PeP wave

User Manual

PePWave Surf / Surf AP Indoor Series:
Surf 200, E200, AP 200, AP 400

PePWave Mesh Connector Indoor Series:
MC 200, E200, 400

PePWave Surf AP Series:
Surf AP 200-X, E200-X, 400-X

PePWave Surf DX Series:
Surf E200-DX, 400-DX

PePWave Mesh Connector Outdoor Series:
MC 200-X, E200-X, 400-X

PePWave CarFi Series:
CarFi 200, E200, 400

Document Rev. 1.4
June 08

Table of Contents

1   Copyright

Copyright © 2008 by PePWave Ltd.

The content of this documentation may not be reproduced in any part or as a whole without the prior written permission of PePWave Ltd.

2   Disclaimer

PePWave does not assume any liability arising out of the application or use of any products, or software described herein. Neither does it convey any license under its patent right nor the patent rights of others. PePWave further reserves the right to make changes in any products described herein without notice. This documentation is subject to change without notice.

3   Product Description

3.1   Product Features

PePWave Surf (AP) / Surf DX Series:

- Signal strength LED for showing the current signal strength (Surf indoor and Surf DX models)
- Always-on, integrated Wi-Fi access point (Surf AP models)
- WPA/WPA2-Personal and WPA/WPA2-Enterprise security support
- Wi-Fi Multimedia (WMM) support
- Built-in DHCP server and NAT routing to manage client devices
- Customizable, built-in web portal for simple web-based configuration

PePWave Mesh Connector Series:

- Transparent Bridge Mode
- WPA/WPA2-Personal and WPA/WPA2-Enterprise security support
- Wi-Fi Multimedia (WMM) support
- Always-on, integrated Wi-Fi access point
- PePWave PolePoint bridging support

PePWave CarFi Series:

- Roaming support
- WPA/WPA2-Personal and WPA/WPA2-Enterprise security support
- Built-in DHCP server and NAT routing to manage client devices
- Wi-Fi Multimedia (WMM) support
- Easy-to-access web-based configuration

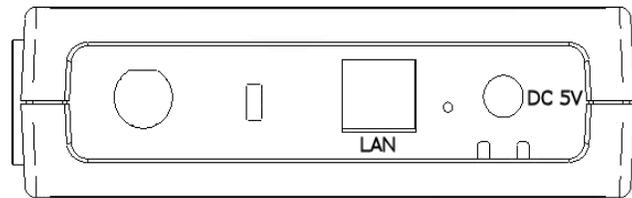| Surf 200, E200
AP 200, AP 400 | Surf AP 200-X, E200-X, 400-X
MC 200-X, E200-X, 400-X | Surf E200-DX,
400-DX | MC 200, E200, 400
CarFi 200, E200, 400 |

3.2 Hardware Setup
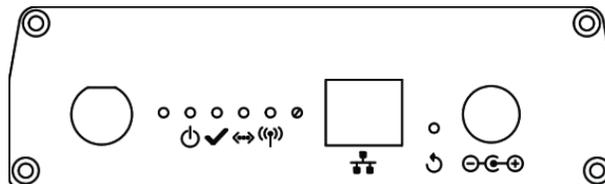
3.2.1 Surf Indoor Series

1. Attach the provided antenna to the left most antenna connector

2. Connect the LAN port to the computer's Ethernet port with an Ethernet cable.

3. Connect the end of the included power adapter to the power socket (labeled "DC 5V") on PePWave Surf.

4. Power on the power adaptor.

3.2.2 Surf / Mesh Connector Outdoor Series

Please follow the installation guide to set up the PePWave AP 200/400-X, Surf 400-DX, MC 200-X / 400-X devices.

3.2.3 Mesh Connector Indoor / CarFi Series

1. Attach the antenna provided to the left most antenna connector

2. Connect the LAN port to the computer Ethernet port with an Ethernet cable.

3. Connect the end of the included power adapter to the power socket on the PePWave Mesh Connector Indoor or CarFi device.

4. Power on the power adaptor.

3.3 LED Description

3.3.1 Surf Indoor Series
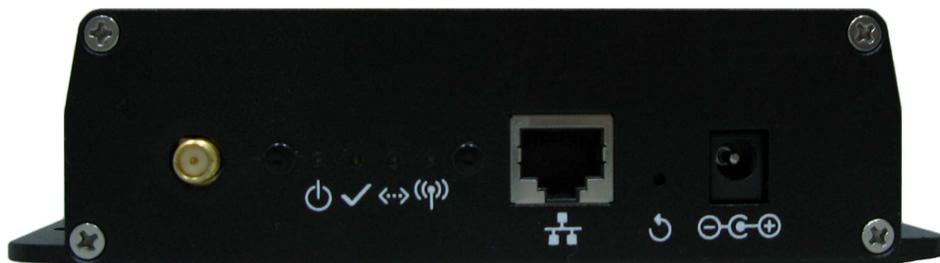

LED	Color	Status	Description
Power	Green	On	Power is on
		Off	Power is off
Status	Green	Solid	Received signal is Excellent, Very Good and Good
	Green	Blinking	Received signal is Low
	Amber	Blinking	Received signal is Very Low
	Amber	Solid	No wireless signal is detected
		Off	Booting up / Upgrading firmware
LAN	Green	On	Ethernet is connected
	Green	Blinking	Sending/Receiving data
		Off	Ethernet is not connected
Wi-Fi	Green	On	Associated with an access point
	Green	Blinking	Sending/Receiving data
		Off	Not associated with any access point
Signal Bars	Green	N/A	The number of lit signal bars depends on the strength of the received signal. A larger number of lit signal bars indicate stronger signals.

3.3.2 Surf DX Series LED Description
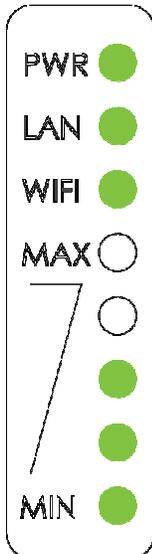
| LED	Color	Status	Description
PWR	Green	On	Power is on
		Off	Power is off
LAN	Green	On	Ethernet is connected
		Off	Ethernet is not connected
Wi-Fi	Green	On	Associated with an access point. The number of LED lights from "MIN" to "MAX" indicates the received signal strength level.
		Off	Not associated with any access point

3.3.3 Mesh Connector Indoor / CarFi Series LED Description

LED	Color	Status	Description
Power	Green	On	Power is on
		Off	Power is off
Status	Green	Solid	Received signal is Excellent, Very Good and Good
		Off	Booting up / Upgrading firmware
LAN	Green	On	Ethernet is connected
		Off	Ethernet is not connected
Wi-Fi	Green	N/A	Associated with an access point
		Off	Not associated with any access point

4 Using the PePWave Devices

4.1 Pre-configuring PC Setup for PePWave Surf (AP) / CarFi Series

You should set up your computer's LAN interface to obtain an IP address automatically. If you do so, you should have set it up correctly.

In order to do so, select the "Start" menu, "Control Panel" and then "Network Connections". Right click on the "Local Area Connection" icon, choose "Properties", double-click on the item "Internet Protocol (TCP/IP)" from the list. On the screen, just set it as follows:
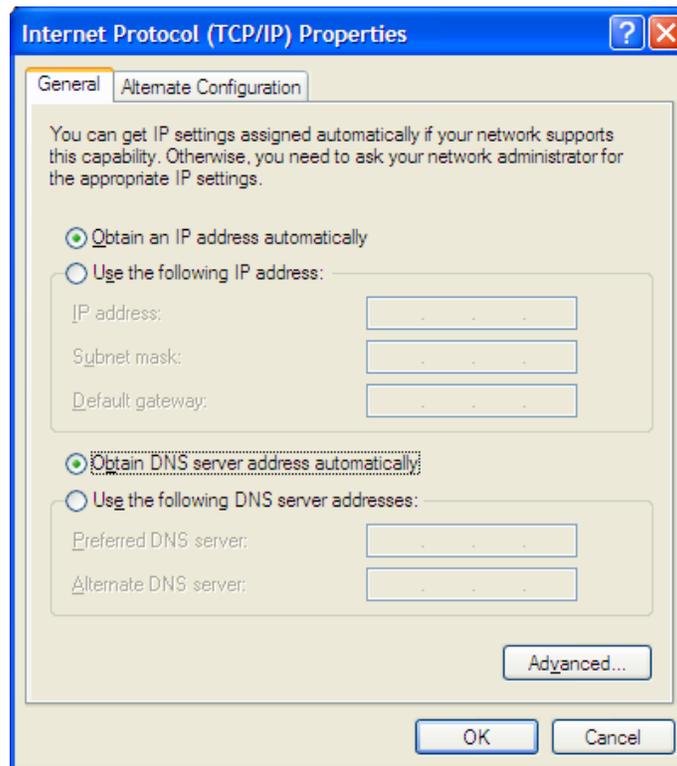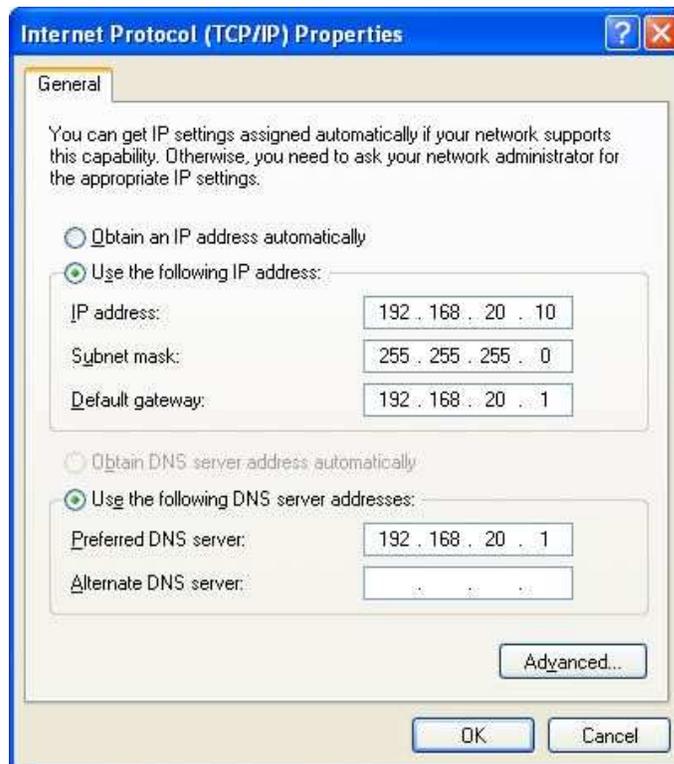
Click the "OK" button to confirm the change.

4.2   Pre-configuring PC Setup for PePWave Mesh Connector

Prior to the PePWave Mesh Connector configuration, a computer with its Local Area Connection set to a static IP address is required to pre-configure to the same subnet as the Mesh Connector (i.e. 192.168.20.X).

An 'Internet Protocol (TCP/IP) Properties' screen will pop up and set it as follows:

Click the "OK" button to confirm the change.

Now you are ready to start the first time configuration of the PePWave Mesh Connector.

4.3 First Time Setup

On your PC, start a web browser, e.g. Internet Explorer, Mozilla Firefox, etc. Visit an Internet web site. If you are not associated to an access point, you should be redirected to a logon page. Or you can go also go to this URL

http://192.168.20.1/

The page will look like this.

Illustration 1: Welcome Page

Click the "Advanced Config" button to enter the parameters of the access point to associate to. You should see this screen:

Illustration 2: PePWave Surf AP Setup Page

Illustration 3: PePWave Mesh Connector Setup Page

In the field "SSID" under Wireless Settings, input the access point's SSID (sometimes it is called the "network name"). According to the setting of the Access Point you are associating to, you may choose a different "Authentication setting".

If "Static WEP key" or "WPA/WPA2-Personal" is selected for Authentication, input the Encryption Key field as well. (There are also options of "802.1x with dynamic WEP key" and "WPA/WPA2-Enterprise". You do not need to use these settings unless instructed to do so by your ISP.)

Click the "Save" button at the bottom to complete.

You can now click the "Connect" link on the top bar and then click the "Connect" button to associate with the access point.
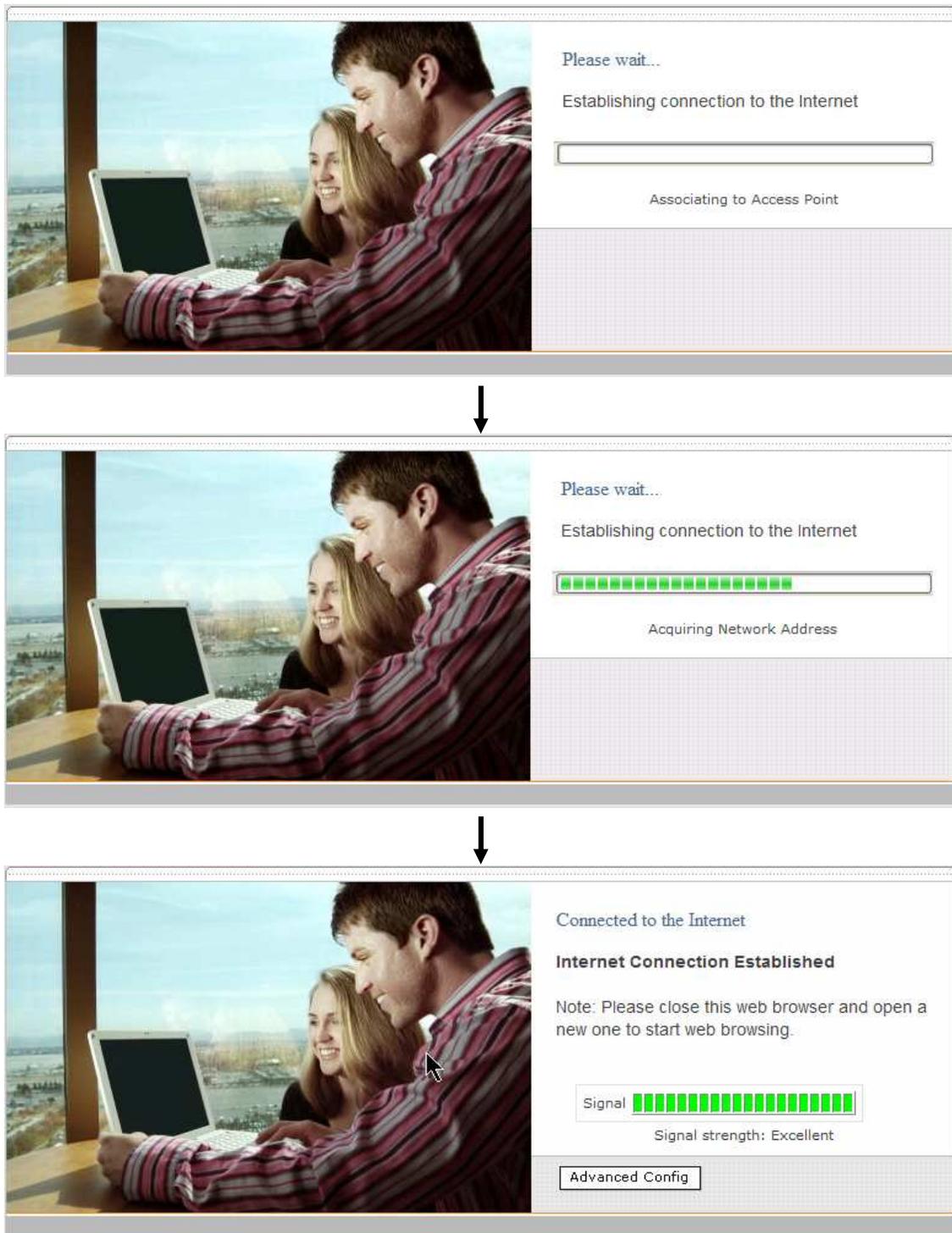
Illustration 4: Establishing Connection to the Internet

At this point, you are associated with the access point. You may now close the web browser and open a new one to start web browsing.

4.4 Settings Details

4.4.1 IP Settings

Illustration 5: IP Settings

LAN Interface: To configure the LAN interface's IP address and subnet mask.

DHCP Server (Applicable to Surf (AP) / Surf DX / CarFi Series):
To configure and enable the built-in DHCP server or not. If enabled, the IP address range can be configured. Configure DHCP Reservation if there is a need to assign a specific IP address to a specific MAC address using DHCP.

4.4.2 Wireless Settings

Illustration 6: PePWave Mesh Connector Wireless Settings

SSID: To configure the SSID / ESSID / Network Name of the wireless network to associate to.

Radio Mode: It allows the user to choose between radio modulations support. E.g. 802.11b/g, 802.11g only, 802.11b, etc. The available settings depend on the Wi-Fi module installed on the device.

Bit Rate: To fix the 802.11 transmit bit rate. Available options depend on the Radio Mode chosen. If "auto" is chosen, the device will choose the best bit rate dynamically and automatically.

Authentication: Available options are "Open", "Static WEP Key", "802.1x with dynamic WEP key", "WPA/WPA2-Enterprise" and "WPA/WPA2-Personal". The selection should be according to the setting of the access point you are associating to. Data transferred are encrypted under all modes except in "Open" mode. When "Static WEP Key" or "WPA/WPA2-Personal" is chosen, you should enter an encryption key in the Encryption Key field. You do not need to use "802.1x" and "WPA/WPA2-Enterprise" unless instructed to do so by your ISP.

PolePoint Bridging Support (Applicable to Mesh Connector Series only):
This option enables the transparent bridging functionality with PePWave PolePoint to achieve true layer two transparency.

Preferred AP: The MAC address of a preferred access point can be entered here. When the preferred access point is found and its signal strength is higher than the "Min Signal Strength", it will connect to this preferred access point, no matter the other access points are found even they have higher signal strength or the same SSID.

4.4.3 Roaming Settings

Roaming Settings for Surf (AP) / Surf DX / Mesh Connector Series:

Illustration 7: Roaming Settings

Roaming Settings: To configure and enable roaming among APs with the same SSID and authentication method.

Background Scanning Interval: The time interval between background scans.

Roaming Threshold (Signal Level Gain): If there is another AP with a signal level greater than the signal level of connected AP by the specified value, it will reconnect to the AP with better signal.

Roaming Settings for CarFi Series:

Illustration 8: CarFi Roaming Settings

Roaming Settings: To configure and enable roaming among APs with the same SSID and authentication method.

Signal Level Threshold: If the signal level of connected AP falls below the specified value, the unit will attempt to roam to another AP with a better signal level.

4.4.4 Wireless IP Settings

Illustration 9: Wireless IP Settings

Wireless IP Settings: The IP address can be obtained automatically or configured manually. If you choose to manually configure the IP address for your unit, enter the fields "IP Address", "Subnet Mask", "Default Gateway", "Preferred DNS Server" and "Alternate DNS Server".

MTU Size: You may also set the MTU Size to increase the data packet size your unit can handle at one time.

AP Settings (applicable to Surf AP, Mesh Connector and CarFi Series):
The AP Settings will be covered in detail in the subsequent section **Integrated Wi-Fi Access Point Configuration**.

4.4.5   Restore and Reboot

Illustration 10:Restore and Reboot

WAI redirection: If the device is not connected to an access point, and the user is accessing an Internet web site, the settings control whether to redirect the web access to the web admin interface page or not. If this is disabled and the device is not connected, the browser will show a web access error message. The user can still access the web admin interface by accessing to the device's LAN IP address. By default, the LAN IP address is set as http://192.168.20.1.

Web Password Protection: Sets the password to protect the web user interface.

Restore default settings: To restore the device to default settings. When this option is clicked, default settings will be restored and the unit will be restarted.

Reboot: To restart the device.

4.5   Integrated Wi-Fi Access Point Configuration

(Applicable to Surf AP / Mesh Connector and CarFi Series)

Integrated Wi-Fi Access Point is configured via the **CPE Setup** tab. The following sections will provide information as a guide through the configuration.

The available Access Point (AP) settings for the Integrated Wi-Fi Access Point functionality are as follows:

- **Disable**

    Integrated Wi-Fi Access Point functionality is disabled

- **Configure Manually**

    Manual configuration of the SSID, Authentication, and Encryption Key values corresponding to the Access Point.

- **Configure Automatically**

    The SSID, Authentication, and Encryption Key values corresponding to the Access Point are automatically configured to be the same as the respective values that correspond to the ISP's network.

4.5.1   Access Point Disabled

Illustration 11: Access Point Disabled

4.5.2 Access Point configure Manually

Illustration 12: Access Point Configure Manually

In Manual Configuration mode, the **SSID** is manually entered.

Authentication can be one of three configurable values:

- **Open**

  For **Open** Authentication Mode, no Encryption Key is necessary.

- **Static WEP Key**

  For **Static WEP Key** Authentication Mode, a 64- or 128-bit Encryption Key is required, and can be entered in either an ASCII or HEX representation.

- **WPA/WPA2-Personal**

  For **WPA/WPA2-Personal** Authentication Mode, an Encryption Key, of at least 8 characters, is required.

- **WPA/WPA2-Enterprise (Applicable to Mesh Connector only)**

  For **WPA/WPA2-Enterprise** Authentication Mode, the Radius server specified by this setting will be used.

4.5.3 Access Point Configure Automatically

Illustration 13: Access Point Configure Automatically

Broadcast SSID:

With this option enabled, the configured SSID will be broadcast such that it can be detected by an SSID scan. Otherwise, the configured SSID will not be broadcast such that it cannot be detected by an SSID scan. In order to connect with the access point, the SSID needs to be known by the client.

Client Isolation: Prevent wireless clients connected to the AP from communicating with each other.

Keep AP: With this option enabled, the Wi-Fi Access Point will always on even if there is no connection to the mesh network.

AP Transmit Power Adjustment: An option to retain a lower power setting for indoor home devices. Available options are between -1 dBm and –15dBm.

With the Access Point Configuration set to *Configure Automatically*, the *SSID*, *Authentication*, and *Encryption Key* values of the Integrated Wi-Fi Access Point will be configured to be the same as in the *Wireless Settings* section.

This configuration mode is effectively equivalent to directly connecting 802.1b/g devices on the customers' premises with Citywide Wi-Fi.

Important Note:

In the *Wireless Settings* section, if *Authentication* is set to either *802.1x with dynamic WEP key* or *WPA/WPA2-Enterprise*, then the *Configure Automatically* option of the Access Point Configuration becomes unavailable, because the Integrated Wi-Fi Access Point functionality currently does not support authentication via the 802.1x with dynamic WEP key and WPA/WPA2-Enterprise methods.

4.6   Test the Setup

To test to setup, you can now go to the unit's main page, enter the user name and password. The realm (the text box next to the "@" sign) value can be left empty. Then click the Connect button.
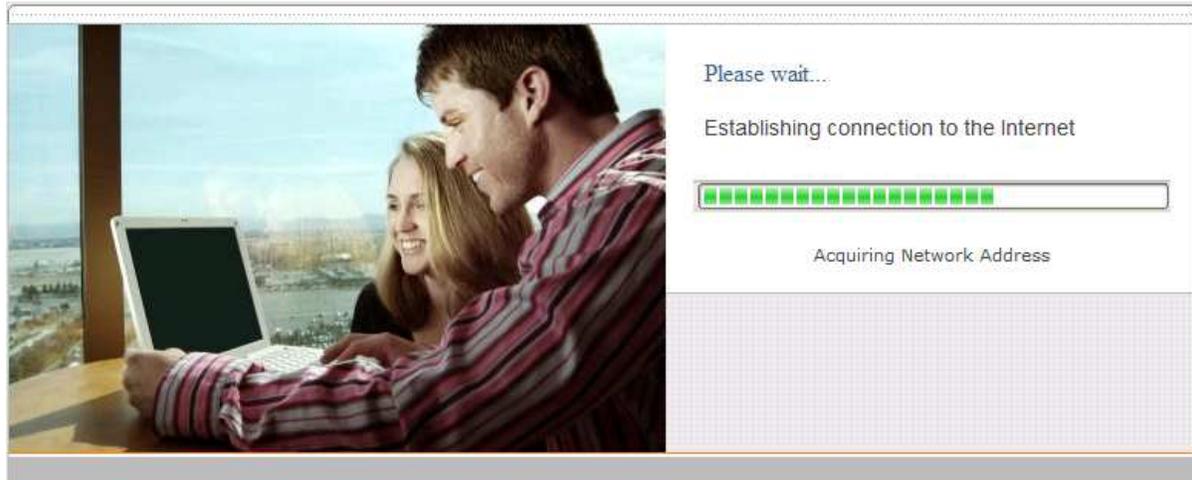

Illustration 14: Establishing Connection to the Internet

After connected, you should see:

Illustration 15: Internet Connection Established

4.7   Post-configuring PC Setup for Mesh Connector Series

At this point an Internet connection should have been successfully established between the access point and the PePWave Mesh Connector. The PC that was previously pre-configured to administrate the Surf has to reconfigure its Local Area Connection and be set to 'Obtain an IP address automatically'.

An 'Internet Protocol (TCP/IP) Properties' screen will appear. Please set as follows:
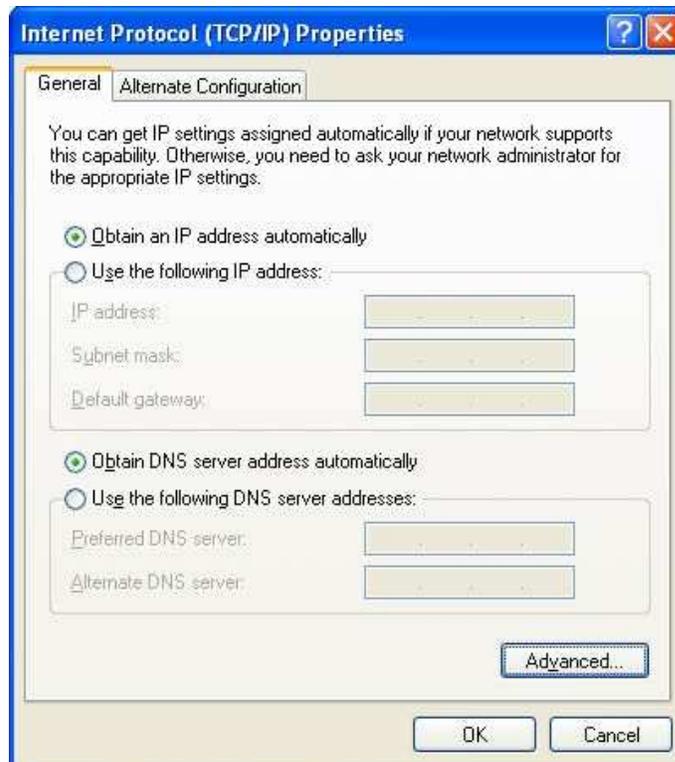
Click the "OK" button to confirm the change.

For now the PC will send a DHCP request directly to the access point via the PePWave Mesh Connector, and an IP address will be assigned from the access point to the PC.

4.8   Firmware Upgrade

The PePWave devices (Surf / Surf DX / Mesh Connector / CarFi Series) are able to check whether a newer firmware (the software running on the unit) is available. This can be done in the Firmware Upgrade section.

However, it is recommended that you do not update the firmware unless specifically instructed by your ISP to do so. When a firmware upgrade is needed, your ISP will either give you instructions or upgrade the firmware remotely.

4.9 Restore to Default Settings

4.9.1 Surf Indoor Series

There are two ways to restore the PePWave Surf Indoor unit to default settings.

If you are able to access the web admin interface, go to the "CPE Setup" page, and click the **Restore and Reboot** button.

Otherwise, you can also power up the unit and wait for about 1 min. Then press the **Reset Button** at the rear side of the unit using a pin and then hold it for 5 seconds. The unit will restore the settings to factory default and reboot.

4.9.2 Surf DX Series

There are two ways to restore the PePWave Surf DX to default settings.

If you are able to access the web admin interface, go to the "CPE Setup" page, and click the **Restore and Reboot** button.

Otherwise, you can also power up the Surf DX unit and wait for about 1 min. Then push the **Reset Button** at the panel side of the unit and then hold it for 5 seconds. The unit will restore the settings to factory default and reboot.
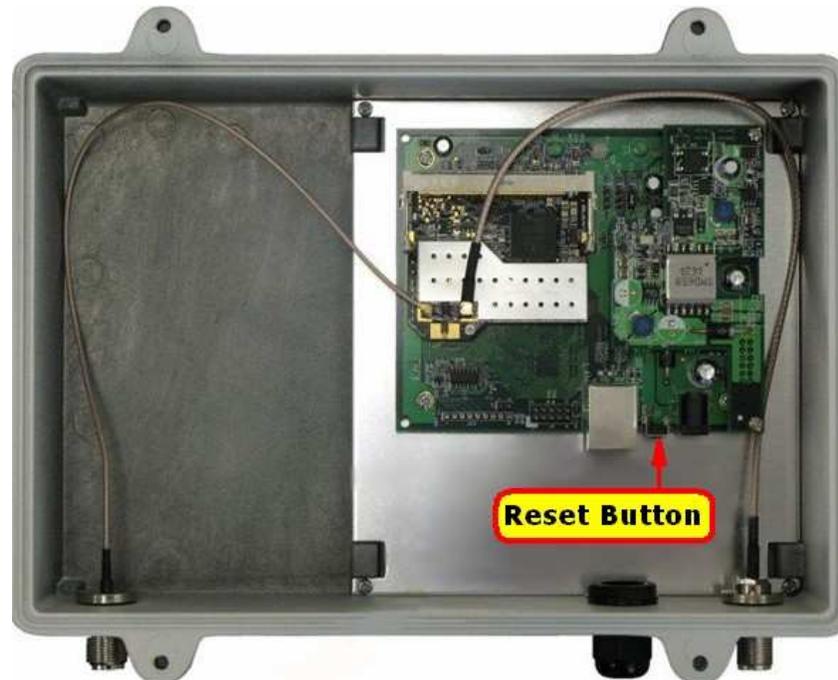

4.9.3 Surf AP Outdoor / Mesh Connector Outdoor Series

There are two ways to restore the PePWave Surf AP outdoor/ Mesh Connector outdoor device to default settings.

If you are able to access the web admin interface, go to the "CPE Setup" page, and click the **Restore and Reboot** button.

Otherwise, you need to open the cover of the outdoor device and also power up the device and wait for about 1 min. Then push the **Reset Button** (see the illustration blow) and then hold it for 5 seconds. The device will restore the settings to factory default and reboot.


4.9.4 Mesh Connector Indoor / CarFi Series

There are two ways to restore the PePWave Mesh Connector Indoor or the CarFi unit to default settings.

If you are able to access the web admin interface, go to the "CPE Setup" page, and click the **Restore and Reboot** button.

Otherwise, you can also power up the unit and wait for about 1 min. Then push the **Reset Button** at the rear side of the unit using a pin and then hold it for 5 seconds. The unit will restore the settings to factory default and reboot.
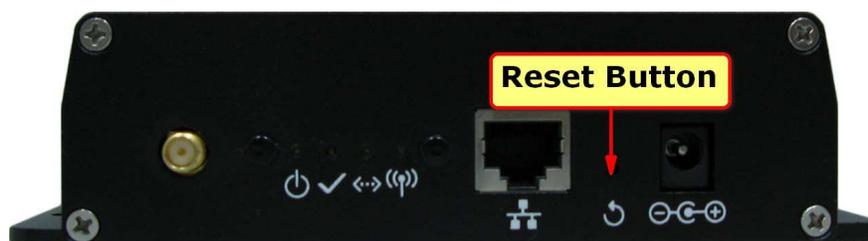
Appendix:

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.

PeP wave

Broadband Possibilities

www.pepwave.com