

GAI-TRONICS® CORPORATION

A HUBBELL COMPANY

Model CB194-xxx and CB195-xxx RF Call Boxes Installation and Operation Manual



CB194-xxx



CB195-xxx



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Model CB194-xxx & CB195-xxx RF Call Boxes

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Model CB194-xxx & CB195-xxx RF Call Boxes

Foreword

Scope of Manual

This manual offers descriptive data and service information for the Model CB194-xxx and CB-195-xxx RF Call Boxes.

Nomenclature

The model number, located on the product identification label in the interior of the enclosure, specifically identifies GAI-Tronics equipment.

Ordering Replacement Parts

Please include the complete identification number when ordering replacement parts or requesting equipment information. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part and sufficient description of the desired component to identify it. Order parts from:

Customer Service

GAI-Tronics Corporation

400 E. Wyomissing Ave.

Mohnton, PA 19540

US: 800-492-1212

Outside US: 610-777-1374

Service and Repair

Inoperative or malfunctioning equipment should be returned to the factory for repair. Please call **1-800-492-1212** or **610-777-1374** to obtain a Return Authorization number, published repair prices, and shipping instructions.

NOTE: A purchase order or credit card number is required prior to processing non-warranty repairs.

Confidentiality Notice

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

FCC Licensing Information

Your radio operates on General Mobile Radio Service (GMRS) frequencies and is subject to the Rules and Regulations of the Federal Communications Commission (FCC). The FCC requires that all operators using GMRS frequencies obtain a radio license before operating their equipment. To obtain the FCC forms, go to <http://wireless.fcc.gov/services/personal/generalmobile/index.html> to obtain Forms **605** and **159**, which include all forms and instructions.

Changes or modifications not approved by GAI-Tronics Corporation may void the user's authority granted by the FCC to operate this radio and should not be made. To comply with FCC requirements, transmitter adjustments should be made only by or under the supervision of a person certified as technically qualified to perform transmitter maintenance and repairs in the private land mobile and fixed services as certified by an organization representative of the user of those services. Replacement of any transmitter component (crystal, semiconductor, etc.) not authorized by the FCC equipment authorization for this radio could violate FCC rules.

NOTE: Use of this radio outside the country where it was intended to be distributed is subject to government regulations and may be prohibited.

Federal Communications Commission (FCC)

1-202-418-0177 1-800-418-FORM

1-800-418-3676

1-888-CALL-FCC

1-888-225-5322

Or: <http://www.fcc.gov>

Computer Software Copyrights

This product contains copyrighted computer programs stored in semiconductor memory. These programs are copyrighted by GAI-Tronics Corporation and may not be reproduced in any form without express written permission from GAI-Tronics.

Warranty

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, and the warranty period on any repaired or replacement equipment shall be 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. The applicability of any such third-party warranty will be determined solely 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, for a period of one (1) year from the date of completion, re-perform such services at no cost to the Buyer. 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 services provided hereunder.

Limitations/Exclusions. The warranty on any equipment supplied hereunder is subject to Customer's use in compliance with applicable FCC regulations and manufacturer specifications. 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 accident, misuse, abuse, neglect, system design, product modification, failure to follow instructions contained in the product manual, repair, or attempted repair by anyone not authorized by GAI-Tronics, improper installation, installation of parts that do not conform to the quality or specifications of the original parts or accessories, damage or loss occurred during shipment, or any unit which is not new when sold or upon which the serial number has been defaced, modified or removed. The warranty does not extend to damage incurred by natural causes including Force Majeure. The warranty does not cover microprocessors if failure is due to static damage or application of improper voltage. 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.

Operational and Maintenance Procedures. Buyer acknowledges that any improper use, maintenance, or modification of the equipment provided hereunder, or use of unqualified maintenance or service technicians will severely impair the operational effectiveness of the entire communication system. Buyer hereby agrees to indemnify, defend and hold GAI-Tronics harmless from and against any and all third party claims arising, in any manner, out of: (a) Buyer's neglect of the equipment; (b) Buyer's use of technicians not authorized by GAI-Tronics to service the equipment; or (c) Buyer's improper use or modification of the equipment or failure to follow the operational and maintenance procedures provided with the equipment.

Limitation of Liability/Damages. In no event (even should circumstances cause the exclusive warranties and remedies set forth in the Warranty section to fail of their essential purpose) shall either party be liable for any indirect, incidental, special or consequential damages (including, but not limited to, loss of use, loss of anticipated profits, or damages arising from delay) whether such claims are alleged to have arisen out of breach of warranty, breach of contract, strict or absolute liability in tort, or other act, error or omission, or from any other cause whatsoever, or any combination of the foregoing.

Safety and General Information



Installation should only be performed by qualified service personnel in accordance with the National Electrical Code or applicable local codes.



Power Sources - Operate this unit only from the type of power source indicated on the label. If unsure of the type of power supply to use, contact qualified service personnel.

- For units intended to operate from battery power, refer to operating instructions.
- For units intended to operate with External Power Supplies, use only the recommended approved power supplies.
- For units intended to operate with a limited power source, this power source must comply with UL60950. Substitutions may damage the unit or cause fire or shock.

Outdoor Product:

Power Lines - An outdoor system should not be located in the vicinity of overhead power lines, electric lights, or power circuits, or where it may contact such power lines or circuits, as this contact might be fatal. Refer to the National Electrical Code Article 800 regarding installation.

User Instructions

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

Exposure to Radio Frequency Energy

Your radio is designed to comply with the following standards and guidelines regarding exposure of human beings to radio frequency electromagnetic energy:

- FCC, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI)/Institute of Electrical and Electronic Engineers (IEEE) C95.1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999

Antenna Care

Unauthorized antennas, modifications, or attachments could damage the radio and may violate FCC regulations.

Do NOT hold the antenna when the radio is IN USE. Holding the antenna affects the effective range.

Approved Accessories

Only use GAI-Tronics Corporation approved accessories. Please visit www.gai-tronics.com.

Electromagnetic Interference/Compatibility

Electronic equipment may be susceptible to electromagnetic interference. If you experience interference, visit the FCC web site at <http://www.fcc.gov> for possible solutions.

Operational Cautions

Hospitals or Health Care Facilities

To avoid electromagnetic interference and/or compatibility conflicts, turn off your radio in any facility where posted notices instruct you to do so. Hospital or health care facilities may be using equipment that is sensitive to external RF energy.

Aircraft/Airports

Airports may be using equipment that is sensitive to external RF energy. Any use of a radio must be in accordance with applicable regulations.

Medical Devices - Pacemakers

These recommendations are consistent with the independent research by, and recommendations of the U.S. Food and Drug Administration. Persons with pacemakers should:

- ALWAYS keep the radio more than 6 inches (15 cm) from their pacemaker when the radio is turned ON.
- Do NOT carry the radio in the breast pocket.
- Turn the radio OFF immediately if you have any reason to suspect that interference is taking place.

Blasting Caps and Areas

To avoid possible interference with blasting operations, turn off your radio when you are near electrical blasting caps, in a blasting area, or in areas posted: "Turn off two-way radio." Obey all signs and instructions.

Safe Handling of CMOS Integrated Circuit Devices

Many of the integrated circuit devices used in communications equipment are of the Complementary Metal Oxide Semiconductor (CMOS) type. Because of their high open circuit impedance, CMOS integrated circuits are vulnerable to damage from static charges. Care must be taken handling, shipping, and servicing them and the assemblies in which they are used.

Even though protection devices are provided in CMOS integrated circuit inputs, the protection is effective only against overvoltage in the hundreds of volts range such as is encountered in an operating system. In a system, circuit elements distribute static charges and load the CMOS circuits, decreasing the chance of damage. However, CMOS circuits can be damaged by improper handling of the modules, even in a system.

To avoid damage to circuits, observe the following handling, shipping, and servicing precautions:

1. Prior to and while servicing a circuit module, particularly after moving within the service area, momentarily touch both hands to a bare metal, earth-grounded surface. This will discharge any static charge that may have accumulated on the person doing the servicing.
NOTE: Wearing a conductive wrist strap will minimize static build-up during servicing.
2. Whenever possible, avoid touching any electrically conductive parts of the circuit module with your hands.
3. Power down the unit before installing or removing the circuit module.
4. When servicing a circuit module, avoid carpeted areas, dry environments, and certain types of clothing (silk, nylon, etc.) because they contribute to static build-up. Similarly, disconnect the test probe prior to removing the ground lead.
5. All electrically powered test equipment should be grounded. Apply the ground lead from the test equipment to the circuit module before connecting the test probe.
6. If a circuit module is removed from the system, it is desirable to lay it on a conductive surface (such as a sheet of aluminum foil) which is connected to ground through 100 k of resistance.
7. When soldering, be sure the soldering iron is grounded and has a grounded tip.
8. Prior to connecting jumpers, replacing circuit components, or touching CMOS pins (if this becomes necessary in the replacement of an integrated circuit device), be sure to discharge any static build-up as described in procedure 1. Since voltage differences can exist across the human body, it is recommended that only one hand be used if it is necessary to touch pins on the CMOS device and associated board wiring.
9. When replacing a CMOS integrated circuit device, leave the device in its conductive rail container or conductive foam until it is to be inserted into the printed circuit module.
10. All low impedance test equipment (such as pulse generators, etc.) should be connected to CMOS device inputs after power is applied to the CMOS circuitry. Similarly, such low impedance equipment should be disconnected before power is turned off.
11. Replacement modules shipped separately from the factory will be packaged in a conductive material. Any modules being transported from one area to another should be wrapped in a similar material (aluminum foil may be used). **Never use non-conductive material** for packaging these modules.

RF Call Box Model Numbers and Descriptions

Model No.	Description
CB194-001	Surface-Mount Handset with noise-canceling microphone, VHF (154–174 MHz)
CB194-002	Surface-Mount Handset with noise-canceling microphone, UHF (450–470 MHz)
CB194-003	Surface-Mount Handset, no radio; for use with customer-provided Kenwood TK-3170 Series Portable Radio
CB195-001	Flush-Mount Push Button, VHF (154–174 MHz)
CB195-002	Flush-Mount Push Button, UHF (450–470 MHz)
CB195-003	Flush-Mount Push Button, no radio; for use with customer-provided Kenwood TK-3170 Series Portable Radio

Replacement Parts and Kits

Part No.	Description	CB194- xxx	CB195 -xxx
10111-101	Handset with Pressbar and 6-Foot Hytrel [®] Cord	■	
19101-045	VHF Radio Transceiver Assembly*	■	■
19101-044	UHF Radio Transceiver Assembly*	■	■
61213-009	Cable, DB15 male to DB15 female*	■	■
69537-101	PCBA, RF Call Box	■	■
190-001BB	Battery Back-up Kit	■	■
40201-004	Battery, 1.3 Ah, 12 V dc (included in 190-001BB)	■	■
40404-060	Adjustable 15 V DC Power Supply, 25 watt (included in 190-002PS)	■	■
231-001	Pole Mounting Kit		
230-001	Pole Mounting Kit (also used with XB001)	■	
51809-009	2.5 A SloBlo Fuse 5×20 mm	■	■
190-002PS	Weatherproof 15 V DC Power Supply Kit, 85–265 V ac, 50/60 Hz	■	
233-001	Security Screwdriver (required)	■	■
SPK100	Solar Panel Kit (low usage applications)	■	■
SPK200	Solar Panel Interface Kit (for GTRFP7784-108)	■	■
GTRFP778 4-108	Solar Panel Array, 30 watt (medium to heavy usage applications)	■	■
238-002	Stainless Steel Surface-Mount Enclosure		■

Part No.	Description	CB194- xxx	CB195 -xxx
XB001	Long-life Battery Enclosure (for GTRFP7784-108)	■	
40201-008	18 Ah Battery, 12 V dc (for XB001 and stanchion applications)	■	■
234- GTB05005	Solar Power Stanchion Assembly		■
190-3170K	Kenwood TK-3170 Series Adapter Kit (only used in -003 models)	■	■

*Not used in -003 models

Programming Software and Cable (Required)

Part No.	Description	CB194- xxx	CB195 -xxx
19101-024	RF Module Programming Kit (software & cable)	■	■
XAC4000B	Programming Bundle Flash Drive	■	■
XAC0004A	RF Call Box Programming Cable	■	■

Specifications

Mechanical Specifications

CB194-xxx

Physical dimensions.....	13.13 H × 9.39 W × 7.27 D inches
Material.....	Valox® (FV649 reinforced polyester)
Shipping weight.....	10.5 lbs.
Color.....	Gray

CB195-xxx

Panel material.....	14-gauge, brushed stainless steel
Panel dimensions.....	12.0 H × 10.0 W inches (304.8 × 254.0 mm)
Back box cutout dimensions.....	10.1 H × 7.6 W inches (255.6 × 193.0 mm)
Back box material.....	0.060-inch aluminum
Shipping weight.....	4.5 lbs.

NOTE: Subtract .5 lbs. shipping weight for all -xx3 models.

Environmental Specifications

Temperature range.....	-20° C to +60° C
Weatherproof rating.....	NEMA 3R
Humidity.....	95% non-condensing

Audio Specifications

Audio level to RF Module.....	50–500 mVrms
Audio level from RF Module (-xx1 and -xx2 models).....	100–1200 mVrms
Audio distortion.....	1.5%
Speaker output level (CB195-xxx).....	84 dB SPL at 1 meter (maximum)
Handset receiver output level (CB194-xxx).....	73 dB SPL at 1 inch

Power Specifications

Battery (40201-004 and 40201-008)

Output voltage.....	12 V dc
Required charge voltage.....	13.2 V dc
Cycle rating.....	6 sec. transmit; 6 sec. receive; 10 sec. standby

1.3 Ah battery (No. 40201-004, part of 190-001BB)

Battery life (No operation).....	9 days
Battery life (2 watt output).....	300 cycles (over 7-day period)
Battery life (5 watt output).....	100 cycles (over 7-day period)

18 Ah battery (No. 40201-008)

Battery life (No operation).....	120 days
Battery life (2 watt output).....	20000 cycles (over 30-day period)
Battery life (5 watt output).....	6300 cycles (over 30-day period)

Model 40404-060 External DC Power Source (Included in 190-002PS Kit)

Output voltage (adjustable)..... 13.2–15.0 V dc (Set to 15.0 V for battery trickle charge)
Rated output current 2.1 amps
Rated output power..... 25 watts
Input voltage 85–264 V ac, 50–60 Hz
Input current..... 0.7 A/115 V ac, 0.4 A/230 V ac

RF Module (CB19x-001/CB19x-002)

General

Frequency range..... VHF: 154–174 MHz
UHF: 450–470 MHz
Antenna impedance..... 50 Ω
Antenna connection BNC
Operating voltage..... 8–15 V dc, 13.8 V dc nominal
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 @ –65 dB; UHF @ –60 dB
Audio output 700 mVrms with 3 kHz-deviated signal
Transmitter (measurement procedures made per ANSI/TIA/EIA-603)
RF output 2 or 5 watts
Spurious and harmonic emissions..... < –20 dBm maximum
Audio input 300 mVrms for 3 kHz-deviated signal
Modulation sensitivity 100 mVrms @ 60% peak dev.

Approvals

FCC Identifier..... VHF: AIERT 17–142
UHF: AIERT 17–442
FCC Compliance..... Part 90
IC Certification VHF: 1084A-RIT 17142
UHF: 1084A-RIT 17442

Introduction

The GAI-Tronics RF Call Boxes are designed for isolated areas requiring voice communication equipment, using wireless RF technology to provide half-duplex communication. These units are ideal for areas where underground or overhead cabling is undesirable or not available. The simple push-to-talk, release-to-listen operation provides user-friendly functionality, and these designs are extremely resistant to vandalism.

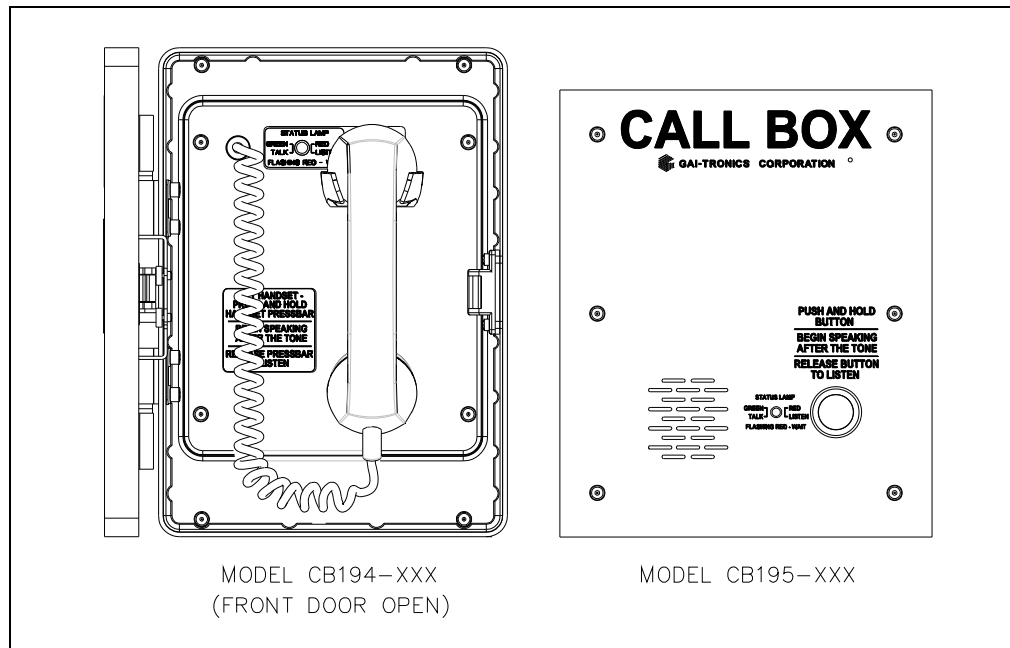


Figure 1. Model CB194-xxx and CB195-xxx Outline Drawing

The Model CB194-xxx Handset RF Call Box (gray) enclosure is constructed of a durable nonmetallic material, and has a weatherproof rating of NEMA 3R when installed according to directions. The CB194-xxx RF Call Box can be wall-mounted or mounted to a pole measuring 1 to 4 inches in diameter using the Model 230-001 Pole Mounting Kit.

The Model CB195-xxx Flush-Mount RF Call Box is equipped with these same features, but is housed in a brushed stainless steel assembly rated NEMA 3R, which is designed for flush mounting. This can be done within any wall cavity or by using the GAI-Tronics Model 234 Series stanchions. The CB195-xxx can be surface mounted when used with a Model 238-002 stainless steel wall-mount enclosure. The CB195-xxx can also be mounted to a pole using the Model 231-001 Pole Mounting Kit when utilizing the Model 238-002 enclosure.

The Model CB195-xxx includes a push-to-talk (PTT) button, an LED status indicator, an integral speaker and a microphone. The Model CB194-xxx includes a handset with noise-canceling microphone, an LED status indicator, and an integral PTT pressbar and features a magnetic proximity hookswitch for handset sensing.

The status lamp indicates the transmit/receive (talk/listen) status of the call box and provides indication when the channel is busy (wait - flashing red), or if a low battery power condition exists (flashing amber every 8 seconds).

All RF Call Box models can be programmed for call box-to-radio, call box-to-call box, or call box-to-telephone line operation via the CARD Suite Software application. All modes of operation require a receiving radio to complete the system (handheld, mobile, or base station). For call box-to-telephone line operation, a GAI-Tronics PL1877A (MRTI 2000) Telephone Interconnect is additionally required to interface the receiving radio's signal to the telephone line via a host radio. The call box-to-call box mode of operation can provide a common communication link (all units commonly broadcast received audio transmission) between call boxes. In this configuration, all RF Call Boxes must be programmed for "Standby Forever" operation and will require a constant external power source.

These units are programmed using the CARD Suite Software application, which is included on the XAC4000B Programming Bundle Flash Drive. Each unit can be bench-programmed prior to installation, thus limiting field installation time. The Model 19101-024 Programming Kit is additionally required for programming the frequency and PL code into the integral radio transceiver (-001 and -002 models only).

The optional Model SPK100 Solar Panel Kit, Model GTRFP7784-108/SPK200 Solar Panel Array and Interface Kit, and the 190-002PS Power Supply Kit are available for use with all models. See the "Field Installed Optional Accessories" section on page 19 and Model 190-002PS installation instructions on page 20 for additional information.

All Models CB19x-001 and CB19x-002 are provided with a factory-installed, integral RF transceiver. These units are ready for programming and system activation without the need for additional circuitry. The Model CB19x-003 is provided without RF circuitry. These units will require the installation of a customer-provided Kenwood TK-3170 Series Portable Radio and Model 190-3170K Adapter Kit prior to system activation.

Functional Description

Each GAI-Tronics RF Call Box is typically in a low-power sleep mode when not in use (factory default setting). In this state, the radio is powered down and all audio circuitry is disabled. The processor is in a low-power sleep mode, waking periodically to check the battery voltage. The sleep mode can be disabled via the CARD Suite Software to provide receive capability at all times (call box-to-radio or call box-to-call box operation only.) In this mode, the Call Box must be connected to a constant 13.8 V dc supply (or 12 V dc if battery is not used.) When used for call box-to-telephone operation, there is no need to disable the sleep mode as all calls must be initiated by the RF Call Box.

RF Call Box-to-Radio Operation

Pressing the PTT button or the handset pressbar removes the Call Box from the low-power sleep mode and enables the radio and the audio circuitry. The front panel status lamp lights red, while the Call Box momentarily monitors the transmit channel for activity, and (when ANI is enabled) broadcasts its programmed ANI code if there is no other radio traffic.

When the radio traffic is clear and after transmitting the ANI code, a “go-ahead” splash tone is generated over the speaker or handset receiver and the front panel status lamp turns green. Speak in a normal voice at arm’s length distance from the push button models or into the handset microphone while holding the pressbar. When finished, release the button or pressbar. The radio ceases transmission and waits for receive audio. The front panel status lamp lights red whenever receive audio is present.

Continue conversation in this push-to-talk, release-to-listen manner. After conversation has ended, the RF Call Box returns to sleep mode with the absence of carrier activity after a preprogrammed amount of time (factory set at 10 seconds).

Call Box-to-Call Box Operation

In this operation application, the RF Call Box will function similarly to the RF Call Box-to-Radio operation, as each Call Box is actually a radio. Operation is push-to-talk/release-to-listen and the transmitting Call Box first monitors the transmit channel and provides a busy signal (if busy) or “go-ahead” splash tone if the channel is clear. In this mode of operation, the ANI feature is not used, and the RF Call Box will not “go to sleep” to conserve power (must be programmed for “Standby Forever” operation). A constant external power source is required.

RF Call Box-to-Telephone Line Operation

In the call box-to-telephone line operational mode, a phone call is initiated by momentarily pressing and releasing the PTT button or handset pressbar. The front panel status lamp flashes red indicating a wait signal. During this time period, the RF Call Box is interfacing with the Model PL1877A Telephone Interconnect. When the telephone interconnect is accessed, the RF Call Box dials a pre-programmed telephone number. When the phone line is accessed, the front panel status lamp changes to a steady red. A ringing or a busy signal will be heard on the speaker or handset receiver.

After the person answering the phone can be heard speaking, press the PTT button or handset pressbar to respond. When the PTT button is pressed, the front panel status lamp lights green as a signal to talk. Speak in a normal tone of voice at arm's length distance from the push button models or into the handset microphone while holding the pressbar. Release the button or pressbar when finished speaking. The radio ceases transmission and waits for receive audio. The front panel status lamp returns to steady red whenever receive audio is present. Continue conversation in a push-to-talk, release-to-listen operation.

The telephone line disconnects after no carrier activity is detected after a pre-programmed time period. The RF Call Box returns to sleep mode as stated under call box-to-radio operation.

NOTE: Due to the resulting time delays associated with the telephone interconnect acknowledgements, this mode of operation is not recommended for emergency communications.

ANI Reporting

A programmable multi-digit ANI code (DTMF) is reported by each unit upon initial PTT activation, if the unit is programmed for ANI operation. The length of this code is adjustable between two and eight digits via the CARD Suite Software. The ANI code is only transmitted on the first PTT of a call upon awakening from sleep mode, unless programmed to transmit on each PTT activation. This reporting operation requires the use of a receiving device that can decode the transmitted DTMF ANI code (portable, mobile, or remote desk set or console). **NOTE:** Identification ANI reporting is not available in the call box-to-telephone line or call box-to-call box operation.

Transmit Time Limiting

The transmit time is limited in several ways. First, a momentary depression of the button to initiate a call results in a minimum duration transmit. The Call Box remains in transmit for a duration long enough for the entire ANI code to be transmitted followed by a programmable amount of open microphone transmit time (factory set at 4 seconds). This allows emergency depression and release of the button, yet still provides the user with a period of time to speak or for the receiving party to hear ambient sounds. For additional transmit cycles in the same call, the user must press and hold the PTT switch during transmit. **NOTE:** Minimum transit time is not available in call box-to-telephone line operation.

The second transmit time limitation is a maximum transmit time. This duration, which is factory set to 20 seconds, prevents the radio from being damaged and also preserves battery life. When this maximum time is reached, the PTT button must be released and re-activated to begin transmitting again. Both transmit time durations are software programmable via the CARD Suite Software.

Low-Power Sleep

A call is terminated when the Call Box returns to its low-power sleep mode or when no receive audio is present. The controller PCBA disables all of the audio circuitry and places the micro-controller in a low-power sleep mode. In the sleep mode, power is removed from the radio module to limit current draw from the power supply or battery to 6 mA.

The Call Box enters its low-power sleep mode after a period of inactivity (no carrier detect and no PTT). The length of this period (standby time) is preprogrammed using the CARD Suite Software application. The Call Box wakes from sleep by a PTT activation. As previously stated, the sleep mode operation can be disabled to provide continuous receive capability (Standby Forever).

Battery Voltage Monitoring and Reporting

The micro-controller monitors the voltage on the battery by use of an analog-to-digital converter. The battery voltage is sampled every 6 hours. If low battery voltage is detected, the Call Box transmits its ANI and a low battery code (*LB' = '*52') via the radio. Once this report is made, the Call Box status lamp turns amber and blinks for 0.25 second every 8 seconds until the battery is charged or replaced. As noted in the ANI reporting paragraph, a DTMF decoding device will be required at the receiving end of the Call Box transmission.

In call box-to-telephone line operation, a low battery ANI code is not transmitted. However, the Call Box status lamp turns amber and blinks for 0.25 second every 8 seconds until the battery is charged or replaced. In conjunction with the status lamp indication, the RF Call Box transmits a low battery alert tone that is audible to the telephone user (if programmed for this operation). This tone is broadcast in unison with the flashing status lamp. A telephone operator must be "online" with the RF Call Box to hear this alert tone.

Off-Hook Reporting (Model CB194-xxx Only)

The Model CB194-xxx RF Call Box is fitted with a magnetic proximity hookswitch for handset sensing. Activation of this sensor wakes the Call Box and initiates transmission of the programmed ANI code. If the handset remains off-hook for an extended period following the termination of a call, or if no call is initiated after the handset is taken off-hook, the Call Box again transmits its ANI and an off-hook alert code (*OH' = '*64'). As noted in the ANI reporting paragraph, a DTMF decoding device will be required at the receiving end of the Call Box transmission.

NOTE: Off-hook ANI reporting is not available in call box-to-telephone line operation.

Field Installed Options/Accessories/Programming

Model 190-001BB Battery Back-up Kit

The Model 190-001BB Battery Back-up Kit provides 12 V dc power if main power is lost or disconnected. The kit includes a bracket, Model 40201-004 1.3 Ah battery, two mounting screws, and a gasket pad. The battery provides 300 cycle uses over a 7-day period @ 2 watt power setting and 100 cycle uses over a 7-day period @ 5 watt power setting, without the application of power. Refer to Publication 43003-042 for installation details.

Model SPK100 Solar Panel Kit

The Model SPK100 Solar Panel Kit should be used for low usage Call Box applications (emergency type applications) when an external power source is not available or feasible. This kit must be used with the Model 190-001BB Battery Back-up Kit installed inside the RF Call Box. The Model SPK100 Kit includes a solar panel array (5 watts) with a 10-foot connecting cable, a charge regulator module, and the necessary mounting hardware for surface or pole mounting. The regulator module is mounted inside the enclosure for all RF Call Box models. Refer to Pub. 43003-043 for installation instructions.

NOTE: The Model 40408-009 Battery Charger should be used to charge the 40201-009 battery (included in the 190-001BB Kit) prior to installation in solar power applications.

Model XB001 External Long-Life Battery Enclosure

The Model XB001 External Long-Life Battery Enclosure includes a NEMA-4 weatherproof enclosure with battery mounting bracket, a sealed 12 V dc external receptacle, and mating power connection cable. The required Model 40201-008 18 Ah battery is purchased separately. This kit allows the RF Call Box to be installed within 2 feet of the XB001 enclosure for true battery-powered operation.

Combining this kit with the Model SPK200 Solar Panel Interface Kit and Model GTRFP7784-108 Solar Panel will provide a completely wireless operation. If the application is only temporary, the speaker can easily be “unplugged” from the battery enclosure and relocated or stored. Refer to Pub. 43003-037 for installation details.

NOTE: Model 40408-011 Battery Charger should be used for charging the 40201-008 battery in solar or battery-only applications.

Model GTRFP7784-108 Solar Panel Array and SPK200 Solar Panel Interface Kit

The Model GTRFP7784-108 Solar Panel Array (30 W) and Model SPK200 Solar Interface Kit must be used with the Model XB001 External Long-life Battery Enclosure and 40201-008 (18 Ah) battery. The solar array and kit provide battery recharging when an external power source is not available. This solar option should be used for medium to heavy RF Call Box usage (9th tee box, high-traffic gate entry, etc.)

The GTRFP7784-108 is provided with an integral 15-foot connecting cable and the SPK200 is supplied with a terminal block, battery charge regulator module, solar array mounting bracket, wiring harness, and the necessary mounting hardware for the components. Refer to Pub. 43003-039 for solar panel installation instructions.

Model 190-002PS Power Supply Kit

The Model 190-002PS Power Supply Kit is designed for mounting to the bottom of a CB194-xxx RF Call Box. The kit includes a two-gang weatherproof electrical box, 15 V dc power supply, mounting bracket, 3-inch pipe nipple, ½-inch NPT conduit hub, security hardware, and security bit (T15 Torx).

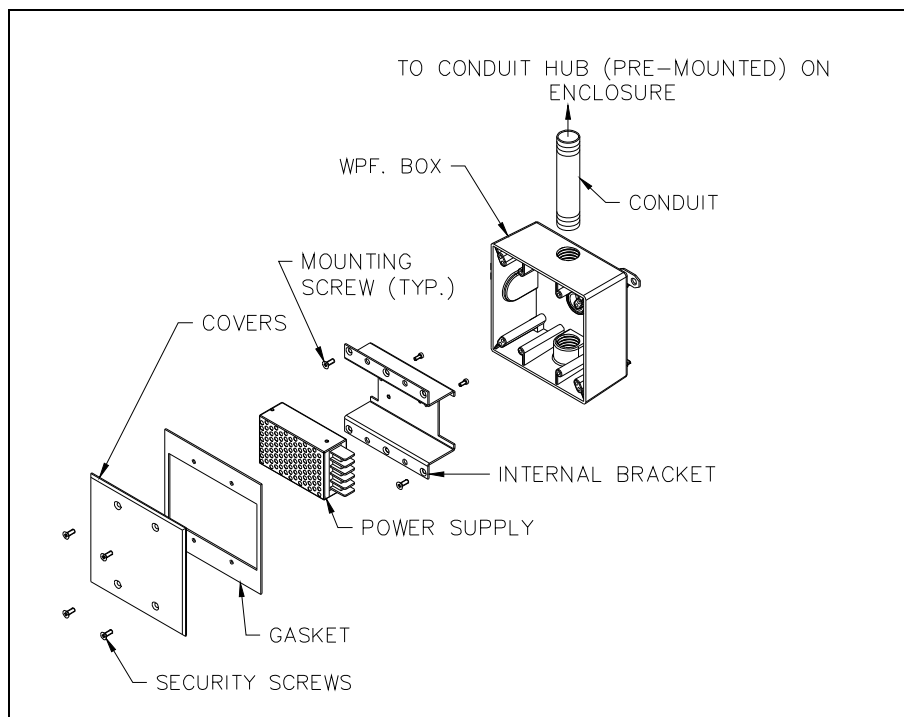


Figure 2. Model 190-002PS Power Supply Kit Components

To properly charge the back-up battery (if required), the 40404-060 power supply (included in the kit) must be set for 15.0 V dc output. This output can be adjusted at the voltage adjustment potentiometer labeled ADJ. Refer to Figure 2 for wire connections.

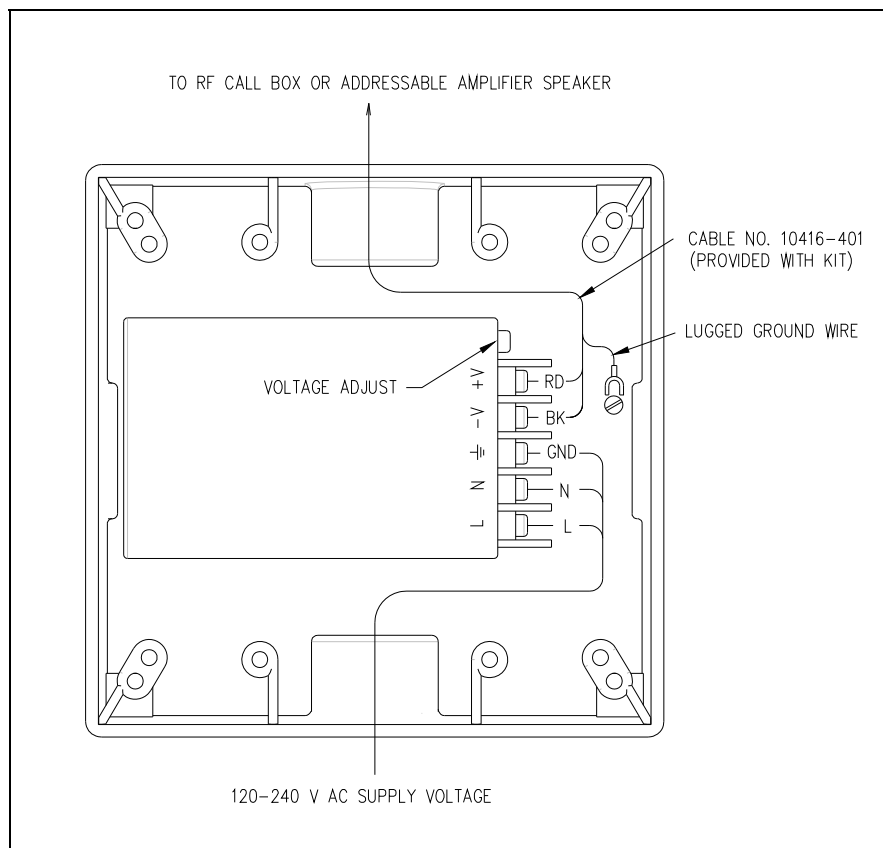


Figure 3. Power Supply Wiring Connections

Model 238-002 Stainless Steel Surface-Mount Call Box Enclosure

The Model 238-002 Stainless Steel Surface-Mount Call Box Enclosure is designed to house a GAI-Tronics CB195 series Flush-mount RF Call Box, and comes with necessary conduit seals, hole gaskets, washers, and keps nuts for installation. Refer to GAI-Tronics Pub. 42004-496.

PC Programming

All RF Call Boxes require the use of the CARD Software application (included on the XAC4000B Programming Bundle Flash Drive) and the XAC0004A Programming Cable for the Call Box non-default settings.

The Model CB194-001, CB194-002, CB195-001 and CB195-002 RF Call Boxes additionally require the use of the 19101-024 RF Module Programming Kit. This kit includes a separate cable and software for programming the RF Module's operating frequency and TPL/DPL code. Refer to the programming instructions on page 40 of this manual.

The CARD Suite Software application is used to program the Call Box PCBA. The ANI code, minimum/maximum user timeouts, sleep enable/disable, "go-ahead" tone, volume, DTMF transmit level, and stand-by times are all configurable through the CARD Suite Software application.

Operation

RF Call Box-to-Radio and Call Box-to-Call Box Communication Protocol

Normal Use

Step	Action	Response
1	User presses and holds the PTT button (CB194-xxx - remove handset first)	Call Box wakes from low-power sleep mode, checks transmit channel activity and the status lamp lights red to indicate a “wait” period.
2	No transmit channel activity detected	Call Box keys radio and transmits ANI code.
3	ANI transmission complete	Call Box emits a “go-ahead” splash tone over the speaker or handset receiver, and the status lamp lights green as a signal to begin talking.
4	User speaks into the microphone	Call Box transmits audio over the radio while timing the transmit duration.
5	User releases PTT button	Call Box un-keys the radio and the status lamp is off .
6	Carrier is detected by radio	Incoming audio is broadcast over the Call Box speaker or handset receiver and the status lamp lights red as a signal to listen (receive audio present).
7	Call Box detects no carrier	Status lamp is off . User may press PTT button and speak into the microphone.
8	Call Box detects a lack of PTT or carrier detect activity for the programmed duration	Call Box terminates the call by powering down the radio and audio circuitry. The status light is off and the unit returns to its low-power sleep mode.

Transmit Channel Busy; Call Completed

Step	Action	Response
1	User presses the PTT button (momentary or maintained)	Call Box wakes from low-power sleep mode, checks transmit channel activity, and status lamp lights red to indicate that the channel is busy (wait period).
2	Transmit channel activity detected	The Call Box status lamp flashes red for a pre-programmed amount of time before again checking transmit channel activity.
3	User continues to depress the PTT button until the channel is available	Call Box proceeds as in steps 2 through 7 in “Normal Use” section. NOTE: If the PTT button is momentarily pressed, the RF Call Box automatically enters the minimum transit time, proceeding as in steps 2 through 7 in the “Normal Use” section after the channel has cleared.

Transmit Channel Busy; Call Aborted

Step	Action	Response
1	User presses the PTT button	Call Box wakes from low power sleep mode, checks transmit channel activity.
2	Transmit channel activity detected	Call Box status lamp flashes red indicating a busy channel (wait).
3	User releases PTT button while the channel is busy	Call Box powers down the radio and audio circuitry (after auto connect time-out has expired). The status lamp is off and the unit returns to its low-power sleep mode. NOTE: If the PTT button is momentarily pressed, the RF Call Box automatically returns to sleep mode after auto-connect time-out has expired.

Transmit Time-Out

Step	Action	Response
1	User presses PTT button	Call Box wakes from low-power sleep mode, checks transmit channel activity, and the status lamp lights red to indicate unit is operating in RX mode.
2	No transmit channel activity detected	Call Box keys radio and transmits ANI code.
3	ANI transmission complete	Call Box emits a “go-ahead” splash tone over the speaker or handset receiver, and the status lamp lights green as a signal to talk.
4	User speaks into the microphone	Call Box transmits audio over the radio while timing the transmit duration.
5	Maximum transmit time reached	Call Box un-keys the radio, the status lamp is off , and it emits a “transmission-terminated” tone over the speaker or handset receiver. The user must now release and repress the PTT button in order to continue transmission.
6	User releases PTT button	Call Box proceeds as in steps 2 through 7 in “Normal Use” section.

Minimum Duration Transmission

Step	Action	Response
1	User presses and releases the PTT button (momentary activation)	Call Box wakes from low-power sleep mode, checks transmit channel activity, and the status lamp lights red to indicate a “wait” period.
2	No transmit channel activity detected	Call Box keys radio and transmits ANI code.
3	ANI transmission complete	Call Box emits a “go-ahead” slash tone over the speaker or handset receiver, and the status lamp lights green as a signal to talk.
4	User speaks into the microphone	Call Box transmits audio over the radio while timing the transmit duration.
5	Minimum transmit time reached	Call Box un-keys the radio, the status lamp is off , and it emits a “transmission-terminated” tone over the speaker or handset receiver. The user must now press and hold the PTT button in order to continue transmission.

RF Call-Box-to-Telephone Communication Protocol

In all of the use cases described in the tables below, the call can be discontinued at any time when using the Model CB194-xxx Handset RF Call Box. If the handset is put in the on-hook position, the Call Box searches for no channel activity and disables the PL1877A Telephone Interconnect (MRTI 2000) from continuing the phone connection. When using the Model CB195-xxx (push-button version), the call is discontinued following the time-out constraints programmed in the Call Box and PL1877A.

Normal Use

Step	Action	Response
1	User presses and releases PTT button (momentary)	Call Box wakes from low-power sleep mode, checks transmit channel activity and status lamp slowly flashes red to indicate unit is operating.
2	No transmit channel activity detected	Call Box keys radio and initiates communication with PL1877A. Status lamp continues to slowly flash red to indicate unit is operating.
3	PL1877A detected and dials phone number	Call Box dials preprogrammed number. Status lamp slowly flashes red to indicate unit is operating.
4	Number dialed complete	Status lamp stops flashing red . Ring or busy signal is broadcast over speaker.
5	Phone connection complete	Incoming audio is broadcast over the Call Box speaker or handset receiver and the status lamp lights steady red as a signal to wait and listen (receive audio present).
6	User presses and holds PTT button (maintained)	Call Box keys the radio and checks transmit channel activity. The status lamp lights red to indicate “wait” period. With no activity detected, a “go-ahead” splash tone is heard on the speaker or handset receiver and the status lamp lights green as a signal to begin talking. Call Box transmits audio to PL1877A while timing the transmit duration.
7	User releases PTT button	Call Box un-keys the radio and the status lamp is off .
8	Carrier is detected by radio	Incoming audio is broadcast over the Call Box speaker or handset receiver and the status lamp lights steady red as a signal to wait and listen (receive audio present).
9	Call Box detects a lack of PTT or carrier detect activity for the programmed duration	The status lamp flashes red , the Call Box terminates the call with the PL1877A, and emits three tones to the speaker. Call Box terminates the call by powering down the radio and audio circuitry. The status light is off and the unit returns to its low-power sleep mode.

Transmit Channel Busy; Call Completed

Step	Action	Response
1	User presses and releases PTT button	Call Box wakes from low-power sleep mode, checks transmit channel activity, and status lamp slowly flashes red to indicate unit is operating.
2	Transmit channel activity is detected	The Call Box status lamp rapidly flashes red for a pre-programmed amount of time before again checking transmit channel activity.
3	Transmit channel becomes available	Call Box proceeds as in steps 2 through 9 in “Normal Use” section.

Transmit Channel Busy; Call Aborted

Step	Action	Response
1	User presses and releases PTT button	Call Box wakes from low-power sleep mode, checks transmit channel activity and status lamp slowly flashes red to indicate unit is operating.
2	Transmit channel activity detected	Call Box status lamp rapidly flashes red indicating a busy channel (wait).
3	Channel activity detected past pre-programmed time duration	The status lamp flashes red , and the call box emits three tones to the speaker. Call Box terminates the call by powering down the radio and audio circuitry. The status light is off and the unit returns to its low-power sleep mode.

PL1877A Does Not Respond to Initialization; Call Aborted

Step	Action	Response
1	User presses and releases PTT button	Call Box wakes from low power sleep mode, checks transmit channel activity and status lamp slowly flashes red to indicate unit is operating.
2	No transmit channel activity detected	Call Box keys radio and initiates communication with PL1877A. Status lamp slowly flashes red to indicate unit is operating.
3	PL1877A not detected and terminates call	The status lamp flashes red , the Call Box terminates the call with the PL1877A, and emits three tones to the speaker. Call Box terminates the call by powering down the radio and audio circuitry. The status light is off and the unit returns to its low-power sleep mode.

PL1877A Does Not Respond to Dialed Number; Call Aborted

Step	Action	Response
1	User presses and releases PTT button	Call Box wakes from low power sleep mode, checks transmit channel activity and status lamp slowly flashes red to indicate unit is operating.
2	No transmit channel activity detected	Call Box keys radio and initiates communication with PL1877A. Status lamp slowly flashes red to indicate unit is operating.
3	PL1877A detected and dials phone number	Call Box dials preprogrammed number. Status lamp slowly flashes red to indicate unit is operating.
4	PL1877A did not respond to numbers dialed and terminates call	The status lamp flashes red , the Call Box emits three tones to the speaker. Call Box terminates the call by powering down the radio and audio circuitry. The status light is off and the unit returns to its low-power sleep mode.

Phone Line Connection Not Made - Busy Signal or No Answer

Step	Action	Response
1	User presses and releases PTT button	Call Box wakes from low power sleep mode, checks transmit channel activity and status lamp slowly flashes red to indicate unit is operating.
2	No transmit channel activity detected	Call Box keys radio and initiates communication with PL1877A. Status lamp slowly flashes red to indicate unit is operating.
3	PL1877A detected and dials phone number	Call Box dials preprogrammed number. Status lamp slowly flashes red to indicate unit is operating.
4	Phone number has been dialed	Status lamp stops flashing red . Ring or busy signal is broadcast over speaker.
5	Call not answered or busy signal	PL1877A time out occurs (defined in PL1877A manual) and PL1877A discontinues transmission to Call Box.
6	Call Box detects a lack of PTT or carrier detect activity for the programmed duration	The status lamp flashes red , the Call Box terminates the call with the PL1877A, and emits three tones to the speaker. Call Box terminates the call by powering down the radio and audio circuitry. The status light is off and the unit returns to its low-power sleep mode.

Transmit Time Out

Step	Action	Response
1	User presses and releases PTT button	Call Box wakes from low-power sleep mode, checks transmit channel activity and status lamp slowly flashes red to indicate unit is operating.
2	No transmit channel activity is detected	Call Box keys radio and initiates communication with PL1877A. Status lamp slowly continues to flash red to indicate unit is operating.
3	PL1877A is detected and Call Box dials phone number	Call Box dials preprogrammed number. Status lamp slowly flashes red to indicate unit is operating.
4	Number dialed complete	Status lamp stops flashing red . Ring or busy signal is broadcast over speaker.
5	Phone connection complete	Incoming audio is broadcast over the Call Box speaker or handset receiver and the status lamp lights steady red as a signal to wait and listen (receive audio present).
6	User presses PTT button	Call Box keys the radio and checks transmit channel activity. The status lamp lights red to indicate “wait” period. With no activity detected, a “go-ahead” splash tone is heard on the speaker or handset receiver and the status lamp lights green as a signal to begin talking. Call Box transmits audio to PL1877A while timing the transmit duration.
7	User speaks into the microphone	Call Box transmits audio over the radio and times the transmit duration.
8	Maximum transmit time reached	Call Box un-keys the radio, the status lamp is off , and it emits a “transmission-terminated” tone over the speaker or handset receiver. The user must now release and repress the PTT button in order to continue transmission.
9	Transmit channel becomes available	Call Box proceeds as in steps 5 through 9 in “Normal Use” section.

Installation and Mounting

Mechanical Receipt Inspection

All RF Call Boxes are shipped in a cardboard container, protected from movement and distress by a self-forming packaging material. Thoroughly inspect it as soon as possible after delivery. In-transit damage should be immediately reported to the transportation company.

Equipment Required

Programming

- PC with Windows 95 or newer operating system
(**NOTE:** CARD Suite is not compatible with Windows NT)
- Card Suite Programming Software (all models, included in the XAC4000B Programming Bundle Flash Drive)
- XAC0004A Programming Cable (all models)
- 19101-024 RF Programming Kit (-001 and -002 models only)

Tools

- #1 Phillips screwdriver
- GAI-Tronics Model 233-001 Security Screwdriver (Torx T-25)
- 1/16-inch flat blade screwdriver (for remote volume and transmit level control only)

Cable Installation Safety Considerations

Interconnecting, communications, and Class 2 dc power cables should be separated from electrical light or other Class 1 circuits by at least 2 inches. The exception is where Class 1 wiring or power circuits are run in a raceway, or are metal-sheathed or metal-clad, or are permanently separated from the conductors of the other circuitry by a continuous and firmly fixed nonconductor such as porcelain tubes or flexible tubing in addition to the insulation on the wire. Communications cables and in-building wiring should be listed and marked for the purpose according to NEC Article 800.

NOTE: Since an external antenna is required, antenna cable must be routed through a dedicated enclosure entry point, separated from power wiring.

Antenna

All Call Box models equipped with an integral radio transceiver require the use of an external antenna. The use of an internal antenna may prevent the Call Box from operating. An omni-directional, unity gain antenna is recommended for general use.

Model CB194-xxx Handset RF Call Box

1. Open the front door. Loosen the four security screws from the midsection assembly using the GAI-Tronics Model 233-001 Security Screwdriver (sold separately).
2. Open the midsection of the enclosure, which is hinged on the left. Remove the front cover and midsection from the rear enclosure by pulling straight out (hinges should remain attached to the midsection, pulling out of the back box). The left side mounting holes are located underneath the hinge pin holes.
3. For conduit/cable installation of external power, select the right or left drill spot location (dimple) located at the bottom of the enclosure.
NOTE: To maintain weatherproof integrity, all cable entries must be properly sealed to prevent the ingress of water.
4. For conduit/cable installation for an external antenna, select the left (facing the front of the Call Box) drill spot location (dimple) located on the top of the enclosure. Use Myers ST or STG Series hub or equivalent to insure a weatherproof seal. To avoid the ingress of moisture due to conduit condensation, seal all conduit entrances with RTV or equivalent substance.



NOTE **Damage caused by moisture related to the use of improper conduit fittings or improper sealing will void the product warranty.**

5. Refer to Figure 5 and Figure 6 for the mounting hole dimensions for wall-mounting applications. Secure the back box to its desired location. Refer to the Model 230-001 Pole Mounting Kit instructions for pole-mounting applications.
6. When applicable, install the Model 190-001BB Back-up Battery Kit and/or the Model SPK100 Solar Charge Regulator in accordance with the included instructions. Connect the black and red wires of the wiring harness to the battery: positive (+) to the red and negative (-) to the black.
7. To connect an external dc power supply, strip the power supply connection wires and attach the positive (+) to pin 1 and the negative to pin 2 of the connector assembly that is plugged into TB1 of the PCBA located on the front panel. Refer to Figure 4.
8. Inspect the jumpers to ensure the Call Box is configured to suit your application. See the “Hardware Configuration” section on page 36 for details.

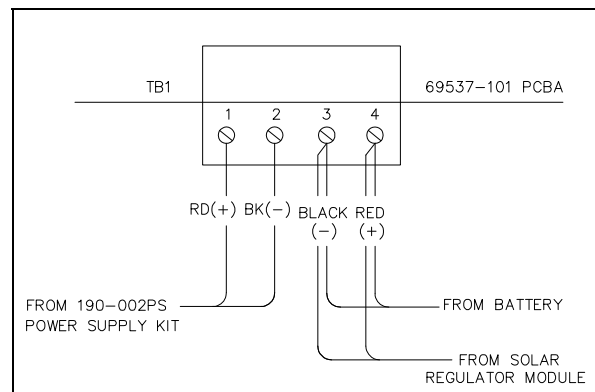


Figure 4. Terminations on 69537-101 PCBA

9. Program the Call Box. See the “Programming and Set Up” section on page 46 for details.



NOTE **It is extremely important to dress all cables to prevent the power and RF module connection cable from touching the external antenna cable with the front panel closed. Failure due to improperly dressed cable may result in RF induced noise during transmit.**

10. Insert mid-section hinge pins in their original holes.
11. Complete the installation by attaching the front panel assembly to the rear enclosure using the four security screws.

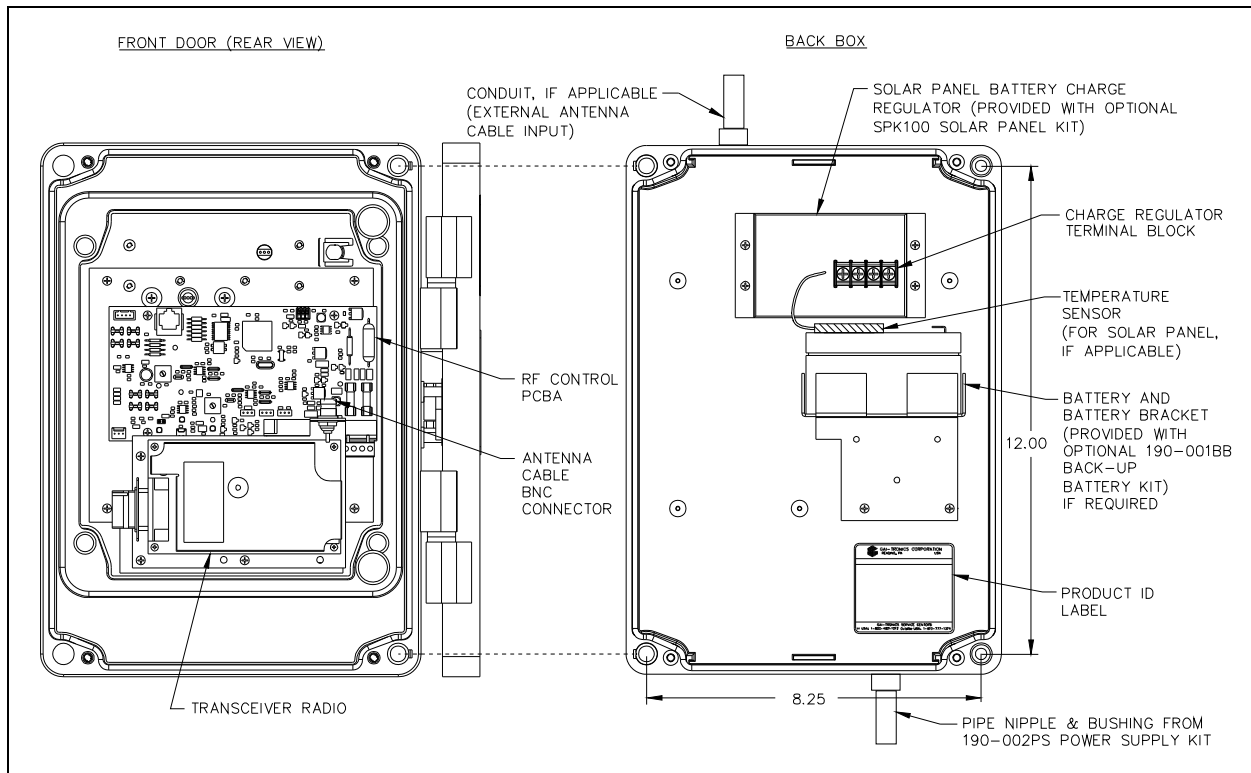


Figure 5. Model CB194-001 and CB194-002 Installation Details

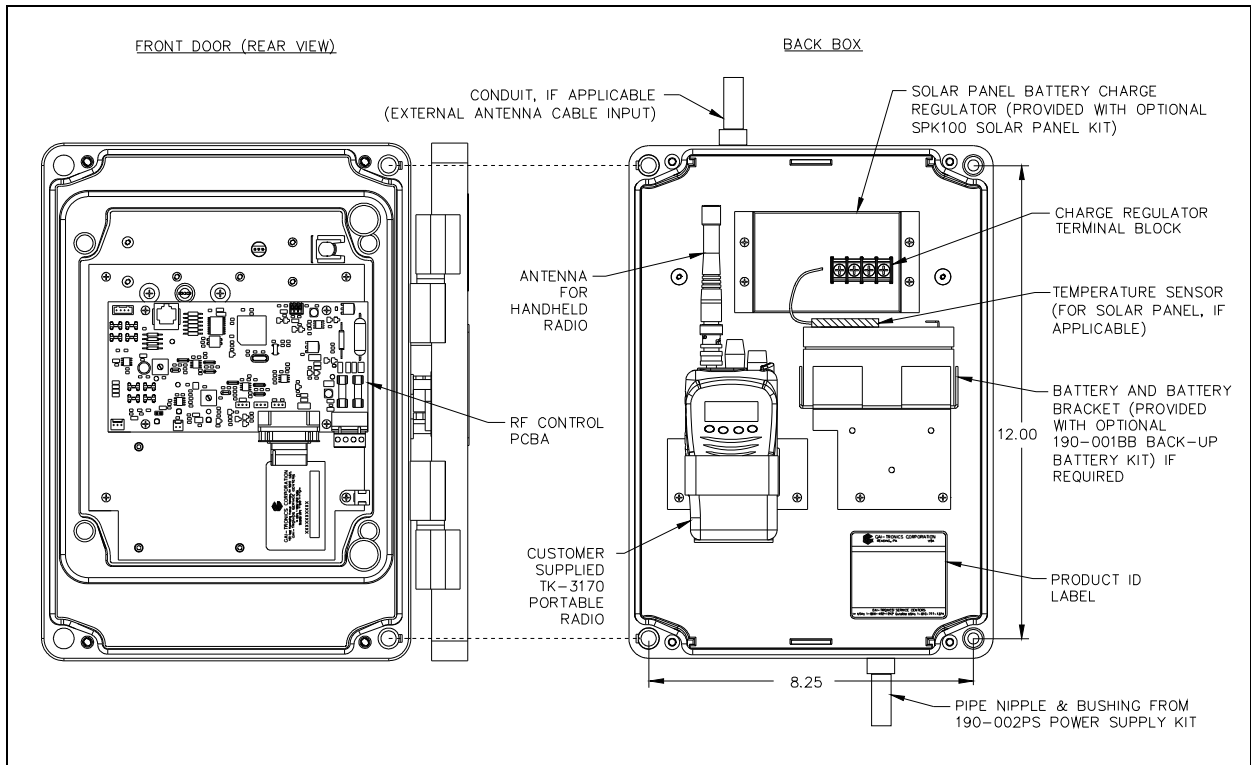




Figure 6. Model CB194-003 Installation Details

Model CB195-xxx Flush-Mount RF Call Box

The Model CB195-xxx is typically installed where a flush-mount unit is needed, such as in a wall or stanchion. It can also be surface-mounted when utilizing the Model 238-002 Enclosure.

1. When mounting in a GAI-Tronics Model 234 Series Stanchion or for flush-mount installations, the supplied back box must be used to mount the Model CB195-xxx RF Call Box. Remove the front panel assembly (six screws) and mount the back box to the structure using the appropriate hardware. Refer to Figure 7 and Figure 8. The cutout dimensions are 10.1 H × 7.6 W inches (255.6 × 193.0 mm).
2. For conduit/cable installation of external power, route the cable through the opening on the bottom of the back box.
3. Attach the appropriate external antenna to the RF Module by routing the connectorized antenna cable through the rear of the back box.
4. When applicable, install the Model 190-001BB Back-up Battery Kit and/or the Model SPK100 Solar Charge Regulator in accordance with the included instructions. Connect the black and red wires of the wiring harness provided to the battery connectors: positive (+) to the red and negative (-) to the black. Refer to Figure 4.
5. To connect an external dc power supply, strip the power supply connection wires and attach the positive (+) to pin 1 and the negative to pin 2 of the connector assembly that is plugged into TB1 of the PCBA located on the front panel. Refer to Figure 4 on page 31.
6. Inspect the jumpers to ensure the Call Box is configured to suit your application. See the “Hardware Configuration” section on page 36 for details.
7. Program the Call Box. See the “Programming and Set Up” section on page 46 for details.

 **NOTE**  **It is extremely important to dress all cables to prevent the power and RF module connection cable from touching the external antenna cable with the front panel closed. Failure due to improperly dressed cable may result in RF induced noise during transmit.**

8. Attach the Call Box front panel to the mounting flanges of the back box using the six supplied #10-32 security screws and six black flat washers.

NOTE: When surface-mounting with the Model 238-002 Enclosure, the supplied back box is not utilized and may be removed and discarded.

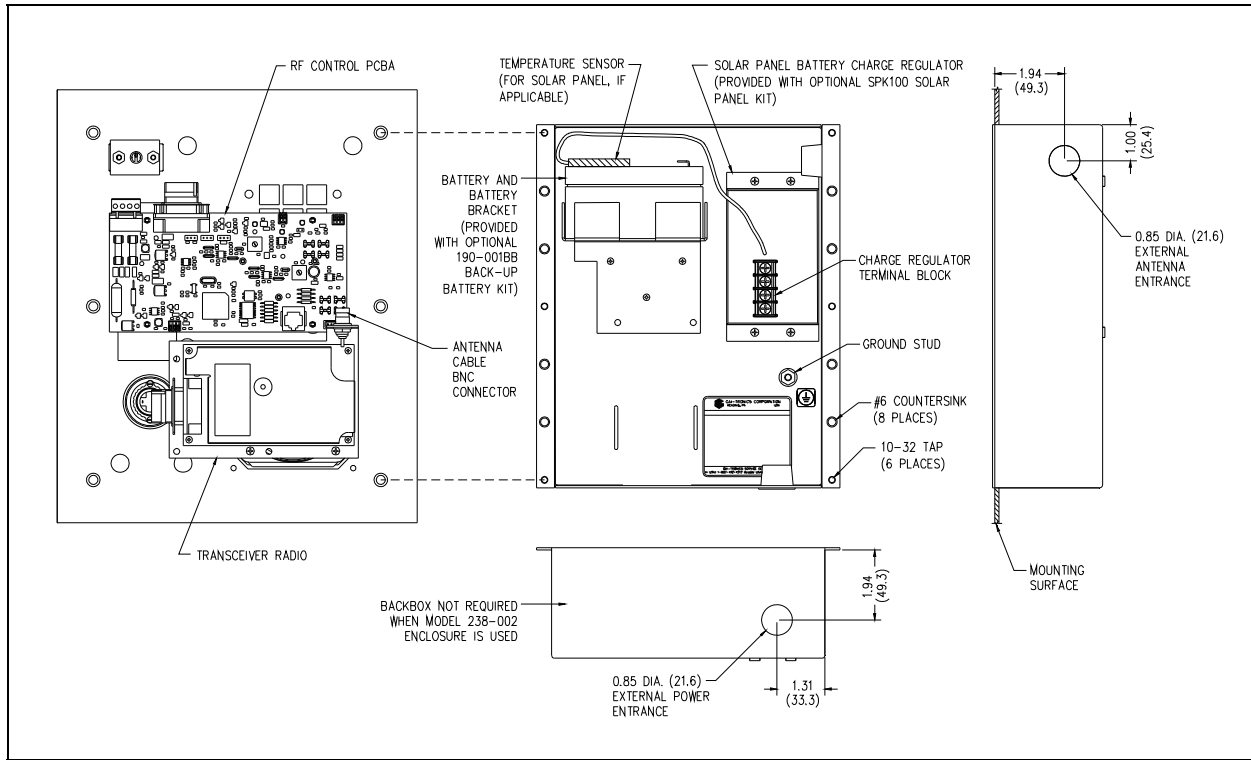


Figure 7. Model CB195-001 and CB195-002 Flush-Mounting Details

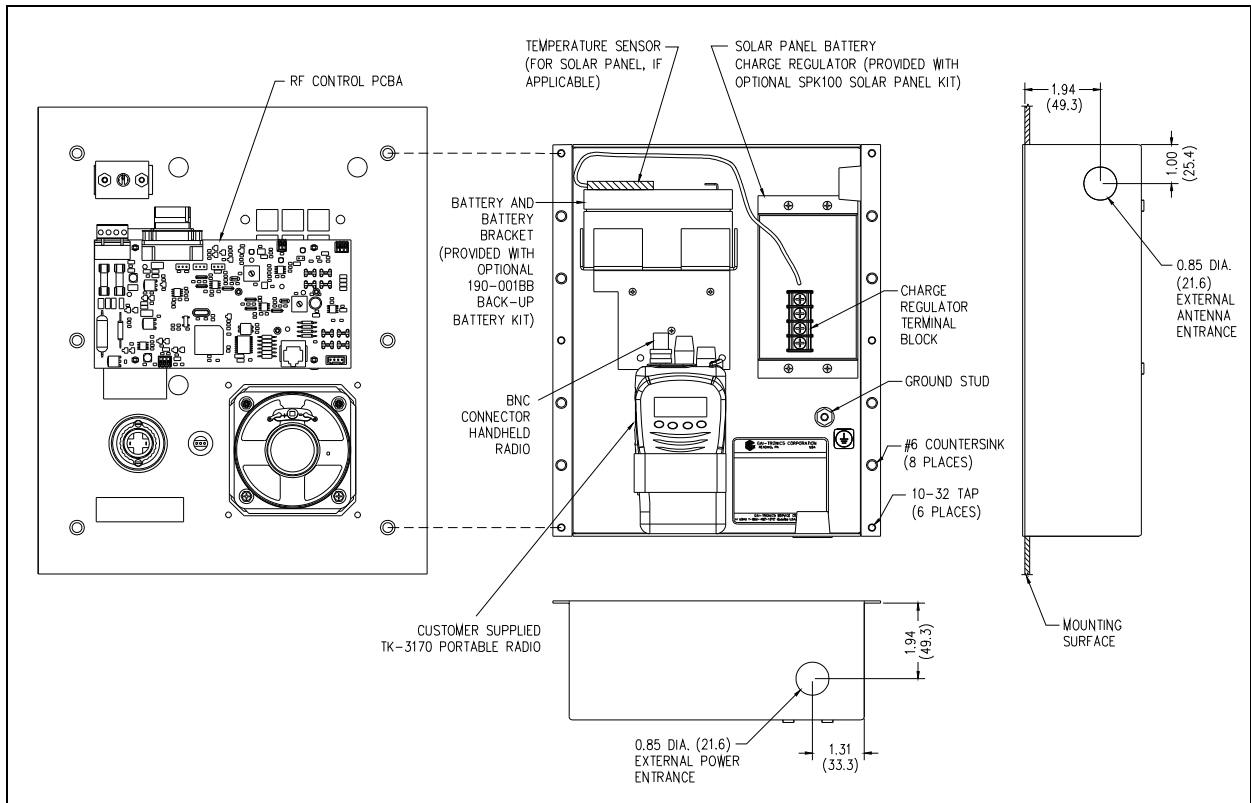


Figure 8. Model CB195-003 Flush-Mounting Details

Call Box Instruction Labeling

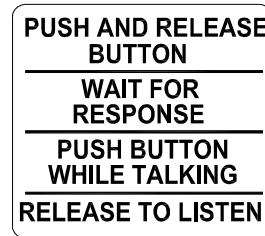
Call box-to-Telephone Line Operation: When using the RF Call Box in call box-to-telephone line mode of operation, the front panel instruction label must be changed.

Replace or cover the factory-installed instruction label with the label found in the hardware envelope packaged inside the Call Box. Label replacements should be as follows:

Model CB195-xxx



Old Silk-screened Labeling



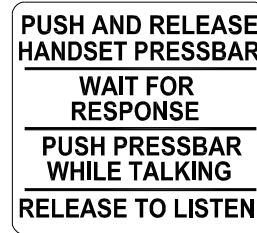
New Label (In envelope)

NOTE: The instruction information silk-screened into the Model CB195-xxx front panel will be covered by the new label shown above.

Model CB194-xxx



Old Label (Factory-installed)



New Label (In envelope)

General Set-Up

Hardware Configuration

PCBA Adjustments

Microphone Level

The microphone (transmit) output level is adjusted using MIC VOL potentiometer, R60, located on the RF Call Box PCBA. Refer to Figure 9. MIC VOL Test Point represents the signal entering the RF module.

Speaker Volume

Speaker (receive) volume (Model CB195-xxx) or handset receiver volume (Model CB194-xxx) can be adjusted using SPKR VOL potentiometer, R30, located on the RF Call Box PCBA. Refer to Figure 9. SPKR VOL Test Point is a -15 dB test point for the signal supplied to the speaker and a 0 dB test point for the signal supplied to the handset receiver. Maximum signal at the test point, guaranteeing minimal distortion, is 180 mVrms.

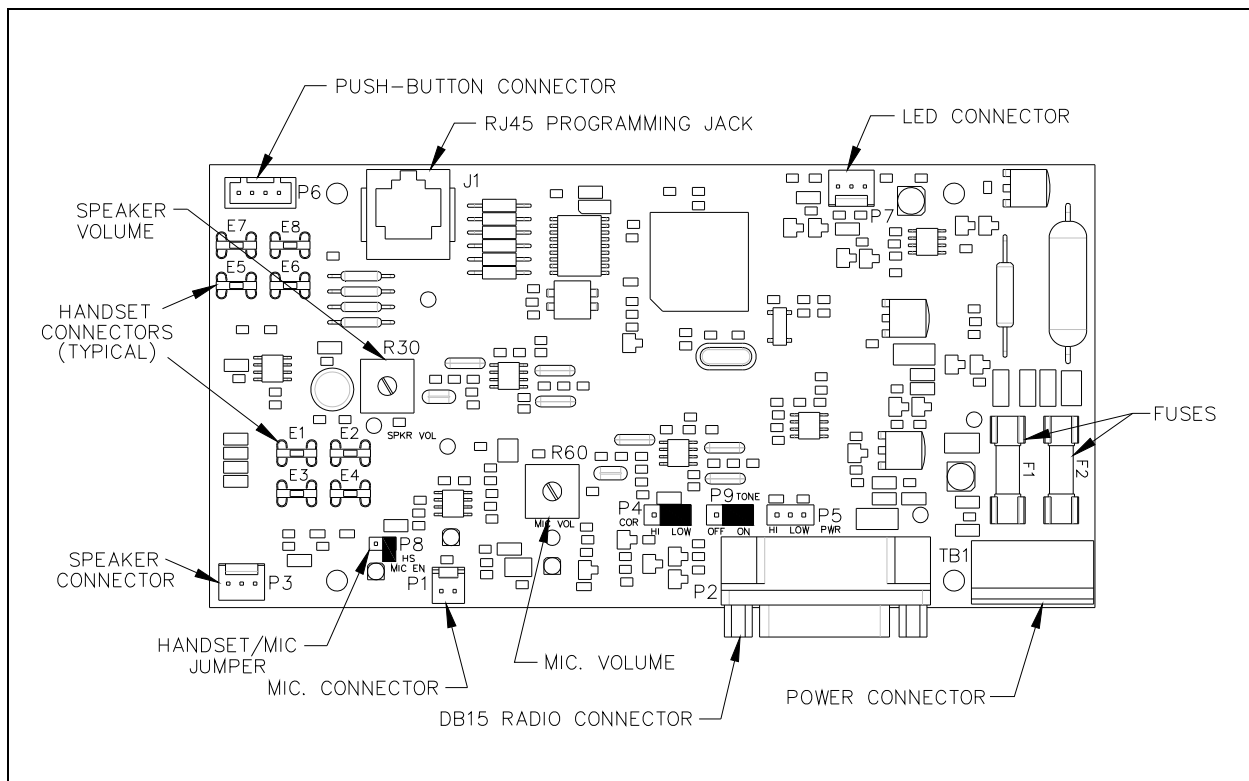


Figure 9. RF Call Box PCBA

Jumper Settings

Carrier Level Detect

Activation of the RF Call Box circuitry relies on a carrier detect signal provided by the radio (HIGH or LOW). The Carrier Detect Level is adjusted using Jumper P4. Factory default is set to LOW.

Note for CB19x-003 Models: When using a Kenwood TK-3170 Series Radio, jumper P4 must be moved to the HIGH position.

Private Line (TCS/DCS) Detection

In addition to the Carrier Detection, the activation of the RF Call Box circuitry may also require receipt an appropriate PL code, if programmed to do so. PL Detection is enable or disabled (ON/OFF) using Jumper P9. Factory default is set to ON. This setting should be changed to the OFF position if PL is not utilized in the RF operating system. This setting must match the other radios and Call Boxes in the system.

Radio Output Power (CB19x-001 and CB19x-002 Models Only)

The output power of the RF module can be changed (LOW – 2W or HIGH – 5W) using Jumper P5. Factory default is Low. An external antenna is required in either power setting.

Handset Microphone Enable (CB194-xxx Only)

The Handset Microphone is enable or disabled using Jumper P8. The jumper is installed only in all CB194-xxx Series RF Call Boxes.

Fuses

F1 is the external power fuse, which limits the current draw from the external power supply. The functionality of F1 can be verified by measuring approximately 13.2 V dc at EXT PWR test point referenced to the AGND test point.

F2 is the battery fuse, which limits the current draw to and from the battery. Functionality of F2 can be verified by measuring approximately 13 V dc on both sides of the fuse referenced to the AGND test point. The same voltage should be measured on each side of the fuse.

Connectors

- Plug **P1** connects the integrated microphone to the RF Call Box PCBA in Model CB195-xxx.
- Plug **P2** connects the RF Module or 190-3170K Kit cable to the RF Call Box PCBA. Pin-out information for P2 is as follows:

Models CB19x-001 and CB19x-002	
Pin Number	Function
1	-
2	-
3	-
4	-
5	Power Level
6	Power
7	Audio TX
8	-
9	-
10	-
11	Tone Detect
12	Audio RX
13	Carrier Detect
14	PTT
15	Ground

Model CB19x-003 with 190-3170K Adapter Kit	
Pin Number	Function
1	-
2	-
3	-
4	-
5	-
6	Power
7	Audio TX
8	-
9	-
10	-
11	Tone Detect
12	Audio RX
13	Carrier Detect
14	PTT
15	Ground

- Plug **P3** connects the speaker to the RF Call Box PCBA in the Model CB195-xxx.
- Terminal Strip **TB1** connects the RF Call Box PCBA to its power source.
- Plug **P6** connects the push-to-talk switch to the RF Call Box PCBA in the Model CB195-xxx.
- Programming Jack **J1** connects the PCBA to the computer for configuring the module for customer specific operation using the CARD Suite Software application and the XAC0004B programming cable.

Handset Connection Table

The following table explains the function and color connections for the Model CB194-xxx Handset Call Box's handset coiled cord and hookswitch.

Connector Name	Function	Handset Wire Color
E1	Handset speaker – positive	Red
E2	Handset speaker – negative	Green
E3	Handset microphone – positive	Thin white
E4	Handset microphone – negative	Black
E5	Handset hookswitch – positive	Dark blue
E6	Handset hookswitch – negative	Thick white
E7	Handset push-to-talk – negative	Light blue
E8	Handset push-to-talk – positive	Yellow

Transceiver Programming Instructions (-xx1 and -xx2 Models Only)

NOTE: Channel 8 is used as the RF Call Box Operating Frequency (channels 1 through 7 are not used).

Required Equipment

- Model 19101-024 Programming Kit (includes software CD, programming cable, power source cable, and adapter)
- Personal computer, Windows 95 or later, with an RS-232 serial port
- 12 V dc battery or power supply

Programming

1. Install the Ritron DTXL Series Programming software on the PC if it has not been previously installed.
NOTE: The unit to be programmed should be connected to the PC before the software application is started.
2. Disconnect the DB-15 cable from the Transceiver Radio.
NOTE: If the Ritron software does not read the type of the connected transceiver, unplug the programming cable and re-insert.
3. Connect the DTXP-PAC cable assembly's 15-pin D-connector into the Transceiver Radio; connect the red and black leads to a 12 V dc source (battery or supply), observing polarity (red +, black -).
4. Connect the DB-9 connector of the 9/RTC-PAS programming cable to the PC's serial port and connect the modular plug end to the modular receptacle on the DTXP-PAC cable.
5. Following the online help, use the Ritron DTXL PCPS programming application to set the Transceiver Radio as indicated in the table below.

Parameter	Selection	Comment
Model	DTX-4450 UHF or DTX-1450 VHF	Application should automatically read this setting
TX Time Out Time	Set to a value greater than the Maximum Talk Time as set in GAI-Tronics CARD Suite	
Quick Sleep On	NOT checked	This ensures that CD output is carrier detect only.
Channel 8 Frequencies, Quiet Call (PL), and Narrowband Mode	As desired	
Channels 1-7	Not used	

6. After the Transceiver Radio is programmed (time bar will disappear), disconnect the programming cable and reconnect the RF Call Box's DB-15 cable to the Transceiver Radio.

Set up for CB19x-xx3 Models

General

RF Call Box Models with a -xx3 suffix are intended for use with Kenwood's TK-3170 Series Portable Radios. The use of the TK-3170 Series Radio is currently limited to conventional operation. Kenwood Models TK-2170 (VHF), TK-3170 (UHF), and TK-3173 (UHF Conv./Trunking used in conventional mode) are capable of being programmed for interfacing to GAI-Tronics' RF Call Boxes.

Kenwood provides an FPU (Field Programming Unit) designed for the TK-3170 Series transceivers. Using this software allows creation the transceiver's configuration data file, writing the data to the transceiver, printing out the data, reading the data from the transceiver, and editing the file.

The TK-3170 Series radios have the ability to provide a COR/TOR output via the accessories connector, required for proper RF Call Box operation. The ability to activate this output on the TK-3170 Series radio requires activation of a special Kenwood DAT File. A copy of the Kenwood DAT file CD is included with the Model 190-3170K Adapter Kit. The DAT file CD will not automatically download to the programming PC's hard drive but it can be copied and saved to the hard drive if desired. A file folder must be created within the KPG-101D folder.

Equipment required for programming the Kenwood TK-3170 Series Portable Radio:

- KPG-101D Field Programming Software (CD-ROM) for the TK-3170 Series Transceivers, version 1.00 (released Mar/15/2005); Copyright 2005 Kenwood Corporation, all rights reserved.
- Model KPG-22 (25-pin D-type connector) or KPG-22A (9-pin D-type connector) programming cable. Appropriate adapters are provided with each cable.
- Custom DAT file CD (provided in Model 190-3170K Interface Kit)
- Personal computer, Windows 98/NT/2000/Me/XP compatible; English / Spanish screen Languages, with an RS-232 serial port.
- A charged battery (KNB-25 or equivalent) or an approved battery eliminator with power supply.

NOTE: The KPG-101D, KPG-22, and KPG-22A are distributed by Kenwood USA, via its dealer network (dealer account number required). These products are not available from GAI-Tronics.

Equipment required for installing a Kenwood TK-3170 Series Portable Radio in a Model CB194-003 or CB195-003 RF Call Box:

- RF Call Box
- TK-3170 Series Portable Radio
- Model 190-3170K Adapter Kit (includes interconnecting cables, mounting bracket, Velcro strap/hardware, and connectorized battery eliminator)

NOTE: The Kenwood TK-3170 Series Radio will obtain power from the RF Call Box power source via the battery eliminator connection.

Install the KPG-101D Software

If the Kenwood KPG-101D (FPU) programming software has not previously been installed in the programming PC, follow the installation instructions provided with the software. Installing new KPG-101D Software will create a “**Kenwood Fpu**” folder in the PC’s Program Files folder. An icon representing the software may also appear on the PC’s desktop display. Remove the CD after installation is complete.

Copying the Kenwood DAT Files

In the system Program Files (with the KPG-101D installed), open the “Kenwood Fpu” folder. Create a new folder under “Program Files\Kenwood Fpu” and name the new folder “GTC DAT Files”. Insert the DAT CD, provided with the 190-3170K Adapter Kit, in the PC’s CD-ROM drive. Copy the seven files on the CD to the “GTC DAT Files” folder and remove the DAT CD from the drive.

Programming the TK-3170 Series Radio

General Information

The TK-3170 Series Radios have multiple frequency capability, however the RF Call Box only utilizes one transmit and one Receive frequency. Multiple radio channels can be programmed into the radio list, but only one may be used at a time. Select the appropriate channel via the channel selector on the top of the portable. The KPG-101D Software contains a complete and concise help file to explain all the parameters pertaining to your standard programming needs. The information below pertains to programming necessary for proper RF Call Box operation.

NOTE: The DAT files provided with the 190-3170K Adapter Kit include pre-programmed parameters. All KPG-101D programming changes required for proper RF Call Box operation are noted in the following instructions. DO NOT change or modify any other parameters other than those specifically noted in these instructions.

Connections (KPG-22 or KPG-22A Programming Cables)

1. Connect the 25-pin male serial port connector (KPG-22) or nine-pin male serial port connector (KPG-22A) to one of the PC’s serial ports.
2. Insert the proprietary accessory connector (3.5/2.5 mm) to the radio’s accessory port.

Programming

3. Start the KPG-101D FPU program. Upon start-up of the KPG-101D, the software will open to the “Zone Information” screen.
4. Select **File** from the menu, then **Open** from the drop-down box. The GTC DAT File screen should automatically appear on the screen. If it does not automatically appear, use the “Look In” screen and follow “Program Files\Kenwood Fpu\KPG101D\DATA” to access the DAT files.
5. Select the “CALL_x17x_.dat” file corresponding to the transceiver model number and the Squelch Logic Signal desired. For example, if a TK-3170 UHF transceiver is to be used with Tone Operated Relay, select file “CALL_3170_TOR_OUT.dat” (this information will appear in the **File Name** box). Select **Open**. The pre-selected information will be transferred to line 1 of the Zone Information screen. This transfer can also be accomplished by simply double clicking on the desired DAT file.

6. Select **Model** from the Menu, then **Product Information** to display the Product Information Box. Select the appropriate transceiver model number from the **Model Name** drop-down menu and select **OK**. **NOTE: The FPU does not always verify the model number of the connected radio. Failure to select the proper model number could cause programming the radio for an incorrect model, rendering it inoperable.**
7. While still in the Zone Information Screen, enter the appropriate radio system information (TX/RX Freq., Decode/Encode data, power setting, etc.).
NOTE: “High” power setting can only be used for external antenna applications
8. Select **Edit** from the Menu and perform the following:

Optional Features

- Common Page 1 tab - Change the “Minimum Volume” setting to 15.
- Common Page 2 tab - Check the “Firmware Programming” box.
If Fleetsync is utilized, change the PTT ID Type from DTMF to Fleetsync.
- Conventional tab - Decrease Squelch Level to 4.
- Close window.

Key Assignments

- “Top/Side/Front tab”
 - Set the “S” switch to “Squelch Level”.
 - Set the “A” switch to “Low Transmit Power”
 - Set the “B” switch to “Zone Up”
 - Set the “C” switch to “Zone Down”
- Close window.

Fleetsync (if utilized)

- General 1 tab -
 - Enter “Fleet” and “ID” information
 - Disable (uncheck) “Manual Dialing”
 - Disable “Interfleet Call
 - Disable “PTT ID Sidetone”
 - Only the Caller ID box should remain enabled
 - Close window
- General 2 tab - Disable (uncheck) all “Auto Reset” and “Stack” boxes.
- ID List tab - Populate ID information as required.
- Close window.

NOTE: The RF Call Box does not provide an external display of the Fleetsync ID. It is intended only to transmit (encode) the Fleetsync ID, upon activation, for caller identification.

1. Select **File** from the menu, then **Save As, Data File**. Type the desired file name for the data file being created. Select **Save**.
2. Verify that the radio model is the same as that selected from the Model Name screen. Turn the radio and select **Program** from the menu to activate the program drop-down menu. Select **Write Data to Transceiver** from the menu. **NOTE:** The “write” icon, located on the toolbar, can also be used to accomplish programming.
3. Select **Write** when the pop-up box appears. The message “Writing Complete” will be displayed.
4. Disconnect programming cable and activate the auxiliary output by pressing the auxiliary button (orange) on the left side of the radio. When properly programmed, an overbar symbol (example: \bar{A}) will appear over the second character position on the display of the Kenwood TK-3170 Series Radio, meaning the COR detect is enabled.

Important Notes:

1. If the TK-3170 Series Radio should require future programming, the COR detect feature must be first disabled because the COR and Programming functions share the same connector port. Disable the COR is by again pressing the auxiliary button located on the upper left side of the radio. When disabled, the overbar will be removed. The COR detect must be re-enabled after programming for proper RF Call Box operation.
2. To achieve the appropriate receive audio level, turn the TK-3170 Series Radio’s volume control knob so the detent points to the rear of the portable (12:00 when viewing the top of the portable with antenna on the left). The RF Call Box’s speaker output level, SPK VOL (potentiometer R30), may then be adjusted as necessary. (Refer to page 36 of this manual).
3. The Kenwood TK-3170 Series Portable Radio must be programmed prior to installation in the RF Call Box. If the TK-3170 Series Radio will not program or operate properly after programming with the DAT files or if an “Error” occurs during operation/programming, check all connections between the PC and the portable. All programming issues/problems relating to the KPG-101D and DAT files must be referred to Kenwood USA technical support at 1-800-752-0987.
4. In some field installations it may be required to increase or decrease the radio squelch setting, particularly in VHF systems. This adjustment can be accomplished via the KPG-101D software. Please refer to the Kenwood KPG-101D Software instructions.

RF Call Box Jumper Settings

Jumper Settings (CB19x-xx3 Models Only)

Carrier Level Detect

Activation of the RF Call Box circuitry relies on a carrier detect signal provided by the radio (HIGH or LOW). The Carrier Detect Level is adjusted using Jumper P4. The factory setting for this jumper is the LOW position. The Kenwood TK-3170 Series Radio provides a high output, which requires this jumper to be moved to the HIGH position for proper operation. Please refer to Figure 9 on page 36 of this manual for the P4 jumper location.

Private Line (TCS/DCS) Detection

In addition to the Carrier Detection, the activation of the RF Call Box circuitry may also require receipt of an appropriate PL code, if programmed to do so. PL Detection is enable or disabled (ON/OFF) using Jumper P9. Factory default is set to ON. This setting should be changed to the OFF position if PL is not utilized in the RF operating system. This setting must match the other radios and Call Boxes in the system.

Installing the Kenwood TK-3170 Series Radio

NOTE: The Kenwood TK-3170 Series Radio should be programmed and tested prior to installing in the RF Call Box.

Refer to the Model 190-3170K RF Call Box Adapter Kit manual (Pub. 43003-044) for complete installation instructions. This manual is provided with the kit.

Programming and Set Up

The RF Call Box requires software configuration to set the operating parameters. **It is highly recommended to program and bench-test the unit prior to field installation.**

A computer with a COM port (RS-232) and Windows95 or newer operating system is required to program the RF Call Box. Windows NT operating system is not supported. If the PC contains only USB ports, a USB-to-RS-232 converter is also required. Programming accessories are sold separately. They are described below:

The No. XAC4000B Programming Bundle Flash Drive with CARD Suite Programming Software and No. XAC0004A programming cable are used to program the operating parameters.

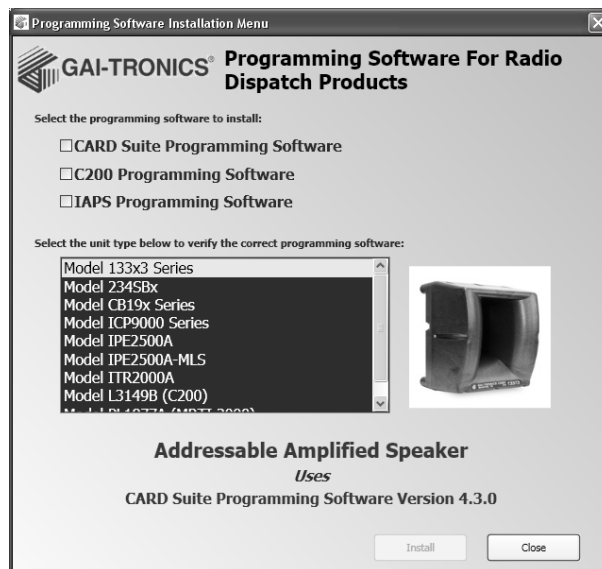
The -001 and -002 RF Call Boxes also require the radio transceiver to be programmed. The No. 19191-024 RF Programming Kit includes the software and cable for programming the desired frequency and optional PL code into the radio transceiver.

Card Suite Software

Installation

Exit all other programs that are running until the installation is complete.

Place the flash drive in the computer USB port.



If the installation does not start up automatically, it can be run from the **Start** menu. Select the **Start** button; then select **Run**. At the prompt, type **x:\Software Select Menu.exe** where *x* represents the drive letter that is associated with your flash drive. A CARD Suite icon should appear on the desktop display after successful installation.

RF Call Box Configuration

RF Call Box PCBA Programming Instructions (All Models)

Required Equipment

- CARD Suite Programming Software (included on XAC4000B Programming Bundle Flash Drive)
- XAC0004A Programming Cable
- Personal computer, Windows 95 or later, with a RS-232 serial port
- 12 V dc battery or power supply

Programming

1. Install the Card Suite Software on the personal computer (refer to “CARD Suite Software” section on page 46).
2. Open Card Suite Software via the desktop icon.
3. Connect the power source to TB1, pin 1 (+) and pin 2 (-).
4. Connect the XAC0004A programming cable to J1 (RJ45 Programming Jack) and the serial port (COM 1 or COM 2) on the personal computer.
5. Turn on power source. Verify Power LED illuminates.
6. In the Card Suite Software application, click on the RF Call Box Icon located in the left side of the screen. In the **File** pull down menu choose **New Archive**. Enter an archive description (name) and customer/site (name), select the method of creating the archive (“Create new unit archive using default values” or “Create new unit archive by reading a connected unit”). The “default values” are recommended for initial programming without a previously stored archive. Selecting “default values” will activate a “Method” pop-up screen. The CB19x-xxx button should be pre-selected (default). Click **OK** button to create the archive.
7. Modify operating parameters for the particular application.

Programmable entry selections:

- **Radio or Telephone Mode Select:** The RF Call Box can be used for direct communications with a radio user or for initiating communications with a telephone user via a base radio and telephone interconnect. Select “Radio” mode for radio-to-radio communication. Select “Telephone Interconnect” for radio-to-telephone communication using a GAI-Tronics’ Model PL1877A Telephone Interconnect and a base radio. By default, the Call Box is in “Radio” mode.
- **Go Ahead Tone Enable:** Enables or disables the beep tone generated by the RF Call Box that directs the Call Box user to begin speaking. Uncheck this box if the Call Box’s radio transceiver produces a “Proceed to talk” tone. By default, this tone is enabled.
- **Go Ahead Tone Volume:** After setting the Speaker Volume adjust potentiometer (R30) and testing for the desired voice volume, use this volume adjust setting to change the volume of the beep tone generated by the Call Box that directs the Call Box user to begin speaking.
- **ANI Enable (radio operation only):** Enables the ability to enter a DTMF ANI code that is transmitted by the Call Box for the caller identification.

- **ANI Code:** Allows for selection of the DTMF identifying code to be transmitted to a radio. This code may contain up to eight digits. The valid range for each digit is 0–9, A-D, *, or #.
NOTE: This applies only when Mode is set to “Radio.”
- **ANI Repeat Mode:** Selects how often the ANI is transmitted. The Call Box can be configured so that the ANI will be transmitted on “Every PTT”, on only the “Initial PTT”, or on any PTT following the “Idle Delay” time. When “Every PTT” is selected, the Call Box will transmit its ANI on every PTT. When “Initial PTT” is selected, the ANI code will only be broadcast on the initial PTT, that is, the PTT activation that woke the unit from its battery-power-saving standby mode. “Initial PTT” is unavailable when “Standby Forever” is enabled. When “Idle Delay” is selected, the ANI code will be broadcast after a period of inactivity with no PTT and no Carrier Detect; determined by the “Repeat Delay Time.” **NOTE:** This applies only when Mode is set to “Radio.” By default, this is set to “Initial PTT.”
- **ANI DTMF Transmit Level:** Allows for adjustment of the DTMF digits’ signal level for the ANI broadcast. By default, this is set at half volume.
- **ANI Repeat Delay Time:** The “Delay Time” setting allows for selection of the length of inactive time required to force the Call Box to retransmit its ANI code on the next PTT. The valid range for the “Delay Time” is 1–126 seconds (cannot be greater than the “Standby Time”).
NOTE: This applies only when Mode is set to “Radio” and the ANI Repeat Mode is set to “Idle Delay.”
- **Standby Forever:** Selecting this feature prevents the Call Box from going to its power-saving standby mode. Enable this feature only if an external power source is used to power the Call Box. **NOTE:** This applies only when Mode is set to “Radio.” By default, “Standby Forever” is not selected.
- **Standby Time:** If the Standby Forever feature is not selected, the Call Box will return to a battery-power-saving mode after a period of inactivity. This setting allows for selection of the time that the Call Box will remain active (able to receive) without activity (PTT or Carrier Detect) before it enters its battery-power-saving standby mode. The valid range is 5–255 seconds (cannot be less than the “ANI Repeat Delay Time”). By default, this is set to 10 seconds.
- **Initial Minimum Talk Time:** The initial PTT button press will cause the Call Box to transmit for a minimum time, even if the user releases the PTT button. The initial PTT activation is the button press that switches the unit out of its battery-power saving standby mode into receive mode. This setting allows for selection of this minimum time. A setting of 0 disables this feature. The valid range is 0 (disabled) or 0.125–31.875 seconds in 0.125 second increments.
NOTE: This applies only when Mode is set to “Radio.” By default, this is set at 4 seconds.
- **Maximum Talk Time:** Allows for selection of the maximum continuous time that the Call Box will transmit even if the PTT button is held for a longer duration. Note that the internal radio module may have its own transmit timeout which has priority over this setting. The valid range is 5–60 seconds. By default, this is set at 20 seconds.
- **Maximum Off Hook Time:** The Model CB194-xxx Handset RF Call Box will transmit an Off-Hook DTMF fault code if it has been off-hook and inactive for a time that exceeds this setting of Maximum Off- Hook Time. This fault can occur at the beginning of a call if the handset is taken off hook, and the PTT is not pressed soon enough. This fault can occur at the end of a call if the handset remains off hook after the Call Box switches to its low- power standby mode. The valid range is 1–255 seconds.
NOTE: This applies only when Mode is set to “Radio.” By default, this is set to 60 seconds.

- **Telephone Number (telephone operation only):** Allows for selection of the telephone number that the Call Box will “dial” via the Telephone Interconnect unit. This code may contain up to 20 digits. The valid range for each digit is 0–9, A–D, *, #, or “,” (comma). The comma is used as a pause.
NOTE: This applies only when Mode is set to “Telephone Interconnect.”
- **Busy Channel RF Lockout Retry Time:** Sets the time that the Call Box will wait after detecting airways activity for the channel to become clear. If the channel is busy at the end of this interval, the Call Box will abandon the transmission, and revert to standby mode. If Mode is set to “Radio,” then the valid range is 1 to 255 seconds in one-second increments. If Mode is set to “Telephone Interconnect,” then the valid range is 20 to 255 seconds in one-second increments. By default, retry time is set at 32 seconds.
- **Carrier Detect Check Enable:** Enables or disables the monitoring of the channel prior to transmission. Uncheck this box if the Call Box often indicates a busy channel due to low level RF interference that does not hinder the use of this channel. By default, the carrier detect check is enabled.
- **Carrier Detect Power Up Delay:** Sets the time that the Call Box will wait after waking from its battery-power-saving mode before it will monitor the RF channel for carrier. If the channel is clear, then the ANI code or telephone number will be transmitted (if enabled), followed by the transmission of voice audio. By default, the delay is set at 0 seconds.
- **Low Battery Warning Select (telephone operation only):** Enables or disables the beep transmitted to the telephone line when the battery level is low. **NOTE:** This applies only when Mode is set to “Telephone Interconnect.”

8. Save entries by clicking on the **Apply** button.
9. Program the connected unit by right clicking on the Archive and highlighting the **Program** unit command. The software will provide an indication that the unit was successfully programmed.
10. Disconnect power connection and XAC0004A Programming Cable.

Operational Check

During this check, another radio programmed to the same frequency must be available. Power must be applied to the RF Call Box assembly during this test, either an internal battery or external power supply.

Verify the status lamp functions correctly:

1. Momentarily press the push-to-talk (PTT) switch (push button or handset pressbar).
 - The lamp illuminates red and changes to green after splash tone is heard over the speaker or in the handset earpiece.
 - The lamp remains green for the initial transmission time-out period
 - The lamp extinguishes at the end of the transmission.
2. A received audio transmission causes the lamp to illuminate red for the duration of the reception.

Verify that transmit audio is received:

1. Press and hold the PTT switch.
 - The status lamp momentarily illuminates red and a splash tone is heard in handset receiver or over the speaker.
 - The status lamp changes to green and remains that color until the PTT switch is released.
2. Speak in a normal tone of voice or into the handset microphone when the status lamp is green. The transmitted audio should be heard at the radio programmed to the same frequency. Adjust the transmitted audio level as required by adjusting R60, MIC VOL pot.

Verify received audio is heard:

1. Release the PTT button and the status lamp extinguishes.
2. Transmit audio from the radio and verify the audio is heard over the speaker or handset receiver. Adjust the received audio level as required by adjusting R30, SPKR VOL pot.

Maintenance

Check external power supply/solar panel or replace battery when a low battery condition is present (notification of ANI DTMF code or blinking amber status lamp).