FLEXIVA ™
GX Low Power FM

888-9071-001

888-9071-001

Flexiva GX Compact Transmitter Series

REV.	DATE	ECN	Pages Affected / Description
Preliminary	June 7, 2023		Draft issued for technical and safety review.
Pilot	Aug 2, 2023	P67228	Release for compliance & certification applications.
A	Sept 5, 2023	P67413	FCC completed and DoC added to manual.
B	Jan 29, 2024	72367	Dec '23 technical review and edits. CE DoC updated.
C	June 11, 2024	72704	Add Dynamic RDS, new models and power cal. Revised parts list.
D	Aug 20, 2024	72813	Add GX3K. Add & edit info for Presets & Scheduler in Section 4 GUI. FCC compliance statement added for LPFM

WARNING: Disconnect primary power prior to servicing.

Publication Information

Trademarks

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Technical Assistance

Technical and troubleshooting assistance for GatesAir products is available from the field service department during normal business hours 8:00AM to 5:00PM CST.

Telephone *+1-217-222-8200*, FAX *+1-217-221-7086*, email *support@gatesair.com*.

Emergency service is available 24 hours a day, seven days a week, *by telephone only.*

Online assistance, including technical manuals, software downloads, and service bulletins, is available at our Customer Portal http://support.gatesair.com

For Global Technical Support Information please visit:

https://www.gatesair.com/services/technical-support

Address written correspondence to:

GatesAir
Field Service Department
3200 Wismann Lane
Quincy, IL 62305, USA.

NOTE: For all service and parts correspondence, please provide the sales order number, as well as the serial number for the transmitter or part in question. Record those numbers here:

_____/_____

Please provide these numbers for any written request, or have these numbers ready in the event you choose to call regarding any service or parts requests. All warranty claims require a serial number to be provided. For out of warranty products, this will help us identify what hardware shipped.

Replaceable Parts Service

The service parts department is available from 8:00AM to 5:00 PM CST Monday - Friday, and 8:00AM to 12:00PM CST on Saturday.

Telephone *+1-217-221-7500* or email service*partsreq@gatesair.com*.

Unpacking

Carefully unpack the equipment and perform a visual inspection to determine if any damage was incurred during shipment. Retain the shipping materials until it has been verified that all equipment has been received undamaged. Locate and retain all packing check lists. Use the packing check list to help locate and identify any components or assemblies which were removed for shipping and must be reinstalled. Also remove any shipping supports, straps, and packing materials prior to initial turn on.

Returns And Exchanges

No equipment can be returned unless written approval and a return authorization is received from GatesAir. Special shipping instructions and coding will be provided to assure proper handling. Complete details regarding circumstances and reasons for return are to be included in the request for return. Custom equipment or special order equipment is not returnable. In those instances where return or exchange of equipment is at the request of the customer, or convenience of the customer, a restocking fee will be charged. All returns will be sent freight prepaid and properly insured by the customer. When communicating with GatesAir, specify the GatesAir order number or invoice number.

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Safety

This manual is intended as a general guide for trained and qualified personnel who are aware of the dangers inherent in handling potentially hazardous electrical/electronic circuits. It is not intended to be a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

The installation, operation, maintenance and service of this equipment involves risks to personnel and equipment, and must be performed only by qualified personnel exercising due care. GatesAir shall not be responsible for injury or damage resulting from improper procedures or from the use of improperly trained or inexperienced personnel performing such tasks. During installation and operation of this equipment, local building/electrical codes and fire protection standards must be observed.

⚠ **WARNING:**
THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS. PER-SONNEL MUST AT ALL TIMES OBSERVE SAFETY WARNINGS, INSTRUCTIONS AND REGULATIONS.

⚠ **WARNING:**
ALWAYS DISCONNECT POWER BEFORE OPENING COVERS, DOORS, ENCLOSURES, GATES, PANELS, OR SHIELDS. ALWAYS USE GROUNDING STICKS AND SHORT OUT HIGH VOLTAGE POINTS BEFORE SERVICING. NEVER MAKE INTERNAL ADJUST-MENTS, PERFORM MAINTENANCE, OR SERVICE WHEN ALONE OR WHEN FATIGUED.

⚠ **WARNING:**
DO NOT REMOVE, SHORT-CIRCUIT OR TAMPER WITH INTERLOCK SWITCHES ON ACCESS COVERS, DOORS, ENCLOSURES, GATES, PANELS OR SHIELDS. KEEP AWAY FROM LIVE CIRCUITS, KNOW YOUR EQUIPMENT AND DON'T TAKE CHANCES.

⚠ **WARNING:**
IN CASE OF EMERGENCY ENSURE THAT POWER HAS BEEN DISCONNECTED. IF OIL FILLED OR ELECTROLYTIC CAPACITORS ARE UTILIZED IN YOUR EQUIPMENT, AND IF A LEAK OR BULGE IS APPARENT ON THE CAPACITOR CASE WHEN THE UNIT IS OPENED FOR SERVICE OR MAINTENANCE, ALLOW THE UNIT TO COOL DOWN BEFORE ATTEMPTING TO REMOVE THE DEFECTIVE CAPACITOR. DO NOT ATTEMPT TO SERVICE A DEFECTIVE CAPACITOR WHILE IT IS HOT DUE TO THE POSSIBILITY OF A CASE RUPTURE AND SUBSEQUENT INJURY.

⚠ WARNING:
PRODUCT AND ENVIRONMENTAL SAFETY - TOXIC MATERIAL. THIS PRODUCT USES COMPONENTS THAT CONTAIN BERYLLIUM OXIDE. THE PRODUCT AND THESE COMPONENTS ARE ENTIRELY SAFE PROVIDED THAT THE BEO CHIP IS NOT DAMAGED. ALL PERSONS WHO HANDLE, USE OR DISPOSE OF THIS PRODUCT SHOULD BE AWARE OF ITS NATURE AND OF THE NECESSARY SAFETY PRECAUTIONS. AFTER USE, DISPOSE OF AS CHEMICAL OR SPECIAL WASTE ACCORDING TO THE REGULATIONS APPLYING AT THE LOCATION OF THE USER. IT MUST NEVER BE THROWN OUT WITH GENERAL OR DOMESTIC WASTE.

First Aid for Electrical Shock

Faulty switches, frayed flexes and defective appliances can all be causes of electrical shock. Even a shock from a domestic current - the type used in the home or the workplace - can cause serious injury or even result in a fatality.

Water is a very efficient conductor of electricity and presents an additional risk. Handling otherwise safe electrical equipment with wet hands, or when standing on a wet floor, greatly increases the risk of electrical shock.

Treatment for Electrical Shock

Before doing anything else, remember that the first priority is personal safety. Do not touch a victim if they are still in contact with the appliance that has caused the shock. If they are still in contact with the electrical source, they will be 'live' and you risk electrocution to yourself.

Turn off the source of the electricity, if possible, to break contact between the victim and the electrical supply. Switch off the supply at the mains or meter point if possible, otherwise remove the plug or wrench the cable free.

Alternatively, you can move the source of the shock away from you and the victim. Stand on some dry, insulating material such as a wooden box, plastic mat or telephone directory. Using a wooden pole or broom, push the casualty's limb away from the electrical source or push the source away from them.

If it is not possible to break the contact using a wooden pole or broom, loop a length of rope around the casualty's ankles or under their arms. Take great care not to touch them while you are doing this. Once you have looped the rope around them, use this to pull them away from the source of the electrical current.

Once you have broken the contact between the victim and the source of the shock, conduct the primary survey - response, airway, circulation, breathing - and treat any urgent condition found. Call immediately for emergency services.

Post as much information as possible at the transmitter site. Posters such as Figure 0-1 on the next page should be prominently displayed near the transmitter. Emergency contact phone numbers and directions to the transmitter site with landmarks in the area should be posted near the transmitter and telephone.

References

It is very important to have a safety plan in place and available personnel that are trained and certified in first aid and CPR. Please refer to the following web sites for more information:

American Red Cross - www.redcross.org

Occupational Safety and Health Administration (OSHA) - www.osha.gov

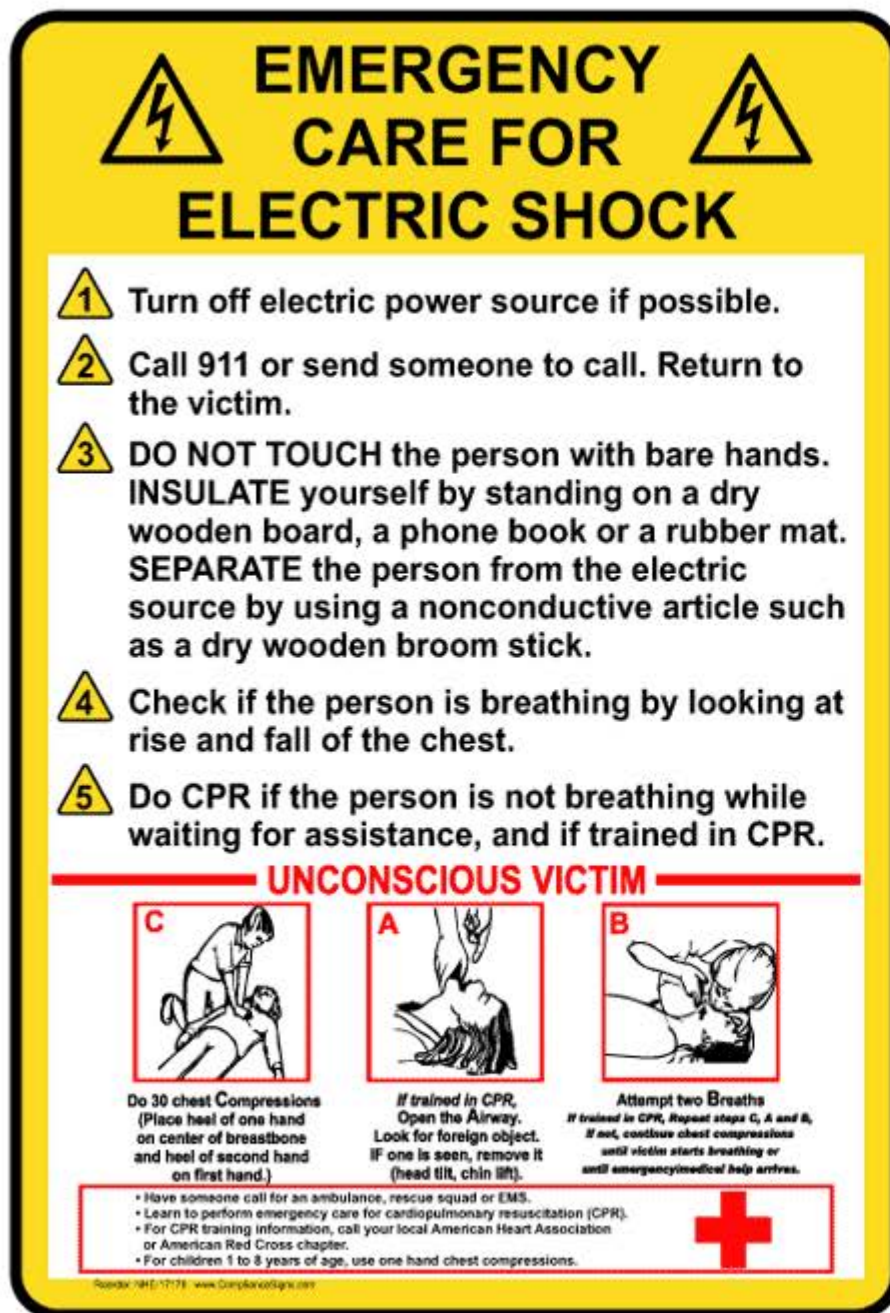For countries other than USA, contact health and safety agencies in your area for more information.

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Figure 0-1 Electrical Shock First Aid Poster (Example)

GATESAIR

SUPPLIER DECLARATION of CONFORMITY

Manufacturer:

GatesAir, Inc.

3200 Wismann Ln

Quincy, IL 62305, USA

Applicant:

GatesAir, Inc.

5300 Kings Island Dr. Ste 101

Mason, OH 45040

FC

Equipment declared compliant by this Declaration:

Product Series:	Flexiva GX
Models:	Flexiva GX50, GX150, GX300, GX500, GX1K, GX2K, GX5K, & GX10K.
Standards:	FCC 47 CFR parts 2 and 73
Test Reports:	GA-REG 22-009, GA-REG-23-004, GA-REG-24-001, & GA-REG-24-003

We hereby certify that the above product has been tested by GatesAir and complies with the technical requirements enumerated in 47 CFR Part 2 and 73, as demonstrated by Test Report GA-REG 22-009, GA-REG-23-004, GA-REG-24-001, & GA-REG-24-003.

These products are to be marketed in the US in accordance with FCC Rules based on the standard 47 CFR Part 2 and 73.

_____

Ted Lantz – Vice President, Product Line Management

Quincy, IL

30 April, 2024

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GATESAIR

Manufacturer:

GatesAir, Inc.

3200 Wismann Ln

Quincy, IL 62305 USA

European Agent:

GatesAir, Srl

Via G. Di Vittorio, 17

25125 Brescia - Italy

We, GatesAir, Inc. at 5300 Kings Island Dr. Ste. 101 Mason, OH USA, declare under our sole responsibility for the equipment:

 Flexiva GX10K, GX5K, GX2K, GX1K, GX500, GX300, GX150, & GX50.

That all the essential requirements set out in Article 3 of Directive 2014/53/EU on radio equipment has been demonstrated in test reports: GA-REG-22-008, GA-REG-23-005, GA-REG-24-002, & GA-REG-24-004

Article 3.1a

Comformity to Directive 2014/35/EU relating to electrical equipment designed for used within certain voltage limits via compliance to Harmonized Standard:

IEC 60215 ed 4.0 2016-04   *Safety Requirements for radio transmitting equipment*

Article 3.1b

Comformity to Directive 2014/30/EU relating to electromagnetic compatibility via compliance to Harmonized Standard:

EN 301 489-53 V1.1.0 (2017-03)   *ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 53: Specific conditions for terrestrial sound broadcasting and digital TV broadcasting service transmitters and associated ancillary equipment; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU*

Article 3.2

Efficient use of radio spectrum in order to avoid harmful interference via compliance to Harmonized Standard:

EN 302 018 V2.1.1 (2017-04)   *Transmitting equipment for the Frequency Modulated (FM) sound broadcasting service; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU*

That the equipment is also in conformity with the following relevant Union harmonisation legislation:

Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

Based on the above tests and inspections, we hereby declare this equipment compliant.

Signature:_____

Ted Lantz – Vice President, Product Line Management

Quincy, IL May 27, 2024

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LPFM APPLICATIONS

This Device Complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

MPE minimum distance required: *(distance from the antenna/load)*
    GX50:   141.21cm
    GX150:   256.08cm
    GX300:   362.56cm

MPE, (Maximum Permissible Exposure), minimum distance required to meet the uncontrolled RF exposure limit.

Caution: Changes or modifications not expressly approved by GatesAir could void the user's authority to operate the GX50/GX150/GX300

Note: 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 radio 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 his own expense.

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1   Section-1 Introduction

1.1   Purpose of This Manual

This manual provides important information for the proper installation, operation and maintenance of the Flexiva GX Compact Series of transmitters. Included are the 50 W, and 1 kW transmitters. These high performance transmitters are compact and easily mount into standard 19" rack mount cabinets. They occupy a minimum of 2 RU's. (It is highly recommended to read this section, plus sections 2 and 3, thoroughly before beginning the installation. If remote control and the GUI is being used, review section 4 also.

1.2   GX Compact Product Features

The key features of the GX Compact series are as follows:

- Integrated Direct to Channel Digital FM modulator includes Stereo Encoder w Auto-switching analog L/R
- 1 AES, 1 Analog, 1 Composite and 1 SCA baseband inputs, (external SCA generator required).
- Static RDS generator
- External 10MHZ and 1 PPS inputs
- Digital MPX/Composite inputs over AES 192
- Internal harmonic filter
- Internal auto switching for external RF Source
- Proportional VSWR fold-back for safe operation at reduced power into marginal loads (icy antenna, etc)
- RF ramp-up to minimize turn-on transients
- Air filter serviceable while transmitter is in operation
- FM 87.5 - 108 MHz models meet or exceed all applicable FCC, Industry Canada, CCIR and IEC215 standards, RoHS compliant
- Front panel control and metering.
- Built-in parallel interface for remote control, status and metering; RFI and transient protected.
- Automatic restart after AC mains interruption; returns to previous operational mode.
- Web GUI for use in remote diagnostics using customer's PC.
- SNMP for basic network control and monitoring

1.2.1   GX Compact Model Summary

The GX Compact transmitter uses a common front panel and modulator for all models. The Modulator card is a direct to channel FM Modulator with built-in stereo encoder that provides unsurpassed high quality FM broadcasting. The front panels of both low power models are the same using the same Front Display Board. The rear panel I/O for the modulator functions are the same. Even the basic locations of the RF Output and AC Input connectors are the same, with only the connector types differing.

The following section and pictures show the front view and the 50W & 1kW models with their top cover removed.

1.3 GXLP Front View

The air filter is accessible by removing the front panel. Control and Status consists of the LCD Display, the On/Off and Rem/Loc buttons and the four Status LEDs. GXLP models ,GX50 up to, and including the GX2K are 2RU in height. GXLP models GXLP models GX3K and larger are 3RU in height.

Figure 1-1 GXLP Front View

1.3.1 GX50 Top View

The GXLP has three enclosures, Left, Center & Right. Figure 1-2 shows the GX50 with it's top cover removed. The Right enclosure houses the Modulator card which is the same for the GX150 and larger models. In the GX50 only, the Center enclosure houses both, the DC power supplies and the 50W amplifier and RF output circuitry. The Left enclosure in all GXLP models is for the AC input and AC Line Filter. Also shown in this GX50 is the Battery Backup Option, side-mounted to the right of the Modulator.
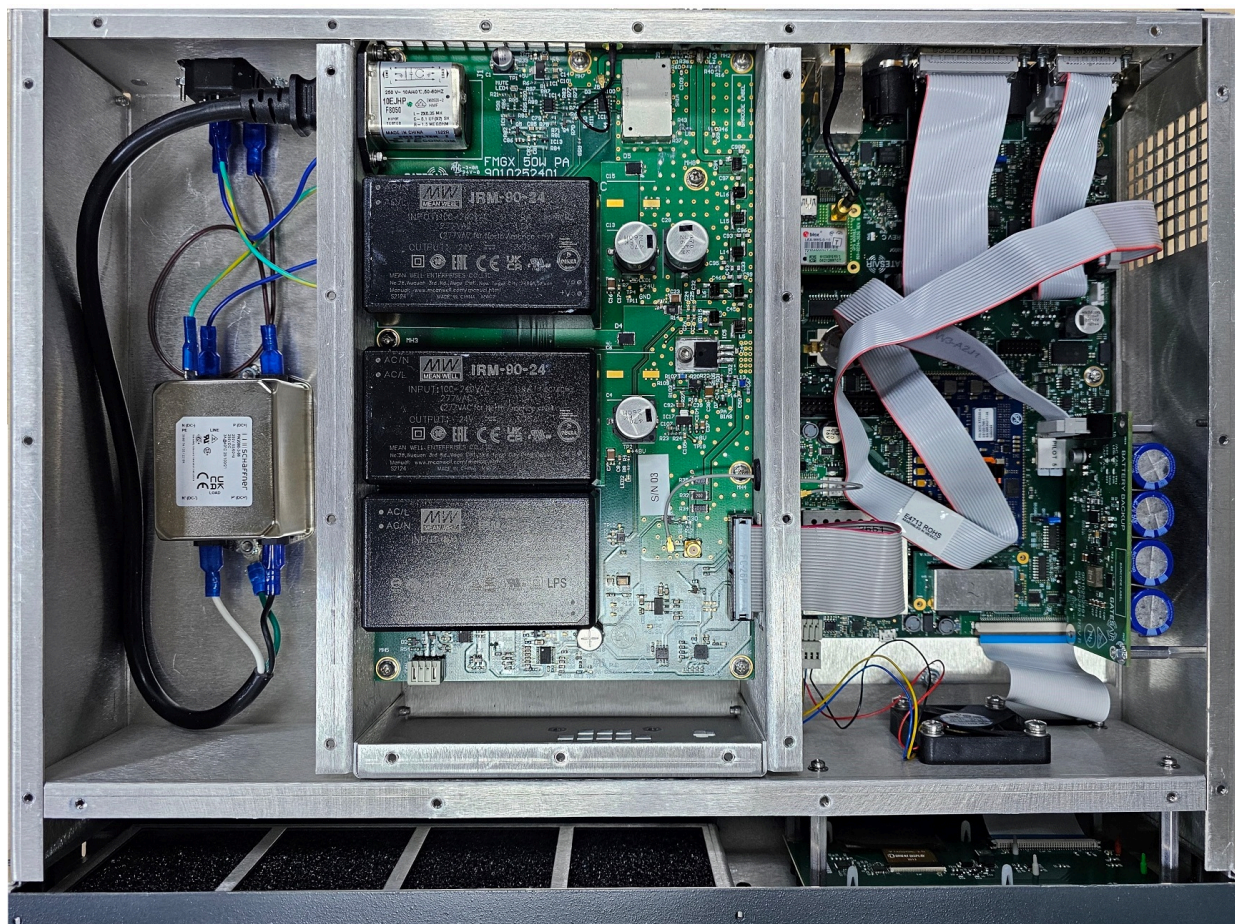
Figure 1-2 GX50 Top Cover Removed

1.3.2 GX150 Top View

In the GX150 and larger models, the DC power supplies are located in the left enclosure, leaving only the RF amplifier and RF output circuitry in the Center enclosure. In regards to the chassis depth, the GX150 is same depth as the GX50. The larger models will be larger in depth to accommodate the increase in RF power and power supply requirement.

Figure 1-3 GX150 Top Cover Removed

1.3.3 GX300, GX500 & GX1K Top View

Figure 1-4 is the GX1K, 1,000 W model. The Modulator card is in Right side enclosure, while the Center enclosure is reserved for the 1KW Power Amplifier and RF Output circuitry. The Left Enclosure houses the AC input and line filter and DC power supplies for the transmitter. The GX500 and GX300 models are very similar in sub assembly layout. Refer to Section 7, Parts List, for Exploded Diagrams of all models.

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Figure 1-4 GX1K Top & Front Cover Removed

1.3.4   GX2K Top View

The GX2K, has the Modulator card in the Right side enclosure. The Center enclosure is reserved for the 2KW Power Amplifier and RF Output circuitry with the Left Enclosure housing the AC input and line filter and DC power supplies for the transmitter.
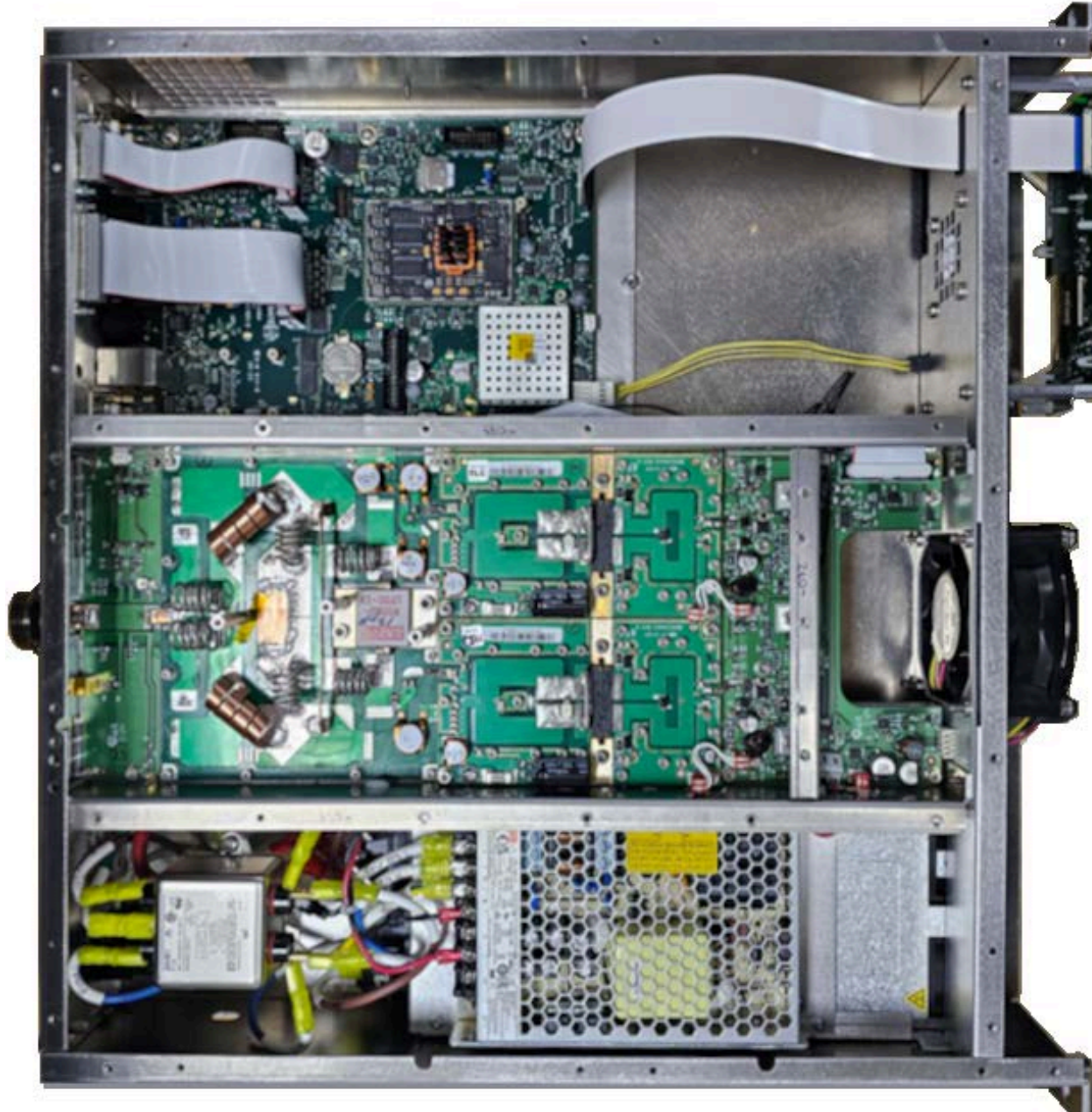
Figure 1-5 GX2K Top & Front Cover Removed

1.3.5   GX3K Top View
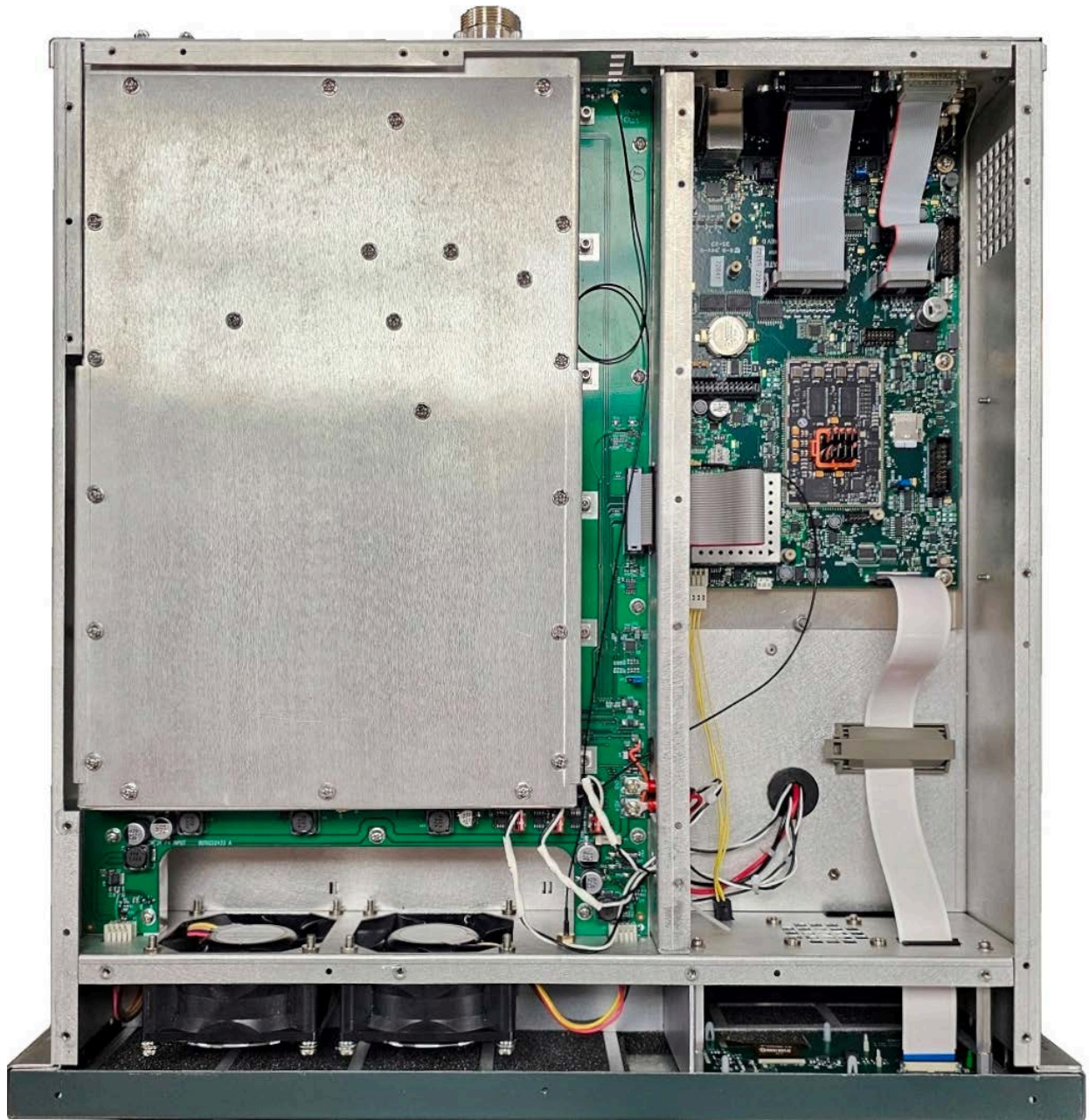
Figure 1-6 GX3K Top Cover Removed

1.4   GX Compact Rear View

Figure 1-7 GX50 Rear View
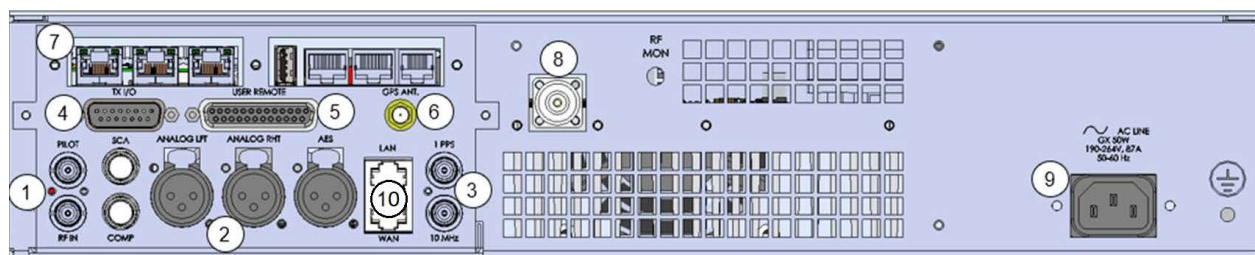
Figure 1-8 GXLP Rear View with I/O Locations

1.4.1   Rear Connection Summary

Refer to Section 2 Installation for additional information on these connections.

1. **RF In & Pilot**
    - Pilot BNC: 19 kHz Out - Stereo pilot for external stereo generator.
    - RF IN BNC: Auto sensing input for external RF source. Range 0 to +10dbm

2. **Audio Inputs**
    - SCA Input: BNC input for SCA
    - Comp Input: BNC input for composite
    - Left Audio - XLR input for Mono Left or Stereo Left Audio Input
    - Right Audio - XLR input for Stereo Audio Right
    - AES - XLR input for Main AES Audio Input

3. **Clocking and Synchronization**
    - 1 PPS: Reference input or output from internally generated signal 50 Ohms or 10 k Ohms jumper selectable
    - 10 MHz: Reference input or output from internally generated signal -10 dBm to +10 dBm; 50 Ohms

4. **TX I/O**
    - Transmitter Interface. (Used when GX is an Exciter in GatesAir or other high power transmitter)

5. **User Remote**
    - GPIO (General Purpose Input/Output) - Parallel I/O Status, Commands and Analog Voltages

6.   GPS - Optional
   • When Optional GPS receiver is installed. Jumper setting available for voltage to antenna (+5 or +3.3 VDC)

7.   Expansion Slot - Options
   • IP Link Option

8.   RF Outputs
   • Type N Female: GX50, GX150, GX300, GX500
   • Type 7-16 DIN: GX1K, GX2K and GX3K

9.   AC Inputs
   • GX50 & GX150: IEC320-C14
   • GX1K, GX300 & GX500: IEC320-C20
   • GX2K: Bulgin PX0931
   • GX3K: Direct terminal lug connection with safety cover.

10. Ethernet
   • LAN   RJ45 Connection for MSC or GUI, and SNMP.   NOTE: Does not do DHCP
   • WAN   RJ45 Connection for Web GUI and SNMP control

11. RF Mon
   • RF Sample of the RF output, can be used for modulation monitor (approx -39 dBc)
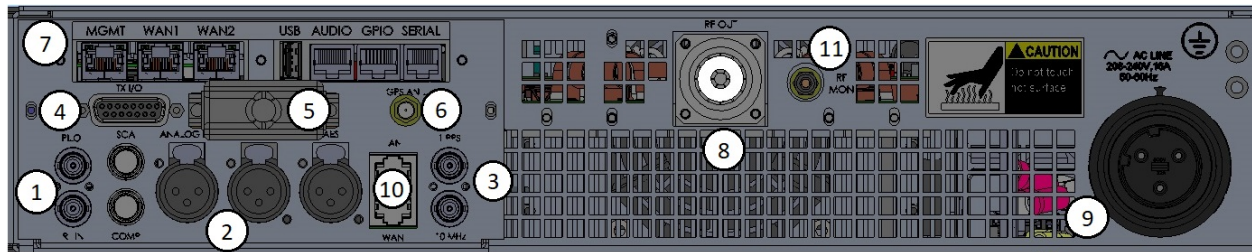
Figure 1-9 GX2K Rear View with I/O Locations

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2   **Section-2 Installation**

2.1   Introduction

This section details the procedures for installation and the steps required for the initial turn-on of the GX Compact series transmitters. All steps should be followed in order to ensure the installation and turn on process are completed properly.

2.2   Unpacking

When the transmitter is delivered to the site, the shipment should be inspected and inventoried before installation is begun. Each transmitter shipment will be accompanied by a packing check-list identifying which items are packed in the various crates or boxes. Be sure to locate and save this document when the shipment arrives.

The contents of the shipment should be as indicated on the packing list. Carefully unpack the transmitter and perform a visual inspection to assure that no apparent damage was incurred during shipment. Retain the shipping materials until it has been determined that the unit has not been damaged. If the contents are incomplete, or if the unit is damaged electrically or mechanically, notify the carrier and GatesAir immediately.

2.3   Returns and Exchanges

Damaged or undamaged equipment should not be returned unless written approval and a Return Authorization is received from GatesAir. Special shipping instructions and coding will be provided to assure proper handling. Complete details regarding circumstances and reasons for return are to be included in the request for return.

Custom equipment or special-order equipment is not returnable. In those instances where return or exchange of equipment is at the request of the customer, or convenience of the customer, a restocking fee will be charged. All returns must be sent freight prepaid and properly packed and insured by the customer. When communicating with GatesAir, specify the GatesAir order number or invoice number and serial number.

2.4   Transmitter Documentation

Prior to installation, this technical manual, the factory test data, and the accompanying drawing package should be studied carefully to obtain a thorough understanding of the principles of operation, circuits, and nomenclature used in the Flexiva GX series transmitter. This will facilitate proper installation and commissioning. Store the documentation, including the factory test data, in a secure location for future reference.

📝✏️ **Note**

The information contained in the drawing package should be considered the most accurate in the case of a discrepancy. Document any changes and all external connections, sign and date them, and keep this info with the doc package.

2.4.1   Installation and Outline Drawings

In the accompanying documentation package there are several drawings that will aid in the installation and initial turn-on of the transmitter. It is always a good practice to locate and review all documentation prior to continuing.

In the case that both generic and custom drawings are provided, the generic drawings are superseded by site/model-specific drawings.

Before continuing please be sure that the site AC mains and cooling are adequate for the installation of your transmitter.

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2.5   Personnel and Equipment Protection

All electrical equipment can pose a safety hazard if not operated properly or if proper safety precautions are not taken. Every care should be taken during the site planning process to maximize personnel protection on site, both during the installation and once the transmitter has been placed into operation. Below is a collection of recommendations to follow to enhance personnel safety on site.

- Post first aid procedures in a visible location.
- Maintain a well-stocked first aid kit in a visible location.
- Post emergency phone numbers next to all site telephones.
- Install fire extinguishers appropriate for extinguishing electrical fires.
- Maintain a file of Material Safety Data Sheets (MSDS) for any hazardous chemicals on premises.
- Restrict site access to unauthorized personnel and post applicable high voltage and non-ionizing radiation hazard warnings.
- Secure all equipment racks to prevent tip over hazards, especially at sites prone to seismic activity.
- In rack installations, be sure to mount equipment low enough in relation to rack center of gravity to prevent a tip over hazard. It is a good practice to bolt rack to the floor.
- Install mains safety disconnects (pull box or emergency off button) in sight of transmitter so as to permit visual verification of mains status at all times while performing maintenance.
- Provide a means to lock out AC mains while performing maintenance to prevent inadvertent electrocution by a second party.

2.5.1   Safety Circuits

The GX LP has provisions for the following safety connections located on the USER REMOTE. Two of these circuits have user selectable settings made with the GUI control setups:

>External Mute:
The Mute Input signal, (RF MUTE) is a selectable pin location on the USER REMOTE connector at the rear of the transmitter. The Trigger and Active are also selectable. As an example, if Active is set to Low, and the RF MUTE input goes to a logic high, the power control circuits within the amplifier forces its RF output to zero, but the DC circuits and cooling fans continue to operate.

> Safety Interlock:
The SAFETY INTERLOCK signal is available on pin 25 of USER REMOTE connector. The interlock pin must have a continuous connection between pin 25 and Ground (Pin 24) to allow the transmitter to turn ON. If continuity between pins 24 & 25 is disconnected, this interlock requires a manual or remote "TX ON" command for the transmitter to restart after connection is restored.
A "dummy" D-sub 25 connector (952-9266-071), with a jumper between pins 24 & 25, is provided to do the initial turn on, or troubleshooting and should be replaced with an actual interlock system for site to ensure safety.

> Equipment Interlock:
The EQUIPMENT INTERLOCK input signal is a selectable pin location on the USER REMOTE connector. The Trigger and Active are also configurable. Active can be set High, or Low (ground). When the interlock input signal, (High or Low) is applied, will make the pin "Active" and the transmitter turns OFF.
When the interlock signal is removed, or non-active, the transmitter returns to its previous operational state ON or OFF. No user interaction is required for the transmitter to turn back to the ON state.

📝 **Note**

These safety circuits are enabled regardless of the Remote Enable/Disable state.

📝 **Note**

Information on how to setup the pins for the USER REMOTE connector is located in Section 4.10.

2.6   Connecting AC Power

Refer to the ECM Data Sheets for detailed information on voltage range, power consumption, and AC wire a circuit breaker sizes for each model. If the GX transmitter is supplied in a GatesAir cabinet with a AC distribution panel there will be only one AC feed from the wall breaker/fuse panel required. This connection will be made directly to the distribution panel terminal block or breaker. Where multiple GX transmitters are installed in a rack with a single AC distribution panel, ensure the AC breaker and wire are sized for the number of transmitters in the rack.

⚠️ **Warning**

DISABLE AND LOCK OUT STATION PRIMARY POWER BEFORE PRIMARY POWER CABLES ARE CONNECTED TO THE EQUIPMENT.

⚠️ **Warning**

CHECK THE AC POWER FEEDING THE GX. IT MUST BE WITHIN THE VOLTAGE RANGES SPECIFIED ON THE MAINS INTERCONNECT WIRING DIAGRAM. ANY VOLTAGE OUTSIDE THIS RANGE WILL CAUSE DAMAGE TO THE EQUIPMENT. THE VOLTAGE SHOULD BE MEASURED LINE TO LINE, AND IF A NEUTRAL IS USED, LINE TO NEUTRAL.

⚠️ **Warning**

AN EXTERNAL CIRCUIT PROTECTION DEVICE (BREAKER OR FUSE) IS REQUIRED FOR EACH COMPONENT AC INPUT. THIS IS PROVIDED BY THE CUSTOMER IN ACCORDANCE WITH THE AC INTERCONNECT DRAWING OR BY GATESAIR IF AN IN-RACK AC DISTRIBUTION CHASSIS IS PURCHASED (OPTIONAL). IN THE LATTER CASE, AN EXTERNAL CIRCUIT PROTECTION DEVICE TO HANDLE THE ENTIRE TRANSMITTER LOAD AT THE MAIN AC DISTRIBUTION POINT IS STILL REQUIRED, IN ACCORDANCE WITH PREVAILING LOCAL SAFETY NORMS.
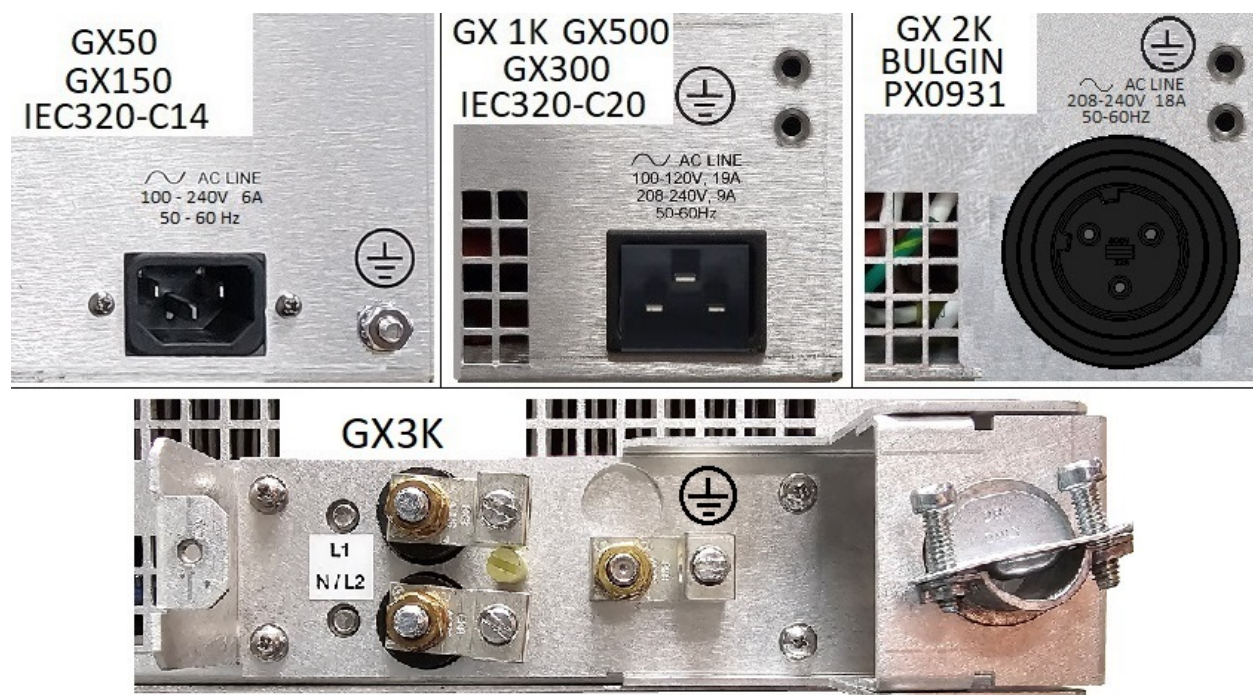

Figure 2-1 AC Power Input Connectors

2.7   GX and Cabinet Grounding Requirements

Two separate ground connections are required for the GX Compact series transmitter: an ***AC safety ground*** and an ***RF earth ground***. In Figure 2-1 in the previous page, notice that each unit has a ground connection near the AC mains input. This should be connect to either the ground bar within the rack or to the station ground. If installing in a rack, the rack should be grounded to the station ground by 2" copper ground strap.

*The **AC safety ground*** prevents an electrocution hazard should a dangerous potential from inside the unit accidentally contact an exposed metal surface. This is done by ensuring all metal surfaces have an uninterrupted connection back to the physical earth (PE) terminal at the AC mains service entrance. A physical earth (PE) connection is typically tied to the return current terminal either indoors at the main distribution panel or outside "at the pole" (as dictated by local codes), thus allowing any fault current to safely return to the power source.

The AC safety ground connection is made automatically for the GX Compact and other GatesAir auxiliary equipment via the green/yellow wire on the third prong of the AC input cord. When the exciter and any auxiliary equipment are connected directly to a user-supplied outlet box or distribution panel, the green-yellow wire from the AC input cord(s) must terminate at the PE terminal at the AC mains source.

When present, a rack buss-bar will also connect to the PE terminal. Individual panels making up the rack cabinet without a solid, permanent connection back to the PE terminal that might be exposed to unsafe voltages (e.g. doors on hinges) will connect to the PE terminal via a wire jumper connection to the buss-bar.

*The **RF earth ground*** prevents damage to the equipment during lightning-induced transients and reduces RF interference to low level circuits in general. An RF ground strap/wire attachment point is located at the rear of the GX Compact transmitter and exciter chassis. This connection is suitable for use in a single point grounding system, with the ground strap attached to the equipment rack and the rack, in turn, to a common grounding plate.

📝 Note

Observe this important distinction: The AC safety ground ensures that energy originating at the AC mains source is always safely returned to the AC mains source (i.e. prevents electrocution), whereas the RF earth ground ensures that energy "originating in the earth," such as lightning, safely returns to the earth. Confusion may arise in some cases because the AC safety and RF earth ground circuits may share the same conductor or connection point(s) in some situations. To prevent confusion, some sources refer to the AC safety ground as "bonding" and the RF earth ground as "earthing."

2.7.1   RF Safety Ground

The GX Compact transmitter is equipped with a RF/Safety ground lug connection on the rear panel located near the AC mains input. This safety ground must be connected to the site ground system, a flat copper ground strap is recommended.

When the GX Compact transmitters are placed in a rack mount cabinet, the transmitter(s) will have special grounding cables or copper ground straps connected to the copper ground buss bar that runs down the left side of the cabinet (when viewing from cabinet rear). The rack mount cabinet Buss Bar must be grounded to the site ground system. A minimum 2" wide copper ground strap is recommended attach the site ground system to the bottom of the cabinet copper ground buss bar.

Figure 2-2 Cabinet Ground Buss Bar Connections

WHEN INSTALLING ANY ADDITIONAL EQUIPMENT IN THE TRANSMITTER RACK, BE SURE TO CONNECT A SEPARATE GROUND WIRE FROM EACH COMPONENT TO THE BUSS BAR. NEVER RUN "DAISY CHAIN" GROUND WIRES ACROSS MULTIPLE COMPONENTS AND THEN GROUND TO BUSS BAR. THIS CAN CREATE A POSSIBLE GROUND LOOP

2.7.2   Overview of RF Grounding Practices

The importance of a good RF grounding system and lightning protection cannot be overemphasized for reasons of personnel safety, protection of the equipment, and equipment performance. The following is only a brief overview.

Lightning and transient energy via the power line or tower connections can impose serious threats to personnel safety, as well as damage the equipment. For these reasons, a good protective grounding system to divert these forms of energy to earth ground is imperative. The energy in a lightning strike has a very fast rise time and can have frequency components up to the megahertz range. For this reason, it is always preferred to use straight, direct runs of large, flat conductors so as to minimize inductance and allow the free passage of transient energy to earth. Note that the small cross-section and non-direct path to ground of the green/yellow wire of the AC safety ground make it an unsuitable means for safely diverting the transient energy present during a lightning strike.

A good grounding system should include substantial grounding at the tower base using copper ground rods and/or a buried copper ground screen, with copper strap used to connect the tower base to earth ground. Coaxial cable shield(s) should be electrically connected to and exit the tower as near to the bottom as practical to minimize the lightning voltage potential carried by the cable back to the transmitter building.

Ideally, a common grounding plate (bulkhead panel) with a low impedance connection to building earth ground should be the entry point to the transmitter building for all signal lines, including AC mains. It should serve as a single-point ground for all coaxial and mains surge protection devices. Wide copper straps should be used for making the connection from the common grounding plate to earth ground.

A good ground system should include perimeter grounding of the transmitter building using copper ground rods and copper strap. There should also be a copper strap running from tower ground to the building perimeter ground.

A ground system that has been in place for a long period of time can deteriorate and should be inspected periodically. This is especially true at the point where the ground strap enters or exits the building. All ground connections should be bolted and brazed together.

Good grounding and shielding practices will also help keep stray RF current to a minimum. RF interference usually shows up as intermittent problems with digital/control circuits, spurious radiated emissions, or audio/video noise if analog signals are present. Even a small amount of non-shielded wire makes a very efficient antenna for RF and transient energy. Wire and cable shields should be connected at both ends to the equipment chassis.

2.8   RF Output and Sample Connections

The RF output connection is located on the rear panel of the GX. When making connection to the GX ensure that the RF coaxial cable does not put undo stress on the RF connector. Ensure that the connection is tightened correctly for the connector style in use. The connection must be made to a good 50 ohm load, either an antenna or dummy load.

An RF Sample port is provided for customer convenience and it is located on the rear panel. Output levels are approximately -39dBc. These may be used for a modulation monitor or spectrum analysis. Ensure the level from the GX sample does not overdrive the equipment it is connected to.

 Note

Refer to Sections 3 and 4 for more installation information on Audio and Remote Control when a PC-GUI set up required to complete setup and installation of the Remote connectors.

2.9   Audio Inputs

The audio can be connected to the GX transmitter at any time during the installation process. Refer to Section 1 for the input locations. Refer to Section 4 of this manual for the input level range for the type of audio used and final setups and adjustments.

WARNING: Disconnect primary power prior to servicing.

2.9.1 RDS and SCA Inputs

The GX Compact Modulator board has a built-in Static RDS Generator or an optional Dynamic RDS Generator. Either generator is setup by connecting a PC to rear panel Ethernet port and accessing the RDS GUI screen. See Section 4.4.4 for further details after the installation has been completed.

If an external Static or Dynamic RBDS Generating system is utilized, refer to that product's Owners Manual for detailed connection and operating information. The RBDS generator output connects to the SCA input.

An external SCA generator can be used. Typically frequencies are 67 and 92 kHz. The generator output connects to the SCA input.

2.10 User Remote Control Connection

The 25 pin female connector labeled, "USER REMOTE", is located on the rear panel. It can be used for remote control and monitoring on the GX transmitter. Most of the pin functions are user defined via the GUI.

There are only a few set pins on the Remote I/O that are not programmable. Table 2-1 provides the pinout of the pins of the Remote I/O.

There is an optional Remote Control Breakout board that converts the connections from the DB-25 to a terminal block with screw-down connections. GatesAir Part Number 901-0218-201G.

Figure 2-3 shows typical input and output circuits with maximum voltage and current for the DB-25. Status Outputs are open collector outputs and require an external pull up. All other inputs and outputs are User Programmable via GUI. Refer to Section 4.10 for GUI set up information if not covered in Table 2-1
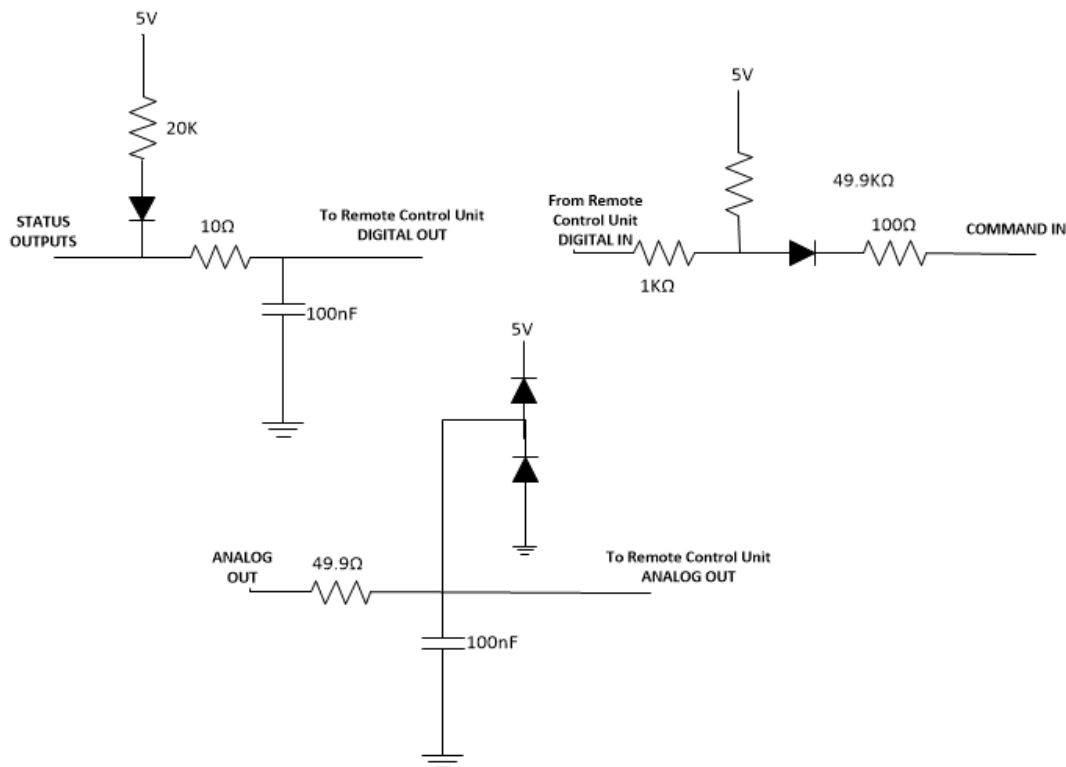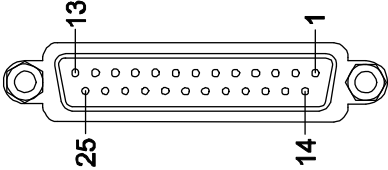

Figure 2-3 Remote I/O Circuits

WARNING: Disconnect primary power prior to servicing.   888-9071-001

Table 2-1 USER REMOTE I/O (D-sub 25, amplifier rear)

Designation	Remarks	Pin		Type
Selectable Function & Type	Edge or Level Trigger, Active High or Low	1-10	Digital	Input
Reset	Reset is a fixed setting to Active Low	11	Digital	Input
Not Connected	n/a	12		N/A
Selectable Function & Type	Edge or Level Trigger, Active High or Low	13-18	Digital	Output
*Analog Output	Fwd Pwr (Forward Power)	19	Analog	Output
*Analog Output	Rfld Pwr (Reflected Power)	20	Analog	
*Analog Output	PA PS Volts	21	Analog	
*Analog Output	PA PS Current	22	Analog	
GROUND	Ground	23		GND
Interlock GROUND	**Ground	24		GND
**SAFETY INTERLOCK	External Interlock Input. Default is Active Low and continuous ground required for transmitter to operate. Open circuit causes transmitter to stay in OFF state. Requires return of low state and manual ON command for transmitter to operate.	25		Input

* Analog Meter Output specifications: Maximum source current per output = 25mA. Output voltage 0 to +5VDC. The levels can be scaled / adjusted via the GUI.

** These inputs operate regardless of Remote Enable/Disable state. All others require Remote Enable

📝 **Note**

Refer to Section 4.10, Figures 4-86 for navigation information and Figure 4-87 which shows the full GUI screen for the User Remote I/O connector to help in the functions for pins that are programmable.

2.11   Ethernet Port Installation for GUI operation.

For most transmitter site installations, the Ethernet cable connection is made to the WAN Port in the rear.

Refer to Section 4.3 for GUI operation and network setups.

Refer to Section 3.3 for obtaining or changing an IP addresses for the first time.

The LAN port is intended for dedicated networks like MSC, and for an inter-transmitter communication such as when a GX50 is used as an exciter in a larger system. The LAN port may also be used for GUI and SNMP operation, but does not have DHCP.

The WAN port is factory set to DHCP and will assign an IP address to a computer connected to it, when the computer is set up in the DHCP client mode.

2.12   Initial Turn-on

This procedure provides steps required to turn on the GX LP for the first time. Either as a standalone transmitter or as an exciter if used for an installation into a larger transmitter. It is recommended to go through and review all the procedure steps before starting. Also, if not done yet, review the rest of the manual to help locate the various information required as you advance through this procedure.

📝 Note

*When the GX is shipped as a standalone transmitter, the output power will come up at 0 Watts.*

STEP 1   Remove front panel and ensure these basic requirements have been met before proceeding:

- Transmitting antenna or terminal resistance (dummy load) of 50 ohms, rated for at least the maximum power of your model, is connected to RF output.

- All rack-mounted units have continual AC mains safety ground connection via green/yellow conductor (third prong) back to main safety ground at AC service entrance.

- Suitable AC mains service connected to transmitter with overload protection (properly sized breakers) and surge protection devices installed.

- Transmitter rack and all rack-mounted units have protective RF earth grounding.

- Fan exhaust and air inlet openings are not blocked, and all necessary duct work is in place where applicable.

- Original factory test data sheet shipped with transmitter is on-hand and ready for consultation.

📝 Note

Verify the GatesAir supplied connector that defeats the External Interlock is installed on the USER REMOTE connector on the rear panel of the GX. If the connection between J1-24 and J1-25 is not closed the transmitter will not operate.

STEP 2   Apply AC mains power. Two front "Status LEDs" will light green, FAULT & REMOTE. If the "REMOTE LED" is off, pushing the REM/LOC button will toggle this status LED.

The LCD Display should illuminate, but if not, touch the Display to illuminate it. Each GX model has a fan for the modulator it will start. The ON-OFF and REM/LOC buttons do not have illumination.

STEP 3   GX1K, GX2K & GX3K ONLY. There are fans in the PA power supply and a fan for the PA amplifier.

The PA fan will operate at slow speed when ON button is pressed and then speed up as power is raised and the internal temperatures elevate. The PA power supply module has status LEDs and the DC Output LED above the AC Input LED will be off until the transmitter is turned on.

STEP 4   Verify the transmitter frequency by using the LCD Display. If the Display screen saver has started, touch the Display again to show it's Home Screen with the block diagram.

If the "REMOTE LED" is lit, press the REM/LOC button to allow settings in the Display navigation.

Touch the Exciter icon and the display will change, to a setup screen for the frequency.   If necessary set the frequency. Refer to Section 3.3 for more information on the LCD Display.

STEP 5   Before turning the transmitter on, verify the RF power, (TPO), is configured to come up to the power required for your system. This step will ensure that your antenna and load will not be overdriven.

On the LCD Display, touch the Output icon to change the screen. The field "Normal Pwr Mode" window will display the TPO. If the wattage displayed for Normal Pwr Mode, needs to changed, touch the window to open a key pad screen to set the transmitter operating power.

Refer to Section 3.4.3 for more information on the Output Icon screen and the other fields displayed. The five fields are displayed and the top field, "Fwd Nominal" is used to set the power meter bars to match the TPO. Touch that window if need to match what is set in "Normal Pwr Mode" field.

STEP 6   Turn ON transmitter via front panel ON button. Verify following actions take place:

- Amplifier ramps up from zero to the power set in Step 5 above, as indicated on the FWD meter bar.
- Front panel STATUS LEDs ON and OUTPUT will illuminate Green. (if forward power displayed in meter bar is less than the configured TPO, the OUTPUT LED and FAULT LED could be Yellow or Red).
- GX1K, 2K & 3K. Upper LED(s) illuminates Green on the PA Power Supply.

STEP 7   Replace front panel and allow transmitter to operate for thirty minutes to warm up.

STEP 8   Connect to the WAN port to set up GUI operation for setups on the USER REMOTE connector pin outs or the TX I/O connector if the GX50 is being used as an exciter.

STEP 9   If transmitter is operating at the same power level as tested in the factory, verify all meter readings closely match those recorded on factory test data report.

STEP 10   If not already completed, the audio can now be setup and connected to the transmitter. Depending on the audio system requirements, use the LCD Display functions or GUI.

STEP 11   Reminder. The transmitter must be in REMOTE for the GUI to respond to all setup commands and full navigation.

STEP 12   After installation and setups are complete, save the Configuration file to an device such as an SD card or PC. This file is useful in the event of a failure of the Modulator card. It will save the time of having to manually re-enter all the setup in the transmitter. See Section 6.2 for the procedure.

          The Presets function in the GUI, Section 4.3.3, is very useful tool for saving different setup settings for quick retrieval of the audio, power settings and other modulator settings.

📝 Note

The configuration file only contains the setup of the transmitter and does not contain calibration factors. The GX LP calibration factors are stored in the PA and are factory set in event a PA is replaced.

STEP 13   Retain packing materials in a safe, dry location. These could be useful should it become necessary to return the equipment to GatesAir or ship equipment to another site at a future date.

       WARNING: Disconnect primary power prior to servicing.

2.13   GX50,150 & 300 as an Exciter   TX I/O Cabling

In applications where the GX50, GX150 or GX300 is used as an Exciter in a larger transmitter, an interface cable is required for the purpose of logic control. The cabling will be made to the rear connector labeled TX I/O. This cabling will be a 15 pin D-sub straight through and is pin for pin compatible for most GatesAir transmitters.

If the transmitter using the GX as an exciter is another manufacturer's product, it will be up to the customer to make a compatible cable for this type of installation.

Table 2-2, provides a summary of the Exciter/Transmitter interface connections.

A 50 ohm, Type "N" coax cable will also be required to connect to the RF output.

Use the Initial Turn-On procedure for a bench checkout and to use the GUI for setting up the TX I/O pin out and cabling requirements before committing the GX to On-Air operation.

As part of the installation, ensure that these basic requirements have been met:

- Suitable AC mains service connected to exciter with overload protection (breakers) and surge protection devices installed.
- Exhaust and air inlet openings to GX exciter are not blocked.

TX I/O   D-sub Rear Connector

Table 2-2 TX I/O   Transmitter Interface (D-sub 15)

Designation	Remarks	Pin	Input/Output
GND	Signal Ground for all pins	1	
Fwd Pwr	Exciter Forward Power analog voltage (0-4 VDC linear scale); Scaling available via Remote GUI	2	Output
**Serial N/C	Not used on GX LP. RS485 + Used in other GatesAir transmitters.	3	n/a
*Selectable	User selectable, all fields via Remote GUI	4-7	Selectable
Ext APC	Analog Power Control voltage input to control RF output power. 0-5 VDC	8	Input
TX Mute	Level only is selectable. High or Low via Remote GUI	9	Input
Rfld Pwr	Exciter Reflected Power analog voltage (0-4 VDC linear scale); Scaling available via Remote GUI	10	Output
**Serial N/C	Not used on GX LP. RS485 - Used in other GatesAir transmitters.	11	n/a
N/C	No connection	12	n/a
*Selectable	User selectable, all fields via Remote GUI	13	Input
Fast Mute	Level only is selectable. High or Low via Remote GUI	14	Input
*Selectable	User selectable all fields via Remote GUI	15	Selectable

📝 Note

Refer to Section 4.10.2, Figures 4-88 for navigation information and Figure 4-89 which shows the full GUI screen for the TX I/O connector to help in setup of the functions for pins that are programmable.

** Serial RS485 is displayed in GUI screen, Figure 4-89 for pins 3 & 11, but are not needed or used in the GX LP. These pins are fixed inactive and no connection is required.

WARNING: Disconnect primary power prior to servicing.   888-9071-001

2.14 Setup External RF Input

The external RF Input accepts an RF signal in the range of 0 to +10 dBm. Setting up an external RF input is done with front panel LCD Display.   Refer to Section 3.4.1.2, for RF Drive LCD display navigation and information.

> ⚠️ **Warning**
>
> *DO NOT EXCEED +10 DBM (10 мW) ON THE EXTERNAL RF INPUT OR DAMAGE TO THE INTERNAL COMPONENTS WILL OCCUR REGARDLESS IF EXTERNAL RF INPUT IS ACTIVATED OR NOT.*

STEP 1   Navigate to the RF Drive Screen using the LCD Display.

STEP 2   In the RF Drive Screen, verify Enable is selected in the "Ext RF" field. If Disable is shown, touch the field to switch to Enable.

STEP 3   In the RF Mode field, select "Auto" to allow automatic switching between external RF and internal RF.

STEP 4   In the Primary RF Source field, select which RF source to be primary. The other RF source will be backup.

> 📝 **Note**
>
> *If the External Source is setup as primary and it fails, the auto switching function will put the internal modulator on the air. However, if the internal modulator is the primary RF source and it fails there is no provision to switch to the External RF input as a backup.*

2.15 GXLP Setup as an Exciter in FAX/FLX Transmitters

This procedure provides the steps required to turn on and check out the GX50 or GX150 or a GX300 as an exciter when used in a high-power FAX or FLX transmitter. This procedure assumes familiarity with the FAX/FLX product. Refer to the appropriate transmitter documentation package for further details.

It is recommended that installation personnel read this entire guide before starting. Refer to the general description in Section 1 of this technical manual. In addition, review the Controls and Operation material in Sections 3 & 4 to become familiar with GX's LCD Touch Display and web GUI menu navigation.

STEP 1   Switch on mains power. The GX Compact LCD touch display should illuminate.

STEP 2   On the GX's LCD Touch Display select Exciter (ensure control is in Local). Also, you may log into the web GUI and select Menu (Home) /Exciter/Mod Setup. Verify the exciter is on the correct frequency.

• Frequency (MHz) - Set to the correct FM carrier frequency if necessary.

STEP 3   Establish communications between transmitter and GX exciter. Enter the GX exciter's IP address into the FAX/FLX transmitter and verify the GX is communicating with the transmitter.

STEP 4   With Remote Enabled and Logged in:

From the transmitter's web GUI home page select SYSTEM>>System Config>>TX Config and enter the GX-LP Exciter Type into Exciter A or Exciter B position as appropriate.

STEP 5   Below the exciter type enter the GX exciter's IP address.

• Verify the exciter's frequency is observed on the FAX/FLX LCD by pressing POWER and observing the FREQ: value. If this field is 0.00 MHz, there is likely a network communication problem between the exciter and the transmitter.

STEP 6   On the GX's LCD Touch Display select Exciter Icon/Setup/External APC. On the web GUI select Menu or Home/Setup/Transmitter/TX Setup. Ensure the GX's APC Mode is set to External.

• APC MODE - Set to External (LCD) or External APC (web GUI).

WARNING: Disconnect primary power prior to servicing.

STEP 7 Set the exciter gains to minimum and APC limit to maximum. Setting the RF Gain value to 0 dB will limit the maximum power capability out of the exciter.

For the GUI web page: Home/Setup/External APC

For the LCD Display, these are located on two screens Exciter Icon/Setup/EXT APC and Exciter Icon/Setup

- Set External APC Gain (%) to 0.0% (this value has 0.4% resolution)
- Set the RF Gain@TPO (dB) setting to 0 dB.
- Set the External APC Limit to its maximum setting of 4095.

These values will be set later, determined during recovering the high power transmitter's forward power setpoint or by performing a high power transmitter forward power calibration.

STEP 8 On the GX's web GUI, select Home/Remote IO/XMTR IO. Select Transmitter: to FAX/FLX. Set the appropriate exciter identification Exc ID: to EXC A or EXC B. Confirm the input mute polarities:

- Pin 9 TX Mute – Active High
- Pin 14 Fast Mute – Active Low

STEP 9 Verify the Exciter Summary Fault and Ready Status per the following:

- Pin 6 Type Output, Function Sum Flt Status, Active Low
- Pin 13 Type Input, Exciter Level Edge, Active High
- Pin 15 Type Output, Exciter Ready, Active Low

STEP 10 This procedure assumes the FAX/FLX transmitter's (5/10/20/30/40 kW power output) has previously been calibrated.

Alternatively, with availability of an external Wattmeter, simple recalibration of forward power of the transmitter also provides the same function. This step selects the GX exciter as the active exciter and prevents any auto-switching.

- Via the FAX/FLX transmitter LCD Select Set-up>>TX CONTROL>>EXC ON AIR: select the GX exciter by selecting A or B.
- Alternatively, via the FAX/FLX transmitter web GUI, on the transmitter's web GUI home page, select DRIVE CHAIN. Select the appropriate (A or B) exciter to place the GX exciter on-air.
- If dual exciters, set the EXCITER CONTROL to Manual. Since the exciter power output will start at 0 watts and the exciter forward power sample and switching thresholds have not been set, the transmitter's exciter auto-switching function must remain inhibited.

STEP 11 Set the FAX/FLX transmitter's APC to OFF, so the APC voltage is at the nominal value when at calibrated power.

- On the FAX/FLX LCD select SET-UP>>TX CONTROL>>APC:. Set the APC to OFF. This will keep APC voltage constant and at the target voltage of 3.0 vdc for 5 kW and 2.7 vdc for 10-40 kW models. The exciter APC gains are now increased slowly until the transmitter achieves the original calibrated Transmitter Power Output (TPO).

STEP 12 Turn the Transmitter ON, it should startup but the power out should be 0 Watts. Turn the Exciter ON, verify that the GX50 is unmuted with 0 Watts output. The exciter should now be left ON at all times, the transmitter will mute and unmute the exciter as needed.

STEP 13 On the GX exciter's LCD touch display select the exciter icon/Setup/EXT APC. Slowly increase the Ext APC Gain value until the transmitter reaches its original calibrated TPO. The RF power will not start to increase on the meter until the exciter APC Gain is in the 20 to 30% range (approximate value). Again, the resolution of this control is in 0.4% steps.

Set to a value closest to the TPO as possible. If the External APC Gain reaches 100%, press Back, and increase the

RF Gain at TPO(dB) setting to a "1" and reset the External APC Gain to 0. The final settings do not need to be exact, when the APC is turned on the transmitter will raise/lower the power to the correct TPO. Continue until TPO from the TX is met.

STEP 14 Let the transmitter run for approximately 30 minutes to allow the temperature in the PA modules to stabilize (typically power per PA, i.e. gain, decreases as the PA temperature increases). As the temperature stabilizes over time minor adjustment to gain to maintain forward power at the target APC voltage may be required.

- Once the power output of the transmitter has stabilized, turn the transmitter APC back on, the transmitter should now run at the TPO it was calibrated at.

STEP 15   Calibrate the forward sample and exciter switching thresholds. To calibrate the GX exciter's forward power DC sample, in the FAX/FLX transmitter LCD select SETUP>>EXCITER SETUP>>EXC SELECTED:.

Set to the appropriate position, A or B, for the GX exciter being installed.

- EXC SELECTED: Sets the LCD window to calibrate exciter A or B as appropriate.

Select the EXC POWER CAL menu. The EXC PWR: field displays a DC voltage indicative of the forward power DC sample from the exciter.

- EXC PWR: The forward power DC sample from the exciter in millivolts.

On the GX exciter's web GUI select Menu/Remote IO/Scaling. Adjust the Forward Power: value so TX Displayed EXC PWR: is in the range of 1-2 VDC (1000-2000mV) while operating the transmitter at TPO. The reflected, voltage and current sample scaling values can be set also, but are not used by the high power transmitter.

- Forward Power - set this field until the DC voltage in the GX HP transmitter EXC PWR is 1000-2000 mVDC.

STEP 16   Calibrate the FAX/FLX exciter power with the power indicated on the GX. Observe the forward power on the GX LCD or web GUI.

In FAX display setup/Exciter Setup/EXC PWR Cal Enter that value under EPWR CAL:.

Navigate to CALIBRATE:, press ENTER (center button) to highlight, press up/down to change to YES, press ENTER again to set the value on the FAX/FLX transmitter.

From the home page of the FAX/FLX web GUI, select the Exciter (A or B) icon and Exciter Summary. Compare the FAX/FLX exciter forward power to the GX forward power to confirm calibration.

STEP 17   If the transmitter has dual exciters, set the exciter switching threshold. Lower the FAX/FLX transmitter to 75% forward output power.

In FAX display setup/Exciter Setup/EXC PWR Cal Select SET THRESHOLD:, press ENTER (center button) to highlight, press up/down to change to YES, press ENTER again to set the selected exciters (A or B) value on the FAX/FLX transmitter.

Confirm the forward sample level (1000-2000mVDC) and set the exciter switching threshold for the alternate exciter by repeating steps 15 and 16 with the alternate exciter selected on-air and the appropriate EXC (A or B) SETUP selected in the FAX/FLX transmitter.

Place the transmitter power back to normal.

STEP 18   Set the exciter's green forward power bargraph to indicate nominal power/full scale. From the home page on the GX exciter's web GUI, select the Output icon. Login and select Config. Set Nominal/100% to the forward power. Set the High Fault: to a value slightly higher that the current power.

- Nominal/100% - Sets the 100% point of the forward power green bargraph-to the white line, on the GUI home screen.

STEP 19   After all changes are completed, it is recommended to download and save the configuration from the transmitter and exciter.

From the GX web GUI home page, select Menu/Setup/Update/Configuration and Download.

- End of setup

WARNING: Disconnect primary power prior to servicing.

WARNING: Disconnect primary power prior to servicing.

3   Section-3 Operation

3.1   Introduction

The transmitter can be operated from these front panel controls or via the web browser interface, GUI. Most monitoring and control functions can be operated on the front. However, to view and modify all modulation settings, the GUI must be used via the IP connection to the rear RJ45 Ethernet ports.
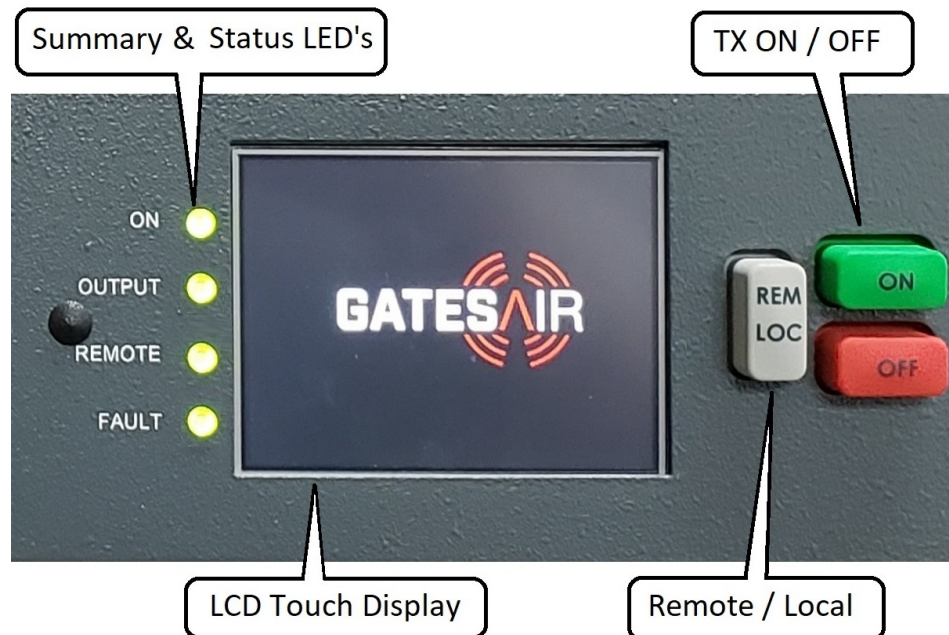

Figure 3-1   Front Panel Controls

3.2   Front Panel Operation

3.2.1   ON/OFF Operation

To turn the transmitter ON from the front panel press the Green ON button. The following should occur:

- Display illuminates if in screen saver mode.
- On the GX1K GX2K & GX3K, the power supply internal fan turns on.
- If RF power has been setup, the RF should ramp up from 0 watts to PWR SET
- On the GX1K GX2k & GX3K, the RF amplifier fan will turn on and speed is based on dissipation.

To turn the transmitter OFF from the front panel press the Red OFF button. The following should occur:

- RF should ramp down from PWR SET to 0 watts
- Power supply fans turn off
- Display remains illuminated until screen saver times out.

3.2.2   Remote / Local Button

Putting the transmitter into REMOTE enable allows the transmitter to be controlled by a customer provided remote control system. When connected to the rear Ethernet port and using the GUI, access is made, but no changes can be made unless the Remote is ENABLED.

To ENABLE the remote, press the REM/LOC button and the REMOTE LED will light.

To DISABLE, simply press the Remote/Local button again and the Status LED will go out.

Table 3-1 Front Control Summary

Status LED	Explanation
ON / OFF Buttons	Green [Upper] Button for ON / Red [Lower] Button for OFF
REM/LOC Button	Toggles from Remote to Local control. the Current status is visible on the LED status to the left. Includes parallel, IP, SNMP
LCD Touch Display	Active touch screen display with multiple menus for control and setup functions in the transmitter. Functions with finger tip or pointer. Refer to details of these displays later in this Section.

Table 3-2 Summary and Status LEDs

Status LED	Explanation
ON	[Green] = indicates that the transmitter is switched on. [Off] = indicates that the transmitter is switched off.
OUTPUT	[Green] = indicates that the transmitter is switched on and the RF output level is greater than the **Forward Low Warning** threshold set. [Yellow] = indicates that the transmitter is switched on, but the RF output level is below the **Forward Low Warning** threshold set. [Red] = indicates that the transmitter is switched on, but the RF output is below the **Forward Low Fault** threshold set per.
REMOTE	[Green] = indicates that the transmitter remote control interface has been activated. [No Light] = indicates that the transmitter remote control interface has been deactivated. Only local front panel control is possible.
FAULT	[Green] = indicates transmitter is switched on and no alarms have been detected. [Yellow] = indicates transmitter is switched on, but warnings have been detected. [Red] = indicates that the transmitter is switched on, but faults' have been detected. [Off] = indicates that the transmitter is switched off.

⚠️ **Warning**

WHENEVER WORK IS BEING PERFORMED ON THE TRANSMITTER SYSTEM, ALWAYS DISABLE THE REMOTE CONTROL SYSTEM BY PRESSING THE DISABLE BUTTON. THIS WILL PREVENT ANOTHER OPERATOR FROM TURNING THE TRANSMITTER ON WHILE WORK IS BEING PERFORMED ON IT.

 Note

Always check to verify the Remote LED is illuminated before leaving the transmitter site. A remote control system cannot gain control of the transmitter the LED is not illuminated.

3.3   LCD Touch Display

The LCD Display will allow control and setup of most of the parameters in the GX with your finger tip or stylus pen. The LCD Display is similar to the web based GUI, but has limitations due to it's screen size. If information and other function detail is not covered in this section, refer to the next section that covers the GUI.

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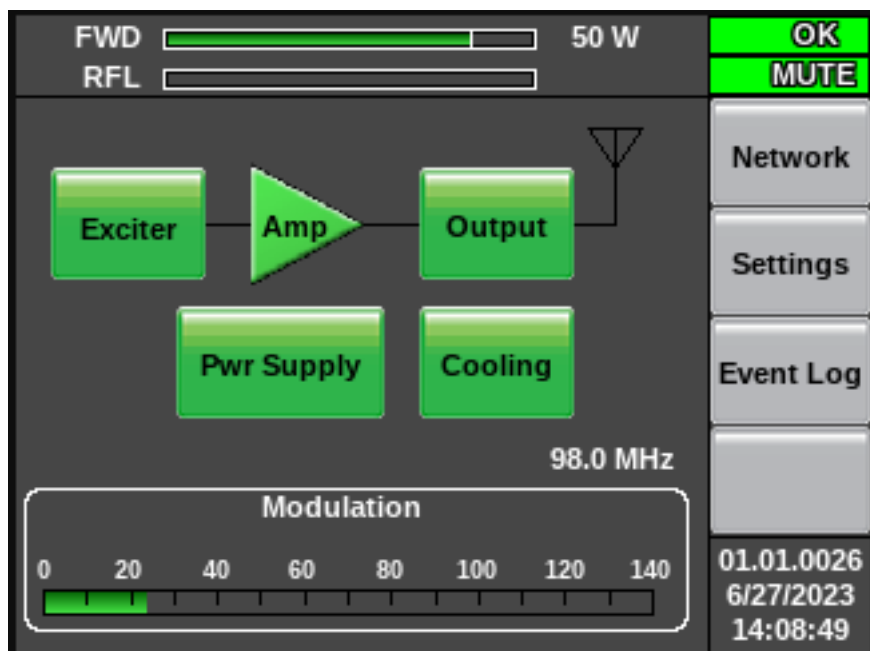
Figure 3-2 Display Home Screen

The FWD & RFL power metering bars on the top of the screen as well as Status and Mute indicator boxes remain active in all screens.   Navigation to the various screens can be done with either the block diagram icons or the buttons on the right hand side of the display.

 Note

There is an LCD Display setting that locks out setup commands via the LCD Display when REMOTE control is enabled. No changes can be made using the front panel display until the REMOTE is disabled with the REM / LOC button on the front panel.

3.3.1   Settings Screen

The note stated above is referring to the [LCD Disable in Remote] setting button that toggles between Enable and Disable. Use the Settings button to enter the Settings Screen and then navigate to make a change in this function.
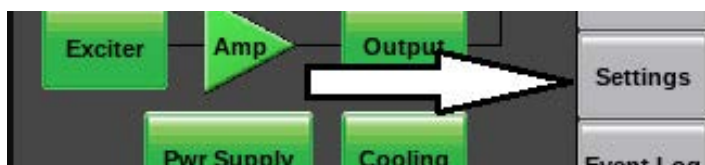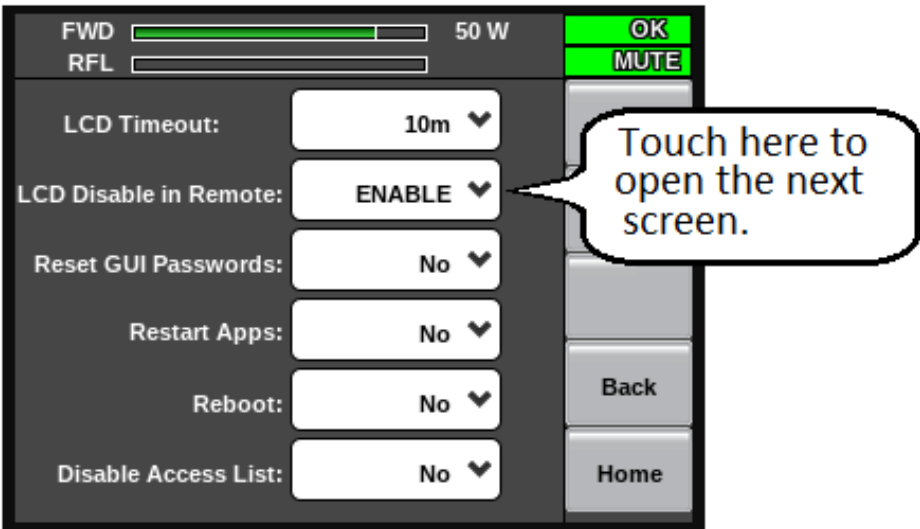

Figure 3-3 Settings Button

Figure 3-4 Settings Screen

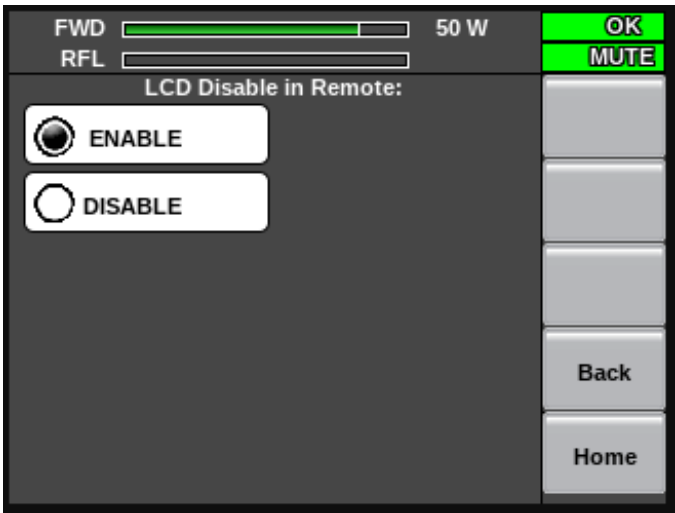The screen changes to select Enable or Disable the function [LCD Disable in Remote].

Figure 3-5 LCD Disable in Remote

Table 3-3 LCD Disable in Remote Menu

Selection	REM/LOC front panel push bottom selection Action
Enable	REM/LOC On (Remote status LED is Green. Setup is locked out using the Display. Limited Navigation. Locked out buttons and windows will be grayed out.
Enable	REM/LOC Off (Remote status LED is Dark. Full Navigation and Setup using the Display Button & windows for Setups will be white.
Disable	REM/LOC On or Off. Full Navigation and Setup using the Display. Buttons & windows for Setup and continued navigation will remain white.

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Table 3-4 SETTINGS SCREEN Menu

Menu	Description
LCD Timeout:	Amount of Time before the screen saver activates.
LCD Disable in Remote:	Sets the LCD Display navigation access and action based on the status of remote control via the REM/LOC switch on the front panel. Refer to Table 3-3
Reset GUI Passwords:	Removes logins & passwords and resets to factory default log in & password to admin / admin.
Restart Apps:	Performs a soft-reset to restart the software , (approximately 2 - 5 seconds.)
Reboot:	Preforms a hard-reset with the addition on re-initialize hardware, (approximately 10 - 20 sec.)
Disable Access List	Disables use of any settings that are enabled in the Access Control Table. Refer to (Setup->Network->Security->ACT)

3•3•1•1   LCD Timeout / Key Pad Example

Many of the Display buttons or block diagram icons will require a quantity or value or text entry to complete a setup. If you touch [LCD Timeout:], the Display will change to a Key Pad screen and displays the current setting. If a change is needed, enter the new amount and hit OK to save.

Figure 3-6 Key Pad

On initial AC power application the display will go to the Home Screen. When the LCD Display Timeout is set to ON, the screensaver will be a moving GatesAir logo and then it is followed by going dark.   Touching the Display again will return the Display to the last screen that was active.

3.3.2   Network

Touching the Network button on the Home screen brings you to the setup screens for WAN, LAN & Gateway. The screen will open to the WAN screen in Figure 3-7.

The WAN can be switched to Static by touching the Mode field and the screen will change as shown on the right of Figure 3-7.

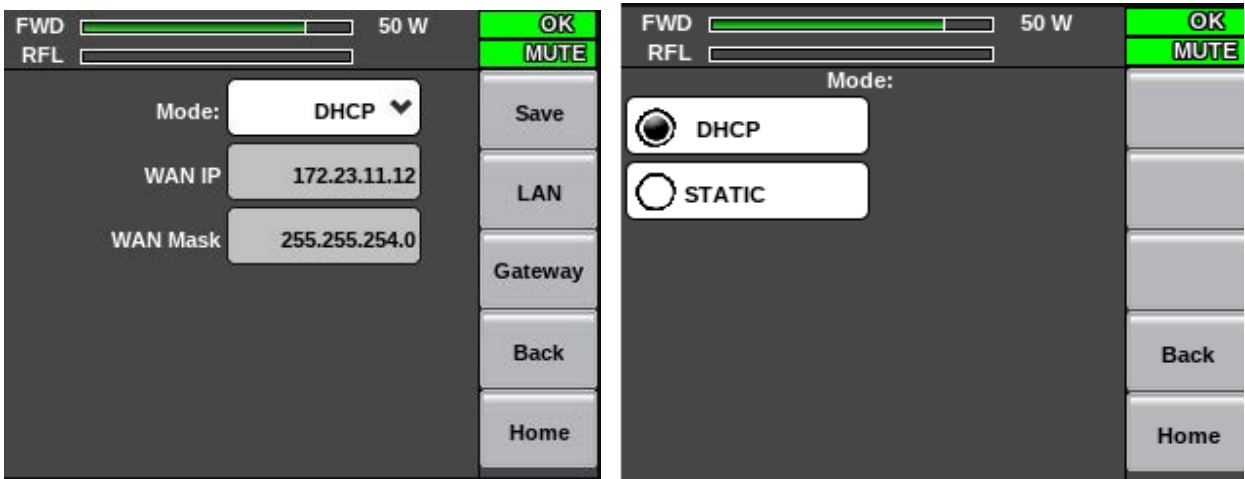When done making changes, touch the Save button to complete the changes.

Figure 3-7 WAN and Select Screens

To change IP and Mask addresses, The LAN button is touched in Figure 3-7 as an example and the Display opens to the LAN screen as shown in Figure 3-8.

Next, touch the desired field, LAN IP or LAN Mask, and the Key Pad screen will open to allow the new settings to be entered.

Enter the new address touching the key pad buttons. If an error is made, the Del button functions as the Back Space key. If the address entered is correct, touch OK to save the setting and return to the LAN screen .

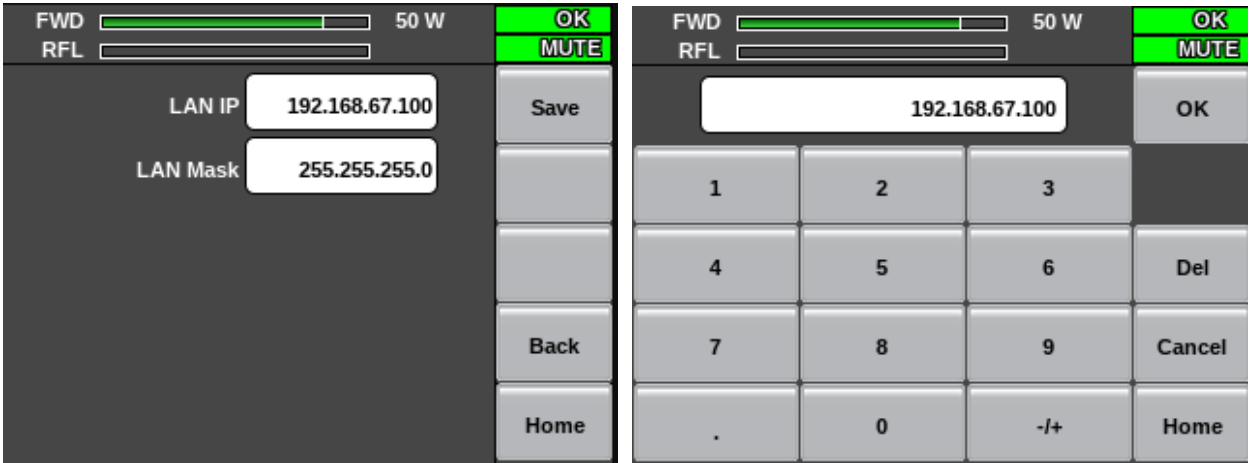The Key Pad and process is the same for Gateway and WAN if static IP is selected.

Figure 3-8 LAN and IP Settings Key Pad Screens

3.3.3   Event Log

The Event Log displays information about events and faults that have occurred in the transmitter. The screen displays the date and times that the events / faults occurred (Set), and cleared (Clear). Activity (ACT) entries display an action that was taken, e.g. Transmitter was turned ON/OFF or the power was raised or lowered.

Faults can be both active and cleared faults.

Figure 3-9 Event Log

An Active Fault is displayed in red. If an event is classified as a Warning, it will be colored yellow in the log. Also, the green status "OK" in the upper right corner will also change color to yellow or red.

Figure 3-10 Log with Fault

Pressing the front panel ON button will attempt to reset any faults that are no longer active but they may show up highlighted in the log. If the fault returns after pressing the ON button they are still active faults. If the fault is cleared by pressing the ON button it will show as cleared in the log. Once the log is full, (1,000 events), the oldest event is deleted when a new event is added.