



### Before You Begin

- The ESTEEM Model 195Ed wireless Ethernet radio modem is compatible with many different applications. The most common application is to bridge two or more Ethernet devices or networks. This guide will demonstrate the basic configuration and testing of a pair of 195Ed's. For more detailed information, please see the ESTEEM Model 195Ed User's Manual.
- This guide assumes you have a working knowledge of Ethernet networking, TCP/IP protocol and how to identify and set the TCP/IP address on your computer.
- The 195Ed can be configured using any current web browser software such as Internet Explorer, Netscape or Mozilla.
- The following procedure will provide an initial communication link between two or more Model 195's for testing purposes. All the example commands listed in this guide can be adjusted to fit your communication network. Please consult the ESTEEM Model 195Ed User's Manual for more details.

### Unpack Contents

Each node in your ESTEEM Model 195Ed's network may have different hardware components based upon the final installation location (i.e Outdoor, Indoor, Point-to-point or Muti-Point). Antenna types, cable lengths, power supplies may be different, but the following items will be required for basic setup:

**Model 195Ed**



**AA109 Resource Disk**



**Antenna  
(AA20DMEs  
Displayed)**



**(2) Ethernet Cables**



**Power Supply  
(AA175 Displayed)**

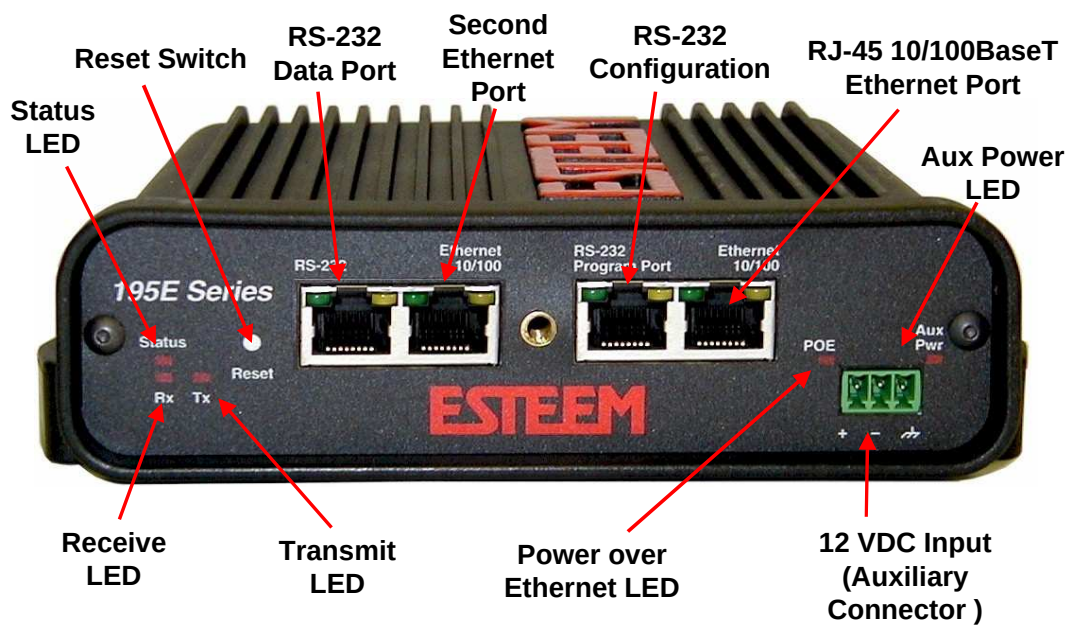


**Serial Interface Cable  
(AA6021.1)**



**Note:** Your accessory model numbers may vary from the above, but you will need to locate each of above items to continue configuration.

# **Front Panel Overview** (RS-232 Data Port and Second Ethernet Port Optional)



## **Antenna Overview**



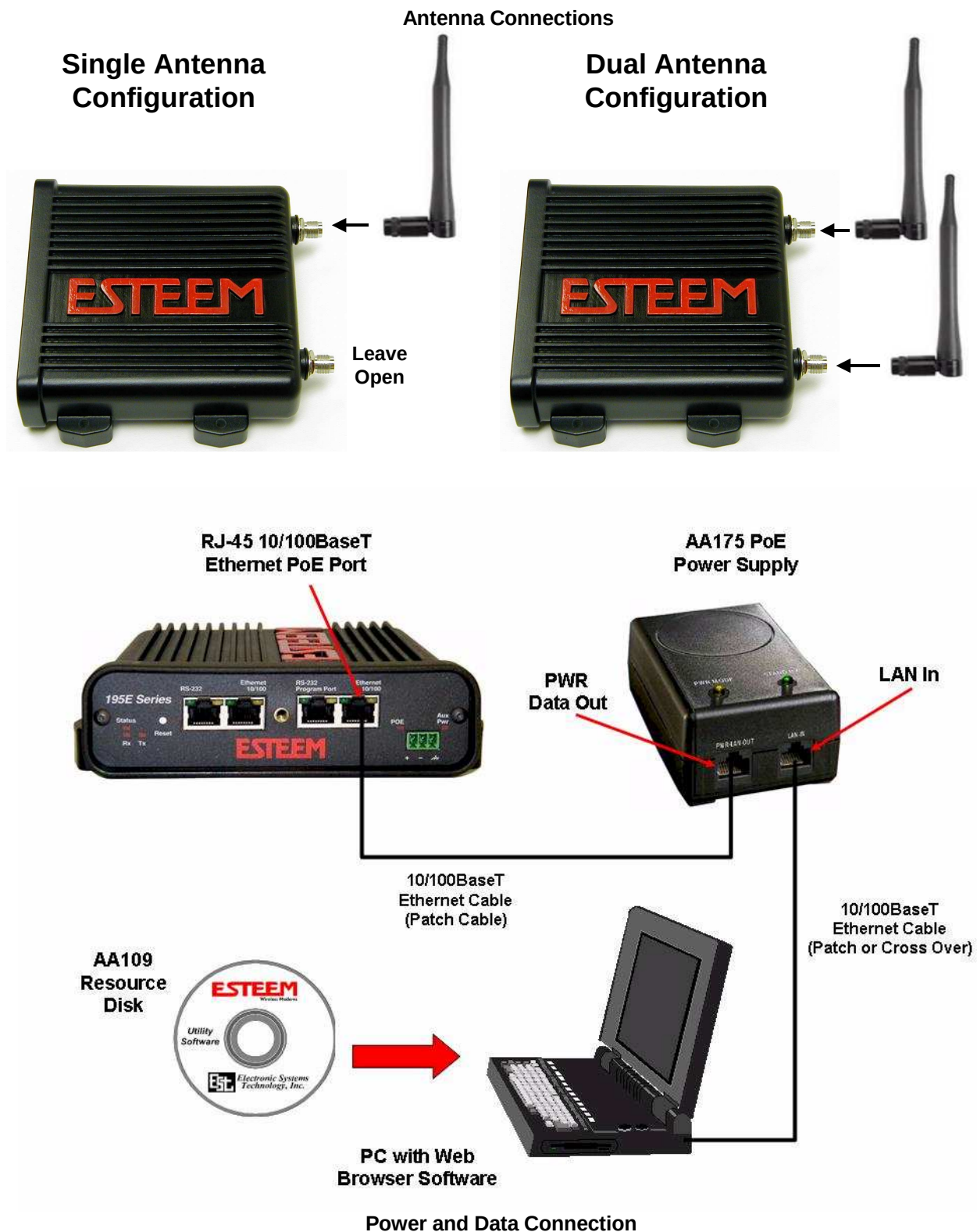
**Antenna Port A**  
(Single Receive Antenna)

**Antenna Port B**  
(Dual Receive Antennas)

**Antenna Connectors**  
(TNC Female-RP)

## Begin Programming

1. Assemble the ESTEEM Model 195Ed using the following:



2. The Model 195Ed will link to other Model 195Ed's on the network via the WLAN Media Access Control (MAC) address found on the bottom of the case. This MAC address is six hexadecimal digits separated by colons and is configured at the factory. Every MAC address in the world is unique and can not be changed. Complete the following chart to aid in your configuration:

| Name            | Serial Number | IP Address   | Ethernet MAC      | WLAN MAC          |
|-----------------|---------------|--------------|-------------------|-------------------|
| Example Modem 1 | E-14001       | 172.16.8.101 | 00:04:3f:00:01:01 | 00:04:3f:00:01:02 |
|                 |               |              |                   |                   |
|                 |               |              |                   |                   |
|                 |               |              |                   |                   |
|                 |               |              |                   |                   |

3. Configuration of the Model 195Ed is completed through the product's internal web server. To access this configuration page, you will need to enter the 195Ed's IP address in your web browser. The IP address set at the factory is Class B (i.e. 172.16.x.x) address and is printed on the Quality Assurance sheet sent with each 195Ed. If the factory default address matches your network configuration, please proceed to **Using Setup**, otherwise continue to step 4.
4. **Install the ESTeem Discovery Utility.** The ESTeem Discovery Utility will allow you to configure the IP address on the Model 195Ed to match your network. Install the Discovery Utility on your computer by inserting the Resource Disk in your CD drive.  
*Note: The ESTeem Resource Disk is stand-alone copy of the ESTeem Web site (Figure 1). Navigation of the Resource Disk is as simple as using your web browser. All technical documentation, User's Manuals and the ESTeem Utility Program is available on the disk.*

Place the ESTeem Utility CD in your CD-ROM drive. The CD will auto load the ESTeem main page

*Note: If the page does not auto load, open your web browser and set your address line to D:\index.html (Where D: is the drive letter for your CD-ROM drive).*

From the Main Page select Support and click on ESTeem Utility.



**Figure 1 –ESTeem Resource Disk Main Page**



*Note: This program is saved in a compressed file format. Microsoft Windows XP® will open the file directly, but other operating systems will require a common compression program such as WinZip available for download at <http://www.winzip.com>*

Double click on the 195EdiscoverySetup.exe file listed in the window to install the program.

5. **Set IP Address on the 195Ed.** Connect the Model 195Ed to your computer either direct to the Ethernet card or through a HUB/Switch using a CAT-5e Ethernet cable. The Ethernet port on the 195Ed supports Auto-Negotiation so either a patch cable or crossover cable will work. Open the ESTeem Discovery Program and press the Discover Modems button. The Model 195Ed will be displayed in the program by the Ethernet MAC address and Current IP Address (Figure 3).

**Note:** The SSID and Mode of Operation will be adjusted later in the configuration.

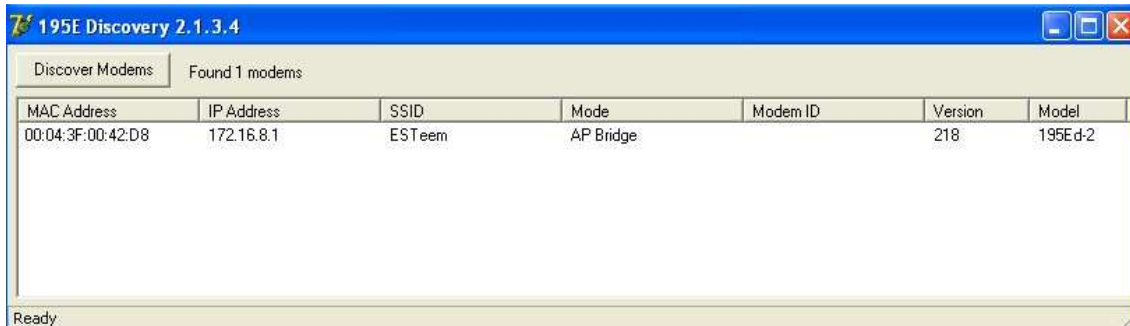


**Figure 2- ESTeem Utility Download**

Double-click on the 195Ed you wish to program and the *Configure IP Address* window will be displayed (Figure 4). Enter an IP address and Subnet Mask for the 195Ed that matches your network subnet and press the OK button to save this to the ESTeem. You will receive notification that the Configuration was Successful and the 195Ed will reboot. Proceed to ESTeem Setup to continue configuration.

## Setup Programming

You should now be ready to configure the Model 195Ed through your web browser. Open the web browser program and enter the IP address of the ESTeem in the address line and press enter.

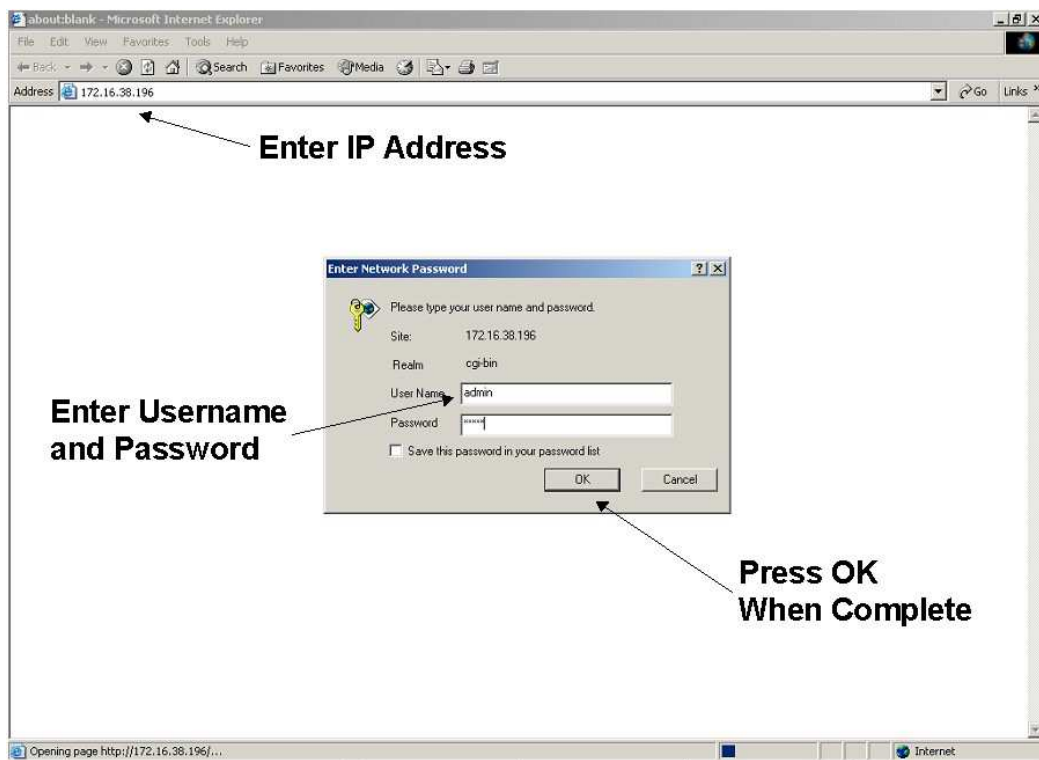


**Figure 3 – Discovery Program Main Page**



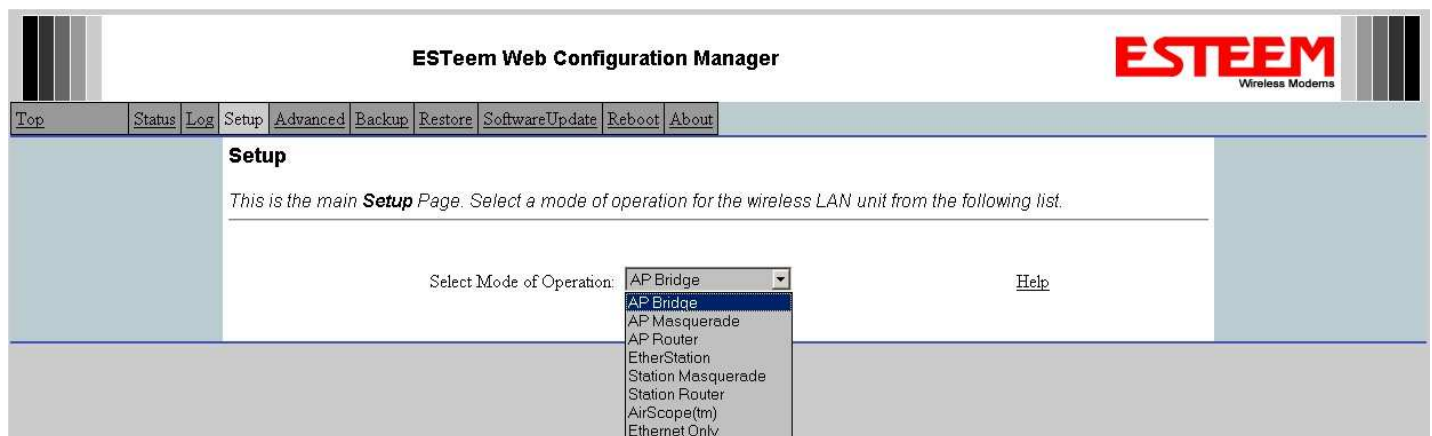
**Figure 4 – Change IP Address Window**

1. When prompted, enter **admin** for both the username and password and press the **OK** button.



Step 1 – Sign-In Screen

2. Select **Setup** on the top menu.
3. Press the drop-down menu and select **AP Bridge** and press the **Next** button.



Step 3 – Select AP Bridge

4. Set the DHCP services to NONE and press the *Next* button.

**ESTeem Web Configuration Manager**

Top Status Log Setup **Advanced** Backup Restore SoftwareUpdate Reboot About

**Setup**

Select whether you wish to use DHCP client services or whether you wish configure a DHCP server. Selecting "None" will take you through a manual setup of IP addresses as opposed to using DHCP services.

Selected mode of operation: AP Bridge

DHCP services on the bridge interface: ☒ None [Help](#)  
☐ Client  
☐ Server

Previous Next

**Step 4 – Turn DHCP Off**

5. Verify the IP address and netmask for the 195Ed (listed as **bridge** device) are correct press the *Next* button.

**ESTeem Web Configuration Manager**

Top Status Log Setup **Advanced** Backup Restore SoftwareUpdate Reboot About

**Setup**

Enter values for the following fields for manual IP setup of the **bridging** device.

Mode of operation: AP Bridge

DHCP Services: Off

Enter IP address for bridge device:  [Help](#)

Enter netmask for bridge device:  [Help](#)

Previous Next

**Step 5 – Verify IP Address**

6. Enter in the Gateway address in the default route IP address block and any DNS information for the server. If this is not know or on a network without a Gateway, leave these items at factory default.

The screenshot shows the 'ESTeem Web Configuration Manager' interface. At the top, there is a navigation bar with links: Top, Status, Log, Setup, Advanced, Backup, Restore, SoftwareUpdate, Reboot, and About. The 'Setup' link is highlighted. Below the navigation bar, the page title is 'Setup'. A subtitle reads: 'Enter values for the following fields to set up the default route and DNS settings'. The main content area contains the following fields and options:

- Mode of operation: AP Bridge
- Enter default route IP address: 172.16.1.6 (with a [Help](#) link)
- Use DNS client services? ☐ Yes ☒ No (with a [Help](#) link)
- Enter DNS domain: (with a [Help](#) link)
- Enter primary DNS server IP address: (with a [Help](#) link)
- Enter secondary DNS server IP address: (with a [Help](#) link)

At the bottom of the form, there are 'Previous' and 'Next' buttons.

**Step 6 – Enter Gateway Address**

7. All 195Ed modems in the network must be have the exact same Service Set Identification (SSID). The default SSID is **ESTeem** and we will use this for demonstration. Enter the SSID as listed above and turn off the wireless security features by selecting the NO radial. Press the *Next* button to continue.

**Note:** It is recommended that security be used in all wireless applications. This procedure will forgo the security configuration for brevity. Please see the example applications and the security appendix for further information.

The screenshot shows the 'ESTeem Web Configuration Manager' interface. At the top, there is a navigation bar with links: Top, Status, Log, Setup, Advanced, Backup, Restore, SoftwareUpdate, Reboot, and About. The 'Setup' link is highlighted. Below the navigation bar, the page title is 'Setup'. A subtitle reads: 'In the following fields, select whether you want wireless security features turned on and enter the service set identifier (SSID) that will be common to all wireless LAN devices.' The main content area contains the following fields and options:

- Selected mode of operation: AP Bridge
- Turn on wireless security features? ☐ Yes ☒ No (with a [Help](#) link)
- Enter the SSID: ESTeem (with a [Help](#) link)

At the bottom of the form, there are 'Previous' and 'Next' buttons.

**Step 7 – Enter SSID**



8. A warning that wireless security is not enabled will be displayed. Press the *Next* button to continue.

The screenshot shows the 'ESTeem Web Configuration Manager' interface. At the top, there is a navigation bar with links: Top, Status, Log, Setup, Advanced, Backup, Restore, SoftwareUpdate, Reboot, and About. The 'Setup' link is highlighted. Below the navigation bar, the page title is 'Setup'. A red 'WARNING!' message is displayed, stating: 'You have chosen to configure your system without any of the security features enabled on the wireless interface(s). This choice will expose your data to eavesdroppers and allow the general public to connect to your network. If you are sure this is what you want, press "Next". Otherwise press "Previous" and change your "wireless security" choice.' At the bottom of the warning message, there are two buttons: 'Previous' and 'Next'.

#### Step 8 – Security Warning Screen

9. All ESTeem 195Ed on the network must use the same RF bandwidth. Set the RF Bandwidth to 5 MHz and press the *Next* button to continue.

The screenshot shows the 'ESTeem Web Configuration Manager' interface. At the top, there is a navigation bar with links: Top, Status, Log, Setup, Advanced, Backup, Restore, SoftwareUpdate, Reboot, and About. The 'Setup' link is highlighted. Below the navigation bar, the page title is 'Setup'. A text block explains: 'Select the RF bandwidth for the wireless LAN device. Note that reducing bandwidth increases the number of available channels and the radio's ability to reject RF interference. Selection of the lowest RF bandwidth and data rate for your application is recommended for increased reliability. All ESTeem radios in the same network **MUST** be on the same frequency channel and use the same bandwidth selection.' Below this text is a table with four columns: RF Bandwidth, RF Data Rate, Equivalent Wired Ethernet Data Rate, and Recommended Use. The table has three rows: 5MHz, 10MHz, and 20MHz. The 5MHz row is selected with a radio button. Below the table, there is a 'Help' link and two buttons: 'Previous' and 'Next'.

| RF Bandwidth                          | RF Data Rate     | Equivalent Wired Ethernet Data Rate | Recommended Use                                                                          |
|---------------------------------------|------------------|-------------------------------------|------------------------------------------------------------------------------------------|
| <input checked="" type="radio"/> 5MHz | 1.5 to 13.5 Mbps | 750 Kbps to 6.75 Mbps               | Narrow bandwidth for enhanced transmission reliability in high interference environments |
| <input type="radio"/> 10MHz           | 3 to 27 Mbps     | 1.5 to 13.5 Mbps                    | Midrange bandwidth for higher speed but lower interference environments                  |
| <input type="radio"/> 20MHz           | 6 to 54 Mbps     | 3 to 27 Mbps                        | Wide bandwidth for maximum RF data rates in low interference environments                |

#### Step 9 – Bandwidth Selection

10. All Model 195Eds on the network must be on the same radio channel, representing a particular frequency. If a particular channel has not been assigned for use, leave the 195Ed at a default value of 5 (**912 MHz**) and press the *Next* button.

The screenshot shows the 'ESTeem Web Configuration Manager' interface. At the top, there is a navigation bar with links: Top, Status, Log, Setup, Advanced, Backup, Restore, SoftwareUpdate, Reboot, and About. The 'Setup' link is highlighted. Below the navigation bar, the page title is 'Setup'. A text block explains: 'Select the channel for the wireless LAN device to operate on. The first displayed number in the list is the channel, and the second is the channel frequency in MHz.' Below this text is a dropdown menu labeled 'Select a channel:' with the value '5 (912 MHz)' selected. To the right of the dropdown is a 'Help' link. At the bottom, there are two buttons: 'Previous' and 'Next'.

#### Step 10 – Set Radio Channel

11. Configure the repeater peer list by selecting Enable the repeater capability radial to YES (Step 11). Press the **Add** button to the right of the repeater peer table and, using the chart created in the **Begin Programming** section of this guide, enter the Wireless MAC (WLAN MAC) address of the opposite 195Ed (the 195Ed this unit you are programming will communicate with) in the Peer 1 – MAC Addr field (below). Leave the Priority Path Cost settings at the default values, Encryption Type to None and change the Enable Link radial to Enable and press the **Create Repeater Peer** button. Press the **Next** button.

**ESTEEM Web Configuration Manager**

Top Status Log Setup Advanced Backup Restore SoftwareUpdate Reboot About

**Setup**

Select whether to enable repeater capability. If the **repeater** capability is disabled, the peer list is ignored. If the **repeater** capability is enabled, then a link is established with each peer in the list.

You may add a peer to the list, remove an existing peer or modify an existing peer by clicking the appropriate button below.

The following configurations are for the wireless LAN device.

Enable the **repeater** capability? ☒ Yes ☐ No [Help](#)

Set as **root bridge**? ☐ Yes ☒ No

MAC Addr Port Priority Path Cost Encrypt Type Data Rate Enable

Repeater Peer List:

Add Remove Modify

Previous Next

**Step 11 – Repeater Peer Configuration**

| Example Addresses                           |               |               |                   |                   |
|---------------------------------------------|---------------|---------------|-------------------|-------------------|
| Name                                        | Serial Number | IP Address    | Ethernet MAC      | WLAN MAC          |
| 195Ed We Are Programming                    | E-14096       | 172.16.48.189 | 00:04:3f:00:01:01 | 00:04:3f:00:01:02 |
| Opposite 195Ed We Will Create Wireless Link | E-14034       | 172.16.38.114 | 00:04:3F:00:0B:00 | 00:04:3F:00:11:02 |

**ESTEEM Web Configuration Manager**

Top Status Log Setup Advanced Backup Restore SoftwareUpdate Reboot About

**Setup - Add a Repeater Peer**

To add a new repeater peer for the first wireless LAN interface, enter the MAC address, the port priority, the port cost, the key type, the key and the rate set and click the "Create Repeater Peer" button.

Enter the MAC address: 00:04:3f:00:11:02

Enter the port path cost: 100

Select the encryption type: ☒ None ☐ WEP 64-bit ☐ WEP 128-bit ☐ TKIP

Enter the encryption key: 11:22:33:44:55:66:77:88:!

Select link data rate: Dynamic

1 Mbps  
2 Mbps  
5.5 Mbps  
6 Mbps  
9 Mbps

Enable link: ☒ Enable ☐ Disable

Return to Repeater Setup Create Repeater Peer

Enter the 48-bit MAC address of the repeater peer.

Enter the bridge port path cost for this link. (1-65535)

Select the repeater link encryption method. Note: the encryption method and key setting must be the same on both repeater peers.

Enter the encryption key as a sequence of hexadecimal bytes (e.g. 0a:0b:1c:2d:3e). Key length: None=0 bytes, WEP64=5 bytes, WEP128=13bytes, TKIP=32 bytes.

Allow dynamic rate selection or select a specific data rate for this link to use. It is recommended, but not required, that the rate selections be the same on both peers.

Enable or disable the repeater peer link. Enable must be selected for the repeaters to communicate.

**Step 12 – Configure Peer Table**

12. Press the *Commit Changes* button and the modem will save all the changes made and reboot. The reboot time is approximately 1 minute to be ready for operation.
13. Complete all steps in this **Setup Programming** section for the other Model 195Ed's you will be testing before moving on the Testing Communication section.

## Testing Communication Link

After you have configured at least two of the Model 195Ed wireless Ethernet modems for operation, you can verify communication with each the following steps:

**Status Light** – The quickest source of link status is to view the Status Light on the face of the 195Ed. If the Status light is solid, the Model 195Ed has a connection to another Model 195Ed listed in the Peer Table.

**Status Screen/Peer Table** – To view further information on the status of the communication link (such as connection speed, signal strength and last update time) you can open the Status Screen from the Web Interface. After press the Status tab at the top of the screen the Status: Summary will be displayed showing the status of all ports and memory in the 195Ed. Under the Wireless Status heading click on the [View Peer Table](#) (Figure 5). The Peer Table will list all other 802.11b or 802.11g wireless activity seen by the 195Ed and how it is classified.

Find the opposite 195Ed in the Repeater Peers list and information such as signal strength (in dBm) and time/speed of last data packet will be displayed.

**Note:** The data rate displayed is not necessarily indicative of the RF data rate between the ESTeems. The rate show in the Repeater Peer

Status LED  
Solid Red on Link



**EST195E Web Configuration Manager**

Top Status Log Setup Advanced Backup Restore SoftwareUpdate Reboot About

**Status: Peer Table**

This page is a summary view of the peer table for WLAN device wlan0. Click on a given MAC address for more details about that peer.

Return to Status Summary Page

**Opposite Modem's Wireless MAC**

Associated Stations

None

**Receive Signal Strength (dBm)**

**Last Packet Received**

**Repeater Peers**

| MAC Addr          | Signal | LastRx (sec@kbps) | Modem ID                      |
|-------------------|--------|-------------------|-------------------------------|
| 00:04:3f:00:09:66 | -36    | 0@11000           | Remote ← <b>Peer Modem ID</b> |

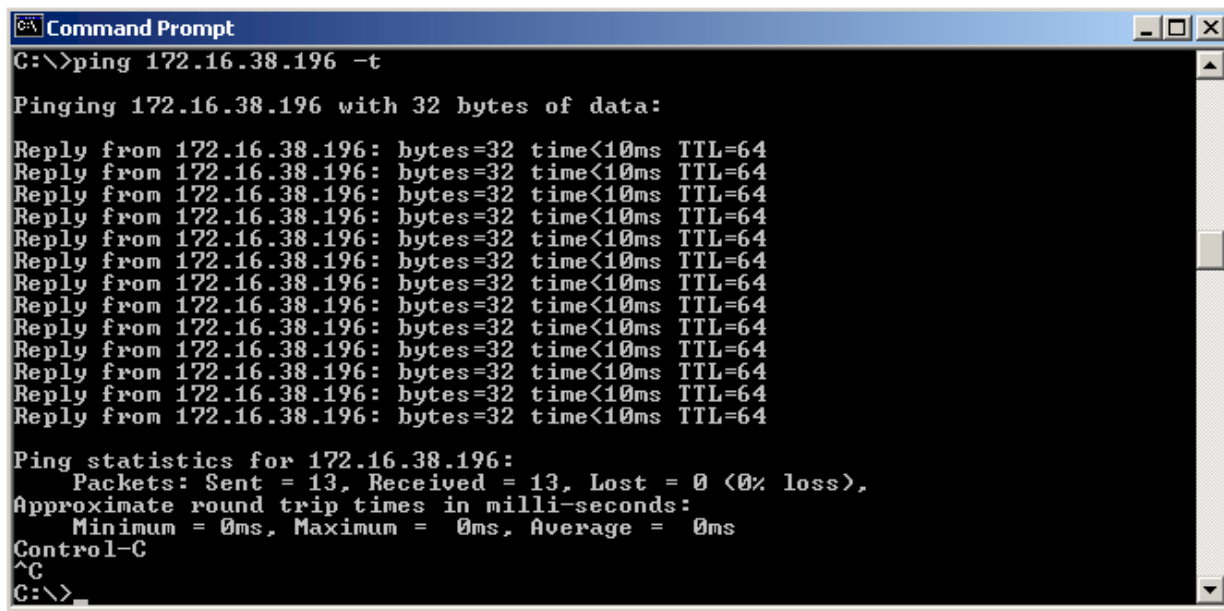
**Access Points**

| MAC Addr          | Signal | LastRx (sec@kbps) | Enc | SSID                         |
|-------------------|--------|-------------------|-----|------------------------------|
| 00:02:2d:03:2a:78 | -70    | 0@2000            | y   | ← <b>Other Access Points</b> |
| 00:02:2d:3f:7d:d3 | -89    | 8@2000            | y   |                              |
| 00:04:3f:00:09:66 | -36    | 0@11000           | y   |                              |

**Figure 5 – Repeater Peer Table**

table will be the last RF packet, which could consist of either data, repeater beacon or network probes. For a detailed analysis on the data rate, please consult the ESTeem User's manual.

**Ping Testing** – The easiest method for testing the efficiency of data flow between the ESTeems is to conduct a Ping test to the opposite modem’s IP address. This will test all links in the Ethernet bridge.



```
Command Prompt
C:\>ping 172.16.38.196 -t

Pinging 172.16.38.196 with 32 bytes of data:

Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64
Reply from 172.16.38.196: bytes=32 time<10ms TTL=64

Ping statistics for 172.16.38.196:
    Packets: Sent = 13, Received = 13, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
Control-C
^C
C:\>
```

### Technical Support

User's Manual and Technical Documentation

<http://www.eesteem.com>

E-Mail Support

[Support@esteem.com](mailto:Support@esteem.com)

Phone Support (8AM to 5PM PST Monday-Friday)

509-735-9092