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## Introduction

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The FastLinc™ 810E Industrial Wireless Ethernet Modem is specially designed for Point-to-Point and Point-to-Multipoint wireless applications, offering system-wide connections between PLCs at a speed of up to 11Mbps over the air data rate. Fully compliant with IEEE 802.11b standard, the FastLinc 810E modem provides powerful features such as the Windows-based configuration utility, MAC address filtering, WEP security and more.

## Features and Benefits

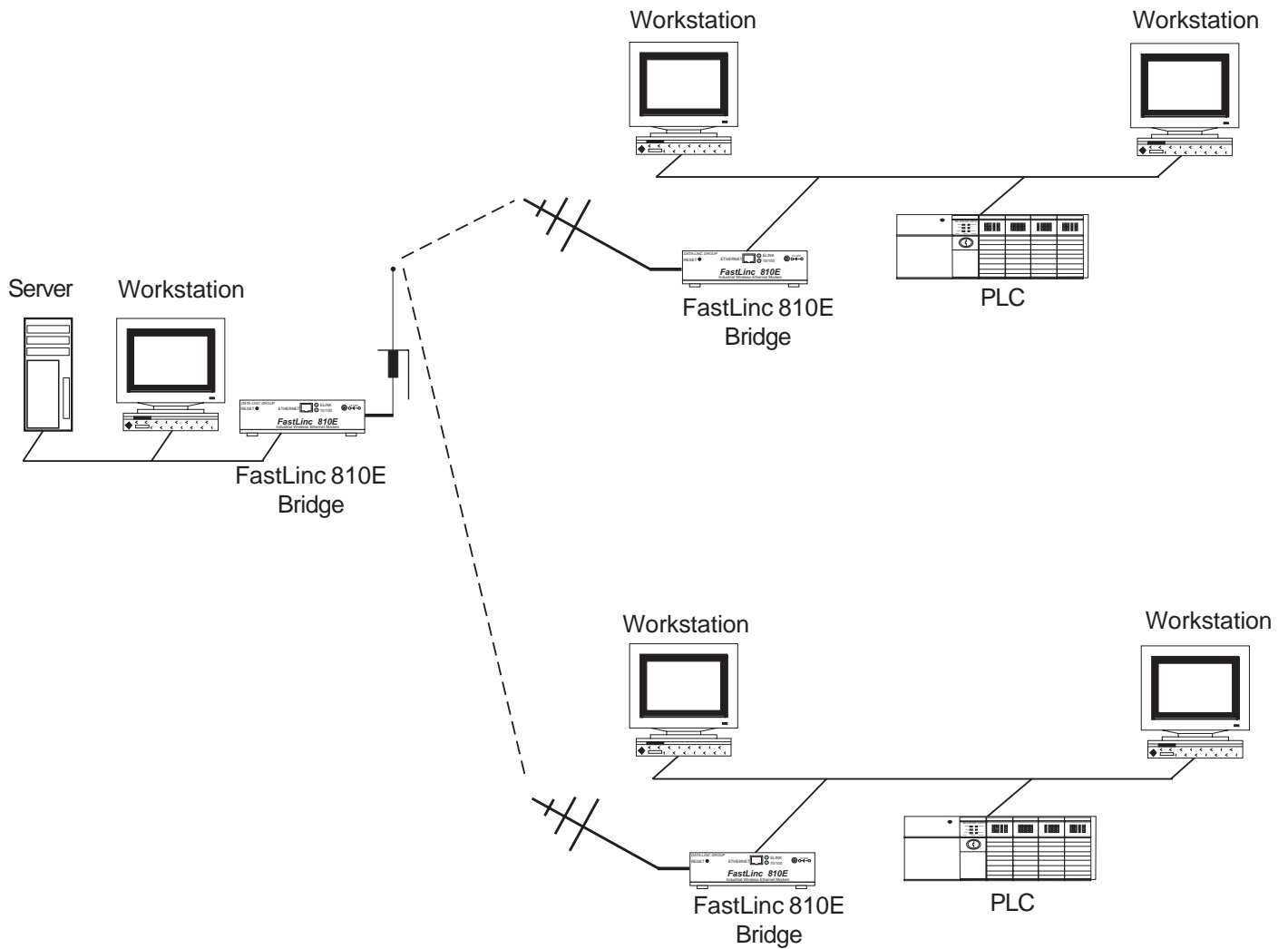
- Creates a Point-to-Point connection linking two LANs, using 2 FastLinc 810E modems.
- Creates a Point-to-Multipoint system using three or more FastLinc 810E modems.
- External antenna connector allows for the use of high gain antennas.
- With an over the air data rate of 11Mbps and 5.5Mbps, the system is faster than an E1/T1 data link.
- Fully IEEE 802.11b compatible.
- Transmits in the license-free 2.4Ghz ISM band.
- Seamless roaming within the 802.11 & 802.11b wireless LAN infrastructure.
- Provides user authentication to enforce tight security.
- MAC address control for enhanced security.
- Easy to install and configure.
- Provides Windows-based configuration utility.
- Industrial ruggedized enclosure provides protection in harsh environments.

## System Configurations

The FastLinc 810E Industrial Wireless Ethernet Modem can be configured in a variety of network system configurations.

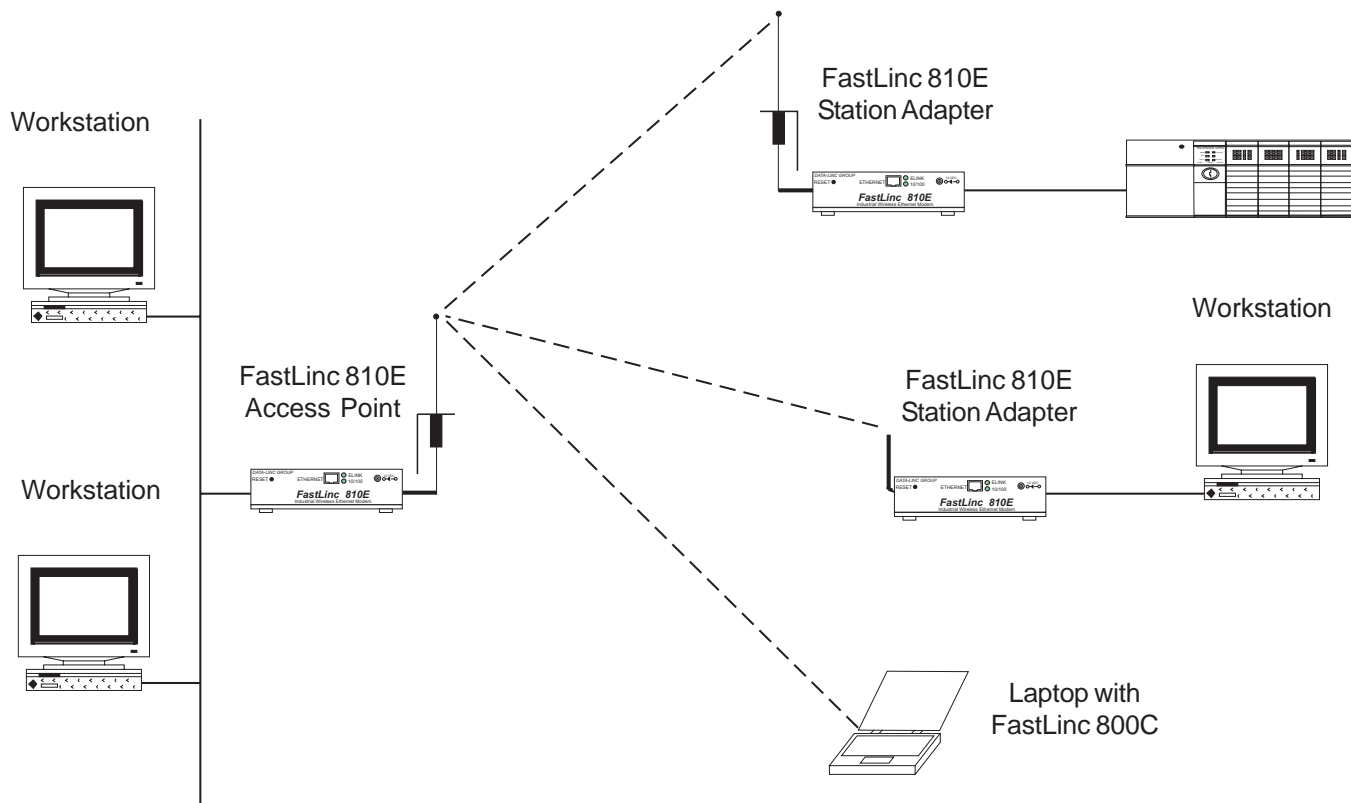
### Wireless Infrastructure

In a wireless infrastructure, the FastLinc 810E modem acts as a bridge. The FastLinc 810E modem connects the wireless clients together. The FastLinc 810E modem acts as a center point for all wireless communications. This would increase efficiency of the communications since the wireless adapters do not need to be within direct range of each other.



**Wireless Infrastructure with Stations Attaching to a Wired LAN**

The FastLinc 810E modem will provide an access point to the local LAN. An integration of wireless and wired LAN is called an Infrastructure configuration. A group of wireless LAN PC users and a FastLinc 810E modem construct a Basic Service Set (BSS). Each wireless PC in this BSS can talk to each other on the network via the FastLinc 810E modem.



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## Hardware Installation

This chapter describes initial setup of the FastLinc 810E modem.

### I. Product Kit

Before installation confirm possession the following items:

- (1) FastLinc 810E Industrial Wireless Ethernet Modem
- (1) Operation Manual
- (1) Power Adapter
- (1) Configuration Utility Software
- (2) Antennas

If any of the above items are not included or damaged, please contact Data-Linc Group for support.

### II. System Requirements

Installation of the FastLinc 810E modem requires:

1. An AC power outlet (100V, 60Hz) which supplies the power for the FastLinc 810E modem.
2. A 10/100BaseT (UTP) Ethernet cable drop.

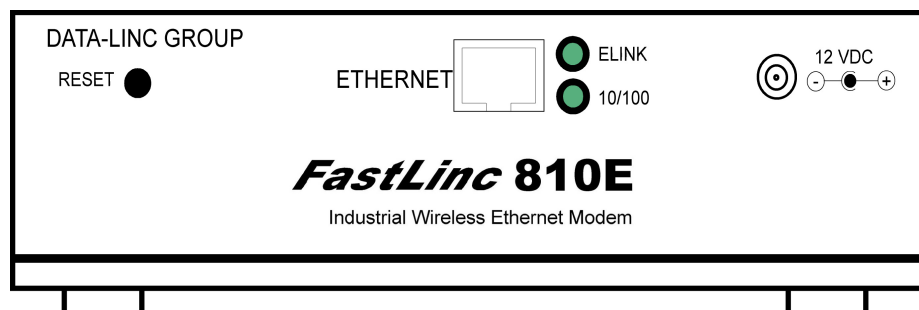
### III. Mechanical Description

#### Top Panel

The following table provides an overview of LED activity on the top panel of the FastLinc 810E modem.

LED	Mode	Description
PWR	Continuous Green	Power enabled
AP Active	Continuous Green	The FastLinc 810E Modem is ready to service
W-LAN	Flashing Green	<b>Off:</b> No wireless activity <b>Flashing:</b> Wireless RX/TX activity
Data	Flashing Green	<b>Off:</b> No Ethernet traffic activity <b>Flashing:</b> Wired LAN traffic activity
LINK	Continuous Green	<b>Off:</b> No station connected to the FastLinc 810E Modem <b>On:</b> When one or more stations are associated with the FastLinc 810E Modem

**Figure 1 Back Panel**



**Power Socket**

The power adapter plugs into the socket labeled “12VDC”.

**Ethernet Ports**

The user may connect the FastLinc 810E modem either to a hub or a PC. Please note to use the cross-over cable when a connection between the modem and a PC is desired. The two LEDs (10/100 & ELink) indicate the Ethernet physical link status. The ‘ELink’ LED is a good indicator to see if a proper Ethernet connection has been established.

**Reset**

The button labeled “Reset” enables the user to restore the modem’s default setting, useful for a forgotten password. Please detach the DC power plug and press the “Reset” button on the connection panel of the modem. Reconnect the power while holding the button in for a few seconds until the “AP Active” LED indicator blinks. This will restore the modem’s default settings and enable the user to configure the modem via the utility software, telnet or Web again. The default TCP/IP address is 192.168.1.1

## IV. Hardware Installation

Take the following steps to set up the FastLinc 810E modem.

**Site Selection**

Before installation, determine the FastLinc 810E modem location. Proper placement of the FastLinc 810E modem is critical to ensure optimum radio range and performance. The Site Survey and Browser Utility shipped with the FLC800C laptop card is used to choose a proper placement for the FastLinc 810E modem. Typically, the best location to place the FastLinc 810E modem is the center of your wireless coverage area with mobile stations within the line of sight. Obstructions may impede performance of the FastLinc 810E modem.

**Connect the Ethernet Cable**

The FastLinc 810E modem supports 10/100M Ethernet connection. Attach your UTP Ethernet cable to the Ethernet connector on the FastLinc 810E modem. Please note to use the cross-over cable when you desire to connect the modem to a PC.

**Connect the Power Cable**

Connect the power adapter to the power socket on the FastLinc 810E modem, and plug the other end of the power into an electrical outlet. The FastLinc 810E modem will be powered on and all five indicators on the top panel will flash in sequence to test the functionality of the indicators.

**Note:** Only use the power adapter supplied with the FastLinc 810E modem. Otherwise, the unit may be damaged.

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## Configuring the FastLinc 810E

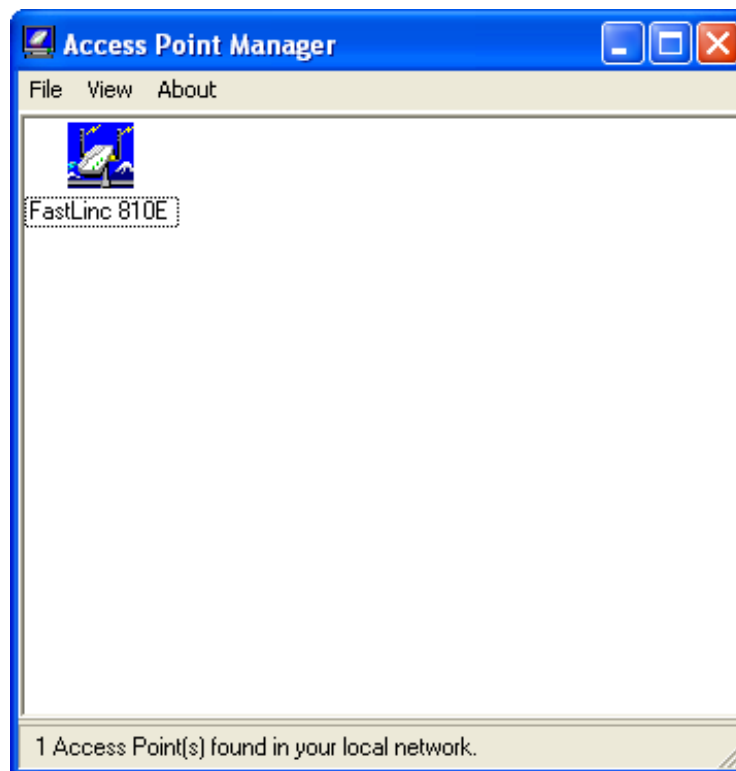
The FastLinc 810E modem is shipped with default parameters, which will be suitable for the typical infrastructure wireless LAN. Just simply install the FastLinc 810E modem and power it on. Nevertheless, the user can still adjust configuration settings depending on wireless network management objectives. The FastLinc 810E modem allows for configuration either via the configuration utility, Telnet or Web Management.

### I. Using FastLinc 810E Utility

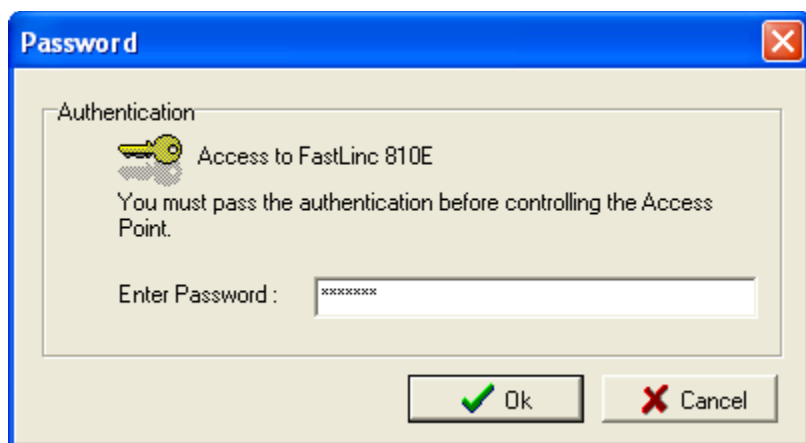
Installed on your Windows 95/98/NT/ME/2000/XP computer, the Windows-based utility provides a user-friendly interface. The utility enables the user to configure all of FastLinc 810E's on the network more easily than ever before.

The following instructions guide the user through the installation of the FastLinc 810E utility.

1. Insert the software floppy disk that came with the modem into the floppy drive on your computer.
2. From the Start menu on the Windows desktop, choose *Run*.
3. In the Run dialog box, type `A:\setup` then click *OK*.
4. Follow the on-screen instructions to install the utility software.
5. Upon completion, go to Program Files and execute the utility software. It will begin to browse all the FastLinc 810E's available on the network.



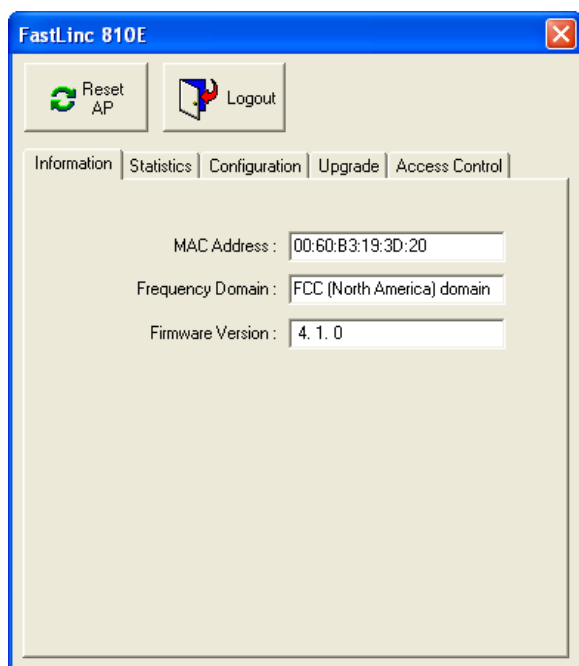
6. Double click a FastLinc 810E modem icon to access its property dialog box. Enter the password in the entry field. The default password is “default”.



7. After entering the correct password, a configuration window appears.

### Information Tab

The user will see the basic information of the FastLinc 810E, such as MAC Address, Frequency Domain and Firmware Version.



**MAC Address:** Hardware identification number that distinguishes the unit from others. The number label is located on the bottom of the FastLinc 810E.

**Frequency Domain:** The regulated operating frequency per country.

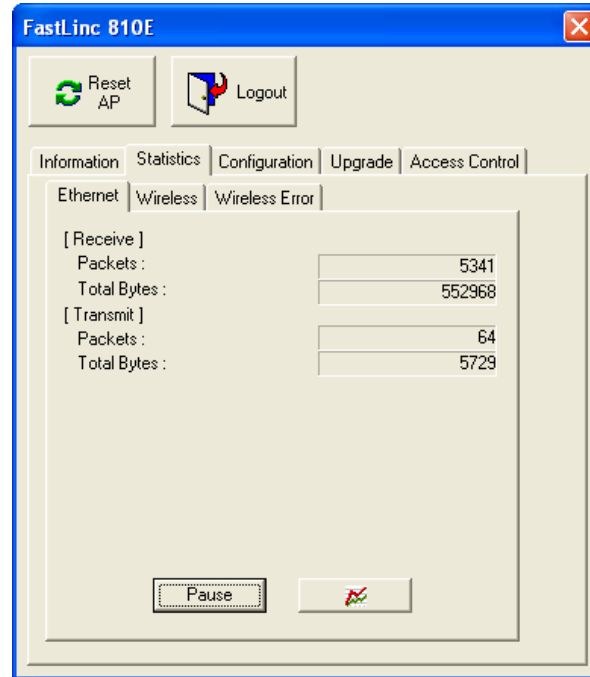
**Firmware Version:** Displays the firmware version that is equipped with the FLC810E hardware.

## Statistics Tab

The statistics tab contains three items for the user to monitor the Ethernet and wireless network traffic.

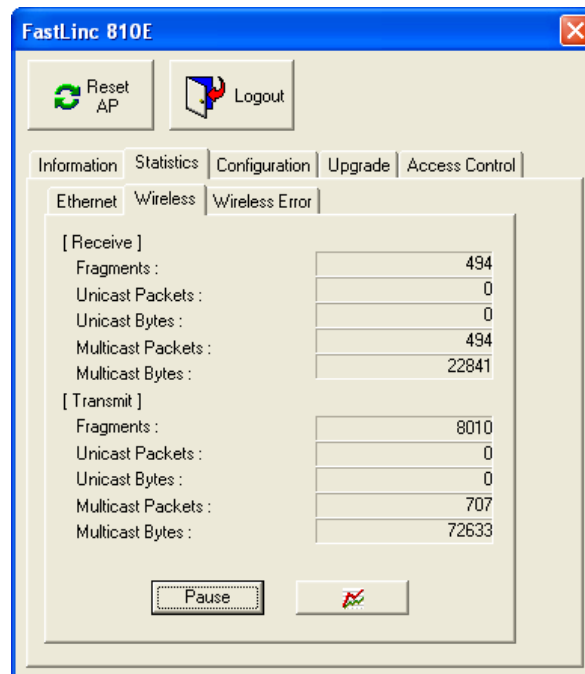
### 1.) Ethernet:

For monitoring the TX/RX on the wired network.



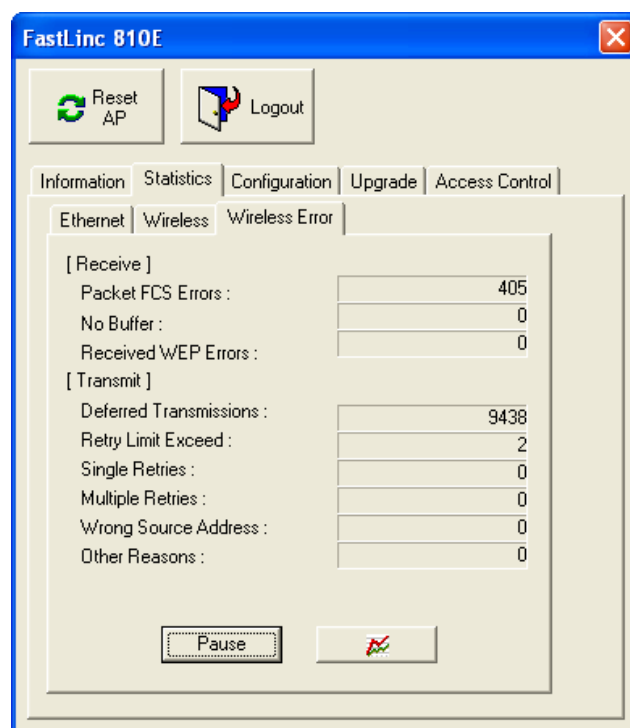
### 2.) Wireless:

For monitoring the TX/RX of the wireless network.



### 3.) Wireless Error:

This item offers detailed information on wireless error packets that the AP (Access Point) receives and transmits.



#### [Receive]:

**Packet FCS Errors:** The number of wireless packets that fail during FCS transmission (Frame Check Sequence) when accessing the wired network.

**No Buffer:** The number of wireless packets that the AP ignores due to insufficient memory.

**Received WEP Errors:** The number of wireless packets that have WEP encryption errors.

#### [Transmit]:

**Deferred Transmission:** The number of packets that have deferred transmission due to the fact that the medium is busy.

**Retry Limit Exceed:** The number of packets that are not sent due to the reason that the packets exceed the retry limits.

**Single Tries:** The number of packets that are successfully sent on the first retry.

**Multiple Retries:** The number of packets that are successfully sent after several retries.

**Wrong Source Address:** The number of packets that are ignored by the FastLinc 810E because the source client is not in its BSS.

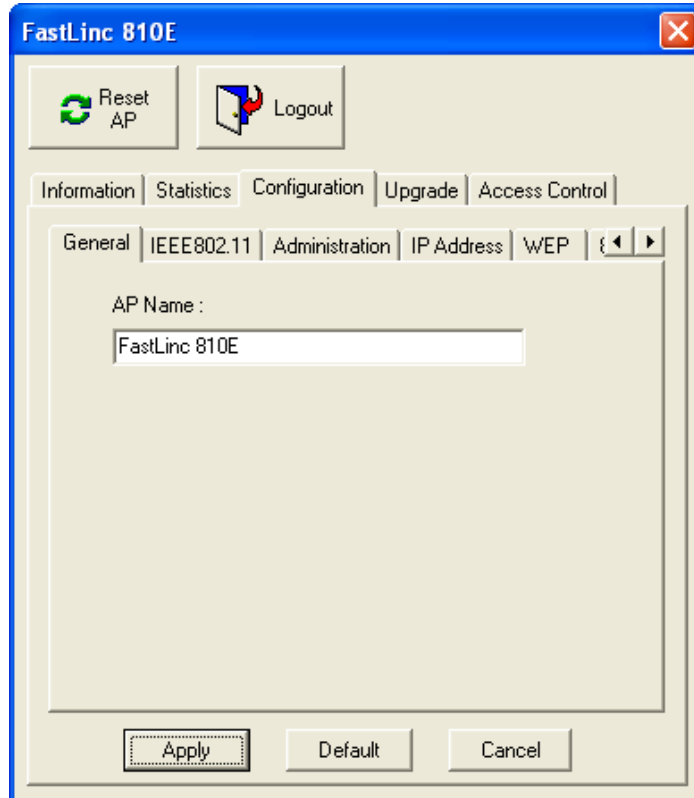
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## Configuration Tab

The configuration tab contains 5 items for configuration management.

### 1.) General:

AP name: In this entry field, you may enter any name. This will enable you to manage your FastLinc 810Es with more ease if you have multiple FastLinc 810Es on the network.



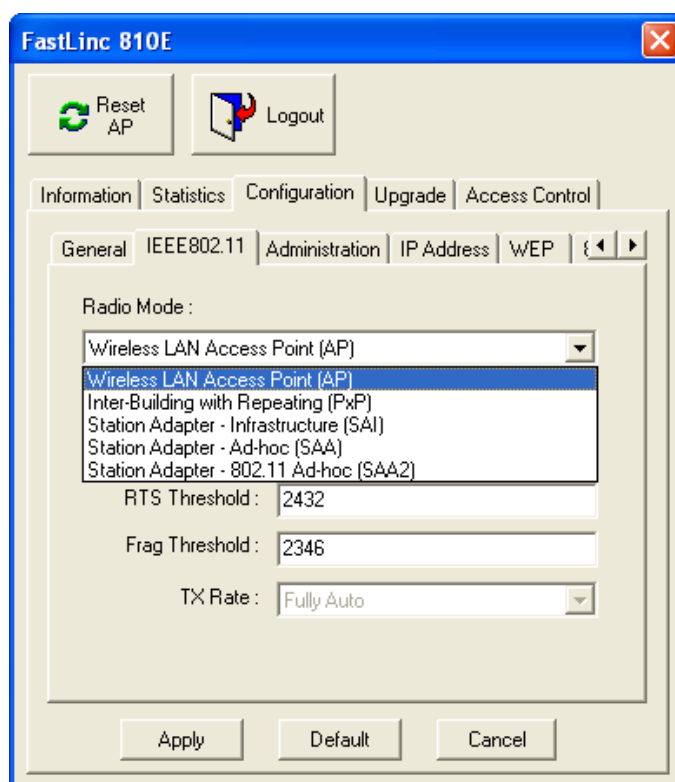
## 2.) IEEE 802.11

### Radio Mode

This item enables the user to set the operation mode for the modems.

- **Wireless LAN Modem (AP):** Serves as a transparent Media Access Control (MAC) bridge connecting a wireless network and a backbone network.
- **Inter-Building with Repeating (PxP):** Connect two or more separate networks with the FastLinc 810E modem.
- **Station Adapter – Infrastructure (SAI):** Serves as a wireless station (infrastructure). Connect the Station Adapter – Infrastructure to a PC with a cross over 10baseT cable, and it is able to access the network via the Access Point (AP).
- **Station Adapter – Ad-Hoc (SAA):** Serves as a wireless station (Ad-Hoc). Connecting to a PC with a cross over 10BaseT cable, the Ad-Hoc Station Adaptor, along with other Ad-Hoc Station Adaptors can establish a small wireless network without an Access Point.
- **Station Adapter – 802.11 Ad-Hoc (SAA2):** Same as SAA except that it operates under 802.11 standards.

**Note:** When setting the operation mode to either PxP or SAA set all devices in the network to the same channel. ESSID can be ignored. When SAA2 is selected set all devices with the same ESSID and channel.



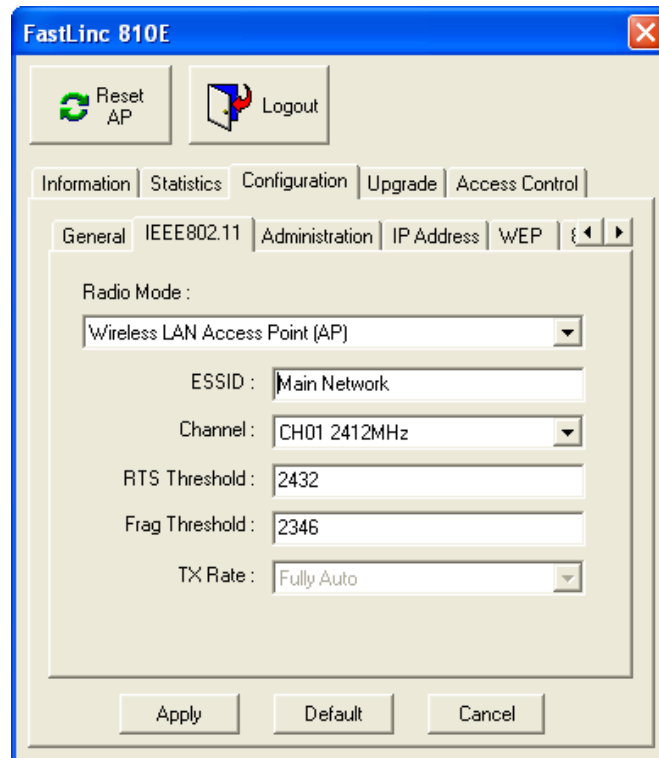
## 2.) IEEE 802.11 cont.

**ESSID:** The ESSID is a unique ID given to the FastLinc 810E. Wireless clients associating to the FastLinc 810E must have the same ESSID. The ESSID can have up to 32 characters.

**Channel:** The user may select any of the available channels as an operational channel for your FastLinc 810E.

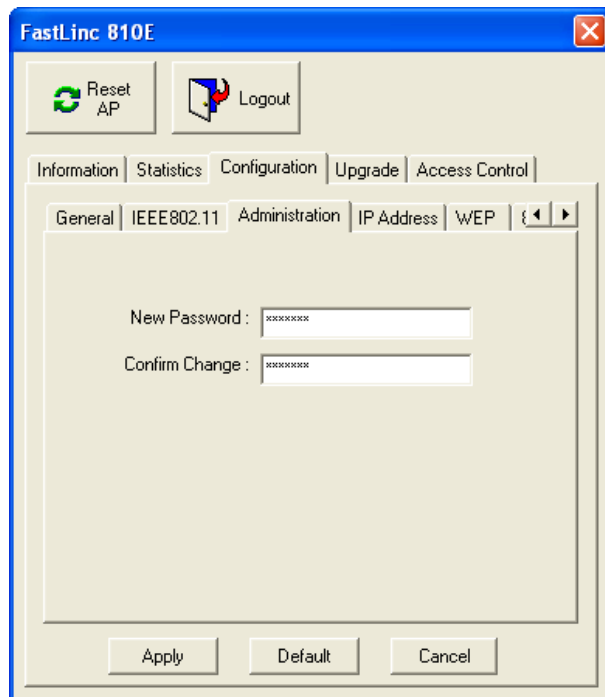
**RTS Threshold:** RTS Threshold is a mechanism implemented to prevent the “Hidden Node” problem. “Hidden Node” is a situation in which two stations are within range of the same FastLinc 810E, but are not within range of each other. Therefore, they are hidden nodes for each other. When a hidden station starts data transmission with the FastLinc 810E, it might not notice that another station is already using the wireless medium. When these two stations send data at the same time, they might collide when arriving simultaneously at the FastLinc 810E. The collision will most certainly result in a loss of messages for both stations. Thus, the RTS Threshold mechanism will provide the solution to prevent data collisions. When the RTS is activated, the station and its FastLinc 810E will use a Request to Send/Clear to Send protocol (RTS/CTS). The station will send an RTS to the FastLinc 810E, informing that it is going to transmit the data. Upon receipt, the FastLinc 810E will respond with a CTS message to all stations within its range to notify all other stations to defer transmission. It will also confirm to the requesting station that the FastLinc 810E has reserved the channel for transmission.

**Fragmentation Threshold:** The Fragmentation mechanism is used for improving the efficiency when there is high traffic within the wireless network. If you transmit large files in a wireless network, you can enable the Fragmentation Threshold and specify the packet size. The mechanism will split the packet into the packet size selected.



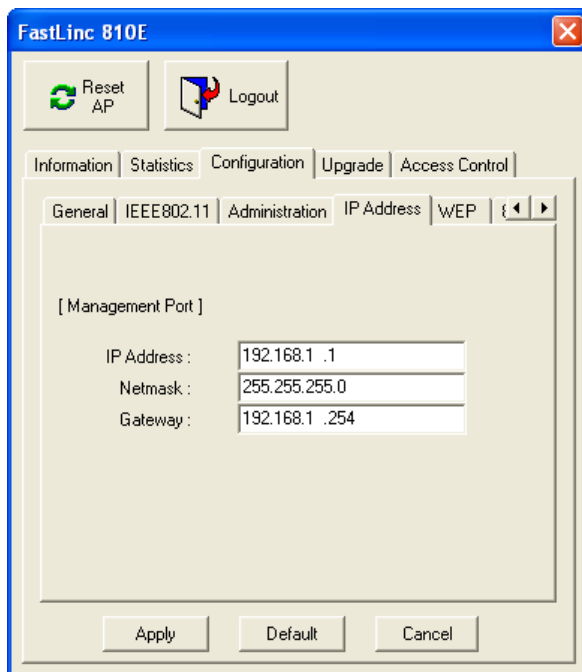
**3.) Administration:**

The user may change the default password by entering the new password. Enter the new password in the *Confirm Change* field and click *Apply* to make the new setting take effect.



**4.) IP Address:**

To enable remote access to the FastLinc 810E using Telnet or Web Management, the user must assign an IP address to the FastLinc 810E. You may also assign other related Internet addressing options, such as subnet mask or gateway address. Consult your network administrator to obtain an available IP address.



## 5.) WEP:

The FastLinc 810E modem allows the “128-bit(s)” user to create up to 4 data encryption keys to secure data from eavesdropping by an unauthorized wireless user. To activate and set the WEP keys, do the following:

1. From the WEP encryption item, pull down the menu and it will list three options:

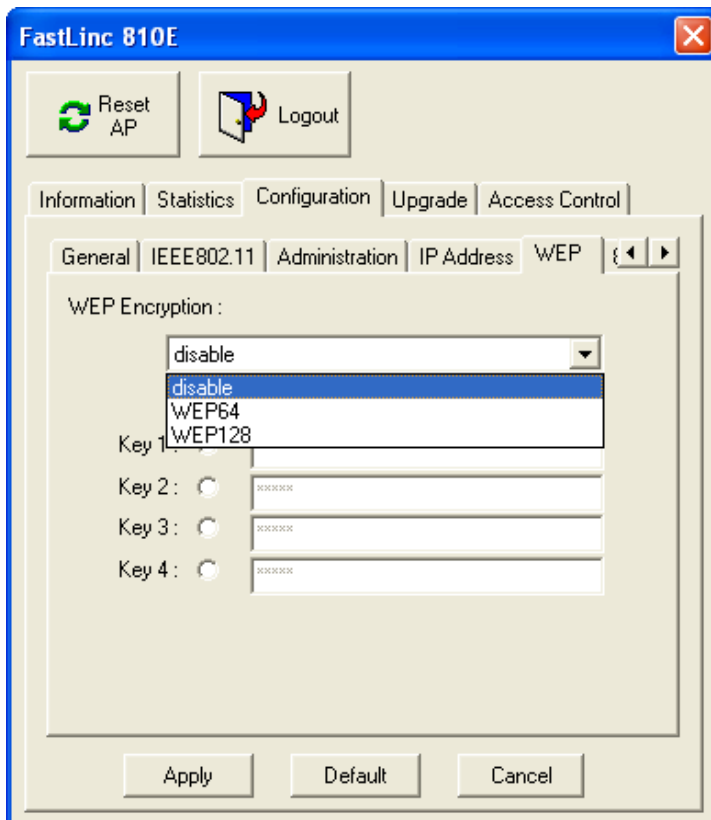
- Disable- Allows wireless adapters to communicate with FastLinc 810Es without any data encryption.
- WEP64- Requires wireless stations to use data encryption when communicating with the FastLinc 810E.
- WEP128- Requires wireless stations to use data encryption when communicating with the FastLinc 810E.

2. WEP encryption is either 40-bits or 128-bits. When the menu or manuals reference 64-bits it is actually 40-bits.

The number of characters to enter for 40-bit encryption is five (5) ASCII characters long. However, if the string is preceded by the characters ‘0x’, the characters can be typed as ten (10) hexadecimal characters. Hexadecimal characters must be 0 to 9 or A to F.

The number of characters to enter for 128-bit encryption is thirteen (13) ASCII characters long. However, if the string is preceded by the characters ‘0x’, the characters can be typed as twenty-six (26) hexadecimal characters. Hexadecimal characters must be 0 to 9 or A to F.

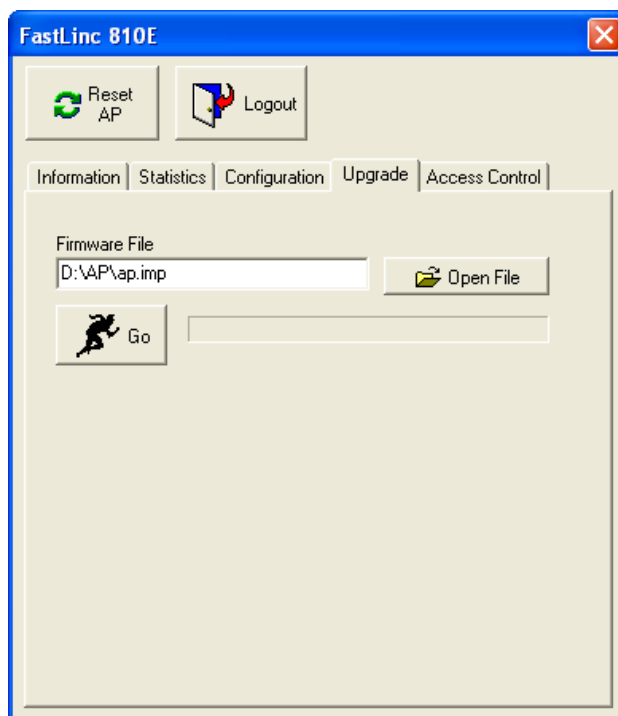
You can also enter WEP keys in the Key 2, Key 3 and Key 4 if you wish. WEP will only use one Key. You will have to select one WEP key as an active key before enabling use of encryption.



**Note:** The WEP key must be set up exactly the same on the FastLinc 810E as on the wireless client stations. If Key 1 is used on the FastLinc 810E and the value is (e.g. MyCar08), the same must be assigned to Key 1 for all client stations.

## Upgrade Tab

This item is used for uploading the newest firmware version for the FastLinc 810E. The user may either enter the file name in the entry field or browse the file by clicking the Open File button. For information about the release of the newest firmware, contact Data-Linc Group.



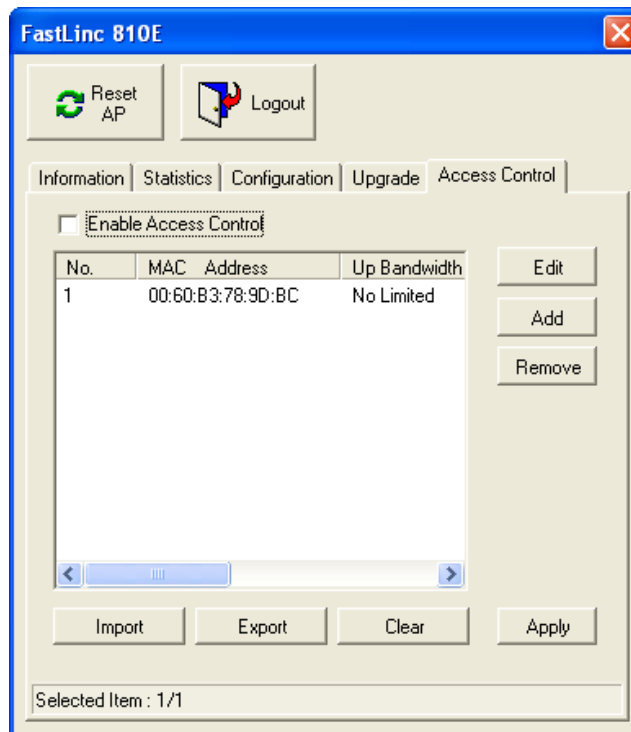
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## Access Control Tab

With the Access Control Table enabled, the user can authorize wireless units to access the FastLinc 810E by identifying the MAC address of the wireless devices that are allowed access to transmit data. To create or edit the Access Control Table, do the following:

- 1.) Go to the Access Control tab and select "Enable Access Control". Note that when you enable the Access Control Table without any MAC address in the table, no access is allowed to communicate with the FastLinc 810E.
- 2.) Use the following buttons to manage the Access Control Table:
  - **Add** – to enter MAC addresses of authorized wireless devices one at a time.
  - **Edit** – to change the entries in the table if you enter the incorrect MAC address.
  - **Remove** – to remove MAC addresses one at a time.
  - **Clear** – to remove all MAC addresses in the table.
  - **Import** – to import an existing Access Control Table.
  - **Export** – to save the current Access Control Table to a location on your computer. You may save the file as a text document.

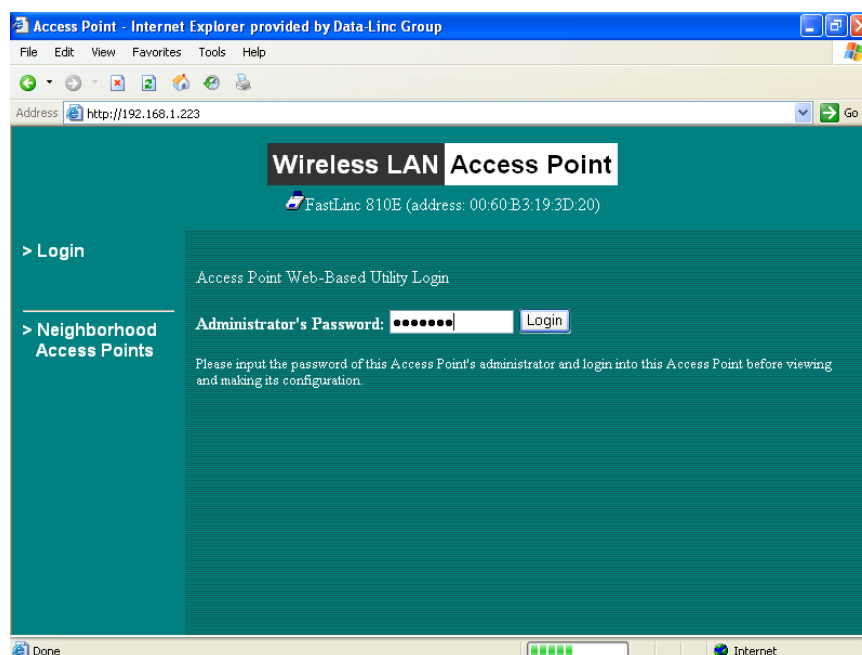
**Note:**The MAC address of the equipment attached to the remote FLC810E (PC, PLC, etc.) needs to be entered in this list.



## II. Using Web Management

The built-in Web Management provides a user-friendly graphical user interface (web pages) to manage your FastLinc 810Es. An AP with an assigned IP address (the default address is 192.168.1.1) will allow you via web browser (e.g., Netscape Navigator 3.0 - 4.5 or MS Internet Explorer 4.0 or higher) to monitor and configure the FastLinc 810E.

1. Open your web browser.
2. Enter the IP address of your FastLinc 810E in the Address field (the default address is 192.168.1.1). You will have access to the FastLinc 810E Web Pages of the FastLinc 810E modem.



3. Enter the password to login to the FastLinc 810E. The default password is "default". The main page will show up.

## Information

### General

This item displays the general information for the FastLinc 810E such as the MAC address, Frequency Domain, and Firmware Version.

The screenshot shows the 'Information' tab selected in the web interface. The main content area displays 'Access Point General Information' with a table of key parameters:

MAC Address (BSS ID)	00:60:B3:19:3D:20
Frequency Domain	FCC (North America) domain
Firmware Version	4.1.0

The left sidebar contains a navigation menu with the following items: Information (General, Statistics, Link Status), Configuration (802.1X), Firmware Upgrade, and Logout.

### Statistics

This item displays the Ethernet and wireless network traffic.

The screenshot shows the 'Statistics' tab selected in the web interface. The main content area displays 'Wireless LAN Interface Statistics' and 'Ethernet Interface Statistics' with their respective data tables.

**Wireless LAN Interface Statistics**

Wireless Receive		Wireless Transmit	
Fragments	500	Fragments	9117
Unicast Packets	0	Unicast Packets	0
Unicast Bytes	0	Unicast Bytes	0
Multicast Packets	500	Multicast Packets	831
Multicast Bytes	23000	Multicast Bytes	93319
Packet FCS Errors	916	Deferred Transmissions	4577
		Retry Limit Exceed	0
		Single Retries	0
		Multiple Retries	0
Discards: No Buffer	0	Discards: Wrong Source Address	0
Discards: WEP Errors	0	Discards: Other Reason	0

**Ethernet Interface Statistics**

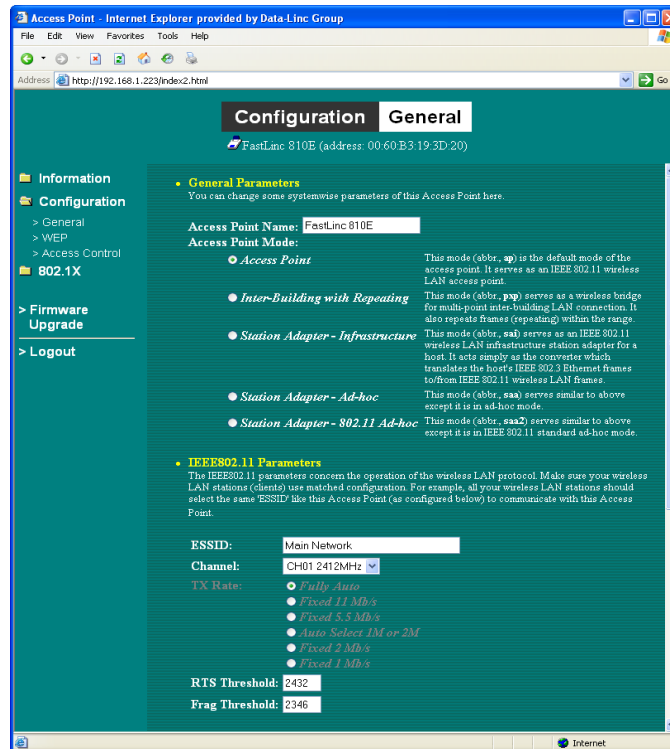
Ethernet Receive		Ethernet Transmit	
Packets	8218	Packets	461
Total Bytes	1269675	Total Bytes	134269

The left sidebar contains the same navigation menu as in the 'Information' tab screenshot.

## Configuration

### General

You may make the settings on the FastLinc 810E such as AP mode, ESSID, channel, RTS threshold, fragment threshold and password.

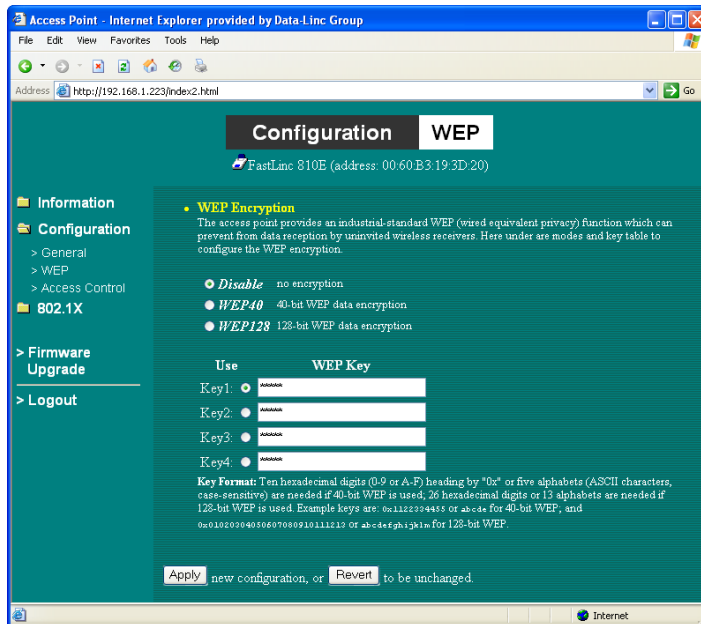


## WEP

To prevent unauthorized wireless stations from accessing data transmitted over the network, the FastLinc 810E modem offers WEP (Wired Equivalency Privacy). You can set up 4 encryption keys but choose one key to encrypt your data.

The number of characters to enter for 40-bit encryption is five (5) ASCII characters long. However, if the string is preceded by the characters '0x', the characters can be typed as ten (10) hexadecimal characters. Hexadecimal characters must be 0 to 9 or A to F.

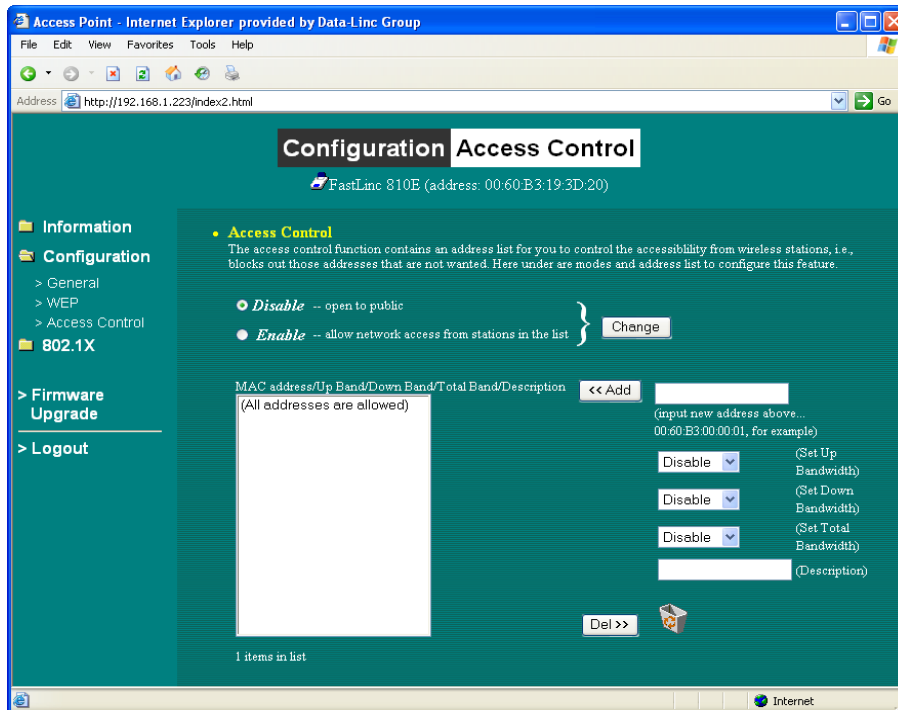
The number of characters to enter for 128-bit encryption is thirteen (13) ASCII characters long. However, if the string is preceded by the characters '0x', the characters can be typed as twenty-six (26) hexadecimal characters. Hexadecimal characters must be 0 to 9 or A to F.



## Configuration cont.

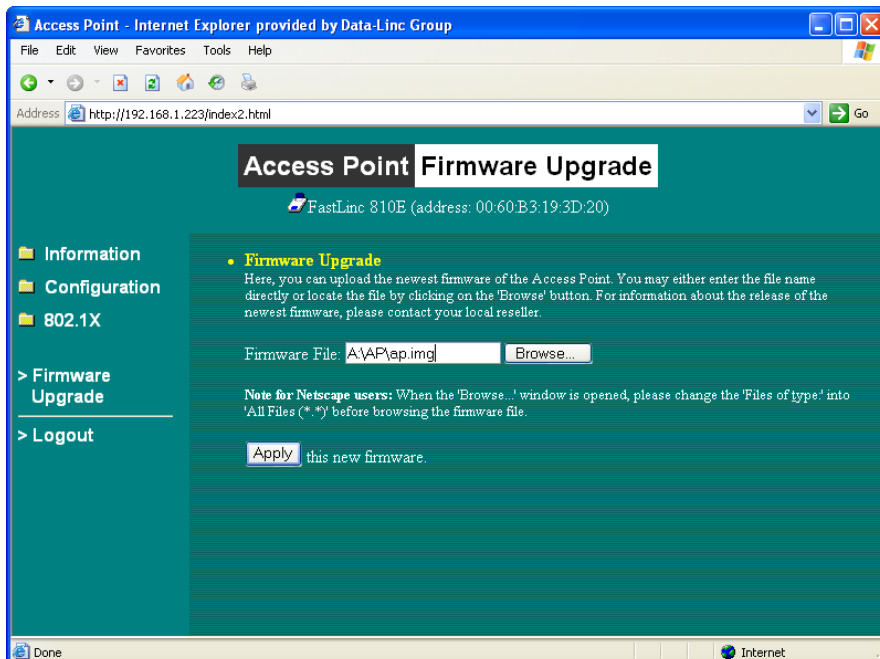
### Access Control

The Access Control Table enables you to restrict wireless stations accessing the FastLinc 810Es by identifying the MAC address of the wireless devices.



### Firmware Upgrade

Here, you can upload the newest firmware for the FastLinc 810E. You may either enter the file name in the entry field or browse the file by clicking the Browse button.



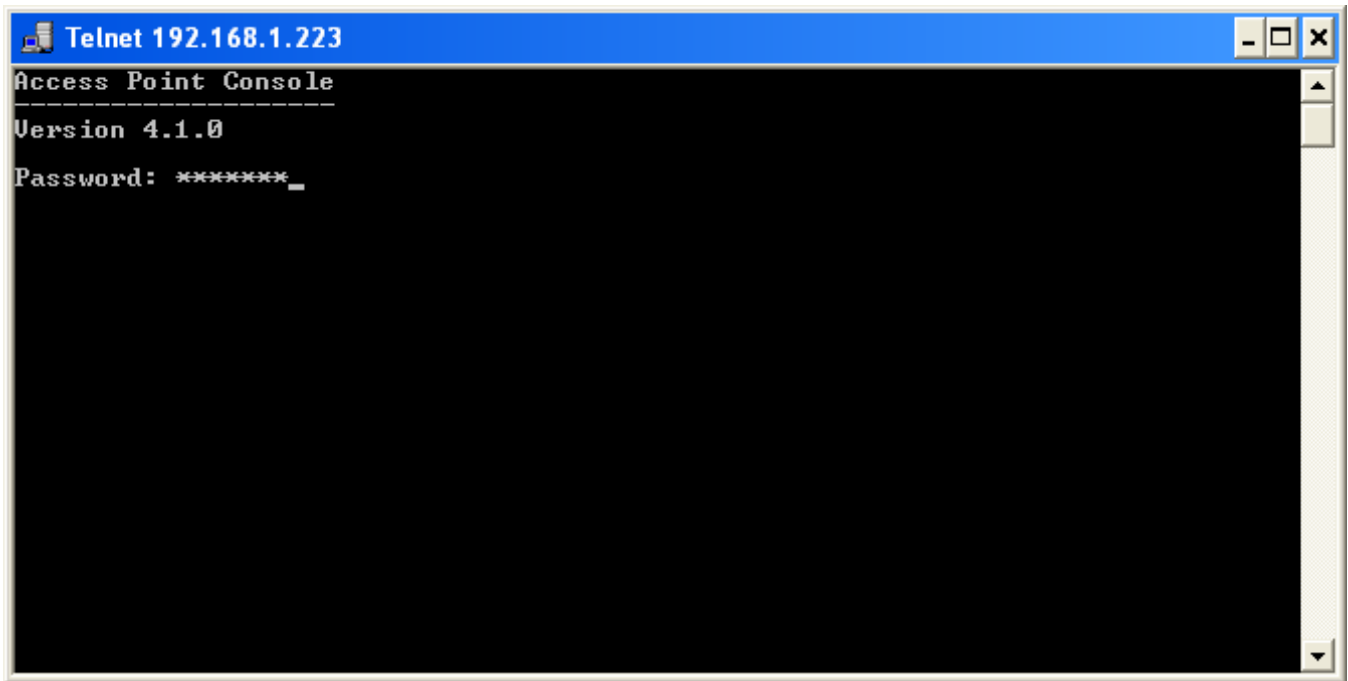
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## II. Using Telnet

The FastLinc 810E can be configured via the command prompt console with TCP/IP:

Telnet (TCP/IP) Connection: Assign an IP address to your FastLinc 810E through the modem Utility or use the default IP address. Telnet to the FastLinc 810E to get access to the FastLinc 810E console using standard Telnet commands.

1. Telnet to your FastLinc 810E. A window will show up.
2. Enter the password. The default password is "default".



## Basic Commands

The following are the commands provided for configuring the FastLinc 810E. In loader mode, i.e., no valid firmware in the FastLinc 810E, only the commands with an asterisk (\*) are provided.

**Note:** [xxx] stands for optional arguments.

### Info\*

Display some basic information of the FastLinc 810E, for example, firmware version, frequency domain, etc.

```

Telnet 192.168.1.223
FastLinc 810E > info
Access Point's Basic Information
MAC Address (BSS ID): 00:60:B3:19:3D:20
System Firmware Version: 4.1.0
with WLAN NIC Firmware: (P) 1.0.7 , (T) 1.3.10
Radio Type: Prism 2.5
Frequency Domain: FCC (North America) domain
Available Channel(s):
    CH01 2412MHz
    CH02 2417MHz
    CH03 2422MHz
    CH04 2427MHz
    CH05 2432MHz
    CH06 2437MHz
    CH07 2442MHz
    CH08 2447MHz
    CH09 2452MHz
    CH10 2457MHz
    CH11 2462MHz
FastLinc 810E > _
    
```

### Stats

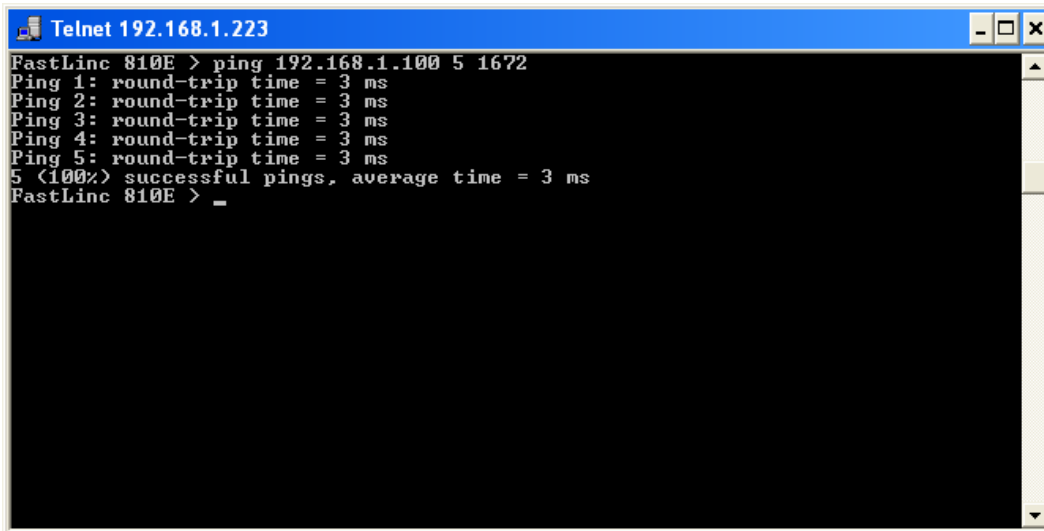
Display the statistical values for the operation of the FastLinc 810E, for example, association status, LAN/WLAN interface load, etc.

```

Telnet 192.168.1.223
FastLinc 810E > stat
=== Station Table ===
No. Station Address Status Rate Signal Level Last RX Time
-----
The table is empty.
=== System Statistics ===
[ Ethernet Receive ] [ Ethernet Transmit ]
Packets : 15061 Packets : 658
Total Bytes : 1938622 Total Bytes : 193040
[ Wireless Receive ] [ Wireless Transmit ]
Fragments : 1029 Fragments : 18531
Unicast Packets : 0 Unicast Packets : 0
Unicast Bytes : 0 Unicast Bytes : 0
Multicast Packets : 1029 Multicast Packets : 1675
Multicast Bytes : 47334 Multicast Bytes : 185413
Packet FCS Errors : 1466 Deferred Transmissions : 7954
Retry Limit Exceed : 0
Single Retries : 0
Multiple Retries : 0
[ Wireless Receive Discards ] [ Wireless Transmit Discards ]
No Buffer : 0 Wrong Source Address : 0
Received WEP Errors : 0 Other Reasons : 0
FastLinc 810E > _
    
```

### **Ping ip\_addr [num\_pings] [data\_size]**

Ping (ICMP echo) to an *ip\_addr* host with optional *num\_pings* times with optional data size in a length of *data\_size*.

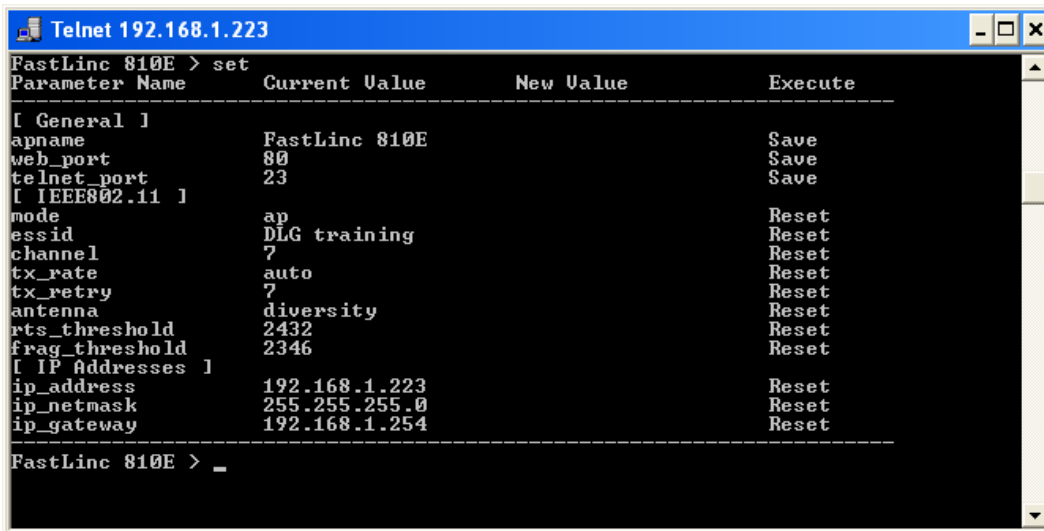


```
Telnet 192.168.1.223
FastLinc 810E > ping 192.168.1.100 5 1672
Ping 1: round-trip time = 3 ms
Ping 2: round-trip time = 3 ms
Ping 3: round-trip time = 3 ms
Ping 4: round-trip time = 3 ms
Ping 5: round-trip time = 3 ms
5 (100%) successful pings, average time = 3 ms
FastLinc 810E > _
```

### **Set**

List the configuration information.

set apname | channel | essid | rts\_threshold | frag\_threshold | ip\_address | ip\_netmask | ip\_gateway



```
Telnet 192.168.1.223
FastLinc 810E > set
Parameter Name      Current Value      New Value      Execute
-----
[ General ]
apname              FastLinc 810E      Save
web_port            80                 Save
telnet_port         23                 Save
[ IEEE802.11 ]
mode                ap                  Reset
essid               DLG training       Reset
channel             7                  Reset
tx_rate            auto                Reset
tx_retry            7                  Reset
antenna             diversity           Reset
rts_threshold       2432               Reset
frag_threshold      2346               Reset
[ IP Addresses ]
ip_address          192.168.1.223      Reset
ip_netmask          255.255.255.0      Reset
ip_gateway          192.168.1.254      Reset
FastLinc 810E > _
```

To change factory default settings, type “set xxx (parameter) xxxx (value)”. For example, set channel 7 command, will set the channel to number 7; set ESSID “Your Network” command, will set the ESSID as Your Network. Remember that, a “save” command is required for changes to take effect. Always reset your AP with the “Reset” command.

```

Telnet 192.168.1.223
FastLinc 810E > set channel 1
FastLinc 810E > set essid "Main Network"
FastLinc 810E > save
Parameter Name      Current Value      New Value      Execute
-----
[ General ]
apname              FastLinc 810E      Save
web_port           80                 Save
telnet_port        23                 Save
[ IEEE802.11 ]
mode                ap                  Reset
essid              DLG Default        Main Network    Reset
channel            7                  1              Reset
tx_rate            auto                Reset
tx_retry           7                  Reset
antenna            diversity           Reset
rts_threshold      2432               Reset
frag_threshold     2346               Reset
[ IP Addresses ]
ip_address          192.168.1.223     Reset
ip_netmask          255.255.255.0     Reset
ip_gateway          192.168.1.254     Reset
-----
New configuration saved.
FastLinc 810E > _
    
```

The following table is a list of parameters changes that can be made on the FastLinc 810E.

Parameter	Description	Default Value
<b>apname</b>	A textual name for the identification of the FastLinc 810E	apxxxxxx (where xxxxxx is the last six octets of FastLinc 810E's MAC address)
<b>mode</b>	Operation mode of the modem	AP
<b>channel</b>	The radio channel number	1
<b>essid</b>	The ESS ID (a.k.a.), SSID) of the FastLinc 810E	My Network
<b>rts_threshold</b>	The threshold(number of bytes) for enabling RTS/CTS handshake. Data with a frame size larger than this value will perform the RTS/CTS handshake. Range of value: 0-2432	2432
<b>frag_threshold</b>	The threshold(number of bytes) for the fragmentation boundary. Data will be transmitted in fragments smaller than this value. Range of value: 256-2432	2432
<b>ip_address</b>	The IP address of the FastLinc 810E	192.168.1.1
<b>ip_netmask</b>	The subnet mask address of the FastLinc 810E	255.255.255.0
<b>ip_gateway</b>	The default gateway address fo the FastLinc 810E	192.168.1.254

**save**  
Save your new configuration. Remember that the “save command” is required every time you make the new configuration.

**set default**  
Return the factory default settings of the FastLinc 810E except for the IP addresses. A ‘save’ command is required for changes to take effect.

**cls**  
Clear the console screen.

**exit**  
Exit the console.

**?\* or help\***  
Print a help screen.

**rz\***  
Receive a firmware file by the Zmodem protocol. The console will enter Zmodem receiving mode and then use the “file upload” function of your terminal emulation program to upload a new firmware file (ap.img) to the FastLinc 810E. Upon completion, always remember to type the ‘reset’ command for running the FastLinc 810E with the new firmware.

**reset\***  
Issue a reset signal. The FastLinc 810E will be reset if user confirms.

## Advanced Settings for Security

This section describes the commands to control the security for FastLinc 810E. To prevent unauthorized wireless stations from accessing data transmitted over the network, the FastLinc 810E modem offers the following levels of security options.

- Access Control Table restricts wireless stations access to the FastLinc 810E.
- Data Encryption, known as WEP (Wired Equivalent Privacy), encrypts wireless data transmitted via wireless medium.

### I. Access Control

#### ***auth mode | add | del | list | clear***

The 'auth' command contains sub-commands that allow you to manage the access control (MAC address filter) of the FastLinc 810E. The access control table consists of a list for you to control the accessibility of any wireless stations or repeaters. The sub-commands are listed below:

#### ***mode open | allow***

set the access control mode. The definition of each mode is specified as follows:

- *open*: open to public (default)
- *restrict*: only allow access of the authorized stations/repeaters in the table (no access is allowed if the list stays empty)

#### ***add mac\_addr***

add an address into the access control table

#### ***del mac\_addr |index***

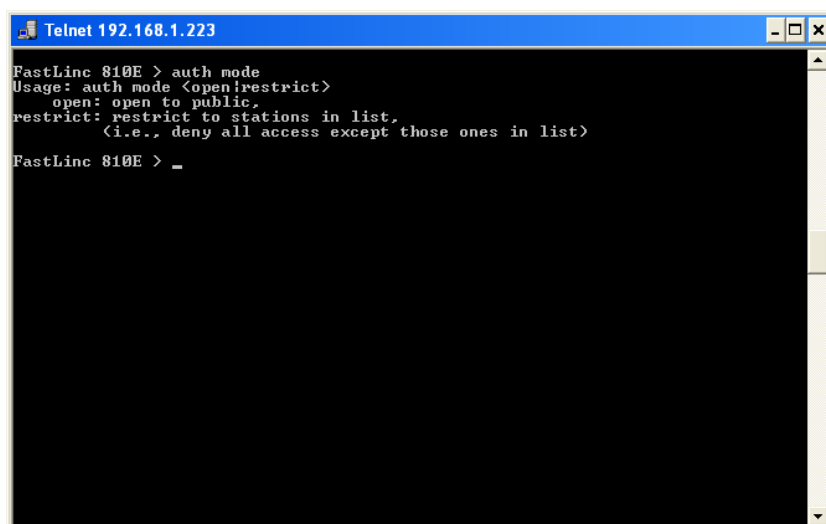
delete a MAC address, or index an address from the access control table

#### ***list [start/end]***

display the content of the access control mode and the address list. The optional arguments, start and end, can be affixed to select the range of items to be listed.

#### ***clear***

clear all the addresses in the access control table.



```

Telnet 192.168.1.223
FastLinc 810E > auth mode
Usage: auth mode <open|restrict>
  open: open to public,
  restrict: restrict to stations in list,
           <i.e., deny all access except those ones in list>
FastLinc 810E > _

```

---

## II. WEP Keys

### **wep mode | set | list**

The 'wep' command contains sub-commands that allow you to manage the data encryption (WEP, Wired Equivalent Privacy) function provided with the FastLinc 810E. The sub-commands are listed as follows:

### **mode disable | wep40**

set the access control mode. The following are the definitions of each data encryption mode.

- none: no encryption (default)
- wep40: use 40-bit WEP data encryption

### **set key1 key\_text: set WEP Key#1 as key\_text**

The number of characters to enter for 40-bit encryption is five (5) ASCII characters long. However, if the string is preceded by the characters '0x', the characters can be typed as ten (10) hexadecimal characters. Hexadecimal characters must be 0 to 9 or A to F.

The number of characters to enter for 128-bit encryption is thirteen (13) ASCII characters long. However, if the string is preceded by the characters '0x', the characters can be typed as twenty-six (26) hexadecimal characters. Hexadecimal characters must be 0 to 9 or A to F.

### **set key2 key\_text**

set WEP Key#2 as *key\_text* with a same format as WEP Key#1.

### **set key3 key\_text**

set WEP Key#3 as *key\_text* with a same format as WEP Key#1.

### **set key4 key\_text**

set WEP Key#2 as *key\_text* with a same format as WEP Key#1.

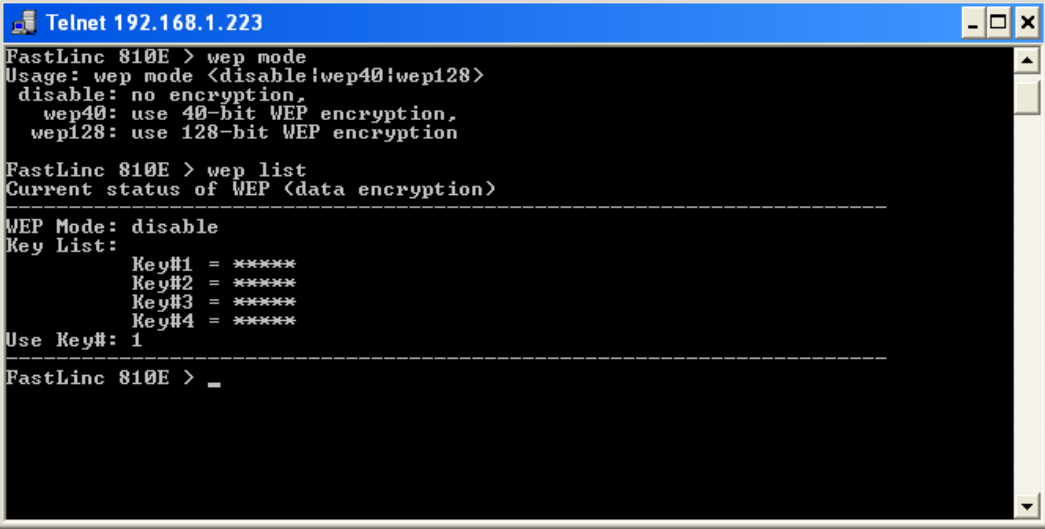
### **set usekey 1|2|3|4**

Select the WEP key to be used for encrypting data transmission. Only one key can be selected at a time.

### **list**

Display current WEP settings.

**Note:** Your new WEP settings will take effect after resetting the FastLinc 810E.



```
Telnet 192.168.1.223
FastLinc 810E > wep mode
Usage: wep mode <disable|wep40|wep128>
  disable: no encryption,
  wep40: use 40-bit WEP encryption,
  wep128: use 128-bit WEP encryption

FastLinc 810E > wep list
Current status of WEP (data encryption)
-----
WEP Mode: disable
Key List:
  Key#1 = *****
  Key#2 = *****
  Key#3 = *****
  Key#4 = *****
Use Key#: 1
-----
FastLinc 810E > _
```

## Network Configuration

FastLinc Wireless LAN products support the same network configuration options as the legacy Ethernet LANs defined by the IEEE 802 standard committee.

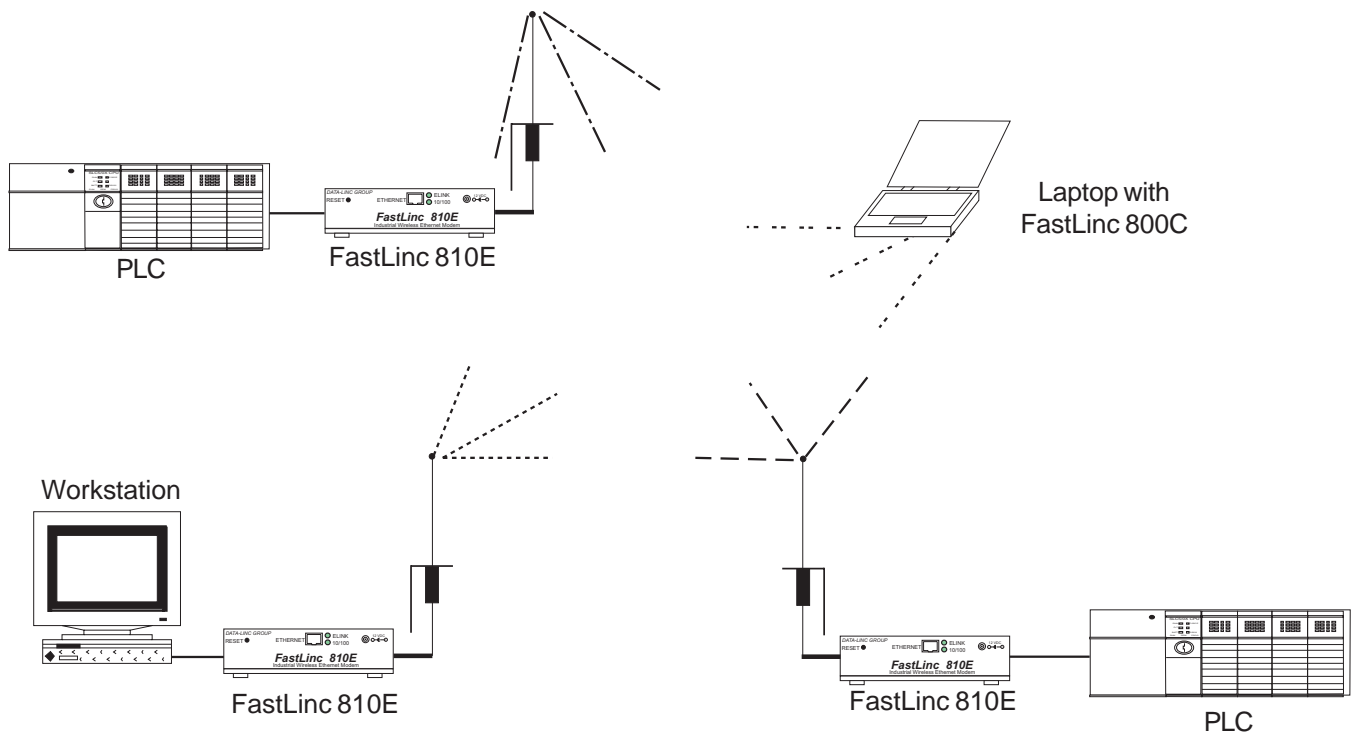
FastLinc Wireless LAN products can be configured as:

1. Ad-Hoc for departmental or SOHO LANs
2. Infrastructure for enterprise LANs
3. LAN-Interconnection for point-to-point link as a campus backbone.

## Network Topology

### Ad-Hoc

*Example of Ad-Hoc Wireless LAN*

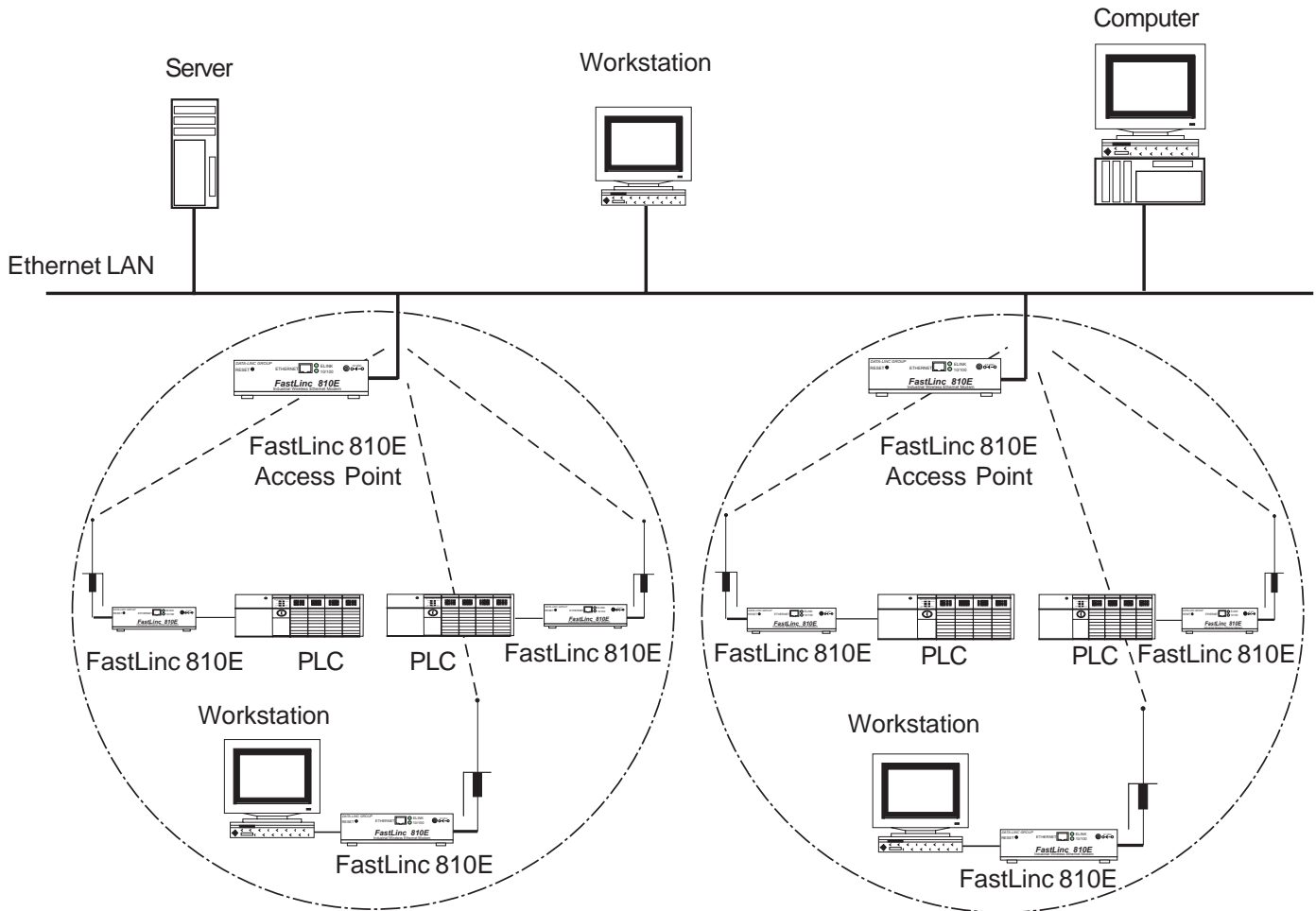


An Ad-Hoc wireless LAN is a group of computers, each equipped with one wireless adapter, connected as an independent wireless LAN. Computers in a specific Ad-Hoc wireless LAN must be configured to the same radio channel.

Ad-Hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

## Infrastructure

### Example of Infrastructure Wireless LAN

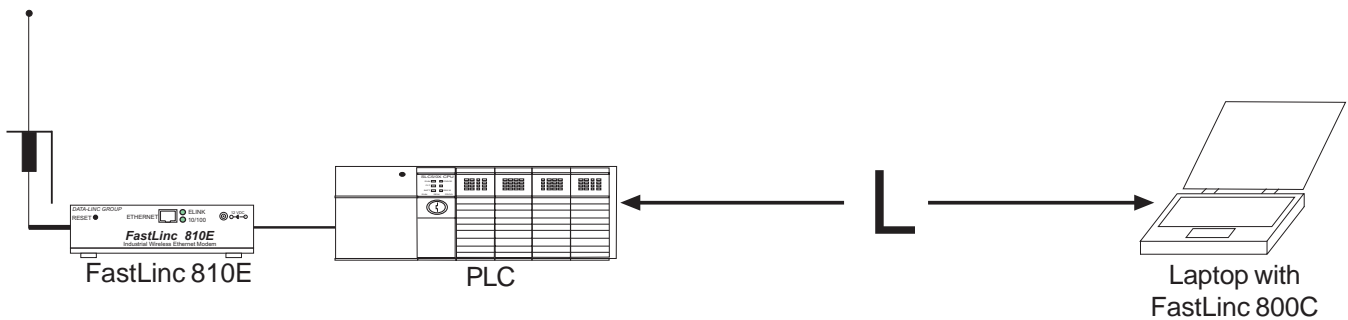


The FastLinc Wireless LAN devices provide access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of wireless LAN PC users and a FastLinc 810E construct a Basic Service Set (BSS). Each wireless-equipped PC in this BSS can talk to any computer in the wired LAN infrastructure via the FastLinc 810E

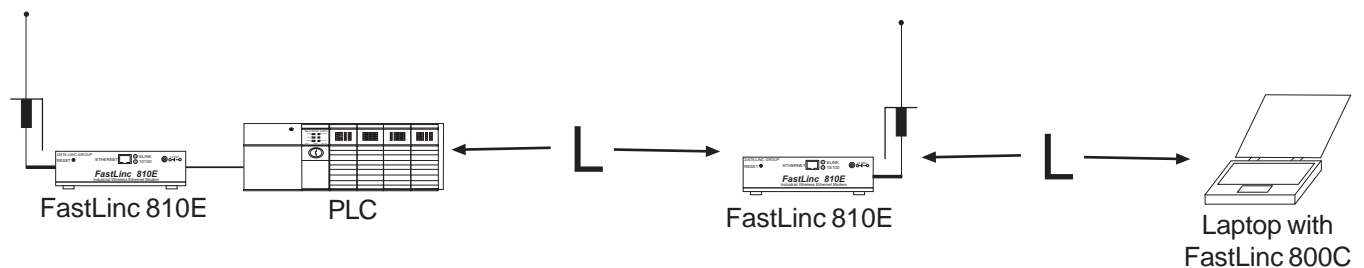
**Increase the effective Transmission Range**

Infrastructure configuration will extend the accessibility of a wireless station to the wired LAN. Multiple FastLinc 810Es will allow roaming and it will increase the transmission range. The FastLinc 810E is also able to forward data within its BSS. The effective transmission range in an infrastructure LAN is doubled.

**AD-HOC**



**Infrastructure**



---

## Technical Specifications

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<b>Product</b>	<b>11Mbs Wireless LAN FastLinc 810E</b>
Wired Interface	10/100BaseT (RJ-45)
Wireless Interface	11 Mbps Wireless LAN
Modulation	DSSS (CCK, DQPSK, DBPSK)
Operation Frequency	N. America/FCC: 2412-2.462 GHz (11 Channels)
Speed Options (over the air)	11M/5.5M/2M/1M, also support Auto Rate Selections
RF Technology	Direct Sequence Spread Spectrum
Power Supply	DC 12V (External power supply included)
RF Output Power	23 dBm (+ / - 2dBm)
Sensitivity	-89dBm at 11Mbps, BER $<8 \times 10^{-2}$

## Troubleshooting

If you have trouble using the FastLinc 810E modem, the starting point to troubleshoot the problem with your FastLinc 810 modem is looking at the LED activity of the FastLinc 810E. The following is the “LED Error Table” provided to assist you in diagnosing and solving operational problems.

If you are still unable to solve the problem by checking the LED activity, the error may be caused from a configuration mismatch, which prevents the FastLinc 810E from establishing a wireless connection with the network. You may check the following to ensure normal operation of the FastLinc 810E:

### WEP keys

If data encryption is activated, always remember to set WEP keys exactly the same on the FastLinc 810E as are on the wireless stations.

### Access Control

Make sure that the MAC address of your FastLinc 810E is not included in the Access Control table of other wireless devices.

PWR	AP Active	W-LAN	Data	LINK	Description/Action
Continuous Green	Continuous Green	Flashing Green	Flashing Green	Steady Green	Normal operation where flashing indicates interface activity - No action required
Continuous Green	On	Off	Off		Normal operation indicating no LAN activity - No action required
Off	Off	Off	Off	Off	Power failure - Check the power cord - Check the power supply
Continuous Green	Off	Off	Off	Off	Invalid loader firmware or the FastLinc 810E controller is dead - Return the unit to the vendor for support
Continuous Green	Flashing Green				Invalid FastLinc 810E firmware - Upgrade the firmware via the utility or console mode.
Continuous Green	Flashing Green	Flashing Green			Wireless LAN initialization failure - Check whether the wireless module has been properly installed.
Continuous Green	Flashing Green		Flashing Green		Ethernet initialization failure - Return the unit to the vendor for support

---

## Glossary

---

**FastLinc 810E Modem** - An Ethernet working device that seamlessly connects wired and wireless networks.

**Ad-Hoc** - An Ad-Hoc wireless LAN is a group of computers, each with wireless adapters, connected as an independent wireless LAN.

**Backbone** - The core infrastructure of a network. The portion of the network that transports information from one central location to another central location where it is off-loaded onto a local system.

**Base Station** - In mobile telecommunications a base station is the central radio transmitter/receiver that maintains communications with the mobile radio telephone sets within range. In cellular and personal communication applications, each cell, or FastLinc 810E cell, has its own base station. Each base station in turn is interconnected with other cells' base stations.

**Bridge** - An Ethernet working function that incorporates the lowest 2 layers of the OSI network protocol model.

**BSS** - Stands for "Basic Service Set," a FastLinc 810E and all the wireless clients that associated with it.

**ESS** - Stands for "Extended Service Set." More than one BSS can be configured as an Extended Service Set. Mobile users can roam between BSS in an ESS.

**Ethernet** - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.

**Infrastructure** - An integrated wireless and wired LAN is called an Infrastructure configuration.

**PCMCIA** - Personal Computer Memory Card International Association, which develops standards for PC cards, formerly known as PCMCIA cards, are available in three "types" which are about the same length and width as credit cards, but range in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for many functions, including memory storage, land line modems and wireless modems.

**Roaming** - A wireless clients around an ESS and get the continuous connection to the Infrastructure network.

**RTS Threshold** – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this "Hidden Node Problem". If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will NOT be enabled.

**Web Management** - Network management using web browser connections to target devices.

## Technical Support

Data-Linc Group maintains a fully trained staff of service personnel who are capable of providing complete product assistance. They can provide you with technical, application and troubleshooting, spare parts and warranty assistance. Our technical staff is based in Bellevue, Washington USA and may be reached at (425) 882-2206 or e-mail [support@data-linc.com](mailto:support@data-linc.com)

## Product Warranty

Data-Linc Group warrants equipment of its own manufacture to be free from defects in material and workmanship for one year from date of shipment to original user. Data-Linc Group will replace or repair, at our option, any part found to be defective. Buyer must return any part claimed defective to Data-Linc Group, transportation prepaid.

## Return Material Authorization

If a part needs to be sent to the factory for repair, contact Data-Linc Group's corporate office and request a Return Material Authorization (RMA) number. The RMA number identifies the part and the owner and must be included with the part when shipped to the factory.

## Contact Information

### Corporate Office

### Data-Linc Group

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# Appendix A

## Enclosure Dimensions

