



GAI-TRONICS® CORPORATION  
A HUBBELL COMPANY

# 700 Series 24 V dc Page/Party® System Design and Installation

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## Confidentiality Notice

This manual is provided solely as an installation, operation, 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 GAI-Tronics Page/Party® system is a modular industrial communication system incorporating from two to possibly hundreds of stations. Stations are available in several forms; each including a handset, two amplifiers (one for the handset and the other to drive one or more paging speakers), associated controls, and a paging speaker (usually mounted separately). All stations are wired in parallel and additional stations may be added at any time.



A GAI-Tronics Page/Party® system layout should be planned in advance of installation. Select handset station locations based on convenience, accessibility, and personnel safety. Consider the ambient noise level or reverberation in each area when selecting the quantity and location of paging speakers.

The speaker amplifier, built into each station, drives one horn-loaded paging speaker. Separate speaker amplifier stations should be added to the system if additional paging speakers are needed. Several paging speakers can be connected to a single station in quiet areas such as offices or living quarters.



Please refer to Publication 42004-135, Speaker Installation, or consult with a GAI-Tronics sales representative for additional system planning information.

## Design Considerations

### System Power

 **WARNING**  —NEVER connect 24 V dc Page/Party® equipment to a supply voltage in excess of 28.8 V dc or equipment damage may result.

The GAI-Tronics 24 V dc Page/Party® system equipment is designed to operate from a 24 V dc rechargeable battery. A battery charger may be connected to the battery to maintain the charge.

 **CAUTION**  —Under no condition should this equipment be operated from a battery charger without the batteries connected. Most chargers have an unloaded output of 35 to 45 volts that can damage equipment designed for nominal 24 volts.

Ground the negative side of the battery system at only one point to eliminate hum and noise induced in the system from the power source.

## Electrical Noise

Consider the following suggestions to avoid electrical noise caused by slip rings and SCR (silicon control rectifier) power supplies when designing the system:

**Slip Rings**—Use an RF (radio frequency) alternative and avoid using slip rings as audio conductors. Slip rings are a source of electrical noise and are not reliable.

**SCR Power Supplies**—Use one or all of the following four recommendations to reduce electrical noise if the Page/Party® system is being installed in areas where SCR power supplies are used to power motors or other heavy equipment:

1. *Separation*—Locate Page/Party® system cables as far as possible from SCR power supply input or output cables. Electrical coupling between cables is reduced by the square of the distance between the cables.
2. *Shielding*—Use shielded (armored) system cables if the cable must be run in the same bundle or cable tray with the SCR power supply cables. Shielded cables reduce capacitive coupling between SCR power supply cables and Page/Party® audio cables.
3. *Fiber Optic Cables*—Use fiber optic audio cables in cable trays as an alternative to shielded cables. Fiber optic cables are immune to SCR-generated electrical noise.
4. *Isolation*—Batteries/battery chargers in 24 V dc systems usually provide isolation from the SCR noise on the ac power system. Cable separation and shielding as mentioned above still apply.

**NOTE:** Avoid battery chargers that use SCRs in their design.

## System Cabling

All stations must be wired in parallel. Good planning will minimize the length of cable required for the installation. GAI-Tronics can supply multi-conductor cable specifically designed for this application. GAI-Tronics cable is color-coded to match the termination points in the enclosures to simplify ease of installation. The number, size, and color-coding of conductors is listed in the accompanying system connection diagrams.

Careful consideration must be given to power cable losses when planning a GAI-Tronics Page/Party® system using 24 V dc stations. The number of units connected in parallel on one cable and the total cable length are restricted when using the same cable types that are used in 120 V ac systems (see [Table 1](#)).

Branch lines from the 24 V dc source can contain from one to six stations. The maximum cable span is 4,000 feet for a single station when using No. 8AWG power conductors. Systems with multiple stations may require multiple branches to meet the maximum cable length and number of stations per branch requirements. It is assumed that stations are evenly spaced along the cable when two or more stations are connected on a single branch.

Each amplifier contains two fuses in the 24 V dc input circuit to protect and isolate the handset and speaker amplifier circuitry in the event of an internal failure.

Power line wiring to each amplifier or group of amplifiers in a branch circuit should have a fuse or circuit-breaker to protect against wiring failures. Fuse or circuit breaker ratings are determined by the cable size used in the branch. Consult the National Electrical Code (NFPA70) or Canadian Standards Association (CSA 22.1) for the maximum allowable capacity of the wire used. A 15-amp fuse or circuit breaker should be installed for each branch line at the point where it connects to the battery when cables with No. 14 AWG power line conductors are used.

Table 1. Maximum Cable Distance (ft)\*

Number of Units	No. 14 AWG Total / Between	No. 12 AWG Total / Between	No. 10 AWG Total / Between	No. 8 AWG Total / Between
1	977 / 977	1,554 / 1,554	2,471 / 2,471	3,931 / 3,931
2	651 / 325	1,037 / 518	1,648 / 824	2,620 / 1,310
3	489 / 163	777 / 259	1,236 / 412	1,966 / 655
4	391 / 98	622 / 155	988 / 247	1,572 / 393
5	325 / 65	518 / 103	823 / 165	1,310 / 262
6	279 / 46	444 / 74	706 / 117	1,123 / 187
9	196 / 21	311 / 34	494 / 55	786 / 87

\*Based on the following assumptions:

- Continuous tone (alarm) signals are driving each station's speaker amplifier to a maximum of 12 watts.  
**NOTE:** If the station is used for speech (audio) signals **only**, the distances stated above can be multiplied by a factor of 2 because speech signals do not have the energy content that a continuous tone has; therefore, they do not require as much average current and thus less cable IR drop will result.
- GAI-Tronics-supplied cable is used.
- Wire resistance (ohms) is the nominal value for the applicable AWG at 1,000 feet of bare copper, stranded wire @ 20 °C (68 °F). Wire resistance values used are as follows:  
No. 14 AWG = ~2.525 ohms; No. 12 AWG = ~1.588 ohms; No. 10 AWG = ~0.999 ohm; No. 8 AWG = ~0.628 ohm
- DC V at cable run's feed point (Float charge of connected batteries) = ~26.6 V dc
- DC V at the last unit in cable run = 21 V dc minimum
- Station unit current draw (I) is the same regardless of the unit's placement along the cable run for ease of calculation. (1.1 amperes when unit is producing a 12-watt sine wave output.)
- Distances reflect a 3% reduction for margin of error.

The following formula may be helpful in calculating the approximate maximum distance for a **SINGLE** station for conditions other than those listed above.

For **CONTINUOUS** tone applications with minimum distortion:

$$\frac{V_{\text{FEEDPOINT}} - V_{\text{MINIMUM}}}{(2 \times \text{AWG WIRE RESISTANCE PER FOOT @ } \sim 20^{\circ}\text{C}) \times \text{UNIT I [IN AMPS @ 12W OUT]}} = \text{APPROXIMATE MAXIMUM DISTANCE IN FEET}$$

For **SPEECH** operation only, multiply the above result by a factor of two.

**Example:** What is the approximate maximum distance for a **single** dc station if the voltage feed is 27.5 V dc and a No. 14 AWG wire is used @ 20 °C?

Info:

- No. 14 AWG @ 20° C = ~0.002525 ohm per foot × 2 for LOOP R
- $V_{\text{FEEDPOINT}} = 27.5 \text{ V dc}$

**Solution:**
$$(27.5 \text{ V} - 21 \text{ V}) / ((2 \times 0.002525 \text{ } \Omega/\text{ft}) \times 1.1 \text{ A})$$
$$= 6.5 / 0.005555$$

= 1,170 feet (for **CONTINUOUS TONE** signal), or up to ~2,340 feet (factor of 2) for **SPEECH** only signals

## Adding Additional Stations

Consult the 24 V dc system layout diagrams at the end of this manual when installing add-on stations. These figures, when used in conjunction with the station installation information and cable layout guide, should provide all the information necessary to install additional Page/Party® stations.

## Installation Information

### Mounting Station and Speaker Amplifier Enclosures



Each Page/Party® system station includes a plug-in amplifier that mates with a fabricated steel, cast aluminum, or molded reinforced non-metallic enclosure. Each enclosure provides a terminal strip for connecting the inter-station cable.

Enclosures are packed separately from the plug-in amplifiers at the factory. This allows the amplifiers to remain protected while the enclosures are installed and wired. This is particularly important during system installation in areas under construction.

The 16-gauge steel enclosures do not have openings for conduits or cables since the location of these can vary with each installation. Drill or punch the necessary openings before mounting the enclosure. Locate the openings either along the top or bottom of the enclosure and near the rear surface. Avoid the top center because of possible interference with the plug-in amplifier receptacle. A drill template is supplied with each enclosure.

Cast aluminum enclosures are drilled and tapped on the top and bottom for specially-designed hub plates. The enclosures include plates for a single 1.25-inch conduit unless special arrangements are made. Plates for a single 0.5-inch, 1.5-inch, or dual 1.25-inch conduits are available.

The molded enclosures are supplied without any conduit openings. Sealed threaded hubs, such as Myers Scru-tite®, are recommended. A drill template is supplied with each enclosure.

 **CAUTION**  —Use caution when drilling holes to avoid damaging the internal electrical components and wiring.

Suggested mounting height for all station enclosures is 54 inches (137 cm). Subsets used with remote subset amplifiers are supplied with an 8-foot (244 cm) cable. The enclosure for the remote subset amplifier must be mounted within reach of the 8-foot cable. Desktop or desk-edge station enclosures are often mounted in the knee-well of a desk.

### Line Balance Assembly Requirements

Each GAI-Tronics Page/Party® system requires one line balance assembly. Its function is to properly load the page and party line circuits. Using GAI-Tronics standard cable, select a location that is:

- near the electrical center of the system
- adjacent to an indoor station in a relatively quiet area

Contact a GAI-Tronics representative for further information for larger system designs or when using other types of cable. The line balance assembly has one electrical adjustment that must be made while using a station (see the [Line Balance Assembly Adjustment](#) section). The preferred method for mounting the line balance assembly is as follows:

1. Suspend the assembly from the lower side of the indoor wall station using a 1-inch conduit nipple (not supplied).
2. Connect one twisted pair wire for the page circuit and another for each of the party lines between the terminal blocks of the line balance assembly and the associated indoor wall station.
3. Make the wiring connections between the No. 305 Series Line Balance Assembly and the station enclosure in accordance with the wiring diagrams at the end of this publication.

## Inter-station Conduit and Cable Requirements

Inter-station cables are generally installed in cable trays or conduit. The outside diameters of the GAI-Tronics cables discussed in this publication are provided below to assist in determining the conduit sizes required (see [Table 2](#)). Size and installation of conduit and cable must meet the requirements of applicable electrical codes.

A ground conductor, with green/yellow insulation must be included with cable in any area where no conduit or where non-metallic conduit is used. Non-metallic enclosures used with metallic conduit and cable without a ground conductor requires a bond between the conduit(s) and the ground terminal (point 3) within the enclosure.

The conductors of the GAI-Tronics system cable should be lugged and attached to the terminals; either in accordance with the color code shown on the applicable accompanying diagrams, or in accordance with special drawings provided for this purpose.

**NOTE:** Some cables have an orange “spare” conductor. This conductor should be insulated and not connected to the terminal strip(s) in the enclosures unless otherwise instructed.

GAI-Tronics cable is a Class 1 cable (maximum voltage is less than 600 V). In a cable tray, Class 1 cables may only be grouped with other Class 1 cables. Long runs of GAI-Tronics cable in proximity to other 600-volt cabling may cause an undesirable amount of hum induced onto the Page/Party® system’s signaling lines. Cable runs over ½-mile should be separated from other 600-volt cables by a minimum of 12 inches to reduce undesired hum.

## Automatic Speaker Muting

One of the many features of GAI-Tronics Page/Party® system equipment is automatic speaker muting. When the push-to-page switch is pressed at a particular station, the paging speaker connected to that station is silenced to prevent acoustic feedback to the handset microphone. The paging speaker is still live to broadcast paging calls from other stations while the handset is in use for party line conversation.

For cases where the muting feature is not necessary or may be a disadvantage, it can be defeated as follows:

1. Locate lugged violet wire attached to terminal point 7 (mute) on the terminal block within the enclosure for station to be modified.
2. Transfer lugged violet wire to terminal point 8 (Page L1).

Table 2. Cable Information

Cable P/N	Conductors	O.D.
60038-101	8	0.60 inches (15.1 mm)
60029-101	16	0.68 inches (17.2 mm)

## Amplifier and Subset Installation

After making any necessary muting changes:

1. Unpack and install the amplifier for each station.
2. Unpack the remote subsets (for desktop, desk-edge, or panel mount stations) and plug each into the bottom sides of the amplifier enclosure (see [Table 3](#) for the series numbers covered by this bulletin).

Table 3. Station Enclosure, Amplifier, and Subset Compatibility

System	Enclosure	Amplifier	Subset
Single Party Line	702, 732, 733	701	None
Single Party Line	7245	723	711, 716, 726
Multiple Party Line	703, 7325, 7335	701	None
Multiple Party Line	7245	723	7115, 7165, 7265

**NOTE:** The above stock numbers are simplified. Most stock numbers include a single digit letter or three-digit suffix (i.e. 702A, 711-101).

## Checkout and Adjustment

Test all field wiring connections (page line, party line(s), mute, dc power, and speaker) between stations, and complete the line balance assembly adjustment to minimize sidetone. Sidetone is sound diverted from a telephone's microphone to the earpiece so that the speaker can hear their own voice.

### Initial Start-up

1. Ensure that all handsets are on-hook.
2. Apply dc power and check the station next to the line balance assembly.
3. Press the push-to-page switch (handset pressbar on some stations) and speak directly into the microphone of the handset.

The broadcast should be heard at all paging speakers in the system except those associated with the station under test.

4. Adjust the line balance assembly to optimize sidetone rejection on the page line after all stations in the system are installed (see the [Line Balance Assembly Adjustment](#) section below).

**NOTE: Do not adjust station (amplifier) controls until the line balance assembly is adjusted.**

5. Release the push-to-page switch and check the party line(s) sidetone level by speaking into the microphone of the handset.

Very little or no sidetone should be heard from the handset earpiece if the system is working properly. The line balance assembly contains a fixed resistor load for each party line so party line sidetone rejection only occurs if the line balance assembly is properly connected. No party line adjustments are provided.

6. Check party line operation by conversing between two or more stations.

### Line Balance Assembly Adjustment

Very little or no sidetone should be heard from the handset earpiece when the system is properly balanced. There will be a high level of sidetone, perhaps enough to cause feedback, if the line balance assembly is not connected properly.

To set the control for proper page circuit loading:

1. Remove the line balance assembly cover to expose the line balance control.
2. Lift the handset from the adjacent handset hook and press the push-to-page button.
3. From a normal speaking distance (approximately ½ inch), blow steadily into the handset microphone and adjust the control to minimize receiver sidetone.

**NOTE:** This adjustment needs to be made only at the initial installation of the system unless more than 10 speaker amplifiers are added or removed from the system. Repeat the adjustment if more than 10 speaker amplifiers have been added or removed.

4. After final adjustment, replace and secure the cover with the four mounting screws to discourage tampering by unauthorized personnel and to prevent entry of contaminants.

### **Amplifier Adjustment**

Each amplifier has a paging speaker volume control. It is accessible from the front panel with a screwdriver, but is concealed behind the metal GAI-Tronics nameplate. To reach it, simply loosen (do not remove) the two nameplate screws and pivot the nameplate around the left screw. This control is adjusted at the factory so that a moderate page level produces 4 watts of output power.

### **Additional Handset/Speaker Amplifier Controls**

Each handset/speaker amplifier has three additional internal controls; receiver volume control, transmission volume control, and receiver sidetone control. All controls are accessible using a screwdriver through the holes in the chassis. A fourth hole allows access from the rear for the paging speaker volume control. Controls are factory-adjusted for optimum results in most industrial applications. Do not readjust these controls to solve system problems until other possible faults are checked, such as a missing, defective, or improperly connected line balance assembly.

There is very little drop in receiver (handset earpiece) volume level due to system cable losses. The only reason to reset the receiver volume control is to compensate for extremely high ambient noise levels (up to 110 dB), or to meet particular personnel needs.

Receiver sidetone rejection is noticeably affected by cable impedance at stations installed in excess of 3,000 feet (1 km) from the line balance assembly,. Use the receiver sidetone control to compensate for this by rotating the control clockwise approximately 60 degrees for 3,000 feet (1 km) of cable length.

## **System Troubleshooting**

### **Hum or Buzz**

Hum or buzz on the page circuit (or one or more party circuits) is usually due to either a short circuit of one of the two conductors for each circuit to ground or an unbalanced leakage to ground. The voltage drop from each conductor of a twisted pair cable to ground should be the same and there should be no voltage drop across the two conductors if there are no significant leakage paths or short circuits to ground.

Locate the source of the ground to correct the problem by using an ohmmeter to check various junction points in the system. The ground can also be located by going from one junction point to another and disconnecting each affected circuit. Faults can also be located in a plug-in amplifier; however, most ground circuits occur in improper terminations or are caused by small strands protruding from an improperly lugged wire.



Another source of grounds or near-grounded circuits can be caused by junction boxes that are filled or partially-filled with water. In many cases, there are deposits in the boxes that when combined with water, produce conductive or corrosive solutions. These deposits cause leakage between circuits and can corrode the wire and terminals.

Isolation of field wiring may be necessary for test purposes. Connect a 33-ohm, 1/2-watt resistor across L1 and L2 of the Page/Party® line circuits if the isolation removes the line balance assembly from the operating portion of the system. Remove the resistors after completion of the tests.

## **Feedback or Distortion on the System**

Each page and party circuit must be loaded to the optimum 33 ohms using the line balance assembly. The system will have excessive gain and will break into feedback quite easily if the line balance is not connected or is defective. Voices will also be distorted and there will be a high level of sidetone in the handset receiver.

Each party line is terminated with fixed 33-ohm resistor in the line balance assembly. The page line has an adjustable control to compensate for the number of speaker amplifiers connected to the system. Improper adjustment affects gain and increases the level of sidetone (see the [Line Balance Assembly Adjustment](#) section).

## **Very Low Audio Level on One or More Lines at all Stations**

It is possible for the system, or part of the system, to function with a dead short across the page or party circuits. The audio level of the system will be very low; decreasing to minimum level in the vicinity of the short circuit, if this occurs. Locate the short circuit the same way as locating a ground, checking junction points with an ohmmeter.

## **Cross Talk**

Cross talk, or inter-channel interference, is generally caused by accidental crossing of circuits in a junction box. To check for this condition, measure the resistance between the circuits of the interfering channels. The resistance should be infinite or a very high value. Leakage or shorts to ground in two or more circuits can also result in cross talk on the affected circuits.

## **Audio Voltage**

In a properly operating system, audio voltage across any of the page or party circuits (L1 or L2) will be 0.5 to 0.75 volts ac on peaks when an audio signal is present: i.e., someone is speaking into a handset. The voltage is proportional to the loudness of the person's voice who is using the handset.

## **Static Charges**

Induced ac voltage may exist from the conductors of the page and party line circuits to ground in many normal installations. The voltage may be as high as 50 volts or more. This voltage is induced into the circuits by capacitance to the ac power circuit (generally carried in the same cable, and also from power cables running parallel to the communication cables). This voltage is inconsequential and can be ignored. Problems occur only if one side of the page or party circuit becomes grounded.

## **One Inoperative Station in a Working System**

Except for a wiring error, an inoperative station indicates a defect in the amplifier at the station. This is checked quickly by installing a spare amplifier or exchanging amplifiers with a properly operating station.

## Special Notes Regarding Installation

GAI-Tronics Page/Party® system equipment does **not**, in normal operation, produce arcs, sparks or heat that would ignite industrial gases or dusts. Many standard GAI-Tronics products are NRTL approved for use in USA and Canada, for intended use in specified Division 2 areas if properly installed and maintained.

Proper installation is defined as:

- mounting and wiring per factory directions without unauthorized modification
- following all requirements of the U.S. National Electric Code (NFPA-70) or the Canadian Electric Code (CSA Standard C22.1)



Installers must be familiar with these codes and consult the codes as required. The most applicable parts of the N.E.C. code are in articles 500-503.

The most applicable parts of the Canadian code are in Section 18. Some, but not all, significant points are:

- Conduits in a Class I, Division 2 area to or from a non-hazardous area or an adjacent Class I, Division 1 area must have approved seals in the boundary.
- Conduits or raceways in a Class II, Division 2 or Class III area must have dust seals at entrances to dust-tight equipment and at boundaries to other areas unless such conduits or raceways are also dust-tight.
- Explosion-proof (Division 1) equipment may be installed in a Division 2 area but must have the same conduit and cable seals as if installed in the corresponding Division 1 area.
- Sealing of multi-conductor cables or conduits containing multi-conductor cables in Class I, Division 1 or 2 areas must be around each conductor of the cable—except where type MI cable is used.

## Safe Power Connection/Disconnection

To satisfy Division 2 requirements, the equipment will not create arcs or sparks in normal operation when completely installed and powered. Installing or removing an amplifier or plugging in a live enclosure is not normal operation and can create arcs.

 **CAUTION**  —To guarantee safety, do not insert or remove equipment from live enclosures, unless the area is known to be non-hazardous at the time.

A better arrangement uses a separate power disconnect, performed safely in either of two ways:

1. Explosion-proof disconnect switch (can be located in the Division 2 area).
2. Ordinary disconnect switch in a non-hazardous area (outside the Division 2 area).

Either method allows the use of the switch at all times. Connect field wiring using the instructions for the same equipment mounted in non-hazardous areas.

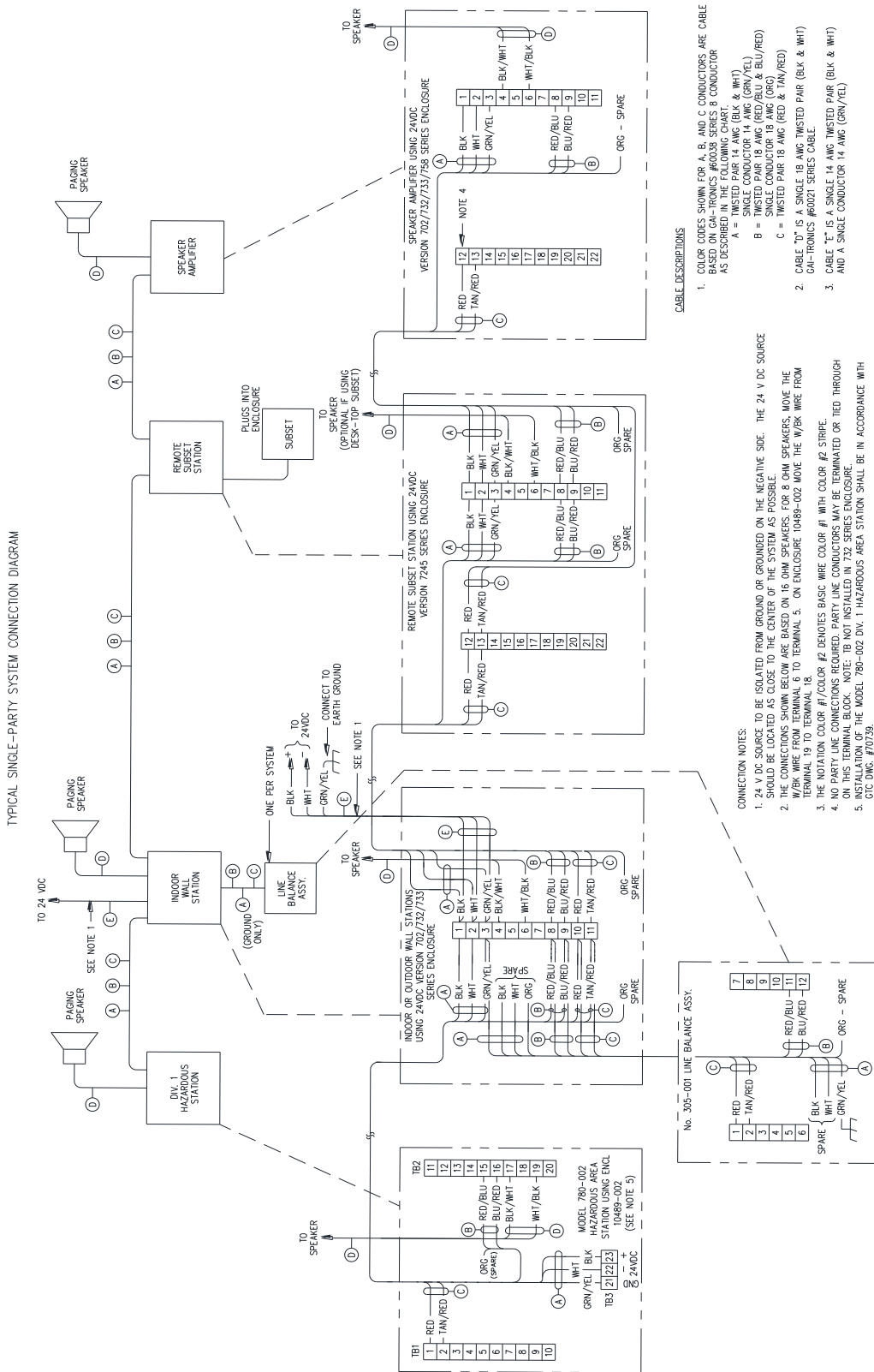


Figure 1. Typical Single Party System Connection Diagram

TYPICAL MULTI-PARTY SYSTEM CONNECTION DIAGRAM

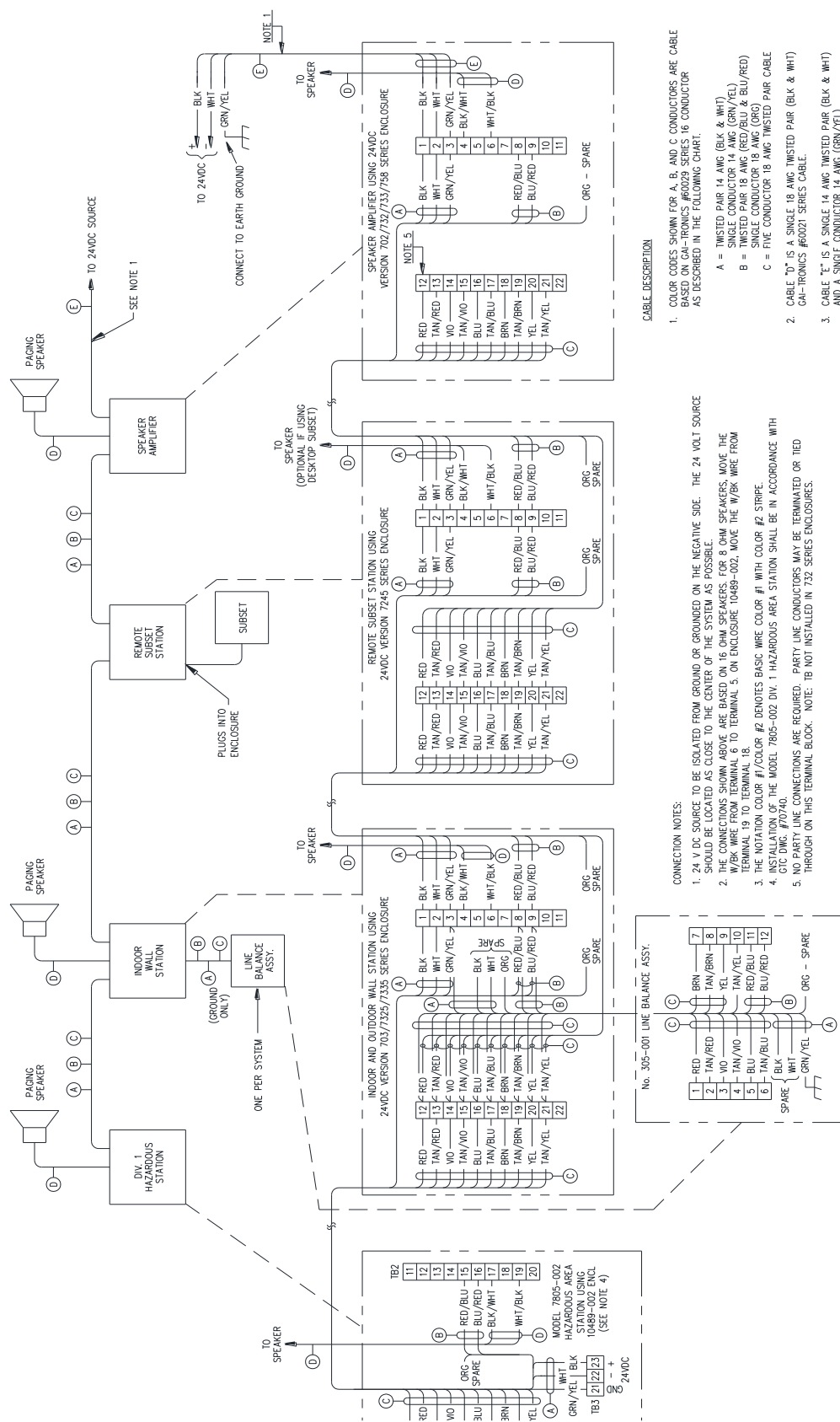


Figure 2. Typical Multi-Party System Connection Diagram

# Warranty

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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

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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.