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Appendix K: User Manual

Please refer to the following pages.

ERRATA SHEET
Changes to 29000152-001 Revision C

Chapter 6, page 99, Paragraph titled “**Radio Frequency Interference Requirements**”

The text currently reads:

“This device has been tested and found to comply with the limits for a Class A Digital Device, pursuant to Part 15 of the Federal Communications Commission’s Rules and Regulations.”

The text should read:

“This device has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the Federal Communications Commission’s Rules and Regulations.”

The following information should be appended to the “Radio Frequency Interference Requirements” section:

“Radiation Exposure Statement

This equipment shall only be installed and operated with the antenna types shown below, with gains not more than those shown below for each of the antennas, respectively, and installed with a minimum of 20 cm of separation distance between the antenna and all persons during normal operation.

Per FCC 1.1310 Table 1B, the maximum permissible RF exposure for an uncontrolled environment is 1 mW/cm² for the frequencies used in this device. The worst case power at the center frequency of the band of operation is used for the calculation below. The power density at a 20 cm distance is shown for each of the antenna options. As shown, the calculated power density is well below the FCC’s limit. The actual power density for the EUT calculated as shown below.

$$S = (P \times G) / (4 \times \pi \times d^2)$$

where:

S = power density

P = transmitter conducted power in (mW)

G = antenna numeric gain

d = distance to radiation center (cm)

Frequency	Antenna	Antenna Max Gain (dBi)	Numeric Gain	Power (mW)	Separation Distance (cm)	Power Density (mW/cm ²)
2.4 GHz	Dual Band Omni Antenna with N Male Connector	2.1	1.6	355	20	0.113
5725 - 5825 GHz	Rubber Duck Omni Antenna with N Male Connector	3	2	372	20	0.148



Wireless Access Point – 8 Port User's Guide

Model 3e-527A3



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3e Technologies International's Wireless Access Point – 8 Port User's Guide

Model 3e-527A3

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SAFETY INFORMATION

Please follow these guidelines when installing and using the 3e-527A3 product.

	! WARNING
	Warnings must be followed carefully to avoid bodily injury.

	! CAUTION
	Cautions must be observed to avoid damage to your equipment.

NOTE: Notes contain important information about this product.

Chapter 1: Introduction

This manual covers the installation and operation of the 3e Technologies International's 3e-527A3 Wireless Access Point. The 3e-527A3 is a ruggedized access point/gateway/bridge which is intended for use in industrial and external environments. It accommodates 802.11a/b/g, and 802.11a Turbo WLAN access and uses Power over Ethernet (PoE) access to the Ethernet WAN to eliminate the need for internal access point power supply units (AC-DC converters) and 110-220V cabling installations. The wireless LANs can include mobile devices such as handheld Personal Data Assistants (PDAs), mobile web pads, and wireless laptops.

FIPS 140-2 mode is always on and encryption is applied for the WLAN. You can set encryption for Static AES, Static 3DES, Dynamic Key Exchange, or FIPS 802.11i.

The access point employs state-of-the-art AES or 3DES encryption, wireless devices must have the 3e-010F, 3e-010F-A-2, or 3e-010F-C-2 Crypto Client software installed. (The 3e-010F Crypto Client software is sold with the 3e-110 long range PC Card or sold separately for use with other compatible PC Cards.)

The 3e-527A3 incorporates Power over Ethernet. The PoE interface on the 3e-527A3 is compatible with commercial vendor "injected power" hub units.

The 3e-527A3 includes AES/3DES cryptographic modules for wireless encryption and HTTPS/TLS, for secure web communication. The 3e-527A3 has an Ethernet WAN interface for communication to the wired LAN backbone, Ethernet LAN local port for purposes of initial setup and configuration, and one wireless AP antenna for communicating on the 802.11b/g frequencies. An antenna for bridging uses the 802.11a and 802.11a Turbo frequencies. The AP and Bridging frequencies can also be swapped using a software configurable feature. In other words the AP can use 802.11a/Turbo A and the Bridge can use 802.11b/g.

Basic Features

The 3e-527A3 is housed in a sturdy case which is not meant to be opened except by an authorized technician for maintenance or repair. If you wish to reset to factory settings, use the reset function available through the web-screen management module.

The 3e-527A3 is wall-mountable.

It has the following features:

- Ethernet uplink WAN port
- Local Ethernet LAN port (for configuration only)
- Wireless Access Point with operating range of 2000+ feet
- Bridge
- Power over Ethernet (PoE)
- Above average temperature range for extreme environments (with TEC option)
- AES, 3DES, DKE, or FIPS 802.11i, depending on setup
- HTTPS/TLS secure Web
- DHCP client
- Access Point or Gateway with Bridging also available in either mode
- Bandwidth control
- Adjustable Radio Power
- MAC address filtering
- Publicly Secure Packet Forwarding
- Rogue AP Detection
- Encrypted Ethernet port
- Auto bridging/Mesh Networking
- Configuration File transfer
- IP aliasing on gateway mode
- Operates on Channels 149, 153, 157, 161 and 165

The following cryptographic modules have been implemented in the 3e-527A3 .

- AES (128/192/256 bit)
- 3DES (192 bit)
- DKE
- FIPS 802.11i

Wireless Basics

Wireless networking uses electromagnetic radio frequency waves to transmit and receive data. Communication occurs by establishing radio links between the wireless access point and devices configured to be part of the WLAN.

The 3e-527A3 incorporates 802.11a, the 802.11b (WiFi) standard, the 802.11g standard and the most state of the art encryption for a very powerful and secure wireless environment.

802.11b

The IEEE 802.11b standard, developed by the Wireless Ethernet Compatibility Alliance (WECA) and ratified by IEEE, establishes a stable standard for compatibility. A user with an 802.11b product can use any brand of access point with any other brand of client hardware that is built to the 802.11b standard for basic interconnection. 802.11b devices provide 11 Mbps transmission (with a fallback to 5.5, 2 and 1 Mbps depending on signal strength) in the 2.4 GHz band.

For wireless devices to communicate with the 3e-527A3, they must meet the following conditions:

- The wireless device and wireless access point must have been configured to recognize each other using the SSID (a unique ID assigned in setup so that the wireless device is seen to be part of the network by the 3e-527A3);
- Encryption and authentication capabilities and types enabled must conform; and
- If MAC filtering is used, the 3e-527A3 must be configured to allow the wireless device's MAC address to associate (communicate) with the 3e-527A3 wireless interface.

802.11a

The IEEE 802.11a standard is an extension to 802.11 that applies to wireless LANs and provides up to 54 Mbps in the 5GHz band. 802.11a uses an orthogonal frequency division multiplexing encoding scheme rather than FHSS or DSSS.

802.11g

Because 802.11g is backwards-compatible with 802.11b, it is a popular component in LAN construction. 802.11g broadens 802.11b's data rates to 54 Mbps within the 2.4 GHz band using OFDM (orthogonal frequency division multiplexing) technology.

802.11b/g Mixed

802.11b/g combines 802.11b and 802.11g data rates to offer a broader range.

802.11a Turbo

802.11a Turbo technology provides speed and throughput of more than double standard wireless LAN technologies in networking products such as PCs, access points, routers and PC cards. It is very helpful to users who require additional bandwidth (over standard WLAN technologies) that results in higher throughput necessary for a variety of functions such as: streaming media (video, DVD, MPEG), VoIP, etc., or for providing multiple users on a single WLAN with optimal speeds despite network demand.

108 Mbps is the *maximum link speed* available and the typical MAXIMUM end-user throughput ranges from approximately 40 Mbps to 60+ Mbps, depending on application demand and network environment.

NOTE: Turbo A's channel bonding feature can significantly degrade the performance of neighboring 802.11a channel WLANs that don't use Turbo A, because there isn't enough room in the 5GHz wireless LAN spectrum for the increased spectrum used by channel bonding. Moreover, Turbo A doesn't check to see if 11a standard-compliant devices are in range before using its non-standard techniques.

The encryption must be applied in the 3e-527C, however, the CPU power can not encrypt more than 12 Mbps of data. Therefore, even in turbo A mode, you will not see more than 12 Mbps of throughput. One benefit of Turbo A is that it provides better RF range.

Network Configuration

The 3e-527A3 is an access point/gateway with bridging capability:

- Access point/Gateway plus:
- Wireless bridging with choice of:
 - Point-to-point setup
 - Point-to-multipoint setup
 - Repeater setup

Bridging actually has more choices, but the above choices are popular and are discussed later in this user guide (Chapter 4).

Access Point Configurations

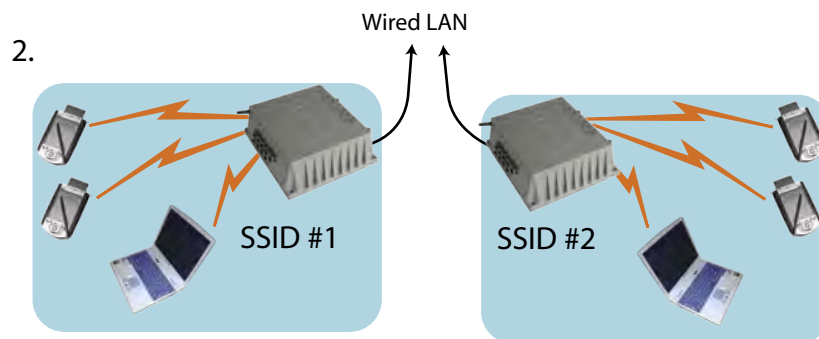
When a 3e-527A3 is used as an access point, IP addresses for wireless devices are typically assigned by the wired network's DHCP server. The wired LAN's DHCP server assigns addresses dynamically, and the AP virtually connects wireless users to the wired network. All wireless devices connected to the AP are configured on the same subnetwork as the wired network interface and can be accessed by devices on the wired network.

Possible AP Topologies

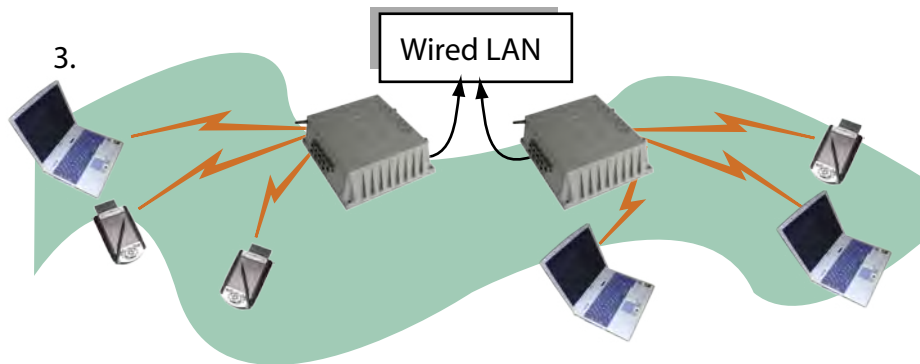
1. An access point can be used as a stand-alone AP without any connection to a wired network. In this configuration, it simply provides a stand-alone wireless network for a group of wireless devices.



2. The 3e-527A3 can be used as one of a number of APs connected to an existing Ethernet network to bridge between the wired and wireless environments. Each AP can operate independently of the other APs on the LAN. Multiple APs can coexist as separate individual networks at the same site with a different network ID (SSID).



3. The last and most prevalent use is multiple APs connected to a wired network and operating off that network's DHCP server to provide a wider coverage area for wireless devices, enabling the devices to "roam" freely about the entire site. The APs have to use the same SSID. This is the topology of choice today.



Bridging

The 3e-527A3 can also function as a bridge. There are a number of bridging configurations supported, including the following popular configurations:

- Point-to-point bridging of 2 Ethernet Links;
- Point-to-multipoint bridging of several Ethernet links;
- Repeater mode (wireless client to wireless bridge.)

Default Configuration

The 3e-527A3's default configuration is an Access Point/Bridge with FIPS 140-2 submode enabled.

Data Encryption and Security

The 3e-527A3 Wireless Access Point includes advanced wireless security features. Over the AP band, you have a choice of AES, 3DES, or DKE. Bridging encryption is established between 3e-527A3's and includes use of AES or 3DES encryption (approved by the National Institute of Standards and Technology (NIST) for U.S. Government and DoD agencies).

SSID

The Service Set ID (SSID) is a string used to define a common roaming domain among multiple wireless access points. Different SSIDs on access points can enable overlapping wireless networks. The SSID can act as a basic password without which the client cannot connect to the network. However, this is easily overridden by allowing the wireless AP to broadcast the SSID, which means any client can discover the AP. SSID broadcasting can be disabled in the 3e-527A3 setup menus.

AES and 3DES

The Advanced Encryption Standard (AES) was selected by National Institute of Standards and Technology (NIST) in October 2000 as an upgrade from the previous DES standard. AES uses a 128-bit block cipher algorithm and encryption technique for protecting computerized information. It has the ability to use even larger 192-bit and 256-bit keys, if desired.

3DES is also incorporated on the 3e-527A3. 3DES is modeled on the older DES standard but encrypts data three times over. Triple-DES uses more CPU resources than AES because of the triple encryption.

If you intend to use AES or 3DES, you must purchase the 3eTI advanced Crypto Client software (3e-010F, 3e-010F-A-2, or 3e-010F-C-2) for each client that will be included in the WLAN. We sell the 3e-010F software with the 3e-110 PC Card.

The 3e-527A3 uses AES-CCMP in WPA mode and AES-ECB (or 3DES) for FIPS 140-2 mode and for bridging.

MAC Address Filtering

The MAC address, short for *Media Access Control address*, is a hardware address that uniquely identifies each node of a network. In IEEE 802 networks, the Data Link Control (DLC) layer of the OSI Reference Model is divided into two sub-layers: the *Logical Link Control (LLC) layer* and the *Media Access Control (MAC) layer*. The MAC layer interfaces directly with the network media. Consequently, each type of network media requires a unique MAC address.

Authentication is the process of proving a client's identity. The 3e-527A3 access points, if set up to use MAC address filtering, detect an attempt to connect by a client and compare the client's MAC address to those on a predefined MAC address filter list. Only client addresses found on the list are allowed to associate. MAC addresses are pre-assigned by the manufacturer for each wireless card.

DHCP Server

The DHCP function is accessible only from the local LAN port to be used for initial configuration.

Operator Authentication and Management

Authentication mechanisms are used to authenticate an operator accessing the device and to verify that the operator is authorized to assume the requested role and perform services within that role.

Access to the management screens for the 3e-527A3 requires knowledge of the assigned operator ID and Password. The Factory defaults are:

- ID: CryptoOfficer
- Password: CryptoFIPS

The Crypto Officer initially installs and configures the 3e-527A3 after which the password **MUST** be changed from the default password. The ID and Password are case sensitive.

Management

After initial setup, maintenance of the system and programming of security functions are performed by personnel trained in the procedure using the embedded web-based management screens.

The next chapter covers the basic procedure for setting up the hardware.

3e-527A3 Navigation Options	
Access Point/Bridge Mode	Gateway/Bridge Mode
System Configuration	System Configuration
General	General
Operating Mode	Operating Mode
WAN	WAN
LAN	LAN
Encrip Port	Encrip Port
Wireless Access Point	Wireless Access Point
General	General
Security • Static AES • Static 3DES • Dynamic Key Exchange • FIPS 802.11i	Security • Static AES • Static 3DES • Dynamic Key Exchange • FIPS 802.11i
MAC Address Filtering	MAC Address Filtering
Rogue AP Detection	Rogue AP Detection
Advanced	Advanced
Wireless Bridge	Wireless Bridge
General • Monitoring	General • Monitoring
Radio	Radio
Encryption	Encryption
MAC Address Filtering (auto mode)	MAC Address Filtering (auto mode)
Services Settings	Services Settings
DHCP Server	DHCP Server
Subnet Roaming	Subnet Roaming
SNMP Agent	SNMP Agent
Firewall	Firewall
	Content Filtering
	IP Filtering
	Port Filtering
	Virtual Server
	DMZ
	Advanced
Admin User Management	Admin User Management
List All Users	List All Users
• Edit/Delete	• Edit/Delete
Add New User	Add New User
User Password Policy	
End User Authentication	End User Authentication
General	General
List All Users	List All Users
Add New User	Add New User
Add Authed Mac	Add Authed Mac
List Authed Mac	List Authed Mac
Monitoring Reports	Monitoring Reports
System Status	System Status
Bridging Status	Bridging Status
Bridging Site Map	Bridging Site Map
Wireless Clients	Wireless Clients
Adjacent AP List	Adjacent AP List
DHCP Client List	DHCP Client List
System Log	System Log
Web Access Log	Web Access Log
Network Activities	Network Activities
Auditing	Auditing
Log	Log
Report Query	Report Query
Configuration	Configuration

System Administration	System Administration
Email Notification Conf	Email Notification Conf
Configuration Button	Configuration Button
System Upgrade • Firmware Upgrade • Local Configuration Upgrade • Remote Configuration Upgrade	System Upgrade • Firmware Upgrade • Local Configuration Upgrade • Remote Configuration Upgrade
Factory Default	Factory Default
Remote Logging	Remote Logging
Reboot	Reboot
Utilities	Utilities

Chapter 2: Hardware installation

Preparation for Use

The 3e Technologies International's 3e-527A3 Wireless Access Point requires physical mounting and installation on the site, following a prescribed placement design to ensure optimum operation and roaming.

FCC Regulations require that the 3e-527A3 be professionally installed by an installer certified by the National Association of Radio and Telecommunications Engineers or equivalent institution.

The 3e-527A3 operates with Power over Ethernet (PoE) which requires the installation of a separate Power injector which “injects” DC current into the Cat5 cable. The standard version has a temperature range of -5 degrees C to +65 degrees C.

The 3e-527A3 package includes the following items:

- The 3e-527A3 Wireless Access Point - 8 Port
- Qty 1 — omni-directional antenna (2.2dBi@2.4GHz and 5dBi@5.75GHz)
- Qty 1 — omni-directional antenna (3dBi@5.75GHz)
- 2 meter weather-resistant WAN Ethernet cable (RJ-45 to RJ-45)
- 3 meter standard LAN Ethernet Cable (RJ-45 to RJ-45)
- Documentation as PDF files (on CD-ROM)
- Registration and Warranty cards

The following items are options:

- Power Injector, POE, 50W (model 3e-POE-1, p/n 90000831-001)
- Power Cord, POE Injector, European version (p/n 90000832-001)
- Power Cord, POE Injector, UK version (p/n 90000833-001)
- Weather-resistant LAN Ethernet cables (RJ-45 to RJ-45)

Installation Instructions

The 3e-527A3 is intended to be installed as part of a complete wireless design solution.

This manual deals only and specifically with a single 3e-527A3 device as a unit. The purpose of this chapter is to describe the device and its identifiable parts so that the user is sufficiently familiar to interact with the physical unit. Preliminary setup information provided below is intended for information and instruction of the wireless LAN system administration personnel.

It is intended that the user not open the unit. Any maintenance required is limited to the external enclosure surface, cable connections, and to the management software (as described in chapter three through five) only. A failed unit should be returned to the manufacturer for maintenance.

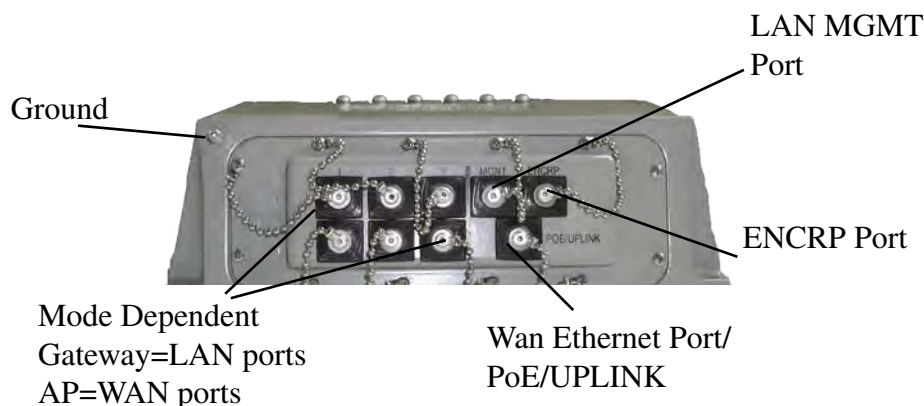
Minimum System and Component Requirements

The 3e-527A3 is designed to be attached to the wall at appropriate locations. To complete the configuration, you should have at least the following components:

- PCs with one of the following operating systems installed: Windows NT 4.0, Windows 2000 or Windows XP;
- A compatible 802.11b PC Card or 802.11b device for each computer that you wish to wirelessly connect to your wireless network. (For wireless cards, and particularly if you will be using secure FIPS mode with AES, we recommend that you select the 3e-110 PC Card with 3e-010F Crypto Client software (sold separately) or install the 3e-010F-A-2 or 3e-010F-C-2 software;
- Access to at least one laptop or PC with an Ethernet card and cable that can be used to complete the initial configuration of the unit.
- A Web browser program (such as Microsoft Internet Explorer 5.5 or later, or Netscape 6.2 or later) installed on the PC or laptop you will be using to configure the Access Point.
- TCP/IP Protocol (usually comes installed on any Windows PC.)

Connectors and Cabling

The following illustration shows the external connectors on the 3e-527A3.



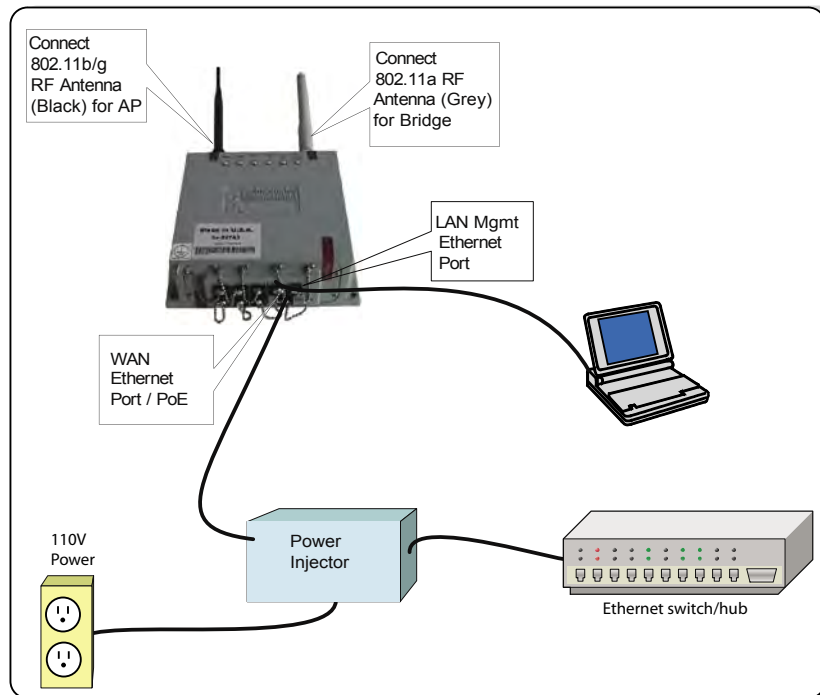
The PoE/UPLINK port is used to connect the 3e-527A3 to the organization's LAN. The Ethernet cable is run from the 3e-527A3 to the power injector which is then connected to a power source and the wired LAN.

A MGMT Port is designed for use during initial configuration only. This uses an RJ45 cable to connect the 3e-527A3 to a laptop.

The ENCRP port is a dedicated Ethernet port used for connecting to the Ethernet port of a DSL modem or any device that requires layer encryption. This port is encrypted and is configurable for AES-128, 192, or 256 and also contains a message integrity check.

Ports X1-3 and Y1-3 are mode-dependent. If the 3e-527A3 is used as an AP then those ports are WAN ports. If the unit is a gateway, then the ports are LAN ports.

The following diagram demonstrates the setup.



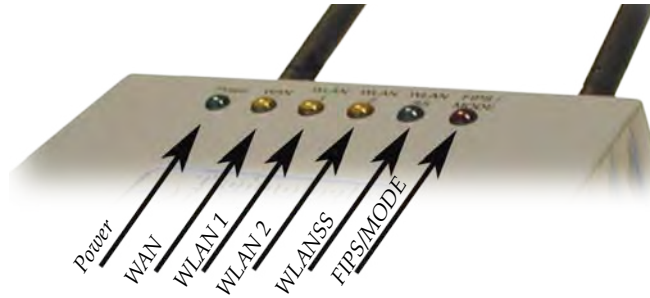
Earth Ground Connection

Attach the earth ground cable to the ring terminal attached to the 3e-527A3's grounding stud. Make sure the ring terminal is against the unit's metal case. The earth ground ring terminal should be the first connection on the unit's grounding stud.

NOTE: The cable used to connect to a proper earth ground must be AWG 10 or heavier. This cable should be kept as short as possible.

The Indicator Lights

The top panel of the 3e-527A3 contains a set of indicator lights (Light Emitting Diodes or LEDs) that help describe the state of various networking and connection operations.



Detail of LEDs on the face of the 3e-527A3

LED	Description
Power	The Power indicator LED indicates when the device is powered on. If this light is on, the gateway is on; if it is not on, the gateway is off.
WAN	This light indicates the state of your connection to the organization's Ethernet LAN network. When on, the WAN light indicates that the gateway is connected to the network. When the WAN light is off, the gateway does not have an active connection to the network.
WLAN1 Activity	1. LED Off means the RF power is administratively disabled. 2. LED steady on means RF power is enabled but there no traffic. 3. LED blinking is relative to user traffic.
WLAN2 Activity	LED is used to indicate downlink traffic. It blinks when traffic is sent to (or received from) the downlink. • Root node: on and blinks with traffic. • Intermediate node: on and blinks with traffic. • Leaf node: always off.
WLAN Signal Strength	The Strength LED indicator indicates the strength of the node assigned in the Signal Strength MAC field of the Bridge Configuration screen. If there is no assignment, the strength of the uplink node is shown.. 1. LED Off: means no connection on the bridge side, or the signal is very weak. 2. LED blinks slowly (every 1 second): means there is a connection, and the signal quality is poor. 3. LED blinks fast: means there is a connection, and the signal quality is good. 4. LED steady on: means there is a connection, and the signal quality is excellent.
FIPS/MODE (WLAN2 Usage)	LED is used to indicate uplink traffic. It blinks when traffic is sent to (or received from) the uplink. • Root node: always off • Intermediate node: on and blinks with traffic. • Leaf node: on and blinks with traffic.

NOTE: for a standalone bridge, technically it's root and leaf. But we define it as root, not leaf. So the WLAN 2 LED will be solid on. FIPS/MODE LED will be off. When high bandwidth traffic is going through, the response of the traffic LED indicators may be slow due to the work load of the internal processor.

Chapter 3: Access Point Configuration

Introduction

The 3e-527A3 comes with the capability to be configured as an access point. As it incorporates two separate 802.11 wireless cards, one for configuring a local WLAN and one for use in bridging, it can also be configured for bridging, either with access point or gateway configuration on the WLAN side. Configuration as a gateway is discussed in Chapter 4 and configuration for bridging is discussed in Chapter 5.

Preliminary Configuration Steps

For preliminary installation the 3e-527A3 network administrator may need the following information:

- IP address – a list of IP addresses available on the organization's LAN that are available to be used for assignment to the AP(s)
- Subnet Mask for the LAN
- Default IP address of the 3e-527A3
- DNS IP address
- SSID – an ID number/letter string that you want to use in the configuration process to identify all members of the wireless LAN.
- The MAC addresses of all the wireless cards that will be used to access the 3e-527A3 network of access points (if MAC address filtering is to be enabled)
- The appropriate encryption key for Static 3DES or Static AES if state-of-the art key management will be used.

Initial Setup using the “Local” Port

Plug one end of an RJ-45 Ethernet cable to the LAN port of the 3e-527A3 (see page 11) and the other end to an Ethernet port on your laptop. This LAN port in the 3e-527A3 connects you to the device’s internal DHCP server which will dynamically assign an IP address to your laptop so you can access the device for configuration. In order to connect properly to the 3e-527A3 on the LAN port, the TCP/IP parameters on your laptop must be set to “obtain IP address automatically.” (If you are unfamiliar with this procedure, use the following instructions for determining or changing your TCP/IP settings.)

In Windows 98/Me click **Start** → **Settings** → **Control Panel**. Find and double click the **Network** icon. In the **Network** window, highlight the TCP/IP protocol for your LAN and click the **Properties** button. Make sure that the radio button for **Obtain an IP address automatically** is checked.

In Windows 2000/XP, follow the path **Start** → **Settings** → **Network and Dialup Connections** → **Local Area Connection** and select the **Properties** button. In the **Properties** window, highlight the TCP/IP protocol and click properties. Make sure that the radio button for **Obtain an IP address automatically** is checked.

Once the DHCP server has recognized your laptop and has assigned a dynamic IP address, you will need to find that IP address. Again, the procedure is similar for Windows 95/98/Me machines and slightly different for Windows 2000/XP machines.

In Windows 98/Me, click **Start**, then **Run** and type **winipcfg** in the run instruction box. Then click **OK**. You will see the IP address of your laptop in the resulting window, along with the “default gateway” IP address. Verify that the IP address shown is 192.168.15.x

In Windows 2000/XP, click **Start**, then **Run** and type **cmd** in the run instruction box. Then click **OK**. This will bring up a window. In this window, type **ipconfig /all | more**. This will list information assigned to your laptop, including the IP address assigned. Verify that the IP address shown is 192.168.15.x

Login

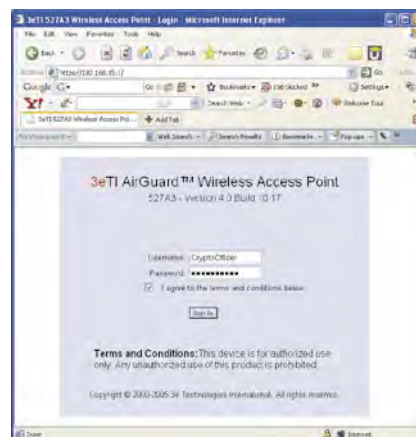
On your computer, pull up a browser window and put the default URL for the 3e-527A3 Local LAN in the address line. (https://192.168.15.1)



You will be asked for your User Name and Password. The default is "CryptoOfficer" with the password "CryptoFIPS" to give full access for setup configuration. (This password is case-sensitive.) Please read the terms and conditions and check the checkbox then click **Sign In** to continue configuration.

NOTE: The CryptoFIPS password is only good for the first login. You must change the password after initially logging in. You are automatically directed to the **Admin User Management—List All Users** screen where you must change your password. Click on **Edit** and enter your new password following the complexity password rule.

You are also asked to change your password every 30-90 days. If you do not change your password then you will be locked out of the system after 150 days.



NOTE: If your login session is in-active for more than 10 minutes, then you will have to re-authenticate your identity. If after three times you fail to re-authenticate then your account will be locked. The exception is if you are the last active CryptoOfficer on the system, then your account will not be locked. The **Admin User Management—List All Users** screen displays account status. If an account is locked, it will show a status of "Locked" and a reason of "bad passwd". Other accounts show status as "Active" and reason "Normal".

The CryptoOfficer is the only user that can unlock an account once it has been locked. Go to the **Admin User Management—List All Users** screen and click the unlock button at the end of the user entry.

System Configuration

General

You will immediately be directed to the **System Configuration — General** screen for the 3e-527A3 access point.

This screen lists the firmware version number for your 3e-527A3 and allows you to set the Host Name and Domain Name as well as establish system date and time. (Host and Domain Names are both set at the factory for “default” but can optionally be assigned a unique name for each.)

NOTE: The CryptoOfficer is the only user who can set the date and time. The system date must be set to a date after 01/01/2005.

You can also enter a description of the physical location of the unit in the Description field. This is useful when deploying units to remote locations.

You can modify the terms and conditions login banner on the login screen. The default is "This device is for authorized use only. Any unauthorized use of this product is prohibited."

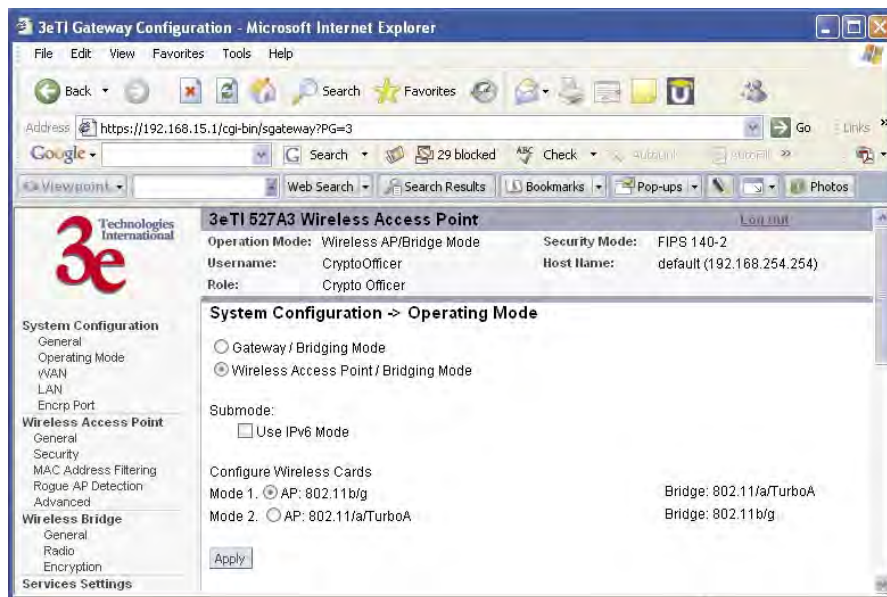
When you are satisfied with your changes, click **Apply**.

Go next to the **System Configuration — Operating Mode** page.

Operating Mode

This screen allows you to set the operating mode to either Wireless Access Point/Bridge or Gateway/Bridge mode. You only need to visit this page only if you will be changing from Access Point to Gateway mode, if you want to change your submode to IPv6, or if you want to configure the wireless cards.

Note that if you change modes from AP to Gateway, your configuration is not lost. However, if you switch from IPv6 to non IPv6 submode, all previously entered information will be reset to factory settings.

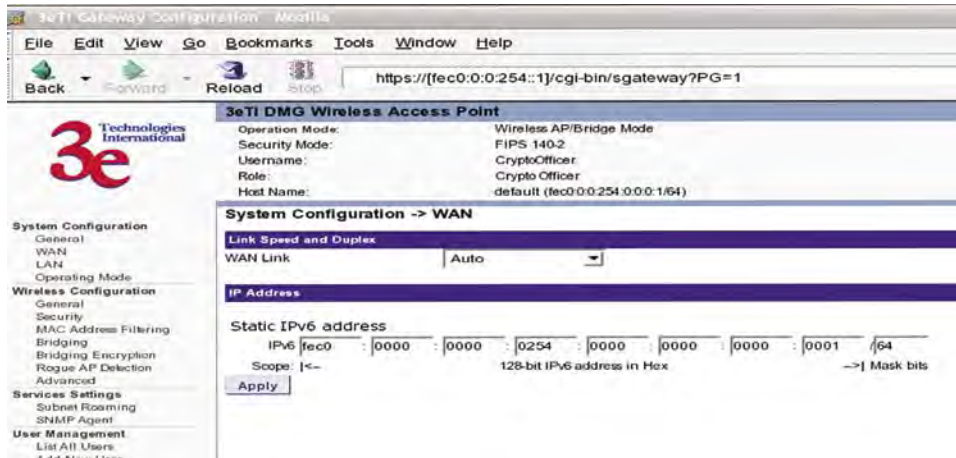


Submode

If you select the Use IPv6 Mode, the AP will be configured to support IPv6 addresses on the WAN and LAN ports. In IPv6 mode, the AP can be managed and pass traffic using IPv6 addresses. Since IPv6 is relatively new in the industry, some networking functions that cannot support IPv6 are disabled such as DHCP server and WPA-802.1x

When in IPv6 mode, the AP can be accessed from the management port using IP address 192.168.15.1. This is the default IP address and it can not be changed. The WAN port can not be accessed using IPv4 addresses.

If Use IPv6 mode is selected as a submode then you will need to enter a IPv6 address under System Configuration—WAN and LAN screens.



Configure Wireless Cards

The factory default for the two wireless cards are:

- 802.11b/g for the AP
- 802.11a/TurboA for the Bridge

If you want to swap the cards and make the 802.11a/TurboA card for the AP and the 802.11b/g card for the Bridge. Select the appropriate button.

WAN

Click the entry on the left hand navigation panel for **System Configuration — WAN**. This directs you to the **System Configuration — WAN** screen.

If not using DHCP to get an IP address, input the static IP information that the access point requires in order to be managed from the wired LAN. This will be the IP address, Subnet Mask, Default Gateway, and, where needed, DNS 1 and 2.

Click **Apply** to accept changes.

3eTI Gateway Configuration - Microsoft Internet Explorer

Address: <https://192.168.15.1/cgi-bin/sgateway?PG=1>

3eTI 527A3 Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode Security Mode: FIPS 140-2
 Username: CryptoOfficer Host Name: default (192.168.254.254)
 Role: Crypto Officer

System Configuration -> WAN

Link Speed and Duplex

WAN Link: Auto

IP Address

☐ Using DHCP to get an IP address

☒ Specify a static IP address

IP Address:	192	168	254	254
Subnet Mask:	255	255	255	0
Default Gateway:	192	168	254	1
DNS 1:				
DNS 2:				

Apply

LAN

Click the entry on the left hand navigation panel for **System Configuration — LAN**. This directs you to the **System Configuration — LAN** screen.

This sets up the default numbers for the four octets for a possible private LAN function for the access point. It also allows changing the default numbers for the LAN Subnet Mask. The Local LAN port provides local access for configuration. It is not advisable to change the private LAN address while doing the initial setup as you are connected to that LAN.

3eTI Gateway Configuration - Microsoft Internet Explorer

Address: <https://192.168.15.1/cgi-bin/sgateway?PG=2>

3e Technologies International

3eTI 527A3 Wireless Access Point [Log out](#)

Operation Mode: Wireless AP/Bridge Mode Security Mode: FIPS 140-2
 Username: CryptoOfficer Host Name: default (192.168.254.254)
 Role: Crypto Officer

System Configuration -> LAN

Link Speed and Duplex

LAN Link:

IP Address

IPv4 Address:

Subnet Mask:

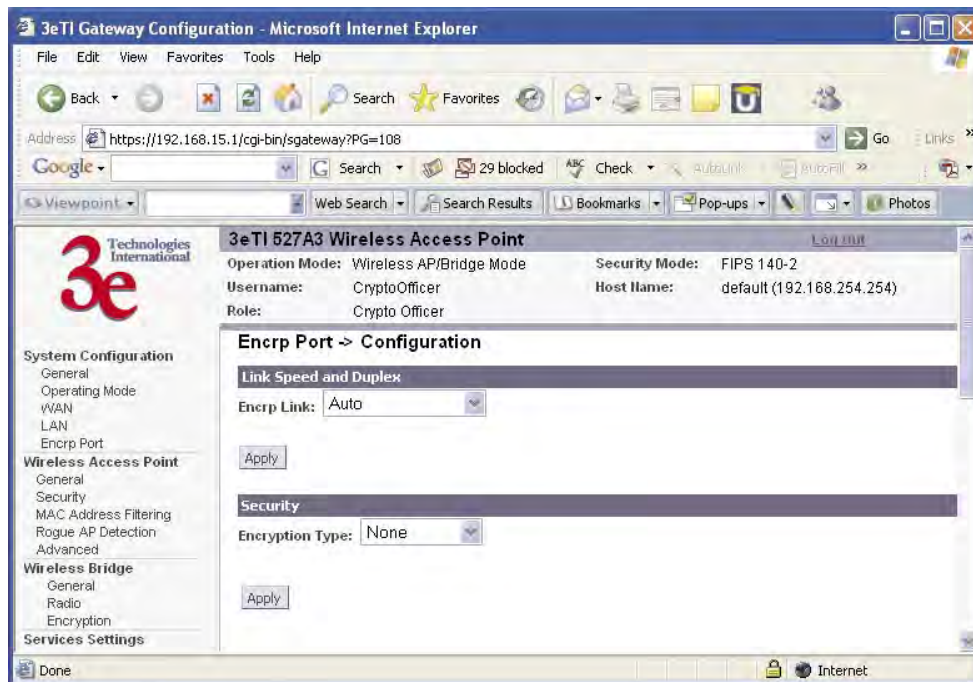
Encrp Port

Click the entry on the left hand navigation panel for **System Configuration — Encrp Port**. This directs you to the **System Configuration — Encrp Port** screen.

You can set the link speed and duplex for the encrp port in the Encrp Link field. Your options are: Auto, 10M Half Duplex, 10M Full Duplex, 100M Half Duplex, or 100M Full Duplex.

NOTE: For best performance, it is recommended that you set the same duplex/speed on both ends of the link. For example, set 100M Full Duplex on both the PC and the 3e-527C Encrp Port. Setting one end to auto-negotiation and the other end to non-auto-negotiation is strongly discouraged.

The Encrp port also provides encryption to the data on this port. The encrypted data is isolated to this port and does not affect the operation of the remaining seven Ethernet ports. The encryption is configurable as Static AES-128, 192, or 256 and Static 3DES. It also contains a message integrity check.



Static AES Key

The Advanced Encryption Standard (AES) uses a 128-bit block cipher algorithm and encryption technique for protecting computerized information. With the ability to use even larger 192-bit and 256-bit keys, if desired, it offers higher security against brute-force attacks than the older 56-bit DES keys.

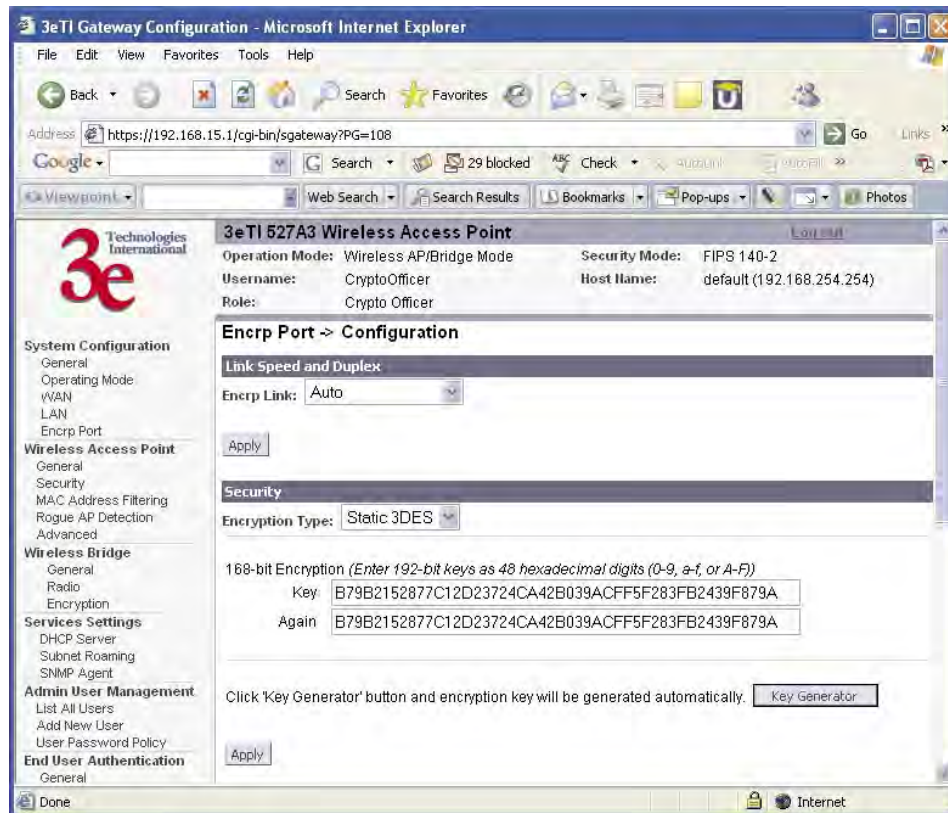
The Key Generator button automatically generates a randomized key of the appropriate length. This key is initially shown in plain text so the user has the opportunity to copy the key. Once the key is applied, the key is no longer displayed in plain text.

The screenshot shows the '3eTI Gateway Configuration' web interface in Microsoft Internet Explorer. The browser address bar shows 'https://192.168.15.1/cgi-bin/sgateway?PG=108'. The page title is '3eTI 527A3 Wireless Access Point'. The left sidebar contains a navigation menu with categories: System Configuration, Wireless Access Point, Wireless Bridge, Services Settings, Admin User Management, End User Authentication, and Monitoring Reports. The main content area is titled 'Encrip Port -> Configuration'. It includes a 'Link Speed and Duplex' section with 'Encrip Link' set to 'Auto'. Below this is the 'Security' section, where 'Encryption Type' is set to 'Static AES'. Three encryption options are available: 128-bit, 192-bit, and 256-bit. The 128-bit option is selected, and its key is displayed as 'A554FA85168339181511E8C45644EA7B'. A 'Key Generator' button is located at the bottom right of the encryption key input area. The status bar at the bottom shows 'Done' and 'Internet'.

Static 3DES Key

To use 3DES, enter a 192-bit key as 48 hexadecimal digit (0-9, a-f, or A-F).

The Key Generator button automatically generates a randomized key of the appropriate length. This key is initially shown in plain text so the user has the opportunity to copy the key. Once the key is applied, the key is no longer displayed in plain text.



Wireless Access Point Configuration

General

Wireless Setup allows your computer's PC Card to communicate with the access point. Once you have completed wireless access point configuration, you can complete the rest of the configuration wirelessly unless you will be employing the FIPS 140-2 secure mode, assuming that you have installed and configured a wireless PC card on your computer. (If you have not done so, you will have to do that to establish communications. Follow the manufacturer's instructions to set up the PC Card on each wireless device that will be part of the WLAN.)



NOTE: The 3e-527A3 is always in FIPS 140-2 secure mode, therefore your configuration will have to be accomplished through the LAN port due to the secure nature of the access point. There is no direct access from wireless clients.

The **Wireless Access Point — General** screen lists the MAC Address of the AP card. This is not the MAC Address that will be used for the BS-SID for bridging setup, however. That is found on the **Wireless Bridge — Radio** screen.

If you will be using an **SSID** for a wireless LAN, enter it here and in the setup of each wireless client. This nomenclature has to be set on the access point and each wireless device in order for them to communicate.

3eTI Gateway Configuration - Microsoft Internet Explorer

Address: <https://192.168.15.1/cgi-bin/gateway?PG=10>

3e Technologies International

3eTI 527A3 Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode Security Mode: FIPS 140-2
 Username: CryptoOfficer Host Name: default (192.168.254.254)
 Role: Crypto Officer

Wireless Access Point -> General

MAC Address: 00:0D:3B:10:05:C1 (Microelect)

SSID: 527A3_fcc

Wireless Mode: 802.11g

Channel No: 6 (2.437 GHz) Select the optimal channel

Tx Pwr Mode: Automatically select the optimal channel at startup ☐ No ☒ Yes

Advanced

Beacon Interval: 100 (Range: 20-1000)

RTS Threshold: 2346 (Range: 1-2346)

DTIM: 1 (Range: 1-255)

Basic Rates: 1, 2, 5.5, 11, 6, 12, 24 Mbps

Preamble: Short Preamble

Broadcast SSID: Disable

Apply

Select the wireless mode from the drop-down list. You can choose from the following options:

- 802.11b
- 802.11g
- 802.11b/g Mixed

You can assign a channel number to the AP (if necessary) and modify the Tx Pwr Mode.

The **Channel Number** is a means of assigning frequencies to a series of access points, when many are used in the same WLAN, to minimize noise. There are 11 channel numbers that may be assigned. If you assign channel number 1 to the first in a series, then channel 6, then channel 11, and then continue with 1, 6, 11, you will have the optimum frequency spread to decrease “noise.”

If you click on the button **Select the optimal channel**, a popup screen will display the choices. It will select the optimal channel for you. You can also set it up to automatically select the optimal channel at boot up.

CHANNEL NO. OPTIONS	
Wireless Mode	Channel No.
802.11b 802.11g 802.11b/g Mixed	1 (2.412 GHz)
	2 (2.417 GHz)
	3 (2.422 GHz)
	4 (2.427 GHz)
	5 (2.432 GHz)
	6 (2.437 GHz)
	7 (2.442 GHz)
	8 (2.447 GHz)
	9 (2.452 GHz)
	10 (2.457 GHz)
	11 (2.462 GHz)

Tx Pwr Mode and Fixed Pwr Level: The Tx Power Mode defaults to Auto, giving the largest range of radio transmission available under normal conditions. As an option, the AP's broadcast range can be limited by setting the Tx Power Mode to Fixed and choosing from 1-8 for Fixed Pwr Level (1 being the shortest distance.) Finally, if you want to prevent any radio frequency transmission, set Tx Pwr Mode to **Off**.

There are a number of advanced options included on this page as described in the following chart:

ADVANCED OPTIONS		
Beacon interval	20-1000	The time interval in milliseconds in which the 802.11 beacon is transmitted by the AP.
RTS Threshold	1-2346	The number of bytes used for the RTS/CTS handshake boundary. When a packet size is greater than the RTS threshold, the RTS/CTS handshaking is performed.
DTIM	1-255	The number of beacon intervals that broadcast and multicast traffic is buffered for a client in power save mode.
Basic Rates	Basic Rates for 802.11b	
	1 and 2 Mbps 1, 2, 5.5 and 11 Mbps	The basic rates used and reported by the AP. The highest rate specified is the rate that the AP uses when transmitting broadcast/multicast and management frames.
	Basis Rates for 802.11g	
	1, 2, 5.5, 11, 6, 12, 24 Mbps 1, 2, 5.5, 11 Mbps	The basic rates used and reported by the AP. The highest rate specified is the rate that the AP uses when transmitting broadcast/multicast and management frames.
	Basic Rates for 802.11b/g Mixed	
	1, 2 Mbps 1, 2, 5.5, 11 Mbps	The basic rates used and reported by the AP. The highest rate specified is the rate that the AP uses when transmitting broadcast/multicast and management frames.
Preamble	Short/Long Preamble	Specifies whether frames are transmitted with the Short or Long Preamble
Broadcast SSID	Enabled/Disabled	When disabled, the AP hides the SSID in outgoing beacon frames and stations cannot obtain the SSID through passive scanning. Also, when it is disabled, the AP doesn't send probe responses to probe requests with unspecified SSIDs.

Security

The **Wireless Access Point — Security** screen displays a default factory setting of AES encryption, but the encryption key is not set and it will not communicate to any clients unless the encryption is set by the CryptoOfficer.

NOTE: One of the encryption options must be selected and applied in order for the AP to communicate with other APs.

Static AES Key

The Advanced Encryption Standard (AES) was selected by National Institute of Standards and Technology (NIST) in October 2000 as an upgrade from the previous DES standard. AES uses a 128-bit block cipher algorithm and encryption technique for protecting computerized information. With the ability to use even larger 192-bit and 256-bit keys, if desired, it offers higher security against brute-force attack than the old 56-bit DES keys.

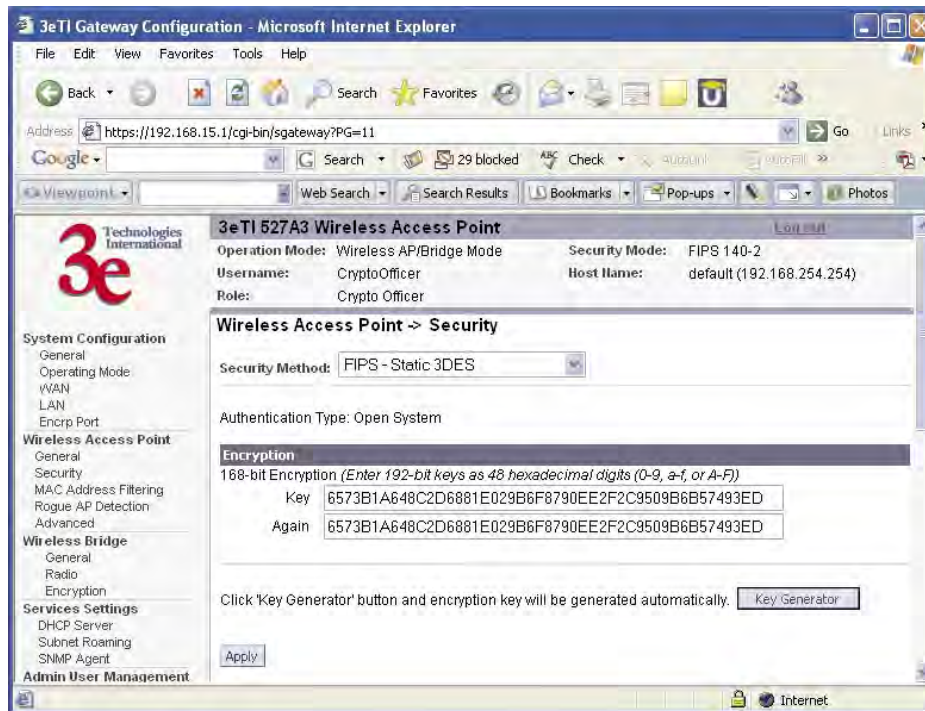
The Key Generator button automatically generates a randomized key of the appropriate length. This key is initially shown in plain text so the user has the opportunity to copy the key. Once the key is applied, the key is no longer displayed in plain text.

The screenshot shows the '3eTI Gateway Configuration' web interface in Microsoft Internet Explorer. The browser's address bar shows 'https://192.168.15.1/cgi-bin/gateway?PG=11'. The page title is '3eTI 527A3 Wireless Access Point'. The left sidebar contains a navigation menu with categories: System Configuration, Wireless Access Point, Wireless Bridge, Services Settings, Admin User Management, End User Authentication, and Monitoring Reports. The main content area is titled 'Wireless Access Point -> Security'. It shows the 'Security Method' as 'FIPS - Static AES' and 'Authentication Type' as 'Open System'. Under the 'Encryption' section, three options are available: '128-bit Encryption' (selected), '192-bit Encryption', and '256-bit Encryption'. Each option has fields for 'Key' and 'Again'. The '128-bit Encryption' key field contains the text 'CA1CDD59E926227FC2CF97C339BB5489'. At the bottom, there is a 'Key Generator' button and an 'Apply' button.

Static 3DES Key

To use 3DES, enter a 192-bit key as 48 hexadecimal digit (0-9, a-f, or A-F).

The Key Generator button automatically generates a randomized key of the appropriate length. This key is initially shown in plain text so the user has the opportunity to copy the key. Once the key is applied, the key is no longer displayed in plain text.

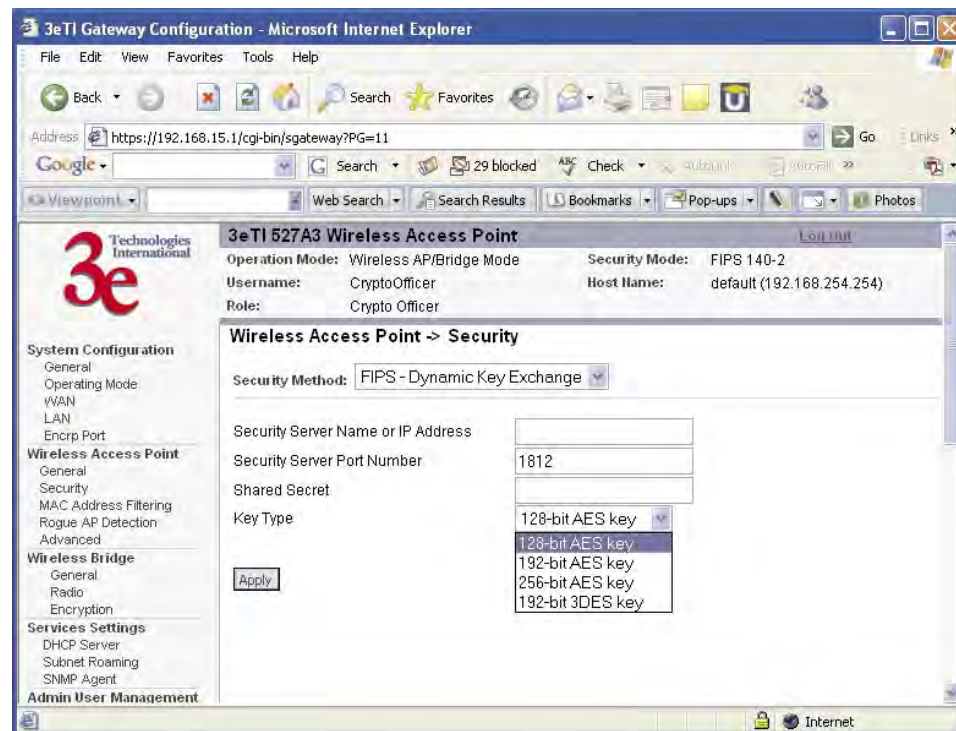


Dynamic Key Exchange

Dynamic key management requires the installation of the 3e-030 Security Server software which resides on a self-contained workstation connected to the 3e-527A3 over the WAN port. The Security Server software configuration includes: obtaining a root certificate from a Certificate Authority (CA) like Microsoft; obtaining user certificates based on the CA which will be used by the clients; and configuring the 3e Technologies International's Security Server software with the appropriate root certificate. The Security Server software application is discussed in a separate manual.

If you have installed the Security Server software, Dynamic Key Management is the preferred security setup. Configure the IP address and password of the security server and set the key type. Key type will be either 3DES (192-bit), or AES (128-bit, 192-bit or 256-bit). Thereafter, the Security Server handles authentication dynamically.

Once you have selected the options you will use, click **Apply**.



FIPS 802.11i

If you wish to use FIPS 802.11i on the 3e-527A3, enable either Pre-shared Key Settings or 802.1x Settings.

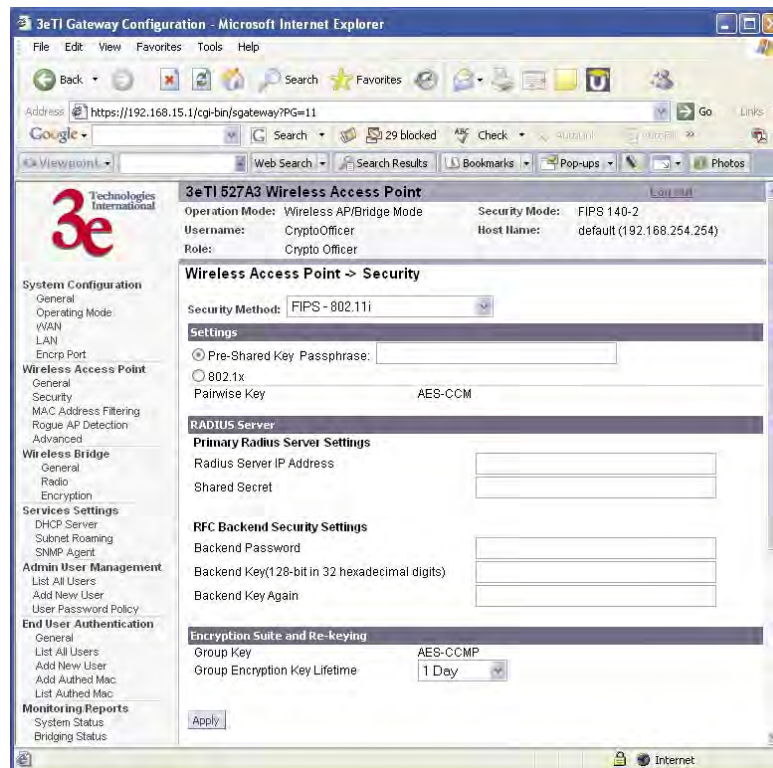
If you are a SOHO user, selecting pre-shared key means that you don't have the expense of installing a Radius Server. Simply input up to 63 character / numeric / hexadecimals in the Passphrase field.

Enable pre-authentication to allow a client to authenticate in advance with the AP before the client is associated with it. Allowing the AP to pre-authenticate a client decreases the transition time when a client roams between APs.

As an alternative, for business applications who have installed Radius Servers, select 802.1x and input the Primary Radius Server and RFC Backend security settings. Use of Radius Server for key management and authentication requires that you have installed a separate certification system and each client must have been issued an authentication certificate.

Re-keying time is the frequency in which new encryption keys are generated and distributed to the client. The more frequent re-keying, the better the security. For highest security, select the lowest re-keying interval.

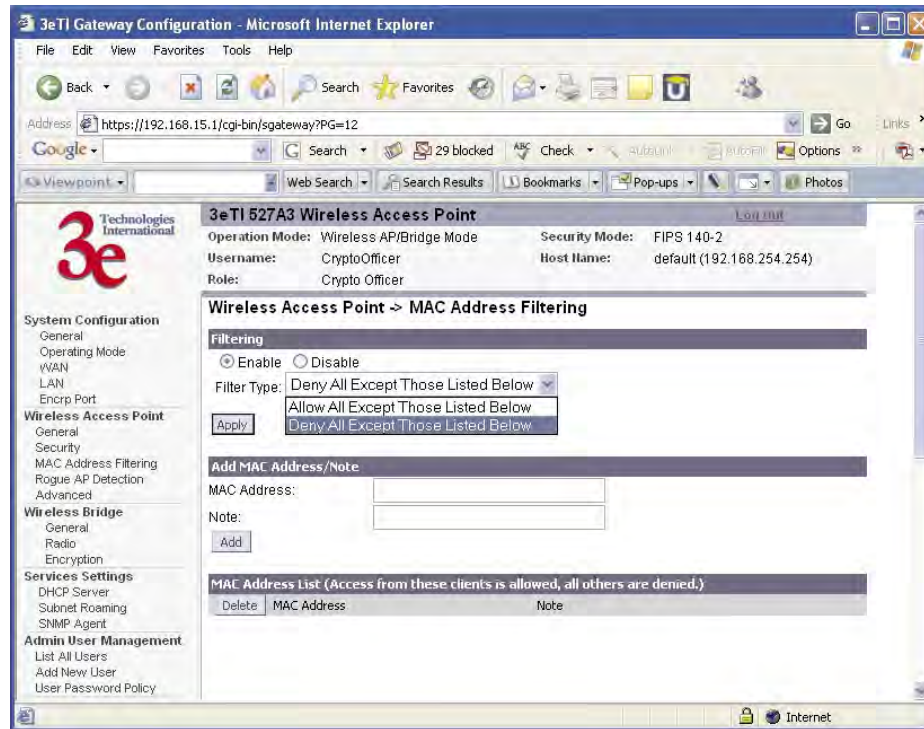
Once you have selected the options you will use, click **Apply**.



If you will be using MAC Address filtering, navigate next to the MAC Address Filtering screen.

MAC Address Filtering

The **Wireless Access Point — MAC Address Filtering** screen is used to set up MAC address filtering for the 3e-527A3 device. The factory default for MAC Address filtering is **Disabled**. If you enable MAC Address filtering, you should also set the toggle for **Filter Type**.



This works as follows:

- If **Filtering** is enabled and **Filter Type** is **Deny All Except Those Listed Below**, only those devices equipped with the authorized MAC addresses will be able to communicate with the access point. In this case, input the MAC addresses of all the PC cards that will be authorized to access this access point. The MAC address is engraved or written on the PC (PCMCIA) Card.
- If **Filtering** is enabled and **Filter Type** is **Allow All Except Those Listed Below**, those devices with a MAC address which has been entered in the MAC Address listing will NOT be able to communicate with the access point. In this case, navigate to the report: **Wireless Clients** and copy the MAC address of any Wireless Client that you want to exclude from communication with the access point and input those MAC Addresses to the MAC Address list.

Rogue AP Detection

The **Wireless Access Point — Rogue AP Detection** screen allows the network administrator to set up rogue AP detection. Enable rogue AP detection and enter the MAC Address of each AP in the network that you want the AP being configured to accept as a trusted AP. (You may add up to 128 MAC addresses.) Enter an email address for notification of any rogue or non-trusted APs. (The MAC Address for the 3e-527A3 is located on the **System Configuration — General** screen. You can also select the following filter options.

- **SSID Filter:** Check the SSID option to only send rogue APs that match the AP's SSID or wireless bridge's SSID.
- **Channel Filter:** Check the channel filter option to only send rogue APs that match the AP's channel or the wireless bridge's channel.
- If both options are checked, only APs that match both the SSID and channel are sent.

The **Adjacent AP list**, under **Monitoring/Reports** on the navigation menu, will detail any marauding APs.

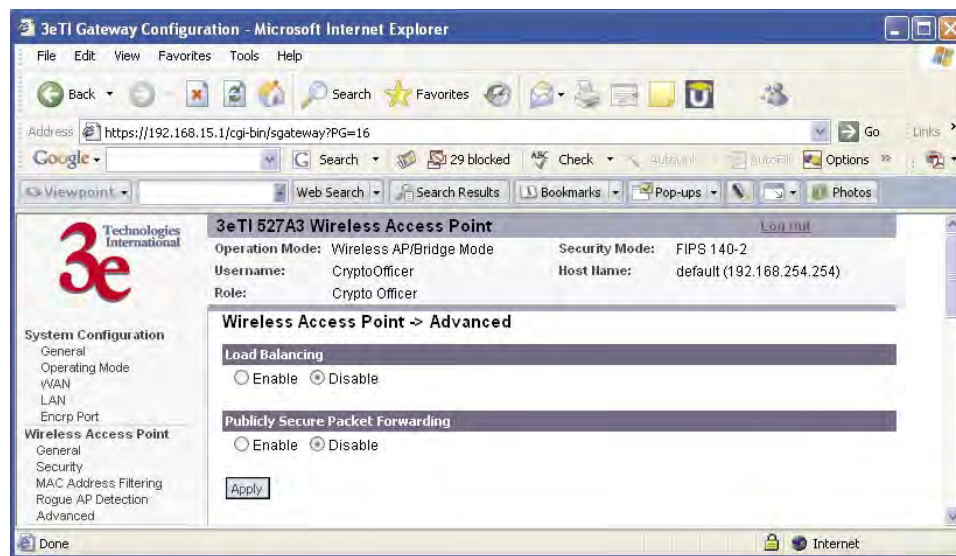
The screenshot shows the '3eTI 527A3 Wireless Access Point' configuration page in a Microsoft Internet Explorer browser. The address bar shows 'https://192.168.15.1/cgi-bin/gateway?PG=15'. The page has a sidebar navigation menu with categories like System Configuration, Wireless Access Point, Wireless Bridge, Services Settings, Admin User Management, End User Authentication, and Monitoring Reports. The main content area is titled 'Wireless Access Point -> Rogue AP Detection'. It includes an 'Email Notification' section with 'Enable' and 'Disable' radio buttons (currently 'Disable' is selected), a 'To:' text field, and 'Filter Options' for 'SSID Filter' and 'Channel Filter'. Below this is an 'Add Known AP MAC Address/Note (Trusted AP)' section with instructions and an example. It features a 'MAC Address:' text field and an 'Add' button. At the bottom, there is a 'Known AP MAC Address List (Trusted AP)' table with columns for 'Delete', 'MAC Address', and 'Note'.

Advanced

The **Wireless Access Point — Advanced** screen allows you to enable or disable load balancing and publicly secure packet forwarding.

Load balancing is disabled by default. The load balancing feature balances the wireless clients between APs. If two APs with similar settings are in a conference room, depending on the location of the APs, all wireless clients could potentially associate with the same AP, leaving the other AP unused. Load balancing attempts to evenly distribute the wireless clients on both APs.

When publicly secure packet forwarding is enabled, wireless clients can not talk to other wireless clients directly at Layer 2. However, they both can have access to others that are not associating to the same AP.



Once you have made any changes, click **Apply** to save.

Wireless Bridge

The Wireless Bridge screens are described in Chapter 5.

Services Settings

DHCP Server

The **Service Settings — DHCP Server** screen is used for configuring the DHCP server function accessible from the Local LAN port. The default factory setting for the DHCP server function is enabled. You can disable the DHCP server function, if you wish, but it is not recommended. You can also set the range of addresses to be assigned. The Lease period (after which the dynamic address can be reassigned) can also be varied.

The DHCP server function, accessible only from the LAN port, is used for initial configuration of the management functions.

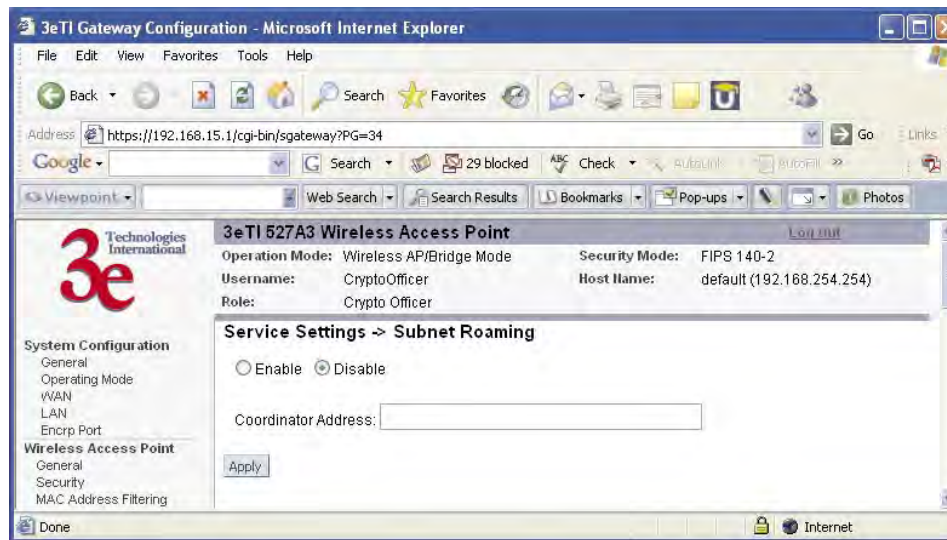
The screenshot shows the '3eTI 527A3 Wireless Access Point' configuration page in a Microsoft Internet Explorer browser. The address bar shows 'https://192.168.15.1/cgi-bin/sgateway?PG=30'. The page has a sidebar with a tree view containing 'System Configuration' (General, Operating Mode, WAN, LAN, Encrp Port) and 'Wireless Access Point' (General, Security, MAC Address Filtering, Rogue AP Detection, Advanced). The 'Services Settings -> DHCP Server' section is active. It shows 'Operation Mode: Wireless AP/Bridge Mode', 'Security Mode: FIPS 140-2', 'Username: CryptoOfficer', 'Role: Crypto Officer', and 'Host Name: default (192.168.254.254)'. The DHCP Server is set to 'Enable'. The 'Starting IP Address' is 192.168.15.10 and the 'Ending IP Address' is 192.168.15.240. The 'WINS server' is 0.0.0.0 and the 'Lease Period' is 1 Day. An 'Apply' button is at the bottom.

Field	Value
Starting IP Address	192.168.15.10
Ending IP Address	192.168.15.240
WINS server	0.0.0.0
Lease Period	1 Day

Subnet Roaming

The 3e-527A3 supports subnet roaming with 3eTI's subnet roaming coordinator server installed. Subnet roaming occurs when a user roams to an access point that is connected to a different subnet than its home subnet. If subnet roaming is supported by the wireless infrastructure, the client is able to continue its network connectivity without having to change its IP address. Therefore, to the mobile device, roaming is transparent and it will continue to function as if it is in its home subnet.

The coordinator is a separate server that keeps track of the client's home network. The software is available from 3eTI upon request.



SNMP Agent

The **Service Settings — SNMP Agent** screen allows you to set up an SNMP Agent. The agent is a software module that collects and stores management information for use in a network management system. The 3e-527A3's integrated SNMP agent software module translates the device's management information into a common form for interpretation by the SNMP Manager, which usually resides on a network administrator's computer.

The SNMP Manager function interacts with the SNMP Agent to execute applications to control and manage object variables (interface features and devices) in the gateway. Common forms of managed information include number of packets received on an interface, port status, dropped packets, and so forth. SNMP is a simple request and response protocol, allowing the manager to interact with the agent to either:

- **Get** - Allows the manager to **Read** information about an object variable
- **Set** - Allows the manager to **Write** values for object variables within an agent's control, or
- **Trap** - Allows the manager to **Capture** information and send an alert about some pre-selected event to a specific destination.

The screenshot shows the '3eTI Gateway Configuration - Microsoft Internet Explorer' window. The address bar displays 'https://192.168.15.1/cgi-bin/gateway?PG=33'. The page title is '3eTI 527A3 Wireless Access Point'. The left sidebar contains a navigation menu with categories: System Configuration, Wireless Access Point, Wireless Bridge, Services Settings, Admin User Management, End User Authentication, and Monitoring Reports. The main content area is titled 'Services Settings -> SNMP Agent'. It includes a 'Logout' link, operation mode details (Wireless AP/Bridge Mode, Security Mode: FIPS 140-2, Username: CryptoOfficer, Role: Crypto Officer, Host Name: default (192.168.254.254)), and a section for 'Community settings (SNMPv1 & SNMPv2c)' with a table of 5 communities. Below this is the 'Secure User Configuration Settings (SNMPv3)' section with a table of 4 users. At the bottom is the 'System Information' section with fields for Location, Contact, and EngineID (SNMPv3). An 'Apply' button is at the bottom left of the main content area.

3eTI 527A3 Wireless Access Point [Logout](#)

Operation Mode: Wireless AP/Bridge Mode Security Mode: FIPS 140-2
 Username: CryptoOfficer Host Name: default (192.168.254.254)
 Role: Crypto Officer

Services Settings -> SNMP Agent

☐ Enable ☒ Disable

Community settings (SNMPv1 & SNMPv2c)

Community	Source	Access Control
1		None
2		None
3		None
4		None
5		None

Secure User Configuration Settings (SNMPv3)

User name	Authentication Type/Password	Encryption Type/Password
1	SHA	DES
2	SHA	DES
3	SHA	DES
4	SHA	DES

System Information

Location	default location
Contact	default contact
EngineID (SNMPv3)	defaultID

[Apply](#)

The SNMP configuration consists of several fields, which are explained below:

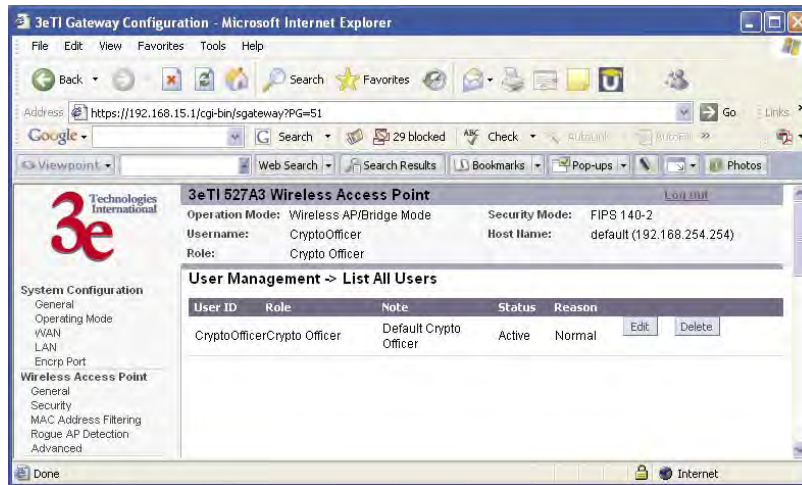
- **Community** –The Community field for Get (Read Only), Set (Read & Write), and Trap is simply the SNMP terminology for “password” for those functions.
- **Source** –The IP address or name where the information is obtained.
- **Access Control** –Defines the level of management interaction permitted.

If using SNMPv3, enter a username (minimum of eight characters), authentication type with key and data encryption type with a key. In FIPS mode, only SHA and AES are supported. This configuration information will also need to be entered in your MIB manager setup.

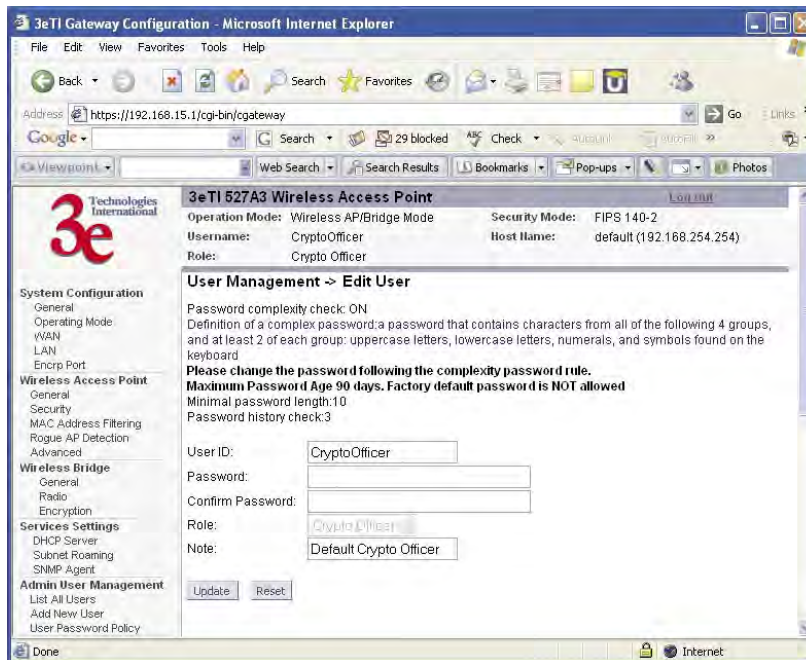
Admin User Management

List All Users

The **Admin User Management — List All Users** screen lists the Crypto Officer and administrator accounts configured for the unit. You can edit or delete users from this screen.

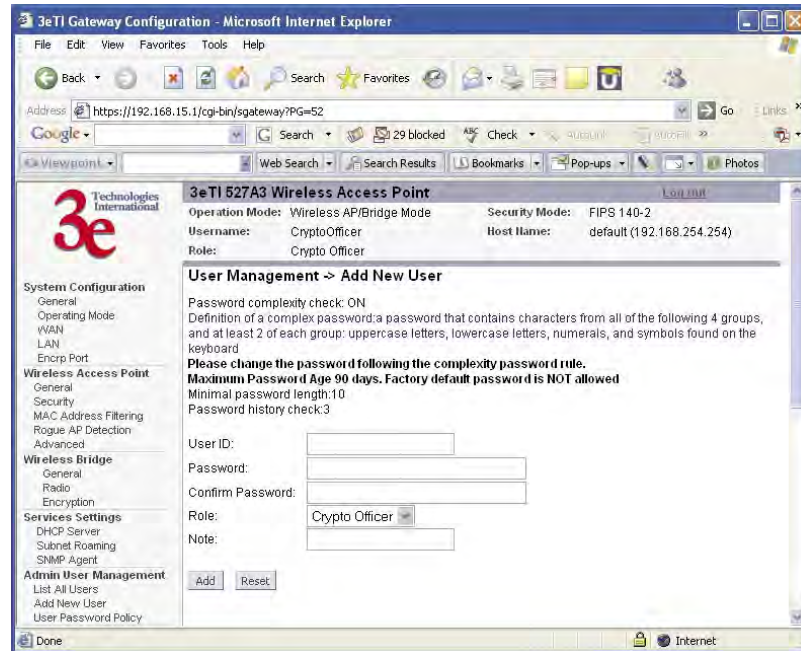


If you click on Edit, the **Admin User Management — Edit User** screen appears. On this screen you can edit the user ID, password, role, and note fields.



Add New User

The **Admin User Management — Add New User** screen allows you to add new Administrators and CryptoOfficers, assigning and confirming the password.



Administrators can view the system but this role has limited access to change settings. CryptoOfficers can view and change any of the settings on the system.

The **Password complexity check** and the **Minimal Password length** are established on the **Admin User Management — User Password Policy** screen.

User Password Policy

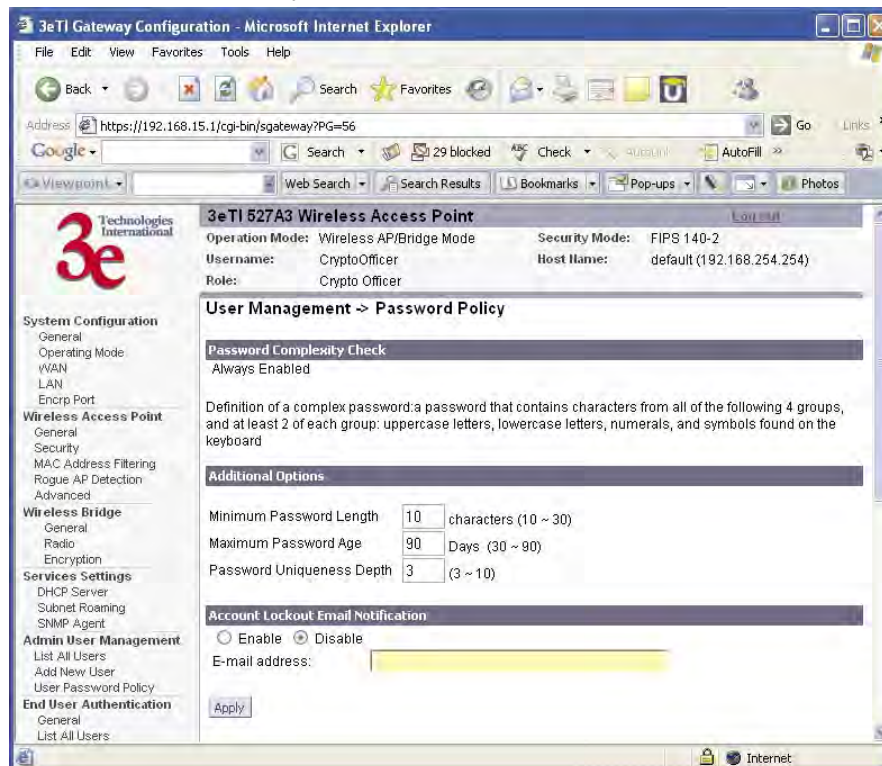
The **Admin User Management — User Password Policy** screen is always enabled. The definition of a complex password is a password that contains characters from all of the following 4 groups and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard. The **minimum password length** is 10 characters and the maximum length is 30.

The **maximum password age** is configurable from 30 to 90 days. The default is 90 days. If you do not change your password after the maximum password age expires, you will not have access to the unit. However, you have until 150 days of the password age to change the password. You will be prompted to change your password from 90-150 days. After 150 days, the account will be locked and the CryptoOfficer will have to unlock it for you. The only exception to this rule is if you are the last active CryptoOfficer user.

You can also set the **password uniqueness depth**. This means a former password can not be reused. The depth is configurable from 3 to 10. For example, if the password uniqueness depth is set to 3, then the last 3 passwords can not be reused when changing your password.

The default for the account lockout email notification is set to disable. If enabled, the system will send an email to the email address listed to inform that person that a user has been locked out of the system. To configure the email notification go to the **System Administration — Email Notification Conf** screen.

Click **Apply** to save your selection.



End User Authentication

In the 3e-527A3, all end users (wireless and wired), may require an account in order to have access to the Internet. Each end user is required to input their user name and password to authenticate with the system. Once you have authenticated, you will not need to re-authenticate for 24 hours unless your CryptoOfficer requires you to. To authenticate, open a browser and enter any resolvable URL. The system will redirect you to the authentication page. Once here, we assume that the client to be authenticated has access to DHCP and DNS servers.

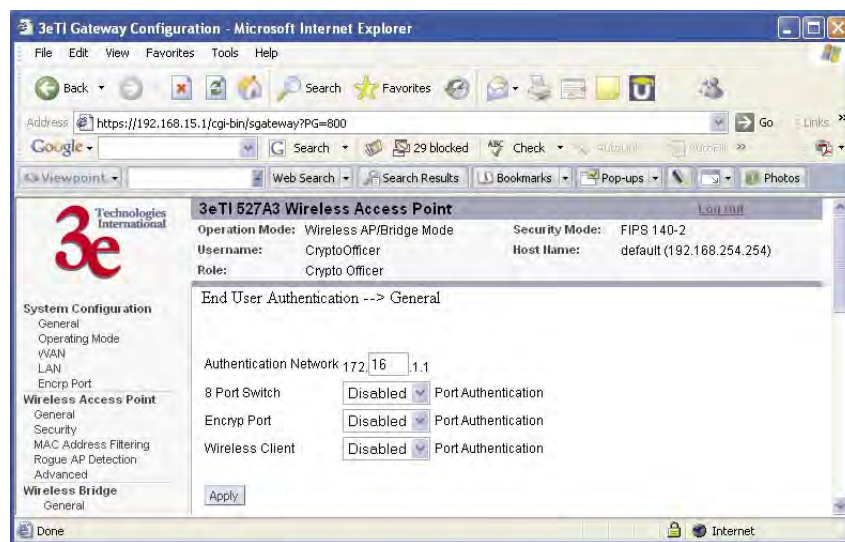
NOTE: During authentication, the 3e-527C may leave a false cookie of the URL on the client PC. You should delete this cookie. Otherwise, if the system forces you to re-authenticate, you may be prompted to delete the cookie.

General

End user authentication needs a private local network to operate. This private network should never be the same as the LAN or WAN. By default, the private network IP is 172.16.0.0. It is configurable from 172.16.0.0 to 172.31.0.0.

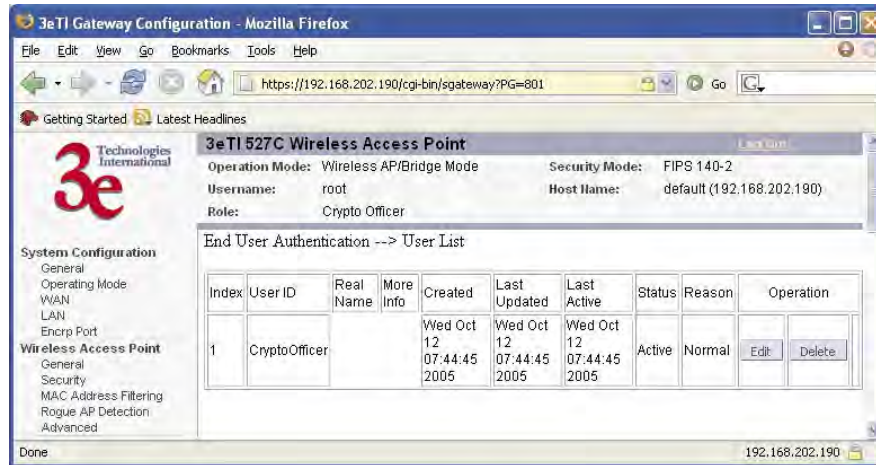
You can partially enable/disable end user authentication. If the 8-port switch feature is enabled, then all wired clients connecting to the 8-port switch need to authenticate. If the encryp port feature is enabled, then any clients attached to the encryp port need to authenticate. If the wireless client feature is enabled, then all wireless clients need to authenticate.

There is one exception however. If the end user network adapter MAC address is manually added in the database, the PC with that adapter doesn't need to authenticate. This is usually used for a TRUSTED user or system server.

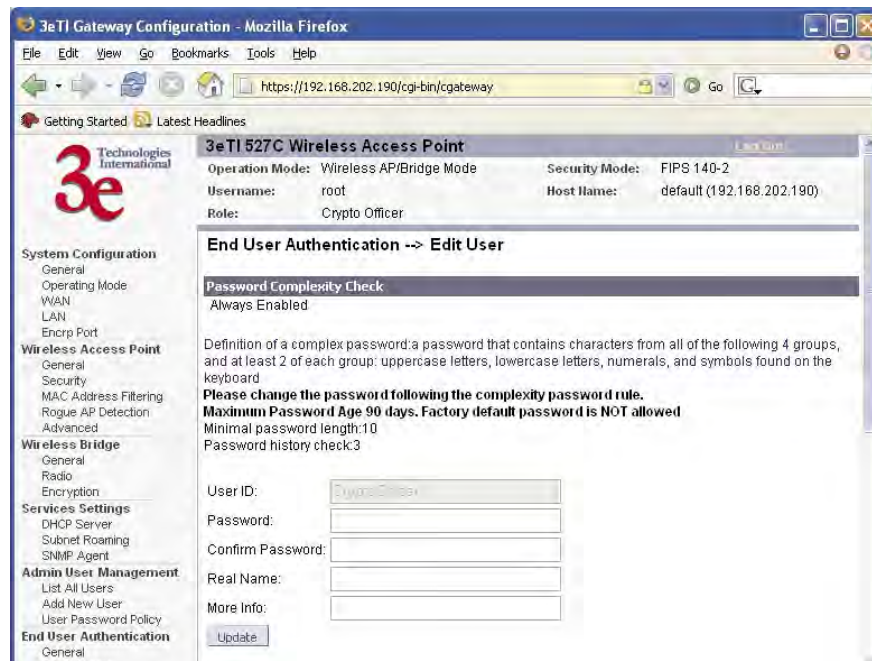


User List

The **End User Authentication — User List** screen lists all end user information. The CryptoOfficer can edit, delete, and unlock users from this screen.

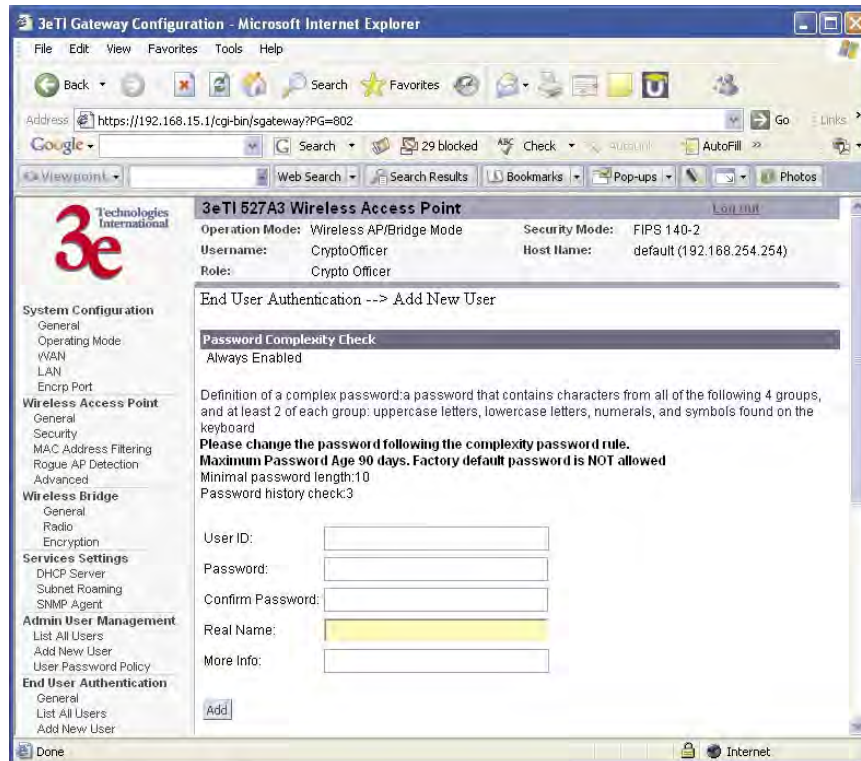


If you click on Edit, the **End User Authentication — Edit User** screen appears. On this screen you can edit the user ID, password, role, and note fields.



Add New User

The **End User Authentication — Add New User** screen allows you to add new end users, assigning and confirming the password.



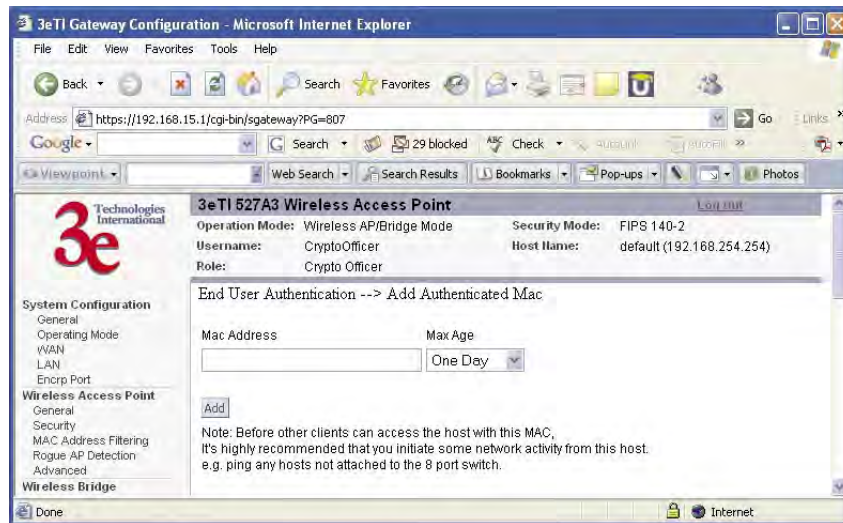
Administrators can view the system but this role has limited access to change settings. CryptoOfficers can view and change any of the settings on the system.

The password policy is the same as the **Admin User Management — User Password Policy** screen.

Add Authenticated MAC

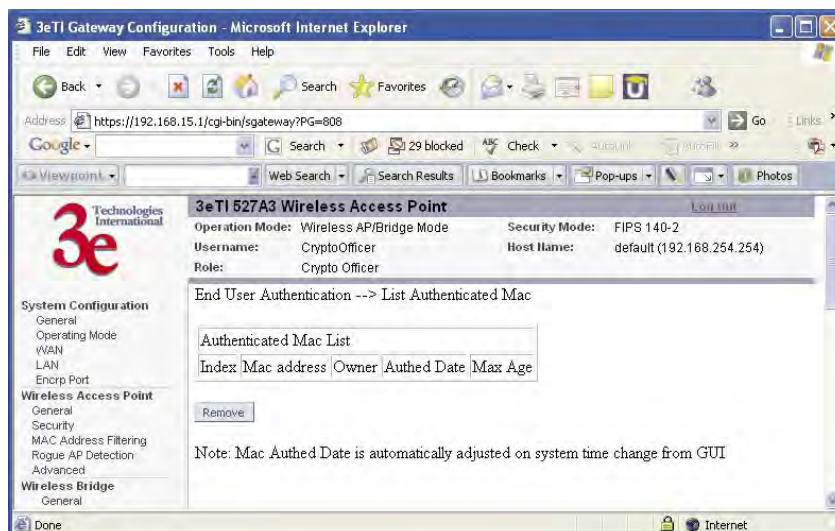
Usually the authenticated MAC is valid for 24 hours. You will be requested to re-authenticate after it expires. In case there is a client without user interaction (for example, a server), you may not want to authenticate that client every 24 hours. You can manually set the authenticated MAC in the authenticated list and mark the entry Permanent. Another use case would be to mark it as Temporarily trusted PC.

NOTE: If you manually add an authenticated MAC, we strongly recommend that you initiate some network activity to hosts that are not attached to the same 8-port switch. We also recommend that you not attach servers and other un-trusted PCs on the same 8-port switch on the 3e-527A3.



List Authenticated MAC

This screen provides a list of all of the authenticated MAC addresses.



Monitoring/Reports

This section gives you a variety of lists and status reports. Most of these are self-explanatory.

System Status

The **Monitoring/Report — System Status** screen displays the status of the 3e-527A3 device, the network interface, and the routing table.

The screenshot shows the 3eTI Gateway Configuration web interface in Microsoft Internet Explorer. The browser address bar shows <https://192.168.15.1/cgi-bin/sgateway?PG=62>. The page title is "3eTI 527A3 Wireless Access Point".

System Configuration

- General
- Operating Mode: Wireless AP/Bridge Mode
- WAN
- LAN
- Encr Port

Wireless Access Point

- General
- Security
- MAC Address Filtering
- Rogue AP Detection
- Advanced

Wireless Bridge

- General
- Radio
- Encryption

Services Settings

- DHCP Server
- Subnet Roaming
- SNMP Agent

Admin User Management

- List All Users
- Add New User
- User Password Policy

End User Authentication

- General
- List All Users
- Add New User
- Add Authed Mac
- List Authed Mac

Monitoring Reports

- System Status
- Bridging Status

Monitoring/Reports -> System Status

Device Status

Security Mode:	FIPS 140-2 Level 2
Current Encryption Mode:	
Bridging Encryption Mode:	AES ENCRYPTION MODE
System Uptime:	0:50:14
Total Usable Memory Size:	63791104 bytes
Free Memory:	28725248 bytes
Current Processes:	30
Country Code:	840

Other Information: [CPU](#) [PCI](#) [Interrupts](#) [Processes](#) [Interfaces](#)

Network Interface Status

WAN Ethernet MAC address:	00:07:D5:00:08:A5
LAN Ethernet MAC address:	00:07:D5:00:08:A5
Encr Port MAC address:	00:07:D5:00:13:41
Primary WLAN MAC address:	00:0D:3B:10:05:C1
Secondary WLAN MAC address:	00:15:6D:10:2D:94

Routing Table

Dest. LAN IP	Subnet Mask	Default Gateway	Hop Count	Interface
192.168.15.0	255.255.255.0	*	0	eth2
192.168.254.0	255.255.255.0	*	0	brg0
172.16.0.0	255.255.0.0	*	0	brgauth
default	0.0.0.0	192.168.254.1	0	brg0

There are some pop-up informational menus that give detailed information about **CPU**, **PCI**, **Interrupts**, **Process**, and **Interfaces**.

Bridging Status

The **Monitoring/Report — Bridging Status** screen displays the Ethernet Port STP status, Encryp Port STP status, Wireless Port STP status, and Wireless Bridging information.

The screenshot shows the 3eTI Gateway Configuration web interface in Microsoft Internet Explorer. The browser address bar shows `https://192.168.15.1/cgi-bin/sgateway?PG=64`. The page title is "3eTI 527A3 Wireless Access Point". The left sidebar contains a navigation menu with categories: System Configuration, Wireless Access Point, Wireless Bridge, Services Settings, Admin User Management, End User Authentication, and Monitoring Reports. The main content area is titled "Monitoring/Reports -> Bridging Status". It displays three sections: Ethernet Encryp Port STP Status, Wireless Port 0 STP Status, and Wireless Bridging Information.

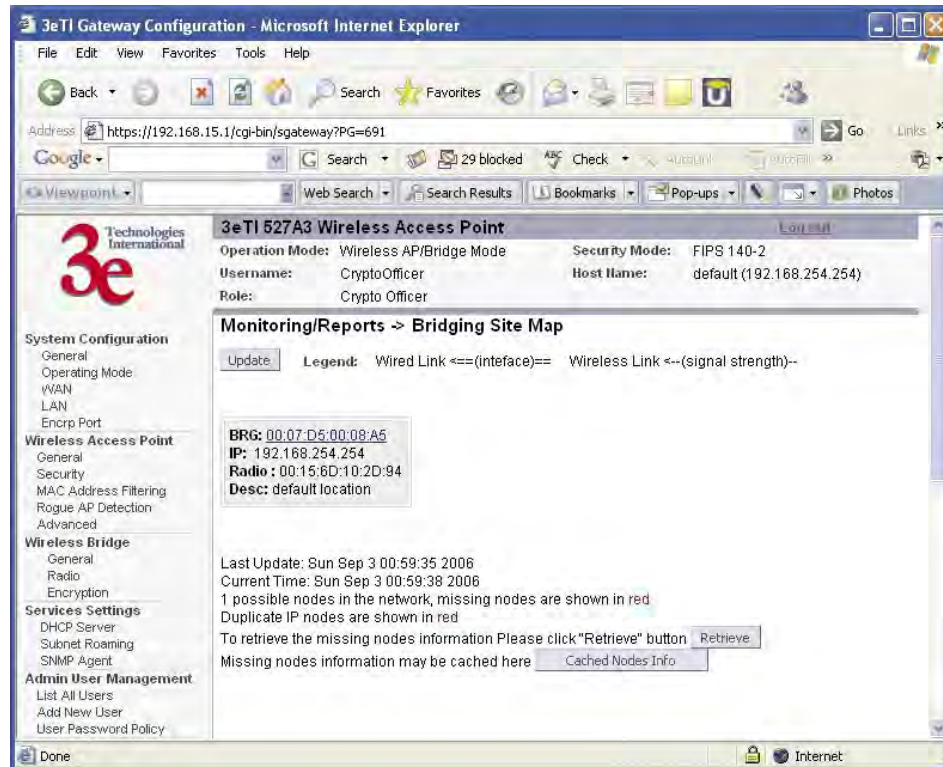
Ethernet Encryp Port STP Status	
Port Priority (hex):	50
Path Cost:	120
State:	forwarding
Designated Bridge:	0128.0007d50008a5

Wireless Port 0 STP Status	
Port Priority (hex):	50
Path Cost:	100
State:	forwarding
Designated Bridge:	0128.0007d50008a5

Wireless Bridging Information	
Bridge Priority(hex):	128
Bridge Hello Time:	2.00 sec
Bridge Forward Delay:	3.00 sec
Bridge Max Age:	20.00 sec
Bridge ID:	0128.0007d50008a5
Designated Root:	0128.0007d50008a5
Root Port:	0
Path Cost:	0
Hello Time:	2.00 sec
Forward Delay:	3.00 sec
Max Age:	20.00 sec
MAC Ageing Time:	300.00 sec
MAC Ageing Interval:	4.00 sec
Flags:	

Bridge Site Map

The Bridge Site Map shows the spanning tree network topology of both wired and wireless nodes connected to the network. The root STP node is always on top and the nodes of the hierarchy are displayed below it. Wired links are double dotted lines and wireless links are single dotted lines (the channel number of this wireless link is also shown). This map does not update dynamically. You must press the Update button to refresh the map.



Wireless Clients

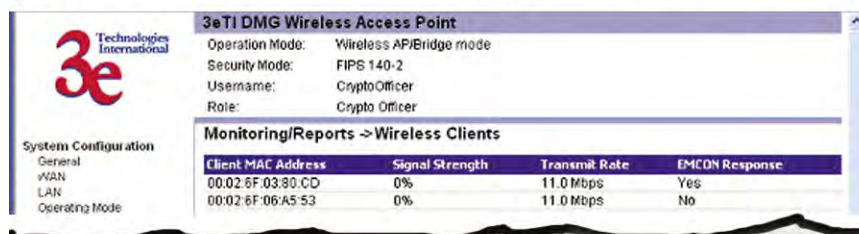
The **Monitoring/Report — Wireless Clients** screen displays the MAC Address of all wireless clients and their signal strength and transmit rate. The screen shown here emulates the FIPS 140-2 setup and contains a column for EMCON response. The EMCON feature only works with 3e-010F Crypto Client in FIPs mode.



If Transmit power is disabled, either by setting TX Pwr Mode to Off on the management screen or by using the RF Manager (Chapter 7), the Wireless Clients page will show the results from each associated client in the EMCON Response column. If the client responds to the "disable" command, a **Yes** is displayed. If the column contains a **No**, this can mean either:

- the client didn't receive the command, or
- the client is no longer in the areas, or
- the client software doesn't support the RF management feature.

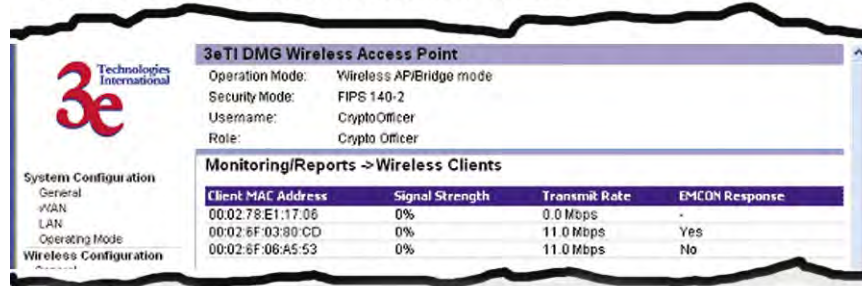
1. EMCON response when TX Power is disabled



This status information remains active for 5 minutes after the clients are disabled.

Once the transmit power is re-enabled and clients re-associate to the AP, EMCON information is maintained for them. If a new client that wasn't associated previously associates with the AP after the EMCON mode, its EMCON status appears as "-", which indicates the status record is not applicable.

2. EMCON response when TX Power is re-enabled



The screenshot shows the configuration page for a 3eTI DMG Wireless Access Point. The left sidebar contains navigation links for System Configuration (General, WAN, LAN, Operating Mode, Wireless Configuration) and Wireless Configuration (General, Security, MAC Address Filtering, Rogue AP Detection, Advanced, Wireless Bridge). The main content area is titled '3eTI DMG Wireless Access Point' and shows the following details:

- Operation Mode: Wireless AP/Bridge mode
- Security Mode: FIPS 140-2
- Username: CryptoOfficer
- Role: Crypto Officer

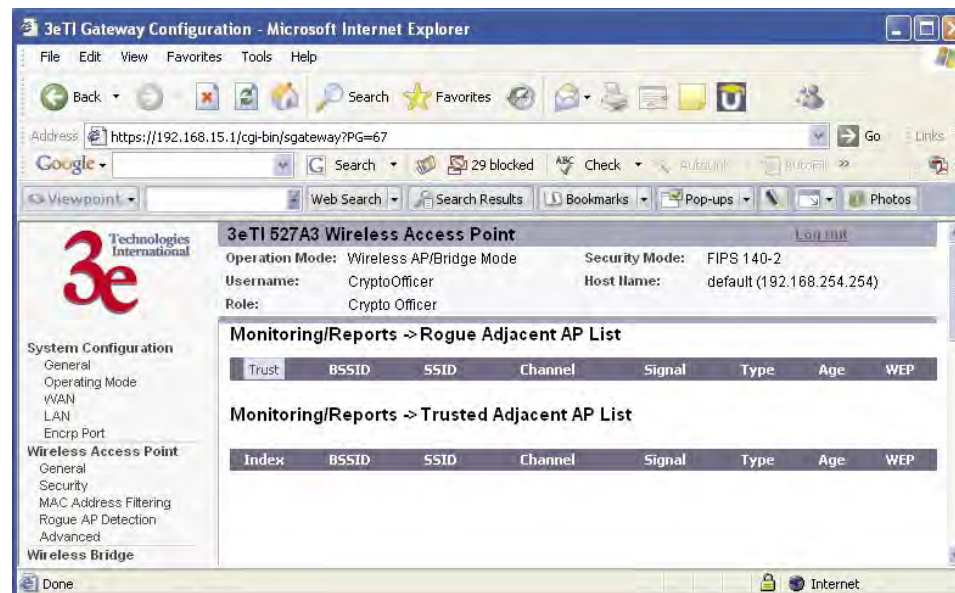
Below this, the 'Monitoring/Reports -> Wireless Clients' section displays a table with the following data:

Client MAC Address	Signal Strength	Transmit Rate	EMCON Response
00:02:78:E1:17:06	0%	0.0 Mbps	-
00:02:6F:03:80:CD	0%	11.0 Mbps	Yes
00:02:6F:06:A5:53	0%	11.0 Mbps	No

Adjacent AP List

The **Monitoring/Report — Adjacent AP List** screen shows all the APs on the network. If you select the check box next to any AP shown, the AP will thereafter be accepted by the 3e-527A3 as a trusted AP.

These APs are detected by the AP's wireless card (2.4 GHz band) and the wireless bridge's wireless card (5.8GHz band). The list of APs are only within the band that can be seen from a particular channel. For example, if the AP is on channel 1, it will display APs on channels 1-3. Adjacent APs are displayed for five minutes.



The screenshot shows the '3eTI Gateway Configuration - Microsoft Internet Explorer' window. The address bar shows 'https://192.168.15.1/cgi-bin/sgateway?PG=67'. The main content area is titled '3eTI 527A3 Wireless Access Point' and shows the following details:

- Operation Mode: Wireless AP/Bridge Mode
- Security Mode: FIPS 140-2
- Username: CryptoOfficer
- Host Name: default (192.168.254.254)
- Role: Crypto Officer

Below this, the 'Monitoring/Reports -> Rogue Adjacent AP List' section displays a table with the following data:

Trust	BSSID	SSID	Channel	Signal	Type	Age	WEP
☐							

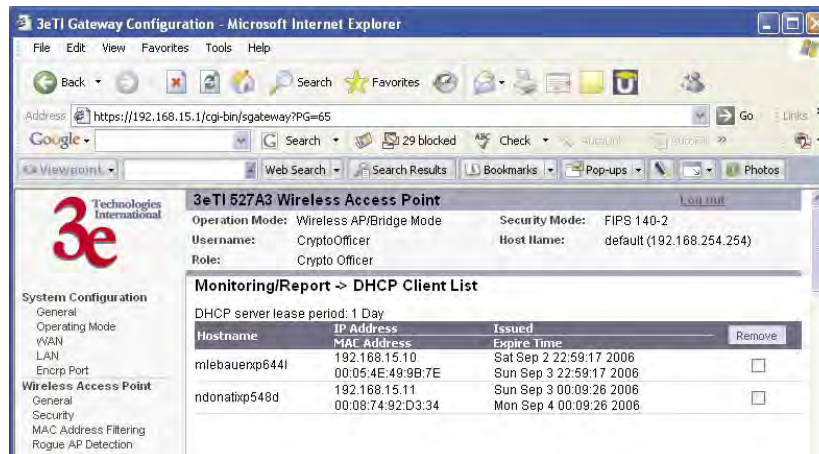
Below this, the 'Monitoring/Reports -> Trusted Adjacent AP List' section displays a table with the following data:

Index	BSSID	SSID	Channel	Signal	Type	Age	WEP

DHCP Client List

The **Monitoring/Report — DHCP Client List** screen displays all clients currently connected to the 3e-527A3 via DHCP server, including their hostnames, IP addresses, and MAC Addresses.

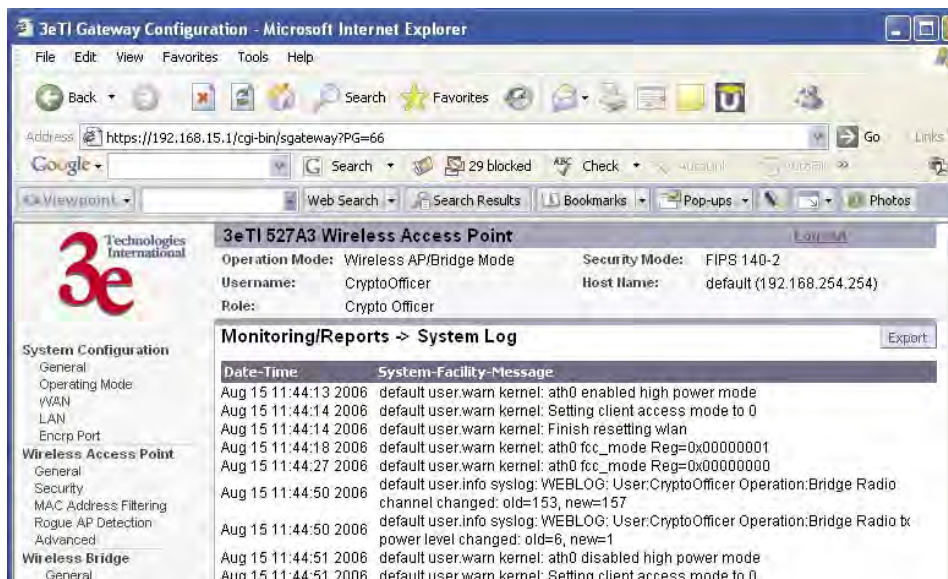
The DHCP Client list constantly collects entries. To remove entries from the list, check mark the **Revoke Entry** selection and click **Remove** to confirm the action.



System Log

The **Monitoring/Report — System Log** screen displays system facility messages with date and time stamp. These are messages documenting functions performed internal to the system, based on the system's functionality. Generally, the Administrator would only use this information if trained as or working with a field engineer or as information provided to technical support.

The System log continues to accumulate listings and rotates when it reaches the defined maximum size. You can never delete this log but you can export the log to a file on a PC.

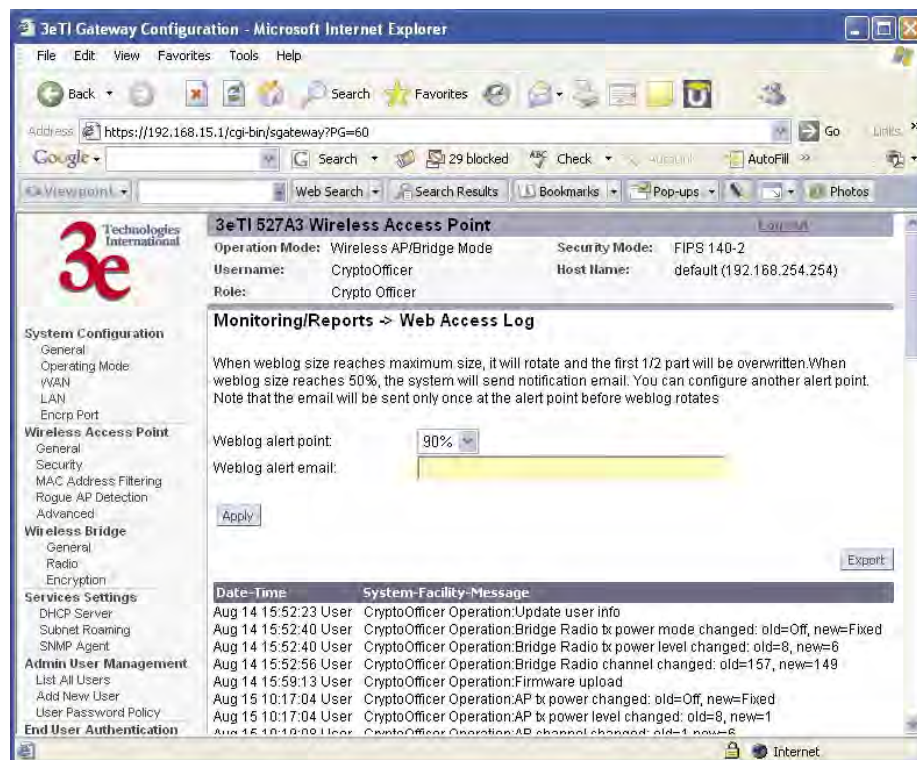


Web Access Log

The Web Access Log displays system facility messages for any configuration changes via the web GUI. Along with the old value and new value, the when/who/what changes are also recorded. For security reasons, some sensitive data may not be recorded (for example, the encryption key) or may not be completely recorded (for example, the authenticated MAC). For example, this log records when you set encryption mode, change operating mode, etc., using the web browser. It establishes a running record regarding what actions were performed and by whom.

The Web access log will continue to accumulate listings and rotate by half when it reaches the defined maximum size (10 Kbytes). If configured, an email notification will be sent when the weblog grows to 50% of the maximum size for the first time. You can also set another alert point of 60-90% of the maximum size and an email notification will be sent when this alert point is reached. You should export the web log to a PC before the maximum size is reached to the log does not get overwritten. An email will be sent only once. The exception is if the unit is rebooted, then it will send an email on each reboot.

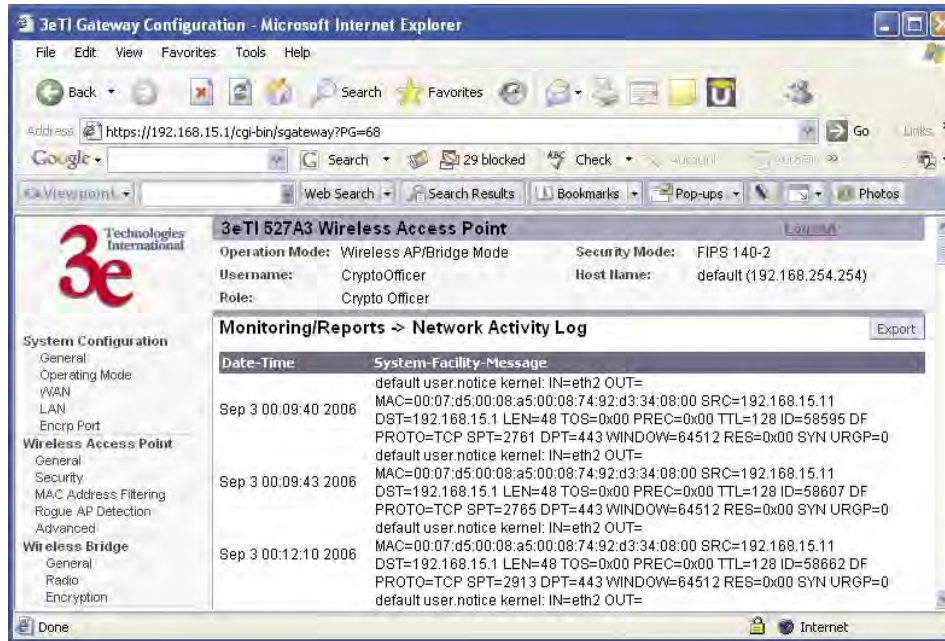
NOTE: You need to set up email notification using the System Administration — Email Notification Conf screen before any emails can be sent from the unit.



Network Activity

The Network Activity Log keeps a detailed log of all activities on the network which can be useful to the network administration staff.

The Network Activities log will continue to accumulate listings and rotates when the log reaches the defined maximum size. You can never delete this log but you can export the log to a file on a PC.



Auditing

The 3e-527A3 collects audit data and provides an interface for authorized administrators to review generated audit records. It generates records for two separate classes of events: authentication/access to the system, and actions taken directly on the system. All audit records include the date/time of the event, the identity associated with the event (such as the service, computer or user), the success/failure of the event and a definition of the event (by code or explanation).

Every start and stop of the audit service is noted in the audit record. For audit events resulting from actions of identified users, the 3e-527A3 shall be able to associate each auditable event with the identity of the user that caused the event. The 3e-527A3 shall be able to include or exclude auditable events from the set of audited events based on object identity, user identity, subject identity, host identity, and event type.

The TOE (Target of Evaluation) provides tools which can be used to review the audit records. These tools allow the user to query for records based on the identity associated with the record, such as the user or computer which is associated with the event.

The Auditing screens contain auditing functions for the system. The screens and functions are detailed in the following subsections.

Log

The **Auditing—Log** screen provides a listing of all the audit records. This log will rotate after it reaches the defined maximum size. You can not delete this log but you can export the file to a PC.

The screenshot shows the 3eTI Gateway Configuration web interface in Microsoft Internet Explorer. The address bar shows the URL: <https://192.168.15.1/cgi-bin/sgateway?PG=81>. The page title is "3eTI 527A3 Wireless Access Point".

System Configuration details:

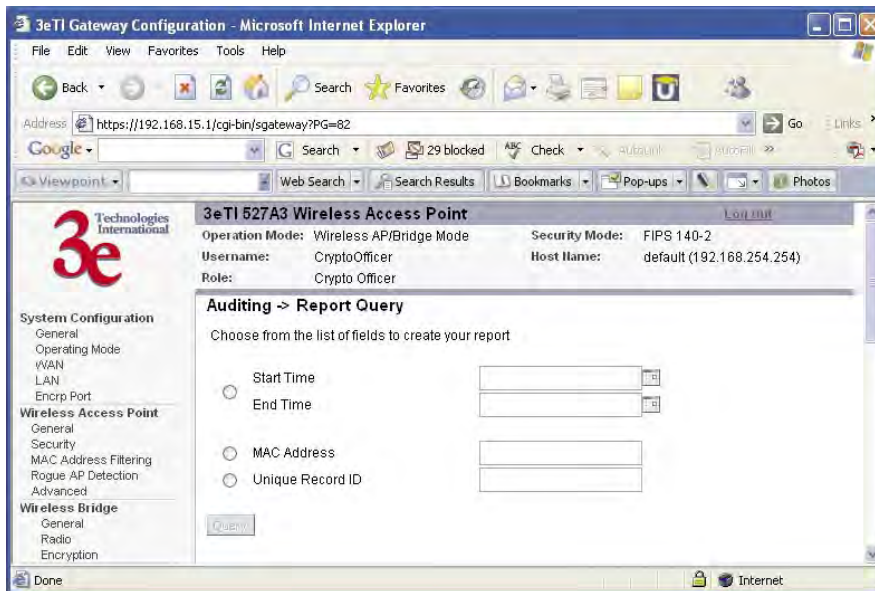
- Operation Mode: Wireless AP/Bridge Mode
- Security Mode: FIPS 140-2
- Username: CryptoOfficer
- Host Name: default (192.168.254.254)
- Role: Crypto Officer

The "Auditing -> Log" screen displays a table of audit records:

No	Date-Time	System-Facility-Message
1	Aug 14 15:50:47 2006	EVT_SELF_TEST_ACTIVATED The self-test function has been called
2	Aug 14 15:59:45 2006	EVT_SELF_TEST_ACTIVATED The self-test function has been called
3	Aug 15 10:11:00 2006	EVT_SELF_TEST_ACTIVATED The self-test function has been called
4	Aug 15 10:19:44 2006	EVT_ENCRYPT_ALG_CHANGED CryptoOfficer Bridging encryption algorithm changed to AES
5	Aug 15 10:41:31 2006	EVT_SELF_TEST_ACTIVATED The self-test function has been called
6	Aug 15 15:16:10 2006	EVT_SELF_TEST_ACTIVATED The self-test function has been called
7	Aug 15 15:35:16 2006	EVT_ENCRYPT_ALG_CHANGED CryptoOfficer Wireless security is changed to 'Static AES'
8	Aug 15 17:05:01 2006	EVT_SELF_TEST_ACTIVATED The self-test function has been called
9	Aug 15 17:11:01 2006	EVT_KEY_ZEROIZED CryptoOfficer Key zeroized - Wireless security is changed from Static AES to FIPS 192.168.15.1

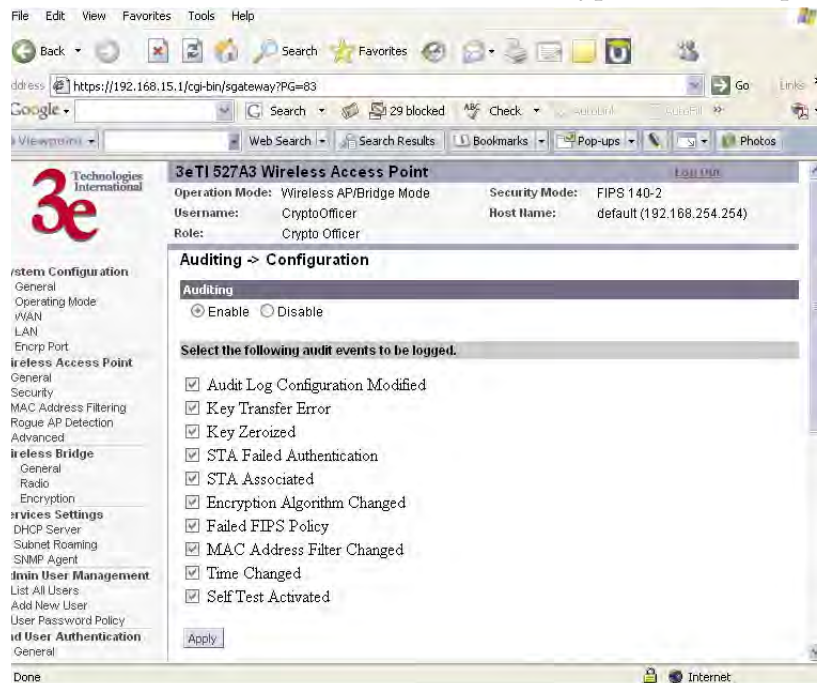
Report Query

The **Auditing—Report Query** screen allows you to query on report based on start time, end time, MAC address, or unique record IDs.



Configuration

The **Auditing—Configuration** screen is used to configure the auditing settings. You can enable and disable the auditing function on this screen. You can select which audit event types you wish to log. The following figure shows the screen and the table lists event types and descriptions.



Event Type	Description
Audit Log Configuration Modified	Any modification to the audit log configuration (enable/disable, recorded event types, etc) will trigger the creation of an audit record.
Key Transfer Error	Any error detected during the dynamic key exchange, either to the station or the authentication server.
Key Zeroized	The keys are zeroized including: 1. Transitioning from static key to DKE (and vice versa) 2. Transitioning to bypass mode Individual log messages appear from the application and driver since keys are held in both locations.
STA Failed Authentication	A station's authentication request is dropped because it doesn't match the MAC address filter.
STA Associated	A station successfully associates to the AP.
Encryption Algorithm Changed	The encryption algorithm is changed, including bypass mode.
Failed FIPS Policy	All HMAC/AES decrypt errors that can be detected.
MAC Filter Changed	The MAC address filter is changed including adding/deleting, enable/disable, and changing filter type.
Time Changed	Whenever the time is changed via the GUI or at bootup if the time is within two minutes of 11/30/1999, 0hr, 0min.
Self Test Activated	The self-test function is run.

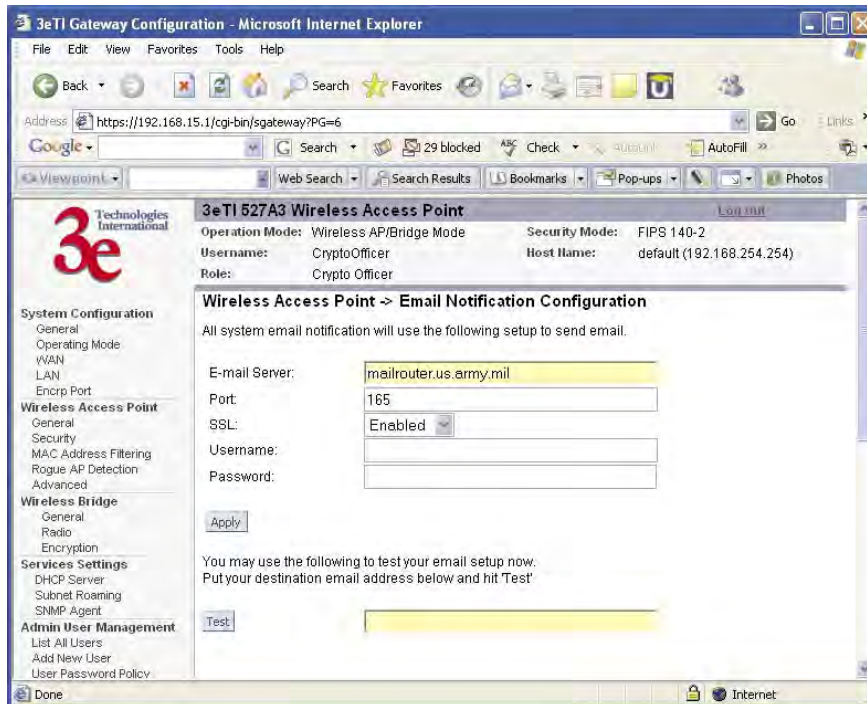
System Administration

The System administration screens contain administrative functions. The screens and functions are detailed in the following section.

Email Notification Configuration

All system notification emails need to be set up using the **System Administration — Email Notification Configuration** screen. Your email server must support SMTP protocol. If your email server does not require authentication to send email then leave the username/password fields blank. If your email server does not support SSL (Secure Socket Layer) then disable SSL on the 3e-527A3. You may also test your email setup using the test feature on this screen.

NOTE: Check your connection to the mail server. Emails sent from the 3e-527A3 may be queued for a short period if the connection fails temporarily, but it will give up if the connection continues to fail.



Configuration-Button

The **System Administration—Configuration Button** screen is used in conjunction with the physical Configuration/RESET button which is accessible from the outside of the 3e-527A3 unit. The Configuration/RESET button is located directly under the number “1” on the front panel. Use a plastic wire wrap or something similar and slide it in-between the gray panel and the Ethernet jack (RJ-45 jack) at an angle so that the tip touches the button hidden under the number “1”. You will know you have located the Configuration/RESET button when you push and “feel” a click.

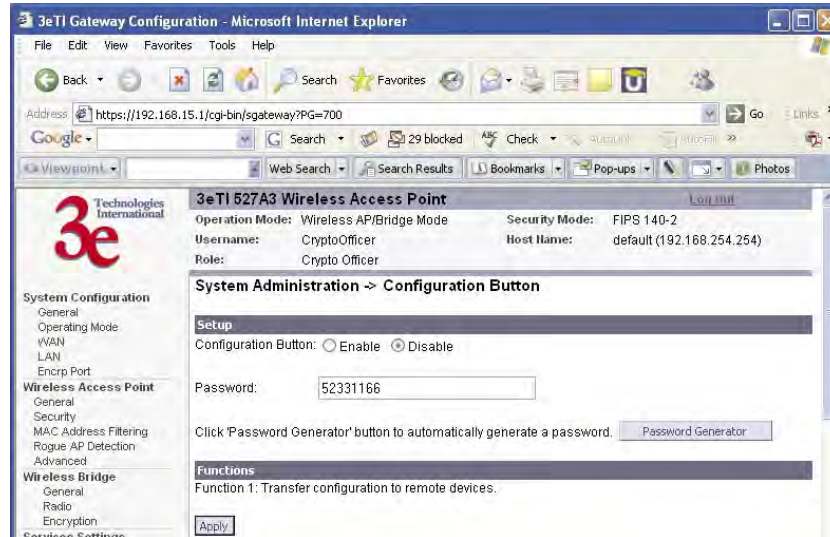
NOTE: A metal paper clip is not recommended as it may damage the reset switch and after time the switch will not be water resistant anymore.



In order to minimize the administration effort of the AP, the external RESET button has been converted into a configuration button to perform certain functions. This configuration button is programmed to perform the following operations.

- Send the configuration file to other APs that are connected to ports 1-6 and the PoE/Uplink port (requires a password)
Note that the configuration file transfer only goes to devices that are connected to the Ethernet ports. The configuration does not get transferred to devices connected wirelessly or through the Encrp port.
- Normal Reset (hold button for five seconds then release, see details below)
- Factory Default (hold button for 10 seconds then release, see details below)

The **System Administration—Configuration Button** screen is where you can enable the configuration button. The configuration button is disabled by default and doesn't have a password. Once the button is enabled, a password must be entered (not needed for reset or factory default functions). In order to perform a configuration transfer, you must enter the password (8 digits between 1-9).



To use the Configuration/RESET button push the button for two seconds. After two seconds the WLAN2 and WLANSS LEDs are turned off. These two LEDs can then be used as input indicators.

The procedure to enter the password is:

Example: 11111111

Push the Configuration/RESET button once (input is acknowledged by the signal strength LED) and wait for one second. The WLAN2 LED blinks to acknowledge the first digit was accepted. Repeat eight times.

To reset the unit:

1. Push in and hold the Configuration/RESET button for five seconds (input is acknowledged by the WLANSS LED turning on).
2. After five seconds, you can release the button to reset the unit without factory default.
3. If you continue to hold the button, after 10 seconds the WLANSS will turn off and the unit will be reset to the factory default.

The signal strength LED and WLAN2 LEDs will go back to normal if there is no input in 10 seconds.



System Upgrade

The **System Administration — System Upgrade** screen gives you the ability to upload updates to the 3e-527A3 device's firmware as they become available. When a new upgrade file becomes available, you can do a firmware upgrade from the **Firmware Upgrade** window.

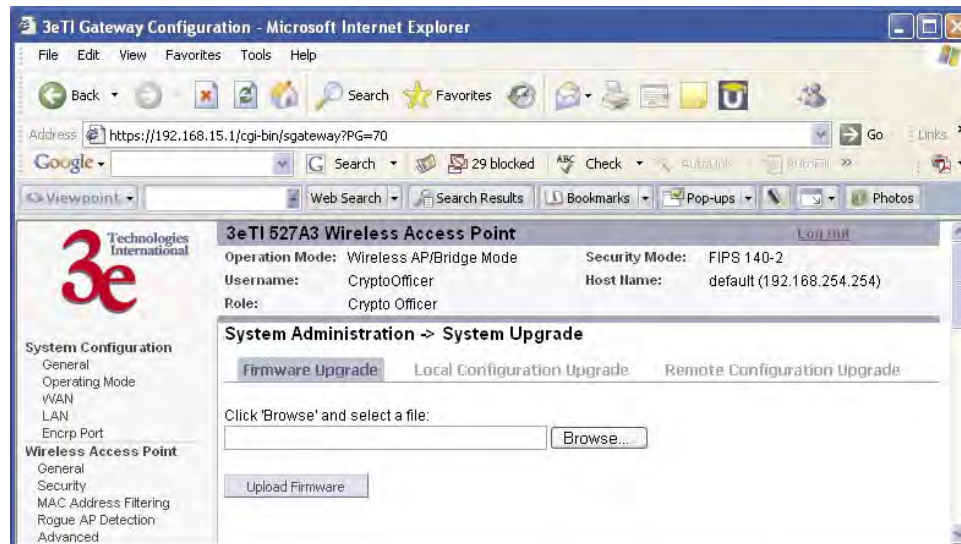
There is also a configuration file transfer option which allows the system configuration file from one AP to be transferred to another AP, in order to minimize the administration of the APs. Only configuration parameters that can be shared between APs are downloaded in the configuration file. WAN IP address, hostname, and bridge priority are not transferred in the configuration file. Click on the **Local Configuration Upgrade** and **Remote Configuration Upgrade** tabs to perform file transfers.

Only the Crypto Officer role can access this function.

Firmware Upgrade

On the **System Administration — System Upgrade** screen, the Firmware Upgrade tab is the default view.

Click browse and select the firmware file to be uploaded. Click on the Upload Firmware button.



Local Configuration Upgrade

On the **System Administration — System Upgrade** screen, click on the **Local Configuration Upgrade** tab to upload and download configuration files to access points connected to the network.

To upload a configuration file, select the file using the browse button and enter the passphrase for that file. The passphrase protects the file from unauthorized users. It prevents unauthorized users from applying the system configuration file to an unauthorized AP to gain access to the network. Before downloading the system configuration file to a local computer, the user must enter a passphrase to protect the file. Before the system configuration file can be uploaded onto another AP, the passphrase must be entered on the remote AP.

The configuration file can be tagged with a 12 character tag to keep track of the configuration file as it is transferred to other APs.

The screenshot shows the 3eTI Gateway Configuration web interface in Microsoft Internet Explorer. The browser address bar shows the URL: `https://192.168.15.1/cgi-bin/sgateway?PG=703`. The page title is "3eTI 527A3 Wireless Access Point".

On the left side, there is a navigation menu with the following categories:

- System Configuration**
 - General
 - Operating Mode
 - WAN
 - LAN
 - Encrip Port
- Wireless Access Point**
 - General
 - Security
 - MAC Address Filtering
 - Rogue AP Detection
 - Advanced
- Wireless Bridge**
 - General
 - Radio
 - Encryption
- Services Settings**
 - DHCP Server
 - Subnet Roaming
 - SNMP Agent
- Admin User Management**
 - List All Users
 - Add New User
 - User Password Policy
- End User Authentication**
 - General
 - List All Users
 - Add New User
 - Add Authed Mac
 - List Authed Mac
- Monitoring Reports**
 - System Status
 - Bridging Status
 - Bridging Site Map
 - Wireless Clients
 - Adjacent AP List
 - DHCP Client List
 - System Log
 - Web Access Log
 - Network Activities
- Auditing**
 - Log
 - Report Query
 - Configuration
- System Administration**
 - Email Notification Conf
 - Configuration Button
 - System Upgrade

The main content area is titled "System Administration -> System Upgrade". It has three tabs: "Firmware Upgrade", "Local Configuration Upgrade" (selected), and "Remote Configuration Upgrade".

Under the "Local Configuration Upgrade" tab, there is a section titled "Local File Upgrade". It contains two options:

Option 1: Click 'Browse' and select a configuration file to upload

There is a text input field for the file name and a "Browse..." button. Below this is a "Passphrase" input field and an "Upload Configuration" button.

Option 2: Input your passphrase and download the configuration file

There is a text input field for the passphrase and a "Download Configuration" button.

Below these options is a section titled "Generate Random File". It contains a "Generate Random" button.

Under "Generate Random File", there are four text input fields with the following values:

- CryptoOfficer Password: `N2LiCa("ti2`
- AP Encryption Key (AES-192): `78C3D3C16E9DAEC3DEB89D6CCD427E6C40EB7731EB70A0A`
- Configuration Button Password: `81618172`

Below these fields is an "Install File" button.

At the bottom is a section titled "File Tagging". It contains a text input field for the file tag and an "Apply" button. A note above the field states: "(This tag is applied to the local configuration file and can be used for tracking files)".

The random configuration feature is intended to reduce the effort to generate new keys for the system and to create a new password for the CryptoOfficer role that is performing this operation. When the generate button is pushed, the following parameters are randomized:

- AD SSID
- AP encryption key (AES-192)
- Bridge SSID
- Bridge encryption key (AES-192)
- Bridge channel (802.11a, random channel in 5.8GHz band)
- DSL encryption key (AES-192)
- Configuration button password
- CryptoOfficer password

The following parameters are set:

- Bridge mode: auto
- Bridge radio: freq=11a, txpower=auto, broadcasting ssid=disabled
- AP radio: txpower=auto, broadcasting ssid=disabled

All other system parameters are unchanged.

IMPORTANT: The three fields that are listed (CryptoOfficer Password, AP Encryption Key, and Configuration Password Button) should be recorded since they won't be visible after reboot. Once you record these values, the file can be installed by clicking on the "Install file" button. The new file will be installed and the unit will reboot.

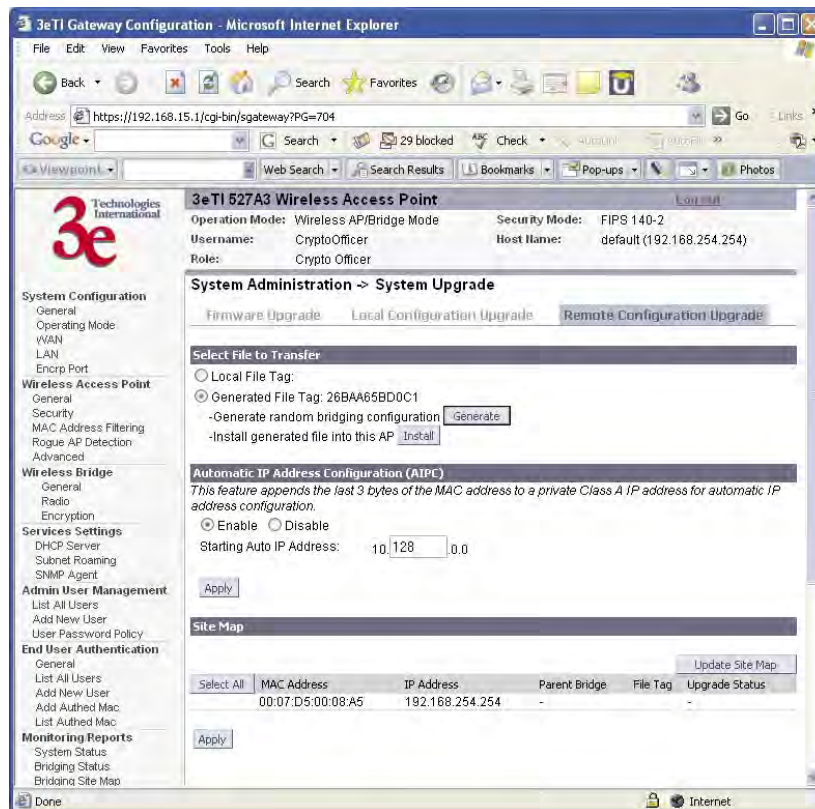
Remote Configuration Upgrade

On the **System Administration — System Upgrade** screen, click on the **Remote Configuration Upgrade** tab to upload and download configuration files to access points in remote locations which are not configured.

This remote configuration upgrade feature allows you to selectively transfer a configuration file to other APs. Once the file is transferred, the remote AP will be rebooted. Once the remote units are rebooted, the site map can be updated and the File Tag will show the status of the units. If the tag matches the local tag, the unit was updated successfully.

While files are being transferred press the F5 key to see the status of the transfer. Pressing F5 will update the status only, not the entire page. The status will either be "file sent", "upgrading", "successful", or "failure". If you click on the **Update Site Map** button then the status of the transfer will be lost.

Two types of files can be transferred, a local file or a randomly generated file. A local file is the current configuration that is running on the AP. A randomly generated file is the local file with a randomly selected bridging SSID and a randomly selected bridging encryption key (AES-192).



The random configuration file is used to update the bridging SSID and bridging encryption on other devices using the existing bridging link. If the bridging key or the bridging SSID is changed on the normal configuration screen, then the bridging link to the other devices will be terminated, and the configuration can not be updated.

To create a randomly generated bridging configuration file, click **Generate**. A new configuration is created in a temporary file and an **Install** button appears. In order to transfer this file, select the **Generated File** radio button, check the desired recipients in the Site Map section, and click **Apply**. After the file has been successfully transferred to the recipients (check the status field in the lower section), click **Install** to apply the randomly generated configuration file to the AP. Once applied, the unit will reboot and start using the new configuration file.

3eTI 527C Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode Security Mode: FIPS 140-2
 Username: root Host Name: default (192.168.202.190)
 Role: Crypto Officer

System Administration -> System Upgrade

Firmware Upgrade Local Configuration Upgrade Remote Configuration Upgrade

Select File to Transfer

☐ Local File Tag:
☒ Generated File Tag: 719216BCABC1
 -Generate random bridging configuration Generate
 -Install generated file into this AP Install

Automatic IP Address Configuration (AIPC)
 This feature appends the last 3 bytes of the MAC address to a private Class A IP address for automatic IP address configuration.
☒ Enable ☐ Disable
 Starting Auto IP Address: 10.128.0.0
 Apply

Site Map

Select All	MAC Address	IP Address	Parent Bridge	File Tag	Upgrade Status
☒	00:07:D5:01:04:16	192.168.203.165	-	3e-wlan	-
☐	00:07:D5:01:04:1C	192.168.203.163	00:30:C1:73:5C:80	-	-
☐	00:07:D5:01:03:DA	192.168.202.193	00:30:C1:63:96:80	-	-
☐	00:02:6F:20:90:3D	192.168.202.192	00:30:C1:63:96:80	-	-
☐	00:07:D5:01:06:4A	192.168.202.143	00:30:C1:63:96:80	-	-
☐	00:07:D5:01:05:FA	192.168.202.142	00:30:C1:63:96:80	-	-
☐	00:07:D5:FE:00:00	192.168.203.164	00:30:C1:63:96:80	-	-
☐	00:07:D5:00:03:BA	192.168.202.190	00:30:C1:63:96:80	-	-
☐	00:02:6F:21:DB:7B	192.168.203.166	00:30:C1:A2:B4:80	3e-wlan	-
☐	00:07:D5:00:03:DC	192.168.203.162	00:30:C1:63:96:80	3e-wlan	-

Update Site Map
 Apply

The automatic IP address configuration feature can be used to assign a remote device an IP address. This feature minimizes the effort to configure IP addresses in a wireless network. The IP addresses are assigned on the private class A IP address range (10.0.0.0). By default, this feature is enabled, so if you want to assign your own IP addresses you need to disable this feature.

You have the option to configure the second byte of the IP address to limit the range in which the IP addresses are distributed. For example, if your network already uses the 10.0.0.0 network address for other devices, you can limit the auto configuration to an upper range of 10.128.0.0 and the IP addresses will start from that number.

The automatic IP address configuration feature uses the last three bytes of the WAN MAC address for the last three bytes of the IP address. For example, the WAN MAC address of 00:07:D5:01:02:03 will translate to an IP address of 10.1.2.3. If the starting range of the automatic IP address configuration is set to 10.128.0.0 and the WAN MAC address is 00:07:D5:01:02:03, then the IP address is pushed to the upper range and becomes 10.129.2.3 (basically the second byte adds 128+1). The MAC addresses on the WAN port are from the 3eTI's address pool of 16 million addresses. There is a small chance for duplicate MACs. However, if a duplicate IP address is detected, the bridge site map will show this device with a red IP address. The distributed default gateway is the first IP address in the valid range. For example: for 10.128.0.0, the default gateway is 10.128.0.1. The distributed netmask is 255.0.0.0.

Factory Default

The **System Administration — Factory Default** screen is used to reset the AP to its factory settings.

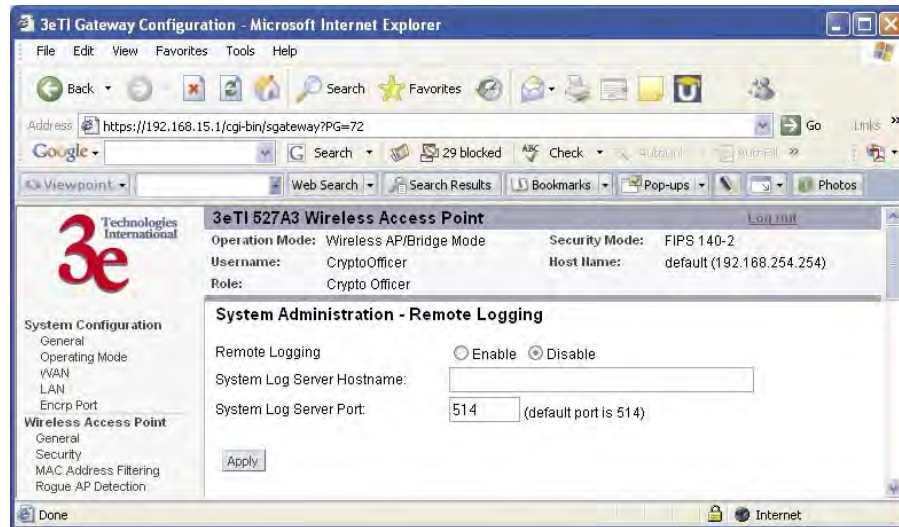
The "Restore" button is a fallback troubleshooting function that should only be used to reset to original settings.

Only the Crypto Officer role has access to the **Restore** button.



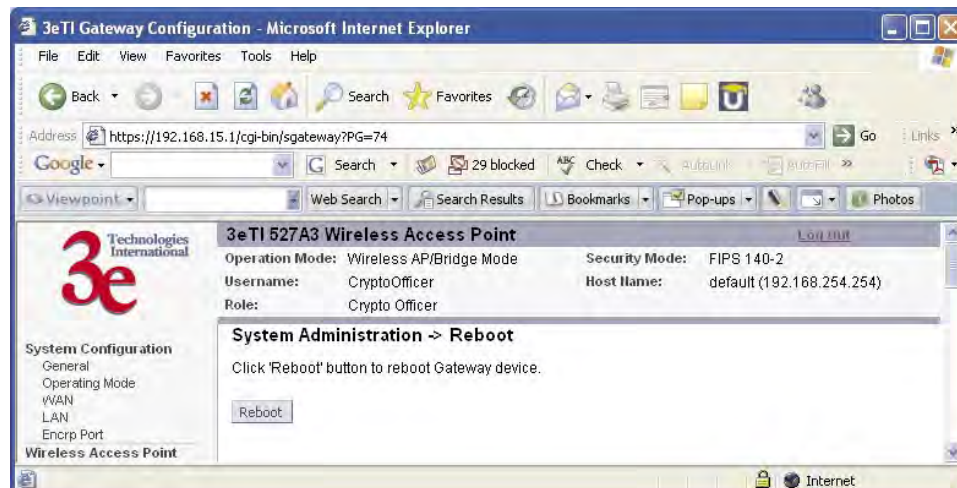
Remote Logging

The **System Administration — Remote Logging** screen allows you to forward the syslog data from each machine to a central remote logging server. In the 3e-527A3, this function uses the **syslogd** daemon. If you enable Remote Logging, input a System Log Server IP Address and System Log Server Port. Click **Apply** to accept these values.



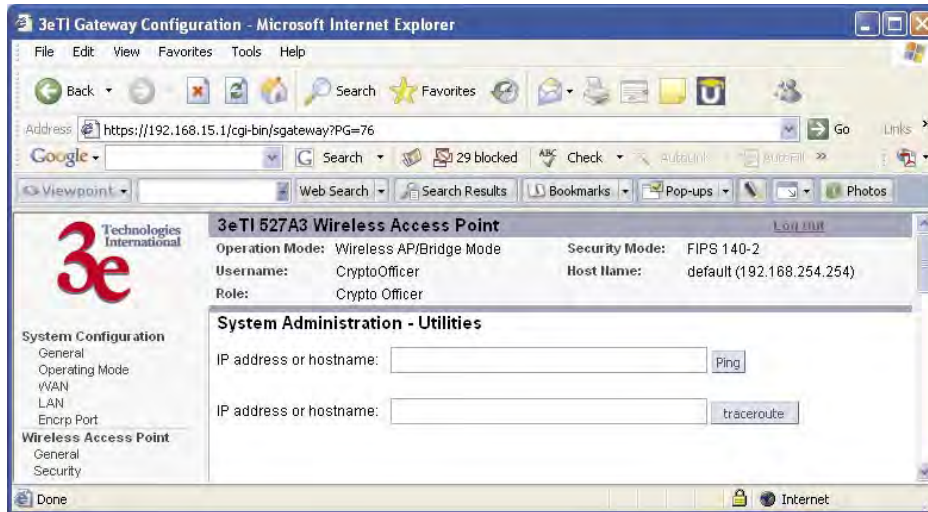
Reboot

The **System Administration — Reboot** screen allows you to reboot the 3e-527A3 without changing any preset functionality. Both Crypto Officer and Administrator functions have access to this function.



Utilities

The **System Administration — Utilities** screen gives you ready access to two useful utilities: Ping and Traceroute. Simply enter the IP Address or hostname you wish to ping or traceroute and click either the **Ping** or **Traceroute** button, as appropriate.



Chapter 4: Gateway Configuration

Introduction

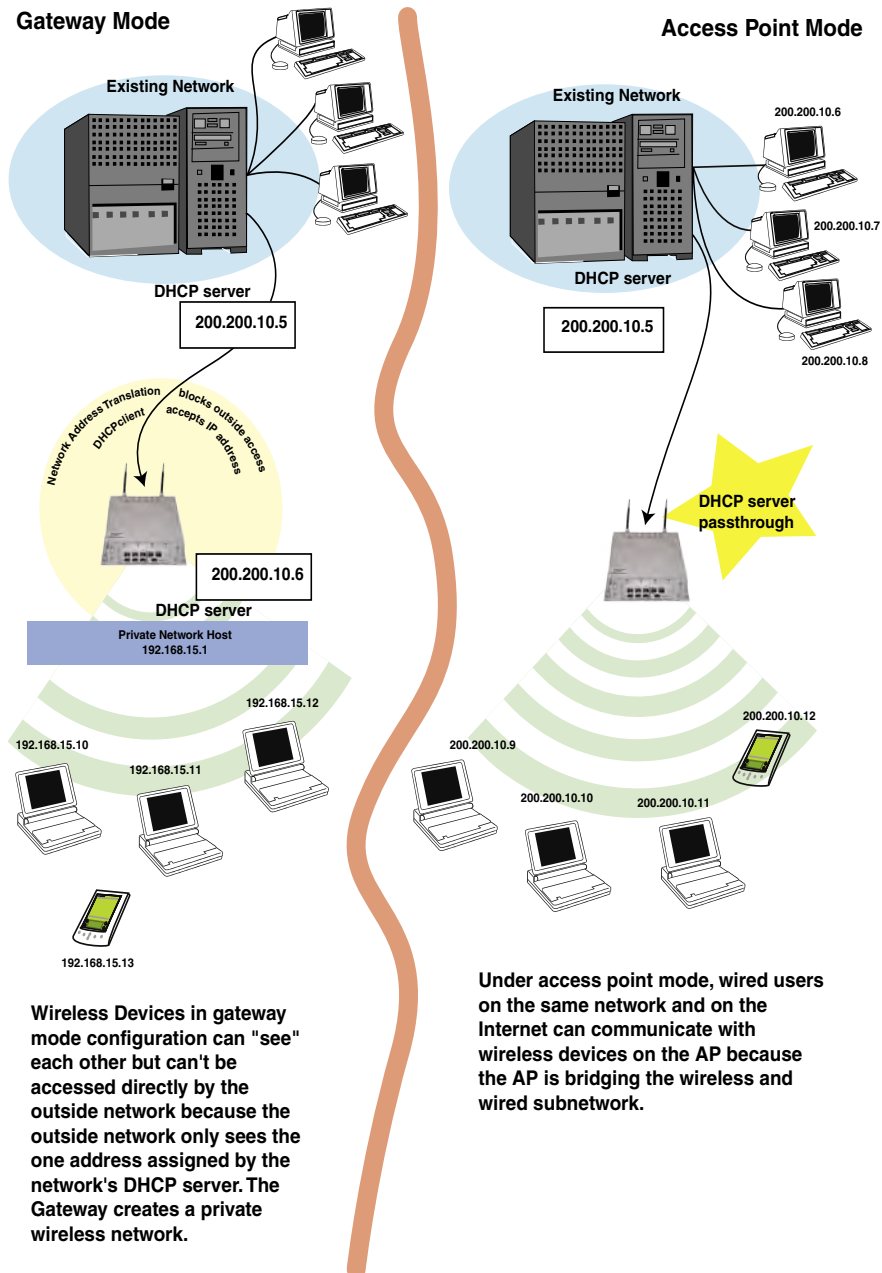
Chapter 3 covered the default configuration of the 3e-527A3 Wireless Access Point as an access point, for use as part of a host wired network. This chapter covers configuration as a gateway.

If additional security for the wireless network is desired (differentiating it from the wired network to which it is connected), set it up in gateway mode. Gateway mode takes advantage of some built-in “router” functions, such as the gateway’s ability to do Network Address Translation (NAT), providing private IP addresses for the wireless clients.

The illustration on the following page shows the difference between AP and Gateway mode.

Caution: If you have previously set up your WLAN using the 3e-527A3 devices as access points and you decide to change the configuration to gateway mode, you will need to convert the MAC addresses on each wireless device that has been set up so they can be seen by the reconfigured system. This is accomplished by the following procedure, done on each device that was configured to use the 3e-527A3 when the system was set up as an access point system. Pull up a System Prompt (“c:\” prompt, also called an MSDOS prompt) on the wireless device’s desktop. type: arp -d and hit return. This reconfigures the MAC address in the wireless device’s PC card so that it is now visible to the gateway.

A comparison of gateway and access point setup for the 3e-527A3

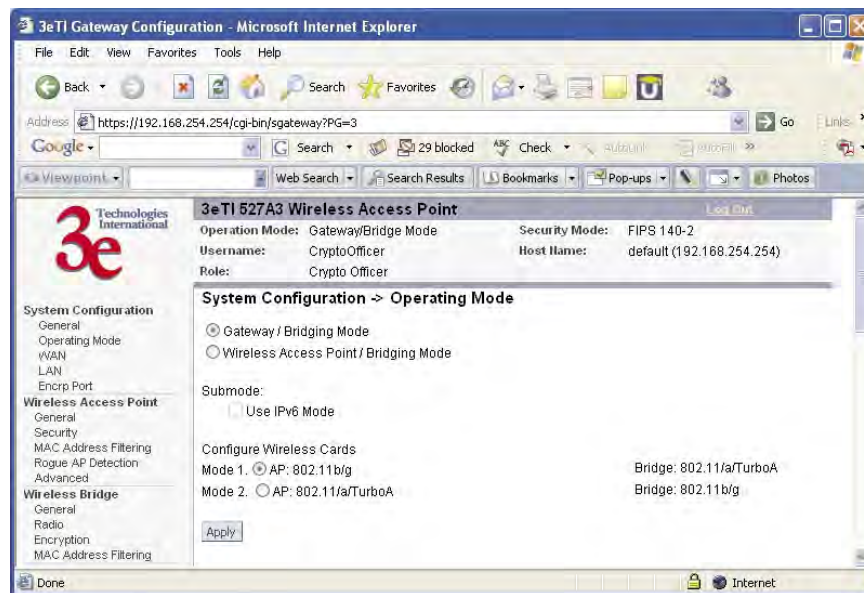


Configuring in Gateway Mode

To configure the 3e-527A3 in gateway mode, complete the following steps.

1. Login on to the 3e-527A3 (see Chapter 3, page 21).
2. Using the navigation bar to the left, navigate to the **System Configuration — Operating Mode** screen, select the **Gateway Mode** radio button, and click **Apply**. The 3e-527A3 AP will reboot in gateway mode.

Note that if you change modes from AP to Gateway, your configuration is not lost.



You can then proceed to change the management screens as necessary to reconfigure the device as a gateway. Configuration in gateway mode allows you to set firewall parameters. This is the main difference between the screens you will see in gateway mode and those covered in access point setup as discussed in Chapter 3.

The following sections only cover the functions and screens that are unique to the gateway mode. All of the screens that are common to both the AP and Gateway modes are covered in Chapter 3.

WAN

In Gateway mode, the **System Configuration-WAN** screen has two tabs: Main IP Setting and IP Aliasing.

Main IP Setting

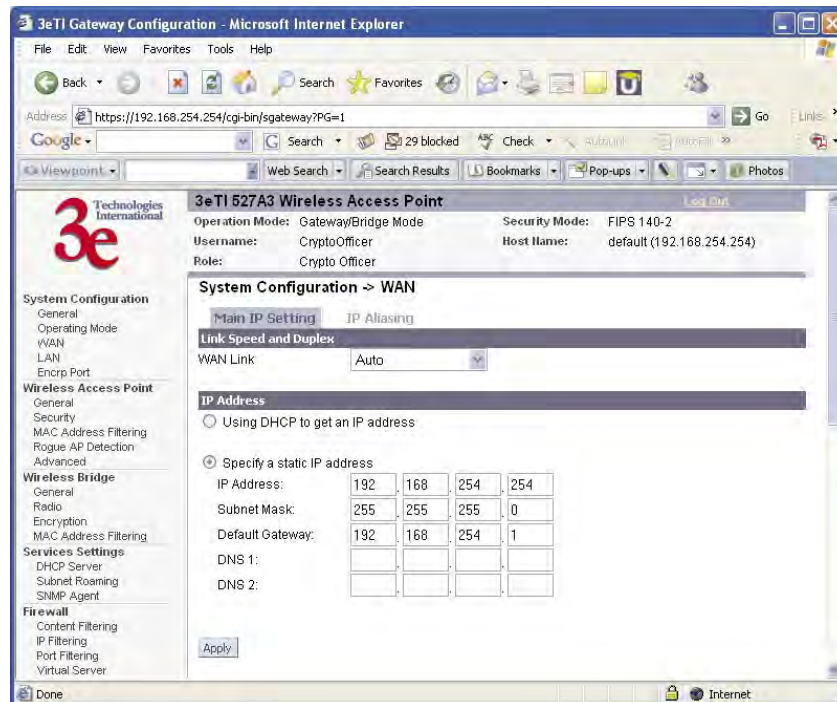
The **Main IP Setting** screen allows you to set Link Speed and Duplex of the WAN port. If you select a choice other than Auto (the default), the 3e-527A3 will use only the selected link speed (10 Mbits/sec or 100 Mbits/sec) and Duplex (Half Duplex transfers or Full Duplex transfers) that you select in the WAN/LAN Link drop-down menu.

You also set information for how the IP address will be obtained.

The WAN IP address is the Public IP address required to link the private WLAN users to the external enterprise or shipboard network, which is to be outside the “protected” wireless LAN. Normally, you will be provided with the IP address, Subnet Mask, Default Gateway and DNS to assign by the Network Administrator for the Ethernet Network.

There are two ways to configure the WAN IP address:

1. **Obtain an IP address Automatically** – This configuration allows the Ethernet network to use the DHCP server on the wired network to dynamically assign the WAN IP address to the DHCP client in the gateway.
2. **Specify an IP address** – This configuration allows the user to manually type in a static IP address, default gateway, and Domain Name Server (DNS) if these are provided by the Ethernet network administrator.



IP Aliasing

You can add up to ten additional IP aliases on the WAN port.

The IP aliasing entries can be used by the virtual server to map a public IP address to a private IP address. If the virtual server needs to map multiple public IP addresses to multiple private IP addresses, the IP aliasing entries can be used to create additional public IP addresses. These entries are always static entries and can not use DHCP.

3eTI 527A3 Wireless Access Point

Operation Mode: Gateway/Bridge Mode Security Mode: FIPS 140-2
 Username: CryptoOfficer Host Name: default (192.168.254.254)
 Role: Crypto Officer

System Configuration -> WAN

Main IP Setting **IP Aliasing**

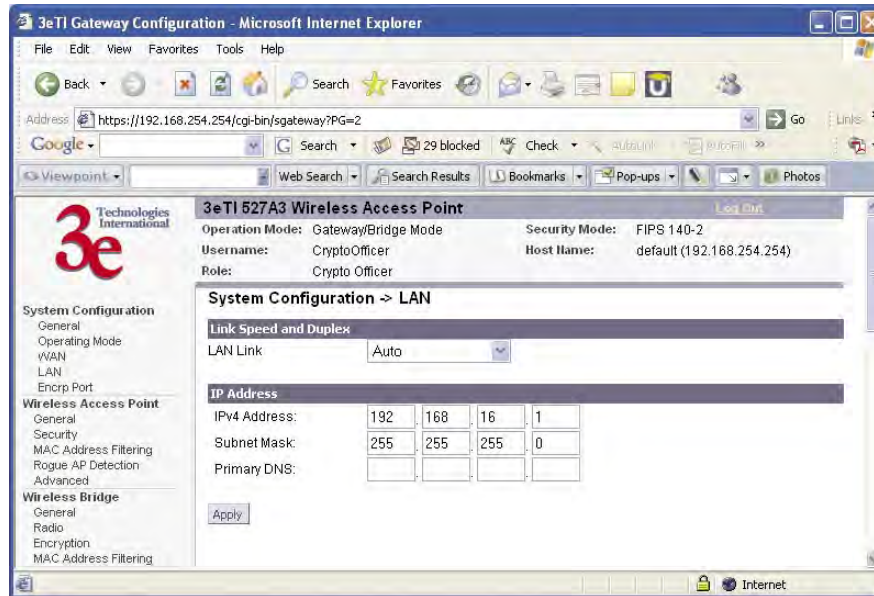
IP Address #1:		Netmask #1:	
IP Address #2:		Netmask #2:	
IP Address #3:		Netmask #3:	
IP Address #4:		Netmask #4:	
IP Address #5:		Netmask #5:	
IP Address #6:		Netmask #6:	
IP Address #7:		Netmask #7:	
IP Address #8:		Netmask #8:	
IP Address #9:		Netmask #9:	
IP Address #10:		Netmask #10:	

Apply

LAN

Click the entry on the left hand navigation panel for **System Configuration — LAN**. This directs you to the **System Configuration — LAN** screen.

This sets up the default numbers for the four octets for a possible private LAN function for the access point. You can also change the default subnet mask. The Local LAN port provides DHCP server functionality to automatically assign an IP address to a computer Ethernet port.



Security

Click the entry on the left hand navigation panel for **Wireless Access Point — Security**. This directs you to the **Wireless Access Point — Security** screen.

The default factory setting for the 3e-527A3 in gateway mode is no encryption but for security reasons it will not communicate to any clients unless the encryption is set by the CryptoOfficer. It is recommended that you set encryption as soon as possible.

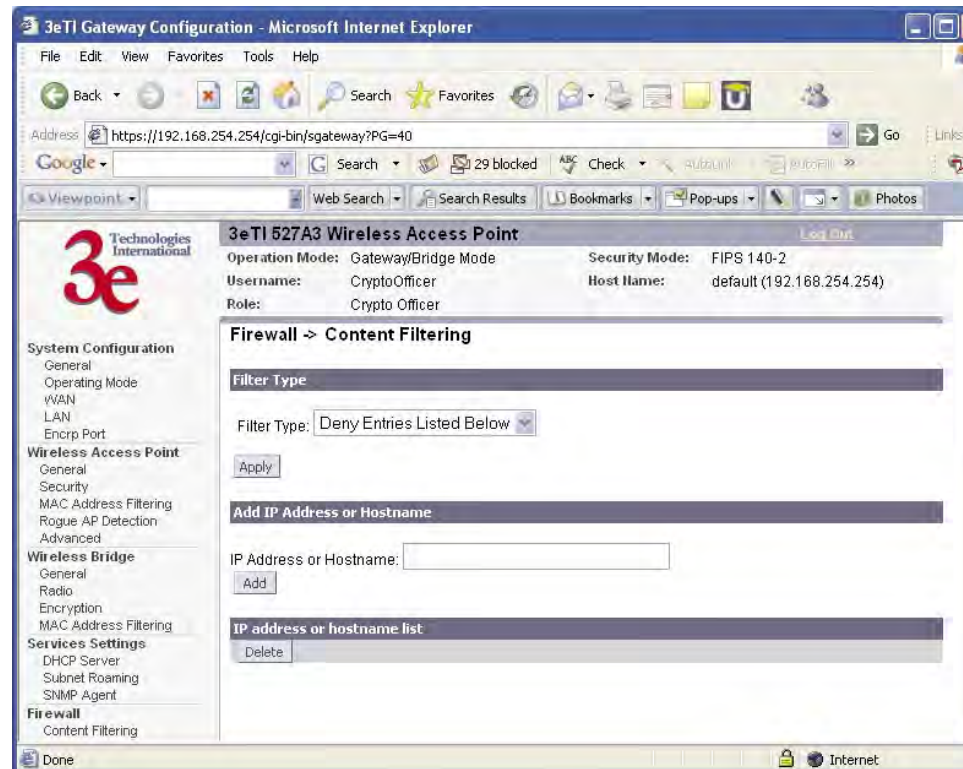
Firewall

Content Filtering

Click the entry on the left hand navigation panel for **Firewall — Content Filtering**. The **Content Filtering** screen allows the system administrator to identify particular hosts or IPs that will be blocked from access by the gateway. Simply input the IP address and click **Add**.

Entries can be added as:

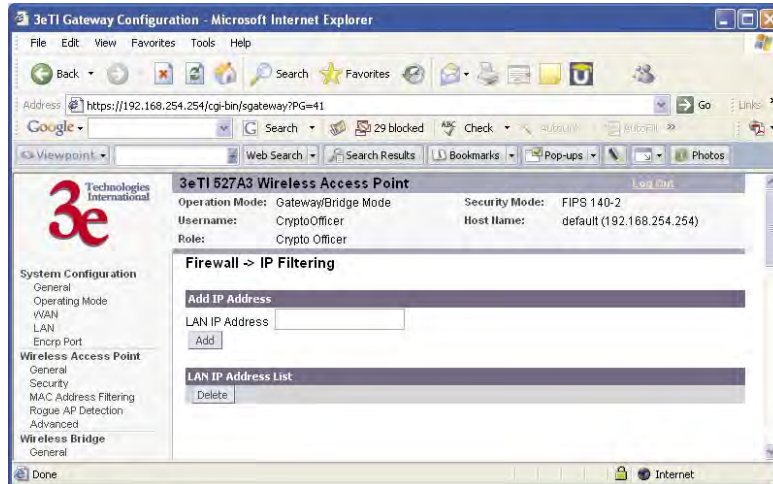
- Individual IP addresses (192.168.204.10)
- IP address range (192.168.204.0/24)



IP Filtering

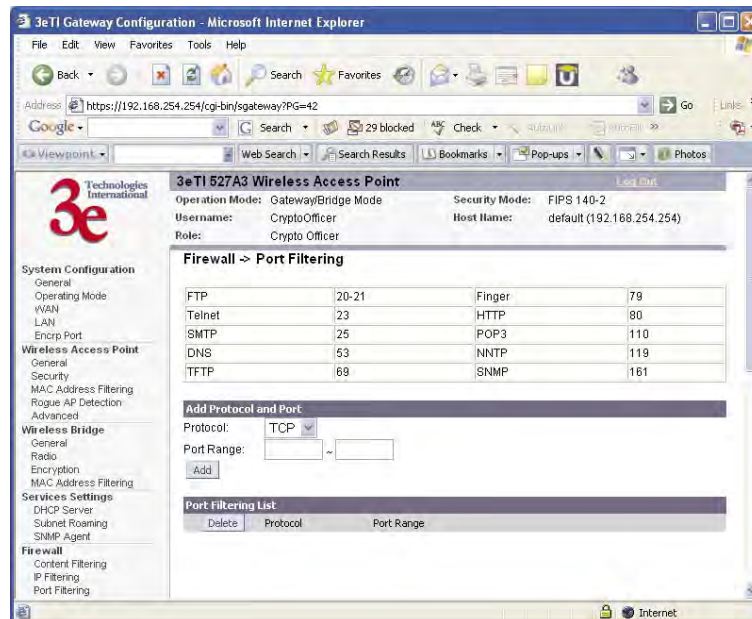
Click the entry on the left hand navigation panel for **Firewall — IP Filtering**.

The **IP Filtering** screen blocks certain IPs on the Private LAN from accessing your Internet connection. It restricts clients to those with a specific IP Address.



Port Filtering

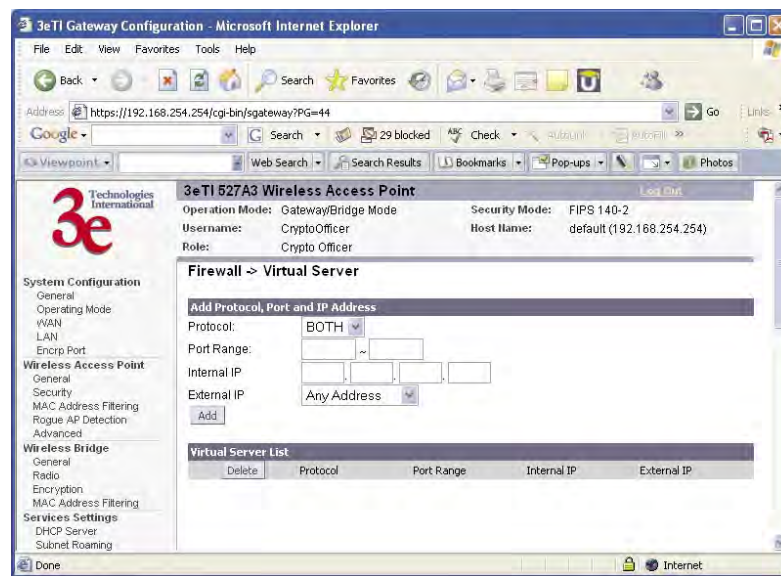
Click the entry on the left hand navigation panel for **Firewall — Port Filtering**. Port filtering permits you to configure the Gateway to block outbound traffic on specific ports. It can be used to block the wireless network from using specific protocols on the network.



Virtual Server

Click the entry on the left hand navigation panel for **Firewall — Virtual Server**.

In order to protect the Private Network, the built-in NAT firewall filters out traffic to the private network. Since all clients on the Private Network are normally not visible to outside users, the virtual server function allows some clients on the Private Network to be accessed by outside users by configuring the application mapping function offered on this page. Certain well known applications use specific TCP ports, such as Telnet (port 23), FTP (port 21), and Web server (port 80). Client computers on the Private LAN can host these applications, and allow users from the Internet to access these applications hosted on the virtual servers.



This is done by mapping virtual servers to private IP addresses, according to the specific TCP port application. As the planning table below shows, we have identified a Telnet (port 23) virtual server for private IP 192.168.15.56, a SMTP Mail (port 25) virtual server for private IP 192.168.15.33, and a Web (port 80) virtual server for private IP 192.168.15.64. For example, all Internet requests to the gateway for SMTP Mail services (port 25) to the WAN IP address will be redirected to the Private Network computer specified by the server IP 192.168.15.33.

Service Port	Server IP
23	192.168.15.56
25	192.168.15.33
80	192.168.15.64

It is recommend that IP addresses of virtual server computers hosted on the Private Network be manually (statically) assigned to coincide with a static server mapping to that specific IP address. Virtual servers should not rely on the dynamic IP assignment of the DHCP server function which could create unmapped IP address assignments.

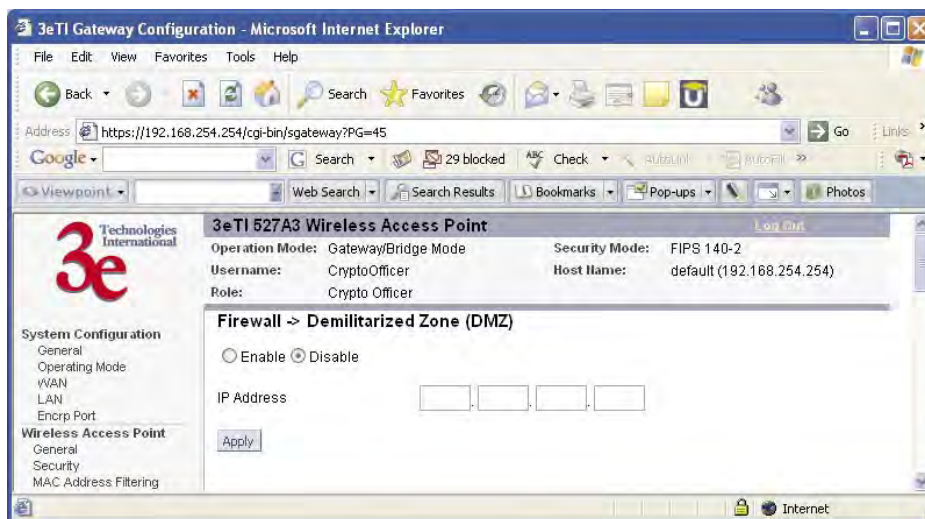
Protocol – Selection of either **UDP**, **TCP**, or **Both** (TCP and UDP) allows these specified network protocols to pass through during the TCP port communication with each virtual server IP address.

Demilitarized Zone (DMZ)

Click the entry on the left hand navigation panel for **Firewall — DMZ**.

The Demilitarized Zone (DMZ) host allows one computer on the Private Network to be totally exposed to the wired network or Internet for unrestricted two-way communication. This configuration is typically used when a computer is operating a proprietary client software or 2-way communication such as video-teleconferencing, where multiple TCP port assignments are required for communication. To assign a PC the DMZ host status, fill in the Private IP address which is identified as the exposed host and click the **Apply** button. However, any Internet user who knows the WAN IP address of the gateway can connect to the DMZ host since the firewall feature is disabled for this device, causing a potential security risk to data residing on that host.

Again, it is recommended that IP addresses of DMZ host computers on the Private Network be manually (statically) assigned to coincide with a static DMZ host mapping to that specific IP address. DMZ hosts should not rely on the dynamic IP assignment of DHCP server function which could create incorrectly mapped IP address assignments to non-DMZ hosts.



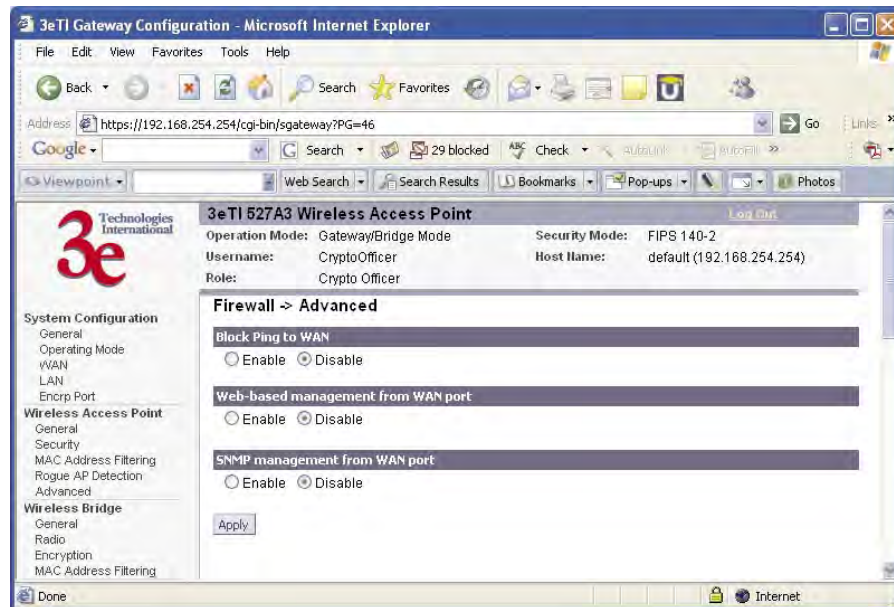
Advanced

Click the entry on the left hand navigation panel for **Firewall — Advanced**.

As advanced firewall functions, you can enable/disable

- Block Ping to WAN
- Web-based management from WAN port
- SNMP management from WAN port

These options allow you more control over your environment.



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Chapter 5: Wireless Bridge Configuration

Introduction

In the 3e-527A3, wireless bridging uses a second WLAN card to set up an independent wireless bridge connection. Since wireless bridging provides a mechanism for APs to collaborate, it is possible to extend the basic service set (BSS) of a standalone AP and to connect two separate LANs without installing any cabling.

The wireless bridging function in the 3e-527A3 supports a number of bridging configurations. Some of the most popular settings are discussed in this chapter:

- **Point-to-point bridging of two Ethernet links**
- **Point-to-multipoint bridging of several Ethernet links**
- **Repeater mode**

The wireless bridging screens are the same whether you are in access point or gateway mode.

Bridging is a function that is set up in addition to basic access point or gateway setup. If you will be using the 3e-527A3 solely as a bridge, some of the settings you may have selected for access point/gateway use will not be necessary.

If setting up as a bridge during initial setup, you can either use the LAN Port directly wired by Ethernet cable to a laptop to set the appropriate settings. The management screens that you may need to modify, regardless of what type of bridging mode you choose, will be in the **Wireless Bridge** section of the navigation bar. These include:

- **Wireless Bridge — General**
- **Wireless Bridge — Radio**
- **Wireless Bridge — Encryption**
- **Wireless Bridge — MAC Address Filtering (Auto Mode Only)**

Wireless Bridge — General

The **Wireless Bridge — General** screen contains wireless bridging information including the channel number, Tx rate, Tx power, spanning tree protocol (802.1d) enable/disable, and remote AP's BSSID. This page is important in setting up your bridge configuration. Wireless bridging supports two modes of operation:

- Manual wireless bridging
- Auto-forming wireless bridging (AWB) - with a maximum number of allowable bridges (the default is 40)

Auto-forming Wireless Bridging

When the wireless bridge is in auto-forming mode, the wireless bridge sniffs for beacons from other wireless bridges and identifies APs that match a policy such as SSID and channel.

Instead of simply adding the APs with the same SSID/channel to the network, a three-way association handshake is performed in order to control network access.

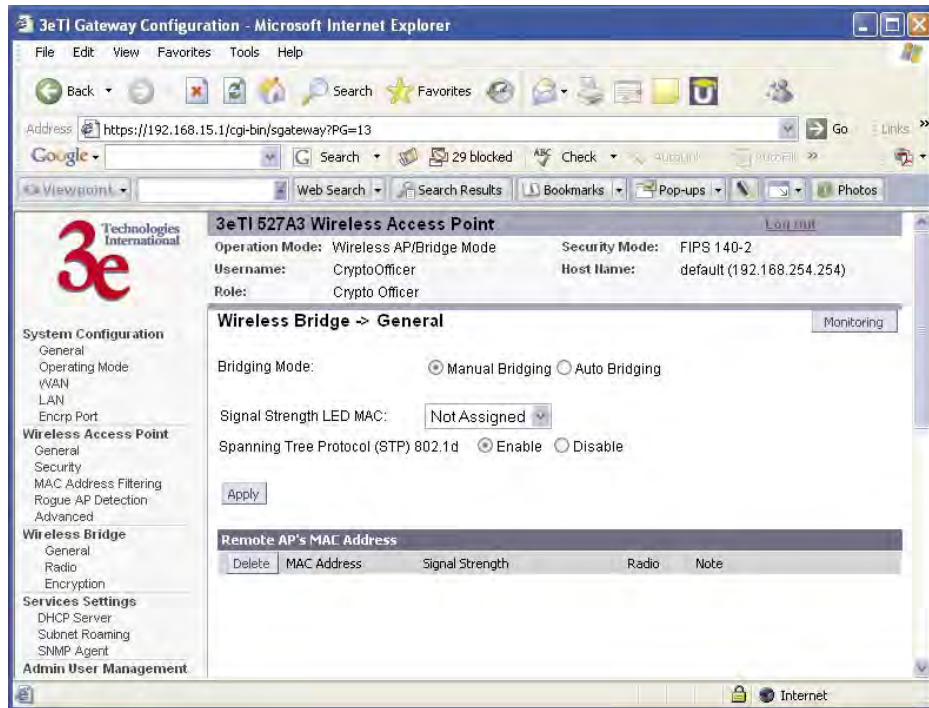
To make a unit the root STP node, set the bridge priority lower than any other node in the network.

The screenshot shows the '3eTI Gateway Configuration' web interface in Microsoft Internet Explorer. The browser address bar shows 'https://192.168.15.1/cgi-bin/sgateway?PG=13'. The page title is '3eTI 527A3 Wireless Access Point'. The left sidebar contains a navigation menu with categories: System Configuration, Wireless Access Point, Wireless Bridge, Services Settings, Admin User Management, End User Authentication, and Monitoring Reports. The main content area is titled 'Wireless Bridge -> General' and includes a 'Monitoring' tab. The 'Bridging Mode' section has two radio buttons: 'Manual Bridging' and 'Auto Bridging', with 'Auto Bridging' selected. Below this, there are input fields for 'SSID' (set to 'default'), 'Max Auto Bridges' (set to '40' with a range of '(1-40)'), 'Bridge Priority' (set to '40' with a range of '(1-40)'), 'Signal Strength Threshold' (set to '9%'), and 'Broadcast SSID' (set to 'Disable'). There are 'Apply' and 'Set' buttons. At the bottom, there is a section for 'Remote AP's MAC Address' with a table header: 'Index', 'BSSID', 'Signal Strength', 'Link Status', and 'Description'. The table is currently empty.

AUTO BRIDGING GENERAL SETTINGS OPTIONS		
Bridging Mode	Auto Bridging	auto bridging selected
SSID	numbers or letters	Can be any set of letters and numbers assigned by the network administrator. This nomenclature has to be set on the wireless bridge and each wireless device in order for them to communicate.
Max Auto Bridges	1-40	Maximum number of auto bridges allowed.
Bridge Priority	1-40	Determines the root STP node. The lowest bridge priority in the network will become the STP root.
Signal Strength Threshold	27% 21% 15% 9% None	Prevents the node under the threshold from associating and joining the network.
Broadcast SSID	Diabie/Enable	When disabled, the AP hides the SSID in outgoing beacon frames and stations cannot obtain the SSID through passive scanning. Also, when it is disabled, the bridge doesn't send probe responses to probe requests with unspecified SSIDs.
Signal Strength MAC		The signal strength of this wireless bridge will be indicated on the Signal Strength LED located on the front of the case.

Manual Bridging

When the wireless bridge is in manual bridging mode, you can manually select a signal strength LED MAC and enable or disable spanning tree protocol. You can also delete remote AP's MAC addresses.



MANUAL BRIDGING GENERAL SETTINGS OPTIONS		
Bridging Mode	Manual Bridging	manual bridging selected
Signal Strength LED MAC	Not Assigned	Allows you to set the number of one of the Remote APs which will be listed at the bottom of the screen once the system is operational. This wireless bridge becomes the guiding port that is displayed in the WLANNSS LED on the front of the 3e-527A3 as a signal.
Spanning Tree Protocol (STP)	Enable/Disable	Enable STP if there is any possibility that a bridging loop could occur. If you are certain that there is no possibility that a bridging loop will occur, then disable STP. The bridge will be more efficient (faster) without it. If you are not sure, the safest solution is to enable STP.

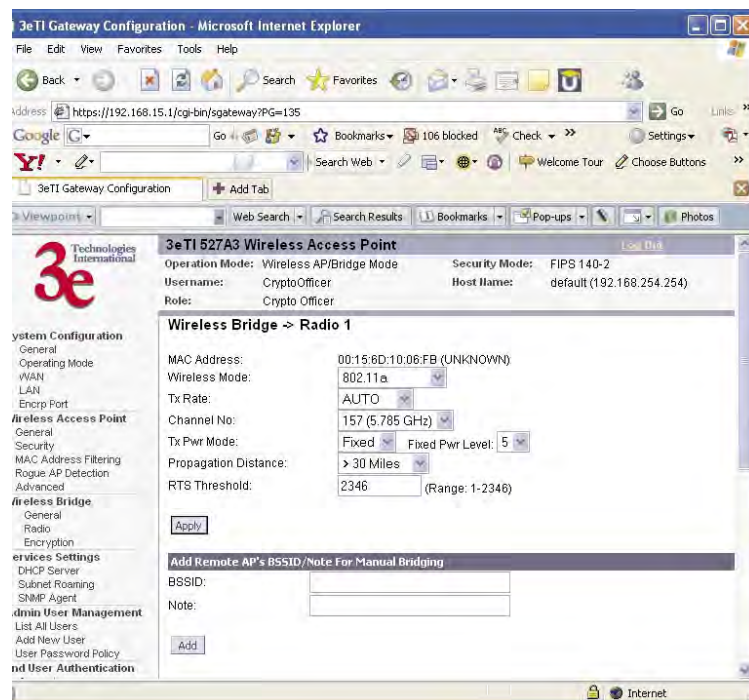
Monitoring

In the upper right-hand corner of the **Wireless Bridge — General** screen there is a button called Monitoring. If you click on this button, a pop-up window will appear (WDS Information). If you select Enable refresh, you can set the bridge refresh interval from 5 seconds to 30 minutes. Refreshing the screen allows you to see the effect of aiming the antenna to improve signal strength.



Wireless Bridge — Radio

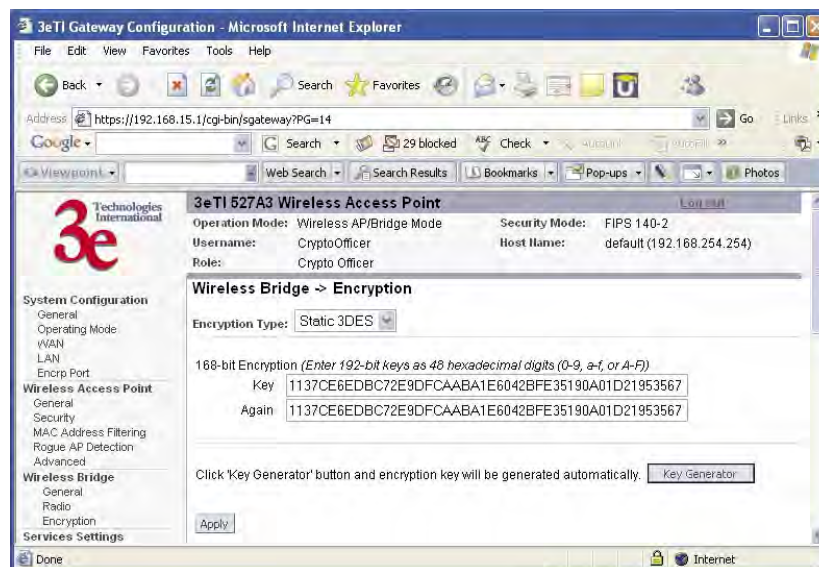
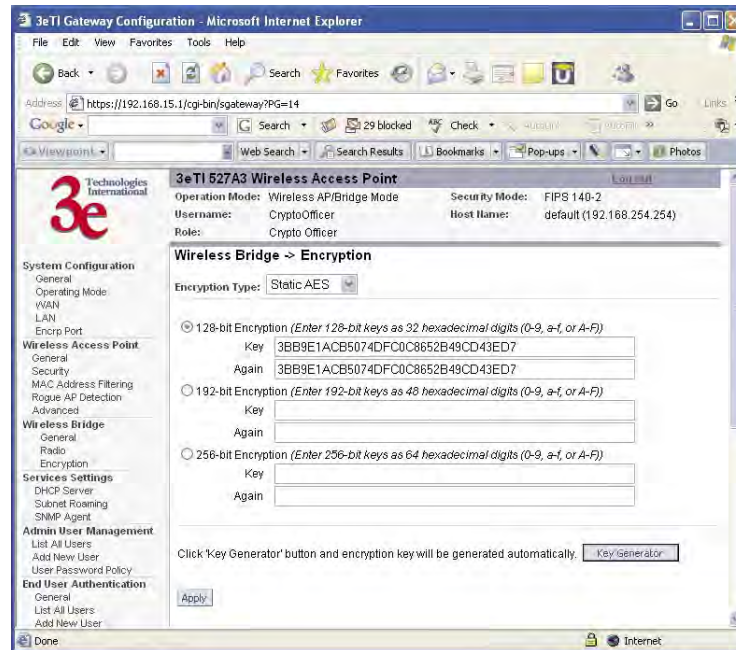
The **Wireless Bridge — Radio** screen contains wireless bridging information including the channel number, Tx rate, Tx power, spanning tree protocol (802.1d) enable/disable, and remote AP's BSSID. This page is important in setting up your bridge configuration.



Radio Settings		
Wireless Mode	802.11a 802.11a Turbo	Sets the wireless mode for the wireless bridge.
Tx Rate	802.11a	
	AUTO, 6, 9, 12, 18, 24, 36, 48, 54 Mbps	When set to AUTO, the card attempts to select the optimal rate for the channel. If a fixed rate is used, the card will only transmit at that rate.
	802.11a Turbo	
	AUTO	The card attempts to select the optimal rate for the channel.
Channel No.	802.11a	
	149 (5.745 GHz) 153 (5.765 GHz) 157 (5.785 GHz) 161 (5.805 GHz) 165 (5.825 GHz)	Sets the channel frequency for the wireless bridge.
	802.11a Turbo	
	152 (5.76 GHz) Turbo Mode 160 (5.80 GHz) Turbo Mode	Sets the channel frequency for the wireless bridge.
Tx Pwr Mode	OFF FIXED, AUTO	The Tx Pwr Mode defaults to AUTO, giving the largest range of radio transmission available under ambient conditions. The wireless bridge's broadcast range can be limited by setting the Tx Pwr Mode to Fixed and choosing from 1-5 for Fixed Pwr Level. If you want to prevent any radio frequency transmission from the wireless bridge, set the Tx Pwr Mode to OFF. This will not turn off RF transmissions from any associated wireless devices, but they will not be able to communicate with the wireless bridge when the Tx Pwr Mode is off.
Fixed Pwr Level	1, 2, 3, 4, 5	Select a range when Rx Pwr Mode is set to FIXED. Level 1 is the shortest distance (Level 1=7dBm) and Level 5 is the longest (Level 5=15dBm)
Propagation Distance	< 5 Miles 5-10 Miles 11-15 Miles 16-20 Miles 21-25 Miles 26-30 Miles > 30 Miles	Set the distance based on the distance between this bridge and furthest bridge that is connected to it.
RTS Threshold	Range 1-2346	The number of bytes used for the RTS/CTS handshake boundary. When a packet size is greater than the RTS threshold, the RTS/CTS handshaking is performed.
BSSID	Enter hexadecimal numbers	Add the MAC address of the remote bridge. The remote bridge's MAC address will appear at the bottom of the screen.
Note		You can enter a note that defines the location of the remote bridge.

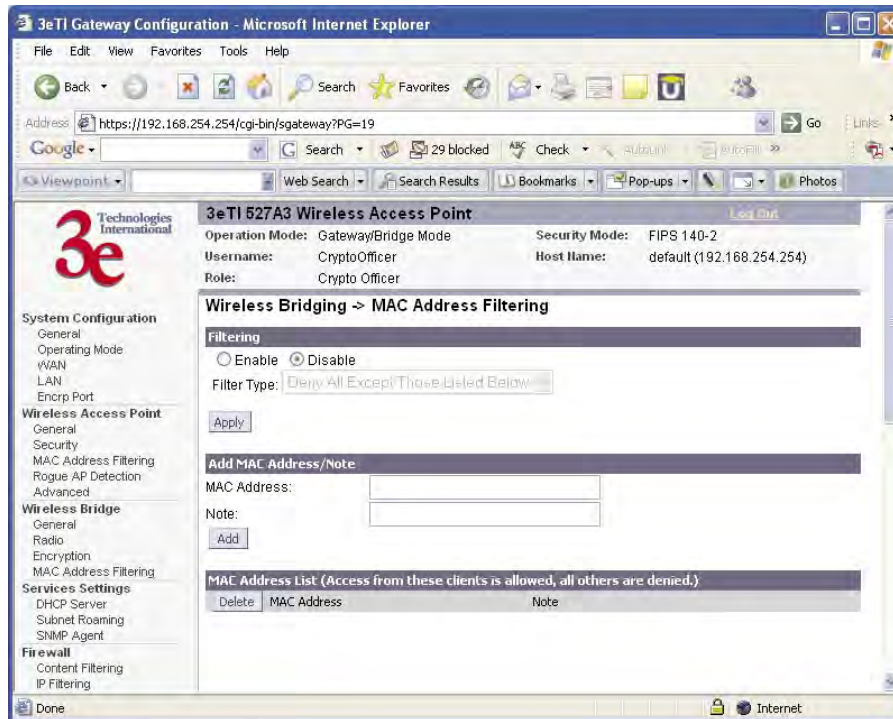
Wireless Bridge — Encryption

The **Wireless Bridge — Encryption** screen is used to configure static encryption keys for the wireless bridge. This is an important page to set up to ensure that your bridge is working correctly. The encryption key that you use on this screen must be the same for any bridge connected to your bridging network in order for communication to occur. On this screen you can select Static 3DES (192-bit) or Static AES (128-bit, 192-bit, or 256-bit).



Wireless Bridge — MAC Address Filtering

The Wireless Bridge — MAC Address Filtering screen functions just like the AP MAC Address Filter (see page 36) but it is only used in auto bridging mode and only controls access to the wireless bridge network.

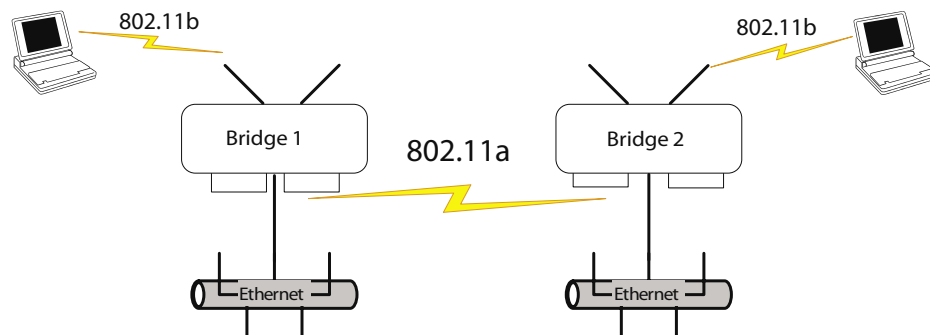


The following sections describe the setup for three types of bridging configuration: point-to-point, point-to-multipoint, or, lastly, repeater.

Setting Up Bridging Type

Point-to-Point Bridge Configuration

A point-to-point link is a direct connection between two, and only two, locations or nodes. Because the bridge function uses a separate WLAN card for bridging, you can also set up WLANs on the separate AP WLAN card.



For the two bridges that are to be linked to communicate properly, they must be set up with compatible commands in the setup screens.

For instance, the bridges must have the same channel number. Because there is a separate WLAN card for bridging, there can be a separate WLAN on the AP WLAN card with no loss efficiency, as long as you set the channel numbers so there's no conflict or noise with the channel assigned to the bridge. Spanning Tree Protocol may be set to Enable, if there is any possibility of a bridging loop, or to Disable (which is more efficient) if there's no possibility of a bridging loop. Each bridge must contain the other's BSSID. (The BSSID of each is equivalent to the MAC address contained on the **Wireless Bridge — Radio** setup page. Enter only hexadecimal numbers, no colons. Data entry is not case sensitive.) Finally, the wireless bridging encryption must be set to the appropriate type and key length and must be identical on each bridge.

The following charts show sample settings for manual bridging and auto bridging modes.

Point-to-Point Bridging Setup Guide - Manual Mode

Direction	Bridge 1	Bridge 2
Wireless Bridge — General (Manual Bridging Mode)		
Bridging Mode	manual bridging selected	manual bridging selected
Signal Strength LED MAC	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)
Spanning Tree Protocol (STP)	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Must be the same as Bridge 2	Must be the same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
BSSID	Add Bridge 2 MAC	Add Bridge 1 MAC
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be the same key as Bridge 2.	Select appropriate key type/length and value. Must be the same key as Bridge 1.

Point-to-Point Bridging Setup Guide - Auto Mode

Direction	Bridge 1	Bridge 2
Wireless Bridge — General (Auto Bridging Mode)		
Bridging Mode	Auto bridging selected	Auto bridging selected
SSID	Must be the same as Bridge 2	Must be the same as Bridge 1
Max Auto Bridges	40 (range 1-40)	40 (range 1-40)
Bridge Priority	40 (range 1-40)	40 (range 1-40)
Signal Strength Threshold	9%	9%
BroadcastSSID	Disable	Disable
Signal Strength MAC	Enter from list at the bottom of the screen	Enter from list at the bottom of the screen
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Must be the same as Bridge 2	Must be the same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be same as Bridge 2.	Select appropriate key type/length and value. Must be same as Bridge 1.

The following sequence walks you through the setup of bridge 1. Bridge 2 would duplicate this procedure, with the BSSID of bridge 2 being the MAC address of bridge 1 and vice versa.

Navigate to the **Wireless Bridge — Radio** screen.

In the first section you will see the MAC Address of the bridging card. This is used as the BSSID on other 3e-527A3s that will be communicating with this one.

Select the **Wireless Mode** to be used for bridging. Set the **Tx Rate** to a fixed transmit rate or select AUTO if you want the card to attempt to select the optimal rate for the channel. If the Tx rate is set to a fixed rate, then the card will only transmit at that rate.

Next select the **Channel Number**. The **Channel Number** must be set to the same frequency in order for each bridge to communicate. **TX Pwr Mode** can be left on **Auto** unless the power needs to be regulated.

Select the **Propagation Distance** which is based on the distance between a bridge and the furthest bridge that is connected to it.

Set the **RTS Threshold** which is the number of bytes used for the RTS/CTS handshake boundary. When a packet size is greater than the RTS threshold, the RTS/CTS handshaking is performed.

Click **Apply** to accept your changes but stay on this screen.

Add the **BSSID** of the remote bridge. The BSSID corresponds to that bridge's MAC address. In entering the BSSID, enter only hexadecimal numbers, no colons. Data entry is not case sensitive. You may also enter a note that defines the location of the remote bridge. Then click **Add** to accept. The remote bridge's BSSID will now appear at the bottom of the **Wireless Bridge — General** screen.

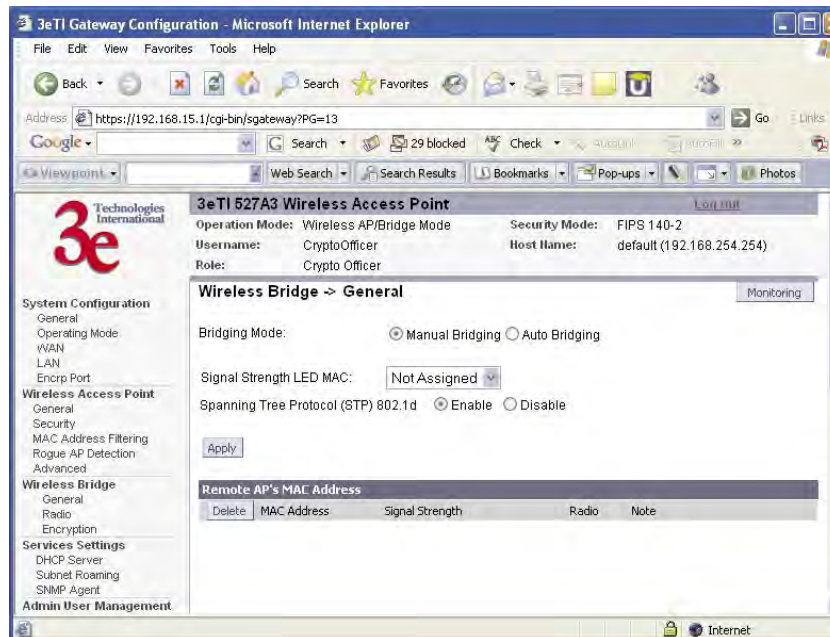
The screenshot shows the '3eTI Gateway Configuration - Microsoft Internet Explorer' window. The address bar shows 'https://192.168.15.1/cgi-bin/gateway?PG=135'. The page title is '3eTI 527A3 Wireless Access Point'. The left sidebar contains a navigation menu with categories like 'System Configuration', 'Wireless Access Point', 'Wireless Bridge', 'Services Settings', 'Admin User Management', and 'End User Authentication'. The main content area is titled 'Wireless Bridge -> Radio 1' and contains the following configuration fields:

- MAC Address: 00:15:6D:10:06:FB (UNKNOWN)
- Wireless Mode: 802.11a
- Tx Rate: AUTO
- Channel No: 157 (5.795 GHz)
- Tx Pwr Mode: Fixed
- Fixed Pwr Level: 5
- Propagation Distance: > 30 Miles
- RTS Threshold: 2346 (Range: 1-2346)

Below these fields is an 'Apply' button. Further down is a section titled 'Add Remote AP's BSSID/Note For Manual Bridging' with input fields for 'BSSID:' and 'Note:', followed by an 'Add' button.

Next go to the **Wireless Bridge — General** screen. Select either manual or auto bridging. If you choose **Manual Bridging** then you will have to set **Spanning Tree Protocol** to **Enable** unless you are sure that there is no chance of a loop. You can also assign a **Signal Strength LED MAC**. **Signal strength LED MAC** allows you to set the number of one of the Remote APs which will be listed at the bottom of the screen once the system is operational as the guiding port that you wish to have display in the WLANSS LED on the front of the 3e-527A3 as a signal. If you don't assign one, the LED will show the upper link signal strength (if there is one). From this screen you can also choose to delete a remote AP's MAC address.

Click **Apply** to accept your changes.



If you choose **Auto Bridging** mode, then you will need to enter the following information:

Enter the **SSID**. This can be any set of letters and numbers assigned by the network administrator. This nomenclature has to be set on the wireless bridge and each wireless device in order for them to communicate.

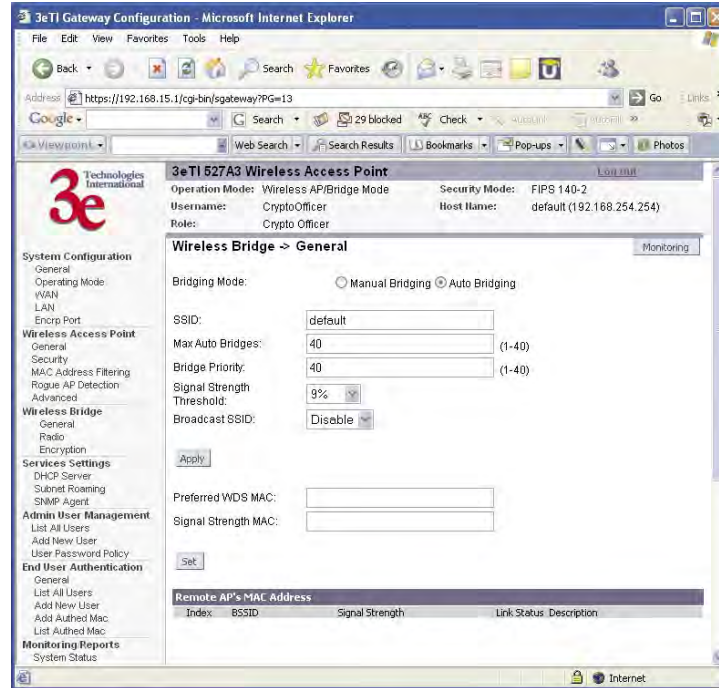
Enter a number from 1 to 40 for the **Max Auto Bridges**. Next enter the **Bridge Priority** (range from 1-40). This determines the root STP node. The lowest bridge priority in the network will become the STP root.

Select the **Signal Strength Threshold**.

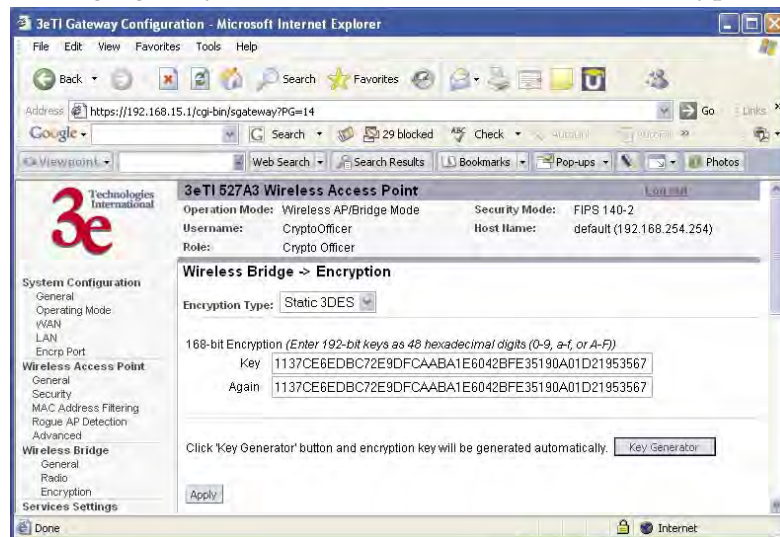
Either enable or disable the **Broadcast SSID**. When disabled, the bridge hides the SSID in outgoing beacon frames and stations cannot obtain the SSID through passive scanning. Also, when it is disabled, the bridge doesn't send probe responses to probe requests with unspecified SSIDs.

Finally enter the **Signal Strength MAC**. The signal strength of this

wireless bridge will be indicated on the Signal Strength LED located on the front of the case.



Next, navigate to the **Wireless Bridge — Encryption** screen. Select the appropriate key type and length and the key value. The encryption key value and type for Bridge 1 must be the same as for Bridge 2. For wireless bridging, only AES and 3DES are available for encryption.



You must complete the configuration of your Bridge 1 by following the general instructions in Chapter 3 of this guide to establish any other required configuration options such as General, WAN and LAN settings.

Configure the second of your two point-to-point bridges following the instructions given for Bridge 1 above.

Point-to-Multipoint Bridge Configuration

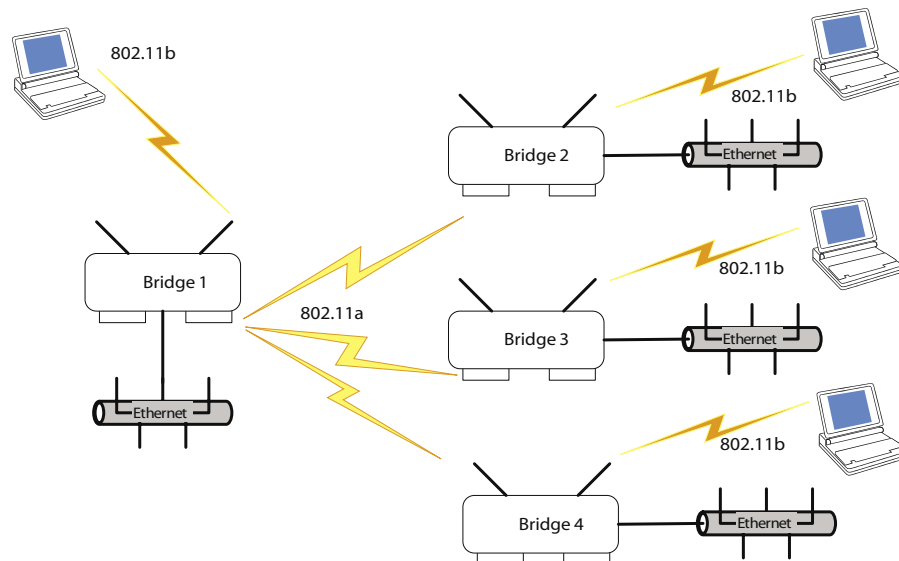
A point-to-multipoint configuration allows you to set up three or more 3e-527A3 access points in bridging mode and accomplish bridging between 3 or more locations wirelessly.

For the three bridges that are to be linked to communicate properly, they have to be set up with compatible commands in their setup screens.

For instance, all bridges must have the same channel number. Spanning Tree Protocol will usually be set to Enable. If configured as in the diagram following, Bridge 1 must contain all of the others' BSSIDs, while Bridge 2 ~ n must only contain Bridge 1's BSSID. (The BSSID of each is equivalent to the MAC address found on the **Wireless Bridge — Radio** page. Enter only hexadecimal numbers. Data entry is not case sensitive.) Finally, the wireless bridging encryption of each must be set to the appropriate type and key length and must be the same on all.

Because the 3e-527A3 has two separate WLAN cards, one for the AP and one for the Bridge, each bridge can have a WLAN on the 802.11a protocol with no loss of efficiency in bridging if you wish.

The following diagram pictures a point-to-multipoint setup, which might be of use where a company's network spans several buildings within a campus-like setting.



Follow the steps of the procedure outlined in the point-to-point bridge section. The chart following describes the basic attributes.

Point-to-Multipoint Bridging Setup Guide - Manual Mode

Direction	Bridge 1	Bridge 2 ~ n
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Same as Bridge 2~n	Same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
BSSID	Add Bridge 2~n MAC	Add Bridge 1 MAC
Wireless Bridge — General (Manual Bridging Mode)		
Bridging Mode	manual bridging selected	manual bridging selected
Signal Strength LED MAC	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)
Spanning Tree Protocol	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be the same key as Bridge 2~n.	Select appropriate key type/length and value. Must be the same key as Bridge 1.

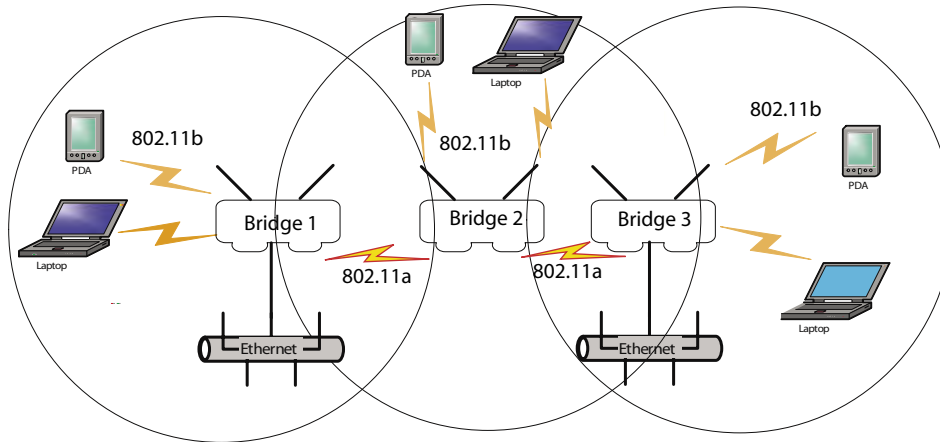
Point-to-Multipoint Bridging Setup Guide - Auto Mode

Direction	Bridge 1	Bridge 2 ~ n
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Same as Bridge 2~n	Same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
BSSID	Add Bridge 2~n MAC	Add Bridge 1 MAC
Wireless Bridge — General (Auto Bridging Mode)		
Bridging Mode	Auto bridging selected	Auto bridging selected
SSID	Must be the same as Bridge 2~n	Must be the same as Bridge 2
Max Auto Bridges	40 (range 1-40)	40 (range 1-40)
Bridge Priority	40 (range 1-40)	40 (range 1-40)
Signal Strength Threshold	9%	9%
Signal Strength MAC	Enter from list at the bottom of the screen	Enter from list at the bottom of the screen
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be same as Bridge 2.	Select appropriate key type/length and value. Must be same as Bridge 1.

The above recommended setup requires only Bridge 1 to be set in point-to-multipoint mode. It is possible to set all bridges in point-to-multipoint mode, in which case, each bridge would have to contain the BSSID for each of the other bridges and Spanning Tree Protocol must be Enabled. Complete any other setup screens following general instructions in Chapter 3.

Repeater Bridge Configuration

A repeater setup can be used to extend the wireless signal from one bridge connected to an Ethernet LAN wirelessly so that another bridge can control a wireless LAN at a distance.



Repeater Bridging Setup Guide - Manual Mode

Direction	Bridge 1	Bridge 2	Bridge 3
Wireless Bridge — Radio			
Wireless Mode	802.11a	802.11a	802.11a
Tx Rate	AUTO	AUTO	AUTO
Channel No.	Same as Bridge 2	Same as Bridge 1	Same as Bridge 1
Tx Power Mode	Auto	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346	2346
BSSID	Add Bridge 2's MAC	Add Bridge 1's and Bridge 3's MAC	Add Bridge 2's MAC
Wireless Bridge — General (Manual Bridging Mode)			
Bridging Mode	manual	manual	manual
Signal Strength LED MAC	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)
Spanning Tree Protocol	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)
Wireless Bridge — Encryption			
Wireless Configuration – Bridging Encryption	Select appropriate key type/length and enter key value. Must be the same as that on the other two Bridges.	Select appropriate key type/length and enter key value. Must be the same as that on the other two Bridges.	Select appropriate key type/length and enter key value. Must be the same as that on the other two Bridges.

Repeater Bridging Setup Guide - Auto Mode

Direction	Bridge 1	Bridge 2	Bridge 3
Wireless Bridge — Radio			
Wireless Mode	802.11a	802.11a	802.11a
Tx Rate	AUTO	AUTO	AUTO
Channel	Same as Bridge 2	Same as Bridge 1	Same as Bridge 1
Tx Power Mode	Auto	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346	2346
BSSID	Add Bridge 2's MAC	Add Bridge 1's and Bridge 3's MAC	Add Bridge 2's MAC
Wireless Bridge — General (Auto Bridging Mode)			
Bridging Mode	auto	auto	auto
SSID	Must be the same as Bridge 2	Must be the same as Bridge 1	Must be the same as Bridge 1
Max Auto Bridges	40 (range 1-40)	40 (range 1-40)	40 (range 1-40)
Bridge Priority	40 (1-40)	40 (1-40)	40 (1-40)
Signal Strength Threshold	9%	9%	9%
Signal Strength MAC	Enter from list at the bottom of the screen	Enter from list at the bottom of the screen	Enter from list at the bottom of the screen
Wireless Bridge — Encryption			
Wireless Configuration – Bridging Encryption	Select appropriate key type/length and enter key value. Must be the same as that on the other 2 Bridges.	Select appropriate key type/length and enter key value. Must be the same as that on the other 2 Bridges.	Select appropriate key type/length and enter key value. Must be the same as that on the other 2 Bridges.

With this configuration, each bridge can control a wireless LAN. All wireless clients must have the same SSID as the bridges on the AP card channel. All clients can roam between the three bridges.

All other setup screens should be completed following the guidelines in Chapter 3.

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Chapter 6: Technical Support

Manufacturer's Statement

The 3e-527A3 is provided with warranty. It is not desired or expected that the user open the device. If malfunction is experienced and all external causes are eliminated, the user should return the unit to the manufacturer and replace it with a functioning unit.

If you are experiencing trouble with this unit, the point of contact is:

support@3eti.com

1-800-449-3384 (Monday - Friday, 8am to 5pm EST)

or visit our website at

www.3eti.com

Radio Frequency Interference Requirements

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission's Rules and Regulations. 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.

Installation should be accomplished using the authorized cables and/or connectors provided with the device or available from the manufacturer/distributor for use with this device. Changes or modifications not expressly approved by the manufacturer or party responsible for this FCC compliance could void the user's authority to operate the equipment.

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Glossary

3DES

Also referred to as Triple DES, a mode of the DES encryption algorithm that encrypts data three times.

802.11

802.11 refers to a family of specifications developed by the IEEE for wireless LAN technology. 802.11 specifies an over-the-air interface between a wireless client and a base station or between two wireless clients. The IEEE accepted the specification in 1997.

802.11b (also referred to as 802.11 High Rate or WiFi)

802.11b is an extension to 802.11 that applies to wireless LANs and provides 11 Mbps transmission (with a fallback to 5.5, 2 and 1 Mbps) in the 2.4 GHz band. 802.11b uses only DSSS. 802.11b was a 1999 ratification to the original 802.11 standard, allowing wireless functionality comparable to Ethernet.

Access Point

An access point is a gateway set up to allow a group of LAN users access to another group or a main group. The access point doesn't use the DHCP server function and therefore accepts IP address assignment from the controlling network.

AES

Short for Advanced Encryption Standard, a symmetric 128-bit block data encryption technique developed by Belgian cryptographers Joan Daemen and Vincent Rijmen. The U.S government adopted the algorithm as its encryption technique in October 2000, replacing the DES encryption it used. AES works at multiple network layers simultaneously.

Bridge

A device that connects two local-area networks (LANs), or two segments of the same LAN that use the same protocol, such as Ethernet or Token-Ring.

DHCP

Short for Dynamic Host Configuration Protocol, DHCP is a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. In some systems, the device's IP address can even change while it is still connected. DHCP also supports a mix of static and dynamic IP addresses. Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means that a new computer can be added to a network without the hassle of manually assigning it a unique IP address. Many ISPs use dynamic IP addressing for dial-up users.

NMS (Network Management Station)

Includes such management software as HP Openview and IBM Netview.

PC Card

A computer device packaged in a small card about the size of a credit card and conforming to the PCMCIA standard.

PDA (Personal Digital Assistant)

A handheld device.

SNMP

Simple Network Management Protocol

SSID

A Network ID unique to a network. Only clients and access points that share the same SSID are able to communicate with each other. This string is case-sensitive. Wireless LANs offer several security options, but increasing the security also means increasing the time spent managing the system. Encryption is the key. The biggest threat is from intruders coming into the LAN. You set a seven-digit alphanumeric security code, called an SSID, in each wireless device and they thereafter operate as a group.

TKIP

Temporal Key Integrity Protocol. TKIP is a protocol used in WPA. It scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven't been tampered with.

VPN (Virtual Private Network)

A VPN uses encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted.

WLAN (Wireless Local Area Network)

A type of local-area network that uses high-frequency radio waves rather than wires to communicate between nodes.

WPA

WPA stands for WiFi Protected Access. It's an interim standard developed by the WiFi Alliance pending full ratification of the 802.11i standard, to protect the wired band and improve upon the old WEP encryption standard.