Chapter 6: Configuration and alignment

This chapter describes how to use the web interface to configure the PTP 700 link. It also describes how to align antennas. This chapter contains the following topics:

- Preparing for configuration and alignment on page 6-2
- Connecting to the unit on page 6-4
- Using the web interface on page 6-6
- Installation menu on page 6-9
- System menu on page 6-30
- Management menu on page 6-58
- SNMP pages (for SNMPv3) on page 6-80
- SNMP pages (for SNMPv1/2c) on page 6-89
- Security menu on page 6-93
- Configuring security for FIPS 140-2 applications on page 6-105
- Aligning antennas on page 6-108
- Other configuration tasks on page 6-116

Preparing for configuration and alignment

This section describes the checks to be performed before proceeding with unit configuration and antenna alignment.

Safety precautions

All national and local safety standards must be followed while configuring the units and aligning the antennas.

Warning

Ensure that personnel are not exposed to unsafe levels of RF energy. The units start to radiate RF energy as soon as they are powered up. Respect the safety standards defined in Compliance with safety standards on page 4-22, in particular the minimum separation distances.

Observe the following guidelines:

- Never work in front of the antenna when the ODU is powered.
- Always power down the PSU before connecting or disconnecting the drop cable from the PSU, ODU or LPU.

Warning

When installing the PTP 700 ATEX/HAZLOC product variants in hazardous locations, follow the instructions contained in the PTP 700 Series Hazardous Location Guide (supplied in box with the products), in addition to the instructions in this user guide.

Regulatory compliance

All applicable radio regulations must be followed while configuring the units and aligning the antennas. For more information, refer to Compliance with radio regulations on page 4-28.

Caution

If the system designer has provided a list of channels to be barred for TDWR radar avoidance, the affected channels must be barred before the units are allowed to radiate on site, otherwise the regulations will be infringed. To bar these channels, follow the procedure Barring channels on page 7-39.

Attention

Si le concepteur du système a fourni une liste de canaux à interdire pour éviter les radars TDWR, les cannaux concernées doivent être interdits avant que les unités sont autorisées à émettre sur le site, sinon la réglementation peut être enfreinte. Pour bloquer ces canaux, suivez la procédure Barring channels page 7-39.

Selecting configuration options

Use the installation report to determine which configuration options are required. Refer to LINKPlanner on page 3-25.

Generating license keys

To obtain License Keys for capabilities that are not factory-installed, proceed as follows:

1. Identify and purchase access keys for the required capability upgrades by referring to ODU capability upgrades on page 2-8.
2. Obtain the MAC Address of the ODU (it is on the System Status page).
3. Go to the Cambium Support web page (see Contacting Cambium Networks on page 1) and navigate to the **Cambium Networks License Key Generator**.
4. Enter the MAC Address and Access Key.
5. Select the country of operation for the link. The list of available countries depends on the regional variant; not all countries are available in all variants. The generated license will automatically include all of the regulatory bands approved for that country.
6. Select any other required capabilities from those that are available.
7. Submit the web form. Cambium will send the License Key by email.

Use the Software License Key page to configure the ODU with newlicense keys (Software License Key page on page 6-11).

Connecting to the unit

This section describes how to connect the unit to a management PC and power it up.

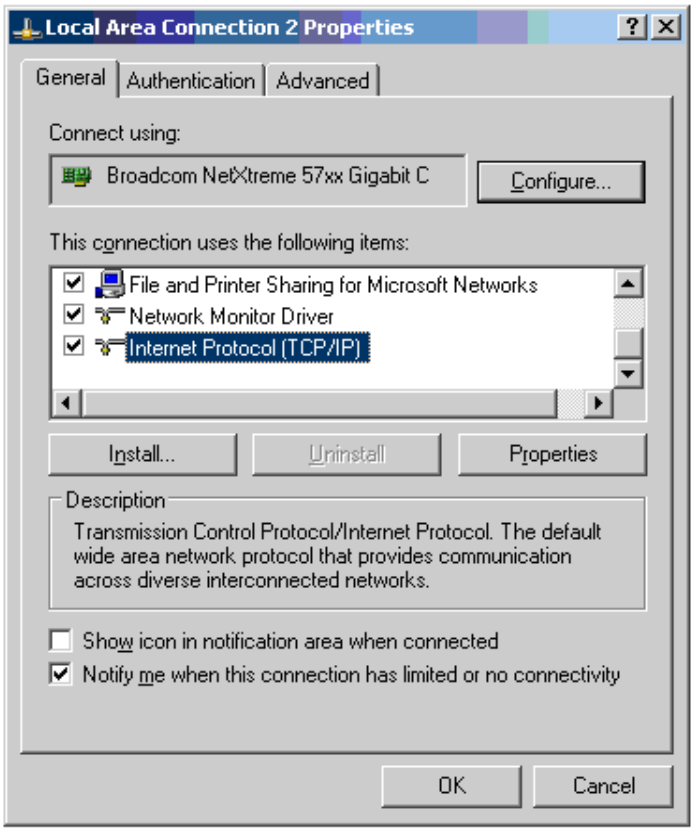
Configuring the management PC

Use this procedure to configure the local management PC to communicate with the PTP 700.

Procedure:

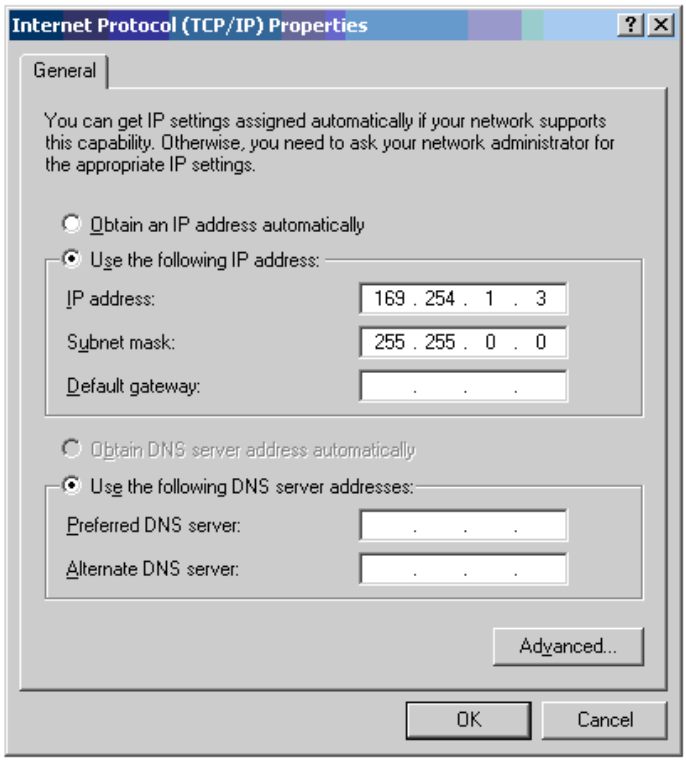
1 Select **Properties** for the Ethernet port. In Windows 7 this is found in **Control Panel > Network and Internet > Network Connections > Local Area Connection**.

2 Select **Internet Protocol (TCP/IP)**:



3 Click **Properties**.

4 Enter an IP address that is valid for the 169.254.X.X network, avoiding 169.254.0.0 and 169.254.1.1. A good example is 169.254.1.3:



5 Enter a subnet mask of 255.255.0.0. Leave the default gateway blank.

Connecting to the PC and powering up

Use this procedure to connect a management PC and power up the PTP 700.

Procedure:

1 Check that the ODU and PSU are correctly connected.

2 Connect the PC Ethernet port to the LAN port of the PSU using a standard (not crossed) Ethernet cable.

3 Apply mains or battery power to the PSU. The green Power LED should illuminate continuously.

4 After about 45 seconds, check that the orange Ethernet LED starts with 10 slow flashes.

5 Check that the Ethernet LED then illuminates continuously. If the Power and Ethernet LEDs do not illuminate correctly, refer to Testing link end hardware on page 8-7.

Using the web interface

This section describes how to log into the PTP 700 web interface and use its menus.

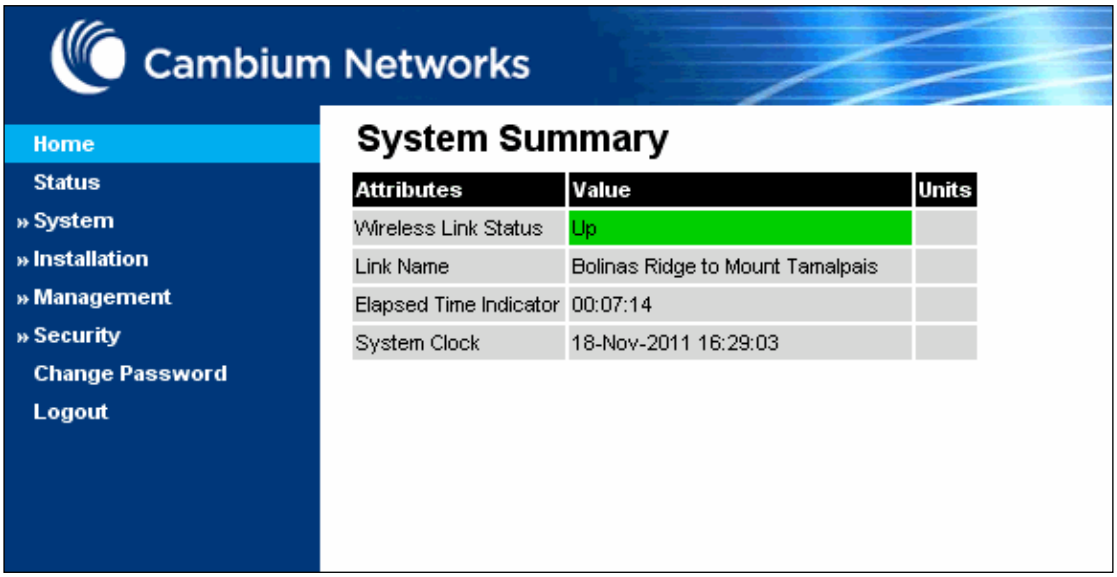
Logging into the web interface

Use this procedure to log into the web interface as a system administrator.

Procedure:

1 Start the web browser from the management PC.

2 Type the IP address of the unit into the address bar. The factory default IP address is **169.254.1.1**. Press ENTER. The web interface menu and System Summary page are displayed:



3 On the menu, click **System**. The login page is displayed with Password only (the default) or with Username and Password (if identity-based user accounts have been enabled):

4 Enter Username (if requested) and Password (the default is blank) and click **Login**.

Using the menu options

Use the menu navigation bar in the left panel to navigate to each web page. Some of the menu options are only displayed for specific system configurations. Use Table 115 to locate information about using each web page.

Table 115 Menu options and web pages

Main menu	Menu option	Web page information
Home		System Summary page on page 7-2
Status		System Status page on page 7-3
System		
	Configuration	System Configuration page on page 6-30
	LAN Configuration	LAN Configuration page on page 6-34
	QoS Configuration	QoS Configuration page on page 6-44
	SFP Configuration	SFP Configuration page on page 6-48
	TDM Configuration	TDM Configuration page on page 6-50
	Save and Restore	Save and Restore Configuration page on page 6-52
	Reset Configuration	Reset Configuration page on page 6-54
	Spectrum Expert	Spectrum Management on page 7-26
	Statistics	System Statistics page on page 7-47 Comparing actual to predicted performance on page 6-115
	Wireless Port Counters	Wireless Port Counters page on page 7-52 Test Ethernet packet errors reported by ODU on page 8-11
	Main Port Counters	Main Port Counters page on page 7-53
	Aux Port Counters	Aux Port Counters page on page 7-56
	SFP Port Counters	SFP Port Counters page on page 7-57
	SyncE Status	SyncE Status page on page 7-58
	Diagnostics Plotter	Diagnostics Plotter page on page 7-61
	CSV Download	Generate Downloadable Diagnostics page on page 7-62
	Cable Diagnostics	Cable Diagnostics on page 8-2

Main menu	Menu option	Web page information
	Software Upgrade	Software Upgrade page on page 6-55
	Reboot	Reboot Wireless Unit page on page 7-15
Installation		Installation menu on page 6-9
	Graphical Install	Graphical Install page on page 6-113
Management		
	Web	Web-Based Management page on page 6-58
	Local User Accounts	Local User Accounts page on page 6-61
	RADIUS Configuration	RADIUS Configuration page on page 6-66
	Login Information	Login Information page on page 7-15
	Web Properties	Webpage Properties page on page 6-68
	SNMP	SNMP pages (for SNMPv3) on page 6-80 SNMP pages (for SNMPv1/2c) on page 6-89
	Email	Email Configuration page on page 6-71
	Diagnostic Alarms	Diagnostic Alarms page on page 6-73
	Time	Time Configuration page on page 6-74
	Syslog	Syslog page on page 7-22
	Syslog Configuration	Syslog Configuration page on page 6-78
Security		Security menu on page 6-93
	Zeroize CSPs	Zeroize CSPs page on page 6-104
Change Password		Change Password page on page 7-16
Logout		Logging out on page 7-16

Installation menu

This section describes how to use the Installation Wizard to complete the essential system configuration tasks that must be performed on a new link.

Caution

If the system designer has provided a list of channels to be barred for TDWR radar avoidance, the affected channels must be barred before the units are allowed to radiate on site, otherwise the regulations will be infringed. To bar these channels, follow the procedure Barring channels on page 7-39.

Starting the Installation Wizard

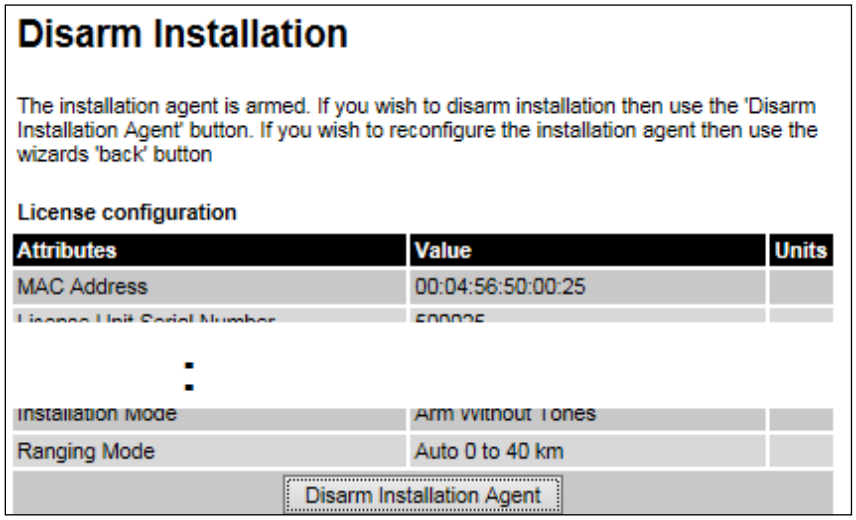
To start the Installation Wizard: on the menu, click **Installation**. The response depends upon the state of the unit:

- If the unit is newly installed, the Software License Key page is displayed. Continue at Software License Key page on page 6-11.
- If the unit is armed for alignment, the Disarm Installation page is displayed. Continue at Disarm Installation page on page 6-10.
- If the unit is not armed, the Current Installation Summary page is displayed. Continue at Current Installation Summary page on page 6-10.

Disarm Installation page

Menu option: **Installation** (Figure 123). This page is displayed only when unit is armed.

Figure 123 Disarm Installation page (top and bottom of page shown)

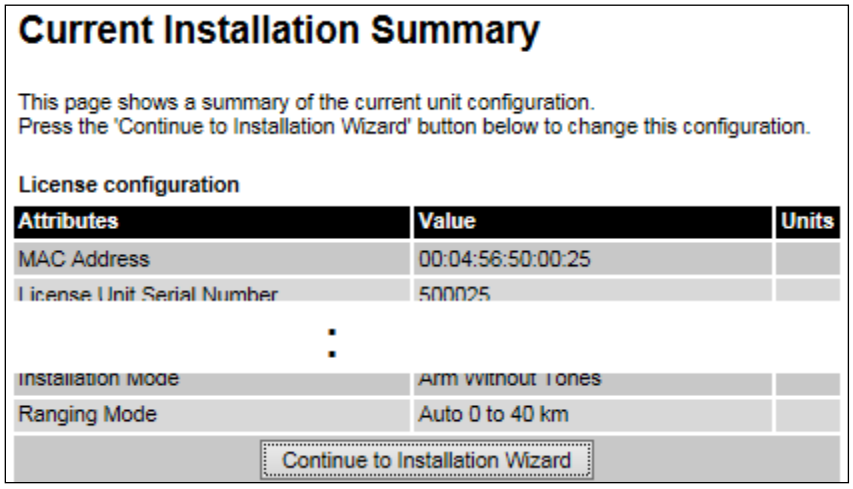


To disarm the unit, click **Disarm Installation Agent**.

Current Installation Summary page

Menu option: **Installation** (Figure 124). This page is displayed only when unit is not armed.

Figure 124 Current Installation Summary page (top and bottom of page shown)

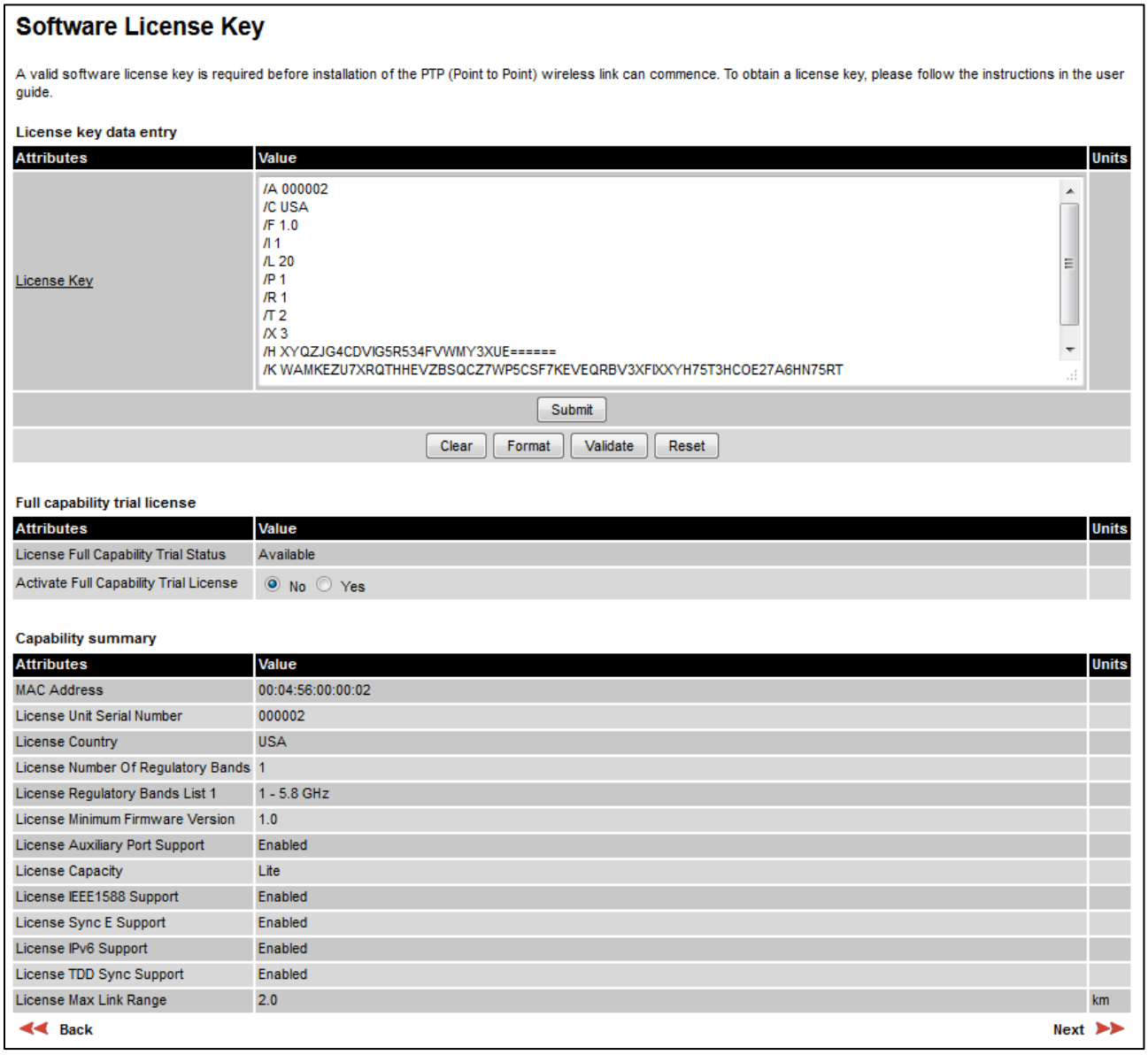


Click **Continue to Installation Wizard**.

Software License Key page

Menu option: **Installation**. Use this page to configure the unit with a new License Key and to review the capabilities of an installed License Key. The appearance of this page varies depending upon which capabilities are enabled by the entered license key. For example, Figure 125 shows the licensed capabilities for a PTP 700 in the USA market with a Full Capability Trial License, whereas Figure 126 shows TDM support, IPv6 and other capabilities. Use the Cambium Networks License Key Generator to generate new License Keys (Generating license keys on page 6-3).

Figure 125 Software License Key page (PTP 700 USA market)



Software License Key

A valid software license key is required before installation of the PTP (Point to Point) wireless link can commence. To obtain a license key, please follow the instructions in the user guide.

License key data entry

Attributes	Value	Units
License Key	/A 000002 /C USA /F 1.0 /I 1 /L 20 /P 1 /R 1 /T 2 /X 3 /H XYQZJG4CDVIG5R534FVWMY3XUE====== /K WAMKEZU7XRQTHHEVZBSQCZ7WP5CSF7KEVEQRBV3XFIXXYH75T3HCOE27A6HN75RT	

Submit

Clear Format Validate Reset

Full capability trial license

Attributes	Value	Units
License Full Capability Trial Status	Available	
Activate Full Capability Trial License	No Yes	

Capability summary

Attributes	Value	Units
MAC Address	00:04:56:00:00:02	
License Unit Serial Number	000002	
License Country	USA	
License Number Of Regulatory Bands	1	
License Regulatory Bands List 1	1 - 5.8 GHz	
License Minimum Firmware Version	1.0	
License Auxiliary Port Support	Enabled	
License Capacity	Lite	
License IEEE1588 Support	Enabled	
License Sync E Support	Enabled	
License IPv6 Support	Enabled	
License TDD Sync Support	Enabled	
License Max Link Range	2.0	km

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Figure 126 Software License Key page (TDM, IPv6 and other capabilities)

Software License Key

A valid software license key is required before installation of the PTP (Point to Point) wireless link can commence. To obtain a license key, please follow the instructions in the user guide.

License key data entry

Attributes	Value	Units
License Key	/A 000002 /C Development_Key /G 1 /I 1 /M 1 /R 1 /R 13 /R 14 /R 25 /R 26 /R 255 /W 8 /X 3 /H XYQZJG4CDV	

Submit

Clear Format Validate Reset

Capability summary

Attributes	Value	Units
MAC Address	00:04:56:00:00:02	
License Unit Serial Number	000002	
License Country	Development Key	
License Number Of Regulatory Bands	6	
License Regulatory Bands List 1	1 - 5.8 GHz	
License Regulatory Bands List 2	13 - 5.4 GHz	
License Regulatory Bands List 3	14 - 4.9 GHz Public Safety	
License Regulatory Bands List 4	25 - 5.8 GHz ETSI	
License Regulatory Bands List 5	26 - 5.4 GHz ETSI	
License Regulatory Bands List 6	255	
License Group Access	Enabled	
License OOB Management Support	Enabled	
License Capacity	Full	
License Max Number Of TDM Channels	8	
License IEEE1588 Support	Enabled	
License Sync E Support	Enabled	
License IPv6 Support	Enabled	
License TDD Sync Support	Enabled	

Back Next

Procedures:

Note

Full capability is available only when both ODUs have the trial active or are already licensed to operate with that capacity.

When the trial has started, the Software License Key page displays the Trial Period Remaining attribute (Figure 128). This shows the number of days remaining before the full capability trial period expires.

To enter a new License Key, proceed as follows:

- To clear the existing License Key (if present), click **Clear**.
- To format the new License Key: copy it from the Cambium notification email, paste it into the License Key box and click **Format**. The page is redisplayed with the License Key formatted.
- To enter the new License Key, click **Submit**. The page is redisplayed with the Capability Summary updated.

To control the full capability trial (Lite license only), proceed as follows:

- If License Full Capability Trial Status is **Available** (Figure 127), start the full capability trial period by setting Activate Full Capability Trial License to **Yes**.
- If License Full Capability Trial Status is **Active** (Figure 128), suspend the full capability trial period by setting Stop Full Capability Trial License to **Yes**.
- If License Full Capability Trial Status is **Inactive** (Figure 129), resume the full capability trial period by setting Start Full Capability Trial License to **Yes**.

To continue with the Installation Wizard, click **Next**.

Figure 127 Software License Key page (extract) with full capability trial available

Full capability trial license

Attributes	Value	Units
License Full Capability Trial Status	Available	
Activate Full Capability Trial License	◉ No ○ Yes	

Figure 128 Software License Key page (extract) with full capability trial active

Full capability trial license

Attributes	Value	Units
License Full Capability Trial Status	Active	
Trial Period Remaining	60	Days
Stop Full Capability Trial License	◉ No ○ Yes	

Figure 129 Software License Key page (extract) with full capability trial inactive

Full capability trial license

Attributes	Value	Units
License Full Capability Trial Status	Inactive	
Trial Period Remaining	60	Days
Start Full Capability Trial License	◉ No ○ Yes	

Interface Configuration page

Menu option: **Installation**. Use this page to update the IP interface attributes.

The appearance of this page varies depending upon which capabilities have been enabled by license key. For example, Figure 130 shows the attributes that are displayed when IPv6, Aux Port, SFP Port, Second Data Service and Out-of-Band Management support are enabled, whereas Figure 131 shows the attributes that are displayed when IPv6 and TDM support are enabled.

Caution

Before configuring a VLAN for management interfaces, ensure that the VLAN is accessible, otherwise the unit will be inaccessible after the next reboot.

Note

TDM support is only available when the following are all true:

- An E1/T1 license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-11).

Note

NIDUs can be installed at both link ends without enabling TDM (set TDM Interface to **None**). LAN data will be bridged successfully, but TDM data will be ignored.

Note

Synchronous Ethernet and IEEE 1588 Transparent Clock are disabled when TDM is enabled (LAN Configuration page on page 6-34).

Note

When TDM is enabled and connected at one link end, up to two minutes may elapse before the TDM link is established (this is known as the settling period). Do not attempt to change the TDM configuration during this settling period.

Procedure:

- Review and update the IP and VLAN attributes (Table 116).
- Review and update the TDM attributes (Table 117) (if available).
- To continue with the Installation Wizard, click **Next** or **Submit Interface Configuration**.

Figure 130 Interface Configuration page (IPv6, Aux, SFP, Second Data Service and OOB support)

Interface Configuration

Please complete the wizard in order to arm the unit.

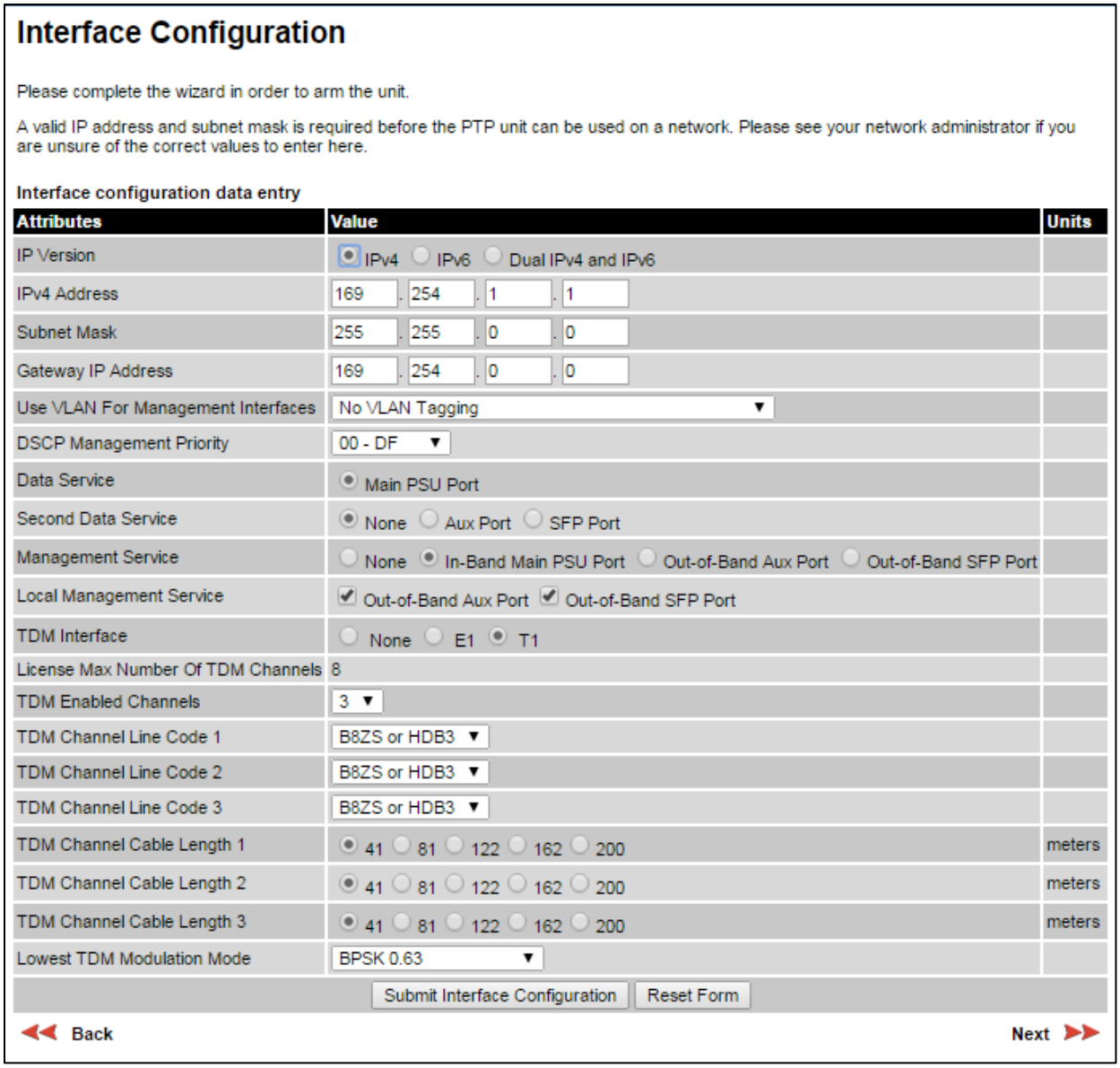
A valid IP address and subnet mask is required before the PTP unit can be used on a network. Please see your network administrator if you are unsure of the correct values to enter here.

Interface configuration data entry

Attributes	Value	Units
IP Version	○ IPv4 ○ IPv6 ◉ Dual IPv4 and IPv6	
IPv4 Address	10 . 10 . 10 . 11	
Subnet Mask	255 . 255 . 255 . 0	
Gateway IP Address	10 . 10 . 10 . 1	
IPv6 Address	2001:cdba:0000:0000:0000:0000:3257:9652	
IPv6 Prefix Length	64	
IPv6 Gateway Address		
IPv6 Auto Configured Link Local Address		
Use VLAN For Management Interfaces	No VLAN Tagging ▼	
DSCP Management Priority	00 - DF ▼	
Data Service	◉ Main PSU Port ○ Aux Port ○ SFP Port	
Second Data Service	◉ None ○ Aux Port ○ SFP Port	
Management Service	○ None ◉ In-Band Main PSU Port ○ Out-of-Band Aux Port ○ Out-of-Band SFP Port	
Local Management Service	☑ Out-of-Band Aux Port ☑ Out-of-Band SFP Port	
	Submit Interface Configuration / Reset Form	

◀◀ Back Next ▶▶

Figure 131 Interface Configuration page (TDM support)



Interface Configuration

Please complete the wizard in order to arm the unit.

A valid IP address and subnet mask is required before the PTP unit can be used on a network. Please see your network administrator if you are unsure of the correct values to enter here.

Interface configuration data entry

Attributes	Value	Units
IP Version	IPv4 IPv6 Dual IPv4 and IPv6	
IPv4 Address	169 . 254 . 1 . 1	
Subnet Mask	255 . 255 . 0 . 0	
Gateway IP Address	169 . 254 . 0 . 0	
Use VLAN For Management Interfaces	No VLAN Tagging	
DSCP Management Priority	00 - DF	
Data Service	Main PSU Port	
Second Data Service	None Aux Port SFP Port	
Management Service	None In-Band Main PSU Port Out-of-Band Aux Port Out-of-Band SFP Port	
Local Management Service	Out-of-Band Aux Port Out-of-Band SFP Port	
TDM Interface	None E1 T1	
License Max Number Of TDM Channels	8	
TDM Enabled Channels	3	
TDM Channel Line Code 1	B8ZS or HDB3	
TDM Channel Line Code 2	B8ZS or HDB3	
TDM Channel Line Code 3	B8ZS or HDB3	
TDM Channel Cable Length 1	41 81 122 162 200	meters
TDM Channel Cable Length 2	41 81 122 162 200	meters
TDM Channel Cable Length 3	41 81 122 162 200	meters
Lowest TDM Modulation Mode	BPSK 0.63	

Submit Interface Configuration Reset Form

Back Next

Table 116 Interface Configuration attributes

Attribute	Meaning
IP Version	The internet protocols to be supported by this ODU: **IPv4:** IPv4 protocols only. IPv4 attributes are displayed. **IPv6:** IPv6 protocols only. IPv6 attributes are displayed. **Dual IPv4 and IPv6:** Both IPv4 and IPv6 protocols. IPv4 and IPv6 attributes are displayed.

Attribute	Meaning
IPV4 Address	The IPv4 internet protocol address. This address is used by the family of Internet protocols to uniquely identify this unit on a network.
Subnet Mask	The address range of the connected IPv4 network.
Gateway IP Address	The IPv4 address of a computer on the current network that acts as an IPv4 gateway. A gateway acts as an entrance and exit to frames from and to other networks.
IPv6 Address	The IPv6 internet protocol address. This address is used by the family of Internet protocols to uniquely identify this unit on a network.
IPv6 Prefix Length	Length of the IPv6 subnet prefix (default 64 bits).
IPv6 Gateway Address	The IPv6 address of a computer on the current network that acts as an IPv6 gateway. A gateway acts as an entrance and exit to frames from and to other networks. It is usual to use the link-local address of the gateway.
IPv6 Auto Configured Link Local Address	The link-local address of the IPv6 gateway (displayed only, not updateable).
Use VLAN For Management Interfaces	VLAN tagging options for the management interfaces: **No VLAN Tagging** **IEEE 802.1Q Tagged (C-Tag, Type 8100)** **IEEE 802.1ad Tagged (S-Tag or B-Tag, Type 88a8)** Ensure that the configured VLAN is accessible, otherwise it will not be possible to access the unit following the next reboot. The PTP 700 management function is only compatible with single VLAN tagged frames. Any management frame with two or more tags will be ignored.
VLAN Management VID	Only displayed when Use VLAN for Management Interfaces is not set to **No VLAN Tagging**. The VLAN VID (range 0 to 4094) that will be included in Ethernet frames generated by the management interfaces.
VLAN Management Priority	Only displayed when Use VLAN for Management Interfaces is not set to **No VLAN Tagging**. The VLAN priority (range 0 to 7) that will be included in Ethernet frames generated by the management interfaces.
DSCP Management Priority	Differentiated Services Code Point (DSCP) value to be inserted in the IP header of all IP datagrams transmitted by the management interface.

Attribute	Meaning
Data Service	The port selection for the Data Service: **Main PSU Port**: The Data Service is connected to the Main PSU Port **Aux Port**: The Data Service is connected to the Aux Port **SFP Port**: The Data Service is connected to the SFP Port The Aux Port and SFP Port options are displayed if these ports are enabled in the license key. The Data Service must always be assigned to one of the three wired ports. For more help Configuring port allocations, see on page 6-20.
Second Data Service	The port allocation for the Second Data Service: **None:** The Second Data Service is disabled. **Main PSU Port**: The Second Data Service is connected to the Main PSU Port **Aux Port**: The Second Data Service is connected to the Aux Port **SFP Port**: The Second Data Service is connected to the SFP Port This attribute is only displayed when the Second Data Service support is license key enabled. The port allocated to the Data Service is not available for allocation to the Second Data Service. For more help, see Ethernet port allocation on page 3-36.
Management Service	The port allocation for the end-to-end Management Service: **None:** The Management Service is disabled. **In-Band Main PSU Port, Out-of-Band Main PSU Port:** The Management Service is connected to the Main PSU Port. **In-Band Aux Port, Out-of-Band Aux Port:** The Management Service is connected to the Aux Port. **In-Band SFP Port, Out-of-Band SFP Port:** The Management Service is connected to the SFP Port. If a port is already connected to the Data Service or the Second Data Service then the option will be displayed as In-Band… otherwise the option will be displayed as Out-of-Band… For more help, see Ethernet port allocation on page 3-36.

Attribute	Meaning
Local Management Service	Any port not already selected to the Data, Second Data or Management Service is available for connection as an out-of-band port for the Local Management Service. Ports already selected to the Data, Second Data or Management services are not displayed as options. For more help, see Ethernet port allocation on page 3-36.

Configuring port allocations with TDM

When TDM is enabled, the Data Service is mapped to the Main PSU Port with no other options presented to the user. Mapping of the Second Data Service, Management Service and Local Management Service have standard options consistent with the Data Service mapping.

Table 117 Interface Configuration TDM attributes

Attribute	Meaning
TDM Interface	Only displayed when TDM is enabled by license key. The type of TDM interface that is activated. **None**: TDM is disabled. **E1**: The E1 TDM interface is activated. **T1**: The T1 TDM interface is activated.
License Max Number of TDM Channels	Only displayed when TDM Interface is set to **E1** or **T1**. The maximum number of TDM channels (E1 or T1) allowed under the installed license key.
TDM Enabled Channels	Only displayed when TDM Interface is set to **E1** or **T1**. Select the number of E1 or T1 channels that are to be enabled over the wireless bridge (1 to 8).
TDM Channel Line Code n	Only displayed when TDM Interface is set to **E1** or **T1**. Select the line code of the transceiver connected to NIDU E1/T1 channel “n” (where “n” is in the range 1 to 8).
TDM Channel Cable Length n	Only displayed when TDM Interface is set to **T1**. This control compensates for the high frequency attenuation in T1 cables. Equalization is automatic in the E1 interface. Select the nearest approximation to the length of cable connecting the transceiver to NIDU T1 channel “n” (where “n” is in the range 1 to 8).

Attribute	Meaning
Lowest TDM Modulation Mode	Only displayed when TDM Interface is set to **E1** or **T1**. The lowest modulation mode at which TDM data can be sent. If the link cannot sustain TDM data in this mode then the effective lowest modulation mode may differ. In conjunction with the LINKPlanner tool, this setting may be used to optimize the latency for links which operate in consistently high modulation modes. High data rate links are able to support lower latencies.

Configuring port allocations

The Interface Configuration page controls the allocation of the Main PSU Port, Aux Port and SFP Port to the Data Service, Second Data Service, Management Service and Local Management Service.

PTP 700 supports exactly one instance of the Data Service, and this service is always mapped to one of the three wired ports. It is not possible to operate a link without any port selected to the Data Service.

PTP 700 supports zero or one instances of the optional Second Data Service. The Second Data Service is enabled by a license key field, and is automatically licensed in any unit with a Full capacity license. The Second Data Service can be disabled or mapped to any available port, except for the port already allocated to the Data Service.

PTP 700 supports zero or one instances of the optional Management Service. The Management Service can be used to access the management agent at the local unit. If the wireless link is established, the Management Service can also be used to access the management agent at the remote unit and other devices connected in the remote management network. The Management Service can be mapped to a port that is already used for the Data Service or Second Data Service to provide In-Band Management. Alternatively, the Management Service can be allocated to a dedicated port to provide Out-of-Band Management.

PTP 700 also supports an optional Local Management Service, providing a connection from a wired port to the local management agent. Any port not already selected is available for selection to the Local Management Service. The Local Management Service does not connect across the wireless link.

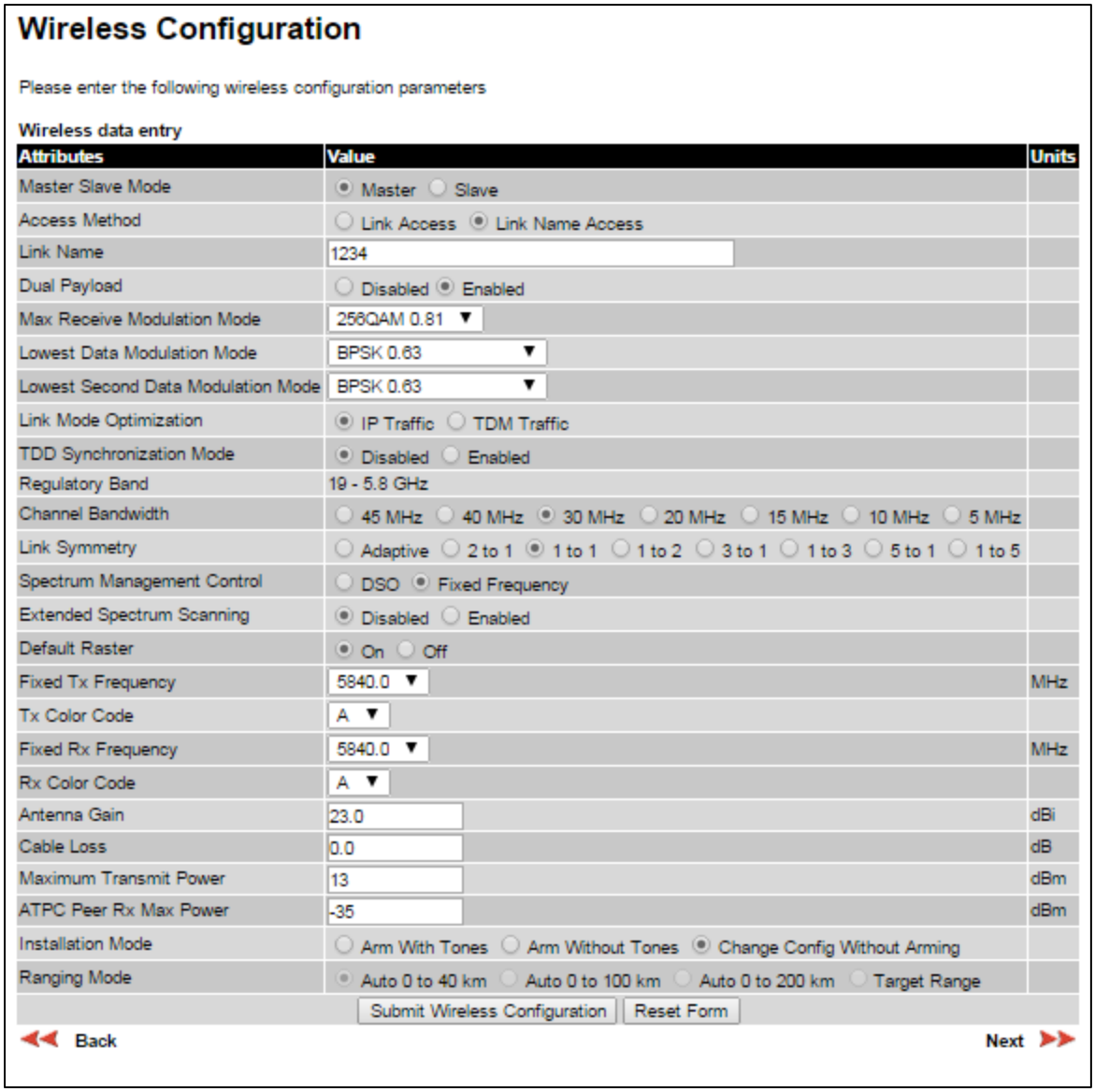
The PTP 700 must always be manageable through one of three ports. Therefore it is not possible to disable the Management Service unless at least one port is allocated to the Local Management Service.

Wireless Configuration page

Menu option: **Installation** (Figure 132).

This page is part of the Installation Wizard. Use it to update the wireless attributes.

Figure 132 Wireless Configuration page



Wireless Configuration

Please enter the following wireless configuration parameters

Wireless data entry

Attributes	Value	Units
Master Slave Mode	(•) Master ( ) Slave	
Access Method	( ) Link Access (•) Link Name Access	
Link Name	1234	
Dual Payload	( ) Disabled (•) Enabled	
Max Receive Modulation Mode	256QAM 0.81 ▼	
Lowest Data Modulation Mode	BPSK 0.63 ▼	
Lowest Second Data Modulation Mode	BPSK 0.63 ▼	
Link Mode Optimization	(•) IP Traffic ( ) TDM Traffic	
TDD Synchronization Mode	(•) Disabled ( ) Enabled	
Regulatory Band	19 - 5.8 GHz	
Channel Bandwidth	( ) 45 MHz ( ) 40 MHz (•) 30 MHz ( ) 20 MHz ( ) 15 MHz ( ) 10 MHz ( ) 5 MHz	
Link Symmetry	( ) Adaptive ( ) 2 to 1 (•) 1 to 1 ( ) 1 to 2 ( ) 3 to 1 ( ) 1 to 3 ( ) 5 to 1 ( ) 1 to 5	
Spectrum Management Control	( ) DSO (•) Fixed Frequency	
Extended Spectrum Scanning	(•) Disabled ( ) Enabled	
Default Raster	(•) On ( ) Off	
Fixed Tx Frequency	5840.0 ▼	MHz
Tx Color Code	A ▼	
Fixed Rx Frequency	5840.0 ▼	MHz
Rx Color Code	A ▼	
Antenna Gain	23.0	dBi
Cable Loss	0.0	dB
Maximum Transmit Power	13	dBm
ATPC Peer Rx Max Power	-35	dBm
Installation Mode	( ) Arm With Tones ( ) Arm Without Tones (•) Change Config Without Arming	
Ranging Mode	(•) Auto 0 to 40 km ( ) Auto 0 to 100 km ( ) Auto 0 to 200 km ( ) Target Range	

Submit Wireless Configuration | Reset Form

Back Next

Procedure:

- Update the attributes (Table 118).
- To save any changes and continue with the Installation Wizard, click **Next** or click **Submit Wireless Configuration**.

Warning

When installing the PTP 700 ATEX/HAZLOC product variants in hazardous locations, follow the instructions contained in the PTP 700 Series Hazardous Location Guide (supplied in box with the products), in addition to the instructions in this user guide.

Caution

The lower center frequency attribute must be configured to the same value for both the Master and Slave, otherwise the wireless link will fail to establish. The only way to recover from this situation is to modify the Lower Center Frequency attributes so that they are identical on both the master and slave units.

Note

When configuring a linked pair of units, use the Master Slave Mode to ensure that one unit is **Master** and the other is **Slave**.

Table 118 Wireless Configuration attributes

Attribute	Meaning
Master Slave Mode	**Master:** The unit controls the point-to-point link and its maintenance. On startup, the Master transmits until a link with the Slave is made. **Slave:** The unit listens for its peer and only transmits when the peer has been identified.
Access Method	ODUs must be configured in pairs before a link can be established. Access Method determines how paired ODUs will recognize each other. **Link Access:** Each ODU must be configured with Target MAC Address equal to the MAC Address of the other unit. **Link Name Access:** Both ODUs must be configured with the same Link Name. **Group Access:** Only displayed when a Group Access license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-11). Both ODUs must be configured with the same Group ID attributes.
Target MAC Address	Only displayed when Access Method is set to **Link Access**. This is the MAC Address of the peer unit that will be at the other end of the wireless link. This is used by the system to ensure the unit establishes a wireless link to the correct peer. The MAC Address can be found embedded within the serial number of the unit. The last six characters of the serial number are the last three bytes of the unit's MAC address.
Link Name	Only displayed when Access Method is set to **Link Name Access**. Link Name may consist of letters (A-Z and a-z), numbers (0-9), spaces, and the following special characters: (),-.,:<=>[]_{} Link Name must be same at both ends and different to site name.

Attribute	Meaning
Group Id	Only displayed when Access Method is set to **Group Access**. A link can only be established between units that have identical Group IDs.
Dual Payload	**Disabled:** The link maximizes robustness against fading and interference. **Enabled:** The link attempts to reach maximum throughput at the expense of robustness against fading and interference.
Max Receive Modulation Mode	The maximum mode the unit will use as its adaptive modulation. By default the Max Receive Modulation Mode is the highest mode available. For minimum error rates, set the maximum modulation mode to the minimum necessary to carry the required traffic.
Lowest Data Modulation Mode	The lowest modulation mode that must be achieved before the link is allowed to bridge customer data Ethernet frames. This does not affect the bridging of management data: if out-of-band remote management is enabled, this will continue regardless of modulation mode.
Lowest Second Data Modulation Mode	The lowest modulation mode that must be achieved before the link is allowed to bridge Ethernet frames in the Second Data Service. This attribute is displayed when the Second Data Service is enabled.
Link Mode Optimization	**IP Traffic:** The link is optimized for IP traffic to provide the maximum possible link capacity. **TDM Traffic:** The link is optimized for TDM traffic to provide the lowest possible latency. This is the only available setting when TDM is enabled (Interface Configuration page on page 6-14).
TDD Synchronization Mode	**Disabled:** The link does not employ TDD synchronization. **Enabled:** The link employs TDD synchronization. This is configured in the Installation Wizard; see TDD synchronization page (optional) on page 6-27. For a basic description, see TDD synchronization on page 1-18. When TDD Synchronization Mode is set to **Enabled**, the following restrictions apply: Ranging Mode and Target Range are disabled, and Link Symmetry is limited to **1 to 1**.
Regulatory Band	The regulatory band selected from the list in the license key.
Channel Bandwidth	Bandwidth of the transmit and receive radio channels.

Attribute	Meaning
Link Symmetry	Only displayed when Master Slave Mode is set to **Master**. **Adaptive**: Allows link symmetry to vary dynamically in response to offered traffic load. This is not supported in the following cases: • Where radar avoidance is mandated in the region. • Link Mode Optimization is set to **TDM Traffic**. **"5 to 1"**, **"3 to 1**, **"2 to 1"**, "**1 to 1"**, "**1 to 2"**, **"1 to 3"** or **"1 to 5"**: There is a fixed division between transmit and receive time in the TDD frame of the master ODU. The first number in the ratio represents the time allowed for the transmit direction and the second number represents the time allowed for the receive direction. The appropriate matching Link Symmetry is set at the slave ODU automatically. For example, if Link Symmetry is set to "**2 to 1"** at the master ODU, then the slave ODU will be set automatically as "**1 to 2"**. In this example, the master-slave direction has double the capacity of the slave-master direction. When TDM is enabled (Interface Configuration page on page 6-14), Link Symmetry is limited to "**1 to 1**".
Spectrum Management Control	In regions that do not mandate DFS (radar detection), the options are: **DSO** **Fixed Frequency** In regions that mandate DFS (radar detection), the options are: **DFS** **DFS with DSO** This attribute is disabled if the regulatory requirement is fixed frequency only.
Extended Spectrum Scanning	Enables scanning of the entire frequency spectrum supported by the device (4400 MHz to 5875 MHz). **Disabled:** The extended Spectrum Scanning is disabled. **Enabled:** The extended Spectrum Scanning is enabled. **Caution** Extended Spectrum Scanning increases DSO performance. Do not leave Extended Spectrum Scanning enabled during normal operation.
Lower Center Frequency	The center frequency (MHz) of the lowest channel that may be used by this link. Not displayed when Spectrum Management Control is set to **Fixed Frequency**. Use this attribute to slide the available channels up and down the band.

Attribute	Meaning
Default Raster	This is only displayed when Spectrum Management Control is set to **Fixed Frequency**. Limits frequency selection to the unit's default raster setting.
Fixed Tx Frequency, Fixed Rx Frequency	This is only displayed when Spectrum Management Control is set to **Fixed Frequency**. The settings must be compatible at each end of the link. Once configured, the spectrum management software will not attempt to move the wireless link to a channel with lower co-channel or adjacent channel interference. Therefore this mode of operation is only recommended for deployments where the installer has a good understanding of the prevailing interference environment.
Tx Color Code, Rx Color Code	Tx Color Code and Rx Color Code may be used to minimize interference in a dense network of synchronized PTP 700 units where some of the units are operating on the same frequency. When this type of network is designed, the Color Code values are normally specified in the link planning report. In all other cases, Cambium Networks recommend that Tx Color Code and Rx Color Code are left at the default value of **A**. The value of Tx Color Code MUST always match the value of Rx Color Code at the other end of the link.
Antenna Gain	Only displayed when the ODU is connectorized. Gain of the remote antenna.
Cable Loss	Only displayed when the ODU is connectorized. Loss in the ODU-antenna RF cable. If there is a significant difference in length of the RF cables for the two antenna ports, then the average value should be entered.
Maximum Transmit Power	The maximum power (dBm) at which the unit will transmit, configurable in steps of 1 dB. Its maximum value is controlled by the selected combination of Regulatory Band, Bandwidth and (for connectorized units) Antenna Gain and Cable Loss. Set this attribute to the value specified in the installation report (LINKPlanner).
Installation Mode	**Arm With Tones**: Audio tones will be emitted during antenna alignment (the recommended option). **Arm Without Tones**: Audio tones will not be emitted during antenna alignment. **Change Config Without Arming**: Configuration changes will be made without arming the ODU for alignment.

Attribute	Meaning
Ranging Mode	This can only be modified if Installation Mode is **Arm With Tones** or **Arm Without Tones**. **Auto..**: During alignment, the wireless units use algorithms to calculate link range. To implement automatic ranging, select a value that corresponds to the estimated maximum range of the link: **Auto 0 to 40 km** (0 to 25 miles). **Auto 0 to 100km** (0 to 62 miles). **Auto 0 to 200km** (0 to 125 miles). **Target Range**: During alignment, the wireless units use the approximate link distance (entered in Target Range) to calculate link range. The main advantage of Target Range mode is that it reduces the time taken by the units to range. If preferred, range functions can be configured to operate in miles, as described in Webpage Properties page on page 6-68.
Target Range	Only available when Ranging Mode is set to **Target Range**. The approximate distance between the two wireless units to within ± 1 km. Enter the same value at both ends of the link.

TDD synchronization page (optional)

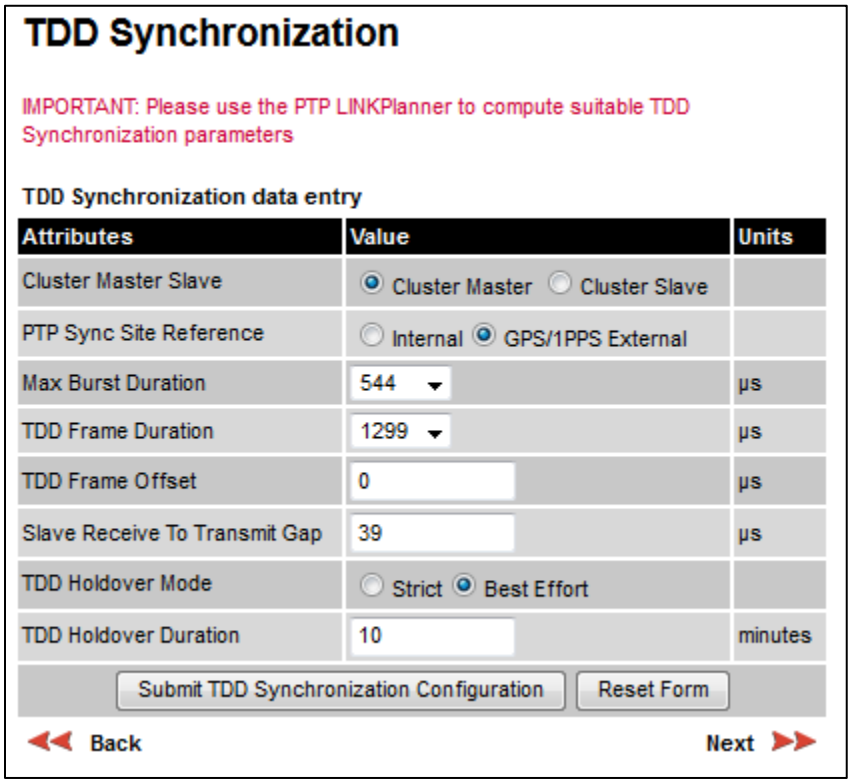
If TDD Synchronization Mode is set to **Enabled** in the Step 2: Wireless Configuration page, the Step 3: TDD Synchronization page (Figure 133) is the third Installation Wizard page.

For more information on the available options, refer to Configuration options for TDD synchronization on page 3-31.

Procedure:

- Update the attributes (Table 119).
- Click **Next**.

Figure 133 Step 3: TDD Synchronization page



Note

The data required to populate this page is available in LINKPlanner.

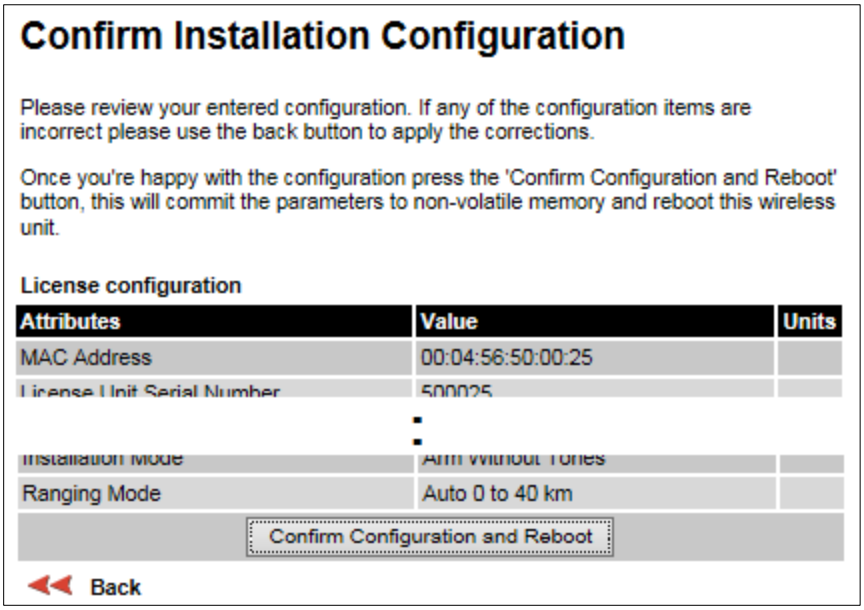
Table 119 TDD Synchronization attributes

Attribute	Meaning
Cluster Master Slave	**Cluster Master**: The first ODU in the synchronization chain. **Cluster Slave**: The second or subsequent ODU in the chain.
PTP-SYNC Site Reference	**Internal**: Standalone operation with no external timing reference. **GPS/1PPS External**: An external GPS receiver will provide a 1 pps timing reference.
Max Burst Duration	The maximum duration of the burst opportunity. Select a value in the range **544** to **2176** microseconds.
TDD Frame Duration	Select a value in the range **1299** to **2747** microseconds.
TDD Frame Offset	The delay of the start of the TDD frame from the epoch of the external timing reference. This permits the design of synchronized networks in which the phase of the TDD frame is independent of the master/slave function. Enter a value in the range from zero to one microsecond less than the TDD Frame Duration.
Slave Receive To Transmit Gap	The duration of the gap between receive and transmit at the slave ODU.
TDD Holdover Mode	Only displayed when Cluster Master Slave is set to **Cluster Master**. **Strict**: The unit will not transmit when synchronization is lost. **Best Effort**: The unit will synchronize when there is a reference signal, but otherwise will operate in unsynchronized mode.
TDD Holdover Duration	Only displayed when Cluster Master Slave is set to **Cluster Master**. Specifies duration of holdover period following loss of the external timing reference for TDD synchronization. Default value **10** minutes, maximum **60** minutes.

Confirm Installation Configuration page

Menu option: **Installation** (Figure 134). Use this page to review and confirm the updated wireless configuration of the unit.

Figure 134 Confirm Installation Configuration page (top and bottom of page shown)



Procedure:

- To undo or correct any updates, click **Back**.
- To confirm the updates and arm the installation, click **Confirm Configuration and Reboot** and click **OK** to reboot the unit.
- If IP Address, Subnet Mask or Gateway IP Address have been changed: reconfigure the local management PC to use an IP address that is valid for the network. Refer to Configuring the management PC on page 6-4.
- If IP Address has been changed, use the new IP address to log into the unit.

System menu

This section describes how to configure the IP and Ethernet interfaces of the PTP 700 unit.

System Configuration page

Menu option: **System > Configuration** (Figure 135). Use this page to enable AES encryption and to review and update key wireless attributes of the unit.

Figure 135 System Configuration page

System Configuration

This page controls the day to day configuration of the PTP wireless unit.

Equipment

Attributes	Value	Units
Link Name	Link W	
Site Name	Site A	
Latitude		
Longitude		
Altitude	0	
IP Address Label	IPv4 Address	
Master Slave Mode	Slave	
Link Mode Optimization	TDM Traffic	
Channel Bandwidth	5	MHz
Max Receive Modulation Mode	256QAM 0.81 ▼	
Lowest Data Modulation Mode	BPSK 0.63 ▼	
Maximum Transmit Power	27	dBm
Antenna Gain	23.0	dBi
Cable Loss	0.0	dB
EIRP	50.0	dBm
ATPC Peer Rx Max Power	-51	dBm
Encryption Algorithm	◉ None ○ AES 128-bit (Rijndael) ○ AES 256-bit (Rijndael)	
Encryption Key		
Confirm Encryption Key		

Submit Updated System Configuration | Reset Form

If the ODU is a Master unit and Transmitter Mute Control is enabled (Webpage Properties page on page 6-68), the Mute Transmitter control is displayed at the top of this page (Figure 136).

Figure 136 Mute Transmitter control in System Configuration page

Attributes	Value	Units
Transmitter	Enabled	
	Mute Transmitter	

Caution

Configuring link encryption over an operational link will necessitate a service outage. Therefore, the configuration process should be scheduled during a period of low link utilization.

Procedure:

- If AES encryption is required but the System Configuration page does not contain the Encryption Algorithm or Encryption Key attributes, then order the necessary AES capability upgrade, generate a license key and enter it on the Software License Key page (Software License Key page on page 6-11).
- Update the attributes (Table 120).
- To save changes, click **Submit Updated System Configuration**.
- If a reboot request is displayed, click **Reboot Wireless Unit** and **OK** to confirm.

Table 120 System Configuration attributes

Attribute	Meaning
Transmitter	Only displayed when the ODU is a Master unit and Transmitter Mute Control is enabled. Use the **Mute Transmitter** control to toggle between **Muted** and **Enabled**. **Muted:** The ODU will not radiate and will not forward Ethernet frames between the wireless interface and the Ethernet ports. **Enabled**: The ODU is allowed by the user to radiate and will forward Ethernet frames between the wireless interface and the Ethernet ports.
Link Name	Link Name may consist of letters (A-Z and a-z), numbers (0-9), spaces, and the following special characters: (),-.,:<=>[]_{}. Link Name must be same at both ends and different to site name.
Site Name	User defined name for the site, with additional notes (if required).
Latitude	The latitude of the ODU, measured in decimal degrees. This attribute has no internal function.

Attribute	Meaning
Longitude	The longitude of the ODU, measured in decimal degrees. This attribute has no internal function.
Altitude	The altitude of the ODU, measured in meters. This attribute has no internal function.
IP Address Label	Read only. The IP Address version used to identify the unit in SMTP messages, fault logs and other system outputs. **IPv4** or **IPv6**: The unit is identified using its IPv4 or IPv6 Address. These options are only available when IP Version is set to **Dual IPv4 and IPv6** in the in the LAN Configuration page (Table 121).
Master Slave Mode	**Master:** The unit is a Master, that is, it controls the point-to-point link and its maintenance. On startup, the Master transmits until a link with the Slave is made. **Slave:** The unit is a Slave, that is, it listens for its peer and only transmits when the peer has been identified. Read only.
Link Mode Optimization	**IP Traffic:** The link is optimized for IP traffic to provide the maximum possible link capacity. **TDM Traffic:** The link is optimized for TDM traffic to provide the lowest possible latency. Read only.
Channel Bandwidth	Bandwidth of the transmit and receive radio channels. Read only.
Max Receive Modulation Mode	The maximum mode the unit will use as its adaptive modulation. By default the Max Receive Modulation Mode is the highest mode available. For minimum error rates, set the maximum modulation mode to the minimum necessary to carry the required traffic.
Lowest Data Modulation Mode	The lowest modulation mode that must be achieved before the link is allowed to bridge customer data Ethernet frames. This does not affect the bridging of management data: if out-of-band remote management is enabled, this will continue regardless of modulation mode.
Max Transmit Power	The maximum power (dBm) at which the unit will transmit, configurable in steps of 1 dB. Its maximum value is controlled by the combination of the selected Regulatory Band, Bandwidth and (for connectorized units) Antenna Gain and Cable Loss. Set this attribute to the value specified in the installation report (LINKPlanner).
Antenna Gain	Only displayed when the ODU is connectorized. Gain of the remote antenna.

Attribute	Meaning
Cable Loss	Only displayed when the ODU is connectorized. Loss in the ODU-antenna RF cable. If there is a significant difference in length of the RF cables for the two antenna ports, then the average value should be entered.
EIRP	Only displayed when the ODU is connectorized. Effective Isotropic Radiated Power (EIRP) describes the strength of the radio signal leaving the wireless unit. Use it to verify that the link configuration (Max Transmit Power, Antenna Gain and Cable Loss) does not exceed any applicable regulatory limit. Read only.
ATPC Peer Rx Max Power	ATPC maximum receive power level at the remote ODU. In a radar avoidance area this is calculated by the software and cannot be changed. In a non-radar avoidance area this can be set manually.
Encryption Algorithm	Only displayed when an AES encryption license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-11). Values are: **None**, **AES 128-bit** or **AES 256-bit**. Use the same setting at both link ends.
Encryption Key	Only displayed when AES encryption is enabled by license key. The key consists of 32 or 64 case-insensitive hexadecimal characters. Use the same key at both link ends.
Confirm Encryption Key	Only displayed when AES encryption is enabled by license key. Retype the Encryption Key.

LAN Configuration page

Menu option: **System > Configuration > LAN Configuration**. Use this page to control how users connect to the PTP 700 web interface, either from a locally connected computer or from a management network.

The appearance of this page varies depending upon which features have been enabled by license key. For example, Figure 137 shows the attributes that are displayed when Aux Port, Second Data Service and Out-of-Band Management Service, support are enabled, whereas Figure 138 shows the attributes that are displayed when TDM support is enabled.

Caution

Before configuring a VLAN for management interfaces, ensure that the VLAN is accessible, otherwise the unit will be inaccessible after the next reboot.

Caution

Before configuring in-band management, ensure that the Master and Slave units are configured with different IP addresses, otherwise the management agent will not be able to distinguish the two units.

Caution

Auto-negotiation and forced Ethernet configuration:

- To operate an Ethernet link at a fixed speed, set Auto Negotiation to **Enabled** and limit Auto Neg Advertisement to the desired speed. If constrained auto-negotiation fails, set Auto Negotiation to **Disabled** (forced Ethernet configuration) as a last resort.
- Both ends of an Ethernet link must be configured identically, because forced and auto-negotiation are not compatible: a mixed configuration will cause a duplex mismatch, resulting in greatly reduced data capacity.
- The Auto Neg Advertisement or Forced Configuration data rates must be within the capability of the Ethernet link partner, otherwise loss of service will occur.

Note

When TDM is enabled (Interface Configuration page on page 6-14), the following restrictions are automatically applied:

- Main PSU Port Auto Negotiation is set to **Enabled**.
- Main PSU Port Auto Neg Advertisement is set to **1000 Mbps Full Duplex**.
- Main PSU Port Auto MDIX is set to **Enabled**.

Figure 137 LAN Configuration page (Aux and OOB support)

LAN Configuration

This page controls the LAN configuration of the PTP wireless unit.

Attributes	Value	Units
IP Interface		
IP Version	◉ IPv4 ○ IPv6 ○ Dual IPv4 and IPv6	
IPv4 Address	10 . 10 . 10 . 11	
Subnet Mask	255 . 255 . 0 . 0	
Gateway IP Address	10 . 10 . 10 . 0	
Use VLAN For Management Interfaces	No VLAN Tagging ▼	
DSCP Management Priority	00 - DF ▼	
Data Service	◉ Main PSU Port ○ Aux Port ○ SFP Port	
Second Data Service	○ None ◉ Aux Port ○ SFP Port	
Management Service	○ None ◉ In-Band Main PSU Port ○ In-Band Aux Port	
Local Management Service	☑ Out-of-Band SFP Port	
Ethernet Loopback Mode	◉ Disabled ○ Aux to Main PSU ○ Aux to SFP	
Data Port Wireless Down Alert	◉ Disabled ○ Enabled	
Second Data Port Wireless Down Alert	◉ Disabled ○ Enabled	
Main PSU Port		
Main PSU Port Auto Negotiation	○ Disabled ◉ Enabled	
Main PSU Port Auto Neg Advertisement	☑ 1000 Mbps Full Duplex ☑ 100 Mbps Full Duplex	
Main PSU Port Auto Mdix	○ Disabled ◉ Enabled	
Aux Port		
Aux Port Auto Negotiation	○ Disabled ◉ Enabled	
Aux Port Auto Neg Advertisement	☑ 1000 Mbps Full Duplex ☑ 100 Mbps Full Duplex	
Aux Port Auto Mdix	○ Disabled ◉ Enabled	
Aux Port Power Over Ethernet Output	◉ Disabled ○ Enabled	
Bridging		
Local Packet Filtering	○ Disabled ◉ Enabled	
Data Port Pause Frames	◉ Tunnel ○ Discard	
Second Data Port Pause Frames	○ Tunnel ◉ Discard	
Synchronous Ethernet		
Sync E Tracking	◉ Disabled ○ Enabled	
IEEE 1588		
Transparent Clock	◉ Disabled ○ Enabled	

Submit Updated System Configuration | Reset Form

Figure 138 LAN Configuration page (TDM support)

LAN Configuration

This page controls the LAN configuration of the PTP wireless unit.

Attributes	Value	Units
IP Interface		
IP Version	(•) IPv4 ( ) IPv6 ( ) Dual IPv4 and IPv6	
IPv4 Address	10 . 10 . 10 . 12	
Subnet Mask	255 . 255 . 0 . 0	
Gateway IP Address	169 . 254 . 0 . 0	
Use VLAN For Management Interfaces	No VLAN Tagging ▼	
DSCP Management Priority	00 - DF ▼	
Data Service	(•) Main PSU Port	
Second Data Service	( ) None (•) Aux Port ( ) SFP Port	
Management Service	( ) None (•) In-Band Main PSU Port ( ) In-Band Aux Port	
Local Management Service	[x] Out-of-Band SFP Port	
Ethernet Loopback Mode	(•) Disabled ( ) Aux to Main PSU ( ) Aux to SFP	
Data Port Wireless Down Alert	(•) Disabled ( ) Enabled	
Second Data Port Wireless Down Alert	(•) Disabled ( ) Enabled	
Main PSU Port		
Main PSU Port Auto Negotiation	( ) Disabled (•) Enabled	
Main PSU Port Auto Neg Advertisement	[x] 1000 Mbps Full Duplex [x] 100 Mbps Full Duplex	
Main PSU Port Auto Mdix	( ) Disabled (•) Enabled	
NIDU Lan Port		
NIDU Lan Port Auto Negotiation	( ) Disabled (•) Enabled	
NIDU Lan Port Auto Neg Advertisement	[x] 1000 Mbps Full Duplex [x] 100 Mbps Full Duplex	
NIDU Lan Port Auto Mdix	( ) Disabled (•) Enabled	
Aux Port		
Aux Port Auto Negotiation	( ) Disabled (•) Enabled	
Aux Port Auto Neg Advertisement	[x] 1000 Mbps Full Duplex [x] 100 Mbps Full Duplex	
Aux Port Auto Mdix	( ) Disabled (•) Enabled	
Aux Port Power Over Ethernet Output	(•) Disabled ( ) Enabled	
Bridging		
Local Packet Filtering	( ) Disabled (•) Enabled	
Data Port Pause Frames	( ) Tunnel (•) Discard	
Second Data Port Pause Frames	( ) Tunnel (•) Discard	
Synchronous Ethernet		
Sync E Tracking	Internal TDM Use Only	
IEEE 1588		
Transparent Clock	Disabled	

[Submit Updated System Configuration] [Reset Form]

Figure 139 LAN Configuration page (SFP support)

LAN Configuration

This page controls the LAN configuration of the PTP wireless unit.

Attributes	Value	Units
IP Interface		
IP Version	IPv4	
IPv4 Address	10 . 10 . 10 . 15	
Subnet Mask	255 . 255 . 255 . 0	
Gateway IP Address	10 . 10 . 10 . 9	
Use VLAN For Management Interfaces	No VLAN Tagging ▼	
DSCP Management Priority	00 - DF ▼	
Data Service	◉ Main PSU Port ○ Aux Port ○ SFP Port	
Second Data Service	○ None ◉ Aux Port ○ SFP Port	
Management Service	○ None ○ In-Band Main PSU Port ◉ In-Band Aux Port	
Local Management Service	☑ Out-of-Band SFP Port	
Ethernet Loopback Mode	◉ Disabled ○ Aux to Main PSU ○ Aux to SFP	
Data Port Wireless Down Alert	○ Disabled ◉ Enabled	
Second Data Port Wireless Down Alert	◉ Disabled ○ Enabled	
Main PSU Port		
Main PSU Port Auto Negotiation	○ Disabled ◉ Enabled	
Main PSU Port Auto Neg Advertisement	☑ 1000 Mbps Full Duplex ☑ 100 Mbps Full Duplex	
Main PSU Port Auto Mdix	○ Disabled ◉ Enabled	
Aux Port		
Aux Port Auto Negotiation	○ Disabled ◉ Enabled	
Aux Port Auto Neg Advertisement	☑ 1000 Mbps Full Duplex ☑ 100 Mbps Full Duplex	
Aux Port Auto Mdix	○ Disabled ◉ Enabled	
Aux Port Power Over Ethernet Output	◉ Disabled ○ Enabled	
SFP Port		
SFP Port Auto Negotiation	○ Disabled ◉ Enabled	
SFP Port Auto Neg Advertisement	☑ 1000 Mbps Full Duplex ☑ 100 Mbps Full Duplex	
SFP Port Auto Mdix	○ Disabled ◉ Enabled	
Bridging		
Local Packet Filtering	○ Disabled ◉ Enabled	
Data Port Pause Frames	○ Tunnel ◉ Discard	
Second Data Port Pause Frames	○ Tunnel ◉ Discard	
Synchronous Ethernet		
Sync E Tracking	◉ Disabled ○ Enabled	
IEEE 1588		
Transparent Clock	◉ Disabled ○ Enabled	

Submit Updated System Configuration | Reset Form

Procedure:

1. Review and update the attributes: IP Interface (Table 121); Main PSU or Aux Port (Table 122); Bridging (Table 124).
2. To save changes, click **Submit Updated System Configuration**. The system may reboot.
3. If Main PSU Port is selected for **Data Service** only (and not for **Management Service**), connect management PC to the port (Aux or SFP) that was selected for Management or Local Management Service
4. If IP Address, Subnet Mask or Gateway IP Address have been changed, reconfigure the local management PC to use an IP address that is valid for the network. Refer to Configuring the management PC on page 6-4.
5. If IP Address has been changed, use the new IP address to log into the unit.

Table 121 IP interface attributes

Attribute	Meaning
IP Version	Defined in Table 116.
IPv4 Address	Defined in Table 116.
Subnet Mask	Defined in Table 116.
Gateway IP Address	Defined in Table 116.
IPv6 Address	Defined in Table 116.
IPv6 Prefix Length	Defined in Table 116.
IPv6 Gateway Address	Defined in Table 116.
IPv6 Auto Configured Link Local Address	Defined in Table 116.
Use VLAN For Management Interfaces	Defined in Table 116.
VLAN Management VID	Defined in Table 116.
VLAN Management Priority	Defined in Table 116.
DSCP Management Priority	Defined in Table 116.
Data Service	Defined in Table 116. For more help, see Ethernet port allocation on page 3-36.
Second Data Service	Defined in Table 116. For more help, see Ethernet port allocation on page 3-36.

Attribute	Meaning
Management Service	Defined in Table 116. For more help, see Ethernet port allocation on page 3-36.
Local Management Service	Defined in Table 116 For more help, see Ethernet port allocation on page 3-36.
Ethernet Loopback Mode	Sets a temporary loopback between the selected ports. The loopback is disabled on a reboot. This mode is provided to allow access to a device connected to the local ODU Aux port via either the main PSU or SFP port. Loopback does not work with jumbo frames: the maximum frame size is 1536 bytes in loopback.
Data Port Wireless Down Alert	**Disabled:** The data Ethernet link will not be dropped when the wireless link drops. **Enabled:** The Data Ethernet link will be dropped briefly when the wireless link drops. This signals to the connected network equipment that this link is no longer available. Connected Ethernet switches can be configured to forward Ethernet frames on an alternative path identified using the Spanning Tree Protocol (STP). When TDM is enabled, the link is dropped briefly at the NIDU LAN port, and not at the ODU.
Second Data Port Wireless Down Alert	**Disabled:** The Second Data Ethernet link will not be dropped when the wireless link drops. **Enabled:** The Second Data Ethernet link will be dropped briefly when the wireless link drops. This signals to the connected network equipment that this link is no longer available. Connected Ethernet switches can be configured to forward Ethernet frames on an alternative path identified using the Spanning Tree Protocol (STP). When TDM is enabled, the link is dropped briefly at the NIDU LAN port, and not at the ODU.
Management Port Wireless Down Alert	Only displayed when an Out-of-Band Port is selected for Management Service. **Disabled:** The management Ethernet link will not be dropped when the wireless link drops. **Enabled:** The management Ethernet link will be dropped briefly when the wireless link drops. This signals to the connected network equipment that this link is no longer available. Connected Ethernet switches can be configured to forward Ethernet frames on an alternative path identified using the Spanning Tree Protocol (STP).

Attribute	Meaning
Management Network Access Enabled	Only displayed when one of the Port selection attributes (Main PSU, Aux or SFP) is set to **Out-of-Band Management Service** and **Second Data Service** is disabled or set to None. **Yes:** The local out-of-band management interface can be used to access the remote management network. **No**: The local out-of-band management interface cannot be used to access the remote management network.

Table 122 Main PSU Port, NIDU LAN Port and Aux Port attributes

Attribute	Meaning
Auto Negotiation	**Disabled:** Configuration of the Ethernet interface is forced. **Enabled:** Configuration of the Ethernet interface is automatically negotiated (default). This is the preferred setting. Use the same setting for the Ethernet link partner.
Auto Neg Advertisement	Only displayed when Auto Negotiation is set to **Enabled**. The data rate that the auto-negotiation mechanism will advertise as available on the Ethernet interface (1000 Mbps or 100 Mbps Full Duplex). Select a data rate that is within the capability of the Ethernet link partner. Use the same setting for the Ethernet link partner.
Forced Configuration	Only displayed when Auto Negotiation is set to **Disabled**. This forces the speed and duplex setting of the Ethernet interface. Over-the-air throughput will be capped to the rate of the Ethernet interface at the receiving end of the link. Select a data rate that is within the capability of the link partner. Use the same setting at both ends.
Auto Mdix	**Disabled:** The Auto Medium Dependent Interface (MDI)/Medium Dependent Interface Crossover (MDIX) capability is disabled. **Enabled:** The Auto Medium Dependent Interface (MDI)/Medium Dependent Interface Crossover (MDIX) capability is enabled.
Power Over Ethernet Output	Aux port only. **Disabled:** The ODU does not supply power to the auxiliary device. **Enabled:** The ODU supplies power to the auxiliary device.

Table 123 SFP Port (connected with copper module) attributes

Attribute	Meaning

Attribute	Meaning
SFP Port Auto Negotiation	**Disabled:** Configuration of the Ethernet interface is forced. This is to be used as a last resort only if auto-negotiation fails. **Enabled:** Configuration of the Ethernet interface is automatically negotiated (default). This is the preferred setting.
SFP Port Auto Neg Advertisement	Only displayed when SFP Port Auto Negotiation is set to **Enabled** and SFP port is connected with copper module. The data rate that the auto-negotiation mechanism will advertise as available on the Ethernet interface (1000 Mbps or 100 Mbps Full Duplex). Select a data rate that is within the capability of the Ethernet link partner. Use the same setting for the Ethernet link partner.
Forced Configuration	Only displayed when SFP Port Auto Negotiation is set to **Disabled** and SFP port is connected with copper module. This forces the speed and duplex setting of the Ethernet interface. Over-the-air throughput will be capped to the rate of the Ethernet interface at the receiving end of the link. Select a data rate that is within the capability of the Ethernet link partner. Use the same setting for the Ethernet link partner.
Auto Mdix	Only displayed when SFP port is connected with copper module. **Disabled:** The Auto Medium Dependent Interface (MDI)/Medium Dependent Interface Crossover (MDIX) capability is disabled. **Enabled:** The Auto Medium Dependent Interface (MDI)/Medium Dependent Interface Crossover (MDIX) capability is enabled.

Table 124 Bridging attributes

Attribute	Meaning
Local Packet Filtering	**Enabled:** The management agent learns the location of end stations from the source addresses in received management frames. The agent filters transmitted management frames to ensure that the frame is transmitted at the Ethernet (data or management) port, or over the wireless link. If the end station address is unknown, then management traffic is transmitted at the Ethernet port and over the wireless link. In the Local Management Service, management frames are not transmitted over the wireless link, and so address learning is not active.
Data Port Pause Frames	Controls whether the bridge tunnels or discards Layer 2 pause frames arriving at the Data port. Such frames are identified by the destination MAC Address being equal to 01-80-C2-00-00-01.

Attribute	Meaning
Second Data Port Pause Frames	**Tunnel:** The Layer 2 pause frames arriving at the port selected for Second Data Service will be bridged across to the port selected for Second Data Service on remote device over the wireless link. **Discard**: The Layer 2 pause frames arriving at the port selected for Second Data Service will be dropped.

Table 125 Synchronous Ethernet attributes

Attribute	Meaning
Sync E Tracking	**Disabled**: The synchronous Ethernet feature is disabled. Synchronization Status Messages received at the Main PSU port will be discarded. **Enabled**: The synchronous Ethernet feature is enabled. **Internal TDM Use Only**: Sync E Tracking is enabled, but is being used internally as part of the TDM feature. Sync E is not available to relay synchronization between external network equipment.
Sync E Equipment Clock	**EEC-Option 1**: Select this option if the equipment is operating in a 2048 kbit/s synchronisation hierarchy (ITU-T G.813 Option 1) **EEC-Option 2**: Select this option if the equipment is operating in a 1544 kbit/s synchronisation hierarchy (Type IV clock from ITU-T G.812)
Main PSU Port QL Rx Overwrite	This control provides the facility to overwrite the Quality Level (QL) of received Synchronisation Status Messages (SSM). It may be useful in a test environment, or for interworking with equipment that does not generate SSMs. **Disabled:** The recommended setting, the QL of received SSMs is unmodified. "**QL-PRC**" or "**QL-SSU A / QL-TNC**" or "**QL-SSU B**" or "**QL-EEC1 / QL-SEC**" or "**QL-DNU / QL-DUS**": The overwritten value of the QL. Where two QLs are given, the QL used is dependent upon the setting of "Sync E Equipment Clock" type.
Main PSU Port SSM Tx	**Disabled**: SSMs are not transmitted from the Main PSU port. Disabling SSMs may be useful in a test environment. **Enabled**: SSMs are transmitted from the Main PSU port (normal operation)
Aux Port SSM Tx	**Disabled**: SSMs are not transmitted from the Aux Port. Disabling SSMs may be useful in a test environment. **Enabled**: SSMs are transmitted from the Aux Port (normal operation)

Attribute	Meaning
SFP Port SSM Tx	**Disabled**: SSMs are not transmitted from the SFP port. Disabling SSMs may be useful in a test environment. **Enabled**: SSMs are transmitted from the SFP port (normal operation)

Table 126 IEEE 1588 attributes

Attribute	Meaning
Transparent Clock	**Disabled**: The Transparent Clock function is disabled. IEEE 1588-2008 event frames will be forwarded, but residence time corrections will not be made. **Enabled**: The Transparent Clock function is enabled. Residence time corrections will be made to IEEE 1588-2008 event frames.
Transparent Clock Port	This specifies the transparent clock source port. It can be Main PSU or SFP Fiber. Only the ports allocated for Data / Second Data Path show up for selection.
Transparent Clock VLAN	**All**: The recommended setting. Residence time corrections will be made to all IEEE 1588-2008 event frames, regardless of any VLAN encapsulation. **S-Tagged**: Residence time corrections are only made to event frames tagged with a service tag equal to “Transparent Clock VID”. **C-Tagged**: Residence time corrections are only made to event frames double tagged and with a customer tag equal to “Transparent Clock VID”.
Transparent Clock VID	The VLAN Identifier (VID) used with “Transparent Clock VLAN” to restrict residence time corrections to IEEE 1588-2008 event frames in a specific VLAN.

QoS Configuration page

Menu option: **System > Configuration > QoS Configuration** (Figure 140 or Figure 141 or Figure 142). Use this page to control the quality of service configuration. Classification may be based on fields in the Ethernet header (Layer 2) or in the network header (Layer 3). The unit recognizes two network layer protocols: IP and MPLS.

Figure 140 QoS Configuration page (Ethernet)

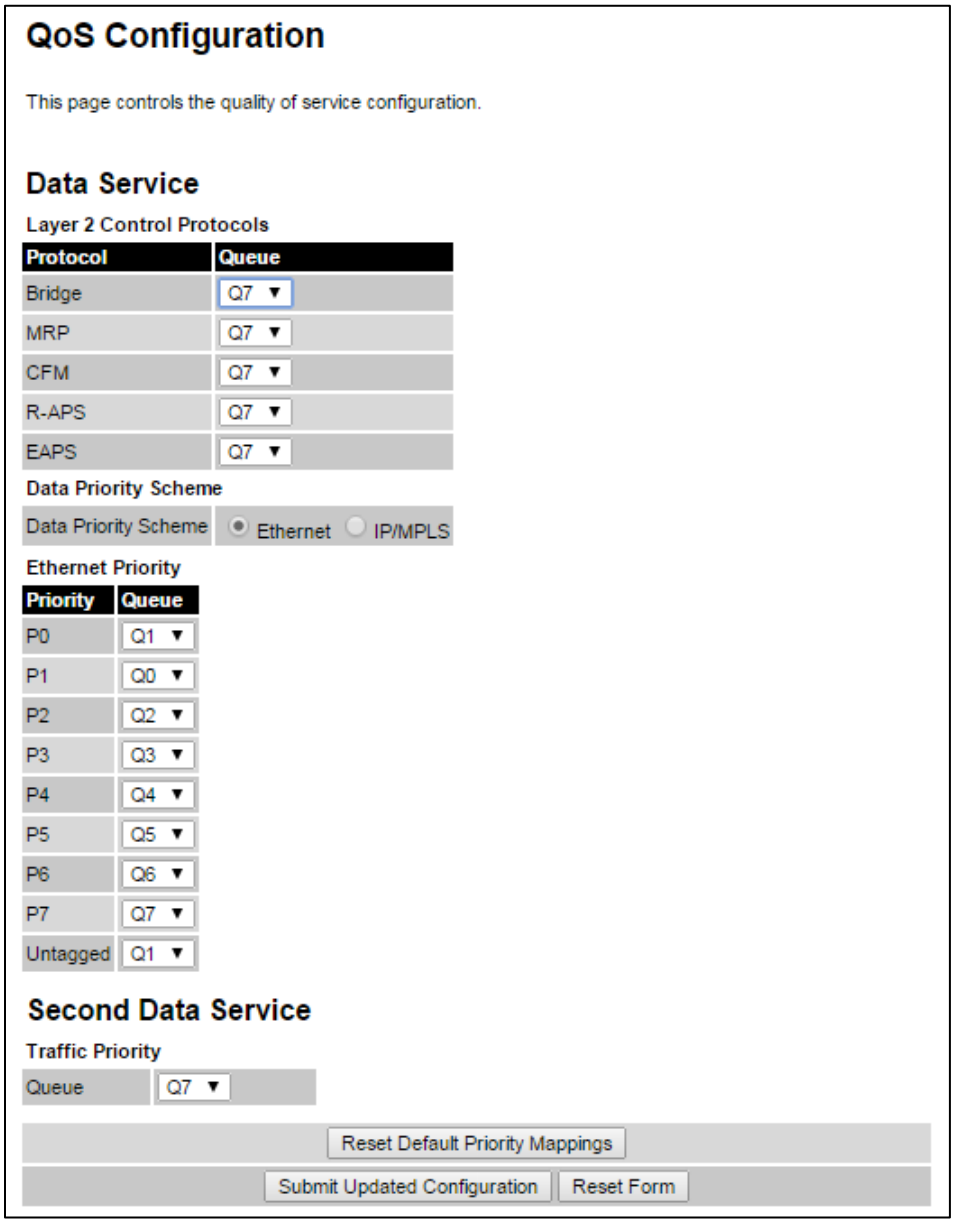


Figure 141 QoS Configuration page (IP/MPLS)

QoS Configuration

This page controls the quality of service configuration.

Data Service

Layer 2 Control Protocols

Protocol	Queue
Bridge	Q7
MRP	Q7
CFM	Q7
R-APS	Q7
EAPS	Q7

Data Priority Scheme

Data Priority Scheme	○ Ethernet ◉ IP/MPLS

Unknown Network Layer Protocol

Unknown Protocol	Q1

IP DSCP

DSCP	Queue	DSCP	Queue	DSCP	Queue	DSCP	Queue
00 - DF	Q1	16 - CS2	Q3	32 - CS4	Q4	48 - CS6	Q7
01	Q1	17	Q1	33	Q1	49	Q1
02	Q1	18 - AF21	Q3	34 - AF41	Q4	50	Q1
03	Q1	19	Q1	35	Q1	51	Q1
04	Q1	20 - AF22	Q3	36 - AF42	Q4	52	Q1
05	Q1	21	Q1	37	Q1	53	Q1
06	Q1	22 - AF23	Q3	38 - AF43	Q4	54	Q1
07	Q1	23	Q1	39	Q1	55	Q1
08 - CS1	Q0	24 - CS3	Q3	40 - CS5	Q5	56 - CS7	Q1
09	Q1	25	Q1	41	Q1	57	Q1
10 - AF11	Q2	26 - AF31	Q3	42	Q1	58	Q1
11	Q1	27	Q1	43	Q1	59	Q1
12 - AF12	Q2	28 - AF32	Q3	44 - VA	Q6	60	Q1
13	Q1	29	Q1	45	Q1	61	Q1
14 - AF13	Q2	30 - AF33	Q3	46 - EF	Q6	62	Q1
15	Q1	31	Q1	47	Q1	63	Q1

MPLS Traffic Class

MPLS	Queue
TC 0	Q0
TC 1	Q1
TC 2	Q2
TC 3	Q3
TC 4	Q4
TC 5	Q5
TC 6	Q6
TC 7	Q7

Second Data Service

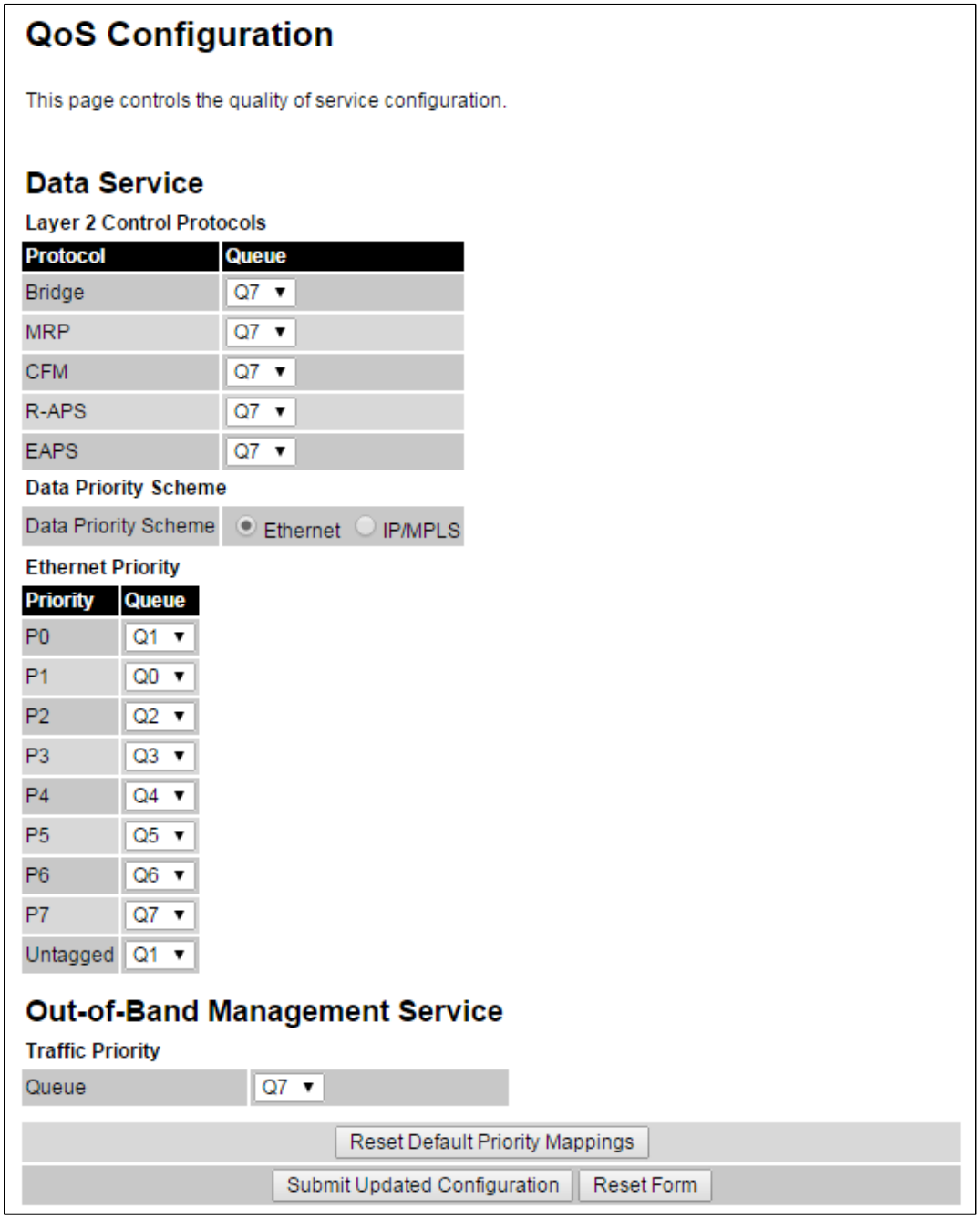
Traffic Priority

Queue	Q7

Reset Default Priority Mappings

Submit Updated Configuration | Reset Form

Figure 142 QoS Configuration page showing Out-of-Band Management



Procedures:

- Review and update the attributes (Table 127, Table 128 and Table 129).
- To use IEEE 802.1Q classification rules, click **Reset Default Priority Mappings**.
- To save changes, click: **Submit Updated Configuration**.

Note

Priority mapping must be configured the same at both Master and Slave units on the wireless link.

Table 127 QoS Configuration attributes – Data Service

Attribute	Meaning
Bridge MRP CFM R-APS EAPS	The classification of each layer 2 control protocol (L2CP) to an egress queue at the wireless port.
Data Priority Scheme	**Ethernet**: Classification is based on fields in the Ethernet header (Layer 2). **IP/MPLS**: Classification is based on fields in the network header (Layer 3). IP includes IPv4 and IPv6.
Unknown Protocol	Only displayed when Priority Scheme is **IP/MPLS**. The classification of unknown network protocols (that is, not IP or MPLS) to an egress queue at the wireless port.
Ethernet Priority	Ethernet priority mapping to Queue

Table 128 QoS Configuration attributes – Second Data Service

Attribute	Meaning
Queue	Set a priority egress queue for Second Data Service traffic classification

Table 129 QoS Configuration attributes –Out-of-Band Managment Service

Attribute	Meaning
Queue	Only displayed when one ODU port is allocated to **Out-of-Band Management** and **Second Data Service** port is not allocated (Configuring port allocations on page 6-20). The classification of out-of-band management traffic to an egress queue at the wireless port.

SFP Configuration page

Menu option: **System > Configuration > SFP Configuration**.

This page is only available when the ODU detects an optical (Figure 143) or copper (Figure 144) SFP module in the SFP port. Use it to configure the way in which the unit connects to the network via the SFP interface.

Figure 143 SFP Configuration page (optical SFP module)

SFP Configuration

This page controls the SFP configuration of the PTP wireless unit.

Attributes	Value	Units
SFP Port Auto Negotiation	○ Disabled ◉ Enabled	
Sfp Vendor Name	JDSU	
Sfp Vendor OUI	00:01:9c	
Sfp Part Number	PLRXPL-VI-S24-22	
Sfp Revision Level	1	
Sfp Laser Wavelength	850	
Sfp Serial Number	CA51QA098	
Sfp Date Code	101214	

Figure 144 SFP Configuration page (copper SFP module)

SFP Configuration

This page controls the SFP configuration of the PTP wireless unit.

Attributes	Value	Units
SFP Port Auto Negotiation	○ Disabled ◉ Enabled	
SFP Port Auto Neg Advertisement	☑ 1000 Mbps Full Duplex ☑ 100 Mbps Full Duplex	
SFP Port Auto Mdix	○ Disabled ◉ Enabled	
Sfp Vendor Name	FINISAR CORP.	
Sfp Vendor OUI	00:90:65	
Sfp Part Number	FCLF8522P2BTL	
Sfp Revision Level	A	
Sfp Serial Number	PM54X88	
Sfp Date Code	120205	

Submit Updated System Configuration | Reset Form

Procedure (only applies when copper SFP module is installed)**:**

- Update the attributes
    - When optical SFP module is installed (Table 133).
    - When copper SFP module is installed (Table 131)
- To save changes, click **Submit Updated System Configuration**.

Table 130 SFP Configuration (Optical module) attributes

Attribute	Meaning
SFP Port Auto Negotiation	**Disabled:** Configuration of the Ethernet interface is forced. This is to be used as a last resort only if auto-negotiation fails. **Enabled:** Configuration of the Ethernet interface is automatically negotiated (default). This is the preferred setting.

Table 131 SFP Configuration (copper SFP module) attributes

Attribute	Meaning
SFP Port Auto Negotiation	**Disabled:** Configuration of the fiber interface is forced. This is to be used as a last resort only if auto-negotiation fails. **Enabled:** Configuration of the fiber interface is automatically negotiated (default). This is the preferred setting.
SFP Port Auto Neg Advertisement	Only displayed when SFP Port Auto Negotiation is set to **Enabled**. The data rate that the auto-negotiation mechanism will advertise as available on the Ethernet interface (1000 Mbps or 100 Mbps Full Duplex). Select a data rate that is within the capability of the Ethernet link partner. Use the same setting for the Ethernet link partner.
Forced Configuration	Only displayed when SFP Port Auto Negotiation is set to **Disabled**. This forces the speed and duplex setting of the Ethernet interface. Over-the-air throughput will be capped to the rate of the Ethernet interface at the receiving end of the link. Select a data rate that is within the capability of the Ethernet link partner. Use the same setting for the Ethernet link partner.
Auto Mdix	**Disabled:** The Auto Medium Dependent Interface (MDI)/Medium Dependent Interface Crossover (MDIX) capability is disabled. **Enabled:** The Auto Medium Dependent Interface (MDI)/Medium Dependent Interface Crossover (MDIX) capability is enabled.

TDM Configuration page

Menu option: **System > Configuration > TDM Configuration** (Figure 145).

Use this page to control how the unit handles E1 or T1 channels over the wireless bridge.

This page is only available when the TDM interface is enabled and the unit is rebooted (Interface Configuration page on page 6-14).

Procedure:

- Update the attributes (Table 132).
- To save changes, click **Submit Updated TDM Configuration**.

Figure 145 TDM Configuration page (T1 option shown)

TDM

This page controls the telecoms configuration of the wireless unit.

Attributes	Value	Units
TDM Interface Control	T1	
TDM Local MAC Address	00:00:00:00:00:00	
TDM Remote MAC Address	00:00:00:00:00:00	
License Max Number Of TDM Channels	8	
TDM Enabled Channels	3	
TDM Channel Line Code 1	B8ZS or HDB3 ▼	
TDM Channel Line Code 2	B8ZS or HDB3 ▼	
TDM Channel Line Code 3	B8ZS or HDB3 ▼	
TDM Channel Cable Length 0	◉ 41 ○ 81 ○ 122 ○ 162 ○ 200	meters
TDM Channel Cable Length 1	◉ 41 ○ 81 ○ 122 ○ 162 ○ 200	meters
TDM Channel Cable Length 2	◉ 41 ○ 81 ○ 122 ○ 162 ○ 200	meters
TDM Channel Loopback 1	◉ None ○ Copper ○ Wireless	
TDM Channel Loopback 2	◉ None ○ Copper ○ Wireless	
TDM Channel Loopback 3	◉ None ○ Copper ○ Wireless	
Lowest TDM Modulation Mode	BPSK 0.63	

Submit Updated TDM Configuration | Reset Form

Table 132 TDM Configuration attributes

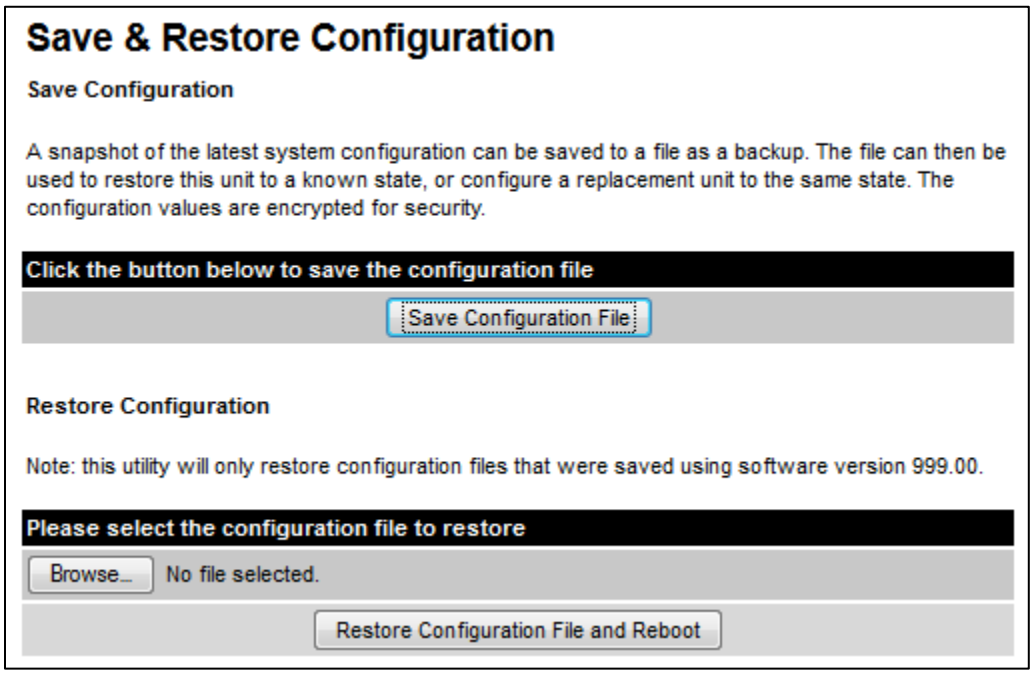
Attribute	Meaning
TDM Interface Control	Display only. Defined in Table 117.
TDM Local MAC Address	Display only. MAC address of the local NIDU.
TDM Remote MAC Address	Display only. MAC address of the remote NIDU.
License Max Number of TDM Channels	Display only. Defined in Table 117.
TDM Enabled Channels	Display only. Defined in Table 117.
TDM Channel Line Code n	Defined in Table 117.
TDM Channel Cable Length n	Defined in Table 117.
TDM Channel Loopback n	Select the loopback status of TDM channel “n” (where “n” is in the range 1 to 8). **None**: Normal operation, no testing is required. **Copper**: Sends the TDM data received from the local transceiver and NIDU back on the same TDM channel. This may be used in conjunction with a Bit Error Rate Tester to confirm that the correct connections have been made between the transceiver, NIDU and ODU. This mode cannot be used for resistance tests, as it is only capable of looping back valid TDM signals. **Wireless**: Sends the TDM data received from the wireless link back across the link on the same TDM channel. The link may be checked using, for example, a Bit Error Rate Tester to ensure that no errors are detected.
Lowest TDM Modulation Mode	Display only. Defined in Table 117.

Save and Restore Configuration page

Menu option: **System > Configuration > Save And Restore** (Figure 146).

Use the Save & Restore Configuration page to take a snapshot of the latest system configuration as a backup. The file can then be used to restore this unit to a known state, or to configure a replacement unit to the same state. The configuration values are encrypted for security.

Figure 146 Save & Restore Configuration page



Save the system configuration in the following situations:

- After a new unit has been fully configured as described in this chapter.
- After any change has been made to the configuration.
- Before upgrading the unit to a new software version.
- After upgrading the unit to a new software version.

Note

The restore is only guaranteed to work if the installed software version has not been changed since the configuration file was saved. This is why the configuration should always be saved immediately after upgrading the software version.

Note

The license key is restored automatically if the configuration file is saved and then loaded on the same unit. However, the license key is not restored if the configuration file is loaded on a different unit. Before restoring configuration to a different PTP 700 unit, ensure that a valid license key is installed (with optional capabilities enabled where appropriate).

Most of the configuration can be restored from the backup. However, certain attributes that were part of the configuration are not saved or restored automatically. Use the web interface to reconfigure the following attributes:

- Usernames, passwords and roles for the web-based interface.
- Key of Keys
- HTTPS Entropy
- HTTPS Private Key
- HTTPS Public Key Certificate
- HTTP Access Enabled
- HTTPS Access Enabled
- Telnet Access Enabled
- HTTP Port Number
- HTTPS Port Number
- Telnet Port Number
- Encryption Algorithm
- Encryption Key
- SNMP Control Of HTTP And Telnet
- SNMP Control of Passwords

Procedures:

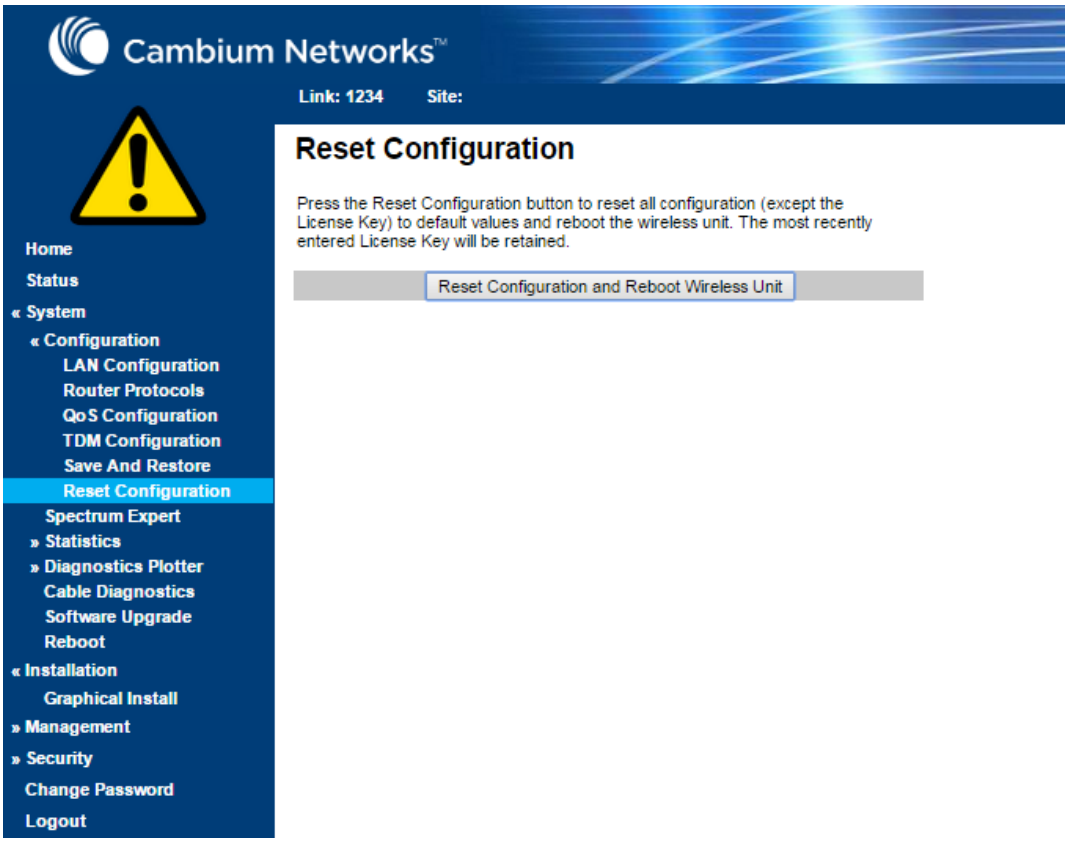
- To save the configuration:
  - Click Save Configuration File.
  - Save the file. The default filename is in the format **MAC-mm-mm-mm_IP-iii-iii-iii-iii.cfg**, where **mm-mm-mm** is MAC address of unit and **iii-iii-iii-iii** is Internet address of unit.
- To restore the configuration:
  - Click **Browse** and navigate to the PC folder containing the saved configuration file (.cfg).
  - Click **Restore Configuration File and Reboot**.
  - Click **OK** to confirm the restore. The configuration file is uploaded and used to reconfigure the new unit to the same state as the old unit. On completion, the unit reboots.

Reset Configuration page

Menu option: **System > Configuration > Reset Configuration**. Use this page to reset the ODU configuration to default settings, retaining the most recently entered License Key (Figure 147).

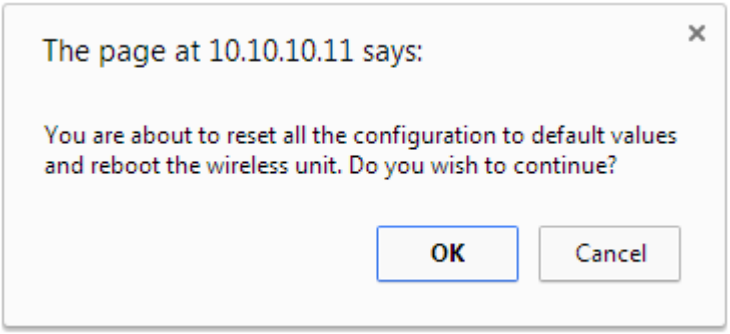
The Reset Configuration page resets the configuration to default settings. After successful execution of Reset Configuration, the ODU reboots and is then accessible via the default IP address (i.e. 169.254.1.1).

Figure 147 Reset Configuration page



Procedure:

- Click **Reset Configuration**. The user pop up box is displayed to reconfirm:



- Click **OK** to restore configuration to the default settings and reboot of unit.

Further reading

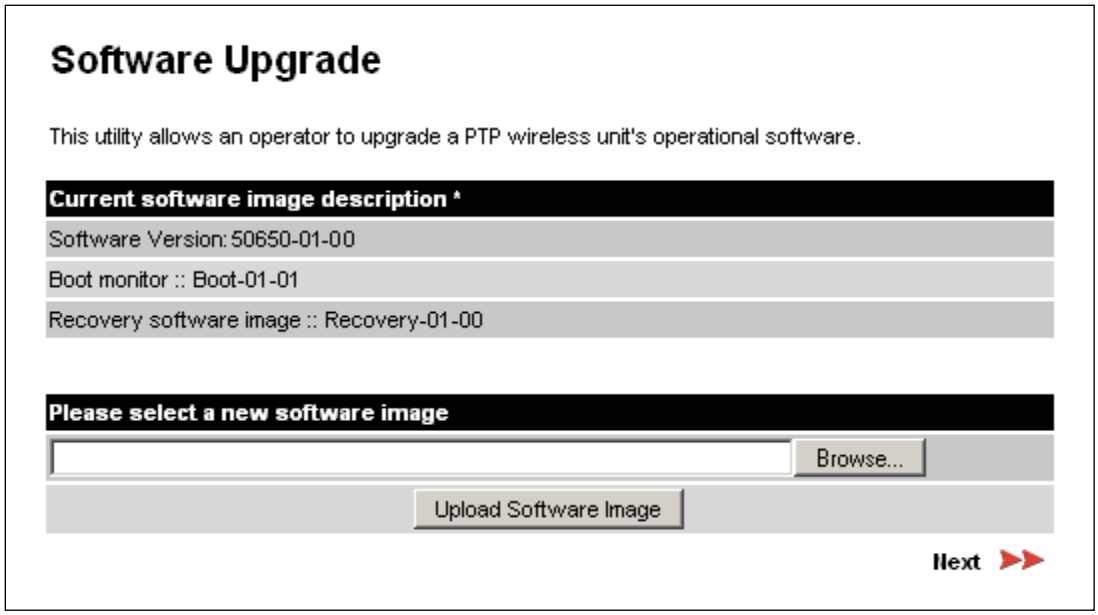
For information about...	Refer to...
Erase Configuration	Use this option to erase the entire configuration of the unit. Refer to Resetting all configuration data on page 7-67.

Software Upgrade page

Menu option: **System > Software Upgrade** (Figure 148).

Use this page to upgrade the unit to a new version of PTP 700 operational software.

Figure 148 Software Upgrade page



Caution

Ensure that the correct units are upgraded, as units cannot easily be downgraded afterwards.

Caution

Software version must be the same at both ends of the link. Limited operation may sometimes be possible with dissimilar software versions, but such operation is not supported by Cambium Networks.

Caution

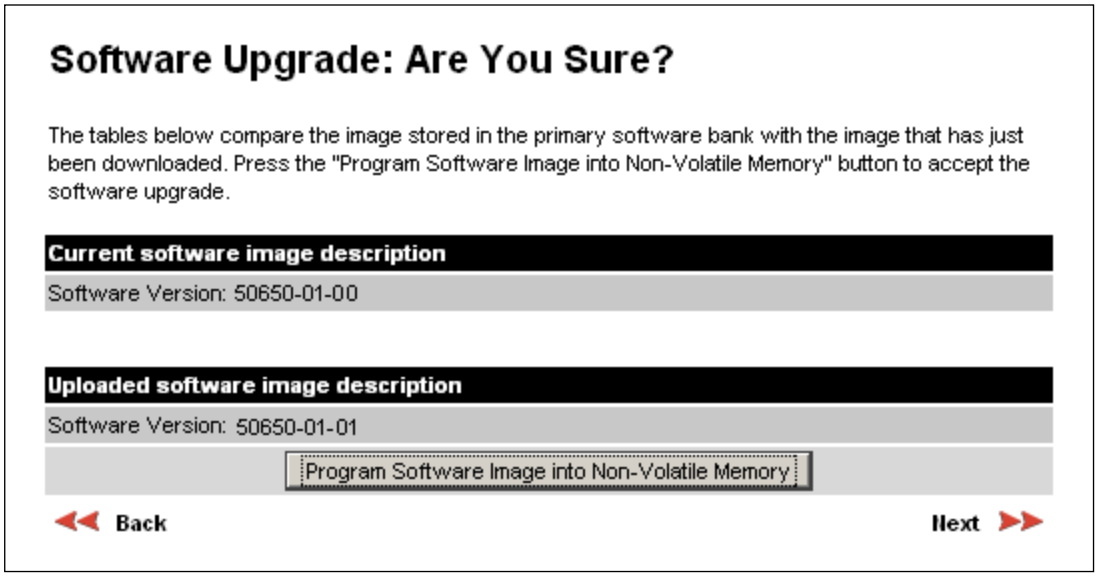
If the link is operational, upgrade the remote end of the link first, then upgrade the local end. Otherwise, the remote end may not be accessible.

Preparation:

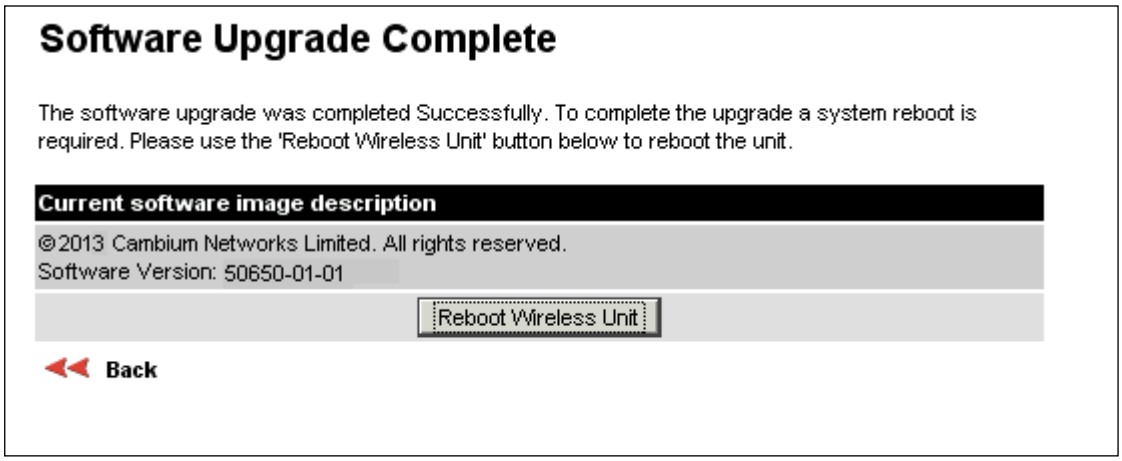
- Go to the Cambium Support web page (see Contacting Cambium Networks on page 1) and navigate to **Point-to-Point Software and Documentation**, **PTP 700 Series**.
- If the support web page contains a later Software Version than that installed on the PTP 700 unit, perform the procedure below.

Procedure:

1. Save the system configuration; see Save and Restore Configuration page on page 6-52.
2. On the Cambium Support web page, select the latest PTP 700 software image (dld2 file) and save it to the local management PC.
3. On the Software Upgrade page, click **Browse**. Navigate to the folder containing the downloaded software image and click **Open**.
4. Click **Upload Software Image**. The Software Upgrade Confirmation page is displayed:



5 Click **Program Software Image into Non-Volatile Memory**. The Progress Tracker page is displayed. On completion, the Software Upgrade Complete page is displayed:



6 Click **Reboot Wireless Unit**, then click **OK** to confirm. The unit reboots with the new software installed.

7 Save the post-upgrade system configuration; see Save and Restore Configuration page on page 6-52.

Note

The unit will not upload FIPS versions of the software unless the unit has the AES encryption and FIPS licenses installed.

Note

CSPs are automatically zeroized if FIPS software is loaded in a unit to replace standard (non-FIPS) software, or standard (non-FIPS) software is loaded in a unit to replace FIPS software.

Management menu

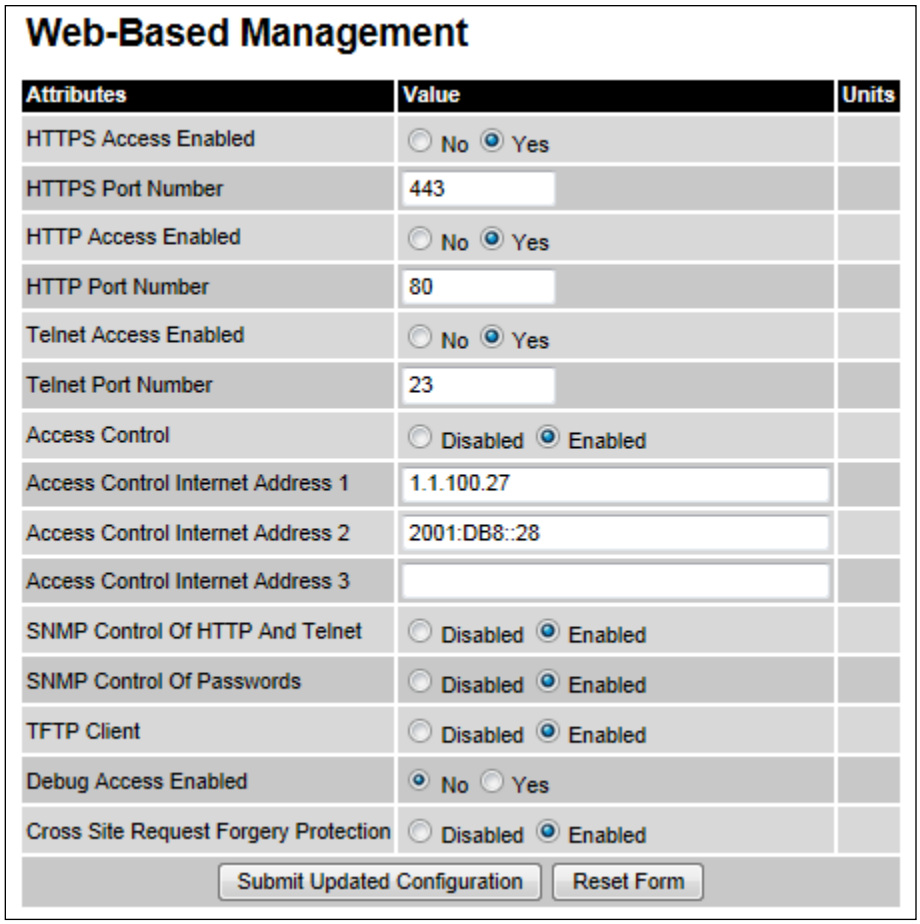
This section describes how to configure web-based management of the PTP 700 unit.

Web-Based Management page

Menu option: **Management > Web** (Figure 149).

Use this page to configure web-based management of the unit.

Figure 149 Web-Based Management page



Web-Based Management

Attributes	Value	Units
HTTPS Access Enabled	No Yes	
HTTPS Port Number	443	
HTTP Access Enabled	No Yes	
HTTP Port Number	80	
Telnet Access Enabled	No Yes	
Telnet Port Number	23	
Access Control	Disabled Enabled	
Access Control Internet Address 1	1.1.100.27	
Access Control Internet Address 2	2001:DB8::28	
Access Control Internet Address 3		
SNMP Control Of HTTP And Telnet	Disabled Enabled	
SNMP Control Of Passwords	Disabled Enabled	
TFTP Client	Disabled Enabled	
Debug Access Enabled	No Yes	
Cross Site Request Forgery Protection	Disabled Enabled	

Submit Updated Configuration Reset Form

Caution

If the HTTP, HTTPS, Telnet and SNMP interfaces are all disabled, then it will be necessary to use the Recovery image to reset IP & Ethernet Configuration back to defaults to re-enable the interfaces.

Note

The HTTP and Telnet interfaces should be disabled if the HTTPS interface is configured. (Preparing for HTTPS/TLS page 6-93).

Procedure:

- Review and update the attributes (Table 133).
- To save changes, click **Submit Updated Configuration**.

Table 133 Web-Based Management attributes

Attribute	Meaning
HTTPS Access Enabled	Only displayed when HTTPS is configured. **No:** The unit will not respond to any requests on the HTTPS port. **Yes:** The unit will respond to requests on the HTTPS port.
HTTPS Port Number	Only displayed when HTTPS is configured. The port number for HTTPS access. A value of zero means the wireless unit uses the default port.
HTTP Access Enabled	**No:** The unit will not respond to any requests on the HTTP port. **Yes:** The unit will respond to requests on the HTTP port. Remote management via HTTPS is not affected by this setting.
HTTP Port Number	The port number for HTTP access. A value of zero means the wireless unit uses the default port.
Telnet Access Enabled	**No:** The unit will not respond to any requests on the Telnet port. **Yes:** The unit will respond to requests on the Telnet port.
Telnet Port Number	The port number for Telnet access. A value of zero means the wireless unit uses the default port.
Access Control	Enables or disables access control to web-based management by Internet Address.
Access Control Internet Address 1/2/3	A list of up to three IPv4 or IPv6 Addresses permitted to perform web-based management. Only displayed when Access Control is set to **Enabled**.
SNMP Control of HTTP And Telnet	**Disabled:** Neither HTTP nor Telnet can be controlled remotely via SNMP. **Enabled:** Both HTTP and Telnet can be controlled remotely via SNMP.

Attribute	Meaning
SNMP Control of Passwords	**Enabled:** Passwords for identity-based user accounts in the web-based interface can be updated via SNMP. This option can be used together with SNMPv3 to provide a secure means to update passwords from a central network manager. **Disabled**: Passwords for identity-based user accounts can be updated only via the web-based interface (default).
TFTP Client	**Disabled:** The unit will not respond to any TFTP software download requests. **Enabled:** Software can be downloaded via TFTP, as described in Upgrading software using TFTP on page 6-117.
Debug Access Enabled	**Yes:** Cambium Technical Support is allowed to access the system to investigate faults.
Cross Site Request Forgery Protection	**Enabled:** The system is protected against cross-site request forgery attacks at the web-based interface.

Local User Accounts page

Menu option: **Management > Web > Local User Accounts**.

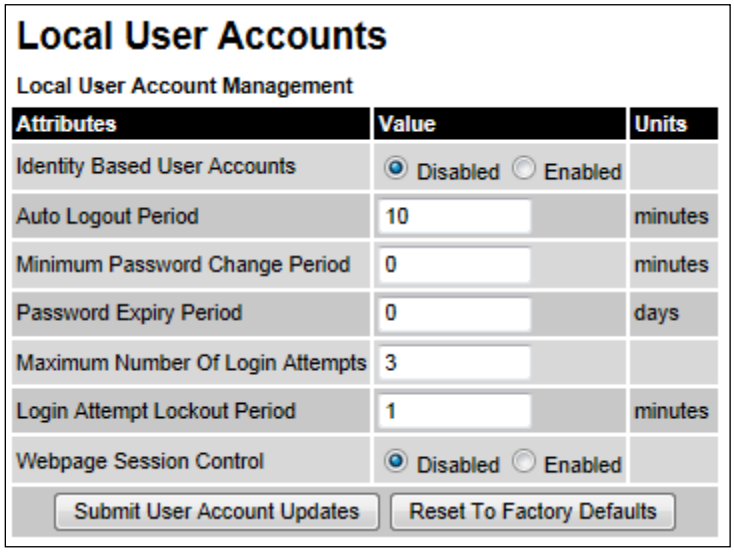
The contents of this page depend upon the setting of Identity Based User Accounts: **Disabled** (Figure 150) or **Enabled** (Figure 151).

Use this page to ensure that user access to the web-based management interface is controlled in accordance with the network operator's security policy. The Identity Based User Accounts option allows multiple users (from one to ten) to access the unit with one of three levels of access: Security Officer, System Administrator and Read Only. If Identity Based User Accounts are **Enabled**, this procedure may only be performed by a Security Officer.

Note

Local User Account Names, Roles and Passwords are critical security parameters that can be rest from the Zeroize CSPs page (Zeroize CSPs page on page 6-104).

Figure 150 Local User Accounts page (Identity Based User Accounts disabled)



Local User Accounts

Local User Account Management

Attributes	Value	Units
Identity Based User Accounts	(•) Disabled ( ) Enabled	
Auto Logout Period	10	minutes
Minimum Password Change Period	0	minutes
Password Expiry Period	0	days
Maximum Number Of Login Attempts	3	
Login Attempt Lockout Period	1	minutes
Webpage Session Control	(•) Disabled ( ) Enabled	

Submit User Account Updates | Reset To Factory Defaults

Figure 151 Local User Accounts page (Identity Based User Accounts enabled)

Local User Accounts

Local User Account Management

Attributes	Value	Units
Identity Based User Accounts	○ Disabled ◉ Enabled	
Auto Logout Period	10	minutes
Minimum Password Change Period	0	minutes
Password Expiry Period	0	days
Maximum Number Of Login Attempts	3	
Login Attempt Lockout Action	◉ Timeout ○ Disable Account	
Login Attempt Lockout Period	1	minutes
Password Expiry Action	◉ Force Password Change ○ Disable Account	
Password Complexity Configuration		
Minimum Password Length	Off characters	
Password Can Contain User Name	○ No ◉ Yes	
Minimum Mandatory Characters	Off Lowercase Off Uppercase Off Numeric Off Special	
Maximum Repeated Characters	Off Alphabetic Off Numeric Off Special	
Maximum Consecutive Characters	Off Lowercase Off Uppercase Off Numeric	
Maximum Sequential Characters	Off Alphabetic Off Numeric	
Maximum Repeated Pattern Length	Off characters	
Match Reversed Patterns	◉ No ○ Yes	
Minimum Characters That Must Change	Off characters	
Password Reuse	◉ Permitted ○ Prohibited	
Special Characters	!"#$%&'()*+,-./:;<=>?@[\]^_`{|}~	

Set Default Complexity | Set Best Practice Complexity

User	Name	Role	Password	Password Confirm	Force Password Change	Disable
1	security	Security Officer	•••••••••••	•••••••••••	☐	☐
2	admin	System Administrator	•••••••••••	•••••••••••	☐	☐
3	readonly	Read Only	•••••••••••	•••••••••••	☐	☐
4	readonly2		•••••••••••	•••••••••••	☐	☑
5	readonly3		•••••••••••	•••••••••••	☐	☑
6	readonly4		•••••••••••	•••••••••••	☐	☑
7	readonly5		•••••••••••	•••••••••••	☐	☑
8	readonly6		•••••••••••	•••••••••••	☐	☑
9	readonly7		•••••••••••	•••••••••••	☐	☑
10	readonly8		•••••••••••	•••••••••••	☐	☑

Submit User Account Updates | Reset To Factory Defaults

Procedure:

- Choose whether to set Identity Based User Accounts to **Disabled** or **Enabled**.
- Review and update the Local User Account Management attributes (Table 134).
- If Identity Based User Accounts is set to **Enabled:**
  - Review and update the Password Complexity Configuration attributes (Table 135). To reset all attributes to the best practice values, click **Set Best Practice Complexity**. To return to default values, click **Set Default Complexity.**
  - Review and update up to 10 identity-based user accounts (Table 136).
- If any attributes have been updated, click **Submit User Account Updates**.

Table 134 Local User Account Management attributes

Attribute	Meaning
Identity Based User Accounts	**Disabled**: Access to the web interface is controlled by a single system administration password. **Enabled**: Up to 10 users may access the unit.
Auto Logout Period	The time without user activity that elapses before a user is automatically logged out (minutes). A value of zero disables this feature.
Minimum Password Change Period	The minimum time that elapses before a user is allowed to change a password (minutes). A value of zero disables this feature.
Password Expiry Period	The time that elapses before a password expires (days). A value of zero disables this feature.
Maximum Number of Login Attempts	The maximum number of login attempts (with incorrect password) that are allowed before a user is locked out. Also, the maximum number of password change attempts before a user is locked out.
Login Attempt Lockout Action	Only displayed when Identity Based User Accounts is **Enabled**. **Timeout**: When a user is locked out, the user is allowed to log in again after a specified period. **Disabled**: When a user is locked out, the user is disabled.
Login Attempt Lockout Period	Only displayed when Identity Based User Accounts is **Disabled**. The time that elapses before a locked out user is allowed to log in again (minutes). Only displayed when Login Attempt Lockout Action is set to **Timeout**.
Password Expiry Action	Only displayed when Identity Based User Accounts is **Enabled**. The action to be taken by the PTP 700 when a password expires.

Always set to user accounts in FIPS

Table 135 Password Complexity Configuration attributes

Attribute	Meaning	Best practice
Minimum Password Length	The minimum number of characters required in passwords.	10
Password Can Contain User Name	**No**: Passwords must not contain the user name. **Yes**: Passwords may contain the user name.	No
Minimum Mandatory Characters	The minimum number of lowercase, uppercase, numeric and special characters required in passwords. For example, if all values are set to **2**, then **FredBloggs** will be rejected, but **FredBloggs(25)** will be accepted.	2
Maximum Repeated Characters	The maximum number of consecutive repeated alphabetic, numeric and special characters permitted in passwords. For example, if all values are set to **2**, then **aaa**, **XXX**, **999** and **$$$** will be rejected, but **aa**, **XX**, **99** or **$$** will be accepted.	2
Maximum Consecutive Characters	The maximum number of consecutive lowercase, uppercase and numeric characters permitted in passwords. For example, if all values are set to **5**, then **ALFRED**, **neuman** and **834030** will be rejected.	5
Maximum Sequential Characters	The maximum number of alphabetic and numeric characters permitted in passwords. For example, if set to **3**, then **abcd**, **WXYZ** and **0123** will be rejected, but **abc**, **xyz** and **123** will be accepted.	3
Maximum Repeated Pattern Length	The maximum sequence of characters that can be repeated consecutively in passwords. For example, if set to **3**, then **BlahBlah** and **31st31st** will be rejected, but **TicTicTock** and **GeeGee** will be accepted. **Blah-Blah** will be accepted because the two sequences are not consecutive.	3
Match Reversed Patterns	**No**: Reversed patterns are not checked. **Yes**: Reversed patterns are checked. For example, if Maximum Repeated Pattern Length is set to **3** and Match Reversed Patterns is set to **Yes**, then **AB1221BA** will be rejected.	Yes
Minimum Characters That Must Change	The minimum number of password characters that must change every time a password is updated.	4
Password Reuse	**Permitted**: A user may reuse a previous password. **Prohibited**: A user must not reuse a previous password.	Prohibited

Attribute	Meaning	Best practice
Special Characters	User defined set of special characters used in password construction. The only characters permitted in a password are: (a-z), (A-Z), (0-9) and any of the special characters entered here.	!"%&'()*+,-./:;<=>?

be sure to select best practice for FIPS

Table 136 Identity-based user accounts attributes

Attribute	Meaning
Name	Enter a user name.
Role	Select a role from the list: **Security Officer, System Administrator** or **Read Only**.
Password	Enter a password for the user. Passwords must comply with the complexity rules (Table 135).
Password Confirm	Retype the password to confirm.
Force Password Change	Force this user to change their password when they next log on.
Disable	Tick the box to disable a user account.

Note

At least one user must be assigned the Security Officer role. If RADIUS is enabled, then this rule is relaxed, in which case the RADIUS server(s) SHOULD be configured with at least one user with **Security Officer** privileges.

RADIUS Configuration page

Menu option: **Management > Web > Radius Configuration** (Figure 152).

Use this page to configure RADIUS authentication. RADIUS authentication is only available when PTP 700 is configured for Identity-based User Accounts and when RADIUS servers are connected to the network.

Figure 152 RADIUS Configuration page

RADIUS Configuration

Attributes	Value	Units
RADIUS Client	Disabled Enabled	
RADIUS Primary Server	Server 1 Server 2	
RADIUS Primary Server Dead Time	5	minutes
RADIUS Server Retries	2	
RADIUS Server Timeout	3	seconds
Authentication Method	CHAP MS-CHAP-v2	
Authentication Server 1		
RADIUS Server Status	server not yet used	
RADIUS Server Internet Address		
RADIUS Server Authentication Port	1812	
RADIUS Server Shared Secret		
RADIUS Server Shared Secret Confirm		
Authentication Server 2		
RADIUS Server Status	server not yet used	
RADIUS Server Internet Address		
RADIUS Server Authentication Port	1812	
RADIUS Server Shared Secret		
RADIUS Server Shared Secret Confirm		
Submit RADIUS Configuration		

Note

Only users with **Security Officer** role are permitted to configure RADIUS authentication.

Note

When RADIUS is enabled, the Security Officer may disable all user accounts.

Note

At least one user with Security Officer privileges must exist and be enabled, in order to disable the RADIUS client.

Procedure:

- Update the attributes (Table 137).
- Click **Submit RADIUS Configuration**.

Table 137 RADIUS Authentication attributes

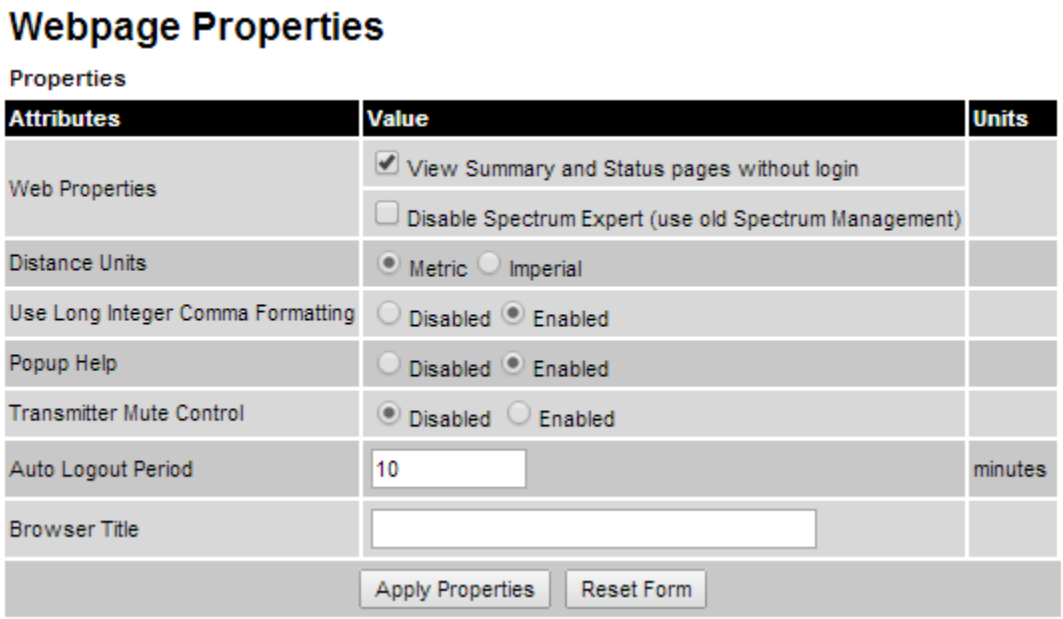
Attribute	Meaning
RADIUS Client Enabled	**Enabled:** PTP 700 users may be authenticated via the RADIUS servers. **Disabled**: RADIUS authentication is not used. This may only be selected if at least one user with Security Officer privileges exists.
RADIUS Primary Server	Specifies the primary server, determining the order in which the servers are tried.
RADIUS Primary Server Dead Time	Time (in minutes) to hold off trying to communicate with a previously unavailable RADIUS server. Setting the value to zero disables the timer.
RADIUS Server Retries	Number of times the PTP 700 will retry after a RADIUS server fails to respond to an initial request.
RADIUS Server Timeout	Time (in seconds) the PTP 700 will wait for a response from a RADIUS server.
Authentication Method	Method used by RADIUS to authenticate users.
Authentication Server 1 and 2:	
RADIUS Server Status	The status of the RADIUS server. This contains the time of the last test and an indication of success or failure. If the Authentication Server attributes are incorrect, the displayed status is “server config not valid”.
RADIUS Server Internet Address	IPv4 or IPv6 address of the RADIUS server.
RADIUS Server Authentication Port	Network port used by RADIUS server for authentication services.
RADIUS Server Shared Secret	Shared secret used in RADIUS server communications. May contain alphabetic, numeric, special characters or spaces, but not extended unicode characters. The maximum length is 127 characters.
RADIUS Server Shared Secret Confirm	Shared secret confirmation.

Webpage Properties page

Menu option: **Management > Web > Web Properties** (Figure 153).

Use this page to control the display of the web interface.

Figure 153 Webpage Properties page



Procedure:

- Update the attributes (Table 138).
- Click Apply Properties.

Table 138 Webpage Properties attributes

Attribute	Meaning
Web Properties	**View Summary and Status pages without login**: • If ticked (the default setting), users can view the Summary and Status web pages without entering a password. • If not ticked, users must enter a password before viewing the Summary and Status pages. This is only effective if the System Administration Password has been set, see Change Password page on page 7-16.
Distance Units	**Metric:** Distances are displayed in kilometers or meters. **Imperial:** Distances are displayed in miles or feet.
Use Long Integer Comma Formatting	**Disabled:** Long integers are displayed thus: 1234567. **Enabled:** Long integers are displayed thus: 1,234,567.

Attribute	Meaning
Popup Help	**Disabled:** Web page popup help is not displayed. **Enabled:** Web page popup help is displayed.
Transmitter Mute Control	**Disabled:** Hides the Enable Transmission attribute. **Enabled:** Shows the Enable Transmission attribute (System Configuration page on page 6-30).
Send HTTPS Close Notify Alerts	Only displayed when HTTPS is configured. Controls whether or not the HTTPS server sends TLS Close Notify Alerts before it shuts down each socket. **Disabled**: TLS Close Notify Alerts are not sent before closing each socket. This is the default because these alerts can cause problems with some browsers (e.g. Internet Explorer) **Enabled**: TLS Close Notify Alerts are sent before closing each socket.
Auto Logout Period	Only displayed if role-based user accounts are in use. Automatic logout period in minutes. If there is no user activity within this time, the user is required to log in again. Think this is only displayed when not using identity based user accounts.
Browser Title	By default, web browser tab titles display PTP 700 model, page title and IP address in one of the following formats: **Cambium PTP 45700 - <current page> (IP=<ipAddress>)** **Cambium PTP 45700 HAZLOC - <current page> (IP=<ipAddress>)** To change the default text, enter simple text and optional variables (prefixed with a $ character). The full list of variables is in Table 139.

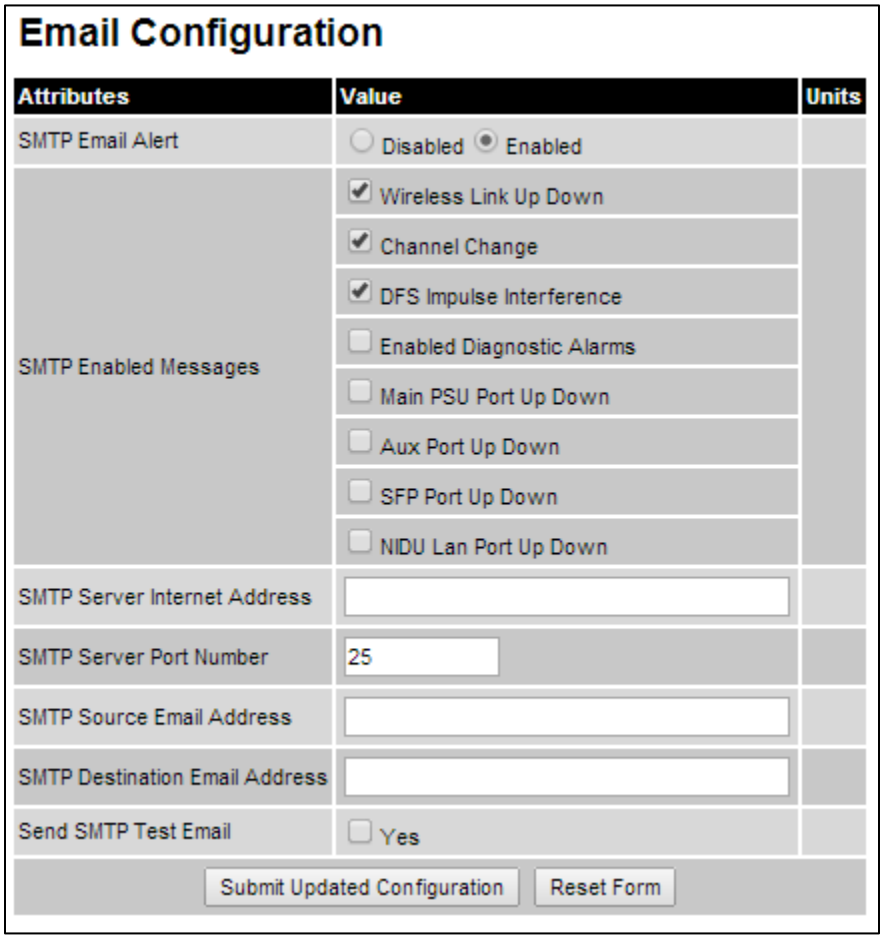
Table 139 Browser Title attribute variables

Variable	Meaning
$siteName	Site Name, as set in the System Configuration page (Table 120).
$linkName	Link Name, as set in the System Configuration page (Table 120).
$masterSlaveMode	Master Slave Mode, as set in the Step 2: Wireless Configuration page (Table 118).
$ipAddress	IP Address currently used to identify the ODU, either IPv4 or IPv6 Address, depending upon the setting of IP Address Label in the System Configuration page (Table 120): • **IPv4**: $ipAddress = $ipv4Address • **IPv6**: $ipAddress = $ipv6Address (if not blank) or $ipv6LinkLocalAddress
$ipv4Address	IPv4 Address of the ODU, as set in the LAN Configuration page (Table 121).
$ipv6Address	IPv6 Address of the ODU, as set in the LAN Configuration page (Table 121).
$ipv6LinkLocalAddress	IPv6 Auto Configured Link Local Address of the ODU. This cannot be updated, but it can be viewed in the LAN Configuration page (Table 121).
$sysName	Sys Name for this SNMP managed node, as set in the Step 2: SNMP MIB-II System Objects page (Table 145).
$productName	The product variant, for example **Cambium PTP 45700** or **Cambium PTP 45700 ATEX/HAZLOC**. Not updateable.
$pageName	Name of the page currently being browsed.

Email Configuration page

Menu option: **Management** > **Email** (Figure 154). Use this page to enable the PTP 700 to generate Simple Mail Transfer Protocol (SMTP) email messages to notify the system administrator when certain events occur.

Figure 154 Email Configuration page



Procedure:

- Update the attributes (Table 140).
- Click **Submit Updated Configuration**. The Configuration Change Reboot dialog is displayed.
- Click **Reboot Wireless Unit** and click **OK**. The reboot progress message is displayed. On completion, the unit restarts.

Table 140 Email Configuration attributes

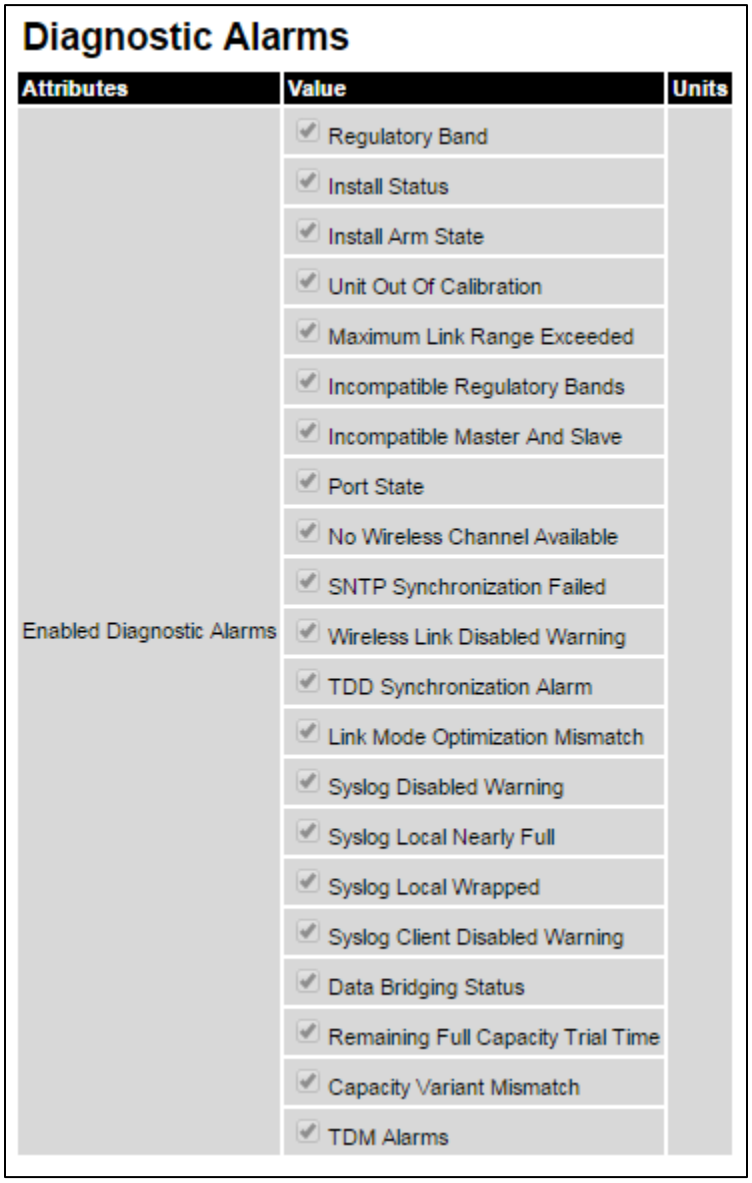
Attribute	Meaning
SMTP Email Alert	Controls the activation of the SMTP client.
SMTP Enabled Messages	The SMTP Enabled Messages attribute controls which email alerts the unit will send.
SMTP Server Internet Address	The IPv4 or IPv6 Address of the networked SMTP server.
SMTP Server Port Number	The SMTP Port Number is the port number used by the networked SMTP server. By convention the default value for the port number is 25.
SMTP Source Email Address	The email address used by the PTP 700 Series to log into the SMTP server. This must be a valid email address that will be accepted by your SMTP Server.
SMTP Destination Email Address	The email address to which the PTP 700 Series will send the alert messages.
Send SMTP Test Email	Generate and send an email in order to test the SMTP settings. The tick box will self-clear when **Submit** is clicked.

Diagnostic Alarms page

Menu option: **Management** > **Diagnostic Alarms** (Figure 155).

Use this page to select which diagnostic alarms will be notified to the system administrator.

Figure 155 Diagnostic Alarms page



Diagnostic Alarms

Attributes	Value	Units
Enabled Diagnostic Alarms	☑ Regulatory Band	
	☑ Install Status	
	☑ Install Arm State	
	☑ Unit Out Of Calibration	
	☑ Maximum Link Range Exceeded	
	☑ Incompatible Regulatory Bands	
	☑ Incompatible Master And Slave	
	☑ Port State	
	☑ No Wireless Channel Available	
	☑ SNTP Synchronization Failed	
	☑ Wireless Link Disabled Warning	
	☑ TDD Synchronization Alarm	
	☑ Link Mode Optimization Mismatch	
	☑ Syslog Disabled Warning	
	☑ Syslog Local Nearly Full	
	☑ Syslog Local Wrapped	
	☑ Syslog Client Disabled Warning	
	☑ Data Bridging Status	
	☑ Remaining Full Capacity Trial Time	
	☑ Capacity Variant Mismatch	
	☑ TDM Alarms	

Procedure:

- Tick the required alarms. These alarms are described in Alarms on page 7-17.
- Click **Submit Updated Configuration**.

Time Configuration page

Menu option: **Management > Time** (Figure 156 and Figure 157). Use this page to set the real-time clock of the PTP 700.

Setting the real-time clock manually

Use this procedure to keep time without connecting to a networked time server.

If SNTP is disabled, it will be necessary to reset the time manually after each system reboot.

Procedure:

- Set SNTP State to **Disabled** (Figure 156).
- Review and update the manual clock attributes (Table 141).
- Click **Submit Updated Configuration**.

Figure 156 Time Configuration page (SNTP disabled)

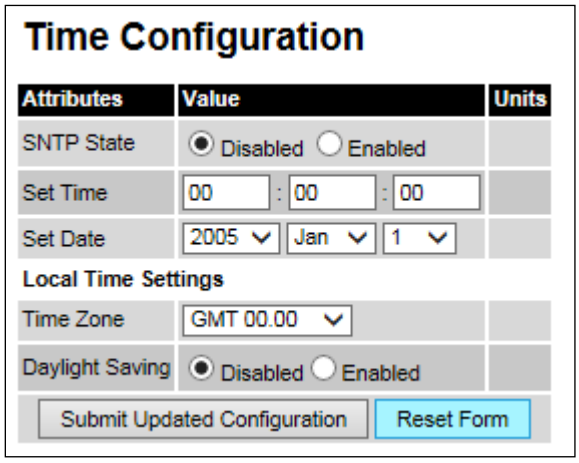


Table 141 Manual clock attributes

Attribute	Meaning
SNTP State	**Disabled:** the PTP 700 will keep time without connecting to a networked time server.
Set Time	Set hours, minutes and seconds.
Set Date	Set year, month and day.
Time Zone	Set the time zone offset from Greenwich Mean Time (GMT). To set the clock to UTC time, set Time Zone to **GMT 00.00**.
Daylight Saving	**Disabled:** There is no offset for daylight saving time. **Enabled:** System clock is moved forward one hour to adjust for daylight saving time. To set the clock to UTC time, set Daylight Saving to **Disabled**.

Setting the real-time clock to synchronize using SNTP

Use this procedure to synchronize the unit with a networked time server:

Procedure:

- Set the SNTP State attribute to **Enabled** (Figure 157).
- Review and update the SNTP clock attributes (Table 142).
- Click **Submit Updated Configuration**.

Figure 157 Time Configuration page (SNTP enabled)

Time Configuration

Attributes	Value	Units
SNTP State	○ Disabled ◉ Enabled	
SNTP Primary Server	◉ Server 1 ○ Server 2	
SNTP Primary Server Dead Time	300	seconds
SNTP Server Retries	2	
SNTP Server Timeout	3	seconds
SNTP Poll Interval	3600	seconds
SNTP Server 1		
SNTP Server Status	01-Jan-2005 00:02:57: OK.	
SNTP Server Internet Address	169.254.1.110	
SNTP Server Port Number	123	
SNTP Server Authentication Protocol	◉ None ○ MD5	
SNTP Server Key Identifier	1	
Server Key	•••••••••••••••••	
Server Key Confirm	•••••••••••••••••	
SNTP Server 2		
SNTP Server Status	Server not yet used	
SNTP Server Internet Address		
SNTP Server Port Number	123	
SNTP Server Authentication Protocol	◉ None ○ MD5	
SNTP Server Key Identifier	1	
Server Key	•••••••••••••••••	
Server Key Confirm	•••••••••••••••••	
Status		
SNTP Sync	In Sync	
SNTP Last Sync	17-Feb-2014 10:36:22	
System Clock	17-Feb-2014 10:36:24	
Local Time Settings		
Time Zone	GMT 00.00 ▼	
Daylight Saving	◉ Disabled ○ Enabled	

Submit Updated Configuration | Reset Form

Table 142 SNTP clock attributes

Attribute	Meaning
SNTP State	**Enabled:** the ODU will obtain accurate date and time updates from a networked time server.
SNTP Primary Server	Specifies the primary SNTP server, determining the order in which the servers are tried.
SNTP Primary Server Dead Time	Time (in seconds) to wait before retrying communications with an unresponsive primary SNTP server. Setting the value to zero disables the timer.
SNTP Server Retries	Number of times the PTP will retry after an SNTP server fails to respond.
SNTP Server Timeout	Time (in seconds) the PTP will wait for a response from an SNTP server.
SNTP Poll Interval	The SNTP server polling interval.
SNTP Server 1 and 2:	
SNTP Server Status	Status message reflecting the state of communications with the SNTP server.
SNTP Server Internet Address	The IPv4 or IPv6 Address of the networked SNTP server.
SNTP Server Port Number	The port number of the networked SNTP server. By convention the default value for the port number is 123.
SNTP Server Authentication Protocol	Authentication protocol to be used with this SNTP server (**None** or **MD5**).
SNTP Server Key Identifier	SNTP key identifier. A key of zeros is reserved for testing.
Server Key	Key used to authenticate SNTP communications.
Server Key Confirm	Must match the Server Key.
SNTP Sync	This shows the current status of SNTP synchronization. If **No Sync** is displayed, then review the SNTP Server Internet Address and Port Number. A change of state may generate an SNMP trap or SMTP email alert.
SNTP Last Sync	This shows the date and time of the last SNTP synchronization.
System Clock	This displays the local time, allowing for the Time Zone and Daylight Saving settings.
Local Time Settings:	

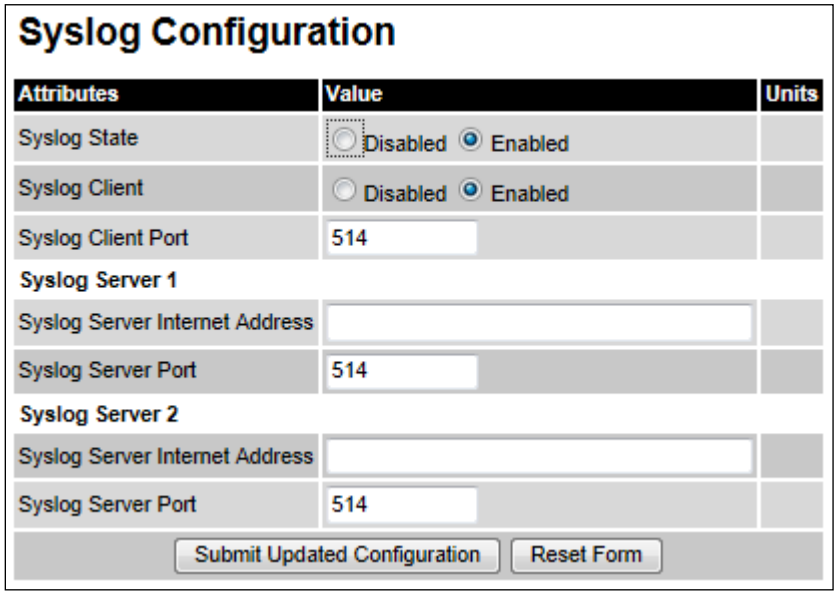
Attribute	Meaning
Time Zone	Set the time zone offset from Greenwich Mean Time (GMT). To set the clock to UTC time, set Time Zone to **GMT 00.00**.
Daylight Saving	**Disabled:** Daylight saving adjustments will not be applied to the time. **Enabled:** Daylight saving adjustments will be applied to the time, according to local rules. To set the clock to UTC time, set Daylight Saving to **Disabled**.

Syslog Configuration page

Menu option: **Management** > **Syslog** > **Syslog configuration** (Figure 158).

Use this page to configure system logging. Only users with **Security Officer** role are permitted to configure the syslog client.

Figure 158 Syslog Configuration page



Note

To record Coordinated Universal Time (UTC time) in syslog messages, use the Time Configuration page to set Time Zone to **GMT 00.00** and Daylight Saving to **Disabled** (Time Configuration page on page 6-74).

Procedure:

- Update the attributes (Table 143).
- Click **Submit Updated Configuration**.

Table 143 Syslog Configuration attributes

Attribute	Meaning
Syslog State	When system logging is enabled, log entries are added to the internal log and (optionally) transmitted as UDP messages to one or two syslog servers.
Syslog Client	**Enabled:** Event messages are logged. **Disabled:** Event messages are not logged.
Syslog Client Port	The client port from which syslog messages are sent.
Syslog Server 1 and 2:	
Syslog Server Internet Address	The IPv4 or IPv6 Address of the syslog server. Delete the IP address to disable logging on the syslog server.
Syslog Server Port	The server port at which syslog messages are received.

SNMP pages (for SNMPv3)

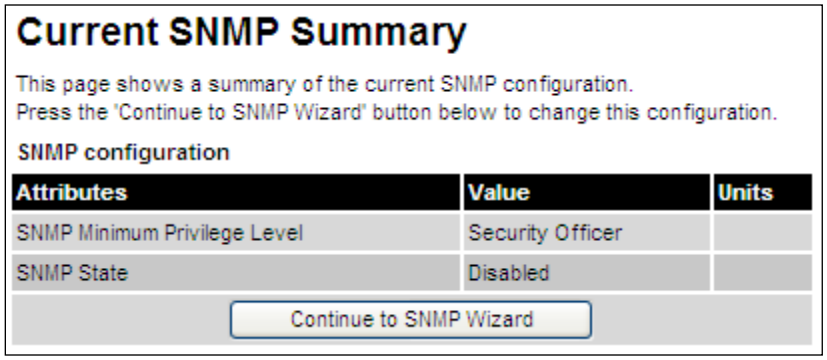
This section describes how to configure Simple Network Management Protocol version 3 (SNMPv3) traps using the SNMP Wizard.

Current SNMP Summary (for SNMPv3)

Menu option: **Management > SNMP** (Figure 159).

Use this page to review the current SNMP configuration and start the SNMP Wizard.

Figure 159 Current SNMP Summary page (when SNMP is disabled)



Procedure:

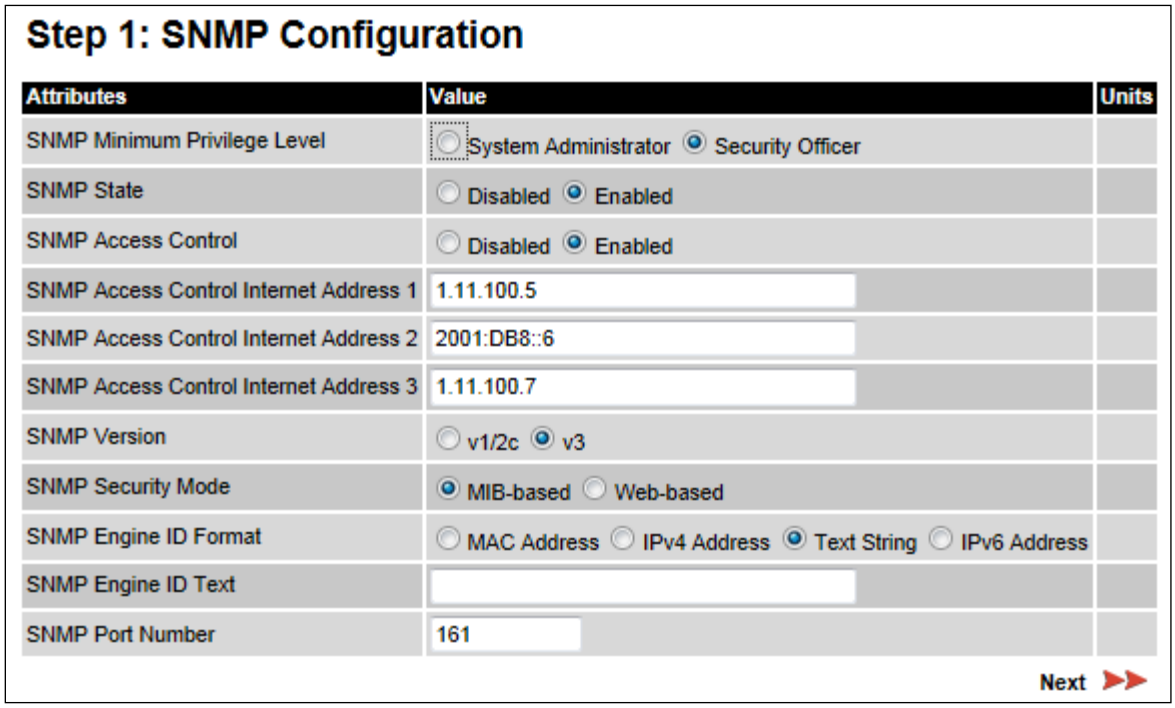
- Review the summary.
- If any updates are required, click **Continue to SNMP Wizard**.

Step 1: SNMP Configuration (for SNMPv3)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 160).

Use this page to enable SNMP, select SNMPv3 and configure access to the SNMP server.

Figure 160 Step 1: SNMP Configuration page (for SNMPv3)



Step 1: SNMP Configuration

Attributes	Value	Units
SNMP Minimum Privilege Level	○ System Administrator ◉ Security Officer	
SNMP State	○ Disabled ◉ Enabled	
SNMP Access Control	○ Disabled ◉ Enabled	
SNMP Access Control Internet Address 1	1.11.100.5	
SNMP Access Control Internet Address 2	2001:DB8::6	
SNMP Access Control Internet Address 3	1.11.100.7	
SNMP Version	○ v1/2c ◉ v3	
SNMP Security Mode	◉ MIB-based ○ Web-based	
SNMP Engine ID Format	○ MAC Address ○ IPv4 Address ◉ Text String ○ IPv6 Address	
SNMP Engine ID Text		
SNMP Port Number	161	

Next

Procedure:

- Set SNMP State to **Enabled**.
- Set SNMP Version to **v3**. The page is redisplayed with SNMPv3 attributes.
- Update the attributes (Table 144).
- Click **Next**.

Table 144 Step 1: SNMP Configuration attributes (for SNMPv3)

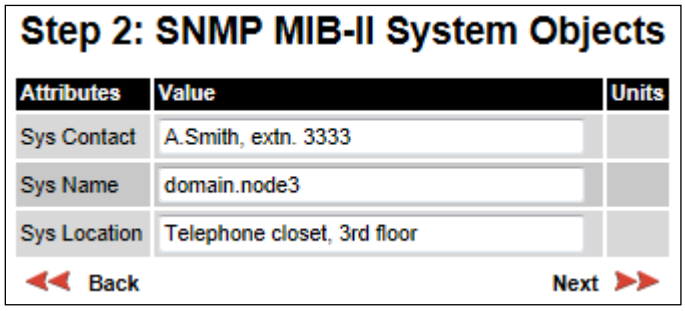
Attribute	Meaning
SNMP Minimum Privilege Level	Minimum security level which is permitted to administer SNMP security settings. Only displayed when Identity Based User Accounts are **Enabled** on the User Accounts page (Table 134).
SNMP State	Enables or disables SNMP.
SNMP Access Control	Enables or disables access control to SNMP management by IP address.
SNMP Access Control Internet Address 1/2/3	A list of up to three IPv4 or IPv6 Addresses permitted to perform SNMP management. Only displayed when SNMP Access Control is set to **Enabled**.
SNMP Version	SNMP protocol version: **v1/2c** or **v3**.
SNMP Security Mode	**MIB-based**: SNMPv3 security parameters are managed via SNMP MIBs. **Web-based**: SNMPv3 security parameters are not available over SNMP, but instead are configured using the SNMP Accounts page, as described in Step 3: SNMP User Policy Configuration (for SNMPv3) on page 6-84.
SNMP Engine ID Format	Specifies whether the Engine ID is generated from the **MAC Address**, **IP4 Address**, **Text String** or **IPv6 Address**.
SNMP Engine ID Text	Only enabled when SNMP Engine ID Format is set to **Text String**. Text used to generate the SNMP Engine ID.
SNMP Port Number	The port that the SNMP agent is listening to for commands from a management system.

Step 2: SNMP MIB-II System Objects (for SNMPv3)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 161).

Use this page to enter details of the SNMP managed node.

Figure 161 Step 2: SNMP MIB-II System Objects page (for SNMPv3)



Procedure:

- Update the attributes (Table 145).
- Click **Next**.
- The next step depends upon which SNMP Security Mode was selected in the Step 1: SNMP Configuration page:
  - If **Web-based**, go to Step 3: SNMP User Policy Configuration (for SNMPv3) on page 6-84.
  - If **MIB-based**, go to Confirm SNMP Configuration (for SNMPv3) on page 6-88.

Table 145 Step 2: SNMP MIB-II System Objects attributes (for SNMPv3)

Attribute	Meaning
Sys Contact	The name of the contact person for this managed node, together with information on how to contact this person.
Sys Name	An administratively-assigned name for this managed node. By convention, this is the fully qualified domain name of the node.
Sys Location	The physical location of this node, for example **Telephone closet, 3rd floor**.

Step 3: SNMP User Policy Configuration (for SNMPv3)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 162).

This page is only displayed when SNMP Security Mode is set to **Web-based** in the Step 1: SNMP Configuration page. Use this page to configure which authentication and privacy protocols are required for SNMP users with roles **System administrator** and **Read only**.

Procedure:

- Update the attributes (Table 146).
- Click **Next**.

Figure 162 Step 3: SNMP User Policy Configuration page (for SNMPv3)

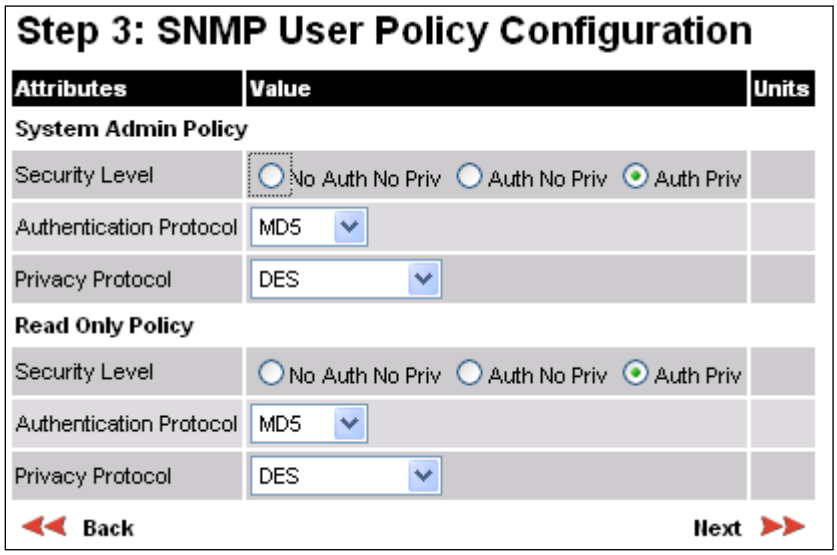


Table 146 Step 3: SNMP User Policy Configuration attributes (for SNMPv3)

Attribute	Meaning
Security Level	Defines the security level and associated protocols that are required to allow SNMP users to access the PTP 700. **No Auth No Priv**: Users are not required to use authentication or privacy protocols. **Auth No Priv**: Users are required to use only authentication protocols. **Auth Priv**: Users are required to use both authentication and privacy protocols.

Attribute	Meaning
Authentication Protocol	The authentication protocol to be used to access the PTP 700 via SNMP. This is disabled when Security Level is set to **Auth No Priv**. **MD5**: Message Digest Algorithm is used. **SHA**: NIST FIPS 180-1, Secure Hash Algorithm SHA-1 is used.
Privacy Protocol	The privacy protocol to be used to access the PTP 700 via SNMP. This is disabled when Security Level is set to **No Auth No Priv** or **Auth No Priv**. **DES**: Data Encryption Standard (DES) symmetric encryption protocol. **AES**: Advanced Encryption Standard (AES) cipher algorithm.

Note

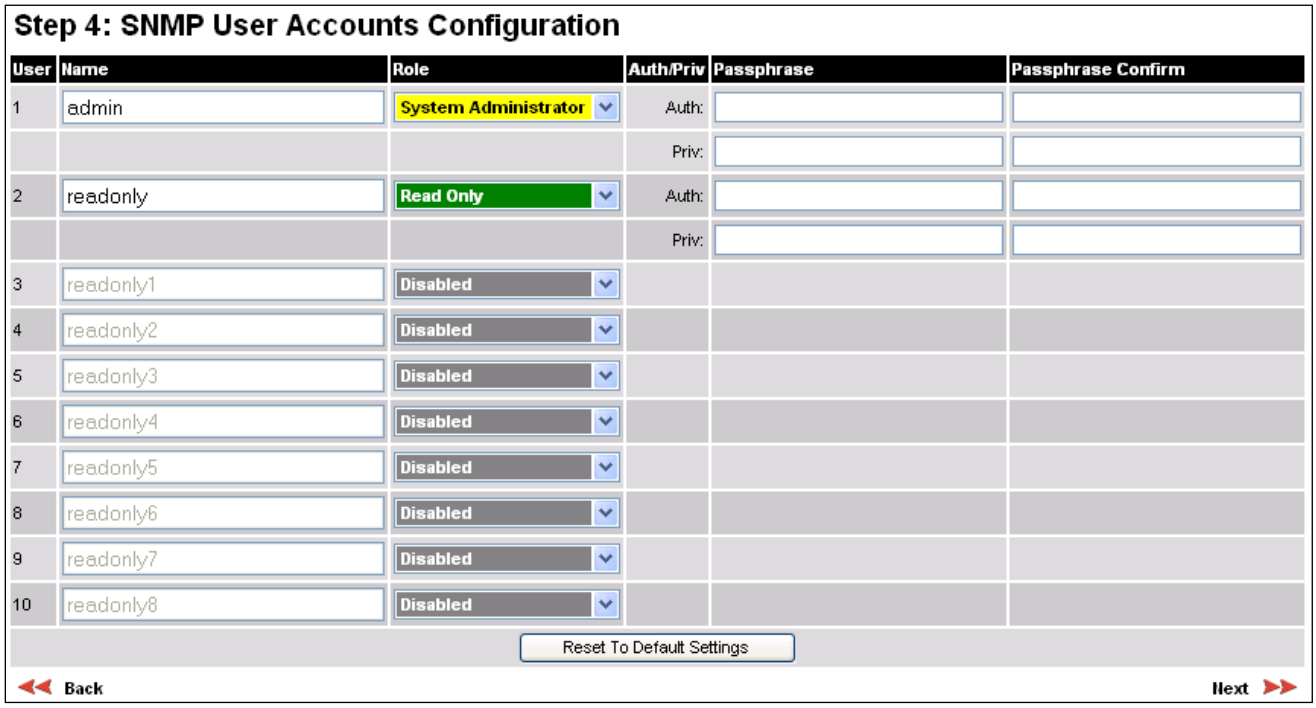
A user configured to use AES privacy protocol will not be able to transmit and receive encrypted messages unless the license key enables the AES capability.

Step 4: SNMP User Accounts Configuration (for SNMPv3)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 163).

This page is only displayed when SNMP Security Mode is set to **Web-based** in the Step 1: SNMP Configuration page. Use this page to update the SNMP user accounts.

Figure 163 Step 4: SNMP User Accounts Configuration page (for SNMPv3)



Procedure:

- Update the individual user attributes (Table 147) for up to 10 SNMP users.
- Click **Next**.

Table 147 Step 4: SNMP User Accounts Configuration attributes (for SNMPv3)

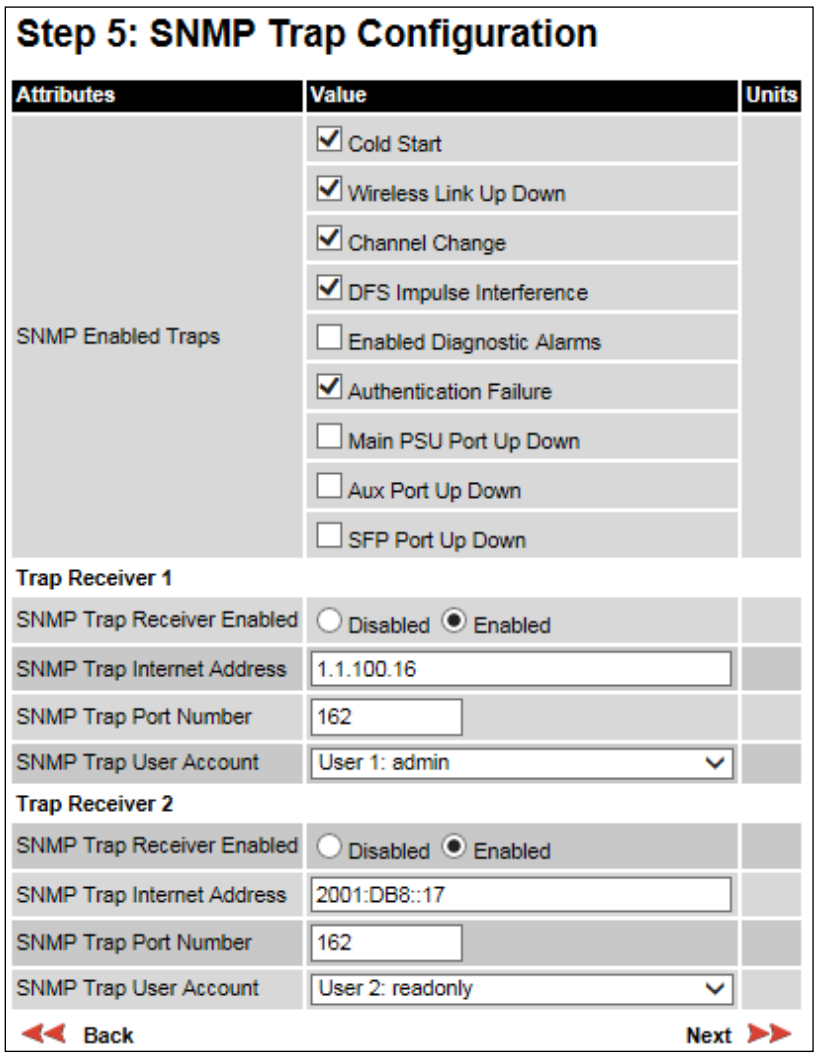
Attribute	Meaning
Name	Name to be used by the SNMP user to access the system.
Role	Selects which of the two web-based security profiles are applied to this user: **System administrator** or **Read only**. Select **Disabled** to disable the SNMP account.
Auth/Priv	Indicates whether the Passphrase applies to authentication or privacy protocols.
Passphrase	The phrase to be entered by this SNMP user to access the system using an authentication or privacy protocol. Length must be between 8 and 32 characters. May contain spaces. The Auth Passphrase is hidden when Security Level for this user's Role is set to **No Auth No Priv**. The Priv Passphrase is hidden when Security Level for this user's Role is set to **No Auth No Priv** or **Auth No Priv**.
Passphrase Confirm	Passphrase must be reentered to confirm it has been correctly typed.

Step 5: SNMP Trap Configuration (for SNMPv3)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 164).

This page is only displayed when SNMP Security Mode is set to **Web-based** in the Step 1: SNMP Configuration page. Use this page to configure the events that will generate SNMP traps and to set up trap receivers.

Figure 164 Step 5: SNMP Trap Configuration page (for SNMPv3)



Procedure:

- Update the attributes (Table 148).
- Click **Next**.

Table 148 Step 5: SNMP Trap Configuration attributes (for SNMPv3)

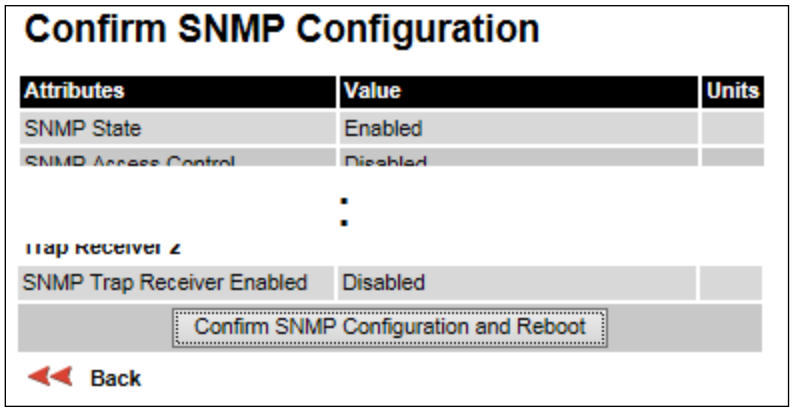
Attribute	Meaning
SNMP Enabled Traps	Select the events that will generate SNMP traps.
SNMP Trap Receiver 1 and SNMP Trap Receiver 2:	
SNMP Trap Receiver Enabled	**Disabled**: SNMP traps are not sent to the corresponding SNMP Trap Receiver (1 or 2). **Enabled**: SNMP traps are sent to the corresponding SNMP Trap Receiver (1 or 2).
SNMP Trap Internet Address	The IPv4 or IPv6 Address of the SNMP server (trap receiver). This is normally the network management system, but it may be a separate trap receiver.
SNMP Trap Port Number	The server port at which SNMP traps are received.
SNMP Trap User Account	The user name (and associated protocols) to use when sending SNMP traps to the server.

Confirm SNMP Configuration (for SNMPv3)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 165).

Use this page to review and confirm the updated SNMPv3 configuration of the unit.

Figure 165 Confirm SNMP Configuration page (for SNMPv3) (top and bottom of page shown)



Procedure:

- To ensure that the changes take effect, click **Confirm SNMP Configuration and Reboot**. The unit reboots and the changes take effect.

SNMP pages (for SNMPv1/2c)

This section describes how to configure Simple Network Management Protocol version 1 or 2c (SNMPv1 or SNMPv2c) traps using the SNMP Wizard.

Current SNMP Summary (for SNMPv1/2c)

Menu option: **Management > SNMP** (Figure 159).

Use this page to review the current SNMP configuration and start the SNMP Wizard.

Procedure:

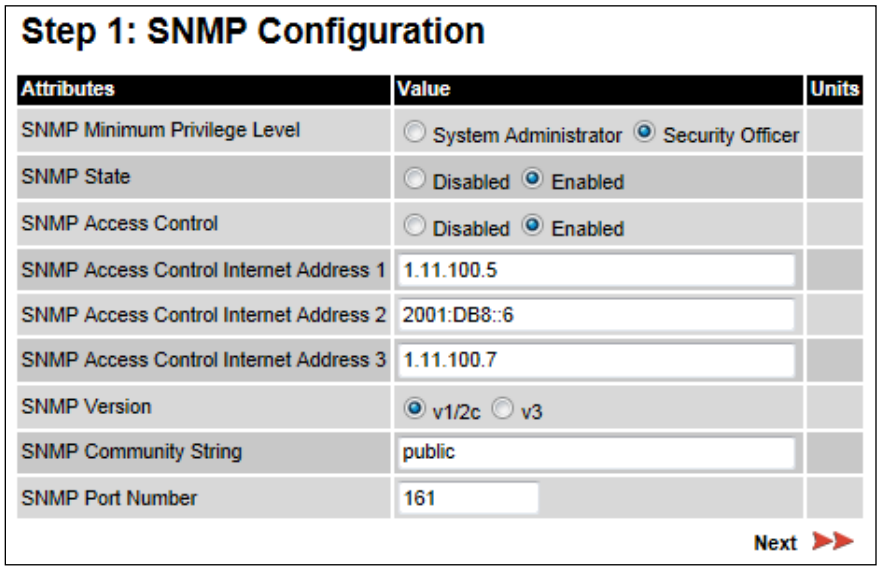
- Review the summary.
- If any updates are required, click **Continue to SNMP Wizard**.

Step 1: SNMP Configuration (for SNMPv1/2c)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 166).

Use this page to enable SNMP, select SNMPv1/2c and configure access to the SNMP server.

Figure 166 Step 1: SNMP Configuration page (for SNMPv1/2c)



Step 1: SNMP Configuration

Attributes	Value	Units
SNMP Minimum Privilege Level	○ System Administrator ◉ Security Officer	
SNMP State	○ Disabled ◉ Enabled	
SNMP Access Control	○ Disabled ◉ Enabled	
SNMP Access Control Internet Address 1	1.11.100.5	
SNMP Access Control Internet Address 2	2001:DB8::6	
SNMP Access Control Internet Address 3	1.11.100.7	
SNMP Version	◉ v1/2c ○ v3	
SNMP Community String	public	
SNMP Port Number	161	

Next

Procedure:

- Set SNMP State to **Enabled**.
- Set SNMP Version to **v1/2c**. The page is redisplayed with SNMPv1/2c attributes.
- Update the attributes (Table 149).
- Click **Next**.

Table 149 Step 1: SNMP Configuration attributes (for SNMPv1/2c)

Attribute	Meaning
SNMP Minimum Privilege Level	Minimum security level which is permitted to administer SNMP security settings. Only displayed when Identity Based User Accounts are **Enabled** on the User Accounts page (Table 134).
SNMP State	Enables or disables SNMP.
SNMP Access Control	Enables or disables access control to SNMP management by IP address.
SNMP Access Control Internet Address 1/2/3	A list of up to three IPv4 or IPv6 Addresses permitted to perform SNMP management. Only displayed when SNMP Access Control is set to **Enabled**.
SNMP Version	SNMP protocol version: **v1/2c** or **v3**.
SNMP Community String	The SNMP community string acts like a password between the network management system and the distributed SNMP clients (PTP 700 ODUs). Only if the community string is configured correctly on all SNMP entities can the flow of management information take place. By convention the default value is set to **public**.
SNMP Port Number	Enter the port that the SNMP agent is listening to for commands from a management system.

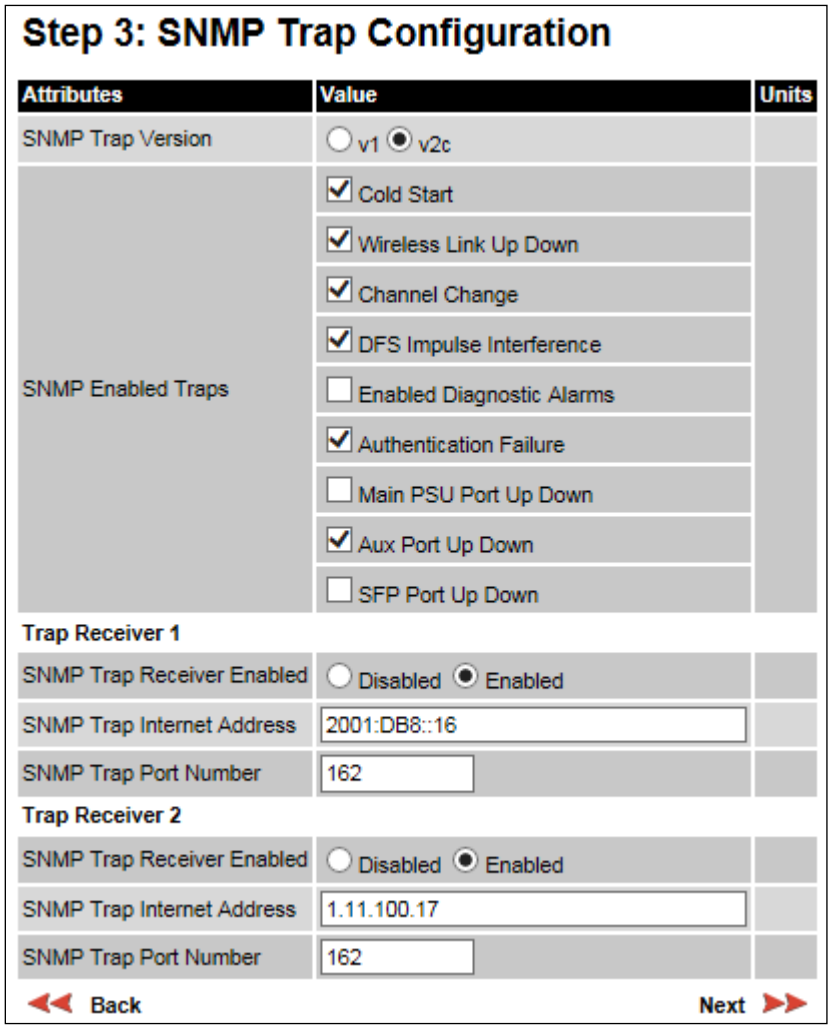
Step 2: SNMP MIB-II System Objects (for SNMPv1/2c)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 161). Use this page to enter details of the SNMP managed node. Update the attributes (Table 145) and click **Next**.

Step 3: SNMP Trap Configuration (for SNMPv1/2c)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 167).

Figure 167 Step 3: SNMP Trap Configuration page (for SNMPv1/2c)



Step 3: SNMP Trap Configuration

Attributes	Value	Units
SNMP Trap Version	○ v1 ◉ v2c	
SNMP Enabled Traps	☑ Cold Start	
	☑ Wireless Link Up Down	
	☑ Channel Change	
	☑ DFS Impulse Interference	
	☐ Enabled Diagnostic Alarms	
	☑ Authentication Failure	
	☐ Main PSU Port Up Down	
	☑ Aux Port Up Down	
	☐ SFP Port Up Down	
Trap Receiver 1		
SNMP Trap Receiver Enabled	○ Disabled ◉ Enabled	
SNMP Trap Internet Address	2001:DB8::16	
SNMP Trap Port Number	162	
Trap Receiver 2		
SNMP Trap Receiver Enabled	○ Disabled ◉ Enabled	
SNMP Trap Internet Address	1.11.100.17	
SNMP Trap Port Number	162	

Back Next

Procedure:

- Update the attributes (Table 150).
- Click **Next**.

Table 150 Step 3: SNMP Trap Configuration attributes (for SNMPv1/2c)

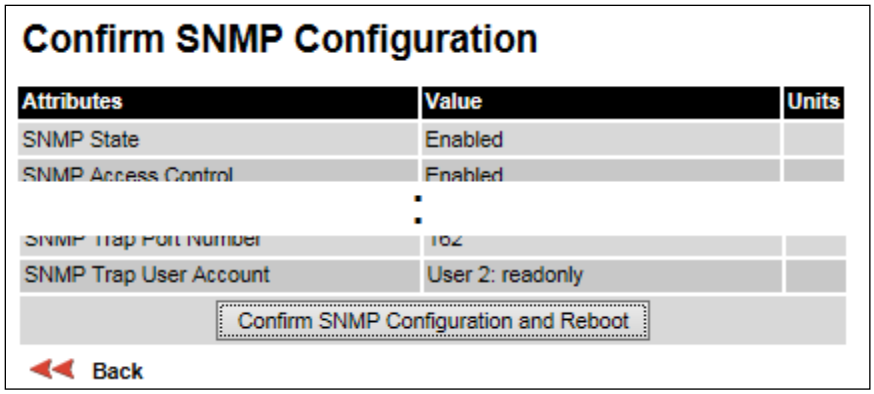
Attribute	Meaning
SNMP Trap Version	Select the SNMP protocol version to use for SNMP traps: **v1** or **v2c**.
SNMP Enabled Traps	Select the events that will generate SNMP traps.
SNMP Trap Receiver Enabled	**Disabled**: SNMP traps are not sent to the corresponding SNMP Trap Receiver (1 or 2). **Enabled**: SNMP traps are sent to the corresponding SNMP Trap Receiver (1 or 2).
SNMP Trap Internet Address	The IPv4 or IPv6 Address of the SNMP server (trap receiver). This is normally the network management system, but it may be a separate trap receiver.
SNMP Trap Port Number	The server port at which SNMP traps are received.

Confirm SNMP Configuration (for SNMPv1/2c)

Menu option: **Management > SNMP**. Part of the SNMP Wizard (Figure 168).

Use this page to review and confirm the updated SNMPv1/2c configuration of the unit.

Figure 168 Confirm SNMP Configuration page (for SNMPv1/2c) (top and bottom of page shown)



Procedure:

- To ensure that the changes take effect, click **Confirm SNMP Configuration and Reboot**. The unit reboots and the changes take effect.

Security menu

This section describes how to configure HTTPS/TLS security using the Security Wizard.

To configure security for the FIPS 140-2 approved mode, read this section and additionally read Configuring security for FIPS 140-2 applications on page 6-105.

Caution

Ensure that the operator's security requirements are configured before connecting the PTP 700 to the network. Otherwise, security may be compromised.

Preparing for HTTPS/TLS

Before running the Security Configuration Wizard, obtain the necessary cryptographic material and ensure that the unit has AES capability. For more information, refer to Planning for HTTPS/TLS operation on page 3-51.

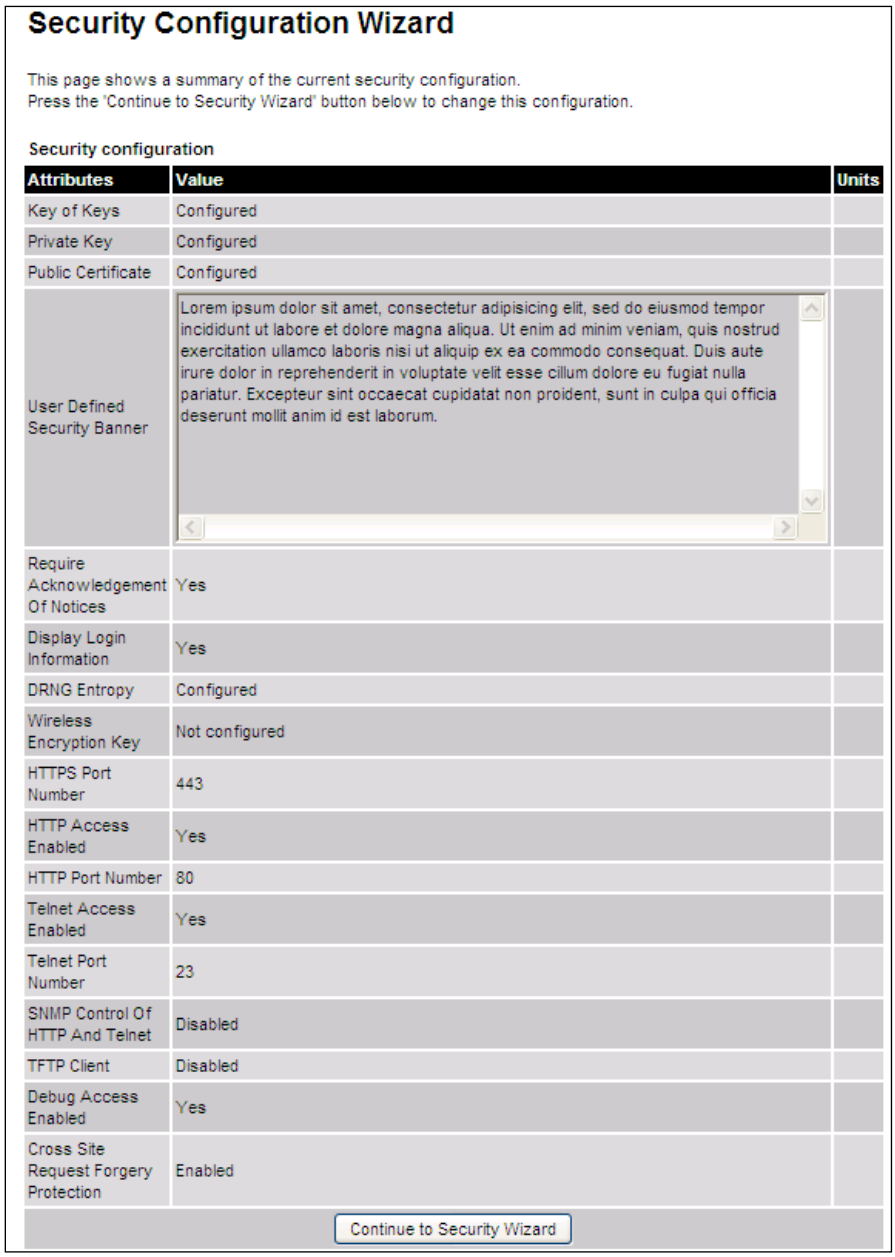
Procedure:

1. Ensure that the following cryptographic material has been generated:
   - Key Of Keys
   - TLS Private Key and Public Certificates (for the correct IP address)
   - User Defined Security Banner
   - Random Number Entropy Input
2. Order the necessary AES capability upgrade, generate a license key (Generating license keys on page 6-3) and enter it on the Software License Key page (Software License Key page on page 6-11).
3. Identify the Port numbers for HTTPS, HTTP and Telnet.
4. Ensure that the web browsers used are enabled for HTTPS/TLS operation.
5. On the Local User Accounts page (Local User Accounts page on page 6-61), check that:
   - Either: Identity Based User Accounts are set to **Disabled**,
   - Or: Identity Based User Accounts are set to **Enabled** and the current user's role is **Security Officer**.

Security Configuration Wizard page

Menu option: **Security**. Displayed only when AES encryption is enabled by license key (Figure 169). Use this page to review the current security configuration of the unit.

Figure 169 Security Configuration Wizard page



Security Configuration Wizard

This page shows a summary of the current security configuration.
Press the 'Continue to Security Wizard' button below to change this configuration.

Security configuration

Attributes	Value	Units
Key of Keys	Configured	
Private Key	Configured	
Public Certificate	Configured	
User Defined Security Banner	Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.	
Require Acknowledgement Of Notices	Yes	
Display Login Information	Yes	
DRNG Entropy	Configured	
Wireless Encryption Key	Not configured	
HTTPS Port Number	443	
HTTP Access Enabled	Yes	
HTTP Port Number	80	
Telnet Access Enabled	Yes	
Telnet Port Number	23	
SNMP Control Of HTTP And Telnet	Disabled	
TFTP Client	Disabled	
Debug Access Enabled	Yes	
Cross Site Request Forgery Protection	Enabled	

Continue to Security Wizard

Procedure:

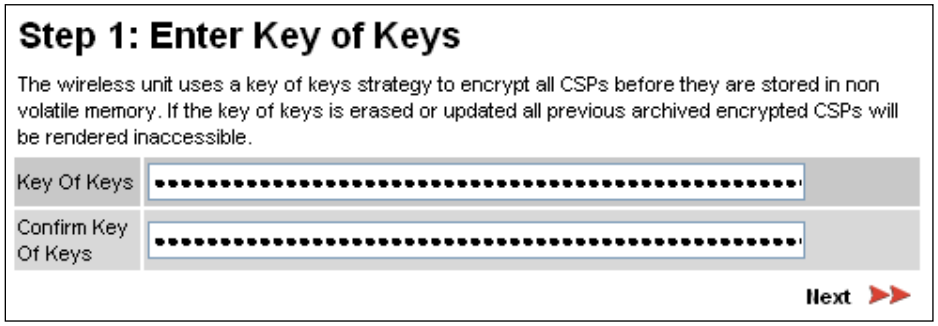
- To continue with the Security Wizard, click **Continue to Security Wizard**.

Step 1: Enter Key of Keys

Menu option: **Security**. Part of the Security Wizard (Figure 170).

Use this page to enter a Key of Keys to encrypt all critical security parameters (CSPs) before they are stored in non-volatile memory.

Figure 170 Step 1: Enter Key of Keys page



Caution

Erasing or changing the key of keys resets all CSPs.

Procedure:

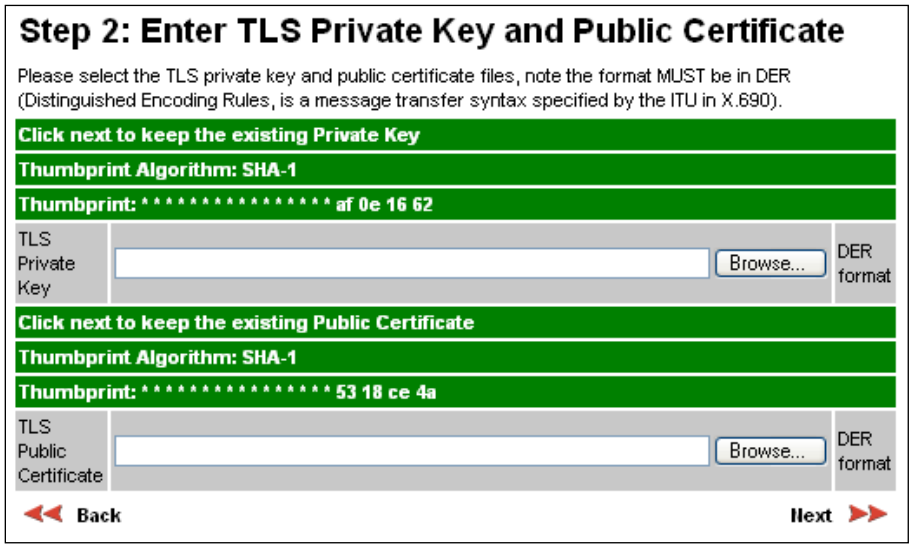
- Enter and confirm the generated Key of Keys.
- Click **Next**.

Step 2: Enter TLS Private Key and Public Certificate

Menu option: **Security**. Part of the Security Wizard (Figure 171).

Use this page to select and upload the TLS Private Key and Public Certificate files.

Figure 171 Step 2: Enter TLS Private Key and Public Certificate page



Caution

If the certificates expire, your web browser will display security warnings. Always investigate the cause of security warnings, and rectify errors in the content or expiry of certificates where necessary. Do not accept or ignore web browser security warnings.

Procedure:

- If a valid TLS private key exists, then an SHA-1 thumbprint of the key is displayed. If this key is correct, then take no action. Otherwise, click **Browse** and select the generated private key file (.der).
- If a valid TLS public certificate exists, then an SHA-1 thumbprint of the certificate is displayed. If this certificate is correct, then take no action. Otherwise, click **Browse** and select the generated certificate file (.der).
- Click **Next.**

Step 3: Enter User Security Banner

Menu option: **Security**. Part of the Security Wizard (Figure 172).

Use this page to enter a banner that will be displayed every time a user attempts to login to the wireless unit.

Figure 172 Step 3: Enter User Security Banner page

Procedure:

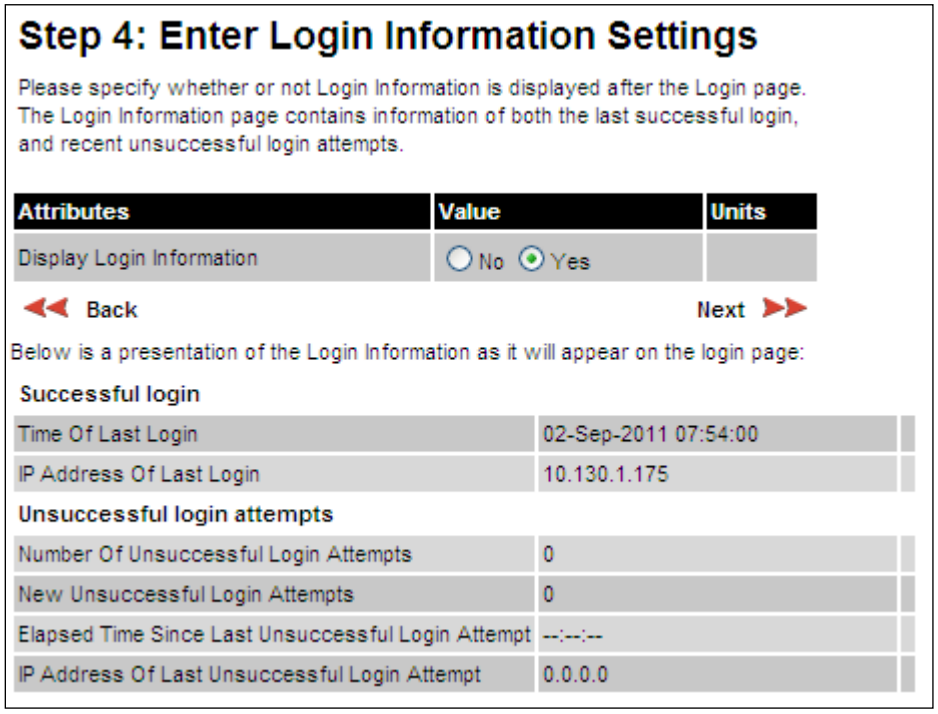
- Update the User Defined Security Banner (optional).
- Set the Acknowledgement to **No** or **Yes**.
- Click **Next**.

Step 4: Enter Login Information Settings

Menu option: **Security**. Part of the Security Wizard (Figure 173).

Use this page to choose whether or not to display information about previous login attempts when the user logs into the web interface.

Figure 173 Step 4: Enter Login Information Settings page



Procedure:

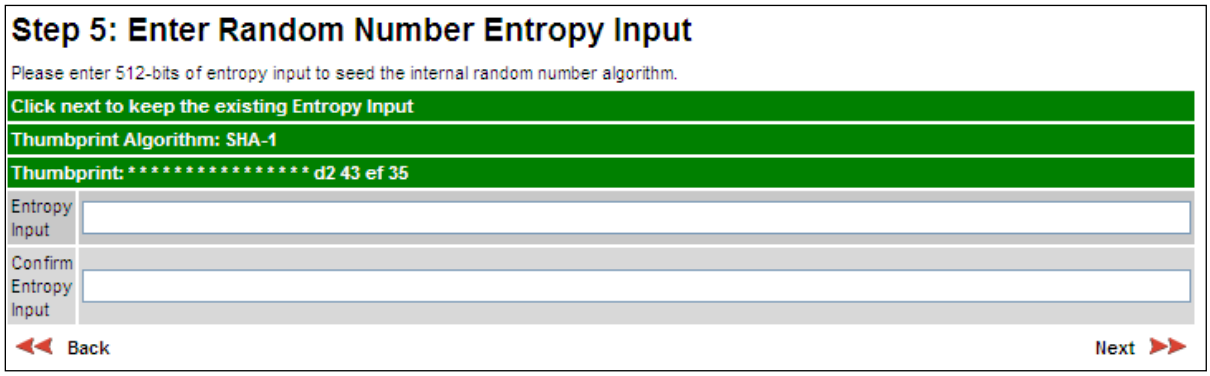
- Set Display Login Information to **No** or **Yes**.
- Click **Next**.

Step 5: Enter Random Number Entropy Input

Menu option: **Security**. Part of the Security Wizard (Figure 174).

Use this page to enter entropy input to seed the internal random number algorithm.

Figure 174 Step 5: Random Number Entropy Input page



Procedure:

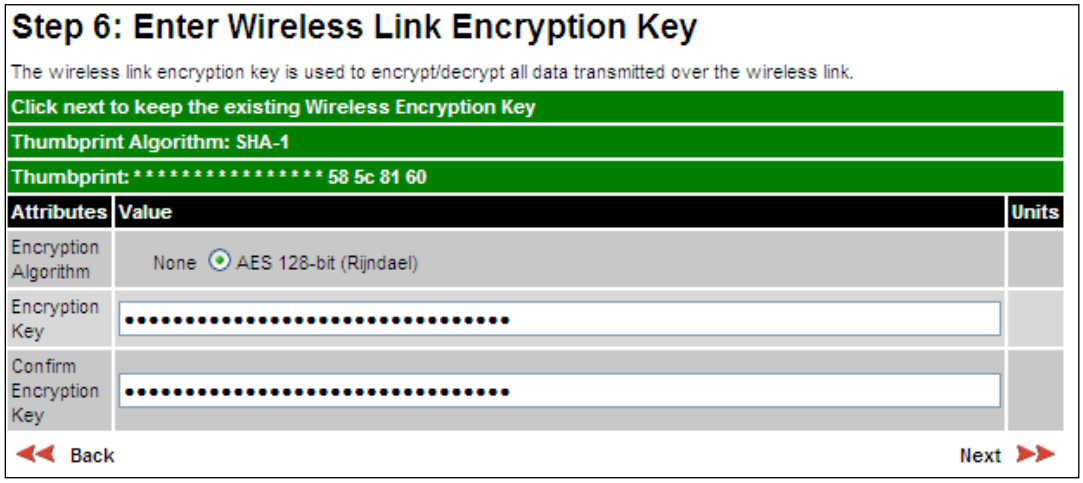
- If valid entropy input exists, then an SHA-1 thumbprint of the input is displayed. If this input is correct, then take no action. Otherwise, enter the generated input in the Entropy Input and Confirm Entropy Input fields.
- Click **Next**.

Step 6: Enter Wireless Link Encryption Key

Menu option: **Security**. Part of the Security Wizard (Figure 175).

Use this page to enable AES encryption and enter the encryption key. The wireless link encryption key is used to encrypt all traffic over the PTP 700 wireless link.

Figure 175 Step 6: Enter Wireless Link Encryption Key page



Procedure:

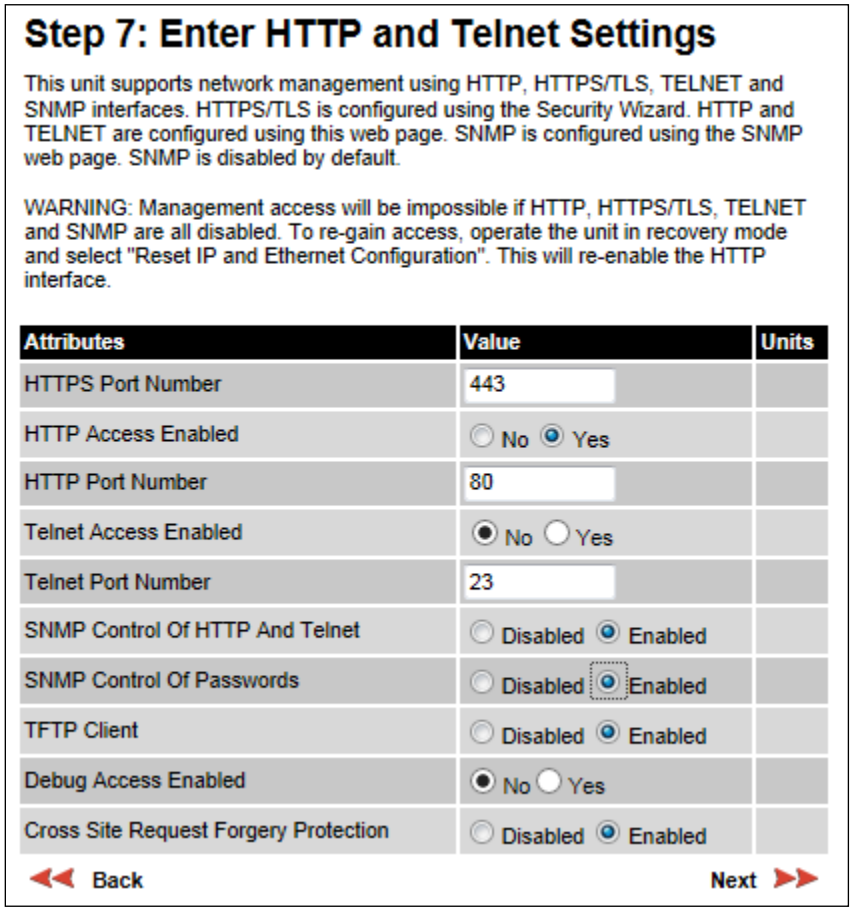
- Select the applicable value in the Encryption Algorithm field. If a valid encryption key exists, then an SHA-1 thumbprint of the key is displayed. If this key is correct, then take no action. Otherwise, enter the generated key in the Wireless Link Encryption Key and Confirm Wireless Link Encryption Key fields.
- Click **Next**.

Step 7: Enter HTTP and Telnet Settings

Menu option: **Security**. Part of the Security Wizard (Figure 176).

Use this page to configure network management of the PTP 700 using one or more of the following methods: HTTPS, HTTP, Telnet or SNMP.

Figure 176 Step 7: Enter HTTP and Telnet Settings page



Step 7: Enter HTTP and Telnet Settings

This unit supports network management using HTTP, HTTPS/TLS, TELNET and SNMP interfaces. HTTPS/TLS is configured using the Security Wizard. HTTP and TELNET are configured using this web page. SNMP is configured using the SNMP web page. SNMP is disabled by default.

WARNING: Management access will be impossible if HTTP, HTTPS/TLS, TELNET and SNMP are all disabled. To re-gain access, operate the unit in recovery mode and select "Reset IP and Ethernet Configuration". This will re-enable the HTTP interface.

Attributes	Value	Units
HTTPS Port Number	443	
HTTP Access Enabled	○ No ◉ Yes	
HTTP Port Number	80	
Telnet Access Enabled	◉ No ○ Yes	
Telnet Port Number	23	
SNMP Control Of HTTP And Telnet	○ Disabled ◉ Enabled	
SNMP Control Of Passwords	○ Disabled ◉ Enabled	
TFTP Client	○ Disabled ◉ Enabled	
Debug Access Enabled	◉ No ○ Yes	
Cross Site Request Forgery Protection	○ Disabled ◉ Enabled	

Back Next

Caution

If HTTPS, HTTP, Telnet and SNMP are all disabled, management access will be impossible until the unit is placed in recovery mode.

Note

If HTTP, Telnet and SNMP are all disabled, the secure web server becomes the only management tool for the ODU web interface. To reenter the web interface after Step 7 of the Security Wizard, use the URL **https://aa.bb.cc.dd** (where aa.bb.cc.dd is the IP address of the unit).

Procedure:

- Review and update the HTTP and Telnet attributes (Table 151) and click **Next**.

Table 151 HTTP and Telnet attributes

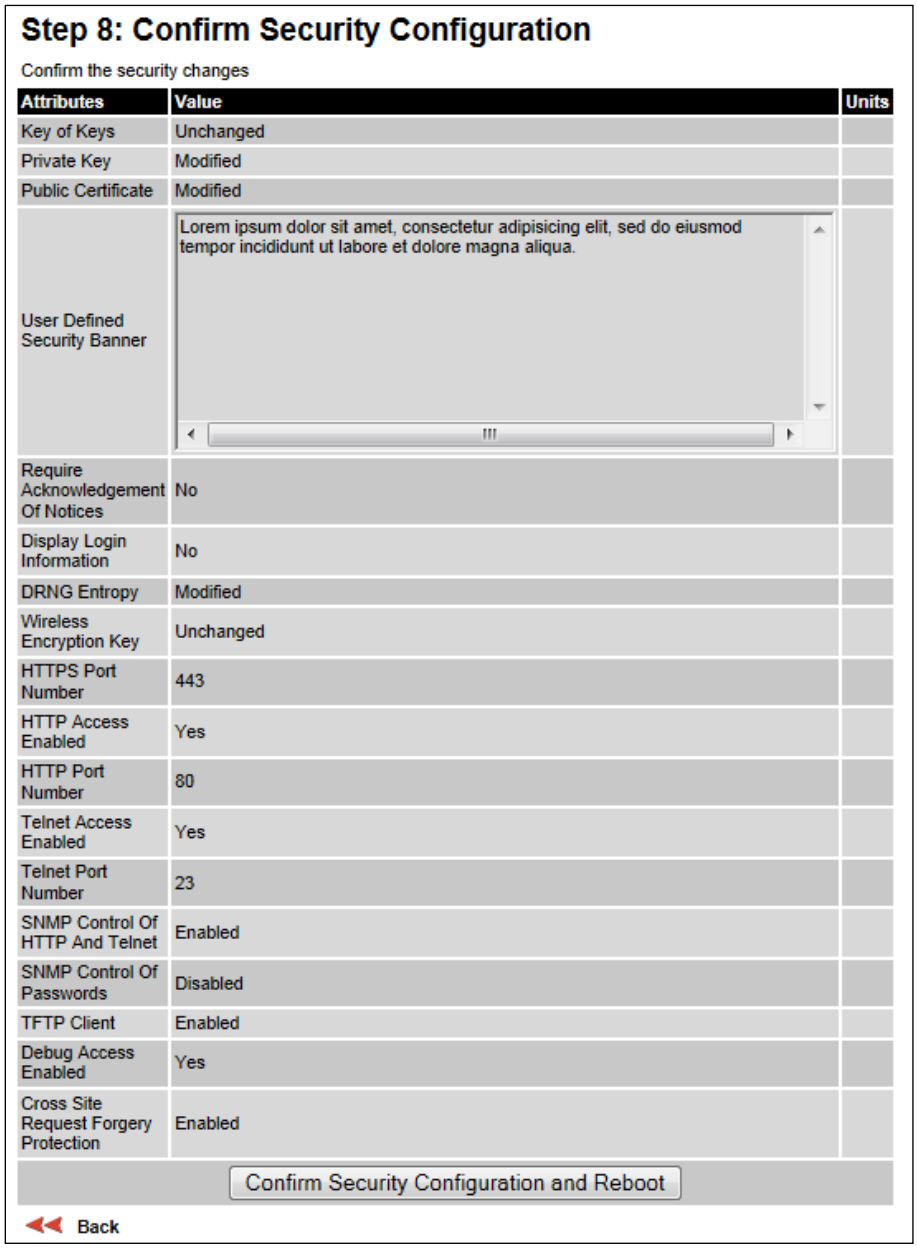
Attribute	Meaning
HTTPS Port Number	The port number for HTTPS access. Zero means use the default port.
HTTP Access Enabled	**No**: The unit will not respond to any requests on the HTTP port. **Yes**: The unit will respond to requests on the HTTP port. Remote management via HTTPS is not affected by this setting.
HTTP Port Number	The port number for HTTP access. Zero means use the default port.
Telnet Access Enabled	**No**: The unit will not respond to any requests on the Telnet port. **Yes**: The unit will respond to requests on the Telnet port.
Telnet Port Number	The port number for Telnet access. Zero means use the default port.
SNMP Control of HTTP And Telnet	**Disabled**: Neither HTTP nor Telnet can be controlled remotely via SNMP. **Enabled**: Both HTTP and Telnet can be controlled remotely via SNMP.
SNMP Control of Passwords	**Enabled:** Passwords for identity-based user accounts in the web-based interface can be updated via SNMP. Use this with SNMPv3 to provide secure password updating from a central network manager. This option is not available in FIPS 140-2 approved mode. **Disabled**: Passwords for identity-based user accounts can be updated only via the web-based interface (default).
TFTP Client	**Enabled**: The unit will respond to TFTP software download requests.
Debug Access Enabled	**Yes**: Cambium Technical Support is allowed to access the system to investigate faults.
Cross Site Request Forgery Protection	**Enabled**: The system is protected against cross-site request forgery attacks at the web-based interface.

Step 8: Commit Security Configuration

Menu option: **Security**. Part of the Security Wizard (Figure 177).

Use this page to review and confirm the updated security configuration of the unit.

Figure 177 Step 8: Commit Security Configuration page



Step 8: Confirm Security Configuration

Confirm the security changes

Attributes	Value	Units
Key of Keys	Unchanged	
Private Key	Modified	
Public Certificate	Modified	
User Defined Security Banner	Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.	
Require Acknowledgement Of Notices	No	
Display Login Information	No	
DRNG Entropy	Modified	
Wireless Encryption Key	Unchanged	
HTTPS Port Number	443	
HTTP Access Enabled	Yes	
HTTP Port Number	80	
Telnet Access Enabled	Yes	
Telnet Port Number	23	
SNMP Control Of HTTP And Telnet	Enabled	
SNMP Control Of Passwords	Disabled	
TFTP Client	Enabled	
Debug Access Enabled	Yes	
Cross Site Request Forgery Protection	Enabled	

Confirm Security Configuration and Reboot

Back

Procedure:

- Review all changes that have been made in the Security Wizard.
- To ensure that the changes take effect, click **Commit Security Configuration and Reboot**. The unit reboots and the changes take effect.

Note

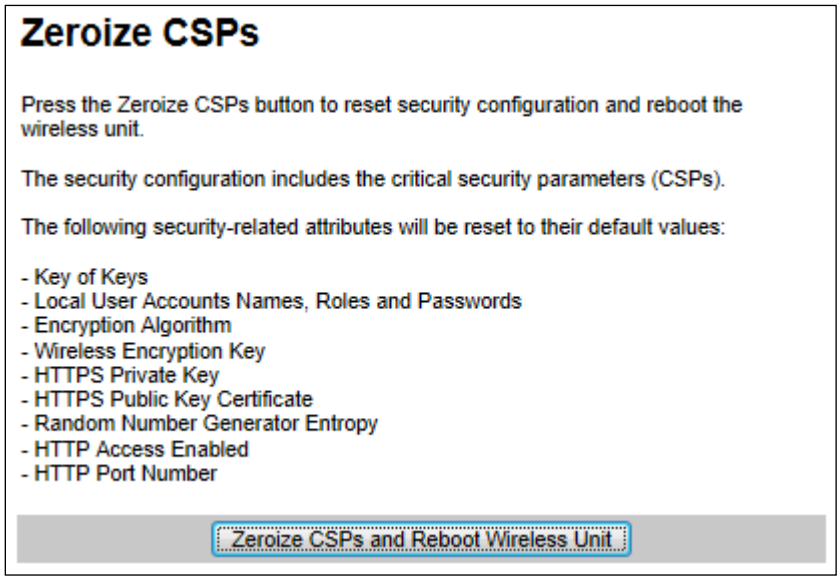
If the Key of keys is entered or modified in the Security Wizard, user accounts are reset when **Commit Security Configuration and Reboot** is clicked. It is then necessary to reconfigure them.

Zeroize CSPs page

Menu option: **Security** > **Zeroize CSPs** (Figure 178).

Use this page if it is necessary to reset the security configuration to default values.

Figure 178 Zeroize CSPs page



Procedure:

- Click **Zeroize CSPs and Reboot Wireless Unit**.
- Confirm the reboot.

Configuring security for FIPS 140-2 applications

This is a summary of all the configuration tasks that are necessary if the unit is to operate in FIPS 140-2 approved mode. For more information, refer to FIPS 140-2 mode on page 1-54 and Security planning on page 3-51.

The common steps for configuring security are described in Security menu on page 6-93.

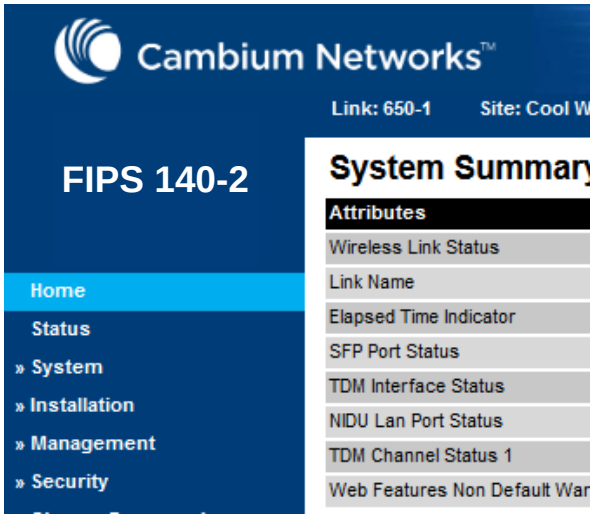
Prerequisites for FIPS 140-2 configuration

Use this procedure to confirm that all prerequisites for FIPS 140-2 are ready.

Procedure:

1. Ensure that the following cryptographic material has been generated using a FIPS-approved cryptographic generator:
   - Key Of Keys
   - TLS Private Key and Public Certificates (for the correct IP address)
   - Entropy Input
   - Wireless Link Encryption Key for AES
2. Identify the Port number for HTTPS.
3. Ensure that the web browsers used are enabled for HTTPS/TLS operation using FIPS-approved cipher specifications.
4. On the **Management, Web** menu, click **Local User Accounts** and check that the current user's role is **Security Officer**.
5. Ensure that the installed license key meets all requirements including FIPS 140-2 compatibility:
   - Check that Security Level is “`FIPS`”.
   - Check that Encryption Algorithm is “AES…`.`”.
   - If necessary, generate and enter a new license key with the above settings and install as described in Software License Key page on page 6-11.
6. Ensure that the installed software version is prefixed “`FIPS-`”. If necessary, upgrade to the latest FIPS validated image as described in Software Upgrade page on page 6-55.

7 To confirm that the above steps have been completed, check that the FIPS 140-2 logo is displayed in the Navigation Bar:



Configuration procedures for FIPS 140-2

To operate the ODU in FIPS 140-2 secure mode:

- Perform the steps in Local User Accounts page on page 6-61, taking care to complete the following additional settings:
  - Click Set Best Practice Complexity.
  - Configure appropriate identity-based user names and passwords.
- Perform the steps described in Security menu on page 6-93.

Checking that the unit is in the FIPS 140-2 operational state

Use this procedure to confirm that the unit is now in the FIPS 140-2 operational state:

Procedure:

1 On the menu, click **Security** and check the Secure Mode Alarm value.

2 If the alarm is "`Secure mode is active`", the unit is in FIPS 140-2 secure mode and no further action is needed.

3 If the alarm is "`Secure mode is not configured`", return to Security menu on page 6-93 and check that all Security Wizard settings are correct for FIPS 140-2.

Secure Mode Alarm	**Secure mode is not configured**

If this alarm is displayed, it is also displayed in the System Summary page.

4 If the alarm is "`Secure mode is configured, but not active`", return to Step 7: Enter HTTP and Telnet Settings on page 6-101 check that HTTP Access Enabled is set to **No**.

Secure Mode Alarm	**Secure mode is configured, but not active**

If this alarm is displayed, it is also displayed in the System Summary page.

Note

If it is necessary to exit from FIPS 140 2 mode, refer to Managing security on page 7-46.

Aligning antennas

This section describes how to align the antennas in a PTP 700 link, use the web interface to assist with alignment, and check wireless performance after alignment.

Before performing this task, check that hardware installation is complete (apart from the network connections) at both the Master and Slave sites.

Starting up the units

Use this procedure to connect one of the units to a management PC and start up both units.

Procedure:

1. Select the unit from which this process is to be controlled; either Master or Slave. This is the "local" unit.
2. Check that the management PC is connected to the local unit, powered up and logged on as described in Connecting to the unit on page 6-4.
4. Power up the remote unit.
5. Log into the local unit as described in Logging into the web interface on page 6-6.

Checking that the units are armed

Use this procedure to confirm that the units are in the armed state, ready for alignment.

In the armed state, the modulation mode is fixed at BPSK 0.63 Single, the TDD frame duration is extended to allow the link to acquire at unknown range, and the transmit power is automatically adjusted for optimum operation.

Procedure:

- Select menu option **Home**. The System Summary page is displayed.
- Check that the Install Arm State is set to **Armed**.
- If the units are not armed, execute the installation wizard as described in Installation menu on page 6-9.

Aligning antennas

Use this procedure to align linked antennas (master and slave), whether integrated or connectorized. The goal of antenna alignment is to find the center of the main beam. This is done by adjusting the antennas while monitoring the receive signal level.

Preparation:

Ensure that the following parameters are available:

- Location of both sites (latitude and longitude).
- Bearing to the other end of the link for both sites.
- Prediction of receive signal level for both ends of the link.
- Prediction of link loss.

LINKPlanner provides all of these parameters in the form of an installation report.

If a connectorized ODU is installed at either site with two separate antennas for spatial diversity, refer to Aligning separate antennas for spatial diversity on page 6-110 before starting alignment.

Note

For improved radio performance, mount the integrated ODU at 45 degrees to the vertical; this ensures that side-lobe levels are minimized for interference transmitted or received at zero elevation.

To achieve best results, make small incremental changes to elevation and azimuth.

Caution

The action of tightening the mounting bolts can alter antenna alignment. This can be helpful when fine-tuning alignment, but it can also lead to misalignment. To prevent misalignment, continue to monitor receive signal level during final tightening of the bolts.

Procedure:

1. At each end of the link, adjust the antenna to point at the other end of the link. This should be done with the aid of a compass.
2. Without moving the master antenna, adjust the elevation and azimuth of the slave antenna to achieve the highest receive signal level using one of the following methods:
   - ODU installation tones on page 6-111
   - Graphical Install page on page 6-113
3. Without moving the Slave antenna, adjust the elevation and azimuth of the Master antenna to achieve the highest receive signal level (using one of the above methods).
4. Repeat steps 2 and 3 as necessary to fine-tune the alignment to find the center of the beam.

5 When the antennas have been aligned on the center of the beam, verify that the receive level is within the predicted range (from the installation report). If this is not the case, go back to step 2.

   The current value of receive level can be verified by using the graphical installation method (see Graphical Install page on page 6-113) or by selecting menu option **Status** and monitoring the Receive Power attribute on the System Status page.

6 If after repeated attempts to align, the receive level still does not lie within the predicted range, this may be because the data provided to the prediction tool (such as LINKPlanner) is inaccurate. For example estimates of path obstructions, antenna heights or site locations may be inaccurate. Check this data and update the prediction as necessary.

7 Once the antennas have been aligned correctly, tighten the integrated ODU (or connectorized antenna) mountings. To ensure that the action of tightening does not alter antenna alignment, continue to monitor received signal level.

Aligning separate antennas for spatial diversity

Use this procedure if a connectorized ODU is installed at either site with two separate antennas for spatial diversity.

Procedure:

1 Connect the horizontal polarization antenna to the ODU, disconnect the vertical polarization antenna, then perform Aligning antennas on page 6-109.

2 Connect the vertical polarization antenna to the ODU, disconnect the horizontal polarization antenna, then perform Aligning antennas on page 6-109.

3 Re-connect the horizontal polarization antennas. The received signal level should increase.

4 Weatherproof the antenna connections at the “H” and “V” interfaces of the ODUs, as described in Weatherproofing an N type connector on page 5-60.

ODU installation tones

This is the first of two methods that may be used to monitor receive signal level during antenna alignment.

The ODU emits audible tones during installation to assist with alignment. The pitch of the alignment tone is proportional to the received power of the wireless signals. Adjust the alignment of the unit in both azimuth and elevation until the highest pitch tone is achieved.

Note

When using ODU installation tones to align connectorized antennas, it may not be possible to hear the tones. To overcome this problem, either use an assistant, or use a stethoscope to give a longer reach.

The tones and their meanings are described in Table 152. In each of the states detailed in the table, align the unit to give the highest pitch tone. The term “wanted signal” refers to that of the peer unit being installed.

Table 152 ODU installation tones

State Name	Tone Description	State Description	Pitch Indication
Free Channel Search	Regular beep	Executing band scan	N/A
Scanning	Slow broken tone	Not demodulating the wanted signal	Rx Power
Synchronized	Fast broken tone	Demodulating the wanted signal	Rx Power
Registered	Solid tone	Both Master and Slave units exchanging Radio layer MAC management messages	Rx Power

Caution

If, when in the Synchronized or Registered state, the tone varies wildly, there may be interference or a fast fading link. Installing in this situation may not give a reliable link. Investigate the cause of the problem.

During alignment, the installation tones should exhibit the following behavior:

- **Band scan:** When first started up and from time to time, the Master unit will carry out a band scan to determine which channels are not in use. During this time, between 10 and 15 seconds, the Master unit will not transmit and as a consequence of this neither will the Slave unit. During this time the installation tone on the master unit will drop back to the band scan state, and the Slave unit will drop back to the Scanning state with the pitch of the tone set to the background noise level. Alignment of the unit should cease during this time.
- **Radar detection:** If the unit is operating where mandatory radar avoidance algorithms are implemented, the ranging behavior may be affected. The Master has to monitor the initially chosen channel for 60 seconds to make sure it is clear of radar signals before transmitting. If a radar signal is detected during any of the installation phases, a further compulsory 60 seconds channel scan will take place as the master unit attempts to locate a new channel that is free of radar interference.
- **Ranging:** The PTP 700 Series does not require the user to enter the link range. The Master unit typically takes less than 60 seconds to determine the length of the link being installed. The Master unit will remain in the Scanning state until the range of the link has been established. The Master unit will only move to the Synchronized state when the range of the link has been established.

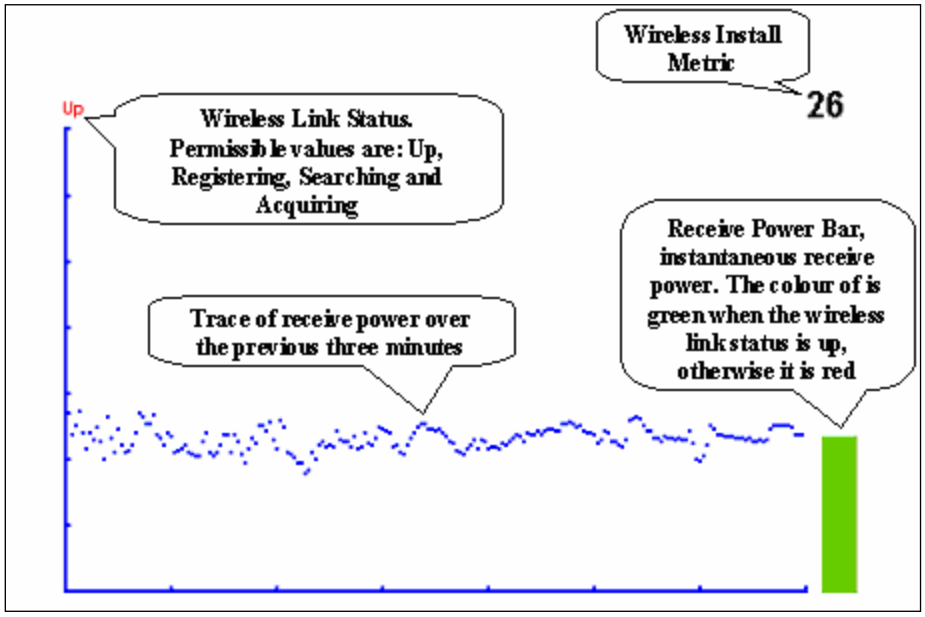
  The Slave unit does not have a ranging process. The slave unit will change to the Synchronized state as soon as the wanted signal is demodulated.
- **Retrying same channel:** If, at the end of the ranging period, the Registered state is not achieved due to interference or other reasons, the Master unit will retry twice more on the same channel before moving to another available channel. Should this occur it may take a number of minutes to establish a link in the Registered state.

Graphical Install page

Menu option: **Installation > Graphical Install** (Figure 179).

This is the second of two methods that may be used to monitor receive signal level during antenna alignment.

Figure 179 Graphical Install page



Procedure:

- Check that Wireless Link Status (top left) is “Up”, “Registering”, “Searching” or “Acquiring”.
- While slowly sweeping the antenna, monitor the trace of receive power over the last three minutes.
- Monitor the Receiver Power Bar (bottom right). Green signifies that the wireless link is up and red signifies all other states.
- Monitor the Wireless Install Metric (top right). This is the instantaneous receive power in dBm + 110.

Note

To access the PDA version of the graphical installation tool, use this URL - **http://<ip-address>/pda.cgi**. This link is only available to system administrators.

Disarming the units

When antenna alignment is complete, use this procedure to disarm both units in the link in order to:

- Turn off the audible alignment aid.
- Enable adaptive modulation.
- Fully enable spectrum management features (such as DSO, if configured).
- Clear unwanted installation information from the various systems statistics.
- Store the link range for fast link acquisition on link drop.
- Enable higher data rates.

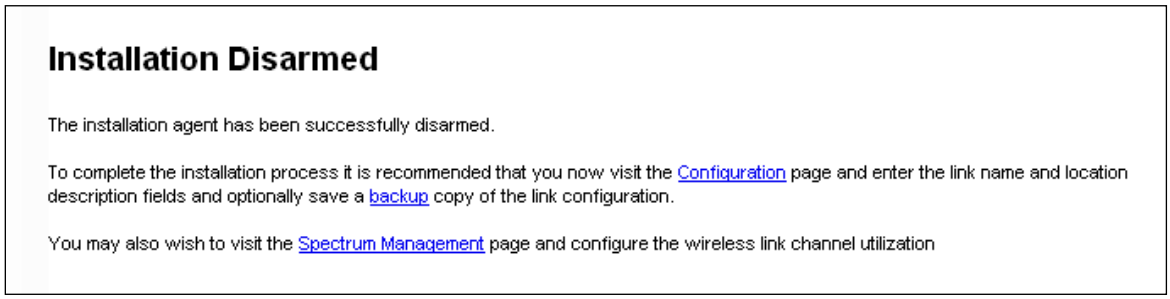
Note

After 24 hours, the units will be disarmed automatically, provided that they are armed and that the link is up.

Procedure:

- Select menu option **Installation**. The Disarm Installation page is displayed (Figure 123).
- Click **Disarm Installation Agent**. The confirmation page is displayed (Figure 180).

Figure 180 Optional post-disarm configuration



Comparing actual to predicted performance

For at least one hour of operation after disarming, use this procedure to monitor the link to check that it is achieving predicted levels of performance. LINKPlanner provides the prediction in the form of an installation report.

Procedure:

- Select menu option **System > Statistics**. The System Statistic page is displayed (Figure 181).
- Monitor the following attributes:
  - Link Loss
  - Transmit Data Rate
  - Receive Data Rate

Figure 181 Statistics to be monitored after alignment

System Statistics

Attributes	Value				Units
System Histograms					
Transmit Power	25.0,	17.5,	-15.0,	14.0	dBm
Receive Power	-37.2,	-64.0,	-110.0,	-51.3	dBm
Vector Error	7.2,	-19.6,	-31.0,	-29.4	dB
Link Loss	110.8,	79.6,	0.0,	107.3	dB
Signal Strength Ratio	0.7,	0.0,	-1.0,	0.0	dB
Transmit Data Rate	20.40,	14.73,	0.00,	20.40	Mbps
Receive Data Rate	20.40,	9.14,	0.00,	20.40	Mbps
Aggregate Data Rate	40.80,	23.88,	0.00,	40.80	Mbps
Histogram Measurement Period	00:07:46				

Reset System Histogram Measurement Period

For more information on the System Statistics page, refer to System Statistics page on page 7-47.

Other configuration tasks

This section describes other configuration tasks.

Connecting to the network

Use this procedure to complete and test network connections.

Procedure:

1. If a management PC is connected directly to the PTP 700, disconnect it.
2. Confirm that all ODU Ethernet interface cables (PSU, SFP and Aux) are connected to the correct network terminating equipment or devices.

   If Main PSU Port Allocation is set to **Disabled** in the LAN Configuration page), it is not necessary to connect the PSU LAN port to network terminating equipment.
3. Test that the unit is reachable from the network management system by opening the web interface to the management agent, or by requesting ICMP echo response packets using the Ping application. For in-band management, test that both units are reachable from one PC.

   If the network management system is remote from the sites, either ask co-workers at the management center to perform this test, or use remote login to the management system.
4. Test the data network for correct operation across the wireless link. This may be by requesting ICMP echo response packets between hosts in the connected network segments, or by some more structured use of network testing tools.
5. Monitor the Ethernet ports and wireless link to confirm that they are running normally. For instructions, see System Summary page on page 7-2 and System Status page on page 7-3.

Upgrading software using TFTP

Use this procedure to upgrade software remotely using Trivial FTP (TFTP) triggered by SNMP.

Procedure:

1. Check that the TFTP client is enabled. Refer to Web-Based Management page on page 6-58.
2. Set tFTP attributes as described in Table 153.
3. Monitor tFTP attributes as described in Table 154.
4. Reboot the ODU as described in Rebooting the unit on page 7-70.

Table 153 Setting tFTP attributes

Attribute	Meaning
tFTPServerInternetAddress	The IPv4 or IPv6 address of the TFTP server from which the TFTP software upgrade file Name will be retrieved. For example, to set the TFTP server IP address for the unit at 10.10.10.10 to the IPv4 address 10.10.10.1, enter this command: **`snmpset_d.exe -v 2c -c public 10.10.10.10 .iso.3.6.1.4.1.17713.7.9.19.0 a 10.10.10.1`**
tFTPServerPortNumber	This setting is optional. The port number of the TFTP server from which the TFTP software upgrade file name will be retrieved (default=69).
tFTPSoftwareUpgrade FileName	The filename of the software upgrade to be loaded from the TFTP server. For example, to set the TFTP software upgrade filename on 10.10.10.10 to "B1095.dld", enter this command: **`snmpset_d.exe -v 2c -c public 10.10.10.10 .iso.3.6.1.4.1.17713.7.9.7.0 s B1095.dld`**
tFTPStartSoftware Upgrade	Write “1” to this attribute to start the TFTP software upgrade process. The attribute will be reset to 0 when the upgrade process has finished. For example, enter this command: **`snmpset_d.exe -v 2c -c public 10.10.10.10 .iso.3.6.1.4.1.17713.7.9.8.0 i 1`**

Table 154 Monitoring tFTP attributes

Attribute	Meaning
tFTPSoftwareUpgradeStatus	This is the current status of the TFTP software upgrade process. Values: idle(0) uploadinprogress(1) uploadsuccessfulprogrammingFLASH(2) upgradesuccessfulreboottorunthenewsoftwareimage(3) upgradefailed(4). For example, enter this command: **`snmpget_d.exe -v 2c -c public 10.10.10.10 .iso.3.6.1.4.1.17713.7.9.9.0`**
tFTPSoftwareUpgradeStatus Text	This describes the status of the TFTP software upgrade process, including any error details. For example, enter this command: **`snmpget_d.exe -v 2c -c public 10.10.10.10 .iso.3.6.1.4.1.17713.7.9.10.0`**
tFTPSoftwareUpgradeStatus AdditionalText	This is used if tFTPSoftwareUpgradeStatusText is full and there are more than 255 characters to report. It contains additional text describing the status of the TFTP software upgrade process, including any error details. For example, enter this command: **`snmpget_d.exe -v 2c -c public 10.10.10.10 .iso.3.6.1.4.1.17713.7.9.11.0`**

Chapter 7: Operation

This chapter provides instructions for operators of the PTP 700 wireless Ethernet bridge.

The following topics are described in this chapter:

- System summary and status on page 7-2
- Rebooting and logging out on page 7-15
- Alarms, alerts and messages on page 7-17
- Spectrum Management on page 7-26
- Managing security on page 7-46
- System statistics on page 7-47
- Recovery mode on page 7-63.

System summary and status

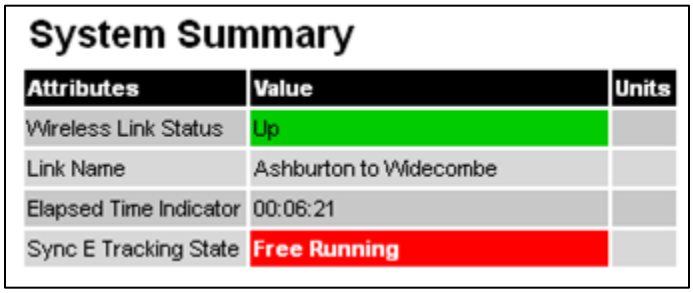
This section describes how to use the summary and status pages to monitor the status of the Ethernet ports and wireless link.

System Summary page

Menu option: **Home** (Figure 182).

This page contains a high level summary of the status of the wireless link and associated equipment. Whenever system alarms are outstanding, a yellow warning triangle is displayed on the navigation bar, and the alarm condition is listed. In the example in Figure 182, there is one alarm, and this is for the Sync E Tracking State.

Figure 182 System Summary page



Procedure:

- Review the attributes (Table 155).
- Check that the Wireless Link Status is "Up" on both units. If it is not "Up", review any uncleared system alarms: these are displayed below the System Clock attribute. For more information, refer to Alarms on page 7-17.

Table 155 System Summary attributes

Attribute	Meaning
Wireless Link Status	Current status of the wireless link. A green background with status text "Up" means that the point-to-point link is established. A red background with suitable status text (for example "Searching") indicates that the link is not established.
Link Name	The name of the PTP link, as set in the System Configuration page.

Attribute	Meaning
Elapsed Time Indicator	The time (hh:mm:ss) that has elapsed since the last system reboot. The system can reboot for several reasons, for example, commanded reboot from the system reboot webpage, or a power cycle of the equipment.
System Clock	The system clock presented as local time, allowing for zone and daylight saving (if set).

System Status page

Menu option: **Status** (Figure 183). This page provides a detailed view of the operation of the PTP 700 link from both the wireless and network perspectives.

Figure 183 System Status page

System Status - Master

Equipment

Attributes	Value	Units
Link Name	Ashburton to Widecombe	
Site Name	Ashburton	
Software Version	50650-G7-B1346+ wdog	
Hardware Version	B0P04.03-C	
Regulatory Band	1 - 5.8 GHz - USA	
Elapsed Time Indicator	00:07:21	
Ethernet / Internet		
Main PSU Port Status	Copper Link Up	
Main PSU Port Speed And Duplex	1000 Mbps Full Duplex	
Aux Port Status	Copper Link Up	
Aux Port Speed And Duplex	1000 Mbps Full Duplex	
SFP Port Status	Fiber Link Up	
SFP Port Speed And Duplex	1000 Mbps Full Duplex	
MAC Address	00:04:56:50:02:2e	
Remote MAC Address	00:04:56:50:04:79	
Remote Internet Address	http://10.10.10.10	
Synchronous Ethernet		
Sync E Tracking State	Free Running	
IEEE 1588 Transparent Clock		
Transparent Clock	Enabled	
Status Page Refresh Period	600	Seconds

Wireless

Attributes	Value	Units
Wireless Link Status	Up	
Maximum Transmit Power	27	dBm
Remote Maximum Transmit Power	27	dBm
Transmit Power	27.0, 23.6, -15.0, 24.0	dBm
Receive Power	-45.8, -62.7, -110.0, -61.3	dBm
Vector Error	7.2, -22.5, -31.5, -24.0	dB
Link Loss	131.8, 124.2, 0.0, 131.3	dB
Transmit Data Rate	16.67, 15.52, 0.00, 16.67	Mbps
Receive Data Rate	20.40, 19.08, 0.00, 20.40	Mbps
Link Capacity Variant	Full	
Link Capacity	37.07	Mbps
Transmit Modulation Mode	64QAM 0.75 (Dual) (5 MHz)	
Receive Modulation Mode	64QAM 0.92 (Dual) (5 MHz)	
Link Symmetry	1 to 1	
Receive Modulation Mode Detail	Running At User-Configured Max Modulation Mode	
Range	0.2	km
TDD Synchronization		
TDD Synchronization Interface	Disabled	

Update Page Refresh Period | Reset form

The two PTP 700 Series units are arranged in a master and slave relationship. The roles of the units in this relationship are displayed in the page title. The master unit will always have the title "`- Master`", and the slave will always have "`- Slave`" appended to the "`Systems Status`" page title.

Note

Link Symmetry is configured at the master ODU only. The appropriate matching Link Symmetry is set at the slave ODU automatically. For example, if Link Symmetry is configured as **2 to 1** at the master ODU, then the slave ODU will be set automatically as **1 to 2**. In this example, the master-slave direction has double the capacity of the slave-master direction.

If TDM is configured, the System Status page displays NIDU LAN Port and TDM attibutes (Figure 184).

Figure 184 System Status page with TDM configured

System Status - Master

Equipment

Attributes	Value	Units
Link Name	link5	
Site Name		
Software Version	50650-G7-B1439+ wdog	
Hardware Version	B0P03.00-C	
Regulatory Band	255 - Development Key	
Elapsed Time Indicator	00:08:56	
Ethernet / Internet		
Main PSU Port Status	Copper Link Up	
Main PSU Port Speed And Duplex	1000 Mbps Full Duplex	
NIDU Lan Port Status	Copper Link Up	
NIDU Lan Port Speed And Duplex	1000 Mbps Full Duplex	
Aux Port Status	Copper Link Up	
Aux Port Speed And Duplex	1000 Mbps Full Duplex	
SFP Port Status	Fiber Link Up	
SFP Port Speed And Duplex	1000 Mbps Full Duplex	
MAC Address	00:04:56:50:00:a9	
Remote MAC Address	00:04:56:50:02:2e	
Remote Internet Address	http://169.254.1.2	
Synchronous Ethernet		
Sync E Tracking State	Free Running	

Wireless

Attributes	Value	Units
Wireless Link Status	Up	
Maximum Transmit Power	10	dBm
Remote Maximum Transmit Power	10	dBm
Transmit Power	10.0, 10.0, 10.0, 10.0	dBm
Receive Power	-54.1, -54.3, -54.5, -54.5	dBm
Vector Error	-30.8, -31.9, -32.8, -31.7	dB
Link Loss	110.4, 110.3, 110.3, 110.4	dB
Transmit Data Rate	24.22, 24.22, 24.22, 24.22	Mbps
Receive Data Rate	24.22, 24.22, 24.22, 24.22	Mbps
Link Capacity Variant	Full	
Link Capacity	48.43	Mbps
Transmit Modulation Mode	256QAM 0.81 (Dual) (5 MHz)	
Receive Modulation Mode	256QAM 0.81 (Dual) (5 MHz)	
Link Symmetry	1 to 1	
Receive Modulation Mode Detail	Running At Maximum Receive Mode	
Range	0.2	km
TDD Synchronization		
TDD Synchronization Interface	Disabled	

TDM

TDM Interface Control	E1		TDM Interface Status	OK	
TDM Single Payload Lock	Disabled		TDM Latency	0	µs
TDM Channel Status 1	Up		TDM Channel Status 2	Up	
TDM Channel Status 3	Up		TDM Channel Status 4	Up	
TDM Channel Status 5	Up		TDM Channel Status 6	Up	
TDM Channel Status 7	Up		TDM Channel Status 8	Up	
Status Page Refresh Period	3600	Seconds	Update Page Refresh Period	Reset form	

Procedures:

- Confirm that the Ethernet Link Status attributes are green and set to **Copper Link Up** or **Fiber Link Up**.

Equipment

The Equipment section of the System Status page contains the attributes described in Table 156.

Table 156 System Status attributes - Equipment

Attribute	Meaning
Link Name	The link name is allocated by the system administrator and is used to identify the equipment on the network. The link name attribute is limited to a maximum size of 63 ASCII characters.
Site Name	The site name is allocated by the system administrator and can be used as a generic scratch pad to describe the location of the equipment or any other equipment related notes. The site name attribute is limited to a maximum size of 63 ASCII characters.
Software Version	The version of PTP 700 software installed on the equipment.
Hardware Version	The PTP 700 hardware version. Formatted as “vvvv-C” or “vvvv-C+I” where vvvv is the version of the printed circuit card. The “-C” suffix indicates a PTP 700 Connectorized unit. The “-C+I” suffix indicates a PTP 700 Connectorized+Integrated unit.
Regulatory Band	This is used by the system to constrain the wireless to operate within regulatory regime of a particular band and country. The license key provides the capability to operate in one or more regulatory bands. The Installation Wizard is used to choose one of those bands.
Elapsed Time Indicator	The elapsed time indicator attribute presents the total time in years, days, hours, minutes and seconds since the last system restart. The system can restart for several reasons, for example commanded reboot from the system reboot web page, or a power cycle of the equipment.

Ethernet / Internet

The Ethernet / Internet section of the System Status page contains the attributes described in Table 157.

Table 157 System Status attributes – Ethernet / Internet

Attribute	Meaning
Main PSU Port Status	The current status of the Ethernet link to the PSU port: • Green "`Copper Link Up`": The Ethernet link is established. • Red "`Down`": The Ethernet link is not established.
Main PSU Port Speed and Duplex	The negotiated speed and duplex setting of the Ethernet link to the PSU port. The speed setting is specified in Mbps.
NIDU LAN Port Status	The current status of the Ethernet link to the NIDU LAN port: • Green "`Copper Link Up`": The Ethernet link is established. • Red "`Down`": The Ethernet link is not established.
NIDU LAN Port Speed and Duplex	The negotiated speed and duplex setting of the Ethernet link to the NIDU LAN port. The speed setting is specified in Mbps.
Aux Port Status	The current status of the Ethernet link to the Aux port: • Green "`Copper Link Up`": The Ethernet link is established. • Red "`Down`": The Ethernet link is not established.
Aux Port Speed and Duplex	The negotiated speed and duplex setting of the Ethernet link to the Aux port. The speed setting is specified in Mbps.
SFP Port Status	The current status of the Ethernet link to the SFP port: • Green "`Fiber Link Up`": The Ethernet link is established. • Red "`Down`": The Ethernet link is not established.
SFP Port Speed and Duplex	The negotiated speed and duplex setting of the Ethernet link to the SFP port. The speed setting is specified in Mbps.
MAC Address	The MAC Address of this unit.
Remote MAC Address	The MAC Address of the peer unit. If the link is down, this is set to "`Not available`".
Remote Internet Address	The Internet Address of the peer unit. To open the web interface of the peer unit, click on the hyperlink. If the link is down, this is set to "`Not available`". Depending on the settings of IP Version (Table 121) and IP Address Label (Table 120), this may be either an IPv4 or an IPv6 address.

Wireless

The Wireless section of the System Status page contains the attributes described in Table 158.

Table 158 System Status attributes – Wireless

Attribute	Meaning
Wireless Link Status	The current status of the wireless link: • Green "Up": A point-to-point wireless link is established. • Red "Down": The wireless link is not established.
Maximum Transmit Power	The maximum transmit power that the local wireless unit is permitted to use to sustain a link.
Remote Maximum Transmit Power	The maximum transmit power that the remote wireless unit is permitted to use to sustain a link.
Transmit Power	The maximum, mean, minimum and latest measurements of Transmit Power (dBm). See System histograms on page 7-47.
Receive Power	The maximum, mean, minimum and latest measurements of Receive Power (dBm). See System histograms on page 7-47.
Vector Error	The maximum, mean, minimum and latest measurements of Vector Error (dB). See System histograms on page 7-47. Vector Error compares the received signals In phase / Quadrature (IQ) modulation characteristics to an ideal signal to determine the composite error vector magnitude. The expected range for Vector Error is approximately -2 dB (NLOS link operating at sensitivity limit on BPSK 0.67) to -33 dB (short LOS link running 256 QAM 0.83).

Attribute	Meaning
Link Loss	The maximum, mean, minimum and latest measurements of Link Loss (dB). See System histograms on page 7-47. The link loss is the total attenuation of the wireless signal between the two point-to-point units. The link loss calculation is: $$P_{ll} = P_{T_x} - P_{R_x} + g_{T_x} + g_{R_x} - c_{T_x} - c_{R_x}$$ Where: P_{ll} = Link Loss (dB) P_{T_x} = Transmit power of the remote wireless unit (dBm) P_{R_x} = Received signal power at the local unit (dBm) g_{T_x}, g_{R_x} = Antenna gain at the remote and local units respectively (dBi). This is the gain of the integrated or connectorized antenna. c_{T_x}, c_{R_x} = Cable loss at the remote and local units respectively (dB). It is RF cable loss which connects ODU to Connectorized antenna. For connectorized ODUs, the link loss calculation is modified to allow for the increased antenna gains at each end of the link.
Transmit Data Rate	The maximum, mean, minimum and latest measurements of Transmit Data Rate (Mbps). See System histograms on page 7-47.
Receive Data Rate	The maximum, mean, minimum and latest measurements of Receive Data Rate (Mbps). See System histograms on page 7-47.
Link Capacity Variant	Indicates whether the installed license key is Lite or Full. When a link is established, this attribute shows the lower of the license keys at each end. For example, if this end is Full and the other end is Lite, it shows “Lite”. To see the installed key, go to the Installation Wizard.
Link Capacity	The maximum aggregate data rate capacity available for user traffic, assuming the units have been connected using Gigabit Ethernet. The link capacity is variable and depends on the prevailing wireless conditions as well as the distance (range) between the two wireless units.
Transmit Modulation Mode	The modulation mode currently being used on the transmit channel.
Receive Modulation Mode	The modulation mode currently being used on the receive channel.
Link Symmetry	A ratio that expresses the division between transmit and receive time in the TDD frame. The first number in the ratio represents the time allowed for the transmit direction and the second number represents the time allowed for the receive direction.

Attribute	Meaning
Receive Modulation Mode Detail	The receive modulation mode in use. For a list of values and their meanings, see Table 159.
Range	The range between the PTP 700 Series ODUs. This is displayed in kilometers by default, but can be changed to miles by updating the Distance Units attribute to imperial, as described in Webpage Properties page on page 6-68.

Table 159 Receive Modulation Mode Detail values and meanings

Value	Meaning
`Running At Maximum Receive Mode`	The link is operating at maximum modulation mode in this channel and maximum throughput has been obtained.
`Running At User-Configured Max Modulation Mode`	The maximum modulation mode has been capped by the user and the link is operating at this cap.
`Restricted Because Installation Is Armed`	The Installation Wizard has been run and the unit is armed, forcing the link to operate in the lowest modulation mode. To remove this restriction, re-run the Installation Wizard to disarm the unit.
`Restricted Because Of Byte Errors On The Wireless Link`	The receiver has detected data errors on the radio and reduced the modulation mode accordingly. The radio may achieve a higher modulation mode as shown by the vector error, but there is some other error source, probably RF interference.
`Restricted Because Channel Change Is In Progress`	This is a transient event where the modulation mode is temporarily reduced during a channel change.
`Limited By The Wireless Conditions`	The radio is running at the maximum achievable modulation mode given the current wireless conditions shown by the vector error. The radio is capable of reaching a higher modulation mode if wireless conditions (vector error) improve.

Synchronous Ethernet

The Synchronous Ethernet section of the System Status page contains the attributes described in Table 160.

Table 160 System Status attributes – Synchronous Ethernet

Attribute	Meaning
Sync E Tracking State	The state of frequency tracking in Synchronous Ethernet. For a list of values and their meanings, see Table 161. In normal operation, with the Synchronous Ethernet feature enabled and a valid timing source present, one end of the link should be in the "`Locked Local, Holdover Acquired State`", the other end should be in the "`Locked Remote, Holdover Acquired`" state. Further status information for the Synchronous Ethernet features is available in the Sync E Status page. See SyncE Status page on page 7-58.

Table 161 Sync E Tracking State values and meanings

Value	Meaning
`Disabled`	The synchronous Ethernet feature is disabled.
`Acquiring Wireless Lock`	Synchronous Ethernet is not operational because the wireless link is establishing.
`Free Running`	Synchronous Ethernet is operational, but with no timing source or history. This is a temporary state.
`Locked Local, Acquiring Holdover`	Sync E tracking has locked to a synchronisation signal from a cabled Ethernet port on the local ODU. This is a temporary state until the unit has acquired holdover history.
`Locked Local, Holdover Acquired`	Sync E tracking has locked to a synchronisation signal from a cabled Ethernet port on the local ODU and has acquired holdover history.
`Holdover`	There is currently no source for the tracking loop, but previously the tracking loop was in a Locked, Holdover Acquired state. The system is using the last known good frequency.
`Locked Remote, Acquiring Holdover`	The tracking loop has locked to a synchronisation signal from the remote ODU. This is a temporary state until the unit has acquired holdover history.
`Locked Remote, Holdover Acquired`	The tracking loop has locked to a synchronisation signal form the remote ODU and has acquired holdover history.

TDD Synchronization

The TDD Synchronization section of the System Status page contains the attributes described in Table 162.

Table 162 System Status attributes – TDD Synchronization

Attribute	Meaning
TDD Synchronization Status	The status of TDD synchronization. Displayed at a TDD Master if TDD synchronization is active. For a list of values and their meanings, see Table 163.

Table 163 TDD Synchronization Status values and meanings

Value	Meaning
`Inactive`	TDD Synchronization has been administratively disabled. This value is not displayed in the System Status page, but can be determined from the SNMP MIB. TDD Synchronization Status is always in the Inactive state at a TDD Slave unit.
`Cluster Timing Master`	The ODU has been configured as a Cluster Master with an internal reference, and is communicating correctly with the PTP SYNC unit.
`Initialising`	The wireless link is down, and the master ODU is attempting to synchronize the TDD frame structure with an external 1 pps reference. Synchronization proceeds more rapidly in this state than in the Acquiring Lock state, because the TDD master does not need to consider the ability of the TDD slave to track changes in frame timing.
`PTP-SYNC Not Connected`	The ODU is not able to communicate with the PTP SYNC unit.
`Locked`	The master ODU has locked the TDD frame structure to the 1 pps reference received at the input of the PTP-SYNC unit. The ODU may be a Cluster Master or a Cluster Slave. The ODU is transmitting.

Value	Meaning
`Holdover (No GPS Sync In)`	The 1 pps reference has been lost at the input to the PTP-SYNC unit, and the ODU in a free running state. The ODU is transmitting. If the reference input is not restored, the Holdover state will terminate automatically after a period set by TDD Holdover Duration.
`Holdover`	The ODU is a Cluster Slave and the 1 pps reference has been lost at the input to an upstream PTP-SYNC unit. The ODU is locked to an upstream ODU that is in the Holdover (No GPS Sync In) state. The ODU is transmitting. If the reference input is not restored at the upstream PTP-SYNC unit, the Holdover state will terminate automatically after a period set by TDD Holdover Duration.
`Not Synchronized (No GPS Sync In)`	The 1 pps reference has been lost at the input to the PTP-SYNC unit and the holdover period has expired. If the ODU is configured for TDD Holdover Mode = Best Effort then the ODU will be transmitting, otherwise it will be muted.
`Not Synchronized`	The ODU is a Cluster Slave and the 1 pps reference has been lost at the input to an upstream PTP-SYNC unit. The holdover period has expired. If the ODU is configured for TDD Holdover Mode = Best Effort then the ODU will be transmitting, otherwise it will be muted.
`Acquiring Lock`	The wireless link is up and the master ODU is attempting to synchronize the TDD frame structure with an external 1 pps reference. Frame timing changes at the TDD master are constrained to allow for tracking by the TDD slave. This state is not allowed when TDD Holdover Mode = Strict.

IEEE 1588 Transparent Clock

The IEEE 1588 Transparent Clock section of the System Status page contains the attributes described in Table 164.

Table 164 System Status attributes – IEEE 1588 Transparent Clock

Attribute	Meaning
Transparent Clock	Indicates if the IEEE 1588 transparent clock feature is enabled.

TDM

The TDM section of the System Status page contains the attributes described in Table 165.

Note

When TDM is enabled and connected at one link end, up to two minutes may elapse before the TDM link is established (this is known as the settling period). Do not attempt to change the TDM configuration during this settling period.

Table 165 System Status attributes – TDM

Attribute	Meaning
TDM Interface Control	The type of TDM interface that is activated (None, E1 or T1). This is set on the Interface Configuration page.
TDM Interface Status	The current status of the Ethernet link between the NIDU (ODU port) and the ODU (PSU port) (OK or Not Connected). • Green "OK": The Ethernet link is established. • Red "Not Connected": The Ethernet link is not established.
TDM Single Payload Lock	The current status of the single payload locking feature: • "Enabled": The ODU will prevent transition from Single Payload modes to the higher Dual Payload modes. The ODU applies this lock when it calculates that such a transition would pass through modes which cannot carry telecoms data. • "Applied": The ODU is actively preventing these transitions. • "Disabled": The wireless will transition to the faster Dual Payload modes as soon as the conditions are appropriate.
TDM Latency	The end-to-end latency of the TDM service between TDM ports at the NIDUs (µs).
TDM Channel Status n	The current status of the TDM service between NIDU port "n" at the local NIDU and the corresponding port at the remote NIDU. For a list of values and their meanings, see Table 166.

Table 166 TDM Channel Status values and meanings

Value	Meaning
`Up`	TDM data is being bridged between the TDM ports on local and remote NIDUs (green background).
`No Signal (Local)`	No TDM data is being received at the TDM port on the local NIDU.
`No Signal (Remote)`	No TDM data is being received at the corresponding TDM port on the remote NIDU.
`No Signal (Local and Remote)`	No TDM data is being received at the associated TDM ports on local and remote NIDUs.
`No Signal (Local and Remote Timing)`	No TDM data is being received at the TDM port on the local NIDU. TDM data is being received at the TDM port on the remote NIDU. The modulation mode of the link is too low to support bridging of TDM data in the remote to local direction, but the transmit clock at TDM port of the local NIDU is synchronised to the clock received at the TDM port on the remote NIDU.
`Remote Timing`	TDM data is being received at the TDM port on the local and remote NIDUs. The modulation mode of the link is too low to support bridging of TDM data in either direction. The transmit clocks at the TDM ports on local and remote NIDUs are synchronized to the clocks received at the TDM ports on (respectively) the remote and local NIDUs.
`Disabled`	The TDM link is not established. This may be because the wireless link is down, or because the TDM service is acquiring synchronization.

Rebooting and logging out

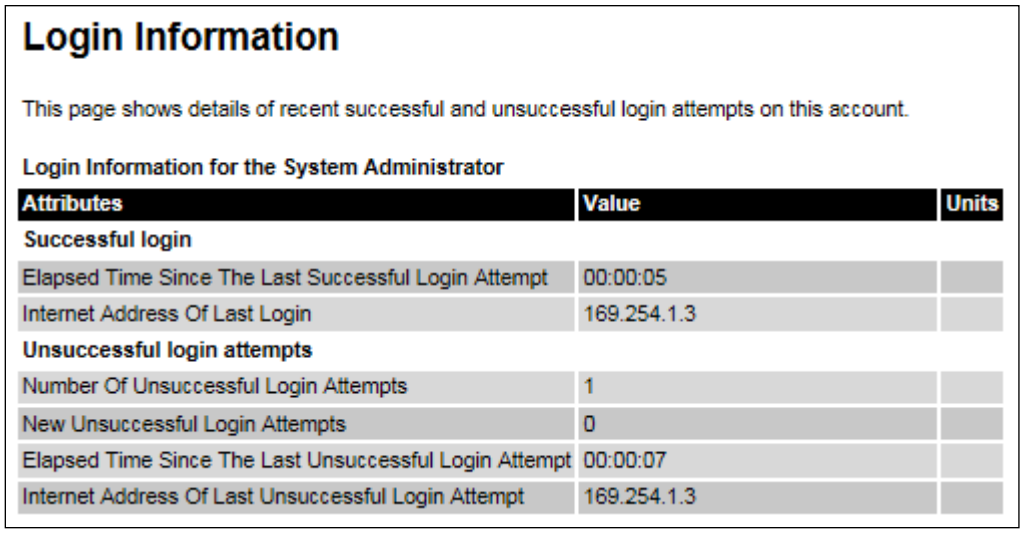
This section describes how to reboot the unit and log out of the web interface.

Login Information page

Menu option: **Management > Web > Login Information** (Figure 185).

Use this page to show recent successful and unsuccessful login attempts on this account.

Figure 185 Login Information page



Login Information

This page shows details of recent successful and unsuccessful login attempts on this account.

Login Information for the System Administrator

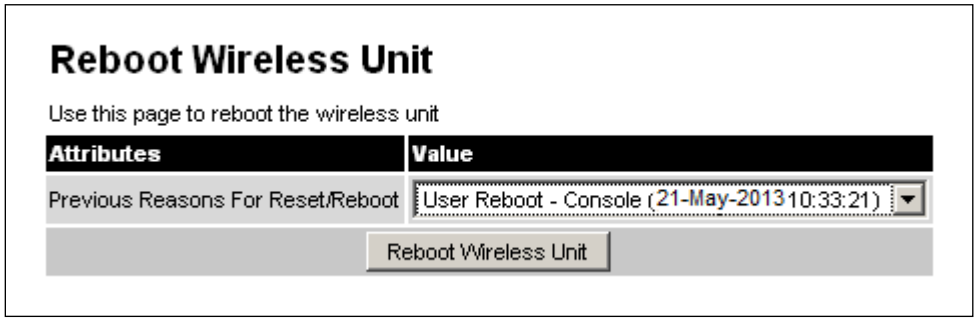
Attributes	Value	Units
Successful login		
Elapsed Time Since The Last Successful Login Attempt	00:00:05	
Internet Address Of Last Login	169.254.1.3	
Unsuccessful login attempts		
Number Of Unsuccessful Login Attempts	1	
New Unsuccessful Login Attempts	0	
Elapsed Time Since The Last Unsuccessful Login Attempt	00:00:07	
Internet Address Of Last Unsuccessful Login Attempt	169.254.1.3	

Reboot Wireless Unit page

Menu option: **System > Reboot** (Figure 186).

Use this page to reboot the ODU or view a list of previous reboot reasons.

Figure 186 Reboot Wireless Unit page



Reboot Wireless Unit

Use this page to reboot the wireless unit

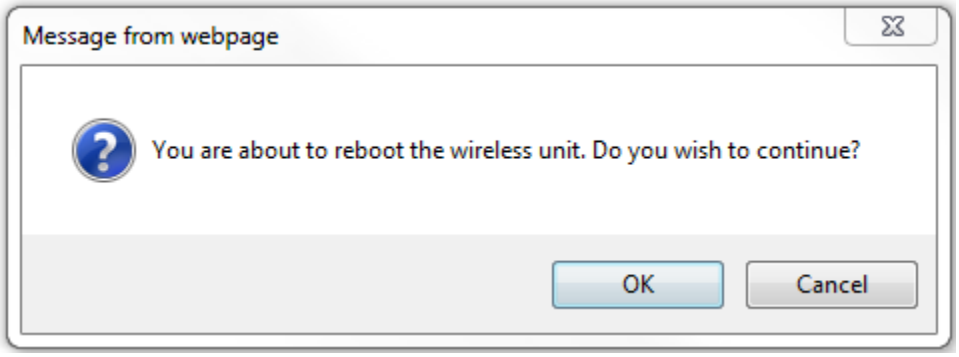
Attributes	Value
Previous Reasons For Reset/Reboot	User Reboot - Console (21-May-2013 10:33:21)

Reboot Wireless Unit

Procedure:

- Use the drop-down list to view the Previous Reasons For Reset/Reboot.
- If a reboot is required:
  - Click **Reboot Wireless Unit**. The Reboot Confirmation dialog is displayed (Figure 187).
  - Click **OK**. The reboot progress message is displayed. On completion, the unit restarts.

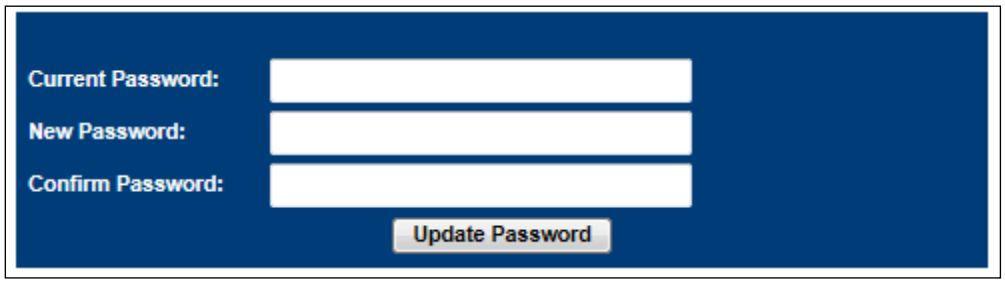
Figure 187 Reboot confirmation pop up



Change Password page

Menu option: **Change Password** (Figure 188). Use this page to change a personal password.

Figure 188 Change Password page (System Administration example)



A security officer can change the passwords of other users using the User Accounts page, as described in Local User Accounts page on page 6-61.

Procedure:

- Enter and confirm the new password (the default is blank). The new password must comply with the complexity rules (Table 135).

Logging out

To maintain security, always log out at the end of a session: on the menu, click **Logout**.

The unit will log out automatically if there is no user activity for a set time, but this depends upon Auto Logout Period in the Webpage Properties page (Figure 153).

Alarms, alerts and messages

This section describes how to use alarms, alerts and syslog messages to monitor the status of a PTP 700 link.

Alarms

Whenever system alarms are outstanding, a yellow warning triangle is displayed on the navigation bar. The warning triangle is visible from all web pages.

Procedure:

- Click the warning triangle (or menu option **Home**) to return to the System Summary page and view the alarms. If the warning triangle disappears when it is clicked, it indicates that the outstanding alarms have been cleared.

The example in Figure 189 shows the warning triangle in the navigation bar and an alarm displayed in the System Summary page. The alarms are defined in Table 167.

A change of state in most alarms generates an SNMP trap or an SMTP email alert.

Figure 189 Alarm warning triangle

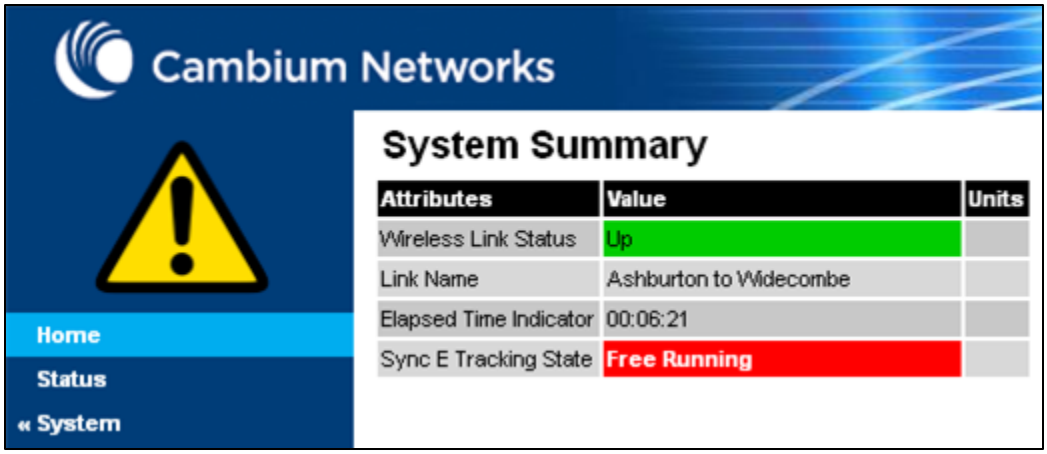


Table 167 System alarms

Alarm	Meaning
Aux Port Configuration Mismatch	Ethernet fragments (runt packets) have been detected when the Aux port is in full duplex. This indicates an auto-negotiation or forced configuration mismatch.
Aux Port Disabled Warning	The Aux port link has been administratively disabled via the SNMP Interface.
Aux Port PoE Output Status	The Aux port link is down. The most likely cause is that the unit has no Ethernet cable plugged into its Aux port.
Aux Port Status	The Aux port link is down. The most likely cause is that the unit has no Ethernet cable plugged into its Aux port.
Cable Diagnostics Warning	"`Test In Progress`" means that the Cable Diagnostics test has been initiated on one or more ports and is in progress.
Capacity Variant Mismatch	The link ends are different capability variants, for example, one is Full and the other is Med.
Data Bridging Status	This alarm depends on Lowest Data Modulation Mode. "`Disabled`" means that the link has stopped bridging Ethernet frames because the Lowest Data Modulation Mode is not being achieved or because the wireless link is down.
Second Data Bridging Status	This alarm depends on Lowest Second Data Modulation Mode. "`Disabled`" means that the link has stopped bridging Ethernet frames because the Lowest Second Data Modulation Mode is not being achieved or because the wireless link is down.
Install Status	Signaling was received with the wrong MAC address. It is very unusual to detect this, because units with wrongly configured Target MAC Address will normally fail to establish a wireless link. However, rare circumstances may establish a partial wireless link and detect this situation.
Install Arm State	A wireless unit is in installation mode. After installation, the wireless unit should be disarmed. This will increase the data-carrying capacity and stop the installation tone generator. The wireless link is disarmed from the "Installation" process, see Disarming the units on page 6-114.

Alarm	Meaning
Incompatible Regulatory Bands	The two linked units have different Regulatory Bands. To clear this alarm, obtain and install license keys for the correct country and select the same Regulatory Band at each end of the link.
Incompatible Master and Slave	The master and slave ends of the wireless link are different hardware products, or have different software versions. It is very unusual to detect this because incompatible units will normally fail to establish a wireless link. However, some combinations may establish a partial wireless link and detect this situation.
Link Mode Optimization Mismatch	The Master and Slave ODUs are configured to use different link mode optimization methods (one is set to IP and the other TDM).
Main PSU Port Configuration Mismatch	Ethernet fragments (runt packets) have been detected when the PSU port is in full duplex. This indicates an auto-negotiation or forced configuration mismatch.
Main PSU Port Disabled Warning	The PSU port link has been administratively disabled via the SNMP Interface.
Main PSU Port Status	The PSU port link is down. The most likely cause is that the unit has no Ethernet cable plugged into its Aux port.
NIDU LAN Port Status	The Ethernet link between the NIDU (LAN port) and the Ethernet network terminating equipment is not established.
No Wireless Channel Available	Spectrum Management was unable to locate a suitable wireless channel to operate on.
Port Allocation Mismatch	The local and remote ODUs have different services configured.The following alarms are raised on the port configuration mismatch - • **Mismatch in Second Data Service:** The Second Data Service is configured at the local unit but it is not configured at the remote unit or vice versa. • **Mismatch in Out of Band Remote Management Service**: The Out of Band Management Service is configured at the local unit but it is not configured at the remote unit or vice versa.
Regulatory Band	The installed license key contains an invalid Regulatory Band. The wireless unit is prohibited from operating outside the regulated limits.

Alarm	Meaning
Remaining Full Capacity Time Trial	Time remaining on the full capability trial period. Activated when seven days or less of the trial period remain.
Remote Transparent Clock Compatibility	The local and remote units have different IEEE 1588 transparent clock configurations. Both units must have the same configuration for the feature to work correctly.
SFP Error	A non-OK value indicates that the SFP link is down. There are two possible causes: • Either: the fiber link has been installed but disabled (because the license key does not include SFP support), • Or: the SFP link could not be established even though an SFP carrier was detected (due perhaps to a cabling fault or the link is disabled at the link partner).
SFP Port Configuration Mismatch	Ethernet fragments (runt packets) have been detected when the SFP port is in full duplex. This indicates an auto-negotiation or forced configuration mismatch.
SFP Port Disabled Warning	The SFP port link has been administratively disabled via the SNMP Interface.
SFP Port Status	The SFP port link is down. The most likely cause is that the unit has no Ethernet cable plugged into its SFP port.
SNTP Synchronization failed	SNTP has been enabled but the unit is unable to synchronize with the specified SNTP server.
Sync E tracking state	The state of the Synchronous Ethernet feature, if there is a problem.
Syslog Client Enabled/Disabled Warning	The local syslog client has been enabled or disabled.
Syslog Enabled/ Disabled Warning	The local log of event messages has been enabled or disabled.
Syslog Local Nearly Full	The local log of event messages is nearly full.
Syslog Local Wrapped	The local log of event messages is full and is now being overwritten by new messages.
TDM Channel Status n	The Ethernet link between the NIDU (E1/T1 port “n”) and the local TDM transceiver is not established.
TDM Channel Loopback n	TDM channel “n” is currently undergoing a loopback test.

Alarm	Meaning
TDD Synchronization Alarm	The reference signal for TDD Synchronization is absent and the ODU is now in holdover with more than 80% of the holdover period elapsed (**Reference Signal Lost**) or the ODU has reached the end of the configured holdover period and may not be correctly synchronized with the remaining units in the wireless network (**Synchronization Lost**). If TDD Synchronization Alarm = Synchronization Lost and TDD Holdover Mode = Strict, the ODU will be muted and the wireless link will be down.
Transparent Clock Source Port Alarm	If SFP was the selected transparent clock source port but the media did not negotiate to Fiber.
Unit Out Of Calibration	The unit is out of calibration and must be returned to the factory using the RMA process for re-calibration.
Wireless Link Disabled Warning	The wireless link has been administratively disabled via the SNMP Interface. The wireless interface MIB-II ifAdminStatus attribute has been set to **DOWN**. To enable the Ethernet interface, set the ifAdminStatus attribute to **UP**.

Add the secure mode alarm

Email alerts

The management agent can be configured to generate alerts by electronic mail when certain events occur. The alerts are defined in Table 168.

Table 168 Email alerts

Alert	Meaning
Wireless Link Up Down	There has been a change in the status of the wireless link.
Channel Change	DFS has forced a change of channel.
DFS Impulse Interference	DFS has detected impulse interference.
Enabled Diagnostic Alarms	Diagnostic alarms have been enabled.
Main PSU Port Up Down	There has been a change in the status of the PSU data port.
Aux Port Up Down	There has been a change in the status of the Aux port.
SFP Port Up Down	There has been a change in the status of the SFP port.
NIDU LAN Port Up Down	There has been a change in the status of the NIDU LAN port.

Syslog page

Menu option: **Management > Syslog** (Figure 190).

Use this page to view the local log of event messages.

Figure 190 Syslog local log

Previous Page Refresh

Filter Out Reports Below This Level: Info

Entries 989 to 890 (0 filtered)

Entry	Relative Time	Timestamp	Facility	Priority	Text
989	00:00:05	Sep 02 13:27:21	Security	Info	event; auth_login; Web user=Geri; from=10.130.1.73; port=443; connection=HTTPS; authentication=local;
988	00:00:17	Sep 02 13:27:09	Security	Info	event; auth_login; Web user=MelC; from=10.130.1.175; port=443; connection=HTTPS; authentication=local;
987	00:00:56	Sep 02 13:26:28	Security	Info	event; auth_logout; Web user=Geri; from=10.130.1.175; port=443; connection=HTTPS; authentication=local;
986	00:01:05	Sep 02 13:26:19	Security	Info	event; auth_login; Web user=Geri; from=10.130.1.175; port=443; connection=HTTPS; authentication=local;
985	00:01:51	Sep 02 13:25:35	NTP	Warning	status; SNTP Sync; was=No Sync; now=In Sync;

Note

For more information about system logging, refer to:

- System logging (syslog) on page 1-49 describes the system logging feature.
- Syslog Configuration page on page 6-78 describes how to enable system logging.

Format of syslog server messages

PTP 700 generates syslog messages in this format:

```
SP = “ ” = %x20
CO = “:” = %x3A
SC = “;” = %x3B
LT = “<” = %x3C
GT = “>” = %x3E
syslog = pri header SP message
pri = LT “1”-“182” GT
```

```
header = timestamp SP hostname
timestamp = month SP days SP hours ":" minutes ":" seconds
month = "Jan"|"Feb"|"Mar"|"Apr"|"May"|"Jun"|
"Jul"|"Aug"|"Sep"|"Oct"|"Nov"|"Dec"
days = " 1"-"31"
hours = "00"-"23"
minutes = seconds = "00"-"59"
hostname = "0.0.0.0"-"255.255.255.255"
message = "PTP700" CO SP (configuration | status | event)
configuration = "configuration" SC SP attribute-name SC SP ("Web
user"|"SNMP user"|"SNTP") SC SP "was=" previous-value SC SP "now="
new-value SC
status = "status" SC SP attribute-name SC SP "was=" previous-value SC
SP "now=" new-value SC
event = "event" SC SP identifier SC SP event-message-content SC
```

Configuration and status messages

Configuration and status messages contain all of the relevant attributes.

This is an example of a configuration message:

```
PTP700: configuration; IP Address; Web user; was=10.10.10.10;
now=169.254.1.1;
```

This is an example of a status message:

```
PTP700: status; Data Port Status; was=Down; now=Up;
```

Event messages

Event messages are listed in Table 169. Definition of abbreviations:

SC = ";"

SP = " "

This is an example of an event message:

```
PTP700: event; auth_login; web user=MarkT; from=169.254.1.1; port=80;
connection=HTTP; authentication=local;
```

Table 169 Event messages

Facility	Severity	Identifier	Message content
security(4)	warning(4)	auth_idle	"Web user=" user-name SC SP "from=" IP-address SC SP "port=" port-number SC SP "connection=" ("HTTP" | "HTTPS") SC SP
security(4)	info(6)	auth_login	
security(4)	warning(4)	auth_login_failed	

Facility	Severity	Identifier	Message content
security(4)	warning(4)	auth_login_locked	"authentication=" ("local" | "RADIUS") SC
security(4)	info(6)	auth_logout	
kernel(0)	warning(4)	cold_start	"PTP wireless bridge has reinitialized, reason=" reset-reason SC
security(4)	warning(4)	License_update	"License Key updated" SC
syslog(5)	warning(4)	log_full	"Syslog local flash log is 90% full" SC
syslog(5)	warning(4)	log_wrap	"Syslog local flash log has wrapped" SC
security(4)	info(6)	radius_auth	"RADIUS user=" user-name SC SP "server " ("1" | "2") " at " IP-address SP "succeeded" SC
security(4)	warning(4)	radius_auth_fail	"RADIUS user=" user-name SC SP "server " ("1" | "2") " at " IP-address SP ("failed" | "succeeded" | "failed (no response)") SC
security(4)	alert(1)	resource_low	"Potential DoS attack on packet ingress " ("warning" | "cleared") SC
security(4)	warning(4)	sec_zeroize	"Critical Security Parameters (CSPs) zeroized" SC
local6(22)	warning(4)	snmpv3_asn1	"ASN.1 parse error" SC
security(4)	warning(4)	snmpv3_auth	"Authentication failure" SC
local6(22)	warning(4)	snmpv3_decryption	"Decryption failure" SC
local6(22)	warning(4)	snmpv3_engine_id	"Unknown engine ID" SC
local6(22)	warning(4)	snmpv3_sec_level	"Unknown security level" SC
kernel(0)	warning(4)	sys_reboot	"System Reboot, reason=" reset-reason SC
security(4)	warning(4)	sys_software _upgrade	"Software upgraded from " software-version " to " software-version SC
local6(22)	warning(4)	telnet_idle	"Telnet user=" user-name SC SP "from=" IP-address SC SP "port=" port-number SC
local6(22)	info(6)	telnet_login	
local6(22)	warning(4)	telnet_login_failed	
local6(22)	info(6)	telnet_logout	
local6(22)	info(6)	tftp_complete	"TFTP software upgrade finished" SC
local6(22)	info(6)	tftp_failure	"TFTP software upgrade failed, reason=" reason SC

Facility	Severity	Identifier	Message content
local6(22)	info(6)	tftp_start	"TFTP software upgrade started" SC
NTP(12)	info(6)	time_auth	"SNTP authentication succeeded at IP-address=" IP-address SC SP "port-number=" port SC
NTP(12)	warning(4)	time_auth_failed	"SNTP authentication failed at IP-address=" IP-address SC SP "port-number=" port SC
NTP(12)	warning(4)	time_conn_failed	"SNTP connection failed at IP-address=" IP-address SC SP "port-number=" port SC SP "reason=" reason SC

Spectrum Management

Spectrum Expert

This section describes how to use the Spectrum Expert page to monitor the radio spectrum usage of the PTP 700 link.

Note

Internet Explorer versions up to and including IE8 do not support the HTTP features used in the Spectrum Expert page.

Menu option: **System > Spectrum Expert**

This page is used to view and configure spectrum usage.

The Spectrum Expert page displays the following plots:

- The Local Receive Spectrum, and
- The Peer Receive Spectrum.

The Spectrum Expert page has two display modes:

- Standard Display mode – The 'Standard' Display mode is the mode which displays only the operational subband channels (shown in Figure 191). In this mode, the Extended Spectrum Scanning attribute could be Enabled but the Extended display box could be un-checked.

  It has further two types of plot:

  - Standard Display mode without realtime line
  - Standard Display mode with realtime line
- Extended Display mode – The 'Extended' Display Mode shows the entire DSO Full Band range of channels along with highlighted operational channels (shown in Figure 192). In this mode, the Extended Spectrum Scanning attribute is Enabled.

  This mode also has two types of plot:

  - Extended Display mode without realtime line
  - Extended Display mode with realtime line

The Extended display mode selection checkbox appears when the Extended Spectrum Scanning attribute is set to Enabled.

See Interpreting the receive spectrum plot on page 7-33 for details on the how to interpret these plots.

Caution

It is recommended not to leave the ODU with Extended Spectrum Scanning enabled during normal operation due to reduction in DSO CAC response in the operating

band.

Standard Display mode

Figure 191 Spectrum Expert page – Standard Display mode

Extended Display Mode

Figure 192 Spectrum Expert page – Extended Display mode

Note

Figure 191 shows the default layout for a unit configured as a Master. On a unit configured as Slave, some of the controls at the bottom of the page are not available. In the remainder of this section, the screen shots shown are for the Master Unit.

Note

For Spectrum Expert Extended Display mode, Extended Spectrum Scanning is Enabled and Display mode is set to Extended.

Standard Display with extended layout

The page layout may be changed from the compact layout to the extended layout by clicking on the **Show Details** hyperlink on the top right of the page shown in Figure 191.

This hyperlink is only visible when the Extended Display checkbox in Spectrum Expert Display Mode is not selected.

A screen shot of the Spectrum Expert page in the extended layout is shown in Figure 193. It displays the following additional plots:

- The Local Timeseries, and
- The Peer Timeseries.

These plots are on the right of the corresponding Receive Spectrum plots. See Selecting a Channel and a Time period on page 7-41 for details on the timeseries plots.

Clicking on the **Hide Details** hyperlink returns to the compact layout.

Figure 193 Spectrum Expert page with Receive Spectrum and Timeseries for both Local and Peer

Full layout

The page layout may be extended further to give access to more information on either or both the local and the peer interference spectra.

For the local interference spectrum, clicking on the **Local Interference Waterfall** hyperlink below the Local Receive Spectrum plot shows:

- The Local Interference Waterfall plot, if the Local TimeSeries was not shown (Figure 194), or
- The Local Interference Waterfall and the Histogram plots otherwise (Figure 195).

The same can be done for the peer section of the page.

Details on how to interpret the Interference Waterfall and Histogram plots are provided in sections Interpreting the Interference Waterfall plot on page 7-43 and Interpreting the histogram plot on page 7-45 respectively.

Figure 194 Spectrum Expert page showing the Receive Spectrum and Interference Waterfall for the Local unit

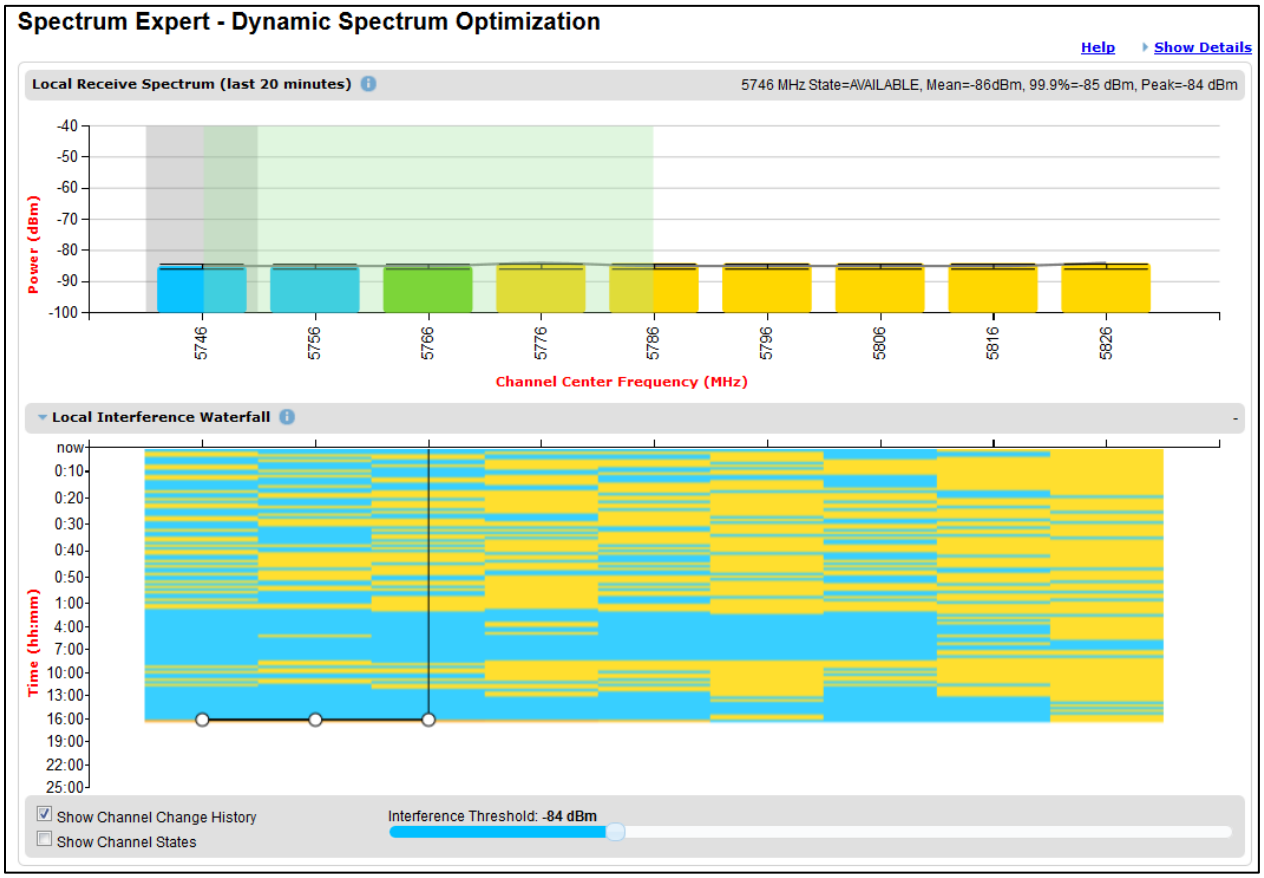
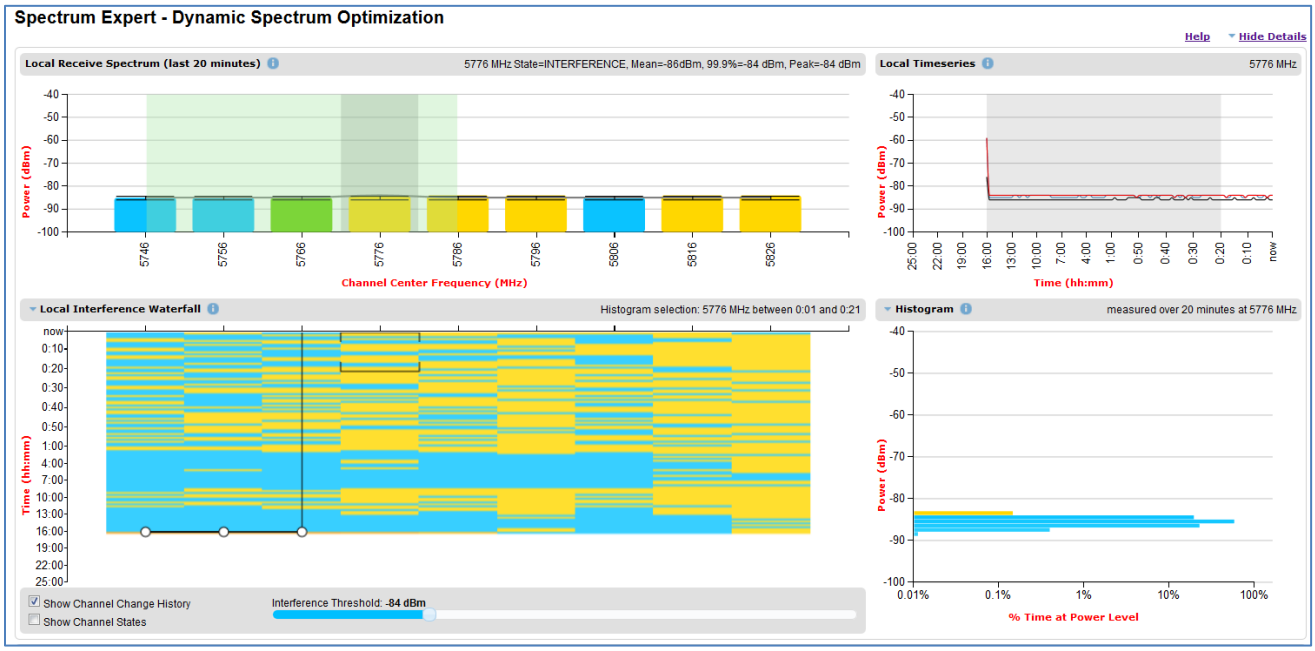


Figure 195 Spectrum Expert page showing the Receive Spectrum, Timeseries, Interference Waterfall and Histogram for the Local unit



Spectrum Management Settings

All spectrum management configuration changes are applied at the master ODU only. These changes are then sent from the master to the slave, so that both master and slave keep identical copies of spectrum management configuration. It is therefore possible to swap master and slave roles on an active PTP 700 link without modifying Spectrum Management configuration.

The default channelization can be modified by varying the lower center frequency attribute in the installation wizard, as described in Wireless Configuration page on page 6-21.

Note

Before attempting to improve the performance of the spectrum management algorithm by changing the default configuration, consult the Cambium Point-to-Point distributor or one of the system field support engineers.

Procedure:

- Review the configuration attributes (Table 170)
- Update the attributes as required. At the slave unit, only Page Refresh Period can be updated.
- To save changes, click Submit configuration changes.

Table 170 Spectrum Management attributes

Attribute	Meaning
Spectrum Expert Display Mode	**Realtime:** When set to Realtime, an additional line appears on the Receive Spectrum plots showing the most recent measurements of interference level for every channel **Extended:** Extended Display mode is visible only when Extended Scanning is enabled. This control is available in the Spectrum Expert page only.
Extended Spectrum Scanning	**Enabled:** Enables scanning of entire DSO full band channels. **Disabled:** Only the operational subband channels are scanned. This control is available in the Spectrum Expert page only.
Hopping Margin	Uses this margin when making a channel hop decision. If the interference level of the target channel is lower than that of the active channel by at least the Hopping Margin, the link will hop to the target channel. The default setting is 3 dB in non-radar regions, or 10 dB in radar regions.
Asymmetric DSO	Only displayed in non-radar regions when DSO is enabled. The default configuration of symmetric operation constrains the link to operate symmetrically, using the same transmit and receive channels. When in symmetric mode the slave unit will always follow the master. If the master moves to a new channel the slave will hop to the same channel. When the Point-to-Point link is configured as an asymmetric link both the master and slave are free to select the best channel from their own set of local interference metrics.
Spectrum Management Control	Only displayed in radar regions. The options are **DFS** and **DFS with DSO**.
Hopping Period	The Spectrum Management algorithm evaluates the metrics every "Hopping Period" seconds (180 seconds by default) looking for a channel with lower levels of interference. If a better channel is located, Spectrum Management performs an automated channel hop. If SNMP or SMTP alerts are enabled an SNMP TRAP or an email alert is sent warning the system administrator of the channel change.
Hopping Counter (not configurable)	This is used to record the number of channel hops. The number in the (+) brackets indicates the number of channel changes since the last screen refresh.
Interference Threshold	Spectrum Management uses the interference threshold to perform instantaneous channel hops. If the measured interference on a channel exceeds the specified threshold, then DSO will instruct the wireless to immediately move to a better channel. If a better channel cannot be found the PTP 700 Series will continue to use the current active channel. (Default –85 dBm).

Attribute	Meaning
Channel Bandwidth (not configurable)	This shows the value of the variable channel bandwidth selected.
Tx Color Code (not configurable)	This shows the Tx Color Code selected during Installation.
Rx Color Code (not configurable)	This shows the Rx Color Code selected during Installation.

Interpreting the receive spectrum plot

The Spectrum Expert page has two graphical plots:

- Local Receive Spectrum
- Peer Receive Spectrum

A more detailed example of one of these plots is shown in Figure 191.

For more information, select the **Help** hyperlink at the top right of the Spectrum Expert page and follow the instructions.

X axis and Y axis

The X-axis shows a stylized view of the selectable wireless channels. Note that the distance between adjacent channels may be smaller than the channel bandwidth. If this is the case, adjacent channels overlap. Channels are displayed separately for clarity. The axis is labeled using the channel center frequencies in MHz. The Y-axis shows the interference power levels from –100 to –40 dBm.

Channel states

The active channel (Channel 9 in Figure 191) is always marked using solid green on the Spectrum Expert page. The width of the hatching is directly proportional the channel bandwidth or spectral occupancy of the channel.

The individual channel metrics are displayed using a colored bar and an “I” bar. The colored bar represents the channel state (Table 171).

Table 171 Channel states represented in the Spectrum Expert plot

Color	State	Meaning
Green	Active	The channel is currently in use, hosting the wireless link.
Orange	Interference	The channel has interference above the interference threshold.
Blue	Available	The channel has an interference level below the interference threshold and is considered by the Spectrum Management

Color	State	Meaning
		algorithm suitable for hosting the Point-to-Point link.
Light Grey	Barred	The system administrator has barred this channel from use. For improved visibility, an additional red “lock” symbol is used to indicate that a channel is barred but The lock is not shown in Extended view.
Red	Radar Detected	A radar signal has been detected and operation on this channel is currently not allowed.
Dark Grey	Region Barred	Extended scanned channels outside the range of configured operational subband channels

Key metrics

The “I” bar and top of the colored bar represent three key metrics (Table 172). The vertical part of the “I” bar represents the statistical spread between the peak and the mean of the statistical distribution.

The arithmetic mean is the true power mean and not the mean of the values expressed in dBm.

Spectrum Management uses the 99.9% Percentile as the prime interference measurement. All subsequent references to interference level refer to this percentile measurement.

Table 172 Key metrics represented in the Spectrum Expert plot

Metric	Description	How represented
Peak of Means	The largest mean interference measurement encountered during the quantization period. The peak of means is useful for detecting slightly longer duration spikes in the interference environment.	Upper horizontal bar.
Mean of Means	The arithmetic mean of the measured means during a quantization period. The mean of means is a coarse measure of signal interference and gives an indication of the average interference level measured during the quantization period. The metric is not very good at predicting intermittent interference and is included to show the spread between the Mean of Means, the 99.9% Percentile and the Peak of Means.	Lower horizontal bar.
99.9% Percentile of the Means	The value of mean interference measurement which 99.9% of all mean measurements fall below, during the quantization period. The 99.9% percentile metric is useful for detecting short duration repetitive interference that by its very	Top of the colored bar.

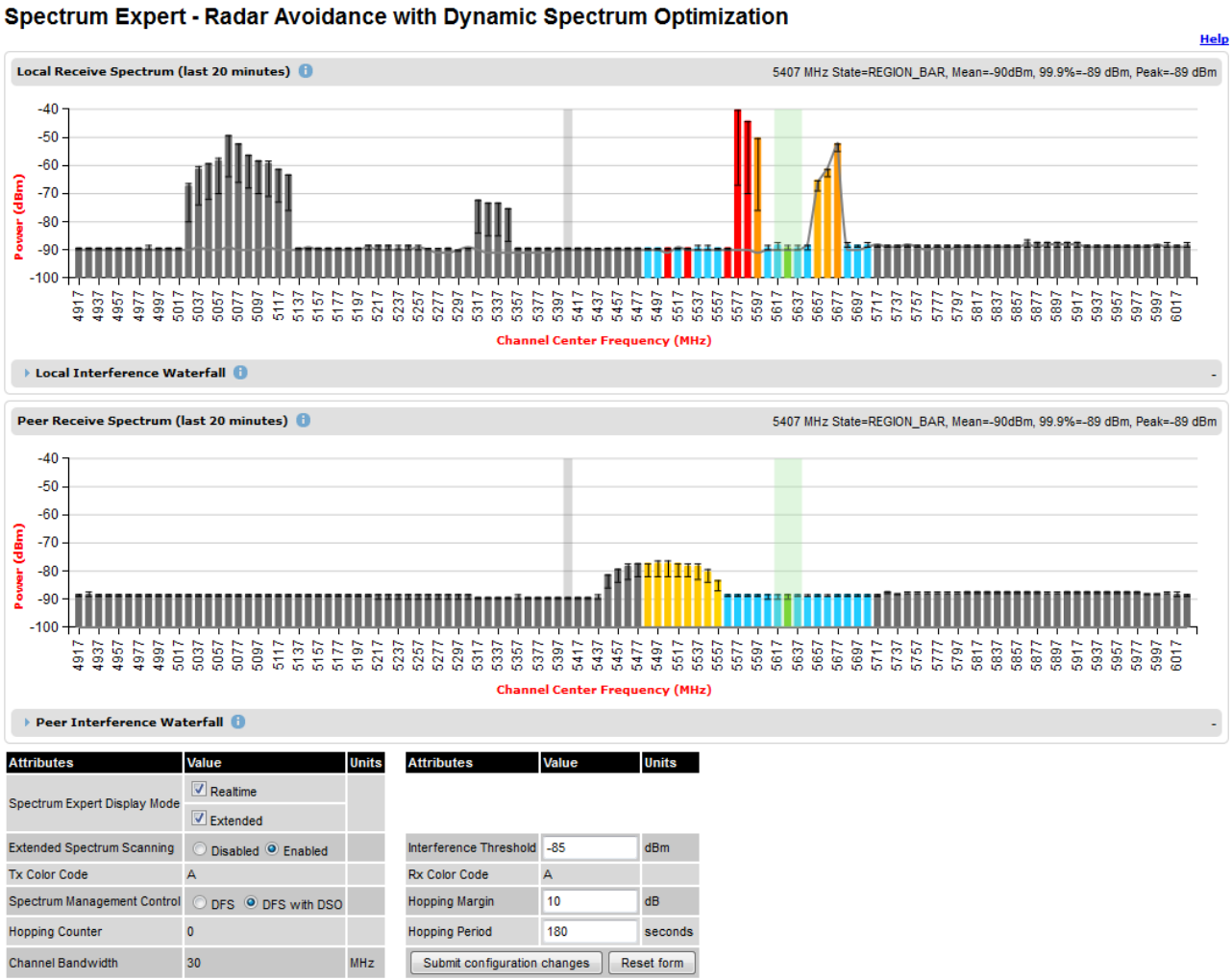
Metric	Description	How represented
	nature has a minimal effect of the mean of means.	
Realtime interference level	The arithmetic mean of the power measured during the last quantization period. The quantization period is two seconds.	Countinuous line.

Spectrum Expert page in fixed frequency mode

When the link is operating in fixed frequency mode, the Spectrum Expert page uses two visual cues (Figure 196). The main page title has the "`Fixed Frequency Mode`" suffix and the selected channels are identified by a red capital "F".

Figure 196 Spectrum Expert page for Fixed Frequency – Standard display mode

Figure 197 Spectrum Expert page for Fixed Frequency – Extended display mode



Channel barring is disabled in fixed frequency mode; it is not required as dynamic channel hopping is prohibited in this mode.

The only controls available to the master are the Spectrum Expert Display Mode and Interference Threshold attributes. They will have no effect on the operation of the wireless link and will only effect the generation of the channel spectrum graphics.

Spectrum Expert page in radar avoidance mode

When the link is operating in radar avoidance mode, the Spectrum Expert page (Figure 198) contains the following additional information:

- The main page title has the "`Radar Avoidance`" suffix.
- The only controls available to the master are the Interference Threshold attribute. This has no effect on the operation of the wireless link and will only affect the generation of the channel spectrum graphics.
- Extra color coding of the interference histogram is provided (Table 173).

Figure 198 Spectrum Expert page with radar avoidance – Standard Display

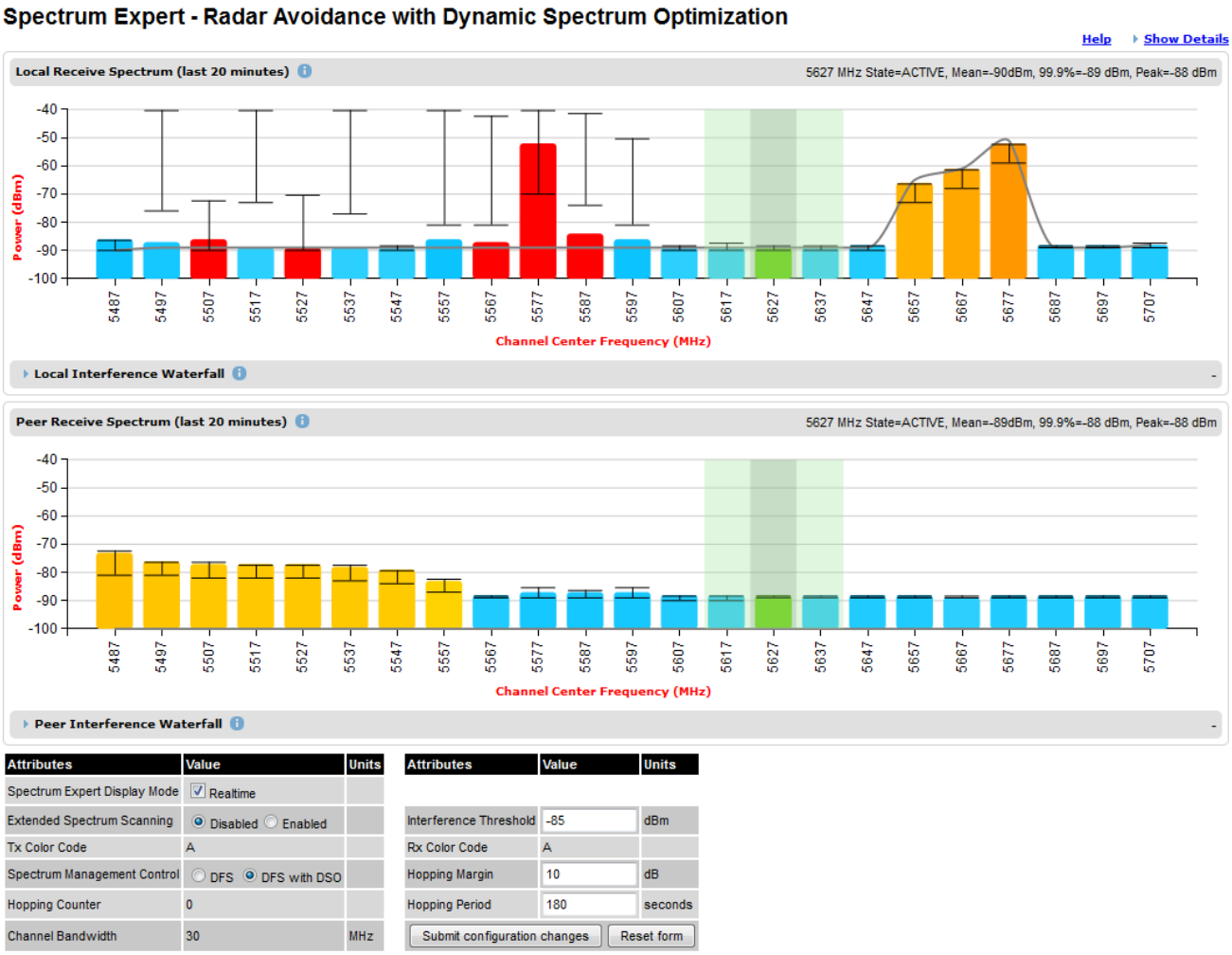
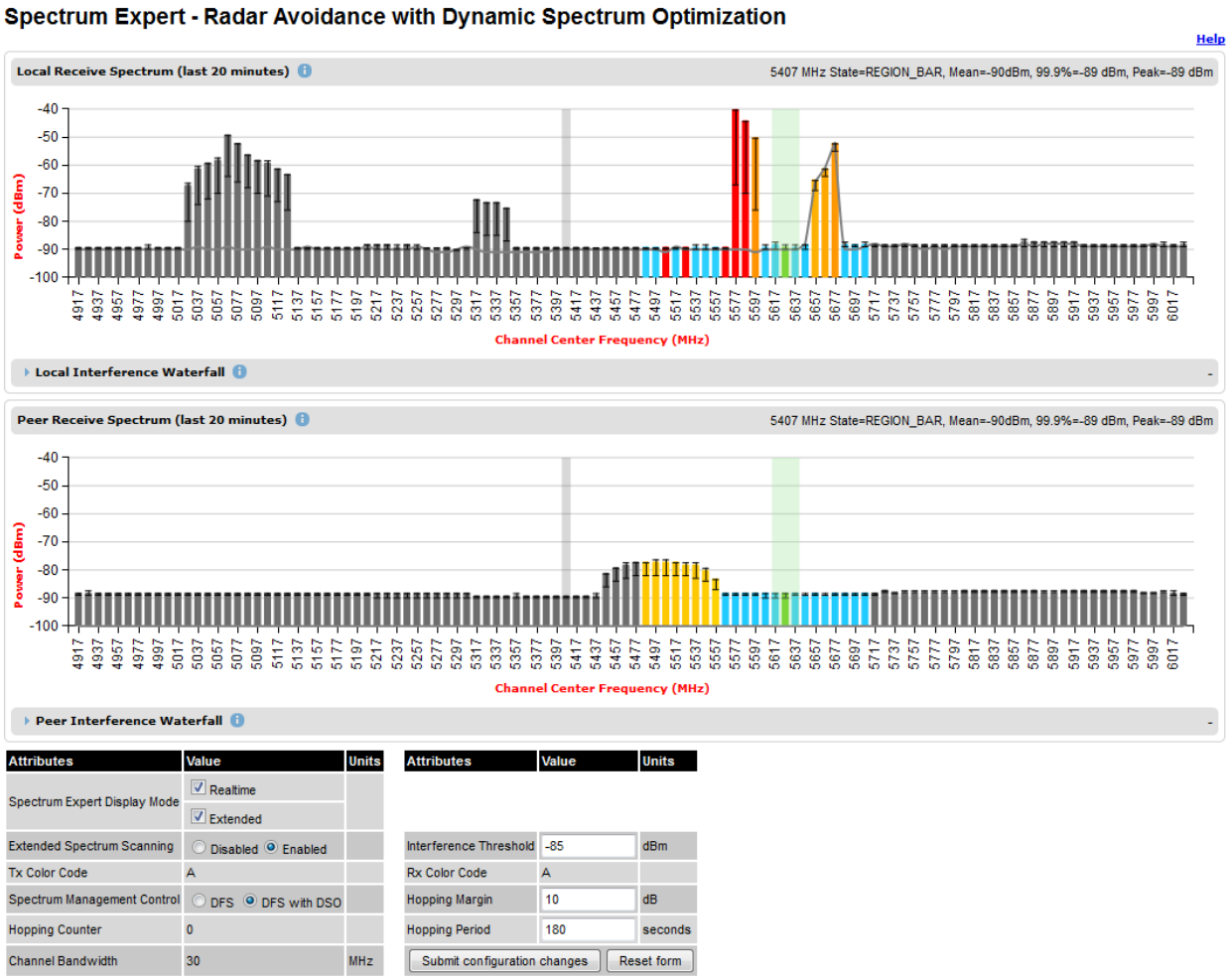


Figure 199 Spectrum Expert page with radar avoidance – Extended Display



When operating with RTTT (Road transport and Traffic Telematics) Avoidance enabled or other regulatory restrictions on channel usage, all channels marked with a “no entry” symbol with their associated statistics colored black are the prohibited channels. These channels are never used to host the wireless link, but CAC measurements are still taken so that adjacent channel biases can be calculated correctly and so the user can see if other equipment is in use.

Table 173 Channel states in the Spectrum Expert plot (radar avoidance)

Color	State and color	Meaning
Green	Active	This channel is currently in use hosting the Point-to-Point wireless link.
Orange	Interference	This channel has interference above the interference threshold

Color	State and color	Meaning
Blue	Available	This channel has an interference level below the interference threshold and is considered by the Spectrum Management algorithm suitable for hosting the Point-to-Point link
Dark grey	Barred	The system administrator has barred this channel from use. Because the low signal levels encountered when a unit is powered up in a laboratory environment prior to installation (which makes the grey of the channel bar difficult to see). An additional red “lock” symbol is used to indicate that a channel is barred.
Light grey	Unavailable	This channel needs to be monitored for one minute and found free of radar signal before it can be used for transmitting.
Red	Radar Detected	Impulsive Radar Interference has been detected on this channel and the channel is unavailable for 30 minutes. At the end of the 30 minute period a Channel Availability Check is required to demonstrate no radar signals remain on this channel before it can be used for the radio link.
Black	Region Bar	This channel has been barred from use by the local region regulator

Barring channels

To comply with FCC rules, bar any channels that may interfere with TDWR radars. This must be done before the units are allowed to radiate on site. The system designer will have provided a list of any affected channels, based on the instructions in Avoidance of weather radars (USA only) on page 3-24.

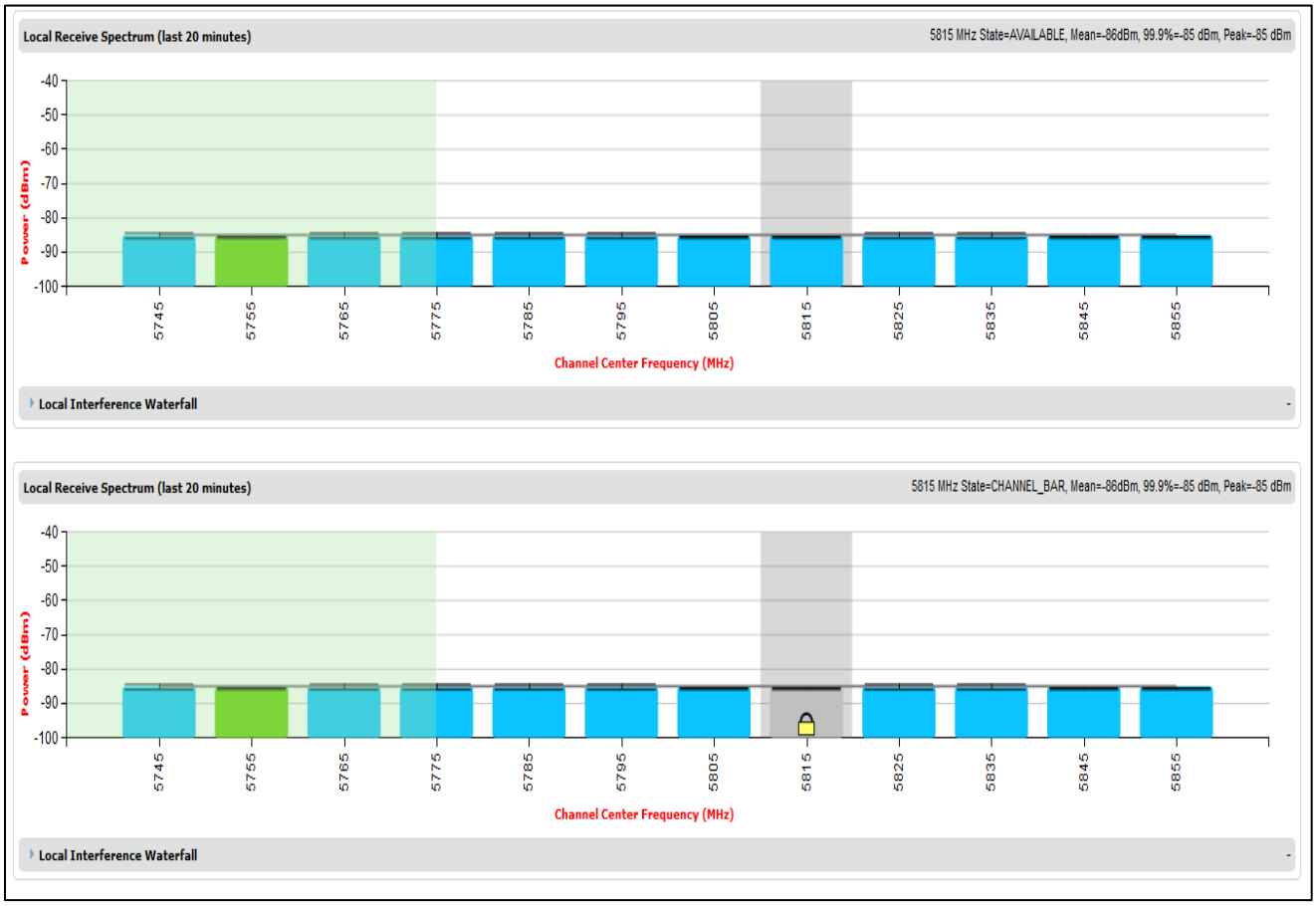
Procedure:

- Log into the Master unit.
- Select menu option **System > Spectrum Expert**. The Spectrum Expert page is displayed.
- Double click on the appropriate channel center frequencies on the Local or Peer Receive Spectrum plots. The example in Figure 200 shows how to bar one channel (5816 MHz).
- When the confirmation dialog is displayed, click **OK**.

Note

The channels cannot be barred in the extended view.

Figure 200 Barring a channel



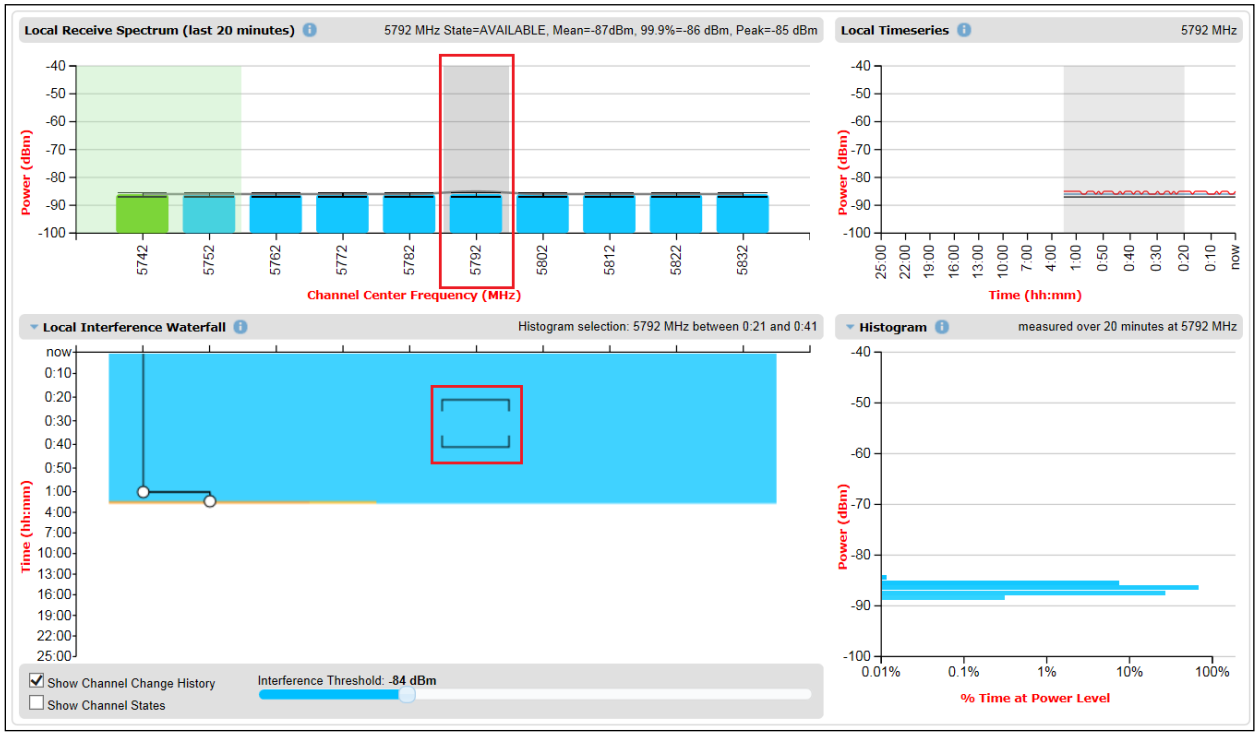
Selecting a Channel and a Time period

The Timeseries plot uses measurements for the selected channel. The Histogram plot uses measurements for the selected channel and the selected measurement period.

To select a channel on the Receive Spectrum Page, click within the plot, move the cursor horizontally to the channel you want to select and click to confirm the selection.

The Selected channel is shown with a grey background. The Selected Channel is centred on 5792 MHz in Figure 201.

Figure 201 Selecting a channel on the Receive Spectrum



To select a channel and a period on the Interference Waterfall, click within the plot, move the cursor horizontally to the channel you want to select, and vertically to the period you want to select, and click to confirm you selection.

The selected channel and period are shown graphically on the Interference Waterfall between two horizontal brackets, as show in Figure 201. They are also indicated in text form right above the Interference Waterfall.

Interpreting the timeseries plot

This plot displays the interference measurements of all previous measurement quantization periods for the selected channel, up to a maximum of 25 h (Figure 202).

The channel is selected as described in Selecting a Channel and a Time period. The center frequency of the selected channel is indicated in MHz at the top right of the Timeseries plot.

The colored lines represent interference measurements, with the color map provided in Table 174.

A white background indicates the measurement period which is used to generate the Receive Spectrum plot. Typically, only the last 20 min are used, although any period of time where the wireless link has been down is excluded.

Figure 202 Spectrum Expert, Timeseries plot

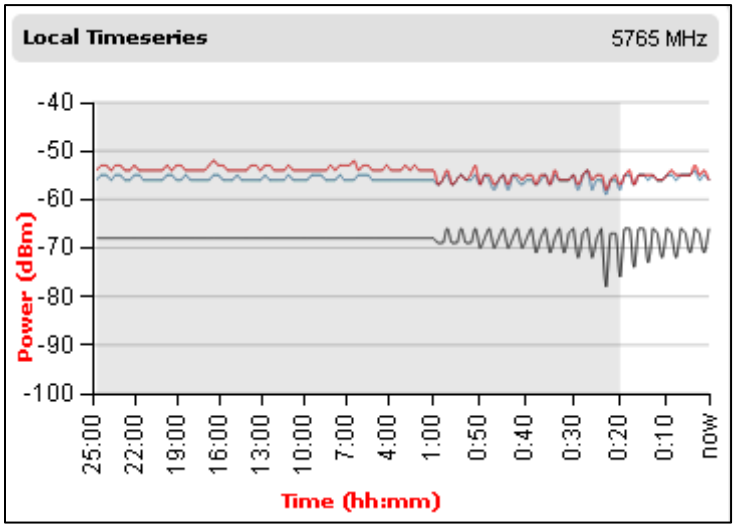


Table 174 Interference represented in the time series plot

Color	Meaning
RED	Peak of Means interference measurement
BLACK	99.9% percentile of means interference measurement
BLUE	Mean of Means interference measurement

Interpreting the Interference Waterfall plot

The Interference Waterfall indicates the level of interference for all the channels in the band over the last 25 h. Figure 203 shows a screen capture example.

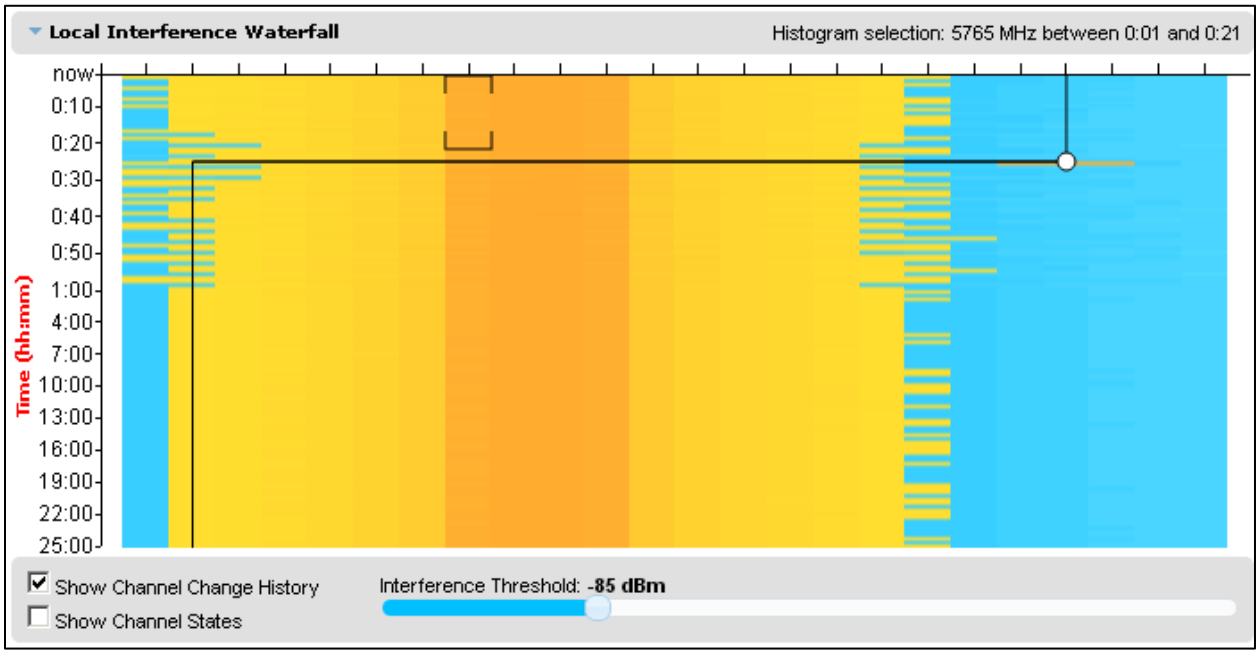
The channel and measurement period are selected as described in Selecting a Channel and a Time period on page 7-41 The center frequency of the selected channel and the time period are indicated at the top right of the Interefrence Waterfall plot.

The X-axis corresponds to the channel center frequency and is horizontally aligned with the Receive Spectrum plot.

The Y-axis corresponds to the time in the past in hours and minutes, with the most recent period being at the top of the plot.

Each channel and measurement period is indicated using the color scale given in Table 171.

Figure 203 Spectrum Expert, Interference Waterfall plot



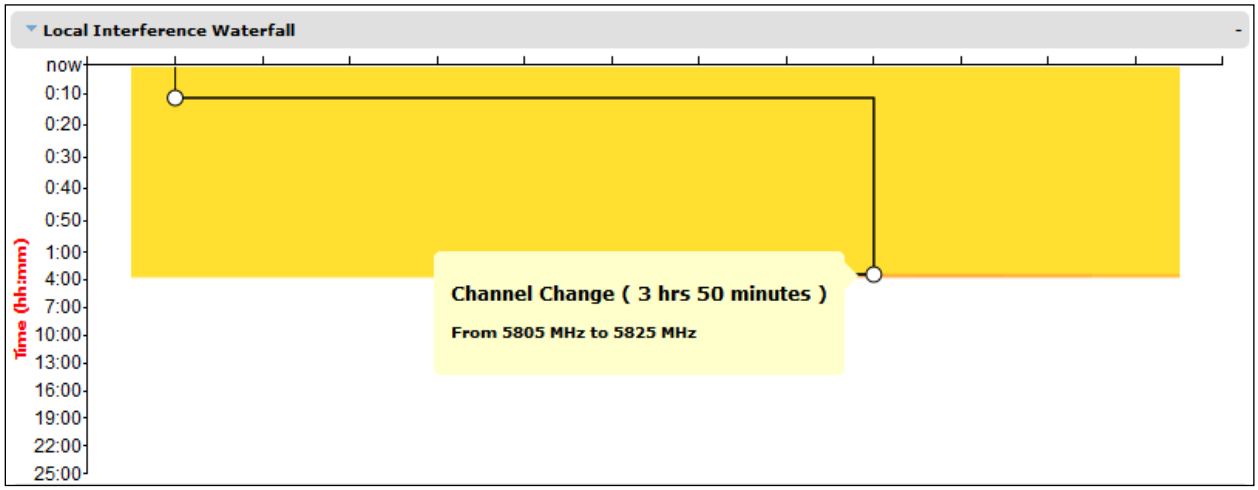
Setting the interference threshold

The interference threshold may be set using the sliding control located directly below the Interference Waterfall plot. This is an alternative to the method described in Spectrum Management Settings on page 7-31. For either method, the change to the Interference Threshold is not taken into account until the Submit button is clicked.

Viewing the active channel history

To display the active channel history, tick the Show Channel Change History control right below the Interference Waterfall plot. The active channel history over the last 25 hours is plotted as a black line overlay on the Interference Waterfall plot. A circle is displayed every time the active channel has changed. By hovering above the circle, the reason for the channel change is indicted, as shown in Figure 204.

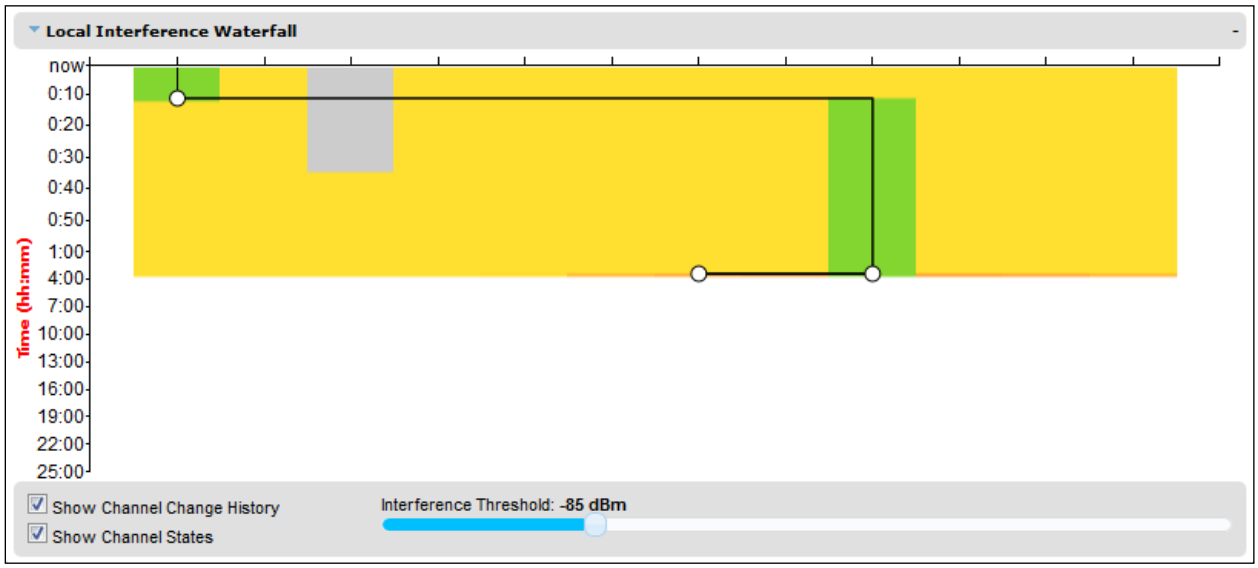
Figure 204 Spectrum Expert, Interference Waterfall with active channel history



Viewing the channel states

To display the Channel States, tick the Show Channel State control right below the Interference Waterfall plot. Figure 205 shows an example of the Interference Waterfall when the Channel States are displayed. The colors used are defined in Channel states on page 7-33.

Figure 205 Spectrum Expert page, Interference Waterfall plot with channel states



Interpreting the histogram plot

The histogram plot indicates the percentage of the measurements in the selected measurement period where the interference level for the selected channel is at a given level (Figure 206).

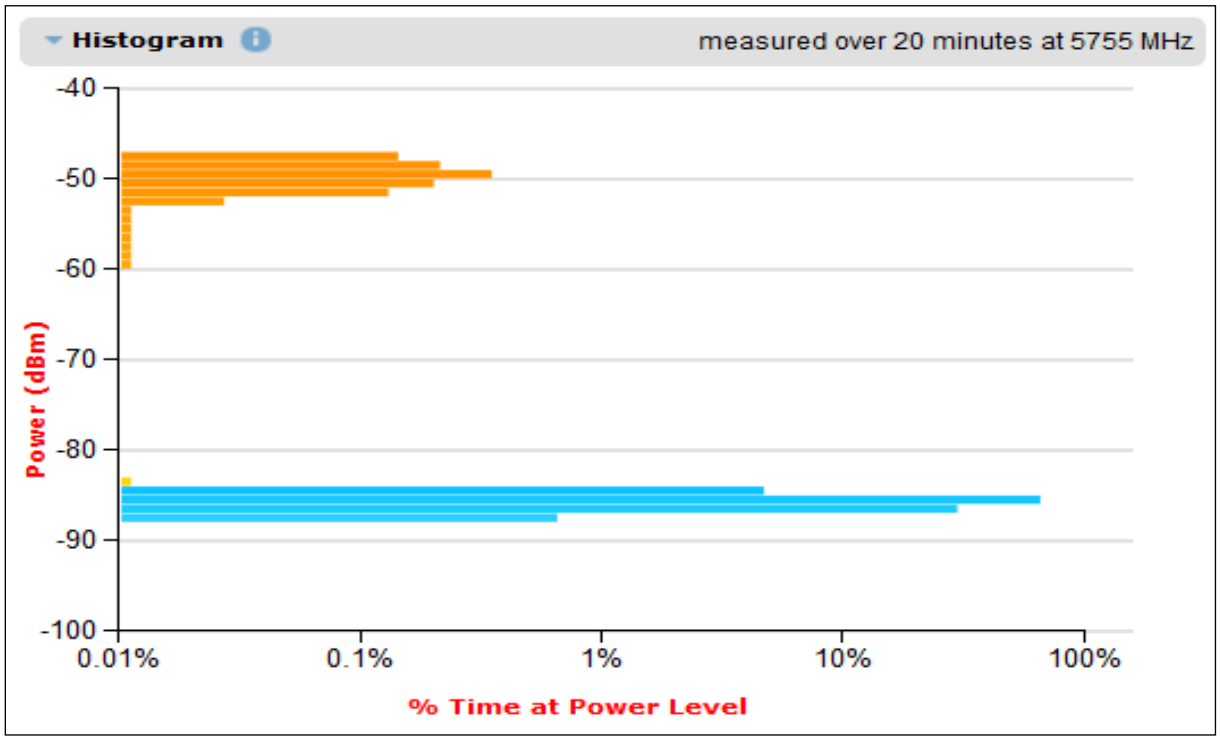
The channel and measurement period are selected as described in Selecting a Channel and a Time period on page 7-41 The combined selection is indicated graphically by a pair of brackets in the Waterfall plot, and in text form on the top right of the Histogram plot, as shown in Figure 205.

The X-axis corresponds to a percentage of the measurements in the measurement period on a logarithmic scale.

The Y-axis corresponds to actual interference level in dBm.

The bar for each each power level is of the same color as in the Interference Waterfall plot.

Figure 206 Spectrum Expert page, histogram plot



Managing security

This section describes the following procedures:

- Exiting FIPS 140-2 approved mode
- Zeroising critical security parameters

Other security configuration procedures are described in Security menu on page 6-93.

Exiting FIPS 140-2 approved mode

To exit from the FIPS 140-2 approved mode, install standard (non-FIPS) PTP 700 software.

Note

The critical security parameters (CSPs) are zeroized when the unit exits from the FIPS 140-2 approved mode.

Zeroizing critical security parameters

Use this procedure to zeroize Critical security parameters (CSPs) as follows:

- Key of keys.
- AES encryption keys for the wireless interface.
- Private key for the HTTPS/TLS interface.
- Entropy value for the HTTPS/TLS interface.
- User account passwords for the web-based interface.

Procedure:

- On the Security menu, click Zeroize CSPs.
- Click Select Zeroize CSPs and Reboot Wireless Unit.
- Confirm the reboot.

Note

Alternatively, select the Zeroize CSPs option in Recovery mode as described in Zeroize Critical Security Parameters on page 7-69

System statistics

This section describes how to use the system statistics pages to manage the performance of the PTP 700 link, use the following web pages:

System Statistics page

Menu option: **System > Statistics**. Use this page to check system statistics.

System histograms

The System Histograms section of the System Statistics page (Figure 207) contains eight diagnostic attributes that are presented as arrays of four elements (Table 175).

Figure 207 System Histograms section of the System Statistics page

System Statistics

Attributes	Value				Units
System Histograms					
Transmit Power	25.0,	17.5,	-15.0,	14.0	dBm
Receive Power	-37.2,	-64.0,	-110.0,	-51.3	dBm
Vector Error	7.2,	-19.6,	-31.0,	-29.4	dB
Link Loss	110.8,	79.6,	0.0,	107.3	dB
Signal Strength Ratio	0.7,	0.0,	-1.0,	0.0	dB
Transmit Data Rate	20.40,	14.73,	0.00,	20.40	Mbps
Receive Data Rate	20.40,	9.14,	0.00,	20.40	Mbps
Aggregate Data Rate	40.80,	23.88,	0.00,	40.80	Mbps
Histogram Measurement Period	00:07:46				

Reset System Histogram Measurement Period

The element arrays represent the following:

- Max: The maximum value measured over the last hour.
- Mean: The mean of a set of values recorded at one second intervals over the last hour.
- Min: The minimum value measured over the last hour.
- Latest: The latest value measured.

The values are calculated over the time that has elapsed since the link was established or since the measurement period was reset.

Use the Diagnostics Plotter page on page 7-61 to plot these attributes against time. Use the Generate Downloadable Diagnostics page on page 7-62 to extract historical data for these attributes to a CSV file.

Procedure:

- To reset and restart measurement, click **Reset System Histograms and Measurement Period**.

Table 175 System Histogram attributes in the System Statistics page

Attribute	Meaning
Transmit Power	The transmit power histogram, calculated over a one hour period.
Receive Power	The receive power histogram, calculated over a one hour period.
Vector Error	The vector error measurement compares (over a one hour period) the received signal IQ modulation characteristics to an ideal signal to determine the composite vector error magnitude.
Link Loss	Link loss calculated (over a one hour period) as follows: Peer_Tx_Power (dBm) – Local_Rx_Power (dBm) + 2 x Antenna_Pattern (dBi)
Signal Strength Ratio	The Signal Strength Ratio (calculated over a one hour period) is: Power received by the vertical antenna input (dB) ÷ Power received by the horizontal antenna input (dB) This ratio is presented as: max, mean, min, and latest. The max, min and latest are true instantaneous measurements; the mean is the mean of a set of one second means. Signal Strength Ratio is an aid to debugging a link. If it has a large positive or negative value then investigate the following potential problems: • An antenna coaxial lead may be disconnected. • When spatial diversity is employed, the antenna with the lower value may be pointing in the wrong direction. • When a dual polar antenna is deployed, the antenna may be directed using a side lobe rather than the main lobe. When there is a reflection from water on the link and spatial diversity is employed, then one expects large, slow swings in Signal Strength Ratio . This indicates the antenna system is doing exactly as intended.
Transmit, Receive and Aggregate Data Rates	The data rates in the transmit direction, the receive direction and in both directions, expressed in Mbps (max, mean, min, and latest). The max, min and latest are true instantaneous measurements. The mean is the mean of a set of one second means.
Histogram Measurement Period	The time over which the system histograms were collected.

System counters

The System Counters section of the System Statistics page (Figure 208) contains Data Port Counters (Table 176), Management Agent Counters (Table 178) and Wireless Port Counters and Performance Information (Table 179).

Figure 208 System Counters section of the System Statistics page

Attributes	Value	Units
Data Port Counters		
Tx Frames	197 (+197)	
Rx Frames	248 (+248)	
Second Data Port Counters		
Tx Frames	14 (+14)	
Rx Frames	3 (+3)	
Management Agent Counters		
Packets To Internal Stack	203 (+206)	
Packets From Internal Stack	293 (+293)	
Wireless Port Counters and Performance Information		
Tx Frames	100 (+100)	
Rx Frames	104 (+104)	
Link Symmetry	1 to 1	
Link Capacity	226.65	Mbps
Transmit Modulation Mode	256QAM 0.81 (Single) (30 MHz)	
Receive Modulation Mode	256QAM 0.81 (Dual) (30 MHz)	
Receive Modulation Mode Detail	Running At User-Configured Max Modulation Mode	
Wireless Link Availability	100.0000	%
Data Bridging Availability	100.0000	%
Byte Error Ratio	1.355e-8	
Counter Measurement Period	00:01:32	
	Reset System Counters	

Procedure:

- To reset all system counters to zero, click **Reset System Counters**.

The packet counter attributes each contain a number in parentheses; this shows the number of packets received since the last page refresh.

Table 176 Data Port Counters

Attribute	Meaning
Tx Frames	The total number of good frames the bridge has sent for transmission through the port selected for Data Service
Rx Frames	The total number of good frames the bridge has received through the port selected for Data Service

Table 177 Second Data Port Counters

Attribute	Meaning
Tx Frames	The total number of good frames the bridge has sent for transmission through the port selected for Second Data Service
Rx Frames	The total number of good frames the bridge has received through the port selected for Second Data Service

Table 178 Management Agent Counters

Attribute	Meaning
Packets To Internal Stack	The total number of good packets the bridge has transmitted to the internal stack (for example, ARP, PING and HTTP requests).
Packets From Internal Stack	The total number of good packets the bridge has received from the internal stack (ARP responses, PING replies, HTTP responses).

Table 179 Wireless Port Counters and Performance Information

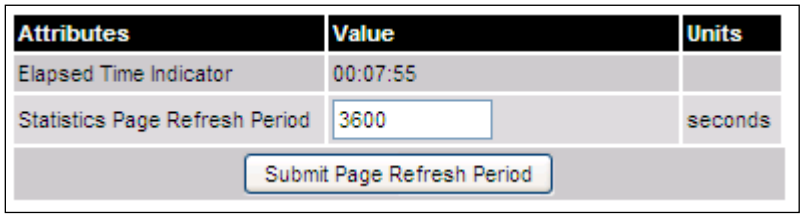
Attribute	Meaning
Tx Frames	Total number of good frames on the Data path, the bridge has sent for transmission through the wireless interface.
Rx Frames	Total number of good frames on the Data path, the bridge has received from the wireless interface.
Tx Frame Management	Total number of good managment frames, the bridge has sent for transmission through the wireless interface
Tx Frame Second Data	Total number of good frames on the Second Data path, the bridge has sent for transmission through the wireless interface
Link Symmetry	Ratio between transmit and receive time in the TDD frame. The first number is the time allowed for the transmit direction and the second number is the time allowed for the receive direction.
Link Capacity	The maximum aggregate data capacity available for user traffic under the current radio link conditions, assuming the units have been connected using Gigabit Ethernet. The sum of the displayed Transmit and Receive data rates may be lower than this figure if the link is not fully loaded by the current traffic profile.
Transmit Modulation Mode	The modulation mode currently being used on the transmit channel. The number in brackets after the modulation mode and coding rate string is the effective data rate available to all MAC layer protocols.

Attribute	Meaning
Receive Modulation Mode	The modulation mode currently being used on the receive channel. The number in brackets after the modulation mode and coding rate string is the effective data rate available to all MAC layer protocols.
Receive Modulation Mode Detail	The receive modulation mode in use. For a list of values and their meanings, see Table 159.
Wireless Link Availability	Wireless link availability calculated since the last system counters reset.
Ethernet Bridging Availability	Link availability for bridging Ethernet traffic calculated since the last reset of the system counters. This is the percentage of time in which the Ethernet Bridging Status attribute has been set to "Enabled".
Byte Error Ratio	The ratio of detected Byte errors to the total number of bytes since the last system reboot. This measurement is made continually using null frames when there is no user data to transport.
Counter Measurement Period	The time over which the system counters were collected.

Other attributes

The bottom section of the System Statistics page (Figure 209) contains two attributes (Table 180).

Figure 209 Other attributes section of the System Statistics page



Procedure:

- After updating the Statistics Page Refresh Period field, click **Submit Page Refresh Period**.

Table 180 Other attributes in the System Statistics page

Attribute	Meaning
Elapsed Time Indicator	Elapsed time since the last system reboot.
Statistics Page Refresh Period	The statistics page refreshes automatically according to the setting entered here (in seconds).

Wireless Port Counters page

Menu option: **System > Statistics > Wireless Port Counters** (Figure 210).

Use this page to check the Ethernet performance of the wireless bridge.

Figure 210 Wireless Port Counters page

Wireless Port Counters

Attributes	Value	Units	Attributes	Value	Units
Tx Frames	132 (+32)		Rx Frames	491 (+387)	
			Rx Frames With Crc Error	0 (+0)	
Tx Frames Q0	0 (+0)		Rx Frames Q0	0 (+0)	
Tx Frames Q1	125 (+125)		Rx Frames Q1	160 (+160)	
Tx Frames Q2	0 (+0)		Rx Frames Q2	0 (+0)	
Tx Frames Q3	0 (+0)		Rx Frames Q3	0 (+0)	
Tx Frames Q4	0 (+0)		Rx Frames Q4	0 (+0)	
Tx Frames Q5	0 (+0)		Rx Frames Q5	0 (+0)	
Tx Frames Q6	0 (+0)		Rx Frames Q6	0 (+0)	
Tx Frames Q7	7 (+7)		Rx Frames Q7	331 (+331)	
Tx Drops Q0	0 (+0)				
Tx Drops Q1	0 (+0)				
Tx Drops Q2	0 (+0)				
Tx Drops Q3	0 (+0)				
Tx Drops Q4	0 (+0)				
Tx Drops Q5	0 (+0)				
Tx Drops Q6	0 (+0)				
Tx Drops Q7	0 (+0)				
Tx Frames Second Data	3 (+3)		Rx Frames Second Data	198 (+198)	
Tx Drops Second Data	0 (+0)				

Attributes	Value	Units	Attributes	Value	Units
Counter Page Refresh Period	3600	seconds	Counter Measurement Period	00:05:36	
Submit Page Refresh Period			Reset System Counters		

Note

If the ODU is configured for OOB Remote Management Service, the OOB Management counters will be displayed instead of Second Data counters (i.e. Tx Frames Management → Tx Frames Second Data, Tx Drops Management → Tx Drops Second Data, and Rx Frames Management → Rx Frames Second Data)

Procedure:

- Review the attributes (Table 181).
- To change the refresh period, update the Counter Page Refresh Period attribute and click **Submit Page Refresh Period**.
- To reset all counters to zero, click **Reset System Counters**.

Table 181 Wireless Port Counters attributes

Attribute	Meaning
Tx/Rx Frames	Number of frames transmitted and received over the wireless bridge.
Rx Frames With Crc Error	Number of received frames with CRC errors.
Tx/Rx Frames Q0…Q7	Number of transmitted and received frames for each Traffic Class.
Tx Drops Q0…Q7	Number of transmitted frames dropped for each Traffic Class.
Rx Drops Q0…Q7	Total number of frames dropped due to the lack of sufficient capacity in the receive buffer, for each Traffic Class.
Rx Frames Second Data	Total number of frames received at the wireless port in the Out-of-Band management queue

Main Port Counters page

Menu option: **System > Statistics > Main Port Counters** (Figure 211). Use this page to check the Ethernet performance of the PSU port. The displayed counters vary depending on which port is being used to bridge the traffic.

Figure 211 Main Port Counters page (when main port is bridging traffic)

Main Port Counters

Attributes	Value	Units
Tx Octets	684,506 (+684,506)	
Tx Frames	6,177 (+2)	
Tx Drops	0 (+0)	
Tx Broadcasts	5,368 (+5,368)	
Tx IEEE1588 Event Frames	0 (+0)	
Tx Frames 64 Bytes	5,912 (+5,912)	
Tx Frames 65 To 127 Bytes	41 (+41)	
Tx Frames 128 To 255 Bytes	17 (+17)	
Tx Frames 256 To 511 Bytes	6 (+6)	
Tx Frames 512 To 1023 Bytes	4 (+4)	
Tx Frames 1024 To 1600 Bytes	197 (+197)	
Tx Frames 1601 To Max Bytes	0 (+0)	

Attributes	Value	Units
Rx Octets	398,584 (+398,584)	
Rx Frames	6,044 (+2)	
Rx Frames With Crc Error	0 (+0)	
Rx Broadcasts	5,554 (+5,554)	
Rx IEEE1588 Event Frames	0 (+0)	
Rx Frames Undersize	0 (+0)	
Rx Frames 64 Bytes	5,968 (+5,968)	
Rx Frames 65 To 127 Bytes	57 (+57)	
Rx Frames 128 To 255 Bytes	2 (+2)	
Rx Frames 256 To 511 Bytes	11 (+11)	
Rx Frames 512 To 1023 Bytes	2 (+2)	
Rx Frames 1024 To 1600 Bytes	4 (+4)	
Rx Frames 1601 To Max Bytes	0 (+0)	
Rx Frames Oversize	0 (+0)	
Rx Pause Frames	0 (+0)	

Attributes	Value	Units
Counter Page Refresh Period	3600	seconds

Submit Page Refresh Period

Attributes	Value	Units
Counter Measurement Period	00:08:09	

Reset System Counters

Procedure:

- Review the attributes (Table 182).
- To change the refresh period, update the Counter Page Refresh Period attribute and click **Submit Page Refresh Period**.
- To reset all counters to zero, click **Reset System Counters**.

Table 182 Main Port Counters attributes

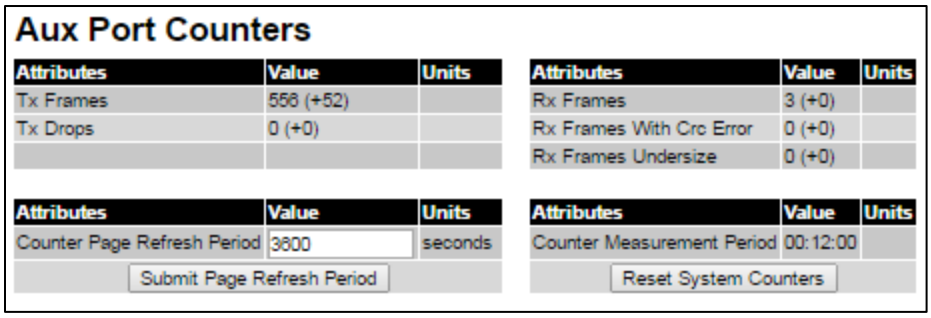
Attribute	Meaning
Tx/Rx Octets	Total number of octets (bytes) transmitted and received over the interface.
Tx/Rx Frames	Total number of frames transmitted and received over the interface. This includes both good and bad frames.
Tx Drops	Total number of transmit frames dropped.
Rx Frames With Crc Error	Total number of received frames with CRC errors.
Tx/Rx Broadcasts	Total number of good transmitted and received broadcast packets.
Tx/Rx IEEE1588 Event Frames	Only displayed when IEEE 1588 Transparent Clock is enabled. Total number of transmitted or received IEEE 1588 Event frames
Tx/Rx Frames TDM	Only displayed when TDM is enabled. Total number of transmitted or received TDM (E1 or T1) frames.
Rx Frames Undersize	Total number of frames received that are less than 64 bytes.
Tx/Rx Frames 64 Bytes	Total number 64 byte frames transmitted and received.
Tx/Rx Frames xxxx to yyyy Bytes	Total number of frames transmitted and received in the size range xxxx to yyyy bytes.
Tx/Rx Frames 1601 to Max bytes	Total number of frames transmitted and received in the size range 1601 to maximum bytes.
Rx Frames Oversize	Total number of frames received that are greater than the maximum number of bytes.
Rx Pause Frames	Total number of received pause frames.

Aux Port Counters page

Menu option: System > Statistics > **Aux Port Counters** (Figure 212).

Use this page to check the Ethernet performance of the Aux port.

Figure 212 Aux Port Counters page (when Aux port is is allocated to the Local Management Service)



Procedure:

- Review the attributes (Table 183).
- To change the refresh period, update the Counter Page Refresh Period attribute and click **Submit Page Refresh Period**.
- To reset all counters to zero, click **Reset System Counters**.

Table 183 Aux Port Counters attributes

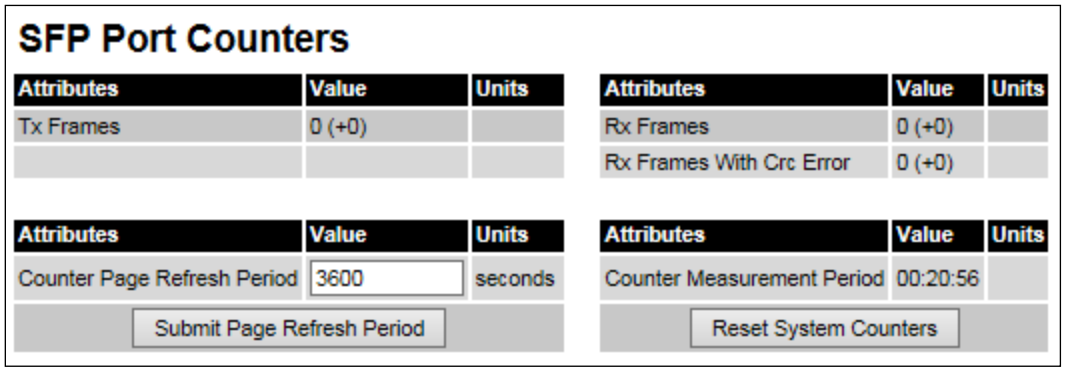
Attribute	Meaning
Tx/Rx Frames	Total number of frames transmitted and received over the interface. This includes both good and bad frames.
Rx Frames With Crc Error	Total number of received frames with CRC errors.
Tx Drops	Number of frames dropped due to excessive collision, late collision or frame ageing
Rx Frames Undersize	Number of short frames (<64 Bytes) with or without a valid CRC

SFP Port Counters page

Menu option: System > Statistics > **SFP Port Counters** (Figure 213).

Use this page to check the Ethernet performance of the SFP port.

Figure 213 SFP Port Counters page (when SFP port is allocated to the Local Management Service)



Procedure:

- Update the attributes (Table 184).
- To change the refresh period, update the Counter Page Refresh Period attribute and click **Submit Page Refresh Period**.
- To reset all counters to zero, click **Reset System Counters**.

Table 184 SFP Port Counters attributes

Attribute	Meaning
Tx/Rx Frames	Total number of frames transmitted and received over the interface. This includes both good and bad frames.
Rx Frames With Crc Error	Total number of received frames with CRC errors.

SyncE Status page

Menu option: System > Statistics > **SyncE Status**

Use this page to monitor the state of the Synchronous Ethernet function.

Note

When TDM is enabled (TDM Configuration page on page 6-50), the following restrictions are automatically applied:

- The SyncE Status page is hidden.
- Main PSU Port Sync E Master Slave Status is set to **Master**.
- Main PSU Port Gigabit Master Slave Status is set to **Master**.

Figure 214 SyncE Status page

SyncE Status

Attributes	Value	Units	Attributes	Value	Units
Sync E Tracking State	Locked Local, Holdover Acquired				
Main PSU Port					
Main PSU Port Accepted QL Rx	QL-PRC		Main PSU Port Sync E Rx Status	Good	
Main PSU Port QL Rx	QL-PRC		Main PSU Port Sync E Master Slave Status	Slave	
Main PSU Port QL Tx	QL-DNU / QL-DUS		Main PSU Port Gigabit Master Slave Status	Slave	
Aux Port					
Aux Port QL Rx	None		Aux Port Sync E Master Slave Status	Master	
Aux Port QL Tx	QL-PRC		Aux Port Gigabit Master Slave Status	Not Applicable	
SFP Port					
SFP Port QL Rx	None		SFP Port Sync E Master Slave Status	Master	
SFP Port QL Tx	None		SFP Port Gigabit Master Slave Status	Slave	
Page Refresh Period	3	Seconds	Submit Page Refresh Period		

Procedure:

- Review the attributes
- To change the refresh period, update the Page Refresh Period attribute and click **Submit Page Refresh Period**

Table 185 Sync E Status attributes

Attribute	Meaning
Sync E Tracking State	The state of the Synchronous Ethernet state machine. See Table 186 for further details.
Main PSU Port Accepted QL Rx	The "accepted" QL received by the Main PSU Port. This should be the same as Main PSU Port QL Rx, unless: • an "Overwrite" has been configured • the system is starting up or recovering from an exception
Main PSU Port QL Rx	The QL currently being received at the Main PSU Port
Main PSU Port QL Tx	The QL currently being transmitted at the Main PSU Port
Main PSU Port SyncE Rx Status	The overall status of the incoming synchronous Ethernet signal on the Main PSU port. This port is available as a valid synchronization source if the status is **Good**. The port may potentially be a valid source in the near future if the status is **Wait-to-Restore**.
Main PSU Port Sync E Master Slave Status	This attribute indicates if the Main PSU Port is operating as a Synchronous Ethernet master (providing a source of timing for downstream devices) or slave (receiving a source of timing from an upstream device).
Main PSU Port Gigabit Master Slave Status	This attribute indicates if the Main PSU Port's Gigabit Ethernet physical interface is operating as a master (generating a clock) or slave (locking to a clock generated at the other end of the Ethernet link).
Aux Port QL Rx	The QL currently being received on the Aux Port
Aux Port Accepted QL Rx	The "accepted" QL received by the Aux Port. This should be the same as Aux Port QL Rx, unless the system is starting up or recovering from an exception
Aux Port QL Tx	The QL currently being transmitted at the Aux Port
Aux Port Sync E Master Slave Status	The Aux Port operates as a Synchronous Ethernet master (providing a source of timing for downstream devices).
Aux Port Gigabit Master Slave Status	This attribute indicates if the Aux Port's Gigabit Ethernet physical interface is operating as a master (generating a clock) or slave (locking to a clock generated at the other end of the Ethernet link).
SFP Port QL Rx	The QL currently being received on the SFP Port
SFP Port Accepted QL Rx	The "accepted" QL received by the SFP Port. This should be the same as SFP Port QL Rx, unless the system is starting up or recovering from an exception

Attribute	Meaning
SFP Port QL Tx	The QL currently being transmitted at the SFP Port
SFP Port Sync E Master Slave Status	The Aux Port operates as a Synchronous Ethernet master (providing a source of timing for downstream devices).
SFP Port Gigabit Master Slave Status	This attribute indicates if the SFP Port's Gigabit Ethernet physical interface is operating as a master (generating a clock) or slave (locking to a clock generated at the other end of the Ethernet link).

The "Sync E Tracking State" attribute can take the following values:

Table 186 Sync E Tracking State

Value	Meaning
Disabled	The synchronous Ethernet feature is disabled.
Acquiring Wireless Lock	Synchronous Ethernet is not operational because real-time clocks have not completed alignment.
Free Running	Synchronous Ethernet is operational, but with no timing source or history. This is a temporary state.
Locked Local, Acquiring Holdover	Sync E tracking has locked to a synchronisation signal from a cabled Ethernet port on the local ODU. This is a temporary state until the unit has acquired holdover history.
Locked Local, Holdover Acquired	Sync E tracking has locked to a synchronisation signal from a cabled Ethernet port on the local ODU and has acquired holdover history.
Holdover	There is currently no source for the tracking loop, but previously the tracking loop was in a Locked, Holdover Acquired state. The system is using the last known good frequency.
Locked Remote, Acquiring Holdover	The tracking loop has locked to a synchronisation signal from the remote ODU. This is a temporary state until the unit has acquired holdover history.
Locked Remote, Holdover Acquired	The tracking loop has locked to a synchronisation signal form the remote ODU and has acquired holdover history.

In normal operation, with the Synchronous Ethernet feature enabled and a valid timing source present, one end of the link should be in the "Locked Local, Holdover Acquired State", the other end should be in the "Locked Remote, Holdover Acquired" state.

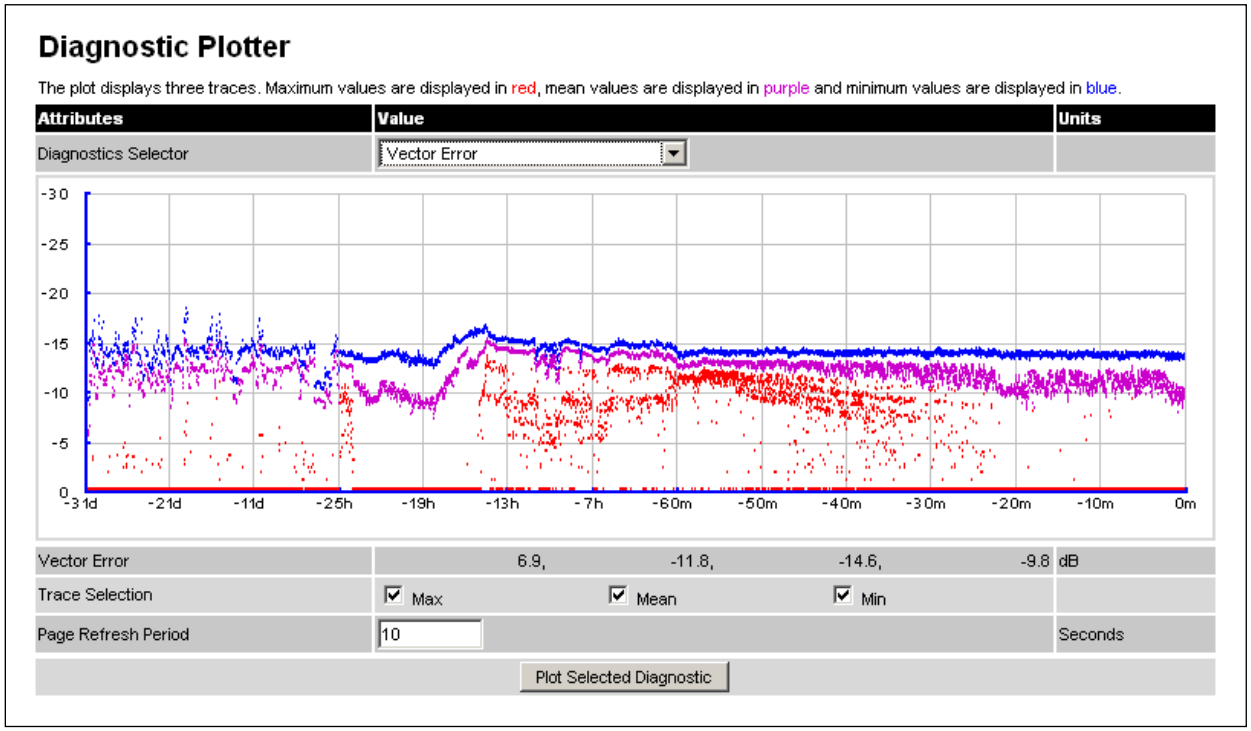
The Sync E Tracking State attribute remains in the Acquiring Wireless Lock state for a period of time after the wireless link has established whilst the two ODUs establish precise synchronization. The duration of this period depends on channel bandwidth, varying from less than one minute at 45 MHz, up to two minutes for 5 MHz.

Diagnostics Plotter page

Menu option: **System** > **Diagnostics Plotter** (Figure 215).

Use this page to monitor the performance of an operational PTP 700 link over time.

Figure 215 Diagnostic Plotter page



Procedure:

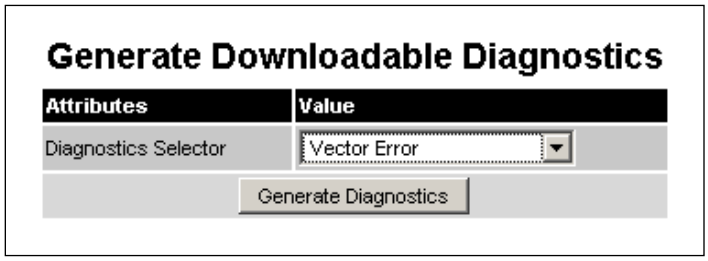
- Select a diagnostic from the Diagnostics Selector drop-down list. These are the same as the System Histogram attributes in the System Statistics page (Table 175).
- Tick the required Trace Selection boxes: Max, Mean and Min.
- Update the Page Refresh Period as required. The default period is 3600 seconds (1 hour). To monitor the performance of a link in real time, select a much shorter period, for example 60 seconds.
- Click **Plot Selected Diagnostic**. The selected diagnostic trace is displayed in the graph. Maximum values are displayed in red, mean values are displayed in purple and minimum values are displayed in blue.

Generate Downloadable Diagnostics page

Menu option: **System > Diagnostics Plotter > CSV Download** (Figure 216).

Use this page to download diagnostics data to a CSV file.

Figure 216 Generate Downloadable Diagnostics page



Procedure:

- Select a diagnostic from the Diagnostics Selector drop-down list.
- Click **Generate Diagnostics**. The Generate Downloadable Diagnostics page is redisplayed with the name of the generated CSV file.
- Click on the CSV file name and save the CSV file to the hard drive of the local computer.
- Open the CSV file in MS Excel and use it to generate reports and diagrams. The CSV file contains at most 5784 entries, recorded over a 32 day period:
  - 3600 entries recorded in the last hour.
  - 1440 entries recorded in the previous 24 hours.
  - 744 entries recorded in the previous 31 days.

Recovery mode

This section describes how to recover a PTP 700 unit from configuration errors or software image corruption.

Entering recovery mode

Use this procedure to enter recovery mode manually.

Note
The unit may enter recovery mode automatically, in response to some failures.

Note
Once the unit has entered recovery, it will switch back to normal operation if no access has been made to the recovery web page within 30 seconds.

Procedure:

1. Apply power to PSU for at least 10 seconds.
2. Remove power for two seconds.
3. Re-apply power to the PSU.
4. When the unit is in recovery mode, access the web interface by entering the default IP address **169.254.1.1**. The Recovery Image Warning page is displayed:

5. Click on the warning page image. The Recovery Option Page is displayed (Figure 217).
6. Review the Software Version and Recovery Reason (Table 187).
7. Select a recovery option (Table 188).

Figure 217 Recovery Options page

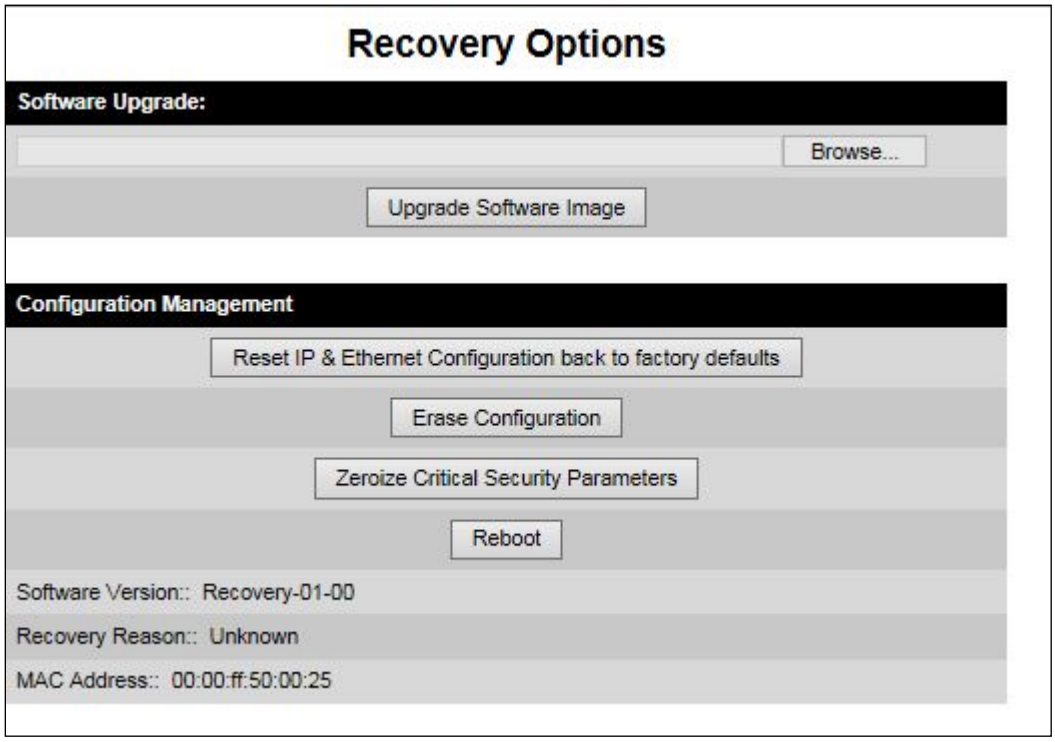


Table 187 Recovery Options attributes

Attribute	Meaning
Software Version	The software version of the recovery operating system permanently installed during manufacture.
Recovery Reason	The reason the unit is operating in Recovery mode, for example “Invalid or corrupt image”. “Unknown” usually means there has been a power outage.
MAC Address	The MAC address of the unit programmed during manufacture.

Table 188 Recovery Options buttons

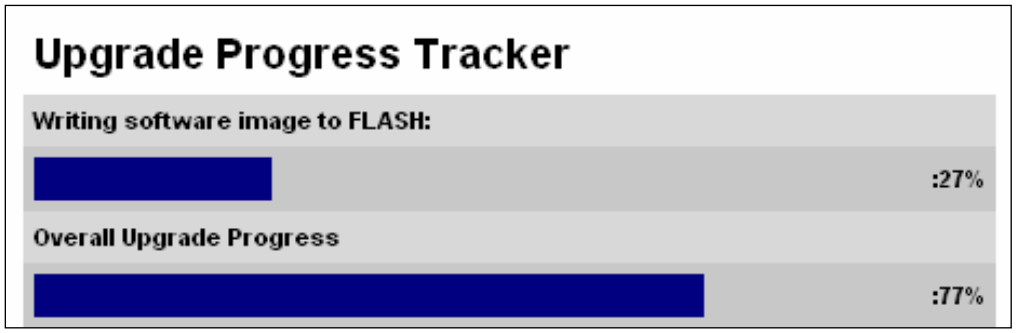
Button	Purpose
Upgrade Software Image	Use this option to restore a working software version when software corruption is suspected, or when an incorrect software image has been loaded. Refer to Upgrading software image on page 7-65.
Reset IP & Ethernet Configuration back to factory defaults	Use this option to reset the IP and Ethernet attributes to factory defaults. Refer to Resetting IP & Ethernet configuration on page 7-66.
Erase Configuration	Use this option to reset the entire configuration of the unit to factory defaults. Refer to Resetting all configuration data on page 7-67.
Zeroize Critical Security Parameters	Use this option to reset the security configuration to default values. Refer to Zeroize Critical Security Parameters on page 7-69.
Reboot	Use this option to reboot the unit. Refer to Rebooting the unit on page 7-70.

Upgrading software image

Use this option to restore a working software image from the Recovery Options page (Figure 217).

Procedure:

1. Click **Browse**.
2. Navigate to the required software image. This may be the most recent image if software corruption is suspected, or an older image if an incorrect image has just been loaded. Click on the image and click **Open**.
3. Click **Upgrade Software Image**. The Confirmation page is displayed. Click **Program Software Image into Non-Volatile Memory**. The Upgrade Progress Tracker page is displayed:



4. When the Software Upgrade Complete page is displayed, check that the correct image has been downloaded:

5 Click **Reboot Wireless Unit**. When the "`Are you sure?`" message is displayed, click **OK**.

6 The unit will now reboot and restart in normal operational mode, and the link should recover. If the unit or link fails to recover, refer to Testing link end hardware on page 8-7.

Note

The unit will not upload FIPS versions of the software unless the unit has the AES encryption and FIPS licenses installed.

Note

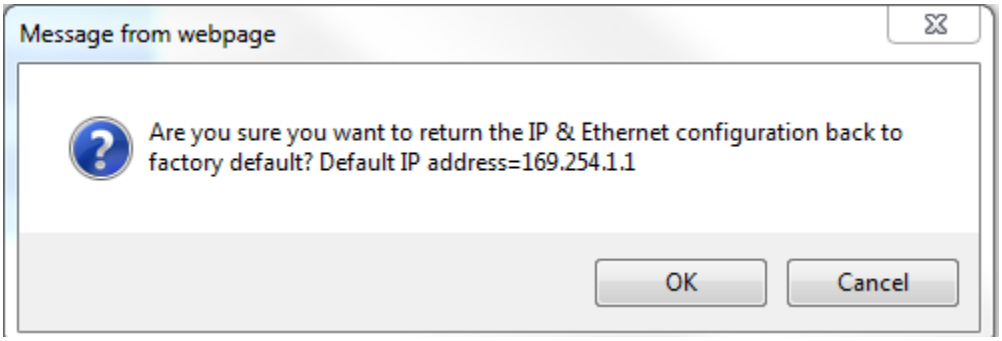
CSPs are automatically zeroized if FIPS software is loaded in a unit to replace standard (non-FIPS) software, or standard (non-FIPS) software is loaded in a unit to replace FIPS software.

Resetting IP & Ethernet configuration

Use this option in the Recovery Options page to reset IPv4, IPv6 and Ethernet configuration to default values (Figure 217). This procedure resets the IP Version attribute to **IPv4**. It also resets the IPv6 configuration.

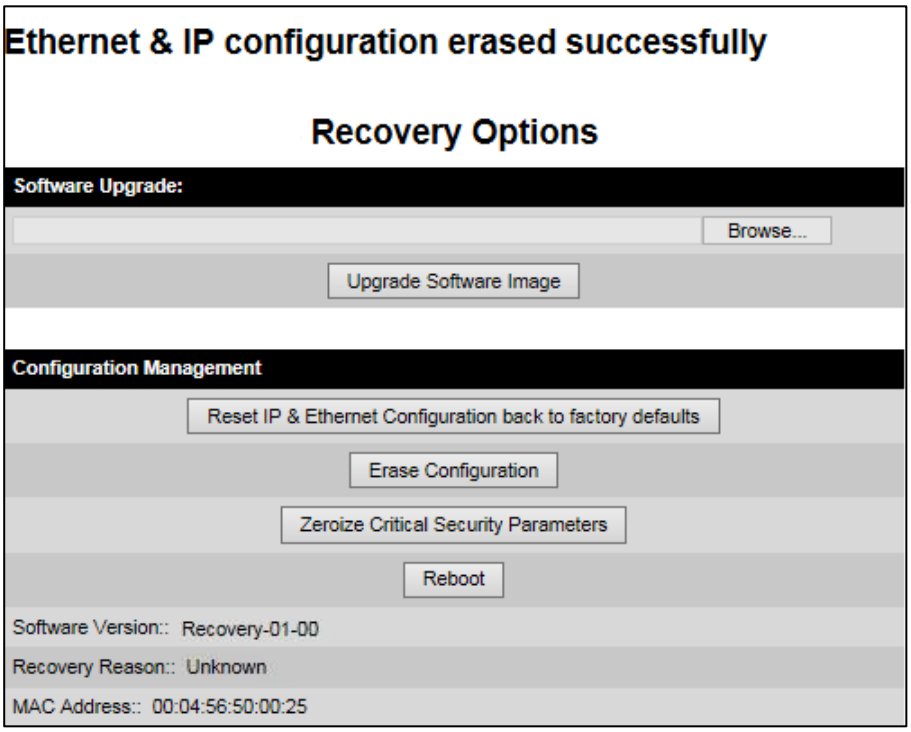
Procedure:

1 Click **Reset IP & Ethernet Configuration back to factory defaults**. The reset pop up box is displayed:



2 Record the IP address, as it will be needed to log into the unit after recovery.

3 Click **OK**. The reset confirmation page is displayed:



4 Click **Reboot**. When the "`Are you sure you want to REBOOT this unit?`" message is displayed, click **OK**.

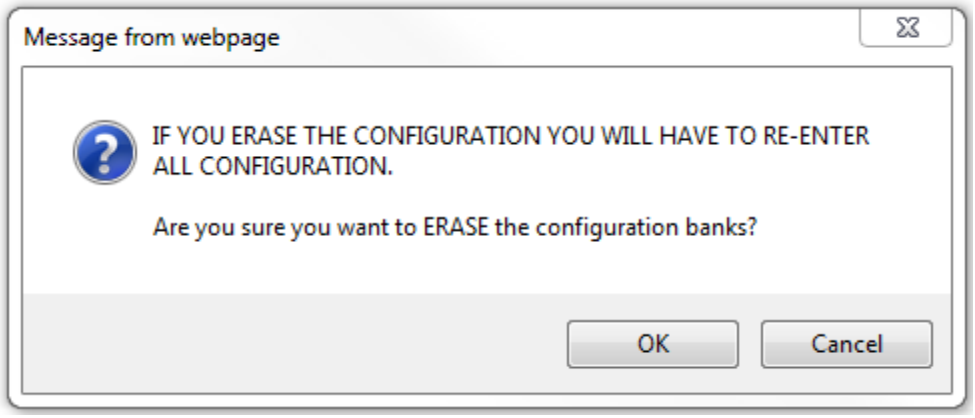
5 The unit will now reboot. The unit should now start up in normal mode but with the IP and Ethernet configuration reset to factory defaults. If the unit fails to recover, refer to Testing link end hardware on page 8-7 and Cable Diagnostics on page 8-2.

Resetting all configuration data

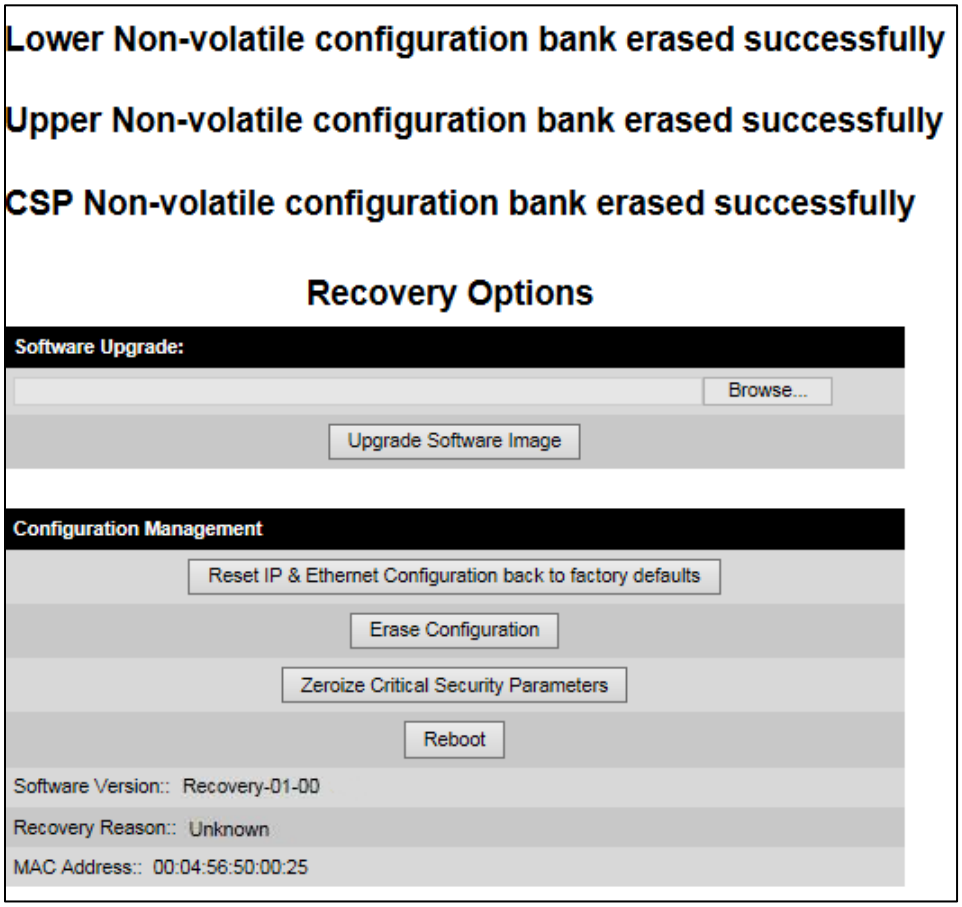
Use this option in the Recovery Options page to reset the entire configuration of the unit (including IP, Ethernet and CSPs) to default values (Figure 217).

Procedure:

1 Click **Erase Configuration**. The erase pop up box is displayed:



2 Click **OK**. The erase confirmation page is displayed:



3 Click **Reboot**. When the confirmation message is displayed, click **OK**.

4 The unit reboots and starts up in normal mode but with all configuration reset to default values. If the unit fails to start up, refer to Testing link end hardware on page 8-7 and and Cable Diagnostics on page 8-2.

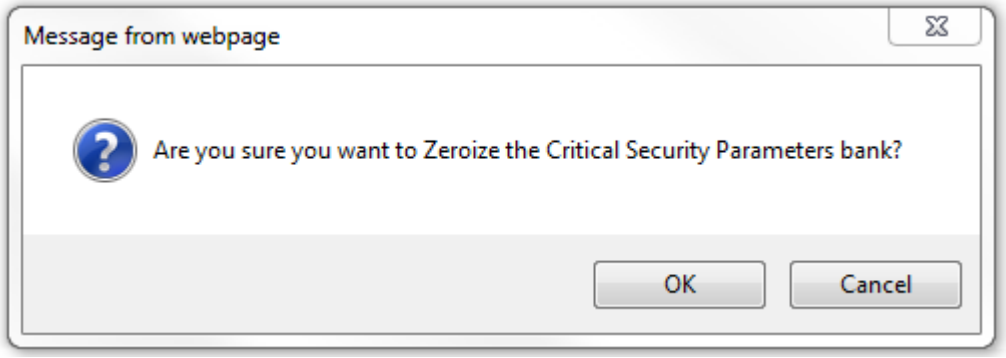
Zeroize Critical Security Parameters

Use this option in the Recovery Options page to reset the security configuration of the unit to default values (Figure 217). This action includes the following attributes:

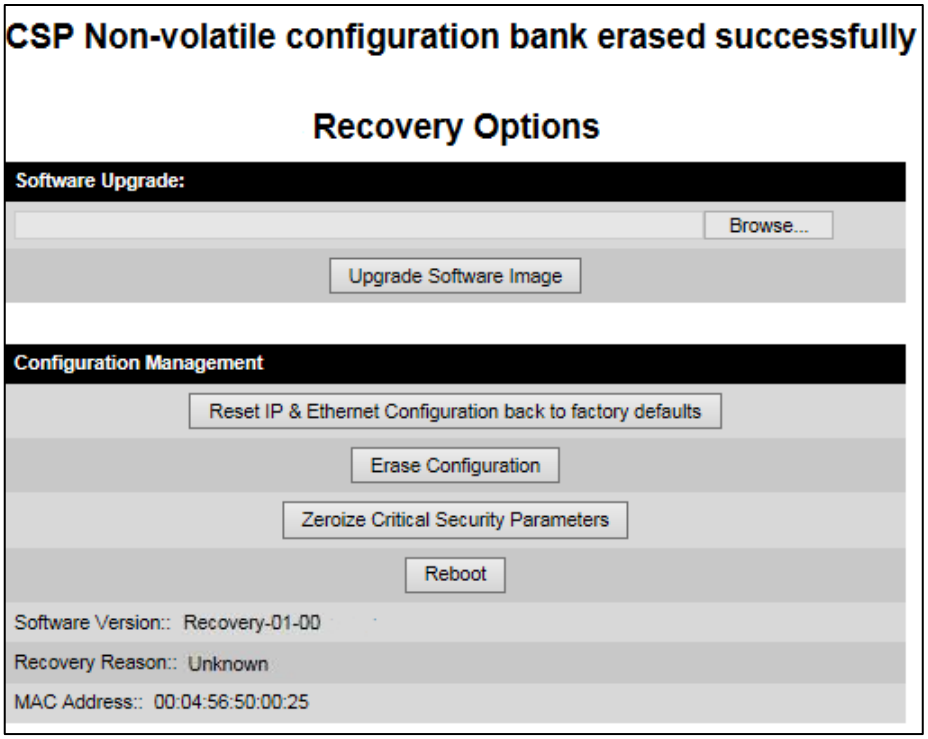
- Key of Keys
- Local User Accounts Names, Roles and Passwords
- Encryption Algorithm
- Wireless Encryption Key
- HTTPS Private Key
- HTTPS Public Key Certificate
- Random Number Generator Entropy
- HTTP Access Enabled
- HTTP Port Number

Procedure:

1 Click **Zeroize Critical Security Parameters**. The confirmation pop up box is displayed:



2 Click **OK**. The zeroize CSPs confirmation page is displayed:



3 Click **Reboot**. When the "`Are you sure you want to REBOOT this unit?`" message is displayed, click **OK**.

4 The unit will now reboot. The unit should now start up in normal mode but with the security configuration reset to default values. If the unit fails to recover, refer to Testing link end hardware on page 8-7 and Cable Diagnostics on page 8-2.

Rebooting the unit

Use this option to reboot the unit from the Recovery Options page (Figure 217).

Procedure:

- Click **Reboot**.
- When the "`Are you sure you want to REBOOT this unit?`" message is displayed, click **OK**. The unit will now reboot. The unit should now start up in normal operational mode. If the unit fails to start up, refer to Testing link end hardware on page 8-7.

Chapter 8: Troubleshooting

This chapter contains procedures for identifying and correcting faults in a PTP 700 link. These procedures can be performed either on a newly installed link, or on an operational link if communication is lost, or after a lightning strike.

The following topics are described in this chapter:

- Cable Diagnostics on page 8-2 describes how to perform cable diagnostics test to detect cabling related faults.
- Testing link end hardware on page 8-7 describes how to test the link end hardware, either when it fails on startup, or after a lightning strike.
- Testing the radio link on page 8-13 describes how to test the link when there is no radio communication, or when it is unreliable, or when the data throughput rate is too low.
- Testing PTP-SYNC on page 8-15 describes how to test the PTP-SYNC unit and its connections when the PTP-SYNC LEDs do not illuminate correctly, or when a synchronization fault is suspected.
- Testing a TDM link on page 8-18 describes how to check the NIDU LEDs and how to perform a TDM loopback test.

Cable Diagnostics

This section describes how to diagnose cable faults.

The Cable Diagnostics feature may be used to test Ethernet cables connected to the Main PSU port and the Aux port. The feature uses Time Domain Reflectometry (TDR) technology to test individual twisted pairs in the cable, to identify open circuit and short circuit faults, and indicate the approximate location of the fault:

- Open circuit – An open circuit is detected when the impedance is greater than 300 ohms.
- Short circuit – A short circuit is detected when the impedance is less than 33 ohms.
- Approximate location of the fault - The fault location is reported as a distance from the ODU along the cable, and is accurate to +/- 2 meters (6.5 feet).

Note

- The cable diagnostics results are provided only as a guide.
- The feature reliably detects all open circuit and short circuit faults in cable pairs, but it is not possible to reliably detect short circuit faults between wires in different cable pairs. Except for that specific circumstance, an OK result for all pairs means the cable is good.
- The presence of LPUs can affect the accuracy and reliability of the results.

Before initiating the test, confirm that all outdoor drop cables (that is those that connect the ODU to equipment inside the building) are specified as supported, as defined in Outdoor copper Cat5e Ethernet cable on page 2-35.

Test scenarios

The Cable Diagnostics test may be performed in following scenarios:

Scenarios	Actions
Main PSU port “Down”	Check for physical Ethernet cable connectivity between Power over Ethernet (PoE) and Customer Data Network (or LAN). If the cable connectivity is OK, Perform Cable Diagnostics test.
Aux port “Down”	Check for physical Ethernet cable connectivity between ODU and Customer Data Network or Management Agent. If the cable connectivity is OK, Perform Cable Diagnostics test.
Main PSU or Aux port is “Up” but the Ethernet speed is noticed slow	There is a possibility that one or more cable pairs have intermittent contact with the RJ45 connector pin. This could result in intermittent communication errors.

	Follow procedure Ethernet packet test. If Ethernet Rx Crc and Align counter is greater than ten (>10), Perform Cable Diagnostics test. If Packet Error Rate is greater than 1 in 1 million, Perform Cable Diagnostics test. If Number of lost packets are less than two (<2) after performing Test ping packet loss, perform Cable Diagnostics test. Otherwise check the ODU's parameter configurations.

Cable Diagnostics test

Menu option: **System > Cable Diagnostics**

The Cable Diagnostics feature determines a fault in a cable and its approximate location based on Time Domain Reflectometry (TDR).

When the test is initiated for the selected port(s), the ODU sends a known signal (+1V) over the twisted pair cable. The transmitted signal will travel down the cable until it reflects off a fault. The magnitude of the reflection and the time it takes for the reflection to come back can be used to calculate the distance to the fault on the cable. For example, a +1V reflection will indicate an open close to the PHY and a -1V reflection will indicate a short close to the PHY.

Based on the returned signal, the radio identifies the cable status and estimates the distance of the fault. The result of the cable test will be displayed.

The cable diagnostics test can be carried out for Main PSU and AUX ports. This test is not supported for SFP port.

Caution

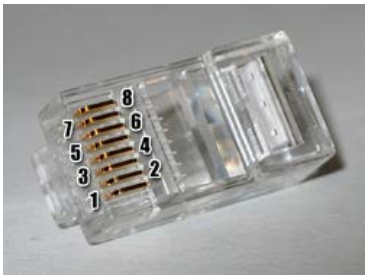
- On the Main PSU port, the presence of LPUs can affect the accuracy of the cable diagnostics results for some cable configurations. When a fault is detected, the feature reports the distance corresponding to the final TDR signal reflection. In configurations where there is a short cable from the ODU to the first LPU (< 2m), and a moderately long cable to the second LPU (30m), the final TDR signal reflection may come from one of the LPUs itself, rather than the fault. For example, a fault in the first short cable may be reported at or near the second LPU.
- On the Aux port, the presence of LPUs can affect the reliability of the cable diagnostics results for many cable configurations. Frequently, open circuit faults may be reported when the cable is OK, and fault distances may be reported corresponding to the LPU locations. Cable diagnostics tests on the Aux port should be repeated a number of times to establish a pattern.

Note

All cable diagnostics results should be verified with an external cable tester before remedial action is taken.

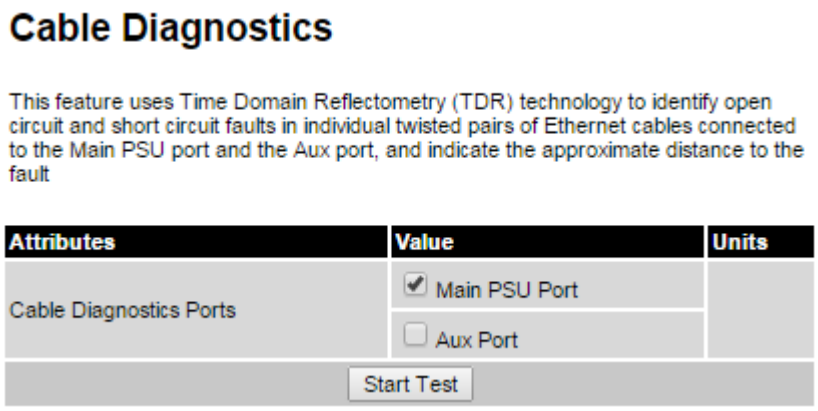
All four twisted pairs of the cable are tested separately and results are displayed for each pair. The pin to pair mapping of a cable is shown in Table 189.

Table 189 Pin to pair mapping of a cable (T568B termination)

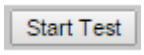
Pin	Pair	Wire	Color (Supplied cable)	Color (Conventional)	Pins on plug face
1	2	1	Light Orange	White/Orange	
2	2	2	Orange	Orange	
3	3	1	Light Green	White/Green	
4	1	2	Blue	Blue	
5	1	1	Light Blue	White/Blue	
6	3	2	Green	Green	
7	4	1	Light Brown	White/Brown	
8	4	2	Brown	Brown	

Procedure

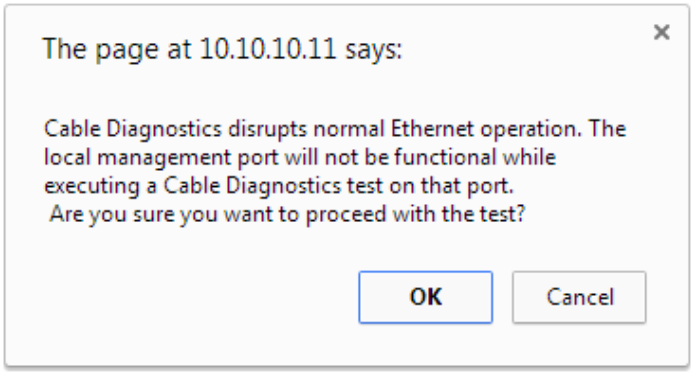
1 Select ports for cable diagnostics test:



2 Click “Start Test” button to begin the test:



3 The confirmation pop up box is displayed. Click the “OK” button to proceed with the test:



Note

The Local Management port connection will be lost when the local management port is under test. However the management port will be accessible when the other ports are under test.

Resubmit the web page after 10 seconds when testing the management port.

4 On completion of the test, the results are displayed :

Cable Diagnostics Results

The cable diagnostics results are provided only as a guide.
The presence of LPUs can affect the accuracy and reliability of the results (see the User Guide for more details).

All cable diagnostics results should be verified with an external cable tester before remedial action is taken.

Main PSU Port

Attributes	Value	Units
Last Test Time	01-Jan-1970 00:06:53	

Cable Pair	Results	Distance to Fault	Units
Pair 1	Short Circuit	6	meters
Pair 2	OK		
Pair 3	OK		
Pair 4	Short Circuit	6	meters

Aux Port

Attributes	Value	Units
Last Test Time		

Cable Pair	Results	Distance to Fault	Units
Pair 1	Not Tested		
Pair 2	Not Tested		
Pair 3	Not Tested		
Pair 4	Not Tested		

Note

The last test performed results are shown for user reference purpose.

Table 190 Cable Diagnostics attributes

Attribute	Meaning
Cable Diagnostics Ports	Select ports on which Cable Diagnostics must be executed.
Last Test Time	The date and time when a Cable Diagnostics test was last executed successfully.
Cable Pair	The result of the most recent execution of cable diagnostics on a cable pair. There are four twisted pairs in each Cat5 cable. The cable diagnostics test is performed on each pair of the cable.
Results	**OK**: Reported when the test is passed for a respective cable pair. **Open Circuit**: Reported when the impedance is greater than 330 ohms. **Short Circuit:** Reported when impedance is less than 33 ohms.
Distance	The estimate of the distance from the ODU to the fault detected on the cable pair during the most recent execution of Cable Diagnostics. Fault in cables longer than 160 meters (525 feet) may not be detected. The error margin is +/- 2 meters (6.5 feet).
Units	Unit of cable length in meters.

Testing link end hardware

This section describes how to test the link end hardware when it fails on startup or during operation.

Before testing link end hardware, confirm that all outdoor drop cables, that is those that connect the ODU to equipment inside the building, are of the supported type, as defined in Outdoor copper Cat5e Ethernet cable on page 2-35.

AC+DC Enhanced power injector LED sequence

For the AC+DC Enhanced power injector, the expected power-up LED sequence is:

- The Power (green) LED illuminates steadily.
- After about 45 seconds, the Ethernet (yellow) LED blinks slowly 10 times.
- The Ethernet (yellow) LED illuminates steadily, then blinks randomly to show Ethernet activity.

If this sequence does not occur, take appropriate action depending on the LED states:

- Power LED is off on page 8-7
- Power LED is blinking on page 8-7
- Ethernet LED did not blink 10 times on page 8-8
- Ethernet LED blinks ten times then stays off on page 8-8
- Ethernet LED blinks irregularly on page 8-9 (for example a short blink followed by a long blink)
- Power LED is on, Ethernet LED blinks randomly on page 8-9

If a fault is suspected in the ODU-PSU drop cable, perform Test resistance in the drop cable on page 5-23.

Power LED is off

Meaning: Either the PSU is not receiving power from the AC/DC outlet, or there is a wiring fault in the ODU cable.

Action: Remove the ODU cable from the PSU and observe the effect on the Power LED:

- If the Power LED does not illuminate, confirm that the mains power supply is working, for example, check the plug and fuse (if fitted). If the power supply is working, report a suspected PSU fault to Cambium Networks.
- If the Power LED does illuminate, perform Test resistance in the drop cable on page 5-23.

Power LED is blinking

Meaning: The PSU is sensing there is an overload on the ODU port; this could be caused by a wiring error on the drop cable or a faulty ODU.

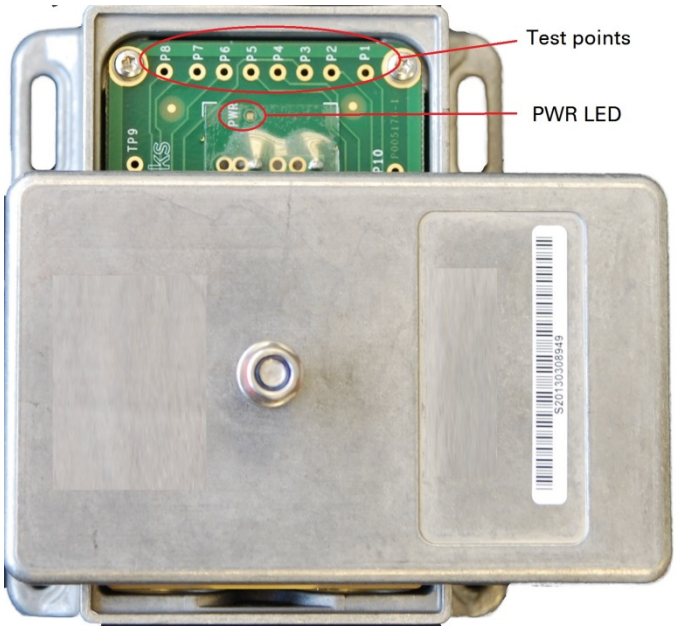
Action: Remove the ODU cable from the PSU. Check that pins 4&5 and 7&8 are not crossed with pins 1&2 and 3&6. Check that the resistance between pins 1&8 is greater than 100K ohms. If either check fails, replace or repair the ODU cable.

Ethernet LED did not blink 10 times

Meaning: The ODU flashes the LED on the AC+DC Enhanced Power Injector 10 times to show that the ODU is powered and booted correctly.

Action:

1. Remove the ODU cable from the PSU. Examine it for signs of damage. Check that the ODU cable resistances are correct, as specified in Test resistance in the drop cable on page 5-23. If the ODU cable is suspect, replace it.
2. Use the LPU (if installed) to check that power is available on the cable to the ODU. Access the connections by rotating the LPU lid as shown (slacken the lid nut but do not remove it):



4. Check that test point P1 on the LPU PCB corresponds to pin 1 on the RJ45. Repeat for points P2 to P8. This test is only valid if both the PSU and the ODU are disconnected.
5. Reconnect the ODU cable to the PSU.
6. Check that the PWR LED near the top right of the LPU PCB is illuminated to indicate power in the Ethernet cable.
7. If any test fails, replace or repair the cable that connects the PSU to the LPU or ODU.

Ethernet LED blinks ten times then stays off

Meaning: There is no Ethernet traffic between the PSU and ODU.

Action: The fault may be in the LAN or ODU cable:

- Confirm that Ethernet traffic is connected to the AC+DC injector LAN port, confirm the cable is not faulty, replace if necessary.
- If the LAN connection to the AC+DC power injector is working, check the drop cable is correctly wired using a suitable cable tester. Repeat the drop cable tests on page Test resistance in the drop cable on page 5-23.

Ethernet LED blinks irregularly

Meaning: If the Ethernet LED blinks irregularly, for example two rapid blinks followed by a longer gap, this indicates that the ODU has booted in recovery mode. The causes may be: installation wiring, or a corrupt ODU software load, or sufficient time has not been allowed between a repeat power up.

Action: Refer to Recovery mode on page 7-63.

Power LED is on, Ethernet LED blinks randomly

Meaning: Both LEDs are in their normal states, implying that the PSU is receiving power from the AC/DC outlet and there is normal Ethernet traffic between the PSU and ODU.

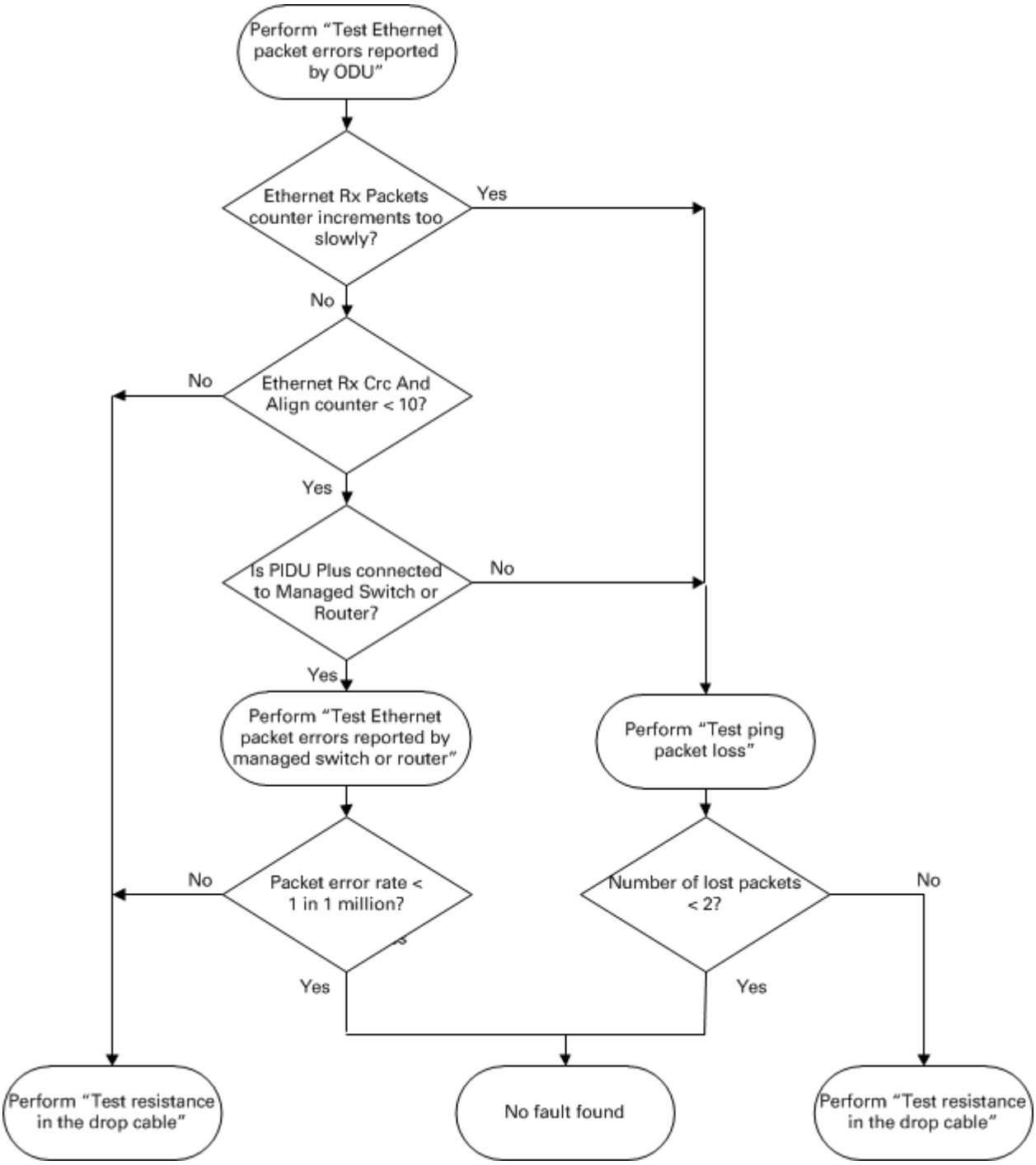
Action: If, in spite of this, a fault is suspected in the link end hardware:

- If the Ethernet connection to the network is only 100BASE-TX, when 1000BASE-T is expected: remove the ODU cable from the PSU, examine it, and check that the wiring to pins 4&5 and 7&8 is correct and not crossed.
- Perform Ethernet packet test on page 8-10.

Ethernet packet test

Follow the Ethernet packet test flowchart (Figure 218) and procedures below.

Figure 218 Ethernet packet test flowchart



Test Ethernet packet errors reported by ODU

Log into the unit and click **Administration**, **Statistics**, **Detailed Counters**. Click **Reset System Counters** at the bottom of the page and wait until the Ethernet Rx Packets counter has reached 1 million (the count will only update when the page is refreshed. If the counter does not increment or increments too slowly, because for example the PTP 700 is newly installed and there is no offered Ethernet traffic, then abandon this procedure and consider using the procedure Test ping packet loss on page 8-11.

Read the Ethernet Rx Crc And Align counter. The test has passed if this is less than 10.

Test Ethernet packet errors reported by managed switch or router

If the ODU is connected to a managed Ethernet switch or router, it may be possible to monitor the error rate of Ethernet packets. Please refer to the user guide of the managed network equipment. The test has passed if the rate of packet errors reported by the managed Ethernet switch or router is less than 10 in 1 million packets.

Test ping packet loss

Using a computer, it is possible to generate and monitor packets lost between the PSU and the ODU. This can be achieved by executing the Command Prompt application which is supplied as standard with Windows and MAC operating systems.

Caution

This procedure disrupt network traffic carried by the PTP 700 under test:

Procedure:

1. Ensure that the IP address of the computer is configured appropriately for connection to the PTP 700 under test, and does not clash with other devices connected to the network.
2. If the PSU is connected to an Ethernet switch or router then connect the computer to a spare port, if available.
3. If it is not possible to connect the computer to a spare port of an Ethernet switch or router, then the PSU will need to be disconnected from the network in order to execute this test:
   - Disconnect the PSU from the network.
   - Connect the computer directly to the LAN port of the PSU.
4. On the computer, open the Command Prompt application.

5 Send 1000 ping packets of length 1500 bytes. The process will take 1000 seconds, which is approximately 17 minutes.

If the computer is running a Windows operating system, this is achieved by typing (for an IPv6 address, use the **ping6** command):

```
ping –n 1000 –l 1500 <ipaddress>
```

where <ipaddress> is the IP address of the PTP 700 ODU under test.

If the computer is running a MAC operating system, this is achieved by typing:

```
ping –c 1000 –s 1492 <ipaddress>
```

where <ipaddress> is the IP address of the PTP 700 ODU under test.

6 Record how many Ping packets have been lost. This is reported by Command Prompt on completion of the test.

The test has passed if the number of lost packets is less than 2.

Testing the radio link

This section describes how to test the link when there is no radio communication, when it is unreliable, when the data throughput rate is too low, or when a unit is causing radio or TV interference. It may be necessary to test the units at both ends of the link.

No activity

If there is no wireless activity, proceed as follows:

1. Check for Alarm conditions on Home page.
2. Check that the software at each end of the link is the same version.
3. Check that the Target Mac address is correctly configured at each end of the link.
4. Check Range.
5. Check Tx Power.
6. Check License keys to ensure that both units are the same product variant.
7. Check Master/Slave status for each unit and ensure that one unit is Master and the other unit is slave.
8. Check that the link is not obstructed or the ODU misaligned.
9. Check the DFS page at each end of the link and establish that there is a quiet wireless channel to use.
10. If there are no faults found in the configuration and there is absolutely no wireless signal, retry the installation procedure.
11. If this does not work then report a suspected ODU fault to Cambium Networks.

Some activity

If there is some activity but the link is unreliable or does not achieve the data rates required, proceed as follows:

1. Check that the interference has not increased using the DSO measurements.
2. If a quieter channel is available check that it is not barred.
3. Check that the path loss is low enough for the communication rates required.
4. Check that the ODU has not become misaligned.

Radio and television interference

If a PTP 700 unit is interfering with radio or television reception (this can be determined by turning the equipment off and on), attempt the following corrective actions:

- Realign or relocate the antenna.
- Increase the separation between the affected equipment and antenna.
- Connect the ODU and PSU power supply into a power outlet on a circuit different from that to which the receiver is connected.
- Contact Cambium Point-to-Point for assistance.

Testing PTP-SYNC

This section describes how to test the PTP-SYNC unit and its connections when the PTP-SYNC LEDs do not illuminate correctly, or when a synchronization fault is suspected.

Checking the PTP-SYNC LEDs

If a fault is suspected in the PTP-SYNC or GPS hardware, check the PTP-SYNC LED states and use Table 191 to choose the correct test procedure.

Table 191 PTP-SYNC indicator LED states

LED	State	Description and test procedure
GPS	Off	No GPS satellite data being received at the GPS/SYNC IN port. Refer to GPS LED does not illuminate or blink on clustered units on page 8-17.
	On steady or blink	GPS satellite data being received.
SYNC	Off	No data being received at the SYNC OUT port.
	On steady or blink	Data being received at the SYNC OUT port. The SYNC LED does not normally illuminate, even in cluster configurations.
STATUS	Off	No power. Refer to LEDs do not illuminate on page 8-16.
	On steady	Power but no satellite lock. Refer to STATUS LED is on steady on page 8-16.
	Blink	Power and satellite lock at either the GPS/SYNC IN or 1PPS IN port.
	Double blink	Possible fault in GPS/SYNC IN or 1PPS IN cables. Refer to STATUS LED double-blinks on page 8-16.
ODU	Off	No signal being received from the ODU. Refer to ODU LED does not illuminate within 90 seconds on page 8-16.
	On	Communication with the ODU is established.
	Blink red	Error in communication with ODU. Refer to ODU LED blinks red on page 8-16,

LEDs do not illuminate

Meaning: The PTP-SYNC unit is not powered up.

Action: Ensure that there is a cable connection between the PSU ODU interface and the PIDU IN interface of the PTP-SYNC unit. Confirm that the PSU is powered up.

STATUS LED is on steady

Meaning: There is power but no satellite lock. This probably indicates that a 1PPS synchronization pulse is not detected by the PTP-SYNC unit.

Action: Depending on system configuration, take one of the following actions:

- System using a GPS receiver module - Ensure that there is a cable connection between the PTP-SYNC GPS/SYNC IN interface and the LPU, also that there is a cable connection between the LPU and the GPS receiver module. Check that the GPS receiver module has an uninterrupted view of the sky.
- System using an alternative 1PPS timing source - Ensure that there is a cable connection between the PTP-SYNC GPS/SYNC IN or 1PPS IN interface and the 1PPS timing source.
- On cluster slave units – Ensure that there is a cable connection between the slave GPS/SYNC IN interface and the SYNC OUT interface of the preceding unit in the chain.

STATUS LED double-blinks

Meaning: There may be a fault in the GPS/SYNC IN or 1PPS IN cables.

Action: Check the GPS wiring in accordance with Table 39.

ODU LED does not illuminate within 90 seconds

Meaning: There may be no communication between PTP-SYNC and ODU.

Action: Ensure that the PTP-SYNC ODU OUT interface is connected to the ODU (and LPUs if installed) via the drop cable.

ODU LED blinks red

Meaning: Error in communication with ODU. Possible causes are: fault in the ODU or PSU cable, maximum recommended cable lengths exceeded, or TDD synchronization is not enabled at the ODU.

Action: Confirm that the ODU and PSU cables are not too long: see Ethernet standards and cable lengths on page 2-34. Check the ODU cable wiring by following the procedure described in Test resistance in the drop cable on page 5-23.

GPS LED does not illuminate or blink on clustered units

Meaning: This indicates a fault only when the timing source is a GPS receiver.

Action: Table 192 describes the action to be taken depending upon the behavior of the GPS LEDs at the master and slave(s).

Table 192 Clustered PTP-SYNC units - GPS LEDs Fault-finding

Cluster timing source	GPS LED on master	GPS LED on slave(s)	Diagnosis
GPS receiver providing NMEA data	Blink	Blink	OK
	Off	Any	Fault in GPS unit or GPS cable
	Blink	Off	Fault in daisy chain cable
Alternative 1PPS source, no NMEA data	Off	Off	OK
	Off	On	Fault in alternative 1PPS source
One ODU is cluster timing master	Off	Off	OK

Testing a TDM link

This section describes how to check the NIDU LEDs and how to perform a TDM loopback test.

Checking the NIDU LEDs

If a fault is suspected in the NIDU, check the NIDU LED states and use Table 193 to choose the correct test procedure.

Table 193 NIDU indicator LED states

Port	LED	State	Description and test procedure
LAN	Green	On steady	Normal state: Ethernet 1000BaseT signal detected.
		Off	Abormal state: Ethernet signal detected but not 1000BaseT.
	Amber	Blink	Normal state: data activity detected.
		On steady	Abormal state: alarm signal received.
ODU	Green	On steady	Normal state: Ethernet 1000BaseT signal detected
		Off	Abormal state: Ethernet signal detected but not 1000BaseT.
	Amber	Blink	Normal state: data activity detected.
		On steady	Abormal state: alarm signal received.
E1/T1	Green	On steady	Normal state: TDM signal detected
	Amber	Blink	Normal state: TDM data activity detected.
	Amber	On steady	Abnormal state: no TDM data activity detected.

Performing a TDM loopback test

The loopback test allows a TDM data stream to be looped back at the copper or wireless interface. A typical T1 or E1 installation test includes a copper loopback on the local unit followed by a wireless loopback on the remote unit.

Note

The TDM Configuration page is only available when the TDM interface is enabled and the unit is rebooted (Interface Configuration page on page 6-14).

Procedure:

- Select menu option **System > Configuration > TDM Configuration** (Figure 145).
- Set the TDM Channel Loopback n attribute (where "n" is in the range 1 to 8) to **Copper** or **Wireless** (Table 132).
- Click **Submit Updated TDM Configuration**.
- Perform loopback tests. The System Summary page displays alarms indicating the presence of loopbacks on each affected TDM channel (Alarms on page 7-17).
- Set the TDM Channel Loopback n attribute (where "n" is in the range 1 to 8) to **None** (Table 132).
- Click **Submit Updated TDM Configuration**.

Checking for 1000BASE-T operation

If the ODU port has negotiated a link at 100BASE-T, the NIDU will not send or receive TDM data and will not bridge customer data traffic. Check that the Ethernet drop cable between the ODU and the PSU, and the network cable between the PSU and the NIDU have successfully negotiated operation at 1000BASE-T. On the System Status page, review Main PSU Port Speed and Duplex (Figure 184) and confirm that it is set to **1000 Mbps Full Duplex**.

Glossary

Term	Definition
AES	Advanced Encryption Standard
ANSI	American National Standards Institution
ARP	Address Resolution Protocol
ATPC	Automatic Transmit Power Control
Aux	Auxiliary
BBDR	Broadband Disaster Relief
BPSK	Binary Phase Shift Keying
BW	Bandwidth
CFM	Connection Fault Management
CHAP	Challenge Handshake Authentication Protocol
CSP	Critical Security Parameter
DC	Direct Current
DER	Distinguished Encoding Rules
DES	Data Encryption Standard
DFS	Dynamic Frequency Selection
DHCP	Dynamic Host Configuration Protocol
DSCP	Differentiated Services Code Point
DSO	Dynamic Spectrum Optimization
EAPS	Ethernet Automatic Protection Switching
EIRP	Equivalent Isotropic Radiated Power
EMC	Electromagnetic Compatibility
EMD	Electro-Magnetic Discharge
EPL	Ethernet Private Line
ETSI	European Telecommunications Standards Institute
EU	European Union
FAQ	Frequently Asked Question
FCC	Federal Communications Commission

Term	Definition
FIPS	Federal Information Processing Standards
GARP	Generic Attribute Registration Protocol
GE	Gigabit Ethernet
GUI	Graphical User Interface
HTTP	Hypertext Transfer Protocol
IB	In-Band
IC	Industry Canada
ICMP	Internet Control Message Protocol
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
IPSec	Internet Protocol Security
ISM	Industrial Scientific and Medical
ITPE	Initial Transmit Power Estimate
KDB	Knowledge Database
L2CP	Layer Two Control Protocols
LACP	Link Aggregation Control Protocol
LLDP	Link Layer Discovery Protocol
LAN	Local Area Network
LOS	Line-of-Sight (clear line-of-sight, and Fresnel zone is clear)
LPU	Lightning Protection Unit
MAC	Medium Access Control Layer
MDI (-X)	Medium Dependent Interface (-Crossover)
MEF	Metro Ethernet Forum
MIB	Management Information Base
MIMO	Multiple-Input Multiple-Output
MLD	Multicast Listener Discovery
MPLS	Multiprotocol Label Switching
MRP	Multiple Registration Protocol
MSTP	Multiple Spanning Tree Protocol

Term	Definition
MTU	Maximum Transmission Unit
NA	Neighbor Advertisement
NIDU	Network Indoor Unit
NLOS	Non-Line-of-Sight
NMEA	National Marine Electronics Association
NS	Neighbor Solicitation
NTP	Network Time Protocol
NUD	Neighbor Un-reachability Detection
ODU	Outdoor Unit
OFDM	Orthogonal Frequency Division Multiplex
OOB	Out-of-Band
PC	IBM Compatible Personal Computer
PIDU	Powered Indoor Unit
POE	Power over Ethernet
PSU	Power Supply Unit
PTP	Point-to-Point
QAM	Quadrature Amplitude Modulation
QoS	Quality of Service
QPSK	Quadrature Phase Shift Keying
R-APS	Ring Automatic Protection Switching
RADIUS	Remote Authentication Dial-In Service
RAM	Random Access Memory
RF	Radio Frequency
RFC	Request for Comments
RoW	Rest of World
RMA	Return Material Authorization
RSSI	Received Signal Strength Indication
RSTP	Rapid Spanning Tree Protocol
SELV	Safety Extra Low Voltage
SFP	Small Form-factor Pluggable

Term	Definition
SLAAC	Stateless Address Auto-configuration
SMTP	Simple Mail Transport Protocol
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
STP	Spanning Tree Protocol
Syslog	System Logging
TC	Traffic Class
TCP	Transmission Control Protocol
TDD	Time Division Duplexing
TDM	Time Division Multiplexing
TDWR	Terminal Doppler Weather Radar
TGB	Tower Ground Bus bar
TLS	Transport Layer Security
UNII	Unlicensed National Information Infrastructure
URL	Universal Resource Location
USM	User-based Security Model
UTC time	Coordinated Universal Time
UTP	Unshielded Twisted Pair
UV	Ultraviolet
VACM	View-based Access Control Model
VLAN	Virtual Local Area Network
WEEE	Waste Electrical and Electronic Equipment