



TELETRONICS
INTERNATIONAL, INC.

WL-CPE-ROUTER

Wireless Customer Premises Router

USER MANUAL

CPE Firmware v2.16



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1.0 Minimum Requirements

System Requirements

- Computer system running Win9x, NT, 2000
- Internet Explorer 4.x with 128 bit high encryption (Cookies Enabled)

Or Netscape 6.x (Cookies Enabled)

- Network Interface card
- 9 pin RS232 (serial) port and crossover cable (in order to restore factory defaults)

CPE Software Configuration Utility Requirements

- 1 of 3 brands of Wireless Network Cards (PCMCIA)

Teletronics 2Mbit
Teletronics PrismII 11Mbit
Raylink 2Mbit

- **Important Note:** Only the Teletronics 2Mbit and the PrismII 11Mbit Wireless Network Cards can be used in Access Point Mode.



2.0 General Overview

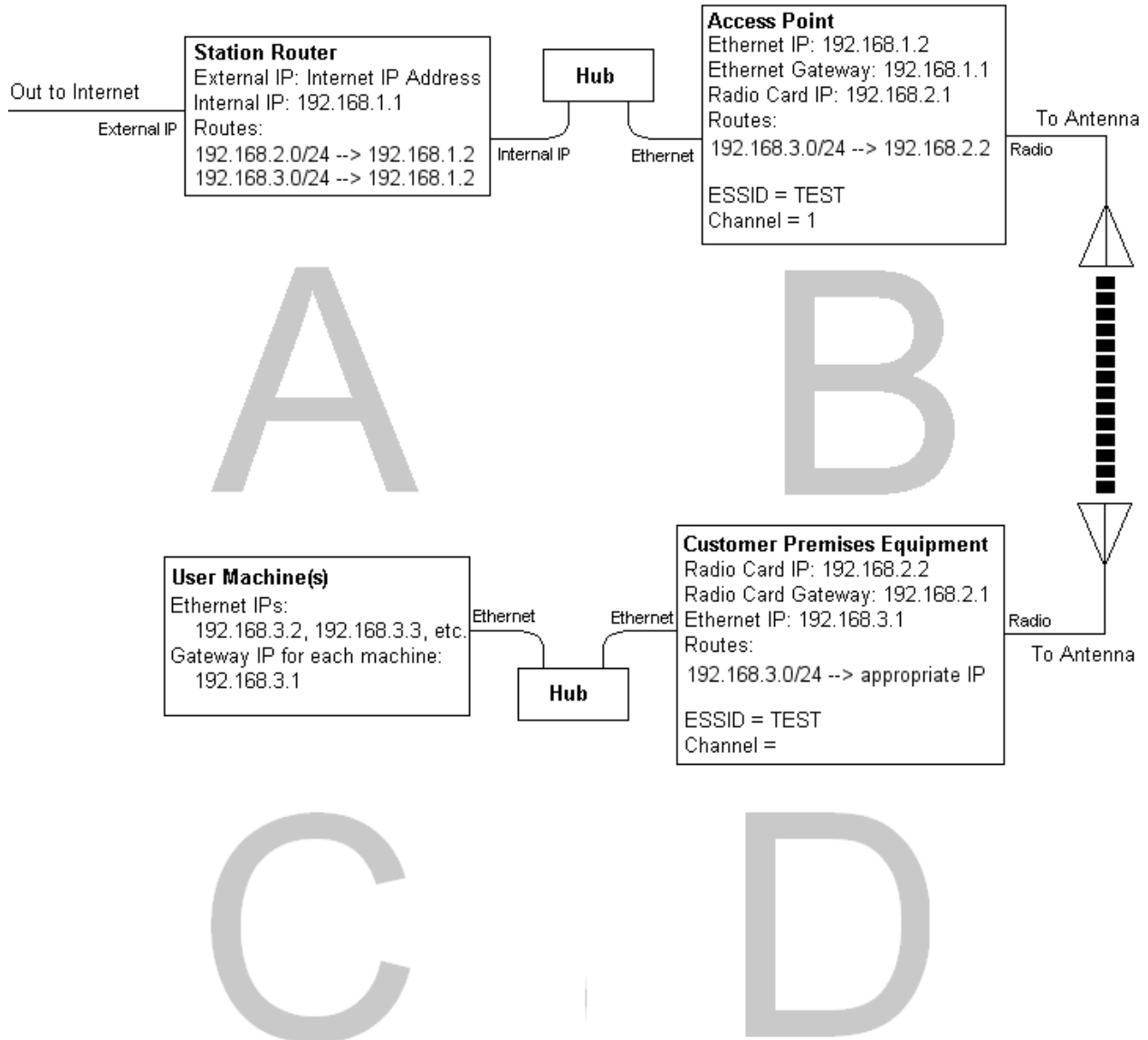
This software controls a CPE (**C**ustomer **P**remises **E**quipment) unit and/or an AP (**A**ccess **P**oint) unit, and acts as a router between a user and an Internet Service Provider. The software allows for 1 Ethernet card and 1 radio card on the device.

Before configuring the software settings, it is extremely important to properly design and setup your network. Without proper network implementation, the software and hardware will not operate at peak efficiency, or in some improper configurations, not at all. Routing requires proper network subnetting with proper network segmentation. Diagram 1.0 outlines one such network implementation. The accompanying descriptions detail this implementation.



3.0 Network Implementation

Diagram 3.0



- From this point onward an Access Point will be designated **AP** and a Customer Premises Equipment will be designated **CPE**.



Description of Diagram 3.0

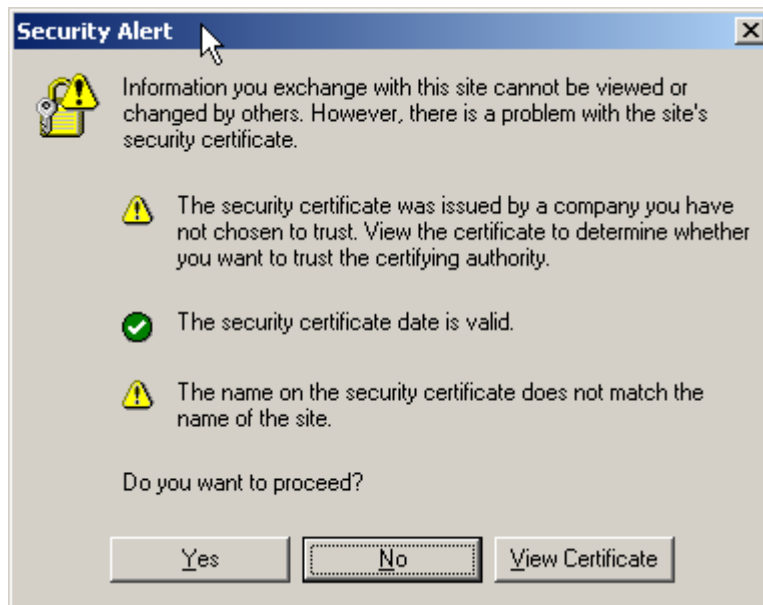
- A.** At point A, a station router has access to the Internet through a public IP address. It has an internal IP of 192.168.1.1. It will route incoming information, destined for 192.168.2.x and 192.168.3.x to the AP's Ethernet IP address of 192.168.1.2 (subnet mask 255.255.255.0).
- B.** At point B, the AP's Ethernet IP is 192.168.1.2 (subnet mask 255.255.255.0). The radio card has an IP of 192.168.2.1 (subnet mask) of 255.255.255.0. Incoming information destined for 192.168.2.x will be delivered. The AP will route information destined for 192.168.3.x to 192.168.2.2. The ESSID for the AP is TEST and the Channel is 1. The AP wireless mode is set to **Access Point**.
- **Please Note:** The ESSID for the AP and connected CPE's **must** be identical. If they are not, two (or more) physically separate networks will exist and communications between these networks will not operate.
- C.** At point C, the CPE's radio card IP is 192.168.2.2 (subnet mask 255.255.255.0). The Ethernet on the CPE will have an IP of 192.168.3.1 (subnet mask 255.255.255.0). Any information destined for 192.168.3.x will be routed through the CPE to the appropriate IP address. The CPE wireless mode is set to **Infrastructure**.
- D.** User machines have Ethernet IP addresses of 192.168.3.2, 192.168.3.3, etc. Each has a gateway of 192.168.3.1.
- Gateways: Gateways must be designated to point at the nearest portal to the Internet. For example, at D, the gateway is 192.168.3.1. It **must** point to this IP. If it does not point to the next nearest portal, communications will not operate.
 - At **D**, user machines must have a gateway of 192.168.3.1 so information can be passed to the CPE. At **C**, the radio card must have a gateway of 192.168.1.2 so information can be passed to the AP. At **B**, the Ethernet gateway IP of the AP must have an IP of 192.168.1.1 so information can be passed to the station router and out to the Internet.

The network implementation described above uses the AP and the CPE as routers, NOT bridges. Configuring the hardware/software as bridges will increase the amount of network traffic, and, as a result, will slow the network down. Configuring the hardware/software as **routers** will decrease the amount of network traffic and will allow for optimal performance on your network

4.0 User Interface

The user interface for the CPE is browser based. The factory default IP for the CPE is 192.168.1.1. You can interface with the device by connecting the CPE to your computer via the Ethernet port and typing the following IP address into your Internet browser and pressing enter, (Please note that you are accessing a secure site -- use https, not http).

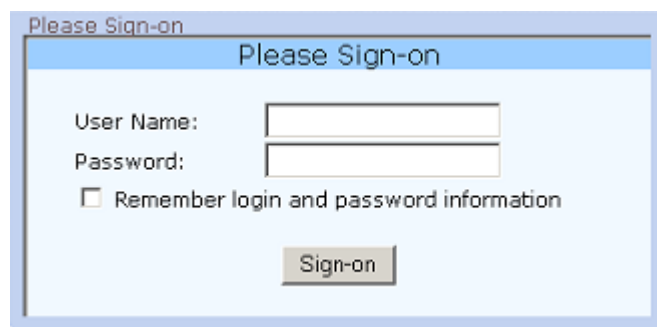
https://192.168.1.1



When the CPE is initially accessed, you will be given a Security Alert screen. It is a harmless warning for the CPE. You will need to click on Yes to proceed.

A sign-on screen will appear which will require a username and a password. The defaults are **case sensitive** and are as follows,

Username: admin
 Password: 1234





With the configuration utility, you will be able to setup the CPE as a CPE, setup the CPE as an AP, and setup IPs, gateways, subnets, and routes.

Clicking on the side options will take you to a variety of menus which include,

Server Status Page	Provides wireless status
Assign W/LAN IP Addresses	Allows you to assign IP addresses to Ethernet and Wireless LAN cards
Static and Default Routes	Allows the setup of gateways and routes
Configure Wireless Adapter	Allows the configuration of up to 4 wireless Adapters
IP Masquerading	Allows NAT to be enabled or disabled
802.1d for AP and Ethernet	Enables or disables bridging <i>only in AP mode</i>
Change Admin Password	Allows the admin password to be changed
Upgrade Firmware	Upgrades the current firmware
Restore Factory Defaults	Restores the CPE to factory default settings

- When adjusting IP addressing or gateway routes, clicking the line of the address you wish to modify will automatically choose that address and put the values in the appropriate fields.



5.0 Changing the Admin Password

The password can be modified once you are logged in. To do this, click on **the Change Admin Password** option on the main CPE Configuration Utility menu.

Change administrator login password

New Password :

(Again) :

Change Password

From this screen, you may change your password (maximum 15 characters). Make sure the **Change Password** button is clicked. Otherwise, the change will not take effect.



5.1 Setting up the CPE as a CPE

- The following explanation and screen shots will demonstrate how to set the CPE as a CPE. The IP addressing explained in this section will reflect the IP addressing as seen in *Diagram 3.0*.
- You can save your changes after you have made modification, however, they will not come into effect until you either **save and reboot**, or **activate**. These options are located at the top left of the CPE Configuration Utility screens.



- Be aware of the **Update** buttons at the bottom of some configurations screens. Be sure to click the update buttons, if you have made any changes, before moving on to other configuration options.

Step 1: Log into the CPE (See Section 4.0 - User Interface)

Step 2: Select **Assign W/LAN IP Addresses** from the menu on the left

Step 3: Click on **All Ethernet and Wireless Adapters**

CPE Configuration Utility, version 2.10

Configuration Window - [IP Address Assignments] **Activate** | **Save** | **Reboot** | **Logout**

Network Address Assignments: 1 Ethernet, and 1 Wireless ports available

Available ether and wlan ports	IP Count	802.1d	Link Type	Card Inserted
└ All Ethernet and Wireless Adaptors				
└ All Ethernet Adaptors				
└ Ethernet device 1 (ether1)	2/0		RJ45	
└ All Wireless Adaptors				
└ Wireless device 1 (wlan1)	0/0		Infra	Prism2 11Mbit

Up 1:18, 0 users, load average: 0.08, 0.02, 0.01

- In *Diagram 3.0*, the CPE has an Ethernet IP of 192.168.3.1, a radio card IP of 192.168.2.2. The radio card gateway is set at 192.168.2.1. Both cards have a subnet mask of 255.255.255.0.



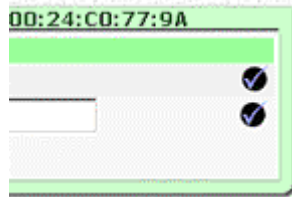
Step 4: Setting up the **ether1** adapter. Click on the default IP (192.168.1.1) to modify it. The default values will appear in the IP, Net Mask, and Comment fields. Make your modifications, and then click on the **Modify** button.

Network Address Assignments for ethernet device **ether1** - MAC: 00:00:24:C0:77:9A

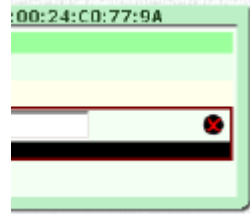
IP Address	Netmask	Comment
<input checked="" type="checkbox"/> 192.168.1.1	255.255.255.0	DEFAULT
<input type="text" value="192.168.3.1"/>	<input type="text" value="255.255.255.0"/>	<input type="text" value="CPE ETHERNET"/>

After your modification have been made, checks will appear at the right to indicate weather or not your changes were appropriate. If you have chosen IPs that are in conflict, you will be notified with "x"s.

Appropriate Modification



Inappropriate Modification



- Important Note: Now that you have modified your **ether1** adapter, you must enter the CPE Configuration Utility through the new IP, in this case, <https://192.168.3.1>.

Step 5: Setting up the **wlan1** adapter. By default, the wlan1 adapter is not setup. Enter these following values into the following fields:

Network Address Assignments for wireless device **wlan1** - MAC: 00:90:D1:07:1C:2E

IP Address	Netmask	Comment
There are no IPs assigned to this device		
<input type="text" value="192.168.2.2"/>	<input type="text" value="255.255.255.0"/>	<input type="text" value="CPE RADIO"/>

When you have completed value entries, click the **Create** button. If there are no IP conflicts, the software will allow the modifications.

Step 6: Select **Static and Default Routes** option from the menu on the left. enter the values into the fields as in the below screen shot. Click on the **Create** button when you have finished, and then click the **Save** button at the top left of the screen.

Static and default route entry form

Network	Netmask	Gateway	Device
There are no static routes assigned 0.0.0.0 / 0.0.0.0 represents the 'default' gateway (recommended)			
<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="192.168.2.1"/>	
<input type="text" value="CPE RADIO GATEWAY"/> (optional route comment)			
<input type="button" value="Create"/>	<input type="button" value="Modify"/>	<input type="button" value="Delete"/>	<input type="button" value="En/Disable"/>

Static and default route entry form

Network	Netmask	Gateway	Device
<input type="checkbox"/> DEFAULT	GATEWAY	192.168.2.1	wlan1
Comment: CPE RADIO GATEWAY			
<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/> (optional route comment)			
<input type="button" value="Create"/>	<input type="button" value="Modify"/>	<input type="button" value="Delete"/>	<input type="button" value="En/Disable"/>

Step 7: Select IP Masquerading (NAT) from the CPE menu on the left. From here you can set the CPE to perform IP Masquerading from either the Ethernet card or the radio card. By default, this function is disabled. **Update your settings** if you make any changes from the default setting.

IP Masquerading (NAT)

Masquerading : (select target adaptor to map too)

Disabled
 ether1
 wlan1

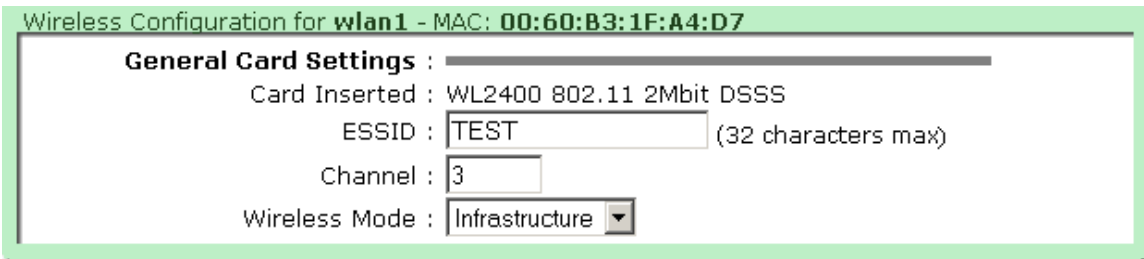
Step 8: Select **Slot 1**, under the **Configure Wireless Adapter** option, from the CPE Configuration Menu on the left. There are 3 different Wireless Network Cards supported by the CPE Configuration Utility Software. (Please see section 1.0 Minimum System Requirements). The following sections are Wireless Network Card specific. Please refer to the appropriate section for your brand of card.



5.2 Setting up the CPE with Teletronics 2Mbit Wireless NIC

- The following explanation and screen shots will demonstrate how to set the CPE with the Teletronics 2Mbit Wireless Network Card. If your wireless card is not manufactured by Teletronics, please move to the appropriate section for your card.

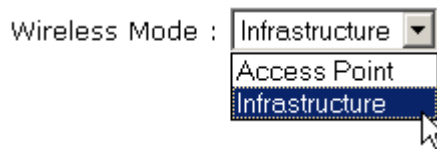
Step 9: You will see a screen like the one below. When setting up your CPE to act as a CPE, the two areas of utmost importance are the **ESSID** and the **Wireless Mode** fields.



The **ESSID** field must reflect the **ESSID** of your Access Point. If the ESSID fields differ between your CPE and your AP, your network will not function. In *Diagram 3.0*, the **ESSID** of both the **CPE** and the **AP** is set to **TEST**.

ESSID : (32 characters max)

The **Wireless Mode** field for a CPE is always set to **Infrastructure**. The only time that this option changes is when you want your CPE to act as an AP.



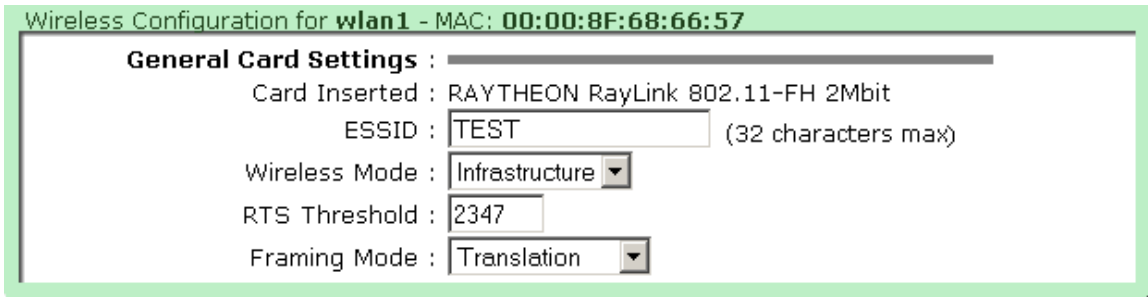
Step 10: Click on the Activate button at the top of the screen. This will save all of your settings and activate any changes you have made to the default settings. Clicking on Save and Reboot will have the same effect. You have completed the setup of the CPE as a CPE.



5.3 Setting up the CPE with RayLink 2Mbit Wireless NIC

- The following explanation and screen shots will demonstrate how to set the CPE with the RayLink 2Mbit Wireless Network Card. If your wireless card is not manufactured by RayLink, please move to the appropriate section for your card.

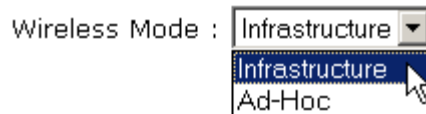
Step 9: You will see a screen like the one below. When setting up your CPE to act as a CPE, the two areas of utmost importance are the **ESSID** and the **Wireless Mode** fields.



The **ESSID** field must reflect the **ESSID** of your Access Point. If the ESSID fields differ between your CPE and your AP, your network will not function. In *Diagram 3.0*, the **ESSID** of both the **CPE** and the **AP** is set to **TEST**.

ESSID : (32 characters max)

The **Wireless Mode** field for a CPE is always set to **Infrastructure**. The only time that this option changes is when you want your CPE to act as an AP.



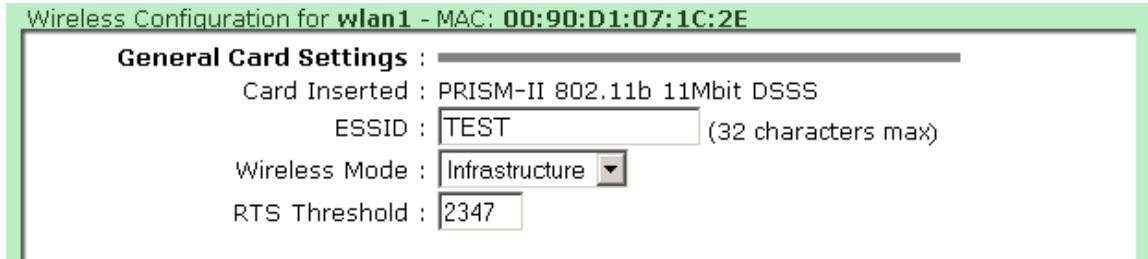
Step 10: Click on the Activate button at the top of the screen. This will save all of your settings and activate any changes you have made to the default settings. Clicking on Save and Reboot will have the same effect. You have completed the setup of the CPE as a CPE.



5.4 Setting up the CPE with PrismII 11Mbit Wireless NIC

- The following explanation and screen shots will demonstrate how to set the CPE with the PrismII 11Mbit Wireless Network Card. If your wireless card is not based on the PrismII chipset, please move to the appropriate section for your card.

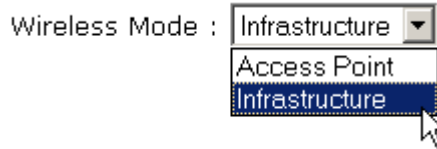
Step 9.0: You will see a screen like the one below. When setting up your CPE to act as a CPE, the two areas of utmost importance are the **ESSID** and the **Wireless Mode** fields.



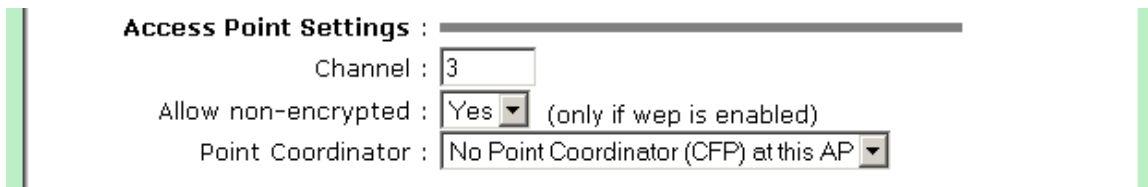
The **ESSID** field must reflect the **ESSID** of your Access Point. If the ESSID fields differ between your CPE and your AP, your network will not function. In *Diagram 3.0*, the **ESSID** of both the **CPE** and the **AP** is set to **TEST**.



The **Wireless Mode** field for a CPE is always set to **Infrastructure**. The only time that this option changes is when you want your CPE to act as an AP.



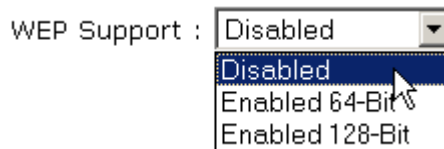
Step 9.1: When the CPE is in infrastructure mode, any modifications made in the Access Point Settings do not affect the functioning of the CPE. When setting up a CPE as a CPE, these values are not used.





Step 9.2: (Optional) The PrismII Wireless Network Card has the ability to send and receive encrypted transmissions. This function allows only CPEs and APs with appropriate keys to communicate and disallows unauthorized use. The following procedure will provide details on how to use this function. It is important to note that both the AP and the CPE must support this function and must be using identical keys. It is highly recommended that you make sure your network is functioning before utilizing any WEP functions.

By default, WEP settings are disabled. You can activate WEP either by using 64 or 128 bit encryption keys.



When 64 bit encryption is enabled, 4 keys are created, enabling the switching of keys from time to time. When 128 bit encryption is enabled, only 1 key is generated. In order to switch to a different key, a new passphrase is required.

Steps in enabling WEP

- i. Choose which **level of encryption** you would like using the drop down WEP support option.
- ii. Choose how you would like to **enter your key** using the drop down key entry option (manual or passphrase). Manual entry allows you to manually enter your keys using hexadecimal values. Passphrase creates hexadecimal values from the characters you enter into the passphrase field. The maximum number of characters allowed in the passphrase field is 35.
- iii. After you have either entered manual values, or have selected a passphrase, click on the **Update Settings** button on the bottom of the screen.
- iv. After you have updated the settings, the keys will be displayed, as below. (The example on the following page uses 64 bit encryption and a passphrase)



WEP Settings :

WEP Support : Enabled 64-Bit

Key Entry : Passphrase

Passphrase : *k*o*k*o*k*o*k*

Default Key ID : Key 1

64-Bit Manual Entry :

Key 1 :	4F	F8	0A	61	AA	<input checked="" type="checkbox"/>
Key 2 :	15	6D	48	00	2C	<input checked="" type="checkbox"/>
Key 3 :	1D	9F	0A	26	2B	<input checked="" type="checkbox"/>
Key 4 :	C1	03	5E	57	FC	<input checked="" type="checkbox"/>

128-Bit Manual Entry :

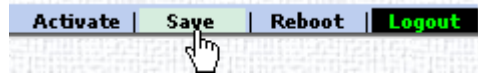
k	*k*	*k*	*k*	*k*	*k*	*k*
k	*k*	*k*	*k*	*k*	*k*	*k*

Step 10: Click on the Activate button at the top of the screen. This will save all of your settings and activate any changes you have made to the default settings. Clicking on Save and Reboot will have the same effect. You have completed the setup of the CPE as a CPE.



6.0 Setting up the CPE as an Access Point

- The following explanation and screen shots will demonstrate how to set the CPE as an AP. The IP addressing explained in this section will reflect the IP addressing as seen in *Diagram 3.0*.
- You can save your changes after you have made modification, however, they will not come into effect until you either **save and reboot**, or **activate**. These options are located at the top left of the CPE Configuration Utility screens.

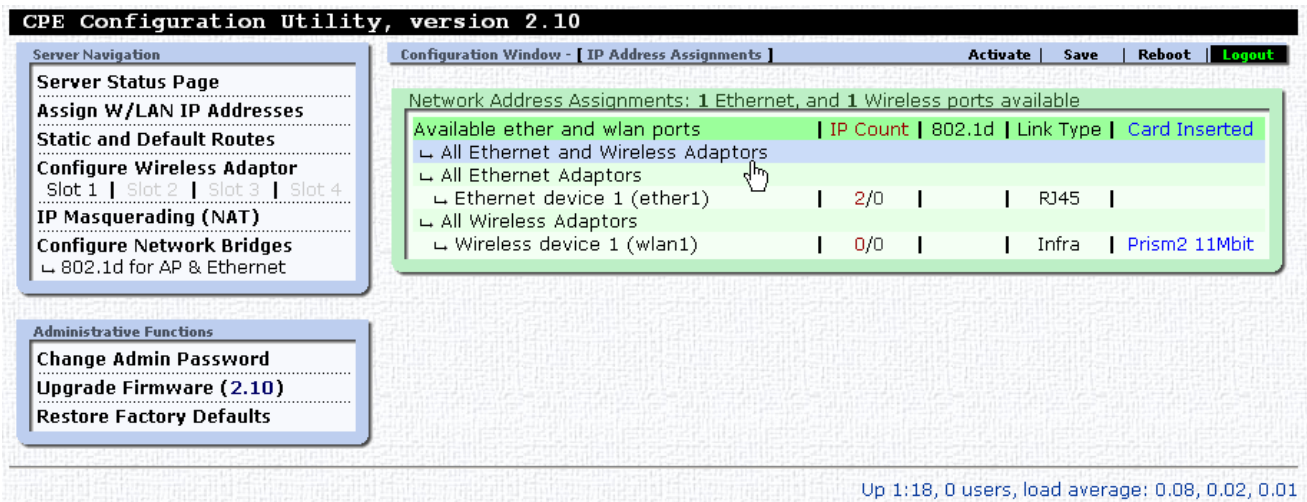


- Be aware of the **Update** buttons at the bottom of some configurations screens. Be sure to click the update buttons, if you have made any changes, before moving on to other configuration options.

Step 1: Log into the CPE (See Section 4.0 - User Interface)

Step 2: Select **Assign W/LAN IP Addresses** from the menu on the left

Step 3: Click on **All Ethernet and Wireless Adaptors**



- In *Diagram 3.0*, the AP has an Ethernet IP of 192.168.1.2, a radio card IP of 192.168.2.1. The radio card gateway is set at 192.168.1.1. Both cards have a subnet mask of 255.255.255.0.



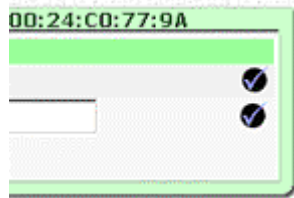
Step 4: Setting up the **ether1** adapter. Click on the default IP (192.168.1.1) to modify it. The default values will appear in the IP, Net Mask, and Comment fields. Make your modifications, and then click on the **Modify** button.

Network Address Assignments for ethernet device **ether1** - MAC: **00:00:24:C0:77:9A**

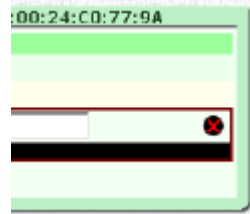
IP Address	Netmask	Comment
<input type="checkbox"/> 192.168.1.1	255.255.255.0	DEFAULT
<input type="text" value="192.168.1.2"/>	<input type="text" value="255.255.255.0"/>	<input type="text" value="AP ETHERNET"/>

After your modification have been made, checks will appear at the right to indicate weather or not your changes were appropriate. If you have chosen IPs that are in conflict, you will be notified with "x"s.

Appropriate Modification



Inappropriate Modification



- Important Note: Now that you have modified your **ether1** adapter, after you click the **Activate** button or the **Save and Reboot** buttons, you must enter the CPE Configuration Utility through the new IP, in this case, <https://192.168.1.2>.

Step 5: Setting up the **wlan1** adapter. By default, the wlan1 adapter is not setup. Enter these following values into the following fields:

Network Address Assignments for wireless device **wlan1** - MAC: **00:90:D1:07:1C:2E**

IP Address	Netmask	Comment
There are no IPs assigned to this device		
<input type="text" value="192.168.2.1"/>	<input type="text" value="255.255.255.0"/>	<input type="text" value="AP RADIO"/>

When you have completed value entries, click the **Create** button. If there are no IP conflicts, the software will allow the modifications.

Step 6: Select **Static and Default Routes** option from the menu on the left. Enter the values into the fields as in the below screen shot. Click on the **Create** button when you have finished, and then click the **Save** button at the top left of the screen.

Static and default route entry form

Network	Netmask	Gateway	Device
There are no static routes assigned			
0.0.0.0 / 0.0.0.0 represents the 'default' gateway (recommended)			
<input type="text" value="0.0.0.0"/>	<input type="text" value="0.0.0.0"/>	<input type="text" value="192.168.1.1"/>	
<input type="text"/> (optional route comment)			
<input type="button" value="Create"/>	<input type="button" value="Modify"/>	<input type="button" value="Delete"/>	<input type="button" value="En/Disable"/>

Static and default route entry form

Network	Netmask	Gateway	Device
<input type="checkbox"/> DEFAULT	GATEWAY	192.168.1.1	ether1
<input type="text"/>	<input type="text"/>	<input type="text"/>	
<input type="text"/> (optional route comment)			
<input type="button" value="Create"/>	<input type="button" value="Modify"/>	<input type="button" value="Delete"/>	<input type="button" value="En/Disable"/>

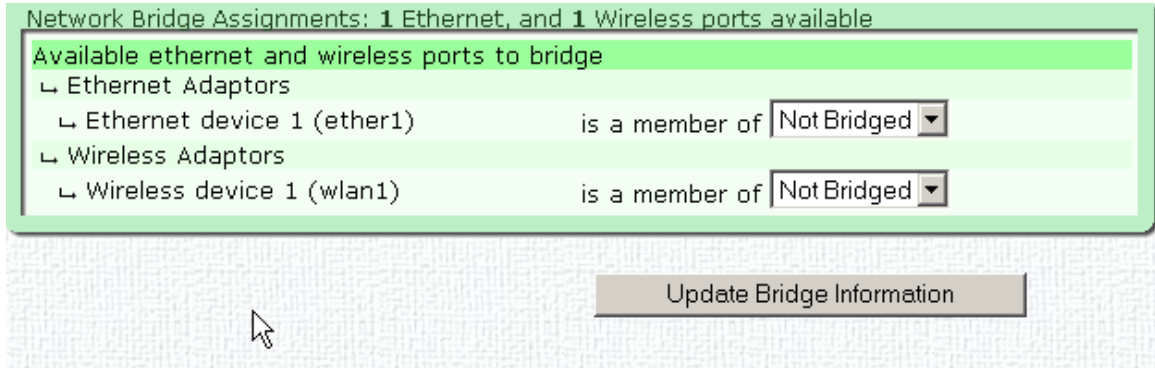
Step 7: Select IP Masquerading (NAT) from the CPE menu on the left. From here you can set the CPE to perform IP Masquerading from either the Ethernet card or the radio card. By default, this function is disabled. **Update your settings** if you make any changes from the default setting.

IP Masquerading (NAT)

Masquerading : (select target adaptor to map too)

- Disabled
- ether1
- wlan1

Step 8: Select **802.1d for AP and Ethernet** under the **Configure Network Bridges** menu on the left. Here, you can specify bridging if necessary. If your network is setup as in **Diagram 3.0**, bridging is not necessary, and you can skip this step. If however, your network is not setup as in the diagram, and bridging is required, you will need to make sure that the bridge values are the same for both **ether1** and **wlan1**. Be sure to **Update Bridge Information** after you have made any modifications other than leaving the settings as disabled.



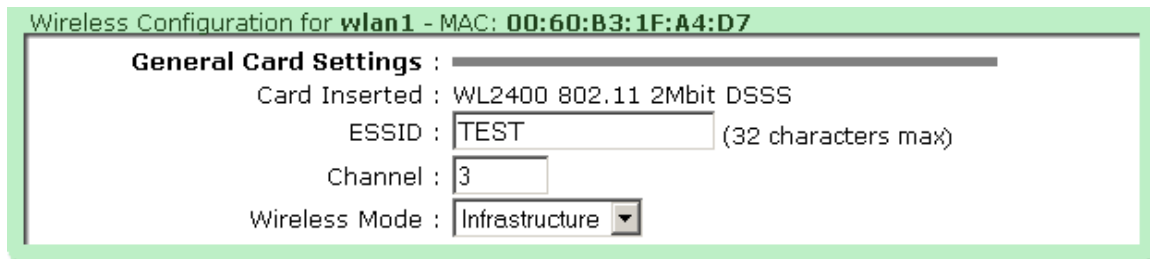
Step 9: Select Slot 1, under the Configure Wireless Adapter option, from the CPE Configuration Menu on the left. There are 2 different Wireless Network Cards supported by the CPE Configuration Utility Software that can be placed in Access Point Mode. (Please see section *1.0 Minimum System Requirements*). The following descriptions are Wireless Network Card specific. Please refer to the appropriate section for your brand of card.



6.1 Setting up the CPE as an AP with Teletronics 2Mbit Wireless NIC

- The following explanation and screen shots will demonstrate how to set the CPE with the Teletronics 2Mbit Wireless Network Card. If your wireless card is not manufactured by Teletronics, please move to the appropriate section for your card.

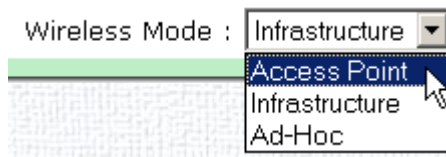
Step 9.1: You will see a screen like the one below. When setting up your CPE to act as a CPE, the two areas of utmost importance are the **ESSID** and the **Wireless Mode** fields.



The **ESSID** field must reflect the **ESSID** of your CPE. If the ESSID fields differ between your CPE and your AP, your network will not function. In *Diagram 3.0*, the **ESSID** of both the **CPE** and the **AP** is set to **TEST**.



The **Wireless Mode** field for an AP is always set to **Access Point**. The only time that this option changes is when you want your AP to act as an CPE.



Step 10: Click on the Activate button at the top of the screen. This will save all of your settings and activate any changes you have made to the default settings. Clicking on Save and Reboot will have the same effect. You have completed the setup of the CPE as an AP.

6.11 Additional Functions with Teletronics 2Mbit Wireless NIC:

- An additional feature of using the Teletronics 2Mbit Wireless NIC in the CPE in AP mode is that the AP can determine signal strength of stations connected to the AP. By default, this function is fully enabled and can be accessed through the **Server Status Page** option in the main **CPE Configuration Utility** menu.
 - i. Once on the Server Status Page, click on the client list under the **Assoc. Stations** header.

Configuration Window - [Server Status] Activate | Save | Reboot | Logout

Authenticated User: **admin**
 Unit has been active for: 1 hour, 56 minutes
 Firmware Version: 2.10
 Free memory: 2200K with 256K in buffers
 Unused flash space: 1.5MB (1576K)

Wireless Status



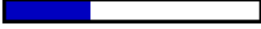
Device	Card Name	Network Mode	Last pkt signal	Assoc. Stations
wlan1	WL2400 802.11 2Mbit	Access Point	--	3 clients
wlan2	--	--	--	--
wlan3	--	--	--	--
wlan4	--	--	--	--

- ii. You will then be able to view the signal strength of connected stations.

Configuration Window - [Access Point Association List] Activate | Save | Reboot | Logout

Stations linked to this Access Point: **3**
 Inactive links are automatically kicked after **1,800** seconds (**30** minutes)

Access Point Association table for WL2400 (wlan1)

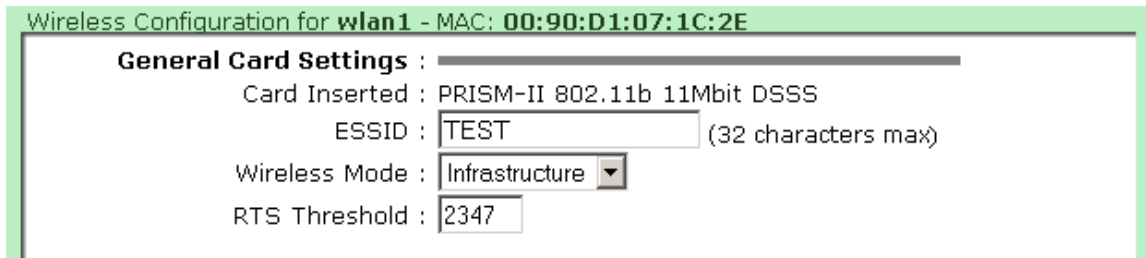
Station Address	Signal Strength	Inactivity
00:90:47:00:04:99	 100%	199 seconds
00:90:D1:07:1C:23	 46%	88 seconds
00:50:C2:01:91:CA	 33%	5 seconds



6.2 Setting up the CPE as an AP with PrismII 11Mbit Wireless NIC

- The following explanation and screen shots will demonstrate how to set the CPE with the PrismII 11Mbit Wireless Network Card. If your wireless card is not based on the PrismII chipset, please move to the appropriate section for your card.

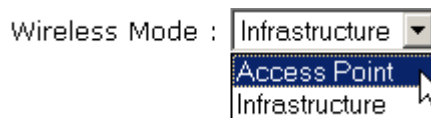
Step 9.1: You will see a screen like the one below. When setting up your CPE to act as a CPE, the two areas of utmost importance are the **ESSID** and the **Wireless Mode** fields.



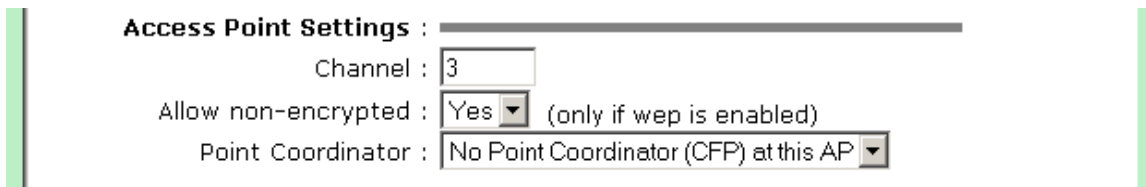
The **ESSID** field must reflect the **ESSID** of your CPE. If the ESSID fields differ between your CPE and your AP, your network will not function. In *Diagram 3.0*, the **ESSID** of both the **CPE** and the **AP** is set to **TEST**.

ESSID : (32 characters max)

The **Wireless Mode** field for an AP is always set to **Access Point**. The only time that this option changes is when you want your AP to act as an CPE.



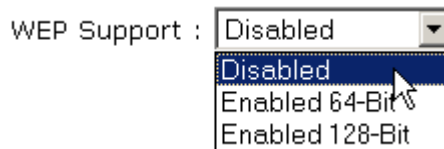
Step 9.2: When the CPE is in infrastructure mode, any modifications made in the Access Point Settings do not affect the functioning of the CPE. When setting up a CPE as a AP, these values are used. The channel range available is from 1 to 11 inclusive. If WEP is enabled (see Step 9.3), you may set the **Allow non-encrypted** field to **No**.





Step 9.3: (Optional) The PrismII Wireless Network Card has the ability to send and receive encrypted transmissions. This function allows only CPEs and APs with appropriate keys to communicate and disallows unauthorized use. The following procedure will provide details on how to use this function. It is important to note that both the AP and the CPE must support this function and must be using identical keys. It is highly recommended that you make sure your network is functioning before utilizing any WEP functions.

By default, WEP settings are disabled. You can activate WEP either by using 64 or 128 bit encryption keys.



When 64 bit encryption is enabled, 4 keys are created, enabling the switching of keys from time to time. When 128 bit encryption is enabled, only 1 key is generated. In order to switch to a different key, a new passphrase is required.

Steps in enabling WEP

- i. Choose which **level of encryption** you would like using the drop down WEP support option.
- ii. Choose how you would like to **enter your key** using the drop down key entry option (manual or passphrase). Manual entry allows you to manually enter your keys using hexadecimal values. Passphrase creates hexadecimal values from the characters you enter into the passphrase field. The maximum number of characters allowed in the passphrase field is 35.
- iii. After you have either entered manual values, or have selected a passphrase, click on the **Update Settings** button on the bottom of the screen.
- iv. After you have updated the settings, the keys will be displayed, as in the diagram on the next page. (The diagram uses 64 bit encryption and a passphrase).



WEP Settings :

WEP Support : Enabled 64-Bit

Key Entry : Passphrase

Passphrase :

Default Key ID : Key 1

64-Bit Manual Entry :

Key 1 :	4F	F8	0A	61	AA	<input checked="" type="checkbox"/>
Key 2 :	15	6D	48	00	2C	<input checked="" type="checkbox"/>
Key 3 :	1D	9F	0A	26	2B	<input checked="" type="checkbox"/>
Key 4 :	C1	03	5E	57	FC	<input checked="" type="checkbox"/>

128-Bit Manual Entry :

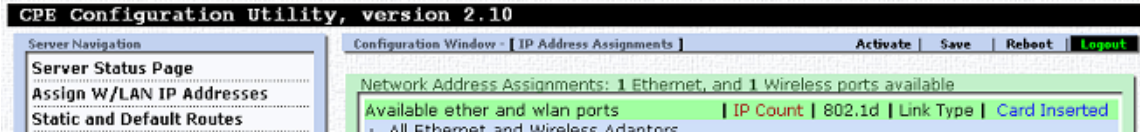
<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>
<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>	<input type="text" value="*"/>

Step 10: Click on the Activate button at the top of the screen. This will save all of your settings and activate any changes you have made to the default settings. Clicking on Save and Reboot will have the same effect. You have completed the setup of the CPE as an AP.



7.0 Updating the CPE Firmware

Updating the CPE firmware is an option on the main menu of the CPE Configuration Utility. The version of your CPE firmware can be determined by looking at the top of the CPE Configuration Utility.



In this example, the firmware is version 2.10.

In order to update the CPE firmware the following steps are necessary. Please be advised, that upgrading firmware on the CPE, as any device, is a risk. Should the CPE lose power or have an unexpected error during the upgrade process, the unit may become unusable. Should this happen, you will need to have the software re-uploaded to the internal flash card. Upgrading firmware is necessary only if you require the features added in the new version. Upgrading firmware is done so at your own risk.

7.1 Steps to upgrading CPE firmware:

- Step 1:** Download the firmware update utility - currently FIRMUPL102.EXE
- Step 2:** Download the firmware binary update file.
- Step 3:** Click on the Upgrade Firmware option in the Administrative Functions on the CPE Configuration Utility Menu.
- Step 4:** The CPE will provide you with a message and a button labeled Proceed. If you are certain you wish to upgrade the firmware, click the Proceed button and continue with the next step.
- Step 5:** At this time the CPE is awaiting commands and data to perform the upgrade. At a DOS command prompt, type the name of the firmware update executable, followed by the IP address of the CPE and then followed by the name of the binary firmware. The syntax for the firmware update utility is,

```
firmupl102 ip-address firmware.bin
```

```
ie: firmupl102 192.168.1.1 cpe-213.bin
```

- Step 6:** The firmware update will update the CPE. Once completed, you will see the following message.



CPE Firmware upgrade utility version 1.02-win32
Windows port - Aug 21, 2001. BETA

MD5 Checksum for this file: 6cefdf7df87bee06884b5af845e71438
Connected: CPE is currently running firmware version 2.13-pr2
Sending firmware, please wait....
[#####] - 8028160 (7840K)
Firmware has been sent.
Finished. Waiting for server to verify the firmware....
Success! The CPE will now reboot using the new firmware.

Step 7: You will need to wait for 2 minutes, while the CPE is checking the firmware and rebooting. After rebooting, you may connect to the CPE using the regular protocol (See Section 4.0 User Interface). You can now configure the settings using the web browser, as described.