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# BDR-1550/4550 Digital/Analog Repeater Owner's Manual



## BridgeIP, LLC

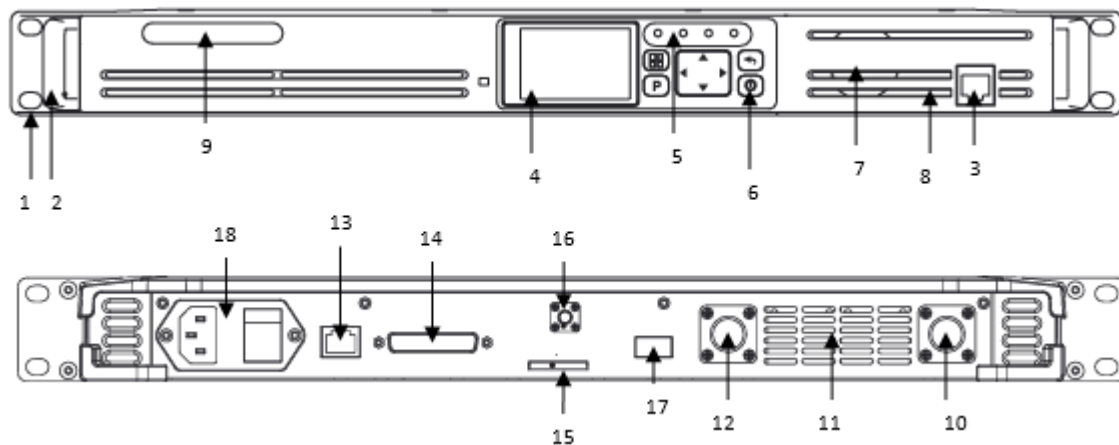
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## Overview

### Front and Rear View

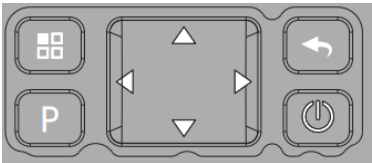


1. Cabinet Standard Rack Mount Installation Holes
2. Handle (right/left)
3. Microphone Interface, Programming Cable Interface
4. LCD
5. LED Indicator's
6. Keypad Interface with Front Panel On/Off
7. Speaker
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11. Cooling vent
12. Receiving RX antenna interface
13. Ethernet port
14. DB 25 pin Female connector
15. SIM card slot
16. 4G Antenna Interface (optional interface)
17. DC Input Power Connector
18. AC Power Connector

## Panel LED Indicator

| No. | Icon                                                                                  | Named               | Description                                                                                                                                                               |
|-----|---------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   |  TX1 | TX Slot 1 Indicator | 1.When operating in DMR mode, the light turns on during transmission in timeslot 1.<br>2.When operating in Analog/NXDN mode, timeslot 1 and timeslot 2 lights will be on. |
| 2   |  TX2 | TX Slot 2 Indicator | 1.When operating in DMR mode, the light turns on during transmission in timeslot 2.<br>2.When operating in Analog/NXDN mode, timeslot 1 and timeslot 2 lights will be on. |
| 3   |  RX1 | RX Slot 1 Indicator | 1.When operating in DMR mode, the light turns on during Receiving in timeslot 1.<br>2.When operating in Analog/NXDN mode, timeslot 1 and timeslot 2 lights will be on.    |
| 4   |  RX2 | RX Slot 2 Indicator | 1.When operating in DMR mode, the light turns on during Receiving in timeslot 2.<br>2.When operating in Analog/NXDN mode, timeslot 1 and timeslot 2 lights will be on.    |

## Front Keypad

| No. | Icon                                                                               | Named                                                                                                   | Description                                                                                                                                                                                                                                                                          |
|-----|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   |  | <b>Arrow Buttons</b>                                                                                    | Used to control menu navigation (up/down), adjust volume, LCD brightness, and other operations.                                                                                                                                                                                      |
|     |                                                                                    |  or MIC Menu Button    | Press  to select menu options or press MENU and OK when using the mic.                                                                                                                             |
|     |                                                                                    |  or MIC Back Button  | Press  to return to the previous menu or save.<br><br>Under standby status, press  to enter channel switch. |
|     |                                                                                    |                      | It is a reserved button, non-function.                                                                                                                                                                                                                                               |
|     |                                                                                    |  <b>Power On/Off</b> | Long press to power on/off; short press to return back to the standby display.                                                                                                                                                                                                       |

## Microphone Accessory interface



- ▶ Push in until MIC connector clicks. To remove depress bottom connector tab and pull to remove MIC connector.
- ▶ MIC: Press PTT to initiate a call, release to wait for response. Use MIC keypad to change channels and menu interface
- ▶ Programming Cable: Use to Read or Write the repeaters programming Information.

Note:

- △ When using this interface, only use the standard accessory supplied with this repeater.
- △ Using non-standard accessory products may cause damage to the interface or equipment.

## LCD Display



| No. | Icon.                     | Named     | Description                                                          |
|-----|---------------------------|-----------|----------------------------------------------------------------------|
| 1   | Signal Strength Indicator |           | Signal strength indicator, the more signal bars, the stronger signal |
| 2   | Channel Mode              | <b>D</b>  | Digital Channel                                                      |
|     |                           | <b>A</b>  | Analog Channel                                                       |
| 3   | Power                     | <b>L</b>  | Low Power                                                            |
|     |                           | <b>ML</b> | Middle Power                                                         |
|     |                           | <b>MH</b> | Middle High Power                                                    |
|     |                           | <b>H</b>  | High Power                                                           |
| 4   | Speaker                   |           | Active Local Monitor                                                 |
|     |                           |           | Not-active Local Monitor                                             |
| 5   | Repeater                  |           | Signal is being transmitting                                         |

### Power on and off

- ▶ Power on: Connect the DC power cable or AC power cable. If the AC cable is connected, turn on the AC switch; press and hold the power button for 5 seconds to turn on the repeater.
  - ▶ Power off: When the repeater is powered on, press and hold the power button to turn off the repeater.
- Note: When repeater is connected to the power supply, it will automatically turn on;

### Channel selection

- ▶ Press to enter channel menu.
- ▶ Use Up and Down button to select the channel.
- ▶ Press to confirm the selection.

### Volume adjustment

- ▶ Press to enter submenu.
- ▶ Select the volume submenu and press to enter the volume adjustment.
- ▶ Press the left and right arrow buttons to adjust the volume. Press to exit.

## Monitoring mode

- ▶ Enable this function through programming software.
- ▶ Press  to enter submenu, use UP and Down button until settings.
- ▶ Press , use UP and Down button until Monitor.
- ▶ Press , use UP and Down button, press  to confirm selection.

## PTT Allow Calling

- ▶ Enable this function through programming software.
- ▶ Press  to enter submenu, use UP and Down button until settings,
- ▶ Press , use UP and Down to PTT Forbid.
- ▶ Press , use UP and Down button, press  to confirm.

## PTT Call

- ▶ Connect the hanger mic.
- ▶ Enable [PTT Allow Call] per above steps.
- ▶ Continuously press and hold MIC PTT, the transmit indicator light will light up, hold the microphone 1 or 2 inches away from you mouth and begin speaking.
- ▶ Release PTT, and wait for response.

## Install

-  The equipment can be installed in a rack or cabinet.

△ The cabinets and racks must have rails and hole spacing that conform to the EIA general 48.3 cm (19 inch) specification and must meet the following minimum standards:

- Depth is 41.3 cm (16.25 inches)
- Width is 48.3 cm (19 inches)
- Height is 13.4 cm (5.25 inches)

- Two mounting rails are 5 cm (2 inches) from the front of the cabinet, and the front mounting holes are spaced (2.25 inches) (center to center).
- Only antennas and accessories that meet the standards can be installed.
- Operating temperature range -20°C to +50°C.

△ This temperature is measured near the equipment. For example: If the equipment is installed in a cabinet, this temperature is the temperature measured in the cabinet. Humidity Relative humidity does not exceed 95% at 50°C (122°F).

### Input Power requirements

- Repeater is equipped with a DC power interface and a standard 3-core AC power interface (**Do not to use both power supplies at the same time**).
- DC power interface, the working range of this device is DC 13.8V±10%, and the supply current is not less than 15A.
- Standard 3-core AC power interface, a standard 3-core wire is provided to connect the power supply to the AC voltage source.
- This device must be installed next to an easily accessible AC power source.
- The socket must be connected to an AC power source that can provide a maximum power of 280W.
- It is recommended to use a standard 3-wire grounded socket to connect the AC power supply.

**Note: The DC power interface can only be used as input, not as output, and cannot charge or power devices such as batteries.**

- RF transmission cables and AC and DC power lines must be protected from lightning strikes if lightning enters the site.
- Proper RF grounding. This type of grounding involves grounding unwanted RF energy. An example of RF grounding is the use of shielding to

prevent or minimize harmful RF energy from communication equipment and cables.

**Duplexer**

△The selection of duplexer is critical to communication performance. Some systems that are not used in high RF density locations may use a "notch (band filtering)" duplexer.

△The duplexer must be able to operate continuously at least 50W. For optimal communication performance, the insertion loss should be less than 2dB.

△If the device is used in a high RF density location, it is recommended to use a "bandpass-band stop" duplexer.

**RF Antenna Connection**

△ The RF feedline must be connected to the corresponding interfaces for receiving and transmitting, the connector must be an N-type male connector.

△ In order to achieve good communication, there must be sufficient isolation between antennas, or if one antenna is used, the duplexer must have sufficient isolation between the Tx and Rx ports.

△ The isolation requirements for each frequency band are shown in the following table:

| Frequency | Bands       | Isolation |
|-----------|-------------|-----------|
| UHF1      | 400-470 MHz | 75dB      |
| VHF       | 136-174 MHz | 85dB      |

**Antenna selection**

△ Antenna selection is critical to communication performance. You must select an antenna with an impedance of 50 ohms and a power capacity of at least 50 watts. You can use a high-gain antenna or increase the height of the antenna to increase the communication coverage.

△ A feedline with a 50-ohm impedance match and a power capacity of at least 50 watts must be used to connect the antenna and the duplexer. The feeder must be equipped with an interface that matches the duplexer interface and the antenna interface.

- ▶ Make sure all RF feedlines are securely connected.
- ▶ Make sure the power cord is wired correctly.
- ▶ Turn on the device and check the display status on the panel.
- ▶ Use a handheld radio programed to the correct settings to test.

△ If the device is operated at high power for a long time and continuously, a good ventilation environment must be ensured and the auxiliary cooling equipment must work properly.

## Specifications

- **General**

- **Frequency Range:** 136-174MHz, 400-470MHz
  - **Channels:** 500
  - **Zones:** 32
  - **Input Voltage (AC):** 220V / 110V
  - **Input Voltage (DC):** 13.6V  $\pm$  15%
  - **Current (Standby):** <800mA
  - **Current (TX):** <11A
  - **Current (RX):** <1900mA
  - **Frequency Stability:**  $\pm$ 0.5ppm
  - **Antenna Impedance:** 50 $\Omega$
  - **RF Connection:** Tx (N), Rx (N)
  - **Dimensions (L×W×H):** 482 × 360 × 44.45mm
- 

- **Receiver**

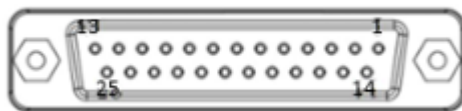
- **Channel Spacing:** 6.25kHz/12.5kHz
  - **Sensitivity (Analog):** 0.22 $\mu$ V (typ.) (FM@12dB SINAD)
  - **Sensitivity (Digital):** 0.22 $\mu$ V @ 5% BER
  - **Adjacent Channel Selectivity:**
    - 70dB @ 12.5kHz
  - **Intermodulation:** 70dB
  - **Blocking:** 95dB
  - **Spurious Response Rejection:** 90dB
  - **Audio Output Power (at 5% distortion):** 2.0W / 8 $\Omega$
  - **Conducted Spurious Emissions:** < -57dBm
- 

- **Transmitter**

- **Output Power:** Low 25W, High 50W
- **Channel Spacing:** 12.5kHz / 25kHz
- **Spurious Emissions:**
  - -36dBm (<1 GHz)
  - -30dBm (>1 GHz)
- **FM Modulation:**
  - 11K0F3E@12.5kHz
- **4FSK Digital Modulation:**
  - Data only: 7K10FXD@12.5kHz
  - Voice & Data: 7K10FXE@ 12.5kHz
  - Data only: 4K00F1D@ 6.25kHz
  - Voice & Data: 4K00F1E/4K00F7W@ 6.25kHz
- **Audio Distortion:** <3%
- **Audio Response:** +1 ~ -3dB
- **FM Hum and Noise:**
  - 40dB @ 12.5kHz
- **Digital FSK Error:** <1.5%
- **Adjacent Channel Power:**
  - $\leq$  -60dB @ 12.5kHz

\*The above specifications are tested in accordance with applicable standards. Due to the continuous development of technology, the above index data are subject to change without notice.

### DB 25 pin Repeater Female Connector View



| No. | Pins      | Type    | In/out            | Description                                                                                                                                                                                    |
|-----|-----------|---------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | GND       |         |                   |                                                                                                                                                                                                |
| 2   | GND       |         |                   |                                                                                                                                                                                                |
| 3   | E-AFOUT   | Analog  | Out               | Analog Voice Out, valid when DB-25-IO3 to GND<br>Output signal characteristics: Capacitive isolation output, output volume depends on repeater volume setting, output amplitude Vpp maximum 5V |
| 4   | DB25-IO1  | Digital | In                | ExPTT, connect to GND is valid, default 3.3V pull-up                                                                                                                                           |
| 5   | DB25-IO2  | Digital | In/Out            | Alarm IO, reserved port, not used, 3.3V/0V                                                                                                                                                     |
| 6   | DB25-IO3  | Digital | Out               | Alarm IO, indicate call in, 0V is valid, default 3.3V pull-up                                                                                                                                  |
| 7   | DB25-IO4  | Digital | In/Out            | Alarm IO, reserved port, not used, 3.3V/0V                                                                                                                                                     |
| 8   | GND       |         |                   |                                                                                                                                                                                                |
| 9   | GND       |         |                   |                                                                                                                                                                                                |
| 10  | E-AFIN    | Analog  | In                | Analog Voice In, valid when DB-25-IO1 to GND<br>Input signal characteristics: Capacitive isolation input, effective value 40mv, maximum value not exceeding 3Vpp                               |
| 11  | GND       |         |                   |                                                                                                                                                                                                |
| 12  | USB-DM    | Digital | Bidirectional     | Usb data-, reserved port, not used                                                                                                                                                             |
| 13  | BOOT-HIGH | Digital | Key one state     | Before power on, usa a key to short circuit BOOT0 to update firmware                                                                                                                           |
| 14  | GND       |         |                   |                                                                                                                                                                                                |
| 15  | 8V DC     |         | Out               | 8V DC Power out, max 300mA                                                                                                                                                                     |
| 16  | USB-DP    | Digital | Bidirectional     | Usb data+, reserved port, not used                                                                                                                                                             |
| 17  | BOOT0     | Digital | Key another state | Before power on, usa a key to short circuit BOOT-HIGH to update firmware                                                                                                                       |
| 18  | DB25-RXD  | Digital | In                | SerialPort rX, TTL 3.3V, for AT command                                                                                                                                                        |
| 19  | DB-TXD    | Digital | Out               | SerialPort TX, TTL 3.3V, for AT command                                                                                                                                                        |
| 20  | GND       |         |                   |                                                                                                                                                                                                |
| 21  | reserved  |         |                   |                                                                                                                                                                                                |
| 22  | reserved  |         |                   |                                                                                                                                                                                                |
| 23  | reserved  |         |                   |                                                                                                                                                                                                |

|    |          |  |  |  |
|----|----------|--|--|--|
| 24 | reserved |  |  |  |
| 25 | reserved |  |  |  |

## Warranty Policy

**Limited Warranty.** This product is warranted by BridgeIP, LLC to be free of defects in materials and workmanship for a period of two years from the date of purchase. If a defective part causes this product to operate improperly during the two-year warranty period, we will service it to the original owner free of charge if shipped to BridgeIP, LLC at the owner's expense. This warranty does not apply to any parts damaged due to improper use or violation of instructions. It does not extend to damage incurred by misuse or abuse, unauthorized modifications, natural causes such as lightning, fire, floods, and other such catastrophes; nor to damage caused by environmental extremes, such as power surges and/or transients, theft, or accidents. All warranties must be performed at BridgeIP, LLC. No credit will be given for unauthorized repair work attempted by the customer. BridgeIP, LLC will repair or replace the equipment and return to the customer freight pre-paid, within the continental United States. Equipment found not to be defective will be returned at the customer's expense, and it will include the cost to ship, test, and return the equipment. Equipment returned for repair must have a return merchandise authorization (RMA) number. To obtain an RMA contact our Technical Support Department at (816)-532-8451 or email [techsupport@BridgeComSystems.com](mailto:techsupport@BridgeComSystems.com). All returned equipment must have the RMA number listed on the outside of the shipping container.

**Ship all returns to;**

**BridgeIP, LLC  
113 S. Bridge St. Smithville Missouri 64089 United States**

Out of warranty repairs and service charges are billed at the current hourly rate plus parts. PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE. This document contains information proprietary to Bridge Embedded Systems, Inc. and BridgeIP, LLC. Its contents may not be reproduced, in whole or in part, without express written permission from BridgeIP, LLC. The information is provided "AS IS" without warranty of any kind, either expressed or implied. BridgeIP, LLC does not assume any liability for damages. Technical information and specifications in this document are subject to change without notice.

## FCC Warning and Compliance

**Warning and Compliance Statement:** Note: BDR-1550 and BDR-4550 has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: --Reorient or relocate the receiving antenna. --Increase the separation between the equipment and receiver. --Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. --Consult the dealer or an experienced radio/TV technician for help. Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### FCC Caution:

#### Part 15.21

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### Part 15.19

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.

#### Part 15.105

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by

turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To control your exposure and ensure compliance with the occupational/controlled environmental exposure limits, always adhere to the following procedures.

#### **Guidelines:**

- Do not remove the RF Exposure Label from the device.
- User awareness instructions should accompany device when transferred to other users.
- Do not use this device if the operational requirements described herein are not met.

#### **Operating Instructions:**

- This radio is designed for and classified as “Occupational/Controlled Use Only”, meaning it must be used only during the course of employment by individuals aware of the hazards, and the ways to minimize such hazards; NOT intended for use in an General population/uncontrolled environment
- DO NOT operate the radio without a proper antenna attached, as this may damage the radio and may also cause you to exceed RF exposure limits. DO NOT transmit for more than 50% of total radio use time, more than 50% of the time can cause RF exposure compliance requirements to be exceeded.
  - During operation when the antenna gain is **0dBi**, the separation distance between user and the antenna shall be at least **58cm**, this separation distance will ensure that there is sufficient distance from a properly installed externally-mounted antenna to satisfy the RF exposure requirements
- During transmissions, your radio generates RF energy that can possibly cause interference with other devices or systems. To avoid such interference, turn off the radio in areas where signs are posted to do so. DO NOT operate the transmitter in areas that are sensitive to electromagnetic radiation such as hospitals, aircraft, and blasting sites.