# POINTRED Technologies Inc.

## BROADBAND WIRELESS ACCESS SYSTEM

# BTS Manual

rev 1.0

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# FCC Emission Information

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 when equipment is operated 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 to 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.

# FCC Radiation Hazard Warning

To ensure compliance with FCC RF exposure requirements, this device must be professionally installed outdoors on a permanent structure with an antenna that is separated from all persons by a minimum of two meters. Using higher gain antennas and types of antennas not covered under FCC certification of this product is not allowed. Installers of the radio and end users of the system must adhere to instructions provided in this manual.

# Safety

**Warning:** To avoid shock, do not open or attempt to service the unit or its associated power supply. This unit is not a user serviceable device.

**Warning:** Do not touch antennas when transmission is in progress. Possible adverse health affects can occur.

**Warning:** Explosive device proximity warning-do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.

**Caution:** This instrument transmits radio frequency energy during normal operation. Do not stand or work in close proximity for extended periods of time to avoid possible harmful exposure. The long-term health effects of exposure to radio frequency energy are not fully understood.

**Caution:** When performing antenna installation and grounding ensure that it presents no threat to people and property. Verify that the antenna mast is grounded properly and is protected from voltage surges and static charges. Observe all regional and national building and safety regulations.

# Contacting PointRed Technologies for Information or Support

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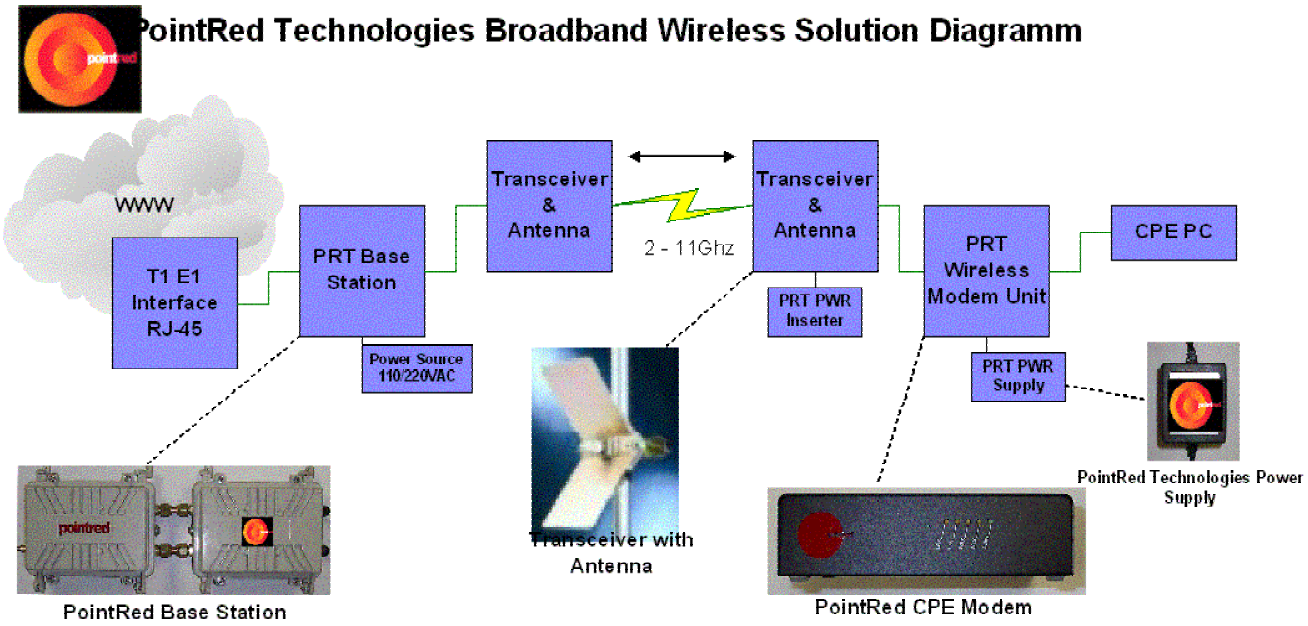
Chapter

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 system consists of a Base Station, with its transmit/receive unit (transceiver) and antenna, and one or many Customer Premise Equipment (CPE) sets each with its associated transceiver and antenna. The system provides "Wireless" operators the ability to quickly deploy Broadband Access PicoCells in dense population areas. 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 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 all-outdoor BTS

The Base Transceiver Station (BTS) Modem is the wide area network interface to the wireless system. A single 10BaseT port is provided to interface the wide area network. The Base Station is an easily configurable data concentration unit. That provides a 10BaseT connection type for multiple applications such as Data, Voice, and Video. The BTS includes a power supply that operates at 100 to 240VAC, 50/60Hz.

## The indoor 19" rack mountable BTS

The indoor Base Station has the same functionality as the outdoor BTS, but has been tailored for the installation in standard 19" racks.

Insert Picture of Indoor BTS.

## The Transceiver Unit

The Transceiver unit functions as the RF interface for both the Base Station (BTS) and the CPE Modem endpoints. The Transceiver can be configured with various antenna gain combinations and models and is powered over the single connecting RF cable by either the CPE Modem or the BTS.

Chapter

2

# Base Station Installation

**1. Hardware Installation Steps**

## 1.1 Pre-Installation Requirements:

a. Base Station mounting location with suitable grounding connection

b. Reliable 110/220VAC source

c. Internet or other media connection interface

d. Suitable broadcast antenna

e. Basic hand tools

## 1.2 Component Inspection:

f. Carefully unpack the Base Station/Transceiver package and inspect the units for physical damage.

g. Verify that all the components are present against the shipping information and/or Purchase order.

Immediately contact PointRed Technonogies Support if any portion of the package is missing or damaged. Call +1-408-383-0153 or send an email to support@pointredtech.com

## 1.3 Mounting the Base Station:

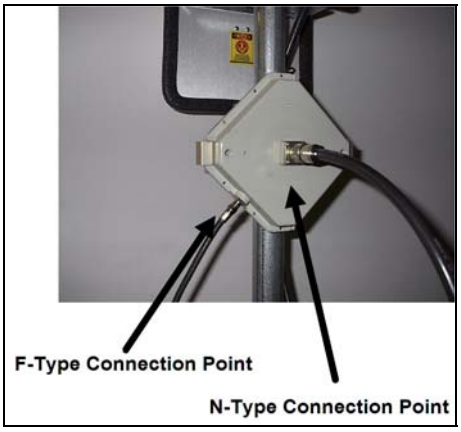
h. Vertically mount the Base Station using the supplied mounting hardware with the F-Type 75-Ohm connection downward.

i. Connect the building ground to the Base Station

j. Connect a 75-Ohm coaxial cable with F-connectors to the F-Type connection point of the Base Station. **Do not connect or disconnect any Base Station connections while the unit is powered!!!**

## Mounting the Base Station-Transceiver

k. Mount the Transceiver Unit with the F-Type connector downward using the supplied mounting hardware.




l. Mount the Base Station antenna to the mounting location above the Transceiver unit (follow instructions included in the antenna package) and connect the N-Type 50Ohm coax cable to the N-Type connection on the Transceiver. **CAUTION: DO NOT CONNECT** the other end of the coax cable to any device yet.

m. Once you have mounted the Tranceiver, Route the 75ohm coax cable to the Base Station. Then, connect the F-Type 75ohm cable to the Transceiver F-Type connection.

Chapter

3

# Connecting to the System

Pre-Configuration Requirements:

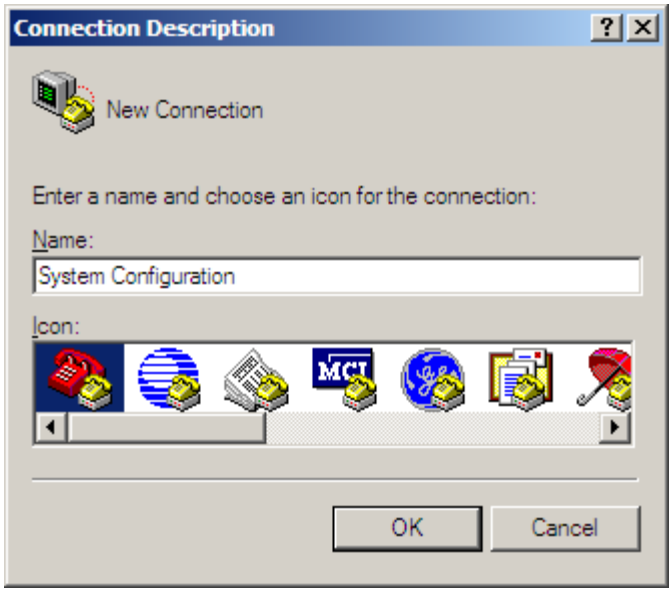
1. Installed BTS and CPE Modem
2. PC with Win 95/98/2000 or XP, 128megRam, Pentium II, with Serial Port
3. 9-pin RS-232 Serial Cable with Null Modem pin out
4. Ethernet 10baseT Crossover Cable
5. Test Server PC

Connecting to the Base Station console port

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

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

Cont.



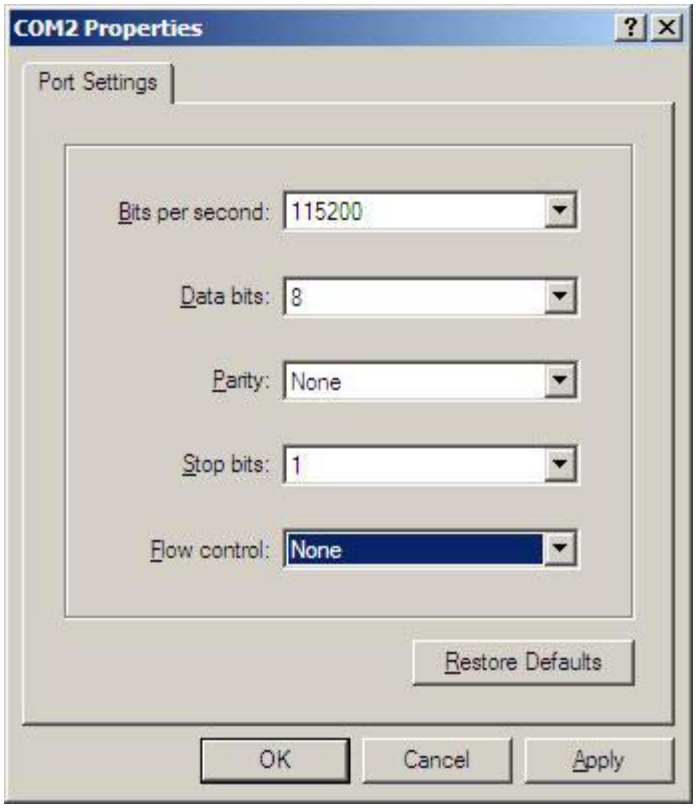

6. Click OK. You should see a dialog box named "Connect To". Select the proper COM port connected to the RS-232 Serial cable.

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

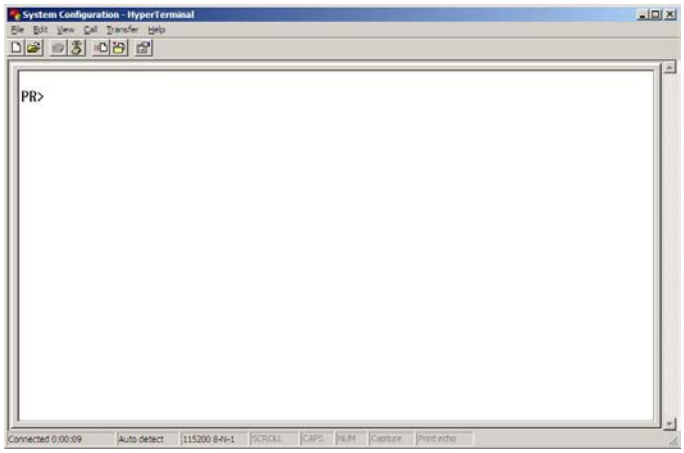
7. Click OK. You should see a dialog Box named "Com (your com port)"

Select the following settings: 115,200 Bits per second, 8 Data bits, None Parity, 1 Stop bit 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"




8. Click OK. You should now return to the hyper terminal window. Hit the "Enter" key, you should now see the Point Red Configuration Prompt. Here is an image of the Hyper Terminal Window:




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

Chapter

4

# Configuring the System

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

The system commands are:

## 1. "help" or "help info"

The "help" or "help info" commands introduce all available commands.

On the Base Station system:

*Command:*

```
PR> help<ENTER>
or
PR> help info<ENTER>
```

*Response:*

```
PointRed info commands:
     help      - Show this help menu
     version   - Display version information
     systime   - System time
     state     - show current station setup
     show      - show configuration information
     listcpe   - List CPEs in the system
     qinfo     - Queue information
     trstate   - Transceiver State
     enable    - Enable login to the system
     startloop - Start loop for qinfo command
Also try 'help [info|ping]
PR>
```

## 2. "version"

This command displays the firmware version installed in the CPE. This information might be requested if you contact customer support at PointRed.

*Command:*

```
PR> version<ENTER>
```

*Response:*

```
PointRed Technologies, Inc. PartNo: 13-0003, Version 5.10
Compiled: Tue Jul 1 19:26:47 2003
PR>
```

## 3. "systime"

The "systime" command shows the system time and CPU Load. To exit from the systime function you need to retype systime.

*Command:*

```
PR> systime<ENTER>
```

*Response:*

```
[1, 06:56:32] CpuLoad=69%
```

## 4. "state"

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

*Command:*

```
PR> state<ENTER>
```

*Response:*

```
Base Station
LAN IPAddress:  192.168.1.40  LAN Subnet Mask:255.255.255.0
WAN IPAddress:  192.0.0.1 WAN Subnet Mask:255.255.255.0
Default Gateway:192.168.1.30 MAC Address: 0.55.33.55.22.b2
Transceiver Application.
```

## 5. "show"

The "show" command opens up a menu with a variety of subcommands that allow the user to see but not modify the system settings.

*Command:*

```
PR> show<ENTER>
```

*Response:*

```
PointRed show commands:
  cpes         - Display CPEs in single line format
  config       - Display Running configuration
  slice        - Slice information
  status       - Print the CPE Status
  routes       - Route entry list
  qinfo        - Queue information
  ratelimit    - Rate limiting CPE info
  upload       - Show Code Upload Status
```

a. *Command:*

```
PR> show cpes<ENTER>
```

*Response:*

```
Number of CPE(s) : 5
[CPE 1]:        LanIP 10.0.0.1/24        WanIP: 192.0.0.2
[CPE 2]:        LanIP 10.0.1.1/24        WanIP: 192.0.0.3
[CPE 3]:        LanIP 10.1.10.1/24       WanIP: 192.0.0.10
[CPE 4]:        LanIP 10.1.11.1/24       WanIP: 192.0.0.11
[CPE 5]:        LanIP 10.2.11.1/24       WanIP: 192.0.0.12
PR>
```

b. *Command:*

```
PR> show config<ENTER>
```

*Response:*

```
Base Station
PointRed Technologies, Inc. PartNo: 13-0003, Version: 5.10
Compiled: Tue Jul 1 19:26:47 2003

Total number of CPEs in Database: 5
Number of line of sight CPEs     : 3
Number of Non-Line of Sight CPEs : 2
Number of Approchable CPEs       : 2
Number of Not-Approachable CPEs (not installed or powered off): 3

Lan IP Address  192.168.1.40/255.255.255.0
Default Gateway 192.168.1.30
Wan IP Address  192.0.0.1/255.255.255.0
Mac Address     0.55.33.55.22.b2

DNS Server(s)   0.0.0.0, 0.0.0.0, 0.0.0.0
DHCP Server(s)  0.0.0.0, 0.0.0.0

Board ID: 0xFFFFFFFE
Transceiver Application
Watchdog ON
4Mbps System
Scrambler OFF
NVRAM - Tc58FVB321FT
fCODE
Do not overwrite lan/mac rcvd from CPEs
Rate Limit Feature Enabled
```

c. *Command:*

```
PR> show slice<ENTER>
```

*Response:*

```
Base Station Time Slice: 7
CPE Time Slice         : 7
Base Timeout Index     : 3
WAIT Time Slice        : 0
Current Trace Value    : 0
Prints Not Blocked     : 0
```

d. *Command:*

```
PR> show status<ENTER>
```

*Response:*

```
CPE 192.0.0.2 : Date: Tue Jul 01 19:26:47 2003, Version: 5.10
CPE 192.0.0.3 : Date: Tue Jul 01 19:26:47 2003, Version: 5.10
CPE 192.0.0.10 : Inactive
CPE 192.0.0.11 : Inactive
CPE 192.0.0.12 : Inactive
```

e. *Command:*

```
PR> show routes<ENTER>
```

*Response:*

```
      .......IPaddr...        ...IPmask...    ...NextHop...
      [1]      10.0.0.1        255.255.255.0   192.0.0.2       STANDARD
      [2]      10.0.1.1        255.255.255.0   192.0.0.3       STANDARD
      [3]      10.1.10.1       255.255.255.0   192.0.0.10      STANDARD
      [4]      10.1.11.1       255.255.255.0   192.0.0.11      STANDARD
      [5]      10.2.11.1       255.255.255.0   192.0.0.12      STANDARD
      PR>
```

f. *Command:*

```
PR> show qinfo<ENTER>
```

*Response:*

```
[ LOS CPE 192.0.0.2  ] Crtl tx/rx [72638/72637] lost 0
[NLOS CPE 192.0.0.3  ] Crtl tx/rx [305  /305  ] lost 0
[ LOS CPE 192.0.0.10 ] Crtl tx/rx [96749/0    ] lost 96749
[ LOS CPE 192.0.0.11 ] Crtl tx/rx [11480/0    ] lost 11480
```

f. *Command:*

```
PR> show ratelimit<ENTER>
```

*Response:*

```
Rate Limit is not enabled in the System
```

g. *Command:*

```
PR> show upload<ENTER>
```

*Response:*

```
Upload Completed or not Started ..
```

## 6. "listcpe"

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

*Command:*

```
PR> 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
```

## 7. "qinfo"

The "qinfo" command lets the user view the activity on the system. This command shows the overall activity on the base station. To reset the counters type qinfo 0.

*Command:*

```
PR> qinfo<ENTER>
Response:
Max Bytes Sent: 0, Pkts sent: 0
[336280]  Total number of Free buffers avail: 100
Number of control pkts sent: 86636, rcvd: 78760, lost: 7876
Number of data pkts sent: 0, rcvd: 0
```

## 8. "trstate"

The "trstate" command lets the user view all the settings of the transceiver. Following the example of a 2.5GHz transceiver.

```
Command:
PR> trstate<ENTER>
Response:
2.5GHz Transceiver ON
Transceiver Setup: Power=182, Frequency=2593
```

## 9. "help ping"

The help ping command shows all the commands that can be used with the CPE internal ping utility.

```
Command:
PR> help ping<ENTER>
Response:
PointRed ping commands:
ping         - Ping [host] [#times]
endping      - terminate the current ping session
pstats       - display statistics about ping
delay        - set milliseconds to wait between pings
host         - set default active IP host
length       - set default ping packet length
```

## 10. "ping"

The PointRed ping utility is designed to verify connectivity within the system, do not use the ping command to measure latency to external equipment. The following is an example on how to use the ping command with it's associated sub commands.

```
Command:
PR> length 100<ENTER>  (Set's the length of the ping package to 100bytes)

PR> delay 800 <ENTER>  (Set's the delay between pings to 800ms)
set inter-ping delay to (approx) 800 ms.

PR> ping 10.0.0.1 25 <ENTER> (Set's the ping address and the number of times the
address is to be pinged, in this example the address will be pinged 25 times.)
```

Response:

```
Pinging 10.0.0.1 with 100 bytes of data:
 PR> Reply from 10.0.0.1: bytes=100 seq=0 time<2ms
  Reply from 10.0.0.1: bytes=100 seq=1 time<1ms
  Reply from 10.0.0.1: bytes=100 seq=2 time<1ms
```

```
 Reply from 10.0.0.1: bytes=100 seq=3 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=4 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=5 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=6 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=7 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=8 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=9 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=10 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=11 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=12 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=13 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=14 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=15 time<2ms
 Reply from 10.0.0.1: bytes=100 seq=16 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=17 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=18 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=19 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=20 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=21 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=22 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=23 time<1ms
 Reply from 10.0.0.1: bytes=100 seq=24 time<1ms
Ping statistics for 10.0.0.1
      Packets: Sent = 25, Received = 25, Lost = 0
```

## 11. "enable"

The "enable" command let's the administrator log on to the system to change settings and add or delete other users. Ones the administrator has logged on he can use the help command as described before and he will get a more comprehensive list of commands to choose from.

*Command:*

```
PR> Enable<enter>
```

*Response:*

```
Enter Passwd: *****
PR>
```

Chapter

5

# Advanced configuration for the system administrator

This Chapter describes all commands available to the system administrator to view 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 introduces all available commands. In this section we will only discuss the commands that are useful to the administrator and have not been available to the user.

*Command:*

```
PR> help<ENTER>
```

*Response:*

```
PointRed info commands:
help          - Show this help menu
  version       - Display version information
  systime       - System time
  state         - Show current station setup
  show          - Show configuration information
  listcpe       - List CPEs in the system
  qinfo         - Queue information
  trstate       - Trasceiver State
  enable        - Enable login to the system
  startloop     - Start loop for qinfo command
Also try 'help[info|network|config|upload|transceiver|ping|voice|debug]'
```

## 2. "help network"

The "help network" command provides the administrator with all subcommands required for the network configuration.

*Command:*

```
PR> help network<ENTER>
```

*Response:*

```
PointRed network commands:
  lanip         - Set LAN IP Address
  gateway       - Set Default LAN Gateway IP Address
  wanip         - Set PWAN IP Address
  dns           - Set DNS Server IP Addresses
  dhcp          - Set DHCP Server IP Address for Relay
  nslookup      - do DNS gethostbyname()
  route         - CPE Routing information table
```

```
   portrule     - Set/See Hi priority Port numbers
```

a. *Command:*

```
PR> lanip 10.0.0.1
```

*Response:*

```
New Configuration:

CPE Station
LAN IP Address : 10.0.0.1 / 255.255.255.0
WAN IP Address : 192.0.0.2 / 255.255.255.0
Default Gateway: 192.168.0.1
MAC Address: 0.c0.11.11.1f.c0
Transceiver Application.
```

b. *Command:*

```
PR> gateway 10.0.1.216 Set's default gateway for Base Station.
```

*Response:*

```
New Configuration:

CPE Station
LAN IP Address : 10.0.0.215 / 255.255.255.0
WAN IP Address : 192.0.0.2 / 255.255.255.0
Default Gateway: 10.0.1.216
MAC Address: 0.c0.11.11.1f.c0
Transceiver Application.
```

c. *Command:*

```
PR> wanip 192.0.0.3
```

*Response:*

```
New Configuration:

CPE Station
LAN IP Address : 10.0.1.215 / 255.255.255.0
WAN IP Address : 192.0.0.3 / 255.255.255.0
Default Gateway: 10.0.1.216
MAC Address: 0.c0.11.11.1f.c0
Transceiver Application.
```

d. *Command:*

```
PR> dns
Usage: dns <pri-ip> <sec-ip> <thrd-ip>
DNS Server(s) 0.0.0.0 0.0.0.0 0.0.0.0
PR> dns 216.38.126.2 216.38.126.3 0.0.0.0
```

Used to set the DNS Server addresses.

e. *Command:*

```
PR> dhcp
Usage: dhcp-server <pri-ip> <sec-ip>
Dhcp-server Server(s): 0.0.0.0 0.0.0.0
```

This command is used to forward DHCP requests from PC's behind the CPEs to the appropriate DHCP `server` in the network.

f. *Command:*

```
PR> route
Usage: route [add/delete/print]
```

```
route print
route add 192.168.201.1 255.255.255.0 192.0.0.100
route delete 192.168.201.1 255.255.255.0 192.0.0.100

PR> route print
. . .Ipaddr. . .     . .Ipmask. .      . .NextHop. .     . .Route Type. .
[1]   10.0.1.215        255.255.255.0     192.0.0.130       STANDARD
[2]   10.0.2.1          255.255.255.0     192.0.0.4         STANDARD
[3]   10.0.4.1          255.255.255.0     192.0.0.5         STANDARD
[4]   10.0.5.1          255.255.255.0     192.0.0.6         STANDARD
[5]   10.0.7.1          255.255.255.0     192.0.0.8         STANDARD
```

g. *Command:*

```
PR> port rule
Port Filter: NoFlags[-a:-b:-c] specified..
Current Voice Port Filter Rules:
      [1] ==> tcp src 6800 dst 6900
      [2] ==> udp dst 9000
      [3] ==> udp dst 4998

Other Filter Rules:
      [1] ==> tcp src 690 dst 6800
      [2] ==> -v udp src 10000
      [3] ==> udp src 4998
```

This command is used to set VoIP priority rules.

## 3. "help config"

The "help config" command provides the administrator with all subcommands required for the configuration of the Base Station.

*Command:*

```
PR> help config<ENTER>
```

*Response:*

```
PointRed config commands:
   addcpe       - Add CPE to the system
   delcpe       - Remove CPE from the system
   findcpe      - Find the CPE in the Cell
   cperoute     - Fixed routing entry for the CPE
   pollratio    - Show/Set the poll ratio
   commit       - Save configuration to the FLASH
   ratelimit    - Show/Set Rate limit for specific CPE
   prset        - Set Parameters
   sync         - Synchronize non-volatile parameters
   nvset        - Set non-volatile parameters
   nvedit       - Edit non-volatile parameters
   useradd      - Show/Set/Delete users in the system
   passwd       - Change Password
   reset        - Reset System
```

a. *Command:*

```
PR> addcpe 00:45:72:11:6c:1f 10.0.15.1 255.255.255.0 192.0.0.15
... CPE added to the list successfully ...
```

Command used to add new CPEs into the Base Station data base.

b. *Command:*

```
PR> delcpe 192.0.0.15
Entry successfully deleted ....
```

Command used to remove CPEs from the Base Station data base.

c. *Command:*

```
PR> findcpe
```

Command not in use any longer, see list command instead.

```
Please use the command ==> list <Wan IP Address of CPE>
```

d. *Command:*

```
PR> cperoute   [-ad] <cpe WAN-IP><router WAN-IP><router Wan-IP2> ..
To add fixed router for cpe use     : cperoute –a
To delete fixed router for CPE use  : cperoute –d
PR> cperoute –a 192.0.0.15 192.0.0.5 192.0.0.6

Link established Successfully for NLOS CPE 192.0.0.15
NLOS traffic routed thru CPE(s): 192.0.0.5 192.0.0.6

PR> cperoute –d 192.0.0.15 192.0.0.5 192.0.0.6
IP Address: 192.0.0.15
IP Address: 192.0.0.5
IP Address: 192.0.0.6

Fixed router delete for CPE: 192.0.0.15, CPE setup for LOS
```

Command used on Base Station to add and delete routes to Non Line of Sight CPE.

e. *Command:*

```
PR> pollratio
Current ratio: <100:10:1>
   Usage:   pollratio #active:#slow:#inactive
   Ex:      pollratio 100:10:1
   For every #active cpe's, #slow and #inactive cpes are visited
```

Command used to balance the priority between active, slow and inactive CPEs.

f. *Command:*

```
PR> commit <ENTER>
```

*Response:*

```
PR>
```

Commits changes to non volatile memory.

g. *Command:*

```
PR> ratelimit
Usage: ratelimit <WAN IP address> <Uplink in Kbps> <Downlink in Kbps>
  Ex:  ratelimit 192.0.0.3 512 256
Current Rate Limit Values for CPE(s):
      CPE[192.0.0.130]: Uplink 128Kbps, Downlink 128 Kbps
      CPE[192.0.0.4]: Uplink 128Kbps, Downlink 128 Kbps
      CPE[192.0.0.5]: Uplink 128Kbps, Downlink 128 Kbps
      CPE[192.0.0.6]: Uplink 128Kbps, Downlink 128 Kbps
      CPE[192.0.0.8]: Uplink 128Kbps, Downlink 128 Kbps
      CPE[192.0.0.15]: Uplink 128Kbps, Downlink 128 Kbps
PR> ratelimit 192.0.0.15 128 384
```

```
Changing Bandwidth parameters..
      Old values: Uplink 128 Kbps, Downlink 128 Kbps
      New Values: Uplink 128 Kbps, Downlink 384 Kbps
```

Command used to set the up and downstream rate limits for each CPE in the Base Station.

h. *Command:*

```
PR> prset
PointRed set commands:
      Autoaddr          -Set/Unset Auto Addressing
      noupload          -Unset Code Upload
      4mbps             -Set WAN link speed to 4Mbps
      8mbps             -Set WAN link speed to 8Mbps
      scrambler         -Set/Unset Scrambler
      ratelimit         -Set Rate Limiting Feature
      noratelimit       -Remove Rate Limiting Feature
      authenticatecpe   -Set/Unset CPE Authentication
```

Changes the startup configuration. The 4/8mbps and noupload commands are used at the time of manufacturing only. They are used to configure the software to work with the hardware it has been installed on. It is recommended to use the ratelimiting feature right from the first installation to ensure a consistent end customer experience.

i. *Command:*

```
PR> sync
Sync started: sending configuration to CPEs.
```

Command used to synchronize the information of the Base Station data base with the CPEs.

j. *Command:*

```
PR> nvset
```

Please use the "commit" Command. It will commit all changes to the non-volatile memory.

k. *Command:*

```
PR> nvedit -p
SNMP Get Community: foo
SNMP Sey Community: public
SNMP sysContact: Pointred Yechnologies, Inc, +1 408 383 0153
SNMP sysName: Base station
SNMP sysLocation: sysLocation not set
SNMP Trap target1: 0.0.0.0
SNMP Trap Community1:
```

To change any of the SNMP values that have been listed using the "`nvedit -p`" command. The following command syntax has to be used:

```
PR> nvedit <name of variable>: <value>
```

Example: `PR> nvedit SNMP Set Community: pointred`

This will change the value of the SNMP Set Community from `public` to `pointred`. To verify that the change was successful use the "`nvedit -p`" command again.

l. *Command:*

```
PR> useradd
Usage: user [-a¦-d] <username> [<passwd>]
Existing users:
      1. admin
      2. root
      3. user
```

The Network Administrator should use the useradd command. It allows the Network Administrator to set up a separate user name for each installer. The installer will only have view rights and cannot change the system settings. Should the installer leave the company, the Network Administrator can easily remove the username and password to ensure system security.

```
Example:
PR> useradd –a Stefan Stefan
 User added Successfully
PR> useradd –d Stefan
 User Deleted Successfully ..
```

m. *Command:*

```
PR> passwd
      Usage: passwd <username>
PR> passwd Stefan
Enter Passwd: ******
Enter New Passwd: *******
Re-Enter New Passwd: *******
Password Changed Successfully
```

The Network Administrator can set and reset the password for all users.

n. *Command:*

```
PR> reset <ENTER>
```

*Response:*

`Executing "go 0xBFC00000" Command...` Resets the Base Station.

## 4. "help upload"

## 5. "help tranceiver"

The "help transceiver" command provides the administrator with all subcommands required for the configuration of the transceiver.

*Command:*

```
PR> help transceiver<ENTER>
```

*Response:*

```
PointRed transceiver commands:
 trnscvr  -Set Transceiver/Set Cable mode
 trpwr    -Change Tx power level use
 trfrq    -Change frequency
```

```
  trmode   -Chose frequency mode in GHz (2.4, 2.5, 2.7, etc...)
```

a. *Command:*

`PR> trnscvr` Toggles the Base Station configuration between the wireless and cable application.

*Response:*

```
Transceiver Application or Cable Application
```

b. *Command:*

`PR> trpwr 102` Any integer between 0 and 202; with 202 representing maximum transmit power

*Response:*

```
Transceiver Power Changed: Old=202, New=102
```

c. *Command:*

`PR> trfrq 2551.00` Check the transceiver you have installed for the appropriate frequency range before you change the frequency as described here.

*Response:*

```
Transceiver Frequency Changed: Old=2593, New=2551
```

d. *Command:*

```
PR> trmode
```

*Response:*

```
Usage: trmode <parameter>
Current trmode is: 1
 Use trmode 0 for "2.4GHz"
 Use trmode 1 for "2.5GHz"
 Use trmode 2 for "2.7GHz"
 Use trmode 3 for "2.7GHz-Wide"
 Use trmode 5 for "2.2GHz"
 Use trmode 6 for "2.0GHz"
```

Verify that the displayed trmode corresponds to the label on the transceiver unit.

## 6. "help debug" 8/22/03

The "help debug" command provides the administrator with all subcommands required for the debugging of the CPE.

*Command:*

```
PR> help debug <ENTER>
```

*Response:*

```
PointRed debug commands:
  trace        - Enables trace level functionality
  memps        - ThreadX Byte pool info
  prvload      - load file to the file system
  jump         - Jump to specified location
  txtest       - Tx link test
  loopcmd      - Execute Commands in loop
  z            - Block/Unblock trace printouts
  getinfo      - Get information about CPE(s)
```

a. *Command:*

```
PR> trace          Enables the Trace function.
```

b. *Command:*

```
PR> memps          Runs a system memory check utility.
```

c. *Command:*

```
PR> prvload        Load file to file system.
```

d. *Command:*

```
PR> jump           Runs program from specified location.
```

e. *Command:*

```
PR> txtest 100 AA 192.0.0.3    Test the transmitter of the CPE.
```

*Response:*

```
Send packets test[192.0.0.3]: Msgs=100 Delay=8 Len=100 Data=0x0A
Tx Quality: 100.00%, Packets recv/sent: 100/100
```

f. *Command:*

```
PR> loopcmd txtest 100 AA 192.0.0.3
```

Endless loop of the CPE transmitter test, can also be used with other commands. Has to be stopped by hitting the esc key.

*Response:*

```
Send packets test[192.0.0.1]: Msgs=100 Delay=8 Len=100 Data=0x0A
Tx Quality: 100.00%, Packets recv/sent: 100/100
Tx Quality: 100.00%, Packets recv/sent: 100/100
Tx Quality: 100.00%, Packets recv/sent: 100/100
PR>
```

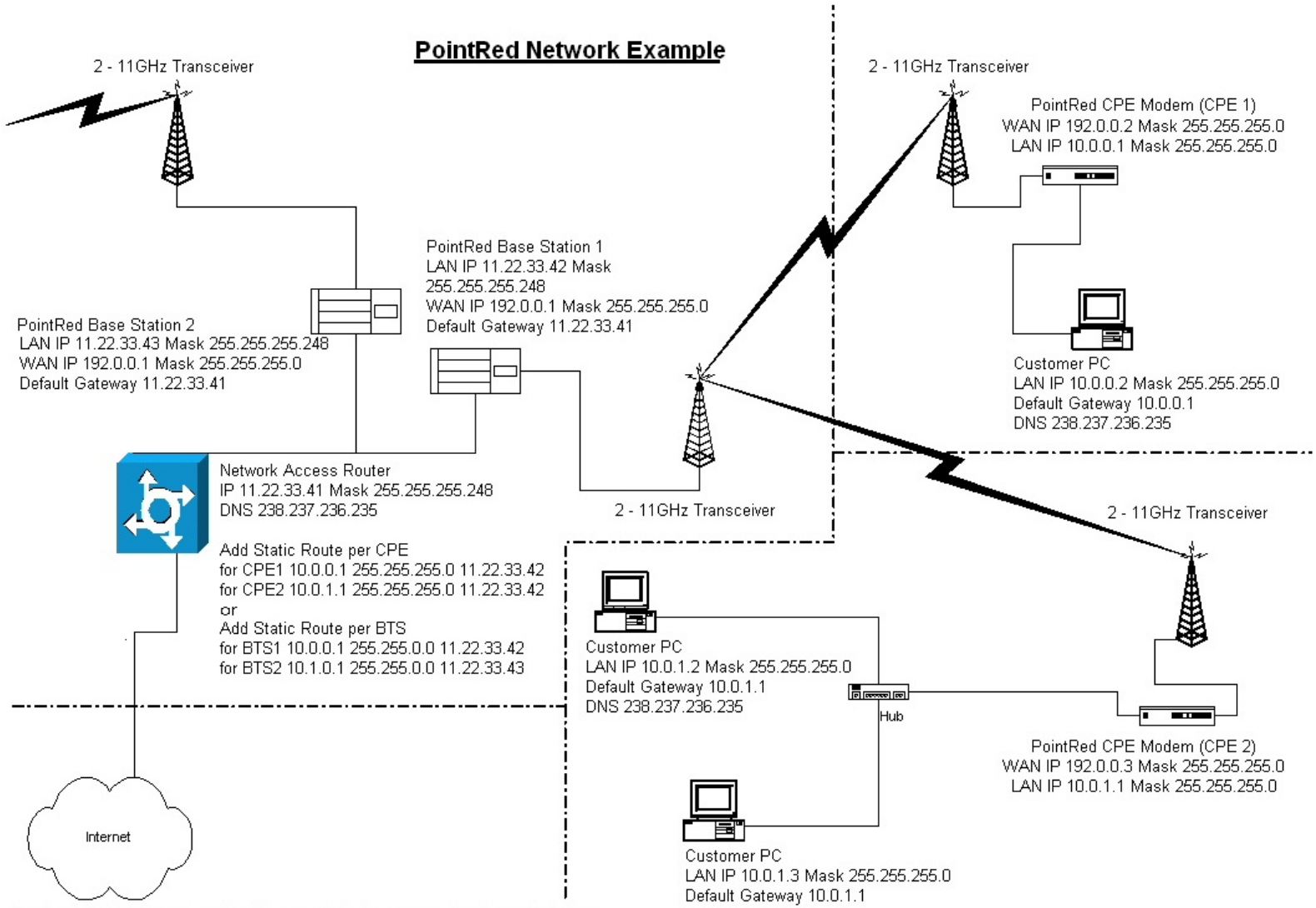
g. *Command:*

```
PR> z              Runs a system memory check utility.
```

h. *Command:*

```
PR> getinfo        Command only used on BTS.
```

# Appendix A Deployment Example




Caution: Default Gateway and LanIP must be in the same subnet for each device.
Caution: Subnets on different CPE's are not aloud to overlap!
Caution: Only the 10.X.X.X and 192.X.X.X IP addresses are public, all other IP addresses used in this example are privat addresses and have to be exchanged against addresses on your network.

# Example Configuration

The following example will explain how to configure CPE2 from the Network diagram on the previous page. This will include the use of the qinfo command for the alignment of the antennas.

1. Complete physical installation as described in Chapter 2.

2. Connect with your PC to the CPE as described in Chapter 3.

3. Verify the default configuration:

```
PR> show config<ENTER>

CPE Station
PointRed Technologies, Inc. PartNo: 13-0020, Version: 3.0
Compiled: Thu Jan 23 19:25:32 2003
Lan IP Address  10.0.0.1/255.255.255.0
Default Gateway 0.0.0.0
Wan IP Address  192.0.0.2/255.255.255.0
Mac Address     0.c0.11.1a.39.c0
DNS Server(s)   0.0.0.0, 0.0.0.0, 0.0.0.0
DHCP Server(s)  0.0.0.0, 0.0.0.0
Board ID: 0xc0111A39
Transceiver Application
Watchdog ON
4Mbps System
Scrambler OFF
CPE receiving Non-Rate limit messages
```

4. Set the LANIP address:

```
PR> enable<ENTER>
Enter Passwd: *****<ENTER>
PR> lanip 10.0.1.1 255.255.255.0<ENTER>
New Configuration:

CPE Station
LAN IP Address : 10.0.1.1  LAN Subnet Mask: 255.255.255.0
WAN IP Address : 192.0.0.2 WAN Subnet Mask: 255.255.255.0
Default Gateway: 0.0.0.0 MAC Address: 0.c0.11.1a.39.c0
Transceiver Application.
```

5. Set the WANIP address:

```
PR> wanip 192.0.0.3 255.255.255.0
New Configuration:

CPE Station
LAN IP Address : 10.0.1.1  LAN Subnet Mask: 255.255.255.0
WAN IP Address : 192.0.0.3 WAN Subnet Mask: 255.255.255.0
Default Gateway: 0.0.0.0 MAC Address: 0.c0.11.1a.39.c0
Transceiver Application.
```

6. Set the transceiver parameters:

```
PR> enable<ENTER>
Enter Passwd: *****<ENTER>
PR> trstate
2.5GHz Transceiver ON
Transceiver Setup: Power=0, Frequency=380
PR> trpwr 202<ENTER>
Transceiver Power Changed: Old=0, New=202
PR> trfrq 2551.0<ENTER>
Transceiver Frequency Changed: Old=380, New=2551
PR> 2.5GHz Transceiver ON, Frequency=2551, Power=202
PR> commit<ENTER>
PR> reset<ENTER>
Executing "go 0xBFC80000" Command...
```

7. Aligning the antenna using the qinfo and qinfo 0 command:

```
PR> qinfo<ENTER>
  Max Bytes Sent: 143, Pkts sent: 1
[351546]  Total number of Free buffers avail: 100
  Number of control pkts sent: 583497, rcvd: 371304
  Number of data pkts sent: 19, rcvd: 7
PR> qinfo 0<ENTER>
  Max Bytes Sent: 143, Pkts sent: 1
[420342]  Total number of Free buffers avail: 100
  Number of control pkts sent: 715786, rcvd: 423947
  Number of data pkts sent: 23, rcvd: 7
PR> qinfo<ENTER>
  Max Bytes Sent: 0, Pkts sent: 0
[429255]  Total number of Free buffers avail: 100
  Number of control pkts sent: 17138, rcvd: 15437
  Number of data pkts sent: 0, rcvd: 0
PR> qinfo<ENTER>
  Max Bytes Sent: 0, Pkts sent: 0
[436523]  Total number of Free buffers avail: 100
  Number of control pkts sent: 31125, rcvd: 27647
  Number of data pkts sent: 0, rcvd: 0
PR> qinfo
  Max Bytes Sent: 76, Pkts sent: 1
[444953]  Total number of Free buffers avail: 100
  Number of control pkts sent: 47325, rcvd: 42231
  Number of data pkts sent: 4, rcvd: 0
PR> qinfo 0<ENTER>
  Max Bytes Sent: 76, Pkts sent: 1
[463499]  Total number of Free buffers avail: 100
  Number of control pkts sent: 82909, rcvd: 76815
  Number of data pkts sent: 4, rcvd: 0
```

```
PR> qinfo<ENTER>
  Max Bytes Sent: 0, Pkts sent: 0
[470729]  Total number of Free buffers avail: 100
  Number of control pkts sent: 13898, rcvd: 13898
  Number of data pkts sent: 0, rcvd: 0
PR> qinfo<ENTER>
  Max Bytes Sent: 0, Pkts sent: 0
[475837]  Total number of Free buffers avail: 100
  Number of control pkts sent: 23718, rcvd: 23718
  Number of data pkts sent: 0, rcvd: 0
```

The way to work with the qinfo and qinfo 0 command is to first configure the unit completely then resetting the internal packet counters to zero by issuing the qinfo 0 command. Following the reset you pan the antenna and issue the qinfo command from time to time and compare the number of control packets sent and received. When the numbers become to hard to compare for a quality improvement reset the counters again with the qinfo 0 command. Repeat this process until you have aligned the antenna in the direction where the packet loss is 0.