Communications Systems

User Manual

RCA PRODIGI™

RDR8000 Series

Professional Digital Two-Way Radio Repeater

RDR8000V VHF 136-174MHz | RDR8000U1 UHF 400-470MHz

Contents

Important Instructions

Please read this User Manual carefully before use. It contains important instructions about your RDR8000 Digital Repeater.

WARNING: For safe installation, operation, service and repair of this equipment, follow the safety precautions and instructions described below and in the RDR8000 Repeater Installation Guide. To obtain copies of these materials, please contact RCA Communications Systems or visit www.rcacommunicationssystems.com/support. After installation, these instructions should be retained and accessible to any person operating, servicing or working near this repeater. Failure to follow these safety precautions and instructions could result in serious injury or property damage. The installation process requires preparation and knowledge of the site before installation begins. Personnel must use safe work practices and good judgment, and always follow applicable safety procedures, such as for example but not limited to requirements of the Occupational Safety and Health Administration (OSHA), the National Electrical Code (NEC), and local codes.

The following are additional general safety precautions that must be observed:

• To continue compliance with any applicable regulations and maintain the safety of this repeater, do not install substitute parts or perform any unauthorized modifications. The repeater must be serviced by RCA Communications Systems trained personnel.

• If troubleshooting the repeater while the power is on, be aware of live circuits which could contain hazardous voltage.

• Do not operate the radio transmitters unless the antenna (if duplexer is used) or the antennas (if separate TX and RX antennas are used) are connected to the repeater, all RF connectors are secure and all connectors are properly terminated.

• Heat burn hazard. Some repeater components including the metal housing can become hot during operation. Turn off the power to the repeater and wait until it cools sufficiently before touching.

• RF energy burn hazard. Disconnect power in the cabinet to prevent injury before disconnecting and connecting antennas.

• Shock hazard. The outer shields of all TX and RX RF cables must be properly grounded.

• Never store combustible materials in or near the repeater. The combination of combustible materials, the presence of heat and electrical energy increases the risk of a fire hazard.

• Equipment shall be installed in a location that is restricted to access from the general public. Access must only be gained by service personnel or by users who have been instructed about the reasons for the

restrictions applied to the location and about any precautions that shall be taken while around the repeater. Compliance with National and International standards and guidelines for human exposure to Electromagnetic Energy (EME) at Transmitter Antenna sites require that personnel having access to a site shall be aware of the potential for exposure to EME and take the necessary precautions while working in close proximity to the repeater equipment. This repeater complies with the requirements set forth by the Federal Communications Commission and ISED (Innovation, Science and Economic Development Canada). Always use licensed frequencies obtained through your local frequency management government agency.

Environment Requirements for Installation

- Use only antennas and accessories approved by the manufacturer.
- Install in temperature controlled and dust free environments. If installed in a cabinet, the cabinet must be equipped with ventilation openings in the front, back and/or side panels for proper air entry and exit. If multiple repeaters are installed in a single cabinet, ventilation openings must surround each repeater to allow for proper cooling. The cabinet must have at least 15 cm (6 in) of clearance from any wall or other objects to allow for proper air ventilation.
- Working temperature range -30 ° C (- 22 ° F) to + 60 ° C (+ 140 ° F).
  This is the temperature measured near the repeater. For example, if the repeater is installed in the cabinet, the temperature is the temperature measured in the cabinet.
- The relative humidity shall not exceed 95% at 50 ° C (122 ° F).

AC Input Power Requirements

- The repeater is equipped with a switching power supply with a working range of 100 – 240VAC (47 – 63Hz AC input power supply).
- A standard 3-core wire is provided to connect the power supply to the AC voltage source.
- It is recommended to use a standard 3-wire grounding socket to connect the AC power supply.
- It is recommended to place the repeater near the AC power socket. Maximum power must not exceed 280W.
- For the nominal 110 / 120VAC input, the AC power supply must be a minimum of 5A, and it shall have a circuit breaker protection with a minimum of 15A rating.
- For the nominal 220 / 240VAC input, the AC power supply must be a minimum of 3A, and it shall have a circuit breaker protection with a minimum of 10A rating.

Field Grounding and Lightning Protection

- It is important to ensure proper surge protection, grounding and sufficient lightning protection to avoid permanent damage to the repeater in the event of lightning strike or power surge.
- The repeater is equipped with a grounding screw, which is located at the rear of the power module of

the repeater. This screw is used to connect the repeater to field ground. The size of the bonding wire used for this connection must be 8 AWG minimum.

Cable Connections

- Connect RF coaxial cables to transmit (N-Type Female, marked as TX) and receive (N-Type Female, marked as RX) antenna connectors.
- Use only properly grounded RF coax cables.

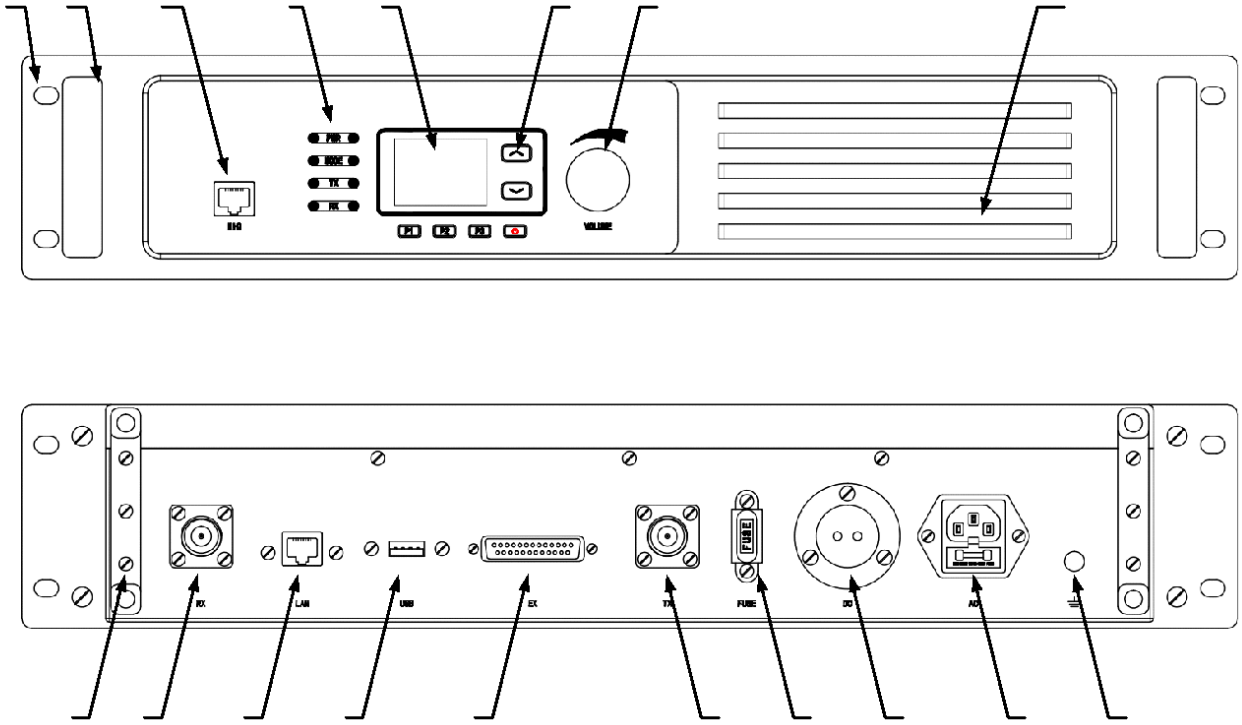
Installation and Usage Considerations

Do not use the Repeater in the following situations:

- Nearby hazardous, flammable and explosive materials and/or nearby locations where flammable gasses are present in the air.
- If the TX and RX antennas or antenna coax cables are not connected or have been damaged.

Introduction

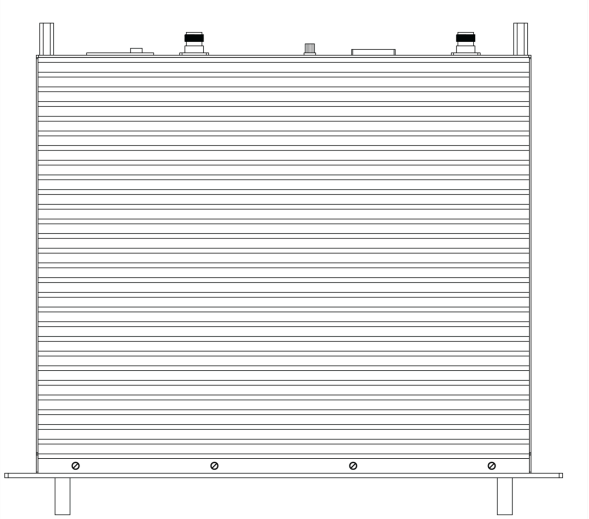
Front and Back Panels



1. Cabinet installation screw holes.
2. Handles (right/left).
3. Microphone and programming cable port.
4. LED indicator.
5. Digital display.
6. Navigation buttons
7. Volume knob.
8. Speaker.
9. Bracket.
10. Receiver (RX) antenna connector.
11. Internet port for IP Connection (if equipped).
12. USB port.
13. DB25 connector.
14. Transmitter (TX) antenna connector.
15. DC power fuse socket.
16. DC power socket.
17. AC power socket.
18. Grounding screw.

Note: The equipment can not use the DC power

Top View of Heat Sink



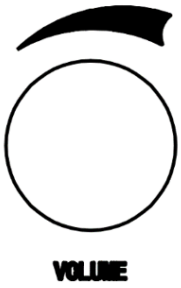
LED Indicators

No.	Icon	Named	Description
1		Power status indicator	1. Left: Illuminates when power is on. 2. Right: Illuminates when there iss a warning.
2		Operating Mode indicator	1. Left: Illuminates in digital mode. 2. Right: Illuminates in analog mode.
3		Transmit indicator	1. Left: Illuminates when transmitting (indicates slot 1 in DMR mode). 2. Right: Illuminates when transmitting (indicates slot 2 in DMR mode).
4		Receive indicator	1. Left: Illuminates when receiving (indicates slot 1 in DMR mode). 2. Right: Illuminates when receiving (indicates slot 2 in DMR mode).

Navigation Buttons

No.	Icon	Named	Description
1		Up Button	Channel Up (when programmed)
2		Down Button	Channel Down (when programmed)
3		Power On/Off Button	See description on the next page under "Power On and Power Off"
4		Custom Button	Customizable via CPS software. Consult with your dealer.
5		Custom Button	Customizable via CPS software. Consult with your dealer.
6		Custom Button	Customizable via CPS software. Consult with your dealer.

Volume Knob

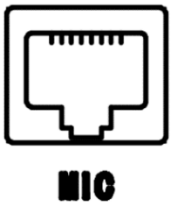


Rotate clockwise to increase the volume. Rotate counterclockwise to decrease the volume.

Note: *The repeater speaker is unmuted only when the monitor function is enabled.*

This function needs to be configured through the CPS. For more details, please consult with your RCA Communications Systems dealer.

Microphone/Programming Cable Port



- If a microphone is connected and the repeater is programmed to function as a base station, you can press the PTT to initiate a call. For more details, please consult with your RCA Communications Systems dealer.
- If a programming cable is connected, it allows you to read and write the programming date file using the RCA RDR8000 CPS.

Note: *Use only RCA Communications Systems approved microphone and programming cables. Using non-standard accessories may lead to equipment malfunction or damage not covered under the standard manufacturer warranty.*

Basic Operating Instructions

Power ON / OFF

- To power the repeater on while it is off, press and hold the power button.
- To power the repeater off while it is on, press and hold the power button.

The repeater will power on automatically upon connection to an AC/DC power.

Channel Selection

- The digital display shows the current channel number.
- Press the Up button ⌣ or the down button ⌢ to switch channels. More than one (1) channel must be programmed into the repeater. For more information, please consult with your RCA Communications Systems dealer.

Monitoring Mode

- If programmed, this function allows you to monitor the transmissions on the channel. When on, the speaker will be unmuted. This function needs to be enabled though the CPS. For more information, please consult with your RCA Communications Systems dealer.

Transmit in Base Station Mode

- Configure the Base Station operation through the CPS. For assistance, please consult with your RCA Communications Systems dealer.
- Connect the RCA microphone (purchased separately).
- Press and hold the PTT button to talk. When the transmission LED lights up, you can speak into the microphone.
- Release the PTT button to end the call.

Installation and Connection

Repeater Installation

- The device can be placed on a desk or mounted in a rack or cabinet. Install in temperature controlled and dust free environments. If installed in a cabinet, the cabinet must be equipped with ventilation openings in the front, back and/or side panels for proper air entry and exit. If multiple repeaters are installed in a single cabinet, ventilation openings must surround each repeater to allow for proper cooling. The cabinet must have at least 15 cm (6 in) of clearance from any wall or other objects to allow for proper air ventilation.

The rack or cabinet provided must have rails and screw holes spacing that comply with the EIA universal 48.3 cm (19 inches) standard, and must meet the following minimum specifications:

- *Depth of 41.3 cm (16.25 inches)*
- *Width of 48.3 cm (19 inches)*
- *Height of 13.4 cm (5.25 inches)*
- *Distance of 5 cm (2 inches) between the two mounting rails in front of the cabinet, with a front mounting hole spacing of 2.25 inches (center to center).*

Duplexer

- The selection of a duplexer is critical for the communication performance. Select a good quality, low loss duplexer from reputable manufacturers.
- Duplexers must be able to operate continuously at a minimum of 50W of RF power. For optimal communication performance, the insertion loss should be less than 2dB.
- If the repeater is **not** deployed in congested radio traffic areas, "bandpass" (band filtering) duplexer

can be used.

- If the repeater is deployed in congested radio traffic areas, it is recommended to use "bandpass - band reject" duplexers.

For assistance, please consult with your RCA Communications Systems dealer.

RCA Communications Systems is not responsible for performance issues related to poor quality duplexer, improper tuning or defective duplexer.

RF Antenna Connection

- RF coax cables must have N-Male type connectors installed and TX and RX cables must be securely connected to the corresponding TX and RX connectors on the back of the repeater.
- If two separate antennas, one for TX and one for RX, are used, to achieve an effective communication, a sufficient isolation must be provided between the two antennas. Alternatively, if a single antenna is used, the duplexer must provide adequate isolation between the TX and RX ports.

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

Frequency	Range	Isolation
UHF 1	400–470 MHz	75dB
UHF 2	450–520 MHz	85dB
UHF 3	350–390 MHz	75dB
VHF	136–174 MHz	85dB

For assistance, please consult with your RCA Communications Systems dealer.

RCA Communications Systems is not responsible for performance issues related to poor quality cables, poorly made or defective cables or wrong connectors.

Antenna Selection

- The selection of the antenna type and its quality has a crucial impact over the communication performance.
- Select antennas with a 50 Ohm impedance and power capacity of at a very minimum 50 Watts. High-gain antennas or increasing the height of the antenna installation point should be considered to expand the communication coverage area.
- The antenna frequency range must cover the frequencies used by the repeater.
- Coaxial cables connecting the antenna and duplexer must have a matching 50 Ohm impedance.

RCA Communications Systems is not responsible for performance issues related to poor quality or defective

antennas or improper antenna installation.

Inspection

- Ensure all RF coax cables have properly mounted connectors and are securely connected to the antenna, duplexer and/or repeater.
- Verify correct wiring of power lines.
- Check the display status on the panel when powered on.
- After installation, conduct a test with handheld or mobile two-way radios.

If the equipment operates at high power for an extended period without interruption, ensure adequate ventilation and that auxiliary cooling devices are functioning properly in order to ensure optimal working temperature.

Care and Cleaning

- **Turn the repeater off before cleaning it.**
- Please use clean and dry lint free cloth to wipe the dust off the repeater and the charging electrode.
- Please use neutral detergent and non-woven fabric to clean the buttons, control knobs and front panel of the repeater. Do not use chemicals such as detergent, alcohol, spray or petroleum preparation to avoid damage. After cleaning, make sure the product is completely dry before turning it back on.

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