POINTRED TECHNOLOGIES BROADBAND WIRELESS ACCESS SYSTEM

System Manual

rev 1.1

PREFACE

This document describes in detail the implementation, use and maintenance of the PointRed Technologies Broadband Wireless Access System.

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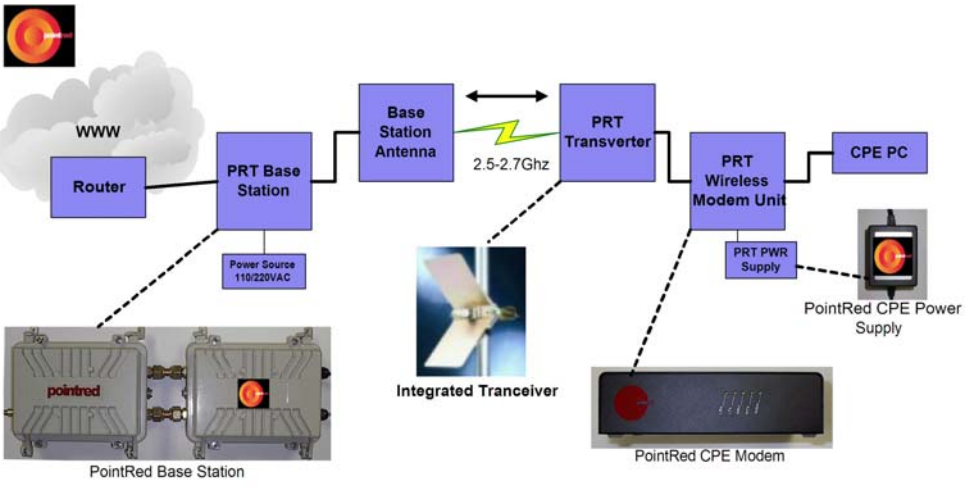
Chapter

1

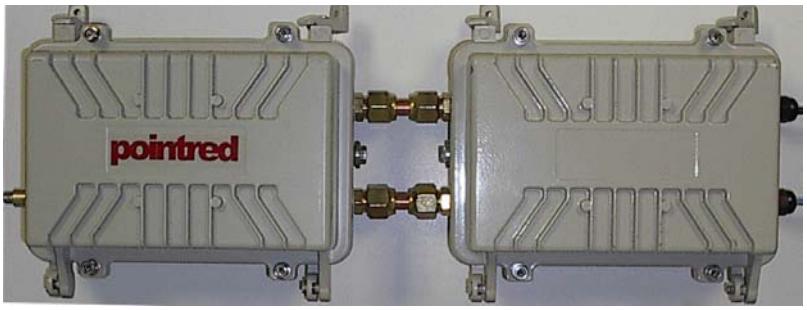
PointRed Technologies System Overview

The MicroRed™ is a family of wireless equipment for the broadband connection of endpoint users to the Internet or other electronic destinations . The system operates at microwave frequency in either point to multipoint (PtMP) or Point to Point (PtP) configurations.



The BASE STATION and its transmit/receive antenna and the Customer Premise Equipment (CPE) with its receive/transmit antenna also known as a transceiver. The system provides "Wireless" operators the ability to quickly deploy Broadband Access PicoCells in dense population areas with a greater cost advantage. Unlike SuperCells, the Base Station generates a focused approach to Wireless access systems. Operators may choose to target specific areas in their market to generate end user customer sales rapidly or incorporate the Solution into a SuperCell to provide coverage to otherwise blocked customer areas. The system operator can then "pick and choose" where to deploy the PointRed PICO CELL in a far more profitable manner. The systems "Pay as you Grow" concept is key to keeping system subscriber acquisition costs low.

The Base Station



The BASE STATION Unit functions as both a receive and transmit device. The (BST) Base Station is a lightweight, robust ODU (outdoor unit) and is typically mounted on a structure or radio tower. The BST provides the interface to the Internet, Router, or other media types. The BST is combined with an Antenna to generate the PICO Cell broadcast.

The CPE Modem

The Customer Premise Equipment (CPE) Modem functions as the endpoint users interface to the Internet or other media types. The CPE is an easily configurable subscriber Modem unit. That provides a 10BASET connection type for multiple applications such as Data, Voice, or Video. The CPE is partnered with a Power supply that operates at 110vdc or 220vdc.

The Tranceiver Unit

The Tranceiver unit functions as the RF interface for both the BASE STATION and the CPE Modem endpoints. The Transceiver can be configured with various antenna gain combinations and models and is powered by the CPE Modem.

Chapter 2

Installing the Base Station

Pre-Installation Requirements:

1. BST Mounting location with suitable grounding connection.
2. 110/220VDC source
3. Internet or Other media Connection interface (IP Router)
4. Suitable Broadcast Antenna
5. Basic Hand Tools

Component Inspection:

1. Carefully unpack the Base Station package and inspect the unit for physical damage.
2. Verify that all the components are present against the shipping information or Purchase order.

   Immediately contact PointRed Technonogies if any portion of the system base station package is missing or damaged.

Mounting the BASE STATION:

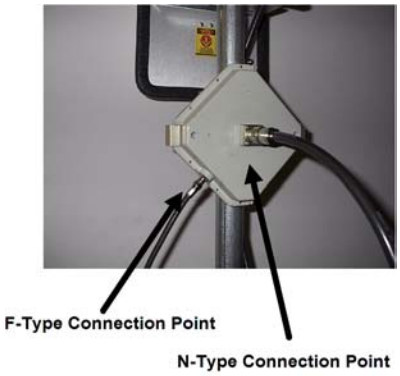
1. Vertically mount the BST using the supplied mounting hardware with the F-Type 75ohm connection downward.

Connecting the BASE STATION:

1. Connect the Ground point to the BASE STATION mount.

2. Connect a F-Type 75ohm Coaxial cable to the F-Type 75ohm connection point of the BST. Note: DO NOT OVERTIGHTEN the F-Type 75ohm connector and **DO NOT connect any cable to the BST while the unit is powered! POWER OFF FIRST!**

3. Connect the other end of the F-Type 75ohm Coax cable to the PointRed Tranceivers F-Type 75ohm connection point. As pictured below. Then, connect an N-Type 50ohm Coax Cable to the Tranceivers N-Type 50ohm connection point.



4. Connect the other end N-Type 50ohm coax cable to BAST Station Antenna's N-Type 50ohm Connection Port as pictured below.

5. Connect an Ethernet CROSSED cable with a standard RJ-45 connector to the Backhaul connection point of the BASE STATION. The other end of the Ethernet Crossed cable to your Media Connection such as a Router.

Here is an image of the final installation configuration below.

Completed ODU installation.

Chapter

3

Installing the CPE Modem and Tranceiver

Pre-Installation Requirements:

1. Suitable CPE Installation Location
2. Suitable 110/220VDC source
3. Customer Endpoint Computer or NAT Router
4. Basic hand tools

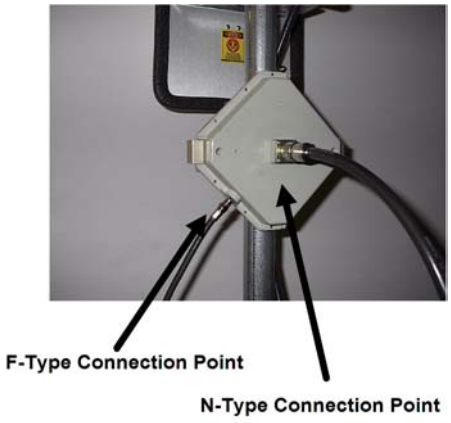
Component Inspection:

1. Carefully unpack the CPE/Tranceiver package and inspect the units for physical damage.
2. Verify that all the components are present against the shipping information or Purchase order.

Immediately contact PointRed Technonogies Support if any portion of the system base station package is missing or damaged. Call 1408-752-1838 www.pointredtech.com

Mounting the CPE-Tranceiver

1. Mount the Tranceiver Unit with the F-Type connector downward using the supplied clamp.

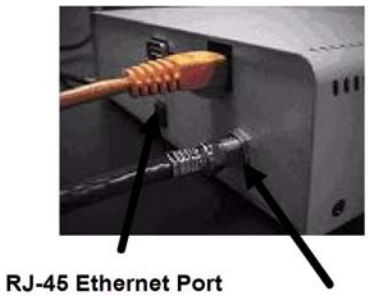


2. Mount the NON-integrated antenna to the Mounting location above the Tranceiver unit and connect the N-Type 50Ohm coax cable to the N-Type connection on the Tranceiver. Then, Connect a F-Type 75ohm cable to the Tranceiver F-Type connection. NOTE: DO NOT CONNECT the other end of the coax to any device yet.

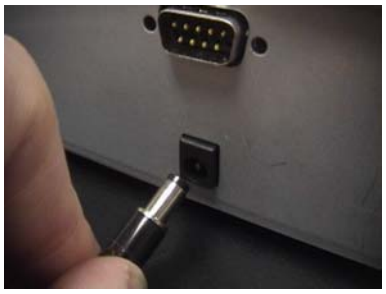
3. Connect the Other end of the 75ohm coax cable from the Transceiver to a Field Strength Meter (FSM). Using the FSM, align the Tranceiver for peak signal strength. One you have Optimized the signal strength, tighten the mounting hardware to ensure that the Antenna and or the Tranceiver does not move from the Optimized position.

4. Once you have mounted the Tranceiver, Route the 75ohm coax cable to the CPE Modem.

5. At the CPE location, Connect the 75Ohm coax cable connector to the CPE "IF" connection port on the back of the CPE



6. Connect the Supplied Power Supply to the CPE Modem as pictured below. The Transformer end of the Power Supply must be connected to a 110/220 compliant power source.



7. This completes the Physical installation of the CPE Modem and Tranceiver.

IT IS NOW safe to connect the System components to the power source

Chapter

4

Connecting to the System

Pre-Configuration Requirements:

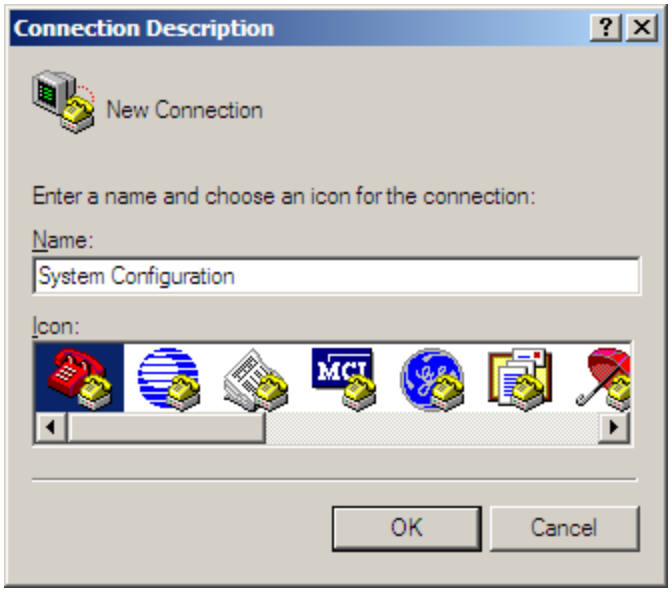
1. Installed BASE Station and CPE Modem
2. PC with Win 2000, 128megRam, Pentium II, with Serial Port
3. 9-pin RS-232 Serial Cable with Null Modem 9pin
4. Ethernet 10baseT CROSSED Cable
5. Test Server PC

Connecting to the Base Station and CPE console port

1. Connect the RS-232 cable to the CPE Modem RS-232 Port or the Base Station RS-232 port. (See Configuring the Base Station)
2. Connect the other end of the RS-232 Serial cable to the Null Modem.
3. Connect the Null Modem to the RS-232 port of the PC.
4. Left Click, Start>Programs>Accessories>Communications>Hyper terminal
5. Click to Open Hyper terminal.
6. At the Hyper Terminal Window you will see a dialog box (Connection description). Enter the following: "System Configuration"

Cont.

Here is an image of the Dialog Box "Connection Description"



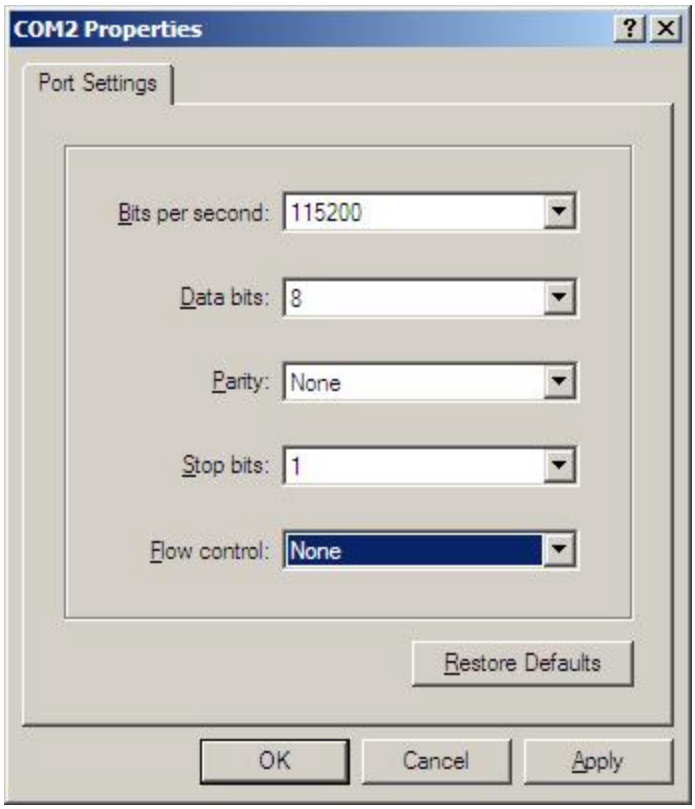
7. Click OK. You should see a dialog box named "Connect To". Select the proper COM port connected to the RS-232 Serial cable.

Here is an image of the Dialog Box "Connect to"

8. Click OK. You should see a dialog Box named "Com (your com port)"

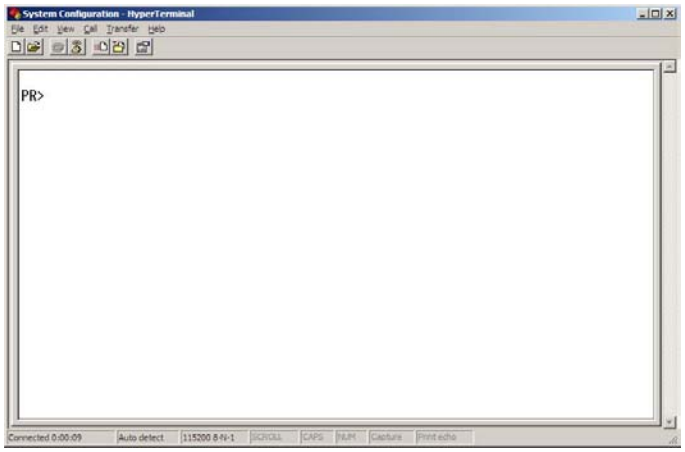
Select the following: 115,200 bits per second, 8 data bits, None Parity, and None for Flow control. Also assign your PC's Com Port. If you are unsure of you COM port, click Start>Control Panel>Ports to find your Com Port configuration

Here is an image of the Dialog Box with " COM2 Properties"



9. Click OK. You should now return to the hyper terminal window. Type "Enter" You should see the Point Red Configuration Prompt.

Here is an image of the Hyper Terminal Window: Type "Enter" to see the PR> prompt.



10. You are now ready to configure the Network Settings for the PointRed System.

Chapter

5

Configuring the System

This Chapter describes all the commands available for the user/administrator to see and modify the system settings.
This document also provides the commands syntax and system response for each command.

The system commands are:

1. "help"

The "help" command introduce all available commands.

a. On the BASE-STATION system:

Command:

```
help<ENTER>
```

Response:

```
help      - Show this help menu
enable    - UART: login Administrator
disable   - UART: logout Administrator
state     - Show current station setup
lanip     - Show/Set LAN IP Address
landg     - Show/Set LAN Default Gateway IP Address
wanip     - Show/Set WAN IP Address
wgateip   - Show/Set WAN Default Gateway IP Address
addcpe    - Add CPE to the system
delcpe    - Remove CPE from the system
listcpe   - List CPEs in the system
commit    - Save configuration to the FLASH
reset     - Reset System
trfrq     - Set transmit frequency
trmode    - Set frequency band
trpwr     - Set the output power level
```

On the CPE-MODEM system:

Command:

```
help<ENTER>
```

Response:

```
help      - Show this help menu
enable    - UART: login Administrator
disable   - UART: logout Administrator
lanip     - Show/Set LAN IP Address
landg     - Show/Set LAN Default Gateway IP Address
commit    - Save configuration to the FLASH
reset     - Reset System
```

2. "enable"

The "enable" command allows the user to login as the administrator for modifying the system settings.

Command:

```
enable<ENTER>
```

Response:

```
Password:
```

Command:

```
<password><ENTER>
```

Response:

```
--  Welcome to UART Admin
```

3. "disable"

The "disable" command causes the system to exit from administrator.

Command:

```
disable<ENTER>
```

Response:

```
<prompt>
```

4. "state"

The "state" command allows the user to see the current system configuration.

Command:

```
state<ENTER>
```

Response:

```
Base Station
```

```
     LAN IPAddress:192.168.0.2 IPMask:255.255.255.0
Gateway:192.168.0.1
     WAN IPAddress:  192.0.0.1 IPMask:255.255.255.224
```

5. "lanip", "landg", "wanip" and "wgateip"

The "lanip", "landg", "wanip" and "wgateip" commands allow the user to see the current system IP settings and to the administrator to modify these settings.

a. To see the current system LAN IP address:

Command:

```
lanip<ENTER>
```

Response:

```
Current Lan IP: 10.0.0.2
   usage: lanip X.X.X.X [ netmask ]
```

b. To modify the current system WAN IP address:

Command:

```
wanip 192.0.0.7 255.255.255.0<ENTER>
```

Response:

```
replacing net if2 IP address 192.0.0.1 with 192.0.0.7
```

6. "addcpe" and "delcpe"

The "addcpe" and "delcpe" commands allow the administrator to add new CPE to the system or to remove unused CPE from the system.

Add command syntax: `addcpe <mac address> <LAN address><ENTER>`

Delete command syntax: `delcpe <LAN address><ENTER>`

a. For example:

Command:

```
addcpe 00.11.22.33.44.55 10.0.8.1<ENTER>
```

Response:

```
....   CPE added to the list successfully ...
```

b. Another example:

Command:

```
delcpe 10.0.8.1<ENTER>
```

Response:

```
Entry successfully deleted ....
```

7. "listcpe"

The "listcpe" command shows to the user all the CPE's that configured in the system.

For example:

Command:

```
listcpe<ENTER>
```

Response:

```
CPE list:
     Number of CPE(s) : 2

[CPE 1]
   Mac address 0.11.22.33.44.c2
   LanIP   10.0.1.1        WanIP   192.0.0.3

   Number of packets sent  : 0
   Number of bytes sent    : 0


[CPE 2]
   Mac address 0.11.22.33.44.c8
   LanIP   10.0.0.1        WanIP   192.0.0.2

   Number of packets sent  : 38440
   Number of bytes sent    : 53989430
```

8. "commit"

The "commit" command lets the administrator to save the new settings in the flash so if the system restarts due to user demand or power failure, no new settings will be lost.

Command:

```
commit<ENTER>
```

Response:

```
copy -f -f 0x7F0000 0xBFDF0000 0x4000
100%, 0x4000/0x4000 bytes loaded
```

9. "reset"

The "reset" command lets the administrator to reset the system. Reset command must be applied for the new IP settings to take place.

Command:

```
reset<ENTER>
```

Response:

```
<system restart>
```

10. "trfrq"

The "trfrq" command lets the administrator to set the transceiver frequency. Valid values range from 2503 to 2683 in increments of 30.

Command:

```
trfrq 2623<ENTER>
```

Response:

```
Transceiver Frequency Changed: Old=2593, New=2623
```

11. "trmode"

The "trmode" command lets the administrator to set the Freguwncy band. 2.4Ghz =trmode 0, 2.5Ghz=trmode 1

Command:

```
Trmode 1 <ENTER>
```

Response:

```
2.5 Ghz system frequency band
```

12. "trpwr"

The "trpwr" command lets the administrator to set the transceiver power. Valid values range from 0 to 255.

Command:

```
trpwr 128<ENTER>
```

Response:

```
Transceiver Power Changed: Old=119, New=128
```

RF Configuration Procedure for the Base Station

This procedure details the steps needed to set the base station's RF operational parameters.

1. Open the Base Station cover and connect to the RS-232 port and your PC. Open Hyperterminal and type enter. You should see the PR> prompt.

2. To Set the Frequency for 2.5 Ghz range type "enable" then enter the password. Type "admin". You should see the admin> prompt. Type "trmode 0" for 2.4 Ghz range, Type "trmode 1" for 2.5Ghz range. Type "commit" and "Y" to save the settings.

3. Next, determine the center frequency for radio channel you which to use. Type "trfrq xxxx" and type enter. Example: trfrq 2593. Type "commit" enter and Y" enter to save the setting. Next, type tfrq to verify system settings. Example : trfrq OLD=2503 NEW=2593.

4. To set the System power level. Type "rpwr 255" enter. type "commit" and "Y" to save the setting. You may type "trpwr" again to verify. This will set the system power level to maximum output. It is recommended to use maximum power level for most configurations.

5. The PoinRed CPE modem is configured exactly as detailed the previous steps. All CPE modem that subscribe to the Base Station in a given MicroCell must have the same Radio Frequency configuration as the Base Station

This Completes the RF configuration

Network Configuration Procedure for the Base Station

This procedure details the steps needed to set the base station's IP Network operational parameters. Contact Pointred Technical support fro assistance in determining your network IP scheme.

1. Open the Base Station cover and connect to the RS-232 port and your PC. Open Hyperterminal and type enter. You should see the PR> prompt.

2. Type, "enable" and enter the Password "admin"". You should see the admin prompt. Type "lanip xxx.xxx.xxx.xxx" then enter and commit to set the IP of the Base Station.

3. Next type "landg xxx.xxx.xxx.xxx" to set the Default Gateway for the Base Station then, enter and commit to save the setting.

4. Type "wanip xxx.xxx.xxx.xxx enter and then commit and y to save the setting.

5. Next, type "wgateip xxx.xxx.xxx.xxx" to set the WAN default gateway. Type commit and y to save the setting.

6. Type, "state" to verify all the above settings. The PoinRed CPE modem is configured exactly as detailed the previous steps. All CPE modem that subscribe to the Base Station in a given MicroCell must have the same Radio Frequency configuration as the Base Station.

7. Type disable to exit the Administrator login

This Completes the Network configuration.

Add/Delete CPE at the Base Station

This procedure details the steps needed to add CPE's to the base station's database. Contact Pointred Technical support for assistance or questions.

1. At the Base Station via RS-232 connection type enable and the password admin to enter the administrator functions.

2. Type " listcpe" to show all of the current added cpe. Next type "addcpe" and enter the IP address and MAC address of the CPE you wish to add to the system.

3. To delete a CPE entry type "delcpe".

4. To save the CPE's you have added to the system type "commit" and "Y" then enter.

This completes the step to add or remove a CPE at the Base Station.

The PointRed system is configured for use. Contact PointRed Technical support for assistance.

Call: 1-408-752-1838 for Customer Support www.pointredtech.com