For More Information

Refer to the I&M Guide embedded in radio memory or can be downloaded at:

http://login.exaltcom.com

Users must register before logging in to the Exalt support website.

For post-sales support, contact Exalt Customer Care at:

Phone: (408) 688-0202
Toll-Free (USA): (877) EXALT-01 (392-5801)
Support email: **support@exaltcom.com**

Live support available M–F 7AM–4PM Pacific, except on designated holidays.

Sales email: **sales@exaltcom.com**

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ExtremeAir®, ExploreAir® HP, and ExploreAir® LR rc-Series (FDD)

Digital Microwave Radios

Quick Start Guide

Models:

ExploreAir rc6150 (LR) FCC

ExploreAir rc111xx HP FCC

ExploreAir rc11150 (LR) FCC

ExtremeAir rc112xx FCC/ITU-ETSI

ExtremeAir rc152xx ITU-ETSI

ExtremeAir rc182xx FCC & ITU-ETSI

ExtremeAir rc232xx FCC & ITU-ETSI

Part Number: 206715-006
2013-12-10

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Changes or modifications not expressly approved in writing by Exalt may void the user's authority to operate this equipment.

The system has been tested and found to comply with the limits of 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 of 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.
- Shielded cables and I/O cords must be used for this equipment to comply with the relevant FCC regulations.

Changes or modifications not expressly approved in writing by Exalt may void the user's authority to operate this equipment.

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe B respecte les exigensces du Reglement sur le material broilleur du Canada.

- this device may not cause interference, and
- this device must accept any interference, including interference that may cause undesired operation of the device.

Antennae associated with these devices must be mounted in a restricted area, at a designated minimum distance away from humans who may be subject to long-term or continuous exposure. Refer to the *Installation & Management Guide* for details.

THIS PRODUCT MUST BE PROFESSIONALLY INSTALLED

Contact Exalt or refer to the Installation & Management Guide for a list of supported antennas and regional transmitter power requirements.

Connections

Ensure that power and grounding are properly wired and installed before making additional connections. The included grounding hardware allows connection of a grounding lug to the M5 receptacle near the lower-left corner of the radio. Place the wave washer next to the head of the screw. Place flat washers on both sides of the grounding lug. Another grounding connection is available on the power injector.

After establishing the radio link, connect the Ethernet and T1/E1 (RJ-48C) services matching the configurations made in the GUI. Use a ping test to verify connectivity across Ethernet. Use a T1/E1 line or test equipment to help verify T1/E1 connectivity.

Indicators

The power injector has indicators to assist in determining status. The right LED on the DATA+POWER connector is solid green when proper power is applied to the injector.

Register the Product

Products registered within 90 days of purchase receive 2 full years of warranty coverage for no extra charge. Unregistered products and products registered after the 90-day period, only receive a 1-year warranty. Register the product according to the instructions on the provided registration card. See the I&M Guide for the full warranty statement.

to pass through, and the rubber seal has a split slot that allows it go over the cable insulation.

2. Insert the RJ-45 connector in the port until it clicks.
3. Press the rubber seal into the port receptacle.
4. Set the beveled washer on top of the rubber seal.
5. Inspect the rubber seal to ensure that there is no deformation, and that the seal appears tight.
6. Hand-tighten the screw caps firmly.

Note: The total length of the Ethernet cable, including the cable from the power injector to the connected network equipment must not exceed 100 meters.

Aligning Antennas

The received signal level (RSL) test point is a BNC connector on the chassis. DC voltage at the RSL port is related to the RSL level in dBm. For example, a value of 0.6VDC is roughly equivalent to an RSL of -60dBm and a value of 0.75VDC is roughly equivalent to an RSL of -75dBm. In this manner, voltage is inversely proportional.

Align antennas to the *minimum* possible voltage (0.6VDC is less than 0.7VDC, but represents a higher RSL level of -60dBm compared to -70dBm). RSL should be roughly equal to the value planned in the link design (within 1 to 2 dB). Account for all transmission system gains and losses to confirm the designed value.

After the designed RSL is achieved, mechanically secure the antenna for both azimuth and elevation alignment. Carefully monitor the RSL voltage while tightening the mechanics and ensure that the antenna remains in alignment.

Use the integrated alignment buzzer as an alternate or in addition to the RSL test point. On the GUI, set the **Buzzer Timeout** parameter on the **Configuration>System** page to 10, 120, or ON for the buzzer to be active for 10 minutes, 120 minutes, or continuously. Select **Off** to disable the buzzer. Buzzer pitch relates to RSL: a higher pitch represents better RSL. A continuous tone indicates a successful link to the far end. A chirping (beeping) buzzer indicates that the radio is not locked to the far end. Note also that RSL in dBm is displayed on the **Monitor>Performance** GUI page.

Initially mount one antenna by bearing and sight, and attempt initial alignment from the opposite side. Align the antenna until maximum RSL is achieved, secure the antenna, then align the original side antenna until maximum RSL is achieved. Two or three rounds of alignment at each end are typically required to achieve the designed RSL. Start alignment with a slow steady sweep in azimuth, then an elevation sweep to help identify the antenna center beam while watching for the highest best RSL in both planes. RSL reporting is delayed by approximately 1 second. For fine alignment, make small adjustments, wait, take a measurement, and continue with small adjustments.

Introduction

Note: Read this entire document before attempting to install Exalt digital microwave radios.

The reader is strongly encouraged to obtain a copy of the *Installation and Management Guide* (I&M) for this product. The I&M is embedded in the radio's graphical user interface (GUI) and can be saved locally (as described in this document). In addition, customers may request access to documentation (and software) by creating an account and logging in at:

http://login.exaltcom.com

This quick start guide (QSG) is intended to provide only a brief overview of the ExtremeAir, ExploreAir HP, and ExploreAir LR FDD radios. The reader must have experience with networking and RF. Refer to the I&M for full descriptions, **regulatory requirements**, **safety requirements** and troubleshooting information.

Preparation

Complete a path analysis and link design prior to installation. Gather the following information in the design phase:

- Length(s) and type(s) of transmission system cabling and connectors (if any)
- Make, model and specifications of antennas
- Antenna structure requirements, antenna and radio mounting locations
- Cable routes and egress location
- Grounding plan, surge protection, grounding mechanics, power and wiring
- Critical radio settings: RF center frequency, transmitter output power, occupied channel bandwidth, and mode (modulation) selection
- Anticipated RSL
- Number of T1/E1 circuits enabled (if any)

Perform the following tasks before installing the radio terminals:

- Build antenna/radio structures and egress mechanics
- Mount antennas and transmission line (if any), lightning arrestor(s) and grounding
- Prepare and test interface and power cables

Shipping Contents

Review the labeling and contents of all boxes and the physical condition of the shipping container and contents. Ensure that items are not damaged, and that part numbers and serial numbers match the original equipment order and shipping information. Each radio terminal box should contain the following:

- Radio terminal
- Quick start guide (this document)
- Product registration card

Generally, a link installation requires items that are sold separately:

- AC or DC Power-over-Ethernet (PoE) Injector (Exalt-specific, must match model type)
- Coaxial cable (for DC power for ExploreAir LR rcxx150 models only)

- Direct-mount antenna (-EX specific models only for ExploreAir, -EXD specific models only for ExtremeAir) or standard antenna with flexible waveguide and remote mount kit (ExploreAir models only)
- Outdoor-rated CAT5e or CAT6 cable
- PoE and/or T1/E1 surge protectors (PoE must be proper model)
- Outdoor-rated Fiber (LR models only)

Configuration Overview

For proper communication, each terminal must be in the same frequency band and support the same TR spacing, as labeled on the radio. In addition, the channel plan must match (for example, B1 talks to B1, B2 talks to B2). Finally the Tx/Rx orientation must be opposite – one radio should be **Hi** and the other **Lo**. Polarization must also match.

Other configurations may also be necessary for completing installation. Use the Exalt browser-based GUI for configuration.

Diplexer Configuration—ExploreAir Models only

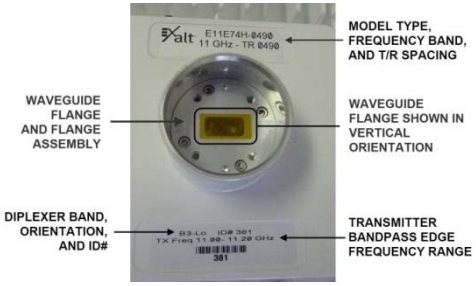
Diplexer Tx/Rx orientation, channel plan, and polarization can be configured in the field. Refer to ***Diplexer Configuration Channel Plan and Polarization*** in the I&M for complete instructions.

CAUTION! Removal of the front panel diplexer cover requires special care. The instructions in the I&M must be followed precisely to maintain performance and weatherproof operation. The Exalt Limited Hardware Warranty may be void if damage to the radio occurs as a result of improper installation.

CAUTION! DO NOT PERFORM THESE CHANGES ON THE TOWER!

Perform these procedures on a bench to minimize the chances of losing small parts.

Review the labels on the radio and the waveguide flange to determine current diplexer configuration and polarization, illustrated as follows.



Diplexer Channel Plan and Tx/Rx Orientation

- Change the sub-band configuration of the radio by removing and replacing the diplexer.
- Change the Hi/Lo orientation of the radio by rotating the diplexer.

Mounting Kit

How the radio is mounted is model dependent. ExtremeAir models are mounted directly to the antenna. ExploreAir HP and ExploreAir LR models can be mounted remotely from the antenna.

Direct-mount configuration

1. Inspect the antenna and the radio. Only one device should have mylar tape protecting the waveguide port (generally, the radio). Mylar tape is not required for proper operation. If each device has tape applied, remove the tape from the antenna.
2. Apply silicon grease to the O-ring of the antenna feed.
3. Align the radio chassis to the antenna feed. Ensure that the waveguide flange orientation matches.
4. Gently slide the radio onto the antenna feed, and secure the mounting clips to the antenna.

   First align all four clips in their receptacles, then completely secure opposite corner clips, and finally secure the last two clips.

Remote-mount configuration—ExploreAir models

1. Mount the ExploreAir radio as close as possible to the antenna, using the remote-mount bracket (sold separately).
2. Connect and secure the two ends of a flexible waveguide to the antenna feed and to the radio using four (4) threaded screws per end. If a flange adapter is required, mount the flange adapter to the antenna, not to the radio. If required, install waveguide stabilization hardware.

Cabling

Lightning arrestors are recommended near the radio for surge protection on all cabled interfaces except fiber or waveguide. Use additional lightning arrestors for all cable egress points where cables enter shelters or buildings. These prevent surges from entering connected equipment and/or harming humans or equipment collocated in the shelter or building.

For the PoE connection, PolyPhaser IXG-05, Transtector ALPU-1101-959 or ALPU-1000BT-R are approved for all models. Note that traditional PoE surge suppression does not operate properly on this connection. For models with multiple Ethernet ports, any GigE rated surge suppression can be used for additional Ethernet connections. When using any T1/E1 interface, use a weatherproof T1/E1surge protection solution.

Use the included connectors with waterproof spacers on any unused connectors.

Use UV-rated (outdoor) CAT5e or CAT6 cable, such as Belden 1300A for all connections. The outside radius of the cable type must be between 0.25 and 0.31 inches to ensure a proper watertight connection.

1. Place connector parts on the cable as shown in the photo to at right.

   All connector parts can be placed on a terminated cable– the screw cap and beveled washer allow a RJ-45 connector

Note: By default, Radio Transmit Power is usually set to the minimum level. At installation set this value to the proper level based on path calculations and regulatory requirements.

This product must be professionally installed. The Radio Transmit Power must be configured, prior to connection to the antenna system, and be in accordance to all applicable government regulations. The professional installer is responsible to ensure that the implementation is within legal limits.

Configure all parameters on both radio terminals to match the requirements of the system design, and verify that the radio link communicates properly during the back-to-back bench test. It can be extremely challenging, time consuming, and costly to troubleshoot a system that is not properly preconfigured and tested.

Extracting the I&M Guide

1. Click the **Manual** navigation link.
   The browser displays the PDF file.
2. Click the **Save** button in the PDF toolbar to save the manual locally.

Reset to Critical Factory Settings

If necessary, the radio terminal may be reset to critical factory settings. This may be necessary if the IP address and/or passwords for the system are not known. All other configurations remain at their current settings.

Use the reset function if the IP address and/or passwords are lost. Use the following steps to perform a reset:

Note: Models rxx150 do not require the use of the PoE injector for power. However, you must use the PoE injector to reset the radio. Remove the power from the coaxial cable interface and plug the provided PoE injector into the ETH1/PoE port using a short CAT5e or CAT6 cable and applying the proper DC power to the power injector, following the same procedure below.

1. Remove power from the radio by disconnecting the power source from the power injector.
2. Hold down the RESET button on the power injector while applying power.
3. Hold the RESET button down through the whole power cycle and monitor the DATA+POWER left LED on the power injector. Release the RESET button only after the LED is in the steady state (1 to 3 minutes, depending on firmware installed).
4. Release the RESET button.

The following parameters are reset:

- IP Address = 10.0.0.1
- IP Mask = 255.0.0.0
- IP Gateway = 0.0.0.0
- Admin password = password
- User password = password
- VLAN disabled

Note: For Models rcxx150 using coaxial power, disconnect PoE injector and associated cabling, restoring proper weatherproofing, and restore power to DC coaxial cable.

- All labels on the cover should reflect the installed configuration and orientation.
- Adjust Hi/Lo orientation using radio management, such as the Exalt GUI.

Polarization

- Change radio polarization orientation by removing, rotating, and re-installing the waveguide flange assembly.

Getting Started

It is strongly advised to configure the radio system prior to physical installation. This step minimizes total installation time and aids troubleshooting that may be required during commissioning.

CAUTION: The antenna port is active when power is applied. Before power is applied, terminate the antenna port to a 50-Ohm load. Place a 50-Ohm termination or ≥20dB fixed attenuator on the port. Alternatively, connect the port to the antenna system or back-to-back with the other terminal with at least 40dB of total attenuation between the terminals.

To apply power (except for Models rcxx150 DC power on coax implementation):

1. For PoE-powered models, connect a straight-wired CAT5e or CAT6 cable to the POWER/ETH1 connector on the radio. See *Cabling* for specific instructions on proper installation of the weatherproof connector.
2. Connect the opposite end of the CAT5e or CAT6 cable to the DATA+POWER connector on the power injector. Always be certain the proper injector is used, which should be marked 1000BaseT.
3. Connect the injector's power source to properly rated DC power and apply power.
4. Connect the network Ethernet connection to the DATA connection of the power injector.
5. Ground the power injector using the grounding receptacle. The injector can be wall or rack mounted.

Warning! For PoE-powered models, only use the AC adapter and DC injector supplied specifically for these models by Exalt. The AC adapter supplies 55VDC to the injector, as required for proper operation. DC-powered solutions are available accepting 24 and/or 48VDC input and supplying 55VDC output. Always use the Exalt recommended injector solution.

Power over Coaxial Cable (models rxx150 only)

These models offer an alternative to PoE power using a coaxial cable connection for power.

TCP/IP Settings

The computer accessing the Exalt GUI must match the IP subnet of the radio. The radio's default IP addresses are **10.0.0.1 (Tx Lo)** and **10.0.0.2 (Tx Hi).** Use the following procedure in Windows:

1. Change the IP address of the accessing computer to match the radio's subnet.
2. Select the Ethernet network adapter, and then select TCP/IP properties.

3. Select the static IP address option and change the IP address to 10.0.0.*x* (where, *x* does not equal 1 or 2 or any other address planned for either radio).

Alternatively, these radios support limited DHCP addressing if your computer's Ethernet interface is set to DHCP (listed as 'Obtain an IP address automatically' on the Ethernet adapter TCP/IP properties). For this approach, the radio will maintain its IP address (10.0.0.1 or 10.0.0.2 default from factory) and will assign the computer (temporarily) to an address that is two digits higher (for example, 10.0.0.3 or 10.0.0.4).

Connecting to the Radio in a Telnet Session

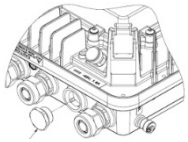
Make the Telnet connection to the radio through the Ethernet or fiber optic (models rcxx150 only) port. Use Windows and perform the following steps:

1. Open a command prompt or MS-DOS prompt (Start>Run).
2. Type C:\>Telnet <IP Address> at the command line.

Connecting the Fiber Optic Cable—Models rxx150 only

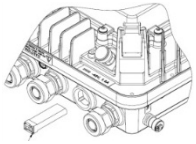
Use the fiber optic port to make the management connection on this model.

1. Prepare a fiber optic cable as instructed in the drawing 206832 included with the radio.
2. Remove and save the plug on the SFP/ETH2 port.



3. Install the included SFP optical module in the port.

   Orient the module as shown at right, and ensure it securely latches in the SFP cage.



4. Connect the fiber optic cable to the SFP optical module.

Note: Follow the instructions carefully to ensure weatherproofing.

Using the GUI

A browser is required to access the GUI. Microsoft Internet Explorer 5.0 or greater is recommended. Firefox, Chrome, and Safari are also supported. Use the following procedure to access the Exalt GUI.

1. Open a browser window and type the IP address of the radio (such as 10.0.0.1 or 10.0.0.2) in the address field, and press **ENTER**.
   A password dialog displays.

2. Type **admin** into the User name field.
3. Type **password** into the Password field.
4. Click **Login**.

The GUI displays the Radio Information page. Use the navigation panel along the left side of the GUI to access the configuration and management tools.

To establish a working link:

1. On the **Administration Settings** page, enter any License Key purchased. The License Key is uniquely tied to the unit's serial number.
   Press the **UPDATE** button to accept the entry.

2. Change the radio's IP address, as desired, on the **Administration Settings** page and click **UPDATE**.

Note: If the IP address is changed, open a new browser window and navigate to the new IP address. When changing the subnet, your computer's IP address must be in the same subnet.

Note: Check the Firmware Revision (on the Radio Information page) to assure that it matches for both terminals in the link. If this doesn't match, follow the instructions in the I&M to upgrade the terminal(s).

At this stage, all other configurations can remain at the factory default settings, and the link operates for back-to-back bench testing. However, for most installations, the following parameters must match the link design (at both ends of the radio link):

- **Administration Settings**:
  - Link Security Key
  - AES (option) enable/disable and key
- **Configuration>System**:
  - Radio Transmit Power
  - Bandwidth
  - Mode (Modulation)
  - RF Frequency Pair (opposite Tx/Rx)
- **Configuration>Interface>Ethernet**: All settings
- **Configuration>Interface>T1/E1**: All settings

Note: Disable any T1/E1 interface not intended for use. Available throughput is allocated to the Ethernet interface.