

PEPWAVE

Broadband Possibilities

User Manual

Pepwave AP One Series:

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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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.

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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.

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3 Package Contents

3.1 AP One AC mini

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

3.2 AP One In-Wall

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

3.3 AP One 300M

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

3.4 AP One Flex 300M

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

3.5 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

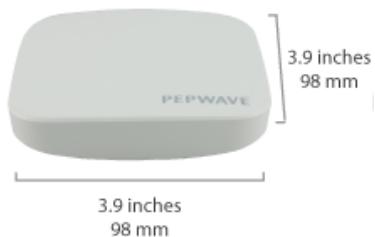
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4 Hardware Overview

4.1 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. |

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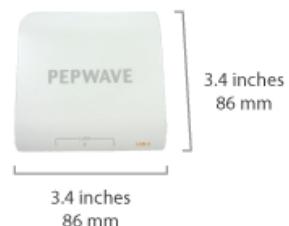
PEPWAVE AP Series

4.2 AP One In-Wall

Front View (US)



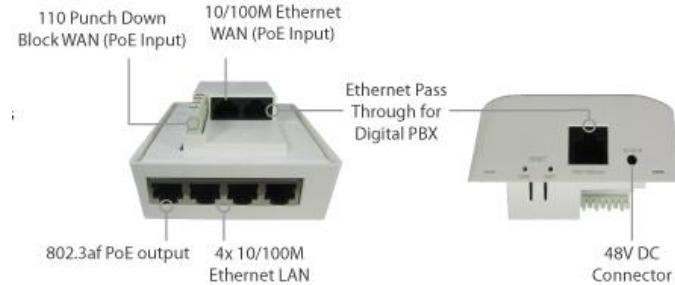
Front View (International)



Rear Panel View



Top View



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

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4.3 AP One 300M

Front View



Rear Panel View



LED Indicators

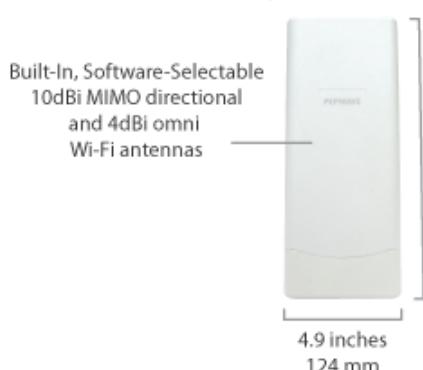
| | |
|-----------------|---|
| Power | On – Power On OFF – Power Off |
| Status | RED – Access point initializing GREEN – Access point ready |
| Wireless | OFF – 2.4/5GHz Wi-Fi radio off BLINKING – AP sending/receiving data GREEN – 2.4/5GHz Wi-Fi radio on Note that this model can operate in either 2.4GHz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

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4.4 AP One Flex 300M

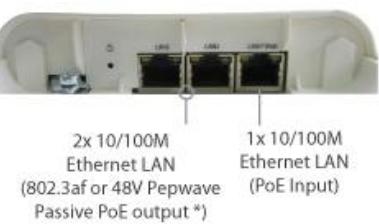
Front View



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



[^] Available separately.

LED Indicators

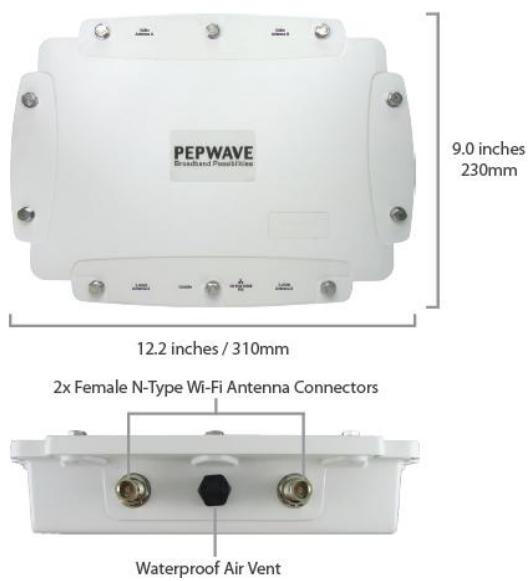
| Status | RED – Access point initializing GREEN – Access point ready |
|--------|--|
| LAN | OFF – No device connected to Ethernet port BLINKING – Ethernet port sending/receiving data ON – Powered-on device connected to Ethernet port |
| | Number of connected clients (1-10, 11-20, 21-30, 31-40) |

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4.5 AP Pro / AP Pro 300M / AP Pro Duo

Front/Top View

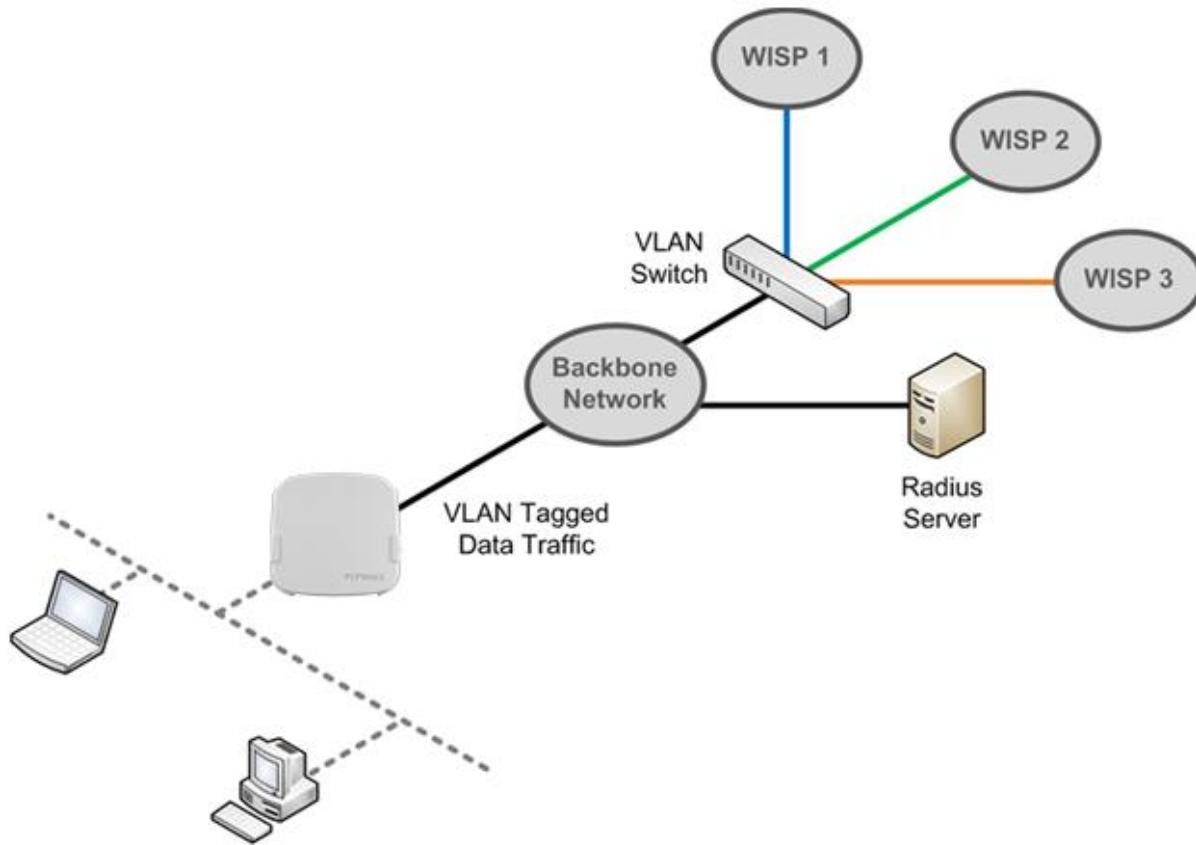


Rear Panel View



5 Installation

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



*AP One Flex does not support bridge mode

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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.

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Web Admin

Login

Username:

Password:

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

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Dashboard Network AP System Status

Apply Changes

General

AP

Logout

WAN

IP Address: [Details...](#) Status: Disconnected

Device Information

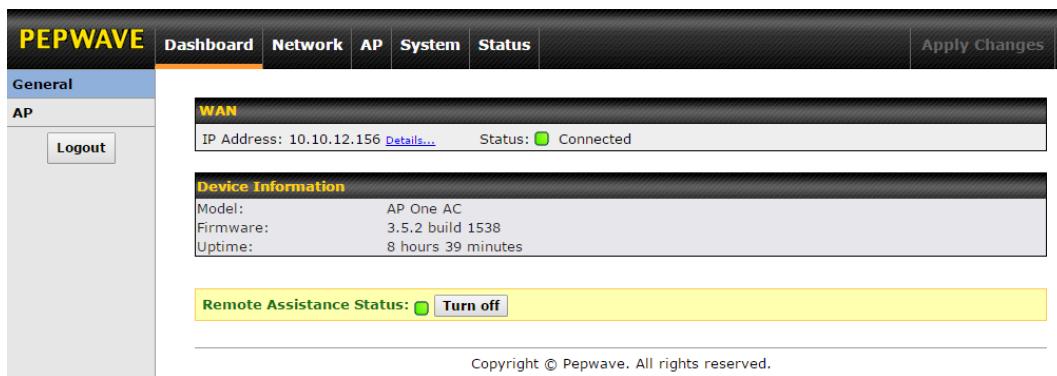
| | |
|-----------|---------------------------|
| Model: | AP One |
| Firmware: | 3.5.0 build 1449 |
| Uptime: | 1 day 12 hours 52 minutes |

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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.



6.1 General

This section contains WAN status and general device information.

The screenshot shows the 'WAN' status section and a 'General' information section. The 'WAN' section displays the IP Address (10.10.12.156) and Status (Connected). The 'General' section is titled 'IP Address' and shows a 'Details of WAN' table with the following data:

| Details of WAN | |
|-----------------|--------------|
| 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 |

The 'General' section also includes a 'Status' field with the note: 'This field displays the current WAN connection status.'

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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

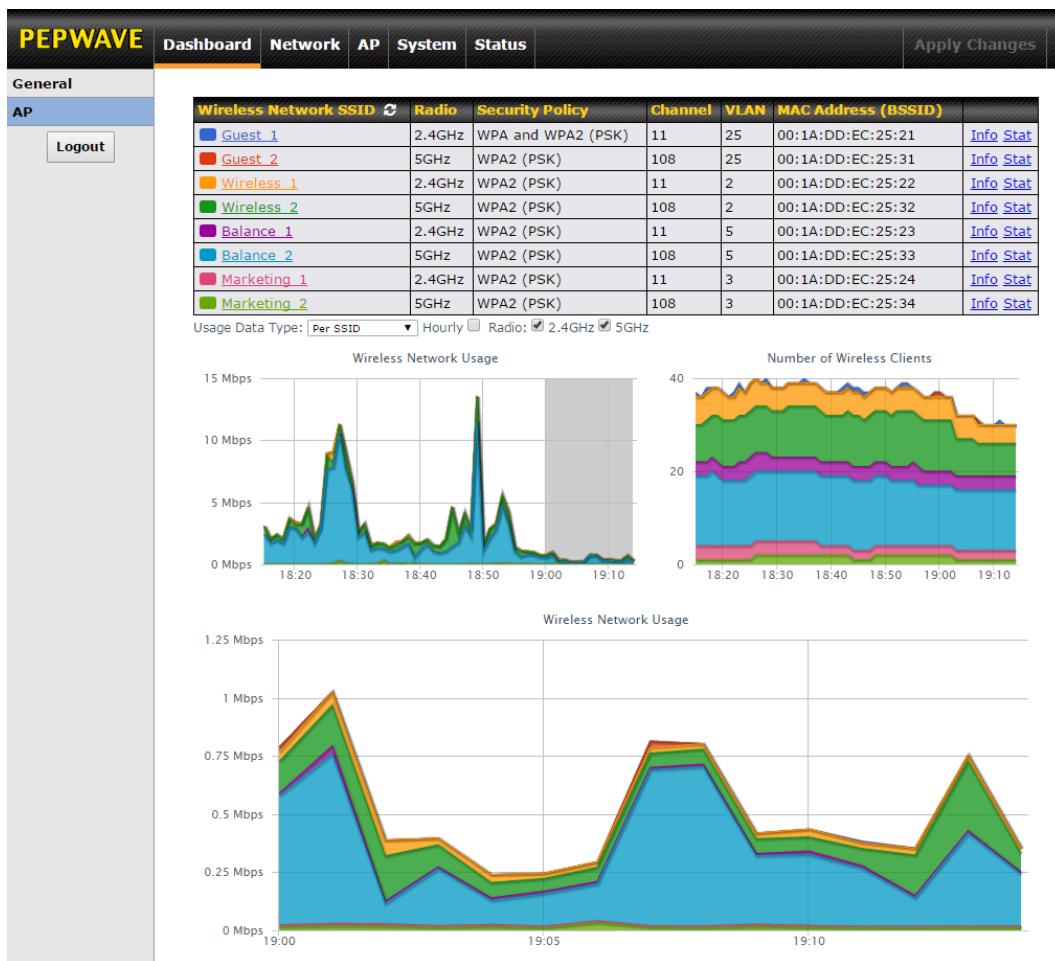
This field displays your access point's uptime since the last reboot or shutdown.

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6.2 AP

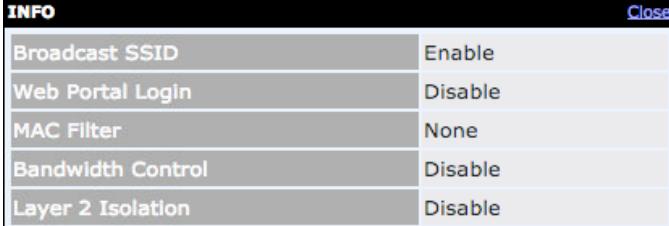
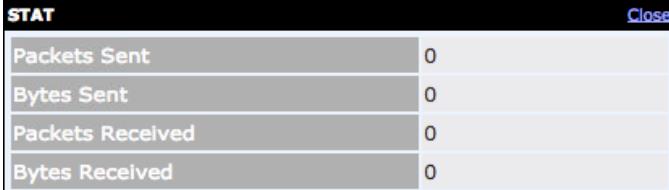
This section displays a variety of information about your wireless network.



| 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. |

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| 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 | Click this link to display the following information panel:  <table border="1"><thead><tr><th colspan="2">INFO</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 | | Broadcast SSID | Enable | Web Portal Login | Disable | MAC Filter | None | Bandwidth Control | Disable | Layer 2 Isolation | Disable |
| INFO | | | | | | | | | | | | | |
| Broadcast SSID | Enable | | | | | | | | | | | | |
| Web Portal Login | Disable | | | | | | | | | | | | |
| MAC Filter | None | | | | | | | | | | | | |
| Bandwidth Control | Disable | | | | | | | | | | | | |
| Layer 2 Isolation | Disable | | | | | | | | | | | | |
| Stat | Click this link to display the following statistics panel:  <table border="1"><thead><tr><th colspan="2">STAT</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 | | Packets Sent | 0 | Bytes Sent | 0 | Packets Received | 0 | Bytes Received | 0 | | |
| STAT | | | | | | | | | | | | | |
| 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. | | | | | | | | | | | | |

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7 Configuration

7.1 System

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

| | |
|---|--|
| System | Admin Security |
| ■ Admin Security | AP Name: AP One Location: site1 Admin User Name: admin Admin Password: Confirm Admin Password: Web Admin Interface: <input checked="" type="checkbox"/> <input type="checkbox"/> HTTP to HTTPS Redirection Security: <input type="radio"/> HTTPS <input checked="" type="radio"/> 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 |
| <input type="button" value="Logout"/> <input type="button" value="Save"/> | |

7.1.1 Admin Security

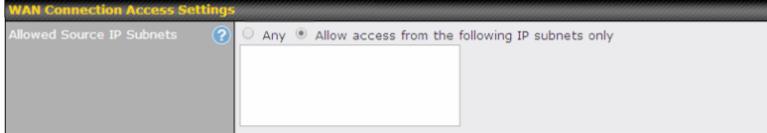
The **Admin Security** section allows you to set up your access point's name, password, security settings, and other options.

| | |
|---|--|
| System | Admin Security |
| ■ Admin Security | AP Name: AP One Location: site1 Admin User Name: admin Admin Password: Confirm Admin Password: Web Admin Interface: <input checked="" type="checkbox"/> <input type="checkbox"/> HTTP to HTTPS Redirection Security: <input type="radio"/> HTTPS <input checked="" type="radio"/> 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 |
| <input type="button" value="Logout"/> <input type="button" value="Save"/> | |

| 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. |

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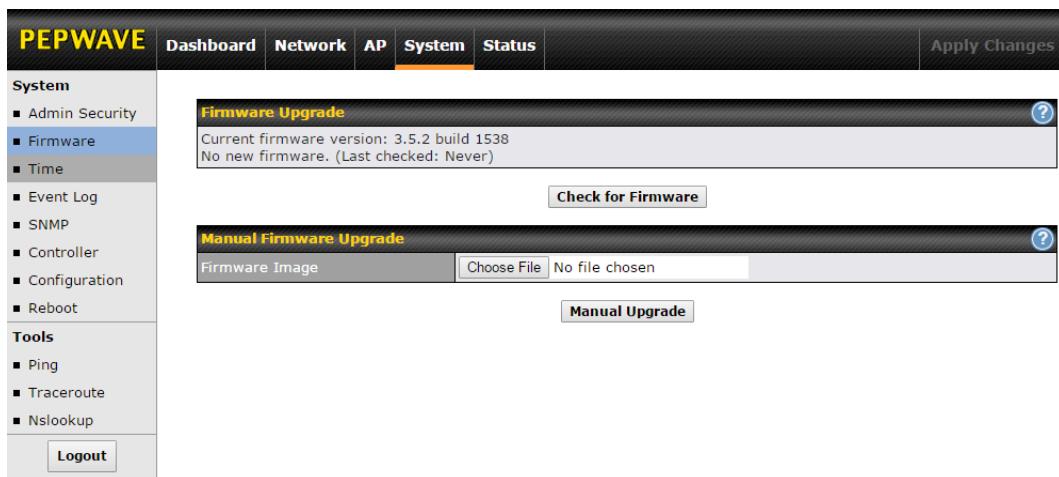
| | |
|----------------------------------|---|
| Admin Password | This field allows you to specify a new administrator password. The default password is <i>public</i> . |
| Confirm Admin Password | Re-enter the admin password. |
| Web Admin Interface | Check this box to turn on the web administration 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., 192.168.0.0), and <i>m</i> represents the subnet mask in CIDR format, which is between 0 and 32 inclusively. For example: 192.168.0.0/24. To define multiple subnets, separate each IP subnet, one per line. For example:</p> <p>192.168.0.0/24 10.8.0.0/16</p> |
| Language | Choose a language for the administration interface. |

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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.

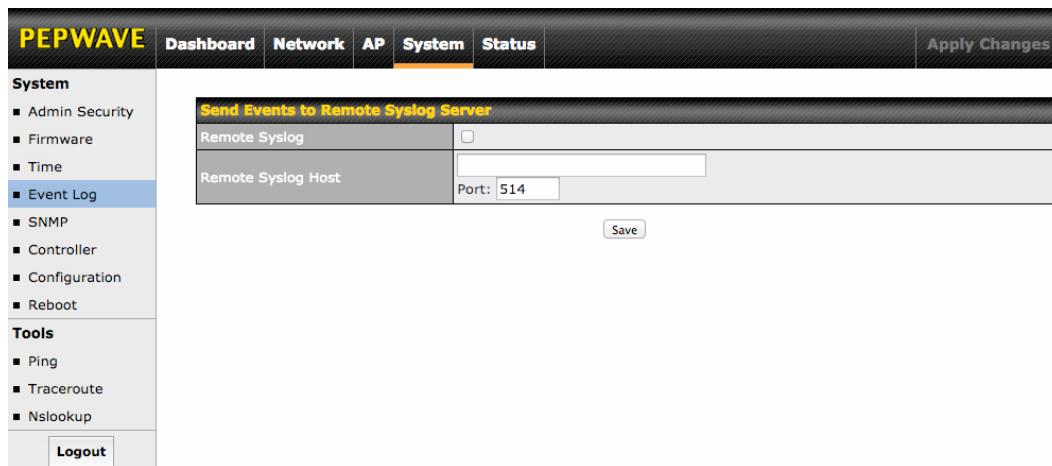
| Time | |
|--------------------|--|
| Time Zone | Time region used by the system. All choices are based on UTC. |
| Time Server | To choose a time server other than the default, enter the URL here. To restore the default time server, click the Default button. |

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7.1.4 Event Log

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



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Dashboard Network AP System Status

Apply Changes

System

- Admin Security
- Firmware
- Time
- Event Log**
- SNMP
- Controller
- Configuration
- Reboot

Tools

- Ping
- Traceroute
- Nslookup

Logout

Send Events to Remote Syslog Server

Remote Syslog

Remote Syslog Host: 192.168.1.1

Port: 514

Save

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. |

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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.

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Dashboard Network AP System Status

Apply Changes

System

- Admin Security
- Firmware
- Time
- Event Log
- SNMP**
- Controller
- Configuration
- Reboot

Tools

- Ping
- Traceroute
- Nslookup

Logout

SNMP Settings

| | |
|------------------|-------------------------------------|
| SNMP Device Name | AP One |
| SNMP Port | 161 Default |
| SNMPv1 | <input checked="" type="checkbox"/> |
| SNMPv2c | <input checked="" type="checkbox"/> |
| SNMPv3 | <input type="checkbox"/> |

Save

Community Name

| Community Name | Allowed Source Network | Access Mode | Remove |
|----------------|------------------------|-------------|--------|
| public | 0.0.0.0 | Read Only | |

Add SNMP Community

SNMPv3 User Name

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

Add SNMP User

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. |

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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="button" 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., 192.168.1.0) 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="button" value="HMAC-MD5"/> |
| Authentication Password | <input type="text"/> |
| Confirm Authentication Password | <input type="text"/> |
| Privacy Protocol | <input type="button" value="None"/> |
| Access Mode | <input type="button" 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. |

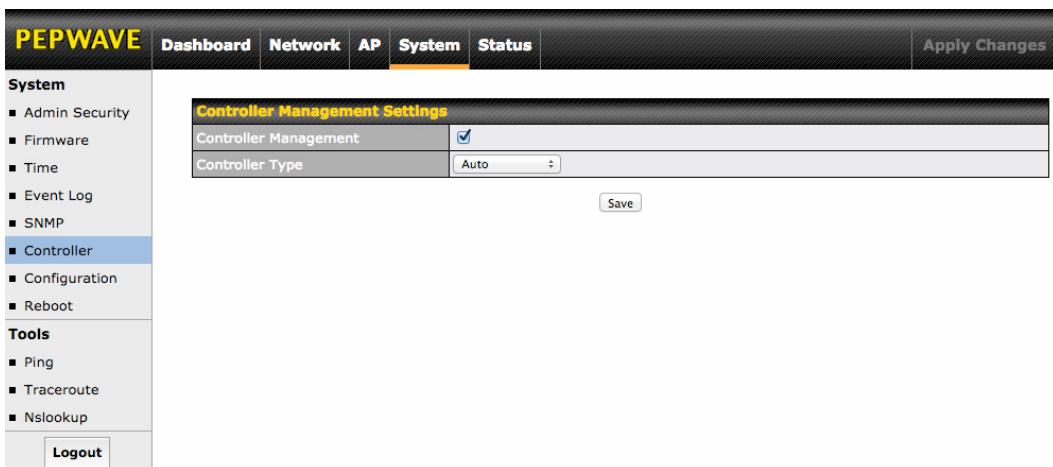
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| | |
|--|--|
| Confirm Authentication Password | Re-enter the authentication password. |
| Privacy Protocol | Select None or CBC-DES as the SNMPv3 privacy protocol. When CBC-DES is selected, an entry field will appear for the password. |
| Access 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.



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Dashboard Network AP System Status Apply Changes

System

- Admin Security
- Firmware
- Time
- Event Log
- SNMP
- Controller**
- Configuration
- Reboot

Tools

- Ping
- Traceroute
- Nslookup

Logout

Controller Management Settings

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

Save

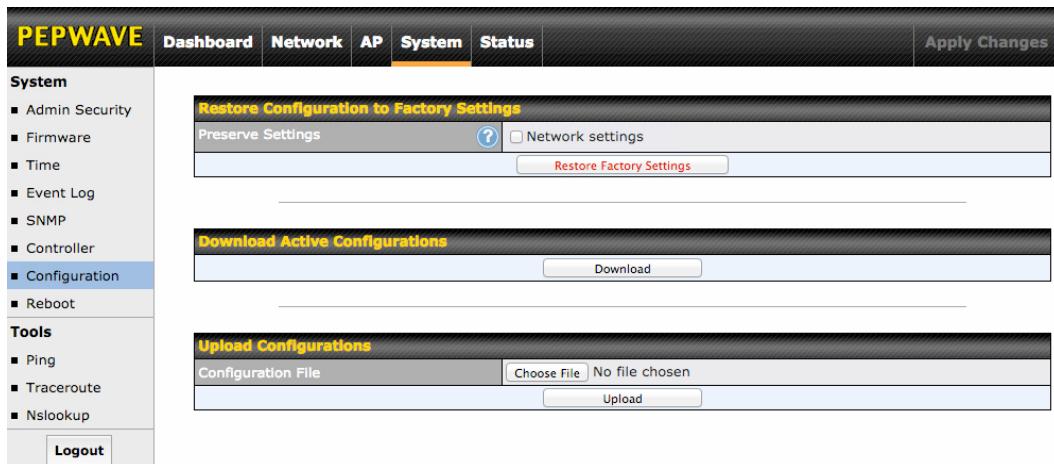
| Controller Management Settings | |
|--------------------------------|--|
| Controller Management | Check this box to enable remote management. |
| Controller Type | Select Auto , InControl , or AP Controller as your remote AP management method. When Auto is selected, your access point will automatically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

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7.1.7 Configuration

In this 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. |

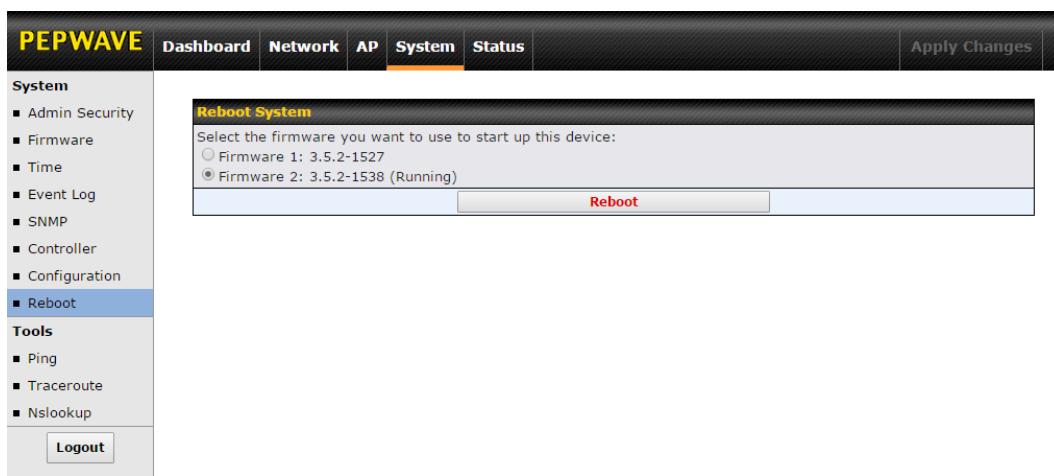
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PEPWAVE AP Series

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.



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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 <input type="button" value="MCS0/6M"/> MCS Index |
| Multicast Filter | <input type="checkbox"/> |
| Multicast Rate | <input type="button" value="MCS0/6M"/> MCS Index |
| IGMP Snooping (Multicast Enhancement) | <input type="checkbox"/> |
| DHCP Setting | <input type="button" value="None"/> |
| DHCP Option 82 | <input type="checkbox"/> |
| Default VLAN ID | 0 |
| VLAN Pooling | <input type="checkbox"/> |
| VLAN Pool | (CSV: e.g. 1,3,9-11,15) |
| Network Priority (QoS) | <input type="button" value="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. |
| 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 |

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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 | <input type="button" value="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. |

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| Security Settings | |
|---------------------------|---|
| Security Policy | WEP |
| Key Size | 40 bits (64-bit WEP) |
| Key Format | ASCII |
| Passphrase | <input type="text"/> Generate Key |
| Encryption Key | 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. |

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| 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**.

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| Web Portal Login | |
|-----------------------|--|
| Web Portal | Enable <input type="button" value="▼"/> |
| Authentication Method | RADIUS <input type="button" value="▼"/> |
| RADIUS Security | PAP <input type="button" value="▼"/> |
| Splash Page | http:// <input type="button" value="▼"/> |
| Landing Page | <input type="checkbox"/> |
| Landing Page URL | <input type="text"/> |
| 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: <input type="button" value="00"/> : <input type="button" value="00"/> <input type="radio"/> 0 minutes after quota reached |
| Allowed Domains / IPs | <input type="text"/> <input type="button" value="+"/> |
| Allowed Client IPs | <input type="text"/> <input type="button" value="+"/> |

Web Portal Login

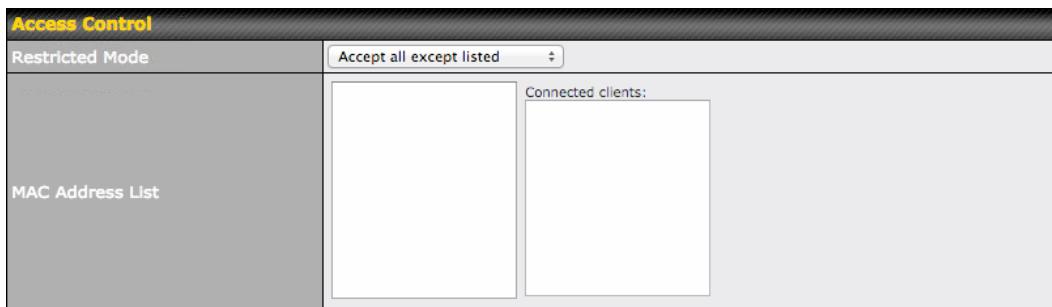
| | |
|------------------------------|--|
| Web Portal | Select Enable to turn on your access point's built-in web portal functionality. |
| Authentication Method | Choose Open Access to allow users to connect without authentication or RADIUS to require authentication. If RADIUS is selected, you'll be 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. |

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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.

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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 | 3 <input type="button" value=""/> | |
| Radius Request Interval | 3 <input type="button" value=""/> 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. |

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| 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 | 0 | kbps (0: Unlimited) | |
| Downstream Limit | 0 | kbps (0: Unlimited) | |
| Client Upstream Limit | 0 | kbps (0: Unlimited) | |
| Client Downstream Limit | 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 |

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Downstream Limit unlimited downstream bandwidth.

| Firewall Settings | | | |
|---------------------|--------------------------------|------|------|
| Firewall Mode | Lockdown – Block all except... | | |
| Firewall Exceptions | Name | Type | Item |
| | No Active Exceptions | | |
| | New Rule | | |

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  button. To turn off the firewall, select **Disable**.

Firewall Rule

| | |
|----------|----------------------|
| Name | <input type="text"/> |
| Type | Port |
| Protocol | TCP |
| Port | Any Port |

[OK](#) [Cancel](#)

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. |

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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 | 4050 | m (input distance for recommended values) |
| Slot Time | <input type="radio"/> Auto <input checked="" type="radio"/> Custom 9 | μs Default |
| ACK Timeout | 48 | μs Default |
| Frame Aggregation | <input checked="" type="checkbox"/> | |
| Aggregation Length | 50000 | |
| Maximum Number of Clients | 0 (0: Unlimited) | |
| Client Signal Strength Threshold | 0 (0: Unlimited) | |

AP Settings

Protocol

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.

| AP Settings | | 2.4GHz | 5GHz |
|-------------|----------|--------|----------|
| Protocol | 802.11ng | | 802.11ac |

Operating Country

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.

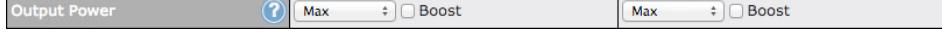
Channel Bonding

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.

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| | |
|----------------------------------|--|
| |  |
| Channel | 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. The AP One AC mini allows setting channels on the 2.4GHz and 5GHz bands, as shown below.  |
| Output Power | 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. 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.  |
| Beacon Rate | 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 . |
| Beacon Interval | Set the time between each beacon send. Available options are 100ms , 250ms , and 500ms . |
| DTIM | Set the frequency for the beacon to include delivery traffic indication messages (DTIM). The interval unit is measured in milliseconds. |
| RTS Threshold | Set the minimum packet size for your access point to send an RTS using the RTS/CTS handshake. Setting 0 disables this feature. |
| Fragmentation Threshold | Enter a value to limit the maximum frame size, which can improve performance. |
| Distance / Time Convertor | This slider and text entry field can be used to interactively set slot time. |
| Slot Time | This field provides the option to modify the unit wait time before your access point transmits. The default value is 9µs . |
| ACK Timeout | Set the wait time to receive an acknowledgement packet before retransmitting. The default value is 48µs . |
| Frame Aggregation | With this feature enabled, throughput will be increased by sending two or more data frames in a single transmission. |
| Aggregation Length | 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 . |
| Max number of Clients | Enter the maximum clients that can simultaneously connect to your access point or set the value to 0 to allow unlimited clients. |

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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 | | | | | | | |
| | | Sunday | Midnight | 4am | 8pm | Noon | 4pm | 8pm | |
| | | Monday | | | | | | | |
| | | Tuesday | | | | | | | |
| | | Wednesday | | | | | | | |
| | | Thursday | | | | | | | |
| | | Friday | | | | | | | |
| | | Saturday | | | | | | | |
| <input checked="" type="checkbox"/> On Off <input checked="" 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

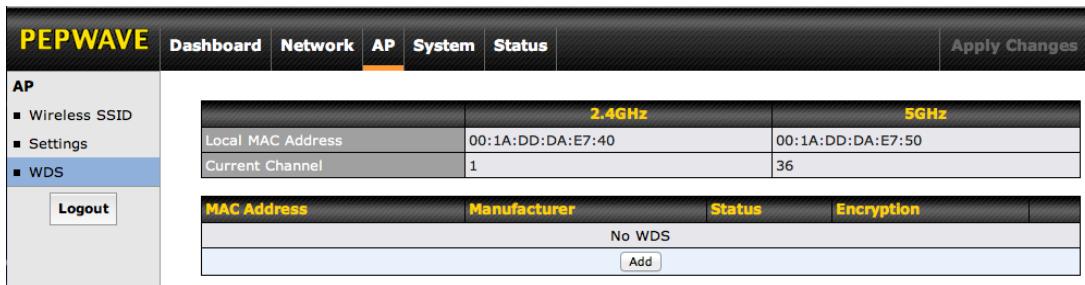
This checkbox enables Wi-Fi Multimedia (WMM), also known as Wireless Multimedia Extensions (WME), on your access point. The default is **enabled**.

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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.



| MAC Address | Manufacturer | Status | Encryption |
|-------------|--------------|--------|------------|
| No WDS | | | |

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. |

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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.

| Basic | | | | | | | |
|------------------------|--|----------|-----|------|--------|--------|-------|
| Keep Default IP | <input checked="" type="checkbox"/> | | | | | | |
| IP Address Mode | Manual | | | | | | |
| Static IP Address | | | | | | | |
| Subnet Mask | 255.255.255.0 (/24) | | | | | | |
| Default Gateway | | | | | | | |
| DNS Server | | | | | | | |
| Advanced | | | | | | | |
| Management VLAN ID | 0 | | | | | | |
| Spanning Tree Protocol | <input type="checkbox"/> | | | | | | |
| Scheduled Reboot | <table border="1"><tr><td>Schedule</td><td>Day</td><td>Time</td></tr><tr><td>Weekly</td><td>Sunday</td><td>00:00</td></tr></table> | Schedule | Day | Time | Weekly | Sunday | 00:00 |
| Schedule | Day | Time | | | | | |
| Weekly | Sunday | 00:00 | | | | | |
| Ethernet Speed/Duplex | 100Mbps Full Duplex | | | | | | |
| AP Mode | Router | | | | | | |

| 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. |

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

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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 AP Series configuration interface. The top navigation bar includes 'PEPWAVE', 'Dashboard', 'Network' (which is selected and highlighted in orange), 'AP', 'System', 'Status', and 'Apply Changes'. On the left, a sidebar titled 'Interfaces' lists 'WAN', 'LAN' (selected and highlighted in blue), and 'PepVPN'. A 'Logout' button is also present. The main content area is divided into several sections: 'IP Settings' (IP Address: 192.168.1.1, Subnet Mask: 255.255.255.0 (/24)), 'DHCP Server Settings' (DHCP Server checked, 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 table with a '+' button), 'DMZ' (checkbox for DMZ, DMZ IP field), and 'Port Forwarding' (table with columns 'Port', 'Protocol', 'Server', and 'Protocol', showing 'No Services Defined' and an 'Add Service' button). A 'Save' button is located at the bottom right of the main content area.

IP Settings

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

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| DHCP Server Settings | | |
|----------------------|-------------------------------------|---|
| DHCP Server | <input checked="" type="checkbox"/> | |
| IP Range | 192.168.1.100 | - 192.168.1.200 |
| Broadcast Address | 255.255.255.0 (/24) | |
| 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 |
| | |  |

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  to add the DHCP reservation. To delete a DHCP reservation, click  . |

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| 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 | <input type="button" value="TCP"/> <input type="button" value="-- Selection Tool --"/> |
| Port | <input type="button" value="Single Port"/> Service Port: <input type="text"/> |
| Server IP Address | <input type="text"/> |
| <input type="button" value="OK"/> <input type="button" value="Cancel"/> | |

| 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 |

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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.

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.

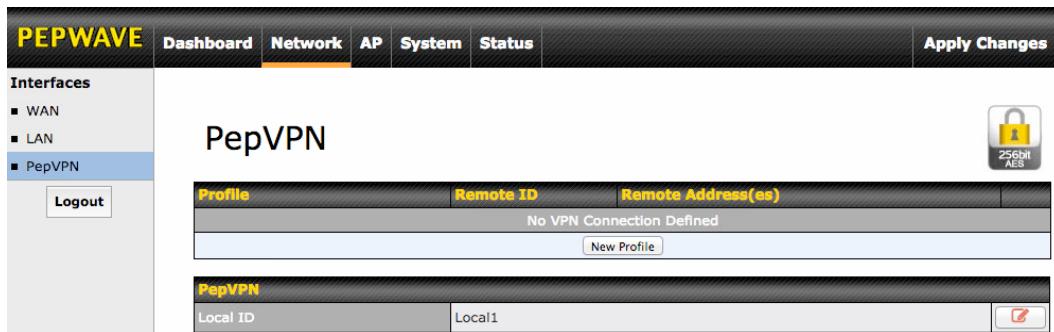
Port Mapping: Traffic that is received by your access point via the specified protocol at the specified port is forwarded via a different port to the servers specified by the **Server IP Address** setting.

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.

| | |
|--------------------------|---|
| Server IP Address | Enter the LAN IP address of the server that handles requests for the forwarded service. |
|--------------------------|---|

7.3.3 PepVPN

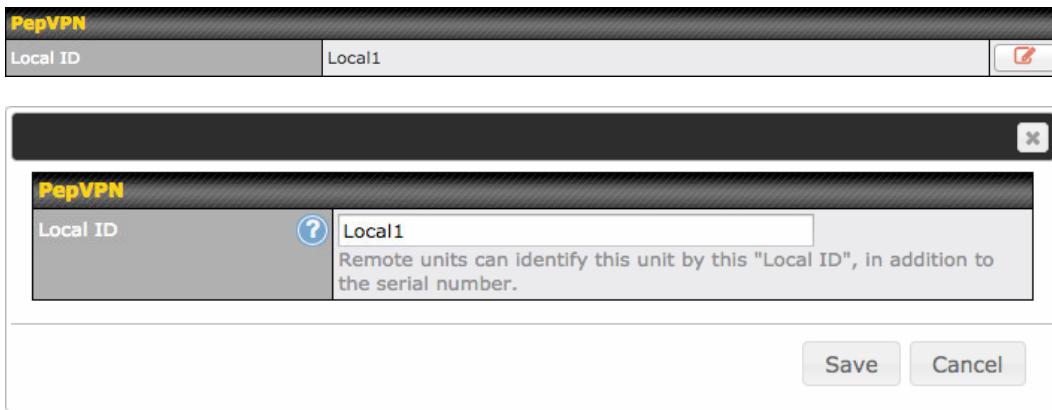
PepVPN securely connects one or more remote sites to the site running your access point.



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

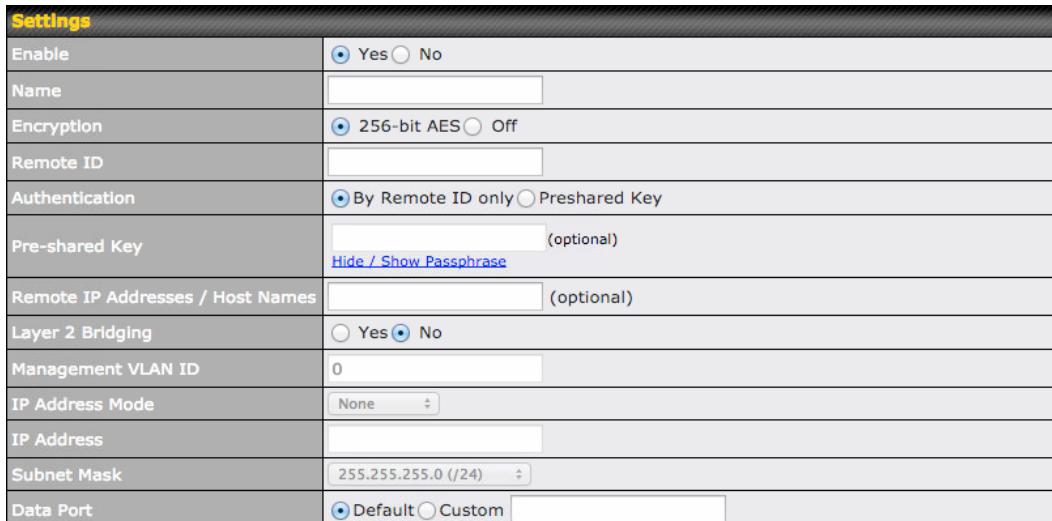


| | | |
|----------|--------|---|
| Local ID | Local1 |  |
|----------|--------|---|

Remote units can identify this unit by this "Local ID", in addition to the serial number.

Save Cancel

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



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

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 |

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| | |
|--|---|
| | 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. |

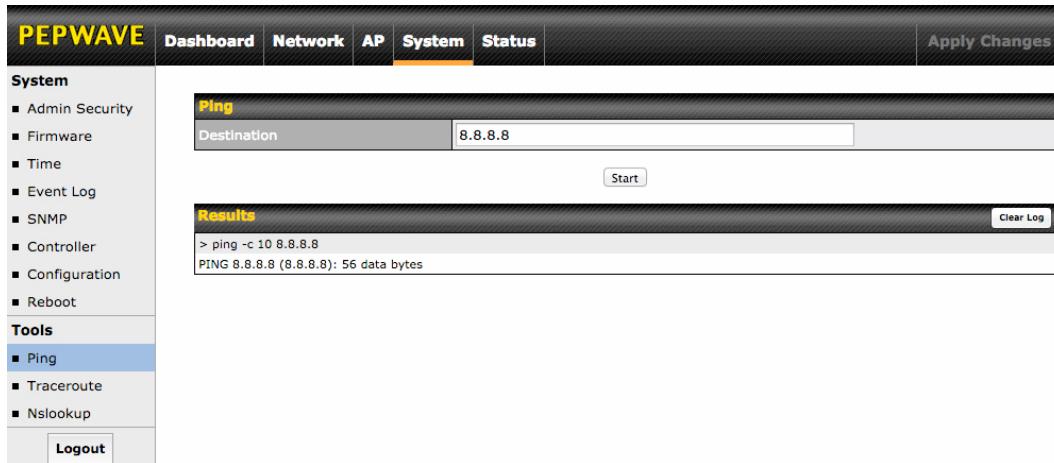
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8 Tools

8.1 Ping

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



PEPWAVE

Dashboard Network AP System **System** Status

Apply Changes

System

- Admin Security
- Firmware
- Time
- Event Log
- SNMP
- Controller
- Configuration
- Reboot

Tools

- Ping
- Traceroute
- Nslookup

Logout

Ping

Destination: 8.8.8.8

Start

Results

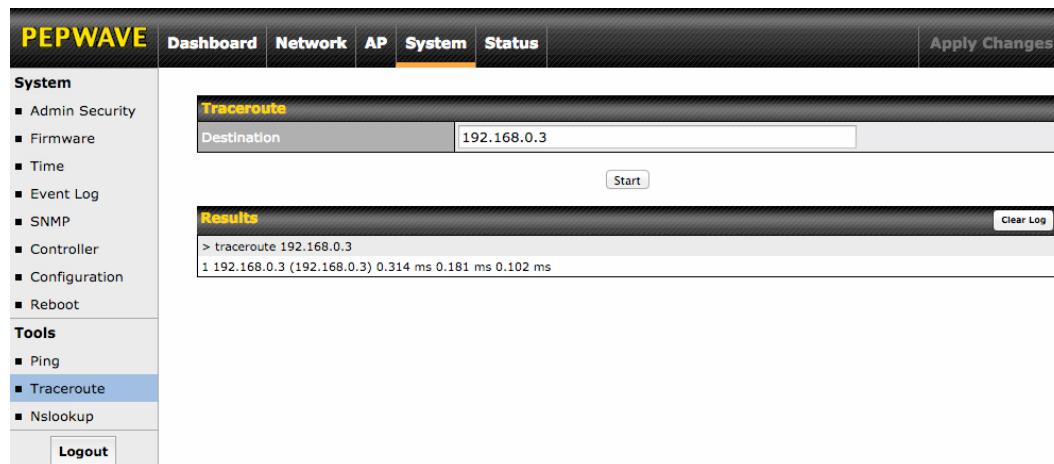
> ping -c 10 8.8.8.8

PING 8.8.8.8 (8.8.8.8): 56 data bytes

Clear Log

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**.



PEPWAVE

Dashboard Network AP System **System** Status

Apply Changes

System

- Admin Security
- Firmware
- Time
- Event Log
- SNMP
- Controller
- Configuration
- Reboot

Tools

- Ping
- Traceroute
- Nslookup

Logout

Traceroute

Destination: 192.168.0.3

Start

Results

> traceroute 192.168.0.3

1 192.168.0.3 (192.168.0.3) 0.314 ms 0.181 ms 0.102 ms

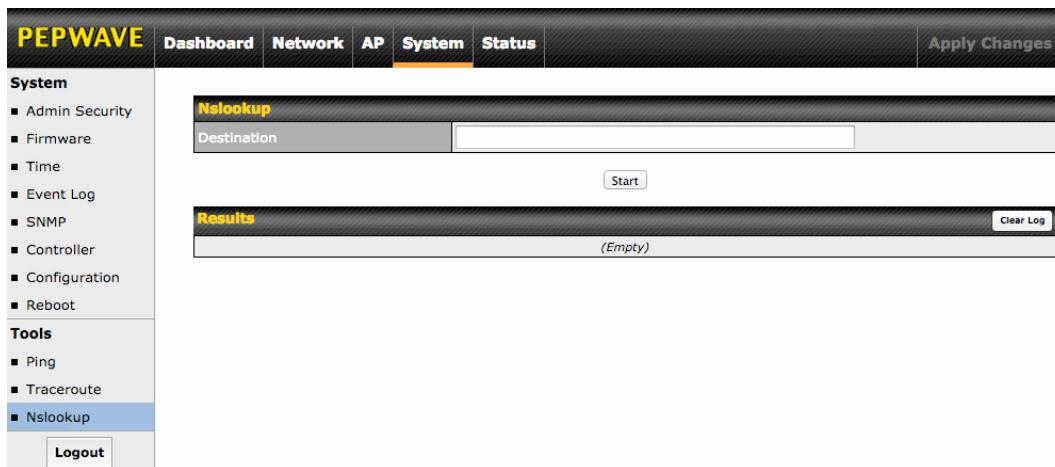
Clear Log

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8.3 Nslookup

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



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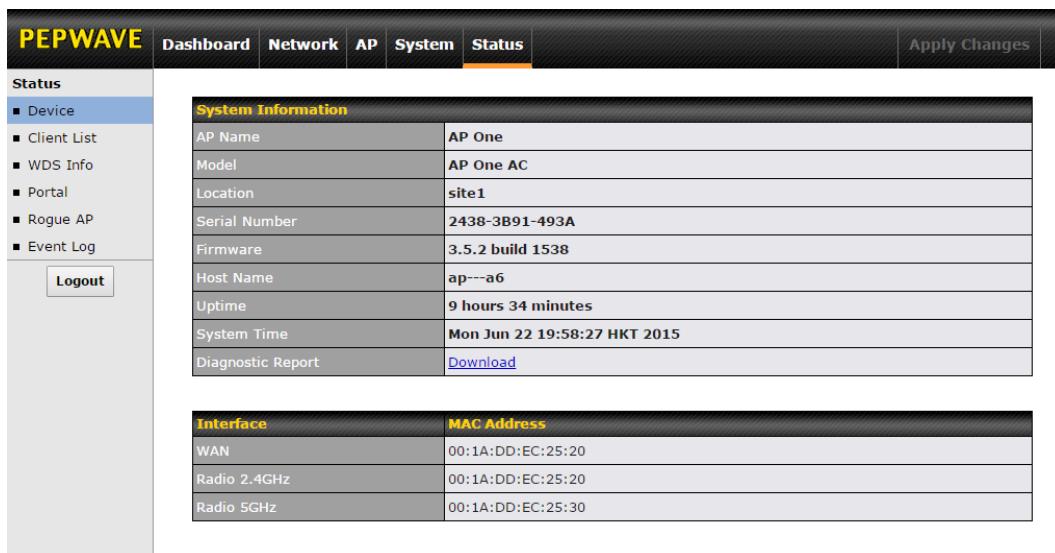
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9 Monitoring Device Status

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 'Status' tab selected in the top navigation bar. The left sidebar has 'Device' selected under 'Status'. The main content area displays two tables: 'System Information' and 'Interface'.

System Information

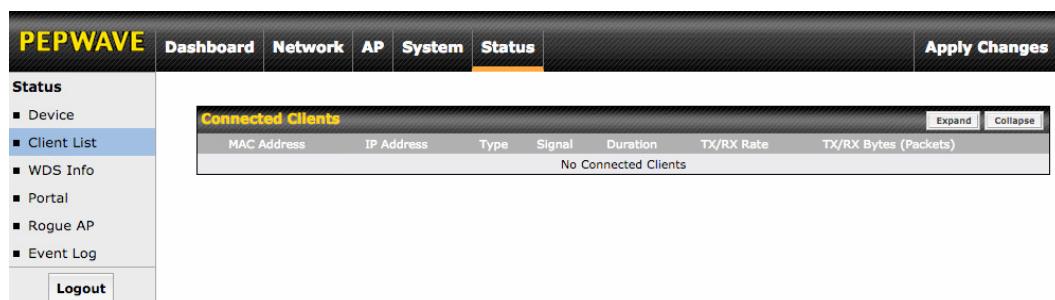
| | |
|-------------------|------------------------------|
| AP Name | AP One |
| Model | AP One AC |
| Location | site1 |
| Serial Number | 2438-3B91-493A |
| Firmware | 3.5.2 build 1538 |
| Host Name | ap---a6 |
| Uptime | 9 hours 34 minutes |
| System Time | Mon Jun 22 19:58:27 HKT 2015 |
| Diagnostic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

Interface

| 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 'Status' tab selected in the top navigation bar. The left sidebar has 'Client List' selected under 'Status'. The main content area displays a table titled 'Connected Clients'.

Connected Clients

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

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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.

| Peer MAC Address | Encryption | Type | Signal | TX/RX Bytes (Packets) |
|-------------------|------------|------|--------|-----------------------|
| 00:1A:DD:DA:E7:40 | | | 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.

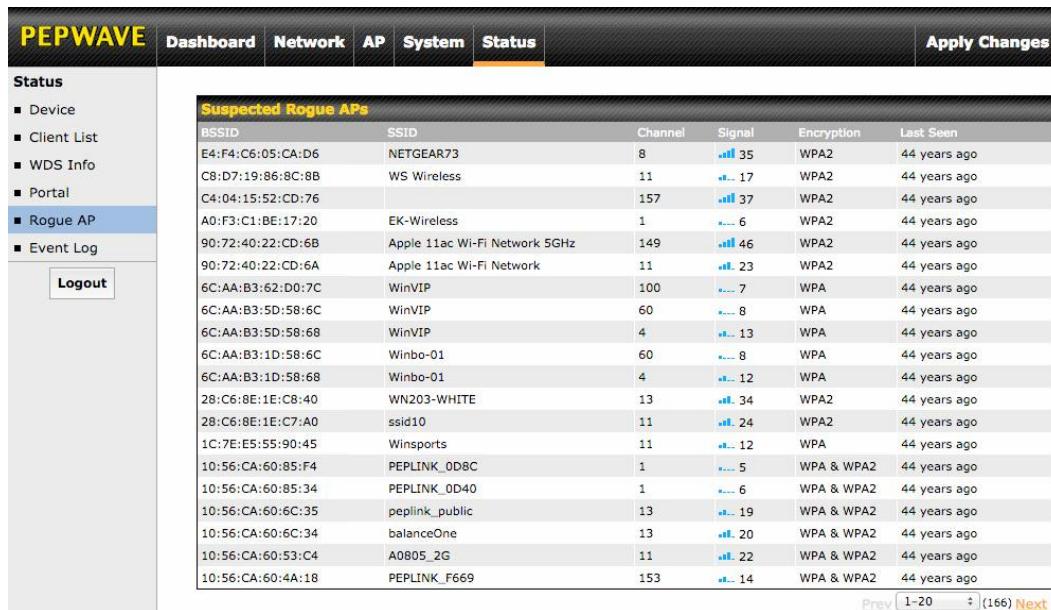
| MAC Address | IP Address | User Name | Status | Last Login Time | Remaining Quota |
|-----------------|------------|-----------|--------|-----------------|-----------------|
| No Portal Users | | | | | |

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9.5 Rogue AP

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

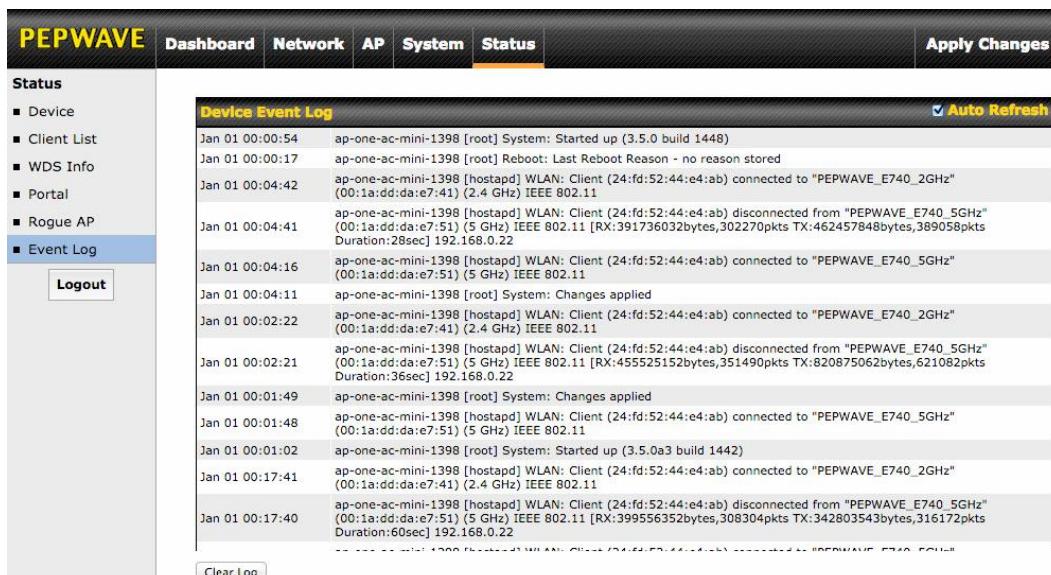


The screenshot shows the 'Status' tab selected in the navigation bar. The 'Rogue AP' option in the sidebar is highlighted. The main content area displays a table titled 'Suspected Rogue APs' with the following columns: BSSID, SSID, Channel, Signal, Encryption, and Last Seen. The table lists 16 entries of rogue access points, including their MAC addresses, names, and signal strengths. At the bottom of the table, there are navigation buttons for 'Prev' (1-20), '(166)', and 'Next'.

| 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:BB | WS Wireless | 11 | ■■ 17 | WPA2 | 44 years ago |
| C4:04:15:52:CD:76 | | 157 | ■■ 37 | WPA2 | 44 years ago |
| A0:F3:C1:B1:17:20 | 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:58:6B | 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:58:6B | 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_0D8C | 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 |

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.



The screenshot shows the 'Status' tab selected in the navigation bar. The 'Event Log' option in the sidebar is highlighted. The main content area displays a table titled 'Device Event Log' with the following columns: Date, Time, and Log. The table lists 20 entries of device events, including system startups, reboots, and client connections. At the top right of the table, there is a checked checkbox for 'Auto Refresh'. At the bottom of the table, there is a 'Clear Log' button.

| Device Event Log | |
|------------------|----------|
| Jan 01 | 00:00:54 |
| Jan 01 | 00:00:17 |
| Jan 01 | 00:04:42 |
| Jan 01 | 00:04:41 |
| Jan 01 | 00:04:16 |
| Jan 01 | 00:04:11 |
| Jan 01 | 00:02:22 |
| Jan 01 | 00:02:21 |
| Jan 01 | 00:01:49 |
| Jan 01 | 00:01:48 |
| Jan 01 | 00:01:02 |
| Jan 01 | 00:17:41 |
| Jan 01 | 00:17:40 |

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 B 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:

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

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.

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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antennas(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

This device is restricted for indoor use..

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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 20 cm between the radiator & your body.

PEPWAVE

Broadband Possibilities

www.pepwave.com

Contact Us:

Sales

<http://www.pepwave.com/contact/sales/>

Support

<http://www.pepwave.com/contact/>

Business Development and Partnerships

<http://www.pepwave.com/partners/channel-partner-program/>