

Wireless Modems

ESTeem MODEL 195Eg USER'S MANUAL

Manual Revision 1.0 June 2004



Electronic Systems Technology, Inc.

ESTeem MODEL 195Eg USER'S MANUAL

Manual Revision 1.0

Firmware Version 3.3.0 and above

June 2004

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Electronic Systems Technology 415 North Quay Street Kennewick, Washington USA 99336

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CHAPTER 1 INTRODUCTION

Mobile Wireless Network With Overlap Coverage

Station M

Ethernet Wired LAN

oss Point Bridge

with Repeater eature Enabled

MODEL 195Eg OVERVIEW

The ESTeem Model 195Eg is a IEEE 802.11g and IEEE 802.11b protocol compatible wireless LAN transceiver that can used to build a Wireless Local Area Network (WLAN) for line-of-sight distances to 7 miles for fixed base and mobile applications. The IEEE 802.11 WLAN was designed to look and feel like any IEEE 802 wired LAN. The Model 195Eg can be configured for multiple modes of operation depending upon the needs of the wireless and wired LAN system.

MODEL 195Eg CONFIGURATION MODES

The Model 195Eg can be configured for

Figure 1: Access Point Bridge Mode Diagram

NOTE:

Repeater may be stand-alone or

stadied to a

multiple modes of operation without any changes to the hardware:

1. Access Point Bridge Mode. When the Model 195Eg is configured as an Access Point it will provide a wireless bridge from a hardwired Local Area Network (LAN) to laptops, office computers, Personal Digital Assistants (PDA's), video cameras, PLC's, etc. that have integral or external 802.11g or 802.11b wireless devices. All Access Points can be physically connected to the same network (LAN) or through a radio link but using the Access Point Repeater mode to provide seamless Ethernet communication for mobile devices. The ESTeem Model 195Eg in Access Point Bridge mode will pass all network traffic between connected devices including global network broadcasts.

HUB or Switch

Paint Brid

Notes

Antenna's shiriwin are for illustriation purprises. There are many antonisa systems analiable depariting on your application.

Ethernet Wired LAN

Access Point Bridge with Repeater

Feature Enabled

Remote

Video

Monitoring

Client Mode

Client Made

2. Access Point Router Mode. In this mode the ESTeem Model 195Eg will function the same as the Access Point Bridge Mode described above with the following exception, the Access Point Router mode will pass network traffic for connected

devices but will not pass global network broadcasts. This mode of operation should be used instead of the Access Point Bridge mode when connecting the ESTeem to larger LAN Networks.

3. Access Point Masquerade Mode. The Access Point Masquerade mode is a special use of the Access Point mode where the Model 195Eg will connect 802.11g or 802.11b wireless devices as clients into a single static IP address on a network. The 195Eg will hide all the IP addresses connected on the wireless link. You should use this mode of operation if Model 195Eg is connected directly to the Internet with a static IP address (DSL, T1, etc.) and you want the wireless clients to access the information through the Model 195Eg (Figure 2). This mode should also be



Figure 2: Access Point Masquerade Mode Diagram



CHAPTER 1 INTRODUCTION

used for attaching the Model 195Eg to a network where few IP addresses are available or a separate, inaccessible subnet for the wireless clients is required.

4. Access Point Repeater Modes. The Access Point Repeater is a unique enhancement of the 802.11g Access Point mode. This feature is available only in the ESTeem Model 195Eg. With this repeater feature enabled, the Model 195Eg Access Points do not have to be hardwired together on the same physical LAN to provide seamless Ethernet communication for roaming 802.11b/g Clients. On power up the Model 195Eg will automatically associate with other Model 195Egs programmed with the same configuration (i.e. SSID, Frequency,



Figure 3: Access Point Repeater Mode Diagram

Security, etc.) for routing message traffic over the wireless Ethernet network. If there are multiple routes to a destination, this feature will create a "self-healing" network by automatically re-routing data through an alternate path to reach its destination if the primary path is inoperable. When programmed in any of the Access Point modes, the Model 195Eg will also bridge any Ethernet network or Ethernet device connected to the unit over this same wireless Ethernet network. This mode gives the user the features of a point to multi-point bridge network but also allows 802.11b/g Client devices or the Model 195Eg in the Client mode to roam under the network. See Figure 3.

- 5. EtherStation Mode. This is a special feature of the Model 195Eg when used in an Access Point application. When the 195Eg is configured in the EtherStation Mode and attached to a single Ethernet Device, the Model 195Eg will emulate an 802.11g PCMCIA wireless card in functionality for communication to an 802.11g Access Point. This mode can provide greatly increased range over a Wireless LAN Card for mobile Ethernet devices such as vehicles, forklifts, cranes, etc. See Figures 1 3.
- 6. **Station Router Mode**. This is a special feature of the Model 195Eg when used in an Access Point application where multiple devices will be connected to a single ESTeem in a mobile or Client application. When the 195Eg is configured in the Station Router Mode and attached to multiple Ethernet devices, the Model 195Eg will emulate an 802.11g client in functionality for communication to an 802.11g Access Point. This mode would be used where multiple Ethernet devices will be connected to a single Model 195Eg in a mobile application and the *IP addresses for each device will be visible on the LAN* connected to the Access Point. See Figure 2.
- 7. Station (Router) Masquerade Mode. This is a special feature of the Model 195Eg when used in an Access Point application where multiple devices will be connected to a single ESTeem in a mobile or Client application. When the 195Eg is configured in the Station Router Mode and attached to multiple Ethernet devices, the Model 195Eg will emulate an 802.11g client in functionality for communication to an 802.11g Access Point. This mode would be used where multiple Ethernet devices will be connected to a single Model 195Eg in a mobile application and the *IP addresses for each device will be hidden on the LAN* connected to the Access Point. See Figure 2.

To begin setup of your wireless Ethernet network you must first configure the Model 195Eg for the mode desired. Chapter 2 will show you how to begin programming the Model 195Eg.



Chapter 2 of the User's Manual will show basic configuration of the system using the RS-232 port to allow further programming using the ESTeem Web Page shown in Chapter 3.

When powering up the ESTeem for the first time you must use the ESTeem RS-232C Configuration Menu to setup the basic operating parameters such as assigning the ESTeem an IP Address, IP Net Mask, Gateway IP Address, Domain Name, and DNS IP Address. Once the IP address is configured you can communicate to the ESTeem through your web browser.

Any terminal emulation program can be used for this configuration of the ESTeem. Most Windows users will probably use Hyper Terminal. Configure your RS-232C port for a Baud Rate to 38,400, Data Bits to 8, Parity to None, Stop Bits to 1 and Handshaking to None. Once your ESTeem has an IP address, you can attach the ESTeem to your network and use the Web Server for further programming.

MODEL 195Eg HARDWARE LAYOUT

Locate the items contained in Figure 1 for initial configuration of the ESTeem Model 195Eg. Take a few minutes to inventory your equipment before you proceed. Report any missing or damaged items to Customer Support (509-735-9092) as soon as possible.



Figure 1: Model 195Eg Hardware Layout Diagram

Notes:

- There is no Power On/Off switch on the Model 195Eg.
- Attach the programming Cable to the RS-232 Programming Port and the Patch Cable between the Power Supply and Ethernet port.
- One word of caution please attached an antenna to the Model 195Eg before power up.



Model 195Eg.

MODEL 195Eg CONFIGURATION

The following steps should be completed before any modifications are made to the network operating parameters for the ESTeem Model 195Eg.

1. Connect the antenna to the antenna connector on the ESTeem Model 195Eg (Figure 2).



- 2. When powering up the Model 195Eg for the first time you must use the ESTeem RS-232C Configuration Menu to setup the basic operating parameters such as assigning the IP Address, IP Net Mask, Gateway IP Address, Domain Name, and DNS IP Address.
- 3. Connect the serial cable (EST P/N: AA0621) between the RS-232 connector on the Model 195Eg to the serial port on the computer.
- 4. Any terminal emulation program can be used for the configuration of the Model 195Eg. Most Windows users use Hyper Terminal. Configure your RS-232C port for a Baud Rate to 38,400, Data Bits to 8, Parity to None, Stop Bits to 1 and Handshaking to None and Terminal to VT100 emulation.
- 5. Plug the Model AA175 power supply into a wall socket and connect the Ethernet patch cable to the Model 195Eg Ethernet port. The Power over Ethernet (POE) LED on the front of the ESTeem should be illuminated.
- 6. If your computer is configured properly, you will see the ESTeem Model 195Eg booting sequence on your Terminal Emulation program.

Once the ESTeem boot sequence is complete (approximately 1 minute) you will receive this message:

"Please press Enter to active this console."

If you don't see this message press the Reset button on the front panel of the Model 195Eg and/or check the programming of your RS-232 port.



7. Press the Enter key and you will be at the Configuration Menu login prompt 195Eg login. See Figure 3.

195Eg - HyperTerminal File Edit View Call Transfer He	lp							<u>×</u>
02 28 21	r							
BusyBox on wdp802 Password: _	ll login: a	ndmin						
Connected 0:00:13 VT100	38400 8-N-1	SCROLL	CAPS	NUM	Capture	Print echo	1	

Figure 3: RS-232 Port Log-in Screen

- 8. To enter the Model 195Eg Main Menu you will need to log into the system with a login name and password.
- 9. If this is not the first time configuration of the Model 195Eg, see your network systems administrator for the password.
- 10. At the 195Eg login prompt type *admin* for the login name and press the *Enter key* (<Enter>). *The login name is defined at the factory and is not changeable by the user. Note that all characters are lower case.*
- 11. If this is the first time the Model 195Eg has been programmed or the Password was not changed from the factory default values, the factory default password is also *admin*. Enter *admin* for the password and press the Enter key (<Enter>).

Note: All characters are lower case.



12. The ESTeem Configuration Welcome Screen (Figure 4) will now be displayed.

Note: The configuration menu will function the same as the Web Configuration Manager, but requires moving the arrows to change fields

Image: Second	
<u>De 93 DB 5</u>	
EST195E Web Configuration EST195E Web Configuration Source Configuration Manager	Manager
Top Status Log Setup Advanced Backup Restore Software Update H	<u>Rebo</u> ot
Top + Welcome	+
rec LAN Press ESC for menu. Select Help->Manual in menu for user's manual.	SS
[OK]	
Current Mode of Operation: Ethernet Only eth0 00:04:3F:00:09:0C Ethernet IP Address: 172.16.38.103 Ethernet IP Netmask: 255.255.0.0 Default Route: DNS Settings: None http://127.0.0.1/cgi-bin/avsweb.cgi?status.frm	

Figure 4: RS-232 Welcome Screen



13. Select SETUP and ETHERNET ONLY. You will see the screen in Figure 5. Program the basic operating parameters such as assigning the Model 195Eg an IP Address, IP Net Mask, Gateway IP Address, Domain Name, or DNS IP Address. When you have completed entering the basic operating parameters as required for your application, answer Yes, to save your changes to flash memory.



Figure 5: Setup Ethernet Only Screen



14. After the basic parameters have been entered into the Model 195Eg you will need to commit the commands to the Model 195Eg (Figure 6). The changes will be saved to flash memory. You can use the higher level programming features in the ESTeem Web Configuration Manager to configure the unit for your application. Proceed to Chapter 3.

後195Eg - HyperTerminal File Edit View Call Transfer H	lelp			
<u>de 88 -de</u>				
<pre><font=title_text></font=title_text></pre>	<font=title_tex< td=""><td>EST195E t></td><th>Web Configuration EST195E Web Configuration Manager</th><td>Manager </td></font=title_tex<>	EST195E t>	Web Configuration EST195E Web Configuration Manager	Manager
Top Status Lo	g Setup Advanced	Backup Restore	Software Update	Reboot
Setup				
To permanently below. Once the change new settings in	commit your changes s have been permane effect.	, click on the "Contly saved, the s	ommit Changes" but ystem will reboot	ton with the
[Previous] [Co	nmit Changes]	[Cancel]	
Post form to http	://127.0.0.1/cgi-bi	n/avsweb.cgi?qs_c	ommit_changes.frm	
Connected 0:05:37 VT100	38400 8-N-1 SCROLL C	APS NUM Capture Print (echo	1.

Figure 6: Commit Changes Screen



CHAPTER 3 WEB CONFIGURATION

When powering up the Model 195Eg for the first time you must use the ESTeem RS-232C Configuration Menu to setup the basic operating parameters such as assigning the Model 195Eg an IP Address, IP Net Mask, Gateway IP Address, Domain Name, and DNS IP Address. This is necessary to communicate with the Model 195Eg using your web browser. Chapter 2, Starting Out will provide detailed information on how this is done.

HARDWARE SETUP

Figure 1 shows a typical hardware configuration if you are accessing the ESTeem Web page from a computer over a hardwired LAN. The Model 195Eg is interfaced to the LAN from a Hub or Switch. Figure 2 shows a typical hardware configuration if you are accessing the



ESTeem Web page from a computer interfaced directly to the Model 195Eg Ethernet port.

- 1. Connect the antenna/s to the antenna connector on the Model 195Eg.
- 2. Plug the Model AA175 power supply into a wall socket and connect the Ethernet patch cable to the Ethernet port on the Model 195Eg. The Power over Ethernet (POE) LED on the front of the Model 195Eg should be illuminated. Ethernet Cross Over Cable 3. Connect the Ethernet cable to Rubber Duck the LAN or computer. Antenna (EST P/N AA01S) Notes: Note Antenna's shown are for There is no Power On/Off illustration purposes. There are many antenna options available dapending on your switch on the Model 195Eg. application Please attach an antenna to the Model 195Eg before ESTeem Model 195Eg power up. When powering up the Power Supply. POE, 48 VDC/100-250 VAC Model 195Eg for the first (EST P/N AA175) time you must use the Ethernet Cat 5e ESTeem RS-232C Patch Cable **Configuration Menu** Figure 2: Hardware Setup Direct to Computer described in Section 2 to

parameters such as assigning the IP Address, IP Net Mask, Gateway IP Address, Domain Name, and DNS IP Address.

setup the basic operating



LOGGING ON TO THE ESTeem WEB PAGE

- 1. Using your Web Browser connect to the Model 195Eg Web Page with the IP Address that you have assigned it in Chapter 2.
- 2. You will now see the Log-on Menu on Figure 3. To enter the Model 195Eg Status Menu you will need to log into the system with a User Name and Password.
- For the User Name enter admin and press the Enter key (<Enter>). The User Name is defined at the factory and is not changeable.
- 4. Enter your Password and press the Enter key (<Enter>).

Enter Nets	work Passwo	rd	<u>?</u> ×
<u>@@</u>	Please type y	our user name and password.	
j -	Site:	172.16.48.209	
	Realm	cgì-bin	
	User Name	admin	
	Password	****	
	🗖 Save this	password in your password list	
		OK Car	ncel

Figure 3: ESTeem Web Page Log-on Screen

If this is the first time the Model 195Eg has been Figure 3: ESTee programmed and Password was not changed from the factory default values, proceed with the steps below to access the Configuration Menu.

- The factory default Password is also admin. Enter admin for the Password and press the Enter key (< Enter>).
- Note: All characters are lower case.
- 5. After Log-in the next screen displayed will be the Model 195Eg Top Menu page (Figure 4). This example screen shows the Top Menu screen.

EST195E W	Veb Configuration Manager	ESTEEM
op Status Log Setup A	dvanced Backup Restore Software Update F	toboot
op		
ibis is the Top Page for th aconfigure the wireless Li	ie Web Configuration Manager. Below are the r AN unit, select the Setup lab	most recent saved settings of the wireless LAN unit. To
	Change Admin	Password
	Software Version 3.0.0	
ystem Configuration Sommar	y Ormat Mada of Ormation MD Bridge	
	SSID T-195tert	
	Wreless MAC Address	
	Wireless Repeater enabled false	
	Ethemet MAC Address 00.04.3F 00.09.0C	
	Bridge MAC Address 00:04:3F 00:09:0C	
	Bridge IP Address 172.16.38 103	
	Bridge IP Netmask: 255,255.0.0	
	Default Route 172.16.1.6	

Figure 4: Top Menu Screen

Note: Throughout the Configuration Manager are Help Screens that can accessed for further information on each item.



STATUS MENU SCREENS

The ESTeem Web Page Status Menu displays the current mode of operation and status of the communication links to other wireless devices. The Status Menu lists connected wireless devices (either other Model 195Egs or 802.11g clients), their signal strength, data rate and background noise. An example is shown below in Figure 5:

EST195E Web Configuration Manager	ESTEEM
Top Status Log Setup Advanced Badoup Restore Software Update Rebox	
Status	
This is a summery of the status of the overall system. Most of the source data for th Details" of the "Log" tab.	is display is also accessible through the "System
wlani): error friching interface information. Device not found cat: /proc/hetip=80211/wlan/Aptable/*/info: No such file or directory	
Common Status	
System Mode: AP_BRIDGE	
Current System Time: Sat, 1 Jan 2000 054948 -3356	
CPU/Memory States	
CPU Usermode (%): 11	
CPU Kamalmoda (96): 07	
CPU Idle (%): St	
CFU Interrupts per Second 3	
Pageable Memory Total 14392k	
Pageable Idemory Used: 85046	
Pageable Memory Free 58886	
Number of Processes 21	
Wareless Status	
SSID T 195turt	
Wreless MAC Address	
	Figure 5: Status Scree

SYSTEM LOG SCREEN

The Log Screen is a trouble-shooting tool that shows the current log of Model 195Eg system messages. See Figure 6.

EST	195E Web Configuration Manager
Top Status Log	Setup Advanced Backup Bestore Software Lipdate Reboot
System Log	
The following disp	lay is the system log. To view more detailed system information, click on the System Dataits button.
System Details	1
System Log	
Opt: 28:02103145	inome' user info kload: PPP owneric driver version 2.4.2
Oct 25 02:03:45	(none) user, info klogd; PPP Deflate Compression module registered
Opt 29 02:03:45	(nons) user.info klogd: DDP 995 Compression wodule registered
Opt 29 02:03:45	(none) user.warn klogd: Probing IcsCube flash at physical address Osffc00000
Opt 29 02:03:45	(none) user.warn klogd: Number of erage regions: 2
Oct 25 02:03:45	(none) ware warn blogd: Primary Vendor Command Det: 8000 (AMD/Fwjitaw Standard)
Oct 29 02:03:45	(none) user.vern klogd: Primary Algorithm Table at 0040
000 53 05103142	(none) wer, warn Klogdi Alternative Vendor command set: 0000 (None)
Oct 29 02:03:45	(none) user.warn klogd: No Alternate Algorithm Table
000 29 00103145	(none) user.warn Nlogdi Vor Blaindas 2.7 V
Cet 29 02:03:45	(none) user, warn klogd: Ver Hamindary 3.6 V
Opt 25 02100145	(none) spectrate blood. No spp 1152
Opr 29 02:03:45	(norm) mart ward klond. Mariaan burger ward with ringsout: 126 pm
Ort 29 02:03:45	increase many many many many and the state of the second state of
Opt 29 02103145	inone) mer. warn kloudi Marimum full buffer write timeouti 4006 ps
Oct 29 02:03:45	(none) user, warn kloud: Typical block srage timeout: 1024 na
Opt 29 02:03:45	inone) user, warn kloudi Haximum block erase timeouti 16384 ms

Figure 6: System Log Screen



SETUP SCREEN

The Setup screen allows the step-by-step configuration of the Model 195Eg. Please see Chapter 4 for complete description on System Configuration. See Figure 7.

EST195E Web Configuration Manager	ESTEEM Windows Medicing
Top Status Log Setup Advanced Backup Restore Software Update Reboot	
secup This is the main Setup Page. Select a mode of operation for the wireless LAN unit from	m the following list.
Select Mode of Operation AP Bridge	Help
Next	and the

Figure 7: Setup Screen

ADVANCED CONFIGURATION SCREEN

The Advanced screen allows the user to access all configuration parameters. The parameters are grouped based upon their variable. See Figure 8.

EST195E Web Configuration Manager	ESTEEM Windows Michael
Top Status Log Setup Advanced Backup Restore Software Update Reboo	
Advanced	
The Advanced leature provides you access to all of the configuration variables a category below:	The variables have been grouped by categories. Select
Global Settings:	
Global Variables @	
Radio Settings:	
all radio devices C	
wlan0 device C	
wlan1 device C	
wlan2 device C	
Network Settings:	
wlan0 device C	
wlan1 device C	
wlan2 device C	
eth0 device	
eth 1 device C	
br0 device C	
Bridge Settings:	
Bridge Vanables C	
Next	

Figure 8: Advanced Features Screen



BACKUP SCREEN

The Backup Screen saves the current configuration in the Model 195Eg to a file on the computer. See Figure 9.

EST195E Web Configuration Manager	
Top Status Log Setup Advanced Backup Restore Software Update Reboot	
To backup the most recent committed changes to a file, enter the name of the backup	file and click the Backup button.
From the Ste name for the basives file //mp/settings.backup	

Figure 9: Backup Screen

RESTORE SCREEN

The Restore screen is used to access the configuration files that were backed up to the computer. See Figure 10.

EST195E Web Configuration Manager	
Top Status Log Setup Advanced Backup Restore Software Update Reboot	
Restore Settings The Restore feature allows you to restore this device to the settings from one of the t button.	following sources below. Click the appropriate
Factory Defaults Lost Committed C	hanges

Figure 10: Restore Setting Screen



SOFTWARE UPDATE SCREEN

The Software Update feature allows the user to update the latest Model 195Eg operating system software from the factory via the Ethernet port to the Model 195Eg's flash memory. See Figure 11.

Wrakese Moderne	
	Wrakse Motorne

Figure 11: Software Update Screen

SYSTEM REBOOT SCREEN

The Reboot Password screen allows the user to reset the Model 195Eg. See Figure 12.

EST195E Web Configuration Manager	
Top Status Log Setup Advanced Backup Restore Software Update Reboot System Reboot This is the Reboot Page for the Web Configuration Manager. Item Page for the Web Configuration Manager. Item Page for the Web Configuration Manager.	
If you would like to reboot this device, press the Roboot button below. Otherwise, select from one o	f the above tabs to continue.

Figure 12: System Reboot Screen