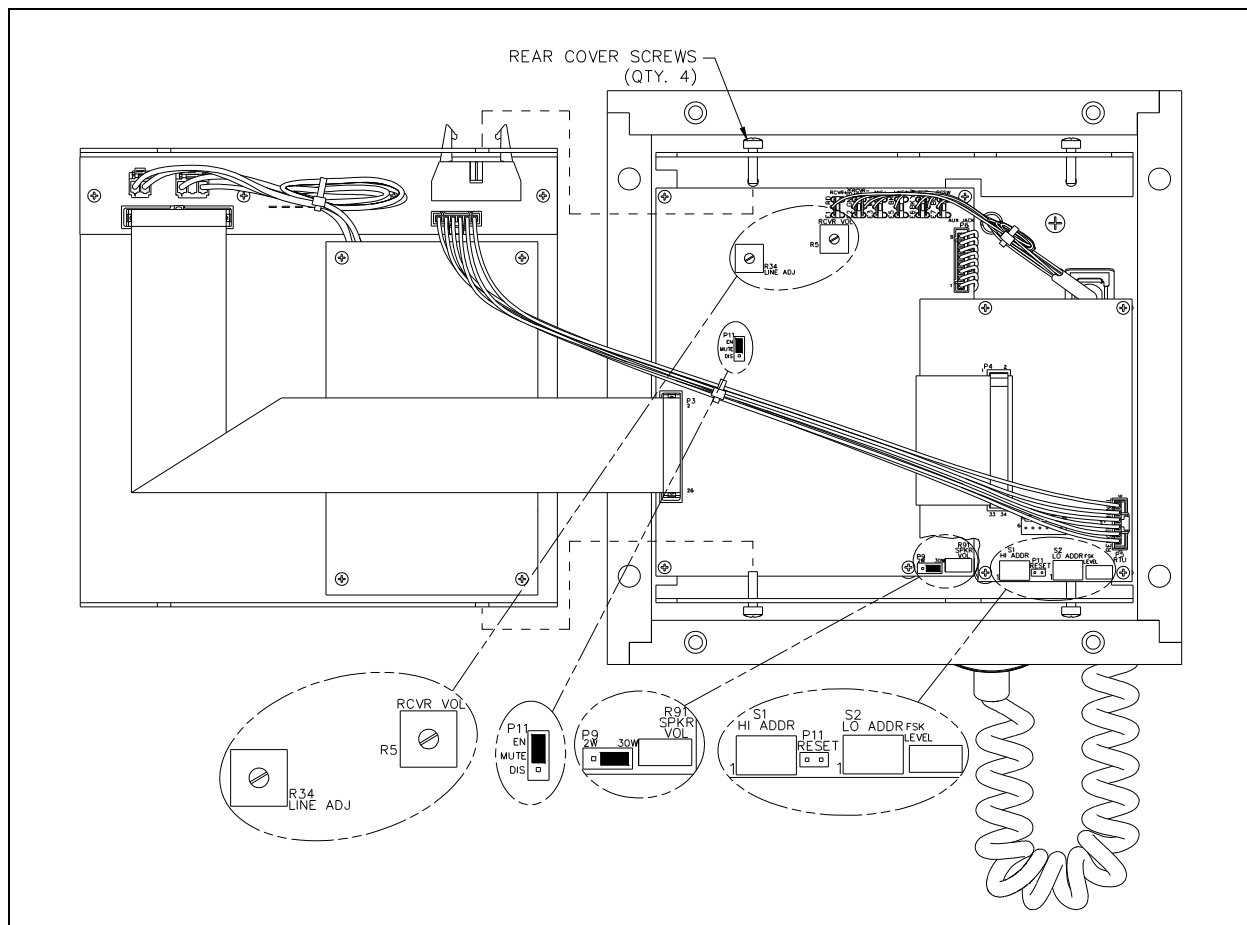


Figure 14. SmartSeries PCBA

Setting the Address

For the SmartSeries option to function properly, each station in an ADVANCE system zone must be given a unique address using the hexadecimal switches, S1 (Hi Address) and S2 (Lo Address). Each switch contains 16 settings, labeled 0–F. A small arrow on each switch indicates the setting.

Make a note of the address of the existing amplifier and use the same setting for the replacement amplifier. The address settings are accessed through holes in the bottom of the ICS SmartSeries Replacement Amplifier.

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 is set to 0 and the low address is set to 5. Valid address settings are 05 to FE. If the SmartSeries PCBA is installed in a system without an ADVANCE head end, set the address to 04 (default).

Level Adjustments

Refer to Figure 14 for locations. It is recommended to use a No. 10440-002 Maintenance Cable (sold separately) to perform the following adjustments.

Speaker Mute

The amplifier can mute the associated speaker during page operation to eliminate feedback. To mute the associated speaker, remove the amplifier from the enclosure, if installed. Open the amplifier as previously described. P11 on the Main PCBA mutes the speaker during page activation when in the EN position (default). P11 in the DIS position allows broadcast to the speaker during paging.

Speaker Gain Setting

P9 on the Main PCBA can limit the maximum speaker output level. To change the speaker gain setting, remove the amplifier from the enclosure. Open the amplifier as previously described. P9 in the 30W position (default) represents a 30-watt maximum output. P9 in the 2W position represents a 2-watt maximum output.

Warning: Maximum output power may exceed rated speaker wattage resulting in speaker damage.

NOTE: Transmit Level and Receiver Volume settings are for Models 701-902ICS and 701-904ICS only.

Transmit Level

If the signal level from the handset to the page or party lines requires adjustment, remove the amplifier from the enclosure and place it on a stable surface. Open the amplifier as previously described. Use the LINE ADJ potentiometer, R34, on the Main PCBA to make the adjustment.

Receiver Volume

If the receiver volume requires adjustment, remove the amplifier from the enclosure. Open the amplifier as previously described. Use the Receiver Volume potentiometer, R5 on the Main PCBA to adjust the signal level to the handset receiver from the page or party lines.

NOTE: It does not adjust the signal level to the Model 701-904ICS auxiliary headset.

ALS Minimum Level

The ALS minimum level is the lowest speaker output level that the station will maintain. To set the ALS minimum level, remove the amplifier from the enclosure and connect the maintenance cable (sold separately). Turn R91 on the Main PCBA fully counterclockwise. 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, the page signal should be used to make the minimum level adjustment. If the page line is inactive following the beep tone, a continuous tone is activated to make the minimum level adjustment. After the tone is activated, all page line activity is ignored until completion of the adjustment.

This test tone is used as a reference to adjust the speaker amplifier output level to the desired volume. Adjust R91 to the desired output. The test tone automatically shuts off 5 seconds after the last adjustment. The factory default setting for minimum level is 4.0 watts nominal into an 8-ohm load.

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, remove the amplifier from the enclosure and connect the maintenance cable (sold separately). Turn R91 on the Main PCBA fully clockwise and listen for the 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. Adjust R91 to the desired offset level.

NOTE: This adjustment should be made under maximum ambient noise level conditions. 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, remove the amplifier from the enclosure and connect the maintenance cable (sold separately). Force the station into the VLC mode by having someone execute a page from a station programmed by the MCU to activate the VLC function. During the page, turn the R91 control on the Main PCBA fully counterclockwise, and listen for two beep tones through the page speaker indicating the VLC Adjustment mode has been activated. After the two beep tones, turn the R91 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 pot adjustment.

NOTE: The system must be equipped with an ADVANCE head end to activate the VLC function.

FSK Signal Gain

The FSK Signal Gain, R13 on the SmartSeries PCBA, adjusts the FSK transmit signal strength. It is set at the factory and should not be adjusted by the installer.

Paging with ADVANCE Head End

Paging and party line operation is similar to standard Page/Party® operation. The main differences are that when the handset pressbar or the headset page switch is depressed a steady “wait” tone will be heard in the handset or headset earpiece. When the “wait” tone ends, a pre-announcement tone, if programmed, will sound, and the operator may place their page. If the system is busy and the page is denied, the user will hear a busy tone in the handset or headset earpiece.

Paging without ADVANCE Head End

Paging and party line operation is similar to standard Page/Party® operation with the addition of an optional pre-announcement tone being generated by the station at the beginning of each page.

Station Time-out Features

The ICS SmartSeries supports a page duration limit that sets the maximum duration of each page. If the page is still active when the page duration limit is reached, the page will be terminated. When used without an ADVANCE head end, the page duration limit is fixed at two minutes.

The ICS SmartSeries supports an off-hook limit that sets the maximum duration that the station may be kept off hook. If the off-hook limit is reached, the station will be placed electrically on hook. To reset the timeout condition, the handset must be physically placed on-hook momentarily. When used without an ADVANCE head end, the off-hook limit is fixed at eight minutes.

Troubleshooting

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

Table 1. Troubleshooting for All Models (Except as Noted)

Problem	Potential Cause
Station not functional	<ul style="list-style-type: none"> • Verify incoming supply voltage at TB2 or TB3 on the Termination PCBA. • Verify regulated 24 V dc at P1 of Termination PCBA. Caution! Supply voltage 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.	<ul style="list-style-type: none"> • Inspect the Page/Party® lines for proper line terminations, shorts, and grounds. • Inspect the Page/Party® party line connections for crossing of the cable pairs.
Feedback occurs during page.	<ul style="list-style-type: none"> • Check location and orientation of speakers in the area. • Refer to the “Speaker Mute” section for the applicable model.

Problem	Potential Cause
Squeal in handset receiver. (Not applicable to speaker amplifier models.)	<ul style="list-style-type: none"> • Ensure proper termination on Page/Party® lines. • Ensure system line balance is connected.
Speaker level is too low/loud.	<ul style="list-style-type: none"> • Speaker volume potentiometer is not adjusted properly. • Ensure the nominal page line level is correct. • Replace the speaker or driver.
Cannot make a page (Not applicable to speaker amplifier models.)	<ul style="list-style-type: none"> • Check handset (or headset) connections • Check proper cable terminations between Termination and Main PCBA. • Check jumper settings or cable connections at P4. • Replace handset.
Handset microphone audio is too low/loud (Not applicable to speaker amplifier models.)	<ul style="list-style-type: none"> • Disconnect headset, if connected (auxiliary jack models only). • Adjust the LINE ADJ on the Main PCBA. • Check jumper settings or cable connections at P4 on the Main PCBA. • Ensure proper termination of Page/Party® lines. • Check handset connections. • Check proper cable terminations between Termination and Main PCBAs. • Check operation of hookswitch. • Replace handset.
Handset receiver audio is too low/loud. (Not applicable to speaker amplifier models.)	<ul style="list-style-type: none"> • Adjust the receiver volume potentiometer on Main PCBA. • Check jumper settings or cable connections at P4. • Ensure proper termination of Page/Party® lines. • Check handset connections. • Check proper cable terminations between Termination and Main PCBAs. • Check operation of hookswitch. • Replace handset.

Table 2. Additional Troubleshooting for VLC Models 701-302ICSVC, 701-304ICSVC, and 751-001ICSVC

Problem	Potential Cause
Speaker volume is too low/loud.	<ul style="list-style-type: none"> • Refer to the “Audio Alignment” section for the specific VLC model. • Ensure the nominal page line level is correct.
Cannot place a page.	Refer to “Audio Alignment” and “Page Disable Control” sections for the specific VLC model.
RTU output is not functional.	<ul style="list-style-type: none"> • Refer to “Remote Output Switching” section for the specific VLC model. • Check fuse F1 on RTU PCBA. • Check the cable connection at P5 on the RTU and VLC PCBA. • Check RTU terminal connections on TB7 on the RTU PCBA in the enclosure. • Check operation of connected device.
RTU input does not function.	Inputs are only available with SmartSeries models.

Table 3. Additional Troubleshooting the SmartSeries Models 701-902ICS, 701-904ICS and 751-901ICS

Problem	Potential Cause
Speaker volume is too low/loud.	<ul style="list-style-type: none"> • Refer to the “ALS Minimum Level,” “ALS Offset Level” and “SmartSeries VLC Level” sections for the specific model. • Check cable connection at P4. • Ensure the nominal page line level is correct.
Page/Party® operation does not function.	Refer to the “Setting the Address” section for the specific model.
RTU output is not functional.	<ul style="list-style-type: none"> • For supervised output, ensure no monitored output faults exist. • Check fuse F1 on RTU PCBA. • Check the cable connection at P5 on the RTU and SmartSeries PCBA. • Check RTU terminal connections on TB6 and TB7 on the RTU PCBA in the enclosure. • Check operation of connected device.
RTU input does not function.	<ul style="list-style-type: none"> • For supervised input, ensure no monitored input faults exist. • Check the cable connection at P5 on the RTU and SmartSeries PCBAs. • Check RTU terminal connections on TB6 on the RTU PCBA in the enclosure. • Check operation of connected device.

Specifications

Power Requirements

AC Input

Input Voltage90 to 140 V ac, 50/60 Hz, 120 V ac nominal

Power Consumed (8-ohm load)	120 V AC
Idle	70 mA/8.4 VA
4-watt output (default setting)	120 mA/14.4 VA
12-watt output	200 mA/24.0 VA
30-watt output	400 mA/48.0 VA
Maximum Current Consumption (8-ohm load)	90 V AC
30-watt output	520 mA/46.5 VA

Handset

MicrophoneDynamic, noise-canceling
 Receiver Dynamic, hearing aid compatible
 CordRetractable, 6-foot extended, PVC
 Material ABS
 External control.....Push-to-page handset pressbar

Handset Amplifiers

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 reference 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 Amplifiers

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 reference to 1 kHz

Distortion <1% THD @ 1 kHz to 24 W
 <3% THD @ 1 kHz to 30 W

Input impedance..... 50,000 Ω
 16 kΩ with SmartSeries option

Model 751-001ICS only—SmartSeries offset level adjustment range 0 to 30 dB

*See Figure 15 on Page 20.

VLC Specifications

VLC minimum input level	50 mV _(RMS)
VLC tolerance	50 kHz +/-4%

RTU Specifications**RTU Input Control (with SmartSeries Models)**

Switch type.....	Normally open (N.O.) or normally closed (N.C.) dry contacts
End-of-line termination.....	20 k Ω , or 15 k Ω + 5.1 k Ω
Cable resistance	100 Ω maximum loop resistance
Contact closure resistance.....	1 k Ω maximum
Open fault detection.....	>65 k Ω
Short fault detection.....	<200 Ω

Mechanical

Material/finish.....	16-gauge cold rolled steel/textured gray powder coat
Dimensions	8.1 H \times 8.1 W \times 3.0 D in (20.6 \times 20.6 \times 7.6 cm)

Handset/Speaker Amplifier

Net weight.....	5.25 lb (2.4 kg)
Shipping weight	6.25 lb (2.8 kg)

Speaker Amplifier

Net weight.....	4.25 lb (1.9 kg)
Shipping weight	5.25 lb (2.4 kg)

Environmental

Temperature range (operation and storage)	-22 $^{\circ}$ F to 158 $^{\circ}$ F (-30 $^{\circ}$ C to 70 $^{\circ}$ C)
Humidity	95% non-condensing

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, T4
-------------------------------------	---

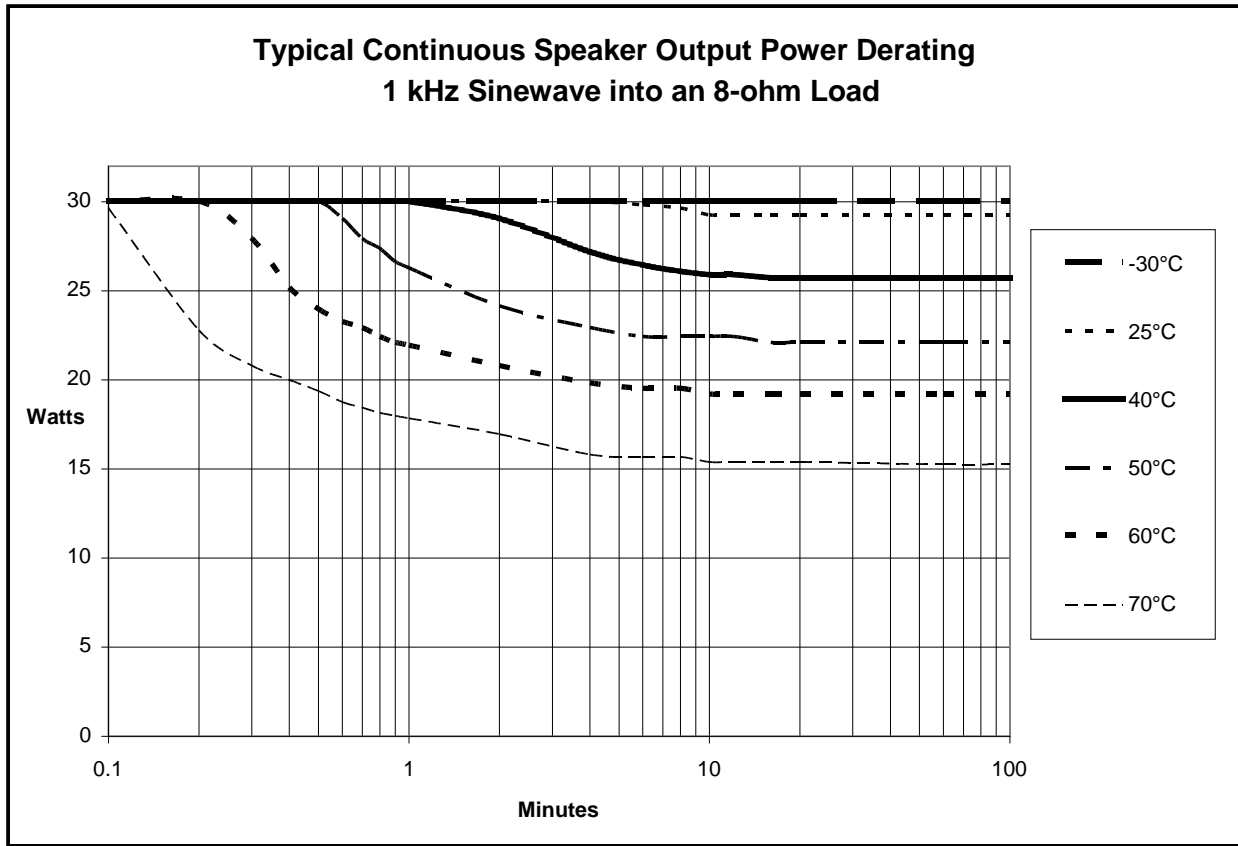


Figure 15. Typical Continuous Speaker Output Power Derating
1 kHz Sine Wave into an 8-ohm Load

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.