Operation of the Web GUI

The BSU and SU Web GUI pages share the basic elements identified in *Figure 3-2*.

Main Menu and Submenu

The Main Menu lists the various categories of functions available via the Web GUI. To select an item from the Main Menu, click on it. Orange crescents will bracket the menu item to show that it has been selected.

The Submenu is context-sensitivity, changing as different Main Menu items are selected. The Submenu lists the pages available under the selected Main Menu category. Click on the appropriately-labeled box in the Submenu to display the desired page.

Submitting and Uploading Changes

Pages on which configuration changes can be entered include a **Submit** button at the bottom. Any change entered on the page does not take effect until the **Submit** button is clicked. Clicking **Submit** affects only the current operation of the BSU or SU. The corresponding configuration file located on the BSU's permanent memory is not altered; therefore, the configuration change will be lost if the BSU or SU is reset or re-powered.

To update the BSU or SU permanent memory with changes made via the Web GUI, use the **Upload Configuration** button on the BSU or SU Device Control Utility page. Clicking the **Upload Configuration** button will cause all configuration changes currently in effect to be written into the permanent memory.

Cancel and Refresh Buttons

Some pages include **Cancel** and/or **Refresh** buttons at the bottom. These buttons have the following functions:

- Clicking on the **Cancel** button cancels any changes made on the page; altered fields will return to their original contents.
- Clicking on the **Refresh** button refreshes the window with the most up-to-date information.

Hyperlinks

Some Web GUI pages include hyperlinks to related pages. Hyperlinks are indicated in the method defined in your browser configuration. In some cases, hyperlinks are implemented using buttons similar to the **Submit** button.

The Web GUI Home Page

When you log on using the BSU's IP address, you will be at the Home Page of the Base Station Unit's Web GUI as shown on *Figure 3-3*.

The Web GUI will log off after 15 minutes of inactivity. Activity can be either user input or automatic status updates performed by the Web GUI (as in the connectivity views described below). To keep the Web GUI from logging off when you will not be using it for more than 15 minutes, go to a page on which status is automatically updated.

BSU/SU Connectivity

From the BSU Home Page, you can access graphical connectivity view of the BSU and SU connection. Hyperlinks allow you to navigate through the connectivity view.

The connectivity view provides a quick way to identify the configured BSU/SU, and to check their status. The arrows pointing to the Subscriber Unit in *Figure 3-3* indicate wireless channel status: green if good or red the Subscriber Unit is down.

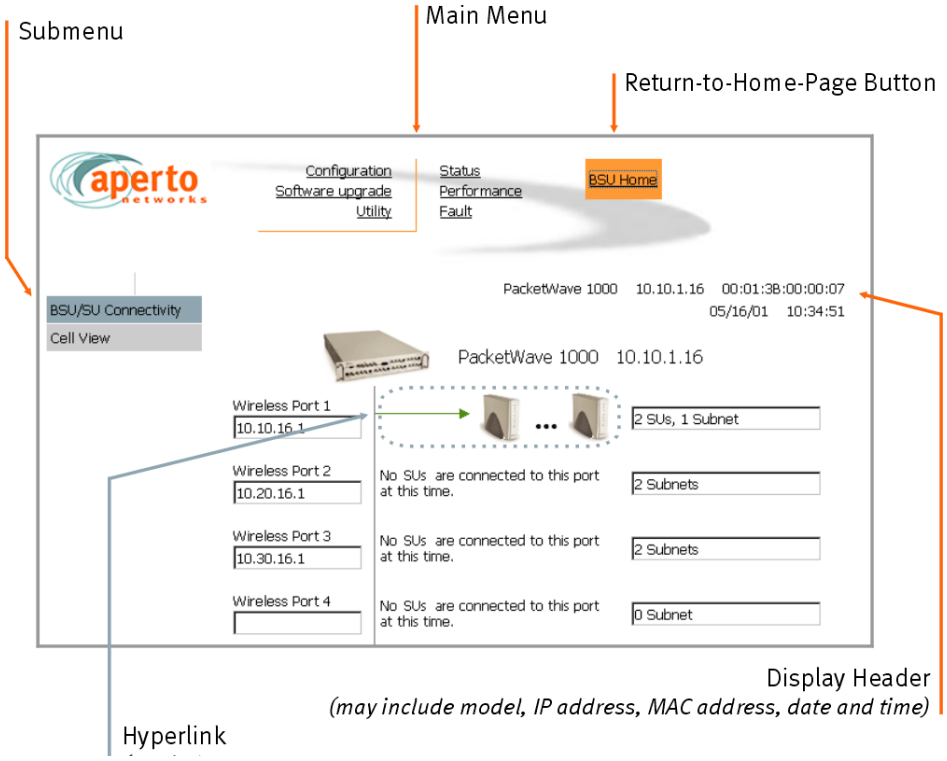

Figure 3-2 Basic Elements in BSU and SU Web GUI

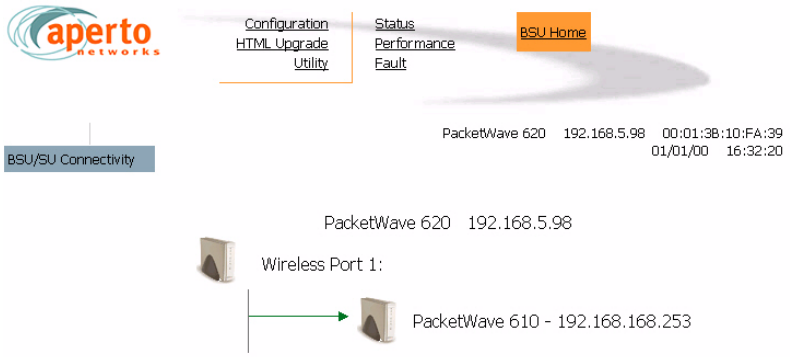

Figure 3-3 BSU Home: BSU/SU Connectivity

Overview of BSU Web GUI Functions

Table 3-A summarizes the functions available for each of the Main Menu and Submenu selection.

Table 3-A Summary of the BSU Web GUI

Main Menu	Submenu	Functions
Configuration	System	Shows general BSU information and status. *Read-only*.
	Administration	Specifies contact, location, and cell name.
	Password	Allows users to change password for access to Web GUI, SNMP, CLI, and FTP.
	SNMP	Configures SNMP management of BSU.
	Local Time	Sets local time, daylight savings parameters.
	IP Filter	Per Ethernet/WSS: List of all defined IP filters. Hyperlinks to contents of individual filters. *Read-only*.
	Wireless Interface	Per WSS: Configuration pages for Frame, Channel, Radio. *Read-only*.
HTML Upgrade	HTML Upgrade	Uploads new HTML pages for Web GUI.
Utility	Device Control	Several commands: Reset BSU; Turn WSS On/Off; Reset WSS; Configuration Upload; Search IP address by Customer Name.

Table 3-A Summary of the BSU Web GUI

Main Menu	Submenu	Functions
Status	BSU System Status	BSU software and hardware information, plus operational status. *Read-only*.
	SU Link Status	Per WSS: Gives upstream or downstream link status for all SUs with status. *Read-only*.
Performance	BSU System Statistics	One-hour, Transmit or Receive byte count graph. *Read-only*.
	Bandwidth Allocation	Shows Upstream and Downstream allocation.
	RF Signal Quality	Shows RF signal quality statistics.
	BSU Flow Statistics	Gives performance statistics for all defined service flows. Hyperlinks to specific flow details. *Read-only*.
	SU Statistics	Shows SU with transmit and receive byte counts. Hyperlinks to Subscriber Unit Web GUI. *Read-only*.
Fault	Event logs	List of logged BSU events. *Read-only*.
	E-mail	Configuration of e-mail alert reporting.

Configuration Pages

The Web GUI lets you check, and in some cases alter, the configuration of the Base Station Unit. Numerous BSU configuration pages may be displayed, as indicated by the submenu at the left of the page.

System Configuration

As shown in *Figure 3-4*, the System Configuration page identifies:

- Ethernet parameters
- Server settings
- Operating software and configuration files, and current boot status.

Figure 3-4 System Configuration Page (BSU in bridge mode)

Administration

As shown in *Figure 3-5*, the Administration Configuration page allows viewing and altering of text fields related to BSU and cell administration. These text fields can be used for whatever information system administrators deem useful. Click on the **Submit** button to activate any changes made on this page.

Password

The Password Configuration page, shown in *Figure 3-6*, allows you to change the password that is used to access the BSU's Web GUI, SNMP, CLI, and FTP. Enter the password exactly the same in the two fields (the password is case-sensitive). Then click the **Submit** button.

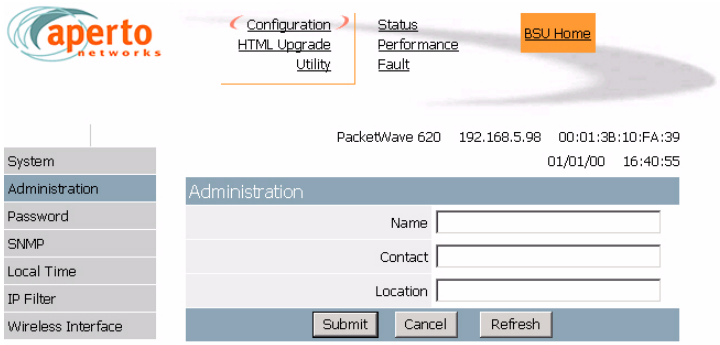

Figure 3-5 Administration Configuration Page

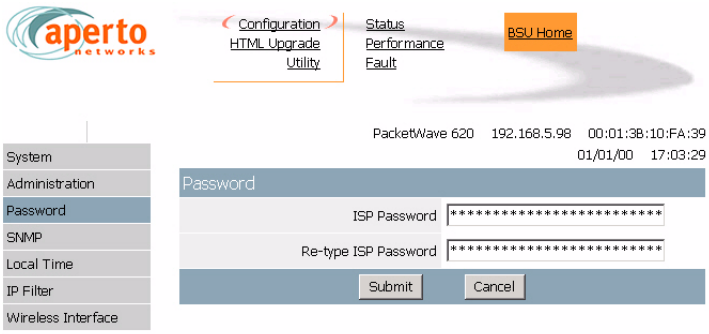

Figure 3-6 Password Configuration Page

SNMP

The SNMP Configuration page, shown in *Figure 3-7,* allows the viewing and altering of SNMP parameters:

- Whether traps will be generated by the BSU.
- What SNMP manager(s) will be recognized, and what level of access they will have.

Click the **Submit** button to activate any changes made on this page.

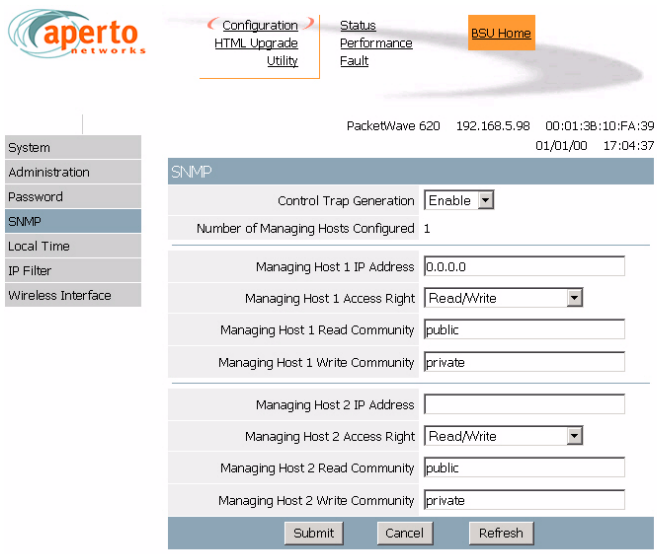

Figure 3-7 SNMP Configuration Page

Local Time

The Local Time Configuration page, shown in *Figure 3-8*, allows the specification of the local time zone and daylight savings time options. These adjustments will be applied to the time received from the Base Station Unit's SNTP server.

Alternatively, obtaining of system time from the SNTP server can be disabled, and the time entered on this page.

Click the **Submit** button to activate any changes made on this page.

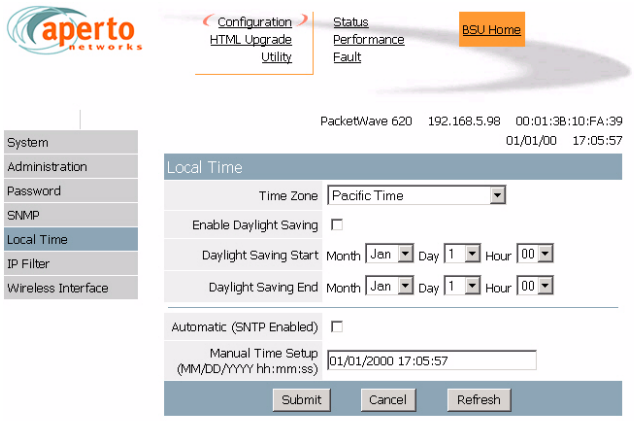

Figure 3-8 Time Configuration Page

IP Filters

IP Filter Configuration pages show any IP filters configured for the Base Station Unit's wireless and Ethernet interfaces. IP Filter List pages list all filters configured for a particular interface, as shown in *Figure 3-9*. Hyperlinks at the top of the page allow selection of the Ethernet interface or a particular wireless interface.

Each filter listed has an identifier number which also functions as a hyperlink to an IP Filter Contents page.

All IP Filter Configuration parameters are read-only.

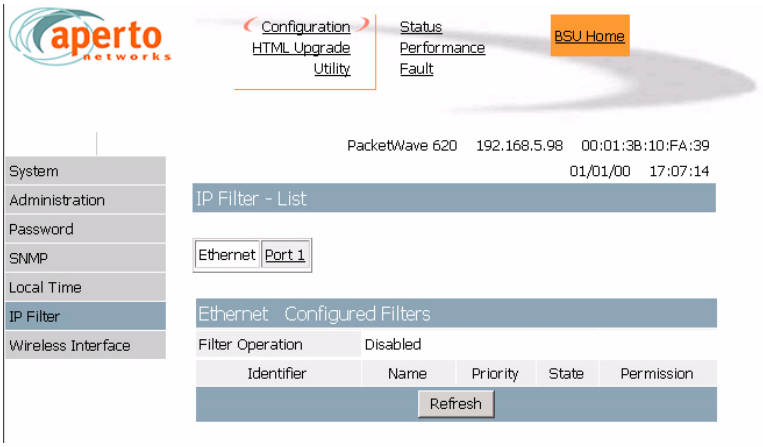

Figure 3-9 IP Filters List Page

Wireless Interfaces

Selecting **Wireless Interface** from the **Configuration** submenu brings up the Frame Configuration page, as illustrated in *Figure 3-10*. Hyperlinks provide access to configuration pages for three different wireless port parameters per wireless port:

- Wireless Interface Frame Configuration, as shown in *Figure 3-10*.
- Wireless Interface Channel Configuration, as shown in *Figure 3-11*.
- Wireless Interface Radio Configuration, as shown in *Figure 3-12*.

All Wireless Interface Configuration pages are read-only.

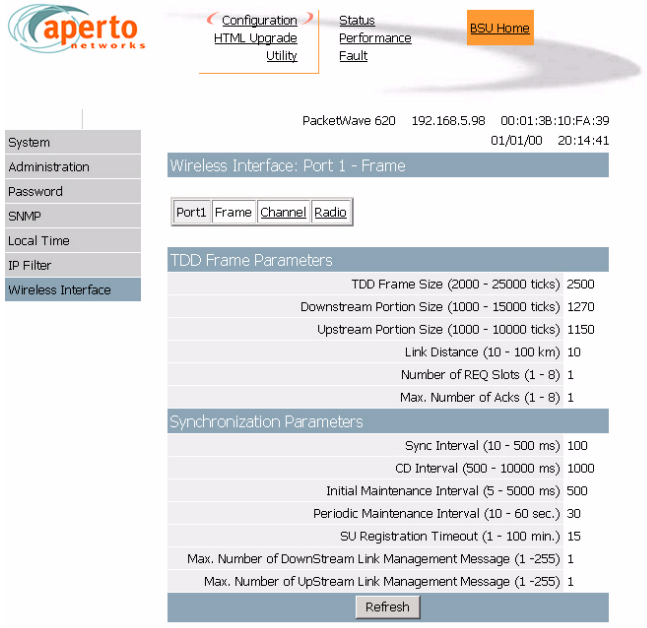

Figure 3-10 Wireless Interface Frame Configuration Page

Figure 3-11 Wireless Interface Channel Configuration Page

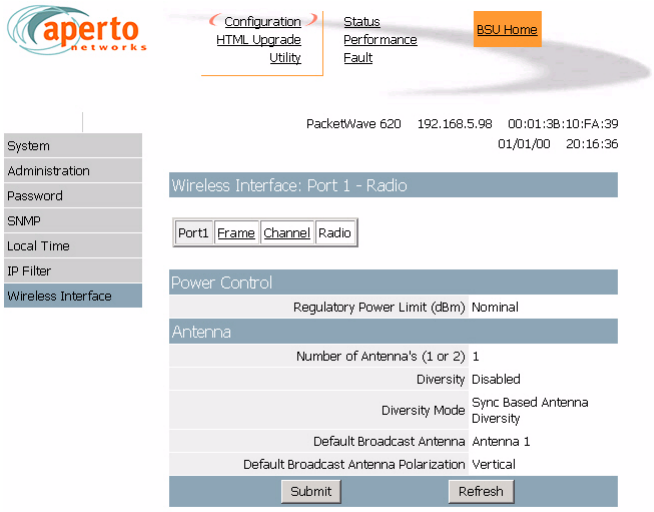

Figure 3-12 Wireless Interface Radio Configuration Page

HTML Upgrade

The HTML upgrade page illustrated in *Figure 3-13* lets you upgrade the Web GUI by writing new pages from files to the BSU. For example, you might have pages translated into a language other than English which you want to load in place of the English-language pages.

If you have an HTML page to upload, you can type in the file name or browse for it. When the file name is specified, click on the **Load** button to load the file into the Base Station Unit's Web GUI agent.

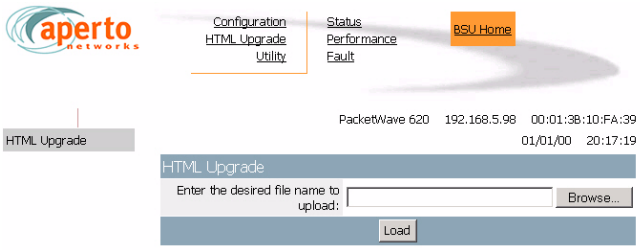

Figure 3-13 HTML Upgrade Page

Utilities

The **Utility** option on the Main Menu provides access to several commands for controlling base station equipment.

Device Control

The Device Control page, illustrated in *Figure 3-14*, allows an operator to:

- Reset the entire BSU.
- Turn a RF port on or off
- Upload configuration changes to the BSU's permanent memory.

The Web GUI will prompt for confirmation before performing any selected functions.

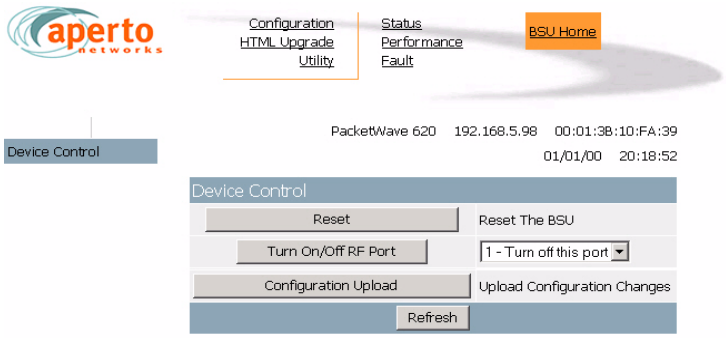

Figure 3-14 Device Control Page

Status Pages

The BSU Web GUI includes the status pages shown in *Figure 3-15 through Figure 3-17*. These provide a snapshot of the current status of the Base Station Unit and its connected Subscriber Unit.

> *NOTE:* The data base used to generate these pages is updated in real time. However, the pages do not update dynamically; you must click on the **Refresh** button to see later status.

No configuration or other operation can be initiated from these pages.

Figure 3-15 System Status Page

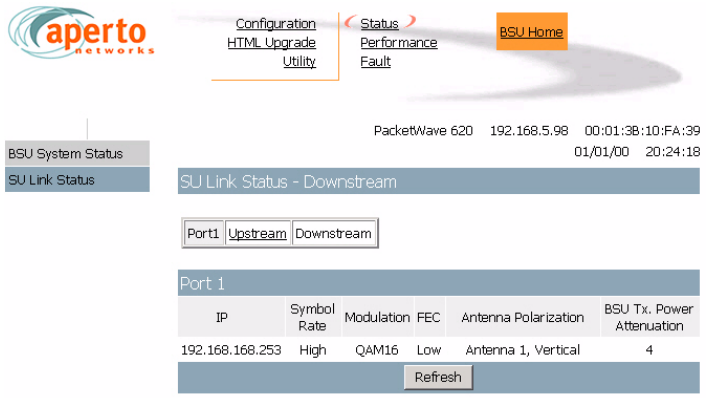

Figure 3-16 SU Link Downstream Page

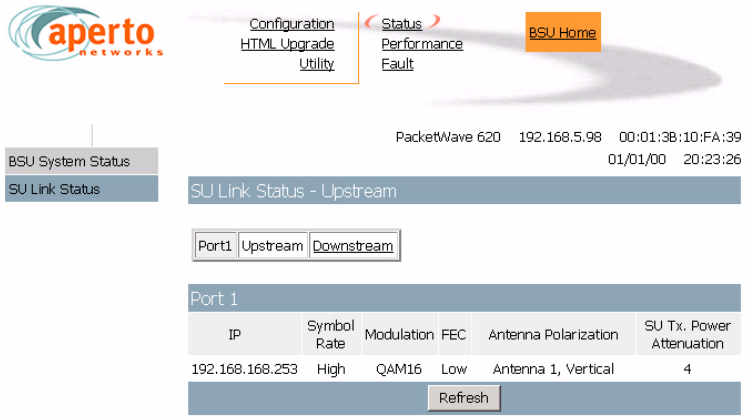

Figure 3-17 SU Link Upstream Status Page

Performance Pages

The BSU Web GUI provides wireless channel performance and bandwidth allocation information on the pages illustrated in *Figure 3-18* through *Figure 3-23*.

As shown in *Figure 3-18*, transmitted byte counts are presented graphically. In *Figure 3-19*, the page shows Best Effort, CIR, and CBR bandwidth allocation in text and graphics. Only Best Effort is supported for software version 1.0.

These data base used to generate these displays is updated in real time, and the pages are automatically updated every 30 seconds.

RF Modem Statistics such as burst error rate and FEC error counts are listed in *Figure 3-20*.

Flow statistics are listed in text format in *Figure 3-21*. By clicking on the flow id, a more detailed information for that flow will be displayed as shown in *Figure 3-22*.

In *Figure 3-23*, transmitted and received byte counts for all subscribers in all sectors (wireless ports) are listed in a text format.

NOTE: The data base used to generate this page is updated in real time. However, the pages do not update dynamically; you must click on the **Refresh** button to see later status.

Figure 3-18 BSU System Statistics Page (Transmit)

Figure 3-19 BSU WSS Bandwidth Allocation Page (Port 1 Upstream)

Figure 3-20 RF Signal Quality Page

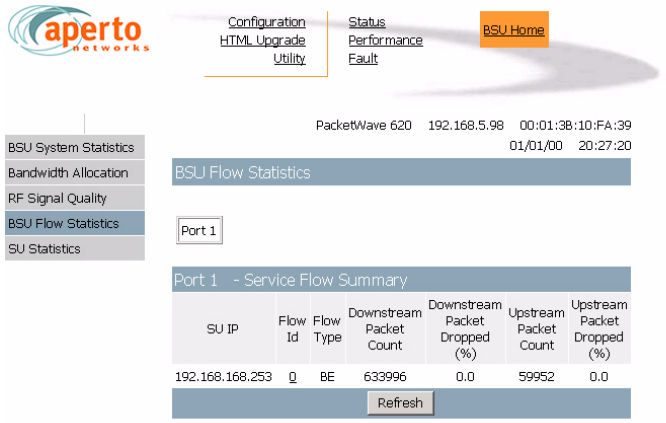

Figure 3-21 BSU Flow Statistics Page

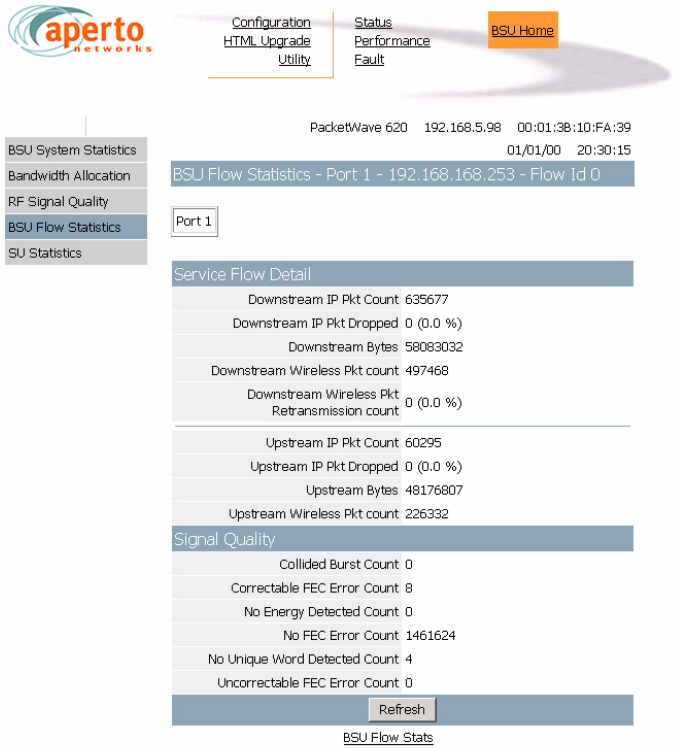

Figure 3-22 BSU Flow Statistics by Flow ID

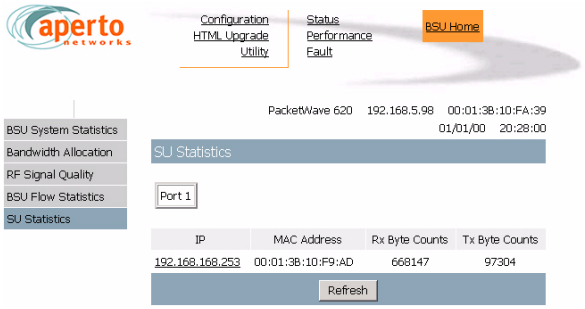

Figure 3-23 Subscriber Unit Statistics Page

Fault Reporting Pages

The BSU fault reporting functions include an event log and E-mail configuration, as shown in *Figure 3-24* and *Figure 3-25*.

Event Log

The event log page, shown in *Figure 3-24*, includes all logable events reported by the Base Station Unit and its connected Subscriber Units.

> *NOTE:* The data base used to generate the log is updated in real time. However, the pages do not update dynamically; you must click on the **Refresh** button to see later status.

You can empty the log by clicking on the **Clear All Events** button.

Figure 3-24 BSU Event Log Page

E-mail Configuration

As shown in *Figure 3-25*, the E-mail Configuration page allows the viewing and altering of E-mail event reporting parameters:

- The address of the SMTP server (may be configured here, or in the BSU configuration).
- The BSU's E-mail domain name.
- Reply-to and receiver E-mail addresses.
- A test E-mail may be sent.
- Event reporting via E-mail may be turned on and off as desired.

Click on the **Submit** button to activate any changes made on this page.

Figure 3-25 BSU E-mail Configuration Page

Subscriber Unit Web GUI

The PacketWave 610 Subscriber Unit includes a Java-based graphical user interface (GUI) which runs on a standard Web browser (Netscape 4.74 or Internet Explorer 5.0 recommended). Functions which can be performed using the Web GUI include:

- Viewing network connectivity.
- Monitoring status and performance.
- Reviewing configuration.
- Making basic configuration changes.
- Uploading configuration changes to permanent memory.
- Resetting Indoor Units.

ISP and Subscriber Logon Levels

The PacketWave SU Web GUI features different logon levels for ISPs and subscribers, each protected by a different user-set password. The Debug logon is reserved for Aperto Networks' use. The ISP logon level provides access to all areas of SU configuration, status reporting, performance monitoring, and operating commands. The Subscriber logon level is limited to:

- The site connectivity view of the SU home page.
- Subscriber password configuration.
- The configuration upload utility.
- System status.

Accessing the Web Interface

To access the Web GUI:

1. On a computer with IP access to the Indoor Unit (via either the LAN or wireless interface), open Netscape 4.74 or Internet Explorer 5.0.

   NOTE: Other browsers could show some anomalies.

Enter the URL, *http://<Indoor Unit IP address>/*. The logon page will appear, as shown in *Figure 4-1*.

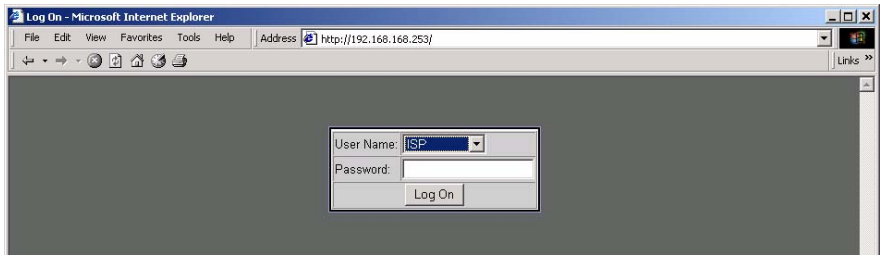

Figure 4-1 SU Web GUI Logon Screen

2. Select the **ISP** or **Subscriber** user name. **Debug** logon is reserved.
3. Enter the correct password (case-sensitive).

   NOTE: The default passwords are **isp** and **subscriber**. For security, these passwords should be changed via the Web GUI.

4. Click on the **Logon** button or press Enter key.
5. If the browser prompts that it needs to load a plug-in, allow it to do so.
6. Wait for the Web interface home page to open, as shown in *Figure 4-2* for isp logon. If you logon as subscriber, some of the screen items will not be shown.

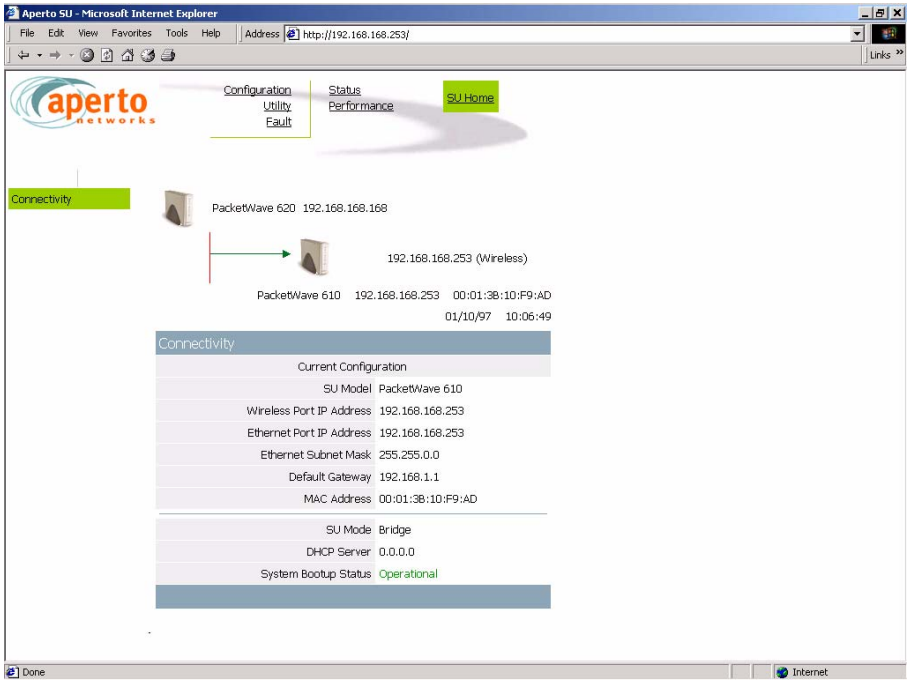

Figure 4-2 Web GUI Home Page (ISP logon)

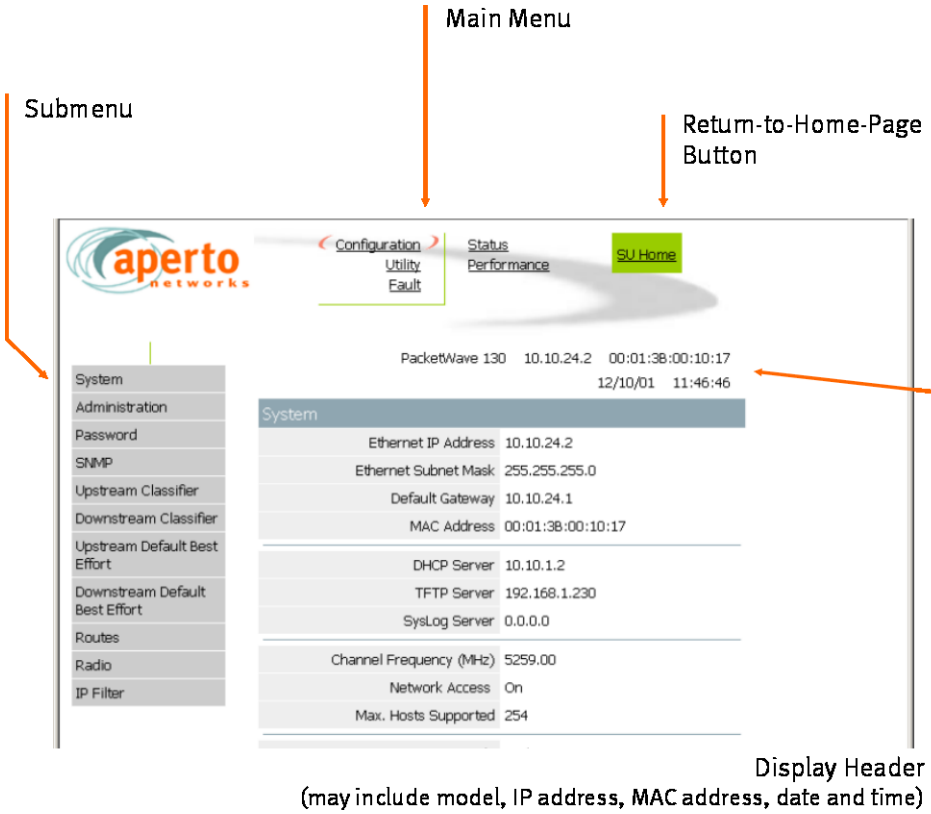

Figure 4-3 Basic Elements of Web GUI

Features of the Web Interface

The Web interface pages share the basic elements identified in *Figure 4-3*.

Home Page: Connectivity View

As shown in *Figure 4-2*, the home page provides a graphical representation of base station-to-subscriber connectivity. The arrow pointing to the Indoor Unit icon indicates wireless channel status: green if good or red if down. Additional configuration and status information related to basic SU connectivity is presented in a table below the graphics.

Status indications on the connectivity view are updated dynamically every 30 seconds.

Main Menu and Submenu

The Main Menu lists the various categories of functions available via the Web GUI. The ISP logon level provides the five Main Menu categories shown in *Figure 4-3*. For the Subscriber logon level, the Main Menu lists **Configuration, Utility,** and **Status** categories only. To select an item from the Main Menu, click on it. Orange crescents will bracket the menu item to show that it has been selected (see the **Configuration** item in *Figure 4-3*).

The Submenu is context-sensitive, changing as different Main Menu items are selected. The Submenu lists the pages available under the selected Main Menu category. Click on the appropriately-labeled box in the Submenu to display the desired page. *Figure 4-3* shows the page displayed when the **System** option is selected in the Submenu.

Submitting and Uploading Changes

Pages on which configuration changes can be entered include a **Submit** button at the bottom. Any change entered on the page does not take effect until the **Submit** button is clicked.

Clicking **Submit** affects only the current operating configuration of the SU. The SU's configuration file located on the TFTP server is not altered; therefore, the configuration change will be lost if the SU is reset or re-powered (after which the SU reverts to the configuration specified in its configuration file).

To update the SU's configuration file on the TFTP server with changes made via the Web GUI, use the **Configuration Upload** button on the Device Control Utility page. Clicking the **Configuration Upload** button will cause all configuration changes currently in effect to be written into the SU's permanent memory.

Cancel and Refresh Buttons

Some pages include **Cancel** and/or **Refresh** buttons at the bottom.

- Clicking on the **Cancel** button cancels any changes made on the page; altered fields will return to their original contents.
- Clicking on the **Refresh** button refreshes all fields with configuration parameters currently stored on the Subscriber Unit.

Hyperlinks

Some Web GUI pages include hyperlinks to related pages. For example, the Classifier Configuration pages includes hyperlinks to pages for corresponding Service Flows. Hyperlinks are indicated in the method defined in your browser configuration.

Overview of SU Web GUI Functions

Table 4-A summarizes the functions available for each of the Main Menu and Submenu selections.

Table 4-A Summary of the SU Web GUI

Main Menu	Submenu	Functions
Configuration	System	Shows general SU information and status. *Read-only*.
	Administration	Specifies contact, location, and system name.
	Password *	Specifies ISP or Subscriber password for Web GUI, CLI, and FTP.
	SNMP	Configures SNMP management of SU.
	Up/Downstream Default Best Effort	Shows configuration of upstream or downstream default best effort service flow (ID=0). *Read-only*.
	Radio	Shows allowed transmit power. *Read-only*.
	IP Filter	List of all defined IP filters for wireless or Ethernet port. Hyperlinks to contents of individual filters. *Read-only*.
Utility	Device Control *	Several commands: Reset SU; Upload Configuration. (At Subscriber level, only Upload Configuration is available.)
Fault	Event logs	List of logged SU events. *Read-only*.
	E-mail	Configuration of e-mail alert reporting.
Status	SU System Status *	SU software and hardware information, plus operational status. *Read-only*.
	SU Link Status	Transmit and receive details for wireless link. *Read-only*.
Performance	SU System Statistics	Basic Transmit and Receive counts. *Read-only*.
	SU Filter Statistics	Counts of packets passed and blocked for wireless or Ethernet port. *Read-only*.
	SU Flow Statistics	List of service flows supported by the SU; hyperlink to service flow details. *Read-only*.
* Available when logged on at Subscriber level.		

Configuration Pages

The Web GUI displays SU configuration in numerous individual pages, as indicated by the Configuration Submenu. In addition, many configuration parameters can be changed via the Configuration pages.

System Configuration

As shown in *Figure 4-4*, the system configuration page provides an overview of the Subscriber Unit's network and operating parameters. *These parameters are read-only.*

This page is available only at the ISP logon level.

Figure 4-4 System Configuration Page

Administration Configuration

The Administration Configuration page, shown in *Figure 4-5*, allows system name, location and contact information to be specified for the subscriber site. Any text entry is acceptable, subject to length limitations for each field.

This page is available only at the ISP logon level.

Figure 4-5 Administration Configuration Page

Password Configuration

Passwords for the ISP and Subscriber logon levels are specified on the Password Configuration page, shown in *Figure 4-6*. Passwords which can be defined depend on the current logon level; if logon is at the Subscriber level, only the Subscriber password fields will be displayed. The passwords are used for the Web GUI, CLI, and FTP.

The password must be entered exactly the same (including case) in the two password fields to be accepted. After specifying the desired password, click **Submit**. The Web GUI will prompt that password storage is temporary, and that the Upload Configuration function (*page 4-13*) is required for making the password permanent.

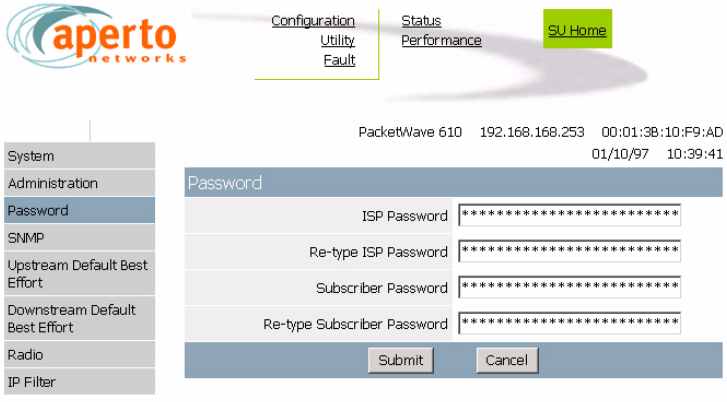

Figure 4-6 Password Configuration Page

SNMP Configuration

As shown in *Figure 4-7*, the SNMP configuration page allows the viewing and altering of SNMP parameters for one or two SNMP managers:

- Whether traps will be generated.
- What SNMP manager(s) will be recognized, what access rights they will have, and the read and write community names.

Click on the **Submit** button to activate any changes made on this page.

NOTE: This page does not support deletion of SNMP managers.

This page is available only at the ISP logon level.

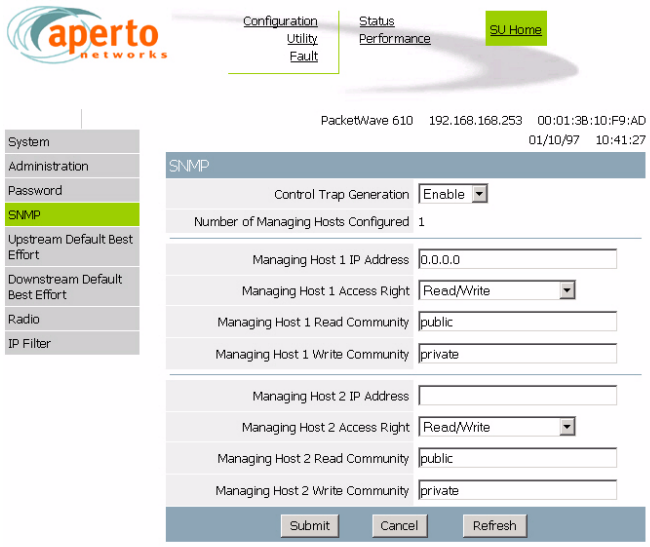

Figure 4-7 SNMP Configuration Page

Default Best Effort Configuration

All Subscriber Units have a default Best Effort service flow. Performance parameters of the default upstream and downstream service flows are configurable using the Advanced Installation Manager. Configuration pages for default Best Effort service flows are shown in *Figure 4-8* and *Figure 4-9*. All fields are read-only.

These pages are available only at the ISP logon level.

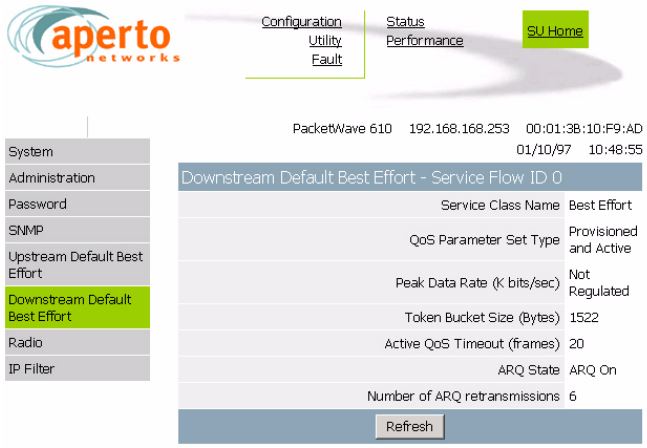

Figure 4-8 Downstream Default Best Effort Configuration Page

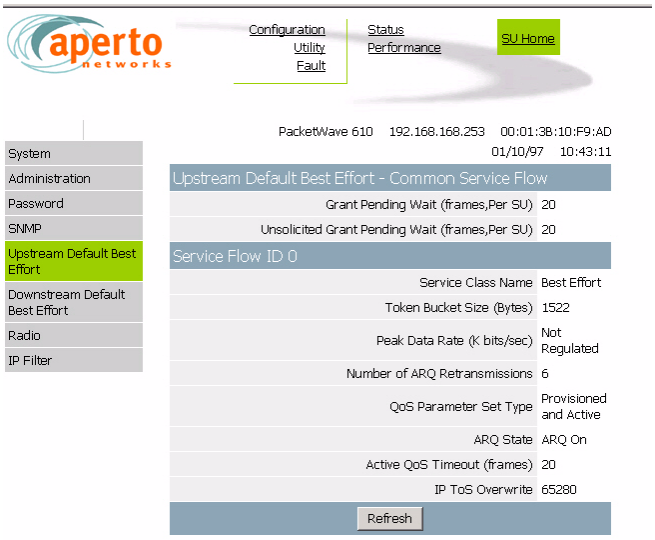

Figure 4-9 Upstream Default Best Effort Configuration Page

Radio Configuration

The Radio Configuration page, shown in *Figure 4-10*, shows the maximum transmit power allowed in the selected frequency band.

This page is available only at the ISP logon level.

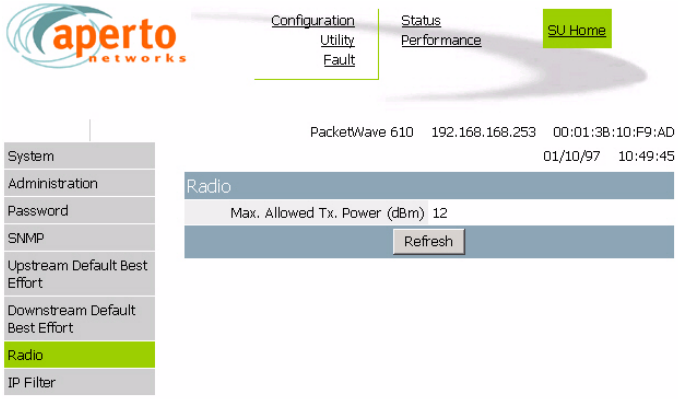

Figure 4-10 Radio Configuration Page

IP Filter Configuration

IP Filter Configuration pages show any IP filters configured for the Subscriber Unit's wireless and Ethernet interfaces. IP Filter List pages list all filters configured for a particular interface, as shown in *Figure 4-11*. Hyperlinks at the top of the page allow either the Ethernet or the wireless interface filters to be listed.

Each filter listed has an identifier number which also functions as a hyperlink to an IP Filter Contents page. The IP Filter Contents page identifies the Layer 2 or Layer 3 parameters used in this particular filter.

All IP Filter Configuration parameters are read-only.

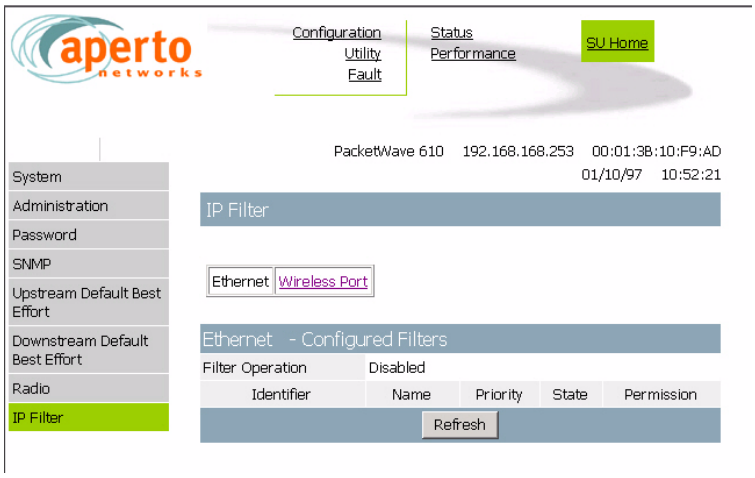

Figure 4-11 IP Filter List Page (Ethernet)

Device Control Utility

The Device Control page, illustrated in *Figure 4-12*, provides access to two important functions:

- Resetting the Indoor Unit.
- Uploading configuration changes entered via the Web interface to the Subscriber Unit's permanent memory, making the changes part of the Subscriber Unit's permanent configuration.

The interface will prompt for confirmation before performing a selected function.

The full Device Control page is available only at ISP logon level. At the Subscriber logon level, only the Upload Configuration function is available.

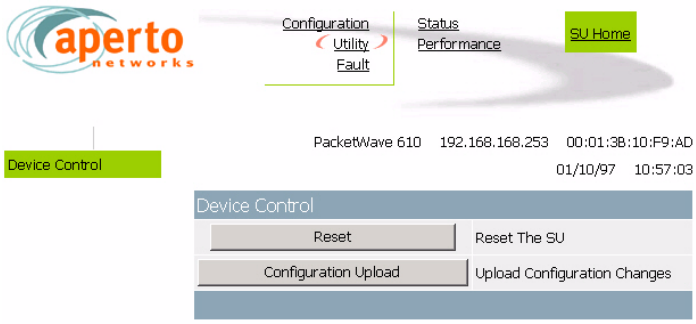

Figure 4-12 Device Control Page

Fault Reporting Pages

The subscriber fault reporting functions include an event log and E-mail configuration, as shown in *Figure 4-13* and *Figure 4-14*. These functions are available only at the ISP logon level.

Event Log Page

The Event Log page, shown in *Figure 4-13*, includes all logable events reported by the Indoor Unit. You can empty the log by clicking on the **Clear All Events** button.

NOTE: The data base used to generate the log is updated in real time. However, the pages do not update dynamically; you must click on the **Refresh** button to see later status.

Figure 4-13 Event Log Page

Figure 4-14 E-mail Page

E-mail Configuration Page

The E-mail Configuration page, shown in *Figure 4-14*, allows the viewing and altering of E-mail event reporting parameters:

- Whether event reporting via E-mail is enabled or disabled.
- The address of the SMTP server.
- The E-mail domain name.
- Reply-to and receiver E-mail addresses.
- Whether a test E-mail will be sent when the **Submit** button is clicked on.

Click on the **Submit** button to activate any changes made on this page.

Status Pages

There are two status pages:

- The System Status page, shown in *Figure 4-15*, identifies the Indoor Unit, its software and hardware, and its current operational status.
- The Link Status page, shown in *Figure 4-16*, provides information about the wireless link between the subscriber equipment and the base station.

System Status is available at both ISP and subscriber levels; Link Status is available at the ISP level only.

Performance Pages

Performance pages, available at the ISP level only, include:

- The System Statistics page (*Figure 4-17*) shows counts of packets and bytes transmitted and received on the wireless link.
- The RF Signal Quality page (*Figure 4-18*) shows RF signal performance statistics such as burst error rate and FEC error counts.
- The Filter Statistics page (*Figure 4-19*) shows counts of passed and blocked packets; hyperlinks allow selection of Ethernet or wireless interface statistics.
- The Flow Statistics pages (*Figure 4-20* and *Figure 4-21*). The Service Flow Summary page provides upstream/downstream packet counts and upstream dropped packet percentage for all defined service flows. Each Service Flow ID serves as a hyperlink to a Service Flow Details page, which provides detailed flow statistics about the particular service flow. A hyperlink at the bottom of the Service Flow Details page leads back to the Service Flow Summary page.

Figure 4-15 System Status Page

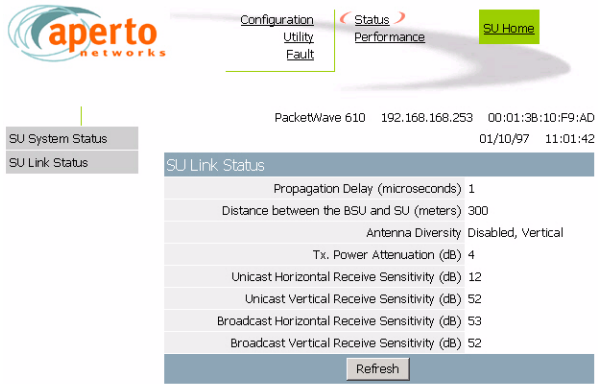

Figure 4-16 Link Status Page

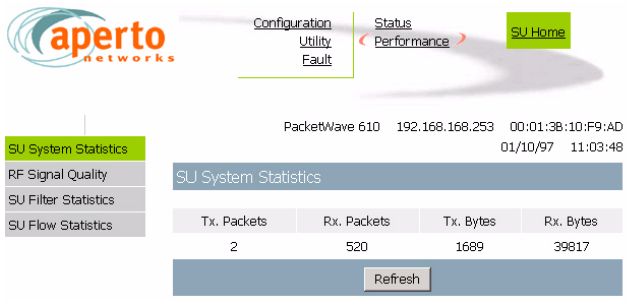

Figure 4-17 System Statistics Page

Figure 4-18 RF Signal Quality Page

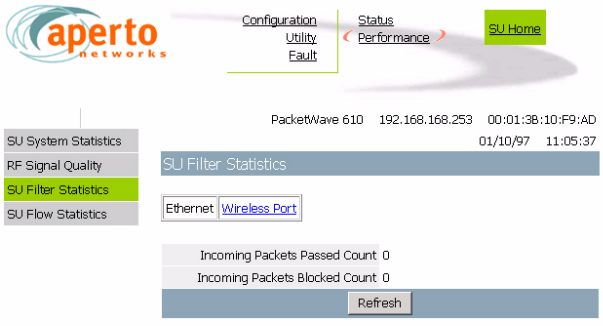

Figure 4-19 Filter Statistics Page

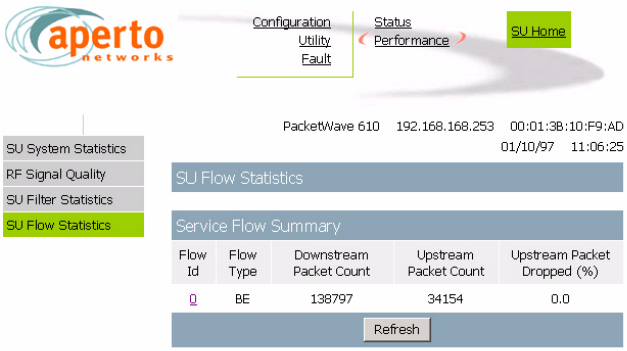

Figure 4-20 Service Flow Summary Page

Figure 4-21 Service Flow Details Page

5

Antennas

PacketWave products support a variety of antennas for both Point-to-Point and Point-to-Multipoint solutions

- The Point-to-Point products use highly directional antennas to establish a single link.
- The Point-to-Multipoint products used sector antennas ranging from 60 to 120 degrees.

This chapter describes the specifications for the various antennas.

Point-to-Point Antennas

The standard PacketWave Point-to-Point product (Model Number PP600-58-01) uses an integrated radio/antenna. The long range option has an N connector and supports the various options listed in Table 5-A.

Table 5-A Point-to-Point Antennas

Antenna	Description	Gain dBi	Az, El deg, deg
Standard Panel	Patch Antenna	17	17, 17

Point-to-Multipoint Antennas

These sector antennas are connected to PacketWave Base Station Unit radios. These units provide flexibility to support a wide range of coverage requirements.

Table 5-B Point-to-Multipoint Antennas

Model	Description	Gain dBi	El deg
PWA5800-90	90 degree sector	16	8

Specifications

Bridge (Indoor Unit) Specifications

Interfaces

10/100Base-T Ethernet — RJ-45 connector

Radio — F connector

Radio Control — shielded RJ-45 connector

Power Requirement — 100 to 240 V ac, 47 to 63 Hz

Power Consumption — 30 Watts for Indoor and Outdoor Unit

Networking and Protocols

Bridging

Management

Embedded WaveCenter agent supporting SNMP and web browser

SNMP MIB (RFC 1157), MIB II (RFC 1213), Aperto Enterprise MIBs

Software updates via TFTP

Advanced Installation Manager Utility

Facilitates configuration and antenna alignment process

Diagnostic Manager Utility

Provides diagnostic functions for troubleshooting subscriber equipment

LED Indicators

Power

Wireless — Transmit, Receive, Status

LAN — Link, Transmit, Receive

Environmental

Operating Temperature — 32 to 104 °F (0 to 40 °C)

Humidity — 10 to 90%, noncondensing

Dimensions and Weight

W x H x D — 1.5 x 6.6 x 9.1 inches (3.8 x 16.8 x 23.1 cm)

Weight — 2.2 lbs (1.0 kg)

Regulatory Approvals

FCC Class B

CE, ETSI

Radio/Antenna (Outdoor Unit) Specifications

RF

Data Rates — from 64 kbps with burst mode up to 20 Mbps in a 6 MHz channel

Modulation — QPSK,16 QAM

Cables and Connectors

Radio Signal — Quad shield RG-6 coaxial cable; Male F-type connector

Radio Control — Shielded Cat 5 cable (outdoor rated); Male RJ45 connector

Cable Lengths — Up to 50 m (165 ft); 100 m (330 ft) with proper type of cable

Mounting

Clamping bracket for pole with diameter of 1.5 inch (3.8 cm) or 2 inches (5.1 cm)
Adjustable elevation

Environmental

Operating Temperature — -22 to 140 °F (-30 to 60 °C)
Storage Temperature — -40 to 257 °F (-40 to 125 °C)
Humidity — 0 to 100%

5.8 GHz Outdoor Unit

Frequency Range — 5725 to 5875 MHz; Maximum EIRP* 33 dBm
Dimensions: W x H x D — 8.1 x 8.1 x 1.9 inches (20.6 x 20.6 x 4.8 cm)
3 dB Beamwidth — Azimuth 17°; Elevation 17°
Polarization — Horizontal and vertical

** The maximum EIRP varies depending on country regulations. Contact Aperto Networks sales for more information.*

Event Reporting

The PacketWave Base Station Units and Subscriber Units can be configured to report events by several means:

- E-mail event messages.
- SNMP traps.
- Logging to a Syslog server.
- Event log presented on request via the Web GUI.

Reportable events are identified in *Table B-A*.

Table B-A Reported Events

Fault Event	Description
Cold Start	BSU, WSS, or subscriber Indoor Unit has performed a full hardware boot.
Warm Start	BSU, WSS, or subscriber Indoor Unit has performed a software reboot.
Authentication Succeeded/Failure	User name or password login succeeded/failed
Port N Link Up/Down	WSS port (number N) has gone up/down.
BSU Up/Down	BSU has started/ceased normal operation.
SU Sync Acquired	BSU has acquired wireless channel synchronization with a specific Subscriber Unit.
SU Up/Down	Subscriber Unit has started/ceased communication with the BSU.
DHCP Failed	A failure has occurred in the retrieval of required data from the DHCP server.
Power Supply Failed	
Radio Synth not Locked	Radio synthesizer out of locked; could be the result of bad connection to the radio or bad radio.
Radio Synth not Locked Cleared	Radio is back to locked
Fan Alarm	Fan stops
Fan Alarm Cleared	Fan back to operational
Temperature too Low/High	
Temperature Normal	
Current Image Corrupted	Software stored on BSU is corrupted
SU Failed Registration	SU failed to complete registration process with the BSU
Config File Error	Configuration file has error

Command Line Interface (CLI)

Each Base Station Unit and Subscriber Unit includes a simple command line interface (CLI) accessible via Telnet

Accessing and Using the CLI

To access and use the Base Station Unit's and Subscriber Unit's command line interface:

1. Telnet to the unit's IP address.
2. At the **Login:** prompt, enter **ISP**. (There is also a **Debug** logon level, which is reserved for Aperto use. The **Subscriber** logon level applies to Subscriber Units only.)

   NOTE: All CLI entries, including logon level and password, are case-sensitive.

3. At the **Password:** prompt, enter the correct password for the specified logon level.

   *The CLI uses the same passwords as the Web interface. The default password is **isp** (case-sensitive). Passwords can be changed via the Web GUI.*

4. When the **CLI#** prompt appears, you are in the CLI.
   a. For a list of commands, type **?** (the **?** will not appear on the screen; pressing **[Enter]** is not necessary). The CLI will respond with a list of the available commands groups.
   b. To display information about the use of a specific commands, including command parameters, enter the command and press space bar followed by **?**.
5. If there is no activity on a connection for 30 minutes, the CLI will disconnect.
6. When you are finished with the CLI, disconnect from the RS-232 Craft Port, or end the Telnet session by entering the **killTelnet** command or simply closing the Telnet application.

Error Messages

Error messages which may be returned by the Base Station Unit CLI include the following:

- **Error: Bad Command** — command has been entered incorrectly.
- **Error: Invalid Parameter** — command has been entered incorrectly.
- **Passwords are not the same** — when setting a password, two password entries do not match.

Table C-A Base Station Unit CLI Commands

Command	Function
killTelnet	Terminate all current Telnet sessions connected at port 5000.
reboot	Reboots the Base Station Unit.

RF Signal Quality

Parameters	Description
Burst Error Rate	Cumulative burst errors (uncorrectable FEC errors + No Unique Word errors) as a percentage of total bursts received. At BSU, a value of 1% in a sector is normal. Higher number may caused by problems such as interference and can degrade performance.
Correctable FEC Error Count	Number of bursts with errors that are corrected by FEC (Forward Error Correction). This is a normal part of system operation.
Uncorrectable FEC Error Count	Number of bursts with errors that can not be corrected by FEC, resulting in such bursts being dropped by the system. If this number is high, the link is likely to be impaired by either low SNR (link is too long), multipath, fading, or interference.
No Unique Word Count	Number of burst with no unique word (an identifier in the preamble of each burst). Mainly caused by external interference and thus it reflects the quality of the channel. At BSU, a high number of No UW Count will degrade performance of the sector. It can also be cuased by packet collision during Contention Request but such occurences are rare. At SU, No UW Count can also caused by the SU beig too close to the BSU, resulting in overdriving of the SU radio. This can be confirmed if Installation Manager reports signal level higher than -40dBm. In such case, the SU antenna should be pointed up toward the sky. Signal level between -45 to -83 dBm is preferred.
No Energy Count	Caused by a scheduled packet failed to arrive or arrived with power level below threshold. At BSU, this count will keep increasing as part of normal system operation. At SU, a low count number may result from fading and can be ignored if the performance is normal. However, a high count number indicates very low signal level. Installation Manager should be used to point the antenna again to make ensure proper power level.