ASSEMBLING THE AA195PM TWO HOLE OUTDOOR POLE MOUNTING KIT

The AA195PM mounting kit contains everything required for pole mounting and weatherproofing the ESTeem Model 195E for outdoor installations. The 195E with AA195PM mounting kit can be directly mounted to a round pole from 1.25" to a diameter of 2.25" OD. Any mounting structure greater than 2" requires hose clamp strapping run through the Pole Mount Brackets. The mounting kit requires the following assembly:

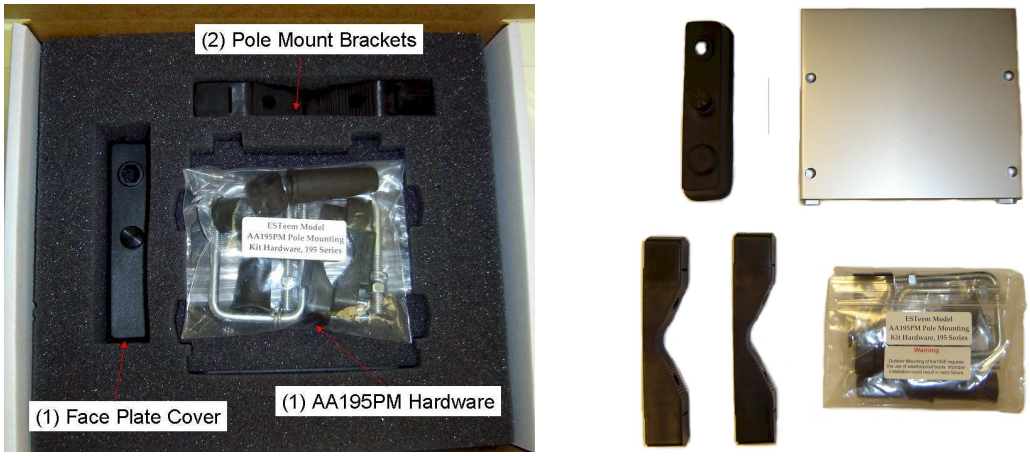


Figure 1: Packet Box Contents

1. If you purchased an AA195PM mounting kit with your Model 195E, the kit will be packed in the same packing box as the ESTeem (Figure 1).

2. Remove and inventory the two (2) Pole Mounting Brackets, one (1) Two-Hole Face Plate Cover (with single port cover installed), one (1) Heat Shield and (1) AA195PM Hardware bag from the packing box (Figure 1). Report any missing or damaged items to ESTeem Customer Support (509-735-9092 Phone) as soon as possible for replacement.

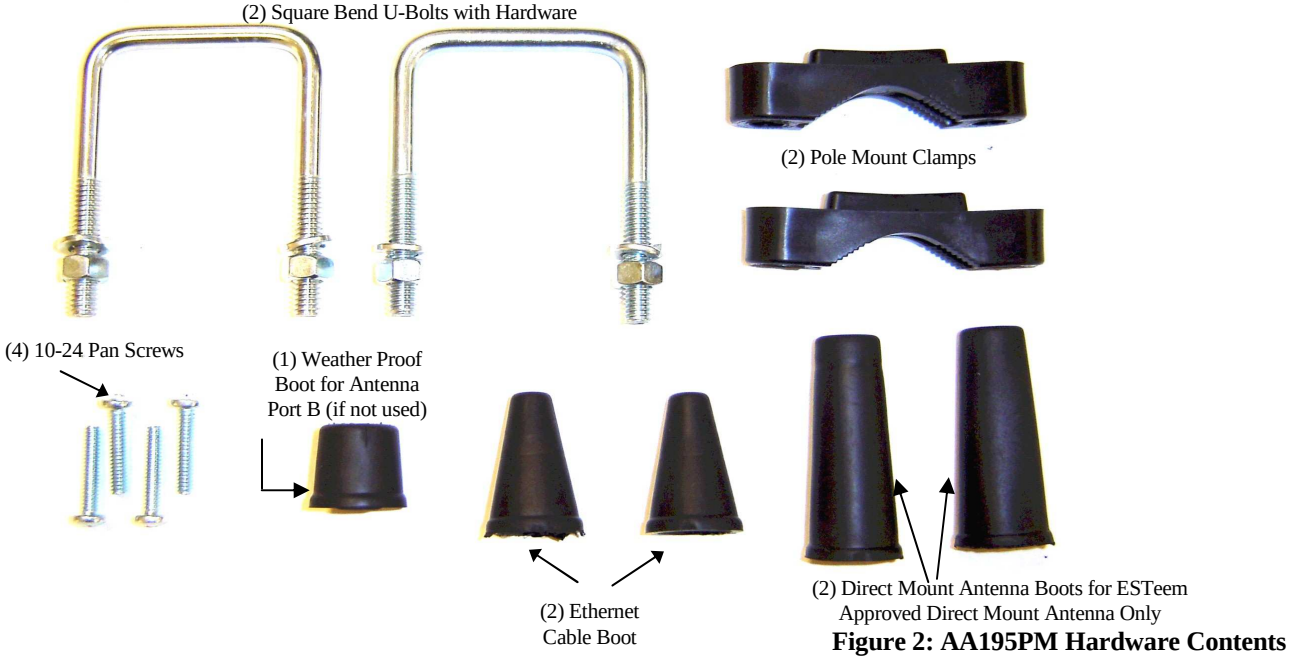


Figure 2: AA195PM Hardware Contents

3. Inventory the AA195PM Hardware bag for all the components listed in Figure 2.

4. Assemble the two Pole Mounting Brackets with the included U-bolts, hardware and Pole Mount Clamps. Reference Figure 3.

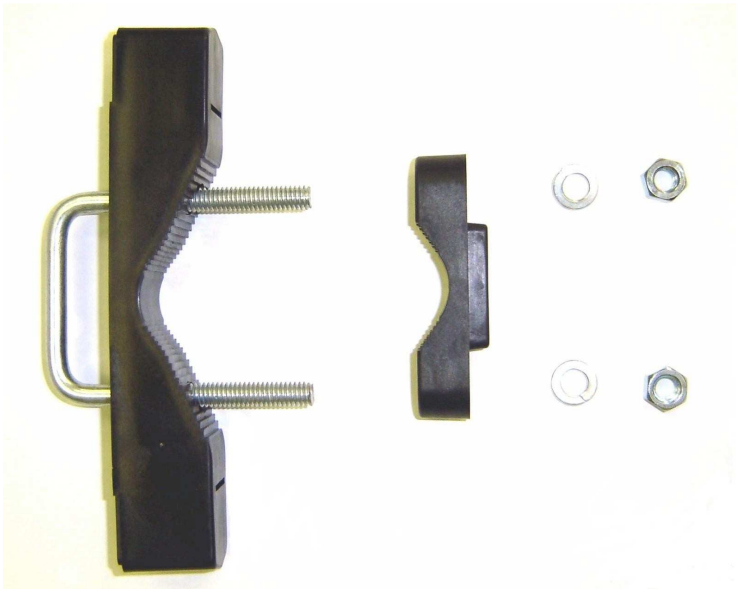


Figure 3: Pole Mount Assembly

5. Place the four supplied 10-24 x 1" Phillips Pan Head screws through the mounting holes of the Heat Shield and attach to the to the top of the ESTeem 195E (Figure 4).

Figure 4: Heat Shield Attachment

6. Attach the two Pole Mounting Brackets to the ESTeem Model 195E with the 10-24 x 1" Phillips Pan Head screws through the top of the heat shield. Reference Figure 5 (Heat Shield removed for detail).

Figure 5: Pole Mount Connection to Case
(Heat Shield Removed for Detail)

7. Assemble the outdoor rated CAT-5e Ethernet cable (Not Provided) with the supplied Ethernet Cable Boot (Figure 6).

Figure 6: Ethernet Cable Assembly

8. Feed the CAT-5e Ethernet connector(s) through the Face Plate Cover and secure the Ethernet Cable Boot to the cover. Reference Figure 7. *NOTE: The Ethernet cable boot must be installed before the RJ-45 end is installed. If using the ESTeem AA09.1 outdoor Ethernet cable, verify that the Ethernet cable boot end is routed toward the ESTeem 195E.*

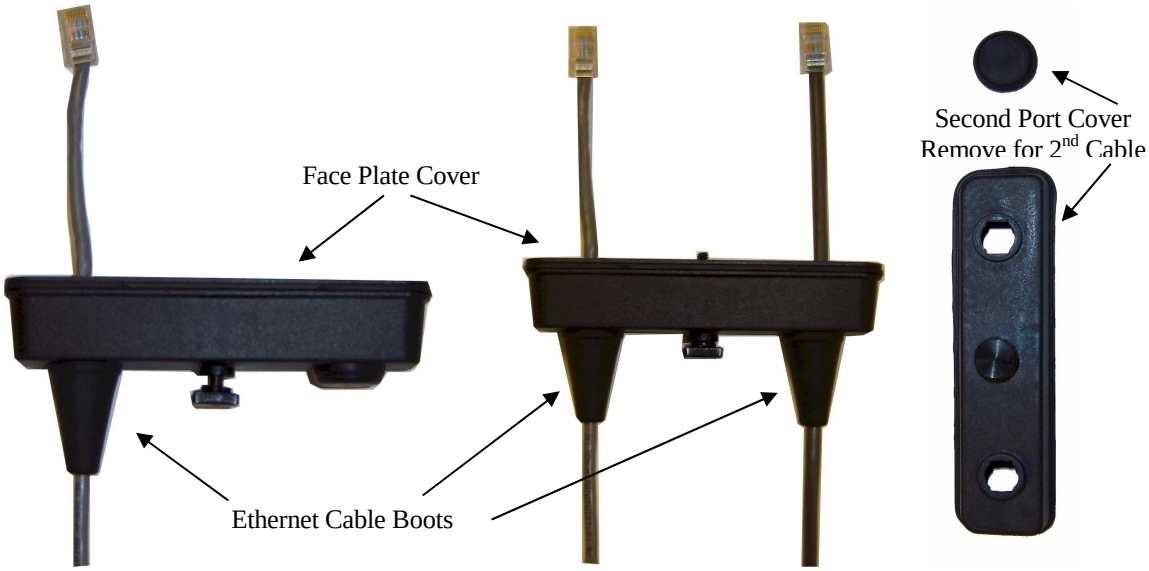


Figure 7: Ethernet Cable Routing

9. Route the CAT-5e Ethernet cable through the molded strain-relief fins in the Face Plate Cover (Figure 8) to secure the cable and provide strain-relief for the connector. If a second Ethernet cable is installed, remove the second port cover and route cable.

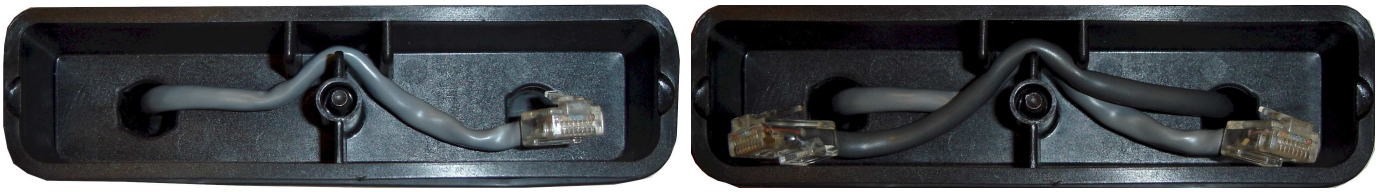


Figure 8: Face Plate Cover Strain Relief

10. Plug the CAT-5e Ethernet cable to the Model 195E's Ethernet port and secure the Face Plate Cover with the attached thumb screw. Verify that the weatherproof seal on the Face Plate Cover is sealed against the outer rim of the Model 195E. Reference Figure 9.

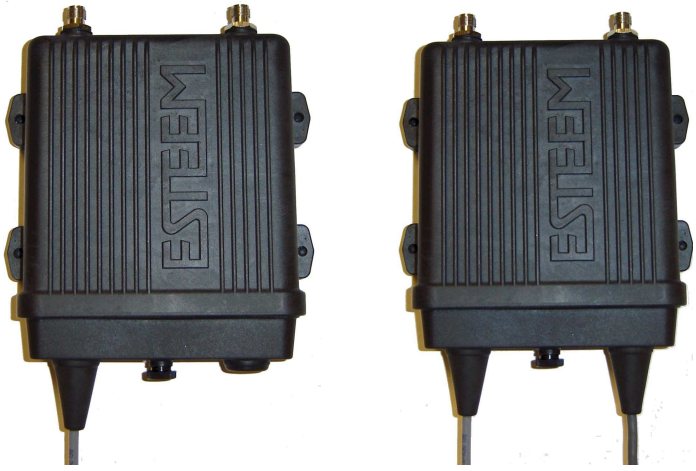


Figure 9: Face Plate Cover Installed on ESTeem

11. Attach the antenna connector boots as show in Figure 10 for either dual attached antennas or external antennas. You are now ready to mount the ESTeem Model 195E

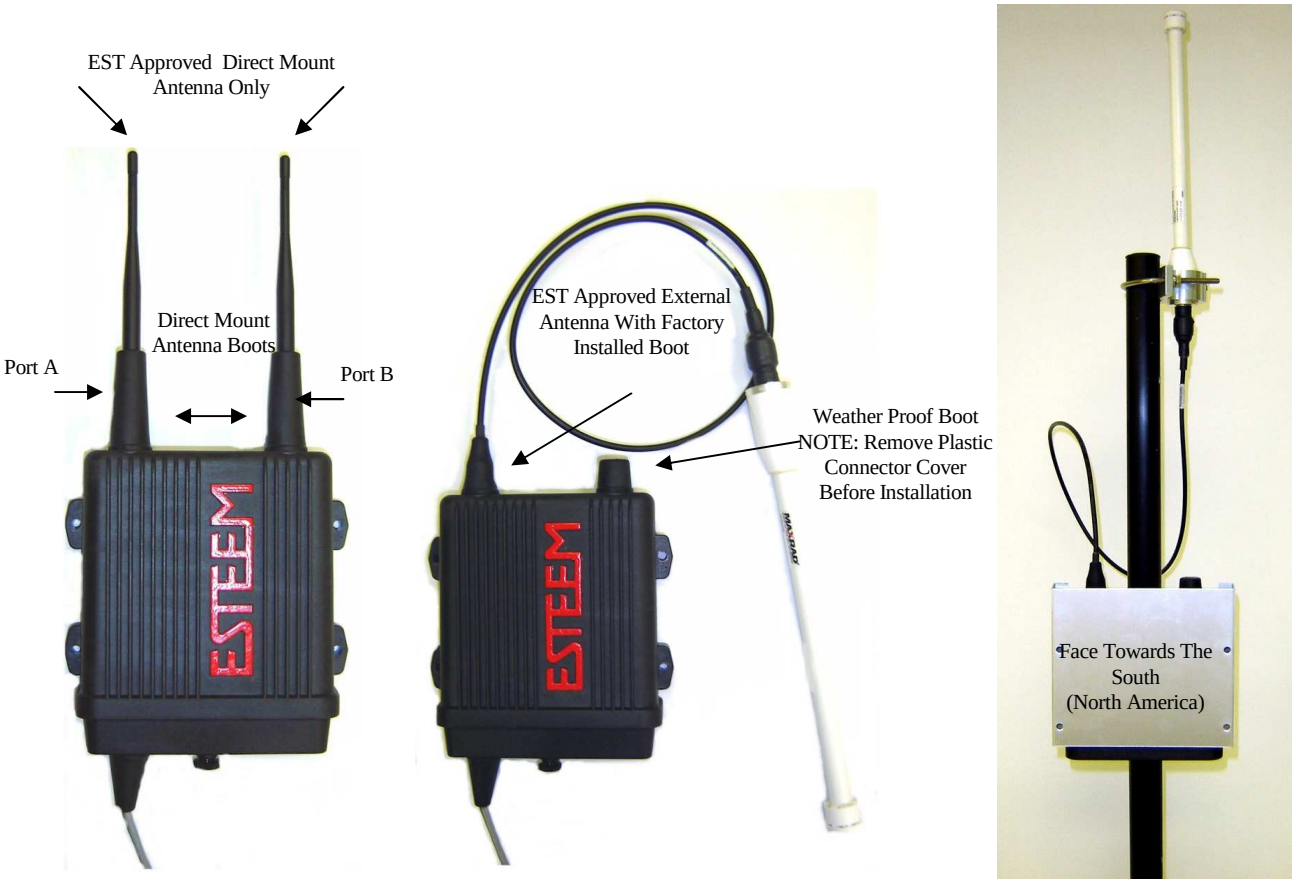
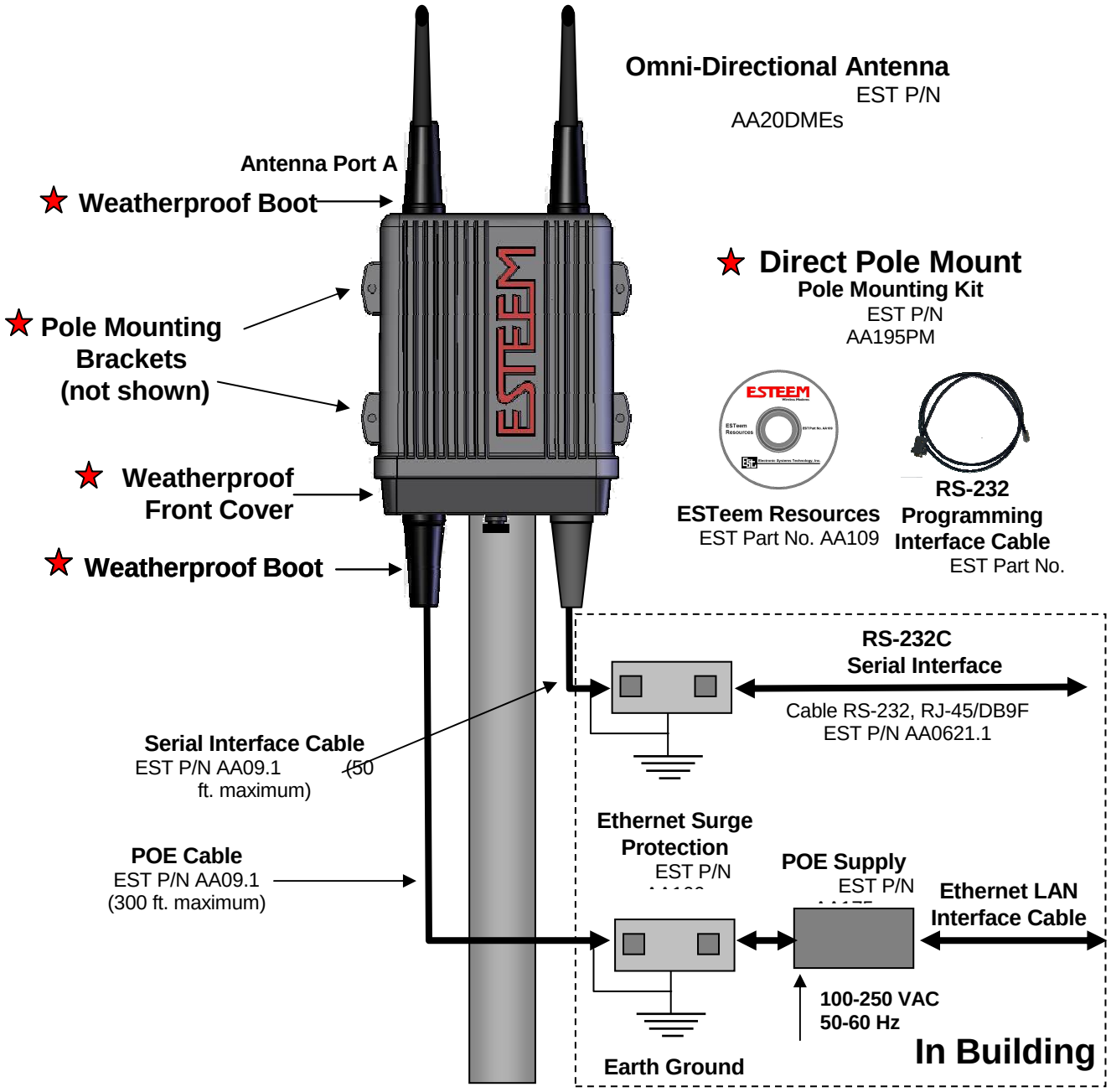


Figure 10: Completed AA195PM Mounts

Caution: Outdoor mounting of the 195E requires the use of weatherproof boots. Improper installation could result in radio failure.

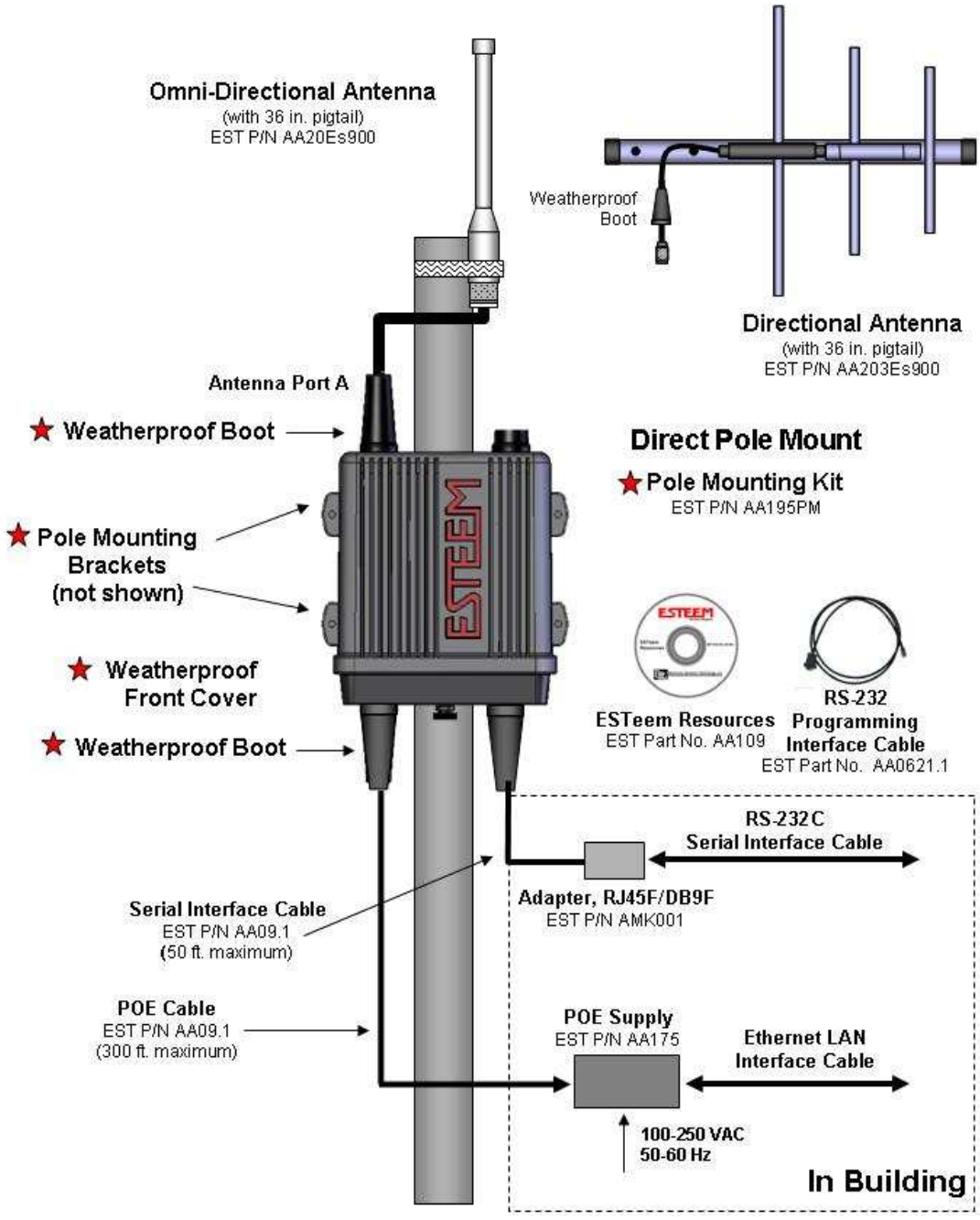
Caution: Always mount the 195E vertically with the antenna ports on top.

Model 195Ed with Direct Mount Antenna and Surge Protection



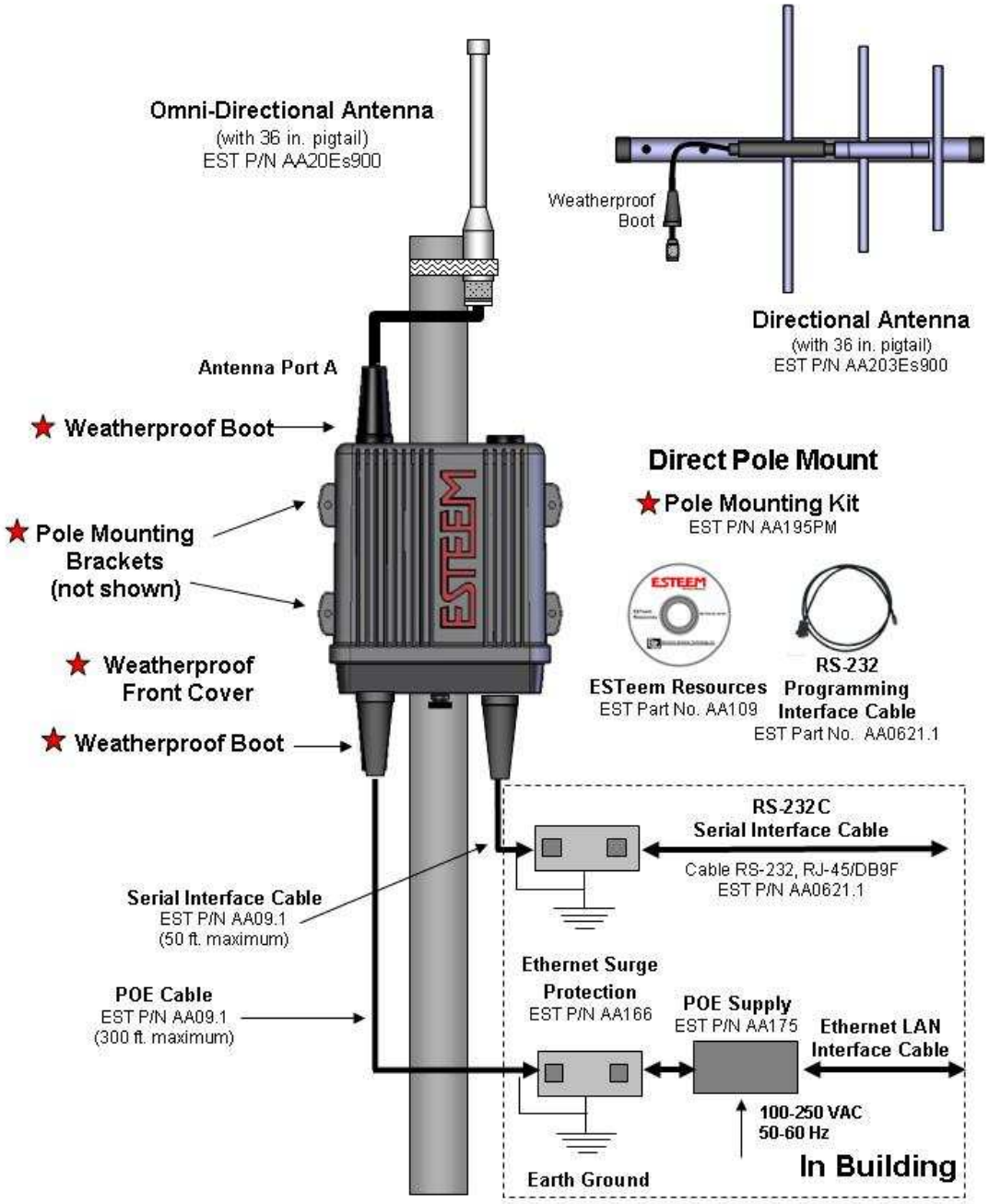
Caution: Always mount the 195Ed vertically with the antenna ports on top.

Model 195Ed
with External Mount Antennas



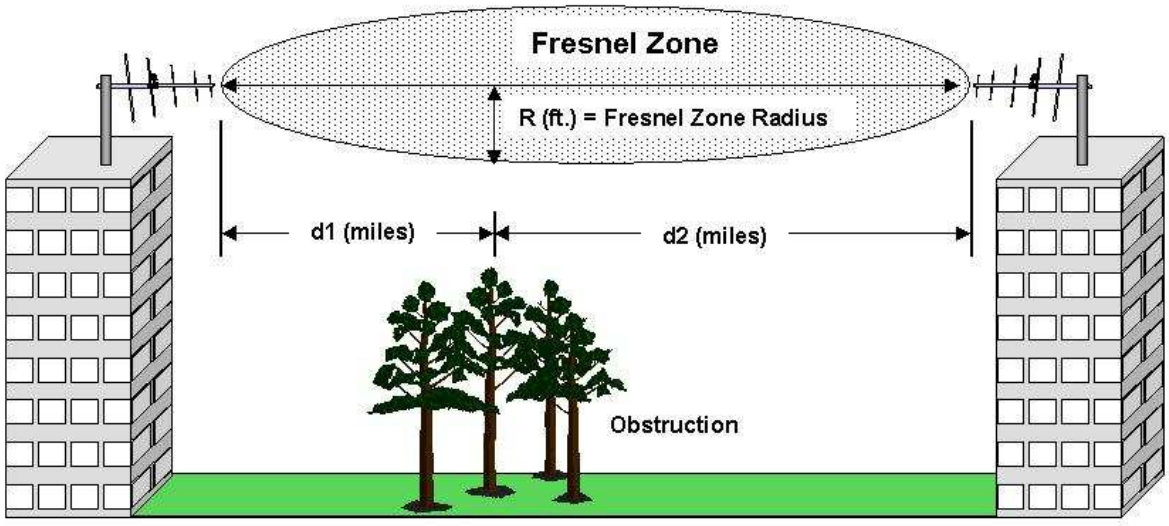
Caution: Always mount the 195Ed vertically with the antenna ports on top.

Model 195Ed with External Mount Antennas and Surge Protection



Caution: Always mount the 195Ed vertically with the antenna ports on top.

FRESNEL ZONE



The Fresnel zone shows the ellipsoid spread of the radio waves around the visual line-of-sight after they leave the antenna (see figure above). This area must be clear of obstructions or the signal strength will be reduced due to signal blockage. Typically, 20% Fresnel Zone blockage introduces little signal loss to the link. Beyond 40% blockage, signal loss will become significant. This calculation is based on a *flat earth.* It does not take into account the curvature of the earth. It is recommended for RF path links greater than 7 miles to have a microwave path analysis done that takes the curvature of the earth and the topography of the terrain into account.

Fresnel Zone Radius = 72.1 SQRT [(d1d2) / (F(d1 + d2)]

Units
Fresnel Zone Radius in feet.
d1 and d2 in statue miles
F in GHz

APPENDIX A
FCC-DOC INFORMATION

INFORMATION TO USERS

The ESTeem Model 195Ed complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This Class A digital apparatus complies with Canadian ICES-003. (Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.)

Note to User:

Changes or modifications to this equipment not expressly approved by Electronic Systems Technology for compliance could void the user's authority to operate the equipment.

Other Information

Model 195Ed

Direct Sequence/OFDM Spread Spectrum Device

(USA) FCC ID: **ENPESTEEM195ED**

(Canada) IC No: **1457-195ED**

The equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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Rm 240 Box 2955
Anchorage, AK 99510

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Lee's Summit, MO 64086

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Buffalo, NY 14202

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Portland, OR 97204

PENNSYLVANIA
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Room 404
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Langhorne, PA 19047-1859

PUERTO RICO
747 Federal Building
Carlo Chardon Ave.
Hato Rey, PR 00918

TEXAS
Dallas Office (DL)
9330 LBJ Freeway, Room 1170
Dallas, TX 75243-3429

5636 Federal Building
515 Rusk Avenue
Houston, TX 77002

WASHINGTON DC
Columbia Office (CF)
9300 East Hampton Drive
Capitol Heights, MD 20743

WASHINGTON
Seattle Office (ST)
11410 NE 122nd Way
Room 312
Kirkland, WA 98034-6927

Model 195Ed Case Specifications

LED Indicators	
Power On/Off	Receiver On/Off
Carrier Detect On/Off	Transmitter On/Off
Link Status On/Off	

I/O Connectors	
Ethernet 10/100Base T (Port 1)	RJ-45 Female
Ethernet 10/100Base T (Port 2)	RJ-45 Female
RS-232C Port (2,400 to 115.2K baud)	RJ-45 Female
RS-232C Programming Port (38.4 K baud)	RJ-45 Female
Antenna Input/Output	TNC Reverse Polarity Female
Remote Input Power	Power Over Ethernet Cable
Direct Input Power	Optional, Header Screw Connector

Transmiter	
Frequency of Operation	902 to 928 MHz Software Selectable 11 Channels
RF Data Rate	1,2,5.5,6,9,11,12,18,24,36,48, & 54 Mbps Fixed or Auto Scaling DSSS/OFDM Modulation
Tx Output Power	250 to 630 mW
RF Output Impedance	50 ohms

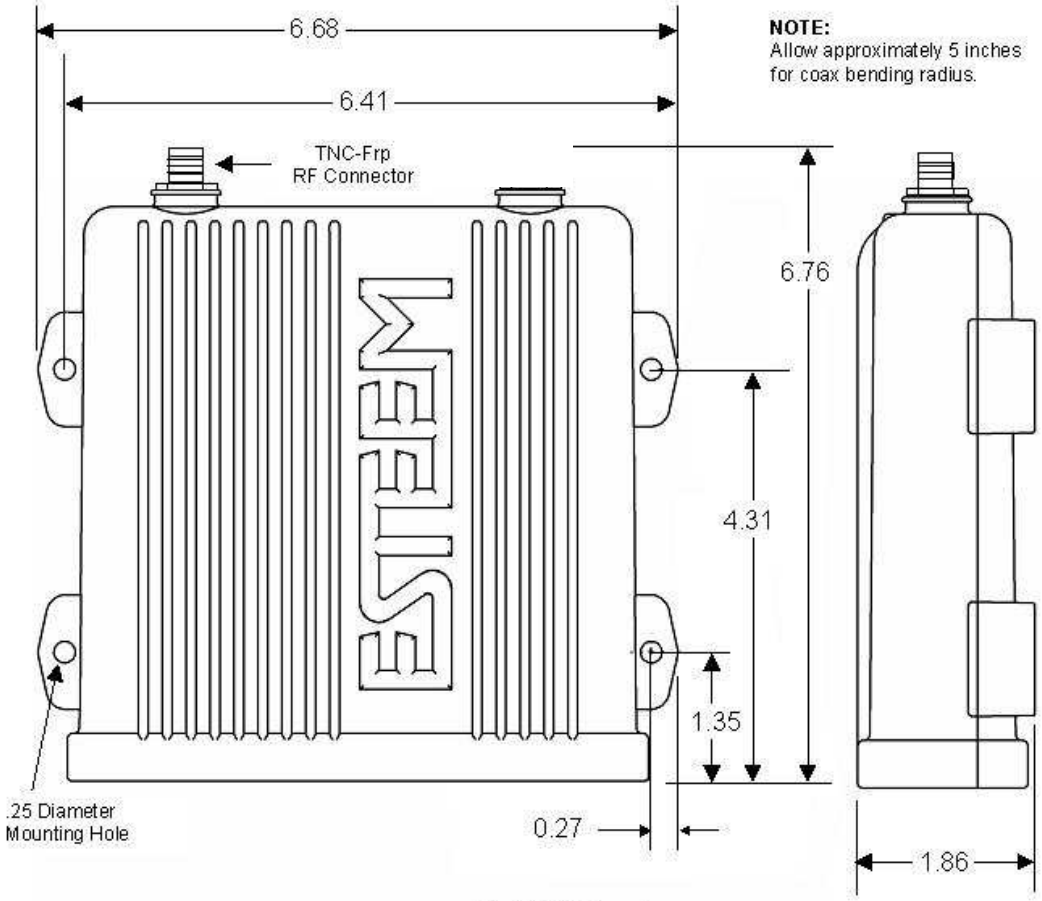
Receiver	
Rx Sensitivity @ Frame Error Rate <10%	-72 dBm @54 Mbps to –95 dBm @ 1 Mbps Frame Error Rate <10%

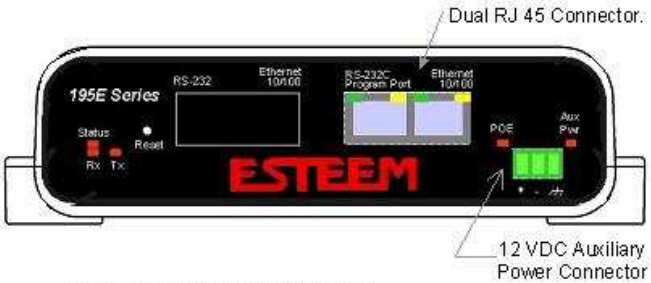
Power	
Power over Ethernet	IEEE 802.3af Standard Power Supply, 48 VDC @ 13 Watts
Power Connector on Unit	10 to 16 VDC
Receive	300 ma @ 12 VDC
Transmit	1100 ma @ 12 VDC

Case	
Dimensions	1.9 in. H x 6.7 in. W x 6.2 in. L
Weight	1.25 lbs.
Outdoor Pole Mounting Kit	Optional, EST P/N 195PM

Other	
Warranty	1 Year
Temperature Range	-30° to +60° C
Humidity	95% Non-condensing
FCC ID Number (USA)	ENPESTEEM195ED
IC Number (Canada)	1457-195ED

Model 195Ed Case Specifications





Note:

Left connector is used for RS-232C programming port.

Right side is the Ethernet interface port.

Note:

Auxiliary Power Plug with screw termination for wiring is available.

Note: All dimensions are in inches.

Antenna Specifications

Model No: AA191s
Antenna Type: Omni-Directional, Permanent Vehicle Mount
Applications: Direct mount
Frequency: 896 to 940 MHz
Polarization: Vertical
Impedance: 50 ohms
Gain: 7 dBi (5 dBd)
VSWR: < 1.5 to 1
Front to Back Ratio: n/a
Horizontal Beamwidth: n/a
Vertical Beamwidth: n/a
Antenna Material: Molded Polymer
Mounting Hardware: Included
Antenna Connector: TNC-R Male
Antenna Envelope: 32 in. length
Weight: <1 lbs.

Caution

Omni-directional antenna should not be located within 23 cm of personnel.

Model 191Es

Model: AA20DMEs
Applications: Model 195Ed direct case mount
Antenna Type: Omni-Directional, Sleeve dipole
Frequency: 902 to 928 MHz
Polarization: Vertical
Impedance: 50 ohms
Gain: 2 dBi (0 dBd)
VSWR: < 2:1
Power: 10 W
Front To Back Ratio: n/a
Horizontal Beamwidth: n/a
Vertical Beamwidth: 60 degrees
Antenna Material: Polyurethane Plastic Radome
Recommended Mounting Hardware: n/a
Antenna Connector: TNC-R Male
Flexibility: +/- 20 °
Antenna Envelope: 8.8 in. length by .51 in. width
Temperature: -20 to +65 C°
Weight: 35 grams

Caution

Omni-directional antenna should not be located within 23 cm of personnel.

Model AA20DMEs

Antenna Specifications

Model No:	AA20Es900
Antenna Type:	Omni Directional, DC Grounded
Applications:	Fixed base
Frequency:	902 to 928 MHz
Polarization:	Vertical
Impedance:	50 ohms
Gain:	7 dBi (5 dBd)
VSWR:	1.5:1 Typical
Front to Back Ratio:	n/a
Horizontal Beamwidth:	n/a
Vertical Beamwidth:	22 degrees @ ½ power
Antenna Material:	Brass radiator, UV inhibited fiberglass enclosed
Mounting Hardware:	Base to Mast, Supplied.
Maximum Power Input:	150 Watts
Wind Survival:	100 mph
Bending Moment:	14.2 ft-lbs. @ 100 mph
Antenna Connector:	TNC-R Male with 36in. pig-tail.
Antenna Envelope:	48 in. L x 1-5/16 in. Dia.
Weight:	1.75 lbs.

Caution

To comply with the FCC exposure compliance requirements, a separation distance of at least 23 cm must be maintained between the antenna and all persons.

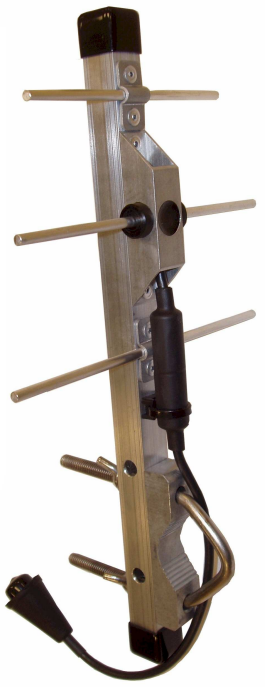
Model AA20Es900

Antenna Specifications

Model No:	AA203Es900
Antenna Type:	Directional, DC grounded
Applications:	Fixed base.
Frequency:	902 to 928 MHz
Polarization:	Vertical or Horizontal
Impedance:	50 ohms
Gain:	7 dBi (5 dBd)
VSWR:	< 1.5:1 Nominal
Front to Back Ratio:	> 16 dB
Horizontal Beamwidth:	130 degrees @ ½ power
Vertical Beamwidth:	70 degrees @ ½ power
Antenna Material:	Aluminum
Mounting Hardware:	Heavy duty U bolts for mounting up to 2.0 in. pipe (included).
Antenna Connector:	TNC-R Male with 2 ft. pigtail with ESTeem weatherproof boot.
Maximum Power Input:	50 Watts
Antenna Envelope:	1.1 ft. length by 6 in. width
Windload (RWV):	150 mph
Wind Surface Area:	.11 ft²
Weight:	1 lbs.

Caution

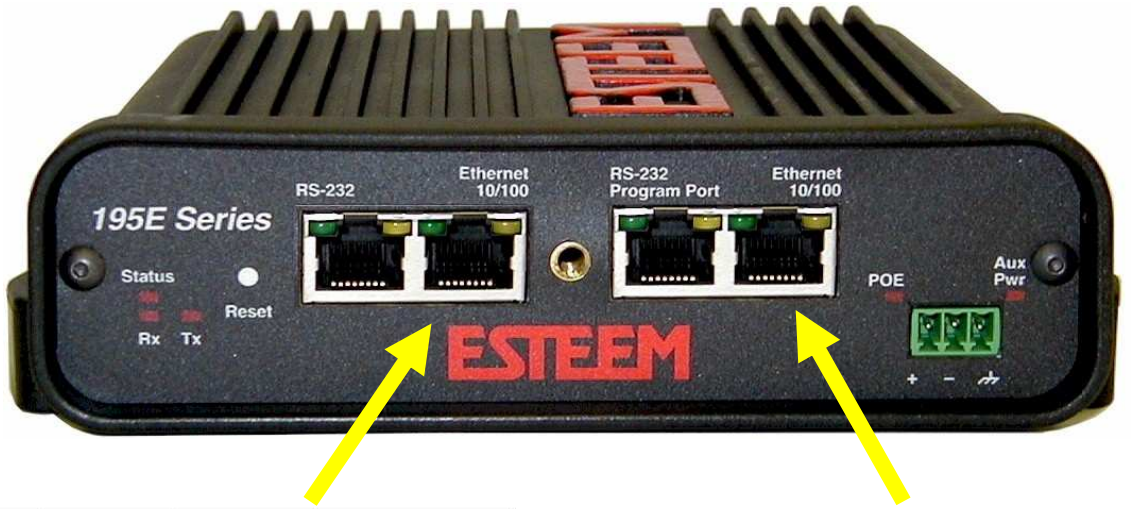
To comply with the FCC exposure compliance requirements, a separation distance of at least 23 cm must be maintained between the antenna and all persons.



Model AA203Es900

ETHERNET INTERFACE

The ESTeem Model 195Ed's Ethernet Port is a Full and Half-Duplex Auto-negotiation interface supporting both 10 Mbps and 100 Mbps (10/100BaseT). The Ethernet port is compliant with IEEE 802.3af Power Over Ethernet (PoE) to provide both data and power over the same CAT-5E grade Ethernet cable. The port is compatible with TIA/EIA-568B cable configuration (Figure 1).



RJ45 Pin No.	Wire Color	Wire Diagram	10Base-T Signal 100Base-TX Signal
1	White/Orange		Transmit +
2	Orange		Transmit -
3	White/Green		Receive +
4	Blue		Unused
5	White/Blue		Unused
6	Green		Receive -
7	White/Brown		Unused
8	Brown		Unused

RJ45 Pin No.	Wire Color	Wire Diagram	10Base-T Signal 100Base-TX Signal
1	White/Orange		Transmit +
2	Orange		Transmit -
3	White/Green		Receive +
4	Blue		+ Power
5	White/Blue		+ Power
6	Green		Receive -
7	White/Brown		- Power
8	Brown		- Power

Figure 1: Ethernet Pin Layout

A second Ethernet port will be included if the serial option is added to the 195Ed. This second Ethernet port can be used in Bridge Mode (HUB) or as a router.

CONFIGURING DHCP SERVER

The ESTeem 195Ed Ethernet port supports both client and server Dynamic Host Configuration Protocol (DHCP). Figure 2 shows the DHCP host configuration screen that will be shown if DHCP server is selected in the setup screens. Enter the values that match the DHCP configuration for your network.

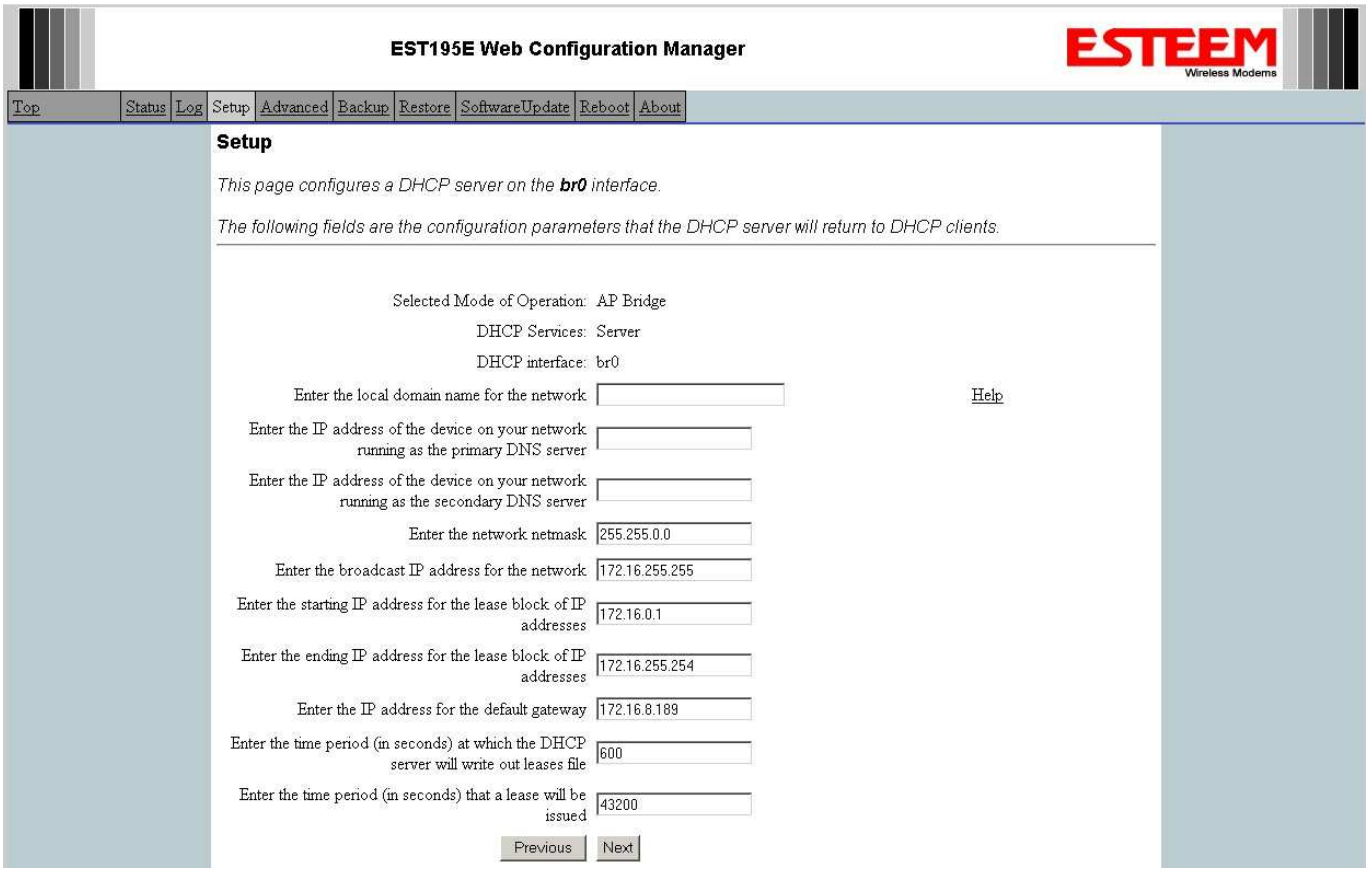


Figure 2: DHCP Server Configuration

RS-232C PROGRAMMING PORT CONFIGURATION

The ESTeem Model 195Ed has a proprietary RS-232C interface in a RJ-45 connector on the front panel. To interface the 195Ed to the serial port on the computer, you need ESTeem cable AA0621 that combines a standard Ethernet patch cable to a 9-pin Female adapter.

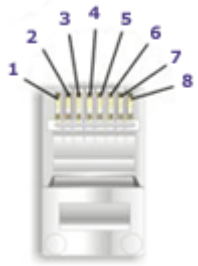
The serial port on the ESTeem Model 192E can be used to access the configuration menu in the ESTeem for system and network configuration. The ESTeem communications port operates at 38,400 bps, No Parity, 8 Data Bits and 1 Stop Bit (38,400,N,8,1). Configure your terminal program to match these settings.

Model 195Ed Serial Port Interface

RS-232 PROGRAMMING PORT PIN-OUT TABLE

ESTeem Model AA0621
RS-232C Port Pin-Out Table

RJ-45 Pin No.	Function	DB-9 Pin No.
4	Signal Ground (GND)	5
5	Receive Data (RxD)	2
6	Transmit Data (TxD)	3



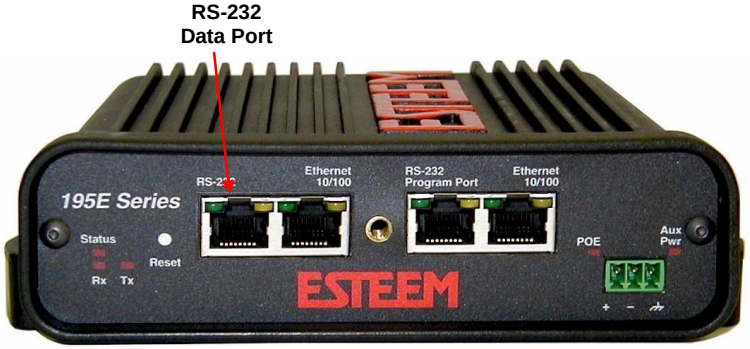
Ethernet Pin-out

RS-232C DATA PORT CONFIGURATION

The ESTeem Model 195Ed has an RS-232C interface in a RJ-45 connector on the front panel that can be installed as an option . To interface the 195Ed to the serial port on the computer, you need serial cable with the following pin-out:

ESTeem Model AA0621
RS-232C Port Pin-Out Table

RJ-45 Pin No.	Function	DB-9 Pin No.
1	Data Set Ready (DSR)	6
2	Data Carrier Detect (DCD)	1
3	Data Terminal Ready (DTR)	4
4	Signal Ground (GND)	5
5	Receive Data (RxD)	2
6	Transmit Data (TxD)	3
7	Clear to Sent (CTS)	8
8	Request to Sent (RTS)	7



Model 195Ed Serial Data Port Interface

195Ed FREQUENCY OF OPERATION

In a wireless Ethernet network all of the ESTeem Model 195Ed's must be set to the same radio frequency of operation or channel. Listed on the right is a table showing the channel and corresponding frequency of operation. The frequency of operation is selectable when configuring the mode of operation of the 195Ed (reference Chapter 4). See Figure 1.

RF COMMUNICATIONS DATA RATE

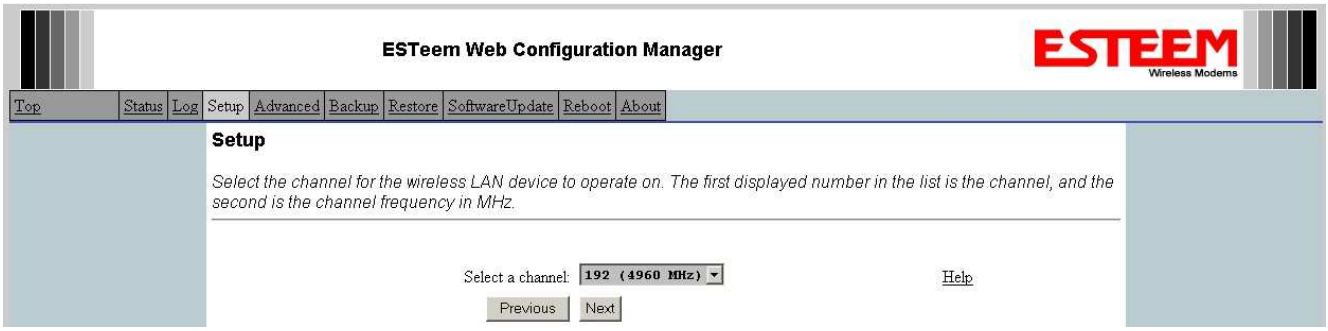


Figure 1: RF Channel Selection

The RF data rate of the Model 195Ed can be programmed for operation at 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps. The RF data rate can be set for a fixed rate or a specific range that is dynamically scaled by the Model 195Ed from monitoring the received signal quality. The Model 195Ed can communicate with multiple client 195Ed devices at different data rates for each device. By selecting all ranges from 1 to 54 Mbps you will be able to communicate with all client 195Ed regardless of their data rate and signal quality requirements.

Dynamic scaling means that the Model 195Ed will operate at the highest RF data rate that is programmed into unit. If the received data quality drops below the required minimums for reliable communications the Model 195Ed will reduce the data rate to the next lowest step to increase signal quality. Conversely if the signal quality increases above the minimums the Model 195Ed will increase the RF data rate the next highest level.

The ESTeem 195Ed is set at the factory to operate at maximized scaling speed data rates from 1-54 Mbps and should not need adjustment. The RF Data Rate is programmed in the Model 195Ed through the **Advanced Menu>Wireless LAN Settings>Wlan0 Device** and the value for **wlan0_OPRATES:**. In the example shown in Figure 2 the RF Date Rate is programmed to dynamic scale from 1 to 54 Mbps (recommend factory default setting). To set the values for the data rate, check the box next to the listed data rate to enable this rate for operation.

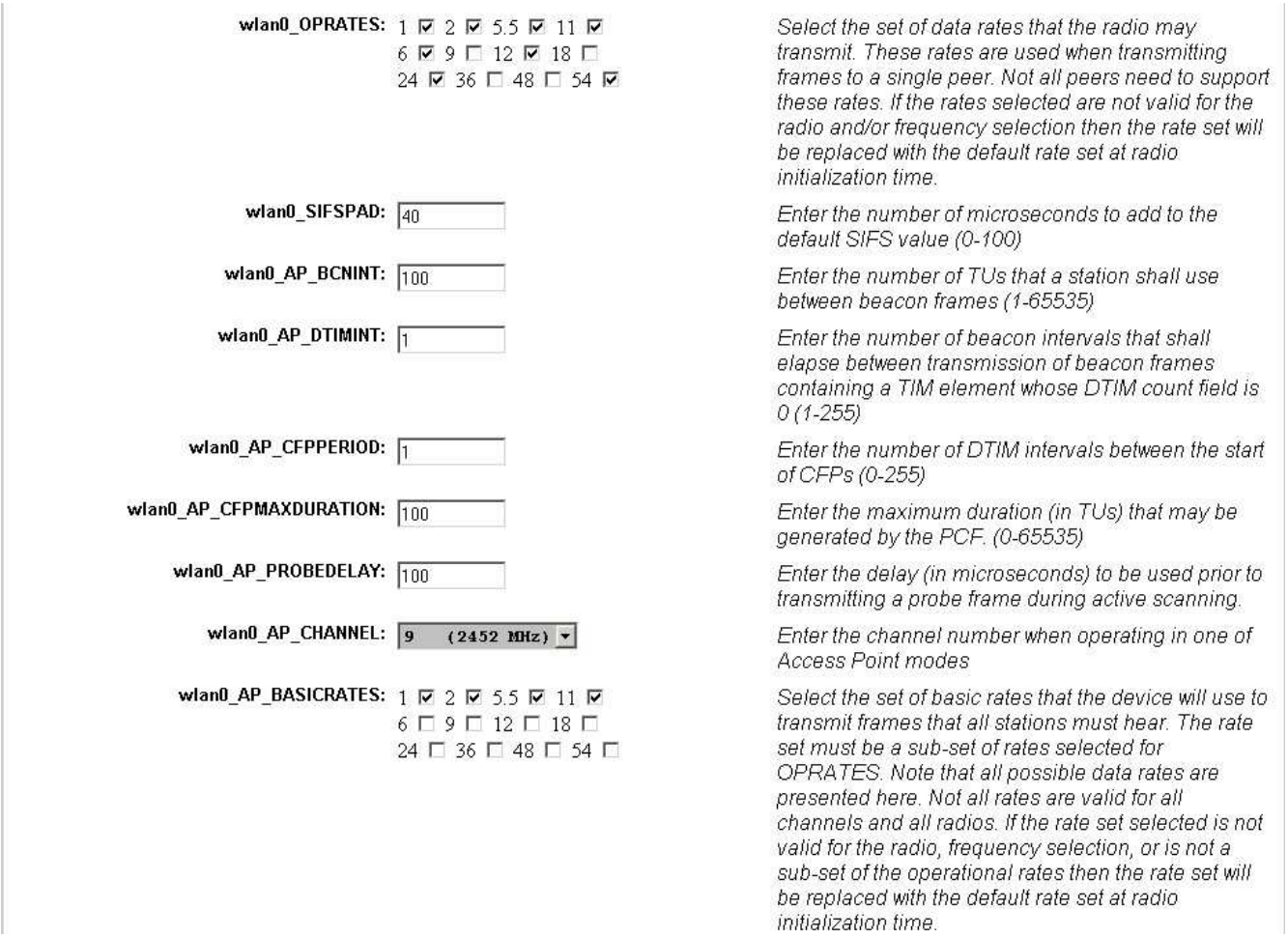


Figure 2: Advanced Data Rate Selection

RF BASIC RATE

The RF Basic Rate is the synchronization rate used to establish the initial connection between 802.11g and 802.11b communication devices in Mbps. After the initial connection has been establish the RF communication rate will be determined by the RF Communication Data Rate established above. Factory default is 1 through 11 Mbps shown in Figure 2 so that the unity will establish communication with the older (slower) 802.11b devices. This lower rate also allows for a quicker reconnect when the ESTeems are configured for EtherStation mode or working in a mobile environment.

The ESTeem 195Ed is set at the factory to operate at all speeds from 1-11 Mbps and should not need adjustment. The RF Basic Rate is programmed in the Model 195Ed through the **Advanced Menu>Wireless LAN Settings>Wlan0 Device** and the value for **wlan0_AP_BASICRATES:**. In the example shown in Figure 2 the RF Date Rate is programmed to dynamic scale from 1 to 11 Mbps (recommend factory default setting). To set the values for the data rate, check the box next to the data rate required.

Note: The Model 195Ed will only communicate with slower speed devices after synchronization if the RF Communication Data shown above has been set to dynamically scale to 1 and 2 Mbps.

*In general, do **not** set the RF Basic Rates above 11Mbps unless specifically instructed by ESTeem Customer Support.*

OVERVIEW

The security for the ESTeem Model 195Ed, like all network security, must be multi-layered. One level of security is never enough to make sure that data does not end up in the wrong hands. Please review the following security levels and decide what is the most appropriate for your network.

128-BIT WEP

The 128 WEP uses a particular algorithm called RC4 encryption to encode and decode traffic that is based on a 104-bit encryption key and a 24-bit Initialization Vector (IV). RC4 starts with a relatively short encryption key (104 bits) that is expanded into a nearly infinite stream of keys to accompany the stream of packets.

The basic concept of RC4 is good, but the way it's implemented in WEP leaves it open to compromise. The researchers that test the integrity of the system usually focus on one piece of the implementation, the Initialization Vector (IV).

The IV (24 bits) is the algorithm component that's supposed to keep expanded keys from repeating. From the researcher's point of view, a high-volume access point is mathematically guaranteed to reuse the same key stream at least once a day. When this happens, it's called an IV collision this becomes a soft spot to enter the system.

The researchers aren't saying that it's easy to break into the system, or that it's being done on a regular basis, only that it is possible and that administrators should consider ways to reduce the possibility.

WPA

Wi-Fi Protected Access with Preshared Key (WPA PSK)
WPA, which uses 802.1x, was introduced in 2003 to improve on the authentication and encryption features of WEP. All authentication is handled within this access point device. WPA has two significant advantages over WEP:

1. An encryption key differing in every packet. The TKIP (Temporal Key Integrity Protocol) mechanism shares a starting key between devices. Each device then changes their encryption key for every packet. It is extremely difficult for hackers to read messages even if they have intercepted the data.
2. Certificate Authentication (CA) can be used, blocking a hacker posing as a valid user.

Wi-Fi Protected Access with Enterprise Server (WPA Enterprise)
Like WPA PSK, WPA Enterprise uses 802.1x. However, a backend authentication server handles the authentication decision. The most commonly type of authentication server is a RADIUS server. The ESTeem Model 195Ed can be configured to operate with an established RADIUS server on the network.

WPA is server/client relationship from a software driver on a computer's wireless LAN (WLAN) card to an Access Point. The scope of WPA is limited in use to this configuration only. The ESTeem Model 195Ed can support WPA Enterprise and PSK as an Access Point, but the level of security on the Bridging layer is configured separately.

ACCESS CONTROL LIST (ACL)

The ACL is one of the simplest yet most secure methods of network security. The ACL is a configurable MAC filter in the Model 192E that can be set to allow specific MAC address on the wireless network by individual address or address ranges. The same filter can also be set to reject individual MAC addresses or address ranges.

The MAC address is a unique, 6 hexadecimal field address assigned at the manufacturer that can not be changed. The MAC address is traceable through the IEEE governing body to the manufacturer and is the "fingerprint" for all Ethernet devices.

Using a combination of both the WPA or 128-Bit WEP encryption and the ACL filter provide the ESTeem an extremely secure wireless networking layer.

DISABLING BROADCAST PROBES AND HIDING SSID

A simple but very effective way of securing a network is to make the network difficult to find. By disabling broadcast probes and hiding the Service Set Identification (SSID), wireless and network “sniffers” will not be able to find your ESTeem Model 195Ed network. To gain access to the wireless network, you would be required to have the SSID and all security loaded in the WLAN card software prior to entering the network.

MASQUERADE MODES

When the ESTeem Model 195Ed is configured in either the Access Point Masquerade or the Client Masquerade modes, the wireless modem functions as a network firewall. If access to the wired network is the greatest concern, place the ESTeem in the Masquerade mode and the wireless network will be completely isolated from the wired Ethernet network.

INCREASING NETWORK SECURITY

The following are a few suggestions to help improve the overall security of your wireless network:

1. Enable the security. If you research all of the articles regarding hackers, they have gotten into the user’s network due to the security not being enabled.

2. Set the ACL filter to include only those MAC address of the wireless Ethernet device being used on the network.

3. Set "Hide SSID" to True. As you take your access point out of the box, broadcast SSID is enabled which means that it will accept *any* SSID. By hiding the SSID configured in the client must match the SSID of the access point.

4. Make sure the keys are not reused in your company, since reuse increases the statistical likelihood that someone can figure the key out and change the default password on your access point or wireless router

5. Change the default SSID of your product. Don't change the SSID to reflect your company's main names, divisions, or products. It just makes you too easy to target.

6. As a network administrator, you should periodically survey your company using a tool like NetStumbler to see if any "rogue" access points pop up within your company without authorization. All of your hard work to "harden" your wireless network could be wasted if a rogue AP was plugged into your network behind the firewall.

7. Many access points allow you to control access based on the MAC address of the NIC attempting to associate with it. If the MAC address of your NIC isn't in the table of the access point, you won't associate with it. And while it's true that there are ways of spoofing a MAC address that's been sniffed out of the air, it takes an additional level of sophistication to spoof a MAC address. The downside of deploying MAC address tables is that if you have a lot of access points, maintaining the tables in each access point could be time consuming. Some higher-end, enterprise-level access points have mechanisms for updating these tables across multiple access points of the same brand.

8. If you're deploying a wireless router, think about assigning static IP addresses for your wireless NICs and turn off Dynamic Host Configuration Protocol (DHCP). If you're using a wireless router and have decided to turn off DHCP, also consider changing the IP subnet. Many wireless routers default to the 192.168.1.0 network and use 192.168.1.1 as the default router.

9. A simple security technique used by the military is to have the administrator periodically change the key for the system i.e. weekly, monthly, etc.

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 (Figure 1). If the Status light is solid on any other 195Ed except the Timing Master, the Model 195Ed has a connection to another Model 195Ed listed in the Peer Table. On the Timing Master the status light will be illuminated at all times.

Figure 1: Connection Status Light

Status Screen/Peer Table

To view detailed 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 (Figure 2).

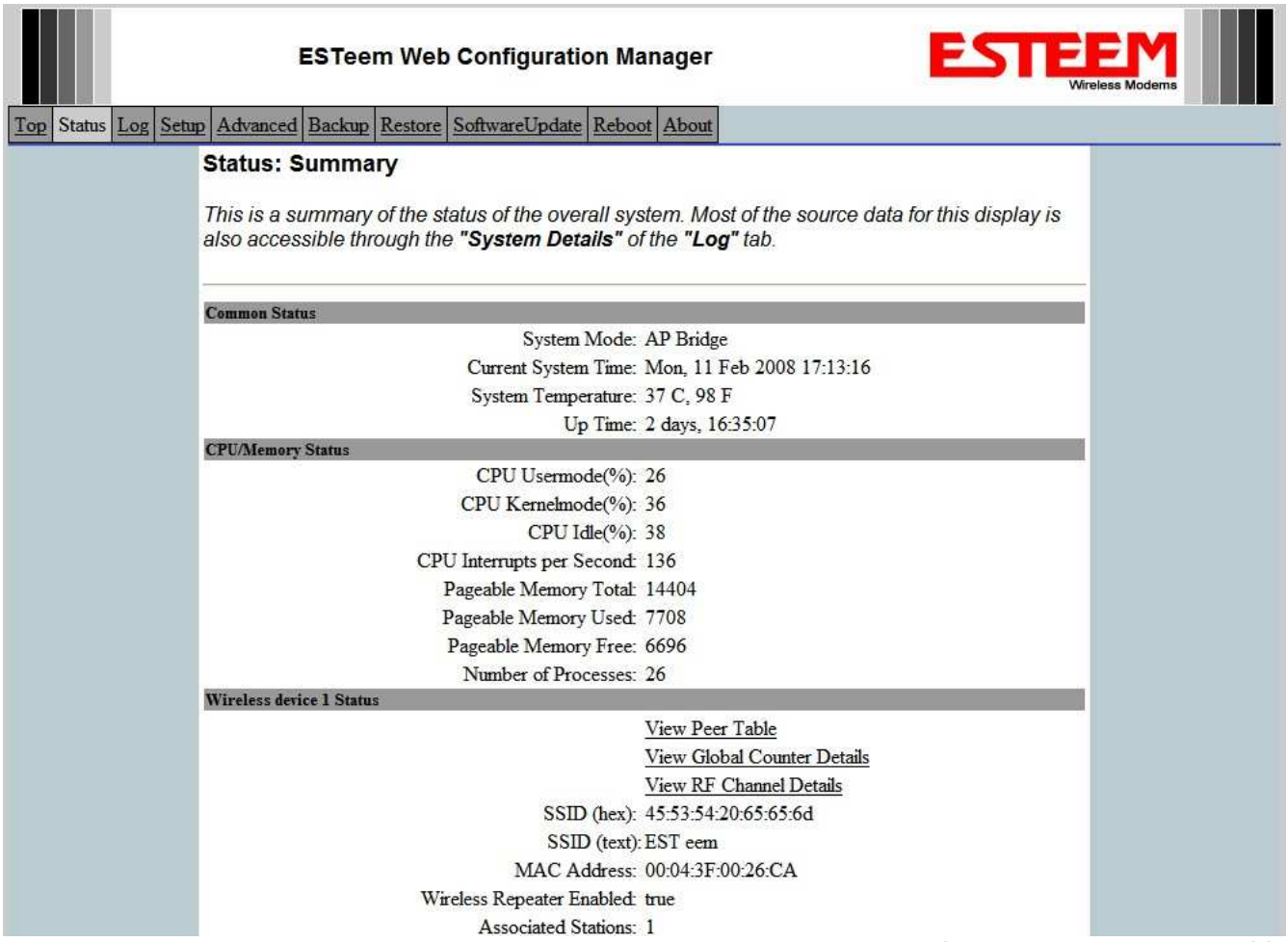


Figure 2: Peer Summary Table

Under the Wireless Status heading click on the View Peer Table and the Peer Table Screen will be displayed (Figure 3).

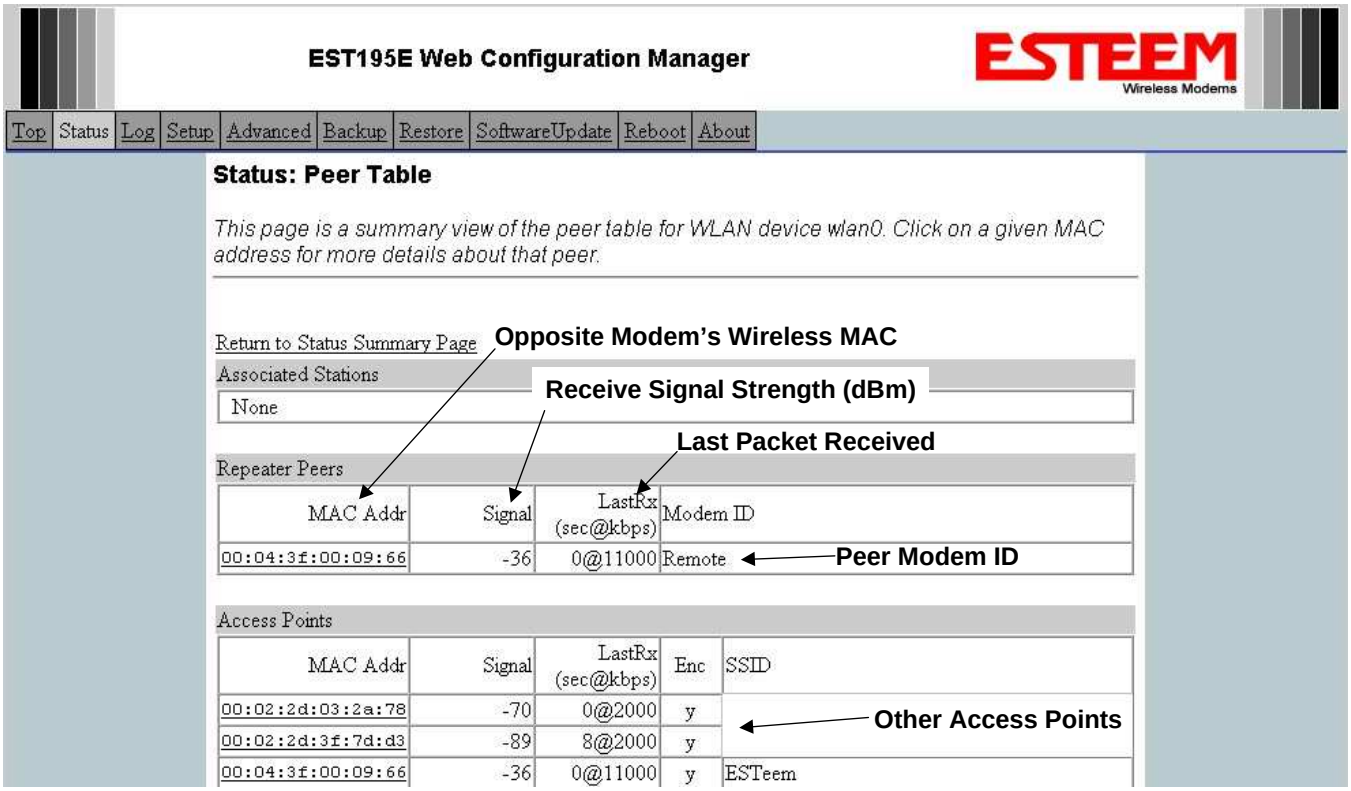


Figure 3: Repeater Peer Table

Repeater Peers - The Peer Table will display all connected 195Ed configured to repeat to this ESTeem by their Wireless (WLAN) MAC address.

Received Signal Strength – This is the first of the two numbers listed in the block. This signal strength value is listed in dBm.

Last RX – This is the time of the last received data packet. When monitoring the status menu, it is important to note the time the last transmission was updated so you are not looking at "stale" data.

Current Data Rate – This is the current speed the last data packet received by the Model 195Ed. Note that the speed is listed in kbps.

Modem ID – This is Modem ID for the opposite repeater peer.

Peer Table Details

To further analyze a repeater peer link, press the hyperlink for any WLAN MAC address listed in the repeater peer summary (Figure 3) and the Peer Info screen will be displayed (Figure 4). Detailed information on the Counter, Statistics, Link Encryption, Beacon and Probes can found by selecting the respective hyperlink.

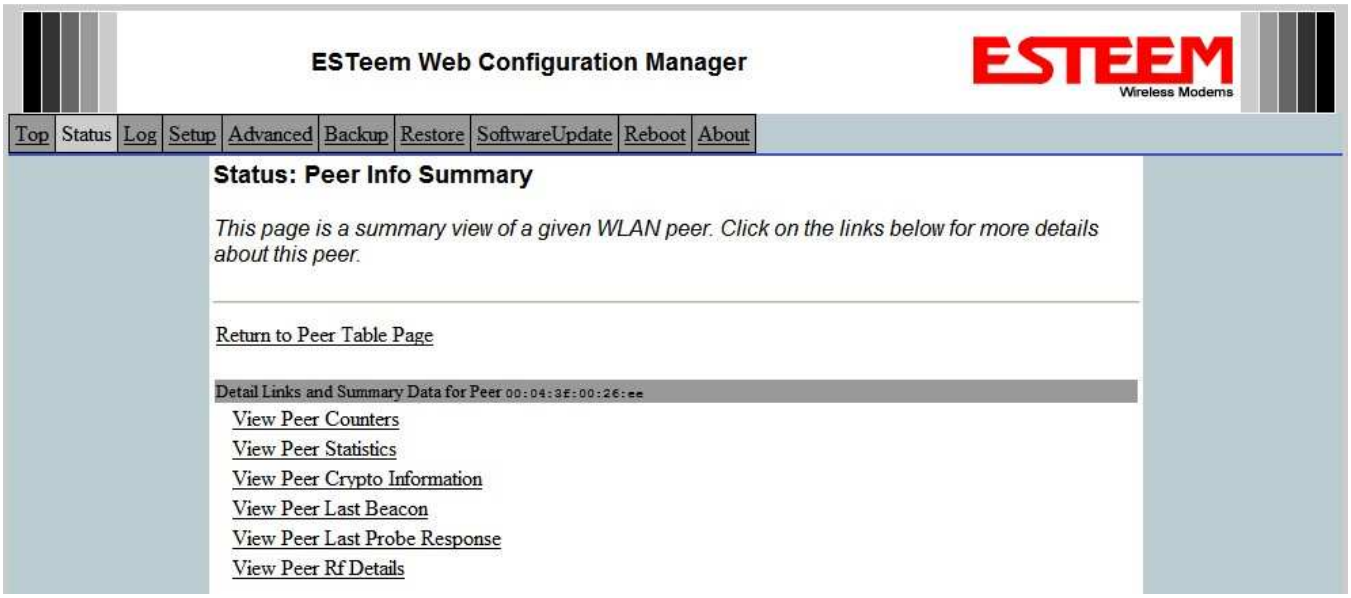


Figure 4: Repeater Peer Table

TROUBLESHOOTING TIPS

General (Applicable to All Modes of Operation)

Where do I find the latest firmware version number? – We have the latest version number of the Model 195Ed firmware listed on the ESTeem Web site (www.esteem.com) under the Model 195Ed product page.

How and when do I update the Model 195Ed firmware? - You should only update the Model 195Ed firmware if you are having a specific problem and it is recommended that you do so by ESTeem Customer Support personnel. All the update instructions and files are located on the ESTeem FTP site at the following address:
ftp://www.esteem.com/195Ed

Do all firmware versions have to be the same to communicate between the Model 195Ed? – It is not necessary for all the firmware versions to be the same revision to communication, but the later version may have added features that the other versions will not recognize.

What characters are valid for WEP Key entry? - Only the Hexadecimal characters 0-9 and A-F are valid for key entry.

What ESTeem Utility version is required to program the Model 195Ed? – The ESTeem Utility program is not required to program the Model 195Ed. The 195Ed can be programmed using any Terminal Emulation program (such as Windows HyperTerminal) and any web browser program.

What is the speed and duplex configuration on the Model 195Ed – The Model 195Ed is an auto-negotiation full/half-duplex 10/100 Base-T interface. Ether a cross-over or patch cable is supported.

Access Point Repeater Mode

If I am unable to communicate with any of the remote sites, what is the most common cause? - The most common cause a communication problems with the 195Ed is that the SSID was entered incorrectly for the radio network. The 195Ed uses the SSID to set the frequency hopping pattern and it must be the same on all modems.

How long does it take to re-establish the Wireless Ethernet Network? - If a communication link is lost and the Wireless Network needs to re-establish the repeater routes, the time can take up to 30 seconds.

Should the AP Repeater Mode be used on mobile equipment? - The AP Repeater mode should be used on equipment that will not change the Repeater Route as it moves. For example, if a mobile device such as a crane can communicate directly to another ESTeem and will not loose the link in its travel, the AP Repeater Mode could be used. If the device requires two ESTeem Model 195Ed's (Base and Repeater) to maintain communication across its complete travel, the Station Modes should be used on the mobile device. The problem will be in the time that the mobile ESTeem will take to transfer between the two sites. In Access Point Repeater mode the transfer can take up to 30 seconds, while the EtherStation mode will transfer without a packet loss.

Does WEP have to be used? – The WEP does not have to be enabled for the modems to communicate, but all modems must be configured the same way.

Correct configuration, but cannot establish communications. – In addition to the network configuration, all 195Ed modems configured in the AP mode must share the same SSID and be on the same frequency channel. The most likely cause of the error is the WLAN MAC address is not configured in **both** 195Ed's repeater tables. If only one side is configured, everything will appear to be correct but no communication will function.

EtherStation

How do I access the Model 195Ed web page in EtherStation Mode? The Model 195Ed does not have an active web browser when configured in EtherStation mode. You must access the ESTeem with the ESTeem Discovery Program or through the RS-232 port after configuration in this mode. To monitor the link status, you can use the EtherStation Status program.

What IP address do I configure the ESTeem in EtherStation mode? – The Model 192E will not have an IP address in EtherStation mode.

I can not link my device into the wireless network – Verify that the MAC address of the device is **exactly** the same as configured in the Model 195Ed. The MAC address must have colons between the values.

Can I connect my Model 195Ed in EtherStation mode to a HUB or Ethernet Switch? – No. The modem must be connected directly to the Ethernet device for which it is programmed. In EtherStation mode the Model 195Ed can only service ONE Ethernet device.

ESTEEM DISCOVERY UTILITY

The ESTeem Discovery Utility will allow you to configure the IP address on the Model 195Ed to match your network regardless of its current IP subnet. This utility will also allow you to update the software in the 195Ed and open the web configuration for that wireless modem.

Figure 1: ESTeem Resource Main Page

Installation

To install the Discovery Utility on your computer, 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.

1. 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).

2. From the Main Page select ESTeem Utilities and click on ESTeem Discovery Utility (Figure 2).

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

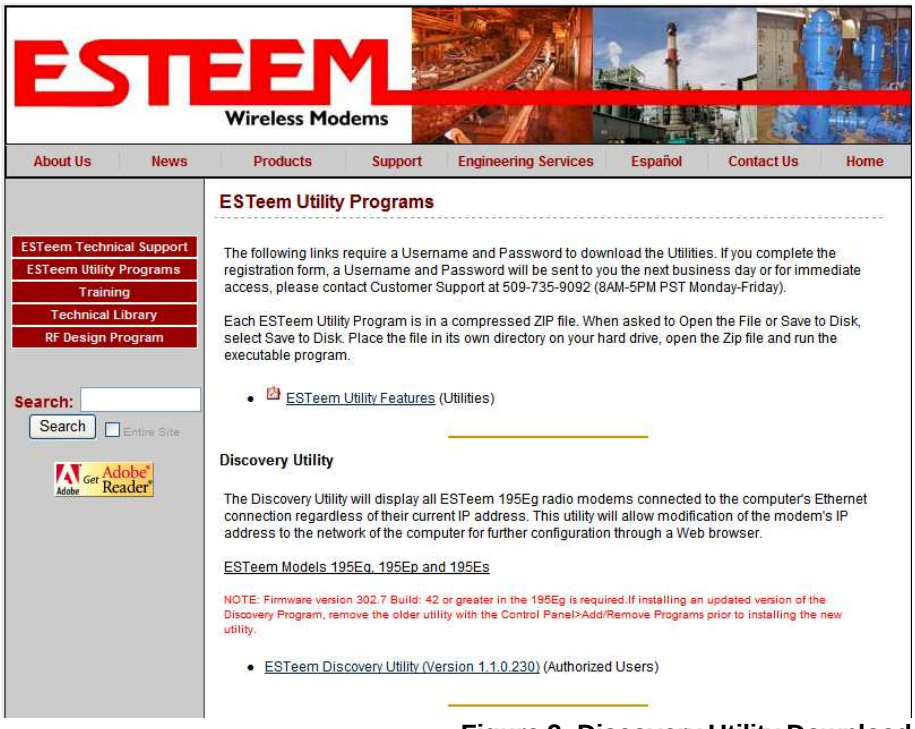


Figure 2: Discovery Utility Download

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

4. 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).

Figure 3: Discovery Program Main Page

Note: *The SSID, Mode of Operation and Modem ID will be adjusted through the web configuration manager..*

5. Double-click on the 195Ed you want 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 in Chapter 4.

Figure 4: Change IP Address Window

Firmware Updates

To update firmware on any ESTeem Model 195 that is shown on the Discovery program, "right-mouse" click on the 195's MAC address and select **Update** from the menu (Figure 5)**.** Once you locate the update file, select the **Open** button and the 195 will update, validate and then reboot with the updated operating system.

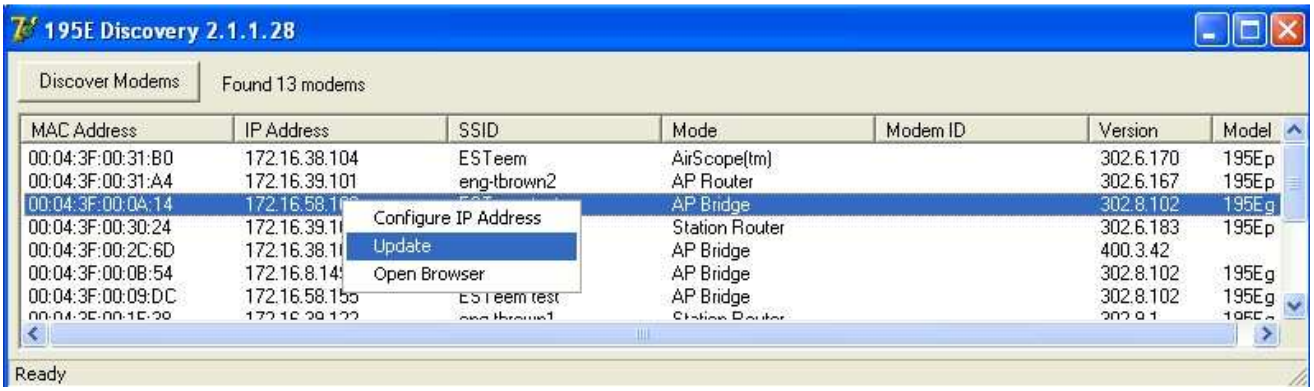


Figure 5: Discovery Features Menu

Opening Web Browser

To quickly open a web browser page to the IP address programmed in the 195 modem, "right-mouse" click on the 195's MAC address and select **Open Browser** from the menu (Figure 5)**.** If your computer is configured for the same IP subnet at the ESTeem 195 wireless modem, you will be asked to sign in with the Username and Password (Figure 6) and you can begin programming the Model 195 for your application.

Figure 6: ESTeem Web Page Log-on Screen

ETHERSTATION STATUS PROGRAM

When configured for EtherStation mode, the Web Configuration Manger is turned off. To gather information from the 195Ed on Access Point, link status and received signal strength you will need to install the ESTeem 195E Status Utility. The EtherStation Status Utility version 2.0.0.0 or greater provides a new feature where it will automatically program the connected ESTeem 195Ed to match up with the computer running the software. This software requires that the ESTeem 195Ed has software version 302.8.102 or greater installed for this feature to function.

This software program is found on the AA109 Resources Disk or available from the ESTeem web site. To install the utility, please complete the following:

Installation

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.

1. 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).

2. From the Main Page select ESTeem Utilities and click on EtherStation Status Utility

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

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

4. 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 Status Program and a status icons will appear in your system tray (Figure 9). When the status menu is opened from the system tray, the status window will be displayed (Figure 7) to show the Access Point MAC address and signal strength. The tray icon and Signal Strength bar will display the colors from Green, Yellow to Red on progressively poorer signal or will show Grey if roaming.

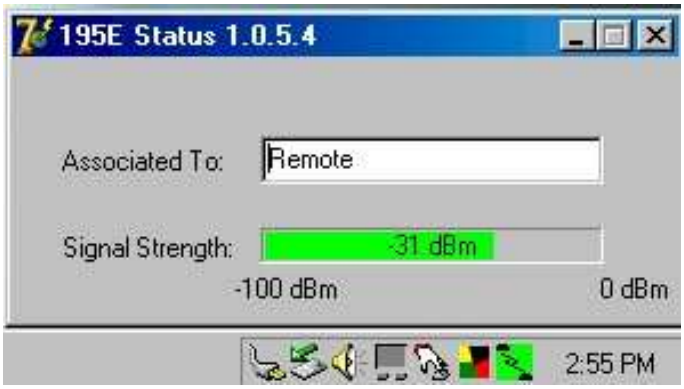


Figure 7: EtherStation Status Program

Note: *This Utility will only operate with an ESTeem Model 195Ed in EtherStation mode.*

SETTING LOCAL TIME

The ESTeem Model 195Ed will be shipped from the factory with the internal real-time clock set to Pacific Time. To change the clock settings to the local time for accurate log file entries:

1. Select **Advanced** from the top Menu then **Wireless LAN Settings>wlan0 device** and press the **Next** button (Figure 8).

2. Select **Global Settings>Set System Time** from the menu and press the **Next** button to continue.

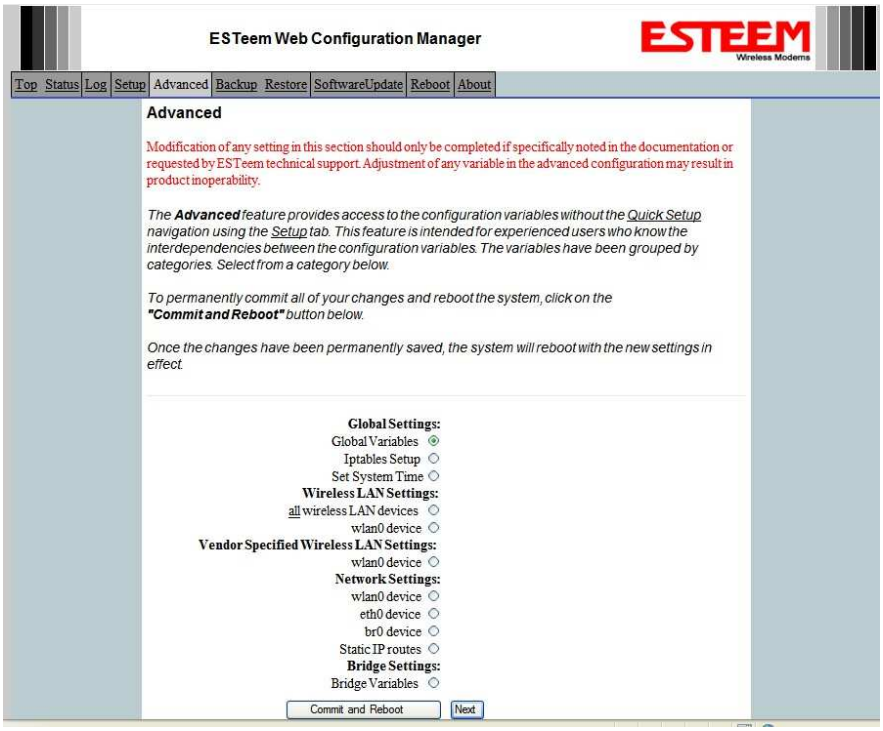


Figure 8: Advanced Features Screen

3. Select the correct date and time from the drop-down menus (Figure 9) and press the **Set System Time** button to save the time to the real time clock.

Figure 9: Advanced Features Screen

CONFIGURING TIME SERVER

Enabling NTP time synchronization services on the ESTeem 195Ed will allow to use time services from upstream services to keep the time on the system accurate.

To allow time synchronization, the Model 195Ed must be configured with the NTP Daemon enabled and the appropriate IP address of the upstream network NTP server.

1. Select **Advanced** from the menu items and **Global Variables** (Figure 10).

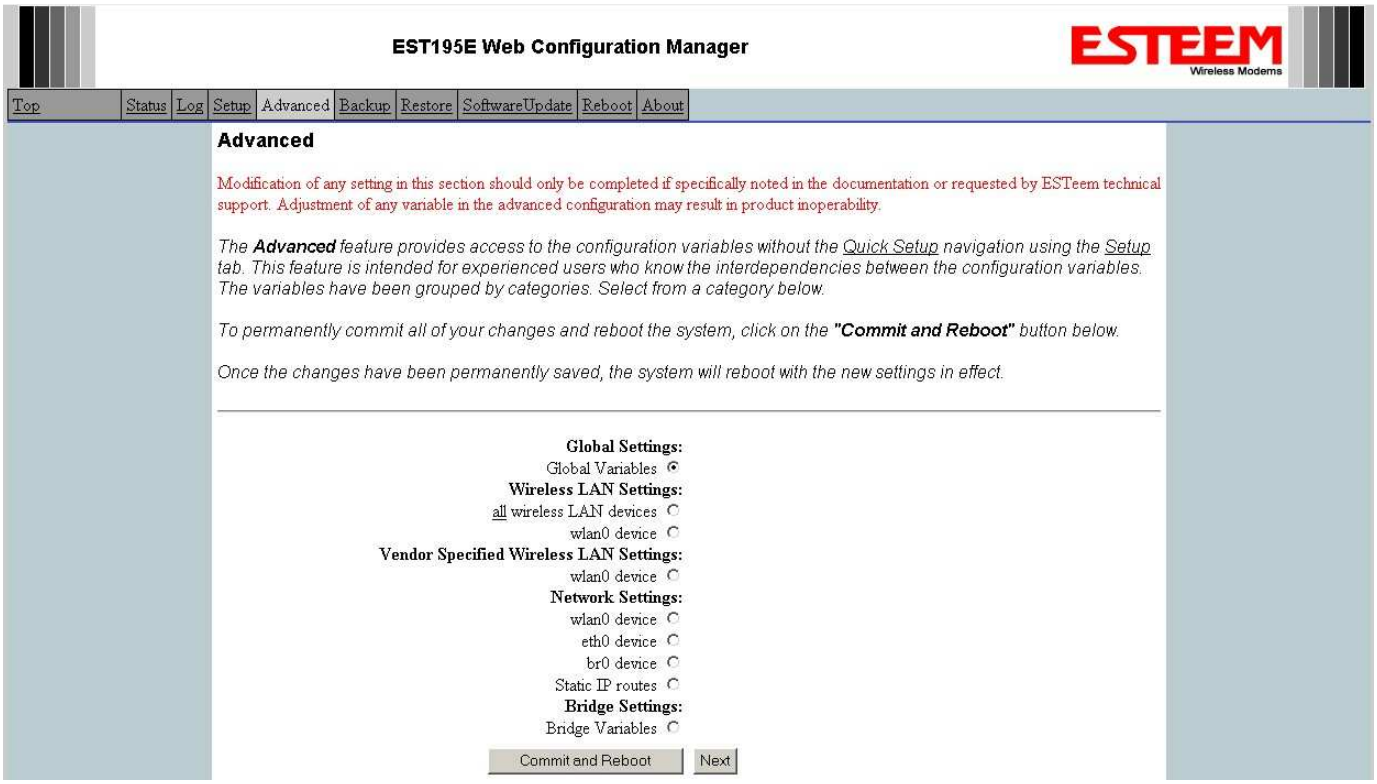


Figure 10: Advanced Settings Menu

2. Press the next button and Figure 11 will be displayed. At the bottom of the page are the NTP server configurations.

3. The NTP daemon is enabled by selecting YES for **NTP ENABLE** (Figure 11). When enabled, the NTP daemon will use time services from upstream services to keep the time on this system accurate.

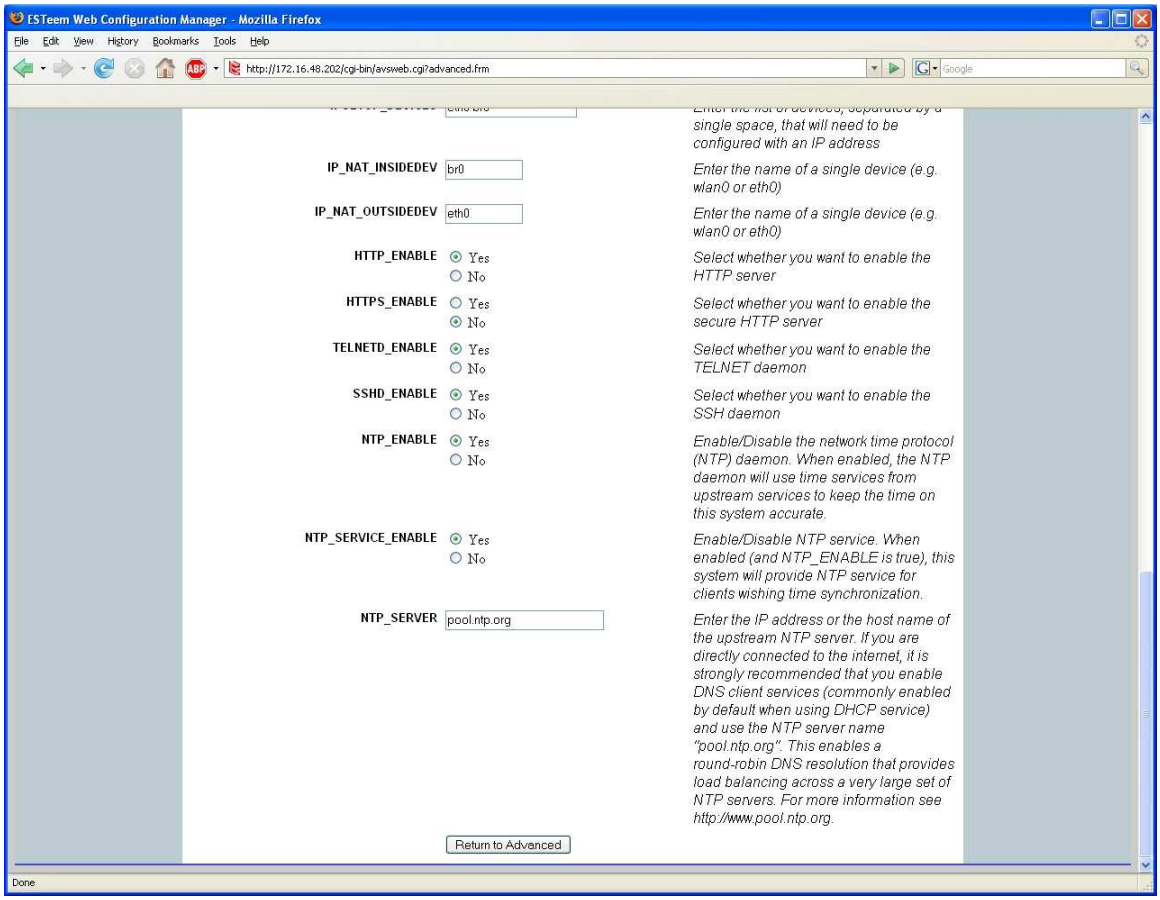


Figure 11: NTP Settings

4. Next, the **NTP SERVICE ENABLE** should be configured to "YES," if you want to allow the system to provide NTP service for clients wishing time synchronization (Figure 11).

5. The final step in configuring NTP services is to enter the IP address or the host name of the upstream NTP server.

6. Once configuration is complete, press the “Return to Advanced” button.

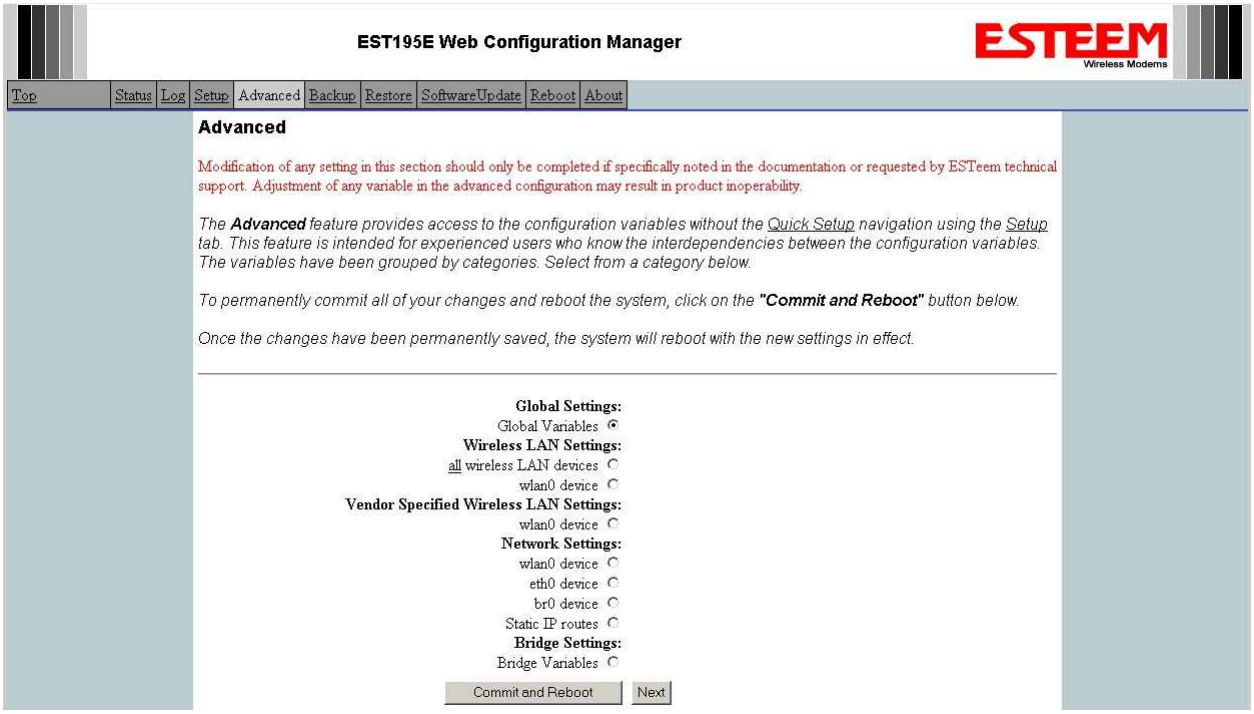


Figure 12: Advanced Settings Menu

7. To complete the configuration, select “Commit and Reboot.” The ESTeem 195Ed will now commit the configuration changes and reboot. (Figure 12)