



GAI-TRONICS[®]
A HUBBELL COMPANY

Model 370-400 UHF and 370-420 VHF Page/Party[®] Radio Couplers

Confidentiality Notice

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General Information

Product Overview

The Model 370-400 UHF and 370-420 VHF Page/Party[®] Radio Couplers allow a GAI-Tronics Page/Party[®] system to communicate with a wireless radio system. Radio users, located outside the facility at a remote location or inside a plant, can communicate with Page/Party[®] users.

The coupler works as a half-duplex system in that audio is only heard in one direction at a time. The current audio path takes precedent over the system and the other audio path cannot engage until the current audio path releases control. The audio path to the Page/Party[®] system is gated by the carrier detect signal from the radio. A VOX circuit that monitors the audio level on the page or party line, whichever is currently active, gates the audio path to the radio.

The coupler converts audio levels from the Page/Party[®] system to the appropriate radio signal levels that are then transmitted on a defined carrier frequency programmed into the radio. The Page/Party[®] Radio Coupler senses off-hook characteristics of the Page/Party[®] system and routes party line audio or page line audio to the radio. Party line audio takes precedence over page line audio.

The coupler converts the radio signal to the appropriate signal levels for the Page/Party[®] system. The module has a relay output that activates during the presence of the programmed carrier frequency.

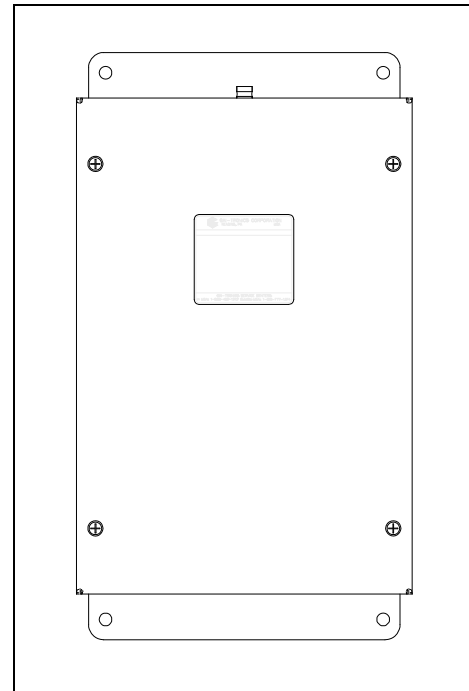


Figure 1. Outline of Model 370-400

Features

- 85–264 V ac or 24 V dc power operation
- hybrid circuitry to eliminate unwanted sidetone
- individual volume adjustment to and from the radio
- off-hook detection on party line
- 16-level VOX detection circuitry for monitoring page or party line audio
- 33-ohm termination internal to unit
- eight selectable programmed radio frequencies
- selectable high or low radio output power
- relay output activated by radio received carrier frequency

Radio Frequency Programming

The operating frequencies of the system must be programmed into the radio before the unit is installed in the field. The radio programming software must be installed on a PC to program the coupler. The radio programming kit is sold separately, P/N 19101-024.

Radio Programming Software installation

1. Place the CD in the computer CD-ROM drive.
2. Select the **Start** button; then select **Run**.
3. At the prompt, type `x:\fscommand\setup.exe`, where *x* represents the drive letter that is associated with your CD-ROM drive.

A DTXL_PCPS icon should appear on the desktop display after successful installation.

Opening the Station

Remove the four screws from the front panel and remove the front panel from the rear enclosure.

Connecting the Programming Cable to the Radio

1. Unplug the Page/Party® Radio Coupler's 15-pin D-connector from the radio.
2. Connect the DTXP-PAC cable assembly's 15-pin D-connector into the radio.
3. Connect the RJ11-style plug of the 9/RTC-PAS cable into the mating receptacle on DTXP-PAC cable.
4. Connect the DB-9 to DB-25 adapter to the other end of the 9/RTC-PAS cable.
5. Connect the DB-9 connector of the cable assembly to the computer serial port.
6. Connect the red and black leads of the 9/RTC-PAS cable to a 12 V dc power source (battery or power supply), observing the polarity (red +, black -).

Programming the Radio

1. Make sure the radio to be programmed is powered and connected to the PC (as described above) before starting the programming software on the PC.
2. Start radio programming software on the PC.
3. Enter the receive (Rx) and transmit (Tx) frequencies for each channel. To enter the frequency, select the channel, then the **Edit** button on the left.
4. Enter the Rx Frequency, Tx Frequency, and select a QC (Quiet Call) frequency or DQC (Digital Quiet Call) code, if desired.
5. After entering the frequency and optional QC or DQC, program the radio by selecting **Radio > Program Radio** from the tool bar.
6. After the radio is programmed (time bar disappears), disconnect the programming cable and reconnect the radio to the 69574-001 PCBA.

Attaching the Front Panel

After attaching the radio cable:



1. Place the front cover on the rear enclosure. Do not to pinch any cables.
2. Secure the front cover using the four screws and washers provided.
3. Torque the screws to 10–12 in·lb (1.13–1.36 Nm).

Installation

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 of 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.

 **WARNING**  —In 24 V dc systems: Under NO condition should this equipment be operated from a battery charger without the batteries connected.

In 24 V dc systems, most chargers have an unloaded output of 35 to 45 volts that can quickly damage the equipment designed for nominal 24 volts. The maximum battery voltage should never exceed the maximum specified input voltage.

Mounting the Enclosure

1. Mount the enclosure using the four 0.312-inch (8 mm) diameter holes located on the mounting flanges with ¼-inch (M6) hardware. The Page/Party® Radio Coupler is not supplied with conduit or cable openings.
2. Remove the front panel and drill or punch entry openings in the rear section of the enclosure (see [Figure 2](#) for suggested locations).

There must be a minimum of ½ inch (13 mm) of material between entry holes. GAI-Tronics recommends bottom entry only wherever possible.

The standard mounting orientation (see [Figure 2](#)), locates the power supply housing in the upper left corner. The orientation of the enclosure can be rotated 180° to allow clear access to the top. When mounting the enclosure, use caution to avoid damaging the internal components.

Antenna Installation

Select an appropriate antenna based upon the frequency of the radio and connect it to the BNC connector on the top of the enclosure (see [Figure 3](#)).

The antenna should be remotely mounted in a location that provides line-of-sight communication to the surrounding area. Refer to the [Specifications](#) section for specific RF module frequency information.

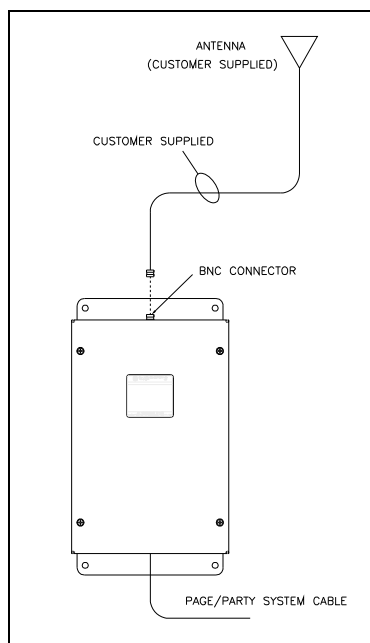


Figure 3. Antenna Connection

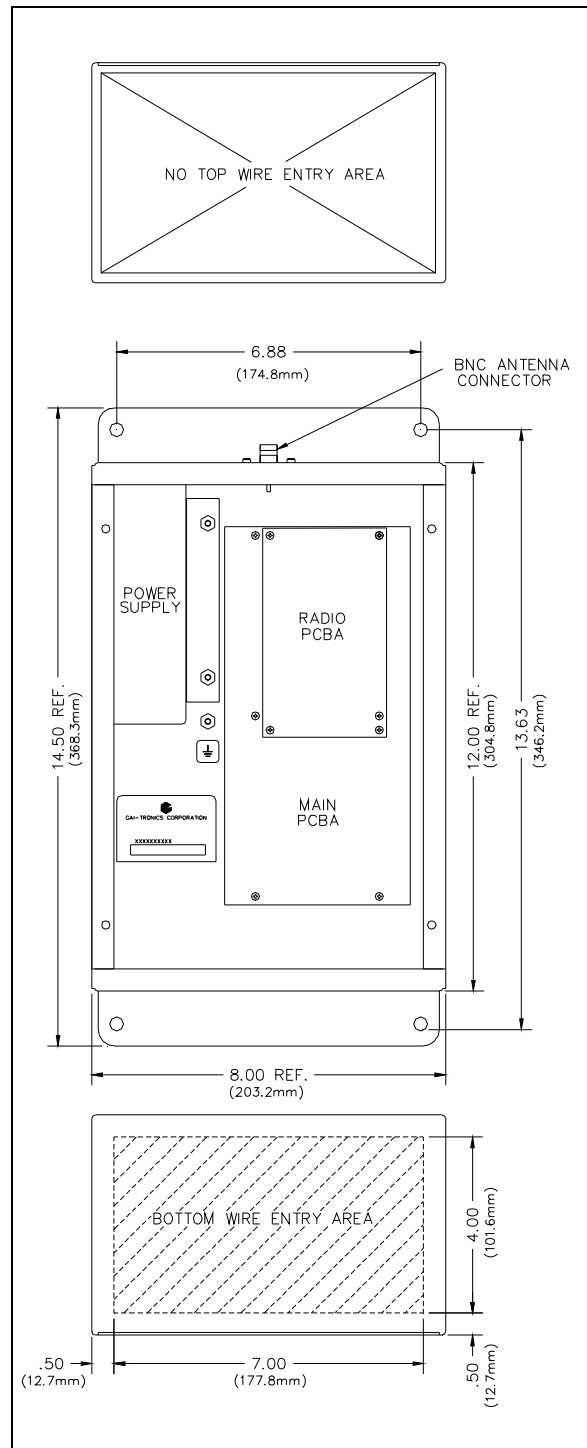


Figure 2. Mounting Details and Wire Entry Locations

Field Wiring

Refer to Figure 4, No. 69574-001 PCBA, for reference to connection locations.

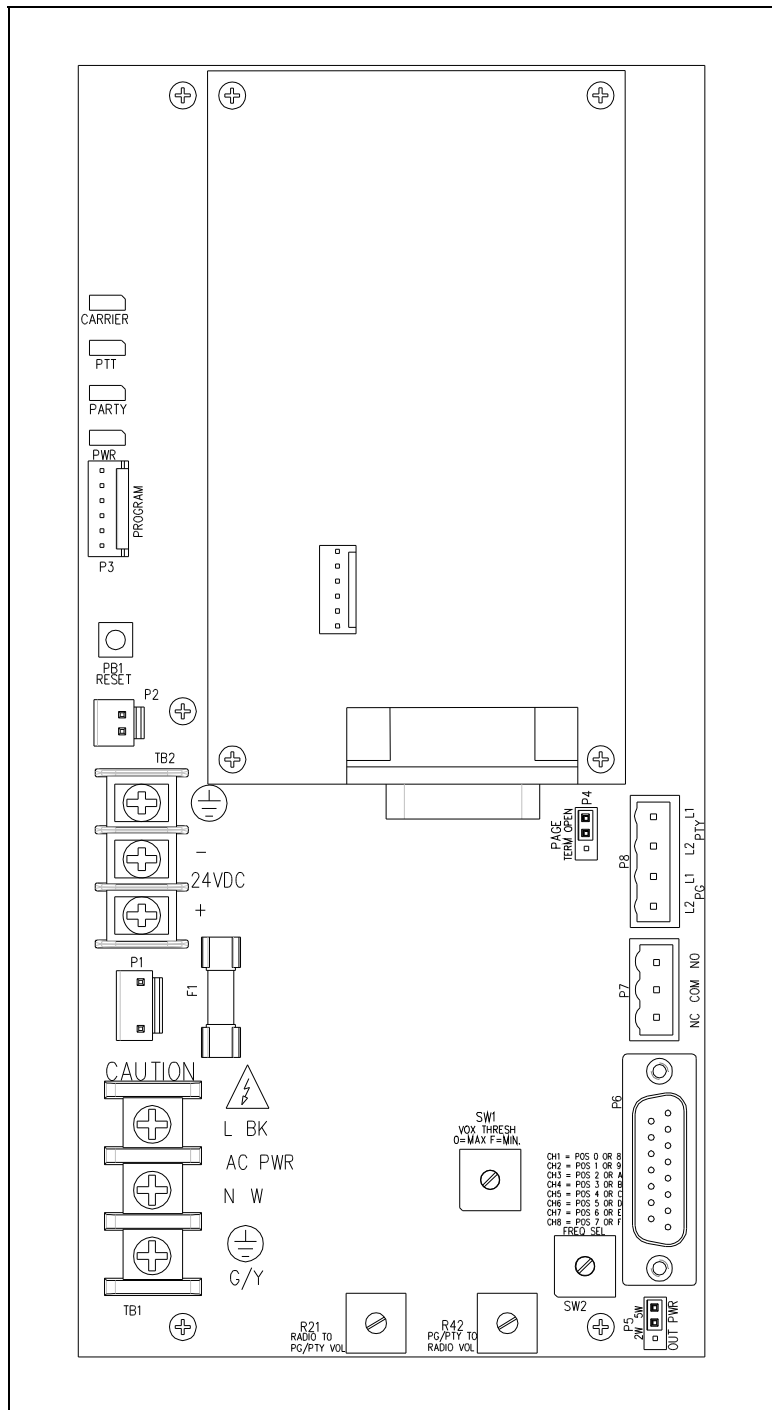




Figure 4. No. 69574-001 PCBA with attached Radio PCBA

Opening the Station

Remove the four screws from the front panel and remove the front panel from rear enclosure.

Power

The Page/Party® Radio Coupler can be powered from the included universal ac power source or from a 24-volt dc power source.

 **ATTENTION**  —Do **NOT** use both an ac and a dc power source at the same time.

AC Power

Field wire the universal ac power source to terminal block TB1.

1. Attach #6 spade lugs to the power supply wires.
2. Connect the power supply wires to P1-LINE, P2-NEUTRAL, and P3-EARTH.

NOTE: Terminal block TB2 is not used in this configuration.

Table 1. TB1—Universal AC Power Supply Connections

Pin Number	Pin Name
1	INPUT LINE
2	INPUT NEUTRAL
3	EARTH

DC Power

Field wire the dc power supply to terminal block TB2.

1. Attach #6 spade lugs to the power supply wires.
2. Connect the dc power supply wires to the 24 V DC + and 24 V DC – terminals.

NOTE: Terminal block TB1 is not used in this configuration.

Table 2. TB2—24 Volt DC Connections

Pin Number	Pin Name
1	24 V DC +
2	24 V DC –
3	EARTH

Audio and Control Signals

The Page/Party® Radio Coupler allows access to the audio lines along with relay outputs.

Table 3. P8—Page/Party® Interface

Pin Number	Pin Name	Function
1	PAGE L2	Bi-directional audio for 33-ohm page line
2	PAGE L1	Bi-directional audio for 33-ohm page line
3	PARTY L2	Bi-directional audio for 33-ohm party line
4	PARTY L1	Bi-directional audio for 33-ohm party line

Table 4. P7—Carrier Detect Output

Pin Number	Pin Name	Function
1	NC	Normally closed connection of carrier detect
2	COM	Common connection of carrier detection
3	NO	Normally open connection of carrier detection

Settings and Adjustments

Jumper Settings

Radio Output Power, P5—The radio can be configured for either high or low power output. Default is high power output (5 W).

Page Line Termination, P4—The page line can be terminated locally or remotely in the system. The default is for remote termination (open). The party line is always terminated internally to the unit. Terminating the party line remotely will cause the off-hook detection circuit to fail.

Selector Switches

VOX Threshold Adjustment Switch, SW1:

Adjust the threshold of the VOX using switch SW1 to one of 16 levels to account for the system signal to noise level (see [Table 5](#)).

Radio Frequency Selector Switch, SW2:

Configure the radio for one of eight programmed frequencies using the 16 position hex switch, SW2. Each frequency is selectable using either of two positions on the switch (see [Table 6](#)).

Table 6. SW2—Radio Frequency Selector Settings

Radio Channel	Selector Switch Position
1	0 or 8
2	1 or 9
3	2 or A
4	3 or B
5	4 or C
6	5 or D
7	6 or E
8	7 or F

Table 5. SW1—Nominal VOX Threshold Settings

Selector Switch Position	VOX Threshold (mV)
0	380
1	350
2	330
3	300
4	275
5	250
6	225
7	200
8	190
9	160
A	140
B	110
C	90
D	60
E	40
F	20

Level Adjustments

Radio to Page/Party® Volume Adjustment:

Adjust the volume from the radio to the Page/Party® lines using potentiometer R21.

Page/Party® to Radio Volume Adjustment:

Adjust the volume from the Page/Party® lines to the radio using potentiometer R42.

Attach the Front Panel

1. Place the front cover on the rear enclosure.
2. Secure the front cover using the four screws and washers provided.
3. Torque the screws to 10–12 in·lb (1.13–1.36 Nm).

Operation

The Page/Party® station operator controls the coupler’s connection to the page or party line by the off-hook and page conditions.

- When all stations are on-hook, the Page/Party® Radio Coupler is connected to the page line.
- When any station is off-hook on the designated party line, the Page/Party® Radio Coupler is connected to that party line.
- When the Page/Party® station operator lifts the handset and presses the handset pressbar, the Page/Party® Radio Coupler is connected to the page line.

Calling a Radio Operator from the Page/Party® System

For paging and subsequent party line conversation:

1. Lift the handset and select the dedicated party line using the five-position rotary selector switch.
2. Press the handset pressbar to connect to the page line in the radio coupler and page the desired individual.

The page is heard over the Page/Party® system and the radio frequency. After the page:

3. Release the pressbar to connect the station to the party line in the radio coupler and wait for a response.

The radio operator then responds by keying the radio and talking.

The resulting communication is half duplex, meaning the person currently talking has control of the conversation. The other operator must wait until the first person has finished talking. After the conversation is complete, the Page/Party® operator should place the handset back on-hook.

Calling a Page/Party® Operator from a Radio

For paging and subsequent party line conversation:

1. Turn on the radio and activate the push-to-talk (PTT) button.
2. Page the desired individual. The Page/Party® station operator lifts the handset, selects the dedicated party line using the five-position rotary selector switch and responds to the radio operator.

The resulting communication is half duplex, meaning the person currently talking has control of the conversation. The other operator must wait until the first person has finished talking. After the conversation is complete, the Page/Party® operator should place the handset back on-hook.

Specifications

AC/DC Input

AC Power Supply

Input voltage	120/230 V ac (nominal), 50/60 Hz
Current draw @ nominal 120 V ac	270 mA
Current draw @ nominal 230 V ac	150 mA

DC Power Supply

Input voltage	24 V dc
Current draw @ nominal 24 V dc	1 A

Audio

33-ohm output with +/-1.5 kHz deviation, narrowband..... 1.5 V_{RMS}, factory aligned
 2.8 V_{RMS} maximum
 Distortion <1.5% @ 1 kHz
 Radio output deviation with 1.5 V_{RMS} from 33-ohm line..... +/-1.5 kHz narrowband, factory aligned
 VOX threshold..... (see [Table 5](#)), Nominal VOX Threshold Settings, on Page 7
 VOX activation time <50 ms
 VOX hold time..... >1 s

Off-Hook Monitoring

Activation time..... <50 ms
 Deactivation time <50 ms

Relay Outputs

Maximum load 2 A @ 30 V dc
 0.5 A @ 125 V ac

Mechanical

Construction/finish..... 16-gauge cold-rolled steel; safety orange powder coat
 Mounting..... wall or column, four 0.31-inch (7.8 mm) mounting holes
 Dimensions 12.0 H x 8.0 W x 5.0 D in (304.8 x 203.2 x 127.0 mm)
 Shipping weight 10.5 lb (4.76 kg)
 Net weight..... 9.5 lb (4.31 kg)

Environmental

Operating temperature range..... -20 °C to +60 °C)
 Relative humidity..... non-condensing 85% maximum

RF Module

General

Frequency range..... VHF: 154–174 MHz
 UHF: 450–470 MHz
 Antenna impedance..... 50 Ω
 Encoder/decoder CTCSS tone, DCS digital

Receiver (measurement procedures made per ANSI/TIA/EIA-603)

Sensitivity (12 dB SINAD)..... 0.25 μV
 Inter-modulation VHF @ -67 dB; UHF @ -67 dB

Transmitter (measurement procedures made per ANSI/TIA/EIA-603)

RF output 2 W or 5 W
 Spurious and harmonic emissions..... < -20 dBm maximum

Approvals

FCC Identifier VHF: AIERT 17–145
 UHF: AIERT 17–445

FCC Compliance.....Part 90

IC CertificationVHF: 1084A-RIT 17145
 UHF: 1084A-RIT 17445

Frequency Restrictions

Certain transmit and receive frequencies within the coupler’s range are unavailable. Refer to the tables below for these frequencies. Do not attempt to program the coupler to these frequencies.

Table 7. VHF (138–174 MHz) Restricted Frequencies

Receive (MHz)	Transmit (MHz)	Receive (MHz)	Transmit (MHz)	Receive (MHz)	Transmit (MHz)	Receive (MHz)
143.9900	143.9900	158.3900	158.3900	172.7900	172.7900	143.5425
143.9925	143.9925	158.3925	158.3925	172.7925	172.7925	143.5575
143.9950	143.9950	158.3950	158.3950	172.7950	172.7950	157.9425
143.9975	143.9975	158.3975	158.3975	172.7975	172.7975	157.9575
144.0000	144.0000	158.4000	158.4000	172.8000	172.8000	172.3425
144.0025	144.0025	158.4025	158.4025	172.8025	172.8025	172.3575
144.0050	144.0050	158.4050	158.4050	172.8050	172.8050	
144.0075	144.0075	158.4075	158.4075	172.8075	172.8075	
144.0100	144.0100	158.4100	158.4100	172.8100	172.8100	

Table 8. UHF (450–470 MHz) Restricted Frequencies

Receive (MHz)	Transmit (MHz)
460.80000	460.78750
461.23750	460.79375
461.24375	460.80625
461.25625	460.81250
461.26250	

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.