Pepwave Device
Connector User Manual

Pepwave Product:
Device Connector Rugged

Pepwave Firmware 1.1
February 2017
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Appendix
1. Getting Started

1.1 What’s in the Box

DCS-RUG
- 12V power supply
- 3x dual-band 5dBi omni antenna

1.2 Get to Know Your Device Connector

Device Connector Rugged
1.3 Access the Web Admin Interface
There are two ways to access the Web Admin page.

1.3.1 Connect by Ethernet
To access the Web Admin page by Ethernet, your PC must be in the same subnet as the Device Connector (i.e. 192.168.20.X).
Your PC should be set up as follow on the Internet Protocol (TCP/IP) Properties or Network screen:
1.3.2 Connect by Wi-Fi
Connect to the SSID: PEPWAVE_XXX where XXXX represents the last four digits of your device’s serial number (e.g. 7D6E). Passphrase is the last 8 hexadecimal digits of your device’s LAN MAC address (e.g. DDC3CCC0)

Now you are ready to start the first time configuration of the Pepwave Device Connector. On your PC, start a web browser, go to this URL:

http://192.168.50.1/

1.4 Choose Your Connection Mode
The Device Connector supports only Wi-Fi connection mode.

After successful login The dashboard will be displayed. The Dashboard shows current WAN and WI-FI AP.
2 Configuring the LAN interface(s)

2.1 Network Settings
LAN interface settings are located at Network>LAN>Network Settings/Port Settings. Begin setting up your physical LAN by entering IP settings (VLAN configuration will be covered following physical LAN setup).

<table>
<thead>
<tr>
<th>LAN</th>
<th>VLAN</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN</td>
<td>None</td>
<td>172.16.251.1/24</td>
</tr>
<tr>
<td>VLAN1</td>
<td>1</td>
<td>2.2.2.2/24</td>
</tr>
<tr>
<td>VLAN2</td>
<td>2</td>
<td>3.3.3.3/24</td>
</tr>
</tbody>
</table>

This represents the LAN interfaces that are active on your router (including VLAN). A grey “X” means that the VLAN is used in other settings and cannot be deleted. You can find which settings are using the VLAN by hovering over the grey “X”. Alternatively, a red “X” means that there are no settings using the VLAN. You can delete that VLAN by clicking the red “X”. Clicking any of the existing LAN interfaces will result in the following:

**IP Settings**

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Subnet Mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.50.1</td>
<td>255.255.255.0/24</td>
</tr>
</tbody>
</table>
**DHCP Server Settings**

**DHCP Server**
When this setting is enabled, the DHCP server automatically assigns an IP address to each computer that is connected via LAN and configured to obtain an IP address via DHCP. The Pepwave router’s DHCP server can prevent IP address collision on the LAN.

**IP Range & Subnet Mask**
These settings allocate a range of IP addresses that will be assigned to LAN computers by the Pepwave router’s DHCP server.

**Lease Time**
This setting specifies the length of time throughout which an IP address of a DHCP client remains valid. Upon expiration of the lease time, the assigned IP address will no longer be valid and renewal of the IP address assignment will be required.

**DNS Servers**
This option allows you to input the DNS server addresses to be offered to DHCP clients. If **Assign DNS server automatically** is selected, the Pepwave router’s built-in DNS server address (i.e., LAN IP address) will be offered.

**BOOTP**
Check this box to enable BOOTP on older networks that still require it.

**Extended DHCP Option**
In addition to standard DHCP options (e.g., DNS server address, gateway address, subnet mask), you can specify the value of additional extended DHCP options, as defined in RFC 2132. With these extended options enabled, you can pass additional configuration information to LAN hosts.

To define an extended DHCP option, click the **Add** button, choose the option to define and enter its value. For values that are in IP address list format, you can enter one IP address per line.
DHCP Reservation

This setting reserves the assignment of fixed IP addresses for a list of computers on the LAN. The computers to be assigned fixed IP addresses on the LAN are identified by their MAC addresses. The fixed IP address assignment is displayed as a cross-reference list between the computers’ names, MAC addresses, and fixed IP addresses.

Name (an optional field) allows you to specify a name to represent the device. MAC addresses should be in the format of 00:AA:BB:CC:DD:EE. Press to create a new record. Press to remove a record. Reserved client information can be imported from the Client List, located at Status>Client List. For more details, please refer to Section 22.3.

Once configuration is complete, click Save to store the changes.

To configure DHCP relay, first click the button found next to the DHCP Server option to display the settings.

<table>
<thead>
<tr>
<th>DHCP Relay Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP Relay</td>
</tr>
<tr>
<td>DHCP Server IP Address</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>DHCP Option 82</td>
</tr>
</tbody>
</table>

DHCP Relay Settings

**Enable**
Check this box to turn on DHCP relay. Click the icon to disable DHCP relay.

**DHCP Server IP Address**
Enter the IP addresses of one or two DHCP servers in the provided fields. The DHCP servers entered here will receive relayed DHCP requests from the LAN. For active-passive DHCP server configurations, enter active and passive DHCP server relay IP addresses in **DHCP Server 1** and **DHCP Server 2**.

**DHCP Option 82**
DCHP Option 82 includes device information as relay agent for the attached client when forwarding DHCP requests from client to server. This option also embeds the device’s MAC address and network name in circuit and remote IDs. Check this box to enable DHCP Option 82.

2.2 Port Setting
Port settings can be accessed at Network>Port Settings.
3 Configuring the WAN Interface(s)

WAN Interface settings are located at Network>WAN. To reorder WAN priority, drag on the appropriate WAN by holding the left mouse button, move it to the desired priority (the first one would be the highest priority, the second one would be lower priority, and so on), and drop it by releasing the mouse button.

To disable a particular WAN connection, drag on the appropriate WAN by holding the left mouse button, move it the Disabled row, and drop it by releasing the mouse button.
You can also set priorities on the Dashboard. Click the Details button in the corresponding row to modify the connection setting.

### Important Note

Connection details will be changed and become effective immediately after clicking the **Save and Apply** button.

3.1 Wi-Fi WAN Settings (Wi-Fi Mode Only)

To access Wi-Fi WAN settings, click **Network>WAN**.

#### 3.1.1 Wireless Networks

To see a list of available networks, click inside wireless network. To connect to a displayed network, select it from this list. To access wireless network, click **Network>WAN>Wireless Networks**.

![Wireless Networks](image)

To access detailed WAN settings click, **Network>WAN>Details**.
Wi-Fi Connection Settings

**WAN Connection Settings**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAN Connection Name</td>
<td>Wi-Fi WAN 1</td>
</tr>
<tr>
<td>Standby State</td>
<td>Remain connected</td>
</tr>
<tr>
<td>MTU</td>
<td>Custom Value: 1500</td>
</tr>
<tr>
<td>Reply to ICMP PING</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Wi-Fi Connection Settings**

**WAN Connection Name**

Enter a name to represent this WAN connection.

**Standby State**

This setting specifies the state of the WAN connection while in standby. The available options are Remain Connected (hot standby) and Disconnect (cold standby).

**MTU**

This setting specifies the maximum transmission unit. By default, MTU is set to Custom 1440. You may adjust the MTU value by editing the text field. Click Default to restore the default MTU value. Select Auto and the appropriate MTU value will be automatically detected. The auto-detection will run each time the WAN connection establishes.

**Reply to ICMP PING**

If this setting is disabled, the WAN connection will not respond to ICMP ping requests. By default, this setting is enabled.

**Wi-Fi WAN Settings**

- **Channel Width**: 20 MHz
- **Channel Selection**: Auto
- **Data Rate**: Auto
- **Output Power**: Max
- **Roaming**: Off
- **Connect to Any Open Mode AP**: Yes
- **Beacon Miss Counter**: 5

**Wi-Fi WAN Settings**

**Channel Width**

Available options are 20 MHz, 40 MHz, and Auto (20/40 MHz). Default is Auto (20/40 MHz), which allows both widths to be used simultaneously.
<table>
<thead>
<tr>
<th><strong>Channel Selection</strong></th>
<th>Determine whether the channel will be automatically selected. If you select custom, the following table will appear:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Rate</strong></td>
<td>This option allows you to select a specific bit rate for data transfer over the device’s Wi-Fi network. By default, Auto is selected.</td>
</tr>
<tr>
<td><strong>Output Power</strong></td>
<td>This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available – Max, High, Mid, and Low. The actual output power will be bound by the regulatory limits of the selected country. Note that selecting the Boost option may cause the MAX’s radio output to exceed local regulatory limits.</td>
</tr>
<tr>
<td><strong>Roaming</strong></td>
<td>Checking this box will enable Wi-Fi roaming. Click the icon for additional options.</td>
</tr>
<tr>
<td><strong>Connect to Any Open Mode AP</strong></td>
<td>This option is to specify whether the Wi-Fi WAN will connect to any open mode access points it finds.</td>
</tr>
<tr>
<td><strong>Beacon Miss Counter</strong></td>
<td>This field allows you to set the frequency for the beacon to include delivery traffic indication messages.</td>
</tr>
</tbody>
</table>

### Bandwidth Allowance Monitor

<table>
<thead>
<tr>
<th>Bandwidth Allowance Monitor</th>
<th><img src="image" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Action</strong></td>
<td>Email notification is currently disabled. You can get notified when usage hits 75%/95% of monthly allowance by enabling Email Notification. Disconnect when usage hits 100% of monthly allowance.</td>
</tr>
<tr>
<td><strong>Start Day</strong></td>
<td>On 1st of each month at 00:00 midnight</td>
</tr>
<tr>
<td><strong>Monthly Allowance</strong></td>
<td>MB</td>
</tr>
</tbody>
</table>

### Bandwidth Allowance Monitor

- **Action**: If **Error! Reference source not found.** is enabled, you will be notified by email when usage hits 75% and 95% of the monthly allowance. If **Disconnect when usage hits 100% of monthly allowance** is checked, this WAN connection will be disconnected automatically when the usage hits the monthly allowance. It will not resume connection unless this option has been turned off or the usage has been reset when a new billing cycle starts.

- **Start Day**: This option allows you to define which day of the month each billing cycle begins.

- **Monthly Allowance**: This field is for defining the maximum bandwidth usage allowed for the WAN connection each month.
Health Check Settings

**Method**
This setting specifies the health check method for the WAN connection. This value can be configured as Disabled, PING, DNS Lookup, or HTTP. The default method is DNS Lookup. For mobile Internet connections, the value of Method can be configured as Disabled or SmartCheck.

**Health Check Disabled**

When Disabled is chosen in the Method field, the WAN connection will always be considered as up. The connection will NOT be treated as down in the event of IP routing errors.

**Health Check Method: PING**

ICMP ping packets will be issued to test the connectivity with a configurable target IP address or hostname. A WAN connection is considered as up if ping responses are received from either one or both of the ping hosts.

**PING Hosts**
This setting specifies IP addresses or hostnames with which connectivity is to be tested via ICMP ping. If Use first two DNS servers as Ping Hosts is checked, the target ping host will be the first DNS server for the corresponding WAN connection. Reliable ping hosts with a high uptime should be considered. By default, the first two DNS servers of the WAN connection are used as the ping hosts.

**Health Check Method: DNS Lookup**
DNS lookups will be issued to test connectivity with target DNS servers. The connection will be treated as up if DNS responses are received from one or both of the servers, regardless of whether the result was positive or negative.

### Health Check DNS Servers

This field allows you to specify two DNS hosts’ IP addresses with which connectivity is to be tested via DNS Lookup.

- If Use first two DNS servers as Health Check DNS Servers is checked, the first two DNS servers will be the DNS lookup targets for checking a connection’s health. If the box is not checked, Host 1 must be filled, while a value for Host 2 is optional.
- If Include public DNS servers is selected and no response is received from all specified DNS servers, DNS lookups will also be issued to some public DNS servers. A WAN connection will be treated as down only if there is also no response received from the public DNS servers.

Connections will be considered as up if DNS responses are received from any one of the health check DNS servers, regardless of a positive or negative result. By default, the first two DNS servers of the WAN connection are used as the health check DNS servers.

### Health Check Method: HTTP

HTTP connections will be issued to test connectivity with configurable URLs and strings to match.

#### URL1

The URL will be retrieved when performing an HTTP health check. When String to Match is left blank, a health check will pass if the HTTP return code is between 200 and 299 (Note: HTTP redirection codes 301 or 302 are treated as failures). When String to Match is filled, a health check will pass if the HTTP return code is between 200 and 299 and if the HTTP response content contains the string.

#### URL 2

If URL 2 is also provided, a health check will pass if either one of the tests passed.
3.1.2 Creating Wi-Fi Connection Profiles
You can manually create a profile to connect to a Wi-Fi connection. This is useful for creating a profile for connecting to hidden SSID access points. Click Network>WAN>Details>Create Profile... to get started.

Clicking this will open a window similar to the one shown below.

<table>
<thead>
<tr>
<th>Wi-Fi Connection Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Name (SSID)</td>
</tr>
<tr>
<td>DCR_2.4GHz</td>
</tr>
</tbody>
</table>

Create Profile...
## Wi-Fi Connection Profile Settings

<table>
<thead>
<tr>
<th>Type</th>
<th>Select whether the network will connect automatically or manually.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Name (SSID)</td>
<td>Enter a name to represent this Wi-Fi connection.</td>
</tr>
<tr>
<td>Security</td>
<td>This option allows you to select which security policy is used for this wireless network. Available options:</td>
</tr>
<tr>
<td></td>
<td>• Open</td>
</tr>
<tr>
<td></td>
<td>• WEP</td>
</tr>
<tr>
<td></td>
<td>• WPA/WPA2 – Personal</td>
</tr>
<tr>
<td></td>
<td>• WPA/WPA2 – Enterprise</td>
</tr>
</tbody>
</table>

### Security Options

<table>
<thead>
<tr>
<th>Security</th>
<th>WEP</th>
<th>Encryption Key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security</th>
<th>WPA/WPA2-Personal</th>
<th>Shared Key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security</th>
<th>WPA/WPA2-Personal</th>
<th>Shared Key</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

- **Open**
- **WEP**
- **WPA/WPA2 – Personal**
- **WPA/WPA2 – Enterprise**
3.2 WAN Health Check

To ensure traffic is routed to healthy WAN connections only, the Pepwave router can periodically check the health of each WAN connection. The health check settings for each WAN connection can be independently configured via Network>WAN>Details.

### Health Check Settings

<table>
<thead>
<tr>
<th>Method</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Check Disabled</td>
<td>Disabled, SmartCheck</td>
</tr>
<tr>
<td>Health Check Method: PING</td>
<td>PING, DNS Lookup, HTTP</td>
</tr>
</tbody>
</table>

When Disabled is chosen in the Method field, the WAN connection will always be considered as up. The connection will NOT be treated as down in the event of IP routing errors.

### Health Check Method: PING

ICMP ping packets will be issued to test the connectivity with a configurable target IP address or hostname. A WAN connection is considered as up if ping responses are received from either one or both of the ping hosts.

PING Hosts  

This setting specifies IP addresses or hostnames with which connectivity is to be tested via ICMP ping. If Use first two DNS servers as Ping Hosts is checked, the target ping host will be the first DNS server for the corresponding WAN connection. Reliable ping hosts with a high uptime should be considered. By default, the first two DNS servers of the WAN connection are used as the ping hosts.
Health Check Method: DNS Lookup

DNS lookups will be issued to test connectivity with target DNS servers. The connection will be treated as up if DNS responses are received from one or both of the servers, regardless of whether the result was positive or negative.

Health Check DNS Servers

This field allows you to specify two DNS hosts’ IP addresses with which connectivity is to be tested via DNS lookup.

If **Use first two DNS servers as Health Check DNS Servers** is checked, the first two DNS servers will be the DNS lookup targets for checking a connection's health. If the box is not checked, **Host 1** must be filled, while a value for **Host 2** is optional.

If **Include public DNS servers** is selected and no response is received from all specified DNS servers, DNS lookups will also be issued to some public DNS servers. A WAN connection will be treated as down only if there is also no response received from the public DNS servers.

Connections will be considered as up if DNS responses are received from any one of the health check DNS servers, regardless of a positive or negative result. By default, the first two DNS servers of the WAN connection are used as the health check DNS servers.

Health Check Method: HTTP

HTTP connections will be issued to test connectivity with configurable URLs and strings to match.

**URL 1**

WAN Settings>WAN Edit>Health Check Settings>URL1

The URL will be retrieved when performing an HTTP health check. When **String to Match** is left blank, a health check will pass if the HTTP return code is between 200 and 299 (Note: HTTP redirection codes 301 or 302 are treated as failures). When **String to Match** is filled, a health check will pass if the HTTP return code is between 200 and 299 and if the HTTP response content contains the string.

**URL 2**

WAN Settings>WAN Edit>Health Check Settings>URL2

If **URL2** is also provided, a health check will pass if either one of the tests passed.
Other Health Check Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Timeout</strong></td>
<td>This setting specifies the timeout in seconds for ping/DNS lookup requests.</td>
</tr>
<tr>
<td><strong>Health Check Interval</strong></td>
<td>This setting specifies the time interval in seconds between ping or DNS lookup requests.</td>
</tr>
<tr>
<td><strong>Health Check Retries</strong></td>
<td>This setting specifies the number of consecutive ping/DNS lookup timeouts after which the Pepwave router will treat the corresponding WAN connection as down. Default health retries is set to 3. Using the default <strong>Health Retries</strong> setting of 3, the corresponding WAN connection will be treated as down after three consecutive timeouts.</td>
</tr>
<tr>
<td><strong>Recovery Retries</strong></td>
<td>This setting specifies the number of consecutive successful ping/DNS lookup responses that must be received before the Pepwave router treats a previously down WAN connection as up again. By default, <strong>Recovery Retries</strong> is set to 3. Using the default setting, a WAN connection that is treated as down will be considered as up again upon receiving three consecutive successful ping/DNS lookup responses.</td>
</tr>
</tbody>
</table>

Automatic Public DNS Server Check on DNS Test Failure

When the health check method is set to **DNS Lookup** and health checks fail, the Pepwave router will automatically perform DNS lookups on public DNS servers. If the tests are successful, the WAN may not be down, but rather the target DNS server malfunctioned. You will see the following warning message on the main page:

⚠️ **Failed to receive DNS response from the health-check DNS servers for WAN connection 3. But public DNS server lookup test via the WAN passed. So please check the DNS server settings.**

4 AP

Use the controls on the **AP** tab to set the wireless SSID and AP settings.
4.1 Wireless SSID

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

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

<table>
<thead>
<tr>
<th>SSID Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSID</strong></td>
</tr>
<tr>
<td><strong>Enable</strong></td>
</tr>
<tr>
<td><strong>Broadcast SSID</strong></td>
</tr>
<tr>
<td><strong>Data Rate</strong></td>
</tr>
<tr>
<td><strong>Multicast Filter</strong></td>
</tr>
<tr>
<td><strong>Multicast Rate</strong></td>
</tr>
</tbody>
</table>
IGMP Snooping

To allow the Pepwave router to listen to internet group management protocol (IGMP) network traffic, select this option.

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.

<table>
<thead>
<tr>
<th>Security Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security Policy</td>
</tr>
<tr>
<td>Encryption</td>
</tr>
<tr>
<td>Shared Key</td>
</tr>
<tr>
<td>Hide Characters</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted Mode</td>
</tr>
<tr>
<td>MAC Address List</td>
</tr>
</tbody>
</table>

4.2 Settings

Navigating to **AP>Settings** displays a screen similar to the one shown below:
Wi-Fi Radio Settings

**Operating Country**
This option sets the country whose regulations the Pepwave router follows.

**Wi-Fi Antenna**
Choose from the router's internal or optional external antennas, if so equipped.

---

### Important Note
Per FCC regulations, the country selection is not available on all models marketed in the US. All US models are fixed to US channels only.

<table>
<thead>
<tr>
<th>Wi-Fi AP Settings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protocol</strong></td>
<td>This option allows you to specify which client association requests will be accepted. By default, <strong>802.11ng</strong> is selected.</td>
</tr>
<tr>
<td><strong>Channel Width</strong></td>
<td>Auto (20/40 MHz) and 20 MHz are available. The default setting is Auto (20/40 MHz), which allows both widths to be used simultaneously. Auto (80 MHz) and (20/40 MHz) are available. The default setting is <strong>80 MHz</strong>. The two default settings are for 802.11ng and 802.11ac accordingly?</td>
</tr>
<tr>
<td><strong>Channel</strong></td>
<td>This option allows you to select which 802.11 RF channel will be used.</td>
</tr>
<tr>
<td><strong>Output Power</strong></td>
<td>This option is for specifying the transmission output power for the Wi-Fi AP. There are 4 relative power levels available - <strong>Max</strong>, <strong>High</strong>, <strong>Mid</strong>, and <strong>Low</strong>. The actual output power will be bound by the regulatory limits of the selected country.</td>
</tr>
<tr>
<td><strong>Maximum number of clients</strong></td>
<td>Enter the maximum number of clients that can simultaneously connect to the wireless network or enter 0 to allow an unlimited number of connections.</td>
</tr>
<tr>
<td><strong>Client Signal Strength Threshold</strong></td>
<td>This field determines that maximum signal strength each individual client will receive. The measurement unit is megawatts.</td>
</tr>
<tr>
<td><strong>Beacon Rate</strong></td>
<td>This option is for setting the transmit bit rate for sending a beacon. By default, <strong>1Mbps</strong> is selected.</td>
</tr>
<tr>
<td><strong>Beacon Interval</strong></td>
<td>This option is for setting the time interval between each beacon. By default, <strong>100ms</strong> is selected.</td>
</tr>
<tr>
<td><strong>DTIM</strong></td>
<td>This field allows you to set the frequency for the beacon to include a delivery traffic indication message. The interval is measured in milliseconds. The default value is set to <strong>1 ms</strong>.</td>
</tr>
<tr>
<td><strong>RTS Threshold</strong></td>
<td>Set the minimum packet size for your access point to send an RTS using the RTS/CTS handshake. Setting 0 disables this feature.</td>
</tr>
<tr>
<td><strong>Fragmentation Threshold</strong></td>
<td>Determines the maximum size (in bytes) that each packet fragment will be broken down into. Set 0 to disable fragmentation.</td>
</tr>
</tbody>
</table>
Distance/Time Converter

Select the distance you want your Wi-Fi to cover in order to adjust the below parameters. Default values are recommended.

Slot Time

This field is for specifying the wait time before the Device Connector transmits a packet. By default, this field is set to 9 µs.

ACK Timeout

This field is for setting the wait time to receive an acknowledgement packet before performing a retransmission. By default, this field is set to 48 µs.

Frame Aggregation

This option allows you to enable frame aggregation to increase transmission throughput.

5 System Settings

5.1 Admin Security

There are two types of user accounts available for accessing the web admin: admin and user. They represent two user levels: the admin level has full administration access, while the user level is read-only. The user level can access only the device’s status information; users cannot make any changes on the device.
Admin Account UI

A web login session will be logged out automatically when it has been idle longer than the **Web Session Timeout**. Before the session expires, you may click the **Logout** button in the web admin to exit the session.

**0 hours 0 minutes** signifies an unlimited session time. This setting should be used only in special situations, as it will lower the system security level if users do not log out before closing the browser. The **default** is 4 hours, 0 minutes.

For security reasons, after logging in to the web admin Interface for the first time, it is recommended to change the administrator password. Configuring the administration interface to be accessible only from the LAN can further improve system security. Administrative settings configuration is located at **System>Admin Security**.
Admin Settings

**Router Name**
This field allows you to define a name for this Pepwave router. By default, **Router Name** is set as **DCS_XXXX**, where **XXXX** refers to the last 4 digits of the unit’s serial number.

**Admin User Name**
**Admin User Name** is set as **admin** by default, but can be changed, if desired.

**Admin Password**
This field allows you to specify a new administrator password.

**Confirm Admin Password**
This field allows you to verify and confirm the new administrator password.
<table>
<thead>
<tr>
<th><strong>Read-only User Name</strong></th>
<th><strong>Read-only User Name</strong> is set as user by default, but can be changed, if desired.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User Password</strong></td>
<td>This field allows you to specify a new user password. Once the user password is set, the read-only user feature will be enabled.</td>
</tr>
<tr>
<td><strong>Confirm User Password</strong></td>
<td>This field allows you to verify and confirm the new user password.</td>
</tr>
<tr>
<td><strong>Web Session Timeout</strong></td>
<td>This field specifies the number of hours and minutes that a web session can remain idle before the Pepwave router terminates its access to the web admin interface. By default, it is set to 4 hours.</td>
</tr>
<tr>
<td><strong>Authentication by RADIUS</strong></td>
<td>With this box is checked, the web admin will authenticate using an external RADIUS server. Authenticated users are treated as either &quot;admin&quot; with full read-write permission or &quot;user&quot; with read-only access. Local admin and user accounts will be disabled. When the device is not able to communicate with the external RADIUS server, local accounts will be enabled again for emergency access. Additional authentication options will be available once this box is checked.</td>
</tr>
<tr>
<td><strong>Auth Protocol</strong></td>
<td>This specifies the authentication protocol used. Available options are <strong>MS-CHAP v2</strong> and <strong>PAP</strong>.</td>
</tr>
<tr>
<td><strong>Auth Server</strong></td>
<td>This specifies the access address and port of the external RADIUS server.</td>
</tr>
<tr>
<td><strong>Auth Server Secret</strong></td>
<td>This field is for entering the secret key for accessing the RADIUS server.</td>
</tr>
<tr>
<td><strong>Auth Timeout</strong></td>
<td>This option specifies the time value for authentication timeout.</td>
</tr>
<tr>
<td><strong>Accounting Server</strong></td>
<td>This specifies the access address and port of the external accounting server.</td>
</tr>
<tr>
<td><strong>Accounting Server Secret</strong></td>
<td>This field is for entering the secret key for accessing the accounting server.</td>
</tr>
<tr>
<td><strong>CLI SSH &amp; Console</strong></td>
<td>The CLI (command line interface) can be accessed via SSH. This field enables CLI support. For additional information regarding CLI.</td>
</tr>
<tr>
<td><strong>CLI SSH Port</strong></td>
<td>This field determines the port on which clients can access CLI SSH.</td>
</tr>
<tr>
<td><strong>CLI SSH Access</strong></td>
<td>This menu allows you to choose between granting access to LAN and WAN clients, or to LAN clients only.</td>
</tr>
</tbody>
</table>
| **Security**            | This option is for specifying the protocol(s) through which the web admin interface can be accessed:  
  ● HTTP |
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Admin Port</td>
<td>Specifies the port number on which the web admin interface can be accessed.</td>
</tr>
<tr>
<td>Web Admin Access</td>
<td>Specifies the network interfaces through which the web admin interface can be accessed:</td>
</tr>
<tr>
<td></td>
<td>- LAN only</td>
</tr>
<tr>
<td></td>
<td>- LAN/WAN</td>
</tr>
<tr>
<td></td>
<td>If LAN/WAN is chosen, the <strong>WAN Connection Access Settings</strong> form will be displayed.</td>
</tr>
</tbody>
</table>

### 5.2 Operating Mode

Operating Mode can be accessed at **System>Operating Mode**. The operating mode can be changed between **Router or Bridge Mode**.

#### Operating Mode

Select the operating mode you want to use for this device:
- **Router mode**
- **Bridge mode**

**Save and Apply**

Your device can act as a bridge or as a router, depending on your selection here.

### 5.3 Firmware

Pepwave router firmware is upgradeable through the web admin interface. Firmware upgrade functionality is located at **System>Firmware**.

#### Firmware Upgrade

Current firmware version: 1.1.0
No update available

**Check for Firmware**

#### Manual Firmware Upgrade

Firmware Image [Browse] No file selected.

**Manual Upgrade**
There are two ways to upgrade the unit. The first method is through an online download. The second method is to upload a firmware file manually.

To perform an online download, click on the **Check for Firmware** button. The Pepwave router will check online for new firmware. If new firmware is available, the Pepwave router will automatically download the firmware. The rest of the upgrade process will be automatically initiated.

You may also download a firmware image from the Peplink website and update the unit manually. To update using a firmware image, click **Choose File** to select the firmware file from the local computer, and then click **Manual Upgrade** to send the firmware to the Pepwave router. It will then automatically initiate the firmware upgrade process.

Please note that all Peplink devices 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, you can simply reboot your device with the inactive firmware and then perform the firmware upgrade.

---

**Important Note**

The firmware upgrade process may not necessarily preserve the previous configuration, and the behavior varies on a case-by-case basis. Consult the release notes for the particular firmware version before installing. Do not disconnect the power during firmware upgrade process. Do not attempt to upload a non-firmware file or a firmware file that is not supported by Peplink. Upgrading the Pepwave router with an invalid firmware file will damage the unit and may void the warranty.

---

**Important Note**

If the firmware is rolled back from 5.x to 4.x, the configurations will be lost.

---

### 5.4 Time

**Time Settings** enables the system clock of the Pepwave router to be synchronized with a specified time server. Time settings are located at **System>Time**.

<table>
<thead>
<tr>
<th>Time Settings</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time Zone</strong></td>
<td>(GMT+07:00) Krasnoyarsk</td>
</tr>
<tr>
<td><strong>Time Server</strong></td>
<td>0.peplink.pool.ntp.org</td>
</tr>
</tbody>
</table>

![Save Button]
Time Settings

**Time Zone**
This specifies the time zone (along with the corresponding Daylight Savings Time scheme). The **Time Zone** value affects the time stamps in the Pepwave router’s event log and e-mail notifications. Check **Show all** to show all time zone options.

**Time Server**
This setting specifies the NTP network time server to be utilized by the Pepwave router.

5.5 Schedule
Enable and disable different functions (such as WAN connections, outbound policy, and firewalls at different times, based on a user-scheduled configuration profile. The settings for this are located at **System > Schedule**

![Schedule Interface]

**Schedule**
- **Enabled**

**Name**
- **Weekdays Only**
- **Time**
- **Weekdays only**

**Edit schedule profile**

**Schedule Settings**
- **Enable**
  - The schedule function of those associated features will be lost if profile is disabled.
- **Name**
  - **Weekdays Only**
- **Schedule**
  - **Weekdays only**
- **Used by**
  - You may go to supported feature settings page and set this profile as scheduler.

**Schedule Map**

- **Sunday**
  - Midnight
  - 4am
  - 8am
  - Noon
  - 4pm
  - 8pm
- **Monday**
- **Tuesday**
- **Wednesday**
- **Thursday**
- **Friday**
- **Saturday**

![Schedule Map Image]
5.6 Email Notification

Email notification functionality provides a system administrator with up-to-date information on network status. The settings for configuring email notifications are found at System > Email Notification.

### Email Notification Setup

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Notification</td>
<td>This setting specifies whether or not to enable email notification. If <strong>Enable</strong> is checked, the Pepwave router will send email messages to system administrators when the WAN status changes or when new firmware is available. If <strong>Enable</strong> is not checked, email notification is disabled and the Pepwave router will not send email messages.</td>
</tr>
<tr>
<td>SMTP Server</td>
<td>This setting specifies the SMTP server to be used for sending email. If the server requires authentication, check <strong>Require authentication</strong>.</td>
</tr>
</tbody>
</table>

### Email Notification Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enable</strong></td>
<td>See Email Notification above.</td>
</tr>
<tr>
<td><strong>Require authentication</strong></td>
<td>If checked, the SMTP server requires authentication.</td>
</tr>
<tr>
<td><strong>Sender's Email Address</strong></td>
<td>Enter the email address of the sender.</td>
</tr>
<tr>
<td><strong>Recipient's Email Address</strong></td>
<td>Enter the email address of the recipient.</td>
</tr>
<tr>
<td><strong>SMTP Port</strong></td>
<td>Enter the SMTP port number.</td>
</tr>
</tbody>
</table>

![Test Email Notification Save button]
SSL Encryption | Check the box to enable SMTPS. When the box is checked, **SMTP Port** will be changed to **465** automatically.

SMTP Port | This field is for specifying the SMTP port number. By default, this is set to **25**; when **SSL Encryption** is checked, the default port number will be set to **465**. You may customize the port number by editing this field. Click **Default** to restore the number to its default setting.

SMTP User Name / Password | This setting specifies the SMTP username and password while sending email. These options are shown only if **Require authentication** is checked in the **SMTP Server** setting.

Confirm SMTP Password | This field allows you to verify and confirm the new administrator password.

Sender's Email Address | This setting specifies the email address the Pepwave router will use to send reports.

Recipient's Email Address | This setting specifies the email address(es) to which the Pepwave router will send email notifications. For multiple recipients, separate each email addresses using the enter key.

After you have finished setting up email notifications, you can click the **Test Email Notification** button to test the settings before saving. After **Test Email Notification** is clicked, you will see this screen to confirm the settings:

<table>
<thead>
<tr>
<th>Test Email Notification</th>
<th>smtp.mycompany.com</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMTP Server</td>
<td>smtp.mycompany.com</td>
</tr>
<tr>
<td>SMTP Port</td>
<td>465</td>
</tr>
<tr>
<td>SMTP UserName</td>
<td>smtpuser</td>
</tr>
<tr>
<td>Sender's Email Address</td>
<td><a href="mailto:admin@mycompany.com">admin@mycompany.com</a></td>
</tr>
<tr>
<td>Recipient's Email Address</td>
<td><a href="mailto:system@mycompany.com">system@mycompany.com</a>, <a href="mailto:staff@mycompany.com">staff@mycompany.com</a></td>
</tr>
</tbody>
</table>

Click **Send Test Notification** to confirm. In a few seconds, you will see a message with detailed test results.

*Test email sent. Email notification settings are not saved, it will be saved after clicked the 'Save' button.*
5.7 Event Log
Event log functionality enables event logging at a specified remote syslog server. The settings for configuring the remote system log can be found at **System>Event Log**.

### Event Log Settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Syslog</td>
<td>This setting specifies whether or not to log events at the specified remote syslog server.</td>
</tr>
<tr>
<td>Remote Syslog Host</td>
<td>This setting specifies the IP address or hostname of the remote syslog server.</td>
</tr>
<tr>
<td>Push Events</td>
<td>The Pepwave router can also send push notifications to mobile devices that have our Mobile Router Utility installed. Check the box to activate this feature. For more information on the Router Utility, go to: <a href="http://www.peplink.com/products/router-utility">www.peplink.com/products/router-utility</a></td>
</tr>
</tbody>
</table>

5.8 SNMP
SNMP or simple network management protocol is an open standard that can be used to collect information about the Pepwave router. SNMP configuration is located at **System>SNMP**.
### SNMP Settings

**SNMP Device Name**
This field shows the router 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 2.

**SNMPv3**
This option allows you to enable SNMP version 3.

**SNMP Trap**
This option allows you to enable SNMP traps.

### Community Name

<table>
<thead>
<tr>
<th>Community Name</th>
<th>Allowed Source Network</th>
<th>Access Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>No SNMPv1 / SNMPv2c Communities Defined</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Add SNMP Community]

### SNMPv3 User Name

<table>
<thead>
<tr>
<th>SNMPv3 User Name</th>
<th>Authentication / Privacy</th>
<th>Access Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>No SNMPv3 Users Defined</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Add SNMP User]

### 5.9 InControl

InControl is a cloud-based service which allows you to manage all of your Peplink and Pepwave devices with one unified system. With it, you can generate reports, gather statistics, and configure your devices automatically. All of this is now possible with InControl.

[InControl Management]

**InControl Management**

- **Allow InControl Management**
- **Privately Host InControl**

[Save]
When this check box is checked, the device's status information will be sent to the Peplink InControl system. This device's usage data and configuration will be sent to the system if you enable the features in the system.

Alternately, you could also privately host InControl. Simply check the box beside the “Privately Host InControl” open, and enter the IP Address of your InControl Host.

You can sign up for an InControl account at https://incontrol2.peplink.com/. You can register your devices under the account, monitor their status, see their usage reports, and receive offline notifications

5.10 Configuration

Backing up Pepwave router settings immediately after successful completion of initial setup is strongly recommended. The functionality to download and upload Pepwave router settings is found at System>Configuration. Note that available options vary by model.

<table>
<thead>
<tr>
<th>Restore Configuration to Factory Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore Factory Settings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Download Active Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Download</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Upload Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration File</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Configuration

- **Restore Configuration to Factory Settings**
  - The Restore Factory Settings button is to reset the configuration to factory default settings. After clicking the button, you will need to click the Apply Changes button on the top right corner to make the settings effective.

- **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.
5.11 Feature Add-ons
Pepwave devices have features that can be activated upon purchase. Once the purchase is complete, you will receive an activation key. Enter the key in the Activation Key field, click Activate, and then click Apply Changes.

<table>
<thead>
<tr>
<th>Feature Activation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation Key</td>
</tr>
</tbody>
</table>

5.12 Reboot
This page provides a reboot button for restarting the system. For maximum reliability, the Pepwave router can equip with two copies of firmware. 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.

<table>
<thead>
<tr>
<th>Reboot System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select the firmware you want to use to start up this device:</td>
</tr>
<tr>
<td>☑ Firmware 1: 1.1.05003 build 2258 (Running)</td>
</tr>
<tr>
<td>☐ Firmware 2: 1.1.0 build 2171</td>
</tr>
</tbody>
</table>

6 Tools

6.1 Ping
The ping test tool sends pings through a specified Ethernet interface or a VPN connection. You can specify the number of pings in the field Number of times, to a maximum number of 10 times. Packet Size can be set to a maximum of 1472 bytes. The ping utility is located at System>Tools>Ping, illustrated below:
Tip

A system administrator can use the ping utility to manually check the connectivity of a particular LAN/WAN connection.

6.2 Traceroute

The traceroute test tool traces the routing path to the destination through a particular Ethernet interface or a SpeedFusion™ connection. The traceroute test utility is located at System>Tools>Traceroute.

Peplink routers can send magical Packets
Tip

A system administrator can use the traceroute utility to analyze the connection path of a LAN/WAN connection.

6.3 Wake-on-LAN

Peplink routers can send special “magic packets” to any client specified from the Web UI. To access this feature, navigate to System>Tools>Wake-on-LAN.

Select a client from the drop-down list and click Send to send a “magic packet”.
7 PEPVPN

To configure PepVPN and SpeedFusion, navigate to Advanced>PepVPN

The local LAN subnet and subnets behind the LAN (defined under Static Route on the LAN settings page) will be advertised to the VPN. All VPN members (branch offices and headquarters) will be able to route to local subnets. Note that all LAN subnets and the subnets behind them must be unique. Otherwise, VPN members will not be able to access each other.
All data can be routed over the VPN using the 256-bit AES encryption standard. To configure, navigate to Advanced->PepVPN and click the New Profile button to create a new VPN profile (you may have to first save the displayed default profile in order to access the New Profile button). Each profile specifies the settings for making VPN connection with one remote Pepwave or Peplink device.

Click the Save button to create and save a new VPN connection profile for making a VPN connection.

### PepVPN Profile Settings

<table>
<thead>
<tr>
<th><strong>Name</strong></th>
<th>This field is for specifying 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 ( ).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active</strong></td>
<td>When this box is checked, this VPN connection profile will be enabled. Otherwise, it will be disabled.</td>
</tr>
<tr>
<td><strong>Encryption</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>
Authentication

Select from By Remote ID Only, Preshared Key. When selecting By Remote ID Only, be sure to enter a unique peer ID number in the Remote ID field.

Remote ID / Pre-shared Key

This optional field becomes available when Remote ID / Pre-shared Key is selected as the Peplink Balance’s 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. When the peer is running firmware 5.0+, this setting will be ignored.

NAT Mode

Check this box to allow the local DHCP server to assign an IP address to the remote peer. When NAT Mode is enabled, all remote traffic over the VPN will be tagged with the assigned IP address using network address translation.

Remote IP Address / Host Names (Optional)

If NAT Mode is not enabled, you can enter a remote peer’s WAN IP address or hostname(s) here. If the remote 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.

This field is optional. With this field filled, the Peplink Balance will initiate connection to each of the remote IP addresses until it succeeds in making a connection. If the field is empty, the Peplink Balance 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.

Data Port

This field is used to specify a UDP port number for transporting outgoing VPN data. If Default is selected, UDP port 4500 will be used. Port 32015 will be used if the remote unit uses Firmware prior to version 5.4 or if port 4500 is unavailable. If Custom is selected, enter an outgoing port number from 1 to 65535.

Bandwidth Limit

Define maximum download and upload speed to each individual peer. This functionality requires the peer to use PepVPN version 4.0.0 or above.

Cost

Define path cost for this profile. OSPF will determine the best route through the network using the assigned cost. Default: 10

8 Port Forwarding

depwave device connector can act as a firewall that blocks, by default, all inbound access from the internet. By using port forwarding, Internet users can access servers behind the depwave router. Inbound port forwarding rules can be defined at Advanced>Port Forwarding.

To define a new service, click Add Service.
### Port Forwarding Settings

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enable</strong></td>
<td>This setting specifies whether the inbound service takes effect. When Enable is checked, the inbound service takes effect: traffic is matched and actions are taken by the Pepwave router based on the other parameters of the rule. When this setting is disabled, the inbound service does not take effect: the Pepwave router disregards the other parameters of the rule.</td>
</tr>
<tr>
<td><strong>Service Name</strong></td>
<td>This setting identifies the service to the system administrator. Valid values for this setting consist of only alphanumeric and underscore “_” characters.</td>
</tr>
<tr>
<td><strong>IP Protocol</strong></td>
<td>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 the Pepwave router 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.</td>
</tr>
<tr>
<td><strong>Port</strong></td>
<td>The Port setting specifies the port(s) that correspond to the service, and can be configured to behave in one of the following manners: <strong>Any Port, Single Port, Port Range, Port Map, and Range Mapping</strong></td>
</tr>
</tbody>
</table>

#### Any Port

- **Any Port**: all traffic that is received by the Pepwave router via the specified protocol is forwarded to the servers specified by the Servers setting. For example, with IP Protocol set to TCP, and Port set to Any Port, all TCP traffic is forwarded to the configured servers.
**Single Port:** traffic that is received by the Pepwave router via the specified protocol at the specified port is forwarded via the same port to the servers specified by the **Servers** 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 the Pepwave router via the specified protocol at the specified port range is forwarded via the same respective ports to the LAN hosts specified by the **Servers** 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 Pepwave router via the specified protocol at the specified port is forwarded via a different port to the servers specified by the **Servers** 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 servers via port 88.

*(Please see below for details on the **Servers** setting.)*

**Range Mapping:** traffic that is received by the Pepwave router via the specified protocol at the specified port range is forwarded via a different port to the servers specified by the **Servers** setting.

---

**Inbound IP Address(es)**

This setting specifies the WAN connections and Internet IP address(es) from which the service can be accessed.

**Server IP Address**

This setting specifies the LAN IP address of the server that handles the requests for the service.

---

**9 NAT Mappings**

NAT mappings allow IP address mapping of all inbound and outbound NAT traffic to and from an internal client IP address. Settings to configure NAT mappings are located at **Advanced>NAT Mappings**.

![NAT Mappings](image)

To add a rule for NAT mappings, click **Add NAT Rule**.
### NAT Mapping Settings

**LAN Client(s)**  
NAT mapping rules can be defined for a single LAN IP Address, an IP Range, or an IP Network.

**Address**  
This refers to the LAN host's private IP address. The system maps this address to a number of public IP addresses (specified below) in order to facilitate inbound and outbound traffic. This option is only available when IP Address is selected.

**Inbound Mappings**  
This setting specifies the WAN connections and corresponding WAN-specific Internet IP addresses on which the system should bind. Any access to the specified WAN connection(s) and IP address(es) will be forwarded to the LAN host. This option is only available when IP Address is selected in the LAN Client(s) field.

**Outbound Mappings**  
This setting specifies the WAN IP addresses that should be used when an IP connection is made from a LAN host to the Internet. Each LAN host in an IP range or IP network will be evenly mapped to one of each selected WAN's IP addresses (for better IP address utilization) in a persistent manner (for better application compatibility).
10 QoS

10.1 Bandwidth Control
You can define a maximum download speed (over all WAN connections) and upload speed (for each WAN connection) that each individual Staff and Guest member can consume. No limit can be imposed on individual Manager members. By default, download and upload bandwidth limits are set to unlimited (set as 0).

<table>
<thead>
<tr>
<th>Individual Bandwidth Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable</td>
</tr>
<tr>
<td>User Bandwidth Limit</td>
</tr>
<tr>
<td>Manager</td>
</tr>
<tr>
<td>Staff: Unlimited</td>
</tr>
<tr>
<td>Guest: 0 Mbps</td>
</tr>
<tr>
<td>Upload</td>
</tr>
<tr>
<td>Unlimited</td>
</tr>
<tr>
<td>(0: unlimited)</td>
</tr>
</tbody>
</table>

10.2 Application

10.2.1 Application Prioritization
Three application priority levels can be set: ↑High, — Normal, and ↓Low. Pepwave device connectors can detect various application traffic types by inspecting the packet content. Select an application by choosing a supported application, or by defining a custom application manually. The priority preference of supported applications is placed at the top of the table. Custom applications are at the bottom.

<table>
<thead>
<tr>
<th>Application</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Supported Streaming Applications</td>
<td>↑High</td>
</tr>
<tr>
<td>All Email Protocols</td>
<td>↑High</td>
</tr>
<tr>
<td>MySQL</td>
<td>↑High</td>
</tr>
<tr>
<td>SIP</td>
<td>↑High</td>
</tr>
</tbody>
</table>

10.2.2 Prioritization for Custom Applications
Click the Add button to define a custom application. Click the button in the Action column to delete the custom application in the corresponding row.

When Supported Applications is selected, the Pepwave router will inspect network traffic and prioritize the selected applications. Alternatively, you can select Custom Applications and define the application by providing the protocol, scope, port number, and DSCP value.
10.2.3 DSL/Cable Optimization
DSL/cable-based WAN connections have lower upload bandwidth and higher download bandwidth. When a DSL/cable circuit’s uplink is congested, the download bandwidth will be affected. Users will not be able to download data at full speed until the uplink becomes less congested. **DSL/Cable Optimization** can relieve such an issue. When it is enabled, the download speed will become less affected by the upload traffic. By default, this feature is enabled.

11 Miscellaneous Settings

11.1 Certificate Manager
This section allows you to assign certificates for web admin SSL. The local keys will not be transferred to another device by any means.

12 Status

12.1 Device
System information is located at **Status>Device**
System Information

**Router Name**
This is the name specified in the **Router Name** field located at System>Admin Security.

**Model**
This shows the model name and number of this device.

**Product Code**
If your model uses a product code, it will appear here.

**Hardware Revision**
This shows the hardware version of this device.

**Serial Number**
This shows the serial number of this device.

**Firmware**
This shows the firmware version this device is currently running.

**PepVPN Version**
This shows the current PepVPN version.

**Hostname**
The host name assigned to the Pepwave router appears here.

**Uptime**
This shows the length of time since the device has been rebooted.

**System Time**
This shows the current system time.
### Diagnostic Report
The **Download** link is for exporting a diagnostic report file required for system investigation.

### Remote Assistance
Click **Turn on** to enable remote assistance.

<table>
<thead>
<tr>
<th>Interface</th>
<th>MAC Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN</td>
<td>00:1A:DD:00:4B:E0</td>
</tr>
<tr>
<td>Wi-Fi WAN 1</td>
<td>00:1A:DD:00:4B:E4</td>
</tr>
<tr>
<td>Wi-Fi WAN 2</td>
<td>00:1A:DD:00:4B:E8</td>
</tr>
</tbody>
</table>

The second table shows the MAC address of each LAN/WAN interface connected. To view your device’s End User License Agreement (EULA), click 📄.

### Important Note
If you encounter issues and would like to contact the Pepwave Support Team ([http://www.pepwave.com/contact/](http://www.pepwave.com/contact/)), please download the diagnostic report file and attach it along with a description of your issue.

### 12.2 Client List
The client list table is located at **Status>Client List**. It lists DHCP and online client IP addresses, names (retrieved from the DHCP reservation table or defined by users), current download and upload rate, and MAC address.

Clients can be imported into the DHCP reservation table by clicking the **Import** button on the right. You can update the record after import by going to **Network>LAN**.

### 12.3 PepVPN
Current PepVPN status information is located at Status>PepVPN. Click on the corresponding peer name to explore the WAN connection(s) status and subnet information of each VPN peer. Click the button for a chart displaying real-time throughput, latency, and drop-rate information for each WAN connection.

12.4 Event Log
Event log information is located at Status>EventLog

The log section displays a list of events that has taken place on the Pepwave router. Check Auto Refresh to refresh log entries automatically. Click the Clear Log button to clear the log.
12.5 Bandwidth
This section shows bandwidth usage statistics and is located at **Status>Bandwidth**. Bandwidth usage at the LAN while the device is switched off (e.g., LAN bypass) is neither recorded nor shown.

12.5.1 Real Time
The **Data transferred since installation** table indicates how much network traffic has been processed by the device since the first bootup. The **Data transferred since last reboot** table indicates how much network traffic has been processed by the device since the last boot up.

![Data transferred since installation (Sun Oct 10 05:56:02 PST 2010)](image)

<table>
<thead>
<tr>
<th>All WAN Connections</th>
<th>Download</th>
<th>Upload</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>215.68 GB</td>
<td>91.70 GB</td>
<td>308.38 GB</td>
</tr>
</tbody>
</table>

![Data transferred since last reboot](image)

<table>
<thead>
<tr>
<th>All WAN Connections</th>
<th>Download</th>
<th>Upload</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.74 GB</td>
<td>0.63 GB</td>
<td>1.37 GB</td>
</tr>
<tr>
<td>WAN1</td>
<td>0.67 GB</td>
<td>0.61 GB</td>
<td>1.28 GB</td>
</tr>
<tr>
<td>WAN2</td>
<td>0.07 GB</td>
<td>0.02 GB</td>
<td>0.09 GB</td>
</tr>
</tbody>
</table>

![Aggregated Transfer](image)

![Average and peak values](image)

<table>
<thead>
<tr>
<th>Overall</th>
<th>Download</th>
<th>Upload</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>61 kbps</td>
<td>75 kbps</td>
<td>136 kbps</td>
</tr>
</tbody>
</table>

12.5.2 Hourly
This page shows the hourly bandwidth usage for all WAN connections, with the option of viewing each individual connection. Select the desired connection to check from the drop-down menu.
12.5.3 Daily
This page shows the daily bandwidth usage for all WAN connections, with the option of viewing each individual connection.

Select the connection to check from the drop-down menu. If you have enabled the Bandwidth Monitoring feature, the Current Billing Cycle table for that WAN connection will be displayed.

Click on a date to view the client bandwidth usage of that specific date. This feature is not available if you have selected to view the bandwidth usage of only a particular WAN connection. The scale of the graph can be set to display megabytes (MB) or gigabytes (GB).
### Daily Usage

<table>
<thead>
<tr>
<th>Connection</th>
<th>All WAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>MB</td>
</tr>
</tbody>
</table>

![Graph showing daily usage](image)

<table>
<thead>
<tr>
<th>Date</th>
<th>Download</th>
<th>Upload</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-02-19</td>
<td>7 MB</td>
<td>16 MB</td>
<td>25 MB</td>
</tr>
<tr>
<td>2012-02-27</td>
<td>32 MB</td>
<td>166 MB</td>
<td>198 MB</td>
</tr>
<tr>
<td>2012-02-25</td>
<td>5 MB</td>
<td>20 MB</td>
<td>28 MB</td>
</tr>
<tr>
<td>2012-02-23</td>
<td>8 MB</td>
<td>20 MB</td>
<td>28 MB</td>
</tr>
<tr>
<td>2012-02-24</td>
<td>11 MB</td>
<td>23 MB</td>
<td>34 MB</td>
</tr>
<tr>
<td>2012-02-23</td>
<td>24 MB</td>
<td>36 MB</td>
<td>60 MB</td>
</tr>
<tr>
<td>2012-02-22</td>
<td>25 MB</td>
<td>43 MB</td>
<td>68 MB</td>
</tr>
<tr>
<td>2012-02-21</td>
<td>25 MB</td>
<td>40 MB</td>
<td>65 MB</td>
</tr>
<tr>
<td>2012-02-20</td>
<td>17 MB</td>
<td>36 MB</td>
<td>53 MB</td>
</tr>
<tr>
<td>2012-02-19</td>
<td>6 MB</td>
<td>3 MB</td>
<td>9 MB</td>
</tr>
<tr>
<td>2012-02-18</td>
<td>6 MB</td>
<td>3 MB</td>
<td>9 MB</td>
</tr>
<tr>
<td>2012-02-17</td>
<td>77 MB</td>
<td>77 MB</td>
<td>154 MB</td>
</tr>
</tbody>
</table>

### Current Month

<table>
<thead>
<tr>
<th>Current Month</th>
<th>Down</th>
<th>Up</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>249 MB</td>
<td>469 MB</td>
<td>718 MB</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12.5.4 Monthly

All WAN Monthly Bandwidth Usage
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:

1) Reorient or relocate the receiving antenna.
2) Increase the separation between the equipment and receiver.
3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4) 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.

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.
Taiwan NCC Statement
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