PMP 450 Series 900 MHz SM

Attaching the SM 900 MHz directional antenna to the pole

1 Unbox the directional yagi antenna.

Figure 81 PMP 450i 900 MHz SM external directional antenna



2 Attach the directional atenna to the pole and insert the two U clamps into the mounting bracket of the antenna

Figure 82 Attach the antenna to the pole



3 Tighten all nuts to approximately 6 to 7 Nm or less to avoid deforming the pole.

Figure 83 Fixing the nuts



Radio mounting to the antenna

1 Align the radio to E bracket and slide towards right to lock on the antenna as shown in figure.

Figure 84 Fixing the radio to the antenna



Slide towards right to lock

2 Connect the port A of SM to vertical and port B of SM to horizontal polarization interfaces of the antenna with RF cable.

Figure 85 Connecting RF cable to the radio



Directional Yagi antenna alignment

The directional Yagi antenna horizontal and vertical alignment procedure is shown below. The Yagi antenna can be aligned for +15 to -15 degree.

Figure 86 Yagi antenn alignment - horizentaly



Figure 87 Yagi antenna alignment - upward tilt



Figure 88 Yagi antenna alignment - downward tilt



Installing an integrated ODU



Caution

Do not reverse the bracket clamp, as this arrangement may lead to failure of the assembly. Do not over-tighten the bolts as this may lead to failure of the assembly.

To mount and connect an integrated ODU, proceed as follows:

1 Fix the mounting plate to the back of the ODU using the four M6 bolts, and spring and plain washers provided. Tighten the bolts to a torque setting of 5.0 Nm (3.7 lb ft).



Figure 89 Fixing the mounting plate to the back of the ODU

- 2 Attach the bracket body to the mounting plate using the M8 bolt, spring and plain washers.
- **3** Hoist the ODU to the mounting position.
- **4** Attach the bracket body to the pole using the bracket clamp, M8 bolts, and spring and plain washers.

5 If the ODU is mounted outdoors, weatherproof the N type connectors (when antenna alignment is complete) using PVC tape and self-amalgamating rubber tape.



Figure 90 Attaching the bracket body

Connecting Cat5e Ethernet cable

Connecting an RJ45 and gland to a unit

Perform this task to connect the Ethernet cable to an AP.

To connect the Ethernet cable with a gland to an AP unit, proceed as follows:

- 1 Insert the RJ45 cable through the gland components
- 2 Insert the RJ45 plug into the socket in the unit, making sure that the locking tab snaps home.
- **3** Support the drop cable and gently hand screw the gland body into the unit until the bushing seal is flush to the unit body.



Note

Do not fit the back shell prior to securing the gland body.

- 4 Once the gland is fully hand screwed into the unit, tighten it one full rotation only with a 1 1/8 inch spanner wrench.
- 5 When the gland body has been fitted, tighten the gland back shell.



Caution

Do not over-tighten the gland back shell, as the internal seal and structure or RJ45 port may be damaged.



Figure 91 Ethernet cable gland for PMP/PTP 450 Series

Figure 92 Ethernet cable gland for PMP/PTP 450i Series



Disconnecting an RJ45 and gland from a unit

Perform this task to disconnect the Ethernet cable and watertight gland from ODU. To disconnect the Ethernet cable and gland from a unit, proceed as follows:

- 1 Hold Ethernet cable and remove the gland back shell
- 2 Use a small flathead screwdriver (0.2"/5mm wide or greater) to gently release the black plastic watertight bushing from the compression fins, being careful not to damage the bushing.
- **3** Unscrew the gland body from the AP, making sure that the Ethernet cable is not rotating while disengaging the gland body from the AP housing
- 4 Use a small screwdriver to depress the RJ45 locking clip
- 5 Unplug the RJ45 cable
- 6 Remove the gland from the cable, if necessary

Installing ODU

Installing an PMP 450 platform AP

To install a PMP 450 platform Series AP, perform the following steps.

Procedure 5 Installing an AP

- 1 Begin with the AP in the powered-down state.
- 2 Choose the best mounting location for your particular application. Modules need not be mounted next to each other. They can be distributed throughout a given site. However, the 60° offset must be maintained. Mounting can be done with stainless steel hose clamps or another equivalent fastener.

See Installing external antennas to a connectorized ODU on page 6-21 for connecting external antenna to PMP 450i Series, PMP 450 Series, PMP 450i Series 900 MHz AP and PMP 450 Series 900 MHz SM

See Installing an integrated ODU on page 6-49

- **3** Align the AP as follows:
 - a. Move the module to where the link will be unobstructed by the radio horizon and no objects penetrate the Fresnel zone.
 - b. Use a local map, compass, and/or GPS device as needed to determine the direction that one or more APs require to each cover the intended 60° sector.
 - c. Apply the appropriate degree of downward tilt.
 - d. Ensure that the nearest and furthest SMs that must register to this AP are within the beam coverage area.
- 4 Using stainless steel hose clamps or equivalent fasteners, lock the AP in the proper direction and downward tilt.
- 5 Attach the cables to the AP (See Powering the AP/SM/BH for test configuration on Page 5-15)
- 6 Perform waterproof the cables (See section Attaching and weatherproofing an N type connector on page 6-66).

Installing a PMP 450 platform SM

Installing a PMP 450 platform Series SM consists of two procedures:

- Physically installing the SM on a residence or other location and performing a coarse alignment using the alignment tool or alignment tone.
- Verifying the AP to SM link and finalizing alignment using review of power level, link tests, and review of registration and session counts.

Procedure 6 Installing an SM

- 1 Choose the best mounting location for the SM based on section ODU and external antenna location on page 3-10.
- Use stainless steel hose clamps or equivalent fasteners to lock the SM into position.
 See Installing external antennas to a connectorized ODU on page 6-21 for connecting external antenna
 See Installing an integrated ODU on page 6-49
- **3** Remove the base cover of the SM.
- 4 Terminate the UV outside grade Category 5 Ethernet cable with an RJ-45 connector, and connect the cable to the SM.
- **5** Wrap a drip loop in the cable.
- **6** For Connectorized Models, Install the external antenna according to the manufacturer's instructions.
- 7 For Connectorized Models, connect the SM's N-type antenna connectors to the external antenna, ensuring that the polarity matches between the SM cable labeling and the antenna port labels.

Connectorized SM Antenna Cable Label	Antenna Connection
A	Vertical
В	Horizontal

- 8 For Connectorized Models, weatherproof the N-type antenna connectors following section Attaching and weatherproofing an N type connector on page 6-66.
- **9** Wrap an AWG 10 (or 6mm²) copper wire around the Ground post of the SM
- **10** Securely connect the copper wire to the grounding system (Protective Earth) according to applicable regulations.
- 11 Install an surge suppressor as describe in section Mount the Surge Suppressor on page 6-9
- 12 Connect the power supply to a power source.
- **13** Connect the Ethernet output from the power supply to the Ethernet port of your laptop.

- 14 Launch your web browser. In the URL address bar, enter **169.254.1.1**. then press Enter.
- 15 If the browser in laptop fails to access the interface of the SM, follow the procedure Radio recovery mode – Radio Recovery Console / Default Mode (fka Default Plug) on page 1-20
- **16** Log in as admin on the ODU. Configure a password for the admin account and log off.
- 17 Log back into the SM as admin or root, using the password that you configured.
- **18** For coarse alignment of the SM, use the Alignment Tool located at **Tools**, **Alignment Tool**.

Optionally, connect a headset to the AUX/SYNC port the SM and listen to the alignment tone, which indicates greater SM receive signal power by pitch. By adjusting the SM's position until the highest frequency pitch is obtained operators and installers can be confident that the SM is properly positioned. For information on device GUI tools available for alignment, see sections Using the Alignment Tool, Using the Link Capacity Test tool, and Using AP Evaluation tool below.

- 19 When the highest power achieved, lock the SM mounting bracket in place.
- 20 Log off of the SM web interface.
- 21 Disconnect the Ethernet cable from your laptop.
- 22 Replace the base cover of the SM.
- 23 Connect the Ethernet cable to the computer that the subscriber will be using.

Installing a PTP 450 platform BHM

To install a PTP 450 platform Series BHM, perform the following steps.

Procedure 7 Installing a BHM

- 1 Access the General tab of the Configuration page in the BHM
- 2 Choose the best mounting location for your particular application.
- **3** Align the BHM as follows:
 - a. Move the module to where the link will be unobstructed by the radio horizon and no objects penetrate the Fresnel zone.
 - b. Use a local map, compass, and/or GPS device as needed to determine the direction to the BHS.
 - c. Apply the appropriate degree of downward or upward tilt.
 - d. Ensure that the BHS is within the beam coverage area.

4 Using stainless steel hose clamps or equivalent fasteners, lock the BHM into position.

See Installing external antennas to a connectorized ODU on page 6-21 for connecting external antenna

- 5 If this BHM will not be connected to a CMM, optionally connect a utility cable to a GPS timing source and then to the SYNC port of the BHM.
- 6 Either connect the BHM's Aux to the CMM or connect the DC power converter to the BHM and then to an AC power source.

RESULT: When power is applied to a module or the unit is reset on the web-based interface, the module requires approximately 25 seconds to boot. During this interval, self-tests and other diagnostics are being performed.

- 7 Access **Configuration > General** page of the BHM for Synchronization configuration.
- 8 If a CMM4 is connected, set the **Sync Input** parameter to the AutoSync or Autosync + Free Run selection.

Installing a PTP 450 platform BHS

To install a PTP 450 platform Series BHS, perform the following steps.

Procedure 8 Installing a BHS

- 1 Choose the best mounting location for the BHS.
- 2 Terminate the UV outside grade Category 5 Ethernet cable with an RJ-45 connector, and connect the cable to the BHS. (See Powering the AP/SM/BH for test configuration on Page 5-15)
- **3** Use stainless steel hose clamps or equivalent fasteners to lock the BHS into position.
- 4 Install an surge suppressor as describe in section Mount the Surge Suppressor on page 6-9
- **5** For coarse alignment of the BHS, use the Audible Alignment Tone feature as follows:
 - a. At the BHS, connect the RJ-45 connector of the Alignment Tool Headset to the Aux port via alignment tone adapter as shown in Figure 138 on page 8-20.
 - b. Listen to the alignment tone for pitch, which indicates greater signal power (RSSI/dBm) by higher pitch.

Adjust the module slightly until you hear the highest pitch and highest volume

6 When you have achieved the best signal (highest pitch, loudest volume), lock the BHS in place with the mounting hardware

Configuring the Link

See Configuring remote access on page 7-181.

Monitoring the Link

See Monitoring the Link on page 7-182.

Installing the AC Power Injector



Caution

As the PSU is not waterproof, locate it away from sources of moisture, either in the equipment building or in a ventilated moisture-proof enclosure. Do not locate the PSU in a position where it may exceed its temperature rating.



Caution

Do not plug any device other than a PMP/PTP 450i ODU into the ODU port of the PSU. Other devices may be damaged due to the non-standard techniques employed to inject DC power into the Ethernet connection between the PSU and the ODU.

Do not plug any device other than a Cambium PMP/PTP 450 platform PSU into the PSU port of the ODU. Plugging any other device into the PSU port of the ODU may damage the ODU and device.

Installing the AC Power Injector

Follow this procedure to install the AC Power Injector:

- 1 Form a drip loop on the PSU end of the LPU to PSU drop cable. The drip loop ensures that any moisture that runs down the cable cannot enter the PSU.
- (a) Place the AC Power Injector on a horizontal surface. Plug the LPU to PSU drop cable into the PSU port labeled ODU. (b) When the system is ready for network connection, connect the network Cat5e cable to the LAN port of the PSU:





Installing CMM4

Note

For instructions on CMM3 (CMMmicro) or CMM4 installation, including the outdoor temperature range in which it is acceptable to install the unit, tools required, mounting and cabling instructions, and connectivity verification, please see the *PMP Synchronization Solutions User Guide* located on the Cambium website.

The Cluster Management Module 4 (CMM4) provides power, sync, and network connectivity for up to eight APs, backhauls, and Ethernet terrestrial feeds in a variety of configurations. The CMM4 provides

- Sync over Power over Ethernet and integrated surge suppression on the controller board for up to 8 APs or BHs. Both a custom 30 VDC power scheme and a custom 56 VDC power scheme are available. Neither is the same as the later IEEE Standard 802.3af, and neither is compatible with it.
- Managed switching using a hardened EtherWAN switch (1090CKHH models). The CMM4 ships with a 14-port EtherWAN switch and is also available without a switch. The CMM4 originally shipped with a 9-port EtherWAN switch.
- Surge suppression on the controller board for the incoming 30V DC and 56V DC power lines and GPS coax cable.
- Auto-negotiation on the Ethernet ports. Ports will auto-negotiate to match inputs that are either 100Base-T or 10Base-T, and either full duplex or half duplex, when the connected device is set to auto-negotiate. Alternatively, these parameters are settable.
- An always-on NTP (Network Time Protocol) server that can provide date and time to any radio that can reach the CMM's management IP address.
- CNUT can be used to upgrade the CMM-4 software.

PMP/PTP 450 platform can use the CMM4's EtherWan switch for their network connectivity.



Note

The 56V of a CMM4 needs to go through the adapter cable (part number N000045L001A) as shown in Figure 21 on page 2-39.

The CMM4 56V power adapter cable can be prepared by swapping pins 5 and 7. See CMM4 56V power adapter cable pinout on page 2-39 for power adapter cable pinout.

Figure 93 CMM4 cabled to support PMP/PTP 450 platform



Supplemental installation information

This section contains detailed installation procedures that are not included in the above topics, such as how to strip cables, create grounding points and weatherproof connectors.

Stripping drop cable

When preparing drop cable for connection to the PMP/PTP 450 platform ODU or LPU, use the following measurements:



When preparing drop cable for connection to the PMP/PTP 450 platform PSU (without a cable gland), use the following measurements:



Trim to 5 mm (start with tails over-length to assist insertion into load bar)

Outer sheath and cable shield stripped to here

Creating a drop cable grounding point

Use this procedure to connect the screen of the main drop cable to the metal of the supporting structure using the cable grounding kit (Cambium part number 01010419001).

To identify suitable grounding points, refer to Drop cable grounding points on page 3-13.

1 Remove 60 mm (2.5 inches) of the drop cable outer sheath.



2 Cut 38mm (1.5 inches) of rubber tape (self-amalgamating) and fit to the ground cable lug. Wrap the tape completely around the lug and cable.



3 Fold the ground wire strap around the drop cable screen and fit cable ties.



- 4 Tighten the cable ties with pliers. Cut the surplus from the cable ties.

5 Cut a 38mm (1.5 inches) section of self-amalgamating tape and wrap it completely around the joint between the drop and ground cables.



6 Use the remainder of the self-amalgamating tape to wrap the complete assembly. Press the tape edges together so that there are no gaps.



7 Wrap a layer of PVC tape from bottom to top, starting from 25 mm (1 inch) below and finishing 25 mm (1 inch) above the edge of the self-amalgamating tape, overlapping at half width.



8 Repeat with a further four layers of PVC tape, always overlapping at half width. Wrap the layers in alternate directions (top to bottom, then bottom to top). The edges of each layer should be 25mm (1 inch) above (A) and 25 mm (1 inch) below (B) the previous layer.



- **9** Prepare the metal grounding point of the supporting structure to provide a good electrical contact with the grounding cable clamp. Remove paint, grease or dirt, if present. Apply anti-oxidant compound liberally between the two metals.
- **10** Clamp the bottom lug of the grounding cable to the supporting structure using site approved methods. Use a two-hole lug secured with fasteners in both holes. This provides better protection than a single-hole lug.

Attaching and weatherproofing an N type connector

The following procedure should be used to weatherproof the N type connectors fitted to the connectorized ODU (AP/SM/BH) and antenna. This procedure must be followed to ensure that there is no moisture ingress at the radio ports. Failure to properly seal N-type antenna connectors can result in poor link performance or complete loss of radio communication.



Note

Cambium recommends to assemble the antenna, attach the ODU and cabling, and to seal the RF connections before installing the unit at the deployment site.



Note

N type connectors should be tightened using a torque wrench, set to 15 lb in or 1.7 Nm. If a torque wrench is not available, N type connectors may be finger tightened.

Use this procedure to weatherproof the N type connectors fitted to the connectorized ODU and external antenna (if recommended by the antenna manufacturer).

1 Ensure the connection is tight. A torque wrench should be used if available:



2 Wrap the connection with a layer of 19 mm (0.75 inch) PVC tape, starting 25 mm (1 inch) below the connector body. Overlap the tape to half-width and extend the wrapping to the body of the LPU. Avoid making creases or wrinkles:



3 Smooth the tape edges:



4 Cut a 125mm (5 inches) length of rubber tape (self-amalgamating):



5 Expand the width of the tape by stretching it so that it will wrap completely around the connector and cable:



6 Press the tape edges together so that there are no gaps. The tape should extend 25 mm (1 inch) beyond the PVC tape:



7 Wrap a layer of 50 mm (2 inch) PVC tape from bottom to top, starting from 25 mm (1 inch) below the edge of the self-amalgamating tape, overlapping at half width.



- 8 Repeat with a further four layers of 19 mm (0.75 inch) PVC tape, always overlapping at half width. Wrap the layers in alternate directions:
 - Second layer: top to bottom.
 - Third layer: bottom to top.
 - Fourth layer: top to bottom.
 - Fifth layer: bottom to top.

The bottom edge of each layer should be 25 mm (1 inch) below the previous layer.



9 Check the completed weatherproof connection:





Note

A video of this procedure can be found at: <u>https://www.youtube.com/watch?v=a-twPfCVq4A</u>

Chapter 7: Configuration

This chapter describes how to use the web interface to configure the PMP/PTP 450 platform link. This chapter contains the following topics:

- Preparing for configuration on page 7-2
- Connecting to the unit on page 7-3
- Using the web interface on page 7-5
- Quick link setup on page 7-12
- Configuring IP and Ethernet interfaces on page 7-26
- Upgrading the software version and using CNUT on page 7-67
- General configuration on page 7-71
- Configuring Unit Settings page on page 7-89
- Setting up time and date on page 7-93
- Configuring synchronization on page 7-95
- Configuring security on page 7-97
- Configuring radio parameters on page 7-123
- Setting up SNMP agent on page 7-168
- Configuring syslog on page 7-175
- Configuring remote access on page 7-181
- Monitoring the Link on page 7-182
- Configuring quality of service on page 7-185
- Installation Color Code on page 7-198
- Zero Touch Configuration Using DHCP Option 66 on page 7-199
- Configuring Radio via config file on page 7-205
- Configuring a RADIUS server on page 7-207

Preparing for configuration

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.

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.



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.

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 PMP/PTP 450 platform.

Procedure 9 Configuring the management PC

- 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):

Local Area Connection 2 Properties	? ×
General Authentication Advanced	
Connect using:	
Broadcom NetXtreme 57xx Gigabit C	onfigure
This connection uses the following items:	
🔽 🖳 File and Printer Sharing for Microsoft Network	is 🔺
✓ T Network Monitor Driver	
✓ Transferret Protocol (TCP/IP)	- 1
•	
Install Uninstall Pr	operties
Description	
Transmission Control Protocol/Internet Protocol. Th wide area network protocol that provides communic across diverse interconnected networks.	e default ation
Sho <u>w</u> icon in notification area when connected	
Notify me when this connection has limited or no c	onnectivity
ОК	Cancel

- 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:

Internet Protocol (TCP/IP) Propertie	es ?X
General	
You can get IP settings assigned autor this capability. Otherwise, you need to the appropriate IP settings.	natically if your network supports ask your network administrator for
O <u>O</u> btain an IP address automatical	lly
─● Use the following IP address: ──	
IP address:	169.254.1.3
S <u>u</u> bnet mask:	255.255.0.0
Default gateway:	· · ·
C Obtain DNS server address autor	natically
,	dresses:
Preferred DNS server:	· · ·
<u>A</u> lternate DNS server:	· · ·
	Ad <u>v</u> anced
	OK Cancel

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 PMP/PTP 450 platform.

Procedure 10 Connecting to the PC and powering up

- 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 several seconds, check that the orange Ethernet LED starts with 10 slow flashes.
- **5** Check that the Ethernet LED then illuminates continuously.

Using the web interface

This section describes how to log into the PMP/PTP 450 platform 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 11 Logging into the web interface

- 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:

Camb	ium Networks	
• Home	General Status	
 Copyright 		
Username: admin	Home	$e \rightarrow General Status$
Password:	5.4GHz MIMO OFD	M - Access Point - 0a-00-3e-bb-00-fb
Login	Device Information	
	Device Type :	5.4GHz MIMO OFDM - Access Point - 0a-00-3e-bb-00-fb
Account: none	Board Type :	P13 C110_SOC
Level: GUES I	Software Version :	CANOPY 14.1 AP-DES
Mode. Read-Only	Board MSN :	PMP450iMSN
	FPGA Version :	100615
CANOPY®	Uptime :	00:01:37
	System Time :	14:57:14 10/09/2015 IST
	Ethernet Interface :	100Base-TX Full Duplex
	Region Code :	Other
	Regulatory :	Passed
	Antenna Type :	External
	Channel Frequency :	5490.0 MHz
	Channel Bandwidth :	10.0 MHz
	Cyclic Prefix :	1/16
	Frame Period :	2.5 ms
	Color Code :	254
	Max Range :	2 Miles
	Transmit Power :	-10 dBm
	Temperature :	35 °C / 95 °F
	Access Point Stats	
	Registered SM Count :	1 (1 Data VCs)
	Sync Pulse Status :	Generating Sync
	Sync Pulse Source :	Self Generate
	Maximum Count of Registered SMs :	1
	Site Information	
	Site Name :	No Site Name
	Site Contact :	No Site Contact
	Site Location :	No Site Location
	(

3 On left hand side of home page, the login information is displayed:



4 Enter Username (factory default username is *admin*) and Password (factory default password is *admin*) and click **Login**.

Web GUI

Home	INELWORKS eral [P] [Radio] [SNMP] [Quality of Service (QoS)] [Security] [Time] [VLAN] [DiffServ] [Protocol Filtering]	
Configuration System Statistics Tools	© [] Unit Settings] Configuration → General	
Accounts Quick Start Copyright	5.7GHz MIMO OFDM - Backhaul - Timing Master - 0a-00-3e-a0-aa-9a	
Logoff Account: admin Level: ADMINISTRATOR	vice Type	
Mode: Read-Write Authentication Method: Local	k Speeds ■ k Speed : Auto 100F/100H/10F/10H ▼	
CANOPY® Sy Sy	nc Setting Inc Input : Generate Sync V	
Field Name	Description	
Main Manu	Click an option in side navigation bar (area marked as "1"). Multiple options in sub-navigation bars appear	
Menu Option	Click top sub-navigation bar to choose one configuration page (area marked as "2")	
Parameter	To configure the parameters (e.g. area marked as "3")	
Save Changes	Press "Save Changes" to confirm and save the changes	

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 72 to locate information about using each web page.

Table	72	Menu	options	and	web	pages
-------	----	------	---------	-----	-----	-------

Main menu	Menu options	Applicable module	Description
• Home			
	General Status	All	Viewing General Status on page 9-2
	Session Status	AP, BHM	Viewing Session Status on page 9-15
	Event Log	All	Interpreting messages in the Event Log on page 9-20
	Network Interface	AP, BHM	Viewing the Network Interface on page 9-23
	Layer 2 Neighbors	All	Viewing the Layer 2 Neighbors on page 9-24
Config	uration		
	General	All	General configuration on page 7-71
	IP	All	Configuring IP and Ethernet interfaces on page 7-26
	Radio	All	PMP/PTP 450i – Configurating radio on page 7-124
	SNMP	All	Setting up SNMP agent on page 7-168
	Qaulity of Service (QoS)	All	Configuring quality of service on page 7-185
	Security	All	Configuring security on page 7-97
	Time	AP, BHM	Setting up time and date Time page of PMP/PTP 450 platform AP/BHM on page 7-93

Main menu	Menu options	Applicable module	Description
	VLAN	All	VLAN Remarking and Priority bits configuration – AP/SM on page 7-46 VLAN configuration for PTP on page
			7-56
	DiffServ	All	IPv4 and IPv6 Prioritization on page 7- 63
	Protocol Filtering	All	Filtering protocols and ports on page 7-64
	Syslog	All	Configuring syslog on page 7-175
	Unit Setting	All	Configuring Unit Settings page on page 7-89
Statist	tics		
	Scheduler	All	Viewing the Scheduler statistics on page 9-25
	Registration Failures	AP, BHM	Viewing list of Registration Failures statistics on page 9-27
	Bridge Control Block	All	Interpreting Bridge Control Block statistics on page 9-50
	Bridging Table	All	Interpreting Bridging Table statistics on page 9-28
	Ethernet	All	Interpreting Ethernet statistics on page 9-30
	Radio	All	Interpreting RF Control Block statistics on page 9-33
	VLAN	All	Interpreting VLAN statistics on page 9-34
	Data VC	All	Interpreting Data VC statistics on page 9-36
	Throughput	AP, BHM	Interpreting Throughput statistics on page 9-38
	Filter	SM	Interpreting Filter statistics on page 9- 43
	ARP	SM	Viewing ARP statistics on page 9-44

Main menu	Menu options	Applicable module	Description
	Overload	All	Interpreting Overload statistics on page 9-41
	Syslog Statistics	All	Interpreting syslog statistics on page 9-55
	Translation Table	SM	Interpreting Translation Table statistics on page 9-29
	DHCP Relay	SM	Interpreting DHCP Relay statistics on page 9-42
	NAT Stats	SM	Viewing NAT statistics on page 9-45
	NAT DHCP	SM	Viewing NAT DHCP Statistics on page 9-47
	Pass Through Statistics	AP	Interpreting Pass Through Statistics on page 9-52
	Sync Status	AP	Interpreting Sync Status statistics on page 9-48
	PPPoE	SM	Interpreting PPPoE Statistics for Customer Activities on page 9-49
	SNMPv3 Statistics	All	Interpreting SNMPv3 Statistics on page 9-53
	Frame Utilization		Interpreting SNMPv3 Statistics on page 9-53
• Tools			
	Link Capacity Test	All	Using the Link Capacity Test tool on page 8-21
	Spectrum Analyzer	AII	Spectrum Analyzer tool on page 8-3
	Remote Spectrum Analyzer	All	Remote Spectrum Analyzer tool on page 8-12
	AP/BHM Evaluation	SM, BHS	Using AP Evaluation tool on page 8-24
			Using BHM Evaluation tool on page 8- 28
	Subscriber Configuration	AP	Using the Subscriber Configuration tool on page 8-36
	OFDM Frame Calculator	AP, BHM	Using the OFDM Frame Calculator tool on page 8-32

Main menu	Menu options	Applicable module	Description
	BER results	SM	Using BER Results tool on page 8-40
	Alignment Tool	SM, BHS	Using the Alignment Tool on page 8- 15
	Link Status	AP	Using the Link Status tool on page 8- 37
	Sessions	AP	Using the Sessions tool on page 8-41
Logs			
Accou	nts		
	Change User Setting		Changing a User Setting on page 7-99
	Add user		Adding a User for Access to a module on page 7-98
	Delete User		Deleting a User from Access to a module on page 7-99
	User		Users account on page 7-100
Quick	Start		
	Quick Start	AP, BHM	Quick link setup on page 7-12
	Region Settings	AP, BHM	Quick link setup on page 7-12
	Radio Carrier Frequency	AP, BHM	Quick link setup on page 7-12
	Synchronization	AP, BHM	Quick link setup on page 7-12
	LAN IP Address	AP, BHM	Quick link setup on page 7-12
	Review and Save Configuration	AP, BHM	Quick link setup on page 7-12
• PDA			
	Quick Status	SM	The PDA web-page includes 320 x 240
	Spectrum Results (PDA)	SM	information important to installation
	Information	SM	legacy PDA devices. All device web
	BHM Evaluation	SM	pages are compatible with touch devices such as smart phones and

Main menu	Menu options	Applicable module	Description
_	AIM	SM	tablets.
Copyrig	yht		
	Copyright Notices	All	The Copyright web-page displays pertinent device copyright information.
Logoff		All	

Quick link setup

Note

This section describes how to use the Quick Start Wizard to complete the essential system configuration tasks that must be performed on a PTP/PMP configuration.



If the IP address of the AP or BHM is not known, See Radio recovery mode – Radio Recovery Console / Default Mode (fka Default Plug) on page 1-20.

Initiating Quick Start Wizard

Applicable products PMP :	AP	РТР: 🗹 ВНМ
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To start with Quick Start Wizard: after logging into the web management interface click the **Quick Start** button on the left side of main menu bar. The AP/BHM responds by opening the Quick Start page.

Figure 94 Disarm Installation page (top and bottom of page shown)

Welcome to the Canopy Quick Sta	rt Configuration Wizard	
The Canopy system consist devices that can be put into configuration. This program need to cover the use of on	s of a family of highly flexible fixed wireless access service very quickly and with a minimal walks you through that configuration. To do this, we ly three parameters:	
	RF Carrier Frequency	
	Synchronization	
	Network IP Address	
These are the only paramet Canopy system! Each of the and ask you for a choice tha you will be given the opport and save it to non-volatile m saving the configuration will Canopy is a highly flexible s from very simple to very sop for your application, please user guides.	ers that need to be configured to start using your e following pages will tell you a little about Canopy at best addresses your network needs. At the end, unity to review the configuration you have selected nemory. None of the changes you make prior to affect your system so feel free to experiment. ystem that can be used to build networks ranging obisticated. If more advanced options are required refer to the Canopy configuration page and Canopy	

Quick Start is a wizard that helps you to perform a basic configuration that places an AP/BHM into service. Only the following parameters must be configured:

- Region Code
- RF Carrier Frequency
- Synchronization
- LAN (Network) IP Address

In each Quick Start page, you can

- specify the settings to satisfy the requirements of the network.
- review the configuration selected.
- save the configuration to non-volatile memory.

Procedure 12 Quick start wizard

- 1 At the bottom of the Quick Start tab, click the **Go To Next Page** button.
- 2 From the pull-down menu, select the region in which the AP will operate.

Figure 95 Regional Settings tab of AP/BHM

Region Settings Descriptions
To comply with various international regulations, a region setting is required. This unit will NOT
transmit unless a valid region code is set. Please select your region code from the drop down
menu. If your region does not appear, then select "Other".

Region Settings	
Region :	Other - Regulatory 🔻
Country :	Other - FCC 🔹

<=Go To Previous Page Go To Next Page=>

3 Click the Go To Next Page button.

4 From the pull-down menu, select a frequency for the test.

Figure 96 Radio Carrier Frequency tab of AP/BHM

To communicate, each Access Point (AP) and Backhaul (BH) timing master must be assigned a specific carrier frequency. By default, this frequency is not set at the factory to ensure that new units do not accidentally transmit on an unintended frequency. For our purposes, frequency selection for OFDM platforms has two basic rules:							
 platforms has two basic rules: Two radios located at a single location (such as an AP cluster) and on the same frequency should not have an overlapping pattern. Generally for PMP 450, no guard band is needed. With the exception of 3.5/3.65 GHz platform, which can also operate with no guard band if "Adjacent Channel Support" is enabled. Otherwise 3.5/3.65 will need a guard band of 5/3/2 MHz for 20/10/5 MHz channel bandwidths. For PMP 430 and PTP 230, 5/5/2.5 MHz guard band is required for 20/10/5 MHz channels bandwidths. We recommend multipoint AP clusters use frequencies separated by 15 MHz where convenient. For a 360 degree multipoint AP, each frequency is used twice with the back-to-back units sharing the same frequency. 							
5/5/2.5 MHz guard We recommend multi where convenient. Fo twice with the back-to Please see the Canop	point AP clusters r a 360 degree m -back units sharin yy User's Guide oi	use freque ultipoint Al g the sam nline for th	encies sepa P, each freo e frequency ie latest info	rated by f quency is ormation.	15 MHz used		
5/5/2.5 MHz guard We recommend multi where convenient. Fo twice with the back-to Please see the Canop Direction of Access Point Radio	point AP clusters r a 360 degree m -back units sharin by User's Guide of	use freque ultipoint Al g the sam nline for th Sector ID	encies sepa P, each freo e frequency e latest info Symbol	rated by fuency is .	I5 MHz used		
5/5/2.5 MHz guard We recommend multi where convenient. Fo twice with the back-to Please see the Canop Direction of Access Point Radio Northeast	point AP clusters r a 360 degree m -back units sharin by User's Guide of Frequency 5495 MHz	use freque ultipoint Al g the sam nline for th Sector ID	encies sepa P, each freq e frequency le latest info Symbol	rated by fuency is fuency is fuency is fuency is fuence for the second s	I5 MHz used		
5/5/2.5 MHz guard We recommend multi where convenient. Fo twice with the back-to Please see the Canop Direction of Access Point Radio Northeast Southeast	point AP clusters r a 360 degree m -back units sharin by User's Guide of Frequency 5495 MHz 5545 MHz	use freque ultipoint Al g the sam nline for th Sector ID 1 2	encies sepa P, each freq e frequency le latest info Symbol A B	rated by fuency is fuency is fuency is fuency is fuence of the second se	I5 MHz used		
5/5/2.5 MHz guard We recommend multi where convenient. Fo twice with the back-to Please see the Canop Direction of Access Point Radio Northeast Southeast Southeast	point AP clusters r a 360 degree m -back units sharin by User's Guide of Frequency 5495 MHz 5545 MHz 5495 MHz	use freque ultipoint Al g the sam nline for th Sector ID 1 2 1	encies sepa P, each freq e frequency le latest info Symbol A B A	rated by fuency is the fuency is the fuence of the fuence	B A		

Please select Carrier Frequency from 5490.0 •

<=Go To Previous Page Go To Next Page=>

5 Click the Go To Next Page button.

6 At the bottom of this tab, select **Generate Sync Signal**.

Figure 97 Synchronization tab of AP/BHM

Synchronization
When any radio transmits, it radiates energy. If a nearby radio is trying to receive at the same time another is transmitting, interference can result. One of the mechanisms used by Canopy to avoid this issue is to synchronize all transmissions. This approach ensures that all Canopy units will transmit and receive during the same time interval.
To accomplish this, Canopy Cluster Management Module's (CMM) each contain a GPS receiver. This receiver is used to create a precision timing signal which is then used by the attached APs/BHs (Backhauls). For systems that have only one AP/BH, this signal can be generated by selecting "Generate Sync" which causes AP/BH to use a simulated synchronization. For systems that have multiple APs/BHs, GPS synchronization should be used.
Each AP or BH timing master (BHM) must be programmed to either generate its own synchronization pulse (for single AP/BHM use only) or to use an external pulse. If you are using a CMM or other source of synchronization timing, you should select "AutoSync"; if not, you should select "Generate Sync". There are three methods on the AP/BHM from which the synchronization is received: 1)Power Port (Not applicable for PTP450) 2)Timing Port 3)On-board GPS (PMP 450 AP only) If the power port is being used, only one cable is pecessary to obtain power
and the synchronization pulse. If the timing port is used, two cables will be necessary, one to obtain power and the other for the synchronization pulse.
Selecting "AutoSync + Free Run" will allow the AP/BHM to continue to transmit even after the sync pulse is lost. Otherwise if "AutoSync" is selected and synchronization pulse is lost, the AP/BHM will immediately stop transmitting. This is done to prevent interference with other Canopy systems.
Please be aware that operating multiple APs/BHs without an external GPS timing source may lead to degraded system operation.
Also, use the Frame Calculator tool for complete transmit and receive synchronization across different Canopy products.
Synchronization Parameters
Synchronization : Generate Sync

<=Go To Previous Page Go To Next Page=>

7 Click the Go To Next Page button.

- 8 At the bottom of the IP address configuration tab, either
 - specify an **IP Address**, a **Subnet Mask**, and a **Gateway IP Address** for management of the AP and leave the **DHCP state** set to **Disabled**.
 - set the DHCP state to Enabled to have the IP address, subnet mask, and gateway IP address automatically configured by a domain name server (DNS).

Figure 98 LAN IP Address tab of the AP/BHM

LAN IP	Address	E
	The IP address of the Canopy AP/BH timing master is used to talk to the unit in order to monitor, update, and manage the Canopy system. If you are viewing this page (which you appear to be doing now), your browser is communicating with the Canopy AP/BH using this IP address.	
	Each network has its own collection of IP addresses that are used to route traffic between network elements such as APs, BHs, Routers, and Computers. You need to select the IP address, Default Gateway, and Network Mask which you intend to use to communicate with the AP/BH timing master in the space below.	
	If you don't know what these are, please consult your local network specialist.	

LAN1 Network Interface Configuration						
IP Address :	10.110.65.90					
Subnet Mask :	255.255.255.0					
Gateway IP Address :	10.110.65.254					
DHCP state :	Enabled					
	Isabled					
DHCP DNS IP Address	Obtain Automatically					
	Set Manually					
Preferred DNS Server :	10.110.12.31					
Alternate DNS Server :	10.110.12.30					
Domain Name :	pool.ntp.org					

<=Go To Previous Page | Go To Next Page=>



Note

Cambium encourages you to experiment with the interface. Unless you save a configuration and reboot the AP after you save the configuration, none of the changes are affected.

9 Click the Go To Next Page => button.

10 Ensure that the initial parameters for the AP are set as you intended.

Figure 99 Review and Save Configuration tab of the AP/BHM

Review and Save Cor	figuration						
The parameter may:	rs below reflect the selections you have made. From here, you						
Change any parameter							
	Save the parameters to non-volatile memory						
	Undo all changes since the unit was last reset						
	Reset all settings to their factory default values						
	Reboot the Unit						
It is important t unit will take ef unit is ready to	to know that no configuration changes you make to the Canopy fect until the unit is rebooted. Once you reboot, your Canopy go!						
AP Carrier Frequency	Parameter						
Please select Carrier F	requency 5490.0 V						
rom the list :							
Region Settings							
Region :	Other - Regulatory 🔻						
Country :	Other •						
Synchronization Para	neters						
Synchronization :	Generate Sync V						
AN1 Network Interfa	co Configuration						
P Address :	10 110 65 90						
Subnet Mask :	255 255 255 0						
Gateway IP Address :	10.110.65.254						
DHCP state :	 Enabled Disabled 						
DHCP DNS IP Addres	s : Obtain Automatically Set Manually						
Preferred DNS Server : 10.110.12.31							
Alternate DNS Server	10.110.12.30						
Demain Mana :	pool nto org						
Domain Name.	poolinpiolog						
Domain Name .	poormprovy						
Unit-Wide Changes							

Save Changes

Reboot

- 11 Click the Save Changes button.
- 12 Click the **Reboot** button.*RESULT:* The AP responds with the message **Reboot Has Been Initiated...**
- 13 Wait until the indicator LEDs are not red.
- 14 Trigger your browser to refresh the page until the AP redisplays the General Status tab.
- 15 Wait until the red indicator LEDs are not lit.

Configuring time settings

Applicable products	PMP :	\checkmark	AP	PTP:	\checkmark	внм

To proceed with the test setup, click the **Configuration** link on the left side of the General Status page. When the AP responds by opening the Configuration page to the General page, click the Time tab.

Figure 100 Time tab of the AP/BHM

NTP Server Configuration		
NTP Server (Name or IP Address) :	 Append DNS Domain Name Disable DNS Domain Name 	
NTP Server 1 (Name or IP Address):	0.0.0	
NTP Server 2 (Name or IP Address):	0.0.0.0	
NTP Server 3 (Name or IP Address):	0.0.0.0	
NTP Server(s) In Use :	No NTP Server Configured	
l	Get Time via NTP	
Current System Time		
Time Zone :	UTC : (UTC) Coordinated Universal Time	•
System Time :	01:55:25 01/01/2011 UTC	
Last NTP Time Update :	00:00:00 00/00/0000 UTC	
Time and Date		
Time :	01 : 55 : 21 UTC	
Date :	01 / 01 / 2011	
l	Set Time and Date	
NTP Update Log		
No entries.		

To have each log in the AP/BHM correlated to a meaningful time and date, either a reliable network element must pass time and date to the AP/BHM or you must set the time and date whenever a power cycle of the AP/BHM has occurred. A network element passes time and date in any of the following scenarios:

- A connected CMM4 passes time and date (GPS time and date, if received).
- A separate NTP server is addressable from the AP/BHM.

If the AP/BHM should obtain time and date from a CMM4, or a separate NTP server, enter the IP address of the CMM4 or NTP server on this tab. To force the AP/BHM to obtain time and date before the first (or next) 15-minute interval query of the NTP server, click **Get Time through NTP**. If you enter a time and date, the format for entry is

Figure 101 Time and date entry formats

Time :	hh	/	mm	/	SS
Date :	ММ	/	dd	/	үүүү

where

hh represents the two-digit hour in the range 00 to 24

- mm represents the two-digit minute
- ss represents the two-digit second
- MM represents the two-digit month
- dd represents the two-digit day
- yyyy represents the four-digit year

Proceed with the time setup as follows.

Procedure 13 Entering AP/BHM time setup information

Note

- **1** Enter the appropriate information in the format shown above.
- 2 Then click the **Set Time and Date** button.



The time displayed at the top of this page is static unless your browser is set to automatically refresh

Powering the SM/BHS for test

Procedure 14 Powering the SM/BHS for test

- 1 In one hand, securely hold the top (larger shell) of the SM/BHS. With the other hand, depress the lever in the back of the base cover (smaller shell). Remove the base cover.
- 2 Plug one end of a CAT 5 Ethernet cable into the SM PSU port
- **3** Plug the other end of the Ethernet cable into the jack in the pig tail that hangs from the power supply
- 4 Roughly aim the SM/BHS toward the AP/BHM

5 Plug the power supply into an electrical outlet



Warning

From this point until you remove power from the AP/BHM, stay at least as far from the AP/BHM as the minimum separation distance specified in Calculated distances and power compliance margins.

6 Repeat the foregoing steps for each SM/BHS that you wish to include in the test.

Viewing the Session Status of the AP/BHM to determine test registration

Once the SMs/BHS under test are powered on, return to the computing device to determine if the SM/BHS units have registered to the AP/BHM.



Note

In order for accurate power level readings to be displayed, traffic must be present on the radio link.

The Session Status tab provides information about each SM/BHS that has registered to the AP/BHM. This information is useful for managing and troubleshooting a system. All information that you have entered in the **Site Name** field of the SM/BHS displays in the Session Status tab of the linked AP/BHM.

The Session Status tab also includes the current active values on each SM(or BHS) (LUID) for MIR, and VLAN, as well as the source of these values (representing the SM/BHS itself, Authentication Server, or the AP/BHM and cap, if any—for example, APCAP as shown above).. As an SM/BHS registers to the AP/BHM, the configuration source that this page displays for the associated LUID may change. After registration, however, the displayed source is stable and can be trusted.

Idle subscribers may be included or removed from the session status display by enabling or disabling, respectively, the **Show Idle Sessions** parameter. Enabling or disabling this parameter only affects the GUI display of subscribers, not the registration status.

The SessionStatus.xml hyperlink allows user to export session status page from web management interface of AP/BHM. The session status page will be exported in xml file.

Procedure 15 Viewing the AP Session Status page

1 On the AP web management GUI, navigate to Home, Session Status:

Figure 102 Session Status tab of AP

eneral Status Session Status Remote Subscribers Event Log Network Interface Layer 2 Neighbors								
Home \rightarrow Session Status								
5.	5.4GHz MIMO OFDM - Access Point - 0a-00-3e-bb-00-fb							
Session Status Configuration								
Show Idle Sessions :	Enabled Disabled							
Reset Session Counters								
Last Session Counter Reset :	None Reset Session Co	unters						
Session Status List	ssionStatus yml							
Device Session	Power Configuration							
Subscriber	Hardware Software Version	FPGA Version	State					
LUID: 002 - [0a-00-3e-bb-01-04] PMP 450i CANOPY 14.1 091415 (DES, Sched, US/ETSI) P13 IN SESSION (Encrypt Disabled)								
< >								



Session status page for BHM is same as AP.

2 Verify that for each SM (or BHS) MAC address (printed on the SM/BHS housing) the AP/BHM has established a registered session by verifying the "State" status of each entry.

The Session Status page of the AP/BHM is explained in Table 73.

Table 73 Session Status Attributes – AP

Session Status Configuration					Ē
Show Idle Sessions :		Enabled			
(Obloadica)
Reset Session Counters					
Last Session Counter Reset :		None			
		Reset Sess	ion Counter	rs	
Session Status List					۵,
Data :	Sessio	nStatus.xml			
Device Session	Po	wer Configur	ation		
Subscriber	Hardware	Software Vers	sion	FPGA Version	State
LUID: 002 - [0a-00-3e-bb-01-04] No Site Name	PMP 450i	CANOPY 14.1	0	91415 (DES, Sched, US/ETSI) P13	IN SESSION (Encrypt Disabled)
1					

Attribute	Meaning			
LUID	This field displays the LUID (logical unit Identifier) of the SM/BHS. As each SM/BHS registers to the AP/BHM, the system assigns a LUID of 2 or a higher unique number to the SM/BHS. If an SM/BHS loses registration with the AP/BHM and then regains registration, the SM/BHS will retain the same LUID.			
	Note The LUID associated is lost when a power cycle of the AP/BHM occurs.			
	Both the LUID and the MAC are hot links to open the interface to the SM/BHS. In some instances, depending on network activity and network design, this route to the interface yields a blank web page. If this occurs, refresh your browser view.			
MAC	This field displays the MAC address (or electronic serial number) of the SM/BHS. Both the LUID and the MAC are hot links to open the interface to the SM. In some instances, depending on network activity and network design, this route to the interface yields a blank web page. If this occurs, refresh your browser view.			
State	 This field displays the current status of the SM/BHS as either IN SESSION to indicate that the SM/BHS is currently registered to the AP/BHM. 			
	 IDLE to indicate that the SM/BHS was registered to the AP/BHM at one time, but now is not. 			
	This field also indicates whether the encryption scheme in the module is enabled.			
Site Name	This field indicates the name of the SM/BHS. You can assign or change this name on the Configuration web page of the SM/BHS. This information is also set into the <i>sysName</i> SNMP MIB-II object and can be polled by an SNMP management server.			
Software Version	This field displays the software release that operates on the SM/BHS, the release date and time of the software.			
FPGA Version	This field displays the version of FPGA that runs on the SM/BHS.			
Session Timeout	This field displays the timeout in seconds for management sessions via HTTP, ftp access to the SM/BHS. 0 indicates that no limit is imposed.			
AirDelay	This field displays the distance of the SM from the AP/BHM. To derive the distance in meters, multiply the displayed number by 0.3048. At close distances, the value in this field is unreliable.			
Session Count	This field displays how many times the AP/BHM has granted registration to the SM/BHS. Typically, this is the sum of Reg Count and Re-Reg			

	Count. However, the result of internal calculation may display here as a value that slightly differs from the sum.
Reg Count	When a SM/BHS makes a registration request, the AP/BHM checks its local database to see whether it considers the SM/BHS to be already registered. If the AP/BHM concludes that the SM/BHS is not currently in session, then the request increments the value of this field.
Re-Reg Count	When an SM/BHS makes a registration request, the AP/BHM checks its local database to see whether it considers the SM/BHS to be already registered. If the AP/BHM concludes that the SM/BHS is not, then the request increments the value of this field.
	Typically, a Re-Reg Count is the case where the SM/BHS attempts to register for having lost communication with the AP/BHM and the AP/BHM has not yet observed the link to the SM/BHS as being out of session. Then the AP/BHM again grants the registration to the SM/BHS and increments the re-registration count.
	If the number of sessions is significantly greater than the number for other SMs/BHS, then this may indicate a link problem (check mounting, alignment, receive power levels) or an interference problem (conduct a spectrum scan).
Session Uptime	Once an SM/BHS successfully registers to an AP/BHM, this timer is started. If a session drops or is interrupted, this timer is reactivated once re-registration is complete.
Power Level	This field indicates the AP's/BHM's combined receive power level for the listed SM/BHS.
Signal Strength Ratio	This field displays the ratio of the Vertical path received signal power to the Horizontal path received signal power. This ratio can be useful for determining multipathing conditions (high vertical to horizontal ratio).
Signal to Noise Ratio	This field lists the current signal-to-noise level, an indication of the separation of the received power level vs. noise floor.
Sustained Uplink Data Rate	This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the specified rate at which each SM/BHS registered to this AP/BHM is replenished with credits for transmission. The configuration source of the value is indicated in parentheses. The AP/BHM will display one of denotations for configuration source.
·····-	See Table 74 on page 7-25.
Uplink Burst Allocation	This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the specified maximum amount of data that each SM/BHS is allowed to transmit before being recharged at the Sustained Uplink Data Rate with credits to transmit more. The configuration source of the value is indicated in

	parentheses. The AP/BHM will display one of denotations for configuration source.
	See Table 74 on page 7-25.
Sustained Downlink Data Rate	This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the specified the rate at which the AP/BHM should be replenished with credits (tokens) for transmission to each of the SMs/BHS's in its sector. The configuration source of the value is indicated in parentheses.
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
Downlink Burst Allocation	This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the maximum amount of data to allow the AP/BHM to transmit to any registered SM/BHS before the AP/BHM is replenished with transmission credits at the Sustained Downlink Data Rate . The configuration source of the value is indicated in parentheses.
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
Max Burst Uplink Rate	The data rate at which an SM/BHS is allowed to burst (until burst allocation limit is reached) before being recharged at the Sustained Uplink Data Rate with credits to transit more. When set to 0 (default), the burst rate is unlimited.
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
Max Burst Downlink Rate	The data rate at which an SM/BHS is allowed to burst (until burst allocation limit is reached) before being recharged at the Sustained Downlink Data Rate with credits to transit more. When set to 0 (default), the burst rate is unlimited.
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
Low Priority Uplink CIR	This field indicates the minimum rate at which low priority traffic is sent over the uplink (unless CIR is oversubscribed or RF link quality is degraded).
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
Low Priority Downlink CIR	This field indicates the minimum rate at which low priority traffic is sent over the downlink (unless CIR is oversubscribed or RF link quality is degraded).
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
High Uplink CIR	This field indicates the minimum rate at which high priority traffic is sent

	over the uplink (unless CIR is oversubscribed or RF link quality is degraded).
	The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25.
High Downlink CIR	This field indicates the minimum rate at which high priority traffic is sent over the downlink (unless CIR is oversubscribed or RF link quality is degraded). The AP/BHM will display one of denotations for configuration source.
Rate	This field displays whether the high-priority channel is enabled in the SM and the status of rate adapt. For example, if "8X/4X" is listed, the radio is capable of operating at 8X but is currently operating at 4X, due to RF conditions.
	This field also states whether it is MIMO-A or MIMO-B radio e.g. "8X/8X MIMO-B" indicates MIMO-B and "8X/4X MIMO-A" indicates MIMO-A.

Table 74 Session Status > Configuration CIR configuration denotations

Attribute	Meaning
(SM)	QoS/VLAN parameters are derived from the SM's/BHS's settings
(APCAP)	QoS/VLAN parameters are derived from the AP's settings, including any keyed capping (for radios capped at 4 Mbps, 10 Mbps, or 20 Mbps)
(D)	QoS/VLAN parameters are retrieved from the device, due to failed retrieval from the AAA or WM server.
(AAA)	QoS/VLAN parameters are retrieved from the RADIUS server
(BAM)	QoS/VLAN parameters are retrieved from a WM BAM server

Configuring IP and Ethernet interfaces

This task consists of the following sections:

- Configuring the IP interface on page 7-27
- NAT, DHCP Server, DHCP Client and DMZ on page 7-29
- IP interface with NAT disabled on page 7-34
- IP interface with NAT enabled on page
- NAT tab with NAT disabled on page 7-37
- NAT tab with NAT enabled on page 7-40
- NAT DNS Considerations on page 7-45
- DHCP BHS on page 7-46
- VLAN Remarking and Priority bits configuration on page 7-46
- VLAN page of AP on page 7-49
- VLAN page of SM on page 7-52
- VLAN Membership tab of SM on page 7-56
- VLAN configuration for PTP on page 7-56
- NAT Port Mapping tab SM on page 7-45

Configuring the IP interface

The IP interface allows users to connect to the PMP/PTP 450 platform web interface, either from a locally connected computer or from a management network.

Applicable products	PMP :	\checkmark	AP	\checkmark	SM	PTP:	\checkmark	внм	\checkmark	BMS
Applicable products								DITIVI		DIVIS

To configure the IP interface, follow these instructions:

Procedure 16 Configuring the AP/BHM IP interface

1 Select menu option **Configuration** > **IP**. The LAN configuration page is displayed:

LAN1 Network Interface Configuration	
IP Address :	169.254.1.1
Subnet Mask :	255.255.0.0
Gateway IP Address :	169.254.0.0
DHCP state :	 Enabled Disabled
DNS IP Address :	 Obtain Automatically Set Manually
Preferred DNS Server :	0.0.0.0
Alternate DNS Server :	0.0.0.0
Domain Name :	example.com

- 2 Update IP Address, Subnet Mask and Gateway IP Address to meet network requirements (as specified by the network administrator).
- 3 Review the other IP interface attributes and update them, if necessary (see Table 75 IP interface attributes).
- 4 Click **Save**. "Reboot Required" message is displayed:

LAN1 Network Interface Configuration	
IP Address :	169.254.1.2
Subnet Mask :	255.255.0.0
Gateway IP Address :	169.254.0.0
DHCP state :	C Enabled ● Disabled
DNS IP Address :	 Obtain Automatically Set Manually
Preferred DNS Server :	0.0.0
Alternate DNS Server :	0.0.0.0
Domain Name :	example.com

5 Click **Reboot**.

The IP page of AP/SM/BHM/BHS is explained in Table 75.

Table 75 IP interface attributes

LAN1 Network Interface (Configuration			
IP Address :	169.254.1.1			
Subnet Mask :	255.255.0.0			
Gateway IP Address :	169.254.0.0			
DHCP state :	 Enabled Disabled 			
DNS IP Address :	Obtain Auton Set Manually	natically		
Preferred DNS Server :	0.0.0.0			
Alternate DNS Server :	0.0.0.0			
Domain Name :	example.com			J
LAN2 Network Interface (IP Address :	Configuration (Radio Private Interface 192.168.101.1	- Must end in	.1))
Attribute	Meaning			
IP Address	Internet Protocol (IP) addr protocols to uniquely ider	ess. This a ntify this ur	ddress is used by family of Intenit on a network.	rnet
Subnet Mask	Defines the address range	e of the cor	nnected IP network.	
	The IP address of a compu- gateway. A gateway acts a other networks.	uter on the as an entra	current network that acts as a nce and exit to packets from ar	าd to
DHCP state	If Enabled is selected, the configuration (IP address, values of those individual of this DHCP state parame Interface tab of the Home	DHCP serv subnet ma paramete eter is also page.	ver automatically assigns the IP ask, and gateway IP address) ar rs (above) are not used. The set viewable (read only), in the Ne	nd the ting twork
DNS IP Address	Canopy devices allow for server IP address either au DNS server IP address ma management interface of automatically from the DH management interface of configured to set the DNS enabled for the managem 0.0.0.0 when configured n	configurat utomatical nually wh the device ICP respor the device server IP ent interfa nanually.	ion of a preferred and alternate ly or manually. Devices must se en DHCP is disabled for the . DNS servers may be configure ase when DHCP is enabled for th . Optionally devices may be address manually when DHCP i ce. The default DNS IP address	DNS >t ed he s es are
Preferred DNS Server	The first address used for	DNS resol	ution.	
Alternate DNS Server	If the Preferred DNS servers is used.	er cannot b	e reached, the Alternate DNS S	erver
Domain Name	The operator's manageme The domain name configu	ent domair uration can	n name may be configured for E be used for configuration of th	DNS. ie

servers in the operator's network. The default domain name is

	example.com, and is only use	ed if config	gured as such.	
LAN2 Network Interface Configuration (Radio Private Interface) – IP Address	It is recommended not to cha AP/BHM private IP address of communicate with each of the uses a combination of the pri SM/BHS. It is only displayed for AP and Table 76 SM/BHS private IP a	It is recommended not to change this parameter from the default AP/BHM private IP address of 192.168.101.1. A /24 CIDR subnet is used to communicate with each of the SMs/BHS that are registered. The AP/BHM uses a combination of the private IP and the LUID (logical unit ID) of the SM/BHS. It is only displayed for AP and BHM. Table 76 SM/BHS private IP and LUID		
	SM/BHS	LUID	Private IP	
	First SM/BHS registered 2 192.168.101.2			
	Second SM/BHS registered	3	192.168.101.3	

NAT, DHCP Server, DHCP Client and DMZ

Applicable products	PMP :	⊠ SM
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The system provides NAT (Network Address Translation) for SMs in the following combinations of NAT and DHCP (Dynamic Host Configuration Protocol):

- NAT Disabled
- NAT with DHCP Client (DHCP selected as the Connection Type of the WAN interface) and DHCP Server
- NAT with DHCP Client(DHCP selected as the Connection Type of the WAN interface)
- NAT with DHCP Server
- NAT without DHCP

NAT

NAT isolates devices connected to the Ethernet or wired side of a SM from being seen directly from the wireless side of the SM. With NAT enabled, the SM has an IP address for transport traffic (separate from its address for management), terminates transport traffic and allows you to assign a range of IP addresses to devices that are connected to the Ethernet or wired side of the SM.

In the Cambium system, NAT supports many protocols, including HTTP, ICMP (Internet Control Message Protocols), and FTP (File Transfer Protocol). For virtual private network (VPN) implementation, L2TP over IPSec (Level 2 Tunneling Protocol over IP Security) and PPTP (Point to Point Tunneling Protocol) are supported.



Note

When NAT is enabled, a reduction in throughput is introduced in the system (due to processing overhead).

DHCP

DHCP enables a device to be assigned a new IP address and TCP/IP parameters, including a default gateway, whenever the device reboots. Thus DHCP reduces configuration time, conserves IP addresses, and allows modules to be moved to a different network within the Cambium system. In conjunction with the NAT features, each SM provides the following:

- A DHCP server that assigns IP addresses to computers connected to the SM by Ethernet protocol.
- A DHCP client that receives an IP address for the SM from a network DHCP server.

DMZ

In conjunction with the NAT features, a DMZ (Demilitarized Zone) allows the allotment of one IP address behind the SM for a device to logically exist outside the firewall and receive network traffic. The first three octets of this IP address must be identical to the first three octets of the NAT private IP address.

- A DHCP server that assigns IP addresses to computers connected to the SM by Ethernet protocol.
- A DHCP client that receives an IP address for the SM from a network DHCP server.

NAT Disabled

The NAT Disabled implementation is illustrated in Figure 103.