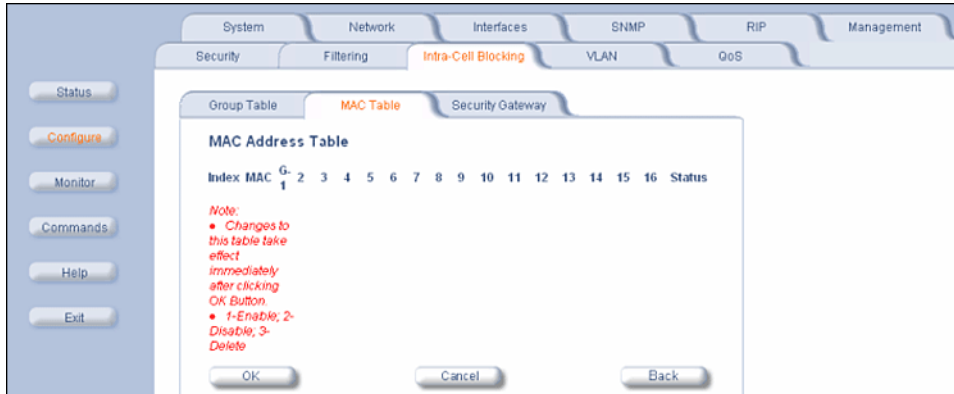


Intra-Cell Blocking (Base Station Unit Only)

Enter the MAC address of the SU. Select **Enable** from the drop-down menu for the Group Index

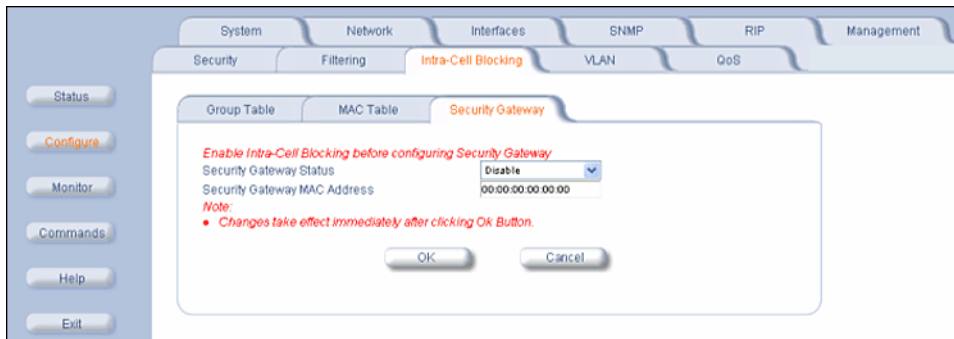
Click **Add**. The MAC address is assigned to the groups. Additions to the MAC Table take effect immediately after clicking the **Add** button.

You can **Enable**, **Disable**, **Delete**, or **Reassign** the groups for a MAC address by using the **Edit/Delete Table Entries** button. A maximum of 250 MAC addresses can be added among all filter groups.



Block Traffic Between SUs (Security Gateway)

You can configure a Security Gateway to block traffic between SUs connected to different BSUs. Verify that Intra-Cell Blocking has been enabled on the **Group Table** tab before configuring the Security Gateway.



- **Security Gateway Status:** Enables or disables packet forwarding to the external Security Gateway.
- **Security Gateway MAC Address:** Lets you configure the MAC address of the external Security Gateway.

VLAN Parameters

Virtual LAN (VLAN) implementation in the Tsunami products:

- Lets the BSU and SU be used in a VLAN-aware network.
- Processes IEEE 802.1Q VLAN-tagged packets.

Network resources behind the BSU and SU can be assigned to logical groups.

Overview

VLAN Modes

Transparent Mode

Transparent mode is available on both the SU and the BSU. This mode is equivalent to NO VLAN support and is the default mode. It is used when the devices behind the SU and BSU are both VLAN aware and unaware. The SU/BSU transfers both tagged and untagged frames received on the Ethernet or WORM interface. Both tagged and untagged management frames can access the device.

Trunk Mode

Trunk mode VLAN is available on both the SU and the BSU. It is used when all devices behind the SU and BSU are VLAN aware. The SU and BSU transfer only tagged frames received on the Ethernet or WORM interface. Both tagged and untagged management frames can access the device.

Access Mode

Access mode is available only on the SU. It is used when the devices behind the SU are VLAN unaware. Frames to and from the Ethernet interface behind the SU map into only one VLAN segment.

Frames received on the Ethernet interface are tagged with the configured Access VLAN ID before forwarding them to the WORM interface. Both tagged and untagged management frames can access the device from the WORM interface. However, only untagged management frames can access the device from the Ethernet Interface.

VLAN Forwarding

The VLAN Trunk mode provides a means to configure a list of VLAN IDs in a Trunk VLAN Table. The SU and BSU only forward frames (between Ethernet and WORM interface) tagged with the VLAN IDs configured in the Trunk VLAN Table. Up to 256 VLAN IDs can be configured for the BSU and up to 16 VLAN IDs can be configured for the SU (depending upon the capabilities of your switching equipment).

VLAN Relaying

The VLAN Trunk mode for BSU operation provides an option to enable and disable a VLAN relaying flag; when enabled, the BSU shall relay frames between SUs on the same BSU having the same VLAN ID.

Management VLAN

The BSU and SU allow the configuration of a separate VLAN ID and priority for SNMP, ICMP, Telnet, and TFTP management frames for device access.

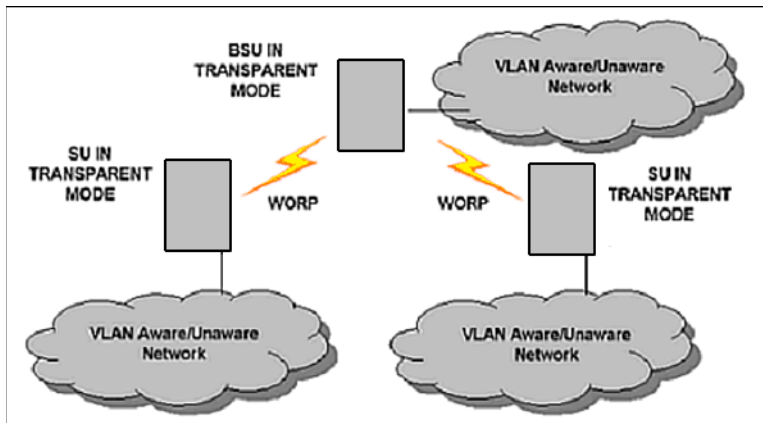
The management VLAN ID and management VLAN priority may be applied in any mode. The management stations tag the management frames they send to the BSU or SU with the management VLAN ID configured in the device. The BSU and SU tag all the management frames from the device with the configured management VLAN and priority.

BSU and SU in Transparent Mode

When the BSU is in Transparent mode, all associated SUs must be in Transparent mode.

How the BSU and SUs function in Transparent mode is described in the following table.

BSU Function – Transparent Mode	SU Function – Transparent Mode
- BSU forwards both tagged and untagged frames received from the Ethernet interface or from any of the associated SUs. - If a valid management VLAN ID is configured, BSU allows only management frames tagged with the configured management VLAN ID to access it. - If a valid management VLAN ID is configured, BSU tags all management frames generated by the BSU with the configured management VLAN ID and priority. - If the management VLAN ID is configured as - 1 (untagged), BSU allows only untagged management frames to access it.	- SU forwards both tagged and untagged frames received from the Ethernet interface or from the BSU. - If a valid management VLAN ID is configured, SU allows only management frames tagged with the configured management VLAN ID to access it. - If a valid management VLAN ID is configured, SU tags all management frames generated by the SU with the configured management VLAN ID and priority. - If the management VLAN ID is configured as - 1 (untagged), SU allows only untagged management frames to access them.

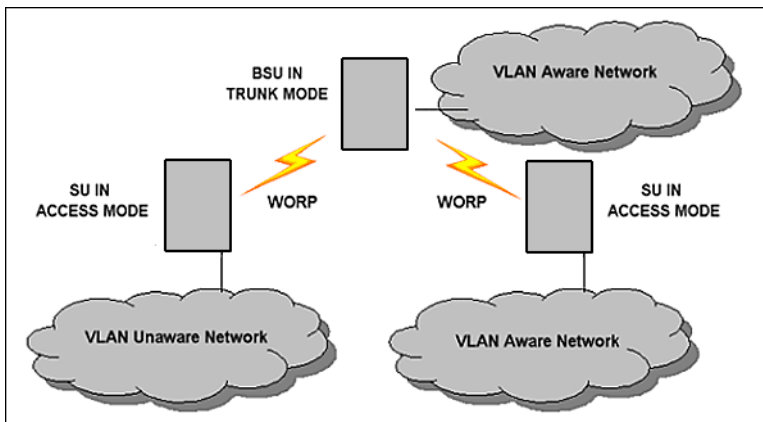


BSU in Trunk Mode and SU in Trunk/Access Mode

When the BSU is in Trunk mode, the associated SUs must be in either Trunk mode or Access mode. When an SU associates to a BSU that is in Trunk mode, it gets the VLAN mode from the BSU.

How the BSU and SU function in Trunk mode, and the SU in Access mode, is described in the following table.

BSU Function – Trunk Mode	SU Function – Trunk Mode	SU Function – Access Mode
- Up to 256 VLAN IDs can be configured on a BSU. - BSU discards all untagged frames received from the Ethernet interface or from any of the associated SUs (unexpected). - If a valid VLAN ID is configured, BSU forwards only VLAN-tagged frames received from the Ethernet interface or from any of the associated SUs that are tagged with the configured VLAN IDs; it discards all other tagged frames. - If a valid management VLAN ID is configured, BSU allows only management frames tagged with the configured management VLAN ID to access it. - If a valid management VLAN ID is configured, BSU tags all management frames generated by the BSU with the configured management VLAN ID and priority. - If the management VLAN ID is configured as -1 (untagged), BSU allows only untagged management frames to access it.	- Up to 16 VLAN IDs can be configured on an SU. - SU discards all untagged frames received from the Ethernet interface or from the BSU (unexpected). - If a valid VLAN ID is configured, SU forwards only VLAN-tagged frames received from the Ethernet interface or from the BSU that are tagged with the configured VLAN IDs; it discards all other tagged frames. - If a valid management VLAN ID is configured, SU allows only management frames tagged with the configured management VLAN ID to access it. - If a valid management VLAN ID is configured, SU tags all management frames generated by the SU with the configured management VLAN ID and priority. - If the management VLAN ID is configured as -1 (untagged), SU allows only untagged management frames to access it.	- SU discards all tagged frames received from the Ethernet interface and all untagged frames received from the BSU (unexpected). - SU tags all untagged frames received from the Ethernet interface with the configured Access VLAN ID and forwards them to the BSU. - SU untags all tagged frames received from the BSU that are tagged with the configured Access VLAN ID and forwards them to the Ethernet interface; it discards all other tagged frames from the BSU. - If a valid management VLAN ID is configured, SU allows only management frames tagged with the configured management VLAN ID to access it from the BSU. - If a valid management VLAN ID is configured, SU tags all management frames generated by the SU with the configured management VLAN ID and priority and forwards them to the BSU. - If the management VLAN ID is configured as -1 (untagged), SU allows only untagged management frames to access it from the BSU. - SU allows only untagged management frames to access it from the Ethernet interface, regardless of the value of the management VLAN ID.



BSU VLAN Configuration

The HTTP Interface to configure BSU VLAN parameters is shown in the following figure.

The following parameters are configurable:

- **BSU VLAN Mode:** The BSU VLAN mode can be either Transparent or Trunk. By default, the BSU is in Transparent mode.
- **Management VLAN ID:** The Management VLAN ID is configurable in any mode. The management VLAN ID has a default value of untagged and may be configured with a value in the range of 1 to 4095.
- **Management VLAN Priority:** The Management VLAN priority values range from 0 to 7 and the default priority is 0 (zero).
- **Relaying Flag:** When this flag is enabled, the BSU relays frames between SUs on the same BSU.
- **BSU VLAN Table:** The BSU VLAN Table is configurable in both Transparent and Trunk mode, but applies only when the BSU is in Trunk mode. The VLAN ID values for the BSU VLAN Table range from 1 to 4095. The maximum number of VLAN IDs that can be configured in the BSU VLAN Table is 256. An SU in Trunk mode is assigned VLAN IDs from this table.

Add BSU VLAN Table Entries

To add entries to the BSU VLAN table, click the **Add Table Entries** button. Enter a **VLAN ID** and select a **Status**, then click **Add** to add your entry to the table.

Edit or Delete BSU VLAN Table Entries

To edit or delete entries in the BSU VLAN Table, click the **Edit/Delete Table Entries** button, make your changes, then click **OK** for your changes to take effect.

The screenshot shows the 'VLAN' configuration page with the 'SU Table' tab selected. It contains a table with two rows for configuration. The first row has Index 1, VLAN ID 1, and Status 'Enable'. The second row has Index 2, VLAN ID 10, and Status 'Enable'. A note states: 'NOTE: Changes to this table take effect immediately after clicking OK Button.' There are 'OK', 'Cancel', and 'Back' buttons at the bottom.

Index	VLAN ID	Status
1	1	Enable
2	10	Enable

Restricting Unit Management

Management access to the unit can be easily secured by making management stations or hosts and the unit itself members of a common VLAN. Simply configure a non-zero management VLAN ID: management of the unit will be restricted to members of the same VLAN.

CAUTION: If a non-zero management VLAN ID is configured, management access to the unit is restricted to hosts that are members of the same VLAN. Ensure your management platform or host is a member of the same VLAN before attempting to manage the unit or you will lose access to the unit.

Providing Access to Hosts in the Same VLAN

The VLAN feature lets hosts manage the unit. If the **Management VLAN ID** matches a VLAN User ID, those hosts who are members of that VLAN will have management access to the unit.

CAUTION: Once a VLAN Management ID is configured and is equivalent to one of the VLAN User IDs, all members of that VLAN will have management access to the unit. Be careful to restrict VLAN membership to those with legitimate access to the unit.

SU VLAN Configuration

The HTTP Interface to configure SU VLAN parameters is shown in the following figure.

The screenshot shows the 'SU VLAN Table' configuration page. It contains a table with columns: Index, MAC, VLAN Mode, Access VLAN ID, Access VLAN Priority, Access VLAN Management VLAN ID, Management VLAN Priority, and 16 VLAN-1 entries (2 through 17). The first two rows are populated with MAC addresses 00:20:A6:62:79:1A and 00:20:A6:59:85:4C, both in 'Transparent' mode with Access VLAN ID 1 and Priority 0. The Management VLAN ID is -1 and Priority is 0. All 16 VLAN-1 entries are set to -1. The Status for both rows is 'Disable'. There are 'Add Table Entries' and 'Edit/Delete Table Entries' buttons at the bottom.

Index	MAC	VLAN Mode	Access VLAN ID	Access VLAN Priority	Access VLAN Management VLAN ID	Management VLAN Priority	VLAN-1 2	3	4	5	6	7	8	...	13	14	15	16	Status
1	00:20:A6:62:79:1A	Transparent	1	0	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Disable
2	00:20:A6:59:85:4C	Transparent	1	0	-1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	Disable

Add SU Table Entries

To add entries to the SU VLAN Table, click the **Add Table Entries** button. Enter the desired parameters in the corresponding fields, then click **Add** to add and save the entry.

The screenshot shows the 'VLAN' configuration window with the 'SU Table' tab selected. The table has columns for Index, MAC, VLAN Mode, Access VLAN ID, Access VLAN Priority, Management VLAN ID, Management Priority, and 16 VLAN IDs (V1-V16). Two entries are shown:

Index	MAC	VLAN Mode	Access VLAN ID	Access VLAN Priority	Management VLAN ID	Management Priority	V1	2	...	8	9	10	11	12	13	14	15	16	Status
1	00:20:A0:02:79:1A	Transparent	1	0	-1	0	-1	-1			-1	-1	-1	-1	-1	-1	-1	-1	Disable
2	00:20:A0:09:05:4C	Transparent	1	0	-1	0	-1	-1			-1	-1	-1	-1	-1	-1	-1	-1	Disable

Note: Changes to this table take effect immediately after clicking OK Button.

The following parameters are configurable:

- **MAC:** Enter the MAC address of the SU to be configured.
- **SU VLAN Mode:** The SU VLAN mode can be either Transparent, Trunk, or Access (by default, the BSU is in Transparent mode).
 - When the BSU is in Transparent mode, the SU must be in Transparent mode.
 - When the BSU is in Trunk mode, the SU must be in either Access mode or Trunk mode.
 - When the BSU is changed from Transparent mode to Trunk mode, all the configured SUs are changed to Trunk mode by default.
- **Access VLAN ID:** The Access VLAN ID is configurable in any mode, but applies only when the SU is in Access mode. The Access VLAN ID values range from 1 to 4095; the default value is 1.
- **Access VLAN Priority:** The Access VLAN Priority is configurable in any mode, but applies only when the SU is in Access mode. The Access VLAN priority values range from 0 to 7; the default priority is 0. For voice frames, the priority field is set to the VoIP configured value (5 according to latest IETF draft, or 6 according to IEEE 802.1D) regardless of the priority value configured.
- **Management VLAN ID:** The management VLAN ID is configurable in any mode. The management VLAN ID has a default value of **untagged** (-1) and may be configured with a value in the range of 1 to 4095.
- **Management Priority:** The Management VLAN priority values range from 0 to 7 and the default priority is 0 (zero).
- **VLAN 1-16:** The VLAN IDs are configurable in any mode, but apply only when the SU is in Trunk mode. The VLAN ID values range from 1 to 4095; the default value is untagged (-1). The maximum number of VLAN IDs that can be configured in the SU VLAN Table is 16 for each SU. The SU VLAN IDs must be in the BSU VLAN Table that corresponds to the BSU.

Edit SU Table Entries

To edit SU table entries, click the **Edit/Delete Table Entries** button; make your changes on the window displayed, then click **OK** to save your changes.

The screenshot shows the 'VLAN' configuration window with the 'SU Table' tab selected. The table has columns for Index, MAC, VLAN Mode, Access VLAN ID, Access VLAN Priority, Management VLAN ID, Management Priority, and 16 VLAN IDs (V1-V16). One entry is shown:

Index	MAC	VLAN Mode	Access VLAN ID	Access VLAN Priority	Management VLAN ID	Management Priority	V1	...	16	Status
1	00:20:A0:09:00:07	Transparent	1	0	-1	0	-1		-1	Disable

Note: Changes to this table take effect immediately after clicking OK Button.

Typical User VLAN Configurations

VLANs segment network traffic into groups, which lets you limit broadcast and multicast traffic. These groups enable hosts from different VLANs to access different resources using the same network infrastructure. Hosts using the same physical network are limited to those resources available to their workgroup.

The unit can segment users into a maximum of 16 different VLANs per unit, based upon a VLAN ID.

The primary scenarios for using VLAN workgroups are as follows:

- **VLAN disabled:** Your network does not use VLANs.
- **VLAN enabled:** Each VLAN workgroup uses a different VLAN ID Tag. A mixture of Tagged and Untagged workgroups may be supported.

QoS (Quality of Service) Parameters

The Quality of Service (QoS) feature is based on 802.16 standard and defines the classes, service flows (SFCs), and packet identification rules (PIRs) for specific types of traffic. The main priority of QoS is to guarantee a reliable and adequate transmission quality for all traffic types under conditions of high congestion and bandwidth over-subscription (for a complete discussion on QoS see [Quality of Service \(QoS\)](#)).

There are already several pre-defined QoS classes, SFCs and PIRs available that you may choose from which cover the most common types of traffic. If you want to configure something else, you start building the hierarchy of a QoS class by defining PIRs; then you associate some of those PIRs to specific Service Flow classes (SFCs); you assign priorities to each PIR within each SFC; and finally you define the QoS class by associating relevant SFCs to each QoS class.

QoS PIR Configuration

Click **Configure > QoS > QoS PIR Table**. The 17 predefined PIRs are shown.

PIR Index	PIR Name	Status	Details
1	All	enable	Details
2	Cisco VoIP UL	enable	Details
3	Vonage VoIP UL	enable	Details
4	Cisco VoIP DL	enable	Details
5	Vonage VoIP DL	enable	Details
6	TCP	enable	Details
7	UDP	enable	Details
8	PPPoE Control	enable	Details
9	PPPoE Data	enable	Details
10	IP	enable	Details
11	ARP	enable	Details
12	Expedited Forwarding	enable	Details
13	Streaming Video	enable	Details
14	802.1p BE	enable	Details
15	802.1p Voice	enable	Details
16	802.1p Video	enable	Details
17	L2 Broadcast/Multicast	enable	Details

[Add Table Entries](#)

To view/edit the parameters of each PIR click on its **Details** button. You may enable, disable or delete any PIR entry by clicking on the **Status** drop-down box and then clicking **OK**.

The screenshot shows the 'QoS PIR' configuration page. The 'PIR Entry Details' section is active. It includes a 'PIR Entry 1' section with the following fields: Rule Name (All), Status (Enable), and checkboxes for 'Enable ToS Rules', 'Enable Ether Priority Rules', 'Enable Vlan ID Rule', and 'Enable Ether Type Rule'. Below these are input fields for ToS Low, ToS High, ToS Mask, Ether Prio Low, Ether Prio High, Vlan ID, Ether Type, and Ether Value.

To add entries to the PIR Table, click the **Add Table Entries** button. Enter the **Rule Name** and select Enable or Disable from the **Entry Status** drop-down box, then click **Add** to add the entry. Once the new entry appears on the screen (as shown below), click its **Details** button to view/edit its parameters.

The screenshot shows the 'QoS PIR Entry Add' page. It includes a 'PIR Entry Add' section with fields for Rule Name, Entry Status (Enable), and a note: 'Note: To configure/add packet identification rules for an entry click on the View/Edit button.' Below this are 'Add' and 'Cancel' buttons. The 'QoS PIR Table' section displays a table with 6 entries, each with a 'Details' button.

PIR Index	PIR Name	Status	Details
1	All	enable	Details
2	Cisco VoIP UL	enable	Details
3	Vonage VoIP UL	enable	Details
4	Cisco VoIP DL	enable	Details
5	Vonage VoIP DL	enable	Details
6	...	...	Details

QoS SFC Configuration

Click **Configure > QoS > QoS SF Class**. The 7 predefined SFCs are shown.

QoS Service Flow
This page allows you to define up to 32 Service Flows. Changes take effect immediately.

Index	SF Name	Type	Dir	MIR	CIR	Lat	Jitter	Prio	Burst	Status
1	UL-Unlimited BE	BE	Uplink	108000	0	10	10	0	4	enable
2	DL-Unlimited BE	BE	Downlink	108000	0	10	10	0	4	enable
3	UL-G711 20ms VoIP rTPS	RtPS	Uplink	88	88	20	20	1	4	enable
4	DL-G711 20ms VoIP rTPS	RtPS	Downlink	88	88	20	20	1	4	enable
5	UL-G729 20ms VoIP rTPS	RtPS	Uplink	66	66	20	20	1	4	enable
6	DL-G729 20ms VoIP rTPS	RtPS	Downlink	66	66	20	20	1	4	enable
7	DL 2 Mbps Video	RtPS	Downlink	2048	2048	20	20	1	4	enable

Buttons: Add Table Entries, Edit/Delete Table Entries

To add entries to the SFC Table, click the **Add Table Entries** button.

Service Flow Entry Add

SF Name:

SF Schd Type:

SF Direction:

MIR:

CIR:

Latency:

Jitter:

Priority:

Number of Frames Per Burst:

SF Entry State:

Buttons: Add, Cancel

QoS Service Flow Table

SF Index	SF Name	Type	Dir	MIR	CIR	Lat	Jitter	Prio	Burst	Status
1	UL-Unlimited BE	BE	Uplink	108000	0	10	10	10	4	enable
2	DL-Unlimited BE	BE	Downlink	108000	0	10	10	10	4	enable

The following parameters are configurable:

- **SF Name:** Enter the name of the SF class you want to add.
- **SF Schd Type:** This field can be set to BE (Best Effort) or RtPS (Real-Time Polling Service).
- **SF Direction:** This field can be set to Downlink (traffic from BSU to SU) or **Uplink** (traffic from SU to BSU).
- **MIR (Maximum Information Rate):** The maximum sustained data rate specified in units of 1 Kbps from 8 Kbps up to the maximum rate of 108000 Kbps per SU.
- **CIR (Committed Information Rate):** The minimum reserved traffic rate specified in units of 1 Kbps from 0 Kbps up to the maximum rate of 10000 Kbps per SU.
- **Latency:** The maximum allowed latency specified in increments of 5 ms steps from a minimum of 5 ms up to a maximum of 100 ms.
- **Jitter:** The maximum tolerable jitter specified in increments of 5 ms steps from a minimum of 0 ms up to the Maximum Latency (in ms).
- **Priority:** The priority of this SFC from zero (0) to seven (7), 0 being the lowest, 7 being the highest.
- **Number of Frames per Burst:** The Maximum number of data messages in a Multi-Frame burst from one (1) to four (4), which affects the percentage of the maximum throughput of the system according to following table.

QoS (Quality of Service) Parameters

No. of messages in a burst:	% of the maximum throughput:
4	100%
3	97.6%
2	92.9%
1	76.2%

- **SF Entry State:** This field can be set to **Enable**, **Disable**, or **Delete**.

Click **Add** to add the entry. The new entry will appear on the screen, taking up the next sequential index entry.

To make changes to the entries of the SFC Table, click the **Edit/Delete Table Entries** button.

SF Index	SF Name	Type	Dir	MIR(Kbps)	CIR(Kbps)	Lat(ms)	Jitter(ms)	Prio	Burst	Status
1	UL-Unlimited BE	BE	Uplink	100000	0	10	10	0	4	Enable
2	DL-Unlimited BE	BE	DownLink	100000	0	10	10	0	4	Enable
3	UL-G711 20ms VoIP rTP	RtPS	Uplink	80	80	20	20	1	4	Enable
4	DL-G711 20ms VoIP rTP	RtPS	DownLink	80	80	20	20	1	4	Enable
5	UL-G729 20ms VoIP rTP	RtPS	Uplink	60	60	20	20	1	4	Enable
6	DL-G729 20ms VoIP rTP	RtPS	DownLink	60	60	20	20	1	4	Enable
7	DL 2 Mbps Video	RtPS	DownLink	2048	2048	20	20	1	4	Enable

Enter your changes and click **OK**. To delete an entry, click the **Status** drop-down box and select **Delete**, then click **OK**.

QoS Class Configuration

Click **Configure > QoS > QoS Class**. The 4 predefined QoS classes are shown.

Table Index	Class Name	Entry Status
1	Unlimited Best Effort	enable
2	G711 VoIP	enable
3	G729 VoIP	enable
4	2 Mbps Video	enable

To view/edit a QoS Class click on its **Details** button. You may enable, disable or delete this QoS Class entry by clicking on the **Status** drop-down box and then clicking **OK**. You may also edit an existing SFC associated to this QoS class, or add a new SFC.

QoS Class Entry View/Edit

QoSClass Entry 2
 Class Name: G711 VoIP
 Status: Enable

OK Cancel

SF Details

Index	SF Class	Status	
1	UL-G711 20ms VoIP rTPS	enable	Details
2	DL-G711 20ms VoIP rTPS	enable	Details

Add Table Entries

To edit an existing SFC associated to this QoS Class click its **Details** button. You may enable, disable or delete this SFC entry by clicking on the **Status** drop-down box and then clicking **OK**. You may also delete a PIR associated to this SFC by clicking on the **Status** drop-down box and then clicking **OK**, or add a new PIR to this SFC.

QoS Class SF Class Entry Details

QoSClass Entry 2.1
 SF Class Name: UL-G711 20ms VoIP rTPS
 Status: Enable

Note: There has to be atleast one PIR entry attached to SF entry.

OK Cancel

PIR Index Add

PIR Index	PIR Value	PIR Priority	Status
1	Vonage VoIP UL	1	Enable
2	Cisco VoIP UL	1	Enable

Add Table Entries

To add more PIRs to this SFC click the **Add Table Entries** button.

Qos Class SF-PIR Index Entry Add

PIR Table Reference Index:

PIR Priority:

Entry Status:

Qos Class SF-PIR Table

QosClass Entry 2.1

PIR Index	PIR Value	PIR Priority	Status
1	3	1	Enable
2	2	1	Enable

The following parameters are configurable:

- **PIR Table Reference Index:** Select one of the possible PIRs that have been previously configured from the drop-down box.
- **PIR Priority:** This priority per rule defines the order of execution of PIRs during packet identification process. The PIR priority is a number in the range 0-63, with priority 63 being executed first, and priority 0 being executed last. The PIR priority is defined within a QoS class, and can be different for the same PIR in some other QoS class. If all PIRs within one QoS class have the same priority, the order of execution of PIR rules will be defined by the order of definition of SFCs, and by the order of definition of PIRs in each SFC, within that QoS class.
- **Entry Status:** This field is always set to **Enable**.

Click **Add** to add the entry. The new entry will show up on the screen taking up the next sequential index entry. You may delete any PIR entry by clicking on the **Status** drop-down box.

Back on the QoS Class screen, click the **Add Table Entries** button to add a new SFC and associate it to this QoS Class.

Qos Class SF Index Add Entry

SF Table Reference Index:

PIR Table Reference Index:

PIR Priority:

Entry Status:

Qos Class SF Index Entry

QosClass Entry 2

Index	SF Class	Entry Status
1	UL-G711 20ms VoIP rTPS	enable
2	DL-G711 20ms VoIP rTPS	enable

Note: User must configure SF Table Reference Index and PIR Table Reference Index. To add more PIR Fields click on the View/Edit button.

The following parameters are configurable:

QoS (Quality of Service) Parameters

- **SF Table Reference Index:** Select one of the possible SFCs that have been previously configured from the drop-down box to associate to this QoS Class.
- **PIR Table Reference Index:** Select one of the possible PIRs that have been previously configured from the drop-down box to associate to this SFC.
- **PIR Priority:** This priority per rule defines the order of execution of PIRs during packet identification process. The PIR priority is a number in the range 0-63, with priority 63 being executed first, and priority 0 being executed last. The PIR priority is defined within a QoS class, and can be different for the same PIR in some other QoS class. If all PIRs within one QoS class have the same priority, the order of execution of PIR rules will be defined by the order of definition of SFCs, and by the order of definition of PIRs in each SFC, within that QoS class.
- **Entry Status:** This field is always set to **Enable**.

Click **Add** to add the entry. The new entry will show up on the screen taking up the next sequential index entry.

From this screen you may also edit an existing SFC by clicking on its **Details** button. This will take you back to the QoS Class SF Class Entry Details.

Finally, to add a new QoS Class click the **Add Table Entries** button on the screen.

QoS Class Add Entry

Class Name:

SF Table Reference Index:

PIR Table Reference Index:

PIR Priority:

Entry Status:

Note: User Must configure QoS Class Name, SF Table Reference Index and PIR Table Reference Index. To configure/add rest of the QoS Class Fields click on the View/Edit button.

QoS Class Table

Table Index	Class Name	Entry Status	
1	Unlimited Best Effort	enable	Details
2	G711 VoIP	enable	Details
3	G729 VoIP	enable	Details

The following parameters are configurable:

- **Class Name:** Enter the name of the QoS class you want to add.
- **SF Table Reference Index:** Select one of the possible SFCs that have been previously configured from the drop-down box to associate to this QoS Class.
- **PIR Table Reference Index:** Select one of the possible PIRs that have been previously configured from the drop-down box to associate to this SFC.
- **PIR Priority:** This priority per rule defines the order of execution of PIRs during packet identification process. The PIR priority is a number in the range 0-63, with priority 63 being executed first, and priority 0 being executed last. The PIR priority is defined within a QoS class, and can be different for the same PIR in some other QoS class. If all PIRs within one QoS class have the same priority, the order of execution of PIR rules will be defined by the order of definition of SFCs, and by the order of definition of PIRs in each SFC, within that QoS class.
- **Entry Status:** This field is always set to **Enable**.

Click **Add** to add the entry. The new entry will show up on the screen taking up the next sequential index entry.

From this screen you may also edit an existing QoS Class by clicking on its **Details** button. This will take you to the QoS Class Entry View/Edit screen.

QoS SU Configuration

Click **Configure > QoS > QoS SU**.

Index	SU MAC Address	QoS Class Name / Index	Status
1	00:09:13:FF:55:7D	Unlimited Best Effort / 1	enable

This screen defines which QoS Classes will be associated to which given SUs by using their MAC addresses.

To add entries to the QoS SU Table, click the **Add Table Entries** button.

Index	SU MAC Address	QoS Class Name / Index	Status
1	00:09:13:FF:55:7D	Unlimited Best Effort / 1	enable

The following parameters are configurable:

- **SU MAC Address:** The MAC Address of the SU you want to associate to a specific QoS Class.
- **SU QOSC Index:** Select one of the possible QoS Classes that have been previously configured from the drop-down box to associate to this SU.
- **SU QOSC State:** This field can be set to **Enable**, **Disable**, or **Delete**.

Click **Add** to add the entry. The new entry will show up on the screen taking up the next sequential index entry.

To make changes to QoS SU Table, click the **Edit/Delete Table Entries** button.

QoS (Quality of Service) Parameters

The screenshot displays a web-based configuration interface for QoS parameters. The main menu at the top includes System, Network, Interfaces, SNMP, RIP, and Management. The 'Network' menu is expanded, showing Security, Filtering, Intra-Cell Blocking, VLAN, and QoS. The 'QoS' sub-menu is selected, and the 'QoS SU' tab is active. The 'QoS SU - Edit' dialog box is open, showing the following fields:

SU Index	SU MAC Address	QoS Class Name	Status
1	00:09:13:FF:55:7D	Unlimited Best Effort	Enable

Buttons for 'OK' and 'Cancel' are located at the bottom of the dialog box.

Enter your changes and click **OK**. To delete an entry, click the **Status** drop-down box and select **Delete**, then click **OK**.

SU Access to the Public Network (NAT)

The NAT (Network Address Translation) feature lets hosts on the Ethernet side of the SU transparently access the public network through the BSU. All hosts in the private network can have simultaneous access to the public network.

NOTE: The NAT tab is available for SUs in Routing mode only. The SU supports NAPT (Network Address Port Translation) where all private IP addresses are mapped to a single public IP address, and does not support Basic NAT (where private IP addresses are mapped to a pool of public IP addresses).

Both **dynamic mapping** (allowing private hosts to access hosts in the public network) and **static mapping** (allowing public hosts to access hosts in the private network) are supported:

- In dynamic mapping, the SU maps the private IP addresses and its transport identifiers to transport identifiers of a single Public IP address as they originate sessions to the public network. This is used only for outbound access.
- Static mapping is used to provide inbound access. The SU maps a private IP address and its local port to a fixed public port of the global IP address. This is used to provide inbound access to a local server for hosts in the public network. Static port mapping allows only one server of a particular type. Up to 1000 ports (500 UDP and 500 TCP) are supported.

This tab is used to configure NAT related parameters including Static Port Table mapping for Port Forwarding.

NOTE: NAT can be enabled when the SU/RSU is configured to work in Router Mode. It cannot be enabled when DHCP Relay Agent is enabled. All changes to NAT configuration require a reboot to take effect.

NAT Status:

NAT Static Bind Status:

Public IP Address:

NAT Static Port Mapping Table

Local IP Address	Port Type	Start Port	End Port	Status
10.0.0.200	TCP	50	100	Enable

The following parameters are configurable:

NOTE: Changes to NAT parameters, including the NAT Static Port Mapping Table, require a reboot to take effect.

NOTE: When NAT is enabled, the DHCP Relay Agent feature is not supported (DHCP Relay Agent must be disabled before NAT is enabled) and RIP updates are not sent or received. You can configure a DHCP server to allocate IP addresses to hosts on the Ethernet side of the SU/ BSU (see [Enable and Configure the DHCP Server](#)).

- **NAT Status:** Enables or disables the NAT feature. NAT can be enabled only for SUs in Routing mode. The default is disabled.
- **NAT Static Bind Status:** Enables or disables the NAT Static Bind status (static mapping) allowing public hosts to access hosts in a private network. The default is disabled.
- **Public IP Address:** The NAT Public IP address is the wireless interface IP address.

NAT Static Port Mapping Table

Adding entries to the NAT Static Mapping Table lets configured hosts in a private address realm on the Ethernet side of the SU access hosts in the public network using Network Address Port Translation (NAPT). Up to 1000 entries can be configured (500 UDP ports and 500 TCP ports).

Adding Entries

To add an entry:

SU Access to the Public Network (NAT)

1. Click the **Add Table Entries** button.
2. Enter the **Local IP Address** of the host on the Ethernet side of the SU.
3. Select the **Port Type**: **TCP**, **UDP**, or **Both**.
4. Enter the **Start Port** and **End Port**.
5. Click **Add**.

The screenshot shows the 'NAT Static Mapping Table' configuration window. It has a sidebar with buttons: Status, Configure, Monitor, Commands, Help, and Exit. The main area has tabs for Security, Filtering, and NAT (selected). Below the tabs is a table with the following data:

Local IP Address	Port Type	Start Port	End Port	Status
10.0.0.200	TCP	50	100	Enable

Below the table, there are input fields for 'Local IP Address', 'Port Type' (a dropdown menu showing 'TCP'), 'Start Port', and 'End Port'. At the bottom are 'Add', 'Cancel', and 'Back' buttons.

Editing Entries

To make changes to an entry:

1. Click the **Edit/Delete Table Entries** button.
2. Enter your changes. To delete an entry, click the **Status** drop-down box and select **Delete**.
3. Click **OK**.

The screenshot shows the 'NAT Static Mapping Table' configuration window in edit/delete mode. The table has the same data as the previous screenshot. Below the table, there are 'OK', 'Cancel', and 'Back' buttons. The 'Status' column has a dropdown menu showing 'Enable'.

Supported Session Protocols

The NAT feature supports the following session protocols for both inbound and outbound access with the required support, applications, and limitations given in the following table.

Certain Internet applications require an Application Level Gateway (ALG) to provide the required transparency for an application running on a host in a private network to connect to its counterpart running on a host in the public network. An ALG may interact with NAT to set up state information, use NAT state information, modify application specific payload and perform the tasks necessary to get the application running across address realms.

No more than one server of a particular type is supported within the private network behind the SU.

These VPN protocols are supported with their corresponding ALGs: IPsec, PPTP, L2TP.

Supported Session Protocols			
Protocol	Support	Applications	Limitations
ICMP	ICMP ALG	Ping	

Supported Session Protocols			
Protocol	Support	Applications	Limitations
FTP	FTP ALG	File transfer	
H.323	H.323 ALG	Multimedia conferencing	
HTTP	Port mapping for inbound connection.	Web browser	
TFTP	Port mapping for inbound connection.	File transfer	
Telnet	Port mapping for inbound connection.	Remote login	
CUSEE Me	Port mapping for inbound and outbound connection.	Video conferencing	One user is allowed for video conferencing
IMAP	Port mapping for inbound connection.	Mail	
PNM	Port mapping for inbound connection.	Streaming media with Real Player	
POP3	Port mapping for inbound connection.	E-mail	
SMTP	Port mapping for inbound connection.	E-mail	Mails with IP addresses of MTAs or using IP addresses in place of FQDN are not supported (requires SMTP ALG).
RTSP	Port mapping for inbound connection.	Streaming audio/video with Quick Time and Real Player	
ICQ	Port mapping for inbound connection.	Chat and file transfer	Each host using ICQ needs to be mapped for different ports.
IRC	Port mapping for inbound connection.	Chat and file transfer	Each host using IRC needs to be mapped for different ports.
MSN Messenger	Port mapping for inbound and outbound connection.	Conference and Share files with Net meeting	Only one user is allowed for net meeting.
Net2Phone	Port mapping for inbound and outbound connection.	Voice communication	
IP Multicast	Pass Through	Multicasting	
Stream works	Port mapping for inbound connection.	Streaming video	
Quake	Port mapping for inbound connection.	Games	When a Quake server is configured within the private network behind a SU, the SU cannot provide information about that server on the public network. Also, certain Quake servers do not let multiple users log in using the same IP address, in which case only one Quake user is allowed.

Monitoring

This chapter describes using the Web interface to obtain detailed information about the settings and performance of the unit.

Click the **Monitor** button to access this information.

The following tabs appear in the **Monitor** section:

- [Wireless](#)
- [ICMP](#)
- [Per Station](#)
- [Features](#)
- [Link Test](#)
- [Interfaces](#)
- [IP ARP Table](#)
- [IP Routes](#)
- [Learn Table](#)
- [RIP](#)
- [RADIUS](#)
- [QoS](#)
- [Temperature](#)

NOTE: The **Radius** tab is available on BSUs only. The **RIP** tab is relevant only in Routing mode.

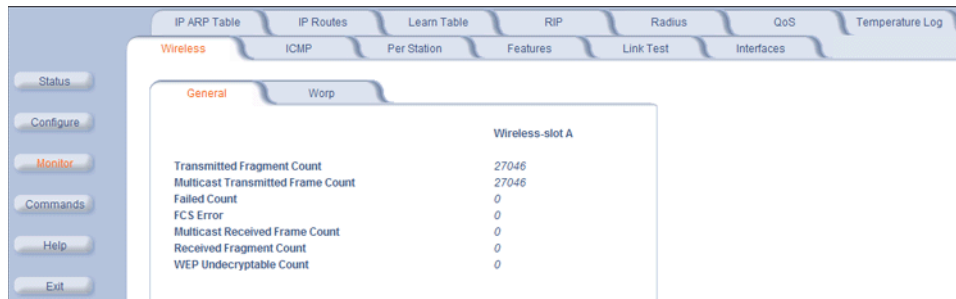
Help and Exit buttons also appear on each page of the Web interface; click the **Help** button to access online help; click the **Exit** button to exit the application.

For an introduction to the basics of management, see [Basic Management](#).

Wireless

General Performance

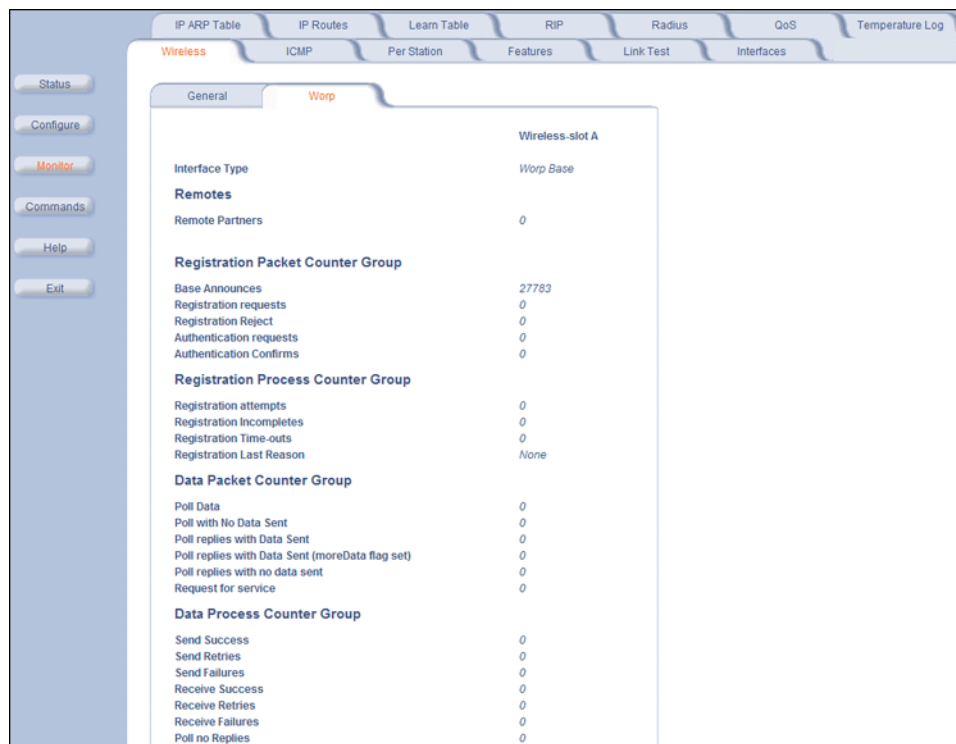
Click **Monitor** > **Wireless** > **General** to monitor the general performance of the wireless interface.



Wireless-slot A	
Transmitted Fragment Count	27046
Multicast Transmitted Frame Count	27046
Failed Count	0
FCS Error	0
Multicast Received Frame Count	0
Received Fragment Count	0
WEP Undecryptable Count	0

WORP Interface Performance

Click **Monitor** > **Wireless** > **WORP** tab to monitor the performance of the WORP Base or WORP SU interfaces.



Wireless-slot A	
Interface Type Worp Base	
Remotes	
Remote Partners	0
Registration Packet Counter Group	
Base Announces	27783
Registration requests	0
Registration Reject	0
Authentication requests	0
Authentication Confirms	0
Registration Process Counter Group	
Registration attempts	0
Registration Incompletes	0
Registration Time-outs	0
Registration Last Reason	None
Data Packet Counter Group	
Poll Data	0
Poll with No Data Sent	0
Poll replies with Data Sent	0
Poll replies with Data Sent (moreData flag set)	0
Poll replies with no data sent	0
Request for service	0
Data Process Counter Group	
Send Success	0
Send Retries	0
Send Failures	0
Receive Success	0
Receive Retries	0
Receive Failures	0
Poll no Replies	0

The **Registration Last Reason** field indicates either a successful registration (a value of 1) or it indicates the reason why the last registration failed. Possible values for the **Registration Last Reason** field are as follows:

- None (successful registration)
- Maximum number of SUs reached
- Authentication failure
- Roaming
- No response from SU within the Registration Timeout Period
- Low Signal Quality

ICMP

Click **Monitor > ICMP** to view the number of ICMP messages sent and received by the unit. It includes **ping**, **route**, and **host unreachable** messages.

IP ARP Table		IP Routes		Learn Table		RIP		Radius		QoS		Temperature Log	
Wireless		ICMP		Per Station		Features		Link Test		Interfaces			
Status													
Configure													
Monitor													
Commands													
Help													
Exit													
		Messages Received						Messages Sent					
		Total Messages 0						Total Messages 0					
		Errors 0						Errors 0					
		Destination Unreachable 0						Destination Unreachable 0					
		Time Exceeded 0						Time Exceeded 0					
		Parameter Problems 0						Parameter Problems 0					
		Source Quench 0						Source Quench 0					
		Redirects 0						Redirects 0					
		Echos 0						Echos 0					
		Echo Reply 0						Echo Reply 0					
		Time Stamps 0						Time Stamps 0					
		Time Stamp Reply 0						Time Stamp Reply 0					
		Address Mask 0						Address Mask 0					
		Address Mask Reply 0						Address Mask Reply 0					

Per Station

Click **Monitor > Per Station** to view Station Statistics. On the SU, the “Per Station” page shows statistics of the BSU to which the SU is registered. On the BSU, it shows statistics of all the SU’s connected to the BSU.

The page's statistics refresh every 4 seconds.



Features

Click **Monitor** > **Features** to view the following information.

Features		
Feature	Supported	Licensed
Upstream Bandwidth WORP (in kbits/s)	108032	108032
Downstream Bandwidth WORP (in kbits/s)	108032	108032
Max. WORP Satellites	250	250
Max. Users On Satellite	65535	65535

NOTE: A BSU shows how many WORP SUs it can support; the SU shows how many Ethernet hosts it supports on its Ethernet port as the “Max Users on Satellite” parameter.

Link Test

Click **Monitor** > **Link Test** to find out which wireless stations are in range and to check their link quality.

NOTE: *Link Test requires Internet Explorer version 6.0 or later. Earlier versions do not support Link Test.*

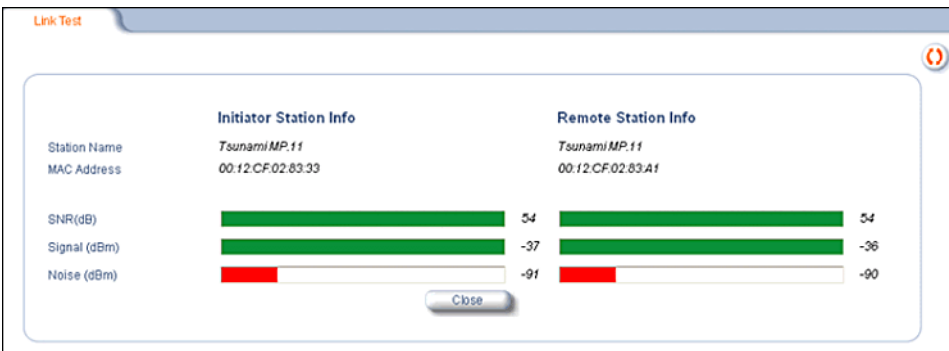
Link Test for the unit reports the Signal-to-Noise Ratio (SNR) value in dB; the higher this number, the better the signal quality. Furthermore, it reports the signal level and noise level in dBm. The latter two are approximations of the level at which the unit receives the signal of the peer unit and the background noise.

- Clicking **Explore** from a BSU displays all its registered SUs.
- Clicking **Explore** from an SU displays only the BSU with which it is registered.



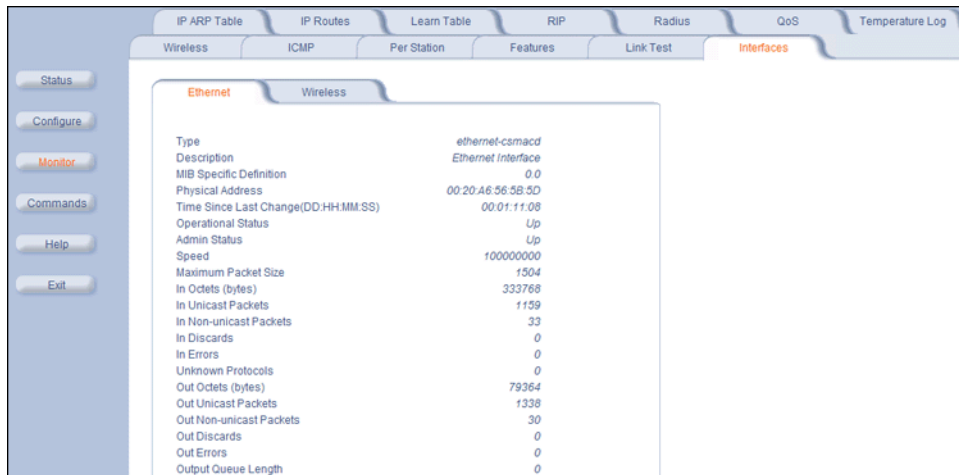
All stations displayed after “Explore” come up “Disabled.” Select a station by changing **Disabled** to **Start** and click the **Link Test** button. You can change multiple stations to **Start**, but only the last station in the list is displayed as the remote partner when you click the **Link Test** button.

The Link Test provides SNR, Signal, and Noise information for both, the local and the remote unit’s levels. Link Test stops when you close the **Link Test** page.

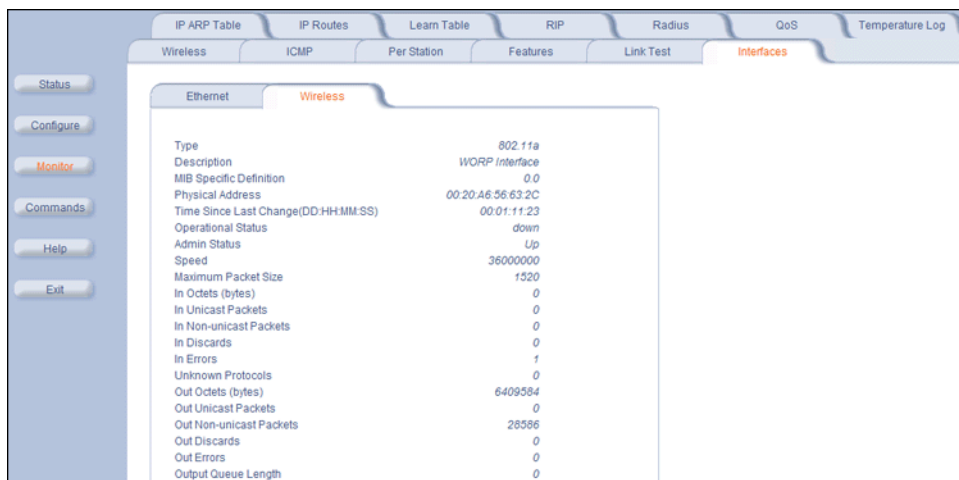


Interfaces

Click **Monitor** > **Interfaces** to view detailed information about the IP-layer performance of the unit's interfaces. There are two sub-tabs: **Wireless** and **Ethernet**. The following figures show both interfaces.



Ethernet	
Type	ethernet-csmacd
Description	Ethernet Interface
MIB Specific Definition	0.0
Physical Address	00:20:A6:56:58:5D
Time Since Last Change(DD:HH:MM:SS)	00:01:11:08
Operational Status	Up
Admin Status	Up
Speed	100000000
Maximum Packet Size	1504
In Octets (bytes)	333768
In Unicast Packets	1159
In Non-unicast Packets	33
In Discards	0
In Errors	0
Unknown Protocols	0
Out Octets (bytes)	79364
Out Unicast Packets	1338
Out Non-unicast Packets	30
Out Discards	0
Out Errors	0
Output Queue Length	0



Wireless	
Type	802.11a
Description	WORP Interface
MIB Specific Definition	0.0
Physical Address	00:20:A6:56:63:2C
Time Since Last Change(DD:HH:MM:SS)	00:01:11:23
Operational Status	down
Admin Status	Up
Speed	36000000
Maximum Packet Size	1520
In Octets (bytes)	0
In Unicast Packets	0
In Non-unicast Packets	0
In Discards	0
In Errors	1
Unknown Protocols	0
Out Octets (bytes)	6409584
Out Unicast Packets	0
Out Non-unicast Packets	28586
Out Discards	0
Out Errors	0
Output Queue Length	0

IP ARP Table

Click **Monitor** > **IP ARP Table** to view the mapping of the IP and MAC addresses of all radios registered at the BSU. This information is based upon the Address Resolution Protocol (ARP).

	Wireless	ICMP	Per Station	Features	Link Test	Interfaces	
	IP ARP Table	IP Routes	Learn Table	RIP	Radius	QoS	Temperature Log
Status							
Configure							
Monitor							
Commands							
Help							
Exit							
	Physical Address	IP Address	Media Type				
	00:0F:1F:D1:A0:5D	169.254.128.7	Dynamic				

Click **Monitor** > **IP Routes** to view all active IP routes of the unit. These can be either **static** or **dynamic** (obtained through RIP). This tab is available only in **Routing** mode, and you can add routes only when in **Routing** mode.

Wireless

ICMP

Per Station

Features

Link Test

Interfaces

IP ARP Table

IP Routes

Learn Table

RIP

Radius

QoS

Temperature Log

Status

Configure

Monitor

Commands

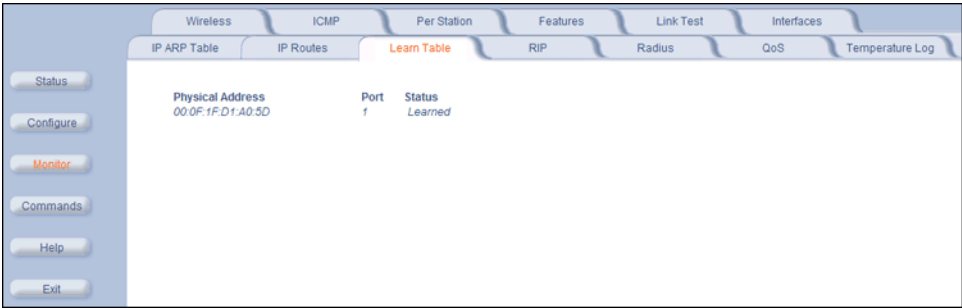
Help

Exit

Destination	Subnet Mask	Next Hop	Interface	Metric
0.0.0.0	0.0.0.0	169.254.128.7	1	1
127.0.0.1	255.255.255.255	127.0.0.1	0	0
169.254.128.0	255.255.255.0	169.254.128.200	1	0
169.254.128.7	255.255.255.255	169.254.128.200	1	0

Learn Table

Click **Monitor** > **Learn Table** to view all MAC addresses the unit has detected on an interface. The Learn Table displays information relating to network bridging. It reports the MAC address for each node that the device has learned is on the network and the interface on which the node was detected. There can be up to 10,000 entries in the Learn Table. This tab is only available in **Bridge** mode.



RIP

Click **Monitor** > **RIP** to view Routing Internet Protocol data for the Ethernet and Wireless interfaces.

Wireless				ICMP				Per Station				Features				Link Test				Interfaces							
IP ARP Table				IP Routes				Learn Table				RIP				Radius				QoS				Temperature Log			
Status				Routes Changed								0															
Configure				Responses to Route Requests								0															
								Ethernet				Wireless-slot A															
Monitor				Address				169.254.128.200				10.0.1.1															
Commands				Network Mask				255.255.255.0				255.255.255.0															
				Triggered Advertisements																							
Help				Bad Routes																							
Exit				Bad Packets																							

RADIUS

Click **Monitor** > **Radius** to view information about the traffic exchanged with a RADIUS server.

Wireless		ICMP		Per Station		Features		Link Test		Interfaces			
IP ARP Table		IP Routes		Learn Table		RIP		Radius		QoS		Temperature Log	
Status		Invalid Server Replies										0	
Configure		Primary										Backup	
Monitor		Access Requests		0		Access Requests		0					
		Access Accepts		0		Access Accepts		0					
		Access Retransmissions		0		Access Retransmissions		0					
		Access Rejects		0		Access Rejects		0					
		Access Challenges		0		Access Challenges		0					
Commands		Malformed Access Responses		0		Malformed Access Responses		0					
		Authentication Bad Authenticators		0		Authentication Bad Authenticators		0					
Help		Timeouts		0		Timeouts		0					
Exit													

QoS

Click **Monitor** > **QoS** to view summary information about the Quality of Service per BSU and for each SU registered with that BSU.

This tab is available only on the BSU.

Status

Configure

Monitor

Commands

Help

Exit

Wireless

ICMP

Per Station

Features

Link Test

Interfaces

IP ARP Table

IP Routes

Learn Table

RIP

Radius

QoS

Temperature Log

SU QoS Monitor

QoS SUMMARY

Note: this screen shows the total bandwidth allocated per BSU and the minimum and maximum bandwidth allocated for each SU registered with the BSU

ACTIVE

Uplink Bandwidth = 0 Kbps

Downlink Bandwidth = 0 Kbps

Uplink MIR = 0 Kbps

Downlink MIR = 0 Kbps

Uplink CIR = 0 Kbps

Downlink CIR = 0 Kbps

PROVISIONED

Uplink MIR = 0 Kbps

Downlink MIR = 0 Kbps

Uplink CIR = 0 Kbps

Downlink CIR = 0 Kbps

SU MAC Address	Class Name / Index	SF Name / Index	PIR	MIR	CIR
00:20:A6:62:79:1A	Voice-Video-Data / 8	UL-G711 20ms VoIP rPS / 3	2	800	600
		DL-G711 20ms VoIP rPS / 4	4	800	600
		DL 2 Mbps Video / 7	13	8000	5000
		UL-UBE / 9	1	10000	4000
		DL-UBE / 10	1	10000	4000
		UL-G729 20ms VoIP rPS / 5	3	800	400
00:20:A6:59:85:4C	Voice-Video-Data / 8	DL-G729 20ms VoIP rPS / 6	5	800	400
		Video-UDP-33333 / 8	18	8000	4000
		UL-G711 20ms VoIP rPS / 3	2	800	600
		DL-G711 20ms VoIP rPS / 4	4	800	600
		DL 2 Mbps Video / 7	13	8000	5000
		UL-UBE / 9	1	10000	4000
		DL-UBE / 10	1	10000	4000
		UL-G729 20ms VoIP rPS / 5	3	800	400
		DL-G729 20ms VoIP rPS / 6	5	800	400
		Video-UDP-33333 / 8	18	8000	4000

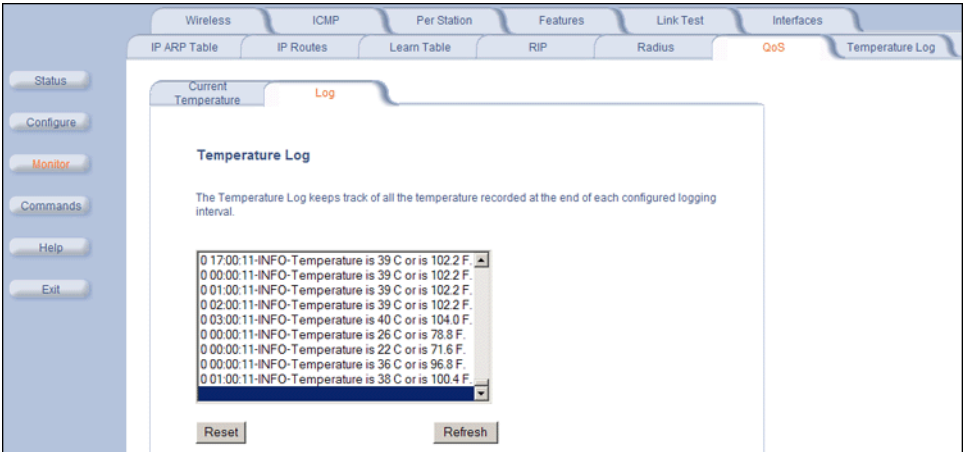
Temperature

The feature for reporting and logging internal unit temperature observes and reports the internal temperature of the unit. Temperature is logged and an SNMP trap sent when the internal temperature crosses the limit of 0°C to 55°C (at 5 degrees before the limit, the unit issues a warning trap).

You can select a recording interval from one to sixty minutes, in 5-minute increments on the **Configure: System** tab. A log file holds the recorded data. The log can hold at least 576 entries (two days with the refresh time of 5 minutes). For further analysis, the log can be exported to a text file with a new line feed as a line separator.

The Temperature Log contains two sub-tabs:

- The **Current Temperature** tab indicates the unit's current temperature. The current temperature value is refreshed every 4 seconds.
- The **Log** tab keeps track of the temperature recorded at the end of each configured logging interval. You can reset or refresh the log using the **Reset** and **Refresh** buttons.



Commands

This chapter describes the commands that you can issue with the Web Interface.

Click the **Commands** button to access available commands. See the following:

- Download (see [Download Files](#))
- Upload (see [Upload Files](#))
- Downgrade (see [Downgrade to Previous Release](#))
- Reboot (see [Reboot the Unit](#))
- Reset (see [Reset the Unit to Factory Default](#))
- Help Link (see [Set the Help Link Location](#))

Help and Exit buttons also appear on each page of the Web interface; click the **Help** button to access online help; click the **Exit** button to exit the application.

For an introduction to the basics of management, see [Basic Management](#).

Download Files

Click **Commands > Download** tab to download configuration, image and license files to the unit via a TFTP server (see [TFTP Server Setup](#) for information about the SolarWinds TFTP server software located on your product installation CD).

The following parameters may be configured or viewed:

- **Server IP address:** Enter the TFTP Server IP address.
- **File Name:** Enter the name of the file to be downloaded. If you are using the SolarWinds TFTP server software located on your product installation CD, the default directory for downloading files is **C:\TFTP-Root**.
- **File Type:** Choose either **Config**, **image**, **BspBI**, or **license**.
- **File Operation:** Choose either **Download** or **Download and Reboot**.

Click **OK** to start the download.

Upload Files

Click **Commands** > **Upload** to upload a configuration or log file from the unit to a TFTP server (see [TFTP Server Setup](#) for information about the SolarWinds TFTP server software located on your product installation CD).

The screenshot shows a web-based interface for managing a device. The 'Upload' tab is active, displaying system information and TFTP upload settings. The sidebar on the left contains navigation buttons, with 'Commands' currently selected. The main content area includes a 'System Information' section showing the software and boot loader versions. Below this is the 'TFTP Information' section, which contains input fields for the server IP address, file name, and file type. A note at the bottom of the TFTP section explains that the upload process copies files from the device to the TFTP server. At the bottom of the dialog are 'OK' and 'Cancel' buttons.

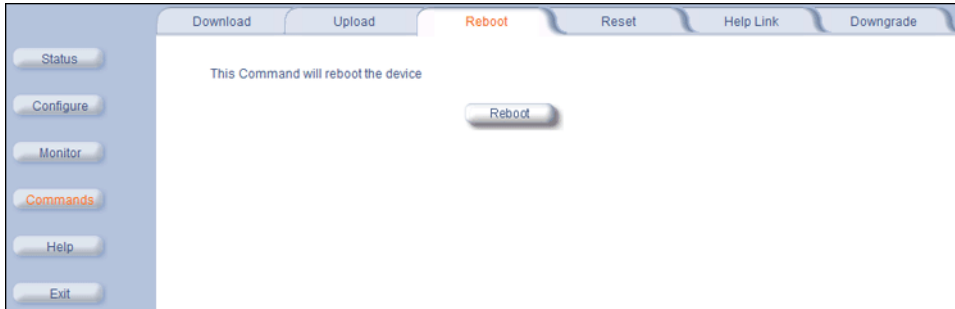
The following parameters may be configured or viewed:

- **Server IP address:** Enter the TFTP Server IP address.
- **File Name:** Enter the name of the file to be uploaded. If you are using the SolarWinds TFTP server software located on your product installation CD, the default directory for uploading files is **C:\TFTP-Root**.
- **File Type:** Choose either **Config**, **Templog**, or **Eventlog**.

Click **OK** to start the upload.

Reboot the Unit

Click **Commands** > **Reboot** to reboot the unit's embedded software. Configuration changes are saved and the unit is reset.



CAUTION: *Rebooting the unit causes all users currently connected to lose their connection to the network until the unit has completed the reboot process and resumed operation.*

Reset the Unit to Factory Default

Click **Commands** > **Reset** to restore the configuration of the unit to the factory default values.



You can also reset the unit by pressing the RELOAD button located on the side of the power brick. See [Hard Reset to Factory Default](#) for more information.

CAUTION: *Resetting the unit to its factory default configuration permanently overwrites all changes made to the unit. The unit reboots automatically after this command has been issued.*

Set the Help Link Location

Click **Commands** > **Help Link** to set the location of the help files of the Web Interface. Upon installation, the help files are installed in the **C:\Program Files\Tsunami\MP.11 [Product Name]\Help** folder.

If you want to place these files on a shared drive, copy the **Help** folder to the new location and specify the new path in the **Help Link** box.

The screenshot shows a web interface with a sidebar on the left containing buttons: Status, Configure, Monitor, Commands (highlighted in orange), Help, and Exit. The main content area has a top navigation bar with tabs: Download, Upload, Reboot, Reset, Help Link (highlighted in orange), and Downgrade. Below the tabs, the text reads: "The help link should be configured to one of the following:" followed by a bulleted list:

- Path to Local Directory where Help Information is found (i.e. file:///C:/help/tmp/index.htm).
- Network File Server Address where Help Information is found (i.e. file:///G:/shared/help/tmp/index.htm), or
- URL/HTTP Address where Help Information is found (i.e. http://www.tmp.com/help/index.htm)

Below the list is a note: "Note: Due to security changes in Internet Explorer, a link to a local or mapped drive may not work unless the IP address of the BSU/SU is added to the Trusted Sites of Internet Explorer (Security tab under Internet Options). There is no known method for enabling links to local or mapped drives with Netscape. The user may install the help files on an internal or external web site and point the link to it."

At the bottom, there is a "Help Link" label followed by a text input field containing the path "C:/Program Files/Tsunami/TMP11/Help/". Below the input field are "OK" and "Cancel" buttons.

Downgrade to Previous Release

Click **Commands** > **Downgrade** to downgrade to a previous release. Downgrade currently is supported only to release 2.0.1 and later. Once you enter this command, the unit is downgraded to the specified release and is automatically rebooted. The filename specified and the filename of the image selected for downgrade must be the same version. The unit will download the file, re-format the configuration to match the version, and reboot to put the image into effect.

The screenshot displays a web-based management interface for a device. On the left is a vertical sidebar with buttons: Status, Configure, Monitor, **Commands** (highlighted in orange), Help, and Exit. The main content area has a top navigation bar with tabs: Download, Upload, Reboot, Reset, Help Link, and **Downgrade** (highlighted in orange). Below the tabs, the 'System Information' section shows 'Software Version' as 2.5.0 and 'Boot Loader Version' as 3.1.0. A red note states: 'Note: Once the downgrade is completed, the unit will reboot.' The 'TFTP Information' section contains fields for 'Server IP Address' (10.20.6.200), 'File Name' (SignedBuild_000198.bir), 'File Type' (Image), 'File Operation' (Download & Reboot), and 'Image Version' (a dropdown menu set to None). Another red note at the bottom reads: 'Note: Downloaded files take effect when the device is rebooted.' At the bottom of the form are 'OK' and 'Cancel' buttons.

System Information	
Software Version	2.5.0
Boot Loader Version	3.1.0

Note: Once the downgrade is completed, the unit will reboot.

TFTP Information	
Server IP Address	10.20.6.200
File Name	SignedBuild_000198.bir
File Type	Image
File Operation	Download & Reboot
Image Version	None

Note: Downloaded files take effect when the device is rebooted.

OK Cancel

Procedures

This chapter describes the following procedures:

- [TFTP Server Setup](#): Prepares the TFTP server for transferring files to and from the unit. This procedure is used by the other procedures that transfer files.
- [Web Interface Image File Download](#): Upgrades the embedded software.
- [Configuration Backup](#): Saves the configuration of the unit.
- [Configuration Restore](#): Restores a previous configuration through configuration file download.
- [Soft Reset to Factory Default](#): Resets the unit to the factory default settings through the Web or Command Line Interface.
- [Hard Reset to Factory Default](#): In some cases, it may be necessary to revert to the factory default settings (for example, if you cannot access the unit or you lost the password for the Web Interface).
- [Forced Reload](#): Completely resets the unit and erases the embedded software. Use this procedure only as a last resort if the unit does not boot and the “Hard Reset to Factory Default” procedure did not help. If you perform a Forced Reload, you must download a new image file as described in [Image File Download with the Bootloader](#).
- [Image File Download with the Bootloader](#): If the unit does not contain embedded software, or the embedded software is corrupt, you can use this procedure to download a new image file.

TFTP Server Setup

A Trivial File Transfer Protocol (TFTP) server lets you transfer files across a network. You can upload files from the unit for backup or copying, and you can download the files for configuration and image upgrades. The SolarWinds TFTP server software is located on the product installation CD, or can be downloaded from <http://support.proxim.com>. You can also download the latest TFTP software from SolarWind's Web site at <http://www.solarwinds.net>. **The instructions that follow assume that you are using the SolarWinds TFTP server software**; other TFTP servers may require different configurations.

NOTE: *If a TFTP server is not available in the network, you can perform similar file transfer operations using the HTTP interface.*

To download or upload a file, you must connect to the computer with the TFTP server through the unit's Ethernet port. This can be any computer in the network or a computer connected to the unit with a cross-over Ethernet cable. For information about installing the TFTP server, see [Step 13: Install Documentation and Software](#).

Ensure that:

1. The upload or download directory is correctly set (the default directory is **C:\TFTP-Root**).
2. The required image file is present in the directory.
3. The TFTP server is running. **The TFTP server must be running only during file upload and download.** You can check the connectivity between the unit and the TFTP server by pinging the unit from the computer that hosts the TFTP server. The ping program should show replies from the unit.
4. The TFTP server is configured to both Transmit and Receive files (on the **Security** tab under **File > Configure**), with no automatic shutdown or time-out (on the **Auto-Close** tab).

Web Interface Image File Download

In some cases, it may be necessary to upgrade the embedded software of the unit by downloading an image file. To download an image file through the Web Interface:

1. Set up the TFTP server as described in [TFTP Server Setup](#).
2. Access the unit as described in [Logging in to the Web Interface](#).
3. Click **Commands > Download** tab.
4. Fill in the following details:
 - **Server IP Address** <IP address TFTP server>
 - **File Name** <image file name>
 - **File Type** Image
 - **File Operation** Download
5. Click **OK** to start the file transfer.

The unit downloads the image file. The TFTP server program should show download activity after a few seconds. When the download is complete, the unit is ready to start the embedded software upon reboot.

Configuration Backup

You can back up the unit's configuration by uploading the configuration file. You can use this file to restore the configuration or to configure another unit (see [Configuration Restore](#)).

To upload a configuration file through the Web Interface:

1. Set up the TFTP server as described in [TFTP Server Setup](#).
2. Access the unit as described in [Logging in to the Web Interface](#).
3. Click **Commands > Upload**.
4. Fill in the following details:
 - **Server IP Address** <IP address TFTP server>
 - **File Name** <configuration file name>
 - **File Type** Config
 - **File Operation** Upload
5. Click **OK** to start the file transfer.

The unit uploads the configuration file. The TFTP server program should show upload activity after a few seconds. When the upload is complete, the configuration is backed up.

Configuration Restore

You can restore the configuration of the unit by downloading a configuration file. The configuration file contains the configuration information of a unit.

To download a configuration file through the Web Interface:

1. Set up the TFTP server as described in [TFTP Server Setup](#).
2. Access the unit as described in [Logging in to the Web Interface](#).
3. Click **Commands > Download** tab.
4. Fill in the following details:
 - **Server IP Address** <IP address TFTP server>
 - **File Name** <configuration file name>
 - **File Type** Config
 - **File Operation** Download
5. Click **OK** to start the file transfer.

The unit downloads the configuration file. The TFTP server program should show download activity after a few seconds. When the download is complete and the system rebooted, the configuration is restored.

Soft Reset to Factory Default

If necessary, you can reset the unit to the factory default settings. Resetting to default settings means that you must configure the unit anew.

To reset to factory default settings using the Web Interface:

1. Click **Commands > Reset**.
2. Click the **Reset to Factory Default** button.

The device configuration parameter values are reset to their factory default values.

If you do not have access to the unit, you can use the procedure described in “Hard Reset to Factory Default” below as an alternative.

Hard Reset to Factory Default

If you cannot access the unit or you have lost its password, you can reset the unit to the factory default settings. Resetting to default settings means you must configure the unit anew.

To reset to factory default settings, press and hold the RELOAD button on the side of the unit's power supply for a minimum of 5 seconds but no more than 10 seconds. The configuration is deleted from the unit and the unit reboots, writing and using a default configuration.

CAUTION: *If you hold the RELOAD button for longer than 20 seconds, you may go into Forced Reload mode, which erases the unit's embedded software. This software image must be reloaded through an Ethernet connection with a TFTP server. The image filename to be downloaded can be configured with either ScanTool through the Ethernet interface or with the Boot Loader CLI through the serial port to make the unit functional again.*

Forced Reload

With Forced Reload, you erase the embedded software. Use this procedure only as a last resort if the unit does not boot and the “Reset to Factory Defaults” procedure did not help. If you perform a Forced Reload, you must download a new image file with the Bootloader (see “Image File Download with the Bootloader” below).

CAUTION: *The following procedure erases the embedded software of the unit. This software image must be reloaded through an Ethernet connection with a TFTP server. The image filename to be downloaded can be configured with ScanTool through the Ethernet interface to make the unit functional again.*

To do a forced reload:

1. Disconnect and reconnect power to the unit; the unit resets and the LEDs flash.
2. Immediately press and hold the RELOAD button on the side of the unit’s power supply for about 20 seconds. The software image and configuration are deleted from the unit.
3. Follow the [Image File Download with the Bootloader](#) procedure to download an image file.

Image File Download with the Bootloader

The following procedures download an image file to the unit after the embedded software has been erased with [Forced Reload](#) or when the embedded software cannot be started by the Bootloader. A new image file can be downloaded to the unit with ScanTool, or the Command Line Interface through the unit's serial port. In both cases, the file is transferred through Ethernet with TFTP. Because the CLI serial port option requires a serial RS-232C cable, Proxim recommends the ScanTool option.

Download with ScanTool

To download an image file with the ScanTool:

1. Set up the TFTP server as described in [TFTP Server Setup](#).
2. Run ScanTool on a computer that is connected to the same LAN subnet as the unit. ScanTool scans the subnet for units and displays the found units in the main window. If in [Forced Reload](#), ScanTool does not find the device until the unit Bootloader times out from its default operation to download an image. Click **Rescan** to re-scan the subnet and update the display until the unit shows up in Bootloader mode.
3. Select the unit to which you want to download an image file and click Change.
4. Ensure that **IP Address Type Static** is selected and fill in the following details:
 - Password
 - IP Address and Subnet Mask of the unit.
 - **TFTP Server IP Address** and, if necessary, the **Gateway IP Address** of the TFTP server.
 - **Image File Name** of the file with the new image.
5. Click **OK** to start the file transfer.

The unit downloads the image file. The TFTP server program should show download activity after a few seconds. When the download is complete, the LED pattern should return to **reboot** state. The unit is ready to start the embedded software.

After a Forced Reload procedure, the unit returns to factory default settings and must be reconfigured. ScanTool can be used to set the system name and IP address.

To access the unit, see [Logging in to the Web Interface](#).

Download with CLI

To use the CLI through the serial port of the unit, you need a connector cable with a male RJ11 and a female DB9 connector (included with the unit) and an ASCII terminal program such as HyperTerminal. Proxim recommends you switch off the unit and the computer before connecting or disconnecting the serial RS-232C cable.

To download an image file:

1. Set up the TFTP server as described in [TFTP Server Setup](#).
2. Start the terminal program (such as HyperTerminal), set the following connection properties, and then connect:
 - COM port: for example, COM1 or COM2 to which the unit serial port is connected)
 - Bits per second: 9600
 - Data bits: 8
 - Stop bits: 1
 - Flow control: None
 - Parity: None
3. Disconnect and reconnect power to reset the unit; the terminal program displays Power On Self Test (POST) messages.

Image File Download with the Bootloader

4. When the **“Sending Traps to SNMP manager periodically”** message is displayed (after about 30 seconds), press the **ENTER** key.
5. The command prompt is displayed; enter the following commands:

```
set ipaddr <IP address nit>
set ipsubmask <subnet mask>
set ipaddrtype static
set tftpipaddr <IP address TFTP server>
set tftpfilename <image file name>
set ipgw <gateway IP address>
reboot
```

For example:

```
set ipaddr 10.0.0.12
set ipsubmask 255.255.255.0
set ipaddrtype static
set tftpipaddr 10.0.0.20
set tftpfilename image.bin
set ipgw 10.0.0.30
reboot
```

The unit reboots and downloads the image file. The TFTP server program should show download activity after a few seconds. When the download is complete, the unit is ready for configuration.

To access the unit, see [Logging in to the Web Interface](#). Note that the IP configuration in normal operation differs from the IP configuration of the Boot Loader.

10

Troubleshooting

This chapter helps you to isolate and solve problems with your unit. In the event this chapter does not provide a solution, or the solution does not solve your problem, check our support website at <http://support.proxim.com>.

Before you start troubleshooting, it is important that you have checked the details in the product documentation. For details about RADIUS, TFTP, terminal and telnet programs, and Web browsers, refer to their appropriate documentation.

In some cases, rebooting the unit clears the problem. If nothing else helps, consider a [Soft Reset to Factory Default](#) or a [Forced Reload](#). The Forced Reload option requires you to download a new image file to the unit.

See the following:

- [Connectivity Issues](#)
- [Communication Issues](#)
- [Setup and Configuration Issues](#)
- [VLAN Operation Issues](#)
- [Link Problems](#)

Connectivity Issues

The issues described in this section relate to the connections of the unit.

Unit Does Not Boot

The unit shows no activity (the power LED is off).

1. Ensure that the power supply is properly working and correctly connected.
2. Ensure that all cables are correctly connected.
3. Check the power source.
4. If you are using an Active Ethernet splitter, ensure that the voltage is correct.

Serial Link Does Not Work

The unit cannot be reached through the serial port.

1. Check the cable connection between the unit and the computer.
2. Ensure that the correct COM port is used.
3. Start the terminal program; set the following connection properties (also see “HyperTerminal Connection Properties” in the *Tsunami MP.11 Reference Manual*), and then connect.
 - COM port: for example, COM1 or COM2 to which the unit serial port is connected)
 - Bits per second: 9600
 - Data bits 8
 - Stop bits: 1
 - Flow control: None
 - Parity: None
4. Ensure that the unit and the computer use the same serial port configuration parameters.

5. Disconnect and reconnect power to reset the unit. The terminal program displays Power On Self Tests (POST) messages and displays the following after approximately 90 seconds: **Please enter password:**

HyperTerminal Connection Problems

The serial connection properties can be found in HyperTerminal as follows:

1. Start HyperTerminal and select Properties from the File menu.
2. Select **Direct to Com 1** in the **Connect using:** drop-down list (depending upon the COM port you use); then click **Configure**.
3. Enter or edit the information as follows, and click **OK**.
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
4. Click the **Settings** tab and then click **ASCII Setup....**
5. Ensure that Send line ends with line feeds is selected and click OK twice. HyperTerminal is now correctly configured.

Ethernet Link Does Not Work

1. First check the Ethernet LED:
 - Solid Green: Power is on, the radio is up, and the Ethernet link is also up.
 - Blinking Green: Power is on, the radio is coming up and the Ethernet is down.
2. Verify pass-through versus cross-over cable.

Cannot Use the Web Interface

1. Open a command prompt window and enter **ping <ip address unit>** (for example **ping 10.0.0.1**). If the unit does not respond, make sure that you have the correct IP address.
If the unit responds, the Ethernet connection is working properly, continue with this procedure.
2. Ensure that you are using one of the following Web browsers:
 - Microsoft Internet Explorer version 5.0 or later (Version 6.0 or later recommended)
 - Netscape version 6.0 or later.
3. Ensure that you are not using a proxy server for the connection with your Web browser.
4. Ensure that you have not exceeded the maximum number of Web Interface or CLI sessions.
5. Double-check the physical network connections. Use a well-known unit to ensure the network connection is properly functioning.
6. Perform network infrastructure troubleshooting (check switches, routers, and so on).

Communication Issues

Two Units Are Unable to Communicate Wirelessly

If a wireless link is possible after testing two units within close distance of each other, then there are two possible reasons why wireless connectivity is not possible while the MP.11 units are at their desired locations:

1. There may be a problem in the RF path, for example, a bad connector attachment (this is the most common problem in installations) or a bad cable (water ingress).

NOTE: *The cables can be swapped with known good ones as a temporary solution to verify cable quality.*

2. Another reason may be related to an interference problem caused by a high signal level from another radio. This can be checked by changing the frequency and then verifying whether another channel works better or by changing the polarization as a way of avoiding the interfering signal. To know in advance how much interference is present in a given environment, a Spectrum Analyzer can be attached to a (temporary) antenna for measuring the signal levels on all available Channels.

NOTE: *The antennas are usually not the problem, unless mounted upside down causing the drain hole to be quickly filled with radome.*

If a wireless link is not possible after testing two units within close distance of each other, then the problem is either hardware or configuration related, such as a wrong Network name, Encryption key, Network Secret or Base Station Name. To eliminate these issues from being a factor, resetting the both units to factory defaults is the recommended solution.

If a wireless link is not possible after resetting the units and verifying that one unit is a BSU with WOPR Base interface configured and the other is a Satellite, then the problem is not configuration related and the only remaining reason is a possible hardware problem. Acquiring a third unit and then testing it amongst the existing units will help pinpoint the broken unit.

Setup and Configuration Issues

The following issues relate to setup and configuration problems.

Lost Password

If you lost your password, you must reset the unit to the default settings. See [Hard Reset to Factory Default](#). The default password is **public**.

If you record your password, keep it in a safe place.

The Unit Responds Slowly

If the unit takes a long time to become available, it could mean that:

- No DHCP server is available.
- The IP address of the unit is already in use.

Verify that the IP address is assigned only to the unit. Do this by switching off the unit and then pinging the IP address. If there is a response to the ping, another device in the network is using the same IP address. If the unit uses a static IP address, switching to DHCP mode could remedy this problem. Also see [Setting the IP Address with ScanTool](#).

- There is too much network traffic.

Web Interface Does Not Work

If you cannot connect to the unit Web server through the network:

1. Connect a computer to the serial port of the unit and check the HTTP status. The HTTP status can restrict HTTP access at different interfaces. For more information, see “Serial Port” in the *Tsunami MP.11 Reference Manual*.
2. Open a command prompt window and enter: **ping <ip address unit>** (for example **ping 10.0.0.1**)
 - If the unit does not respond, ensure that you have the correct IP address.
 - If the unit responds, the Ethernet connection is working properly; continue with this procedure.
3. Ensure that you are using one of the following Web browsers:
 - Microsoft Internet Explorer version 5.0 or later (Version 6.0 or later recommended)
 - Netscape version 6.0 or later
4. Ensure that you are not using a proxy server for the connection with your Web browser.
5. Ensure that you have not exceeded the maximum number of Web Interface sessions.

Command Line Interface Does Not Work

If you cannot connect to the unit through the network:

1. Connect a computer to the serial port of the unit and check the SNMP table. The SNMP table can restrict telnet or HTTP access. For more information, see “Serial Port” in the *Tsunami MP.11 Reference Manual*.
2. Open a command prompt window and enter: **ping <ip address unit>** (for example **ping 10.0.0.1**).
 - If the unit does not respond, ensure that you have the correct IP address.
 - If the unit responds, the Ethernet connection is working properly; continue with this procedure.
3. Ensure that you have not exceeded the maximum number of CLI sessions.

TFTP Server Does Not Work

With TFTP, you can transfer files to and from the unit. Also see [TFTP Server Setup](#). If a TFTP server is not properly configured and running, you cannot upload and download files. The TFTP server:

- Can be situated either local or remote

- Must have a valid IP address
- Must be set for send and receive without time-out
- Must be running only during file upload and download

If the TFTP server does not upload or download files, it could mean:

- The TFTP server is not running
- The IP address of the TFTP server is invalid
- The upload or download directory is not correctly set
- The file name is not correct

Online Help Is Not Available

Online help is not available:

1. Make sure that the Help files are installed on your computer or server. Also see [Step 13: Install Documentation and Software](#).
2. Verify whether the path of the help files in the Web Interface refers to the correct directory. See [Set the Help Link Location](#).

Changes Do Not Take Effect

Changes made in the Web Interface do not take effect:

1. Restart your Web browser.
2. Log into the radio unit again and make changes.
3. Reboot the radio unit when prompted to do so.

Wait until the reboot is completed before accessing the unit again.

VLAN Operation Issues

The correct VLAN configuration can be verified by “pinging” wired hosts from both sides of the device and the network switch. Traffic can be “sniffed” on the wired (Ethernet) network. Packets generated by hosts and viewed on one of the backbones should contain IEEE 802.1Q compliant VLAN headers when in Transparent mode. The VLAN ID in the headers should correspond to one of the VLAN Management IDs configured for the unit in Trunk mode.

The correct VLAN assignment can be verified by pinging:

- The unit to ensure connectivity
- The switch to ensure VLAN properties
- Hosts past the switch to confirm the switch is functional

Ultimately, traffic can be “sniffed” on the Ethernet interface using third-party packages. Most problems can be avoided by ensuring that 802.1Q compliant VLAN tags containing the proper VLAN ID have been inserted in the bridged frames. The VLAN ID in the header should correspond to the assigned VLAN.

What if network traffic is being directed to a nonexistent host?

- All sessions are disconnected, traffic is lost, and a manual override is necessary.
- Workaround: You can configure the switch to mimic the nonexistent host.

Link Problems

While wireless networking emerges more and more, the number of wireless connections to networks grows every day. The Tsunami MP.11 unit is one of the successful product families used by customers today who enjoy the day after day high-speed, cost-effective connections. To successfully use the connections, technicians must be able to troubleshoot the system effectively. This section gives hints on how a unit network could be analyzed in the case of “no link,” a situation in which the customer thinks that the link is down because there is no traffic being passed.

The four general reasons that a wireless link may not work are related to:

- Hardware
- Configuration
- Path issues (such as distance, cable loss, obstacles)
- Environment (anything that is outside the equipment and not part of the path itself)

You have tested the equipment in the office and have verified that the hardware and configurations are sound. The path calculation has been reviewed, and the path has been double-checked for obstacles and canceling reflections. Still, the user reports that the link does not work.

Most likely, the problem reported is caused by the environment or by improper tests to verify the connection. This article assumes that the test method, cabling, antennas, and antenna alignment have been checked. Always do this before checking the environment.

General Check

Two general checks are recommended before taking any action:

- Check whether the software version at both sides is the most current
- Check for any reported alarm messages in the Event Log

Statistics Check

Interference and other negative environment factors always have an impact on the number of correctly received frames. The Tsunami MP.11 models give detailed information about transmission errors in the Web interface, under **Monitor**.

The windows that are important for validating the health of the link are:

- **Monitor / Wireless / General (Lowest level of the wireless network):** Check FCS errors: Rising FCS errors indicate interference or low fade margin. So does **Failed count**. If only one of those is high, this indicates that a source of interference is significant near one end of the link.
- **Monitor / Interfaces / Wireless (One level higher than Wireless / General):** The information is given after the wireless Ethernet frame is converted into a normal Ethernet frame. The parameters shown are part of the MIB-II.
 - Both operational and admin status should be **up**. An admin status of **down** indicates that the interface is configured to be down.
 - **In Discards** and **Out Discards** indicate overload of the buffers, likely caused by network traffic, which is too heavy.
 - **In Errors** and **Out Errors** should never happen; however, it might happen if a frame's FCS was correct while the content was still invalid.
- **Monitor / Wireless / WORP (Statistics on WORP):** WORP runs on top of normal Ethernet, which means that the WORP frame is in fact the data field of the Ethernet frame. **Send Failure** or **Send Retries** must be low in comparison to **Send Success**. **Low** is about 1%. The same applies for **Receive Success** versus **Receive Retries** and **Receive Failures**. Note that the **Receive Failures** and **Retries** can be inaccurate. A frame from the remote site might have been transmitted without even being received; therefore, the count of that frame might not have been added to the statistics and the receiver simply could not know that there was a frame.

- **Remote Partners** indicates how many SUs are connected (in case of a BSU) or whether a Base is connected (in case of a Subscriber).
- **Base Announces** should increase continuously.
- **Registration Requests** and **Authentication Requests** should be divisible by 3. WOPR is designed in a way that each registration sequence starts with 3 identical requests. It is not a problem if, once in a while, one of those requests is missing. Missing requests frequently is to be avoided.
- **Monitor / Per Station (Information per connected remote partner):** Check that the received signal level (RSL) is the same on both sides; this should be the case if output power is the same. Two different RSLs indicate a broken transmitter or receiver. A significant difference between Local Noise and Remote Noise could indicate a source of interference near the site with the highest noise. Normally, noise is about –80 dBm at 36 Mbps. This number can vary from situation to situation, of course, also in a healthy environment.
- **Monitor / Link Test (Information used by Administrators for on-the-spot checking):** Check the received signal level (RSL) and noise level. Compare the RSL with the values from path analysis. If the figures differ significantly from the values recorded at the Per Station window, check for environment conditions that change over time.

Analyzing the Spectrum

The ultimate way to discover whether there is a source of interference is to use a spectrum analyzer. Usually, the antenna is connected to the analyzer when measuring. By turning the antenna 360 degrees, one can check from which direction the interference is coming. The analyzer will also display the frequencies and the level of signal is detected.

Proxim recommends performing the test at various locations to find the most ideal location for the equipment.

Avoiding Interference

When a source of interference is identified and when the level and frequencies are known, the next step is to avoid the interference. Some of the following actions can be tried:

- Changing the channel to a frequency away from the interference is the first step in avoiding interference. For countries that require DFS, it might be not possible to manually select a different frequency.
- Each antenna has a polarization; try to change to a polarization different from the interferer.
- A small beam antenna looks only in one particular direction. Because of the higher gain of such an antenna, lowering the output power or adding extra attenuation might be required to stay legal. This solution cannot help when the source of interference is right behind the remote site.
- Lowering the antennas can help avoid seeing interference from far away.

Move the antennas to a different location on the premises. This causes the devices to look from a different angle, causing a different pattern in the reception of the signals. Use obstructions such as buildings, when possible, to shield from the interference.

Conclusion

A spectrum analyzer can be a great help to identify whether interference might be causing link problems on Tsunami MP.11 systems.

Before checking for interference, the link should be verified by testing in an isolated environment, to make sure that hardware works and your configurations are correct. The path analysis, cabling and antennas should be checked as well.

Statistics in the web interface under Monitor tell if there is a link, if the link is healthy, and a continuous test can be done using the Link Test.



Frequency Bands and Channels

The following table contains information on frequency band and allowed channels/center frequencies by bandwidth.

Frequency Bands	Allowed Channels (Center Freq)		
	5 MHz	10 MHz	20 MHz
4.945 -4.990 GHz	10 (4945), 20 (4950), 30 (4955), 40 (4960), 50 (4965), 60 (4970), 70 (4975), 80 (4980) 90 (4985), 100 (4990)	10 (4945), 20 (4950), 30 (4955), 40 (4960), 50 (4965), 60 (4970), 70 (4975), 80 (4980) 90 (4985)	20 (4950), 30 (4955), 40 (4960), 50 (4965), 60 (4970), 70 (4975), 80 (4980)

B

Technical Specifications

Please see the following sections:

- [Part Numbers](#)
- [Regulatory Approvals and Frequency Ranges](#)
- [Integrated Antenna Specifications](#)
- [RF Modulation and Over-the-Air Rates](#)
- [Wireless Protocol](#)
- [Device Interface](#)
- [Network Architecture Type](#)
- [Receive Sensitivity](#)
- [Maximum Throughput](#)
- [Latency](#)
- [Transmit Power Settings](#)
- [Range Information](#)
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Part Numbers

Base Station Unit

Part Number	Description
4954-BSUR-US	Tsunami MP.11 Model 4954-R Base Station Unit with Type-N Connector – US PSU

Subscriber Unit

Part Number	Description
4954-SUA-US	Tsunami MP.11 Model 4954-R Subscriber Unit with Type-N Connector – US PSU
4954-SUR-US	Tsunami MP.11 Model 4954-R Subscriber Unit with Integrated 23-dBi Antenna – US PSU

Accessories

Part Number	Description
5054-SURGE	Surge Arrestor 0-6 GHz - Standard-N Female to Female
848 274 171	20 ft Low Loss Antenna Cable St-N - Male-Male LMR 200
848 332 789	20 ft Low Loss Antenna Cable St-N - Male-Male LMR 400
848 274 197	50 ft Low Loss Antenna Cable St-N - Male-Male LMR 400
848 274 205	75 ft Low Loss Antenna Cable St-N - Male-Male LMR 400
69828	6 ft Low Loss Antenna Cable St-N - Male-Male LMR 600
5054-LMR600-50	50 ft Low Loss Antenna Cable St-N - Male-Male LMR 600
70251	PoE (Power over Ethernet) Surge Arrestor for Tsunami MP.11 and QuickBridge.11

Outdoor Ethernet Cables

Part Number	Description
69819	25m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap
69820	50m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap
69821	75m outdoor, terminated CAT5 cable for Tsunami MP.11 or QB.11 with three RJ-45 and one weather-proof Ethernet port cap

Power Injector

Part Number	Description
69823	Spare Power DC Injector for Tsunami MP.11 or QB.11 (-R model ONLY)

Regulatory Approvals and Frequency Ranges

Model 4954-R Regulatory Approval and Frequency Ranges

Region/Country	Country	GHz	Number of Channels			Certification
			5 MHz	10 MHz	20 MHz	
North America	USA	4.945-4.990	Up to 10	Up to 9	Up to 7	Yes
	Canada	4.945-4.990	Up to 10	Up to 9	Up to 7	In Progress

Integrated Antenna Specifications

Subscriber Unit with Integrated 21-dBi Antenna

Feature	Specification
Part Number	4954-SUR-xx
Frequency range	4900 - 5100 MHz
Nominal Impedance	50 ohms
Gain	21 dBi
Front-to-Back Ratio	35 dB
HPBW/vertical	10 degrees
HPBW/horizontal	10 degrees
Cross Polarization	23 dB
Power handling	1 W (cw)
VSWR	1.5: 1 Max

RF Modulation and Over-the-Air Rates

OFDM (Orthogonal Frequency Division Multiplexing)

- Maximum Packet Size: 1522 Bytes
- Modulation Rates:

Modulation	Rate		
	20 MHz Channels	10 MHz Channels	5 MHz Channels
BPSK	6 and 9 Mbps	3 and 4.5 Mbps	2.25 and 1.5 Mbps
QPSK	12 and 18 Mbps	6 and 9 Mbps	3 and 4.5 Mbps
16-QAM	24 and 36 Mbps	12 and 18 Mbps	6 and 9 Mbps

Wireless Protocol

- Worp (Wireless Outdoor Router Protocol)

Device Interface

- Ethernet: Auto-sensing 10/100BASE-TX Ethernet
- Antenna Connector for BSU and SU with Type-N Connector: Standard Type-N Female

Network Architecture Type

- Infrastructure

Receive Sensitivity

- BER=10⁻⁶

Maximum Throughput

Data Rate	40 MHz Channels (US Only)	20 MHz Channels	10 MHz Channels	5 MHz Channels Standard Mode
108 Mbps Turbo 54	31 Mbps	—	—	—
96 Mbps Turbo 48	28 Mbps	—	—	—
72 Mbps Turbo 36	28 Mbps	—	—	—
48 Mbps Turbo 24	28 Mbps	—	—	—
36 Mbps Turbo 18	24 Mbps	—	—	—
24 Mbps Turbo 12	19 Mbps	—	—	—
54 Mbps	—	29 Mbps	—	—
48 Mbps	—	27 Mbps	—	—
36 Mbps	—	22 Mbps	—	—
24 Mbps	—	16 Mbps	16 Mbps	—
18 Mbps	—	13 Mbps	13 Mbps	—
12 Mbps	—	9 Mbps	9 Mbps	—
9 Mbps	—	7 Mbps	7 Mbps	7 Mbps
6 Mbps	—	5 Mbps	5 Mbps	4.7 Mbps
4.5 Mbps	—	—	3.6 Mbps	3.8 Mbps
3 Mbps	—	—	2.4 Mbps	2.7 Mbps
2.25 Mbps	—	—	—	2 Mbps
1 Mbps	—	—	—	1.2 Mbps

NOTE: Maximum-throughput data with release 2.3, as measured with test equipment under controlled lab conditions and best performing packet size. In some instances, data compression yields throughput equal to the configured data rate. Actual throughput performance in the field may vary.

Latency

- < 10ms typical at maximum throughput (as measured with test equipment under controlled lab conditions and best performing packet size)

Transmit Power Settings

- Output Power Attenuation: 0 - 18dB, in 3dB steps

Range Information

- Output Power Values will have a tolerance of +/- 1.5 dB

Frequency	6-24 Mbps @ 20 MHz 16QAM $\frac{1}{2}$; QPSK $\frac{3}{4}$; QPSK $\frac{1}{2}$; BPSK $\frac{3}{4}$; BPSK $\frac{1}{2}$	36 Mbps @ 20 MHz 16QAM $\frac{3}{4}$	48 Mbps @ 20 MHz 64QAM $\frac{1}{2}$	54 Mbps @ 20 MHz 64QAM $\frac{3}{4}$
5.15-5.35 GHz	15 dBm	13 dBm	12 dBm	11 dBm
5.47-5.725 GHz	16 dBm	13 dBm	12 dBm	11 dBm
5.725-5.850 GHz	16 dBm	13 dBm	12 dBm	11 dBm

Range Information

Integrated Antenna

Frequency	36 Mbps	6 Mbps
5.15-5.35 GHz (US)	1.2 mi/2.0 km	3.0 mi/4.8 km
5.47-5.7 GHz (ETSI)	1.1 mi/1.8 km	3.1 mi/5.0 km
5.725-5.850 GHz (US)	2.1 mi/3.8 km	6.4 mi/10.3 km

External Antenna

Frequency	36 Mbps	6 Mbps
5.15-5.35 GHz (US)	1.2mi/2.0 km	3.2mi/5.1 km
5.47-5.7 GHz (ETSI)	1.1mi/1.8 km	3.1mi/5.0 km
5.725-5.850 (US)	4.1mi/6.6 km	12.5mi/20.1 km

Notes

Note the following:

- PMP configuration using USA regulations for L and U bands, ETSI regulations for M bands
- Clear LOS
- 99.995% availability
- Sector antenna (17 dBi, 60-degrees) at BSU with short 1 dB jumper cable
- Fade margin minimum of 10 dB to 2 miles, 0.2 dB additional fade margin for every 0.1 mile to 15 dB
- Predicted availability >99.990% (one-way) for all configurations
- Distance calculations for 5 and 10 MHz channels are comparable for ETSI regulatory domains. Proper TPC settings (3 and 6 dB) respectively, should be set to meet power density rules. Increased distances are possible in the US with proper link engineering.

System Processor and Memory

- 166 MHz Motorola 8241 processor
- 16 Mbytes RAM
- 8 Mbytes FLASH

Software Specification

Base Station and Subscriber Units

- Miscellaneous
 - WORP protocol
 - Dynamic Data Rate Selection
 - Transmit Power Control
 - Antenna Alignment
 - Integrity Check for Software Upload
 - 5, 10, and 20 MHz channels
- Satellite Density
 - Dynamic Frequency Selection
- Redundancy
 - Spanning Tree (802.1D)
- Bridging and Routing
 - Bridge (802.1d)
 - IP/ RIPv1 (RFC 1058)
 - IP/ RIPv2 (RFC 1388)
 - CIDR (RFC 1519)
 - ICMP (RFC 792)
 - IP (RFC 791)
 - ARP (RFC 826)
- Filtering
 - Ethernet protocol (Ethertype)
 - Static MAC
 - Storm threshold
 - IP address
 - Broadcast protocol
- Services
 - DHCP Server (RFC 2131)
 - DHCP Client (RFC 2131)
 - Bi-Directional Bandwidth Control
- VLAN
 - 802.1Q
- Security Features
 - MAC Authentication
 - Radius MAC Access Control
 - WEP/AES-OCB encryption
 - RADIUS (RFC 2138)
- Mobility
 - Subscriber Unit Roaming

Base Station Unit

- Filtering
 - Intra Cell Blocking

Subscriber Units

- Services
 - NAT (RFC 3022)
 - DHCP Relay (RFC 2131)

Security

- WOPR provides critical feature support for secure long-range wireless deployments in unlicensed frequency spectrum.
- MD5 (embedded in WOPR) authentication between BSU and SU.
- Filter based on packet information such as unicast/multicast/ broadcast MAC or IP.
- Secure “over the air encryption” with WEP, WEP+, and AES, and AES-CCB.
- Authentication via Radius
- Intracell blocking allows the BSU to act as the central policy enforcer for SU to SU communications.

Management

- SU/BSU statistics
- Link Test
- Temperature logging
- SNMP v1/v2 (RFC 1157)
- SNMP v2c (RFC 1907)
- HTTP Server (RFC 2616)
- Telnet (RFC 855)
- TFTP client (RFC 783)
- CLI
- MIB-II (RFC 1213)
- Ethernet-like MIB (RFC 1643)
- Bridge MIB (RFC 1493)
- 802.3MAU (RFC 2668)
- 802.11 MIB
- Remote reboot (reload) or reset to factory default via power injector
- Private MIB
- Orinoco MIB

Antenna

- Audible tone
- CLI output

Status LEDs

- Two indicators on the RJ-45 connector to indicate power, wireless traffic, and Ethernet traffic

Local Configuration Support

- RS-232 Serial port
 - RJ11 port built-into the unit
 - DB9 Female via a converter (included)

Compliance and Standards

Safety

- UL: 60950, UL50
- CSA: 22.2 No. 60950-00
- IEC: 60950 3rd Ed (1999)

Radio Approvals

- USA: FCC 15.107, 15-109; 15-203-15.205, 15.207, 15.209; 15.247; 15.401-15.407
- Canada: RSS-102; RSS-210; ICES-003
- Europe (ETSI): EN 301.893; EN 300.328; EN 301.489-1; EN 301.489-17; EN 300-440; EN50371
- ARIB: STD-T71, STD 33, STD 66

EMI and Susceptibility (Class B)

- USA: FCC Part 15.107
- Canada: ICES-003

Water and Dust Proof

- NEMA4/IP56

Electrical

PoE Power Injector

- Custom Power over Ethernet (802.3af compatible)
- Input: Voltage 110 to 250 VAC (47-6 3Hz)
- Output: 48V @ 420mA MAX (injected into the Cat-5 Cable)
- Pin for Remote reboot (reload) or reset to factory default

Outdoor Radio Unit

- Power Consumption: 7.5W typical. Up to 20 Watts across full operating temperature range.
- Input: Voltage 42 to 60 VDC

Dimensions

Base Station and Subscriber Unit

- Packaged: 14.57 in x 13.70 in x 8.19 in (370 mm x 348 mm x 208 mm)

Base Station and Subscriber Unit with Type-N Connector

- Unpackaged: 10.5 in x 10.5 in x 3.25 in (267 mm x 267 mm x 83 mm)

Subscriber Unit with Integrated 21-dBi Antenna Unpackaged: 12.60 in x 12.60 in x 3.50 in (320 mm x 320 mm x 18 mm) **Weight**

Base Station and Subscriber Unit with Type-N Connector

- Packaged weight: 9.2 lbs (4.2 kg)
- Unpackaged weight: 5.5 lbs (2.49 kg) Unit-only,.45 lbs (.20 kg) for power supply

Subscriber Unit with Integrated 21-dBi or 16-dBi Antenna Packaged weight: 10.1 lbs (4.6 kg)

- Unpackaged weight: 6.0 lbs (2.72 kg) Unit-only,.45 lbs (.20 kg) for power supply

Environmental

Operating

- -33° to 60° C (-27.5° to 140° Fahrenheit)
- 100% humidity
- Wind loading: 125 mph

Storage

- -55° to 80° C (-41° to 176° Fahrenheit)
- 100% humidity

Packaging Contents

- One Tsunami MP.11 Model 4954-R Base Station or Subscriber Unit
- One wall/ pole mounting bracket
- One Power-Over-Ethernet injector for Model 4954-R
- One country specific power cord
- One Ethernet cable weather-proof plug
- One Documentation and Software CD-ROM

MTBF

- 100,000 hours

Warranty

- One year

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Lightning Protection

Lightning protection is used to maximize the reliability of communications equipment by safely re-directing current from a lightning strike or a power surge traveling along the Cat 5 Ethernet cabling to ground using the shortest path possible. Designing a proper grounding system prior to installing any communications equipment is critical to minimize the possibility of equipment damage, void warranties, and cause serious injury.

The surge arrestor (sometimes referred to as a lightning protector) can protect your sensitive electronic equipment from high-voltage surges caused by discharges and transients at the PoE.

Proxim Wireless offers superior lightning and surge protection for Tsunami MP.11 and Tsunami QuickBridge.11 products. Contact your reseller or distributor for more information.

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Technical Services and Support

Obtaining Technical Services and Support

If you are having trouble utilizing your Proxim product, please review this manual and the additional documentation provided with your product.

If you require additional support and would like to use Proxim's free Technical Service to help resolve your issue, please be ready to provide the following information before you contact Proxim's Technical Services:

- **Product information:**
 - Part number of suspected faulty unit
 - Serial number of suspected faulty unit
- **Trouble/error information:**
 - Trouble/symptom being experienced
 - Activities completed to confirm fault
 - Network information (what kind of network are you using?)
 - Circumstances that preceded or led up to the error
 - Message or alarms viewed
 - Steps taken to reproduce the problem
- **Servpak information (if a Servpak customer):**
 - Servpak account number
- **Registration information:**
 - If the product is not registered, date when you purchased the product
 - If the product is not registered, location where you purchased the product

NOTE: If you would like to register your product now, visit the Proxim eService Web Site at <http://support.proxim.com> and click on **New Product Registration**.

Support Options

Proxim eService Web Site Support

The Proxim eService Web site is available 7x24x365 at <http://support.proxim.com>.

On the Proxim eService Web Site, you can access the following services:

- **New Product Registration:** Register your product for free support.
- **Open a Ticket or RMA:** Open a ticket or RMA and receive an immediate reply.
- **Search Knowledgebase:** Locate white papers, software upgrades, and technical information.
- **ServPak (Service Packages):** Receive Advanced Replacement, Extended Warranty, 7x24x365 Technical Support, Priority Queuing, and On-Site Support.
- **Your Stuff:** Track status of your tickets or RMAs and receive product update notifications.
- **Provide Feedback:** Submit suggestions or other types of feedback.
- **Customer Survey:** Submit an On-Line Customer Survey response.
- **Repair Tune-Up:** Have your existing Proxim equipment inspected, tested, and upgraded to current S/W and H/W revisions, and extend your warranty for another year.

Telephone Support

Contact technical support via telephone as follows:

- **Domestic:** 866-674-6626
- **International:** +1-408-542-5390

Hours of Operation

- **North America:** 8 a.m. to 5 p.m. PST, Monday through Friday
- **EMEA:** 8 a.m. to 5 p.m. GMT, Monday through Friday

ServPak Support

Proxim understands that service and support requirements vary from customer to customer. It is our mission to offer service and support options that go above-and-beyond normal warranties to allow you the flexibility to provide the quality of service that your networks demand.

In recognition of these varying requirements we have developed a support program called ServPak. ServPak is a program of Enhanced Service Options that can be purchased individually or in combinations to meet your needs.

- **Advanced Replacement:** This service offers customers an advance replacement of refurbished or new hardware. (Available in the U.S., Canada, and select countries. Please inquire with your authorized Proxim distributor for availability in your country.)
- **Extended Warranty:** This service provides unlimited repair of your Proxim hardware for the life of the service contract.
- **7x24x365 Technical Support:** This service provides unlimited, direct access to Proxim's world-class technical support 24 hours a day, 7 days a week, 365 days a year.
- **Priority Queuing:** This service allows your product issue to be routed to the next available Customer Service Engineer.

To purchase ServPak support services, please contact your authorized Proxim distributor. To receive more information or for questions on any of the available ServPak support options, please call Proxim Support at +1-408-542-5390 or send an email to servpak@proxim.com.



Statement of Warranty

Warranty Coverage

Proxim Wireless Corporation warrants that its Products are manufactured solely from new parts, conform substantially to specifications, and will be free of defects in material and workmanship for a Warranty Period of **1 year** from the date of purchase.

Repair or Replacement

In the event a Product fails to perform in accordance with its specification during the Warranty Period, Proxim offers return-to-factory repair or replacement, with a thirty (30) business-day turnaround from the date of receipt of the defective Product at a Proxim Wireless Corporation Repair Center. When Proxim Wireless has reasonably determined that a returned Product is defective and is still under Warranty, Proxim Wireless shall, at its option, either: (a) repair the defective Product; (b) replace the defective Product with a refurbished Product that is equivalent to the original; or (c) where repair or replacement cannot be accomplished, refund the price paid for the defective Product. The Warranty Period for repaired or replacement Products shall be ninety (90) days or the remainder of the original Warranty Period, whichever is longer. This constitutes Buyer's sole and exclusive remedy and Proxim Wireless's sole and exclusive liability under this Warranty.

Limitations of Warranty

The express warranties set forth in this Agreement will not apply to defects in a Product caused; (i) through no fault of Proxim Wireless during shipment to or from Buyer, (ii) by the use of software other than that provided with or installed in the Product, (iii) by the use or operation of the Product in an application or environment other than that intended or recommended by Proxim Wireless, (iv) by modifications, alterations, or repairs made to the Product by any party other than Proxim Wireless or Proxim Wireless's authorized repair partners, (v) by the Product being subjected to unusual physical or electrical stress, or (vii) by failure of Buyer to comply with any of the return procedures specified in this Statement of Warranty.

Support Procedures

Buyer should return defective LAN¹ Products within the first 30 days to the merchant from which the Products were purchased. Buyer can contact a Proxim Wireless Customer Service Center either by telephone or via web. Calls for support for Products that are near the end of their warranty period should be made not longer than seven (7) days after expiration of warranty. Repair of Products that are out of warranty will be subject to a repair fee. Contact information is shown below. Additional support information can be found at Proxim Wireless's web site at <http://support.proxim.com>.

- **Domestic:** 866-674-6626
- **International:** +1-408-542-5390

Hours of Operation

- **North America:** 8 a.m. to 5 p.m. PST, Monday through Friday
- **EMEA:** 8 a.m. to 5 p.m. GMT, Monday through Friday

When contacting the Customer Service for support, Buyer should be prepared to provide the Product description and serial number and a description of the problem. The serial number should be on the product.

In the event the Customer Service Center determines that the problem can be corrected with a software update, Buyer might be instructed to download the update from Proxim Wireless's web site or, if that's not possible, the update will be sent to Buyer. In the event the Customer Service Center instructs Buyer to return the Product to Proxim Wireless for

1. LAN products include: ORINOCO™

repair or replacement, the Customer Service Center will provide Buyer a Return Material Authorization ("RMA") number and shipping instructions. Buyer must return the defective Product to Proxim Wireless, properly packaged to prevent damage, shipping prepaid, with the RMA number prominently displayed on the outside of the container.

Calls to the Customer Service Center for reasons other than Product failure will not be accepted unless Buyer has purchased a Proxim Wireless Service Contract or the call is made within the first thirty (30) days of the Product's invoice date. Calls that are outside of the 30-day free support time will be charged a fee of \$25.00 (US Dollars) per Support Call.

If Proxim Wireless reasonably determines that a returned Product is not defective or is not covered by the terms of this Warranty, Buyer shall be charged a service charge and return shipping charges.

Other Information

Search Knowledgebase

Proxim Wireless stores all resolved problems in a solution database at the following URL: <http://support.proxim.com>.

Ask a Question or Open an Issue

Submit a question or open an issue to Proxim Wireless technical support staff at the following URL: <http://support.proxim.com/cgi-bin/proxim.cfg/php/enduser/ask.php>.

Other Adapter Cards

Proxim Wireless does not support internal mini-PCI devices that are built into laptop computers, even if identified as "ORINOCO" devices. Customers having such devices should contact the laptop vendor's technical support for assistance.

For support for a PCMCIA card carrying a brand name other than Proxim, ORiNOCO, Lucent, Wavelan, or Skyline, Customer should contact the brand vendor's technical support for assistance.