COVERAGE SYSTEMS

# NEXUS RT REPEATER

## INSTALLATION AND SERVICE MANUAL

044-05311 REV. A | OCTOBER 2008


Powerwave® technologies

Powerwave Technologies Inc. reserves the right to make changes to documentation and equipment, including but not limited to component substitution and circuitry changes. Changes that impact this document may be subsequently incorporated in a later revision of this document.

This Powerwave product is designed to operate within the Normal Operating (typical operating) ranges or conditions specified in this document. Operation of this equipment beyond the specified ranges in this document may cause (1) spurious emissions that violate regulatory requirements; (2) the equipment to be automatically removed from service when maximum thresholds are exceeded; or (3) the equipment to not perform in accordance with its specifications. It is the Operator's responsibility to ensure this equipment is properly installed and operated within Powerwave operating specifications to obtain proper performance from the equipment and to comply with regulatory requirements.

The rated output power of a Nexus RT is for multiple carriers. As long as the composite power does not exceed the rated power (28 dBm for North America), derating is not required for multiple carriers. For situations where regulatory requirements require reduced interference to adjacent band users, the rating would have to be reduced by 3 dB. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device. Input power is rated at 115/230VAC, 50/60Hz, and should be protected based on the power and fuse specifications in Chapter 5 of this manual. Power strips should, at a minimum, conform to this requirement to prevent equipment damage and possible overload.

Federal Communications Commission (FCC)

This device complies with the technical standards governing mobile radio devices in accordance with FCC Rules. This device is intended to facilitate the transmission of mobile radio devices in the cellular and PCS services, and its operation by end users or others requires carrier consent under FCC rules. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to CRF47 part 15 of the FCC rules. This equipment is also certified to CRF47 part 22 (cellular) and part 24 (PCS) of the FCC Rules depending on the band of operation. Changes or modifications not expressly approved by PowerwaveTechnologies, Inc. for compliance could void the user’s authority to operate this equipment. 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.

Industry Canadian Requirements

All Powerwave apparatus introduced in the Canadian market meet all requirements of the Canadian Interference-Causing Equipment Regulations. The -20dB bandwidth at Downlink at 1900 MHz band is 61 MHz. The -20dB bandwidth at Uplink at 1900 MHz band is 61.2 MHz. The -20dB bandwidth at Downlink at 850 MHz is 27 MHz. The -20dB bandwidth at uplink at 850 MHz is 27 MHz. The output impedance of the unit referenced in this document is 50 Ohms. The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device. The input signal is optical so input impedance requirements are not applicable.

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# Revision Record

| Revision Letter | Date of Change | Reason for Change |
|---|---|---|
| A | October 2008 | New (original) |

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## Warning, Cautions, and Notes

Warnings, Cautions, and Notes are found throughout this manual where applicable. The associated icons in warnings and cautions are used to quickly identify a potential condition that could result in the consequences described below if precautions are not taken. Notes clarify and provide additional information to assist the user.

**WARNING: The warning symbol means danger. You are in a situation that could cause bodily injury or death. Before you work on any equipment, be aware of the hazards involved with electrical and RF circuitry and be familiar with standard practices for preventing accidents.**

**CAUTION:** The caution symbol means the potential exists for equipment damage or loss of data.

**NOTE:** Notes contain helpful suggestions or references to material not covered in the document.

## Safety

Any personnel involved in installation, operation, or service of units included in a Powerwave repeater systemmust understand and follow the points below:

Powerwave repeaters are designed to receive and amplify signals from one or more base stations and retransmit the signals to one or more mobile stations. And, also to act the other way round, that is to receive signals from one or more mobile stations, amplify and retransmit the signals to the base stations. Powerwave repeater systems must be used exclusively for this purpose and nothing else.

Units supplied from the mains must be connected to grounded outlets and in conformity with the local prescriptions.

For outdoor use, the power cord should meet at least IP65 encapsulation requirements. Do not turn the main power on until you are ready to commission the equipment.

Power supply units supplied from the mains contain dangerous voltage that can cause electric shock. Disconnect the mains prior to any work in such a unit. Local regulations are to be followed when servicing such units. Only authorized service personnel are allowed to service units while the mains are connected.

When working on an a repeater on high ground, for instance on a mast or pole, be careful not to drop parts or the entire repeater. Falling parts can cause serious personal injury.
All RF transmitting units, including the Nexus RT Repeater, will generate radio signals and thereby give rise to electromagnetic fields that may be hazardous to the health of any person who is extensively exposed close to an antenna.

Beryllium oxide (BeO) may be contained in power devices, for instance in dummy loads in directional couplers (DCC), in combiner units (CMB), and in attenuators on the FON board. Beryllium oxide is poisonous if present as dust or smoke that can be inhaled. Do not file, grind, machine, or treat these parts with acid.

Coaxial cables used in many Powerwave systems have the insulation made of PTFE, polytetrafluoro ethylene, that gives off small amounts of hydrogen fluoride when heated. Hydrogen fluoride is poisonous. Do not use heating tools when stripping off coaxial cable insulation. No particular measures are to be taken in case of fire because the emitted concentration of hydrogen fluoride is very low.

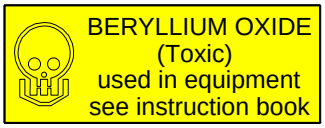
## Warning Signs

The following warning signs must be observed and be kept clean and readable.


**Beryllium oxide**

This warning sign to the left is applied to boards and units which contain beryllium oxide parts.

This warning sign below is applied at the bottom, inside the cabinet, below the power supply unit.




## Human Exposure to RF Radiation

Safe distances must be kept when working around antennas. The following paragraphs describe the cautions to be aware of during the installation and maintenance of antenna systems and how to calculate safety distances needed for RF radiation at different antenna power and frequencies.

### Repeater Antennas

To be able to receive and transmit signals, a repeater is connected to a donor antenna directed towards the base station and a service antenna directed towards the coverage area. A fiber optic cable from the base station might, however, be substituted for the donor antenna.

### Installation and Maintenance of Antenna Systems

Installation and maintenance of all antenna systems must be performed with respect to the radiation exposure limits for public areas. The antenna radiation level is affected by the output power, antenna gain, and transmission devices such as cables, connectors, splitters and feeders. Also have in mind the system minimum coupling loss, typically between 25dB and 35dB, is determined by a standard with the purpose to protect base stations from noise and other performance dropping effects.

### Radiation Exposure

The World Health Organization (WHO) and International Commission on Non-Ionising Radiation Protection (ICNIRP) have determined recommendations for radiation exposure. ICNIRP recommends not to exceed the following radiation power for public exposure:

**Frequency Radiation power**

| | |
|---|---|
| 800/900 MHz | 4.5W/m² |
| 1800/1900 MHz | 9.0W/m² |
| 2100 MHz | 10.0W/m² |

For antennas larger than 20cm the maximum radiation power can be calculated by using the following formula:

$S = P/(4\pi r^2)$

S = Radiation power in W/m²
P = Output power in W
r = Distance between antenna and human in meters

# Electrostatic Discharge (ESD)

ESD can severly damage essential parts of the equipment if not handled carefully. Parts on Printed Circuit Board Assemblies (PCBA) as well as other parts in the equipment are sensitive to ESD. Never touch the PCBA or uninsulated conductor surfaces unless absolutely necessary.

If you must handle the PCBAs or uninsulated conductor surfaces, use ESD protective equipment or first touch the chassis with your hand. Never let your clothes touch PCBAs or uninsulated conductor surfaces and always store PCBAs in ESD-safe bags.

## List of Acronyms

| | |
|---|---|
| AC | Alternating Current |
| ADC | Analogue-to-Digital Converter |
| ALC | Automatic Level Control |
| BTS | BaseTransceiver Station |
| DAC | Digital to Analog Converter |
| dB | Decibel |
| DC | Direct Current |
| DDA | Donor Duplexer Assembly |
| DL | Downlink |
| DPA | Donor Power Amplifier |
| DSP | Digital Signal Processor |
| EEPROM | Electrically Erasable Programmable Read Only Memory |
| EMC | ElectroMagnetic Compatibility |
| EMI | ElectroMagnetic Interference |
| EMS | Element Management System |
| FCC | Federal Communications System |
| FPGA | Field Programmable Gate Array |
| GRL | Gain Range Limiting |
| GSM | Global System Mobile |
| IF | Intermediate Frequency |
| IIP3 | 3rd Order Input Intercept Point |
| IMD | Intermodulation Distortion |
| IO | Input-Output |
| IOC | Input Overload Control |
| IP | Internet Protocol |
| JTAG | Joint Test Advisory Group Interface (common name for IEEE Std 1149.1) |
| LED | Light Emitting Diode |
| LPT | Linear Power Transmitter |
| MHz | MegaHertz |

| | |
|---|---|
| MCU | Microcontroller Unit |
| MFLOPs | Million Floating Point Operations per second |
| MHz | Mega Hertz |
| Msps | Million of Samples Per Second |
| MTBF | Mean Time Between Failures |
| MTTR | Mean Time to Repair |
| NEP | Network Elerment Processor |
| NMS | Network Management System |
| OA&M | Operations, Administration and Maintenance |
| OTA | Over the Air |
| PA | Power Amplifier |
| PCS | Personal Communications Services |
| PCBA | Printed Circuit Board Assembly |
| RCM | RF Converter Module |
| RF | Radio Frequency |
| RSSI | Receive Signal Strength Indicator |
| Rx | Receive |
| SNMP | Simple Network Management Protocol |
| SDA | Service Duplexer Assembly |
| SPA | Service Power Amplifier |
| TBD | To Be Decided |
| TX | Transmit |
| UL | Uplink; Underwriters Laboratory |
| USB | Universal Serial Bus |
| VSWR | Voltage Standing Wave Ratio |
| WAN | Wide Area Network |
| WCDMA | Wideband Code Division Multiple Access |

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# *Chapter 1*
# *Product Description*

## Introduction

This manual contains information and procedures for installation, operation, and maintenance of the Nexus RT epeater, referred to in this manual as the Nexus RT. The manual is organized into chapters as follows:

- ❑ Chapter 1 - Product Description
- ❑ Chapter 2 - Indicators and Connectors
- ❑ Chapter 3 - Installation
- ❑ Chapter 4 - Maintenance
- ❑ Chapter 5 - Specifications

## Scope of Manual

This manual is intended for use by service technicians familiar with similar types of equipment. It contains service information required for the equipment described and is current as of the printing date. Changes which occur after the printing date may be incorporated by a complete manual revision or alternatively as additions.

## Overview

Nexus RT is a digital repeater that digitally filters the signal, allowing multiple-pass bands of variable bandwidth to be implemented across the available bandwidth. Feedback cancellation technology reduces the required isolation between donor and coverage antennas. The Nexus RT is configured with digital processing for sub-banding and will operate either with or without echo cancellation processing capability. Other features include:

- ❑ Single or dual band configurations with full band coverage for all bands.
- ❑ Split band operation (up to 5 sub-bands per band). 1900 and 850 bands are supported in Phase 1.
- ❑ +28 dBm composite UL/DL
- ❑ 20 to 35 dB echo cancellation capability
- ❑ Digital Filtering – 5 sub-bands
- ❑ Programmable interference rejection
- ❑ Echo cancellation
- ❑ Auto configuration / optimization
- ❑ Native Simple Network Managemenmt Protocol (SNMP) monitoring/control
- ❑ NetWay Manager support
- ❑ Native SNMP control/monitoring
- ❑ Packet Data modem (option)
- ❑ Zero maintenance (sealed, no fans)

Nexus RTs are microprocessor controlled with alarm and operational status LEDs visible on the bottom of the cabinet. Cooling is provided through convection heat dissipation.

Figure 1-1 shows a block diagram of the Nexus RT.

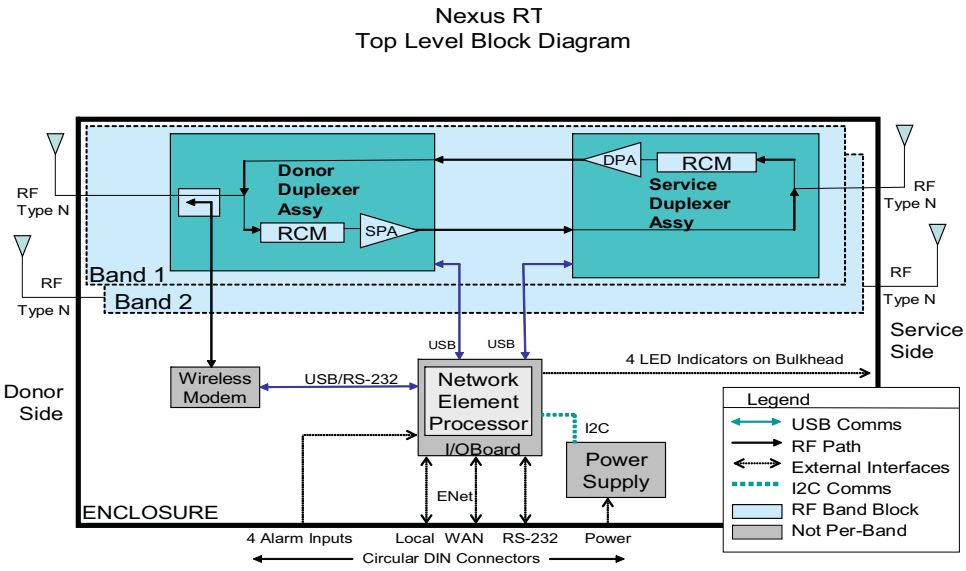


Figure 1-1 Nexus RT Block Diagram

## Chassis Design

The Nexus RT is housed in a cast aluminum, waterproof chassis, with a detachable sun shield approved for outdoor use. Using an appropriate mounting bracket, the Nexus RT can be mounted on a wall.

Figure 1-2 illustrates the Nexus RT repeater with and without the sunshield attached.

Sunshield attached

Sunshield removed

Figure 1-2 Nexus RT Repeater Enclosure

**Main Chassis**

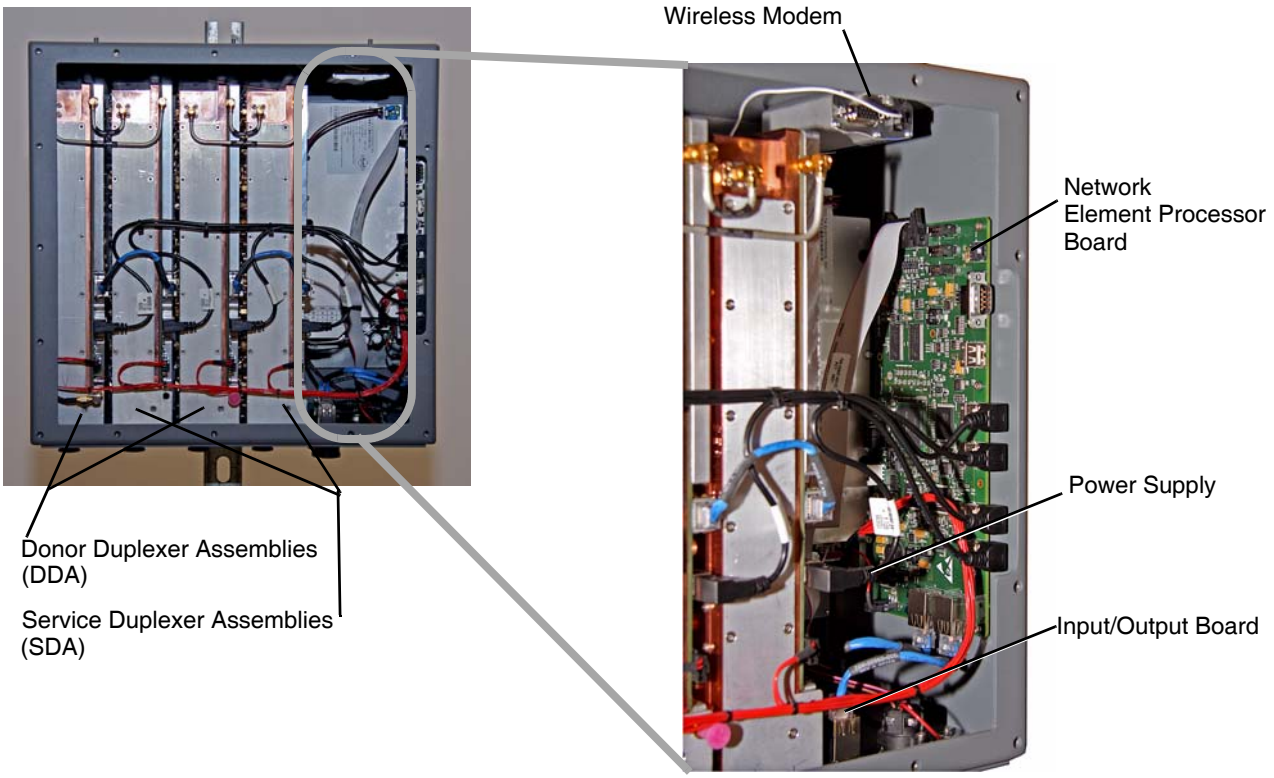


Figure 1-3 Nexus RT Dual Slice Configuration

**Nexus RT Connections**


Figure 1-4 Nexus RT Connections

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# Chapter 2
# Indicators and Connectors

## Introduction

This chapter contains descriptions of the controls, indicators, and connectors for the Nexus RT.

## Indicators

Four LEDs, shown in Figure 2-1 and described in Table 2-1, are located on the bottom of the Nexus RT to provide easy identification of system status.


Figure 2-1 External Indicators

Table 2-1 External Indicators

| LED | Color | Indicates |
|---|---|---|
| INPUT O-R | Amber | Input Over-Range |
| OPM | Amber | Oscillation Protection Mode |
| FAULT | Red | Flashing–System error<br>Steady–Critical alarm |
| PWR | Green | Ready for operation<br>(Lights up 15 seconds after power applied) |

## Connectors

Figure 2-2 and Table 2-2 describe the connectors available on the Nexus RT repeater.


Figure 2-2 Nexus RT Connectors

Table 2-2 Nexus RT Connectors

| Connector | Type | Purpose |
|---|---|---|
| DNR ANT 850 MHz<br>SRV ANT 850 MHz | Type N Female | Connectors for receive/transmit signals in 850 MHz |
| DNR ANT 1900 MHz<br>SRV ANT 1900 MHz | Type N Female | Connectors for receive/transmit signals in 1900 MHz |
| POWER | Circular DIN | Main power connector |
| LOCAL and WAN | RJ-45 | Connectors for repeater control and status |
| RS-232 | Circular DIN | Factory use only |
| ALARM | Circular DIN | Connector for alarm signals external to the repeater |

**CAUTION:** All connectors are located on the bottom face of the repeater.To avoid damaging the connectors, do not set the set the repeater down on the connector side.

## Software and Hardware Compatibility

There are different versions of Contol Unit (CU) Printed Circuit Board Assembly (PCBA) software which can be combined with PCBAs of various revisions. These have unique part numbers and revision information. Table 2-3 lists the software currently available in combination with CU PCBA revisions.

Table 2-3 Hardware / Software Compatibility

| CU PCBA part number | CU Software part number |
|---|---|
| 500-13817-001 (previously K103/3) | D631-18072-001<br>D631-18072-003 |

This information is accurate as of 06/31/2007. As new versions of hardware and software are released without prior notice, contact your Powerwave sales representative for information on the latest revision.

For detailed information, refer to the release notes for the CU software to be downloaded (normally found in the readme.txt file provided with the program files).

# *Chapter 3*
# *Installation*

## Introduction

This chapter contains unpacking and inspection, and mounting installation instructions for powering up the Nexus RT.

## Site Survey

Powerwave recommends that a site survey be performed prior to ordering or installing equipment. Performing a detailed site survey reduces or eliminates installation and turn-up delays. Pay particular attention to power plant capacity, cooling needs, floor space, and RF/DC cabling/breaker requirements. Cabinet dimensions and weights are listed in Chapter 5.

## Unpacking and Inspection

This equipment has been operated, tested, and calibrated at the factory. Carefully open containers to remove equipment. Retain all packing material that can be reassembled in the event unit must be returned to the factory. Perform the following steps:

- ❑ Visually inspect equipment for damage that may have occurred during shipment. If possible, in the presence of the delivery person.
- ❑ Check for evidence of water damage, bent or warped chassis, loose screws or nuts, or extraneous packing material in connectors.

If any equipment is damaged, file a claim with the carrier once the extent of any damage is assessed.

If any equipment must be returned to factory, please contact the factory for a Return Material Authorization (RMA). See Chapter 4.

## Nexus RT Location

The Nexus RT is designed with a weatherproof outdoor cabinet. The unit can also be installed indoors. A preferable site for the Nexus RT is a location free of obstructions, easily accessible, and that allows for proper air-flow and ventilation.

A Sunshield is available for situations where the Nexus RT is installed outdoors and can be exposed to direct sunlight. It is essential that air circulates around the Nexus RT with no obstacles. The operating temperature must not exceed 55°C (131°F).

Never open a Nexus RT when rain, snow, hail, high humidity or high winds are present unless some kind of temporary shelter can be erected.

## Mounting

Use the mounting bracket provided (as shown in Figure 3-1) to mount the Nexus RT on a wall.

Figure 3-1 Mounting Bracket

Figure 3-2 illustrates the installation of the mounting bracket on a wall using six fixing screws.

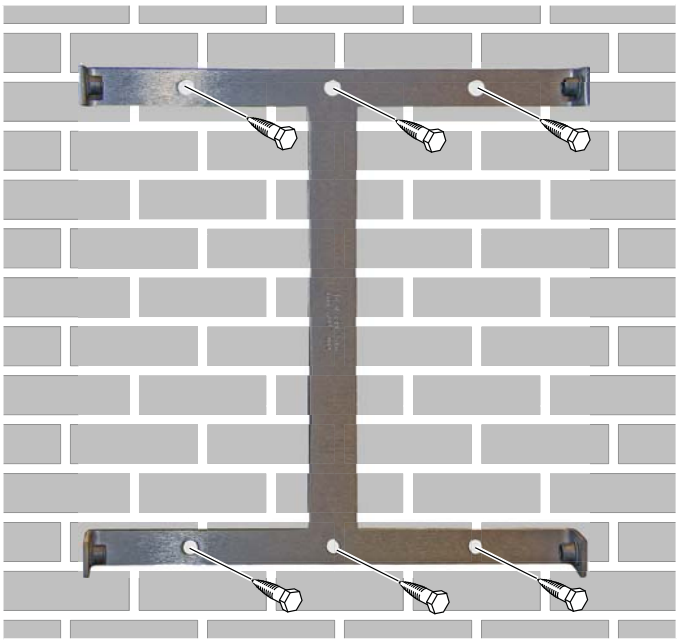

Figure 3-2 Mounting Bracket Installation on Wall

## Mounting the Nexus RT on the Bracket

1. After installing the mounting bracket, insert the mounting screws into the bracket, then hook the upper supports on the Nexus RT over the mounting screws, as illustrated in Figure 3-3.

Figure 3-3 Attaching the Nexus RT upper supports

2. Align the lower supports with the mounting holes on the bracket, then insert the lower mounting screws, as shown in Figure 3-4

Figure 3-4 Attaching the Nexus RT lower supports

3. Tighten the screws using a 6mm hex socket wrench to secure the Nexus RT tn place.

Locking cylinders, used to prevent unauthorized removal of the repeater, can be inserted and locked with a key after the lower screws have been tightened.

4. Verify that the donor antenna (directed toward the Base Tranceiver Staton antenna) and the service antenna (directed toward the area to be covered by the Nexus RT) are mounted and installed properly.

# Connections

This section describes general examples of how to connect the input and output ports on the Nexus RT.

Figure 3-5illustrates the connections for the Nexus RT.

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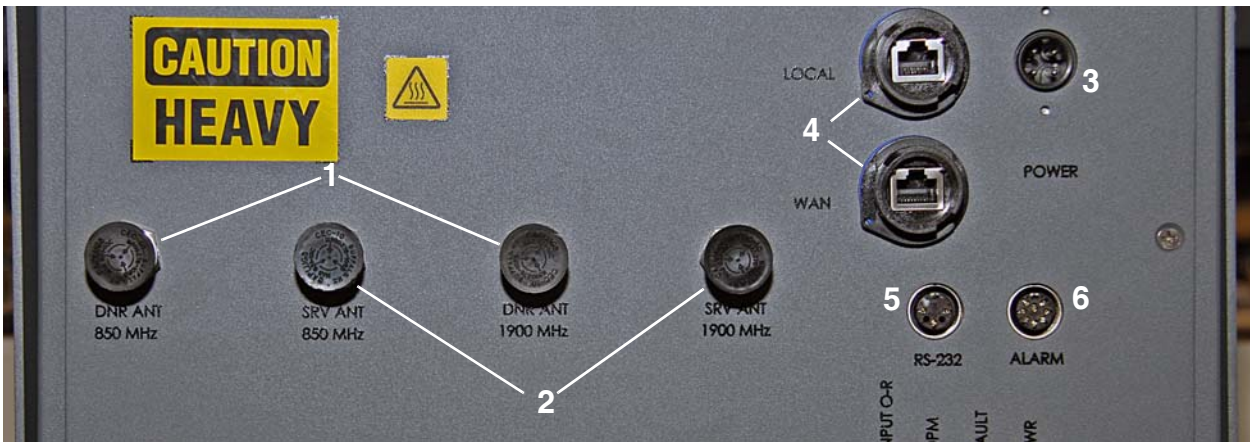


Figure 3-5 Nexus RT Cable Connections

1— RF Input/Output – Donor Side. The reverse transmit and forward receive signals are duplexed onto one RF port. There is one donor side connector for each band.
2—RF Input/Output – Service Side. The forward transmit and reverse receive signals are also duplexed onto one RF port. There is one service side connector for each band.
3—Power Input – Prime power input for the repeater.
4—IP Connections – Ethernet connections for control and status of the Nexus RT. One for local and one for wide area network (WAN).
5—Serial Port. An RS-232 interface for factory use only.
6—External Alarm Input. This is a connection port for alarm input signals external to the Nexus repeater.

The Nexus RT also has a wireless modem interface for communicating control and status information with the network management system. The repeater supports a USB interface between the Network Element Procesor (NEP) and modem.

## Main Power and Grounding

Local regulations need to be followed for the main power connection. Nexus RTs are approved in accordance with EN and UL/cUL regulations. This is, however, only valid if a classified power cord is used. For the Nexus RT to meet these regulations you must select one of the following classified and approved cord types:

- ❑ EN – H 05 W5 - F HMR
- ❑ UL – AWM Style 2587
- ❑ CSA– AWM 1 A/B 11 A/B

For outdoor use, the power cord should meet at least IP65 encapsulation requirements. Do not turn the main power on until you are ready to commission the Nexus RT

**WARNING: For Nexus RTs supplied from the main power source, the main outlet must be grounded.**

## Connecting RF Cables

RF cable connections should be verified both internally and externally before powering up the equipment. This section describes the general internal connections of the Nexus RT. Verify these connections with the as-built drawings and documents for your specific system configuration.

1. Connect the service and donor antenna coaxial cables to the appropriate terminals on the cabinet.
2. Plug the main power cord into the terminal labeled POWER.

## Attaching the Sunshield

The Nexus RT is housed in a cast aluminum, waterproof chassis, with a detachable sunshield approved for outdoor use.

To attach the sunshield, align the grooves on the inside of the sunshield with the tabs on the Nexus RT housing and slide the sunshield down until it stops, as shown in Figure 3-6.

Figure 3-6 Attaching the Sunshield

# Commissioning

Before proceeding, carefully read the Safety section and check all connections made during the installation. To fulfill the IP65 weather protective requirements, ensure cable strain relief bushings are properly tightened. Also, ensure the gaskets at cable inlets and on the cabinet are properly fitted and not damaged.

## Initial Startup

To complete the initial start-up of the Nexus RT, follow the steps listed below.

1. Turn on the main power. All LEDs will light up.
2. After about five seconds, check the PWR LED. If it shows green and steady, the Nexus RT is functioning correctly.

## Configure the Nexus RT

The Nexus RT can be configured locally with the built-in web terminal interface. Connect a standard Ethernet cable from the RJ45 socket on a PC to the LOCAL connector located on the bottom of the cabinet as shown in Figure 3-7.


Figure 3-7 Connection for Local Access

## Log in

Follow these steps to access the Nexus RT interface pages.

1. Open a web browser on your PC.
2. Enter the IP address of the LOCAL port on the Nexus RT (192.168.47.10) in the URL address field and press Return. The login dialog box, as shown in Figure 3-8, displays.


Figure 3-8 Nexus Web Terminal Login Screen

3. Enter user name “PW_Admin” and password “admin22.” The Home page of the Nexus RT interface displays, as shown in Figure 3-9.

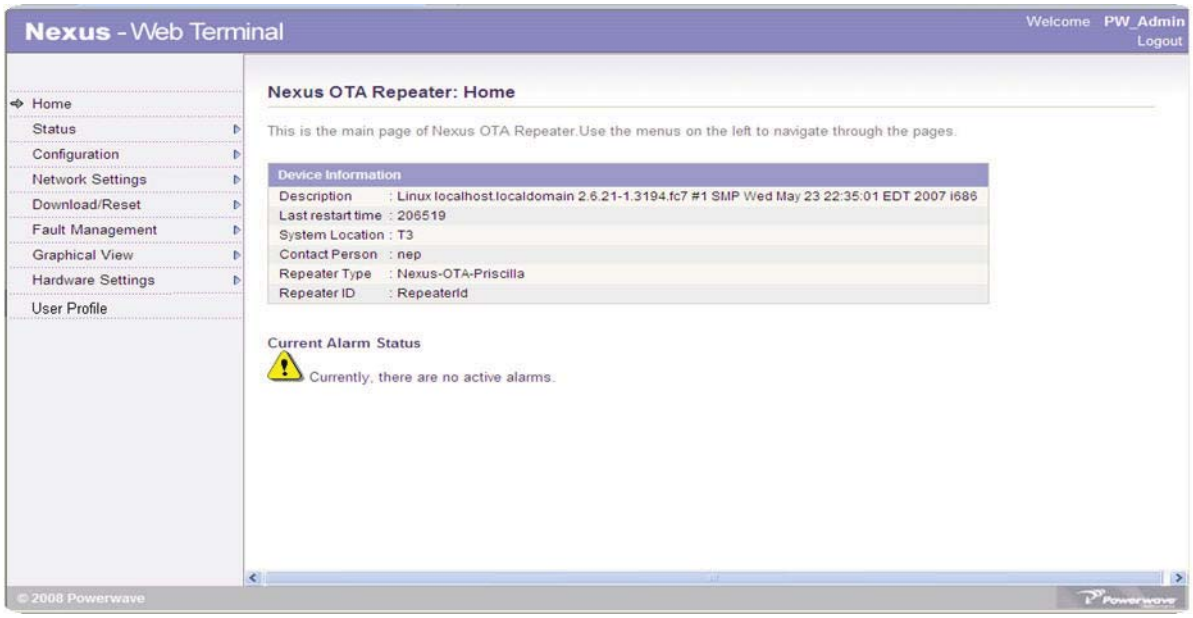


Figure 3-9 Nexus RT Home Page

For configuration settings, refer to the Nexus RT Software and Configuration Manual (044-XXXXX).

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# Chapter 4
# Maintenance

## Introduction

This chapter contains periodic maintenance and procedures to return the Nexus RT for service.

## Periodic Maintenance

Refer to Table 4-1 for Periodic maintenance requirementsand the intervals at which to perform the tasks.

Table 4-1 Recommended Periodic Maintenance

| Task | Interval | Action |
|---|---|---|
| Inspection of cables and connectors | 12 months | Inspect power and RF cables for signs of damage or wear (frayed insulation, cracks, punctures, etc.) Check connections to be sure they are tight |
| | Optional | Perform cable sweeps |
| Clean equipment | Clean as required depending on operating environment | |

## Troubleshooting

The sections that follow contain a list of problems that could occur and a few suggested actions that might correct each problem. If the suggested corrective action does not eliminate the problem, please contact your Powerwave field representative or customer service for further instruction.

### Alarm Faults

The Nexus RT Web Interface pages provide an overview of the repeater's status and alarm situation asl isted inTable 4-2 Nexus RT Alarms . Please refer to the the Nexus RT Configuration Manual (044-05341) for more information.

Table 4-2 Nexus RT Alarms

| | | |
|---|---|---|
| Power Supply Voltage | Modem SIM Card Door Open | High Temperature |
| Flash Disk Failure | NEP Improper ShutDown | OS Rebooted |
| Modem Disconnected | External Contact 1 | External Contact 2 |
| External Contact 3 | External Contact 4 | Modem Signal Strength Out of Range |
| Invalid Kernel Version | Invalid UBoot Version | High Return Loss |
| Heart Beat | Power Amplifier Over Power | Communication Failure |
| Slice Module Missing | Echo Canceller Not Balanced | Reference PLL Unlocked |
| Master Synthesizer Unlocked | OBS LO Synthesizer Unlocked | TX LO Synthesizer Unlocked |
| RX LO Synthesizer Unlocked | RX ADC PLL Unlocked | FPGA PLL Unlocked |
| Echo Canceller Error | RX ADC Overflow Reported | OBS ADC Overflow Reported |
| DDC Overflow Reported | DUC Overflow Reported | PA High Temperature |
| High VSWR Level | LNA Fault | High Output Power |
| Invalid FPGA Version | Invalid FX2 Version | Invalid DSP Version |

# Field Replaceable Units

There are no field replaceable components in the Nexus RT. If any components fail, plese contact Powerwave for assistance.

# Return For Service Procedures

When returning products to Powerwave, the following procedures will ensure optimum response.

## Obtaining an RMA

A Return Material Authorization (RMA) number must be obtained prior to returning equipment to the factory for service. Pease contact our Repair Department at +1-714-466-1000 to obtain this number, or FAX your request to +1-714-466-5800. Failure to obtain this RMA number may result in delays in receiving repair service.

## Repackaging for Shipment

To ensure safe shipment of the unit, it is recommended that the original package designed for shipping the unit be reused. If it is not available, contact Powerwave's Customer Service Department at 1-800-797-9283, +1-714-466-100 or by e-mail at support@pwav.com for packing material.

# Chapter 5
# Specifications

## Introduction

This chapter provides specifications for the Nexus RT.

Table 5-1: Nexus RT Specifications

| | |
|---|---|
| **Electrical** | |
| Frequency band UL | 824 to 849 MHz (Cellular)<br>1850 to 1910 MHz (PCS) |
| Frequency band DL | 869 to 894 MHz (Cellular)<br>1930 to 1990 MHz (PCS) |
| Gain adjustment range (in 1 dB steps) | 55 - 85 dB |
| **Gain**<br>Uplink<br>/Downlink | <br>-10 to +30 dBm<br>+20 to +45 dBm |
| Instantaneous bandwidth | 25 MHz |
| Return Loss | <-15 dB |
| Downlink, Spurious and Emissions level | -160 dBm/Hz |
| Output Power - Downlink | +25 dB Composite |
| Noise figure | 5 dB |
| Power supply voltage | 110 - 120 VAC |
| Maximum Current Draw (Single Band) | 70 w |
| Power consumption | < 200 W typical |
| **Impedance**<br>IOutput | <br>50 Ω |
| **Mechanical** | |
| Dimensions (W x H x D in inches) | 393.7 mm (15.5 in.) x 381 mm (15 in.) x 266.7 mm (10.5 in) |
| Weight | 20 Kg (44 lbs) Single Band Configuration<br>27 Kg (60 lbs) Dual Band Configuration |
| Service Antenna port connector | N Type Female |
| Donor Optical port connector | N Type Female |
| **Environmental** | |
| Operating Temperature Range | -30 °C to +50 °C (-22°F to +122°F) |
| Altitude | -30.48 m to 1828.8 m (-100 ft. to 6000 ft.) |
| Casing class | IP50 |

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