

PEP WAVE

Broadband Possibilities

User Manual

Pepwave AP One Series:

AP One Enterprise / AP One AC mini / AP One In-Wall /
AP One 300M / AP One Flex 300M

Pepwave AP Pro Series:

AP Pro / AP Pro 300M / AP Pro Duo

June 2015

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Table of Contents

1	Introduction and Scope	4
2	Product Features and Benefits	5
3	Package Contents	6
3.1	AP One Enterprise	6
3.2	AP One AC mini	6
3.3	AP One In-Wall	6
3.4	AP One 300M	6
3.5	AP One Flex 300M	6
3.6	AP Pro / AP Pro 300M / AP Pro Duo	6
4	Hardware Overview	7
4.1	AP One Enterprise	7
4.2	AP One AC mini	8
4.3	AP One In-Wall	9
4.4	AP One 300M	10
4.5	AP One Flex 300M	11
4.6	AP Pro / AP Pro 300M / AP Pro Duo	12
5	Installation	13
5.1	Installation Procedures	14
6	Using the Dashboard	15
6.1	General	15
6.2	AP	17
7	Configuration	19
7.1	System	19
7.1.1	Admin Security	19
7.1.2	Firmware	21
7.1.3	Time	21
7.1.4	Event Log	22
7.1.5	SNMP	23
7.1.6	Controller	25
7.1.7	Configuration	26
7.1.8	Reboot	27

User Manual

PEPWAVE AP Series

7.2	AP	27
7.2.1	Wireless SSID	27
7.2.2	Settings	37
7.2.3	WDS	40
7.3	Network	41
7.3.1	WAN	41
7.3.2	LAN	43
7.3.3	PepVPN	46
8	Tools	49
8.1	Ping	49
8.2	Traceroute	49
8.3	Nslookup	50
9	Monitoring Device Status	51
9.1	Device	51
9.2	Client List	51
9.3	WDS Info	52
9.4	Portal	52
9.5	Rogue AP	53
9.6	Event Log	53
10	Restoring Factory Defaults	54
11	Appendix	55

1 Introduction and Scope

Our AP Series of enterprise-grade 802.11b/g/n Wi-Fi access points is engineered to provide fast, dependable, and flexible operation in a variety of environments, all controlled by an easy-to-use centralized management system. From the small but powerful AP One AC mini to the top-of-the-line AP One 300M our AP Series offers wireless networking solutions to suit any business need, and every access point is loaded with essential features such as multiple SSIDs, VLAN, WDS, and Guest Protect.

A single access point provides as many as 32 virtual access points (16 on single-radio models), each with its own security policy (WPA, WPA2, etc.) and authentication mechanism (802.1x, open, captive portal, etc.), allowing faster, easier, and more cost-effective network builds. Each member of the AP Series family also features a high-powered Wi-Fi transmitter that greatly enhances coverage and performance while reducing equipment costs and maintenance.

2 Product Features and Benefits

Key features and benefits of AP Series access points:

- High-powered Wi-Fi transmitter enhances coverage and lowers cost of ownership.
- Independent security policies and encryption mechanisms for each virtual access point allow fast, flexible, cost-effective network builds.
- Centralized management via InControl reduces maintenance expense and time.
- WDS support allows secure and fast network expansion.
- Guest Protect support guards sensitive business data and subnetworks.
- WMM (Wi-Fi Multimedia) and QoS (Quality of Service) support keeps video and other bandwidth-intensive data flowing fast and lag-free.

3 Package Contents

3.1 AP One Enterprise

- 1 x AP One Enterprise
- 1 x Mounting kit
- 1 x Instruction sheet

3.2 AP One AC mini

- 1 x AP One mini
- 1 x Omni-directional antenna
- 1 x Power supply
- 1 x Instruction sheet

3.3 AP One In-Wall

- 1 x AP One In-Wall
- 1 x Mounting kit
- 1 x Instruction sheet

3.4 AP One 300M

- 1 x AP One 300M
- 2 x Omni-directional antennas
- 1 x Power supply
- 1 x Instruction sheet

3.5 AP One Flex 300M

- 1 x AP One Flex 300M
- 1 x Instruction sheet

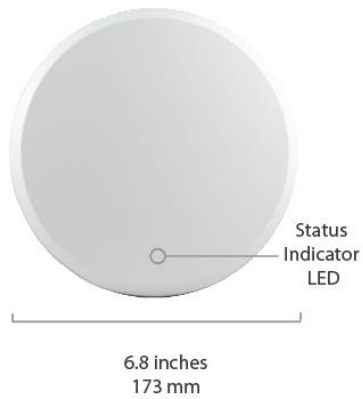
3.6 AP Pro / AP Pro 300M / AP Pro Duo

- 1 x AP Pro / AP Pro 300M / AP Pro Duo
- 1 x Instruction sheet
- 1 x Installation guide

4 Hardware Overview

4.1 AP One Enterprise

Top View



Bottom view



Side View

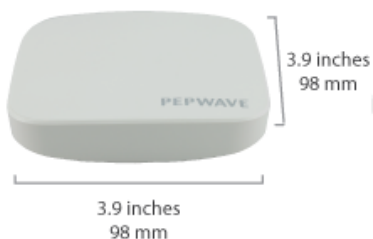


LED Indicators

LED Indicators	
Status	RED – Access point initializing
	GREEN – Access point ready
LAN	OFF – No device connected to Ethernet port
	BLINKING – Ethernet port sending/receiving data
	ON – Powered-on device connected to Ethernet port

4.2 AP One AC mini

Front View



Rear Panel View



LED Indicators

Status

RED – Access point initializing

GREEN – Access point ready

Wi-Fi

OFF – 2.4/5GHz Wi-Fi radio off

BLINKING – AP sending/receiving data

GREEN – 2.4/5GHz Wi-Fi radio on

Note that this model includes a 2.4GHz Wi-Fi radio and a 5GHz Wi-Fi radio that can operate simultaneously to increase speed and reduce interference.

4.3 AP One In-Wall

Front View (US)



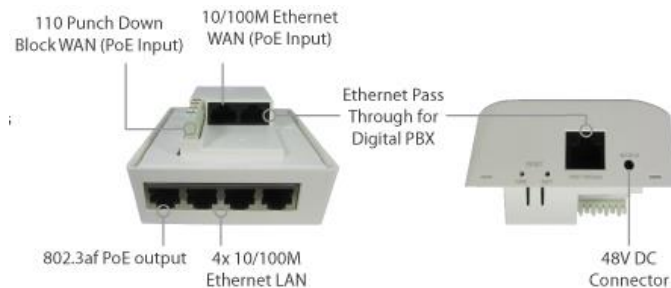
Front View (International)



Rear Panel View



Top View



LED Indicators

LED Indicators	
Status	RED – Access point initializing
	GREEN – Access point ready
WLAN 1/2	OFF – 2.4/5GHz Wi-Fi radio off
	BLINKING – AP sending/receiving data
	GREEN – 2.4/5GHz Wi-Fi radio on
Note that this model includes a 2.4GHz Wi-Fi radio and a 5GHz Wi-Fi radio that can operate simultaneously to increase speed and reduce interference. WLAN1 displays the status of the 2.4GHz Wi-Fi radio, while WLAN2 displays the status of the 5GHz Wi-Fi radio.	
LAN 1-5	OFF – No device connected to Ethernet port
	BLINKING – Ethernet port sending/receiving data
	ON – Powered-on device connected to Ethernet port
Note that LAN 5 displays the status of the uplink connection	

4.4 AP One 300M

Front View



Rear Panel View



LED Indicators

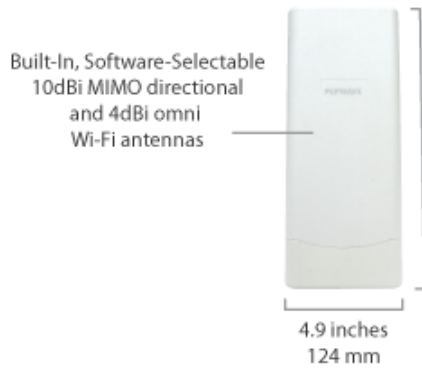
Power	On – Power On OFF – Power Off
Status	RED – Access point initializing GREEN – Access point ready
Wireless	OFF – 2.4/5GHz Wi-Fi radio off BLINKING – AP sending/receiving data GREEN – 2.4/5GHz Wi-Fi radio on Note that this model can operate in either 2.4GHz or 5GHz mode, depending on Wi-Fi radio settings.

User Manual

PEPWAVE AP Series

4.5 AP One Flex 300M

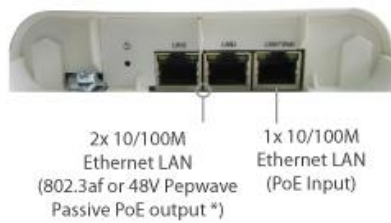
Front View



Rear Panel View



Connector Panel (Inside the Lid)




Accessory – Wall/Pole Mount with Ball Joint for IP55 Outdoor Products ^

Flexible ball joint allows for high-precision installation

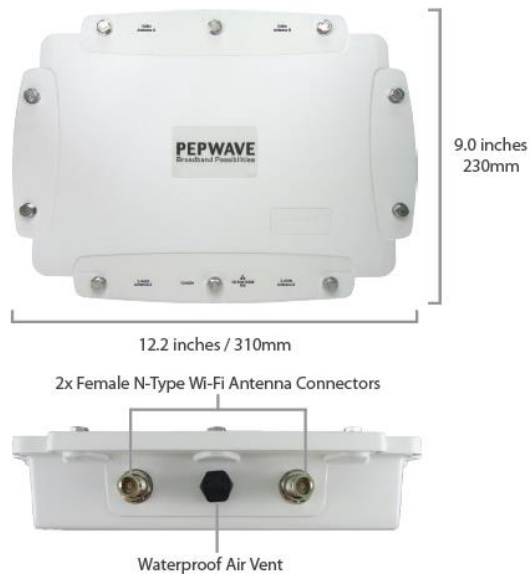


LED Indicators

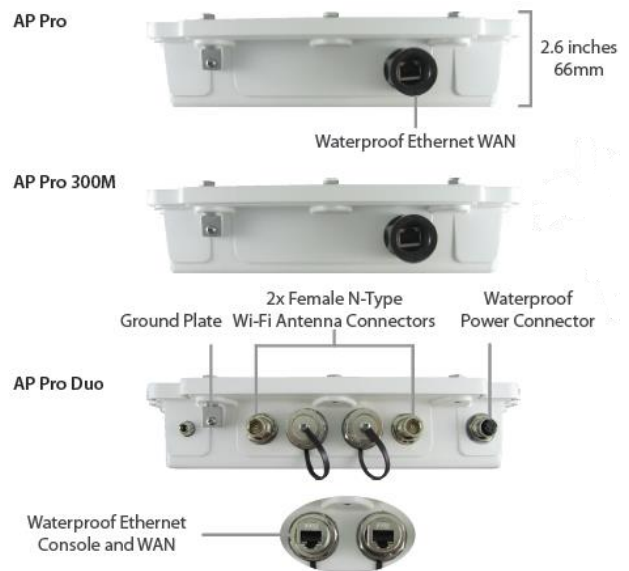
Status	RED – Access point initializing
	GREEN – Access point ready
LAN	OFF – No device connected to Ethernet port
	BLINKING – Ethernet port sending/receiving data
	ON – Powered-on device connected to Ethernet port
	Number of connected clients (1-10, 11-20, 21-30, 31-40)

4.6 AP Pro / AP Pro 300M / AP Pro Duo

Front/Top View

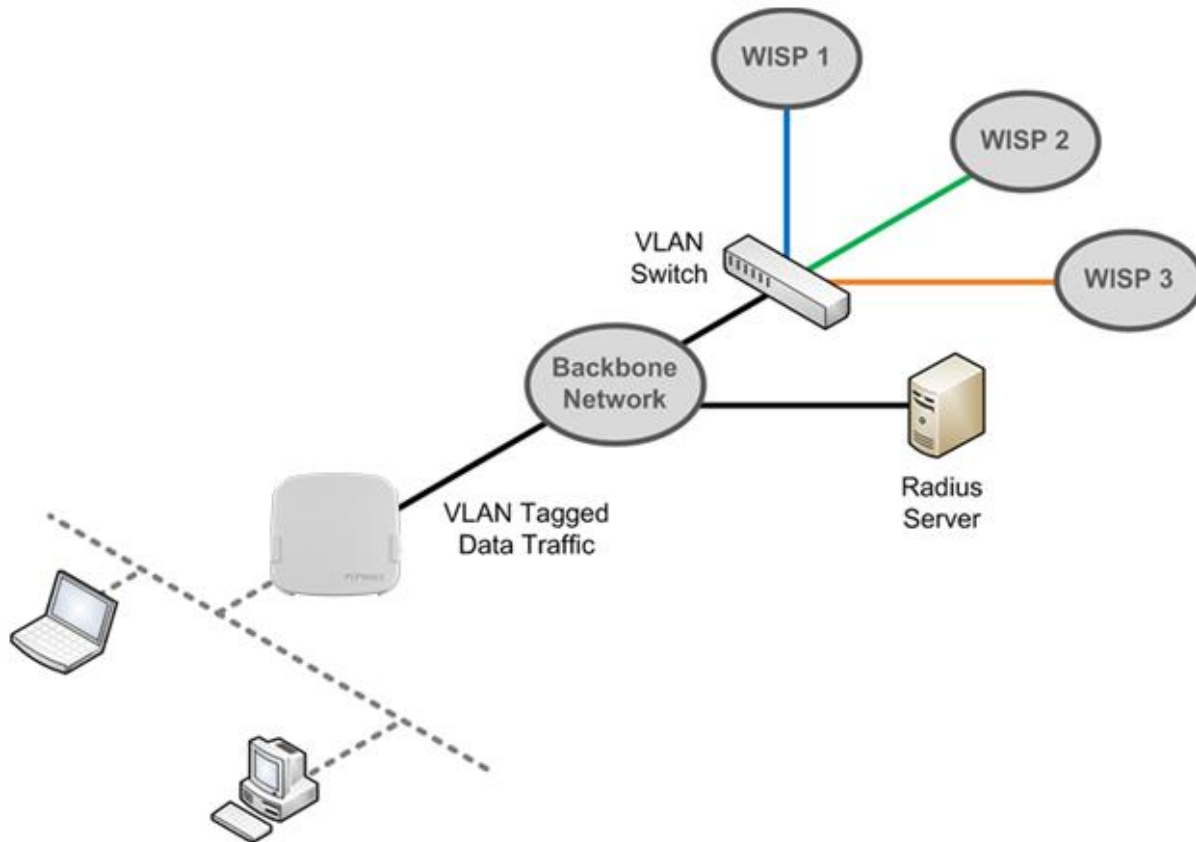


Rear Panel View



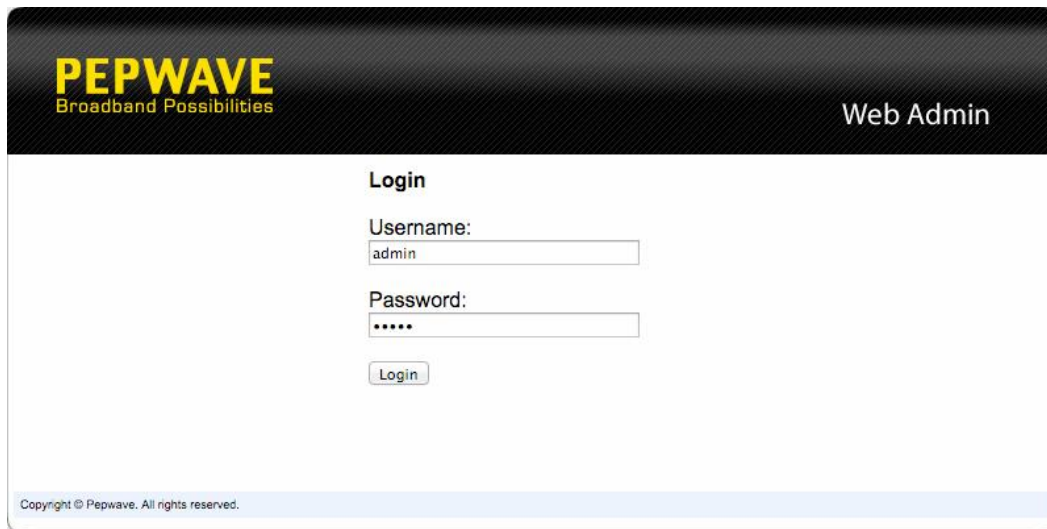
5 Installation

Your access point acts as a bridge between wireless and wired Ethernet interfaces. A typical setup follows:



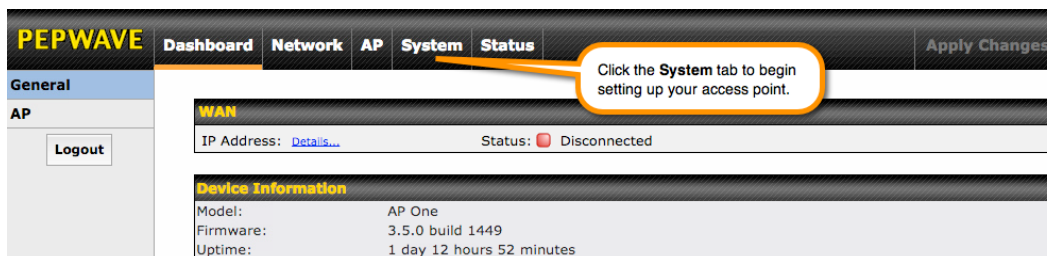
5.1 Installation Procedures

1. Connect the Ethernet port on the unit to the backbone network using an Ethernet cable. The port should auto sense whether the cable is straight-through or crossover.
2. Connect the power adapter to the power connector of the unit. Plug the power adapter into a power source.
3. Wait for the status LED to turn green.
4. Connect a PC to the backbone network. Configure the IP address of the PC to be any IP address between 192.168.0.4 and 192.168.0.254, with a subnet mask of 255.255.255.0.
5. Using Microsoft Internet Explorer 6 or above, Mozilla Firefox 2.0 or above, or Google Chrome 2.0 or above, connect to <https://192.168.0.3>.
6. Enter the default admin login ID and password, **admin** and **public** respectively.



The screenshot shows the PEPWAVE Web Admin login interface. At the top left is the PEPWAVE logo with the tagline "Broadband Possibilities". At the top right is the text "Web Admin". The main content area is titled "Login" and contains two input fields: "Username:" with the value "admin" and "Password:" with masked characters "*****". Below the password field is a "Login" button. At the bottom left, there is a small copyright notice: "Copyright © Pepwave. All rights reserved."

7. After logging in, the Dashboard appears. Click the **System** tab to begin setting up your access point.



The screenshot shows the PEPWAVE Dashboard. The top navigation bar includes tabs for "Dashboard", "Network", "AP", "System", and "Status". The "System" tab is highlighted with an orange callout box that says "Click the System tab to begin setting up your access point." Below the navigation bar, there is a "General" section with a "Logout" button. The main content area is divided into two sections: "WAN" and "Device Information". The "WAN" section shows "IP Address: Details..." and "Status: Disconnected". The "Device Information" section shows "Model: AP One", "Firmware: 3.5.0 build 1449", and "Uptime: 1 day 12 hours 52 minutes".

6 Using the Dashboard

The **Dashboard** section contains a number of displays to keep you up-to-date on your access point's status and operation. Remote assistance can also be enabled here.

The screenshot shows the PEPWAVE dashboard interface. The top navigation bar includes 'Dashboard', 'Network', 'AP', 'System', and 'Status', with 'Apply Changes' on the right. The left sidebar has 'General' and 'AP' sections, with a 'Logout' button under 'AP'. The main content area displays:

- WAN** section: IP Address: 10.10.12.156 [Details...](#) Status: Connected
- Device Information** section: Model: AP One AC, Firmware: 3.5.2 build 1538, Uptime: 8 hours 39 minutes
- Remote Assistance Status** section: [Turn off](#)

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6.1 General

This section contains WAN status and general device information.

The close-up shows the WAN status display with the following text: IP Address: 10.10.12.156 [Details...](#) Status: Connected

WAN

When your access point is connected to a WAN, this field displays the WAN IP address. For more information, click the **Details...** link, which displays the following:

Details of WAN Close	
Connection Type	DHCP
IP Address	10.10.12.156
Subnet Mask	255.255.0.0
Default Gateway	10.10.10.1
DNS Servers	10.10.10.1

IP Address

Status This field displays the current WAN connection status.

User Manual

PEPWAVE AP Series

Device Information

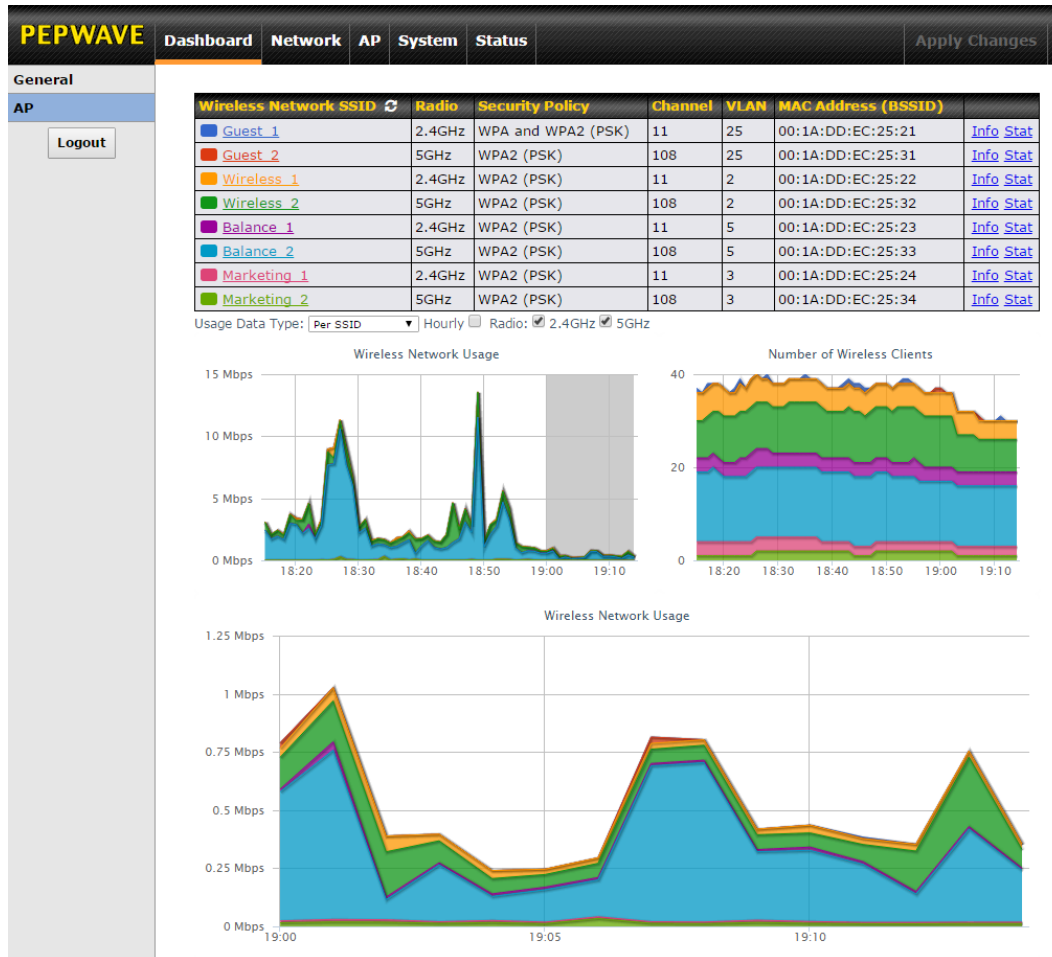
Model:	AP One AC
Firmware:	3.5.2 build 1538
Uptime:	8 hours 49 minutes

Device Information

Model	This field displays your access point's model number.
Firmware	The firmware version currently running on your access point appears here.
Uptime	This field displays your access point's uptime since the last reboot or shutdown.

6.2 AP

This section displays a variety of information about your wireless network.



AP Status	
Wireless Network SSID	This field displays your access point's SSID.
Radio	The radio frequency currently used by your access point appears here. If you're using the AP One AC mini or the AP One In-Wall and have configured both radios, this displays both radios in use.
Security Policy	This field displays the security policy your access point is currently using. If you're using the AP One AC mini and have configured both radios, this displays channels in use for the 2.4GHz and 5GHz bands.
Channel	The channel currently used by your access point is displayed in this field.

User Manual

PEPWAVE AP Series

VLAN	If your access point is using a VLAN ID for management traffic, it will appear here. A value of 0 indicates that a VLAN ID is not being used.												
MAC Address (BSSID)	Your access point's MAC address appears here. If you're using the AP One AC mini and have configured both radios, this displays a MAC address for both the 2.4GHz and 5GHz radio.												
Info	<p>Click this link to display the following information panel:</p> <table border="1"><thead><tr><th colspan="2">INFO Close</th></tr></thead><tbody><tr><td>Broadcast SSID</td><td>Enable</td></tr><tr><td>Web Portal Login</td><td>Disable</td></tr><tr><td>MAC Filter</td><td>None</td></tr><tr><td>Bandwidth Control</td><td>Disable</td></tr><tr><td>Layer 2 Isolation</td><td>Disable</td></tr></tbody></table>	INFO Close		Broadcast SSID	Enable	Web Portal Login	Disable	MAC Filter	None	Bandwidth Control	Disable	Layer 2 Isolation	Disable
INFO Close													
Broadcast SSID	Enable												
Web Portal Login	Disable												
MAC Filter	None												
Bandwidth Control	Disable												
Layer 2 Isolation	Disable												
Stat	<p>Click this link to display the following statistics panel:</p> <table border="1"><thead><tr><th colspan="2">STAT Close</th></tr></thead><tbody><tr><td>Packets Sent</td><td>0</td></tr><tr><td>Bytes Sent</td><td>0</td></tr><tr><td>Packets Received</td><td>0</td></tr><tr><td>Bytes Received</td><td>0</td></tr></tbody></table>	STAT Close		Packets Sent	0	Bytes Sent	0	Packets Received	0	Bytes Received	0		
STAT Close													
Packets Sent	0												
Bytes Sent	0												
Packets Received	0												
Bytes Received	0												
Usage Data Type	Select Per SSID or AP Send / Recv to determine the data displayed in the graphs below.												
Hourly	Check this box to graph wireless network usage on an hourly basis.												
Wireless Network Usage/Number of Wireless Clients	These graphs detail recent wireless network usage.												

7 Configuration

7.1 System

The options on the **System** tab control login and security settings, firmware upgrades, SNMP settings, and other settings.

Admin Settings	
AP Name	AP One <small>hostname: ap-one</small>
Location	site1
Admin User Name	admin
Admin Password
Confirm Admin Password
Web Admin Interface	<input checked="" type="checkbox"/>
Security	HTTPS <input checked="" type="checkbox"/> HTTP to HTTPS Redirection
Web Admin Port	443
Allowed Source IP Subnets	<input checked="" type="radio"/> Any <input type="radio"/> Allow access from the following IP subnets only
Language	English

7.1.1 Admin Security

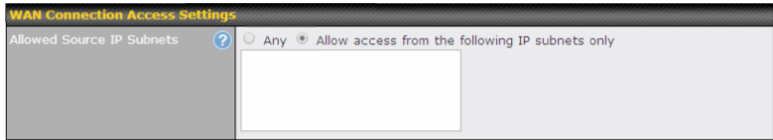
The **Admin Security** section allows you to set up your access point's name, password, security settings, and other options.

Admin Settings	
AP Name	AP One <small>hostname: ap-one</small>
Location	site1
Admin User Name	admin
Admin Password
Confirm Admin Password
Web Admin Interface	<input checked="" type="checkbox"/>
Security	HTTPS <input checked="" type="checkbox"/> HTTP to HTTPS Redirection
Web Admin Port	443
Allowed Source IP Subnets	<input checked="" type="radio"/> Any <input type="radio"/> Allow access from the following IP subnets only
Language	English

Admin Security	
AP Name	Enter a name to identify your access point. This name can be retrieved via SNMP.
Location	Enter a name to identify the location of your access point. This name can be retrieved via SNMP.
Admin User Name	This field specifies the administrator username of the web admin. It is set as <i>admin</i> by default.

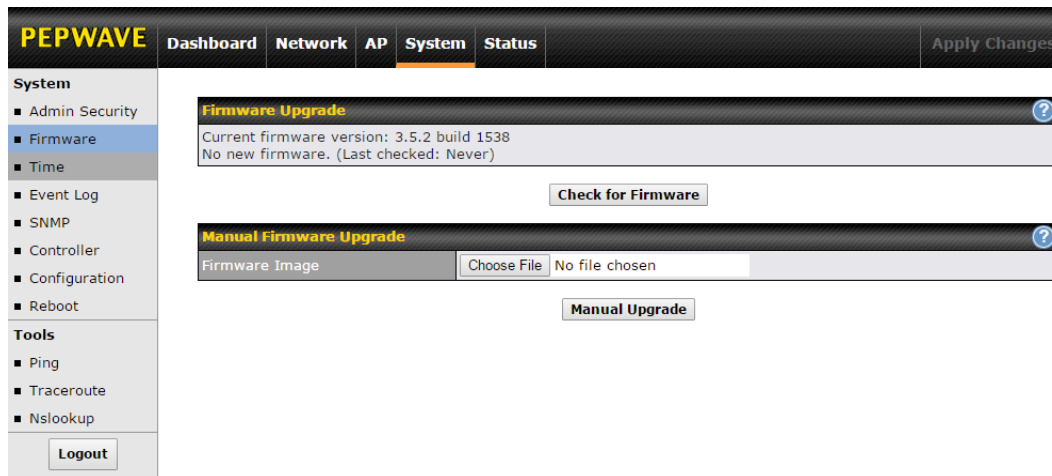
User Manual

PEPWAVE AP Series

Admin Password	This field allows you to specify a new administrator password. The default password is <i>public</i> .
Confirm Admin Password	Re-enter the admin password.
Web Admin Interface	Check this box to turn on the web administration interface, which allows remote AP management.
Security	Choose HTTP or HTTPS as the protocol to use when accessing the web admin interface. To automatically redirect HTTP access to HTTPS, check HTTP to HTTPS Redirection .
Web Admin Port	Specify the port number on which the web admin interface can be accessed.
Allowed Source IP Subnets	<p>This field allows you to restrict access to the web admin to only defined IP subnets.</p> <ul style="list-style-type: none">• Any - Allow web admin accesses from anywhere, without IP address restrictions.• Allow access from the following IP subnets only – Restricts the ability to access web admin to only defined IP subnets. When this option is chosen, a text input area will appear:  <p>Enter your allowed IP subnet addresses into this text area. Each IP subnet must be in the form of <i>w.x.y.z/m</i>. <i>w.x.y.z</i> represents an IP address (e.g., <i>192.168.0.0</i>), and <i>m</i> represents the subnet mask in CIDR format, which is between 0 and 32 inclusively. For example: <i>192.168.0.0/24</i>. To define multiple subnets, separate each IP subnet, one per line. For example:</p> <pre>192.168.0.0/24 10.8.0.0/16</pre>
Language	Choose a language for the administration interface.

7.1.2 Firmware

The **Firmware** section lets you check the firmware version currently used by your access point, as well as check for and install new firmware via online download. You can also upgrade your firmware using a firmware file stored locally.



To check for new firmware, click the **Check for Firmware** button. If new firmware is available, your access point will automatically download and install it.

To upgrade your access point using a firmware file on your network, click **Choose File** to select the firmware file. Then click **Manual Upgrade** to initiate the firmware upgrade process using the selected file.

Note that your access point can store two different firmware versions in two different partitions. A firmware upgrade will always replace the inactive partition. If you want to keep the inactive firmware, simply reboot your device with the inactive firmware and then perform the firmware upgrade.

7.1.3 Time

The settings in this section govern the access point's system time zone and allow you to specify a custom timeserver.

Time	
Time Zone	Time region used by the system. All choices are based on UTC.
Time Server	To choose a time server other than the default, enter the URL here. To restore the default time server, click the Default button.

7.1.4 Event Log

The section allows you to turn on event logging at a specified remote syslog server.

The screenshot shows the PEPWAVE web interface. At the top, there is a navigation bar with tabs for Dashboard, Network, AP, System (selected), and Status. An 'Apply Changes' button is on the right. On the left, a sidebar menu lists various system and tool options, with 'Event Log' highlighted. The main content area is titled 'Send Events to Remote Syslog Server' and contains a form with two rows: 'Remote Syslog' with a checkbox, and 'Remote Syslog Host' with a text input field and a 'Port: 514' label. A 'Save' button is located below the form.

Event Log	
Remote Syslog	Check this box to turn on remote system logging.
Remote Syslog Host	Enter the IP address or hostname of the remote syslog server, as well as the port number.

7.1.5 SNMP

SNMP, or simple network management protocol, is an open standard that can be used to collect information about your access point. The **SNMP** section offers a range of settings to control simple network management protocol access.

The screenshot shows the PEPWAVE web interface with the 'System' tab selected. The left sidebar contains a 'System' menu with options: Admin Security, Firmware, Time, Event Log, **SNMP**, Controller, Configuration, and Reboot. Below this is a 'Tools' menu with options: Ping, Traceroute, and Nslookup, and a 'Logout' button. The main content area is titled 'SNMP Settings' and contains the following configuration options:

- SNMP Settings**
 - SNMP Device Name: AP One
 - SNMP Port: 161 (Default)
 - SNMPv1:
 - SNMPv2c:
 - SNMPv3:
 - Save button
- Community Name** table:

Community Name	Allowed Source Network	Access Mode	
public	0.0.0.0	Read Only	<input type="checkbox"/>

 - Add SNMP Community button
- SNMPv3 User Name** table:

SNMPv3 User Name	Authentication / Privacy	Access Mode	
No SNMPv3 Users Defined			

 - Add SNMP User button

SNMP Settings	
SNMP Device Name	This field shows the AP name defined at System>Admin Security .
SNMP Port	This option specifies the port which SNMP will use. The default port is 161 .
SNMPv1	This option allows you to enable SNMP version 1.
SNMPv2c	This option allows you to enable SNMP version 2c.
SNMPv3	This option allows you to enable SNMP version 3.

User Manual

PEPWAVE AP Series

To add a community for either SNMPv1 or SNMPv2c, click the **Add SNMP Community** button in the **Community Name** table, which displays the following screen:

Settings	
Community Name	<input type="text"/>
IP Address	<input type="text" value="0.0.0.0"/>
IP Mask	<input type="text" value="0.0.0.0 (/0)"/>
Access Mode	<input type="text" value="Read Only"/>
Status	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

SNMP Community Settings	
Community Name	Enter a name for the SNMP community.
IP Address/IP Mask	These settings specify a subnet from which access to the SNMP server is allowed. Enter the subnet address here (e.g., <i>192.168.1.0</i>) and select the appropriate subnet mask.
Access Mode	Select Read Only or Read and Write as the SNMP community access mode.
Status	Use these controls to enable or disable SNMP community access.

To define a user name for SNMPv3, click **Add SNMP User** in the **SNMPv3 User Name** table, which displays the following screen:

Settings	
SNMPv3 User Name	<input type="text"/>
Authentication Protocol	<input type="text" value="HMAC-MD5"/>
Authentication Password	<input type="text"/>
Confirm Authentication Password	<input type="text"/>
Privacy Protocol	<input type="text" value="None"/>
Access Mode	<input type="text" value="Read Only"/>
Status	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

SNMPv3 User Settings	
SNMPv3 User Name	Enter a user name to be used in SNMPv3.
Authentication Protocol	Select one of the following valid authentication protocols: <ul style="list-style-type: none">• NONE• HMAC-MD5• HMAC-SHA When HMAC-MD5 or HMAC-SHA is selected, an entry field will appear for the password.
Authentication Password	Enter a password to use with the selected authentication protocol.

Confirm Authentication Password	Re-enter the authentication password.
Privacy Protocol	Select None or CBC-DES as the SNMPv3 privacy protocol. When CBC-DES is selected, an entry field will appear for the password.
Access Mode	Select Read Only or Read and Write as the SNMPv3 access mode.
Status	Use these controls to enable or disable SNMPv3 access.

7.1.6 Controller

In the **Controller** section, you can set up Peplink InControl or AP Controller remote management.

The screenshot shows the PEPWAVE web interface. The top navigation bar includes 'Dashboard', 'Network', 'AP', 'System', and 'Status'. The left sidebar menu is expanded to 'Controller'. The main content area displays 'Controller Management Settings' with the following fields:

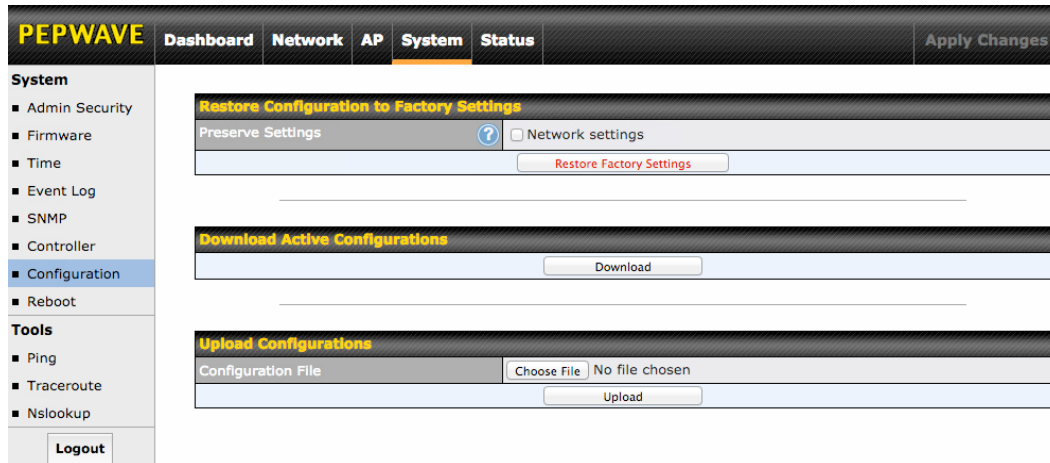
Controller Management	<input checked="" type="checkbox"/>
Controller Type	Auto

A 'Save' button is located below the settings table.

Controller Management Settings	
Controller Management	Check this box to enable remote management.
Controller Type	Select Auto , InControl , or AP Controller as your remote AP management method. When Auto is selected, your access point will automatically choose the appropriate mode.

7.1.7 Configuration

In section, you can manage and backup access point configurations, as well as reset your access point to its factory configuration. Backing up your access point's settings immediately after successful initial setup is strongly recommended.

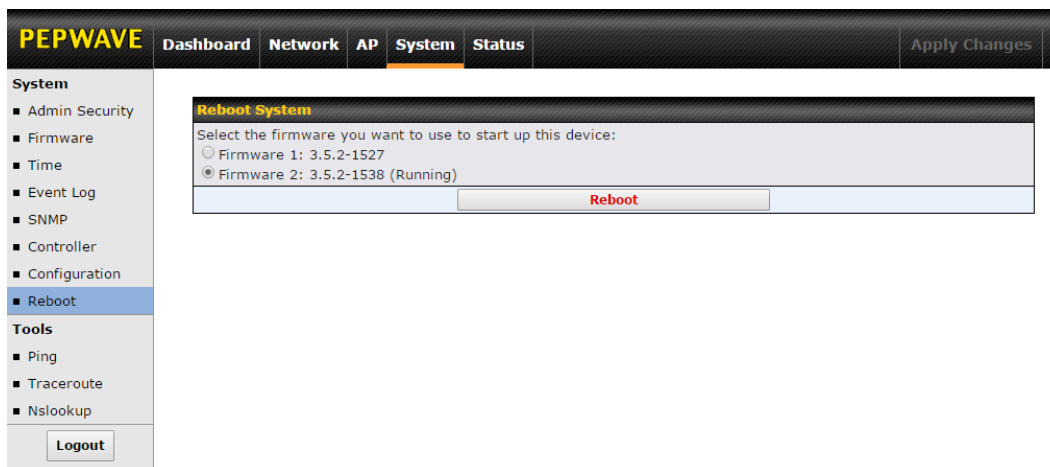


Configuration	
Restore Configuration to Factory Settings	The Restore Factory Settings button resets the configuration to factory default settings. After clicking the button, click the Apply Changes button on the top right corner to make the settings effective. To save existing network settings when restoring factory settings, check the Network Settings box before clicking Restore Factory Settings .
Download Active Configurations	Click Download to backup the current active settings.
Upload Configurations	To restore or change settings based on a configuration file, click Choose File to locate the configuration file on the local computer, and then click Upload . The new settings can then be applied by clicking the Apply Changes button on the page header, or you can cancel the procedure by pressing discard on the main page of the web admin interface.

7.1.8 Reboot

This section provides a reboot button for restarting the system. For maximum reliability, your access point can equip with two copies of firmware, and each copy can be a different version. You can select the firmware version you would like to reboot the device with. The firmware marked with **(Running)** is the current system boot up firmware.

Please note that a firmware upgrade will always replace the inactive firmware partition.

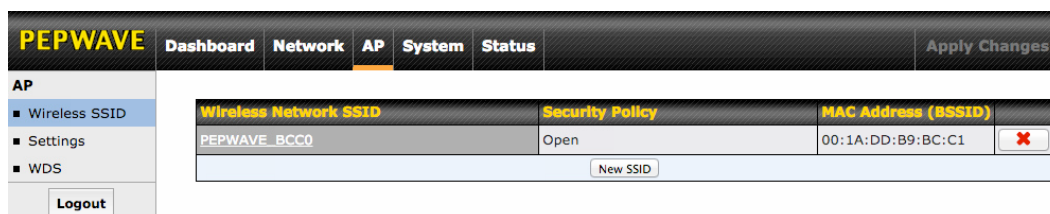


7.2 AP

Use the controls on the **AP** tab to set the wireless SSID and AP settings, as well as wireless distribution system (WDS) settings.

7.2.1 Wireless SSID

Wireless network settings, including the name of the network (SSID) and security policy, can be defined and managed in this section.



User Manual

PEPWAVE AP Series

Click **New SSID** to create a new network profile, or click the existing network profile to modify its settings.

SSID Settings	
Enable	<input checked="" type="checkbox"/>
SSID	PEPWAVE_BCC0
Broadcast SSID	<input checked="" type="checkbox"/>
Data Rate	<input checked="" type="radio"/> Auto <input type="radio"/> Fixed MCS0/6M MCS Index
Multicast Filter	<input type="checkbox"/>
Multicast Rate	MCS0/6M MCS Index
IGMP Snooping (Multicast Enhancement)	<input type="checkbox"/>
DHCP Setting	None
DHCP Option 82	<input type="checkbox"/>
Default VLAN ID	0
VLAN Pooling	<input type="checkbox"/>
VLAN Pool	<input type="text"/> (CSV: e.g. 1,3,9-11,15)
Network Priority (QoS)	Gold
Layer 2 Isolation	<input type="checkbox"/>
Maximum Number of Clients	0 (0: Unlimited)

SSID Settings			
Enable	Check this box to enable wireless SSID.		
Radio Selection	Available only on the AP One AC mini, this setting, shown below, allows you to enable or disable either of the two on-board radios. <table border="1"><tr><td>Radio Selection</td><td><input checked="" type="checkbox"/> 2.4GHz <input checked="" type="checkbox"/> 5GHz</td></tr></table>	Radio Selection	<input checked="" type="checkbox"/> 2.4GHz <input checked="" type="checkbox"/> 5GHz
Radio Selection	<input checked="" type="checkbox"/> 2.4GHz <input checked="" type="checkbox"/> 5GHz		
SSID	This setting specifies the AP SSID that Wi-Fi clients will see when scanning.		
Broadcast SSID	This setting specifies whether or not Wi-Fi clients can scan the SSID of this wireless network. Broadcast SSID is enabled by default.		
Data Rate	Select Auto to allow your access point to set the data rate automatically, or select Fixed and choose a rate from the drop-down menu. Click the MCS Index link to display a reference table containing MCS and matching HT20 and HT40 values.		
Multicast Filter	This setting enables the filtering of multicast network traffic to the wireless SSID.		
Multicast Rate	This setting specifies the transmit rate to be used for sending multicast network traffic.		
IGMP Snooping	To allow your access point to convert multicast traffic to unicast traffic for associated clients, select this option.		
DHCP Setting	To set your access point as a DHCP server or relay, select Server or Relay . Otherwise, select None .		
DHCP Option 82	If you use a distributed DHCP server/relay environment, you can enable this option to provide additional information on the manner in which clients are physically		

User Manual

PEPWAVE AP Series

	connected to the network.
Default VLAN ID	This setting specifies the VLAN ID to be tagged on all outgoing packets generated from this wireless network (i.e., packets that travel from the Wi-Fi segment through your access point to the Ethernet segment via the LAN port). If 802.1x is enabled and a per-user VLAN ID is specified in authentication reply from the RADIUS server , then the value specified by Default VLAN ID will be overridden. The default value of this setting is 0 , which means VLAN tagging is disabled (instead of tagged with zero).
VLAN Pooling	Check this box to enable VLAN pooling using the values specified in VLAN Pool .
VLAN Pool	If VLAN pooling is enabled, enter VLAN pool values separated by commas.
Network Priority (QoS)	Select from Gold , Silver , and Bronze to control the QoS priority of this wireless network's traffic.
Layer 2 Isolation	Layer 2 refers to the second layer in the ISO Open System Interconnect model. When this option is enabled, clients on the same VLAN, SSID, or subnet are isolated to that VLAN, SSID, or subnet, which can enhance security. Traffic is passed to upper communication layer(s). By default, the setting is disabled.
Maximum Number of Clients	Enter the maximum number of clients that can simultaneously connect to your access point, or enter 0 to allow unlimited Wi-Fi clients.

Security Settings	
Security Policy	WPA/WPA2 – Personal ▾
Passphrase	<input type="text"/> Hide / Show Passphrase

Security Settings	
Security Policy	This setting configures the wireless authentication and encryption methods. Available options are Open (No Encryption) , WEP , 802.1X , WPA2 – Personal , WPA2 – Enterprise , WPA/WPA2 - Personal , and WPA/WPA2 – Enterprise . To allow any Wi-Fi client to access your AP without authentication, select Open (No Encryption) . Details on each of the available authentication methods follow.

User Manual

PEPWAVE AP Series

Security Settings	
Security Policy	WEP
Key Size	40 bits (64-bit WEP)
Key Format	ASCII
Passphrase	<input type="text"/> <input type="button" value="Generate Key"/>
Encryption Key	<input type="text"/> Hide / Show Passphrase
Shared Key Authentication	<input type="checkbox"/>

WEP	
Key Size	Select 40 bits (64-bit WEP) or 104 bits (128-bit WEP) .
Key Format	Choose ASCII or Hex format for the WEP key. ASCII can be applied only to encryption keys that are manually entered. Hex can be applied to encryption keys that are manually entered or automatically generated.
Passphrase	Enter a series of alphanumeric characters, and then click Generate Key to create a WEP key using the passphrase.
Encryption Key	The generated WEP key appears here. Click Hide / Show Passphrase to toggle visibility.
Shared Key Authentication	Check to enable shared key authentication. The default is disabled, meaning open authentication is used.

Security Settings	
Security Policy	802.1X
802.1X Version	<input type="radio"/> V1 <input checked="" type="radio"/> V2
WEP Key Size	40 bits (64-bit WEP)
Re-keying Period	14400 seconds (0: Disable)

802.1X	
802.1X Version	Choose v1 or v2 of the 802.1x EAPOL. When v1 is selected, both v1 and v2 clients can associate with the access point. When v2 is selected, only v2 clients can associate with the access point. Most modern wireless clients support v2. For stations that do not support v2, select v1 . The default is v2 .
WEP Key Size	Select 40 bits (64-bit WEP) or 104 bits (128-bit WEP) .
Re-keying Period	This option specifies the length of time throughout which the broadcast key remains valid. When the re-keying period expires, the broadcast key is no longer valid and broadcast key renewal is required. The default is 14400 seconds (four hours). 0 disables re-keying.

User Manual

PEPWAVE AP Series

Security Settings	
Security Policy	WPA/WPA2 – Personal ▾
Passphrase	<input type="text"/> Hide / Show Passphrase

WPA/WPA2 – Personal

Passphrase

Enter a passphrase of between 8 and 63 alphanumeric characters to create a passphrase used for data encryption and authentication. Click **Hide / Show Passphrase** to toggle visibility.

Security Settings	
Security Policy	WPA/WPA2 – Enterprise ▾
802.1X Version	<input type="radio"/> v1 <input checked="" type="radio"/> v2

WPA/WPA2 – Enterprise

802.1X Version

Choose **v1** or **v2** of the 802.1x EAPOL. When **v1** is selected, both v1 and v2 clients can associate with the access point. When **v2** is selected, only v2 clients can associate with the access point. Most modern wireless clients support v2. For stations that do not support v2, select **v1**. The default is **v2**.

User Manual



PEPWAVE AP Series



Web Portal Login	
Web Portal	Enable ▾
Authentication Method	RADIUS ▾
RADIUS Security	PAP ▾
Splash Page	http:// ▾
Landing Page	<input type="checkbox"/>
Landing Page URL	
Concurrent Login	<input checked="" type="checkbox"/>
Access Quota	0 minutes (0: Unlimited) 0 MB (0: Unlimited)
Inactive Timeout	0 minutes
Quota Reset Time	<input checked="" type="radio"/> Disable <input type="radio"/> Daily at: 00 ▾ : 00 ▾ <input type="radio"/> 0 minutes after quota reached
Allowed Domains / IPs	Domains / IPs <input type="text"/> +
Allowed Client IPs	Client IPs <input type="text"/> +

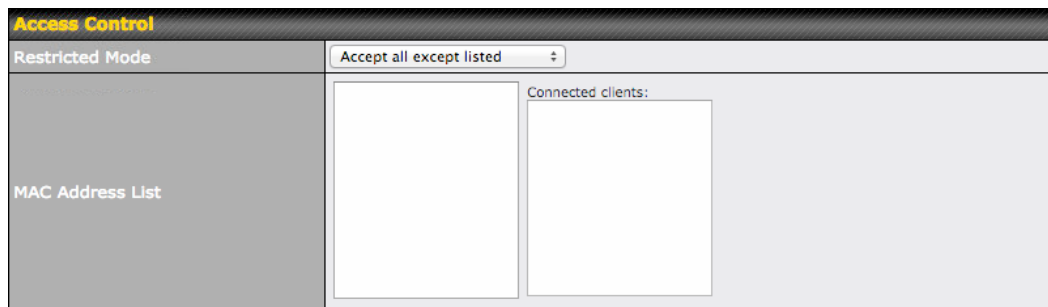
Web Portal Login	
Web Portal	Select Enable to turn on your access point's built-in web portal functionality.
Authentication Method	Choose Open Access to allow users to connect without authentication or RADIUS to require authentication. If RADIUS is selected, you'll be given the opportunity to select a RADIUS security method in the next field.
RADIUS Security	Select PAP , EAP-TTLS PAP , EAP-TTLS MSCHAPv2 , or PEAPv0 EAP-MSCHAPv2 .
Splash Page	If your web portal will use a splash page, choose HTTP or HTTPS and enter the splash page's URL.
Landing Page	If your web portal will use a landing page, check this box.
Landing Page URL	If you have checked Landing Page , enter your landing page's URL here.
Concurrent Login	Check this box to allow users to have more than one logged in session active at a time.
Access Quota	Enter a value in minutes to limit access time on a given login or enter 0 to allow unlimited use time on a single login. Likewise, enter a value in MB for the total bandwidth allowed or enter 0 to allow unlimited bandwidth on a single login.
Inactive Timeout	Enter a value in minutes to logout following the specified period of inactivity or enter 0 to disable inactivity logouts.
Quota Reset Time	This menu determines how your usage quota resets. Setting it to Daily will reset it at a specified time every day. Setting a number of minutes after quota reached establishes a timer for each user that begins after the quota has been reached.

User Manual

PEPWAVE AP Series

Allowed Domains / IPs To whitelist a domain or IP address, enter the domain name / IP address here and click . To delete an existing entry, click the  button next to it.

Allowed Client IPs To whitelist a client IP address, enter the IP address here and click . To delete an existing entry, click the  button next to it.



Access Control

Restricted Mode The settings allow administrator to control access using Mac address filtering. Available options are **None**, **Deny all except listed**, **Accept all except listed**, and **RADIUS MAC Authentication**.

MAC Address List Connections coming from the MAC addresses in this list will be either denied or accepted based on the option selected in the previous field.

User Manual

PEPWAVE AP Series

RADIUS Server Settings	Primary Server	Secondary Server
Host	<input type="text"/>	<input type="text"/>
Secret	<input type="text"/>	<input type="text"/>
Authentication Port	<input type="text"/> <input type="button" value="Default"/>	<input type="text"/> <input type="button" value="Default"/>
Accounting Port	<input type="text"/> <input type="button" value="Default"/>	<input type="text"/> <input type="button" value="Default"/>
Maximum Retransmission	<input type="text" value="3"/>	
Radius Request Interval	<input type="text" value="3"/> s (initial value, double upon every retransmission)	

RADIUS Server Settings	
Host	Enter the IP address of the primary RADIUS server and, if applicable, the secondary RADIUS server.
Secret	Enter the RADIUS shared secret for the primary server and, if applicable, the secondary RADIUS server.
Authentication Port	Enter the UDP authentication port(s) used by your RADIUS server(s) or click the Default button to enter 1812 .
Accounting Port	Enter the UDP accounting port(s) used by your RADIUS server(s) or click the Default button to enter 1813 .
Maximum Retransmission	Enter the maximum number of allowed retransmissions.
RADIUS Request Interval	Enter a value in seconds to limit RADIUS request frequency. Note the initial value will double on each retransmission.

User Manual

PEPWAVE AP Series

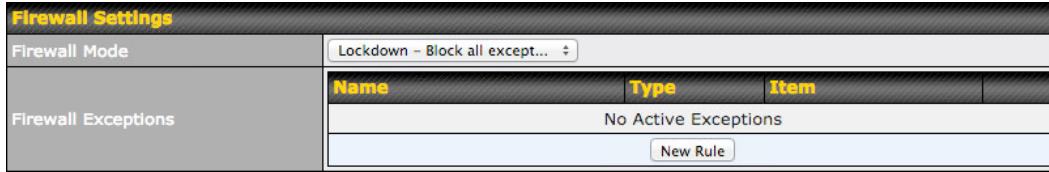
Guest Protect			
Block LAN Access	<input type="checkbox"/>		
Custom Subnet	<input type="checkbox"/>		
	Network	Subnet Mask	
	<input type="text"/>	255.255.255.0 (/24) ▾	<input type="button" value="+"/>
Block Exception	<input type="checkbox"/>		
	Network	Subnet Mask	
	<input type="text"/>	255.255.255.0 (/24) ▾	<input type="button" value="+"/>
Block PepVPN	<input type="checkbox"/>		

Guest Protect	
Block LAN Access	Check this box to block access from the LAN.
Custom Subnet	To specify a subnet to block, enter the IP address and choose a subnet mask from the drop-down menu. To add the blocked subnet, click <input type="button" value="+"/> . To delete a blocked subnet, click <input type="button" value="x"/> .
Block Exception	To create an exception to a blocked subnet (above), enter the IP address and choose a subnet mask from the drop-down menu. To add the exception, click <input type="button" value="+"/> . To delete an exception, click <input type="button" value="x"/> .
Block PepVPN	To block PepVPN access, check this box.

Bandwidth Management	
Bandwidth Management	<input checked="" type="checkbox"/>
Upstream Limit	<input type="text" value="0"/> kbps (0: Unlimited)
Downstream Limit	<input type="text" value="0"/> kbps (0: Unlimited)
Client Upstream Limit	<input type="text" value="0"/> kbps (0: Unlimited)
Client Downstream Limit	<input type="text" value="0"/> kbps (0: Unlimited)

Bandwidth Management	
Bandwidth Management	Check this box to enable bandwidth management.
Upstream Limit	Enter a value in kbps to limit the wireless network's upstream bandwidth. Enter 0 to allow unlimited upstream bandwidth.
Downstream Limit	Enter a value in kbps to limit the wireless network's downstream bandwidth. Enter 0 to allow unlimited downstream bandwidth.
Client Upstream Limit	Enter a value in kbps to limit connected clients' upstream bandwidth. Enter 0 to allow unlimited upstream bandwidth.
Client	Enter a value in kbps to limit connected clients' downstream bandwidth. Enter 0 to allow

Downstream Limit unlimited downstream bandwidth.

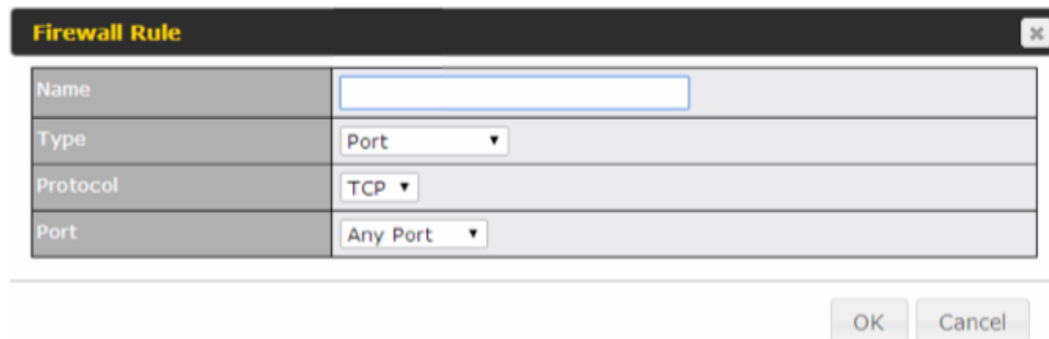


The screenshot shows the 'Firewall Settings' window. At the top, 'Firewall Mode' is set to 'Lockdown - Block all except...'. Below this is a table for 'Firewall Exceptions' with columns for 'Name', 'Type', and 'Item'. The table is currently empty, displaying 'No Active Exceptions'. A 'New Rule' button is located at the bottom of the table.

Firewall Settings

Firewall Mode

Choose **Flexible - Allow all except...** or **Lockdown - Block all except...** to turn on the firewall, then create rules for the firewall exceptions by clicking **New Rule**. See the discussion below for details on creating a firewall rule. To delete a rule, click the associated **X** button. To turn off the firewall, select **Disable**.



The screenshot shows the 'Firewall Rule' dialog box. It contains four fields: 'Name' (text input), 'Type' (dropdown menu set to 'Port'), 'Protocol' (dropdown menu set to 'TCP'), and 'Port' (dropdown menu set to 'Any Port'). At the bottom right, there are 'OK' and 'Cancel' buttons.

Firewall Rule

Name

Enter a descriptive name for the firewall rule in this field.

Type

Choose **Port**, **Domain**, **IP Address**, or **MAC Address** to allow or deny traffic from any of those identifiers. Depending on the option chosen, the following fields will vary.

Protocol / Port

Choose **TCP** or **UDP** from the **Protocol** drop-down menu to allow or deny traffic using either of those protocols. From the **Port** drop-down menu, choose **Any Port** to allow or deny TCP or UDP traffic on any port. Choose **Single Port** and then enter a port number in the provided field to allow or block TCP or UDP traffic from that port only. You can also choose **Port Range** and enter a range of ports in the provided fields to allow or deny TCP or UDP traffic from the specified port range.

IP Address / Subnet Mask

If you have chosen **IP Address** as your firewall rule type, enter the IP address and subnet mask identifying the subnet to allow or deny.

MAC Address

If you have chosen **MAC Address** as your firewall rule type, enter the MAC address identifying the machine to allow or deny.

User Manual

PEPWAVE AP Series

7.2.2 Settings



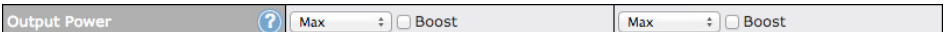
Basic access point operation settings, such as the protocol and channels used, as well as scanning interval and other advanced settings, can be defined and managed in this section.

AP Settings	5GHz
Protocol	802.11na
Operating Country	United States
Channel Bonding	20 MHz
Channel	Auto Edit
Output Power	Max <input type="checkbox"/> Boost
Beacon Rate	6Mbps
Beacon Interval	100ms
DTIM	1
RTS Threshold	0
Fragmentation Threshold	0
Distance / Time Convertor	<input type="text" value="4050"/> m (input distance for recommended values)
Slot Time	<input type="radio"/> Auto <input checked="" type="radio"/> Custom <input type="text" value="9"/> μ s Default
ACK Timeout	<input type="text" value="48"/> μ s Default
Frame Aggregation	<input checked="" type="checkbox"/>
Aggregation Length	<input type="text" value="50000"/>
Maximum Number of Clients	<input type="text" value="0"/> (0: Unlimited)
Client Signal Strength Threshold	<input type="text" value="0"/> (0: Unlimited)

AP Settings							
Protocol	<p>Choose 802.11ng or 802.11na as your access point's Wi-Fi protocol. The AP One AC mini provides the 802.11ng protocol for the 2.4 GHz band and the 802.11ac protocol for the 5GHz band, as shown below.</p> <table border="1"><thead><tr><th>AP Settings</th><th>2.4GHz</th><th>5GHz</th></tr></thead><tbody><tr><td>Protocol</td><td>802.11ng</td><td>802.11ac</td></tr></tbody></table>	AP Settings	2.4GHz	5GHz	Protocol	802.11ng	802.11ac
AP Settings	2.4GHz	5GHz					
Protocol	802.11ng	802.11ac					
Operating Country	<p>This drop-down menu specifies the national / regional regulations the AP should follow. If a North American region is selected, RF channels 1 to 11 will be available and the maximum transmission power will be 26 dBm (400 mW). If European region is selected, RF channels 1 to 13 will be available. The maximum transmission power will be 20 dBm (100 mW). NOTE: Users are required to choose an option suitable to local laws and regulations. Per FCC regulation, the country selection is not available on all models marketed in the US. All US models are fixed to US channels only.</p>						
Channel Bonding	<p>There are three options: 20 MHz, 40 MHz, and 20/40 MHz. With this feature enabled, the Wi-Fi system can use two channels at once. Using two channels improves the performance of the Wi-Fi connection. The AP One AC mini offers channel bonding options for the 2.4GHz and 5GHz bands, as shown below. In addition to 20 MHz, 40 MHz, and 20/40 MHz, the 5Ghz band offers 80Mhz, which is the default setting.</p>						

User Manual

PEPWAVE AP Series

	
Channel	<p>This drop-down menu selects the 5GHz 802.11 channel to be used. If Auto is set, the system will perform channel scanning based on the scheduled time set and choose the most suitable channel automatically.</p> <p>The AP One AC mini allows setting channels on the 2.4GHz and 5GHz bands, as shown below.</p> 
Output Power	<p>This drop-down menu determines the power at which your access point will broadcast. When fixed settings are selected, the AP will broadcast at the specified power level, regardless of context. When Auto is selected, the AP will adjust its power level based on surrounding APs to maximize performance.</p> <p>While single-radio models allow setting power output levels for one frequency band only, the AP One AC mini provide output power settings for both the 2.4GHz and 5GHz bands, as shown below.</p> 
Beacon Rate	<p>This drop-down menu provides the option to send beacons in different transmit bit rates. The bit rates are 1Mbps, 2Mbps, 5.5Mbps, 6Mbps, and 11Mbps.</p>
Beacon Interval	<p>Set the time between each beacon send. Available options are 100ms, 250ms, and 500ms.</p>
DTIM	<p>Set the frequency for the beacon to include delivery traffic indication messages (DTIM). The interval unit is measured in milliseconds.</p>
RTS Threshold	<p>Set the minimum packet size for your access point to send an RTS using the RTS/CTS handshake. Setting 0 disables this feature.</p>
Fragmentation Threshold	<p>Enter a value to limit the maximum frame size, which can improve performance.</p>
Distance / Time Convertor	<p>This slider and text entry field can be used to interactively set slot time.</p>
Slot Time	<p>This field provides the option to modify the unit wait time before your access point transmits. The default value is 9µs.</p>
ACK Timeout	<p>Set the wait time to receive an acknowledgement packet before retransmitting. The default value is 48µs.</p>
Frame Aggregation	<p>With this feature enabled, throughput will be increased by sending two or more data frames in a single transmission.</p>
Aggregation Length	<p>This field is only available when Frame Aggregation is enabled. It specifies the frame length for frame aggregation. By default, it is set to 50000.</p>
Max number of Clients	<p>Enter the maximum clients that can simultaneously connect to your access point or set the value to 0 to allow unlimited clients.</p>

User Manual

PEPWAVE AP Series

Client Signal Strength Threshold

This field determines the minimum acceptable client signal strength, specified in megawatts. If client signal strength does not meet this minimum, the client will not be allowed to connect.

Advanced Features																																																									
Discover Nearby Networks	<input checked="" type="checkbox"/> * Discover Nearby Networks will be enabled if Channel is set to Auto																																																								
Scanning Interval	10 s																																																								
Scanning Time	50 ms																																																								
Scheduled Radio Availability	<input type="radio"/> Always On <input checked="" type="radio"/> Custom Schedule																																																								
	<table border="1"><thead><tr><th></th><th>Midnight</th><th>4am</th><th>8pm</th><th>Noon</th><th>4pm</th><th>8pm</th></tr></thead><tbody><tr><td>Sunday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Monday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Tuesday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Wednesday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Thursday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Friday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Saturday</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table>		Midnight	4am	8pm	Noon	4pm	8pm	Sunday							Monday							Tuesday							Wednesday							Thursday							Friday							Saturday						
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	On <input checked="" type="checkbox"/> Off <input type="checkbox"/>																																																								
WMM	<input checked="" type="checkbox"/>																																																								

Advanced Features

Discover Nearby Networks

Check this box to enable network discovery. Note that setting **Channel to Auto** will activate this feature automatically.

Scanning Interval

This setting controls the interval, in seconds, that your access point scans for nearby networks.

Scanning Time

This setting specifies the time, in milliseconds, that your access point scans any particular channel while searching for nearby networks.

Scheduled Radio Availability

Click **Custom Schedule** to specify radio availability schedule options or select **Always On** to make the radio continuously available.

WMM

This checkbox enables Wi-Fi Multimedia (WMM), also known as Wireless Multimedia Extensions (WME), on your access point. The default is **enabled**.

7.2.3 WDS

A wireless distribution system (WDS) provides a way to link access points when wires are not feasible or desirable. A WDS can also extend wireless network coverage for wireless clients. Note that your access point's channel setting should not be set to **Auto** when using WDS.

PEPWAVE				Dashboard	Network	AP	System	Status	Apply Changes
AP									
■ Wireless SSID									
■ Settings									
■ WDS									
<input type="button" value="Logout"/>									
				2.4GHz			5GHz		
Local MAC Address		00:1A:DD:DA:E7:40			00:1A:DD:DA:E7:50				
Current Channel		1			36				
MAC Address	Manufacturer	Status	Encryption						
				No WDS					
				<input type="button" value="Add"/>					

To create a new WDS, click **Add**.

WDS	
Enable	Check this box to enable WDS.
MAC Address	Enter the MAC address of the access point with which to form a WDS link.
Encryption	Select AES to enable encryption for WDS peer connections. Selecting None disables encryption.

7.3 Network

The settings on the **AP** tab control WAN and LAN settings, as well as allow you to set up PepVPN profiles.

7.3.1 WAN

This section provides basic and advanced WAN settings.

The screenshot shows the PEPWAVE web interface with the 'Network' tab selected. The left sidebar shows 'Interfaces' with 'WAN' selected. The main content area is divided into 'Basic' and 'Advanced' sections. The 'Basic' section includes fields for 'Keep Default IP' (checked), 'IP Address Mode' (Manual), 'Static IP Address', 'Subnet Mask' (255.255.255.0 (/24)), 'Default Gateway', and 'DNS Server'. The 'Advanced' section includes 'Management VLAN ID' (0), 'Spanning Tree Protocol' (unchecked), 'Scheduled Reboot' (with a table for Schedule, Day, and Time), 'Ethernet Speed/Duplex' (100Mbps Full Duplex, Advertise Speed checked), and 'AP Mode' (Router, NAT). A 'Save' button is at the bottom.

Basic			
Keep Default IP	<input checked="" type="checkbox"/>		
IP Address Mode	Manual		
Static IP Address	<input type="text"/>		
Subnet Mask	255.255.255.0 (/24)		
Default Gateway	<input type="text"/>		
DNS Server	<input type="text"/>		

Advanced			
Management VLAN ID	0		
Spanning Tree Protocol	<input type="checkbox"/>		
Scheduled Reboot	Schedule	Day	Time
	Weekly	Sunday	00 : 00
	<input type="text"/>		
Ethernet Speed/Duplex	100Mbps Full Duplex <input checked="" type="checkbox"/> Advertise Speed		
AP Mode	Router NAT		

Basic	
Keep Default IP	When enabled, this option maintains 192.168.0.3 as your access point's IP address.
IP Address Mode	IP Address Mode options are Automatic and Manual . In Automatic mode, the IP address of your access point is acquired from a DHCP server on the Ethernet segment. In Manual mode, a user-specified IP address is used for your access point, as described below.
Static IP Address / Subnet Mask	You can use these fields to specify a unique IP address that your access point will use to communicate on the Ethernet segment. This IP address is distinct from the admin IP address (192.168.0.3) on the Ethernet segment.
Default Gateway	Enter the IP address of the default gateway to the internet.
DNS Server	Enter the DNS server address that your access point will use to resolve host names.

User Manual

PEPWAVE AP Series

Advanced			
Management VLAN ID	<input type="text" value="0"/>		
Spanning Tree Protocol	<input type="checkbox"/>		
Scheduled Reboot	<input checked="" type="checkbox"/>		
	Schedule	Day	Time
	<input type="text" value="Weekly"/>	<input type="text" value="Sunday"/>	<input type="text" value="00"/> : <input type="text" value="00"/>
Ethernet Speed/Duplex	<input type="text" value="100Mbps Full Duplex"/> <input checked="" type="checkbox"/> Advertise Speed		
AP Mode	<input type="text" value="Router"/> <input type="text" value="NAT"/>		

Advanced	
Management VLAN ID	This field specifies the VLAN ID to tag to management traffic, such as AP-to-AP controller communication traffic. The value is 0 by default, meaning that no VLAN tagging will be applied. NOTE: change this value with caution as alterations may result in loss of connection to the AP controller.
Spanning Tree Protocol	Checking this box enables spanning tree protocol, used to prevent loops in bridged Ethernet LANs
Scheduled Reboot	When this box is checked, your access point can be scheduled to reboot automatically on a recurring basis, as indicated by the values under the Schedule , Day , and Time headings.
Ethernet Speed/Duplex	Select a speed and duplex setting for sending and receiving. When selecting a speed manually, you can also control whether the access point's speed will be advertised on the network by checking or unchecking the Advertise Speed box. When Auto is selected, your access point will automatically negotiate speeds.
AP Mode	Your access point can act as a bridge or as a router, depending on your selection here. When Router is selected, you can additionally select whether the access point will function in NAT or IP Forwarding mode.

7.3.2 LAN

This section offers a variety of settings that affect your access point's operation on the LAN, such as settings for DHCP, DMZ, and port forwarding. Note that the following settings will be available only when your access point is operating in router mode.

The screenshot shows the PEPWAVE web interface with the following sections:

- IP Settings:** IP Address: 192.168.1.1, Subnet Mask: 255.255.255.0 (/24)
- DHCP Server Settings:** DHCP Server: ; IP Range: 192.168.1.100 - 192.168.1.200; Broadcast Address: 192.168.1.255; Gateway: 192.168.1.1; DNS 1: 192.168.1.1; DNS 2: (optional); DNS 3: (optional); Lease Time: 1 Days 0 Hours 0 Mins; DHCP Reservation: MAC Address, Static IP, +
- DMZ:** DMZ: ; DMZ IP: [Empty]
- Port Forwarding:** Table with columns: Port Forwarding, Server, Protocol. Content: No Services Defined, Add Service button.

Buttons: Logout, Apply Changes, Save.

IP Settings

IP Address

Enter the LAN IP address and subnet mask to assign to your access point on the LAN.

User Manual

PEPWAVE AP Series

DHCP Server Settings		
DHCP Server	<input checked="" type="checkbox"/>	
IP Range	192.168.1.100 - 192.168.1.200	255.255.255.0 (/24)
Broadcast Address	192.168.1.255	
Gateway	192.168.1.1	
DNS 1	192.168.1.1	
DNS 2	<input type="text"/> (optional)	
DNS 3	<input type="text"/> (optional)	
Lease Time	1 Days 0 Hours 0 Mins	
DHCP Reservation	MAC Address	Static IP
	<input type="text"/>	<input type="text"/>
		<input type="button" value="+"/>

DHCP Server Settings	
DHCP Server	Check to enable the DHCP server feature of your access point. Enabling DHCP is the best option for most users. The following options will be enabled once you have checked and enabled the DHCP server.
IP Range	Enter the first and last IP addresses of the range of addresses that your access point will make available to DHCP clients. The default range is from 192.168.1.100 to 192.168.1.200 , with 24-bit subnet mask.
Broadcast Address	Enter the broadcast address that DHCP clients will use when communicating with the entire LAN segment. The default value is 192.168.1.255 .
Gateway	Enter the default gateway address that DHCP clients will use to access the internet. By default, this address will be the same as your access point's IP address on the LAN.
DNS 1/2/3	In DNS 1 , enter the IP address of the primary DNS server offered to DNS clients or accept the default of 192.168.1.1 , which is your access point's address on the LAN. You can also specify up to two additional DNS servers to use when the primary server is busy or down.
Lease Time	Specify the length of time that an IP address of a DHCP client remains valid. When an address lease time has expired, the assigned IP address is no longer valid, and renewal of the IP address assignment is required. By default, this value is set to one day.
DHCP Reservation	To reserve certain addresses for specific clients, such as network printers, enter the device's MAC Address and a static IP to be assigned to the device. Click <input type="button" value="+"/> to add the DHCP reservation. To delete a DHCP reservation, click <input type="button" value="X"/> .

User Manual

PEPWAVE AP Series

DMZ	
DMZ	<input type="checkbox"/>
DMZ IP	<input type="text"/>

DMZ	
DMZ	Check this box to forward traffic sent to the WAN IP address to the DMZ IP address.
DMZ IP	Enter an IP address clients will use to connect to the DMZ.

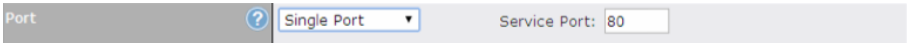
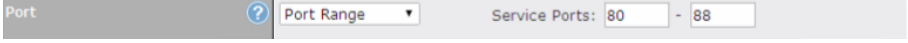
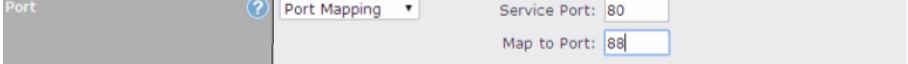
Port Forwarding	Server	Protocol
No Services Defined		
<input type="button" value="Add Service"/>		

To create a port forwarding rule, first click the **Add Service** button, located in the **Port Forwarding** section.

Port Forwarding ✕

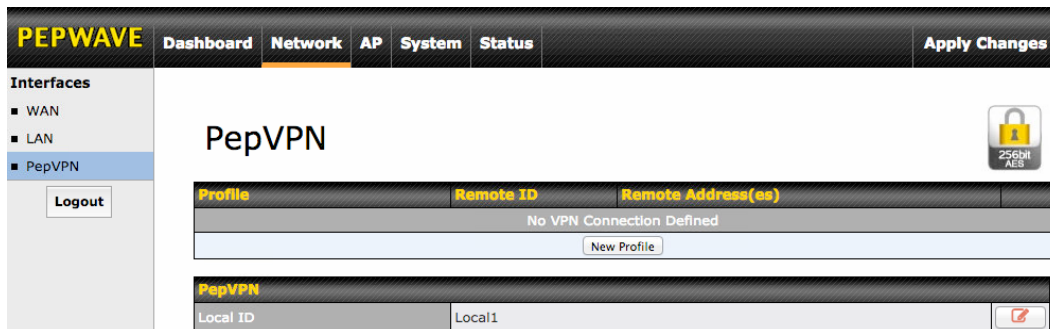
Service Name	<input type="text"/>
IP Protocol	TCP <input type="button" value="←"/> -- Selection Tool -- <input type="button" value="→"/>
Port	Single Port <input type="button" value="↓"/> Service Port: <input type="text"/>
Server IP Address	<input type="text"/>

Port Forwarding	
Service Name	Enter a name for the new port forwarding rule. Valid values for this setting consist of alphanumeric and underscore “_” characters only.
IP Protocol	The IP Protocol setting, along with the Port setting, specifies the protocol of the service as TCP, UDP, ICMP, or IP. Traffic that is received by your access point via the specified protocol at the specified port(s) is forwarded to the LAN hosts specified by the Servers setting. Please see below for details on the Port and Servers settings. Alternatively, the Protocol Selection Tool drop-down menu can be used to automatically fill in the protocol and a single port number of common Internet services (e.g., HTTP, HTTPS, etc.). After selecting an item from the Protocol Selection Tool drop-down menu, the protocol and port number remain manually modifiable.
Port	The Port setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: Single Port, Port Range, Port Mapping

 <p>Single Port: Traffic that is received by your access point via the specified protocol at the specified port is forwarded via the same port to the servers specified by the Server IP Address setting. For example, with IP Protocol set to TCP, and Port set to Single Port and Service Port 80, TCP traffic received on port 80 is forwarded to the configured servers via port 80.</p>	
 <p>Port Range: Traffic that is received by your access point via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the Server IP Address setting. For example, with IP Protocol set to TCP, and Port set to Port Range and Service Ports 80-88, TCP traffic received on ports 80 through 88 is forwarded to the configured servers via the respective ports.</p>	
 <p>Port Mapping: Traffic that is received by your access point via the specified protocol at the specified port is forwarded via a different port to the servers specified by the Server IP Address setting.</p> <p>For example, with IP Protocol set to TCP, and Port set to Port Mapping, Service Port 80, and Map to Port 88, TCP traffic on Port 80 is forwarded to the configured server via Port 88.</p>	
Server IP Address	Enter the LAN IP address of the server that handles requests for the forwarded service.

7.3.3 PepVPN

PepVPN securely connects one or more remote sites to the site running your access point.




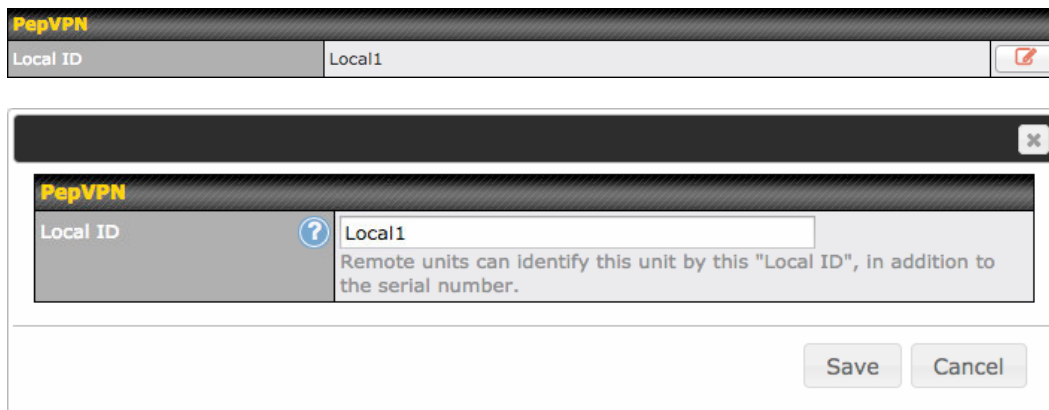
Profile	Remote ID	Remote Address(es)
No VPN Connection Defined		
New Profile		

PepVPN	
Local ID	Local1

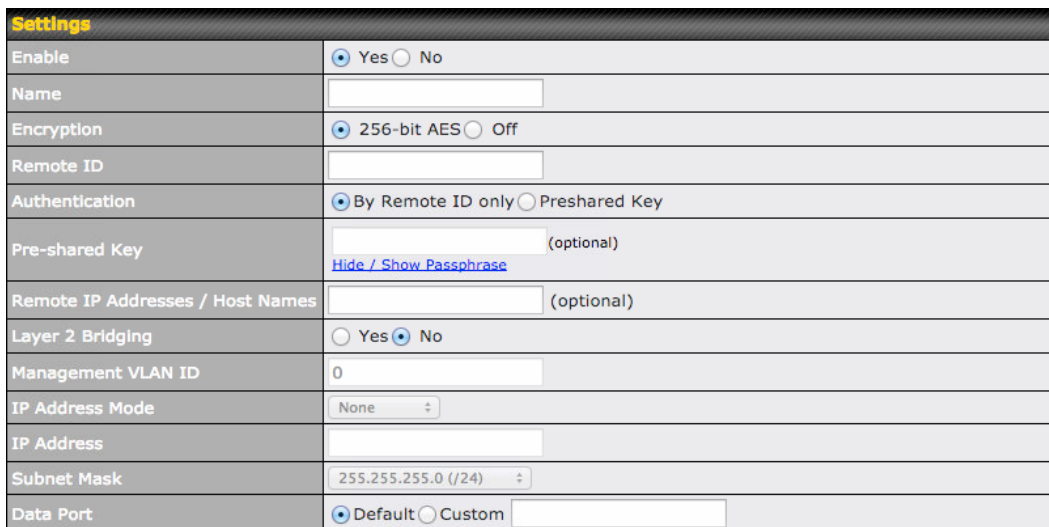
User Manual

PEPWAVE AP Series

To set up PepVPN, first give your site a local PepVPN ID. To modify an existing local ID, click 



Once you've specified a local ID, click the **New Profile** button to configure PepVPN.



Settings	
Enable	<input checked="" type="radio"/> Yes <input type="radio"/> No
Name	<input type="text"/>
Encryption	<input checked="" type="radio"/> 256-bit AES <input type="radio"/> Off
Remote ID	<input type="text"/>
Authentication	<input checked="" type="radio"/> By Remote ID only <input type="radio"/> Preshared Key
Pre-shared Key	<input type="text"/> (optional) Hide / Show Passphrase
Remote IP Addresses / Host Names	<input type="text"/> (optional)
Layer 2 Bridging	<input type="radio"/> Yes <input checked="" type="radio"/> No
Management VLAN ID	<input type="text" value="0"/>
IP Address Mode	None ▾
IP Address	<input type="text"/>
Subnet Mask	255.255.255.0 (/24) ▾
Data Port	<input checked="" type="radio"/> Default <input type="radio"/> Custom <input type="text"/>

PepVPN Profile Settings	
Enable	Check this box to enable PepVPN.
Name	Enter a name to represent this profile. The name can be any combination of alphanumeric characters (0-9, A-Z, a-z), underscores (_), dashes (-), and/or non-leading/trailing spaces ().
Encryption	By default, VPN traffic is encrypted with 256-bit AES . If Off is selected on both sides of a VPN connection, no encryption will be applied.
Remote ID	To allow your access point to establish a VPN connection with a specific remote peer using a unique identifying number, enter the peer's ID or serial number here.
Authentication	Select By Remote ID Only or Preshared Key to specify the method your access point will use to authenticate peers. When selecting By Remote ID Only , be sure to enter a

User Manual

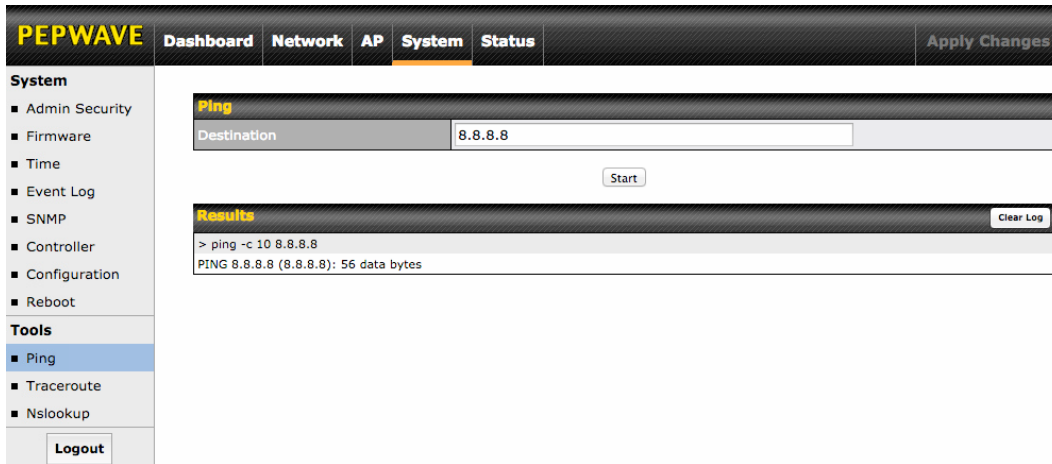
PEPWAVE AP Series

	unique peer ID number in the Remote ID field.
Pre-shared Key	This optional field becomes available when Pre-shared Key is selected as the VPN Authentication method, as explained above. Pre-shared Key defines the pre-shared key used for this particular VPN connection. The VPN connection's session key will be further protected by the pre-shared key. The connection will be up only if the pre-shared keys on each side match. Click Hide / Show Passphrase to toggle passphrase visibility.
Remote IP Address / Host Names (Optional)	Optionally, you can enter a remote peer's WAN IP address or hostname(s) here. If the remote client uses more than one address, enter only one of them here. Multiple hostnames are allowed and can be separated by a space character or carriage return. Dynamic-DNS host names are also accepted. With this field filled, your access point will initiate connection to each of the remote IP addresses until it succeeds in making a connection. If the field is empty, your access point will wait for connection from the remote peer. Therefore, at least one of the two VPN peers must specify this value. Otherwise, VPN connections cannot be established.
Layer 2 Bridging	When this check box is unchecked, traffic between local and remote networks will be IP forwarded. To bridge the Ethernet network of an Ethernet port on a local and remote network, select Layer 2 Bridging . When this check box is selected, the two networks will become a single LAN, and any broadcast (e.g., ARP requests) or multicast traffic (e.g., Bonjour) will be sent over the VPN.
Management VLAN ID	This field specifies the VLAN ID that will be tagged to management traffic, such as AP-to-AP controller communication traffic. A value of 0 indicates that no VLAN tagging will be applied.
IP Address Mode	Choose Automatic or Manual . In automatic mode, your access point acquires an IP from a DHCP server on the Ethernet segment. In manual mode, your access point uses a user-specified IP address.
IP Address/Subnet Mask	When using manual IP addressing (above), enter an IP address and subnet mask in these fields.
Data Port	This field specifies the outgoing UDP port number for transporting VPN data. If Default is selected, port 4500 will be used by default. Port 32015 will be used if port 4500 is unavailable. If Custom is selected, you can input a custom outgoing port number between 1 and 65535.

8 Tools

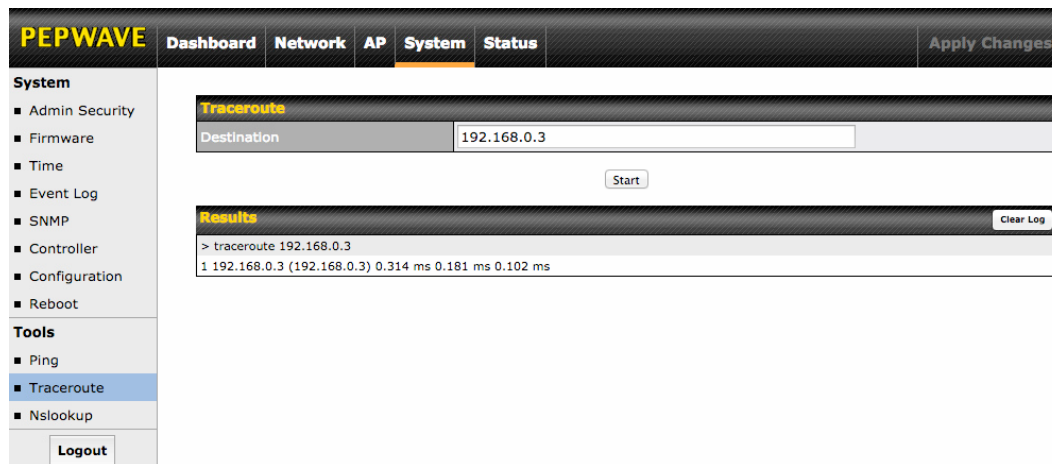
8.1 Ping

The ping test tool tests connectivity pinging the specified destination IP address. The ping utility is located at **System>Tools>Ping**.



8.2 Traceroute

The traceroute test tool traces the routing path to the specified IP address. The traceroute test utility is located at **System>Tools>Traceroute**.



8.3 Nslookup

The nslookup tool is used to test DNS name servers. The nslookup utility can be found at **System>Tools>Nslookup**.

The screenshot displays the PEPWAVE web management interface. At the top, there is a navigation bar with tabs for Dashboard, Network, AP, System (selected), and Status. An 'Apply Changes' button is located on the right side of this bar. On the left, a sidebar menu lists various system and tool options. Under the 'System' section, options include Admin Security, Firmware, Time, Event Log, SNMP, Controller, Configuration, and Reboot. Under the 'Tools' section, options include Ping, Traceroute, and Nslookup (which is currently selected and highlighted). A 'Logout' button is positioned at the bottom of the sidebar. The main content area is titled 'Nslookup' and features a 'Destination' input field, a 'Start' button, and a 'Results' section with a 'Clear Log' button. The results area is currently empty, displaying '(Empty)'.

9 Monitoring Device Status

The displays available on the **Status** tab help you monitor device data, client activity, rogue device access, and more.

9.1 Device

Here you can access a variety of data about your access point, download a diagnostic report, and check MAC addresses. To download a diagnostic report, click the **Download** link.

The screenshot shows the PEPWAVE web interface. The top navigation bar includes 'Dashboard', 'Network', 'AP', 'System', and 'Status' (which is highlighted). A 'Logout' button is visible in the left sidebar. The main content area is divided into two sections:

System Information	
AP Name	AP One
Model	AP One AC
Location	site1
Serial Number	2438-3B91-493A
Firmware	3.5.2 build 1538
Host Name	ap---a6
Uptime	9 hours 34 minutes
System Time	Mon Jun 22 19:58:27 HKT 2015
Diagnostic Report	Download

Interface	MAC Address
WAN	00:1A:DD:EC:25:20
Radio 2.4GHz	00:1A:DD:EC:25:20
Radio 5GHz	00:1A:DD:EC:25:30

9.2 Client List

The **Client List** displays all currently connected clients. Use the **Expand** and **Collapse** buttons to control the amount of data displayed.

The screenshot shows the PEPWAVE web interface with the 'Client List' section expanded. The top navigation bar is the same as in the previous screenshot. The 'Client List' section is highlighted in the left sidebar. The main content area shows a table titled 'Connected Clients' with 'Expand' and 'Collapse' buttons in the top right corner. The table has the following columns: MAC Address, IP Address, Type, Signal, Duration, TX/RX Rate, and TX/RX Bytes (Packets). The table currently displays 'No Connected Clients'.

MAC Address	IP Address	Type	Signal	Duration	TX/RX Rate	TX/RX Bytes (Packets)
No Connected Clients						

9.3 WDS Info

Here you can monitor the status of your wireless distribution system (WDS) and track activity by MAC address. If you're using the AP One AC mini, this section will display information for both the 2.4GHz and 5GHz radios.

The screenshot shows the PEPWAVE web interface with the 'Status' tab selected. The left sidebar contains a 'Status' menu with 'WDS Info' highlighted. The main content area displays WDS information for 2.4GHz and 5GHz radios.

	2.4GHz	5GHz
Local MAC Address	00:1A:DD:DA:E7:40	00:1A:DD:DA:E7:50
Current Channel	1	36

WDS Clients				
Peer MAC Address	Encryption	Type	Signal	TX/RX Bytes (Packets)
No WDS				

9.4 Portal

If you've turned on your access point's captive portal, client connection data will appear here. Use the **Expand** and **Collapse** buttons to control the amount of data displayed.

The screenshot shows the PEPWAVE web interface with the 'Status' tab selected. The left sidebar contains a 'Status' menu with 'Portal' highlighted. The main content area displays a table for 'Portal Users' with 'Expand' and 'Collapse' buttons.

MAC Address	IP Address	User Name	Status	Last Login Time	Remaining Quota
No Portal Users					

9.5 Rogue AP

This section displays a list of nearby suspected rogue access points.

PEPWAVE Dashboard Network AP System **Status** Apply Changes

Status

- Device
- Client List
- WDS Info
- Portal
- Rogue AP**
- Event Log

Logout

Suspected Rogue APs

BSSID	SSID	Channel	Signal	Encryption	Last Seen
E4:F4:C6:05:CA:D6	NETGEAR73	8	35	WPA2	44 years ago
C8:D7:19:86:8C:8B	WS Wireless	11	17	WPA2	44 years ago
C4:04:15:52:CD:76		157	37	WPA2	44 years ago
A0:F3:C1:BE:17:20	EK-Wireless	1	6	WPA2	44 years ago
90:72:40:22:CD:6B	Apple 11ac Wi-Fi Network 5GHz	149	46	WPA2	44 years ago
90:72:40:22:CD:6A	Apple 11ac Wi-Fi Network	11	23	WPA2	44 years ago
6C:AA:B3:62:D0:7C	WinVIP	100	7	WPA	44 years ago
6C:AA:B3:5D:58:6C	WinVIP	60	8	WPA	44 years ago
6C:AA:B3:5D:58:68	WinVIP	4	13	WPA	44 years ago
6C:AA:B3:1D:58:6C	Winbo-01	60	8	WPA	44 years ago
6C:AA:B3:1D:58:68	Winbo-01	4	12	WPA	44 years ago
28:C6:8E:1E:C8:40	WN203-WHITE	13	34	WPA2	44 years ago
28:C6:8E:1E:C7:A0	ssid10	11	24	WPA2	44 years ago
1C:7E:E5:55:90:45	Winsports	11	12	WPA	44 years ago
10:56:CA:60:85:F4	PEPLINK_0DBC	1	5	WPA & WPA2	44 years ago
10:56:CA:60:85:34	PEPLINK_0D40	1	6	WPA & WPA2	44 years ago
10:56:CA:60:6C:35	peplink_public	13	19	WPA & WPA2	44 years ago
10:56:CA:60:6C:34	balanceOne	13	20	WPA & WPA2	44 years ago
10:56:CA:60:53:C4	A0805_2G	11	22	WPA & WPA2	44 years ago
10:56:CA:60:4A:18	PEPLINK_F669	153	14	WPA & WPA2	44 years ago

Prev 1-20 (166) Next

9.6 Event Log

The **Event Log** displays a list of all events associated with your access point. Check **Auto Refresh** to refresh log entries automatically. Click the **Clear Log** button to clear the log.

PEPWAVE Dashboard Network AP System **Status** Apply Changes

Status

- Device
- Client List
- WDS Info
- Portal
- Rogue AP
- Event Log**

Logout

Device Event Log Auto Refresh

Jan 01 00:00:54	ap-one-ac-mini-1398 [root] System: Started up (3.5.0 build 1448)
Jan 01 00:00:17	ap-one-ac-mini-1398 [root] Reboot: Last Reboot Reason - no reason stored
Jan 01 00:04:42	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) connected to "PEPWAVE_E740_2GHz" (00:1a:dd:da:e7:41) (2.4 GHz) IEEE 802.11
Jan 01 00:04:41	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) disconnected from "PEPWAVE_E740_5GHz" (00:1a:dd:da:e7:51) (5 GHz) IEEE 802.11 [RX:391736032bytes,302270pkts TX:462457848bytes,389058pkts Duration:28sec] 192.168.0.22
Jan 01 00:04:16	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) connected to "PEPWAVE_E740_5GHz" (00:1a:dd:da:e7:51) (5 GHz) IEEE 802.11
Jan 01 00:04:11	ap-one-ac-mini-1398 [root] System: Changes applied
Jan 01 00:02:22	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) connected to "PEPWAVE_E740_2GHz" (00:1a:dd:da:e7:41) (2.4 GHz) IEEE 802.11
Jan 01 00:02:21	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) disconnected from "PEPWAVE_E740_5GHz" (00:1a:dd:da:e7:51) (5 GHz) IEEE 802.11 [RX:455525152bytes,351490pkts TX:820875062bytes,621082pkts Duration:36sec] 192.168.0.22
Jan 01 00:01:49	ap-one-ac-mini-1398 [root] System: Changes applied
Jan 01 00:01:48	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) connected to "PEPWAVE_E740_5GHz" (00:1a:dd:da:e7:51) (5 GHz) IEEE 802.11
Jan 01 00:01:02	ap-one-ac-mini-1398 [root] System: Started up (3.5.0a3 build 1442)
Jan 01 00:17:41	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) connected to "PEPWAVE_E740_2GHz" (00:1a:dd:da:e7:41) (2.4 GHz) IEEE 802.11
Jan 01 00:17:40	ap-one-ac-mini-1398 [hostapd] WLAN: Client (24:fd:52:44:e4:ab) disconnected from "PEPWAVE_E740_5GHz" (00:1a:dd:da:e7:51) (5 GHz) IEEE 802.11 [RX:399556352bytes,308304pkts TX:342803543bytes,316172pkts Duration:60sec] 192.168.0.22

Clear Log

10 Restoring Factory Defaults

The following procedure restores the settings of your access point to factory defaults:

- Power on the unit and wait for one minute.
- Press and hold the reset button for at least five seconds, then release.
- The unit will automatically reboot.
- Wait for one minute or until the status LED turns green, upon which the settings of the device will have been restored to the factory defaults.

By default, the unit will acquire an IP address from a DHCP server.

11 Appendix

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- 1) Increase the separation between the equipment and receiver.
- 2) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- 3) Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

IMPORTANT NOTE

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands is country dependent and is firmware programmed at the factory to match the intended destination.

PEP WAVE

Broadband Possibilities

www.pepwave.com

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