IES-1000

Integrated Ethernet Switch

Version 2.05

11/2005

User's Guide

ZyXEL
Unleash Networking Power

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Customer Support

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- Product model and serial number.
- Warranty information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

Method / Location	Support e-mail / Sales e-mail	Telephone / Fax	Web Site / FTP Site	Regular Mail
Corporate Headquarters (Worldwide)	support@zyxel.com.tw	+886-3-578-3942	www.zyxel.com www.europe.zyxel.com	ZyXEL Communications Corp. 6 Innovation Road II Science Park Hsinchu 30099 Taiwan
	sales@zyxel.com.tw	+886-3-578-2439	ftp.zyxel.com ftp.europe.zyxel.com	
Czech Republic	info@cz.zyxel.com	+420-241-091-350	www.zyxel.cz	ZyXEL Communications Czech s.r.o. Modranská 621 143 01 Praha 4 – Modrany Ceská Republika
	info@cz.zyxel.com	+420-241-091-359		
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	sales@ua.zyxel.com	+380-44-494-49-32		
United Kingdom	support@zyxel.co.uk	+44-1344 303044 08707 555779 (UK only)	www.zyxel.co.uk	ZyXEL Communications UK Ltd.,11 The Courtyard, Eastern Road, Bracknell, Berkshire, RG12 2XB, United Kingdom (UK)
	sales@zyxel.co.uk	+44-1344 303034	ftp.zyxel.co.uk	

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Preface

Congratulations on your purchase of the IES-1000 Integrated Ethernet Switch.

About this User's Manual

This user's guide explains how to:

- Install the IES-1000 chassis
- Install network modules into the chassis
- Use the web configurator or command line interface to manage and troubleshoot the AAM-1008-61, AAM-1008-63 and SAM-1008 modules.

See the AAM-1212 User's Guide for information on the AAM-1212-51/53 network modules.

IES-1000 Network Module Models and Firmware Releases

The IES-1000 supports the following modules. The firmware version contains a model code. In firmware version V2.05(DN.1) for example; "DN" is the model code.

- AAM1008-61 for ADSL over POTS (Annex A). "DN" denotes the firmware version.
- AAM1008-63 for ADSL over ISDN (Annex B). "DJ" denotes the firmware version.
- SAM1008 for G.SHDSL. "DD" denotes the firmware version.
- AAM-1212-51 for ADSL over POTS (Annex A). "ABA" denotes the firmware version.
- AAM-1212-53 for ADSL over ISDN (Annex B). "ABP" denotes the firmware version.

A firmware version also includes the firmware's release number. In firmware version V2.05(DN.1) for example, "0" is the firmware's release number. This varies as new firmware is released. Your firmware's release number may not match what is displayed in this User's Guide.

Naming Conventions

- The IES-1000 (Integrated Ethernet Switch) may be referred to as the IES or the switch.
- The AAM1008 (ADSL Access Module) may be referred to as the AAM, the ADSL module, the DSL module or the module.
- There the AAM1008-61 is for ADSL over POTS (Annex A) and the AAM-1008-63 is for ADSL over ISDN (Annex B). Differentiation is made where needed.
- The SAM1008 (G.SHDSL Access Module) may be referred to as the SAM, the SHDSL module, the DSL module or the module.

Related Documentation

- Quick Start Guide

  The Quick Start Guide contains general initial configuration instructions.
- The AAM-1212-51/53 User's Guide
- Glossary and ZyXEL Web Site

Please refer to www.zyxel.com for an online glossary of networking terms or the ZyXEL download library for additional support documentation.

Online Registration

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General Syntax Conventions

- Mouse action sequences are denoted using a comma. For example, click **Start, Settings, Control Panel, Network** means first you click **Start**, click or move the mouse pointer over **Settings**, then click or move the mouse pointer over **Control Panel** and finally click (or double-click) **Network**.
- "Enter" means for you to type one or more characters. "Select" or "Choose" means for you to use one of the predefined choices.
- Predefined choices are in **Bold Arial** font.
- Button and field labels, links and screen names in are in **Bold Times New Roman** font.
- A single keystroke is in Arial font and enclosed in square brackets. [ENTER] means the Enter, or carriage return key; [ESC] means the Escape key and [SPACE BAR] means the Space Bar.

For brevity's sake, we will use "e.g.," as shorthand for "for instance", and "i.e.," for "that is" or "in other words".

User's Guide Feedback

Help us help you. E-mail all User's Guide-related comments, questions or suggestions for improvement to techwriters@zyxel.com.tw or send regular mail to The Technical Writing Team, ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu, 300, Taiwan. Thank you.

Part I:

Overview and Installation

This part introduces the general features, default settings, hardware and installation of the IES-1000 Integrated Ethernet Switch.

Chapter 1
Getting to Know the IES-1000

This chapter describes the key features, benefits and applications of your IES-1000.

The IES-1000 (Integrated Ethernet Switch) is an IP-based DSLAM (Internet Protocol Digital Subscriber Line Access Multiplexer) that connects up G.SHDSL or ADSL subscribers to the Internet. When deployed together with ZyXEL's DSL modems and WAN routers, the combination forms an integrated solution for providing broadband services to multiple tenant units such as apartments, hotels, offices and campus buildings.

G.SHDSL is an acronym for Single-pair High-speed Digital Subscriber Line. ITU-T G.991.2 defines the "G." in "G.SHDSL". ADSL is an acronym for Asymmetric Digital Subscriber Line.

This user's guide covers the IES-1000 chassis, AAM-1008-61/63 and SAM-1008 network modules. See the AAM-1212 User's Guide for information on the AAM-1212-51/53 network modules.

1.1 Features

Two-Slot Chassis

The IES-1000 has two slots that accept multiplexer network modules. The chassis design gives you the flexibility to initially install a single module and then add another as demand increases.

Multiplexer Network Modules

Up to two hot-swappable multiplexing network modules may be installed in each IES-1000 chassis.

The SAM1008 (G.SHDSL Access Module) is an 8-port G.SHDSL multiplexer network module that aggregates traffic from eight lines to an Ethernet port.

The AAM1008 (ADSL Access Module) is an 8-port ADSL multiplexer network module that aggregates traffic from eight lines to an Ethernet port and has integrated splitters to allow voice and ADSL to be carried over the same phone line wiring.

10/100 Mbps Auto-negotiating Ethernet Port

This 10/100 Mbps auto-negotiating Ethernet port connects the IES-1000 to an Ethernet network. With Ethernet as the backbone, you can create a network that provides G.SHDSL and or ADSL service to hundreds of subscribers.

G.SHDSL Compliance (SAM1008)

- ITU-T G.991.2
- G.hs (ITU-T G.994.1)
- Rate adaptation support

ADSL Compliance (AAM1008)

- Multi-Mode ADSL standard
  - G.dmt (ITU-T G.992.1)

- G.lite (ITU-T G.992.2)
- G.hs (ITU-T G.994.1)
- ANSI T1.413 issue 2
- ETSI (TS 101 388)

- Rate adaptation support

N-wire Mode (SAM1008)

The n-wire mode allows you to physically bundle two or four G.SHDSL ports into a single 4-wire or 8-wire G.SHDSL connection.[1] This can increase the reach of G.SHDSL or give increased bandwidth when connecting to 4-wire mode G.SHDSL modems or another IES-1000. Given the same number of ports, n-wire mode provides better throughput than (2-wire port) port bonding.

Port Bonding (SAM1008)

The port bonding feature allows you to combine two to eight G.SHDSL connections between two IES-1000s into a single logical connection. You can combine individual ports or n-wire bundled groups. This can give increased bandwidth for LAN-to-LAN applications.

Bridging

- IEEE 802.1D transparent bridging
- Up to 4096 MAC entries address table
- Port-based VLAN (Virtual Local Area Network)

IEEE 802.1Q Tagged VLAN

Your IES-1000 uses the IEEE 802.1Q Tagged VLAN (Virtual Local Area Network), which allows your device to deliver tagged/untagged frames to and from its ports. The IES-1000 supports up to 400 VLANs and up to 4094 VLAN IDs.

IEEE 802.1p Priority

Your IES-1000 uses IEEE 802.1p Priority to assign priority levels to individual ports.

Fast Mode

The fast mode makes use of the "tag" subset of the IEEE 802.1Q standard to identify the source port of a frame and speed traffic through a service gateway.

MAC (Media Access Control) Filter

Use the MAC filter to filter incoming frames based on MAC (Media Access Control) address(es) that you specify. You may enable/disable the MAC filter on specific ports. You may specify up to five MAC addresses per port.

MAC (Media Access Control) Count Filter

[1] N-wire mode is available with the D0 hardware. The hardware version is in the serial number on the sticker on the SAM1008 network module. You can also use the `sys info` command to display the hardware version.

You can limit the number of MAC addresses that may be dynamically learned or statically configured on a port. You may enable/disable the MAC count filter on individual ports.

IEEE 802.1X Port-based Authentication

The IES-1000 supports the IEEE 802.1X standard for centralized user authentication through an optional network authentication (RADIUS) server.

Secured Host

Allow up to ten remote hosts to access your IES-1000 via IP addresses you specify.

System Error Logging

The system error log will record error logs locally to the IES-1000 memory.

UNIX Syslog Logging

Use UNIX syslog commands to send logs to your UNIX server.

Protocol

- Multiprotcol Encapsulation over ATM Adaptation Layer 5 (RFC 1483)

Management

- Remote configuration backup/restore and firmware upgrade
- SNMP manageable
- Text-based management locally via console port and remotely via telnet
- Web configurator

Security

- Password protection for system management
- VLAN

Multiple PVC and ATM QoS

The IES-1000 allows you to use different channels (also called Permanent Virtual Circuits or PVCs) for different services or subscribers. Define up to eight channels on each DSL port for different services or levels of service and assign each channel a priority. ATM Quality of Service (QoS) allows you to regulate the average rate and fluctuations of data transmission. This helps eliminate congestion to allow the transmission of real time data (such as audio and video).

DHCP Relay with Relay Agent Information Option

The IES-1000 can relay client TCP/IP configuration requests to a DHCP server and the server's responses back to the clients. The IES-1000 also has the relay agent information option (also known as option 82) feature to add information to client TCP/IP configuration requests that it relays to a DHCP server.

IGMP Snooping

IGMP (Internet Group Management Protocol) snooping reduces multicast traffic for maximum performance.

Overheating Detection, Warning and Safegaurd

An ALM LED turns on when the IES-1000's internal temperature is too high and turns off when the temperature has returned to a normal level. Internal fans cool the unit.

Compact Design for Limited Space

The IES-1000 occupies only 1 U of standard Telco rack space. Its compactness is perfect for collocation (installation in a central office) and basement installation.

Scalable Platform for Future Expansion

The flexible design of the IES-1000 series allows service providers to start with minimum cost. As the number of subscribers and applications increases additional IES-1000s can be added to provide greater bandwidth.

1.2 Applications

The following sections describe example applications for the IES-1000.

1.2.1 MTU Application

The following figure depicts a typical application of the IES-1000 in a large residential building, or multiple tenant unit (MTU), that leverages the existing phone line wiring to provide Internet access to all tenants.

A tenant connects a computer to the phone line in a unit using a G.SHDSL or ADSL modem. The other end of the phone line is connected to a port on the IES-1000. The IES-1000 aggregates the traffic from tenants to the Ethernet port and then forwards it to a router. The router then routes the traffic further to the Internet.

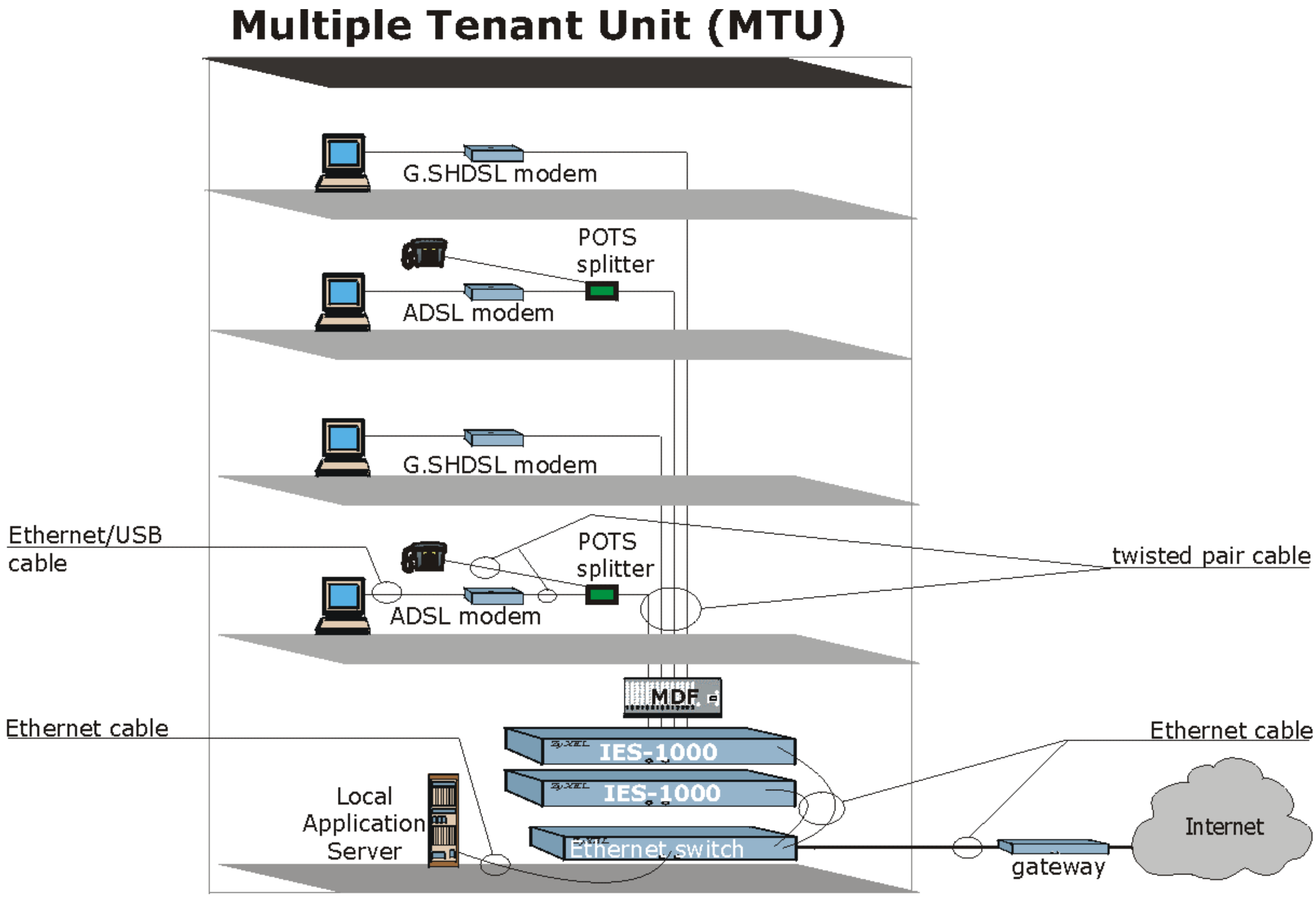


Figure 1-1 MTU Application

1.2.2 Central Office or ISP Application

The IES-1000 provides DSL service over telephone wires to subscribers. The following figure shows the IES-1000 set up in an Internet Service Provider (ISP) building or telephone company central office.

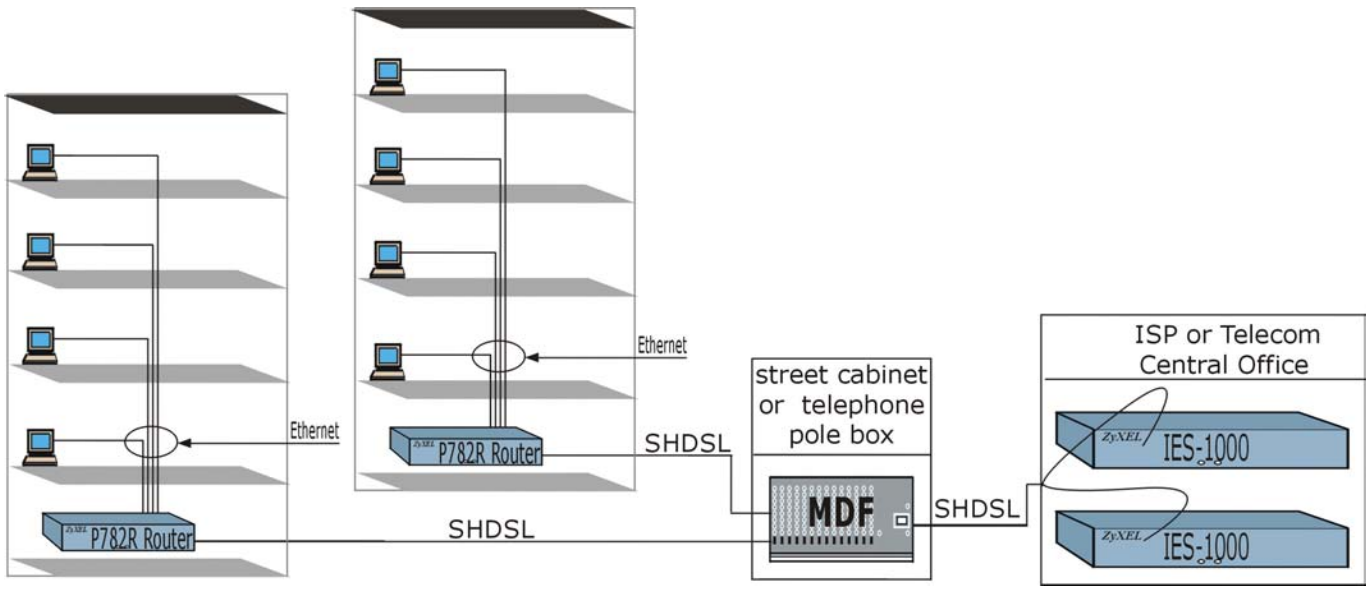


Figure 1-2 Central Office or ISP Application

Chapter 2
Factory Default Settings

This section describes the factory default settings of the IES-1000.

2.1 IP Parameters

- IP address = 192.168.1.1
- Subnet mask = 255.255.255.0
- Default gateway = 192.168.1.254

2.2 Console Port

- Baud rate = 9600 bps
- Data bits = 8
- Parity = none
- Stop bit = 1
- Flow control = none

2.3 SNMP Community Strings

- Read = public
- Write = 1234

2.4 Console, Telnet, Web Configurator and FTP Password

- User name: admin (web configurator)
- Password: 1234 (default)

2.5 G.SHDSL Ports (SAM1008)

- Encapsulation: RFC 1483
- Multiplexing: LLC-based
- VPI: 0
- VCI: 33

- Enable/Disable State: Disabled
- Profile: DEFVAL
  - Maximum upstream/downstream speed: 2304 Kbps
  - Minimum upstream/downstream speed: 192 Kbps

2.6 ADSL Ports (AAM1008)

- Encapsulation: RFC 1483
- Multiplexing: LLC-based
- VPI: 0
- VCI: 33
- Enable/Disable State: Disabled
- Operational Mode: auto
- Profile: DEFVAL
  - Maximum Upstream Rate: 512 Kbps
  - Maximum Downstream Rate: 2048 Kbps

2.7 Ethernet Port

The factory default settings for the Ethernet port of the IES-1000 are:

- Auto-negotiation: ON
- Speed used with auto-negotiation OFF: 100Mbps
- Duplex mode used with auto-negotiation OFF: half duplex

2.8 Other Factory Defaults

- MAC filter: Disabled
- MAC count filter: Disabled
- Secured Host: Disabled
- Sys Error Log: Always Enabled
- UNIX Syslog: Disabled
- IEEE 802.1Q Tagged VLAN: Disabled
- IGMP Snooping: Enabled (Unknown-flood)
- DHCP Relay: Disabled
- IEEE 802.1X Port-based Authentication: Disabled

Chapter 3
Hardware Overview

This chapter gives a brief introduction to the IES-1000 hardware.

3.1 Additional Installation Requirements

A computer with Ethernet 10Base-T or 100Base-TX NIC (Network Interface Card)

- WAN service provided by a local phone company

A computer with terminal emulation software configured to the following parameters:

VT100 terminal emulation

  - 9600 bps
  - No parity, 8 data bits, 1 stop bit
  - No flow control

3.2 AC Power Front Panel

The following figure shows the front panel of the AC power version of the IES-1000 with a SAM1008 network module installed on the left and an AAM1008 network module on the right.

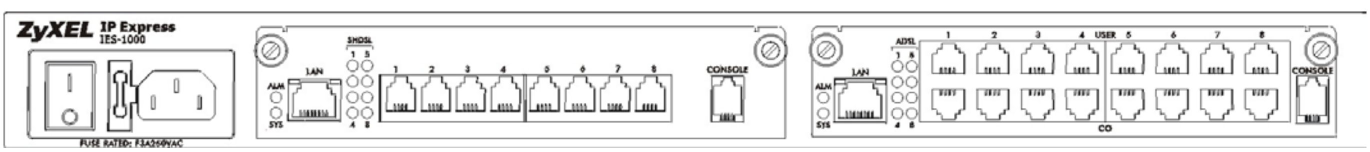


Figure 3-1 AC Power Front Panel

3.3 DC Power Front Panel

The following figure shows the front panel of the DC power version of the IES-1000 with a SAM1008 network module installed on the left and an AAM1008 network module on the right.

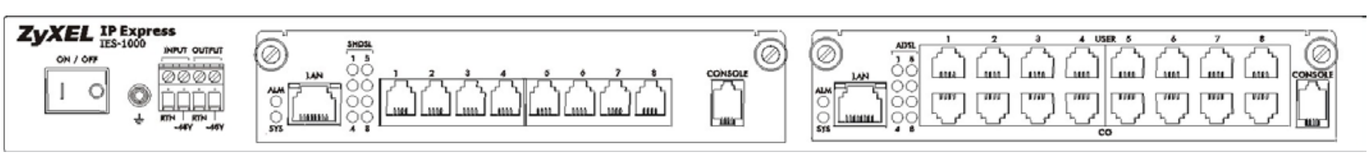


Figure 3-2 DC Power Front Panel

3.3.1 Network Module Front Panel LEDs

See the *Turning On the IES-1000* chapter for details on the LED indicators on the front panel of a SAM1008 or AAM1008 network module.

3.3.2 Front Panel Ports

The following tables describe front panel ports.

Table 3-1 Front Panel Ports of the SAM1008 Network Module

PORT	DESCRIPTION
LAN	The LAN port is a 10/100 Mbps auto-sensing Ethernet port that connects to a router or Ethernet switch.
SHDSL 1-8	These RJ-11 ports (labeled 1-8) connect to subscriber G.SHDSL equipment.
CONSOLE	The CONSOLE port is an RJ-11 port used for configuring the IES-1000. This port connects to a local computer.

Table 3-2 Front Panel Ports of the AAM1008 Network Module

PORT	DESCRIPTION
LAN	The LAN port is a 10/100 Mbps auto-sensing Ethernet port that connects to a router or Ethernet switch.
User 1-8	These RJ-11 ports (labeled 1-8) connect to subscriber ADSL equipment.
CO 1-8	These RJ-11 ports (labeled 1-8) connect to CO (central office) equipment.
CONSOLE	The CONSOLE port is an RJ-11 port used for configuring the IES-1000. This port connects to a local computer.

Table 3-3 Front Panel Ports of the IES-1000

PORT	DESCRIPTION
POWER	Refer to the *Hardware Specifications* appendix for power connection specifications.

Chapter 4 Hardware Installation

This chapter shows you how to install hardware for a freestanding or rack-mounted scenario.

4.1 Environment

The following are the recommended environments for the IES-1000.

4.1.1 Operating Environment

Temperature: 0 — 50°C; Humidity: 5% — 95% (non-condensing)

4.1.2 Storage Environment

Temperature: -25 - 70°C; Humidity: 5% - 95% (non-condensing)

Refer also to the *Hardware Specifications Appendix*.

4.2 Freestanding IES-1000 Installation Requirements

Position the IES-1000 on a flat surface. Remember that the unit requires proper ventilation.

4.3 Rack-mounted IES-1000 Installation Requirements

- Two mounting brackets (supplied).
- Eight M3 flat head screws (supplied) and a #2 Philips screwdriver.
- Four M5 flat head screws and a #2 Philips screwdriver.

4.4 Mounting the IES-1000 on a Rack

Precautions:

- Make sure the rack will safely support the combined weight of all the equipment it contains.
- Make sure the position of the IES-1000 does not make the rack unstable or top-heavy. Take all necessary precautions to anchor the rack securely before installing the unit.

4.4.1 Attaching the Mounting Brackets to the IES-1000

Step 1. Position a mounting bracket on one side of the IES-1000, lining up the four screw holes on the bracket with the screw holes on the side of the unit (see the figure shown next).

Failure to use the proper screws may damage the unit.

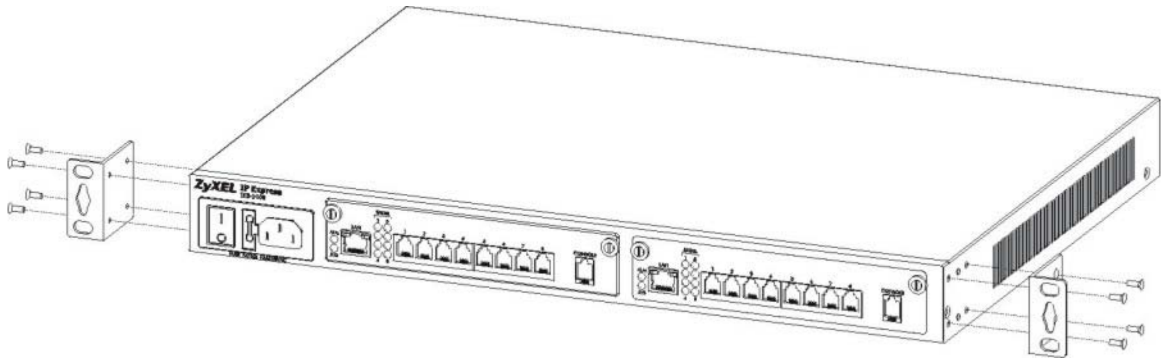


Figure 4-1 Attaching the Mounting Brackets to the IES-1000

Step 2. Using a #2 Philips screwdriver, install the M3 flat head screws that came with the brackets through the mounting bracket holes into the IES-1000.

Step 3. Repeat Step 1 and Step 2 to install the second mounting bracket on the other side of the unit.

You may now mount the IES-1000 on a rack. Proceed to the next section.

4.4.2 Mounting the IES-1000 on a Rack

Step 1. Position a mounting bracket (that is already attached to the IES-1000) on one side of the rack, lining up the two screw holes on the bracket with the screw holes on the side of the rack (see the figure shown next).

Failure to use the proper screws may damage the unit.

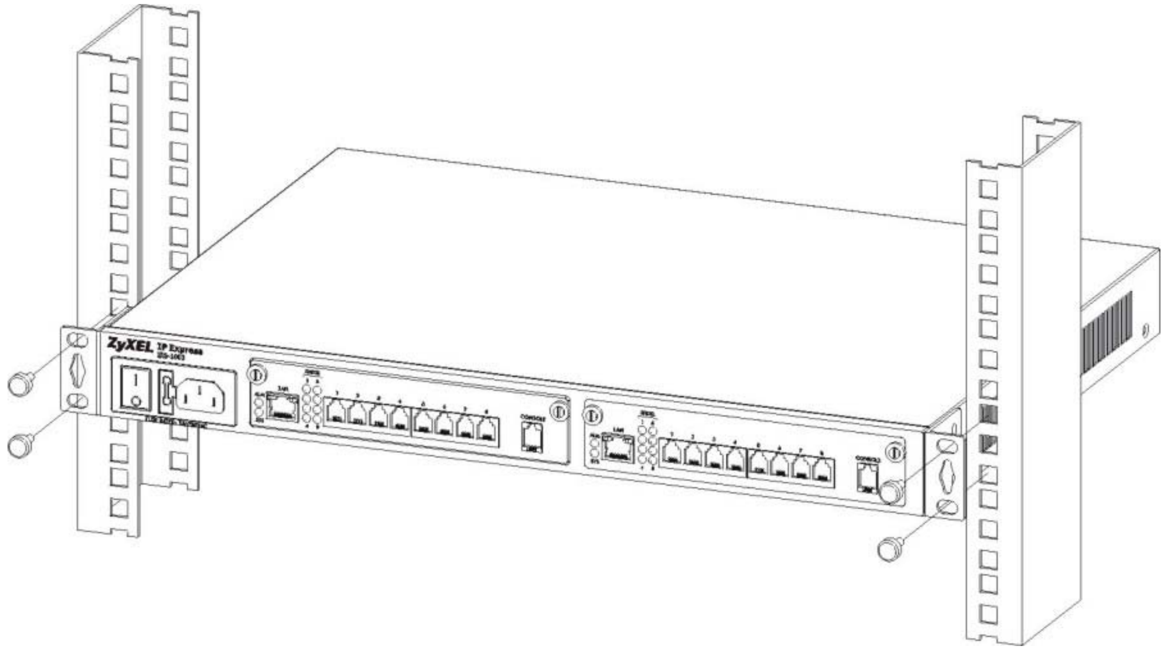


Figure 4-2 Mounting the IES-1000 on a Rack

Step 2. Using a #2 Philips screwdriver, install the M5 flat head screws through the mounting bracket holes into the rack.

Step 3. Repeat Step 1 and Step 2 to attach the second mounting bracket on the other side of the rack.

Chapter 5 Removing and Installing Network Modules

This chapter shows you how to remove and install network modules.

Each IES-1000 accommodates up to two network modules. Remove and install modules via the front of the IES-1000. The figure below shows the front view of a SAM1008 network module; the procedures for removing and installing AAM1008 network modules are the same.

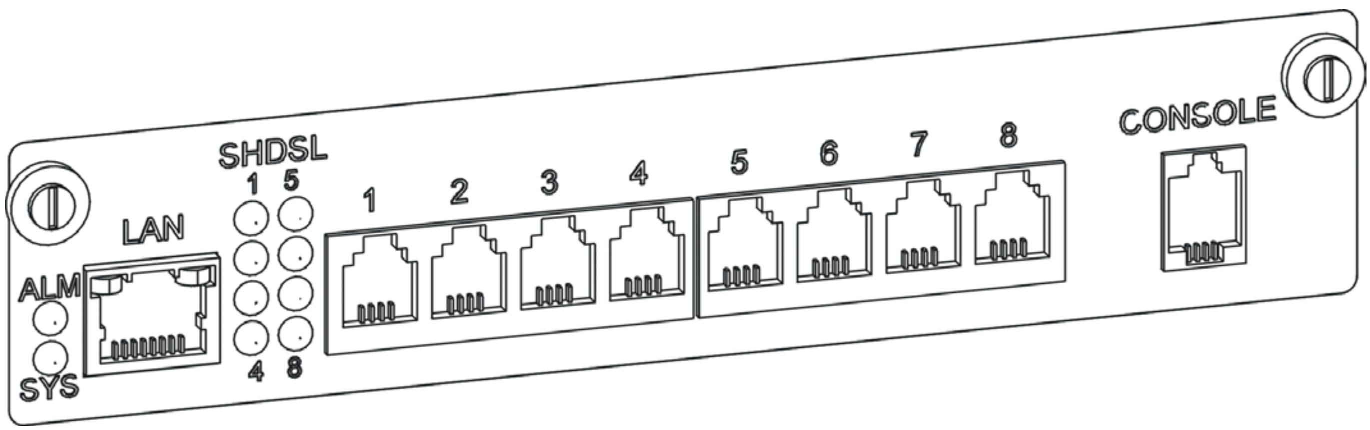


Figure 5-1 IES-1000 G.SHDSL SAM1008 Network Module

5.1 Removing a G.SHDSL SAM1008 Network Module

Step 1. Loosen the two screws on the front panel that secure the module to the chassis by turning them counter-clockwise as shown next.

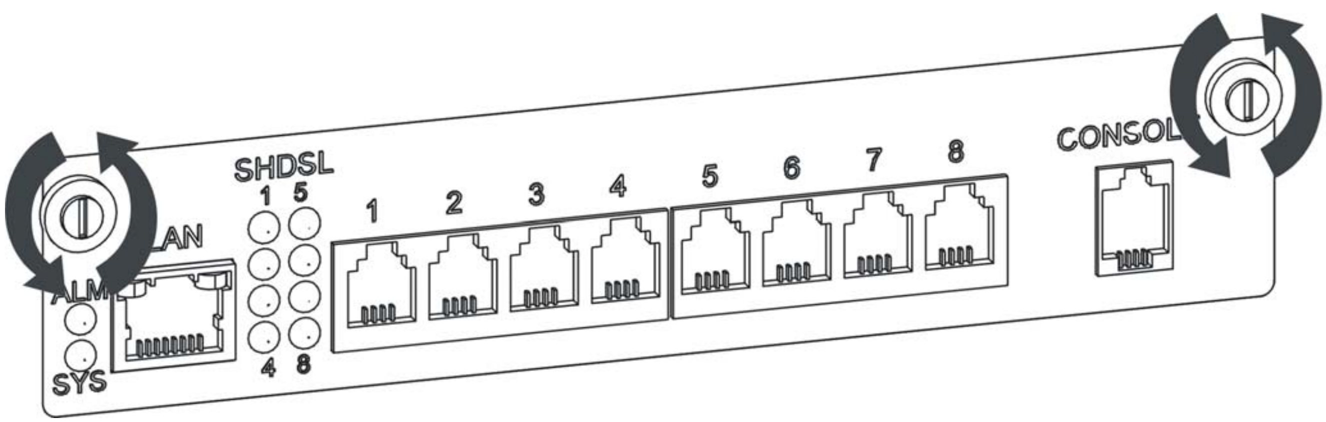


Figure 5-2 Loosen Module Screws

Step 2. Gently pull the network module out of the chassis as shown next.

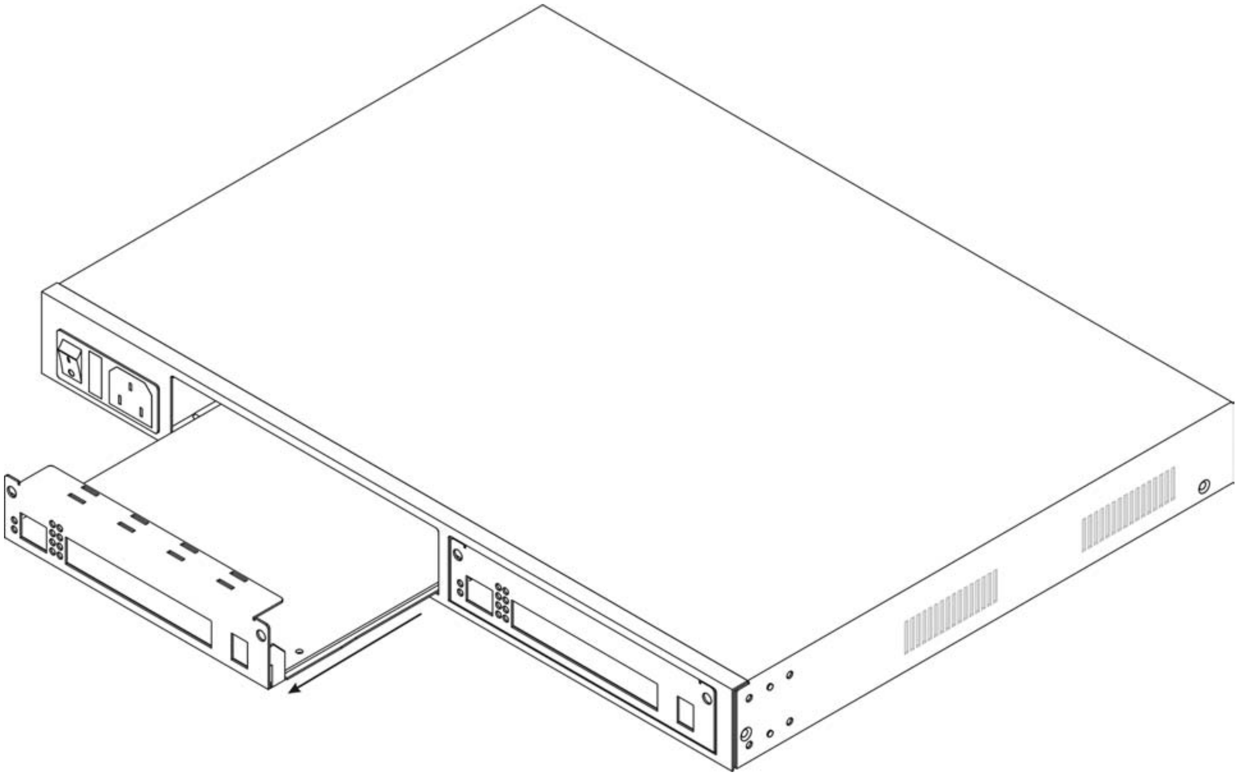


Figure 5-3 Removing a Network Module from the IES-1000 Chassis

5.2 Installing a Network Module

Step 1. Hold the module with the network ports facing you and insert it into an empty slot located on the front of the IES-1000 as shown next.

Step 2. Push the bottom of the front of the module into the IES-1000. The front of the module should be flush with the IES-1000 chassis.

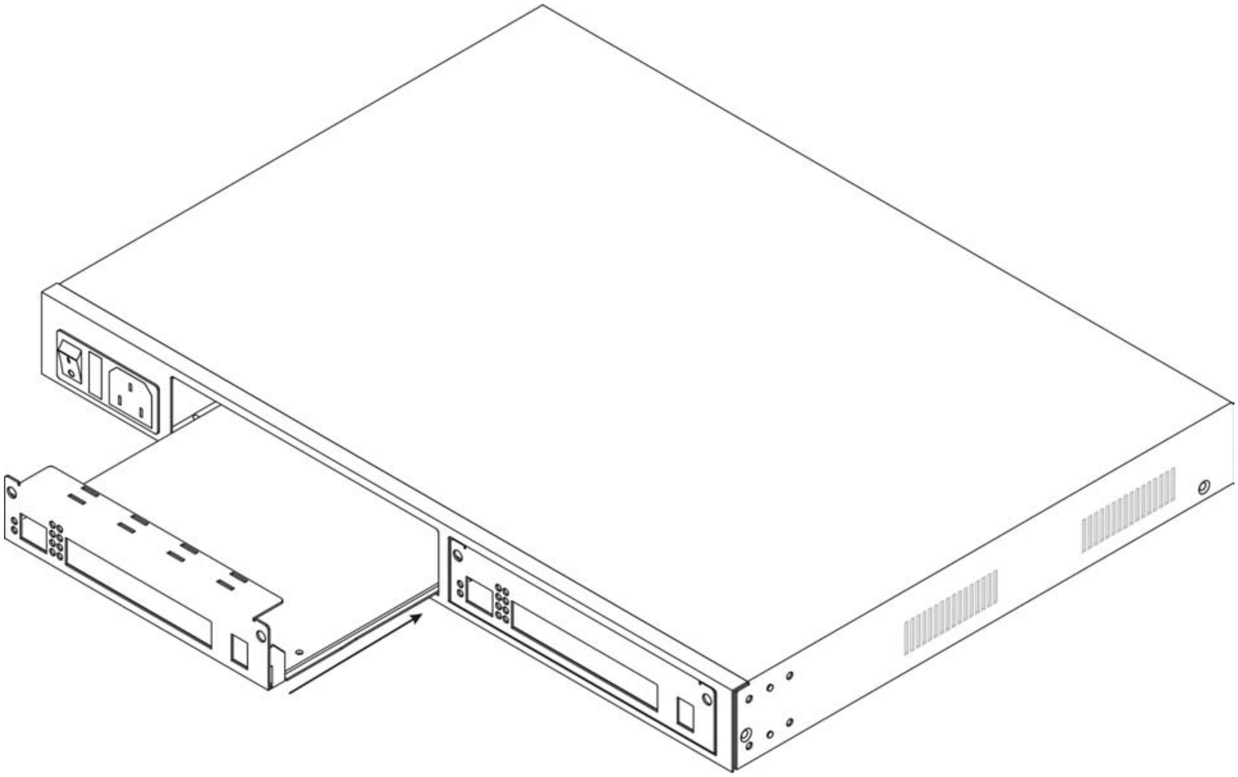


Figure 5-4 Installing a Network Module into the IES-1000 Chassis

The front of the network module must be flush with the front of the IES-1000 after you install a network module or it will not work!

Step 3. Secure the module to the chassis by turning the two screws on the front of the module clockwise as shown next.

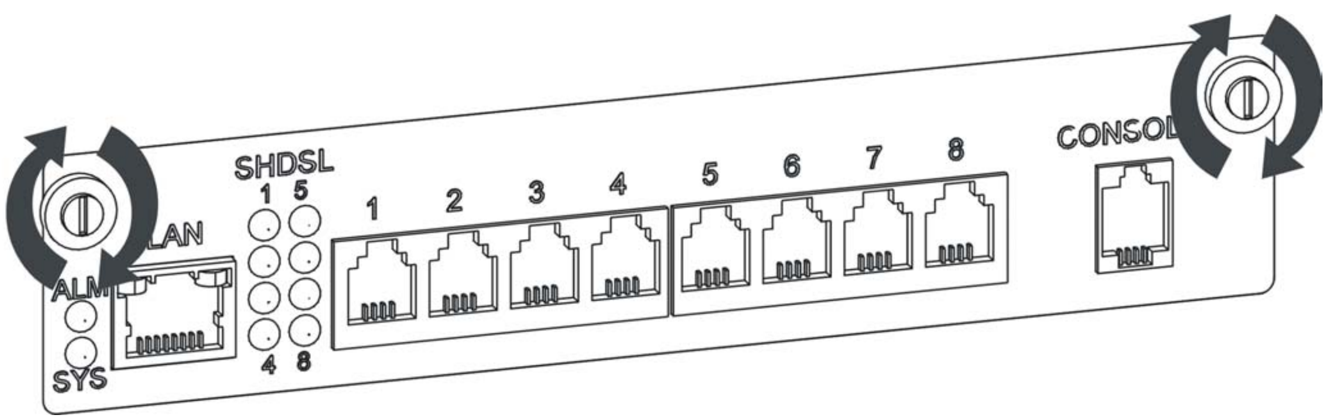


Figure 5-5 Tighten Module Screws

Part II:

Hardware Connections and Troubleshooting

This part covers how to connect the IES-1000 and turn it on. It also covers how to troubleshoot the hardware.

Chapter 6
Hardware Connections

This chapter shows you how and where to make hardware connections.

Before you make your hardware connections, make sure that your IES-1000 is safely and securely positioned.

6.1 Front Panel Connections

All connections are made on the front panel of the IES-1000. The following figure shows the front panel connections of the SAM1008. Connect A to a power source. B is an Ethernet switch. Connect C to the users. D is a local management computer. A more detailed discussion follows. Connections for the AAM1008 are the same except for the DSL ports (see *6.4* for details).

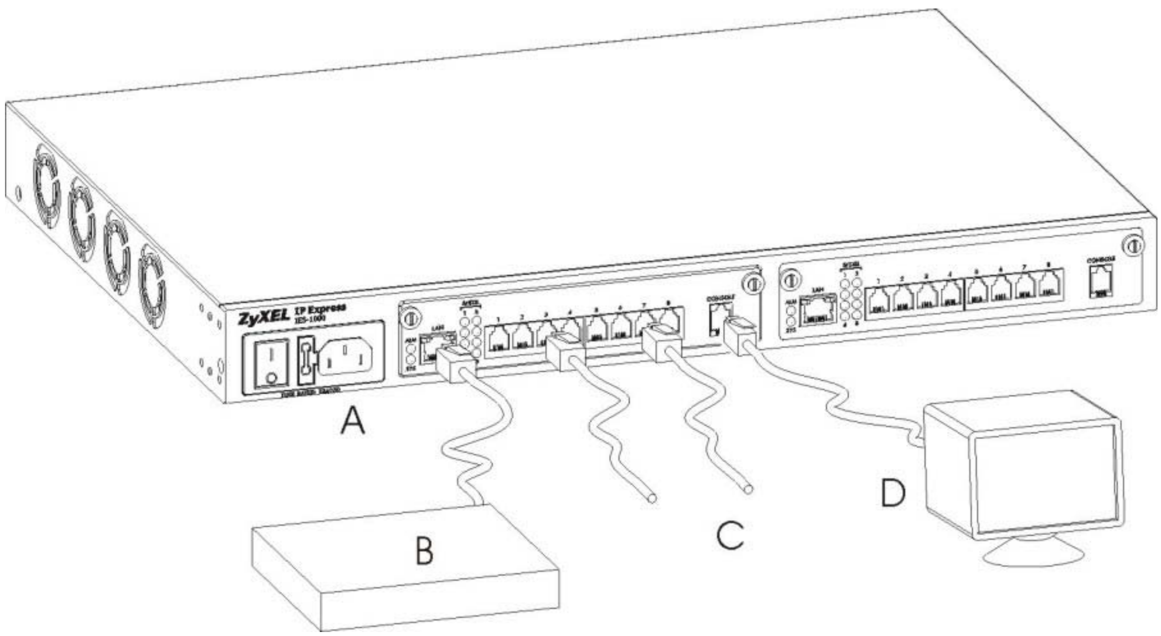


Figure 6-1 SAM1008 Front Panel Connections Overview

6.2 Console Port

For the initial configuration, you need to use terminal emulator software on a computer and connect it to a network module through the console port. Connect the mini-RJ-11 end of the console cable to the console port of the network module. Connect the other end to a serial port of your computer. After the initial setup, you can modify the configuration remotely through Telnet connections.

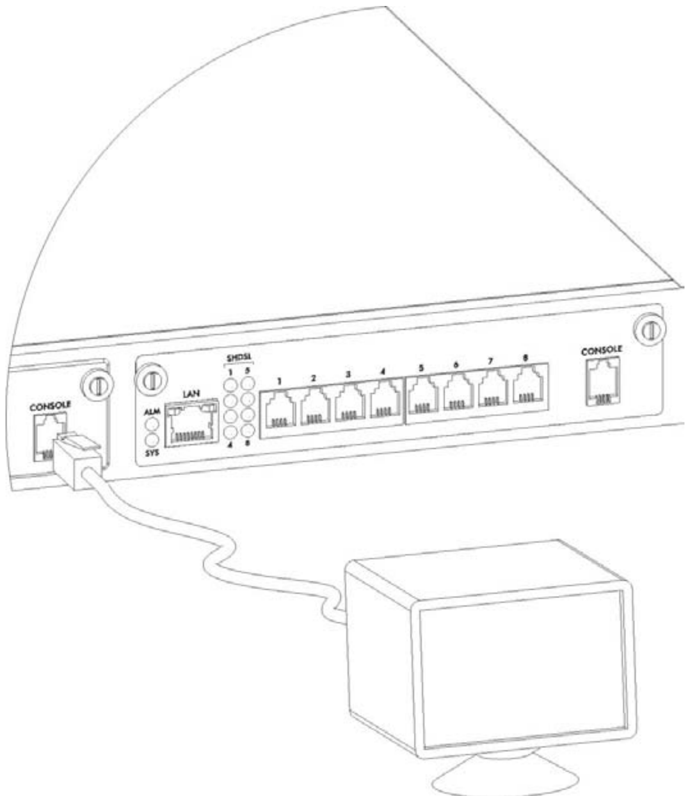


Figure 6-2 Console Port Connection

6.3 SHDSL Port Connections

The SHDSL ports connect to an MDF (Main Distribution Frame) and end-user equipment via telephone wires.

- For detailed specifications about the associated RJ-11 connector, refer to the *Pin Assignment* appendix.
- For more detail about MDF connections refer to the *Notes About MDFs (Main Distribution Frames)* section shown later.

The procedure shown next explains how to complete a single G.SHDSL connection (SAM1008) to an MDF via an SHDSL port. Instructions on ADSL connections (AAM1008) come later.

6.3.1 Procedure to Complete a G.SHDSL Connection

Step 1. Connect the RJ-11 end of a telephone wire to the SHDSL port on the front panel of the SAM1008 as shown next.

Step 2. Connect the other end of the telephone wire to the upper port of an MDF (Main Distribution Frame) using a punch-down tool.

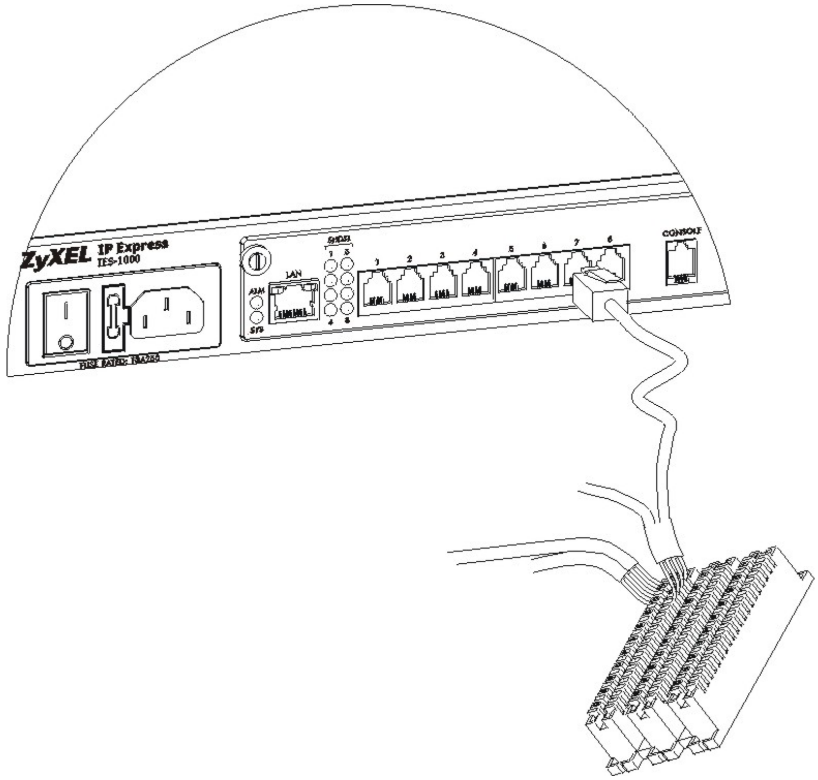


Figure 6-3 SHDSL Port and MDF Connections

Step 3. Connect a different telephone wire to the lower port of the MDF using a punch-down tool.

Step 4. Connect the other (RJ-11) end of the telephone wire to the end-user G.SHDSL modem/router.

When you finish this procedure your connections should look similar to the figure shown next. Connections between the user's computer and modem/router are not described here.

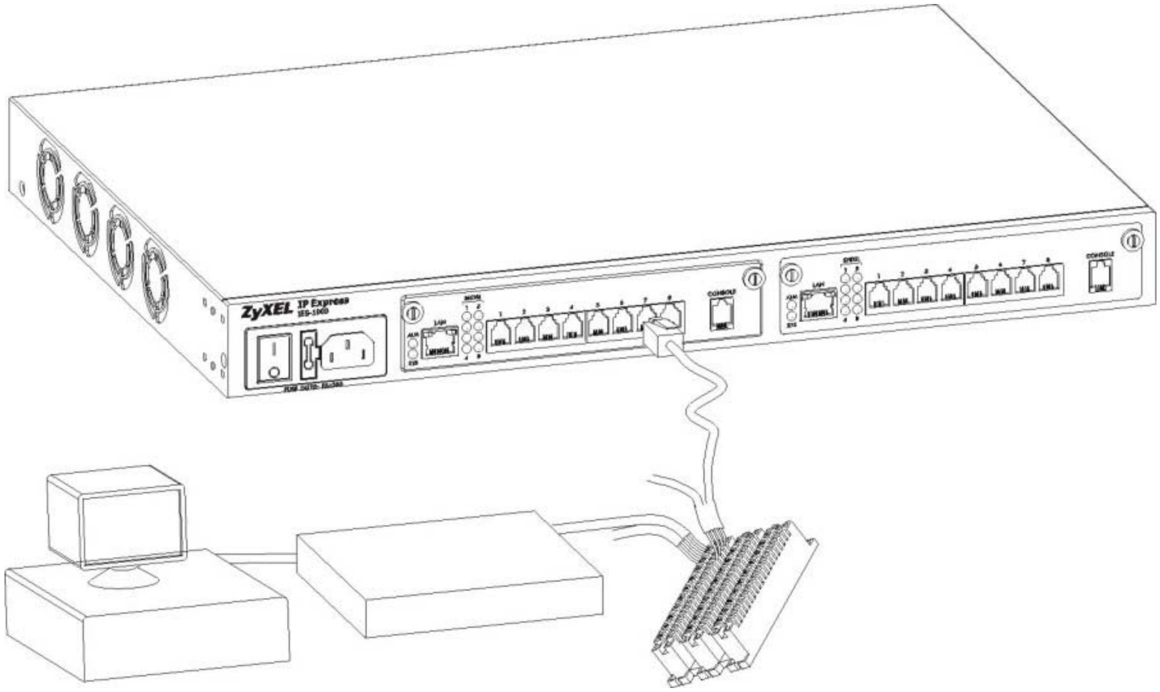


Figure 6-4 SHDSL Port, MDF and User Equipment Connections

Notes About MDFs (Main Distribution Frames)

An MDF is usually installed between end-users' equipment and the telephone company (CO) in a basement or telephone room. The MDF is the point of termination for the outside telephone company lines coming into a building and the telephone lines in the building.

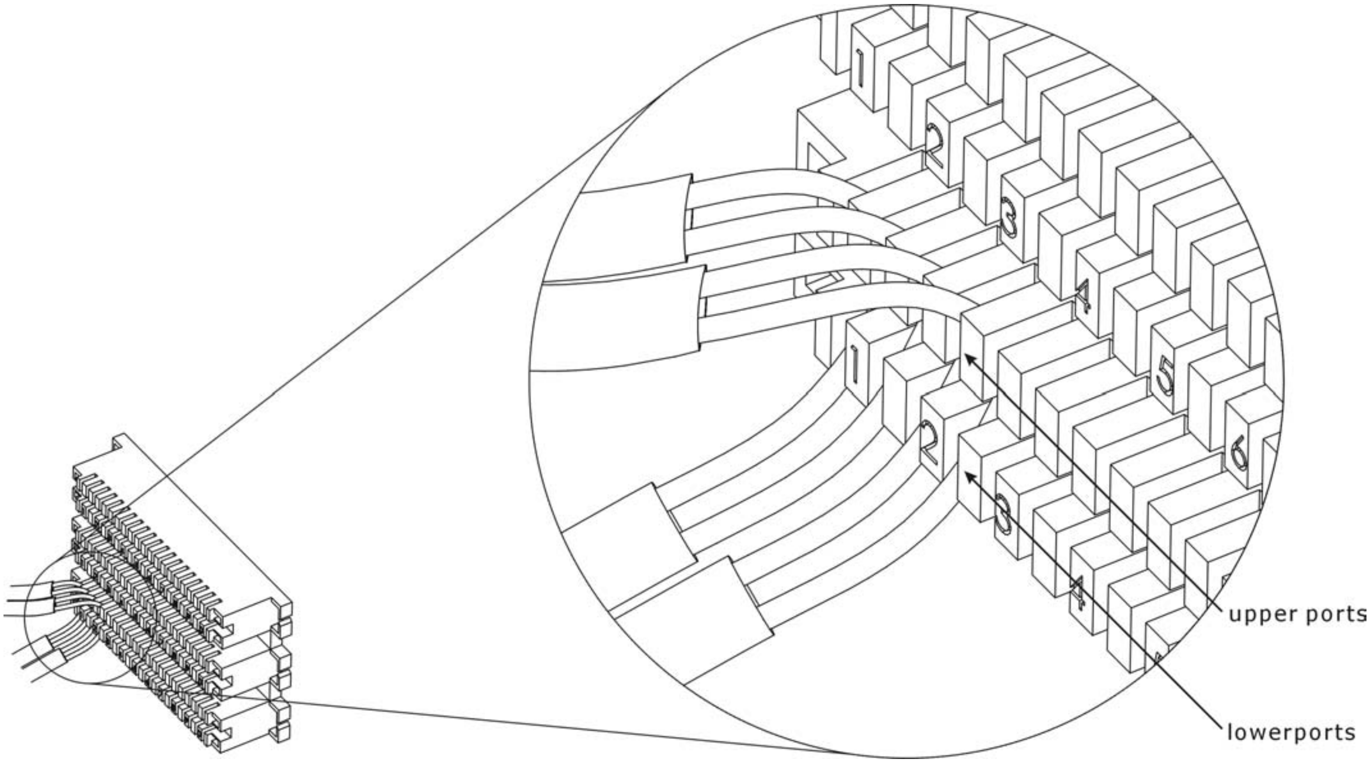


Figure 6-5 Magnified View of MDF Wiring

Connect wiring from end-user equipment to the lower ports of an MDF using a telephone wire. Connect wiring from the telephone company to the upper ports of an MDF (see the previous figure).

Some MDFs have surge protection circuitry built in between the two banks; thus, do not connect telephone wires from the telephone company directly to the IES-1000.

Use a punch-down tool to seat telephone lines between MDF blocks.

6.4 ADSL Port Connections

The AAM1008 network module can provide ADSL and voice services over the same telephone wiring. It also has built in splitters that save space and simplify installation.

The following figure gives an example of a basic installation scenario for using the AAM1008 to combine voice and data signals.

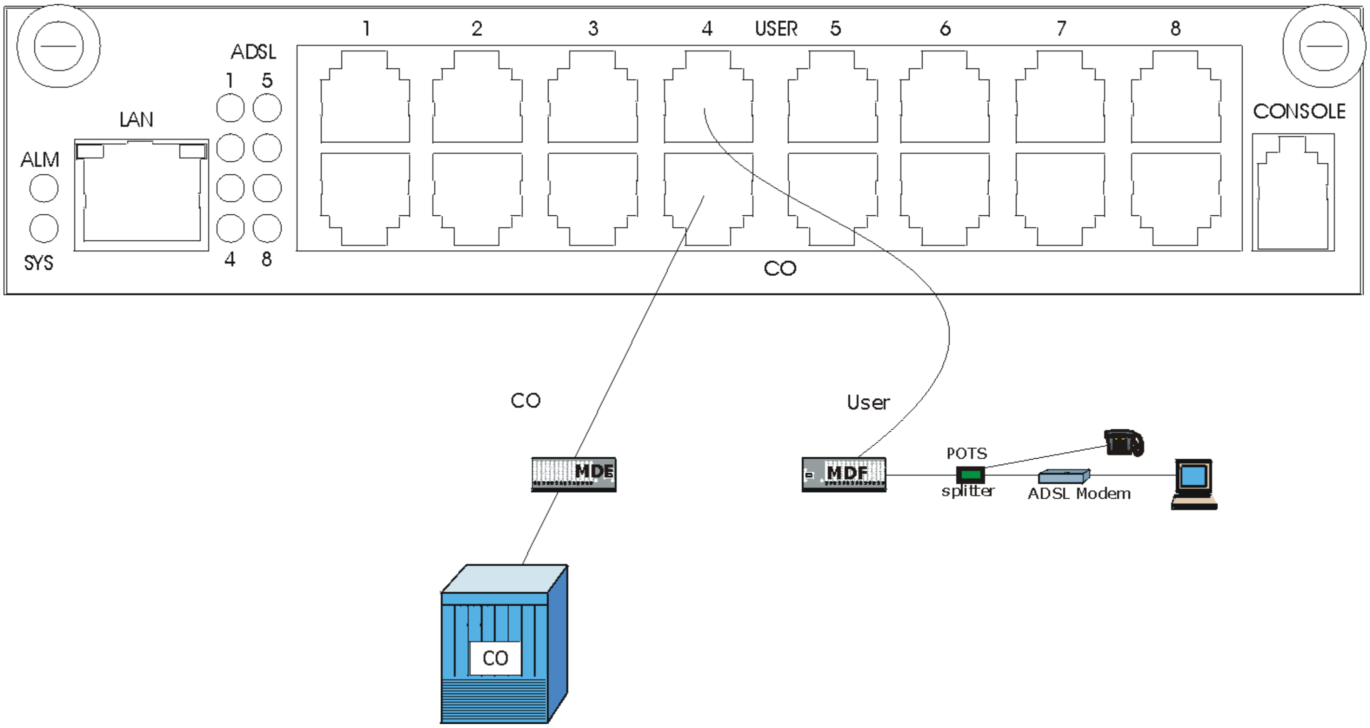


Figure 6-6 AAM1008 Installation Overview

You can also use RJ-11 connectors on both ends of the telephone cables connect directly to an ADSL modem(s) or patch panel. This chapter discusses connections using MDFs.

6.4.1 Typical Scenarios

Your existing telephone wiring usually depends on your region. Here are descriptions of three typical installation scenarios. See the *Notes About MDFs (Main Distribution Frames)* for more information about MDFs. Use telephone wires with RJ-11 jacks on one end (follow the pin assignments shown in the appendices) for connecting to the AAM1008.

6.4.2 Installation Scenario A

You want to install the AAM1008 network module in an environment where there are no previously installed MDFs. There is no phone service and you want to install the AAM1008 for data-access only. No connections from the CO ports are necessary.

You may connect using an MDF or attach RJ-11 connectors to the non-AAM1008 side of the telephone wire and then connect to ADSL modem directly.

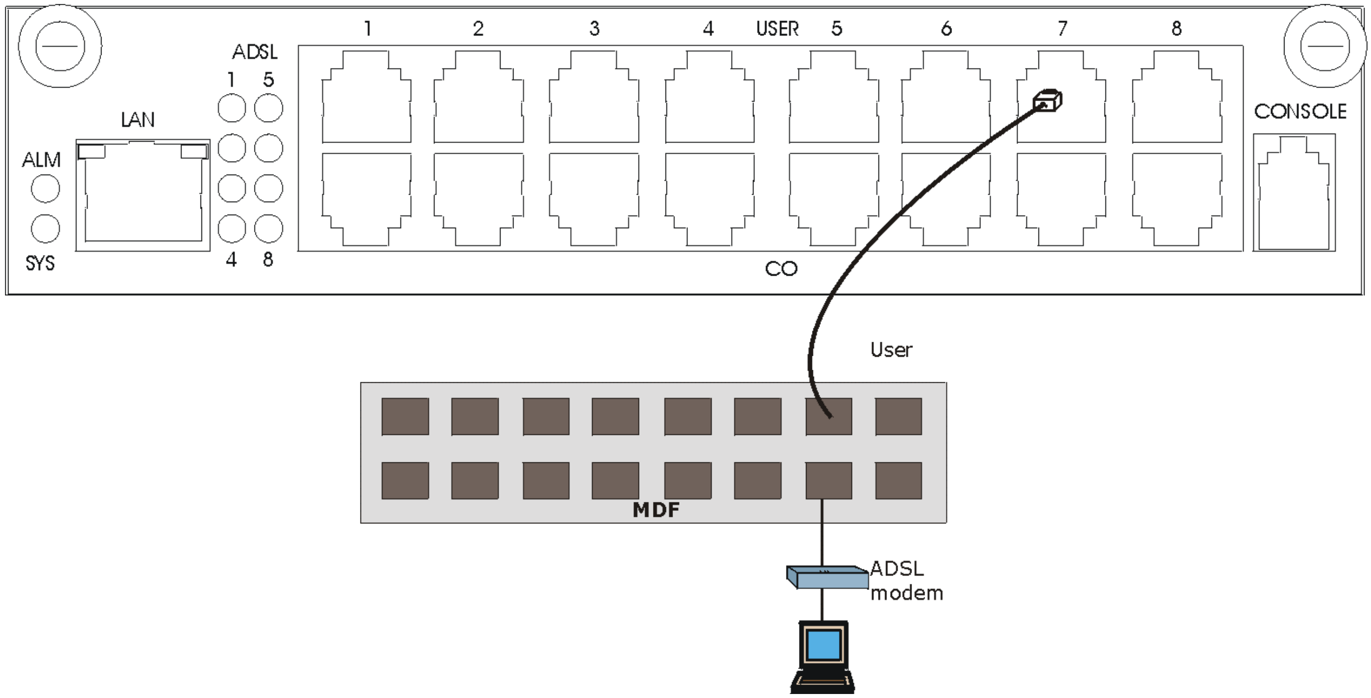


Figure 6-7 Installation Scenario A

Procedure To Connect To An MDF

Step 1. Connect the RJ-11 connector end of a telephone wire to one of the **USER** ports on the AAM1008.

Step 2. Connect the other end of the telephone wire to the upper ports of the MDF using a punch-down tool.

Step 3. Connect the telephone wiring from each end-user's ADSL modem to the lower ports of the MDF.

6.4.3 Installation Scenario B

Phone service is available. There is one MDF from which end-users CO connections are made (see next figure).

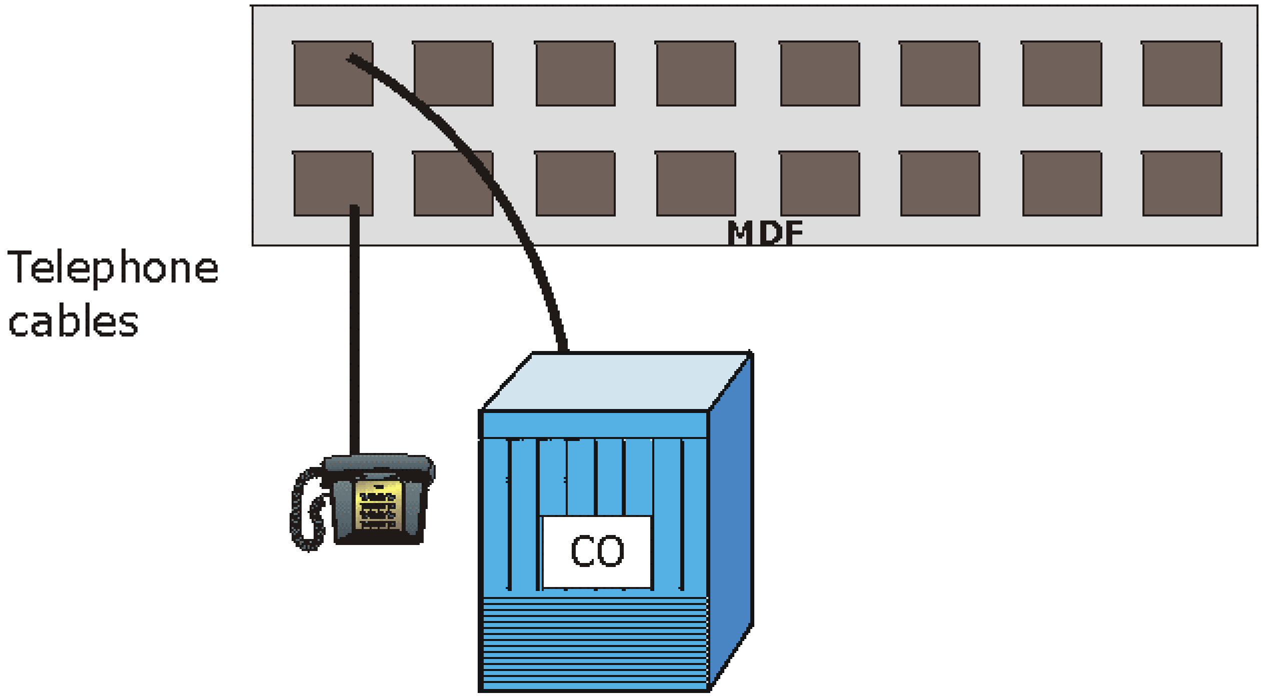


Figure 6-8 One MDF for End-user and CO Connections

Please refer to the following figure for the connection schema.

- MDF 1 is the original MDF used for telephone connections only.
- MDF 2 is used for telephone connections only.
- MDF 3 is for ADSL service connections.

Change the wiring (in the following figure) from MDF 1 to MDF 3 for telephone subscribers who want ADSL service.

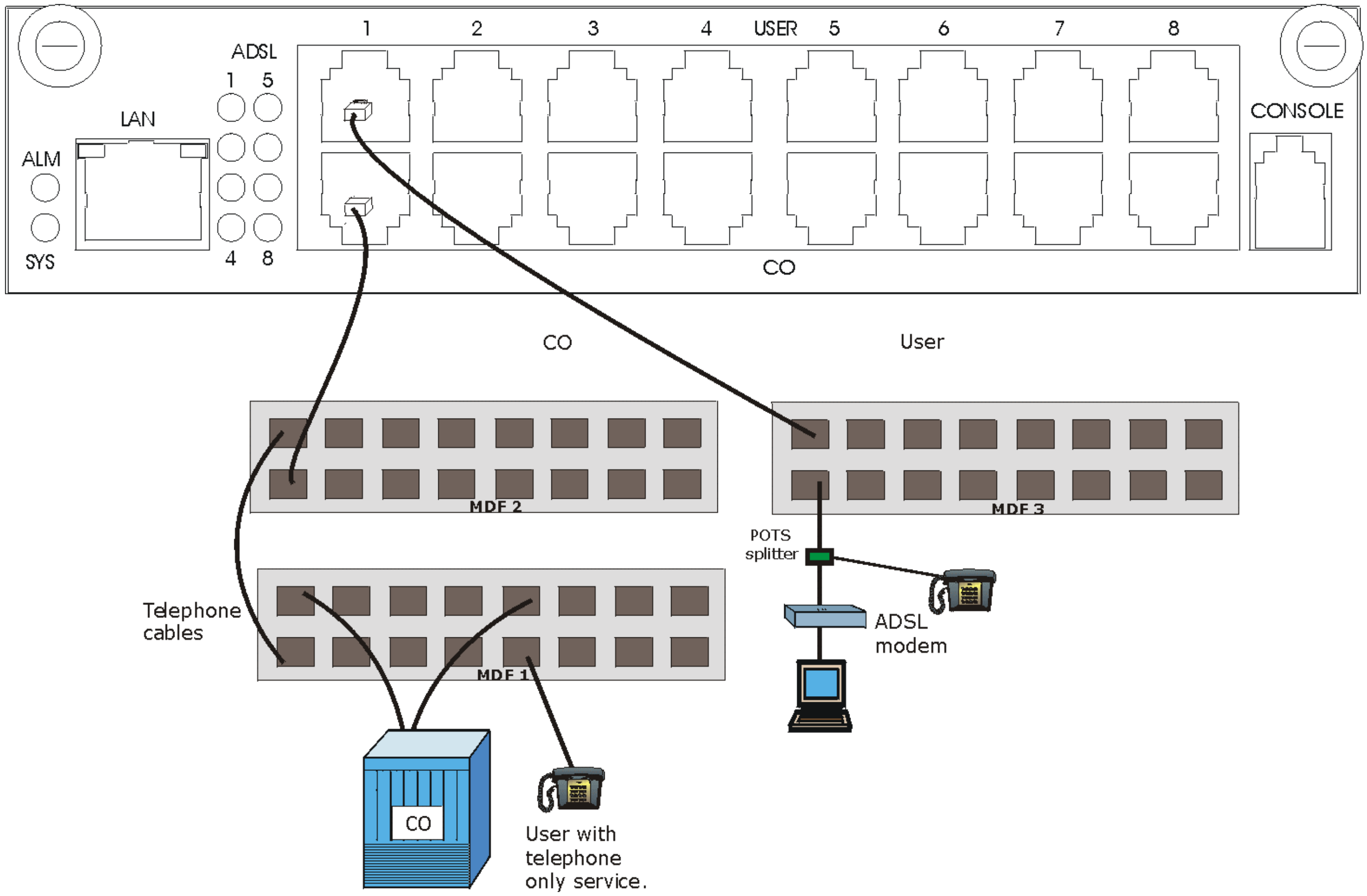


Figure 6-9 Installation Scenario B

Procedure To Connect To MDFs

Step 1. Acquire two additional MDFs (MDFs 2 and 3).

Step 2. Connect the RJ-11 connector ends of telephone wires you want for ADSL service to the **USER** ports on the AAM1008.

Step 3. Connect the other ends of the telephone wires to the upper ports of MDF 3 using a punch-down tool.

Step 4. Connect the telephone wiring from the end-user's ADSL modem(s) to the lower ports of MDF 3.

Step 5. Connect the RJ-11 connector ends of telephone wires you want for phone service to the AAM1008 ports labeled **CO**.

Step 6. Connect the other ends of the telephone wires to the lower ports of MDF 2 using a punch-down tool.

Step 7. Connect the upper ports of MDF 2 to the lower ports of MDF 1 using regular telephone wires.

Step 8. Connect the upper ports of MDF 1 to the telephone company.

Step 9. Telephone subscribers only (that is, non-ADSL subscribers) retain connections to the lower ports of MDF 1.

Step 10. Change the wiring from MDF 1 to MDF 3 for telephone subscribers who want ADSL service.

6.4.4 Installation Scenario C

Phone service is also available but there are two MDFs; one for end-user telephone line connections and the other one for CO telephone line connections (see the following figure).

Users A and B have telephone (only) service.

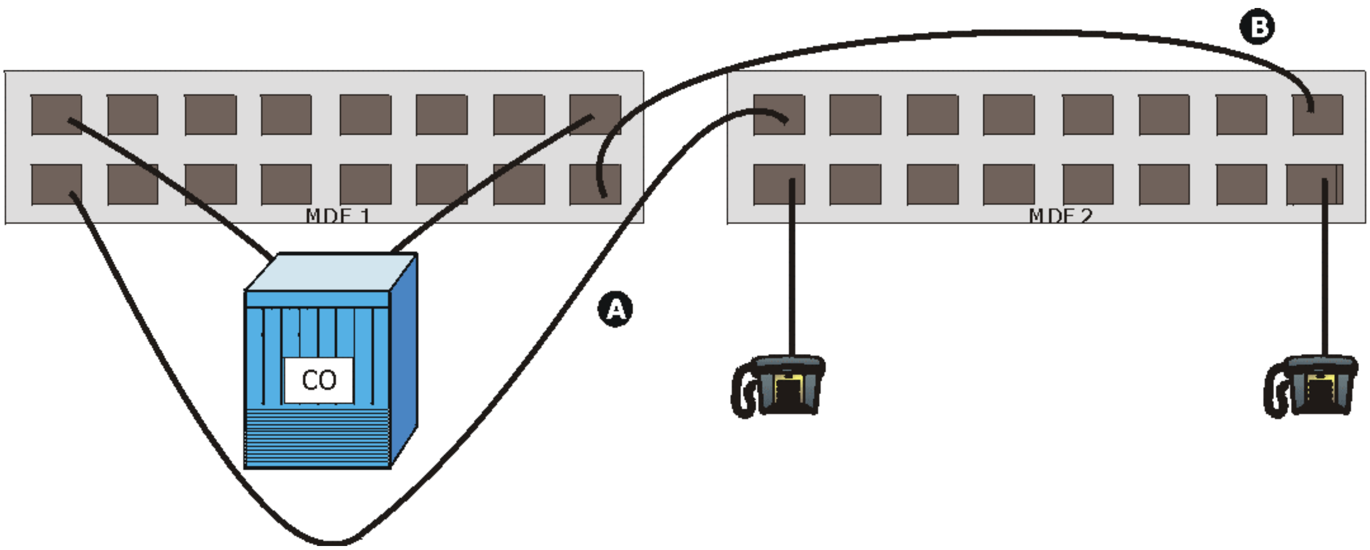


Figure 6-10 Two Separate MDFs for End-user and CO Connections

Please refer to the following figure for the ADSL connection schema.

- MDFs 1 and 2 are the two original MDFs.
- MDFs 3 and 4 are two additional MDFs you need.

User A still has telephone service only. User B now has ADSL service also (see the following figure).

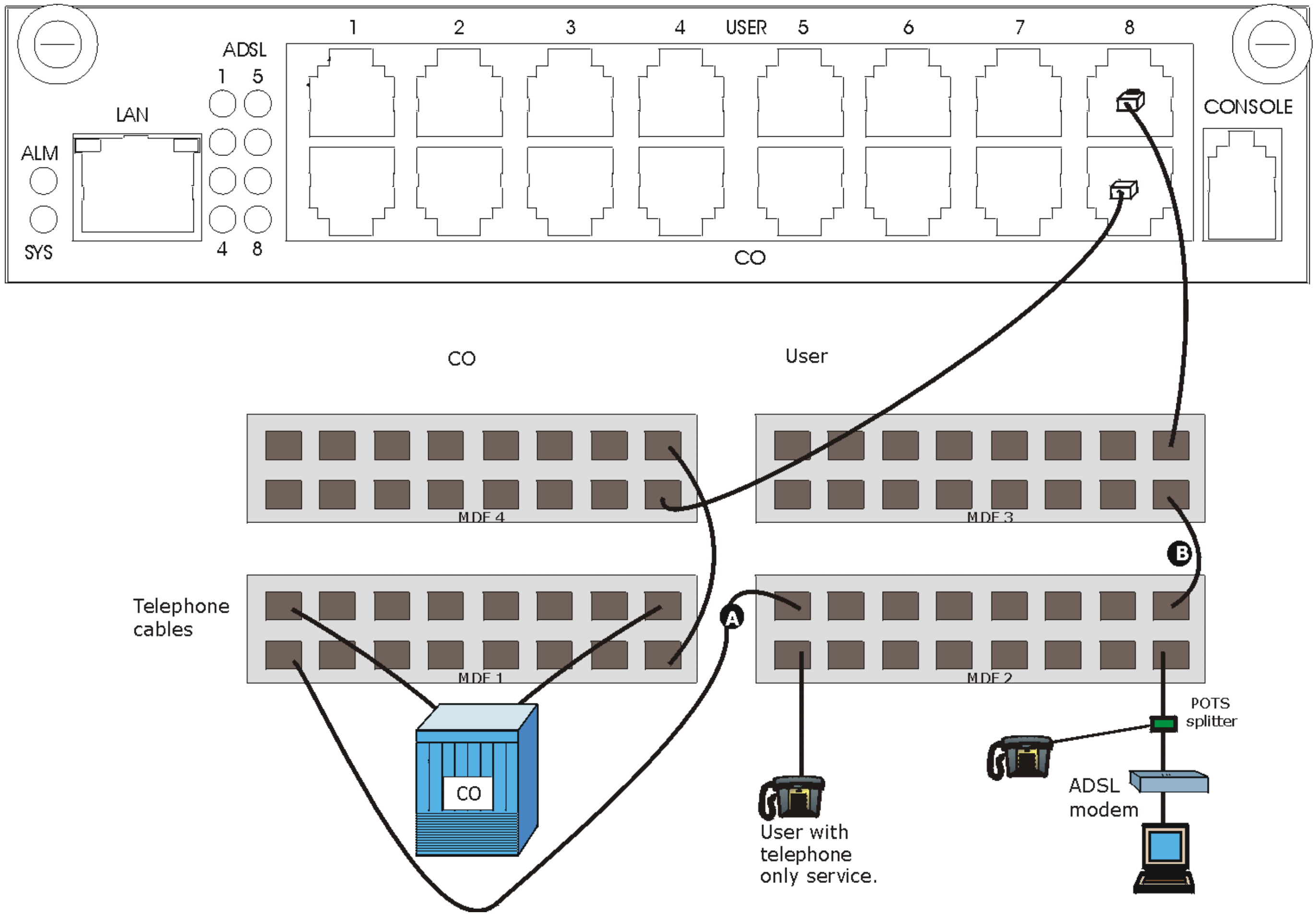


Figure 6-11 Installation Scenario C

Procedure To Connect To MDFs

Step 1. Acquire two additional MDFs (3 and 4).

Step 2. Connect the RJ-11 connector ends of telephone wires you want for ADSL service to the **USER** ports on the AAM1008.

Step 3. Connect the other ends of the telephone wires to the upper ports of MDF 3 using a punch-down tool.

Step 4. Connect the lower ports of MDF 3 to the upper ports of MDF 2 for those users that want ADSL service. (Users who want telephone service only, retain the original connection from the top port of MDF 2 to the bottom port of MDF 1.)

Step 5. Connect the telephone wiring from the end-user's ADSL equipment to the lower ports of MDF 2.

Step 6. Connect the RJ-11 connector ends of telephone wires you want for voice service to the AAM1008's **CO** ports.

Step 7. Connect the other ends of the telephone wires to the lower ports of MDF 4 using a punch-down tool.

Step 8. Connect the top ports of MDF 4 to the bottom ports of MDF 1 using regular telephone wires.

Connect the top ports of MDF 1 to the telephone company.

6.4.5 LAN Port (Ethernet) Connection

Connect the LAN port of your SAM1008 to an Ethernet WAN switch using a straight-through Category 5 UTP (Unshielded Twisted Pair) cable with RJ-45 connectors. Connect the other end of the cable to an Ethernet switch.

You may stack multiple IES-1000 units up to the number of ports available on the Ethernet switch as shown next.

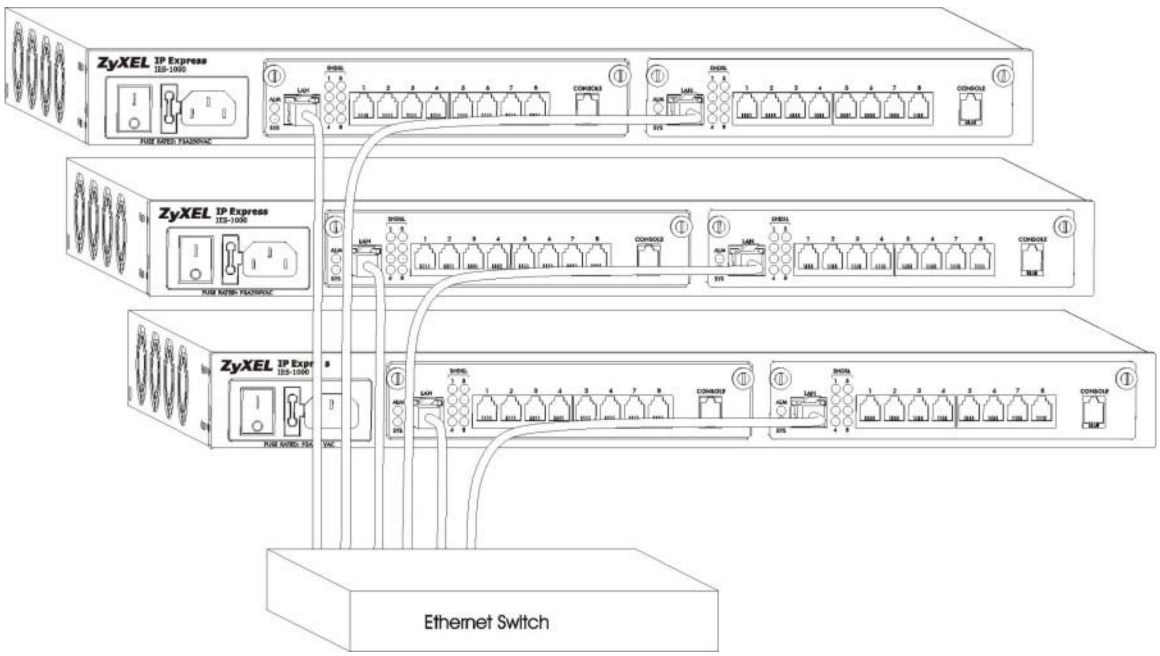


Figure 6-12 Stacking Multiple IES-1000 Units

6.5 AC Power Model Power Connection

Connect the female end of the power cord to the power socket on the front panel of your IES-1000 (to the right of the fuse housing) as shown next. Connect the other end of the cord to a power outlet. Make sure that no objects obstruct the airflow of the fans (located on the side of the unit).

Make sure you use a 100-240VAC/1A, 50/60Hz power source.

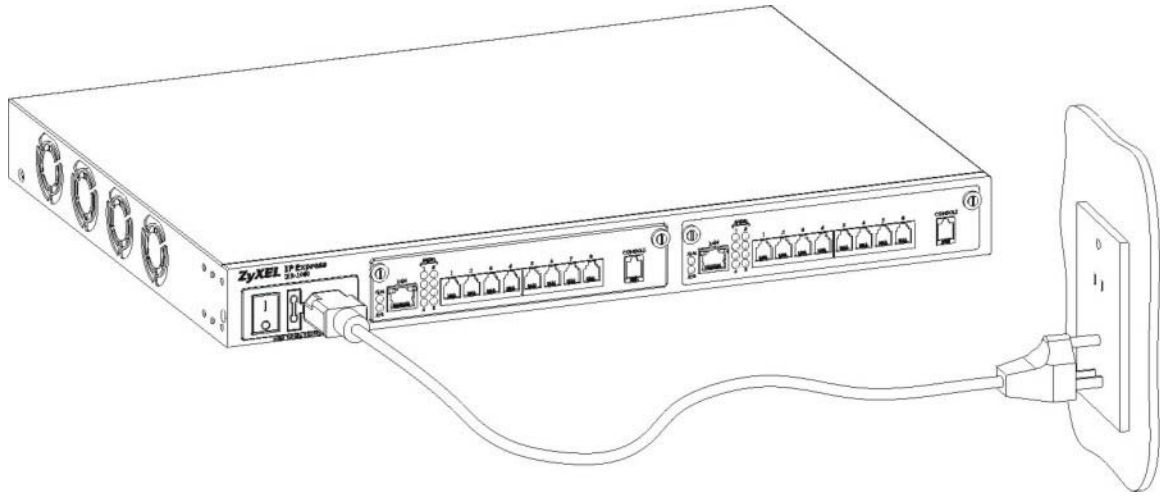


Figure 6-13 Connecting the Power Cord to the IES-1000 and a Power Source

6.6 DC Power Model Power Connections

Use the following procedures to connect the IES-1000 to a power source after you have installed the IES-1000 in a rack.

Refer to power supply requirements in the hardware specifications in the appendices and make sure you are using an appropriate power source.

Observe the following before you start:

- Refer to the *Hardware Specifications* appendix for the gauge of wire to use for the IES-1000 power connections.
- Keep the IES-1000 power switch in the off position until you come to procedure for turning on the power.
- Keep the power supply switch in the off position until you come to procedure for turning on the power.

Use only power wires of the required diameter for connecting the IES-1000 to a power supply (refer to the hardware specifications in the appendices for the required wire diameter).

The IES-1000 power connections are at the left end of the front panel of the IES-1000 chassis.

6.6.1 Procedure to Connect the Power

When installing the IES-1000 power wire, push the wire firmly into the terminal as deep as possible and make sure that no exposed (bare) wire can be seen or touched.

Step 1. Connect one end of a power wire to the **–48V** power terminal on the front panel of your IES-1000 and tighten the terminal screw.

Step 2. Connect the other end of the power wire to the –48V terminal on the power supply.

Step 3. Repeat the previous step for the terminal labeled **RTN**.

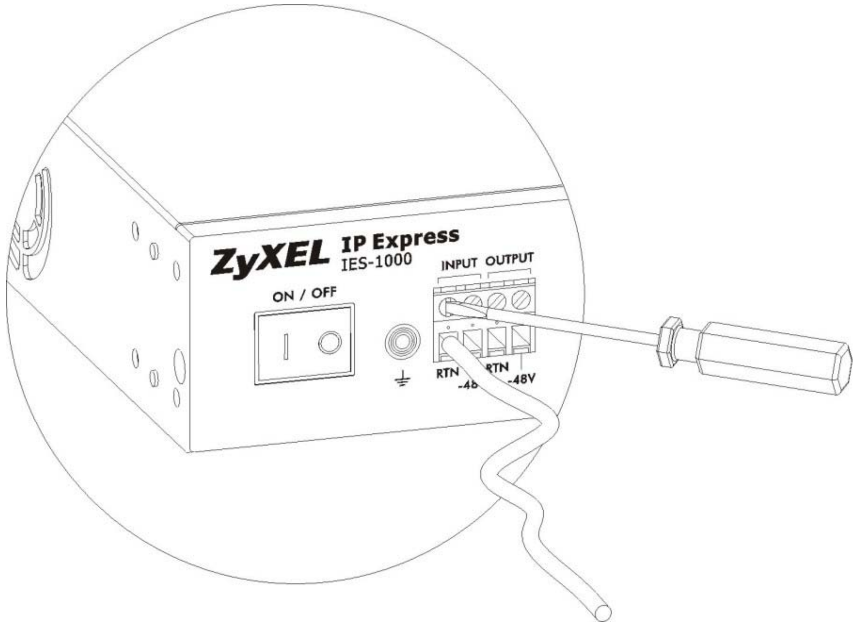


Figure 6-14 Connecting IES-1000 Power

Chapter 7
Turning On the IES-1000

This chapter discusses the fans and LEDs of the IES-1000 after you turn it on.

7.1 Introduction

Before turning on your IES-1000, make sure you:

- Have attached a computer to the IES-1000 serial port as explained previously.
- Can see the status LEDs on the front panel.

Push the power switch (located at the front of the IES-1000) to the ON or "|" position. You may also need to turn on the power supply. The IES-1000 will automatically run a self-test that takes approximately 20 seconds. The SYS LED will remain on if your IES-1000 has started normally.

If the SYS LED does not turn on then recheck your connections or refer to the *Hardware Troubleshooting* chapter.

Make sure you can feel and/or hear the fans working — working fans emit a low buzz and blow air. The fans are located on the IES-1000 as shown next. Refer to the *Hardware Troubleshooting* chapter to test the fans if they are not working.

See the next section to interpret the operational status of your IES-1000.

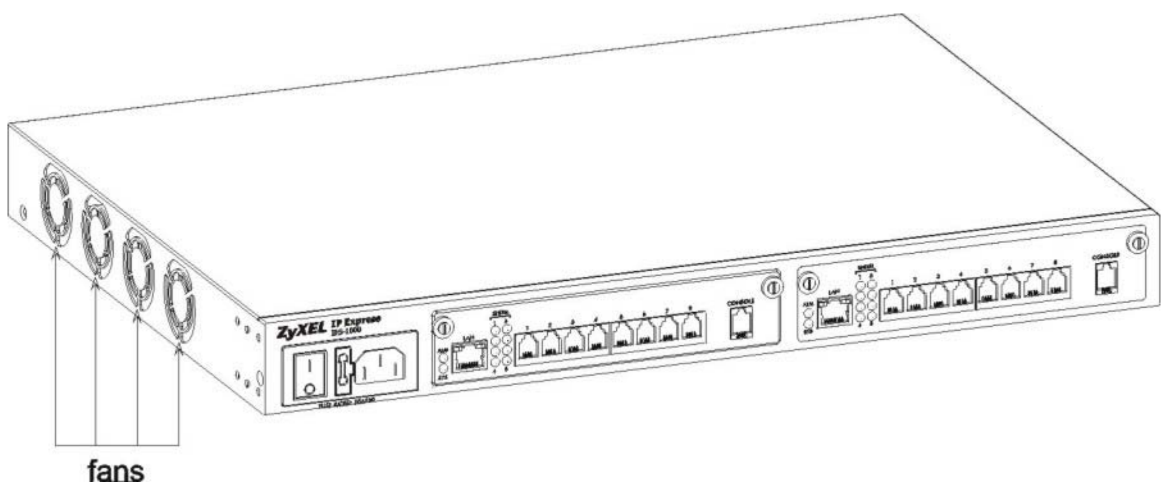


Figure 7-1 Location of the IES-1000 Fans

7.2 Network Module Front Panel LEDs

The following figures show the front panels of the network modules. LEDs describe the operational status of your network module. Please also refer to the *Hardware Troubleshooting* chapter to see how LEDs may aid in troubleshooting.

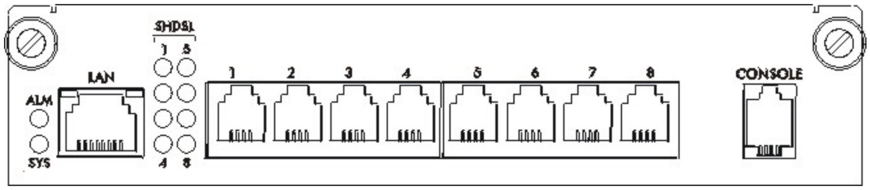


Figure 7-2 SAM1008 Front Panel LEDs

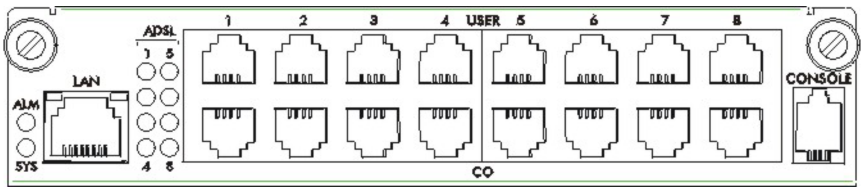


Figure 7-3 AAM1008 Front Panel LEDs

Table 7-1 Network Module LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
ALM	Red	On	The module has overheated.
		Off	The module is functioning within normal temperature parameters.
SYS	Green	Blinking	The system is initializing.
		On	The module is on and functioning properly.
		Off	The system is not receiving power, is not ready or has a malfunction.
SHDSL (1-8) or ADSL (1-8)	Green	On	The DSL link is up.
		Off	The DSL link is down.
LAN	Green	Blinking	The system is transmitting/receiving to/from a 10 Mbps Ethernet network.
		On	The link to a 10 Mbps Ethernet network is up.
		Off	The link to a 10 Mbps Ethernet network is down.
	Yellow	Blinking	The system is transmitting/receiving to/from a 100 Mbps Ethernet network.
		On	The link to a 100 Mbps Ethernet network is up.
		Off	The link to a 100 Mbps Ethernet network is down.

Chapter 8
Hardware Troubleshooting

This chapter explains how to troubleshoot IES-1000 hardware.

8.1 System Startup

When you turn on the IES-1000, it automatically runs a self-test that takes approximately 20 seconds. The SYS LED will remain on if your IES-1000 has started normally.

8.1.1 The SYS LED Does Not Turn On

Table 8-1 SYS LED Troubleshooting

STEP	CORRECTIVE ACTION
1	With the AC power model, make sure the power cord is properly connecting the IES-1000's power socket to an appropriate power outlet. Refer to the *Hardware Specifications appendix* to make sure you are using the correct power source. With the DC power model, make sure the power wires are properly connecting the IES-1000's power terminal to an appropriate power supply and the power supply is operating normally. Refer to the *Hardware Specifications appendix* to make sure you are using the correct power supply.
2	Make sure the network module is properly installed in the IES-1000 (refer to the *Hardware Installation* chapter).
3	With the AC power model, make sure the fuse is not burnt-out. Replace the fuse if it is burnt out (refer to the *Removing and Installing a Fuse appendix)*.
4	The LED itself or the unit may be faulty; contact your vendor.

8.2 The ALM LED Is On

The ALM (alarm) lights when the IES-1000 is overheated and/or the fans are not working properly and/or voltage readings are outside the tolerance levels.

Table 8-2 ALM LED Troubleshooting

STEP	CORRECTIVE ACTION
1	Make sure you can feel and/or hear the fans working - working fans emit a low buzz and blow air. If the fans are not working properly, make sure the power connector is connected properly. Contact your vendor if the fans do not work. Do not remove fans from the IES-1000. Only a qualified distributor should remove or repair fans.

8.3 The SHDSL LED(s) Do Not Turn On

The SHDSL LEDs show the operational status of SHDSL port connections. If the SHDSL LED is off, it means the link to the SHDSL modem/router is down or there is not a connection to the SHDSL port.

Table 8-3 SHDSL LED Troubleshooting

STEP	CORRECTIVE ACTION
1	Ensure that all hardware connections are correctly installed (including the modem/router on the subscriber's side) and that all devices are turned on.
2	Make sure the SAM1008 SHDSL port is enabled (refer to the web configurator edit port setup screens). The SHDSL ports are disabled by default.
3	Check the SHDSL line pin assignments shown in the *Pin Assignments appendix*.
4	Check the telephone wire connections between the G.SHDSL modem/router and the MDF(s).
5	Check the telephone wire and connections between the MDF(s) and ADSL port(s).
6	Check the telephone wire mapping on the MDF(s).
7	Make sure the in-house wiring works and is connected properly.
8	Make sure the line speed is consistent between the IES-1000 side and the CPE (Customer Premise Equipment) side.
9	If your line quality is low, you may need to select a slower line speed for both the IES-1000 and CPE sides. Refer to the *User's Guide*.
10	Repeat the steps above using a different SHDSL port.

8.4 The ADSL LED(s) Do Not Turn On

The ADSL LEDs show the operational status of ADSL port connections. If the ADSL LED is off, it means the link to the ADSL modem/router is down or there is not a connection to the ADSL port.

Table 8-4 ADSL LED Troubleshooting

STEP	CORRECTIVE ACTION
1	Ensure that all hardware connections are correctly installed (including the modem/router on the subscriber's side) and that all devices are turned on.
2	Make sure the AAM1008 ADSL port is enabled (refer to the *User's Guide* or *Quick Start Guide*). The ADSL ports are disabled by default.
3	Check the ADSL line pin assignments shown in the *Pin Assignments appendix*.
4	Check the telephone wire connections between the ADSL modem/router and the MDF(s).
5	Check the telephone wire and connections between the MDF(s) and ADSL port(s).
6	Check the telephone wire mapping on the MDF(s).
7	Make sure the in-house wiring works and is connected properly.
8	Make sure the upstream and downstream line rates are consistent between the IES-1000 side and the CPE (Customer Premise Equipment) side.
9	If your line quality is low, you may need to select slower upstream and downstream line rates for both the IES-1000 and CPE sides. Refer to the *User's Guide*.

Table 8-4 ADSL LED Troubleshooting

STEP	CORRECTIVE ACTION
10	Repeat the steps above using a different ADSL port.

8.5 The LAN LED(s) Do Not Turn On

Table 8-5 LAN LED Troubleshooting

STEP	CORRECTIVE ACTION
1	Make sure the LAN port of your network module is connected to an Ethernet WAN switch with a straight-through Category 5 UTP (Unshielded Twisted Pair) cable with RJ-45 connectors.
2	The factory default settings for the LAN (Ethernet) port of the network module are: ➢ Speed: Auto ➢ Duplex: Auto ➢ Flow control: Auto If the IES-1000's auto-negotiation is turned off, an Ethernet port uses the pre-configured speed and duplex mode when making a connection, thus requiring you to make sure that the settings of the WAN switch Ethernet port are in the same order to connect.

8.6 There Is No Voice on an ADSL Connection

The AAM1008 has internal POTS (Plain Old Telephone Service) splitters and CO side RJ-11 ports that allow the telephone wiring used for ADSL connections to also simultaneously carry normal voice conversations.

Table 8-6 ADSL Voice Troubleshooting

STEP	CORRECTIVE ACTION
1	Make sure the subscriber has a POTS splitter properly installed.
2	Check the ADSL line pin assignments shown in the *Pin Assignments appendix*.
3	Check the telephone wire connections between the subscriber and the MDF(s).
4	Check the telephone wire and connections between the MDF(s) and **USER** port(s).
5	Check the telephone wire and connections between the MDF(s) and the **CO** port(s). Check the connection from the MDF(s) to the telephone company or the PBX.
6	Check the telephone wire mapping on the MDF(s).
7	Make sure the in-house wiring works and is connected properly.
8	Repeat the steps above using a different ADSL port.

8.7 Testing Wiring

Use the following tests if there is no voice.

Systematically test wiring using a functioning telephone to determine if there is a wiring problem. If the connection is good, the telephone will return a dial tone. Letters in the figure shown next indicate the systematic tests to be done. Suppose you're using installation scenario "B" as shown in the chapter on MDF connections. The logic for other scenarios should be similar.

Use steps A-D if there is no voice but you can transmit data. Use all of the steps if there is no voice and you cannot transmit data.

A. Test A determines if there is a wiring problem between the TELCO (telephone company) and MDF 1.
B. Test B determines if there is a wiring problem between MDF 1 and MDF 2.
C. Test C determines if there is a wiring problem between MDF 2 and your device.
D. Test D determines if there is a problem with your device's internal splitter.
E. Test E determines if there is a wiring problem between your device and MDF 3.
F. Test F determines if there is a building-wiring problem between the subscriber's wall jack and MDF 3.

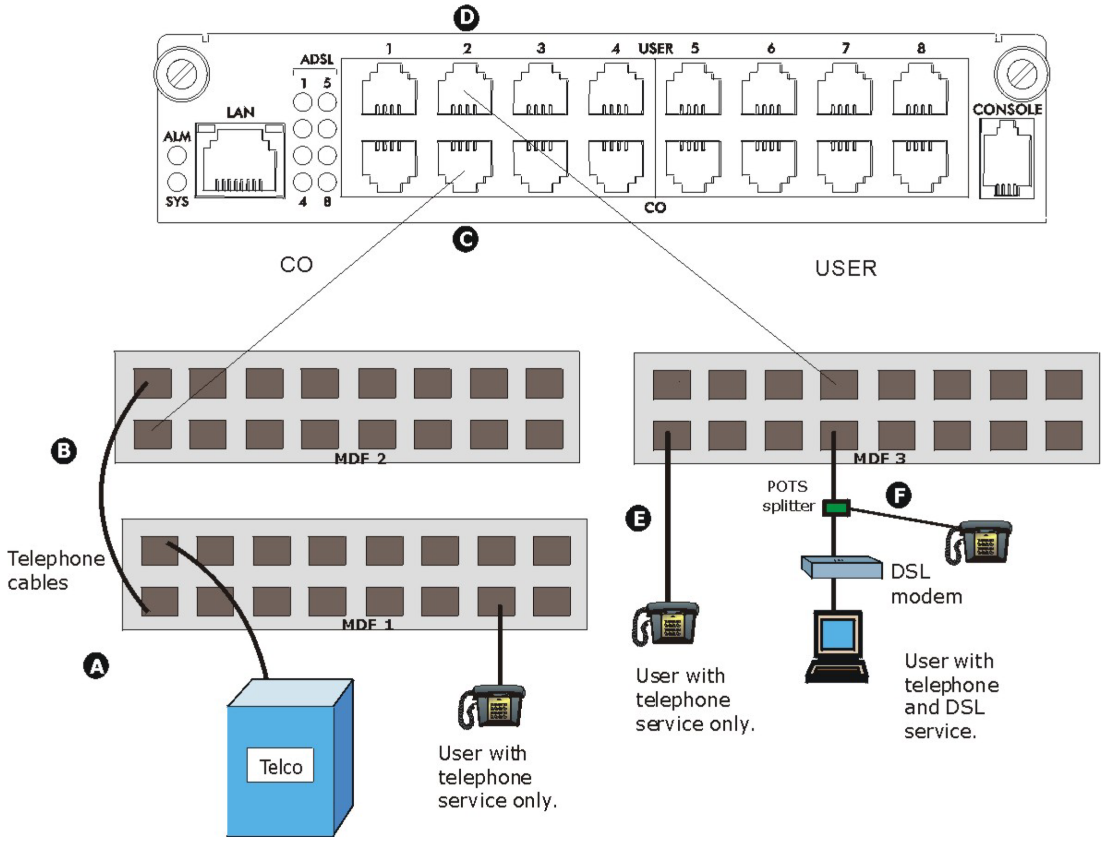


Figure 8-1 Testing In-house Wiring

Table 8-7 Testing In-house Wiring

STEP	TEST
A	Connect a standard telephone to MDF 1. If there is no dial tone, then a problem with the wire or wire connections between MDF 1 and the TELCO exists. Contact your telephone company for troubleshooting.
B	Connect a telephone to the upper port of MDF 2. If there is no dial tone, then the problem is between MDF 1 and MDF 2. Check the telephone wire and connections between MDFs 1 and 2.

Table 8-7 Testing In-house Wiring

STEP	TEST
C	Disconnect the telephone wire from **CO**. Connect a telephone to the telephone wire. If there is no dial tone, then the problem is between your device and MDF 2. Check the telephone wire's pin assignments (refer to the appendices for the proper pin assignments). Replace the telephone wire if the pin assignments are OK and there is still no dial tone.
D	Reconnect the telephone wire to **CO**. Disconnect the telephone wire from **USER**. Connect a telephone to **USER** (refer to the appendices for the proper pin assignments). If there is no dial tone, your device's internal splitter may be faulty, contact your vendor.
E	Reconnect the telephone wire to **USER**. Connect a telephone to a lower port of MDF 3. If there is no dial tone, then the problem is between your device and MDF 3. Check the pin assignments of the telephone wire's connector that connects to **USER**. Replace the telephone wire connecting your device to MDF 3. If there is no dial tone, then MDF 3 may be faulty. Contact the telephone company if that is the case.
F	Disconnect the DSL modem from the wall jack and connect the telephone to the wall jack. If there is no dial tone, then there is a problem with the building wiring between the DSL subscriber's home and the MDF. Contact your telephone company for troubleshooting.

Part III:

Getting Started

This part tells how to access and navigate the web configurator. It also describes the Getting Started web configurator screens.

Chapter 9
Web Configurator Access and Navigation

This chapter describes how to log into the web configurator and navigate through it.

9.1 Web Configurator Overview

The embedded web configurator allows you to manage the switch from anywhere on the network through a browser such as Microsoft Internet Explorer or Netscape Navigator (use Internet Explorer 5.5 and later or Netscape Navigator 6 and later versions).

9.2 Accessing the Web Configurator

Use the following instructions to log on to the web configurator.

9.2.1 Password Screen

Step 1. Start your web browser.

Step 2. Type http:// and the IP address of the DSL module (for example, the default is 192.168.1.1) in the Location or Address field. Press **Enter**.

Step 3. The **Password** screen now appears. Type the user name (**admin**) and your password (default **1234**) in the respective fields.

Figure 9-1 Password Screen

Step 4. Click **OK**. The home page of the web configurator displays.

9.3 Home Screen

This is the web configurator home screen. Click a link on the navigation panel to go to the corresponding screen.

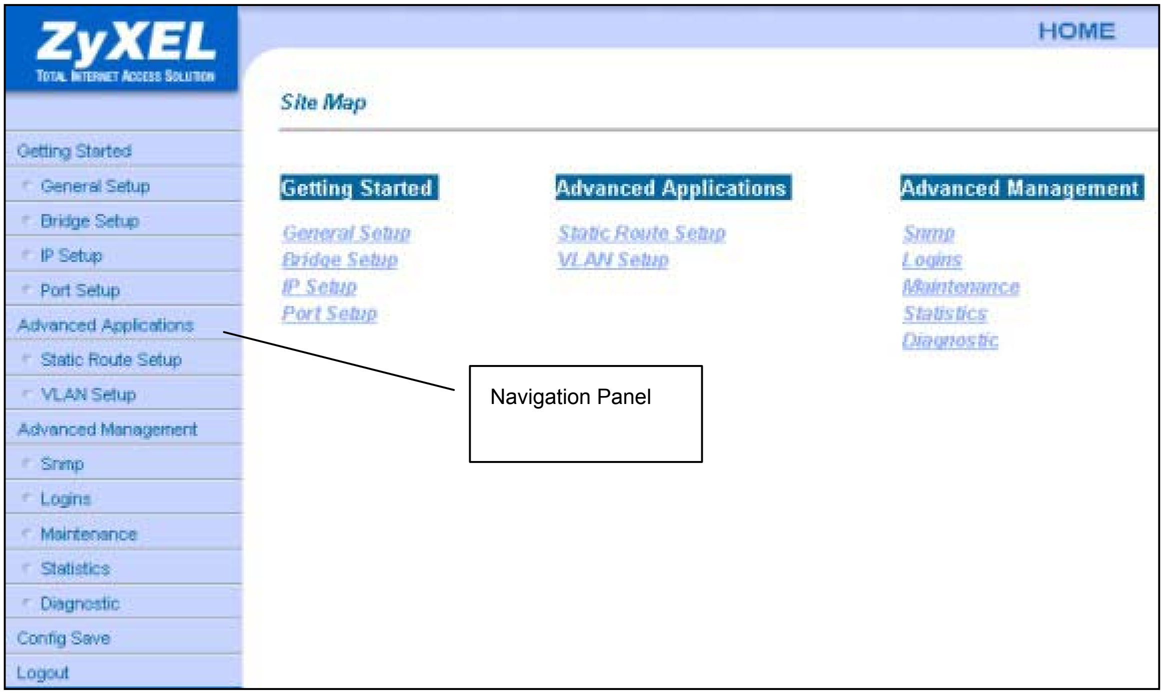


Figure 9-2 Home Screen

Table 9-1 Navigation Panel Links

LABEL	DESCRIPTION
Getting Started	
General Setup	This link takes you to a screen where you can configure general information about your device.
Bridge Setup	This link takes you to a screen where you can set up and configure your device's bridging and filtering features.
IP Setup	This link takes you to a screen where you can configure your device's IP address information.
Port Setup	This link takes you to a screen where you can configure settings for the individual ports on your device.
Advanced Applications	
Static Route Setup	This link takes you to a screen where you can configure static routes for the device.
VLAN Setup	This link takes you to a screen where you can configure VLANs for your device.
Advanced Management	
SNMP	This link takes you to a screen where you can set up SNMP related parameters.
Logins	This link takes you to a screen where you can change your password.
Maintenance	This link takes you to a screen where you can perform firmware maintenance.
Statistics	This link takes you to a screen where you can view statistical information about the status of your device.

Table 9-1 Navigation Panel Links

LABEL	DESCRIPTION
Diagnostic	This link takes you to a screen where you can view error logs and test the DSL connections.
Config Save	Click this link to save your changes to the device's non-volatile memory.
Logout	Use this to exit the web configurator.

9.4 Screens Overview

The following table lists the various web configurator screens.

Table 9-2 Web Configurator Screens

GETTING STARTED	ADVANCED APPLICATIONS	ADVANCED MANAGEMENT
General Setup	Static Route Setup	SNMP
Bridge Setup	Add Static Route	SNMP Access Entry Add
Bridge Packet Type Filter Setup	VLAN Static Entry Setup	Logins
Bridge Port Filter Setup	Edit VLAN Static Entry	Maintenance
Bridge MAC Filter Setup		Secured Client Setup
Bridge MAC Count Filter Setup		Firmware Upgrade
MAC Count Filter Edit		Restore Configuration
Bridge MAC Address Record		Backup Configuration
IGMP Snooping Record		Statistics
DHCP Relay Setup		Hardware Monitor
Add DHCP Server		Port Statistics
802.1X Setup		Channel Statistics
Edit 802.1X Setup		VLAN Status
Bridge Fast Mode VLAN ID Setup		Diagnostic
IP Setup		
Port Setup		
DSL Profile Setup		
Add/Edit DSL Profile		
Add G.SHDSL N-wire Group		
Add G.SHDSL Port Bonding		
Edit Port Setup		
Channel Setup		
VC Profile Setup		
Add/Edit VC Profile		
Add/Edit Channel Setup		

9.5 Saving Your Configuration

Click **Apply** in a configuration screen to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power. Click **Config Save** on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.

9.6 Navigating the Web Configurator

The web configurator uses multiple levels. Some features only require you to use one level. For example, to configure **General Setup**, click the link on the navigation panel to open the configuration screen.

Some features use more levels.

9.6.1 Web Configurator Navigation Example

Bridge Setup has screens that allow you to configure bridging and filtering features. For example, click **Bridge Setup** in the navigation panel to go to the general **Bridge Setup** screen (shown next).

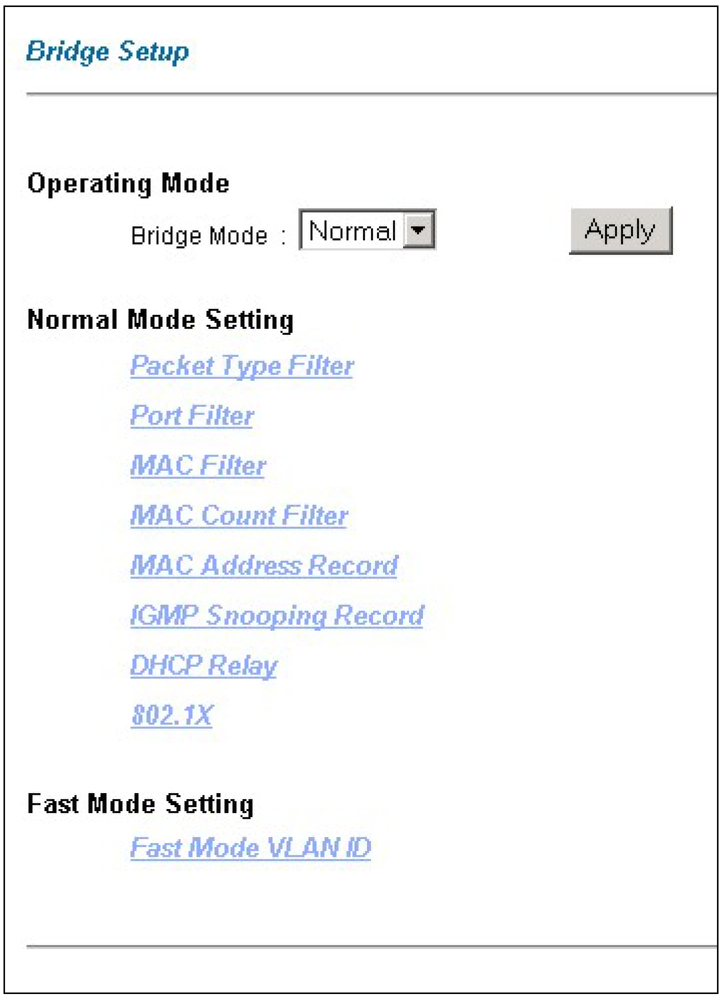


Figure 9-3 Bridge Setup Example

Click the **Packet Type Filter** to go down one level to the **Packet Type Filter Setup** screen (shown next).

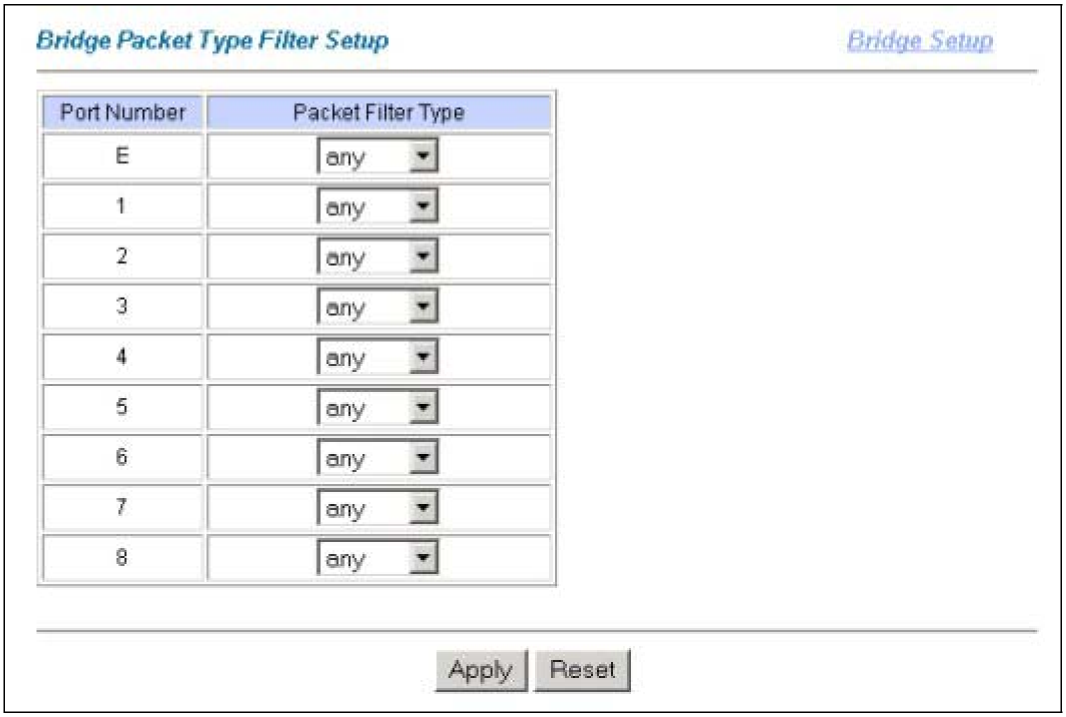


Figure 9-4 Bridge Packet Type Filter Setup Example

Click the link labeled **Bridge Setup** in the **Packet Type Filter Setup** screen to go back up a level and view the **Bridge Setup** screen.

Chapter 10
Getting Started Screens

This chapter explains the General Setup and Bridge Setup screens.

10.1 Getting Started Overview

The web configurator allows you to configure basic settings using the **Getting Started** screens.

10.2 General Setup Screen

Click **General Setup** in the navigation panel to open this screen.

Use this screen to set up general identification information for the IES-1000.

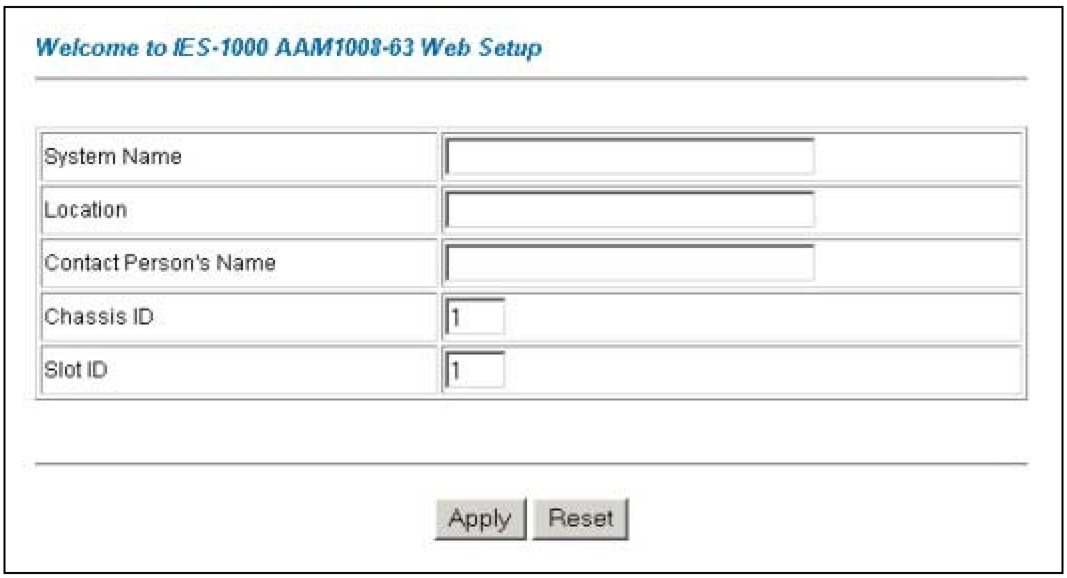


Figure 10-1 General Setup

The following table describes this screen.

Table 10-1 General Setup

LABEL	DESCRIPTION
System Name	Type a descriptive name for identification purposes. This name can be up to 31 alphanumeric characters long.
Location	Type the geographic location (up to 31 characters) of your IES-1000.
Contact Person's Name	Type the name (up to 31 characters) of the person in charge of this IES-1000.
Chassis ID	Type a chassis ID number from 1 to 64. The chassis ID helps to keep track of this individual unit in a multiple unit application.

Table 10-1 General Setup

LABEL	DESCRIPTION
Slot ID	Type 1 or 2 for the slot ID number. The slot ID helps keep track of this individual network module.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Cancel	Click **Cancel** to begin configuring this screen afresh.

10.3 Bridge Overview

The IES-1000 supports IEEE 802.1D transparent bridging, but not the static filtering feature or spanning tree protocol. The bridge learns the source MAC addresses of sender hosts by inspecting incoming Ethernet frames and recording the learned MAC addresses with their incoming port numbers into its filtering database. Based on the database, the bridge forwards each incoming frame to its destination port.

10.4 Bridge Setup Screen

Click **Bridge Setup** in the navigation panel to open this screen.

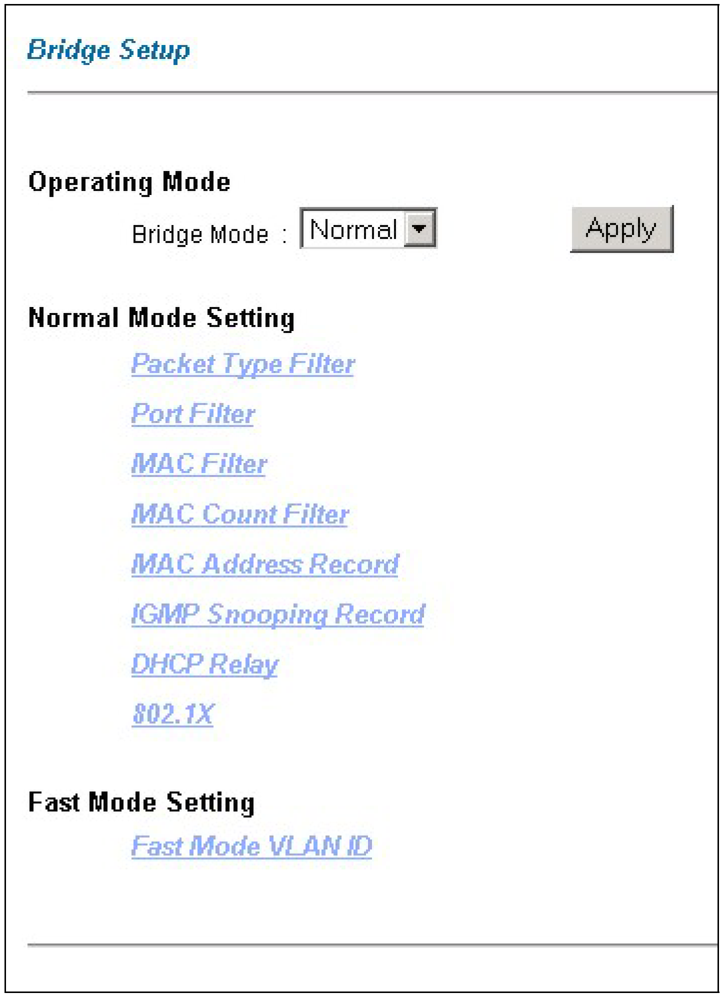


Figure 10-2 Bridge Setup

The following table describes this screen.

Table 10-2 Bridge Setup

LABEL	DESCRIPTION
Operating Mode	
Bridge Mode	Choose **Normal** or **Fast** from the drop-down list box. The **Normal** mode supports 802.1Q tagged VLAN (enabled in VLAN Setup), which allows tagged/untagged frames to and from all ports. The **Fast** mode allows tagged frames on the LAN port and untagged frames on the ADSL ports.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Normal Mode Setting	
Packet Type Filter	Click this link to go to a screen for editing the packet filter type for each port.
Port Filter	Click this link to go to a screen for editing each port's egress (outgoing) ports.
MAC Filter	Click this link to go to a screen for editing the MAC filtering for each port.

Table 10-2 Bridge Setup

LABEL	DESCRIPTION
MAC Count Filter	Click this link to go to a screen for setting limits on how many MAC addresses may be dynamically learned or statically configured on a port.
MAC Address Record	Click this link to show the filtering database for each port.
IGMP Snooping Record	Click this link to show received multicast membership information for each port.
DHCP Relay	Click this link to go to a screen where you can configure DHCP relay settings.
802.1X	Click this link to go to a screen where you can configure for IEEE 802.1X authentication.
Fast Mode Setting	
Fast Mode VLAN ID	Click this link to go to a screen for editing each port's VLAN ID (only in Fast Mode).

10.4.1 Packet Type Filter Setup Screen

Click **Packet Type Filter** in the **Bridge Setup** screen to open this screen.

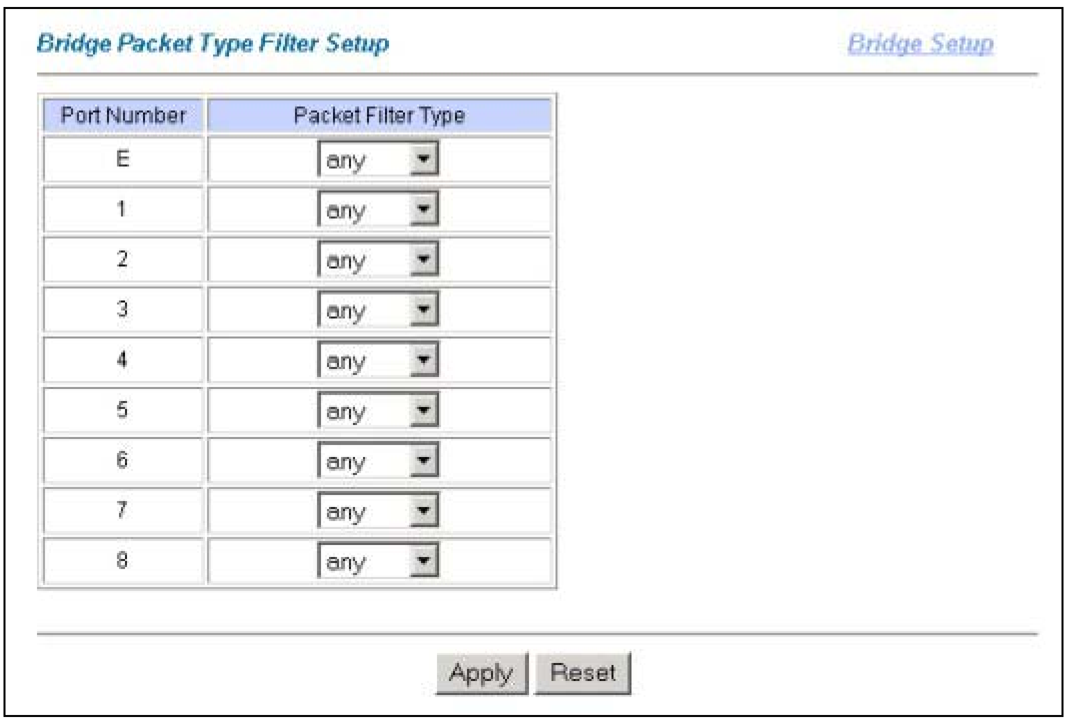


Figure 10-3 Bridge Packet Type Filter Setup

The following table describes this screen.

Table 10-3 Bridge Packet Type Filter Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Port Number	This field identifies the individual ports.

Table 10-3 Bridge Packet Type Filter Setup

LABEL	DESCRIPTION
Packet Filter Type	Choose **Any** or **IP** or **PPPoE** from the drop-down list. Choose **Any** to allow all kinds of packets, **IP** to allow IP packets only or **PPPoE** to allow PPPoE packets only.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

10.5 Port Filter (Port-based VLAN)

The IES-1000 port filter (or port-based VLAN) mechanism can be used to limit the broadcast domain to the members of a port filter group only. In this way, the port filter increases network performance by limiting broadcasts to a smaller and more manageable logical broadcast domain. In traditional switched environments, all broadcast frames go to each and every individual port.

The stations on a logical network belong to one group; however, a station can belong to more than one group. Subscribers of one group are not allowed to access the resources of other groups and a higher level of security is achieved. This isolates the subscribers from one another and prevents a subscriber from discovering the resources, for example, shared drives or printers, of another subscriber.

In the IES-1000 port filter, the allowable outgoing port(s) of each incoming port must be defined. Ethernet frames are forwarded according to these rules. Therefore, if you wish to allow two subscriber ports to talk to each other, for example, between conference rooms in a hotel, you must define the egress port (outgoing port) for both ports. An egress port is an outgoing port, that is, a port through which a data frame leaves. Port filters are specific only to the switch on which they were created.

The factory default settings for the port-based filter of the IES-1000 are:

- Bridge port 1 (Ethernet port) allowed to all bridge ports
- Bridge port 2 (DSL port 1) allowed to bridge port 1 (Ethernet port) only
- Bridge port 3 (DSL port 2) allowed to bridge port 1 (Ethernet port) only
- Bridge port 4 (DSL port 3) allowed to bridge port 1 (Ethernet port) only
- Bridge port 5 (DSL port 4) allowed to bridge port 1 (Ethernet port) only
- Bridge port 6 (DSL port 5) allowed to bridge port 1 (Ethernet port) only
- Bridge port 7 (DSL port 6) allowed to bridge port 1 (Ethernet port) only
- Bridge port 8 (DSL port 7) allowed to bridge port 1 (Ethernet port) only
- Bridge port 9 (DSL port 8) allowed to bridge port 1 (Ethernet port) only

The default port filter settings allow each DSL port to communicate back and forth with only the Ethernet port, and not with other DSL ports. The following figure illustrates this.

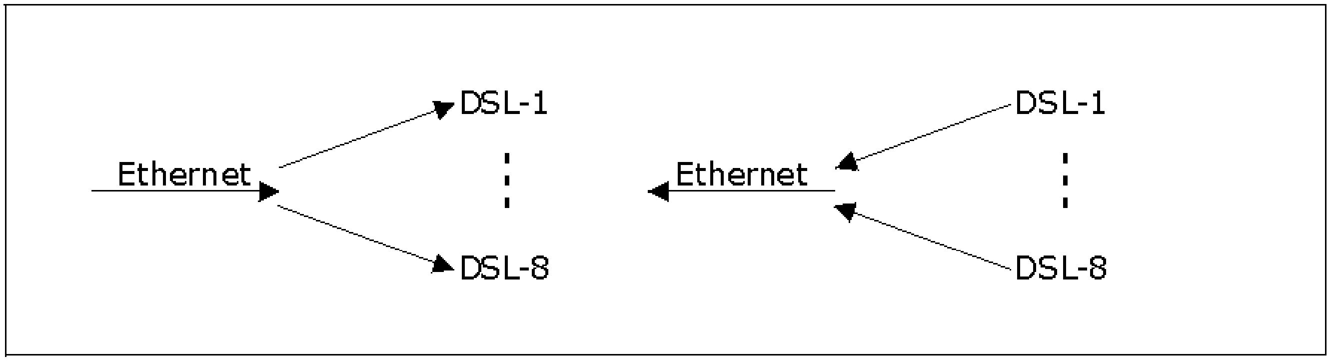


Figure 10-4 Default Port Filter Settings

10.5.1 Port Filter Setup Screen

Click **Port Filter** in the **Bridge Setup** screen to open this screen.

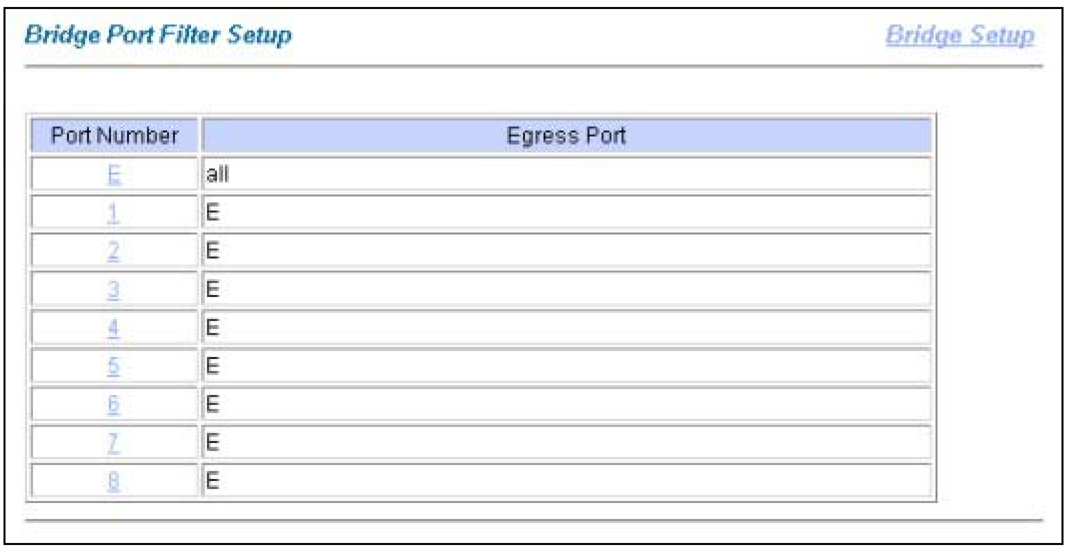


Figure 10-5 Bridge Port Filter Setup

The following table describes this screen.

Table 10-4 Bridge Port Filter Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Port Number	Click an entry to go to a screen to edit the egress ports for that port.
Egress Port	This field displays the forwarding ports for this port.

Edit Bridge Port Filter Setup Screen

Click a port link in the **Bridge Port Filter Setup** screen to open this screen.

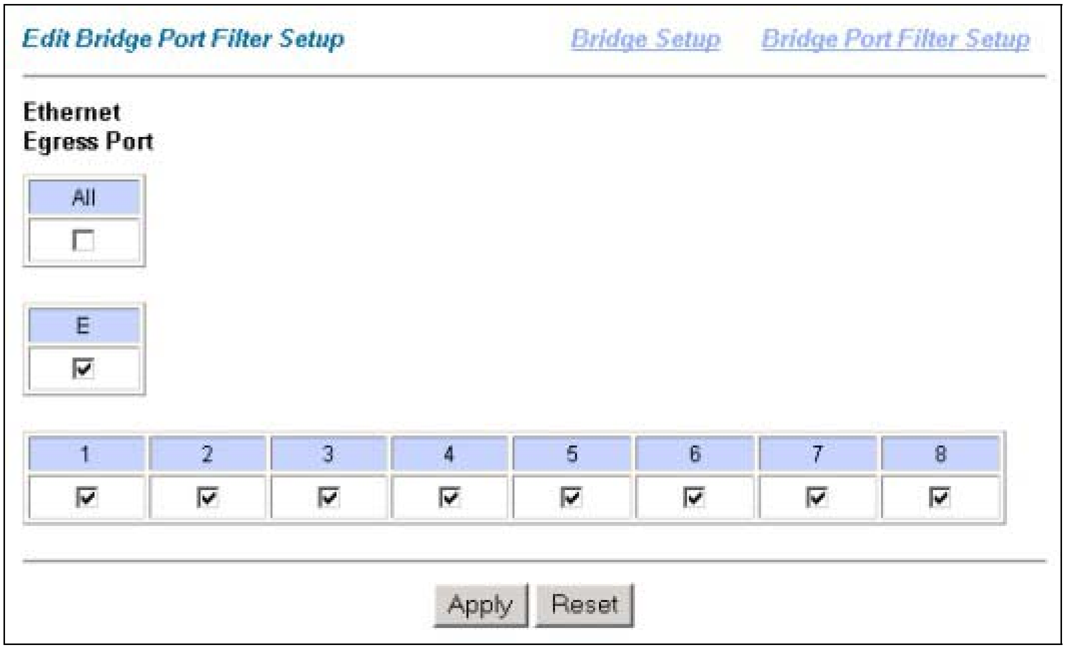


Figure 10-6 Edit Bridge Port Filter Setup

The following table describes this screen.

Table 10-5 Edit Bridge Port Filter Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Bridge Port Filter Setup	Click this link to go to the **Bridge Port Filter Setup** screen.
All	Select this check box to forward packets to all ports.
E	Select this check box to forward packets to the Ethernet port.
1-8	Select one or more of these check boxes in order to forward packets to specific DSL ports.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

10.5.2 MAC Filter Setup Screen

Click **MAC Filter Setup** in the **Bridge Setup** screen to open this screen.

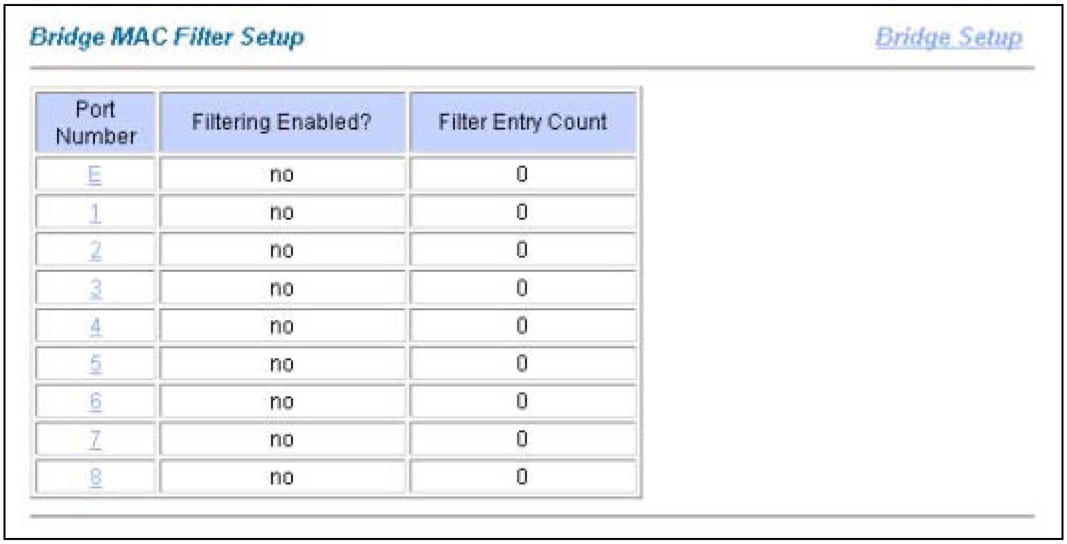


Figure 10-7 Bridge MAC Filter Setup

The following table describes this screen.

Table 10-6 Bridge MAC Filter Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Port Number	Click the port name to edit that port's MAC filter setup.
Filtering Enabled?	This field tells whether or not filtering has been enabled for that port.
Filter Entry Count	This field displays how many static MAC addresses are specified for the port.

Bridge MAC Filter Entry List Screen

Click on a port link in the **Bridge MAC Filter Setup** screen to open this screen.

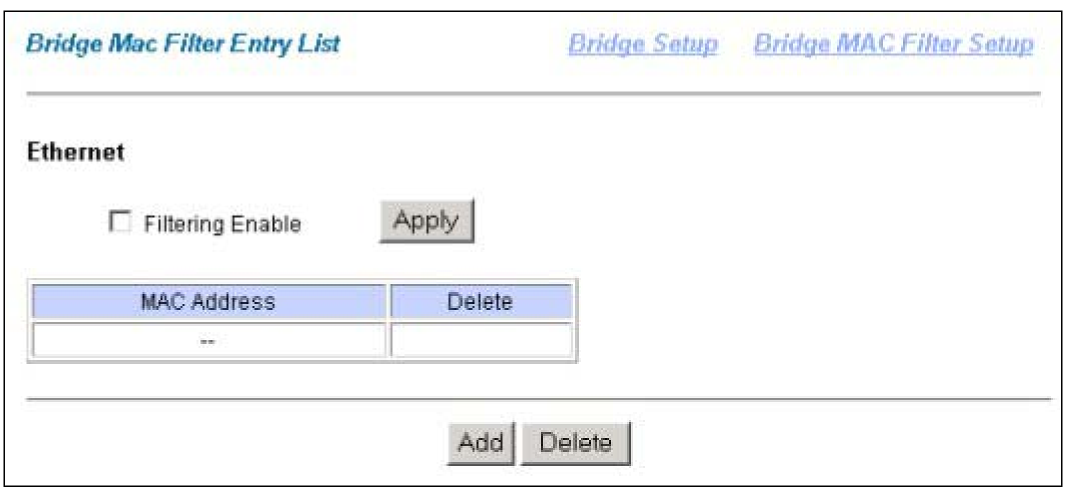


Figure 10-8 Bridge MAC Filter Entry List

The following table describes this screen.

Table 10-7 Bridge MAC Filter Entry List

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Bridge MAC Filter Setup	Click this link to go to the **Bridge MAC Filter Setup** screen.
Filtering Enable	Select this check box to enable MAC filtering on this port.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
MAC Address	This field lists the MAC addresses that are set for this port.
Add	Click this button to add the MAC address in the edit box to the list in the list box.
Delete	Select a MAC address in the list box and click this button to delete the MAC address from the list.

Bridge MAC Filter Entry Add Screen

Click **Add** in the **Bridge MAC Filter Setup** screen to open this screen.

Figure 10-9 Bridge MAC Filter Entry Add

The following table describes this screen.

Table 10-8 Bridge MAC Filter Entry Add

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Bridge MAC Filter Setup	Click this link to go to the **Bridge MAC Filter Setup** screen.
Bridge MAC Filter Entry List	Click this link to go to the **Bridge MAC Filter Entry List** screen.
Add MAC Address	Type a MAC address in hexadecimal notation (xx:xx:xx:xx:xx:xx, where x is a number from 0 to 9 or a letter from a to f) in this field. The MAC address cannot be a multicast or broadcast address. Then click **Apply**.

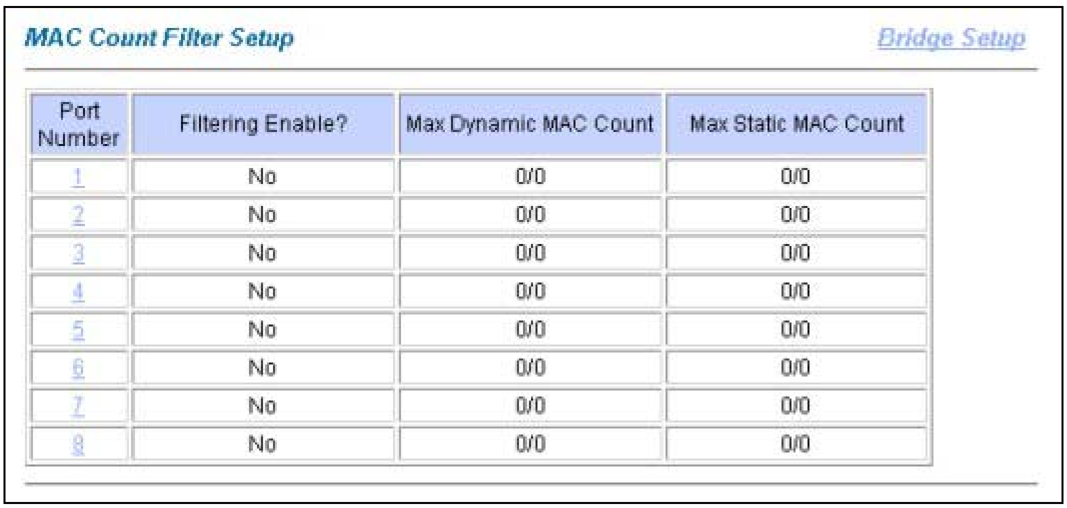
Table 10-8 Bridge MAC Filter Entry Add

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

10.5.3 MAC Count Filter Setup Screen

Click **MAC Count Filter** in the **Bridge Setup** screen to open this screen.

Use this screen to limit the number of MAC addresses that may be dynamically learned or statically configured on a DSL port.



MAC Count Filter Setup   Bridge Setup

Port Number	Filtering Enable?	Max Dynamic MAC Count	Max Static MAC Count
1	No	0/0	0/0
2	No	0/0	0/0
3	No	0/0	0/0
4	No	0/0	0/0
5	No	0/0	0/0
6	No	0/0	0/0
7	No	0/0	0/0
8	No	0/0	0/0

Figure 10-10 MAC Count Filter Setup

The following table describes the labels in this screen.

Table 10-9 MAC Count Filter Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Port Number	This field displays a DSL port number. Click an entry to go to a screen to edit the number of MAC addresses that may be learned on that port.
Filtering Enable?	This field tells whether or not MAC address count filtering has been enabled for that port.
Max Dynamic MAC Count	This field's first number displays how many dynamically learned MAC addresses are recorded for a port. This field's second number displays the limit of how many MAC addresses may be dynamically learned on the port.

Table 10-9 MAC Count Filter Setup

LABEL	DESCRIPTION
Max Static MAC Count	This field's first number displays how many MAC addresses are statically specified for a port. This field's second number displays the limit of how many MAC addresses may be statically specified on the port.

10.5.4 MAC Count Filter Edit Screen

Click port number in the **MAC Count Filter Setup** screen to open this screen.

Figure 10-11 MAC Count Filter Edit

Table 10-10 MAC Count Filter Edit

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
MAC Count Filter Setup	Click this link to go to the **MAC Count Filter Setup** screen.
Filtering Enable	Select this check box to enable MAC address count filtering on this port.
Max Dynamic MAC Count	Use this field to limit the number of MAC addresses that this port may dynamically learn. For example, if you are configuring port 2 and you set this field to "5", then only five devices with dynamically learned MAC addresses may access port 2 at any one time. A sixth device would have to wait until one of the five learned MAC addresses aged out. The MAC address aging out time can be set in the **Bridge MAC Address Record** screen (see *Figure 10-12*). The valid range is from "0" to "4096". "0" means this feature is disabled, so the switch will learn MAC addresses up to the limit of 4096.

Table 10-10 MAC Count Filter Edit

LABEL	DESCRIPTION
Max Static MAC Count	Use this field to limit the number of MAC addresses that may be statically specified for this port. For example, if you are configuring port 2 and you set this field to "5", then only five device MAC addresses may be statically configured on port 2 at any one time. The valid range is from "0" to "5". "0" means no MAC addresses may be statically specified for this port.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Cancel	Click **Cancel** to begin configuring this screen afresh.

10.5.5 Bridge MAC Address Record Screen

Click **MAC Address Record** in the **Bridge Setup** screen to open this screen.

This screen displays a list of the MAC addresses that have connected to each individual port on the network module. The listing includes MAC addresses and the connected time (measured in seconds) for each port.

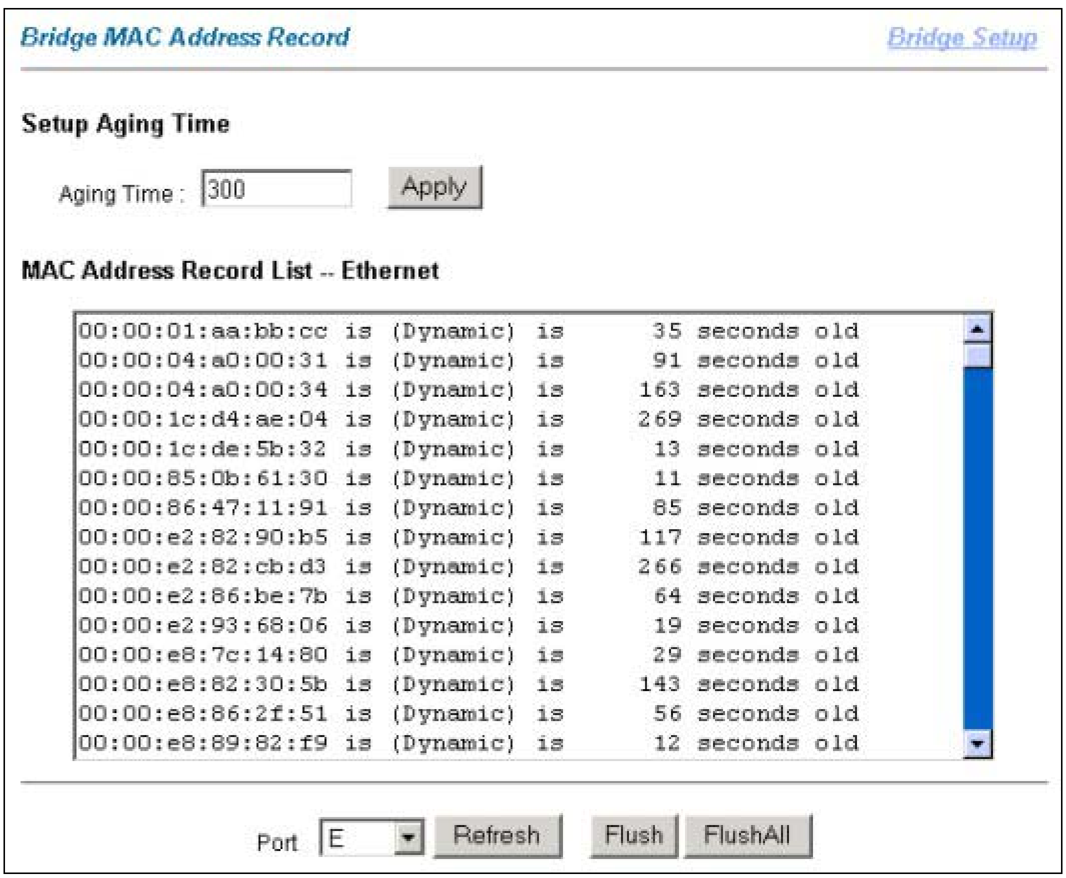


Figure 10-12 Bridge MAC Address Record

The following table describes this screen.

Table 10-11 Bridge MAC Address Record

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
Setup Aging Time	Enter a time from 10 to 1,000,000 seconds. This is how long all dynamically learned MAC addresses remain in the MAC address table before they age out (and must be relearned).
Port	Select a port from and click Refresh to display that port's MAC address listings.
Refresh	Click this button to update the MAC address listings.
Flush	Click this button to clear the MAC address listings for the specific port.
FlushAll	Click this button to clear the MAC address listings for all of the ports.

10.5.6 IGMP Snooping

Traditionally, IP packets are transmitted in one of either two ways - Unicast (one sender to one recipient) or Broadcast (one sender to everybody on the network). Multicast delivers IP packets to just a group of hosts on the network.

IGMP (Internet Group Multicast Protocol) is a network-layer protocol used to establish membership in a multicast group - it is not used to carry user data. Refer to *RFC 1112* and *RFC 2236* for information on IGMP versions 1 and 2 respectively.

A layer-2 switch can passively snoop on IGMP Query, Report and Leave (IGMP version 2) packets transferred between IP multicast routers/switches and IP multicast hosts to learn the IP multicast group membership. It checks IGMP packets passing through it, picks out the group registration information, and configures multicasting accordingly.

Without IGMP snooping, multicast traffic is treated in the same manner as broadcast traffic, that is, it is forwarded to all ports. With IGMP snooping, group multicast traffic is only forwarded to ports that are members of that group. IGMP Snooping generates no additional network traffic, allowing you to significantly reduce multicast traffic passing through your switch.

10.5.7 IGMP Snooping Record Screen

Click **IGMP Snooping Record** in the **Bridge Setup** screen to open this screen.

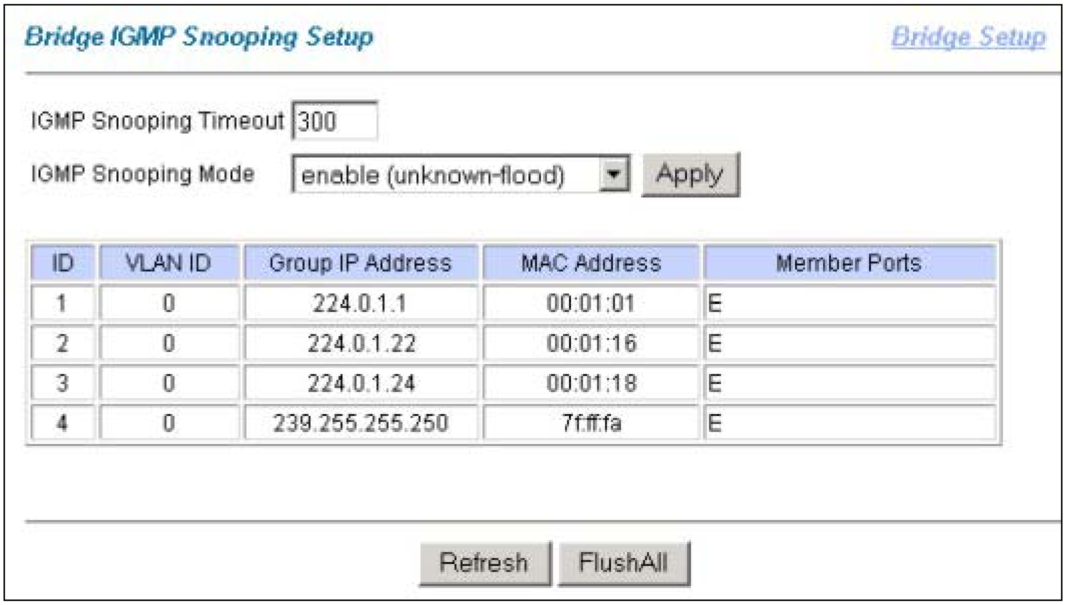


Figure 10-13 Bridge IGMP Snooping Record

The following table describes this screen.

Table 10-12 Bridge IGMP Snooping Record

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
IGMP Snooping Timeout	Specify how long the IES-1000 is to retain entries in the group membership table.
IGMP Snooping Mode	Select **enable (unknown-flood)** to have the IES-1000 only forward group multicast traffic to ports that are members. IGMP packets for multicast groups that the IES-1000 has not learned are flooded to all of the IES-1000's ports. This reduces the amount of multicast traffic passing through your switch. Select **enable (unknown-discard)** to have the IES-1000 only forward group multicast traffic to ports that are members. The IES-1000 drops IGMP packets that are destined for multicast groups that the IES-1000 has not learned. Selecting **enable (unknown-discard)** results in less multicast traffic passing through your switch than if you select **enable (unknown-flood)**. Select **disable** to treat multicast traffic in the same manner as broadcast traffic, that is, it is forwarded to all ports.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
ID	This field displays the location of the entry in the multicast filtering database.
VLAN ID	This is the VLAN ID (Virtual LAN ID) for the multicast group.
Group IP Address	This field displays the multicast IP address of a multicast group.
MAC Address	This field displays the last three bytes of the MAC address to which the multicast group is mapped.

Table 10-12 Bridge IGMP Snooping Record

LABEL	DESCRIPTION
Member Ports	This field displays the ports that belong to this multicast group, E=Ethernet, 1~8 = ADSL ports 1 through 8.
Refresh	Click this button to update the multicast filtering record.
FlushAll	Click this button to clear the multicast filtering record.

10.5.8 DHCP Relay

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a DHCP server. You can configure the Integrated Ethernet Switch to relay client TCP/IP configuration requests to a DHCP server and the server's responses back to the clients.

10.5.9 DHCP "Relay Agent Information Option"

The Integrated Ethernet Switch can add information to client TCP/IP configuration requests that it relays to a DHCP server. This helps provide authentication about the source of the requests. You can also specify additional information for the Integrated Ethernet Switch to add to the client TCP/IP configuration requests that it relays to the DHCP server. Please refer to RFC 3046 for more details.

10.5.10 DHCP Relay Agent Circuit ID Sub-option Format

The DHCP relay agent information feature adds an Agent Information field to the option 82 field of the DHCP headers of client TCP/IP configuration request frames that the Integrated Ethernet Switch relays to a DHCP server. The Agent Information field that the Integrated Ethernet Switch adds contains an "Agent Circuit-ID sub-option" that includes the slot ID, port number, VLAN ID and optional information about the port where the TCP/IP configuration request was received.

The following figure shows the format of the Agent Circuit ID sub-option. The 1 in the first field identifies this as an Agent Circuit ID sub-option. If the configuration request was received on a network module's port, a 1-byte Slot ID field specifies the slot location of the network module in the Integrated Ethernet Switch and a 1-byte Port No field specifies the ingress port number. The next field is 2 bytes and displays the DHCP request packet's VLAN ID. The last field (A) can range from 0 to 24 bytes and is optional information (that you specify) about this relay agent.

Figure 10-14 DHCP Relay Agent Circuit ID Sub-option Format

10.5.11 DHCP Relay Screen

Click **DHCP Relay** in the **Bridge Setup** screen to open this screen.

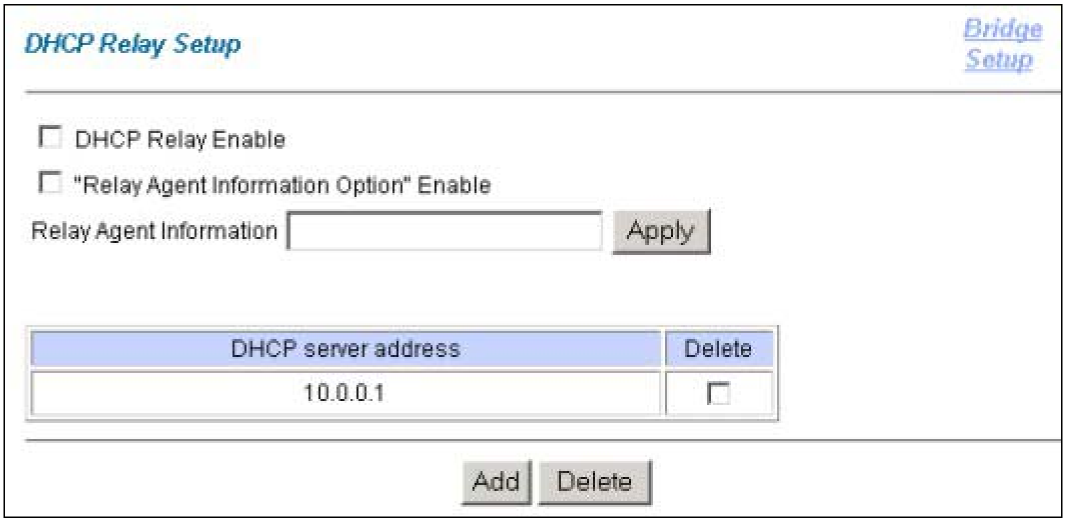


Figure 10-15 DHCP Relay Setup

Table 10-13 DHCP Relay Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
DHCP Relay Enable	Enable DHCP relay to have the Integrated Ethernet Switch relay client TCP/IP configuration requests to a DHCP server and the server's responses back to the clients.
"Relay Agent Information Option" Enable	Select this check box to have the Integrated Ethernet Switch add the originating slot and port numbers to client TCP/IP configuration requests that it relays to a DHCP server.
Relay Agent Information	Use this field to specify up to 24 ASCII characters of additional information for the Integrated Ethernet Switch to add to the DHCP client TCP/IP configuration requests that it relays to a DHCP server. Examples of information you could add would be the chassis number of the Integrated Ethernet Switch or the ISP's name.
DHCP server address	There are the IP addresses of the DHCP servers to which the Integrated Ethernet Switch should relay DHCP client TCP/IP configuration requests.
Add	Click this button to go to a screen where you can configure an IP address of a DHCP server to which the Integrated Ethernet Switch should relay DHCP client TCP/IP configuration requests.
Delete	Select an address's **Delete** check box and click the **Delete** button to remove the DHCP server.

Add DHCP Server Screen

Click **DHCP Relay** in the **Bridge Setup** screen to open the **DHCP Relay** screen.

Click **Add** in the **DHCP Relay** screen to open this screen.

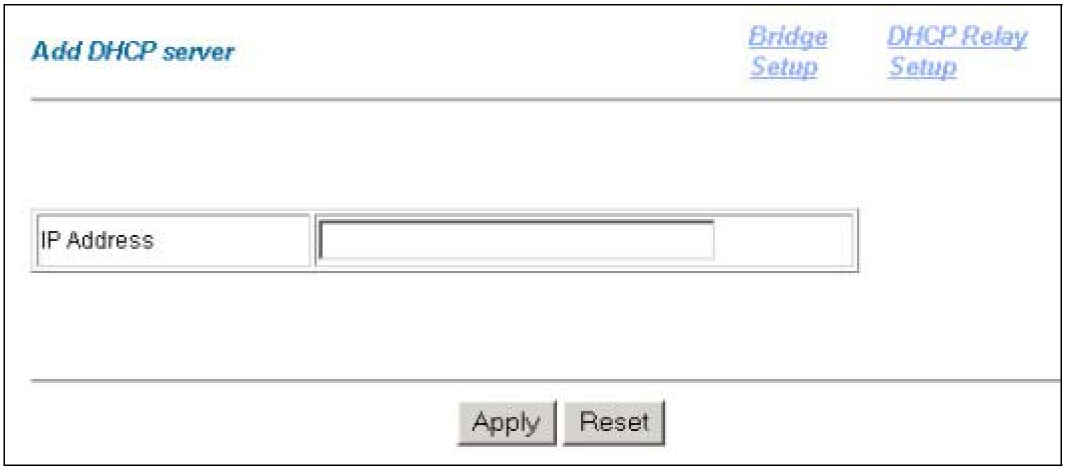


Figure 10-16 Add DHCP Server

Table 10-14 Add DHCP Server

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
DHCP Relay Setup	Click this link to go to the **DHCP Relay Setup** screen.
IP Address	Type the IP address of the DHCP server to which the Integrated Ethernet Switch should relay DHCP client TCP/IP configuration requests.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

10.5.12 IEEE 802.1X Authentication Introduction

IEEE 802.1X is an extended authentication protocol[1] that allows support of RADIUS (Remote Authentication Dial In User Service, RFC 2138, 2139) for centralized user profile and accounting[2] management on a network RADIUS server.

RADIUS

RADIUS (Remote Authentication Dial-In User Service) authentication is a popular protocol used to authenticate users by means of an external server instead of (or in addition to) an internal device user database that is limited to

[1] At the time of writing, only Windows XP and Windows 2000 with service pack four of the Microsoft operating systems supports it. See the Microsoft web site for information on other Windows operating system support. For other operating systems, see its documentation. If your operating system does not support IEEE 802.1X, then you may need to install IEEE 802.1X client software.

[2] Not available at the time of writing.

the memory capacity of the device. In essence, RADIUS authentication allows you to validate an unlimited number of users from a central location.

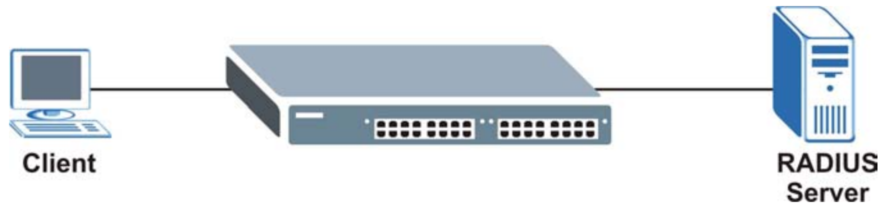


Figure 10-17 RADIUS Server

10.5.13 802.1X Setup Screen

Click **802.1X** in the **Bridge Setup** screen to open this screen.

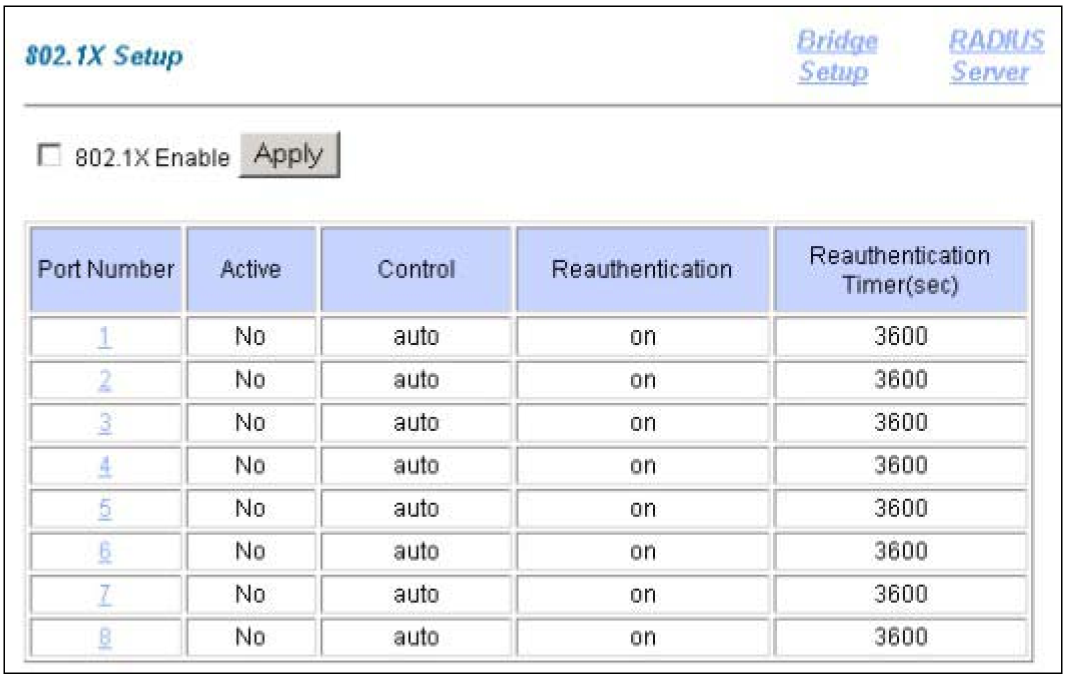


Figure 10-18 802.1X Setup

Table 10-15 802.1X Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
RADIUS Server	Click this link to go to the screen where you can configure the RADIUS server settings.
802.1X Enable	Select this check box and click **Apply** to turn on IEEE 802.1X authentication on the IES-1000.
Port Number	Click a port's index number to go to that port's **Edit 802.1X Setup** screen.
Active	This field displays whether (**Yes**) or not (**No**) IEEE 802.1X authentication is enabled on this port.

Table 10-15 802.1X Setup

LABEL	DESCRIPTION
Control	When this field displays **Auto**, the IES-1000 authenticates all subscribers before they can access the network through this port. When this field displays **Force Authorized**, all connected users are allowed to access the network through this port without authentication. When this field displays **Force Unauthorized**, all subscribers are denied access to the network through this port.
Reauthentication	This field displays whether (**On**) or not (**Off**) a subscriber has to periodically re-enter his or her username and password to stay connected to the port.
Reauthentication Timer	This field displays how often a subscriber has to re-enter his or her username and password to stay connected to the port.

RADIUS Server Setup Screen

Click **802.1X** in the **Bridge Setup** screen to open the **802.1x Setup** screen.

Click **RADIUS Server** in the **802.1x Setup** screen to open this screen.

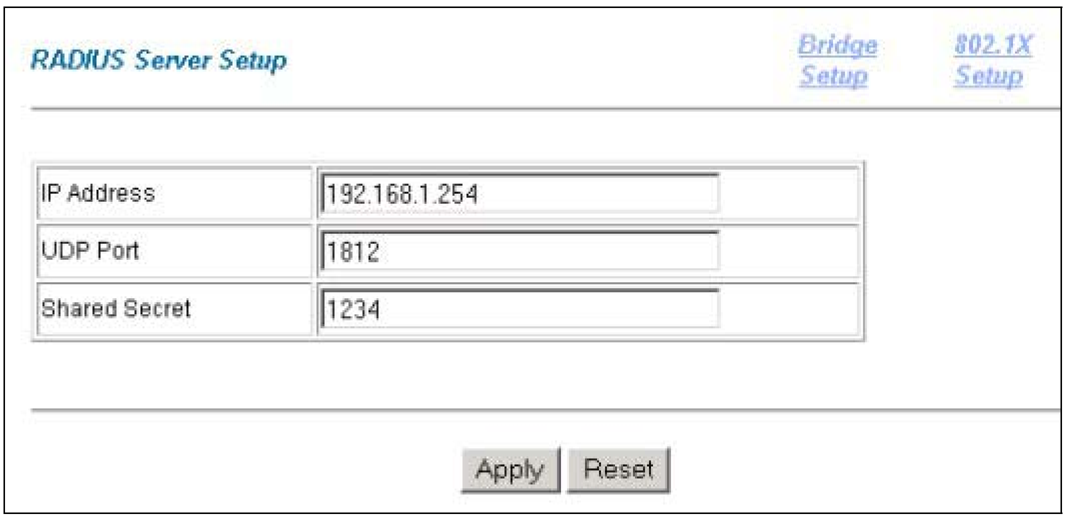


Figure 10-19 RADIUS Server Setup

Table 10-16 RADIUS Server Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
802.1X	Click this link to go to the **802.1x Setup** screen.
IP Address	Enter the IP address of the external RADIUS server in dotted decimal notation.
UDP Port	The default port of the RADIUS server for authentication is **1812**. You need not change this value unless your network administrator instructs you to do so.

Table 10-16 RADIUS Server Setup

LABEL	DESCRIPTION
Shared Secret	Specify a password (up to 31 alphanumeric characters) as the key to be shared between the external RADIUS server and the IES-1000. This key is not sent over the network. This key must be the same on the external RADIUS server and the IES-1000.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

802.1X Edit Screen

Click **802.1X** in the **Bridge Setup** screen to open the **802.1X Setup** screen.

Click a port's index number in the **802.1X Setup** screen to edit the port's IEEE 802.1X settings.

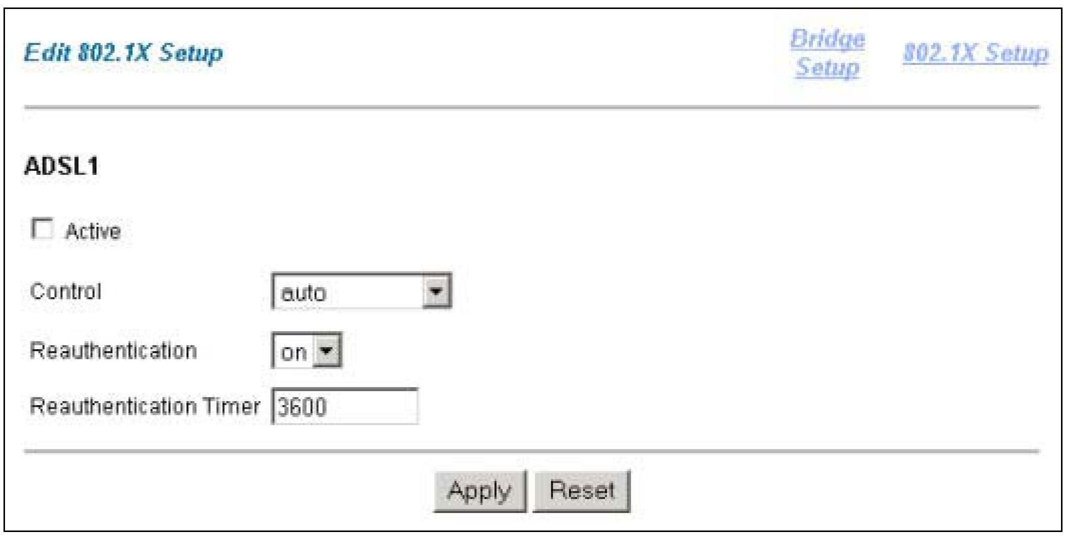


Figure 10-20 Edit 802.1X Setup

Table 10-17 Edit 802.1x Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.
802.1X Setup	Click this link to go to the **802.1X Setup** screen.
Active	Select this checkbox to turn on IEEE 802.1X authentication on this port.
Control	Select **Auto** to authenticate all subscribers before they can access the network through this port. Select **Force Authorized** to allow all connected users to access the network through this port without authentication. Select **Force Unauthorized** to deny all subscribers access to the network through this port.

Table 10-17 Edit 802.1x Setup

LABEL	DESCRIPTION
Reauthentication	Select (**On**) if a subscriber has to periodically re-enter his or her username and password to stay connected to the port.
Reauthentication Timer	Specify how often (60~65535 seconds) a subscriber has to re-enter his or her username and password to stay connected to the port.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

10.5.14 Fast Mode VLAN ID Setup Screen

Click **Fast Mode VLAN ID** in the **Bridge Setup** screen to open this screen.

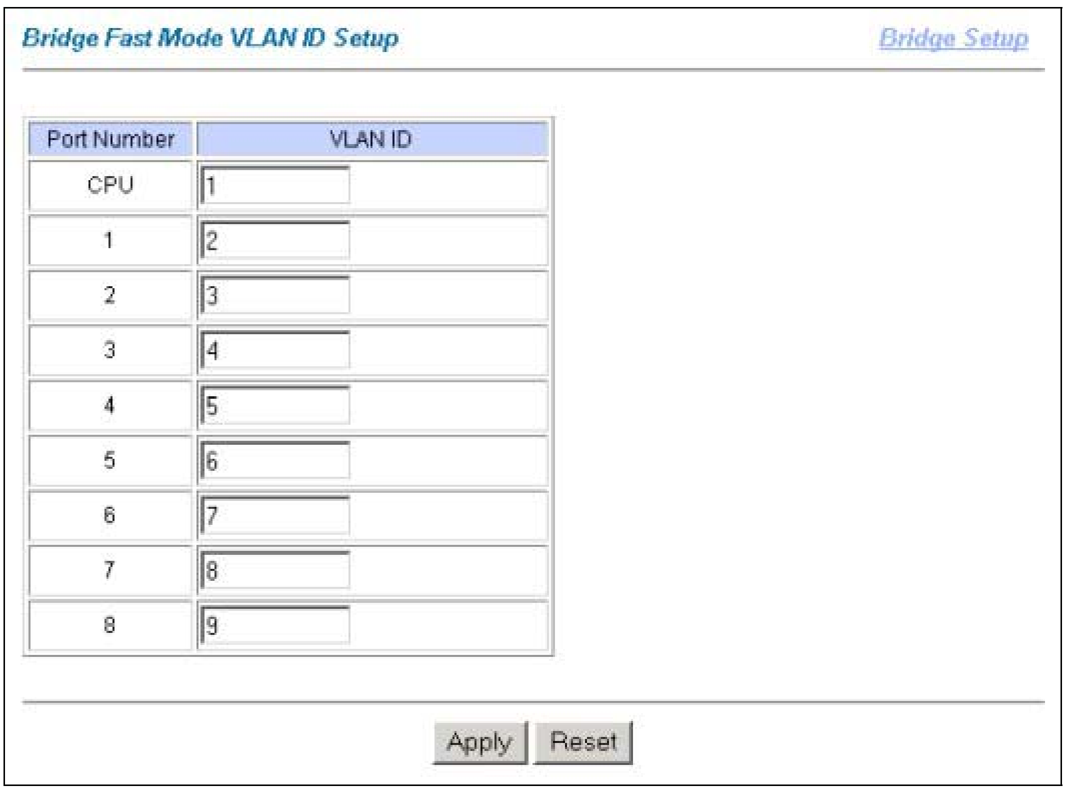


Figure 10-21 Bridge Fast Mode VLAN ID Setup

The following table describes this screen.

Table 10-18 Bridge Fast Mode VLAN ID Setup

LABEL	DESCRIPTION
Bridge Setup	Click this link to go to the **Bridge Setup** screen.

Table 10-18 Bridge Fast Mode VLAN ID Setup

LABEL	DESCRIPTION
Port Number	This is the port's name.
VLAN ID	Enter a VLAN ID number for the port. The valid range is 1-4094. You cannot configure more than one port to use the same VLAN ID.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

10.6 IP Setup Screen

The IES-1000 needs an IP address for it to be managed over the network. The factory default IP address is 192.168.1.1. The subnet mask specifies the network number portion of an IP address. The factory default subnet mask is 255.255.255.0. The default gateway specifies the IP address of the default gateway (next hop) for outgoing traffic. The default gateway is specified as 192.168.1.254.

Click **IP Setup** in the navigation panel to open the **IP Setup** screen.

Use this screen to configure the IP address of the IES-1000.

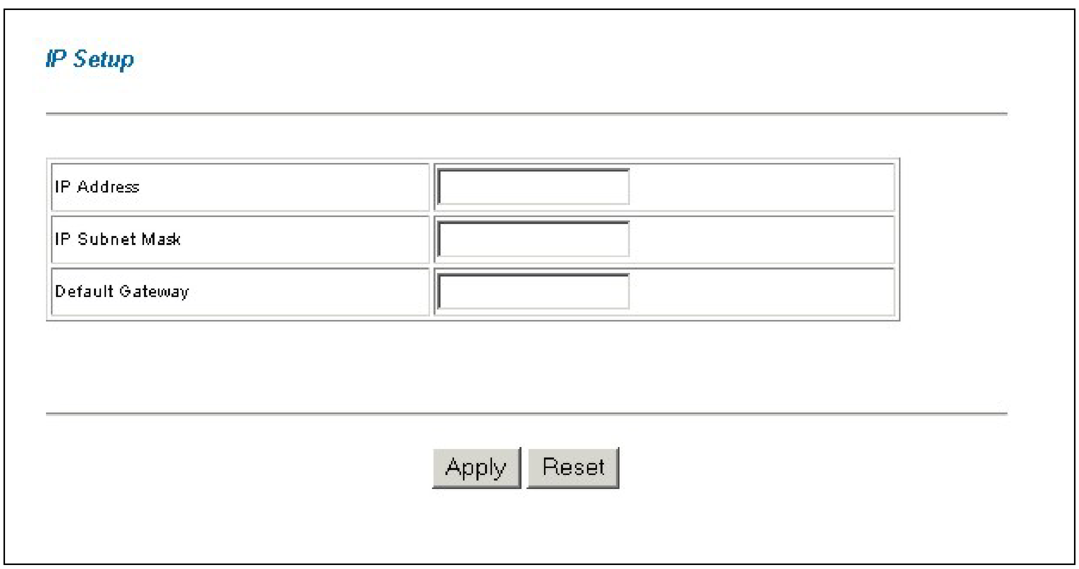


Figure 10-22 IP Setup

The following table describes this screen.

Table 10-19 IP Setup

LABEL	DESCRIPTION
IP Address	Enter the IP address of the IES-1000 in dotted decimal notation, for example 192.168.1.1.
IP Subnet Mask	Enter the IP subnet mask of your IES-1000 in dotted decimal notation, for example 255.255.255.0.

Table 10-19 IP Setup

LABEL	DESCRIPTION
Default Gateway	Enter the IP address of the default-outgoing gateway in dotted decimal notation, for example 192.168.1.254.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

Chapter 11
ADSL Module Port Setup

This chapter explains how to configure individual ports on the AAM-1008.

11.1 ADSL Module Port Setup Overview

The web configurator allows you to configure settings for the ADSL Access Module's ports.

11.2 ADSL Standards Overview

The ADSL module supports both the G.lite and the G.dmt standards. G.lite is intended to minimize the cost for the consumer market.

Table 11-1 Maximum Transfer Rates of the ADSL Ports

STANDARD	MAXIMUM DOWNSTREAM	MAXIMUM UPSTREAM
G.dmt (AAM1008-61)	8160 Kbps	1024 Kbps
G.dmt Annex B (AAM1008-63)	8160 Kbps	1024 Kbps
ETSI (AAM1008-63)	8160 Kbps	1024 Kbps
G.lite (AAM1008-61)	1536 Kbps	512 Kbps
ANSI T1.413 issue 2 (AAM1008-61)	8160 Kbps	1024 Kbps

11.3 Downstream and Upstream

Downstream refers to traffic going out from the DSL module to the subscriber's DSL modem or router. Upstream refers to traffic coming into the DSL module from the subscriber's DSL modem or router.

11.4 Profiles

A profile is a table that contains a list of pre-configured DSL settings. Each DSL port has one (and only one) profile assigned to it at any given time. You can configure multiple profiles, including profiles for troubleshooting.

Profiles allow you to configure DSL ports efficiently. You can configure all of the DSL ports with the same profile, thus removing the need to configure the DSL ports one-by-one. You can also change an individual DSL port by assigning it a different profile.

You could set up different profiles for different kinds of accounts (for example, economy, standard and premium). Assign the appropriate profile to a DSL port and it takes care of a large part of the port's configuration. See later in this chapter for how to configure profiles. You can only delete a profile when no DSL port is set to use it.

11.5 Interleave Delay

Interleave delay is the wait (in milliseconds) that determines the size of a single block of data to be interleaved (assembled) and then transmitted. Interleave delay is used when transmission error correction (Reed- Solomon) is necessary due to a less than ideal telephone line. The bigger the delay, the bigger the data block size, allowing better error correction to be performed.

Reed-Solomon codes are block-based error correcting codes with a wide range of applications. The Reed-Solomon encoder takes a block of digital data and adds extra "redundant" bits. The Reed-Solomon decoder processes each block and attempts to correct errors and recover the original data.

11.5.1 Fast Mode

Fast mode means no interleaving takes place and transmission is faster (a "fast channel"). This would be suitable if you have a good line where little error correction is necessary.

11.6 ADSL Configured Versus Actual Rate

You configure the maximum rate of an individual ADSL port by modifying its profile (see the **ADSL Edit Profile** screen) or assigning the port to a different profile (see the **ADSL Edit Port Setup** screen). However, due to noise and other factors on the line, the actual rate may not reach the maximum that you specify.

Even though you can specify arbitrary numbers using the **ADSL Edit Profile** screen, the actual rate is always a multiple of 32 Kbps. If you enter a rate that is not a multiple of 32 Kbps, the actual rate will be the next lower multiple of 32Kbps. For instance, if you specify 60 Kbps for a port, the actual rate for that port will not exceed 32 Kbps, and if you specify 66 Kbps, the actual rate will not be over 64Kbps.

11.7 ADSL Module Default Settings

The default profile always exists and all of the ADSL ports use the default profile settings when the AAM-1008 is shipped. The default profile's name is `DEFVAL`. The default profile's maximum downstream rate can only be obtained when using the G.dmt standard. Configure a profile with a maximum downstream rate of 1536 Kbps or less for use with G.lite.

11.7.1 Default Profile Settings

The following are the settings of the default profile.

- Name: DEFVAL
- Profile Status: Active

Downstream ADSL settings:

- Latency Delay: 4ms
- Target Signal/Noise Ratio: 6 db

- Maximum Signal/Noise Ratio: 31 db
- Minimum Signal/Noise Ratio: 0 db
- Minimum Transmission Rate: 32 Kbps
- Maximum Transmission Rate: 2048 Kbps

Upstream ADSL settings:

- Latency Delay: 4ms
- Target Signal/Noise Ratio: 6 db
- Maximum Signal/Noise Ratio: 31 db
- Minimum Signal/Noise Ratio: 0 db
- Minimum Transmission Rate: 32 Kbps
- Maximum Transmission Rate: 512 Kbps

11.7.2 Other Default Settings

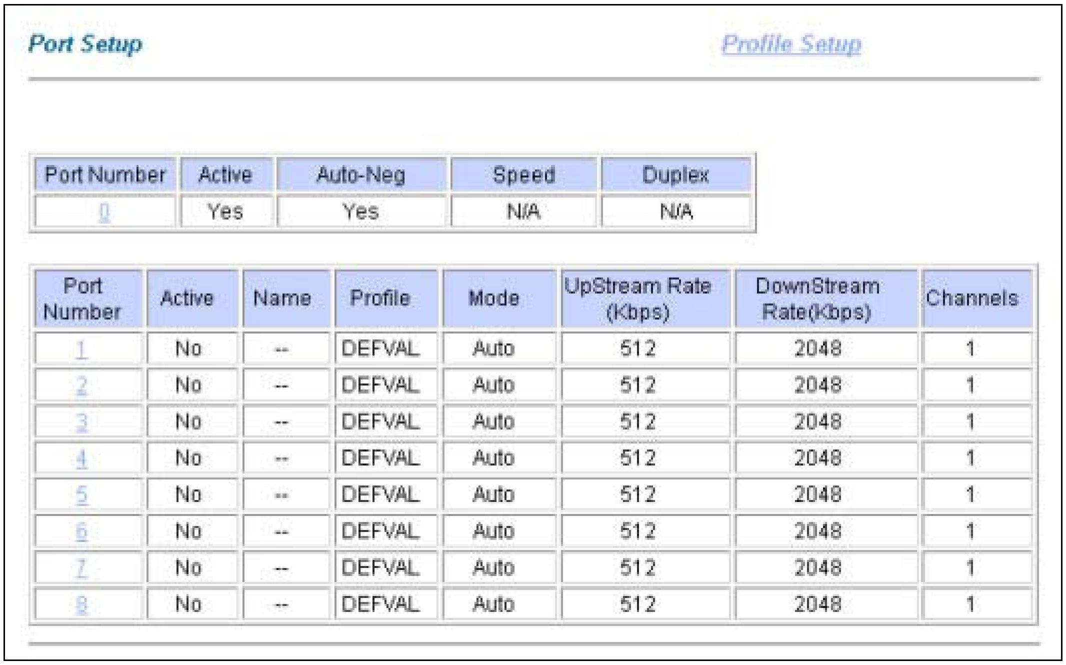
The factory default settings for all ADSL ports of the IES-1000 are

- Encapsulation: RFC 1483
- Multiplexing: LLC-based
- VPI: 0
- VCI: 33
- Enable/Disable State: disabled
- Operational mode: auto

11.8 ADSL Module Port Setup Screen

Click **Port Setup** in the navigation panel to open the **Port Setup** screen.

This screen is a summary screen that displays read-only information about the ports. Click a port's name to go to a setup screen for that port.



Port Number	Active	Auto-Neg	Speed	Duplex
0	Yes	Yes	N/A	N/A

Port Number	Active	Name	Profile	Mode	UpStream Rate (Kbps)	DownStream Rate(Kbps)	Channels
1	No	--	DEFVAL	Auto	512	2048	1
2	No	--	DEFVAL	Auto	512	2048	1
3	No	--	DEFVAL	Auto	512	2048	1
4	No	--	DEFVAL	Auto	512	2048	1
5	No	--	DEFVAL	Auto	512	2048	1
6	No	--	DEFVAL	Auto	512	2048	1
7	No	--	DEFVAL	Auto	512	2048	1
8	No	--	DEFVAL	Auto	512	2048	1

Figure 11-1 ADSL Port Setup

The following table describes this screen.

Table 11-2 ADSL Port Setup

LABEL	DESCRIPTION
Profile Setup	Click this link to go to a screen for setting up DSL profiles.
Port Number	This field shows "0" for the Ethernet port.
Active	This field shows whether or not this port is enabled (the Ethernet port is always enabled).
Name	This field displays the port's descriptive name if one has been configured.
Auto-Neg	This field shows whether auto-negotiation is turned on (Yes) or not (No). The **Speed** and **Duplex** fields display N/A when the auto-negotiation is turned on.
Speed	This is the speed of the Ethernet connection.
Duplex	The duplex mode can be half (meaning traffic is transmitted in one direction at a time) or full (meaning traffic is simultaneously transmitted in both directions).
Port Number	This field identifies the port's index number.
Active	This field shows whether the port is turned on (Yes) or not (No). The factory default of all ADSL ports is disabled. A port must be enabled for data transmission to occur.
Profile	This field shows which profile is assigned to this port.
Mode	This field shows to which ADSL operational mode the port is set.
UpStream Rate (Kbps)	This field shows the maximum upstream speed that is configured for this port.
DownStream Rate (Kbps)	This field shows the maximum downstream speed that is configured for this port.
Channels	This field displays the number of PVCs (Permanent Virtual Circuits) that are configured for this port.

11.8.1 ADSL Profile Setup Screen

A profile is a list of settings that you define. Then you can assign them to one or more individual ports.

Click the **Profile Setup** link in the **Port Setup** screen to go to the **Profile Setup** screen.

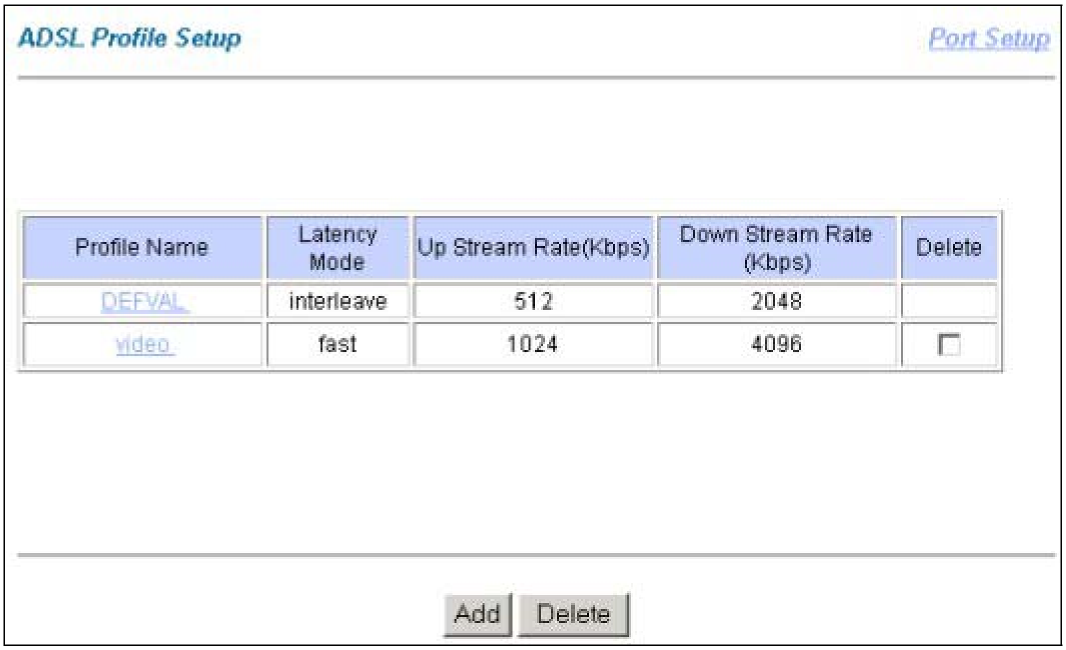


Figure 11-2 ADSL Profile Setup

Table 11-3 ADSL Profile Setup

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
Profile Name	These are the names of individual profiles. The DEFVAL profile always exists and all of the DSL ports have it assigned to them by default. Click a profile's name to go to a screen where you can edit the profile.
Latency Mode	This is the ADSL latency mode (**fast** or **interleave**) for the ports that use this profile.
Upstream Max Rate: Kbps	This is the maximum upstream transfer rate for the ports that use this profile. Speeds from 32 to 1024 kilobits per second (Kbps) are supported.
Downstream Max Rate: Kbps	This is the maximum downstream transfer rate for the ports that use this profile. Speeds from 32 to 8160 (Kbps) are supported.
Add	Click this button to configure a new profile.
Delete	Select a profile's **Delete** check box and click the **Delete** button to remove the profile.

ADSL Profile Add or Edit Screen

Click the **Profile Setup** link in the **Port Setup** screen to go to the **Profile Setup** screen.

Click the **Add** button in the **Profile Setup** screen to add a new profile or click the name of an existing profile to edit the profile.

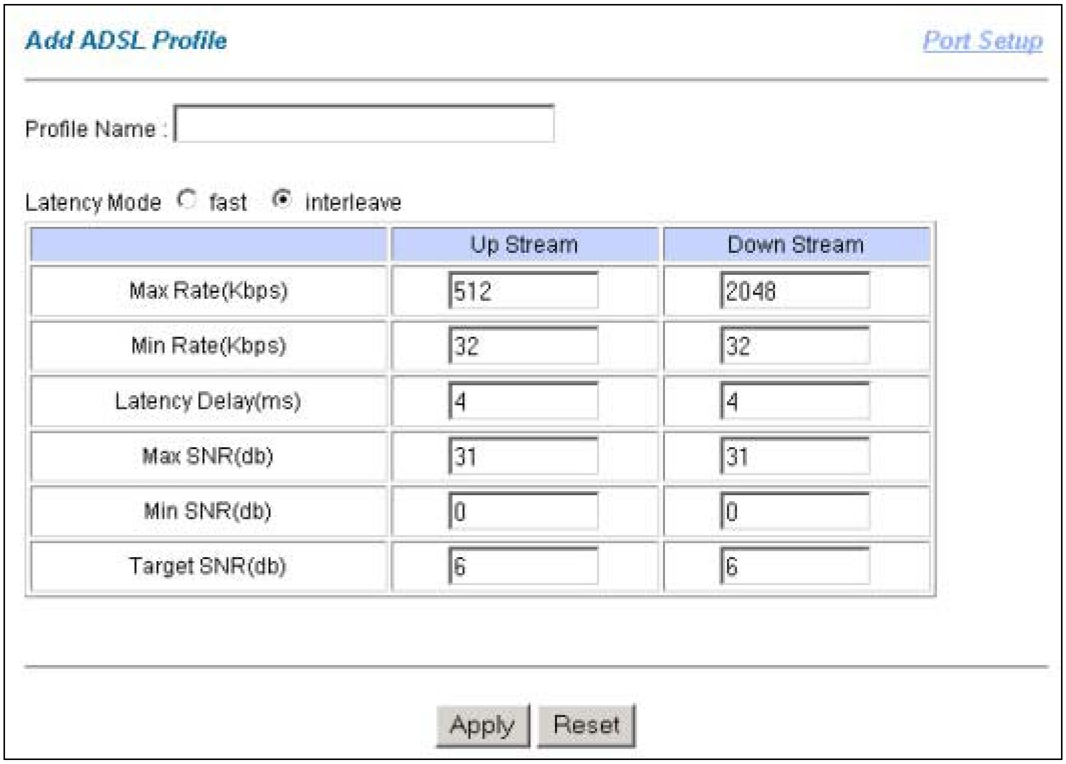


Figure 11-3 ADSL Add Profile

Table 11-4 ADSL Add Profile

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
Profile Name	When editing a profile, this is the name of this profile. When adding a profile, type a name for the profile.
Latency Mode	This field sets the ADSL latency mode for the ports that use this profile. Select **fast** mode to use no interleaving and have faster transmission (a "fast channel"). This would be suitable if you have a good line where little error correction is necessary. Select **interleave** mode to use interleave delay when transmission error correction (Reed-Solomon) is necessary due to a less than ideal telephone line.
Up Stream	The following parameters relate to upstream transmissions.
Max Rate (Kbps)	Type a maximum upstream transfer rate for this profile. Speeds from 32 to 1024 (Kbps) are supported. Configure the maximum upstream transfer rate to be less than the maximum downstream transfer rate.

Table 11-4 ADSL Add Profile

LABEL	DESCRIPTION
Min Rate (Kbps)	Type the minimum upstream transfer rate (from 32 to 1024 Kbps) for this profile. Configure the minimum upstream transfer rate to be less than the maximum upstream transfer rate.
Latency Delay(ms)	Configure this field when you set the **Latency Mode** field to **interleave**. Type the number of milliseconds (0-255) of interleave delay to use for upstream transfers. It is recommended that you configure the same latency delay for both upstream and downstream.
Max SNR (db)	Type the maximum upstream signal to noise margin (0-31 dB).
Min SNR (db)	Type the minimum upstream signal to noise margin (0-31 dB). Configure the minimum upstream signal to noise margin to be less than or equal to the maximum upstream signal to noise margin.
Target SNR (db)	Type the target upstream signal to noise margin (0-31 dB). Configure the target upstream signal to noise margin to be greater than or equal to the minimum upstream signal to noise margin and less than or equal to the maximum upstream signal to noise margin.
Down Stream	The following parameters relate to downstream transmissions.
Max Rate (Kbps)	Type a maximum downstream transfer rate in Kbps for this profile. Speeds from 32 to 8160 (Kbps) are supported.
Min Rate (Kbps)	Type the minimum downstream transfer rate (from 32 to 8160 Kbps) for this profile. Configure the minimum downstream transfer rate to be less than the maximum downstream transfer rate.
Latency Delay(ms)	Configure this field when you set the **Latency Mode** field to **interleave**. Type the number of milliseconds (0-255) of interleave delay to use for upstream transfers. It is recommended that you configure the same latency delay for both upstream and downstream.
Max SNR (db)	Type the maximum downstream signal to noise margin (0-31 dB).
Min SNR (db)	Type the minimum downstream signal to noise margin (0-31 dB). Configure the minimum downstream signal to noise margin to be less than or equal to the maximum downstream signal to noise margin.
Target SNR (db)	Type the target downstream signal to noise margin (0-31 dB). Configure the target downstream signal to noise margin to be greater than or equal to the minimum downstream signal to noise margin and less than or equal to the maximum downstream signal to noise margin.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

11.9 10/100M Auto-Sensing Ethernet

The IES-1000 supports 10/100Mbps auto-negotiating Ethernet. There are two factors related to the connection of two Ethernet ports: speed and duplex mode. In a 10/100Mbps fast Ethernet, the speed can be 10Mbps or 100Mbps and the duplex mode can be half duplex or full duplex. The auto-negotiation capability makes one Ethernet port able to negotiate with a peer automatically to obtain the optimal connection speed and duplex mode.

When auto-negotiation is turned on, the Ethernet port of the IES-1000 negotiates with the peer Ethernet port on the Ethernet cable automatically to determine the optimal connection speed and duplex mode. If the peer Ethernet port does not support auto-negotiation or turns off this feature, the IES-1000 determines the connection speed by detecting the signal on the cable and using half duplex mode. When the IES-1000's auto-negotiation is turned off, the Ethernet port uses the pre-configured speed and duplex mode settings when making a connection, thus requiring you to check the settings of the peer Ethernet port in order to connect.

11.9.1 Ethernet Port Setup Screen

Click **0** in the **Port Setup** screen to open this screen.

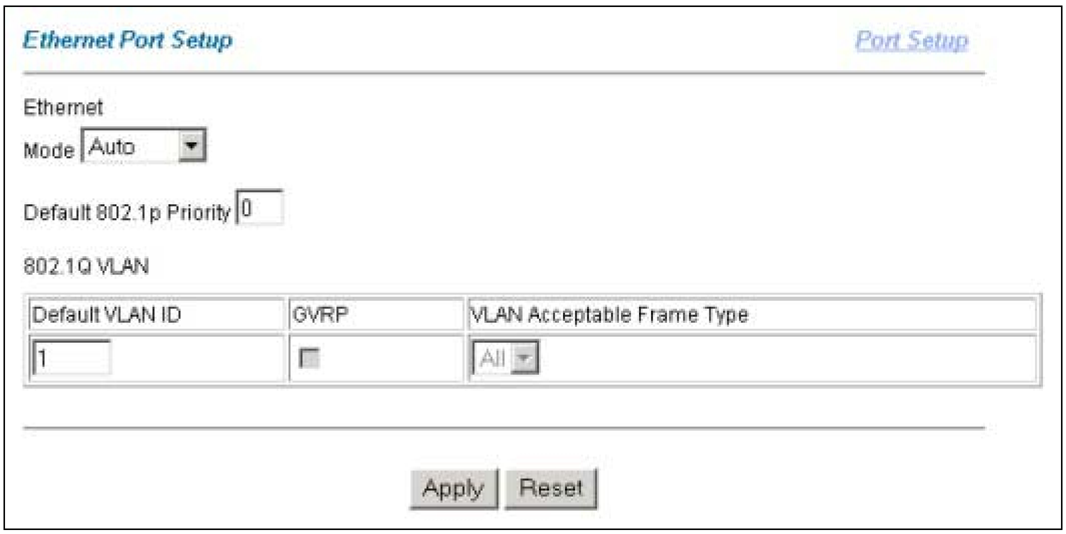


Figure 11-4 Ethernet Port Setup

The following table describes this screen.

Table 11-5 Ethernet Port Setup

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
Mode	Use the drop-down list box to select a speed and duplex setting for the Ethernet port. In 10/100Mbps Fast Ethernet, the speed can be 10Mbps or 100Mbps. The duplex mode can be **Half** (meaning traffic is transmitted in one direction at a time) or **Full** (meaning traffic is simultaneously transmitted in both directions). Select **Auto** to have the Ethernet port auto-negotiate with a peer to obtain the connection speed and duplex mode.
Default 802.1p Priority	Type the priority value (0 to 7) to add to incoming frames without a (802.1p) priority tag.

Table 11-5 Ethernet Port Setup

LABEL	DESCRIPTION
Default VLAN ID	Type the Port VLAN ID (PVID) from 1 to 4094. The IES-1000 assigns the PVID to untagged frames or priority frames (0 VID) received on this port.
GVRP	GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. The IES-1000 propagates VLAN information to other devices when this check box is selected.[3]
VLAN Acceptable Frame Type	Select **All** if you want the port to accept both tagged and untagged incoming frames (on this port). Choose **Tagged** if you want the port to accept just tagged incoming frames (on this port). [4]
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

11.9.2 ADSL Port Setup Edit Screen

Click an ADSL port in the **Port Setup** screen to open this screen.

[3] At the time of writing, the **GVRP** check box is read-only. Enabling the VLAN automatically enables GVRP on the Ethernet port.

[4] At the time of writing, the **VLAN Acceptable Frame Type** field is read-only. The IES-1000 accepts both tagged and untagged incoming frames.

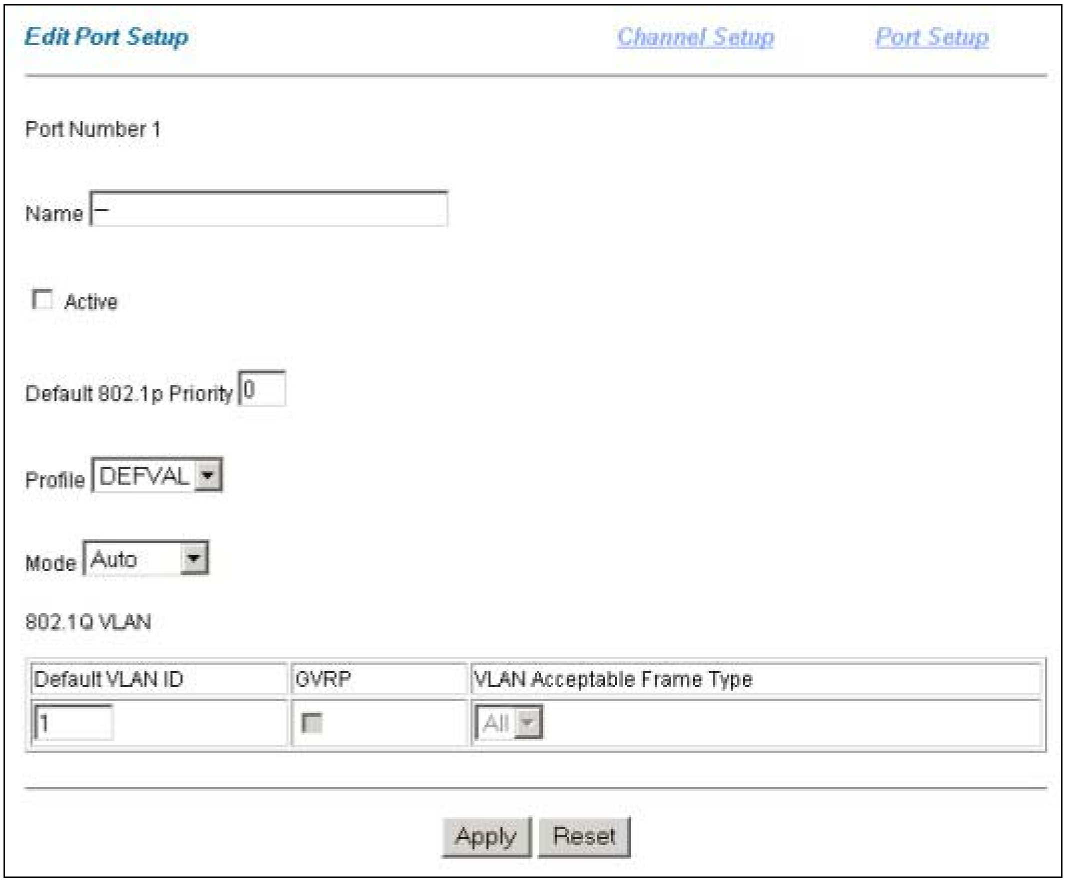


Figure 11-5 ADSL Port Setup Edit

The following table describes this screen.

Table 11-6 ADSL Port Setup Edit

LABEL	DESCRIPTION
Channel Setup	Click this link to go to the port's **Channel Setup** screen.
Port Setup	Click this link to go to the **Port Setup** screen.
Name	Type a descriptive name to identify the port.
Active	Select this check box to turn on this ADSL port. The ADSL ports are disabled by default because an enabled but disconnected ADSL port generates more heat than an operating port. Disable ADSL ports when they are not in use to minimize heat generation and enhance reliability.
Default 802.1p Priority	Type the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag.
Profile	Use the drop-down list box to select a profile to assign to this port.
Mode	Use the drop-down list box to select the ADSL operational mode for this port.

Table 11-6 ADSL Port Setup Edit

LABEL	DESCRIPTION
Default VLAN ID	Type the Port VLAN ID (PVID) from 1 to 4094. The IES-1000 assigns the PVID to untagged frames or priority frames (0 VID) received on this port.
GVRP	GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. The IES-1000 propagates VLAN information to other devices when this check box is selected.[5]
VLAN Acceptable Frame Type	Select **All** if you want the port to accept both tagged and untagged incoming frames (on this port). Choose **Tagged** if you want the port to accept just tagged incoming frames (on this port). [6]
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

[5] At the time of writing, GVRP is not available with the DSL ports.

[6] At the time of writing, the **VLAN Acceptable Frame Type** field is read-only. The IES-1000 accepts both tagged and untagged incoming frames.

Chapter 12 G.SHDSL Module Port Setup

This chapter explains how to configure individual ports on the SAM1008.

12.1 G.SHDSL Module Port Setup Overview

The web configurator allows you to configure settings for the G.SHDSL Access Module's ports.

12.2 G.SHDSL Standards Overview

The G.SHDSL module supports both the Annex A and the Annex B power spectral density regions with G.991.2.

Table 12-1 Data Rates of the SAM1008's SHDSL Ports

STANDARD	MAXIMUM UPSTREAM AND DOWNSTREAM RATE	MINIMUM UPSTREAM AND DOWNSTREAM RATE
G.991.2	2304 Kbps	192 Kbps

12.3 G.SHDSL Profiles

A profile is a table that contains a list of pre-configured G.SHDSL settings. Each G.SHDSL port has one (and only one) profile assigned to it at any given time. You can configure multiple profiles, including profiles for troubleshooting.

Profiles allow you to configure G.SHDSL ports efficiently. You can configure all of the G.SHDSL ports with the same profile by modifying the profile, thus removing the need to configure the G.SHDSL ports one-by-one. You can also change an individual G.SHDSL port by assigning it a different profile.

For example, you could set up different profiles for different kinds of accounts (for example, economy, standard and premium). Assign the appropriate profile to a G.SHDSL port and it takes care of a large part of the port's configuration. See later in this chapter for how to configure profiles. You can only delete a profile when no G.SHDSL port refers to it.

12.4 N-wire Mode

The n-wire mode allows you to physically bundle two G.SHDSL ports into a single 4-wire connection. The 4-wire mode is described in ITU-T G.991.2. You can use it to connect to G.SHDSL modems or routers that also support 4-wire mode. N-wire mode also allows you to physically bundle four G.SHDSL ports into a single 8-wire connection. The 8-wire group is proprietary and should be used between two SAM1008s.

N-wire mode can increase the reach of a particular data rate without having to regenerate the signal. It can also give increased bandwidth for LAN-to-LAN applications.

You can n-wire bundle multiple groups of ports on a single IES-1000 (or even within a single SAM1008 module) as long as they do not overlap.

12.5 Port Bonding

The port bonding feature allows you to send IP packets over two to eight G.SHDSL connections as a single connection. Since n-wire mode occurs at the physical level and port bonding occurs at the software level, you can combine n-wire bundled groups as well as individual ports. This can give increased bandwidth in LAN-to-LAN applications between IES-1000s.

You can easily select G.SHDSL ports or n-wire bundled groups to bond together. The IES-1000 checks the transfer rates of the individual G.SHDSL ports when they connect. The IES-1000 retrains any of the bonded ports that have a lower speed up to three times in an attempt to get them to reach the higher speed. If a port does not reach the higher speed (or at least within a 640 Kbps tolerance of the higher speed) by the third attempt, that port is dropped.

You can bond multiple groups of ports on a single IES-1000 (or even within a single SAM1008 module) as long as they do not overlap.

12.6 N-wire Mode with Port Bonding Example

The following figure shows a SAM1008's ports one to four and five to eight physically bundled into 8-wire groups 1 and 2 (respectively). These two 8-wire bundled groups are then bonded into a single logical connection (3 in the figure).

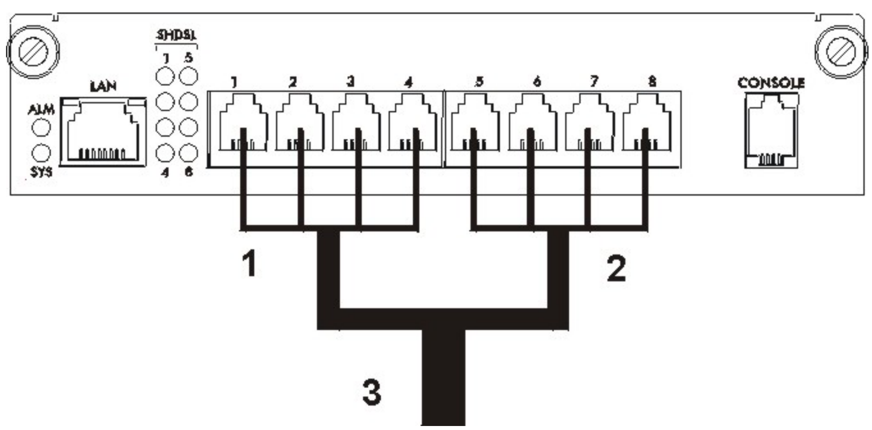


Figure 12-1 N-wire Mode with Port Bonding Example

With eight ports bundled together, use multiple TCP connections in order to reach the higher speeds. This is due to the limiting characteristics of a single TCP session. For example, if you need to make a large FTP file transfer, it would be faster to use two FTP clients.

When using multiple G.SHDSL ports to connect two SAM1008s, it is recommended that you bond all of the G.SHDSL ports to avoid network loops (and improve throughput).

12.7 Default G.SHDSL Module Settings

The default profile always exists and all of the G.SHDSL ports use the default profile settings when the network module is shipped. The default profile's name is set to `DEFVAL`. The default profile can't be deleted.

12.7.1 Default G.SHDSL Module Profile Settings

The following are the settings of the default profile.

- Name: DEFVAL
- Profile Status: Active
- Maximum: 2034 Kbps
- Minimum: 192 Kbps

12.7.2 Other Default G.SHDSL Module Settings

The factory default settings for all G.SHDSL ports of the network module are

- Encapsulation: RFC 1483
- Multiplexing: LLC-based
- VPI: 0
- VCI: 33
- Enable/Disable State: disabled

12.8 G.SHDSL Module Port Setup Screen

Click **Port Setup** in the navigation panel to open the **Port Setup** screen.

This screen is a summary screen that displays read-only information about the ports. Click a port's name to go to a setup screen for that port.

Figure 12-2 G.SHDSL Port Setup

The following table describes this screen.

Table 12-2 G.SHDSL Port Setup

LABEL	DESCRIPTION
Profile Setup	Click this link to go to a screen for setting up DSL profiles.
Port Number	This field shows "0" for the Ethernet port.
Active	This field shows whether or not this port is enabled (the Ethernet port is always enabled).
Auto-Neg	This field shows whether auto-negotiation is turned on (**Yes**) or not (**No**). The **Speed** and **Duplex** fields display N/A when the auto-negotiation is turned on.
Speed	This is the speed of the Ethernet connection.
Duplex	The duplex mode can be half (meaning traffic is transmitted in one direction at a time) or full (meaning traffic is simultaneously transmitted in both directions).
Port Number	This field identifies the port's index number.

Table 12-2 G.SHDSL Port Setup

LABEL	DESCRIPTION
Active	This field shows whether the port is turned on (**Yes**) or not (**No**). The factory default of all DSL ports is disabled. A port must be enabled for data transmission to occur.
Name	This field shows the name that identifies this port.
Profile	This field shows which profile is assigned to this port.
Max Rate (Kbps)	This field shows the maximum speed that is configured for this port.
Max Rate (Kbps)	This field shows the minimum speed that is configured for this port.
PSD Region	This field shows the Power Spectral Density (PSD) region that is configured for this port (**Annex A** or **Annex B**).
Channels	This field displays the number of PVCs (Permanent Virtual Circuits) that are configured for this port.
N-wire Group Name	This field displays the name of an n-wire group (they are listed in alphabetical order).
Mode	This field displays how many wires are bundled in the n-wire group, as well as which side of the connection this n-wire group is. For example, **4-wire STU-C** means two ports physically bundled on the SHDSL Terminal Unit – Central side. **8-wire STU-R** means four ports physically bundled on the SHDSL Terminal Unit – Remote side.
Group Number	This field displays the number of the n-wire group.
Bundled Ports	This field displays the ports that belong to an n-wire group.
Add	Click this button to configure a new n-wire group.
Delete	Select an n-wire group's **Delete** check box and click the **Delete** button to remove the n-wire group. You cannot delete an n-wire group that is part of a port bonding group. You must first delete the port bonding group before you can delete an n-wire group that is a member of the port bonding group. **With 4-wire groups, you must delete group 1 before you can delete group 2. You also need to delete group 3 before you can delete group 4.**
Bonding Name	This field displays the name of a port bonding group (they are listed in alphabetical order).
Mode	This field displays the type of bonding units bonded in the port bonding group, as well as which side of the connection this port bonding group is. For example, **2-wireSTU-C** means port units are used on the SHDSL Terminal Unit – Central side. **4-wireSTU-R** means 4-wire group units are used on the SHDSL Terminal Unit – Remote side.
Member List	This field displays the ports or n-wire groups that belong to a port bonding group.
Add	Click this button to configure a new port bonding group.
Delete	Select a port bonding group's **Delete** check box and click the **Delete** button to remove the port bonding group.

12.8.1 G.SHDSL Profile Setup Screen

A profile is a list of settings that you define. Then you can assign them to one or more individual ports.

Click the **Profile Setup** link in the **Port Setup** screen to go to the **Profile Setup** screen.

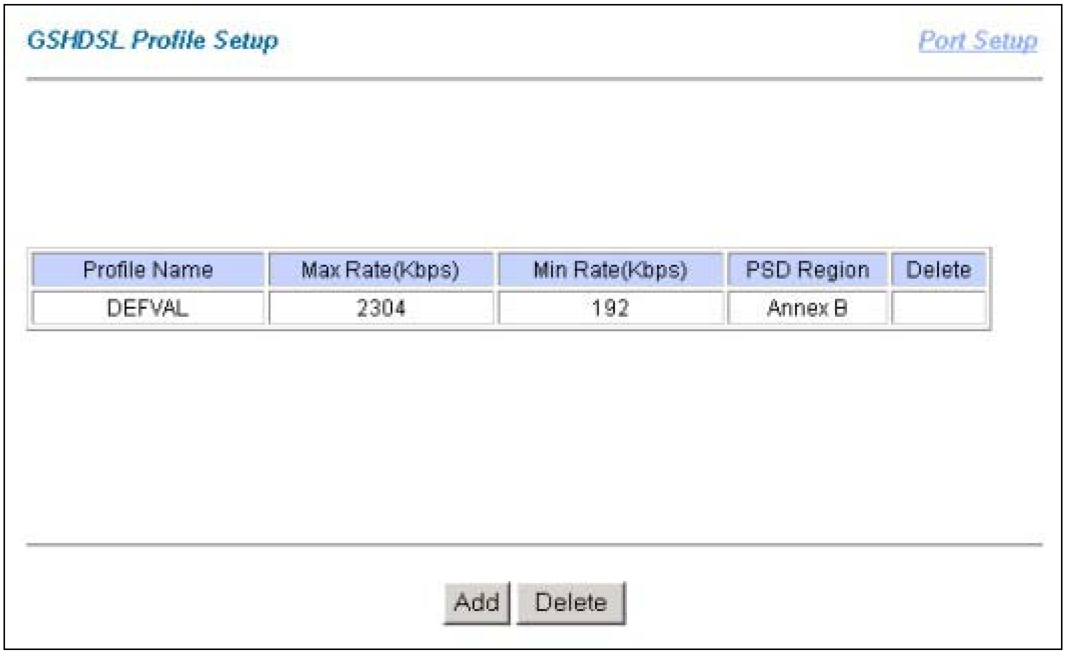


Figure 12-3 G.SHDSL Profile Setup

Table 12-3 G.SHDSL Profile Setup

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
Profile Name	These are the names of individual profiles. The DEFVAL profile always exists and all of the DSL ports have it assigned to them by default. Click a profile's name to go to a screen where you can edit the profile.
Max Rate (Kbps)	This is the maximum transfer rate in kilobits per second (Kbps) configured for the ports that use this profile.
Min Rate (Kbps)	This is the minimum transfer rate in kilobits per second (Kbps) configured for the ports that use this profile.
PSD Region	This field shows the Power Spectral Density (PSD) region that is configured for this profile (**Annex A** or **Annex B**).
Add	Click this button to configure a new profile.
Delete	Select a profile's **Delete** check box and click the **Delete** button to remove the profile.

G.SHDSL Profile Add or Edit Screen

Click the **Profile Setup** link in the **Port Setup** screen to go to the **Profile Setup** screen.

Click the **Add** button in the **Profile Setup** screen to add a new profile or click the name of an existing profile to edit the profile.

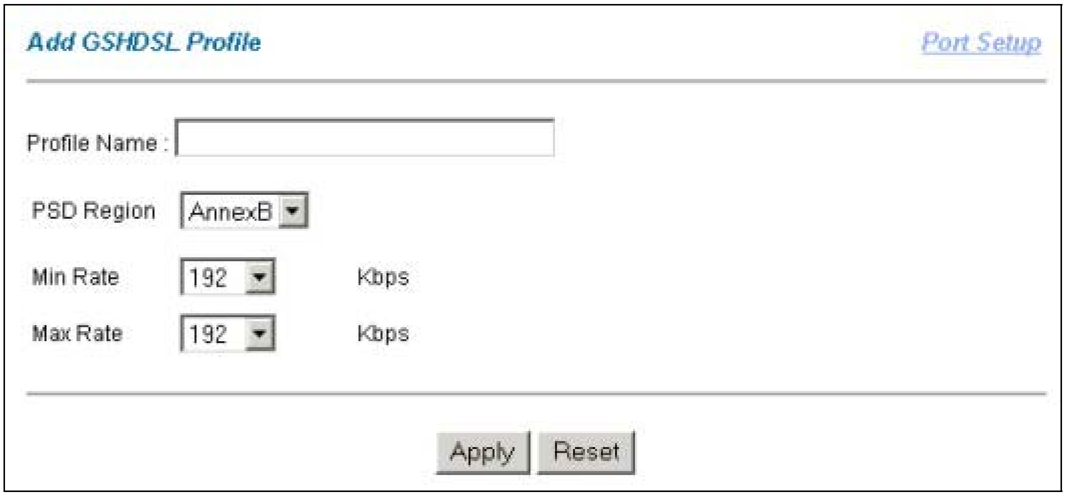


Figure 12-4 G.SHDSL Add Profile

Table 12-4 G.SHDSL Add Profile

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
Profile Name	When editing a profile, this is the name of this profile. When adding a profile, type a name for the profile.
PSD Region	Select the Power Spectral Density (PSD) region for this profile (**Annex A** for North America or **Annex B** for Europe).
Min Rate (Kbps)	Select a minimum speed from 192K to 2304K. Do not configure a minimum speed greater than the maximum speed.
Max Rate (Kbps)	Select a maximum speed from 192K to 2304K. Do not configure a maximum speed less than the minimum speed.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

12.8.2 Ethernet Port Setup Screen

Ethernet Port Setup in the SAM1008 module is the same as in the AAM1008 module (see *section 11.9*).

12.8.3 G.SHDSL Port Setup Screen

Click a G.SHDSL port in the **Port Setup** screen to open this screen.

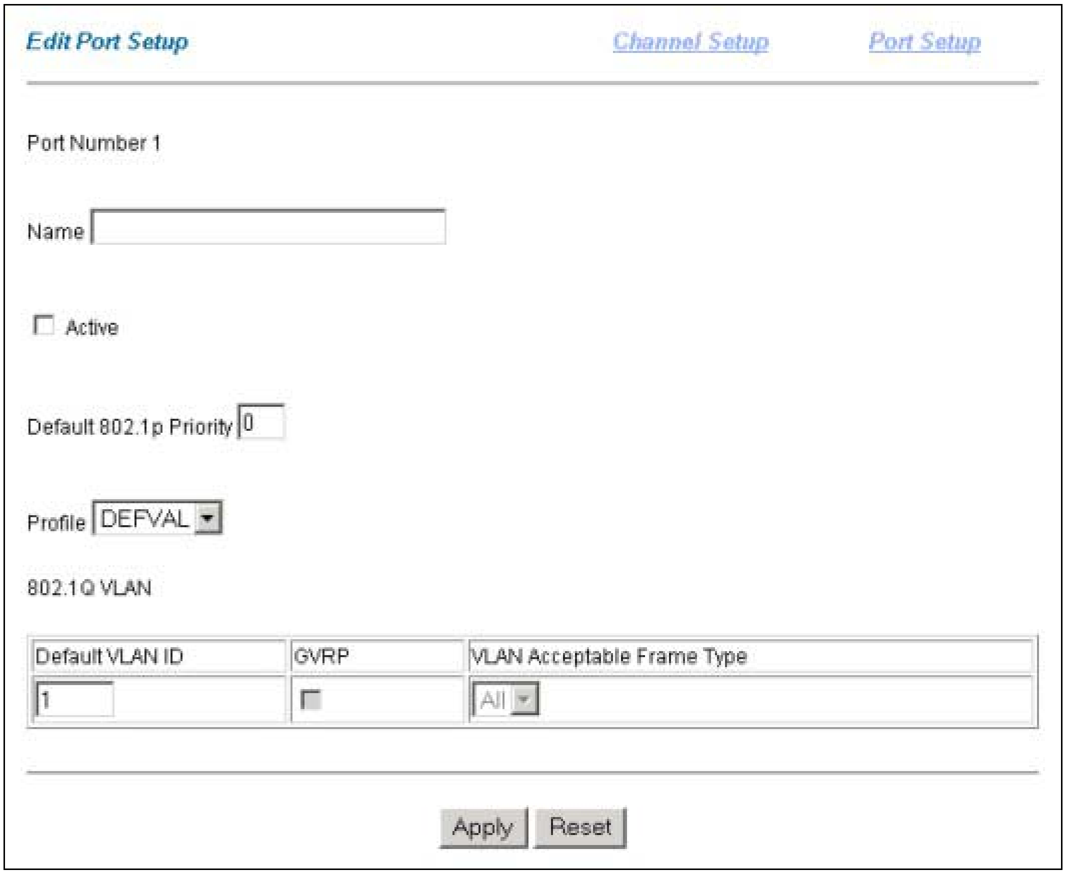


Figure 12-5 G.SHDSL Port Setup

The following table describes this screen.

Table 12-5 G.SHDSL Port Setup

LABEL	DESCRIPTION
Channel Setup	Click this link to go to the port's **Channel Setup** screen.
Port Setup	Click this link to go to the **Port Setup** screen.
Name	Type a name to identify this port.
Active	Select this check box to turn on this G.SHDSL port. The G.SHDSL ports are disabled by default because an enabled but disconnected G.SHDSL port generates more heat than an operating port. Disable G.SHDSL ports when they are not in use to minimize heat generation and enhance reliability.
Default 802.1p Priority	Type the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag.
Profile	Use the drop-down list box to select a profile to assign to this port.

Table 12-5 G.SHDSL Port Setup

LABEL	DESCRIPTION
Default VLAN ID	Type the Port VLAN ID (PVID) from 1 to 4094. The IES-1000 assigns the PVID to untagged frames or priority frames (0 VID) received on this port.
GVRP	GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. The IES-1000 propagates VLAN information to other devices when this check box is selected.[7]
VLAN Acceptable Frame Type	Select **All** if you want the port to accept both tagged and untagged incoming frames (on this port). Choose **Tagged** if you want the port to accept just tagged incoming frames (on this port). [8]
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

12.8.4 Add G.SHDSL N-wire Group

Click **Add** in the **Port Setup** screen (under the n-wire table) to go to the **Add G.SHDSL N-wire Group** screen.

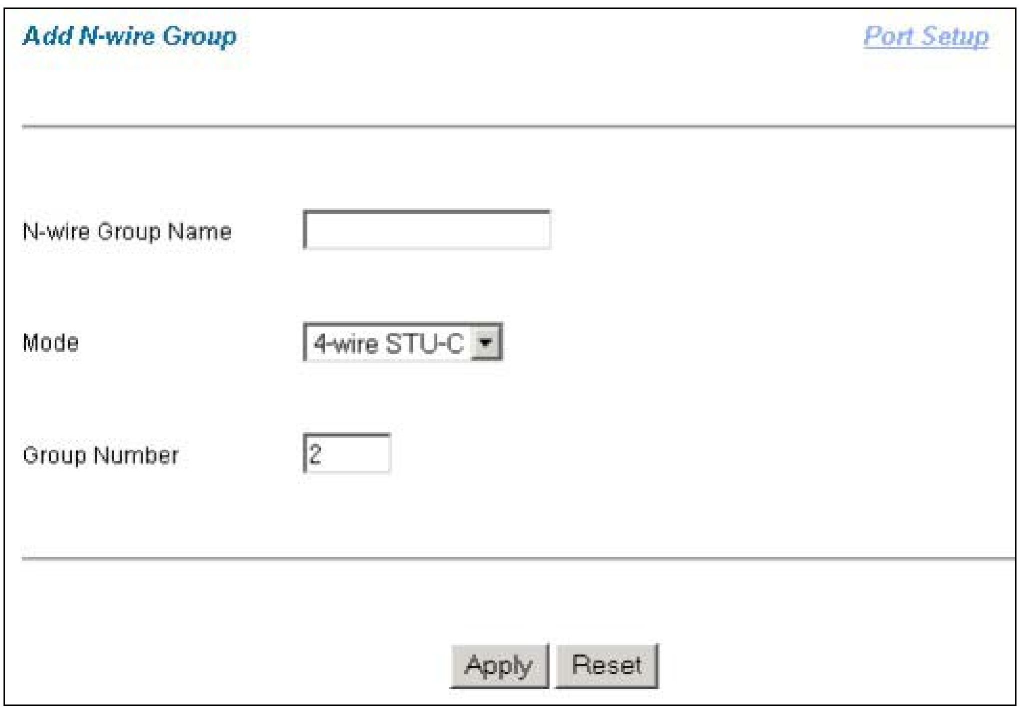


Figure 12-6 Add G.SHDSL N-wire Group

[7] At the time of writing, GVRP is not available with the DSL ports.

[8] At the time of writing, the **VLAN Acceptable Frame Type** field is read-only. The IES-1000 accepts both tagged and untagged incoming frames.

Table 12-6 Add G.SHDSL N-wire Group

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
N-wire Group Name	Type a name to identify this n-wire group.
Mode	Select how many wires to physically bundle together into an N-wire group and which side of the connection this n-wire group is. Each port uses two wires so a 4-wire group consists of two ports and an 8-wire group consists of four ports. For example, **4-wireSTU-C** means two ports on the SHDSL Terminal Unit – Central side. **8-wireSTU-R** means four ports on the SHDSL Terminal Unit – Remote side. You can bundle multiple groups of ports as long as they do not overlap. One SAM1008 module can have both STU-C and STU-R groups. Make sure that G.SHDSL ports one through four are all the same end of their connections (all STU-C or all STU-R). Make sure that G.SHDSL ports five through eight are all the same end of their connections (all STU-C or all STU-R). G.SHDSL ports one through four do not need to be set to be the same end of the connection as G.SHDSL ports five through eight. For example, G.SHDSL ports one through four could be set to be STU-C while G.SHDSL ports five through eight are set to be STU-R.
Group Number	Select which ports are to be members of this bundled n-wire group. With a 4-wire group, select 4 for ports seven and eight, 3 for ports five and six, 2 for ports three and four or 1 for ports one and two. **You must configure 4-wire group 4 before group 3 and group 2 before group 1.** Although you can configure groups 2 and 1 before configuring groups 4 and 3, it is recommended that you configure 4-wire groups from right to left (higher numbers to lower numbers) and delete them from left to right (lower numbers to higher numbers). With an 8-wire group, select 2 for ports five to eight or 1 for ports one to four.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

12.8.5 Add G.SHDSL Port Bonding

Click **Add** in the **Port Setup** screen (under the port bonding table) to go to the **Add G.SHDSL Port Bonding** screen.

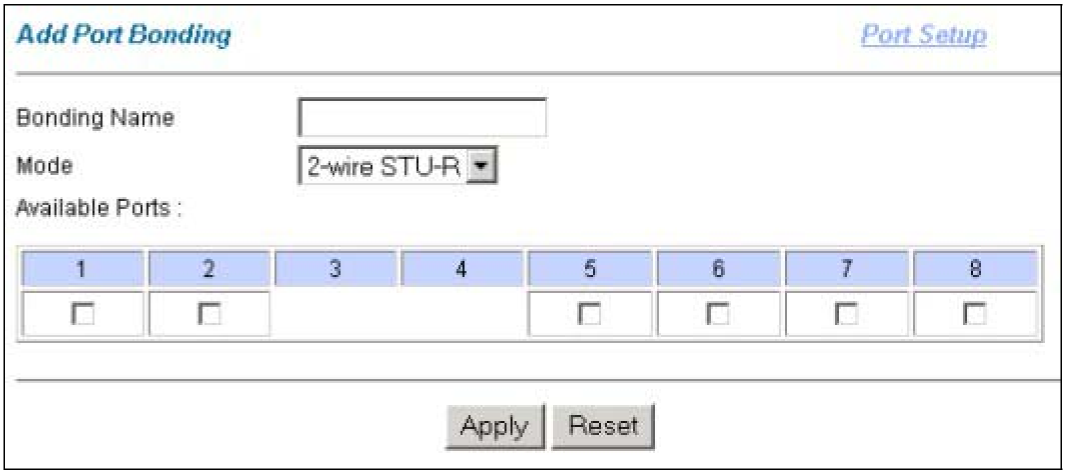


Figure 12-7 Add G.SHDSL Port Bonding

Table 12-7 Add G.SHDSL Port Bonding

LABEL	DESCRIPTION
Port Setup	Click this link to go to the **Port Setup** screen.
Bonding Name	Type a name to identify this port bonding group.
Mode	Select the type of bonding units that you want to bond together into a port bonding group (single logical connection) and which side of the connection this port bonding group is. Select **2-wire** to bond individual ports (each port uses two wires) together. Select **4-wire** to bond 4-wire (two port) n-wire groups together. Select **8-wire** to bond 8-wire (four port) n-wire groups together. **You must use the** Add G.SHDSL N-wire Group **screen to configure the 4 or 8-wire bundled groups before you can use this screen to bond them.** Select **STU-C** to set this end of the connection as the SHDSL Terminal Unit – Central side. Select **STU-R** to set this end of the connection as the SHDSL Terminal Unit – Remote side. You can bond multiple groups of ports as long as they do not overlap. One SAM1008 module can have both STU-C and STU-R groups. Make sure that G.SHDSL ports one through four are all the same end of their connections (all STU-C or all STU-R). Make sure that G.SHDSL ports five through eight are all the same end of their connections (all STU-C or all STU-R). G.SHDSL ports one through four do not need to be set to be the same end of the connection as G.SHDSL ports five through eight. For example, G.SHDSL ports one through four could be set to be STU-C while G.SHDSL ports five through eight are set to be STU-R.

Table 12-7 Add G.SHDSL Port Bonding

LABEL	DESCRIPTION
Available Ports /Available Groups	When you select a 2-wire mode, the screen displays the available ports (those that are not members of an n-wire group or another port bonding group). Select the member ports for this port bonding group. Configure the groups on both ends of a connection with the same number of ports. When you select 4-wire or 8-wire in the **Mode** field, the screen displays the available 4 or 8-wire groups. You must have already configured the 4 or 8-wire groups in the **Add G.SHDSL N-wire Group** screen and the groups cannot be members of another port bonding group. Select the member groups for this port bonding group. Configure the groups on both ends of a connection with the same number of 4 or 8-wire groups.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

Chapter 13
Virtual Channel Management

This chapter shows you how to configure virtual channels. The configuration of virtual channels is the same for both the AAM1008 and SAM1008 network modules.

13.1 About Virtual Channels

Defining channels (also called Permanent Virtual Circuits or PVCs) allows you to set priorities for different services or subscribers. You can define up to eight channels on each DSL port and use them for different services or levels of service. You set the PVID that is assigned to untagged frames received on each channel. You also set an IEEE 802.1p priority for each of the PVIDs. In this way you can assign different priorities to different channels (and consequently the services that get carried on them or the subscribers that use them).

For example, you want to give high priority to voice service on one of the AAM1008's ADSL ports.

Use the **Edit Static VLAN** screen to configure a static VLAN on the AAM1008 network module for voice on the port.

Use the **ADSL Edit Port Channel Setup** screen to:

- Configure a channel on the port for voice service.
- Set the channel to use the PVID of the static VLAN you configured.
- Assign the channel a high priority.

13.1.1 Super Channel

The IES-1000 forwards frames belonging to VLAN groups that are not assigned to specific channels to the super channel. Enable the super channel option to allow a channel forward frames belonging to multiple VLAN groups (that are not assigned to other channels). The super channel functions in the same way as the channel in a single channel environment. One port can have only one super channel.

13.1.2 LLC

LLC is a type of encapsulation where one VC (Virtual Circuit) carries multiple protocols with each packet header containing protocol identifying information. Despite the extra bandwidth and processing overhead, this method may be advantageous if it is not practical to have a separate VC for each carried protocol, for example, if charging heavily depends on the number of simultaneous VCs.

13.1.3 VC Mux

VC Mux is a type of encapsulation where, by prior mutual agreement, each protocol is assigned to a specific virtual circuit, for example, VC1 carries IP, VC2 carries IPX, and so on. VC-based multiplexing may be dominant in environments where dynamic creation of large numbers of ATM VCs is fast and economical.

13.1.4 Virtual Channel Profile

Virtual channel profiles allow you to configure the virtual channels efficiently. You can configure all of the virtual channels with the same profile, thus removing the need to configure the virtual channels one-by-one. You can also change an individual virtual channel by assigning it a different profile.

The IES-1000 provides two default virtual channel profiles: **DEFVAL** (for LLC encapsulation) and **DEFVAL_VC** (for VC encapsulation). By default, all virtual channels are associated to **DEFVAL**.

13.2 DSL Port Channel Setup Screen

Do the following to open a port's **Channel Setup** screen:

Step 1. Click a DSL port's index number in the **Port Setup** screen to go to the **Edit Port Setup** screen.

Step 2. Click **Channel Setup** in the **Edit Port Setup** screen to go to the **Channel Setup** screen.

This screen is a summary screen that displays read-only information about the DSL port's VPI/VCI settings.

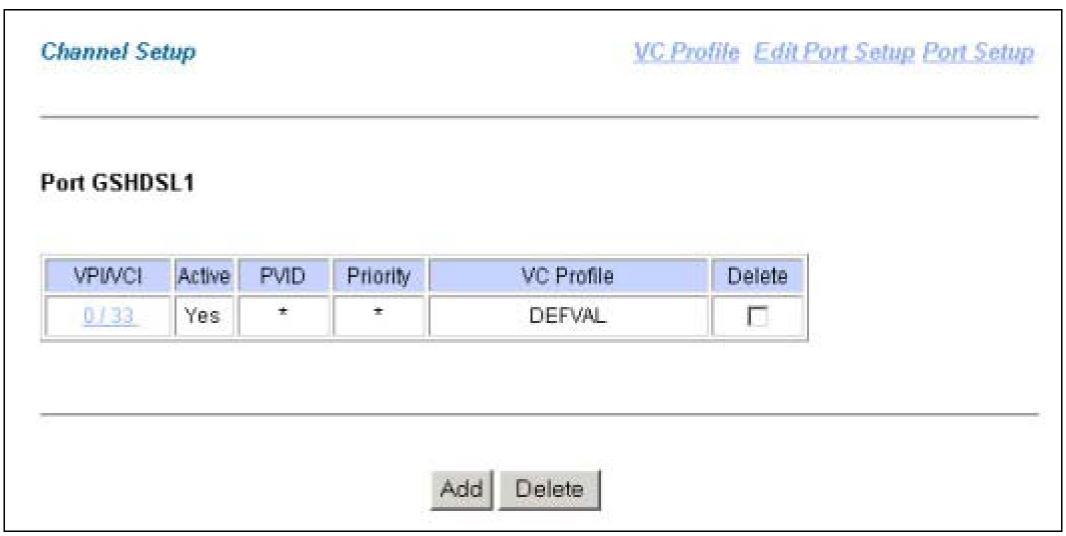


Figure 13-1 DSL Port Channel Setup

Table 13-1 DSL Port Channel Setup

LABEL	DESCRIPTION
VC Profile	Click this link to go to the **VC Profile Setup** screen.

Table 13-1 DSL Port Channel Setup

LABEL	DESCRIPTION
Edit Port Setup	Click this link to go to the **Edit Port Setup** screen.
Port Setup	Click this link to go to the **Port Setup** screen.
VPI/VCI	This field displays the Virtual Path Identifier (VPI) and Virtual Circuit Identifier (VCI). The VPI and VCI identify a channel on this port. Click a link in the **VPI/VCI** column to open a screen where you can edit the VPI/VCI settings.
Active	This field shows whether the channel is turned on (**Yes**) or not (**No**).
PVID	This is the PVID (Port VLAN ID) assigned to untagged frames or priority frames (0 VID) received on this channel. An asterisks (*) denotes a super channel.
Priority	Type the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. An asterisks (*) denotes a super channel.
VC Profile	This shows which VC profile the channel is set to use.
Add	Click this button to configure a new channel.
Delete	Select a channel's **Delete** check box and click the **Delete** button to remove the channel.

13.3 ATM QoS

ATM Quality of Service (QoS) mechanisms provide the best service on a per-flow guarantee. ATM network infrastructure was designed to provide QoS. It uses fixed cell sizes and built-in traffic management (see the following section on traffic shaping). This allows you to fine-tune the levels of services on the priority of the traffic flow.

13.4 Traffic Shaping

Traffic shaping is an agreement between the carrier and the subscriber to regulate the average rate and fluctuations of data transmission over an ATM network. This agreement helps eliminate congestion, which is important for transmission of real time data such as audio and video connections.

13.4.1 ATM Traffic Classes

These are the basic ATM traffic classes defined by the ATM Forum Traffic Management 4.0 Specification.

Constant Bit Rate (CBR)

Constant Bit Rate (CBR) is an ATM traffic class that provides fixed bandwidth. CBR traffic is generally time-sensitive (doesn't tolerate delay). CBR is used for connections that continuously require a specific amount of bandwidth. Examples of connections that need CBR would be high-resolution video and voice.

Variable Bit Rate (VBR)

The Variable Bit Rate (VBR) ATM traffic class is used with bursty connections. Connections that use the Variable Bit Rate (VBR) traffic class can be grouped into real time (rt-VBR) or non-real time (nrt-VBR) connections.

The rt-VBR (real-time Variable Bit Rate) type is used with bursty connections that require closely controlled delay and delay variation. An example of an rt-VBR connection would be video conferencing. Video conferencing requires real-time data transfers and the bandwidth requirement varies in proportion to the video image’s changing dynamics.

The nrt-VBR (non real-time Variable Bit Rate) type is used with bursty connections that do not require closely controlled delay and delay variation. An example of an nrt-VBR connection would be non-time sensitive data file transfers.

Available Bit Rate (ABR)

The Available Bit Rate (ABR) ATM traffic class is used for bursty data transfers. ABR gives a subscriber a set amount of bandwidth and allows the use of more if it is available. End devices using ABR get feedback from the network and can use flow-control to dynamically adjust transmission rates.

ABR uses RM (Resource Management) cells to send feedback information from the connection’s destination and/or intervening network switches to the connection’s source. A source generates forward RM cells, which the destination returns to the source as backward RM cells. Along the way, network switches can adjust the fields in the RM cells depending on network conditions. Number of Resource Management (NRM) is the maximum number of cells a source may send for each forward Resource Management cell.

Minimum Cell Rate (MCR) applies with the **abr** traffic class.

Unspecified Bit Rate (UBR)

The Unspecified Bit Rate (UBR) ATM traffic class is similar to the ABR traffic class for bursty data transfers. However, while ABR gives subscribers a set amount of bandwidth, UBR doesn’t guarantee any bandwidth and only delivers traffic when the network has spare bandwidth.

13.4.2 Traffic Parameters

These are the parameters that control the flow of ATM traffic.

Peak Cell Rate (PCR)

Peak Cell Rate (PCR) is the maximum rate at which the sender can send cells. This parameter may be lower (but not higher) than the maximum line speed. 1 ATM cell is 53 bytes (424 bits), so a maximum speed of 832Kbps gives a maximum PCR of 1962 cells/sec. This rate is not guaranteed because it is dependent on the line speed.

Sustained Cell Rate (SCR)

Sustained Cell Rate (SCR) is the mean cell rate of each bursty traffic source. It specifies the maximum average rate at which cells can be sent over the virtual connection. SCR may not be greater than the PCR.

Maximum Burst Size (MBS)

Maximum Burst Size (MBS) is the maximum number of cells that can be sent at the PCR. After MBS is reached, cell rates fall below SCR until cell rate averages to the SCR again. At this time, more cells (up to the MBS) can be sent at the PCR again.

Minimum Cell Rate (MCR)

Minimum Cell Rate (MCR) is the minimum rate at which the sender can send cells

If the PCR, SCR or MBS is set to the default of "0", the system will assign a maximum value that correlates to your upstream line rate.

The following figure illustrates the relationship between PCR, SCR, MCR and MBS.

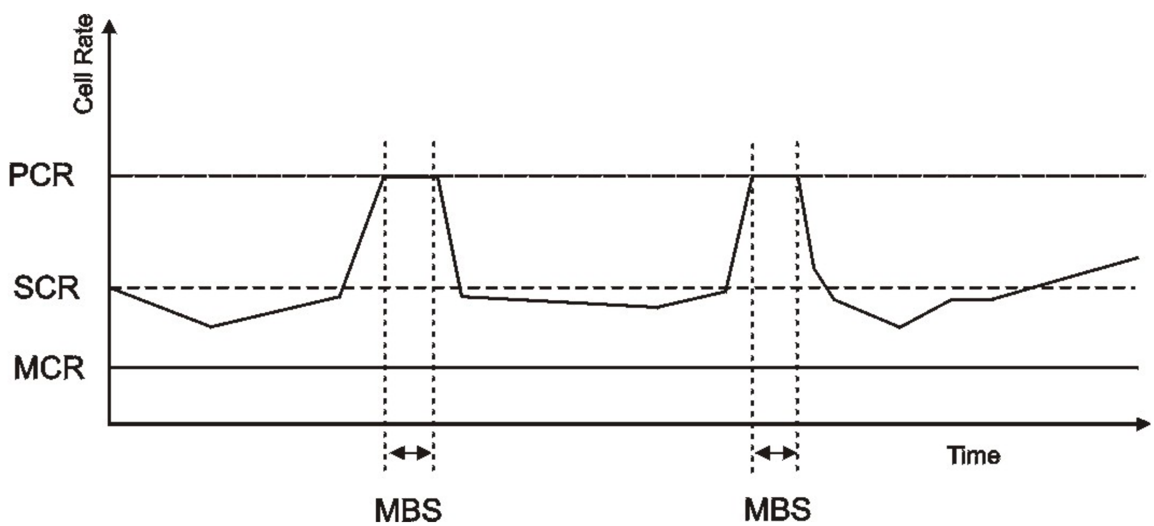


Figure 13-2 PCR, SCR, MCR and MBS in Traffic Shaping

Cell Delay Variation Tolerance (CDVT)

Cell Delay Variation Tolerance (CDVT) is the accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay. CDVT controls the time scale over which the PCR is enforced. CDVT is used to determine if a cell arrived too early in relation to PCR.

Burst Tolerance (BT)

Burst Tolerance (BT) is the maximum number of cells that the port is guaranteed to handle without any discards. BT controls the time scale over which the SCR is enforced. BT is used to determine if a cell arrived too early in relation to SCR. Use this formula to calculate BT: (MBS – 1) x (1 / SCR – 1 / PCR) = BT.

Theoretical Arrival Time (TAT)

The Theoretical Arrival Time (TAT) is when the next cell (in an ATM connection's stream of cells) is expected to arrive. TAT is calculated based on the PCR or SCR.

The following figure illustrates the relationship between TAT, CDVT and BT. If a cell arrives at time A, then according to PCR or SCR, the next cell is expected to arrive at time B. If the next cell arrives earlier than time C, it is discarded or tagged for not complying with the TAT. Time C is calculated based on the CDVT or BT.

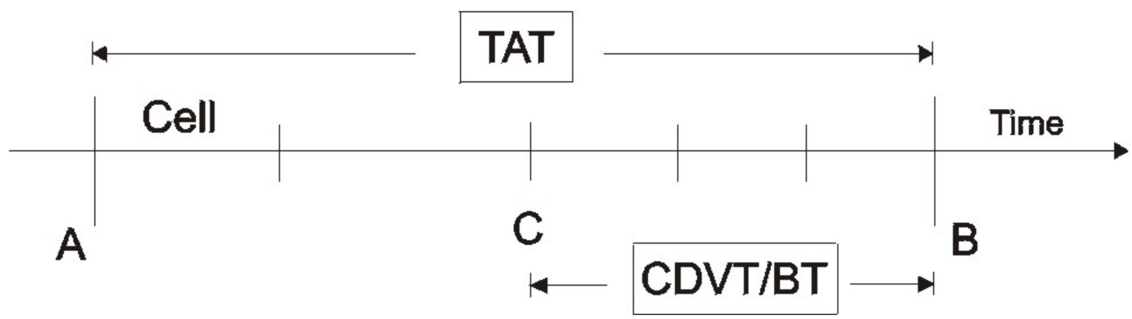


Figure 13-3 TAT, CDVT and BT in Traffic Shaping

13.4.3 DSL Port VC Profile Setup Screen

Do the following to open the **VC Profile** screen:

Step 1. Click a DSL port's index number in the **Port Setup** screen to go to the **DSL Port Setup** screen.

Step 2. Click **Channel Setup** in the **DSL Port Setup** screen to go to the **Channel Setup** screen.

Step 3. Click **VC Profile** in the **Channel Setup** screen to open the **VC Profile** screen.

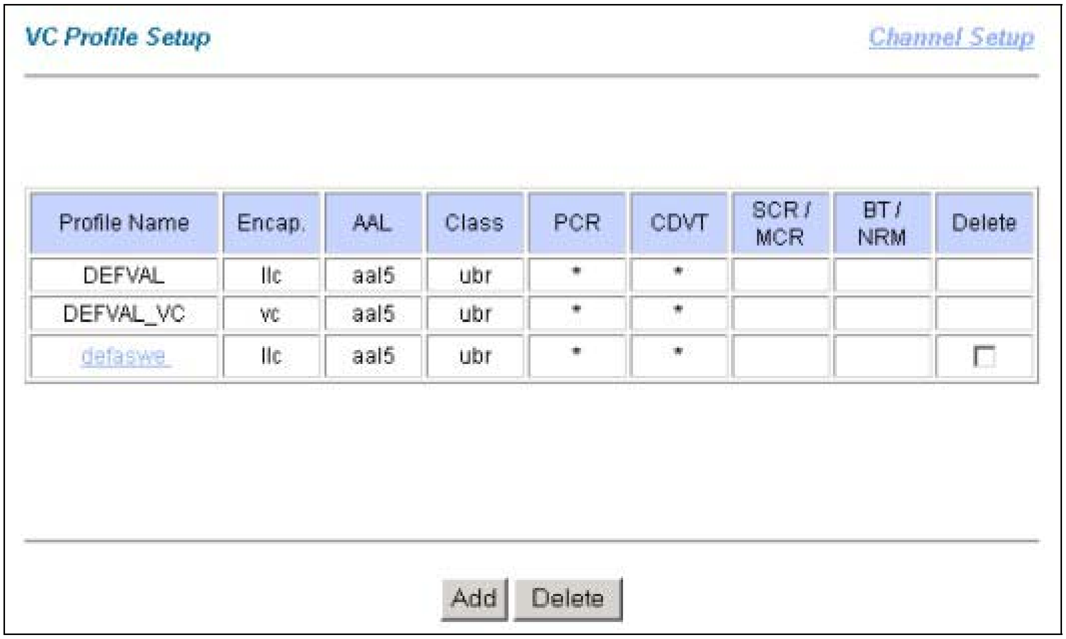


Figure 13-4 DSL Port VC Profile Setup

Table 13-2 DSL Port VC Profile Setup

LABEL	DESCRIPTION
Channel Setup	Click this link to go to the **Channel Setup** screen.
Profile Name	This name identifies the profile.
Encap.	This field displays the type of encapsulation (**LLC** or **VC**).
AAL	This field displays the ATM Adaptation Layer (AAL).
Class	This field displays the type of ATM traffic class: **cbr** (constant bit rate), **rt-vbr** (real-time variable bit rate), **nrt-vbr** (non real-time variable bit rate), **ubr** (unspecified bit rate) or **abr** (available bit rate).
PCR	This is the Peak Cell Rate (PCR), the maximum rate at which the sender can send cells.
CDVT	This field displays the accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay.
SCR/MCR	The Sustained Cell Rate (SCR) sets the average cell rate (long-term) that can be transmitted. SCR applies with the **rt-vbr** and **nrt-vbr** traffic classes. Minimum Cell Rate (MCR) is the minimum rate at which the sender can send cells. MCR applies with the **abr** traffic class.
BT/NRM	Burst Tolerance (BT) is the maximum number of cells that the port is guaranteed to handle without any discards. BT applies with the **rt-vbr** and **nrt-vbr** traffic classes. The Number of Resource Management (NRM) cells is the maximum number of cells a source may send for each forward Resource Management cell. NRM applies with the **abr** traffic class.
Add	Click this button to configure a new VC profile.
Delete	Select a VC profile's **Delete** check box and click the **Delete** button to remove the VC profile.

DSL Port VC Profile Add or Edit Screen

Do the following to open the **VC Profile** screen:

Step 1. Click a DSL port's index number in the **Port Setup** screen to go to the **DSL Port Setup** screen.

Step 2. Click **Channel Setup** in the **DSL Port Setup** screen to go to the **Channel Setup** screen.

Step 3. Click **VC Profile** in the **Channel Setup** screen to open the **VC Profile** screen.

Step 4. Click the **Add** button in the **VC Profile** screen to add a new VC profile or click an existing VC profile's link in the **Profile Name** column to edit the profile.

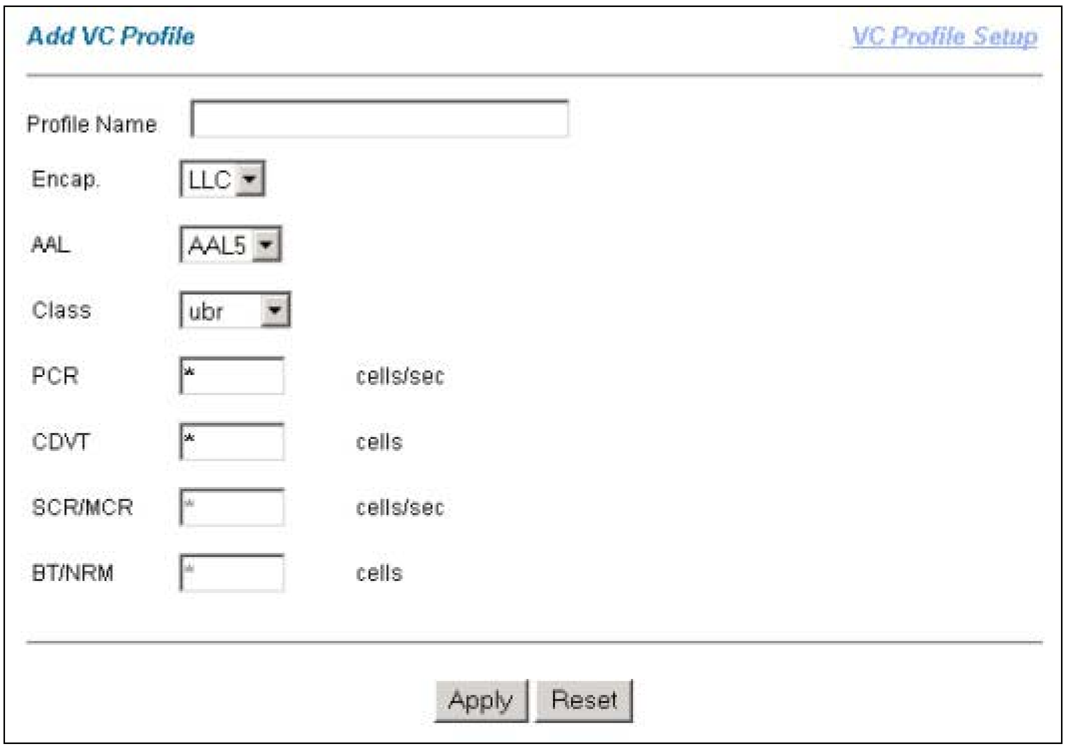


Figure 13-5 DSL Port VC Profile Add

Table 13-3 DSL Port VC Profile Add

LABEL	DESCRIPTION
VC Profile Setup	Click this link to go to the **VC Profile Setup** screen.
Profile Name	When editing a profile, this is the name of this profile. When adding a profile, type a name for the profile.
Encap.	Select the encapsulation type (**LLC** or **VC**) for this port.
AAL	Select the ATM Adaptation Layer (0, 3, 4 or 5).

Table 13-3 DSL Port VC Profile Add

LABEL	DESCRIPTION
Class	Select **cbr** (constant bit rate) to specify fixed (always-on) bandwidth for voice or data traffic. Select **ubr** (unspecified bit rate) for applications that are non-time sensitive, such as e-mail. Select **rt-vbr** (real time variable bit rate) or **nrt-vbr** (non real time variable bit rate) for bursty traffic and bandwidth sharing with other applications. Select **abr** (available bit rate) for file transfers and other bursty, non-real time traffic.
PCR	Divide the DSL line rate (bps) by 424 (the size of an ATM cell) to find the Peak Cell Rate (PCR). This is the maximum rate at which the sender can send cells. PCR applies with all of the ATM traffic classes. Type the PCR here.
CDVT	Cell Delay Variation Tolerance (CDVT) is the accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay. CDVT applies with all of the ATM traffic classes. Type the CDVT here.
SCR/MCR	The Sustained Cell Rate (SCR) sets the average cell rate (long-term) that can be transmitted. Type the SCR, which must be less than the PCR. SCR applies with the **rt-vbr** and **nrt-vbr** traffic classes. Minimum Cell Rate (MCR) is the minimum rate at which the sender can send cells. MCR applies with the **abr** traffic class.
BT/NRM	Burst Tolerance (BT) sets a maximum number of cells that the port is guaranteed to handle without any discards. Type the BT here. BT applies with the **rt-vbr** and **nrt-vbr** traffic classes. The Number of Resource Management (NRM) cells sets the maximum number of cells a source may send for each forward Resource Management cell. Type the NRM here. NRM applies with the **abr** traffic class.
Add	Click this button to configure a new channel.
Delete	Select a channel's **Delete** check box and click the **Delete** button to remove the channel.

13.4.4 DSL Port Channel Add or Edit Screen

Do the following to open the **DSL Port Channel Add** or **Edit** screen:

Step 1. Click a DSL port's index number in the **Port Setup** screen to go to the **DSL Port Setup** screen

Step 2. Click **Channel Setup** in the **DSL Port Setup** screen to go to the port's **Channel Setup** screen.

Step 3. Click the **Add** button in the **Channel Setup** screen to add a new channel or click an existing channel's link in the **VPI/VCI** column to edit the channel.

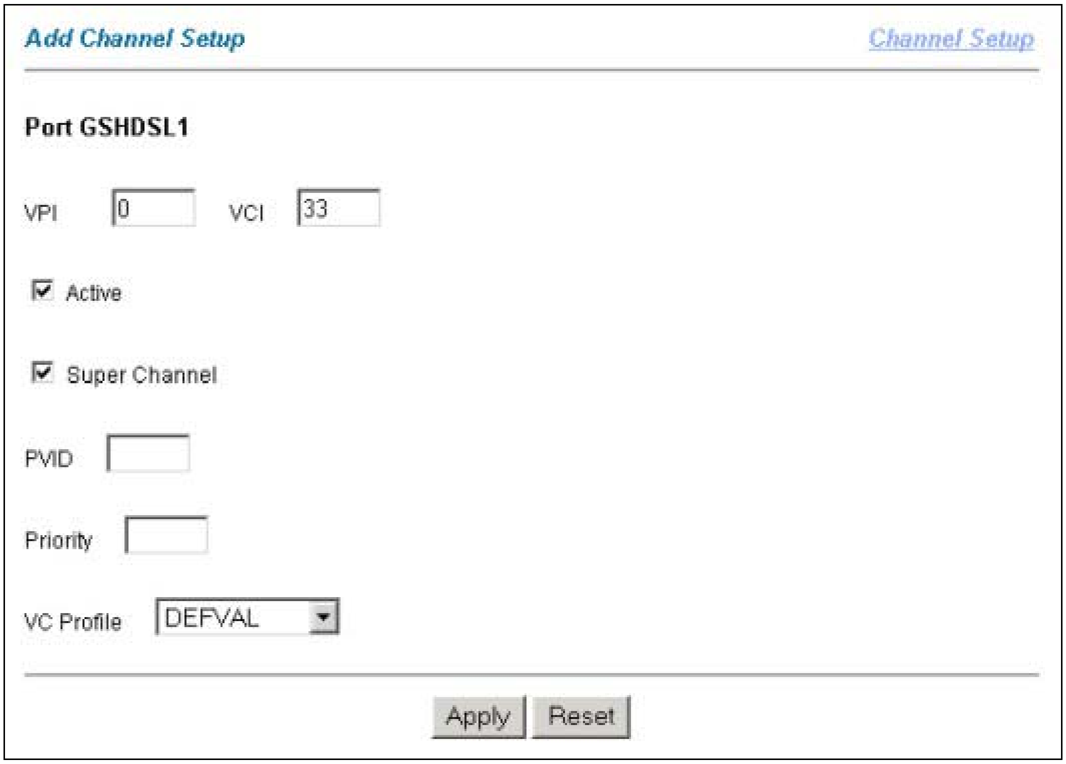


Figure 13-6 DSL Port Channel Add

Table 13-4 DSL Port Channel Add

LABEL	DESCRIPTION
Channel Setup	Click this link to go to the port's **Channel Setup** screen.
VPI	Type the Virtual Path Identifier for this port.
VCI	Type the Virtual Circuit Identifier for this port.
Active	Select this check box to turn on the channel.
Super Channel	The IES-1000 forwards frames belonging to VLAN groups that are not assigned to specific channels to the super channel. Enable the super channel option to have this channel forward frames belonging to multiple VLAN groups (that are not assigned to other channels). The super channel functions in the same way as the channel in a single channel environment.
PVID	This is the PVID (Port VLAN ID) assigned to untagged frames received on this channel. You cannot configure a PVID for a super channel.
Priority	Type the priority value (0 to 7) to add to incoming frames without a (IEEE 802.1p) priority tag. You cannot configure a priority for a super channel.
VC Profile	Use the drop-down list box to select a VC profile to assign to this channel.

Table 13-4 DSL Port Channel Add

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this screen afresh.

Part IV:

Advanced Applications and Management

This part describes the Advanced Applications and Advanced Management web configurator screens and troubleshooting.

Chapter 14
Static Route

This chapter explains how to configure static routes for the IES-1000.

14.1 Static Route Overview

The web configurator allows you to set up static routes that tell the IES-1000 how to forward management traffic when you configure the TCP/IP parameters manually.

14.2 Static Route Setup Screen

Click **Static Route Setup** in the navigation panel to open this screen.

Static Route Setup is a static route summary table.

Figure 14-1 Static Route Setup

The following table describes this screen.

Table 14-1 Static Route Setup

LABEL	DESCRIPTION
Name	This field displays the descriptive name for this route. This is for identification purposes only.
Destination Address	This field displays the IP network address of the final destination.
Subnet Mask	This field displays the subnet mask for this destination.
Gateway Address	This field displays the IP address of the gateway. The gateway is an immediate neighbor of your IES-1000 that will forward the packet to the destination.
Metric	This field displays the cost of transmission for routing purposes.
Add	Click this button to configure a new static route.
Delete	Select a static route(s)'s **Delete** check box and click the **Delete** button to remove the static route.

14.2.1 Add Static Route Screen

Click **Static Route Setup** in the navigation panel to open the **Static Route** screen and then click **Add** to open this screen.

Use this menu to configure a static route.

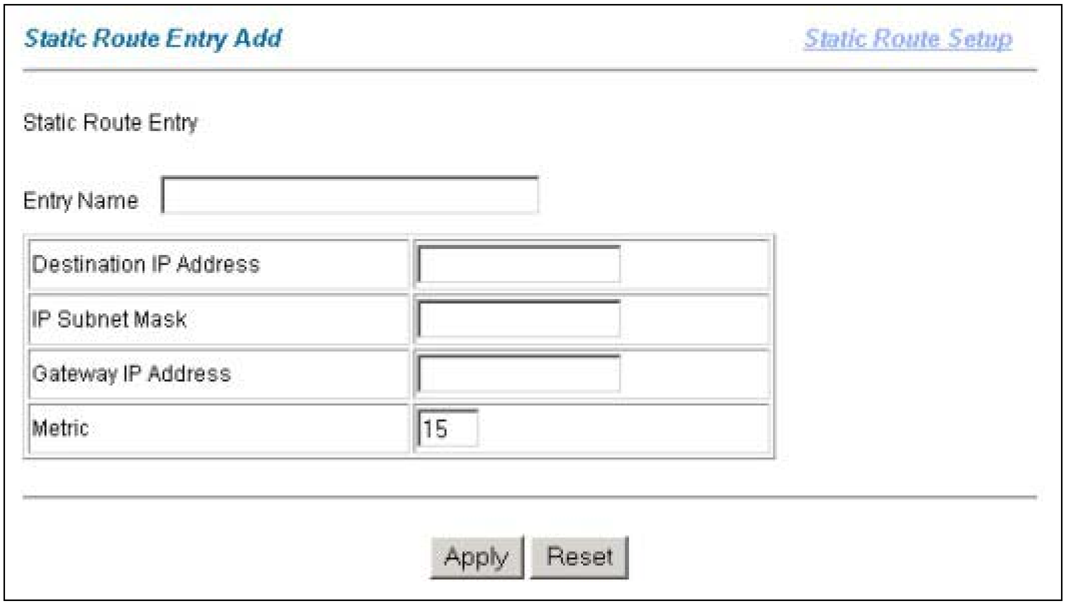


Figure 14-2 Add Static Route

The following table describes this screen.

Table 14-2 Add Static Route

LABEL	DESCRIPTION
Static Route Setup	Click this link to go to the **Static Route Setup** page.
Entry Name	Enter a descriptive name for the static route (maximum 27 alphanumeric characters). This is for identification purposes only.
Destination IP Address	This parameter specifies the IP network address of the final destination. Routing is always based on network number. If you need to specify a route to a single host, use a subnet mask of 255.255.255.255 in the subnet mask field to force the network number to be identical to the host ID.
IP Subnet Mask	Enter the subnet mask for this destination.
Gateway IP Address	Enter the IP address of the gateway. The gateway is an immediate neighbor of your IES-1000 that will forward the packet to the destination. The gateway must be a router on the same segment as your IES-1000.
Metric	The metric represents the cost of transmission for routing purposes. IP routing uses hop count as the measurement of cost, with a minimum of 0 for directly connected networks. Enter a number that approximates the cost for this link. The number need not be precise, but it must be between 0 and 15. In practice, 2 or 3 is usually a good number.

Table 14-2 Add Static Route

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this page afresh

Chapter 15 VLAN

This chapter explains how to configure VLANs on the IES-1000.

15.1 VLAN Overview

A VLAN (Virtual Local Area Network) allows a physical network to be partitioned into multiple logical networks. Stations on a logical network belong to one group. A station can belong to more than one group. With VLAN, a station cannot directly talk to or hear from stations that are not in the same group(s); the traffic must first go through a router.

In MTU applications, VLAN is vital in providing isolation and security among the subscribers. When properly configured, VLAN prevents one subscriber from accessing the network resources of another on the same LAN, thus a user will not see the printers and hard disks of another user in the same building.

VLANs also increase network performance by limiting broadcasts to a smaller and more manageable logical broadcast domain. In traditional switched environments, all broadcast packets go to each and every individual port. With VLAN, all broadcasts are confined to a specific broadcast domain.

Note that VLANs are unidirectional- they only govern outgoing traffic.

15.2 Tagged VLANs (IEEE 802.1Q)

When a LAN bridge receives a frame from a workstation, the VLAN from whence it came must be known so the bridge may respond, if necessary, to the source of the frame. This is accomplished by tagging. There are two kinds of tagging:

1. Explicit Tagging
   - A VLAN identifier is added to the frame header that identifies the source VLAN.
2. Implicit Tagging
   - The MAC (Media Access Control) number, the port or other information is used to identify the source of a VLAN frame.

The IEEE 802.1Q Tagged VLAN uses both explicit and implicit tagging.

Tagged VLAN uses an explicit tag (VLAN ID) in the MAC header to identify the VLAN membership of a frame across bridges - tagged VLANs are not confined to the switch on which they were created. The VLANs can be created statically by hand or dynamically through GVRP. The VLAN ID associates a frame with a specific VLAN and provides the information that switches need to process the frame across the network. A tagged frame is four bytes longer than an untagged frame and contains two bytes of TPID (Tag Protocol Identifier, residing within the type/length field of the Ethernet frame) and two bytes of TCI (Tag Control Information, a tagged header starts after the source address field of the Ethernet frame).

TPID 2 Bytes	User Priority 3 Bits	CFI 1 Bit	VLAN ID 12 bits

TPID has a defined value of 8100 (hex). The first three bits of the TCI define user priority (giving eight priority levels). The CFI (Canonical Format Indicator) is a single-bit flag, always set to zero for Ethernet switches. The remaining twelve bits define the VLAN ID, giving a possible maximum number of 4,096 VLANs. Note that user priority and VLAN ID are independent of each other. A frame with VID (VLAN Identifier) of null (0) is called a priority frame, meaning that only the priority level is significant and the default VID of the ingress port is given as the VID of the frame. Of the 4096 possible VIDs, a VID of 0 is used to identify priority frames and value 4095 (FFF) is reserved, so the maximum possible VLAN configurations are 4,094.

15.3 Forwarding Tagged and Untagged Frames

Each port on the switch is capable of receiving tagged or untagged frames. You can configure a network module to receive only tagged or all frames on a port-by-port basis. If it is set to tagged-only on a port, then only tagged frames are allowed to enter from that port and untagged frames are dropped; if set to all, then both tagged and untagged frames are allowed to enter the switch. The network module does not alter the VID of a frame if it is already tagged; however, when an untagged frame enters the switch, it is assigned the default port VID (PVID) of the ingress (incoming) port. Thus a frame always has a VID inside the switch, regardless of whether it is tagged or not on the wire. The default PVID is 1 for all ports, but this can be changed.

The egress (outgoing) port(s) of a frame is determined on the combination of the destination MAC address and the VID of the frame. For a unicast frame, the egress port based by the destination address must be a member of the VID, also; otherwise, the frame is blocked. For a broadcast (or multicast without IGMP snooping) frame, it is duplicated only on ports (except the ingress port itself) that are members of the VID, thus confining the broadcast to a specific domain.

Whether to tag an outgoing frame depends on the setting of the egress port on a per VLAN, per port basis (recall that a port can be members of multiple VID). If the tagging on the egress port is enabled for the VID of a frame, then the frame is transmitted as a tagged frame; otherwise, it is transmitted as an untagged frame.

15.4 Filtering Databases

A filtering database stores and organizes VLAN registration information useful for switching frames to and from a LAN bridge. A filtering database consists of a static entries (Static VLAN or SVLAN table) and dynamic entries (Dynamic VLAN or DVLAN table).

15.4.1 Static Entries (SVLAN Table)

Static entry registration information is added, modified and removed by management only.

15.4.2 Dynamic Entries (DVLAN Table)

Dynamic entries are learned by the bridge and cannot be created or updated by management. The bridge learns this information by observing what port, source address and VLAN ID (or VID) is associated with a frame. Entries are added and deleted using GARP VLAN Registration Protocol (GVRP), where GARP is the Generic Attribute Registration Protocol.

15.5 Automatic VLAN Registration

GARP and GVRP are the protocols used to automatically register VLAN membership across switches.

15.6 GARP

GARP (Generic Attribute Registration Protocol) allows network devices to register and de-register attribute values with other GARP participants within a bridged LAN. GARP is a protocol that provides a generic mechanism for protocols that serve a more specific application, for example, GVRP.

15.6.1 GARP Timers

Switches join VLANs by making a declaration. A declaration is made by issuing a Join message using GARP. Declarations are withdrawn by issuing a Leave message. A Leave All message terminates all registrations. GARP timers set declaration timeout values.

15.6.2 GVRP

GVRP (GARP VLAN Registration Protocol) is a registration protocol that defines a way for switches to register necessary VLAN members on ports across the network. Enable this function to permit VLANs groups beyond the local switch.

Please refer to the following table for common GARP terminology.

Table 15-1 GARP Terminology

VLAN Type	Permanent VLAN	This is a static VLAN created manually.
	Dynamic VLAN	This is a VLAN configured by a GVRP registration/deregistration process.
VLAN Administrative Control	Registration Fixed	Fixed registration ports are permanent VLAN members.
	Registration Forbidden	Ports with registration forbidden are not allowed to register (join) this VLAN.
	Normal Registration	Ports join a VLAN using GVRP.
VLAN Tag Control	Tagged	Ports tag all (VLAN member) egress frames transmitted.
	Untagged	Ports do not tag all (VLAN member) egress frames transmitted.

Table 15-1 GARP Terminology

VLAN Port	Port VID	This is the VLAN ID assigned to untagged frames that this port received (in Port Setup).
	Acceptable Frame Type	Whether tagged only or both untagged frames are accepted on this port.
	Port Filtering	If set, the IES-1000 discards incoming frames for VLANs which do not include this port in its member set.

15.7 VLAN Setup

The web configurator allows you to configure VLAN settings for the individual cards.

15.8 Static VLAN Setup Screen

Click **VLAN Setup** in the navigation panel to open this screen.

This menu displays IEEE 802.1Q VLAN parameters for the IES-1000.

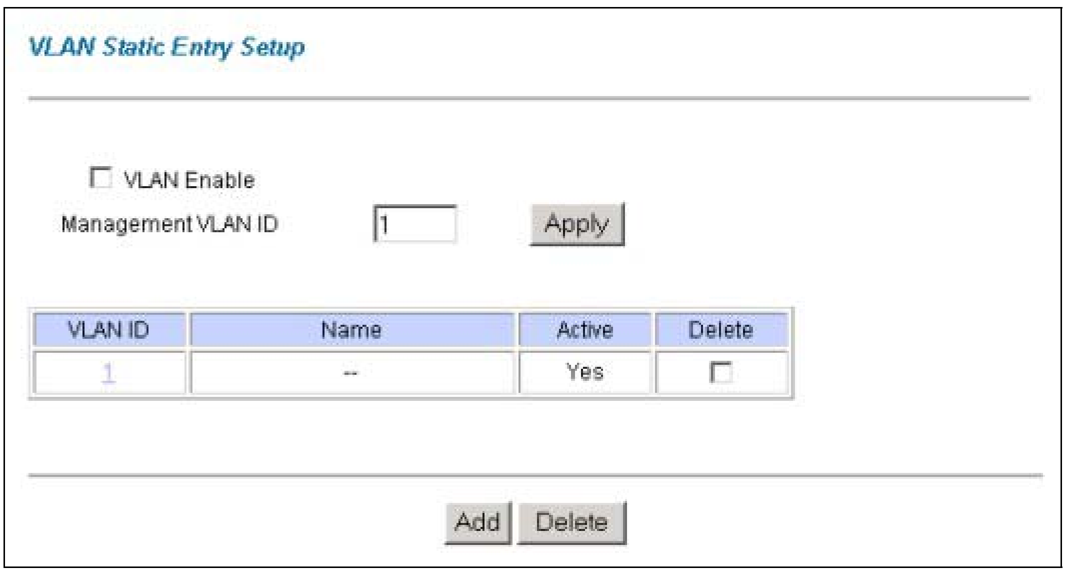


Figure 15-1 Static VLAN Setup

The following table describes this screen.

Table 15-2 Static VLAN Setup

LABEL	DESCRIPTION
VLAN Enable	Select this check box to turn on the VLAN and permit VLANs groups beyond the local switch.[1]

[1] At the time of writing, enabling VLAN also enables GVRP on the Ethernet port.

Table 15-2 Static VLAN Setup

LABEL	DESCRIPTION
Management VLAN ID	The management VLAN ID is the number of the VLAN through which you manage the IES-1000. The management VLAN defines which ports you can use to manage the IES-1000. You cannot manage the IES-1000 via a port that is not a member of the management VLAN.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
VLAN ID	This field displays the ID number of the VLAN. Click an entry's VLAN ID to go to a screen where you can edit that VLAN.
Name	This field displays the name of this VLAN.
Active	This field displays **Yes** when the entry is activated and **No** when the entry is empty.
Add	Click this button to configure a new VLAN.
Delete	Select a VLAN(s)'s **Delete** check box and click the **Delete** button to remove the VLAN.

15.8.1 Add or Edit VLAN Static Entry Screen

Click **VLAN Setup** in the navigation panel and then **Add** or a VLAN ID in the **VLAN Setup** screen.

Use this menu to set up IEEE 802.1Q VLAN parameters for the IES-1000.

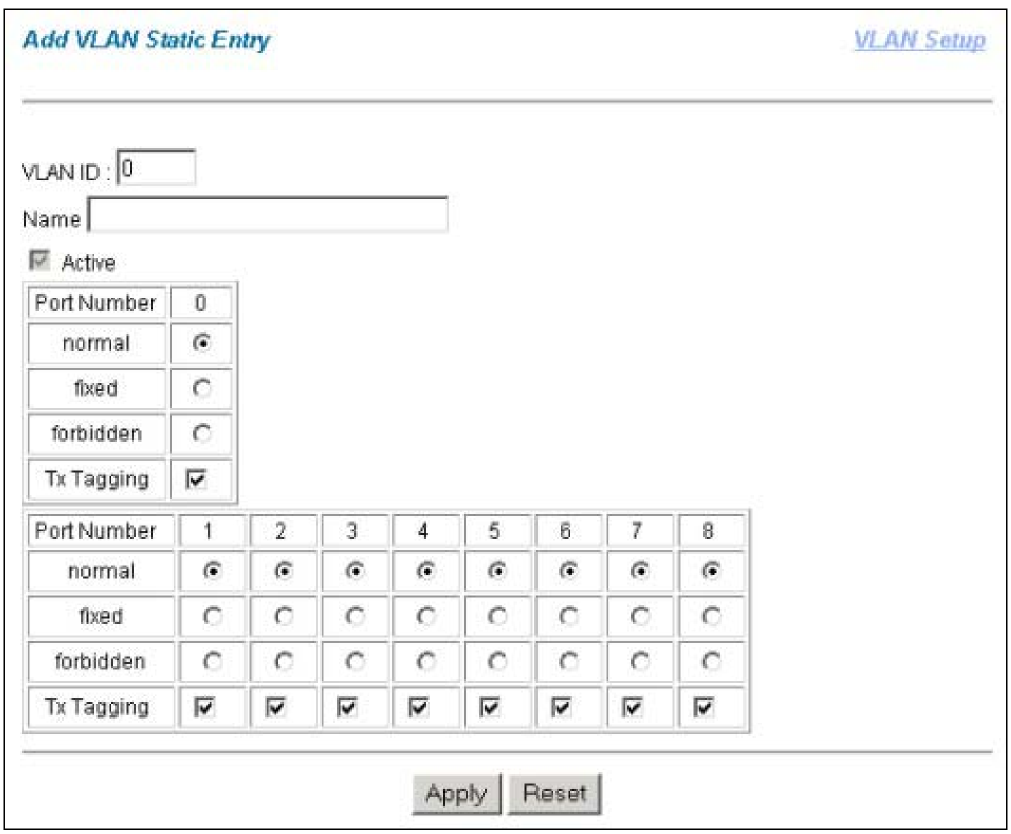


Figure 15-2 Add VLAN Static Entry

The following table describes this screen.

Table 15-3 Add VLAN Static Entry

LABEL	DESCRIPTION
VLAN Setup	Click this link to go to the **Static VLAN Setup** screen.
VLAN ID	This is the ID number of VLAN group index number you clicked in the Static VLAN Setup page.
Name	Type a name to identify the VLAN.
Port Number	This field displays the port number.
Normal	Select **Normal** registration for the associated port if you want that port to join this VLAN group using GVRP.
Fixed	Fixed registration ports are permanent members of this VLAN group.
Forbidden	Select forbidden for a port to block that port from joining this VLAN group.
Tx Tagging	Select **Tx Tagging** for the associated port if you want that port to tag all *outgoing* frames transmitted. Only select this if the subscriber's DSL modem or router supports IEEE 802.1Q VLAN.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this page afresh.

Chapter 16
SNMP

This chapter explains how to configure Simple Network Management Protocol (SNMP).

16.1 SNMP Management

SNMP (Simple Network Management Protocol) is a protocol used for exchanging management information between network devices. The IES-1000 supports SNMP versions one and two (SNMPv1 and SNMPv2) agent functionality, which allows a manager station to manage and monitor it through the network.

The next figure illustrates an SNMP management operation.

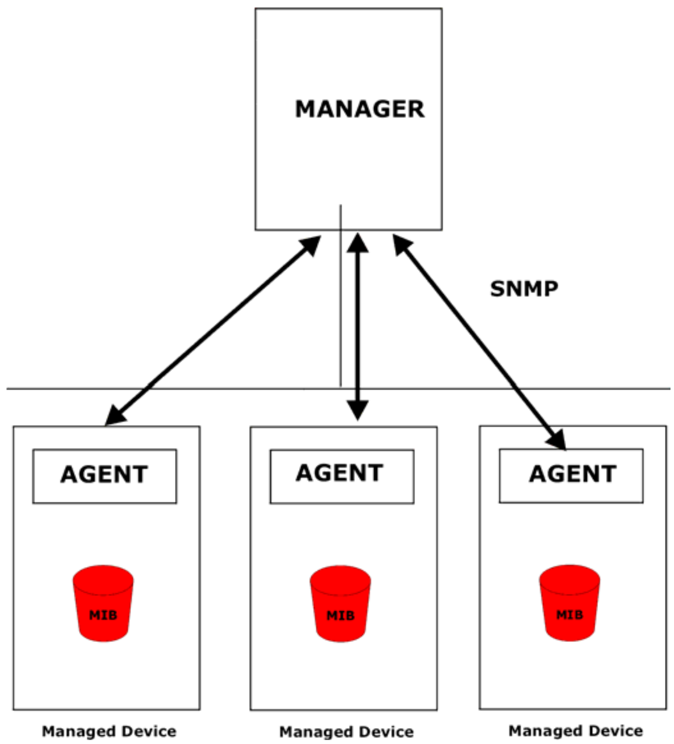


Figure 16-1 SNMP Management Model

An SNMP managed network consists of two main component types: agents and a manager.

An agent is a management software module that resides in a managed device (the IES-1000). An agent translates the local management information from the managed device into a form compatible with SNMP. The manager is the station through which network administrators perform network management functions. It executes operations that control and monitor the managed devices.

The managed devices contain objects that define each piece of information to be collected about a device. Examples of variables include the number of packets received, node port status, etc. A Management Information

Base (MIB) is a collection of managed objects. SNMP allows manager and agents to communicate for the purpose of accessing these objects.

SNMP itself is a simple request/response protocol based on the manager/agent model. The manager issues a request and the agent returns responses using the following protocol operations:

Table 16-1 SNMP

COMMAND	DESCRIPTION
Get	Allows the manager to retrieve an object variable from the agent.
GetNext	Allows the manager to retrieve the next object variable from a table or list within an agent. In SNMPv1, when a manager wants to retrieve all elements of a table from an agent, it initiates a Get operation, followed by a series of GetNext operations.
Set	Allows the manager to set values for object variables within an agent.
Trap	Used by the agent to inform the manager of some events.

16.1.1 Supported MIBs

The IES-1000 supports MIB II (defined in RFC-1213 and RFC-1215). The IES-1000 can also respond with specific data from the ZyXEL private MIBs (zyxel.mib, zyxel-AS.mib, zyxel-AS-ATM.mib, zyxel-AESCommon.mib and zyxel-SESCommon.mib). MIBs let administrators collect statistics and monitor status and performance.

16.1.2 Supported Traps

The network module supports the following traps

- coldStart Trap (defined in RFC 1215):

  This trap is sent at system start-up.

- authenticationFailure Trap (defined in RFC 1215):

  This trap is sent if a request arrives with an invalid community string.

- linkUp Trap (defined in RFC 1215):

  This trap is sent when a DSL port is up.

- linkDown Trap (defined in RFC 1215):

  This trap is sent when a DSL port is down.

- overheat Trap (defined in ZYXEL-MIB):

  This trap is sent periodically when a network module is overheated.

- overheatOver Trap (defined in ZYXEL-MIB):

  This trap is sent when the network module is no longer overheated.

16.2 SNMP Setup Screen

Click **SNMP** in the navigation panel to open the **SNMP** screen.

Figure 16-2 SNMP Setup

The following table describes this screen.

Table 16-2 SNMP Setup

LABEL	DESCRIPTION
Trust Host	The trusted host, your IES-1000 will only respond to SNMP messages from this address. If you leave the field set to 0.0.0.0 (default), your IES-1000 will respond to all SNMP messages it receives, regardless of source.
Community	This field displays the SNMP access entry's community (password) for the incoming requests from the management station.
Access Right	This field displays **None** if this SNMP access entry does not allow incoming Get and GetNext or Set requests. **Read** displays if the entry is read-only (allows incoming Get and GetNext requests). **Write** displays if the entry is read-write (allows incoming Get, GetNext and Set requests).
Send Trap	This field displays whether (**Yes**) or not (**No**) this SNMP access entry allows traps to be sent to the SNMP manager.
Add	Click this button to configure a new SNMP access entry.
Delete	Select a SNMP access entry(s)'s **Delete** check box and click the **Delete** button to remove the entry.

16.2.1 Add SNMP Access Entry Screen

Click an index number in the **SNMP Setup** screen to open this screen.

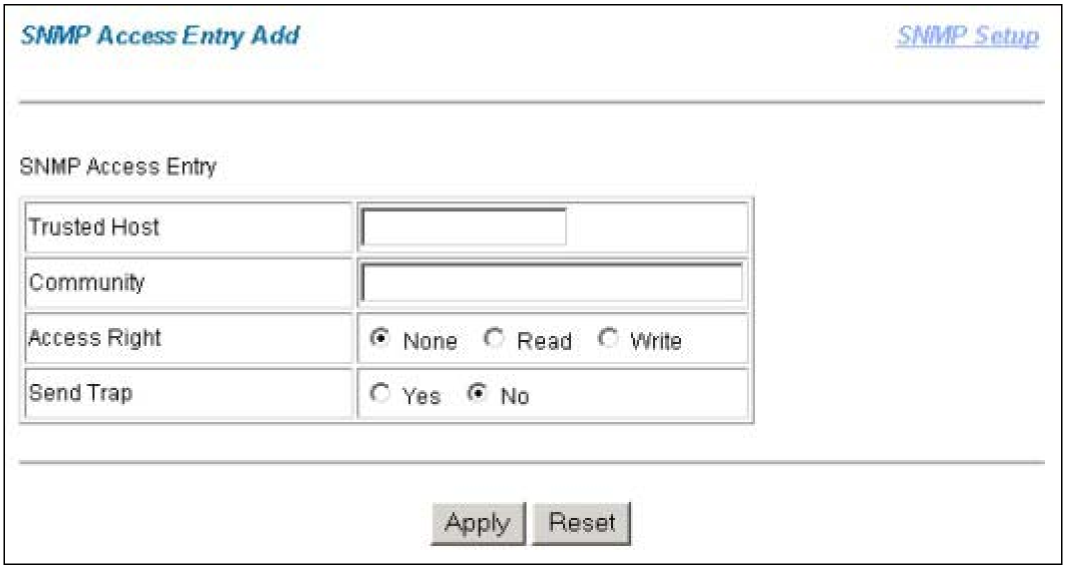


Figure 16-3 Add SNMP Access Entry

The following table describes this screen.

Table 16-3 Add SNMP Access Entry

LABEL	DESCRIPTION
SNMP Setup	Click this link to go to the **SNMP Setup** page.
Trusted Host	If you enter a trusted host, your IES-1000 will only respond to SNMP messages from this address. If you leave the field set to 0.0.0.0 (default), your IES-1000 will respond to all SNMP messages it receives, regardless of source.
Community	Enter the community, which is the password for the incoming requests from the management station.
Access Right	Select what access you want this SNMP access entry to allow from the management station. Select **None** to not allow incoming Get and GetNext or Set requests. Select **Read** to allow incoming Get, GetNext and Set requests. Select **Write** to allow incoming Set requests.
Send Trap	Select **Yes** to have the IES-1000 send traps to the SNMP manager. Select **No** to have the IES-1000 not send traps to the SNMP manager. **Setting the** Access Right **field to** None **and the** Send Trap **field to** No **renders the SNMP access entry invalid.**
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this page afresh.

Chapter 17 Logins

This chapter explains how to change the IES-1000's passwords.

17.1 Logins Overview

The **Logins** screen allows you to configure the administrator password.

17.2 Logins Screen

Click **Logins** in the navigation panel to open the **Logins** screen.

Use the **Logins** screen to set administrator passwords for the IES-1000.

It is highly recommended that you change the default password ("1234").

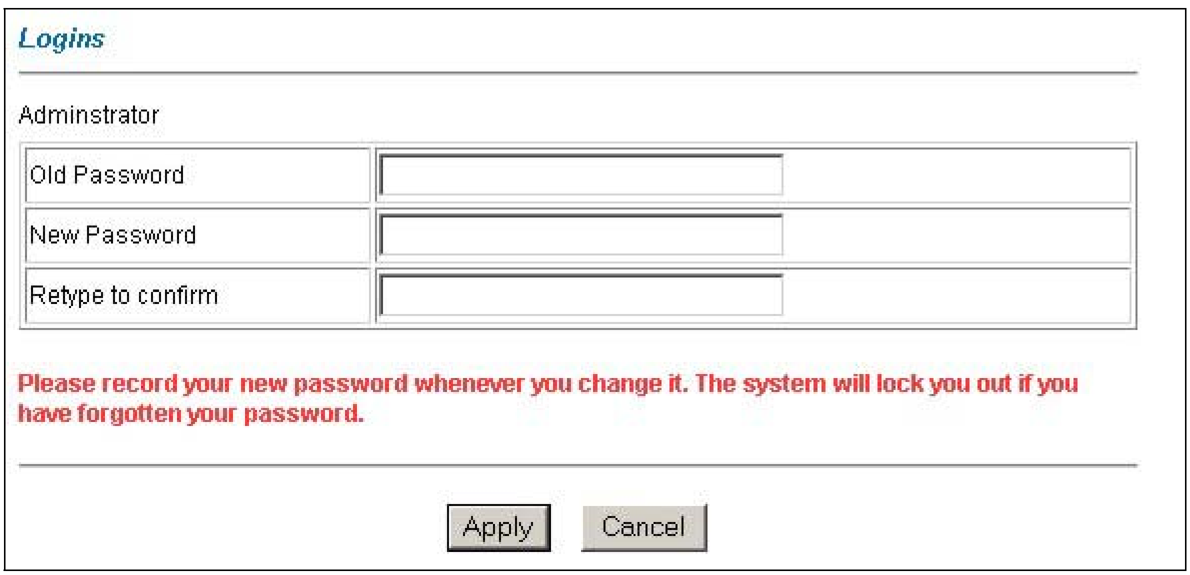


Figure 17-1 Logins

The following table describes this screen.

Table 17-1 Logins

LABEL	DESCRIPTION
Old Password	Type the existing system password ("1234" is the default password when shipped).
New Password	Type your new system password.
Retype to confirm	Retype your new system password for confirmation.

Table 17-1 Logins

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Cancel	Click **Cancel** to begin configuring this page afresh.

Chapter 18 Maintenance

This chapter explains how to use the maintenance screens to set the Unix syslog parameters and remote management; as well as perform firmware and configuration file maintenance.

18.1 Maintenance Overview

The Maintenance screen allows you to set UNIX syslog parameters. It also provides links to the **Secured Client**, **Firmware Upgrade**, **Restore Configuration** and **Backup Configuration** screens.

18.2 Maintenance Screen

Click **Maintenance** in the navigation panel to open the **Maintenance** screen.

Use the **Maintenance** screen to set UNIX syslog parameters.

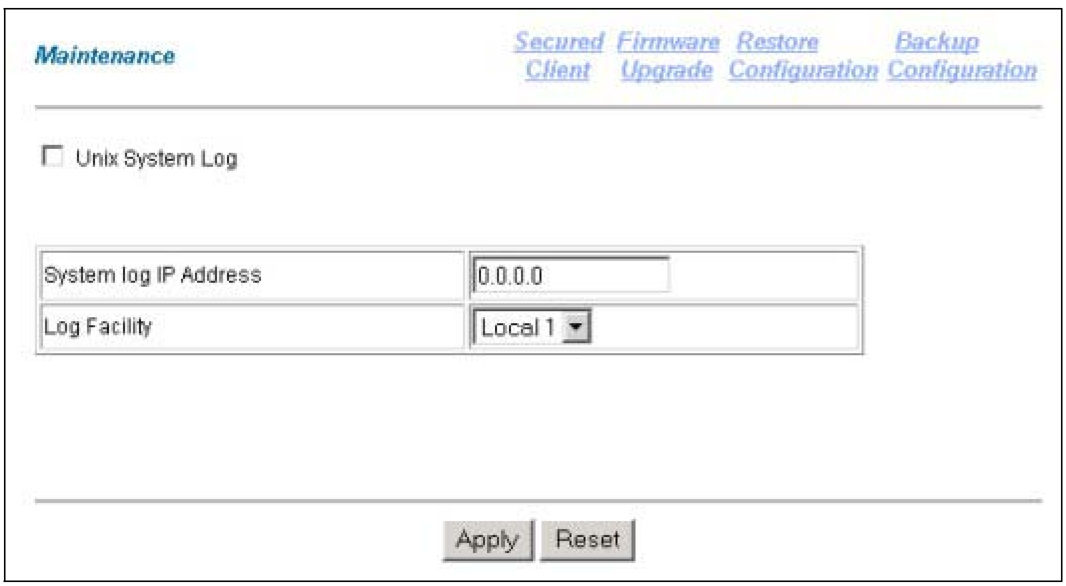


Figure 18-1 Maintenance

The following table describes this screen.

Table 18-1 Maintenance

LABEL	DESCRIPTION
Secured Client	Click this link to configure clients for secure remote IES-1000 access via Telnet, FTP and Web.
Firmware Upgrade	Click this link to upgrade firmware.
Restore Configuration	Click this link to restore a previously saved configuration file.

Table 18-1 Maintenance

LABEL	DESCRIPTION
Backup Configuration	Use the **Backup** link to save your current configuration to a computer.
UNIX System Log	Select this check box to activate syslog (UNIX system logging) and then configure the UNIX syslog parameters described in the following fields.
System Log IP Address	Enter the IP address of the syslog server.
Log Facility	Select one of 7 different options from the drop-down list box. The log facility allows you to log the message to different files in the server. Please refer to your UNIX manual for more details.
Apply	Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this page afresh

18.2.1 Secured Client Screen

Click **Maintenance** in the navigation panel and then **Secured Client** in the **Maintenance** screen to open the **Secured Client Setup** screen.

The **Secured Client Setup** screen configures trusted computers that may manage the IES-1000.

Figure 18-2 Secured Client Setup

The following table describes this screen.

Table 18-2 Secured Client Setup

LABEL	DESCRIPTION
Maintenance	Click **Maintenance** to return to the main maintenance screen.

Table 18-2 Secured Client Setup

LABEL	DESCRIPTION
Secured Enable	Select this check box to allow these secured clients to manage the IES-1000. Do not select this check box unless the IP address that you are using to manage the IES-1000 is already configured as one of the client addresses below. The IES-1000 blocks your access if you apply this page with this check box selected and your IP address is not one of the configured client addresses.
Apply	Click **Apply** to save your changes back to the IES-1000 's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Address	The address of a client that is permitted to use a service (Telnet, FTP, Web) to manage the IES-1000. For example, 192.168.1.100.
Add	Click this button to configure a new secured client entry.
Delete	Select a secured client entry(s)'s **Delete** check box and click the **Delete** button to remove the entry.

Add Secured Client Screen

Click **Maintenance** in the navigation panel and then **Secured Client** in the **Maintenance** screen.

Click **Add** in the **Secured Client Setup** screen to open the **Add Secured Client** screen.

Use the **Add Secured Client** screen to configure the IP addresses that an administrator can use to manage the IES-1000.

Figure 18-3 Add Secured Client

The following table describes this screen.

Table 18-3 Add Secured Client

LABEL	DESCRIPTION
Maintenance	Click this link to go to the **Maintenance** screen.

Table 18-3 Add Secured Client

LABEL	DESCRIPTION
Secured Client Setup	Click this link to go to the **Secured Client Setup** screen.
Secured Client Address	Set the IP address of a computer that you want to allow Telnet, FTP or Web access to this IES-1000. If you enter an IP address in this field, the IES-1000 checks if the client IP address of a computer requesting a service matches the value here. The IES-1000 immediately disconnects the session if it does not match.
Apply	Click **Apply** to save your changes back to the IES-1000 's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link in the navigation panel on the left to save your changes to the non-volatile memory when you are done configuring.
Reset	Click **Reset** to begin configuring this page afresh

18.2.2 Firmware Upgrade Screen

Click **Maintenance** in the navigation panel and then **Firmware Upgrade** in the **Maintenance** screen.

Use the **Firmware Upgrade** screen to upgrade the network module's firmware.

Do not interrupt the upgrade process, as it may permanently damage the network module.

The IES-1000 automatically restarts when the upgrade process is complete.

Procedure to upgrade your firmware:

Step 1. Use the network module's **Statistics** screen to check its current firmware version number.

Step 2. Download and unzip the new firmware.

Step 3. Go to the **Firmware Upgrade** screen.

Step 4. Type the path and file name of the firmware file you wish to upload to the IES-1000 in the **File Path** field or click **Browse** to display the **Choose File** screen from which you can locate it. After you have specified the file, click **Upload**.

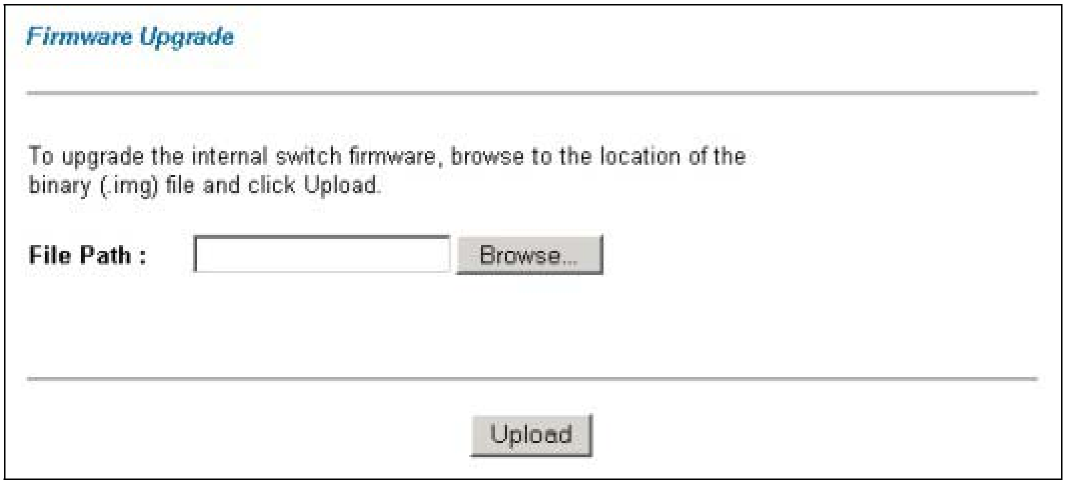


Figure 18-4 Firmware Upgrade

18.2.3 Restore Configuration Screen

Click **Maintenance** in the navigation panel and then **Restore Configuration** to open the **Restore Configuration** screen.

Use the **Restore Configuration** screen to restore a previously saved configuration from your computer to the IES-1000. Click **Maintenance** to return to the main maintenance screen.

Do not interrupt the restore process, as it may permanently damage the IES-1000.

The IES-1000 automatically restarts when the restore process is complete.

Type the path and file name of the configuration file you wish to restore in the **File Path** field or click **Browse** to display the **Choose File** screen from which you can locate it. After you have specified the file, click **Upload**.

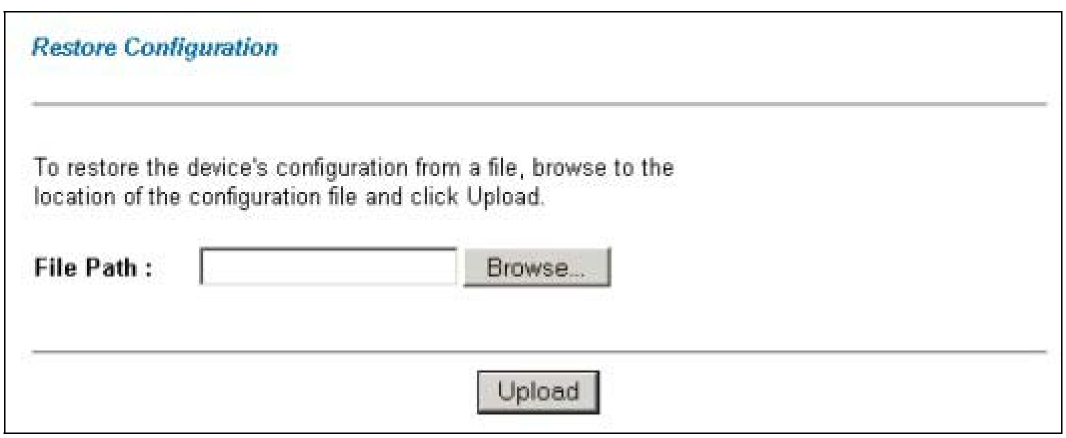


Figure 18-5 Restore Configuration

18.2.4 Backup Configuration Screen

Click **Maintenance** in the navigation panel and then **Backup Configuration** to open the **Backup Configuration** screen.

Use the **Backup Configuration** screen to save the current configuration of the IES-1000 to a computer. Click **Maintenance** to return to the main maintenance screen.

Step 1. Click **Backup Configuration** to display the **Backup Configuration** screen.

Step 2. Click **Backup** to display the **Save As** screen.

Step 3. Choose a location to save the file on your computer from the **Save in** drop-down list box and type a name for it in the **File name** field.

Step 4. Click **Save** to save the configuration file to your computer.

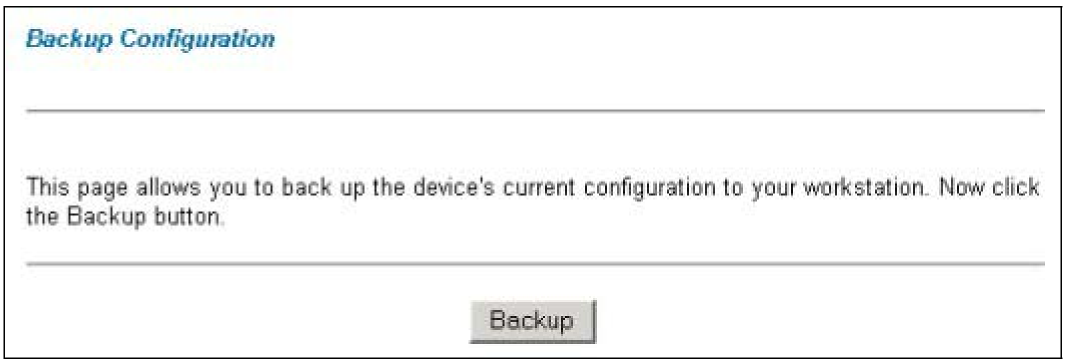


Figure 18-6 Backup Configuration

Chapter 19 Statistics

This chapter explains the Advanced Management Statistics screens.

19.1 Statistics Overview

The web configurator provides statistics screens to allow you to see how much traffic the IES-1000 is handling and how it is handling it.

19.2 Statistics Screen

Click **Statistics** in the navigation panel to open this screen.

Use this screen to view general information about the IES-1000 and to access other screens with more detailed statistical information.

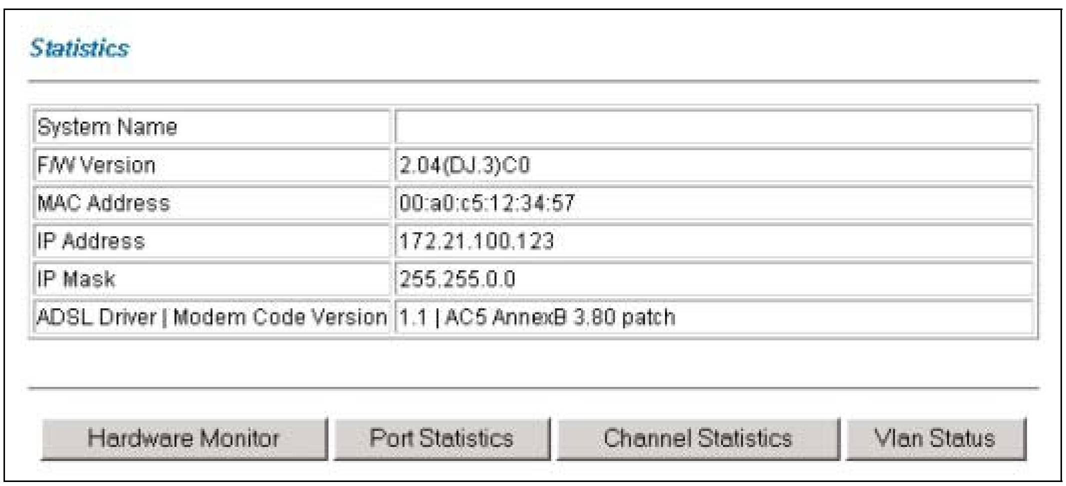


Figure 19-1 Statistics

The following table describes this screen.

Table 19-1 Statistics

LABEL	DESCRIPTION
System Name	This is the IES-1000 system name assigned in General Setup.
F/W Version	This field refers to the version of the firmware.
MAC Address	This field refers to the Ethernet MAC (Media Access Control) address of the IES-1000.
IP Address	This is the IP address of the IES-1000 in dotted decimal notation.
IP Mask	This shows the IP mask of the IES-1000.

Table 19-1 Statistics

LABEL	DESCRIPTION
DSL Driver | Modem Code Conversion	This field displays the version of DSL driver and modem code.
Hardware Monitor	Click this button to display temperature statistics.
Port Statistics	Click this button to display statistics for the ports.
Channel Statistics	Click this button to display statistics for the channels on this DSL module’s ports.
VLAN Status	Click here to display 802.1Q VLAN statistics.

19.2.1 Hardware Monitor Screen

Click **Statistics** in the navigation panel and then **Hardware Monitor** in the **Statistics** screen to open the **Hardware Monitor** screen.

Use the hardware performance statistics for hardware troubleshooting.

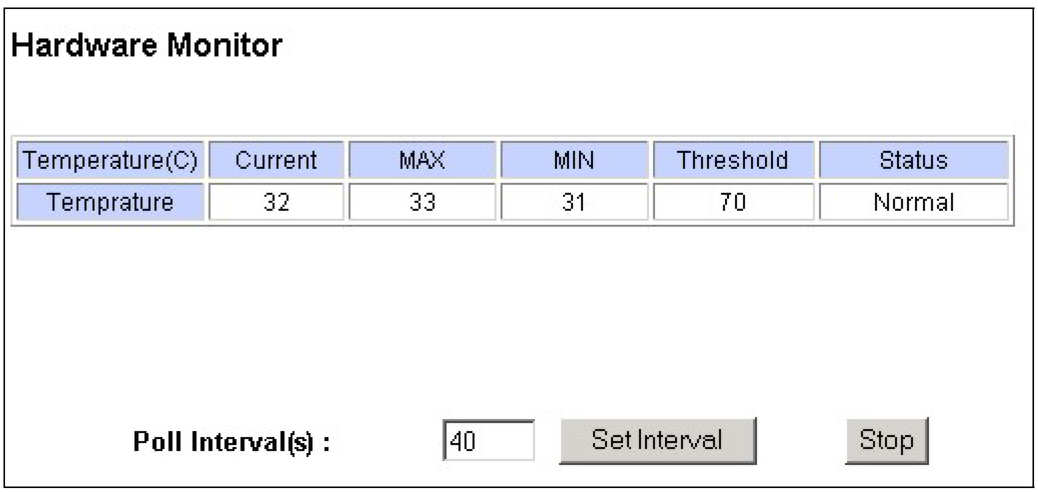


Figure 19-2 Hardware Monitor

Table 19-2 Hardware Monitor

LABEL	DESCRIPTION
Temperature (C)	The IES-1000’s temperature sensor is capable of detecting and reporting if the temperature rises above the threshold. All temperature measurements are in degrees Celsius.
Current	This shows the current temperature at this sensor.
Max	This field displays the maximum temperature measured at this sensor.
Min	This field displays the minimum temperature measured at this sensor.
Threshold	This field displays the upper temperature limit at this sensor.

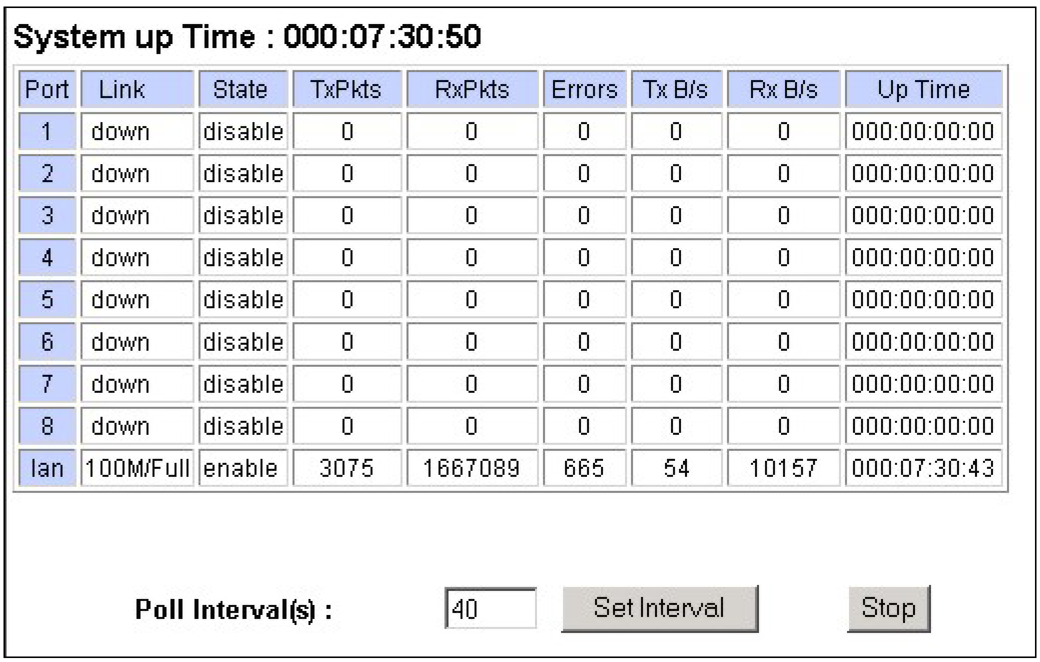
Table 19-2 Hardware Monitor

LABEL	DESCRIPTION
Status	This field displays **Normal** for temperatures below the threshold and **Error** for those above.
Poll Interval(s)	The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**.
Stop	Click **Stop** to halt the hardware monitor statistic polling on the IES-1000.

19.2.2 Port Statistics Screen

Click **Statistics** in the navigation panel and then **Port Statistics** in the **Statistics** screen to open this screen.

Use this screen to check status and performance data about the IES-1000’s ports.



System up Time : 000:07:30:50

Port	Link	State	TxPkts	RxPkts	Errors	Tx B/s	Rx B/s	Up Time
1	down	disable	0	0	0	0	0	000:00:00:00
2	down	disable	0	0	0	0	0	000:00:00:00
3	down	disable	0	0	0	0	0	000:00:00:00
4	down	disable	0	0	0	0	0	000:00:00:00
5	down	disable	0	0	0	0	0	000:00:00:00
6	down	disable	0	0	0	0	0	000:00:00:00
7	down	disable	0	0	0	0	0	000:00:00:00
8	down	disable	0	0	0	0	0	000:00:00:00
lan	100M/Full	enable	3075	1667089	665	54	10157	000:07:30:43

Poll Interval(s) : 40 Set Interval Stop

Figure 19-3 Port Statistics

Table 19-3 Port Statistics

LABEL	DESCRIPTION
System up Time	This field shows how long the system has been running since the last time it was started.
Port	This identifies the DSL or Ethernet (**lan**) port.
Link	This field shows the upstream/downstream speeds of the DSL connections that are up or **Down** for the DSL ports that are not connected. The field for the Ethernet port displays the speed and the duplex. Take **100M/Full** as an example, the **100M** represents a speed of 100Mbps and the **Full** is for full duplex.

Table 19-3 Port Statistics

LABEL	DESCRIPTION
State	This field shows whether a port is turned on (**enable**) or off (**disable**).
TxPkts	This field shows the number of frames transmitted by this port since the network module last restarted or the statistics were last manually cleared via command.
RxPkts	This field shows the number of frames received by this port since the network module last restarted or the statistics were last manually cleared via command.
Errors	This field shows the number of transmitted and received errors on this port.
Tx B/s	This field shows the number of bytes transmitted on a per-second basis by this port.
Rx B/s	This field shows the number of bytes received on a per-second basis by this port.
Up Time	This field shows the total amount of time the line has been up.
Poll Interval(s)	The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**.
Stop	Click **Stop** to halt system statistic polling on the IES-1000.

19.2.3 Channel Statistics Screen

Click **Statistics** in the navigation panel and then **Channel Statistics** in the **Statistics** screen to open this screen.

Use this screen to check status and performance data about the channels on this DSL module's ports.

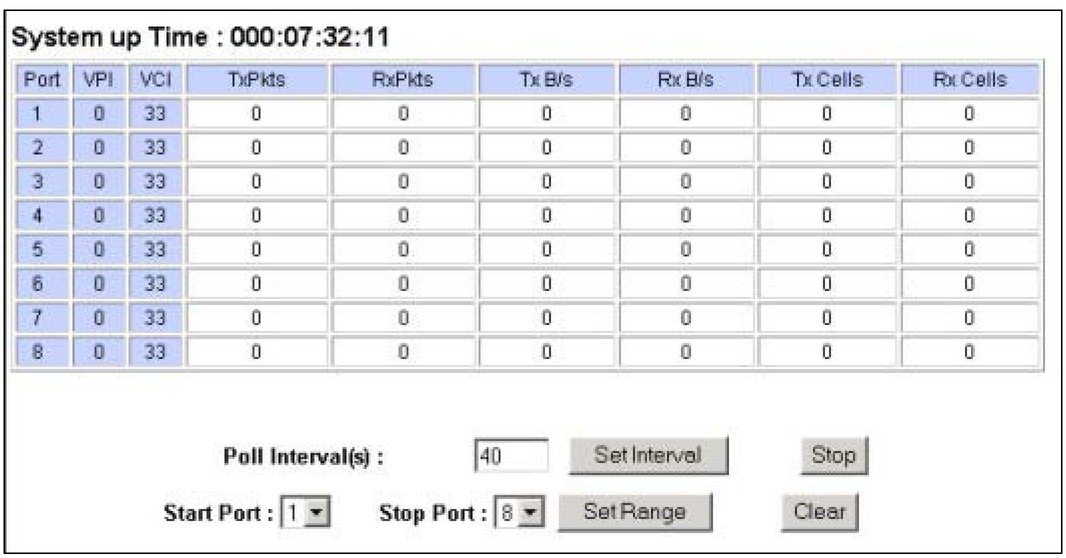


Figure 19-4 Channel Statistics

Table 19-4 Channel Statistics

LABEL	DESCRIPTION
System Uptime	This field shows how long the system has been running since the last time it was started.
Port	This refers to the DSL port number.
VPI	This field displays the channel's Virtual Path Identifier (VPI). The VPI and VCI identify a channel on a port.
VCI	This field displays the channel's Virtual Circuit Identifier (VCI). The VPI and VCI identify a channel on a port.
TxPkts	This field shows the number of packets transmitted by this port on this individual channel since the network module last restarted or the statistics were last cleared.
RxPkts	This field shows the number of packets received by this port on this individual channel since the network module last restarted or the statistics were last cleared.
Tx B/s	This field shows the number of bytes transmitted on a per-second basis by this port on this individual channel.
Rx B/s	This field shows the number of bytes received on a per-second basis by this port on this individual channel.
Tx Cells	This field shows the number of ATM cells transmitted by this port on this individual channel.
Rx Cells	This field shows the number of ATM cells received by this port on this individual channel.
Poll Interval(s)	The field displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**.
Stop	Click **Stop** to halt system statistic polling on the IES-1000.
Start Port End Port Set Range	Use these fields to have the screen display channel statistics for a range of ports that you specify. Select a beginning port number in a range of ports in the **Start Port** field and an ending port number in the **End Port** field. Click **Set Range** to have the screen display channel statistics for the range of ports that you specified.
Clear	Click **Clear** to reset this IES-1000's statistic records.

19.2.4 VLAN Status Screen

Click **Statistics** in the navigation panel and then **VLAN Status** in the **Statistics** screen to open this screen.

These fields describe the status of the IEEE 802.1Q VLAN.

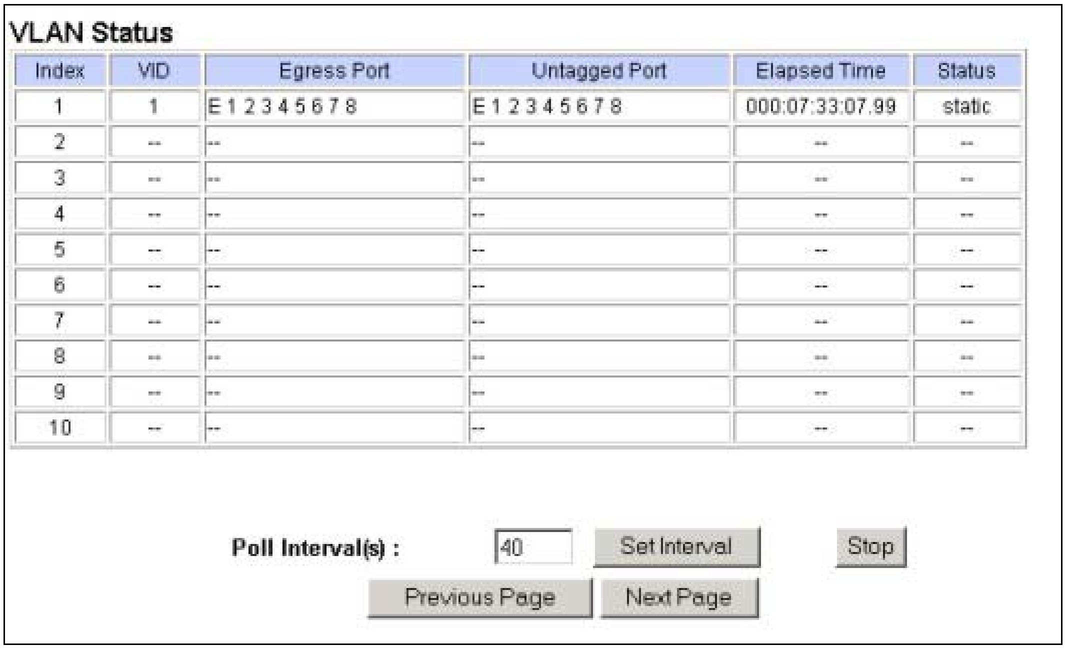


Figure 19-5 VLAN Status

The following table describes this screen.

Table 19-5 VLAN Status

LABEL	DESCRIPTION
Index	This is the VLAN index number.
VID	This is the VLAN ID number configured in the Edit Static VLAN page.
Egress Port	Ports that have been added to this VLAN are listed here in numerical order.
Untagged Port	Untagged ports that have been added to this VLAN are listed here in numerical order.
Elapsed Time	This field shows how long it has been since a normal VLAN was registered or a static VLAN was set up.
Status	This field shows how this VLAN was added to the switch; dynamically using GVRP or statically, that is, added as a permanent entry.
Poll Interval(s)	The text box displays how often (in seconds) this screen refreshes. You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**.
Set Interval	You may change the refresh interval by typing a new number in the text box and then clicking **Set Interval**.
Stop	Click **Stop** to halt system statistic polling.
Previous Page	Click **Previous Page** to show the preceding screen of VLAN status information (if there is more than one screen of VLAN statistics).
Next Page	Click **Next Page** to show the subsequent screen of VLAN status information (if there is more than one screen of VLAN statistics).

Chapter 20 Diagnostic

This chapter explains the Advanced Management Diagnostic screens.

20.1 Diagnostic Overview

The IES-1000 provides diagnostic screens to aid in troubleshooting.

20.2 Diagnostic Screen

Click **Diagnostic** in the navigation panel to open the **Diagnostic** screen.

Use this screen to check system logs, reset the system or ping IP addresses.

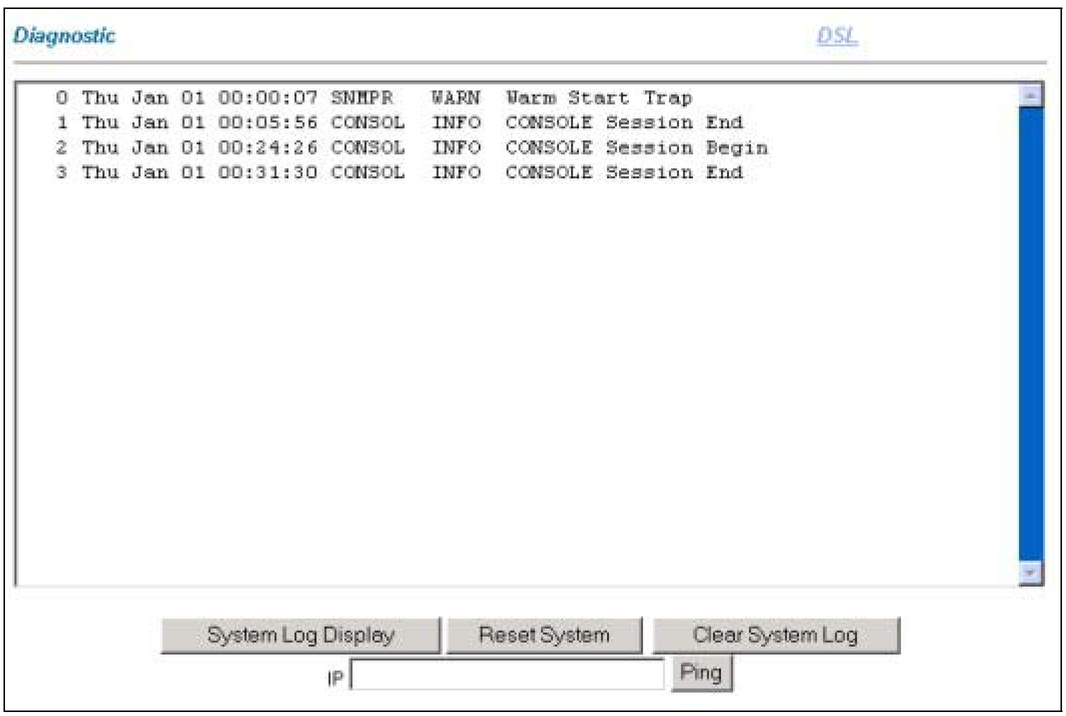


Figure 20-1 Diagnostic

The following table describes this screen.

Table 20-1 Diagnostic

LABEL	DESCRIPTION
DSL	Click this link to open the **DSL Line Diagnostic** screen.
System Log Display	Click this button to display a log of events in the multi-line text box.

Table 20-1 Diagnostic

LABEL	DESCRIPTION
Reset System	Click this button to restart the IES-1000. A warning dialog box displays asking if you're sure you want to restart the system. Click **OK** to proceed.
Clear System Log	Click this button to clear the log of events in the multi-line text box.
IP	Type the IP address of a device that you want to ping in order to test a connection.
Ping	Click this button to have the IES-1000 ping the IP address (in the field to the left) 5 times.

20.3 Log Format

The common format of the system logs is: `<item no> <time> <process> <type> <log message>`

Table 20-2 Log Format

LABEL	DESCRIPTION
`<item no>`	This is the index number of the log entry.
`<time>`	This is the time and date when the log was created.
`<process>`	This is the process that created the log.
`<type>`	This identifies what kind of log it is. "INFO" identifies for an information log. "WARN" identifies a warning log.
`<log message>`	This is the log's detailed information (see section *20.3.1* for descriptions).

20.3.1 Log Messages

The following table lists and describes the system log messages.

Table 20-3 Log Messages

LOG MESSAGE	TYPE	DESCRIPTION
`ADSL <port> Reset`	INFO	The network module reset an ADSL port due to a software layer error.
`ADSL <port> Dying-Gasp`	INFO	The subscriber turned off the ADSL modem or router. The subscriber's device must support the dying gasp feature in order for this log to display.
`ADSL Link Info: <us NM>/<ds NM>, <us AttainableSpeed>/<ds AttainableSpeed>`	INFO	An ADSL port established a connection. <us NM> - upstream noise margin <ds NM> - downstream noise margin <us AttainableSpeed> - maximum possible upstream speed for this line <ds AttainableSpeed> - maximum possible downstream speed for this line

Table 20-3 Log Messages

LOG MESSAGE	TYPE	DESCRIPTION
`ADSL <port> Link Down(SN=<seq no>)`	WARN	An ADSL port lost its connection. <port> - port number <seq no> - sequence number of the connection
`ADSL <port> Link Up(SN=<seq no>): <us rate>/<ds rate>`	WARN	An ADSL port established a connection. <ds rate> - downstream rate <us rate> - upstream rate
`Insecure SNMP From <ip addr>`	WARN	Someone tried to start an SNMP session from an IP address that did not match any of the configured secured client IP addresses.
`Incorrect SNMP Password`	WARN	Someone attempted to use the wrong password to start an SNMP session.
`CONSOLE Session End`	INFO	A console session has terminated.
`CONSOLE Session Begin`	INFO	A console session has started.
`FTP Session End`	INFO	An FTP session has terminated.
`FTP Session Begin`	INFO	An FTP session has started.
`Insecure FTP From <ip addr>`	WARN	Someone tried to start an FTP session from the listed IP address and it did not match any of the configured secured client IP addresses.
`Collision at downloading file!`	WARN	Someone attempted to use FTP or the web configurator to upload firmware but the upload conflicted with another process (maybe someone else was using another method to upload firmware at the same moment).
`Incorrect FTP Password`	WARN	Someone attempted to use the wrong password to start an FTP session.
`Reboot System`	WARN	The network module is restarting after a firmware upload via FTP or console port, or due to a command invoked by an administrator.
`Received Image Checksum Error`	WARN	A checksum error was detected during an attempted FTP firmware upload.
`Invalid Image`	WARN	Someone attempted to use FTP upload a firmware file with a wrong identity.
`File Size Too Large`	WARN	The file size was too large with an attempted FTP firmware upload.
`Receive <file name> OK`	WARN	A file was uploaded to the network module by FTP. <file name> - received file's name
`GSHDSL OVER_HEAT_ACTIVE: <temp>`	WARN	The temperature detected in the G.SHDSL module was too high. <temp> - temperature when the entry was logged
`GSHDSL OVER_HEAT_RELEASE: <temp>`	WARN	The temperature detected in the G.SHDSL module has come back to normal. <temp> - temperature when the entry was logged

Table 20-3 Log Messages

LOG MESSAGE	TYPE	DESCRIPTION
GSHDSL <port> Link Info: NM=<noise margin> ATT=<loop attenuation>	INFO	This log displays information about a G.SHDSL port's connection. <port> - port number <noise margin> - the connection's signal quality in dB. <loop attenuation> - the connection's line loss in dB.
GSHDSL <port> Link Up(SN=<seq no>): rate=<rate>Kbps	WARN	A G.SHDSL port established a connection. <seq no> - sequence number of the connection <rate> - the connection's rate
GSHDSL <port> Link Down(SN=<seq no>) NM=<noise margin> ATT=<loop attenuation>	WARN	A G.SHDSL port lost its connection.
GSHDSL <port> CRC crcAnomaly:<couter1> LOSW Defect:<couter2> LOSW Failure:<couter3>	WARN	These are G.SHDSL port error counters. <couter1>- the number of cyclic redundancy check errors <couter2> - the number of Loss of Sync Word defects <couter3> - the number of Loss of Sync Word failures
GSHDSL <port> ATT Defect:<couter1> SNR Defect:<couter2>	WARN	These are G.SHDSL port error counters. <couter1> - the number of times the loop attenuation was too high <couter2> - SNR (Signal to Noise Ratio) the number of times the signal quality was too low.
HTTPD data crash theAllegroServerDataPtr <mem addr>	ERROR	The network module failed in an attempt to construct an HTTP (web configurator) session.
File too large <file id> <file size>	WARN	The file size was too large with an attempted HTTP (web configurator) firmware upload.
Insecure HTTP From <ip addr>	WARN	Someone tried to start an HTTP (web configurator) session from the listed IP address and it did not match any of the configured secured client IP addresses.
Watchdog timeout	WARN	The hardware watchdog determined that the network module was hung or not executing the correct sequence of code and restarted the network module.
Warm Start Trap	WARN	The network module restarted as a result of a reboot command.
Cold Start Trap	WARN	The network module started.
Core Dump!!!	WARN	The error log is not kept after a restart. When the network module restarts due to a software level error, you can use config save in order to create a core file. Send the core file to customer support for analysis.
THERMO OVER RANGE: dev:<device id> value:<temp>	WARN	The temperature detected in the network module was too high. <temp> - temperature when the entry was logged

Table 20-3 Log Messages

LOG MESSAGE	TYPE	DESCRIPTION
`THERMO RELEASE OVER RANGE: dev:<device id> value:<temp>`	`WARN`	The temperature detected in the network module has come back to normal. <temp> - temperature when the entry was logged
`Insecure Telnet From <ip addr>`	`WARN`	Someone tried to start a Telnet session from the listed IP address and it did not match any of the configured secured client IP addresses.
`Incorrect Telnet Password`	`WARN`	Someone attempted to use the wrong password to start a Telnet session.
`Telnet Session Begin`	`INFO`	A Telnet session has started.
`Telnet Session End`	`INFO`	A Telnet session has terminated.

20.3.2 DSL Line Diagnostic Screen

Click **DSL** in the **Diagnostic** screen to open the **DSL Line Diagnostic** screen.

Use this screen to check the module's DSL chip via **Local Loopback** or connections via **OAM F5** tests.

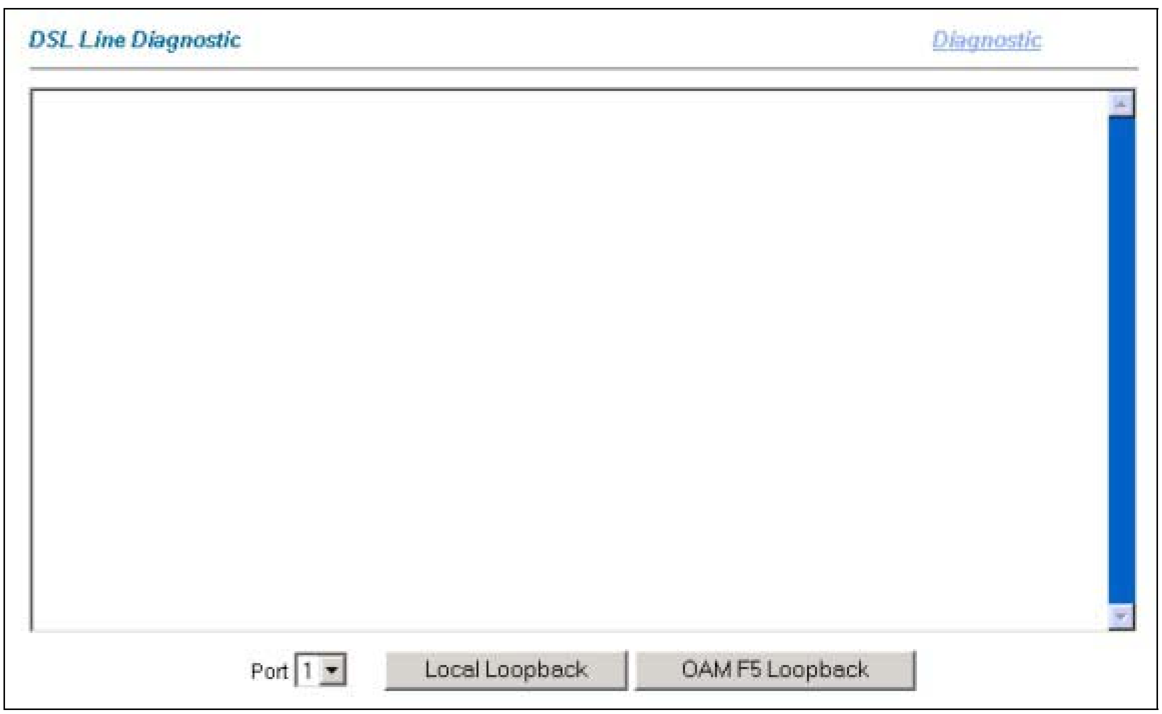


Figure 20-2 DSL Line Diagnostic

Table 20-4 DSL Line Diagnostic

LABEL	DESCRIPTION
Diagnostic	Click this link to go to the network module's **Diagnostic** screen.

Table 20-4 DSL Line Diagnostic

LABEL	DESCRIPTION
Port	This refers to the DSL port number. Select a port upon which you want to perform a loopback test.
Local Loopback	Click this to perform a local loopback test on the specified DSL port. A local loopback test is used to check the device's DSL chip. A local loopback test failure indicates an internal device problem.
OAM F5 Loopback	Click this to perform an OAM F5 loopback test on the specified DSL port. An Operation, Administration and Maintenance Function 5 test is used to test the connection between two DSL devices. First, the DSL devices establish a virtual circuit. Then the local device sends an ATM F5 cell to be returned by the remote DSL device (both DSL devices must support ATM F5 in order to use this test). The results ("Passed" or "Failed") display in the multi-line text box.

20.3.3 Reset System

Click **Diagnostic** in the navigation panel and then click the **Reset System** button and click **OK** to restart the system.

Figure 20-3 Reboot System Confirmation

20.4 Logout Screen

Click **Logout** in the navigation panel to open this screen and exit the web configurator.

Figure 20-4 Logout

Chapter 21 Troubleshooting

This chapter covers potential problems and possible remedies. After each problem description, some steps are provided to help you to diagnose and to solve the problem.

21.1 DSL LED(s)

A DSL LED is not on.

Table 21-1 Troubleshooting the DSL LED(s)

STEPS	CORRECTIVE ACTION
1	Make sure the DSL port is enabled (refer to the sections on the edit port setup screens).
2	Connect a DSL modem directly to the DSL port of the IES-1000 using a different telephone wire. If the LED turns on, go to step 4.
3	Check to see that the settings in the DSL modem or router match those of the DSL port (refer to the sections on the edit port setup screens). If the DSL LED stays off, there may be a problem with the port. Contact the distributor.
4	Take the DSL modem to the subscriber's location. If the DSL LED stays off, check for a problem with the telephone wiring that connects to the subscriber.

21.2 Data Transmission

The DSL LED is on, but data cannot be transmitted.

Table 21-2 Troubleshooting Data Transmission

STEPS	CORRECTIVE ACTION
1	Check to see that the VPI/VCI settings in the DSL modem or router match those of the DSL port on the IES-1000 (refer to the sections on the DSL port channel setup screens). Also, make sure that the subscriber's modem is using RFC 1483 encapsulation. If the subscriber is using a router (with routing mode), make sure it is using ENET ENCAP.
2	Check the IES-1000's VLAN configuration (see the *VLAN chapter*).
3	Ping the IES-1000 from the computer behind the DSL modem or router.
4	If you cannot ping, connect a DSL modem to a DSL port (that is known to work) on the same IES-1000. If the DSL modem or router works with a different DSL port, there may be a problem with the original port. Contact the distributor.
5	If using a different port does not work, try a different DSL modem or router with the original port.

21.3 DSL LED(s) Turn On and Off

A DSL LED turns on and off intermittently.

Table 21-3 Troubleshooting a Non-Constant DSL LED

STEPS	CORRECTIVE ACTION
1	Check the IES-1000's diagnostic screen.
2	Connect a DSL modem directly to the DSL port of the IES-1000 using a different telephone wire. If the DSL LED still turns on and off repeatedly, contact the distributor.

21.4 Data Rate

The SYNC-rate is not the same as the configured rate.

Table 21-4 Troubleshooting the SYNC-rate

STEPS	CORRECTIVE ACTION
1	Connect the DSL modem or router directly to the DSL port of the IES-1000 using a different telephone wire.
2	If the rates match, the quality of the telephone wiring that connects the subscriber to the IES-1000 may be limiting the speed to a certain rate. If they do not match when a good wire is used, contact the distributor.

21.5 Port Bonding

Refer to the *Troubleshooting* chapter in the part on commands.

21.6 Configured Settings

The IES-1000's configured settings do not take effect.

Table 21-5 Troubleshooting the Network Module's Configured Settings

CORRECTIVE ACTION
Click **Apply** to save your changes back to the IES-1000's volatile memory. The IES-1000 loses these changes if it is turned off or loses power, so use the **Config Save** link on the navigation panel to the left to save your changes to the non-volatile memory when you are done configuring. If this does not work, contact the distributor.

21.7 Password

I forgot the password to my IES-1000.

Table 21-6 Troubleshooting the Password

CORRECTIVE ACTION
See the chapter on firmware upload and recovery in the *Commands* part.

21.8 Local Server

The computer behind a DSL modem or router cannot access a local server connected to the IES-1000.

Table 21-7 Troubleshooting a Local Server

STEPS	CORRECTIVE ACTION
1	Refer to *section 21.2* to make sure that the subscriber is able to transmit to the IES-1000.
2	Make sure the computer behind the DSL device has the correct gateway IP address configured.
3	Check the IES-1000's VLAN configuration (see the *VLAN chapter*).
4	Check the cable and connections between the IES-1000 and the local server.
5	Try to access another local server. If data can be transmitted to a different local server, the original local server (that could not be accessed) may have a problem.

21.9 SNMP

The SNMP manager server cannot get information from the IES-1000.

Table 21-8 Troubleshooting the SNMP Server

STEPS	CORRECTIVE ACTION
1	Ping the IES-1000 from the SNMP server. If you cannot, check the cable, connections and IP configuration.
2	Check to see that the community (or trusted host) in the IES-1000 matches the SNMP server's community. If these steps fail to correct the problem, contact the distributor.

21.10 Telnet

I cannot telnet into the IES-1000.

Table 21-9 Troubleshooting Telnet

STEPS	CORRECTIVE ACTION
1	Make sure that a telnet session is not already operating. The IES-1000 only accepts one telnet session at a time.
2	Make sure that the IP address of the computer you are using matches a range of secured hosts configured in **Secured Client** under **Maintenance** in the IES-1000. The IES-1000 immediately disconnects the telnet session if they do not match.
3	Ping the IES-1000 from your computer. If you are able to ping the IES-1000 but are still unable to telnet, contact the distributor. If you cannot ping, check the cable, connections and IP configuration.
4	If you are attempting to telnet from a DSL port, refer to *section 21.2* to make sure that you can transmit data to the DSL port.

Part V:

Commands

This part gives information on commands for the IES-1000

Chapter 22 Commands Introduction

This section introduces the command line interface and lists the available commands.

22.1 Command Line Interface Overview

In addition to the web configurator, you can use commands to configure the IES-1000. It is recommended that you use the web configurator for everyday management of the IES-1000 and that you use commands for advanced switch diagnosis and troubleshooting. If you have problems with your IES-1000, customer support may request that you issue some of these commands to assist them in troubleshooting.

Telnet to the switch or connect a computer to the console port and use terminal emulation software configured to the following parameters:

- VT100 terminal emulation
- No parity, 8 data bits, 1 stop bit
- 9600 bps
- No flow control

22.2 Command Structure

The system uses a two-level command structure. The commands related to one subsystem are grouped under a primary command of that subsystem, for instance, to configure the Ethernet parameters, you must first enter the Ethernet subsystem by entering the `ethernet` command. When you are in a subsystem, the system reminds you by including the subsystem name in the command prompt, for example,

```
192.168.1.1 ethernet>
```

To get back to the top level prompt from a subsystem, use the `home` command.

22.3 Command Syntax Conventions

The command keywords are in `courier new` font.

1. The command keywords must be entered exactly as shown, that is, no abbreviations are allowed.
2. The required fields in a command are enclosed in angle brackets (<>), for instance,

   ```
   list port <port #>
   ```

   means that you must specify the port number for this command.
3. The optional fields in a command are enclosed in square brackets (`[]`), for instance,

   ```
   config [save]
   ```

   means that the `save` field is optional.
4. A "`|`" means "or"

`[on|off]`

means that you can use either `on` or `off`.

5. "Command" refers to a command used in the command line interface (CI command).

Using commands not documented in this User's Guide can damage the unit and possibly render it unusable.

22.3.1 Help Facility

The system includes a help facility to provide you with online assistance.

You can issue the `help` or `help all` command at any time. The system will display a list of available commands in response.

You can issue `help` with a command name to get more details about it, for instance, the command

```
192.168.1.1> help version
```

yields

```
version                        - show system software version
```

The system responds with a description of the `version` command.

22.3.2 Saving Your Configuration

Always remember to save your configuration using the following syntax:

```
192.168.1.1> config save
```

This command saves all system configurations into nonvolatile memory. You must use this command to save any configurations that you make, otherwise the IES-1000 will return to its default settings when it is restarted.

Do not turn off your IES-1000 while saving your configuration.

22.4 Commands

The following table lists all of the commands that you can use with the IES-1000. Refer to the following chapters for descriptions of commonly used commands.

This user's guide describes commands that are helpful for configuring the IES-1000.

Using commands not documented in the user's guide can damage the unit and possibly render it unusable.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
bridge			
	config	save	Saves the bridge’s run time configuration to nonvolatile memory.
		print	Shows the bridge’s run time configuration.
		reset	Reloads the bridge’s run time configuration from nonvolatile memory.
	device		Shows the bridge settings.
		add <edd | xport/[1..8]>	Adds a bridge device.
		delete <edd | xport/[1..8]>	Deletes a bridge device.
		list	Displays the bridge devices.
	ethertype		Displays the types of packets that the ports are set to forward.
		<port> <any | ip | pppoe>	Sets the type of packets that a port is allowed forward.
	filter		Displays the filtering database.
	filterage		Displays the filter age time.
		<seconds>	Sets the filter age time.
	flush		Clears the filtering database for all ports.
		<portNo>	Clears the filtering database on an individual port.
	info		Shows bridge information.
	interface	files	Shows files opened by upper layer.
		info	Shows ether-support driver information.
		stats	Shows bridge upper interface statistics.
		version	Shows ether-support driver information.
	portfilter		Displays ports to forward to.
		<srcPort> <all | destPorts>	Sets ports to forward to.
	status		Displays bridge management statistics.
	igmpsnoop		Displays the multicast filtering database.
		flush	Clears all stored IGMP snooping records.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		enable [1 | 2]	Turns on IGMP snooping. 1 sets unknown-discard mode, 2 sets unknown-flood mode.
		disable	Turns off IGMP snooping.
		timeout [<seconds>]	Sets how long the IES-1000 retains entries in the multicast filtering database.
	mfilter		Displays the multicast filtering database.
	fpvid		Displays default port VLAN IDs in Fast Mode.
		<portNo> <vid>	Sets a default port VLAN ID in Fast Mode.
	macfilter		Displays the MAC filtering status and setting on all ports.
		<portNo>	Displays the MAC filtering status and setting on the specified port.
		enable <portNo>	Enables the MAC filtering mechanism.
		disable <portNo>	Disables the MAC filtering mechanism.
		add <portNo> <mac>	Adds a source MAC address from which to forward packets.
		delete <portNo> <mac>	Deletes a source MAC address from which to forward packets.
	maccount	<portNo>	Displays the system's current MAC address count filter settings for that port.
		enable [port]	Turns on the MAC address count filter.
		disable [port]	Turns off the MAC address count filter.
		set <port> <max 1> <max 2>	Sets the MAC address count filter.
	version		Displays bridge information.
buffer			
	list		Displays all buffer pools.
	info		Shows the current buffer pool's information.
		<poolName>	Sets the current buffer pool to <poolName> and shows the pool's information.
	show		Shows all buffers in the current buffer pool.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		<n>	Shows buffer <n> in the current buffer pool.
	steal	<num>	Steals <num> buffers from the current buffer pool.
	version		Displays version information for the buffer driver.
bun			
	version		Displays the bun driver’s version.
	build		Shows information on the bun driver’s build.
	config	<config_spec>	Enters manual configuration request to bun driver.
	list	config	Shows all configuration requests.
		devices	Shows all registered bun device drivers.
		ports	Shows all registered bun ports.
		channels <portName>	Shows all enabled channels on the specified port.
		all opened channels <portName>	Shows open channels on the specified port.
		spices	Shows all available spices.
		objects	Shows all data objects.
	show	system	Shows system attributes.
		device <deviceName>	Shows device information for the specified device.
		port <portName>	Shows information for the specified port.
		channel <portName> <channelNo>	Shows information on the specified channel of the specified port.
	set	system	Sets system attributes.
		port <portName> / <attr> = <value>	Sets a port attribute.
		channel <portName> <channelNo> /<attr> = <value>	Sets a channel attribute.
	reset	port <portName>	Resets port hardware.
	list	classes	Displays available port classes.
	show	class <className>	Displays a class’s members.
	ethernet	filter	Shows the NP filter table.
		address <addr>	Selects the PHY address in the SMI bus.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		read <addr>	Reads the MII register of the device with the selected PHY address.
		write <addr> <data>	Writes data to the MII register of the device with selected the PHY address.
chips			
	cpu		Shows CPU usage.
	debug		Starts debug mode (ATMOS).
	exit		Exits the debugger (ATMOS).
	info		Shows version information and MAC address.
	mem		Shows memory usage on a per-process basis.
	stack		Shows stack usage on a per-process basis.
	rb	<addr>	Reads 1 byte from the specified address.
	rh	<addr>	Reads 1 half-word from the specified address.
	rw	<addr>	Reads 1 word from the specified address.
	wb	<addr> <data>	Writes 1 byte to the specified address.
	wh	<addr> <data>	Writes 1 half-word to the specified address.
	ww	<addr> <data>	Writes 1 word to the specified address.
	tell	<process> <cmd> [<attrs>]	Sends a tell command to the specified process.
config			
	list		Displays all registered modules.
	print		Shows configuration information for all modules.
		<module>	Shows configuration information for the specified module.
	reset		Resets configuration information in all modules from nonvolatile memory.
		<module>	Resets configuration information in the specified module from nonvolatile memory.
	save		Saves configuration information in all modules to nonvolatile memory.
	resource		Shows the controlled resources in all processes.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		<process>	Shows the controlled resources in the specified process.
		<process> <resource>	Shows the value of the specified resource in a process.
		<process> <resource> <value>	Sets the value of a process's resource.
	version		Shows the configuration driver's version information.
dhcprelay			
	add	<ip>	Adds a DHCP server to the relay's list.
	config		Displays the list of DHCP servers to relay between.
	delete	[<ip> | all]	Deletes a DHCP server or all servers from the relay's list.
	enable		Turns on DHCP relay.
	disable		Turns off DHCP relay.
	help		Displays help on available commands.
	reset		Resets and restarts DHCP relay.
	pool		Shows the DHCP relay memory pool status.
	status		Shows whether or not DHCP relay is activated.
	trace		Activates trace option(s).
	untrace		Deactivates trace option(s)
	version		Displays the DHCP software version.
	relayinfo	enable	Turns on the DHCP relay agent information (Option 82) feature.
		disable	Turns off the DHCP relay agent information (Option 82) feature.
		status	Displays the current status of the DHCP relay agent information (Option 82) feature.
		add [<info>]	Adds the specified information for the relay agent.
dot1x			
	enable		Turns on 802.1X security.
	disable		Turns off 802.1X security.
	status		Displays the 802.1X security status.
	debug	[level]	Turns the debug level on or off.
	port	enable <port>	Enables 802.1X security on the specified port.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		disable <port>	Disables 802.1X security on the specified port.
		control <port> <auto|auth|unauth>	Sets how the specified port should be authenticated.
		reauth <port> <on|off>	Turns re-authentication on or off on the specified port.
		period <port><value>	Configures how often the specified port should be re-authenticated.
		status <port>	Displays 802.1X security status on the specified port.
	radius	ip <addr>	Sets the external RADIUS server IP address.
		port <portnum>	Sets the external RADIUS server port number.
		secret <secret>	Sets the authentication and encryption key.
		show	Displays the external RADIUS server settings.
edd			
	version		Displays Ethernet device driver information.
	test	<ip>	Enables a ping-based Ethernet work around.
	set timeout	[<# of minutes>]	Sets the Ethernet test timeout value.
ethernet	set	auto <on | off>	Enables/disables Ethernet port auto negotiation.
		duplex <full | half>	Sets the Ethernet port to full or half duplex.
		speed <100 | 10>	Sets the operating speed of the Ethernet port (100M or 10M).
	status		Shows Ethernet link status (auto-negotiation, duplex, speed).
	save		Saves Ethernet settings.
exit			Ends the console or telnet session.
flashfs			
	config		Displays the configuration of the flash file system.
	default		Shows the current partition.
		<partition>	Selects a partition as the current flash file system.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
	fsck		Does a file system check in the current partition.
		<partition>	Does a file system check in the specified partition.
	format		Formats the current partition.
		<partition>	Formats the specified partition.
	id	<n>	Shows the chip ID of the n'th flash chip.
	info		Shows file system information.
	partitions		Shows all partitions information.
	rewrite	<file>	Rewrites the boot area with the specified ISFS file.
	trace		Shows the trace level in the FLASHFS driver.
		<level>	Sets the trace level in the FLASHFS driver.
	update		Commits ISFS files to the current partition.
		<partition>	Commits ISFS files to the specified partition.
	version		Shows the FLASHFS driver's version information.
	wipe		Erases the current partition.
		<partition>	Erases the specified partition.
fm			
	append	<file> [<text>]	Appends text to the specified file in the current file system.
	cat	<file>	Shows the contents of the specified file in the current file system.
	cp	<src file> <dest file>	Copies a source file to a destination file.
	default	[<fs>]	Displays or sets the current file system to either isfs or flashfs.
	fsinfo		Shows file system information.
	info	<file>	Shows file information.
	ls	[-l | -L]	Shows all files in the current file system.
	mv	<src file> <dest file>	Gives the source file the same name as the destination file.
	rm	<file>	Removes a file.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
	version		Shows the version information of file system.
adsl			The adsl commands apply to the AAM module.
	config	save	Saves configuration of the ADSL module to nonvolatile memory.
	enable	ch <port> <vpi> <vci>	Enables the specified PVC channel(s).
		chs [<start port> [<stop port>]]	Enables all PVC channels for specific ports.
		port <port>	Enables the specified ADSL port.
		ports	Enables all ADSL ports.
	disable	ch <port> <vpi> <vci>	Disables the specified PVC channel(s).
		chs [<start port> [<stop port>]]	Disables all PVC channels for the specified ports.
		port <port>	Disables the specified ADSL port.
		ports	Disables all ADSL ports.
	ldly	ldly <ports|port number> [<downstream value> <upstream value> <Symbol|MilliSec>]	Sets or displays the maximum line delay.
	linedata	<port>	Shows the line bit allocation of the specified ADSL port.
	lineinfo	<port>	Shows the line operating values of the specified ADSL port.
	lineperf	<port>	Shows the line quality of the specified ADSL port.
	linerate	<port>	Shows the line rate parameters of the specified ADSL port.
	set	ch <port> <vpi> <vci> <pvid> <priority> <vcp name>	Creates a new PVC channel, or modifies an existing one.
		ch <port> <vpi> <vci> super <vcp name>	Creates a super channel, or modifies an existing one.
		profile <name> [fast] <atur max rate> <atuc max rate> [ldly <atur delay> <atuc delay>] [<atur ...> <atuc ...>]	Sets an ADSL line configuration profile.
		port <port> <profile> <mode>	Applies a profile setting and operational mode to an ADSL port.
		ports <profile> <mode>	Applies a profile setting and operational mode to all ADSL ports.
		pvc <port> <muxMode> <txvpi> <txvci> [<rxvpi> <rxvci>]	Sets the PVC configuration to the specified ADSL port.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		pvcs <muxMode> <txvpi> <txvci> [<rxvpi> <rxvci>]	Sets the PVC configuration to all ADSL ports.
		vcp <profile name> <encap> <aal> <class> <pcr> <cdvt> [<scr/mcr> <bt/nrm>]	Creates a VC profile.
	delete	profile <profile>	Deletes the specified profile.
		ch <port> <vpi> <vci>	Deletes the specified PVC channel.
		chs [<start port> [<stop port>]]	Deletes all PVC channels for the specified ports.
		vcp <profile name>	Deletes a specific VC profile.
		vcps	Deletes all VC profiles except the DEFVAL profile.
	show	profile <profile>	Shows the contents of the specified profile.
		profiles	Shows the contents of all profiles.
		port <port>	Shows the line status of the specified ADSL port.
		ports	Shows the line status of all ADSL ports.
		pvc <portNo>	Shows the PVC configuration of the specified ADSL port.
		pvcs	Shows the PVC configuration of all ADSL ports.
		ch <port> <vpi> <vci>	Shows the contents of the specified PVC channel.
		chs [<start port> [<stop port>]]	Shows the contents of all PVC channels in all ports or in the specified ports.
		vcp <profile name>	Shows the contents of the specific VC profile.
		vcps	Shows the contents of all VC profiles.
	list	port <portNo>	Shows the port configuration of the specified ADSL port.
		ports	Shows the port configurations for all ADSL ports.
		profiles	Shows all profiles and profiles applied to all ADSL ports.
	getname	<portNo>	Gets the name of the specified port.
	getnames		Gets the names of all ports.
	setname	<portNo> <name>	Sets the name of the specified port.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
	loopback	<portNo> local | f5	Does a local/OAM F5 loopback test on the specified GSHDSL port.
	stat	ch <port> <vpi> <vci>	Shows the statistics of the specified PVC channel.
		chs [<start port> [<end port>]]	Shows the statistics of all PVC channels in all ports or in the specified port.
	clear	ch <port> <vpi> <vci>	Clears the statistics of the specified PVC channel.
		chs [<start port> [<end port>]]	Clears the statistics of all PVC channels in all ports or in the specified port.
gshdsl			The gshdsl commands apply to the SAM module.
	config	save	Saves configuration of GSHDSL module to nonvolatile memory.
	enable	ch <port> <vpi> <vci>	Enables the specified PVC channel(s).
		chs [<start port> [<stop port>]]	Enables all PVC channels for specific ports.
		port <portNo>	Enables the specified GSHDSL port.
		ports	Enables all GSHDSL ports.
	disable	ch <port> <vpi> <vci>	Disables the specified PVC channel(s).
		chs [<start port> [<stop port>]]	Disables all PVC channels for the specified ports.
		port <portNo>	Disables the specified GSHDSL port.
		ports	Disables all GSHDSL ports.
	lineinfo	<portNo>	Shows the statistics of the specified GSHDSL ports.
	lineperf	<portNo>	Shows the line quality of the specified GSHDSL port.
	set	ch <port> <vpi> <vci> <pvid> <priority> <vcp name>	Creates a new PVC channel, or modifies an existing one.
		ch <port> <vpi> <vci> super <vcp name>	Creates a super channel, or modifies an existing one.
		profile <profile name> <Cmax> [<Cmin>] [annexA | annexB]	Sets the specified profile a maximum and a minimum rate, and a PSD region.
		port <portNo> <profile>	Applies a specified profile setting to a GSHDSL port.
		ports <profile>	Applies the specified profile setting to all GSHDSL ports.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION

		`bondc <bond name> <port list>`
		or
		`bondc <mode> <bond name> <group list>`
			Bonds the specified member list and sets them to STU-C mode.

		`bondr <bond name> <port list>`
		or
		`bondr <mode> <bond name> <group list>`
			Bonds the specified member list and sets them to STU-R mode.

		`nwirec <mode> <group name> <group#>`	Bundles the specified ports into an n-wire group set to STU-C mode.
		`nwirer <mode> <group name> <group#>`	Bundles the specified ports into an n-wire group set to STU-R mode.
		`pvc <portNo> <muxMode> <txvpi> <txvci> [<rxvpi> <rxvci>]`	Sets the PVC configuration to the specified GSHDSL port.
		`pvcs <muxMode> <txvpi> <txvci> [<rxvpi> <rxvci>]`	Sets the PVC configuration to all GSHDSL ports.
		`vcp <profile name> <encap> <aal> <class> <pcr> <cdvt> [<scr/mcr> <bt/nrm>]`	Creates a VC profile.
	`delete`	`profile <profile>`	Deletes the specified profile.
		`profiles`	Deletes all profiles except the DEFVAL profile.
		`bond <bond name>`	Deletes the specified bonding group.
		`nwire <group name>`	Deletes the specified n-wire group.
		`ch <port> <vpi> <vci>`	Deletes the specified PVC channel.
		`chs [<start port> [<stop port>]]`	Deletes all PVC channels for the specified ports.
		`vcp <profile name>`	Deletes a specific VC profile.
		`vcps`	Deletes all VC profiles except the DEFVAL profile.
	`show`	`profile <profile>`	Shows the contents of the specified profile.
		`profiles`	Shows the contents of all profiles.
		`pvc <portNo>`	Shows the PVC configuration of the specified GSHDSL ports.
		`pvcs`	Shows the PVC configuration of all GSHDSL ports.
		`ch <port> <vpi> <vci>`	Shows the contents of the specified PVC channel.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		chs [<start port> [<stop port>]]	Shows the contents of all PVC channels in all ports or in the specified ports.
		vcp <profile name>	Shows the contents of the specific VC profile.
		vcps	Shows the contents of all VC profiles.
	list	port <portNo>	Shows the setting and status of the specified GSHDSL port.
		ports	Shows the setting and status for all G.SHDSL ports.
		profiles	Shows the contents of all profiles and profiles applied to all G.SHDSL ports.
		bond	Shows all bonding groups.
		nwire	Shows all n-wire groups
	setname	<port number> <port name>	Sets the name of a G.SHDSL port.
	getname	<port number>	Displays the name of a G.SHDSL port.
	getnames		Displays the names of all G.SHDSL ports.
	monitor		Shows port statistics of all GSHDSL ports.
		<startPort>	Shows port statistics of GSHDSL ports from the specified start port to the end.
		<startPort><stopPort>	Shows port statistics of GSHDSL ports from the specified start port to the specified end port.
	ver		Shows version information of GSHDSL modem code and driver.
	loopback	<portNo> local | f5	Does a local/OAM F5 loopback test on the specified GSHDSL port.
	stat	ch <port> <vpi> <vci>	Shows the statistics of the specified PVC channel.
		chs [<start port> [<end port>]]	Shows the statistics of all PVC channels in all ports or in the specified port.
	clear	ch <port> <vpi> <vci>	Clears the statistics of the specified PVC channel.
		chs [<start port> [<end port>]]	Clears the statistics of all PVC channels in all ports or in the specified port.
hmon			
	display		Shows the temperature values.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
ip			
	arp	add <if> <ip> <mac>	Adds ARP record <ip> <mac> to interface <if>.
		delete <if> <ip>	Deletes ARP record <ip> from interface <if>.
		flush	Flushes all cached ARP records.
		list	Lists all resolved ARP records.
		help	Shows a help message for the ARP command.
	config		Shows the IP module's run-time configuration.
		save	Saves the IP module's configuration to the nonvolatile memory.
	enable	[<if> [mtu <size> [<ip> [<ipmask>]]]	Sets the IP address setting of the specified interface.
	device	[list]	Lists interface definitions.
		add <if> <type> <file> [mtu <size>] [<IP> [mask <mask>]]	Adds a new interface.
		delete <if>	Deletes the specified interface.
		flush	Deletes all interfaces.
	enable	<if>	Enables the specified interface.
	disable	<if>	Disables the specified interface.
	ping	<host> [ttl [size]]	Does a ping test.
	route		Displays all routing entries.
		add <routeName> <ip> <relayIp> [<mask> [<cost> [<timeout>]]]	Adds a routing entry.
		delete <routeName>	Deletes a routing entry.
		flush	Deletes all routing entries.
	routes		Shows all routing entries.
	stats	help	Shows the help information about the stats command.
		arp [reset]	Shows or resets the ARP statistics.
		icmp [reset]	Shows or resets the ICMP statistics.
		ip [reset]	Shows or resets the IP statistics.
		raw [reset]	Shows or resets the raw statistics.
		tcp [reset]	Shows or resets the TCP statistics.
		udp [reset]	Shows or resets the UDP statistics.
	subnet	add <netName> <if> <ip> <mask>	Creates a subnet.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		delete <netName>	Deletes a subnet.
		flush	Removes all subnets.
	version		Shows the version information for the IP module.
isfs			
	trace		Shows the ISFS trace level.
		<level>	Sets the ISFS trace level.
	version		Shows version information for the ISFS module.
passwd			Changes the management password.
restart			Saves the configuration and restarts the system.
snmp			
	access	<read | write> <community> [<ip>]	Adds an SNMP access entry.
		delete <community> [<ip>]	Deletes an SNMP access entry.
		flush	Deletes all SNMP access entries.
		list	Lists all SNMP access entries.
	trap	add <community> <ip>	Adds a trap destination.
		delete <community> <ip>	Deletes a trap destination.
		flush	Deletes all trap destinations.
		list	Lists all trap destinations.
	config	save	Saves access entries and trap destinations to the nonvolatile memory.
sys			
	info		Shows the system information.
	set	name [<name>]	Sets or clears the system name.
		contact [<name>]	Sets the contact person's name.
		chassis <id>	Sets the chassis ID number.
		location [<loc>]	Sets or clears the location.
		mode <fast | normal>	Sets the bridge operation mode.
		slot <id>	Sets the slot ID.
	errlog	clear	Clears the system error log.
		display	Shows the system error log.
	syslog		Shows the syslog setting.
		enable | disable	Enables or disables the syslog.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		facility <facility>	Sets the syslog facility.
		server <ip>	Sets the syslog server IP.
	secured host		Shows the secured host.
		enable | disable	Enables or disables checking for the secured host.
		add <hostIp>	Adds a secured host.
		delete <hostIp>	Deletes a secured host.
	date	date [<YYYY>-<MM>-<DD>] [<hh>:<mm>:<ss>]	Sets or show the date and time.
uptime			Shows the system uptime.
version			Shows the system version information.
vlan1q			
	config	save	Saves the VLAN settings to nonvolatile memory.
		list	Shows the run-time VLAN settings.
		reset	Reloads the VLAN settings from nonvolatile memory.
	dvlan	getentry <vid>	Shows the dynamic VLAN status for the specified entry.
		list	Shows all dynamic VLAN status.
	svlan	setentry <vid> <portNo>	Sets a static VLAN entry to normal tagged.
		setentry <vid> <portNo> <ad_control>	Sets a static VLAN entry to <ad_control> tagged.
		setentry <vid> <portNo> <ad_control> <tag_control>	Sets a static VLAN entry to <ad_control> and tagged or untagged.
		setname <vid> <name>	Sets a name of a specific static VLAN.
		delentry <vid>	Deletes a static VLAN table entry.
		getentry <vid>	Shows the static VLAN setting for the specified entry.
		getname <vid>	Displays the name of a specific static VLAN.
		getnames	Displays the name of all static VLANs.
		cpu [<vid>]	Registers the CPU port to the specified VLAN ID (sets the management VLAN).
		list	Shows all static VLAN settings.
	vlan	enable/disable	Enables or disables the VLAN.
		status	Shows the VLAN's current status.

Table 22-1 Commands

MODULE	COMMAND		DESCRIPTION
		list	Shows the VLAN's current status periodically.
	stop		Stops showing the VLAN's current status periodically.
	pvid		Lists the default port VLAN ID for all ports.
		<portNo> <vid>	Sets the default port VLAN ID for a specific port.
	priority port		Lists the default priority for all ports.
		<portNo> <priority>	Sets the default priority for a specific port.
	regen port		Lists the mapping of the incoming user priority to regen priority.
		<portNo> <user pri> <reg pri>	Sets the mapping of the incoming user priority to regen priority.

Chapter 23 System Commands

This chapter describes the IES-1000's system-related commands.

23.1 System Commands Overview

Use the commands described in this chapter to configure system functions on the IES-1000.

23.2 Commonly Used Commands

This section shows you commonly used commands.

23.2.1 Uptime Command

Syntax:

```
192.168.1.1> uptime
```

This command shows the elapsed time the system has been running since the last reboot.

23.2.2 Version Command

Syntax:

```
192.168.1.1> version
```

This command shows the system firmware version and date

23.2.3 Restart Command

Syntax:

```
192.168.1.1> restart
```

This command instructs the system to perform a warm start, that is, restarting the system without turning the power off and on.

23.2.4 Passwd Command

Syntax:

```
192.168.1.1> passwd
```

This command changes the management password. The management password is used for authentication at console or Telnet login. This command is only allowed for local console management sessions. The management password must be from 1 to 8 characters long and any character is accepted. The factory default password is "1234".

It is very important that you remember your password. If you forget it, refer to the *Troubleshooting* section for help.

23.2.5 Config Print Command

Syntax:

```
192.168.1.1> config print
```

This command lists all current system configuration settings.

23.2.6 Exit Command

Syntax:

```
192.168.1.1> exit
```

This command terminates the console or telnet management session.

23.3 Sys Commands

23.3.1 Info Command

Syntax:

```
192.168.1.1 sys> info
```

This command displays system related information.

23.3.2 Set Name Command

Syntax:

```
192.168.1.1 sys> set name <name>
```

This command allows you to set the name of your IES-1000. The previous setting will be cleared if the command is entered with the `<name>` parameter omitted.

23.3.3 Set Contact Command

Syntax:

```
192.168.1.1 sys> set contact [<name>]
```

This command allows you to set the name of the contact person for your IES-1000. The previous setting will be cleared if the command is entered with the name omitted.

23.3.4 Set Location Command

Syntax:

```
192.168.1.1 sys> set location [<name>]
```

This command allows you to set the location of your IES-1000. The previous setting will be cleared if the command is entered with the location omitted.

23.3.5 Set Mode Command

Syntax:

```
192.168.1.1 sys> set mode <fast|normal>
```

where

`fast`	=	`Fast` makes use of the "tag" subset of the IEEE 802.1Q standard to identify the source port of a frame and speed traffic through a service gateway.
`normal`	=	`Normal` switches frames using a layer 2 switch (IEEE 802.1D) transparent bridge standard. Use normal mode when you are using a regular gateway.

This command lets you set the network module into fast or normal mode. Determine which mode you are using by entering the `info` command. Fast mode allows only one port per PVID. Use normal mode and the 802.1Q VLAN commands (see *Chapter 31*) to configure VLANs or PVIDs with multiple ports.

Enable fast mode only when you are using a service gateway.

23.3.6 Set Slot Command

Syntax:

```
192.168.1.1 sys> set slot <slot number>
```

where

`<slot number>=` This network module's number in the IES-1000 chassis (1 or 2).

This command sets slot number of the network module. This is an optional parameter to help network administrators keep track of individual network modules. Enter the command without the slot number to display the network module's slot number.

23.3.7 Set Chassis Command

Syntax:

```
192.168.1.1 sys> set chassis <chassis number>
```

where

`<chassis number>=` The number for this IES-1000 chassis (1 to 64).

This command sets a number to identify this IES-1000 in a network. This is an optional parameter to help network administrators keep track of multiple IES-1000s. Enter the command without the chassis number to display the IES-1000's chassis number.

23.4 Secured Host Commands

Allow up to ten remote administrators to access your IES-1000 via IP addresses you specify.

23.4.1 Secured Host Command

Syntax:

```
192.168.1.1 sys> secured host [<mode>]
```

where

`<mode> =` "enable" or "disable".
If `<mode>= disable` (default), then anyone may access your IES-1000.
If `<mode>= enable`, then only those computers with IP addresses specified by you may access your IES-1000 (refer to the S*ecured Host Add* command).

This command enables/disables the secured host function. To display current secured host settings, simply enter the command `secured host.`

23.4.2 Secured Host Add Command

Syntax:

```
192.168.1.1 sys> secured host add <host IP>
```

where

`<host IP> =` The IP address of a secured host.

This command adds the IP address of a secured host. You may add up to ten IP addresses.

23.4.3 Secured Host Delete Command

Syntax:

```
192.168.1.1 sys> secured host delete <host IP>
```

where

`<host IP> =` The IP address of a secured host.

This command deletes the IP address of a previously added secured host.

23.5 UNIX Syslog Commands

Use UNIX syslog commands to send logs to your UNIX server. If the DSL link is on or goes down, the IES-1000 will send a log to your UNIX server. The table, shown next, indicates what is logged in each case.

Table 23-1 Logs Sent to Your UNIX Server

DSL LINK ON	DSL LINK DOWN
port number	port number
sequence number	sequence number
rate	-

If the subscriber's device supports the dying gasp feature, the AAM1008 can also send a log indicating that the subscriber turned off the ADSL modem or router.

If your UNIX server is down these logs will be lost.

23.5.1 Syslog Command

Syntax:

```
192.168.1.1 sys> syslog [<mode>]
```

where

`<mode>` = enable or disable.

This command enables or disables the sending of logs to your UNIX server. Syslog is disabled by default (`<mode>`= disable). A log is sent if `<mode>= enable`. To display current settings, do not specify a `<mode>`.

23.5.2 Syslog Facility Command

Syntax:

```
192.168.1.1 sys> syslog facility <facility>
```

where

`<facility>` = Local 1 to local 7.

This command sets the syslog facility for the UNIX system.

23.5.3 Syslog Server Command

Syntax:

```
192.168.1.1 sys> syslog server <server IP>
```

where

`<server IP>` = The IP address of syslog server.

This command sets the UNIX server IP address. If `<server IP>=0.0.0.0` (default), then logs will be dropped (not be sent).

23.6 System Error Log Commands

The system error log will record error events locally to the IES-1000 memory. You may clear or display these logs using the commands listed in this section.

The following lists some examples of logs that the system error log can record. Please refer to the web configurator *Diagnostic chapter* for log details.

ADSL link on (port number, sequence number, rate, noise margin, attenuation)	ADSL link down (port number, sequence number, noise margin, attenuation)
ADSL OVER_HEAT_ACTIVE (temperature)	ADSL OVER_HEAT_RELEASE (temperature)
G.SHDSL link on (port number, sequence number, rate, noise margin, attenuation)	G.SHDSL link down (port number, sequence number, noise margin, attenuation)
G.SHDSL OVER_HEAT_ACTIVE (temperature)	G.SHDSL OVER_HEAT_RELEASE (temperature)
Console session begin	Console session end
Telnet session begin	Telnet session end
Incorrect telnet password	Insecure telnet access (IP address)
FTP session begin	FTP session end
Incorrect FTP password	Insecure FTP access (IP address)
FTP image error (reason)	FTP receive file OK (file name)
System reboot	

23.6.1 Errlog Display Command

Syntax:

```
192.168.1.1 sys> errlog display
```

This command displays the system error log.

Upgrade firmware or restore the configuration file through FTP or the web configurator to store an error log in non-volatile memory.

23.6.2 Errlog Clear Command

Syntax:

```
192.168.1.1 sys> errlog clear
```

This command clears the system error log.

If you clear a log (using the `errlog clear` command), you may not view it again.

Chapter 24 ADSL Commands

The ADSL (Asymmetrical Digital Subscriber Line) subsystem allows you to configure and monitor the ADSL ports on the AAM1008 network module.

24.1 ADSL Overview

See the web configurator chapter on ADSL for background information about ADSL.

24.2 Configured Versus Actual Rate

You configure the maximum rate of an individual ADSL port by modifying its profile (see the `set profile` command) or assigning the port to a different profile (see the `set port` command). However, due to noise and other factors on the line, the actual rate may not reach the maximum that you specify.

Even though you can specify arbitrary numbers in the `set profile` command, the actual rate is always a multiple of 32 Kbps. If you enter a rate that is not a multiple of 32 Kbps, the actual rate will be the next lower multiple of 32Kbps. For instance, if you specify 60 Kbps for a port, the actual rate for that port will not exceed 32 Kbps, and if you specify 66 Kbps, the actual rate will not be over 64Kbps.

Note that when you configure an ADSL port, the upstream rate must be less than or equal to the downstream rate. Note also that the `list port` command displays the configured parameters of the ADSL port, while the `show port` command displays the actual rates.

24.3 ADSL Commands

Use these commands to configure an AAM-1008's ADSL ports and profiles.

The commands related to one subsystem are grouped under a primary command of that subsystem. To configure the ADSL parameters, you must first enter the ADSL subsystem by entering the `adsl` command as shown next.

Syntax:

```
192.168.1.1> adsl
192.168.1.1 adsl>
```

When you see the `192.168.1.1 adsl>` command line prompt, you are ready to enter G.SHDSL commands. Enter the `home` command to return to the "192.168.1.1>" prompt.

24.3.1 Config Save Command

Syntax:

```
192.168.1.1 adsl> config save
```

The `config save` command saves the ADSL configuration into nonvolatile memory.

24.3.2 Disable Port Command

Syntax:

```
192.168.1.1 adsl> disable port <port number>
```

where

`<port number>` = port number, from 1 to 8.

The `disable port` command forcibly disables the specified ADSL port.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

24.3.3 Disable Ports Command

Syntax:

```
192.168.1.1 adsl> disable ports
```

The `disable ports` command forcibly disables all ADSL ports.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

24.3.4 Enable Port Command

Syntax:

```
192.168.1.1 adsl> enable port <port number>
```

where

`<port number>` = A port number, from 1 to 8.

The `enable port` command forcibly enables the specified ADSL port.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

24.3.5 Enable Ports Command

Syntax:

```
192.168.1.1 adsl> enable ports
```

The `enable ports` command forcibly enables all ADSL ports.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected ADSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

24.3.6 Linedata Command

Syntax:

```
192.168.1.1 adsl> linedata <port number>
```

where

`<port number>` = A port number, from 1 to 8.

The `linedata` command shows the line bit allocation of an ADSL port.

Discrete Multi-Tone (DMT) modulation divides up a line's bandwidth into tones. This command displays hexadecimal digits that indicate the number of bits transmitted for each tone. This can be used to determine the quality of the connection, whether a given sub-carrier loop has sufficient margins to support ADSL transmission rates, and possibly to determine whether certain specific types of interference or line attenuation exist. Refer to the ITU-T G.992.1 recommendation for more information on DMT.

The better (or shorter) the line, the higher the number of bits transmitted for a DMT tone. The maximum number of bits that can be transmitted per DMT tone is 15.

"DS carrier load" displays the number of bits transmitted per DMT tone for the downstream channel (from the network module to the subscriber's DSL modem or router).

"US carrier load" displays the number of bits received per DMT tone for the upstream channel (from the subscriber's DSL modem or router to the network module).

The bit allocation contents are only valid when the link is up.

In the following example, the numbers of bits for two DMT tones display together. "44" displays for DMT tones 96 and 97. This means DMT tone 96 transmitted 4 bits and tone 97 transmitted 4 bits. Where neither of the two tones transmitted any bits, a single "0" is displayed (like tones 0 and 1 for example).

In the following example, the downstream channel is carried on tones 38 to 240 and the upstream channel is carried on tones 9 to 31 (space is left between the channels to avoid interference).

An example is shown next.

```
192.168.1.1 adsl> linedata 7
DS carrier load: number of bits per symbol(tone):
tone   0- 31:  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
tone  32- 63:  0  0  0 22 22 33 33 33 33 33 33 44 33 44 44 44
tone  64- 95:  4 44 44 43 43 33 34 44 33 44 44 34 44 43 33 44
tone  96-127: 44 43 34 44 44 33 43 44 44 34 44 44 33 44 44 44
tone 128-159: 44 44 44 34 44 34 43 44 33 43 34 33 33 33 33 34
tone 160-191: 43 33 33 34 34 33 23 33 33 33 22 33 33 33 33 33
tone 192-223: 33 33 33 23 22 33 33 33 23 33 33 33 22 23 22 32
tone 224-255: 22 22 22 22 20 22 22 22 20  0  0  0  0  0  0  0
US carrier load: number of bits per symbol(tone)
tone   0- 31:  0  0  0  0  2 34 55 77 88 89 99 99 99 98 88 87
tone  32- 63:  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
```

Figure 24-1 Linedata Command Example

24.3.7 Lineinfo Command

Syntax:

`192.168.1.1 adsl> lineinfo <port number>`

where

`<port number>` = A port number, from 1 to 8.

The `lineinfo` command shows the line operating values of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> lineinfo 7
Current Operating Modes:
    Data Mode: ATM    Service Type in operation: G.DMT
    Number of Channels (Down/up stream): 1/1
    Downstream Framing Structure       : 3
    Active down/up stream rate option  : 1/1
    TRELLIS operation mode is          : ON
Current Connection detail:
    Down/up stream interleaved Delay :  4/ 4 ms
    Downstream Parity byte assigned to fast/interleaved : 0/ 2
    Upstream   Parity byte assigned to fast/interleaved : 0/ 2
    Downstream Symbols assigned to fast/interleaved     : 0/ 1
    Upstream   Symbols assigned to fast/interleaved     : 0/ 1
    Down/up stream Depth value       :  2/ 2
    Total Transceiver Output Power   :  8dB
Current ATUR Information:
    Country code 0
    Provider Code 01020304
    Capabilities:
        g.dmt  POTS overlap (Annex A)
```

Figure 24-2 Lineinfo Command Example

The results contain the operating modes, interleave delay, parity byte assignment and parity bytes per codeword, symbols per codeword and interleave depth. Information obtained prior to training to steady state transition will not be valid or will be old information. Annex A refers to POTS.

Table 24-1 Lineinfo Command

LABEL	DESCRIPTION
Service Type in Operation	This is the ADSL standard that the port is using: G.dmt (AAM1008-61), G.dmt Annex B (AAM1008-63), ETSI (AAM1008-63), G.lite or ANSI T1.413 issue 2 (AAM1008-61).
Number of Channels	An ADSL port on the network module uses one downstream channel and one upstream channel.
Downstream Framing Structure	This displays the framing mode that the network module uses on the traffic that it sends. "0" is full overhead framing with the synchronization control mechanism enabled (asynchronous bit-to-modem timing) "1" is full overhead framing with the synchronization control mechanism disabled (synchronous bit-to-modem timing). "2" is reduced overhead framing with separate fast and synchronization bytes in the respective fast and interleaved latency buffers. This produces 64 kilobits per second of framing overhead. "3" is reduced overhead framing with a merged fast and synchronization byte, using either the fast or the interleaved latency buffer. This produces 32 Kbps of framing overhead.
Active down/up stream rate option	This is the rate option currently being used for the down/upstream channel.
TRELLIS operation mode is	Trellis coding helps to reduce the noise in ADSL transmissions. Trellis may reduce throughput but it makes the connection more stable.[1]
Down/up stream interleaved Delay	The numbers of milliseconds of interleave delay for downstream and upstream transmissions are listed.
Downstream Parity byte assigned to fast/interleaved	This is the current number of downstream parity bytes (FEC Redundancy) per Reed Solomon codeword that are assigned to the fast or interleaved buffer.
Upstream Parity byte assigned to fast/interleaved	This is the current number of upstream parity bytes (FEC Redundancy) per Reed Solomon codeword that are assigned to the fast or interleaved buffer.
Downstream Symbols assigned to fast/interleaved	This is the current number of downstream symbols per Reed Solomon codeword value that are assigned to the fast or interleaved buffer. This should always be 1 for fast mode.
Upstream Symbols assigned to fast/interleaved	This is the current number of upstream symbols per Reed Solomon codeword value that are assigned to the fast or interleaved buffer. This should always be 1 for fast mode.

[1] At the time of writing, the AAM1008 always uses Trellis coding.

`Down/up stream Depth value`	This is the current downstream or upstream, interleaved codeword depth value. The larger the number, the more interleave blocks data is distributed across and the stronger the protection against errors (and the lower the performance is). The smaller the number, the fewer interleave blocks data is distributed across and the higher the performance (and the weaker the protection against errors).
`Total Transceiver Output Power`	The total output power of the transceiver varies with the length and line quality. The farther away the subscriber's ADSL modem or router is or the more interference there is on the line, the higher the power will be.
`Current ATUR Information`	This section contains data acquired from the ATUR (ADSL Termination Unit – Remote) during negotiation/provisioning message interchanges. This information can help in identifying the subscriber's ADSL modem or router. Information obtained prior to training to steady state transition will not be valid or will be old information.
`Country Code`	The country code is from the Vendor ID (g.994.1).
`Provider Code`	The provider code includes the Vendor ID and Version Number obtained from Vendor ID fields (g.994.1) or R-MSGS1(T1.413).
`Capabilities`	The "Capabilities" section displays what kind of DSL connection the subscriber's ADSL modem or router supports.

24.3.8 Lineperf Command

Syntax:

```
192.168.1.1 adsl> lineperf <port number>
```

where

`<port number>` = A port number, from 1 to 8.

The `lineperf` command shows the line performance counters of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> lineperf 7
 nfebe-I/nfebe-ni                : 0/0
 ncrc-I/ncrc-ni                  : 0/0
 nfecc-I/nfecc-ni                : 0/0
 nfec-I/nfec-ni                  : 0/0
 nblks-ds/nblks-us               : 120878/120878
 nsec-ds/nsec-us                 : 2060/2060
 n-eb-ds/n-eb-us                 : 0/0
 n-bbe-ds/n-bbe-us               : 0/0
 n-es-ds/n-es-us                 : 0/0
 n-ses-ds/n-ses-us               : 0/0
 non-ses-blks-ds/non-ses-blks-us : 120878/120878
 n-uas-ds/n-uas-us               : 0/0
 fe_loss_seconds/ne_loss_seconds : 0/0
 fe_fec_seconds/ne_fec_seconds   : 0/0
 fast_trains                     : 0
 fast_trains_fail                : 0
```

Figure 24-3 Lineperf Command Example

These counters display line performance data that has been accumulated since the system started. In the list above the definitions of near end/far end will always be relative to the ATU-C (ADSL Termination Unit-Central Office).

Downstream (ds) refers to data from the ATU-C and upstream (us) refers to data from the ATU-R. "I" stands for interleaved and "ni" stands for non-interleaved (fast mode).

A block is a set of consecutive bits associated with the path; each bit belongs to one and only one block. Consecutive bits may not be contiguous in time.

Table 24-2 Line Performance Counters

LABEL	DESCRIPTION
nfebe	The number of far end block errors.
ncrc	Near end cyclic redundancy check errors.
nfecc	The number of far end forward error correction count.
nfec	The number of near end forward error count.
nblks	The number of blocks transmitted.
nsec	The number of seconds the connection has been up.
n-eb-	The number of super frames containing at least one error at the far (ds) or near (us) end.
n-bbe-	The number of background block errors not occurring during a severely errored second at the far (ds) or near (us) end.
n-es	The number of errored seconds. This is how many seconds contained at least one errored block or at least one defect.
n-ses	The number of severely errored seconds. This is how many seconds contained 30% or more errored blocks or at least one defect. This is a subset of n-es.
non-ses-blks	The number of non-Severely Errored Second (SES) blocks at the far (ds) or near (us) end. This is the total number of super frames received during non-SES seconds.
n-uas	The number of unavailable seconds.
fe/ne_loss_seconds	The number of loss seconds accumulated at the far (fe) or near (ne) end.
fe/ne_fec_seconds	The current number of seconds with one or more errors at the far (fe) or near (ne) end.
fast_trains : 0	The current count of the total number of fast retrains in the performance period (15 minutes).
fast_trains_fail : 0	The current count of the total number of fast retrains that have failed in the performance period (15 minutes).

24.3.9 Linerate Command

Syntax:

```
192.168.1.1 adsl> linerate <port number>
```

where

`<port number>` = A port number, from 1 to 8.

The `linerate` command shows the line rate parameters of an ADSL port.

An example is shown next.

```
192.168.1.1 adsl> linerate 7
Current Active Rates:
    AS0 downstream rate              : 2048 Kbps
    AS1 downstream rate              : 0 Kbps
    LS0 upstream   rate              : 512 Kbps
    LS1 upstream   rate              : 0 Kbps
    Down/up stream Margin            : 31/22 dB
    Down/up stream Attenuation       : 0/ 0 dB
    Attainable Down/up stream Rate   : 11456/ 1344 Kbps
```

Figure 24-4 Linerate Command Example

These results contain the current downstream and upstream operating values (SHOWTIME) for the requested line, the latest available downstream and upstream margins, channel attenuation and the maximum attainable rate.

Downstream and upstream margins must both be at least 6 dB. The initial downstream and upstream margins are first set during training. The upstream margin is recalculated every 15 seconds during "show time" at the ATU-C and the downstream margin updates every 15 seconds during "show time" by using EOC messaging.

Information obtained prior to training to steady state transition will not be valid or will be old information.

24.3.10 Line Delay Command

Syntax:

```
192.168.1.1 adsl> ldly <ports|port number> [<downstream value> <upstream value> <Symbol|MilliSec>]
```

where

`<ports|port number >`	=	All of the ADSL ports or a single port, from 1 to 8.
`<downstream value>`	=	The downstream interleave latency delay (0..255)
`<upstream value>`	=	The upstream interleave latency delay (0..255) milliseconds.
`<Symbol|MilliSec>]`	=	Set the measurement of the interleave delay to use with symbols or milliseconds.

Sets or displays the maximum interleave latency delay.

24.3.11 List Port Command

Syntax:

```
192.168.1.1 adsl> list port <port number>
```

where

`<port number>` = A port number, from 1 to 8.

The `list port` command shows the configured maximum upstream/downstream rates, the mode (or standard), and enable/disable state of an individual ADSL port.

24.3.12 List Ports Command

Syntax:

```
192.168.1.1 adsl> list ports
```

The list ports command shows the configured maximum rates, modes and states of all ADSL ports.

24.3.13 Set Profile Command

Syntax:

```
192.168.1.1 adsl> set profile <name> [fast] <atur max rate > <atuc max rate>
[ldly  <atur delay> <atuc delay>][<atur ...> <atuc ...>]

  <atux ...> = <target margin> <min margin> <max margin> <min rate>
```

where

<name>	=	The name of the profile (up to 31 characters).
[fast]	=	This is optional to set this profile for fast latency mode Select **fast** mode to use no interleaving and have faster transmission (a “fast channel”). This would be suitable if you have a good line where little error correction is necessary.
<atur max rate>	=	The maximum ADSL upstream transmission rate.
<atuc max rate>	=	The maximum ADSL downstream transmission rate.
<atur delay>	=	The upstream interleave latency delay (0..255) milliseconds.
<atuc delay>	=	The downstream interleave latency delay (0..255) milliseconds.
<atur target margin>	=	The upstream target ADSL signal/noise margin (0-31db).
<atur min margin>	=	The upstream minimum acceptable ADSL signal/noise margin (0-31db).
<atur max margin>	=	The upstream maximum acceptable ADSL signal/noise margin (0-31db).
<atur min rate>	=	The upstream minimum ADSL transmission rate in Kbps.
<atuc target margin>	=	The downstream target ADSL signal/noise margin (0-31db).
<atuc min margin>	=	The downstream minimum acceptable ADSL signal/noise margin (0-31db).
<atuc max margin>	=	The downstream maximum acceptable ADSL signal/noise margin (0-31db).
<atuc min rate>	=	The downstream minimum ADSL transmission rate in Kbps.

ATU-C (atuc) stands for ADSL Termination Unit-Central and refers to downstream transmission and ATU-R (atur) stands for ADSL Termination Unit-Remote and refers to upstream transmission.

The profile is a table that contains information on ADSL line configuration. Each entry in this table reflects a parameter defined by a manager, which can be used to configure the ADSL line.

Note that the default value will be used for any of the above fields that are omitted.

The upstream rate must be less than or equal to the downstream rate.

Even though you can specify arbitrary numbers in the `set profile` command, the actual rate is always a multiple of 32 Kbps. If you enter a rate that is not a multiple of 32 Kbps, the actual rate will be the next lower multiple of 32Kbps. For instance, if you specify 60 Kbps for a port, the actual rate for that port will not exceed 32 Kbps, and if you specify 66 Kbps, the actual rate will not be over 64Kbps.

An example is shown next.

```
192.168.1.1 adsl> set profile debug 800 8000
```

This command sets the maximum upstream transmission rate to 800 kbps and the maximum downstream transmission rate to 8000 kbps. None of the other settings are changed.

The following example creates a premium profile (named gold) for providing subscribers with very high connection speeds and no interleave delay. It also sets the upstream target signal/noise margin to 5 db, the upstream minimum acceptable signal/noise margin to 0 db, the upstream maximum acceptable signal/noise margin to 30 db, the upstream minimum ADSL transmission rate to 64 Kbps, the downstream target signal/noise margin to 6 db, the downstream minimum acceptable signal/noise margin to 0 db, the downstream maximum acceptable signal/noise margin to 31 db, and the downstream minimum ADSL transmission rate to 128 Kbps.

```
192.168.1.1 adsl> set profile gold fast 800 8000 5 0 30 64 6 0 31 128
```

This next example creates a similar premium profile (named goldi), except it sets an interleave delay of 16 ms for both upstream and downstream traffic.

```
192.168.1.1 adsl> set profile gold 800 8000 ldly 16 16 5 0 30 64 6 0 31 128
```

24.3.14 Delete Profile Command

Syntax:

```
192.168.1.1 adsl> delete profile <name>
```

where

`<name>` = A profile name.

The `delete profile` command allows you to delete an individual profile by its name. You cannot delete a profile that is assigned to any of the DSL ports in the network module. Assign a different profile to any DSL ports that are using the profile that you want to delete, and then you can delete the profile.

The following example deletes the gold ADSL profile.

```
192.168.1.1 adsl> delete profile gold
```

24.3.15 List Profiles Command

Syntax:

```
192.168.1.1 adsl> list profiles
```

The `list profiles` command displays all of the ADSL ports and that profile is assigned to each one.

An example is shown next. This display shows that there are two profiles (DEFVAL and debug) and that port 4 belongs to the debug profile while ports 1, 2, 3, 5, 6, 7 and 8 belong to the DEFVAL profile.

```
192.168.1.1 adsl> list profiles
Profile 1 : DEFVAL
Profile 2 : debug

Port 1, Profile : DEFVAL
Port 2, Profile : DEFVAL
Port 3, Profile : DEFVAL
Port 4, Profile : debug
Port 5, Profile : DEFVAL
Port 6, Profile : DEFVAL
Port 7, Profile : DEFVAL
Port 8, Profile : DEFVAL
```

Figure 24-5 List Profiles Command Example

24.3.16 Show Profile Command

Syntax:

```
192.168.1.1 adsl> show profile <name>
```

where

`<name>` = A profile name.

The `show profile` command displays the settings of an ADSL profile.

An example is shown next. This display shows that the maximum downstream transmission rate is set to 8000 kbps and the maximum upstream transmission rate is set to 800 kbps. The `ConfProfileRowStatus` displays `active`; this means that the profile is available for use. It does not mean that the profile has been applied to any of the ports. Please refer to the `set port` command for information on assigning profiles to ports or the `list profiles` command for information on displaying the names of all of the profiles and which profile is assigned to each port.

```
192.168.1.1 adsl> show profile gold
#Entry type : adslLineConfProfileEntry
        ConfProfileName : gold
        AtucConfRateChanRatio : 0 %
        AtucConfTargetSnrMgn : 6 db
        AtucConfMaxSnrMgn : 31 db
        AtucConfMinSnrMgn : 0 db
        AtucChanConfFastMinTxRate : 32 Kbps
        AtucChanConfInterleaveMinTxRate : 32 Kbps
        AtucChanConfFastMaxTxRate : 8160 Kbps
        AtucChanConfInterleaveMaxTxRate : 8000 Kbps
        AtucChanConfMaxInterleaveDelay : 4 ms
        AturConfRateChanRatio : 0 %
        AturConfTargetSnrMgn : 6 db
        AturConfMaxSnrMgn : 31 db
        AturConfMinSnrMgn : 0 db
        AturChanConfFastMinTxRate : 32 Kbps
        AturChanConfInterleaveMinTxRate : 32 Kbps
        AturChanConfFastMaxTxRate : 1024 Kbps
        AturChanConfInterleaveMaxTxRate : 800 Kbps
        AturChanConfMaxInterleaveDelay : 4 ms
        ConfProfileRowStatus : active(1)
```

Figure 24-6 Show Profile Command Example

24.3.17 Show Profiles Command

Syntax:

```
192.168.1.1 adsl> show profiles
```

The `show profiles` command displays the settings of all the ADSL profiles.

24.3.18 Set Port Command

Syntax:

```
192.168.1.1 adsl> set port <port number> <profile name> <oper mode>
```

where

`<port number>`	=	Port number ranging from 1 to 8.
`<profile name>`	=	The profile that will define the settings of this port.
`<oper mode>`	=	The operational mode. Choose from `glite`, `gdmt`, `t1413` or `auto` for Annex A. Choose from `anxb`, `etsi` or `auto` for Annex B.

The `set port` command assigns a specific profile to an individual port and sets the port's mode (or standard). The profile defines the maximum and minimum upstream/downstream rates, the target upstream/downstream signal noise margins, and the maximum and minimum upstream/downstream acceptable noise margins of all the ADSL ports to which you assign the profile.

The mode parameter specifies the standard that this port is allowed. When set to auto, the AAM1008 follows whatever mode is set on the other end of the line. Annex A refers to ADSL over POTS and Annex B refers to ADSL over ISDN.

When the mode is set to auto and the negotiated mode is G.lite, if the configured rates exceed those allowed by G.lite, the actual rates are governed by G.lite, regardless of the configured numbers.

An example is shown next.

```
192.168.1.1 adsl> set port 4 gold auto
```

This command sets ADSL port 4 to have the gold profile. The results of this command are reflected when you use the `list profiles` command.

24.3.19 Set Ports Command

Syntax:

```
192.168.1.1 adsl> set ports <profile name> <oper mode>
```

`where`

`<profile name>`	=	The profile that will define the settings of this port.
`<oper mode>`	=	Operational mode. Choose from `glite`, `gdmt`, `t1413` or `auto` for Annex A. Choose from `anxb`, `etsi` or `auto` for Annex B.

The `set ports` command assigns a specific profile to all of the ADSL ports and sets all of the ports to one mode, or standard. The profile defines the maximum and minimum upstream/downstream rates, the target upstream/downstream signal noise margins, and the maximum and minimum upstream/downstream acceptable noise margins of all the ADSL ports.

The mode parameter specifies the standard that this port is allowed. When set to auto, the AAM1008 follows whatever mode is set on the other end of the line.

An example is shown next.

```
192.168.1.1 adsl> set ports gold auto
```

This command sets all of the ADSL ports to have the gold profile. The results of this command are reflected when you use the `list profiles` command.

When the mode is set to auto and the negotiated mode is G.lite, if the configured rates exceed those allowed by G.lite, the actual rates are governed by G.lite, regardless of the configured numbers.

24.3.20 Show Port Command

Syntax:

```
show port <port number>
```

where

<port number> = A port number, from 1 to 8.

The show port command shows the line status (up or down), the actual upstream/downstream rates and mode of an individual ADSL port.

24.3.21 Show Ports Command

Syntax:

```
192.168.1.1 adsl> show ports
```

The show ports command shows the line status (up or down), the actual upstream/downstream rates and the mode of all ADSL ports.

24.3.22 Set PVC Command

Syntax:

```
192.168.1.1 adsl> set pvc <port number> <multiplexing mode> <tx vpi>
<tx vci> [<rx vpi> <rx vci>]
```

where

<port number>	=	A port number, from 1 to 8.
<multiplexing mode>	=	Either "llc" or "vc"
<tx vpi>	=	The VPI setting of the ADSL port for use with a Tx based network
<tx vci>	=	The VCI setting for the ADSL port for use with a Tx based network
<rx vpi>	=	The VPI setting for the ADSL port for use with Rx based networks
<rx vci>	=	The VCI setting for the ADSL port for use with Rx based networks

The <tx vpi> and <tx vci> settings define virtual channels for outgoing (downstream) traffic. The <rx vpi> and <rx vci> settings define virtual channels for incoming (upstream) traffic. The <rx vpi> and <rx vci> settings will be equal to those of <tx vpi> and <tx vci> if the rx settings are not configured.

The set pvc command allows the configuration of a PVC (permanent virtual circuit) for an individual ADSL port.

The following example sets ADSL port 5 to use the LLC multiplexing mode, Tx VPI 8 and Tx VCI 33. The results of this command are reflected when you use the show pvcs command.

```
192.168.1.1 adsl> set pvc 5 llc 8 33
```

24.3.23 Set PVCs Command

Syntax:

```
192.168.1.1 adsl> set pvcs <multiplexing mode> <tx vpi> <tx vci> [<rx vpi> <rx vci>]
```

where

multiplexing mode = either "llc" or "vc"

<tx vpi> = The VPI setting of the ADSL ports for use with a Tx based network

<tx vci> = The VCI setting for the ADSL ports for use with a Tx based network

<rx vpi> = The VPI setting for the ADSL ports for use with Rx based networks

<rx vpi> = The VCI setting for the ADSL ports for use with Rx based networks

The <rx vpi> and <rx vci> settings will be equal to those of <tx vpi> and <tx vci> if the rx settings are not configured.

The set pvcs command allows you to configure a single PVC for all of the ADSL ports at once.

The following example sets all of the ADSL ports to use the LLC multiplexing mode, Tx VPI 8 and Tx VCI 33. The results of this command are reflected when you use the show pvcs command.

```
192.168.1.1 adsl> set pvcs llc 8 33
```

24.3.24 Show PVC Command

Syntax:

```
192.168.1.1 adsl> show pvc <port number>
```

where

<port number> = A port number, from 1 to 8.

The show pvc command allows you to display the PVC parameters of an individual ADSL port. This command is equal to the show chs <port #> command (see section *26.3.5 Show Channels Command*).

24.3.25 Show PVCs command

Syntax:

```
192.168.1.1 adsl> show pvcs
```

The show pvcs command allows you to display the PVC parameters of all ADSL ports. This command is equal to the show chs command (see section *26.3.5 Show Channels Command*).

Chapter 25
G.SHDSL Commands

The G.SHDSL (G.991.2 Single-pair High-speed Digital Subscriber Line) subsystem allows you to configure and monitor the G.SHDSL ports on the SAM1008 network module.

25.1 G.SHDSL Overview

Refer to the web configurator chapter on G.SHDSL for background information on G.SHDSL.

25.2 Configured Versus Actual Speed

You configure the maximum and minimum speed of individual G.SHDSL ports using the `set profile` command. However, due to noise and other factors on the line, the actual speed may not reach the maximum that you specify.

Even though you can specify arbitrary numbers in the `set profile` command, the actual rate is always a multiple of 64 Kbps. If you enter a rate that is not a multiple of 64 Kbps, the actual value will be the next lower multiple of 64Kbps. For instance, if you specify 2100 Kbps for a port, the actual value will be 2048 Kbps, and if you specify 2120 Kbps, the actual value will be 2112Kbps.

Note that when you configure a G.SHDSL profile, the upstream and downstream speeds are the same. The minimum rate must be less than or equal to the maximum rate. The `list port` command displays the configured parameters and actual speed of a G.SHDSL port.

25.3 G.SHDSL Commands

Use these commands to configure a SAM-1008's G.SHDSL ports and profiles.

The commands related to one subsystem are grouped under a primary command of that subsystem. To configure the G.SHDSL parameters, you must first enter the G.SHDSL subsystem by entering the `gshdsl` command as shown next.

Syntax:

```
192.168.1.1> gshdsl
192.168.1.1 gshdsl>
```

When you see the `192.168.1.1 gshdsl>` command line prompt, you are ready to enter G.SHDSL commands. Enter the `home` command to return to the "192.168.1.1>" prompt.

25.3.1 Config Save Command

Syntax:

```
192.168.1.1 gshdsl> config save
```

This command saves the G.SHDSL configuration into nonvolatile memory. You must use this command to save any configurations that you make, otherwise the IES-1000 will return to its default settings when it is restarted.

Do not turn off your IES-1000 while saving your configuration.

25.3.2 Disable Port Command

Syntax:

```
192.168.1.1 gshdsl> disable port <port #>
```

where

`<port #>` = A port number, from 1 to 8

This command forcibly disables the specified G.SHDSL port. For ports that are part of an n-wire group, each n-wire group has one master port and the others are slaves. Enabling or disabling the master port enables or disables all of the ports in the n-wire group. You cannot enable or disable a slave port.

The factory default of all ports is disabled. A port must be enabled before data transmission can occur. An enabled but disconnected SHDSL port generates more heat than an operating port. To minimize heat generation and to enhance reliability, remember to disable a port when it is not in use.

25.3.3 Disable Ports Command

Syntax:

```
192.168.1.1 gshdsl> disable ports
```

This command forcibly disables all G.SHDSL ports.

25.3.4 Enable Port Command

Syntax:

```
192.168.1.1 gshdsl> enable port <port #>
```

where

`<port #>` = A port number, from 1 to 8

This command forcibly enables the specified G.SHDSL port. For ports that are part of an n-wire group, each n-wire group has one master port and the others are slaves. Enabling or disabling the master port enables or disables all of the ports in the n-wire group. You cannot use the `enable` or `disable` commands on a slave port. If you are using n-wire and/or port bonding and you changed the ports from the central side to the remote side or vice versa, the system will process the change when you use the `enable` command. This will take a few moments and the system appears to be hanging.

25.3.5 Enable Ports Command

Syntax:

```
192.168.1.1 gshdsl> enable ports
```

This command forcibly enables all G.SHDSL ports.

25.3.6 Lineinfo Command

Syntax:

```
192.168.1.1 gshdsl> lineinfo <port #>
```

where

<port #>	=	A port number, from 1 to 8

This command shows the line operating values of a G.SHDSL port.

An example is shown next.

```
192.168.1.1 gshdsl> lineinfo 2
2=Down Sp=0    Tx=0         Tr=0    Rx=0         Rr=0    NM=0  T=000:00:00
```

where

<2=Down>	=	The port number and whether the port is down/up (respectively).
<Sp>	=	The line rate.
<Tx>	=	The number of frames transmitted.
<Tr>	=	The number of frames transmitted with errors.
<Rx>	=	The number of frames received.
<Rr>	=	The number of frames received with errors.
<NM>	=	The noise margin in decibels.
<T>	=	The uptime of a port in day:hour:minute format.

25.3.7 Lineperf Command

Syntax:

```
192.168.1.1 gshdsl> lineperf <port #>
```

where

<port #>	=	A port number, from 1 to 8

This command shows the line performance counters of an G.SHDSL port

An example is shown next.

```
192.168.1.1 gshdsl> lineperf 7
Port=7 Sp=2048kbps NM=0db ATTEN=0db ES=0 SES=0 LOSWS=0 UAS=0 downN=0
```

where

<Port>	=	The port number on the SAM1008.
<Sp>	=	The line rate. If Sp=0, then the connection is down.
<NM>	=	Noise Margin. The noise margin in decibels.
<ATTEN>	=	Attenuation. The loop attenuation in decibels.
<ES>	=	Errored Second. The total number of one-second intervals when one or more CRC errors are found.
<SES>	=	Severely Errored Second. The total number of one-second intervals when at least fifty CRC errors are found.
<LOSWS>	=	Loss of Sync Word Failure Second. Displays the total number of one-second intervals when one or more SHDSL LOSW errors are found.
<UAS>	=	Unavailable Second. The total number of one-second intervals when the G.SHDSL line is unavailable.
<downN>	=	The number of times the G.SHDSL line has been dropped.

25.3.8 List Port Command

Syntax:

```
192.168.1.1 gshdsl> list port <port #>
```

where

<port #> = The port number, from 1 to 8

This command displays information about the line speed, state and the line rate parameter of a G.SHDSL port.

An example is shown next.

```
192.168.1.1 gshdsl> list port 8
Port  Speed (Kbps)    Mode            Bonding  PSD region  State
      Cmax/Cmin/Act
----+---------------+--------------+--------+-----------+--------------
   1  2304/ 192/   -  Normal          No       annexB      Disabled/Down
   2  2304/ 192/   -  2-wireC         Yes      annexB      Disabled/Down
   3  2304/ 192/   -  2-wireC         Yes      annexB      Disabled/Down
   4  2304/ 192/   -  2-wireC         Yes      annexB      Disabled/Down
   5  2304/ 192/   -  Normal          No       annexB      Disabled/Down
   6  2304/ 192/   -  Normal          No       annexB      Disabled/Down
   7  2304/ 192/   -  Normal          No       annexB      Disabled/Down
   8  2304/ 192/   -  2-wireC         Yes      annexB      Disabled/Down
```

Figure 25-1 List Port Command Example

where

Cmax	=	Configured maximum line speed in Kbps. The maximum G.SHDSL line speed you configured. For details about configuring this parameter see section *25.3.15.*
Cmin	=	This is the configured minimum line speed in Kbps for this port. The minimum G.SHDSL line speed you configured.
Act	=	The actual G.SHDSL line speed in Kbps.

`Mode`	=	This field displays which port bonding or n-wire mode the port is set to use. "Normal" displays when the port is not part of an n-wire group. "2-wire" displays when the port is part of a port bonding group (but not part of an n-wire group). "4-wire" displays when the port is part of a 4-wire n-wire group. "8-wire" displays when the port is part of an 8-wire n-wire group. "C" stands for the central side and "R" stands for the remote side. Each n-wire group has one master port and the others are slaves. Enabling or disabling the master port enables or disables all of the ports in the n-wire group. You cannot use the `enable` or `disable` commands on a slave port. "Failed" displays when the system was unable to download firmware to the DSL chipset. "Dropped" displays when the port is a member of a bonded group but was dropped because it could not connect within at least 640 Kbps of the rate of the other bonded ports. Both the central and remote sides of the connection must disable and re-enable the dropped port to attempt to bring up the connection again.
`Bonding`	=	This field displays "Yes" when the port is a member of a port bonding group. "No" displays for a port that is not a member of a port bonding group.
`PSD region`	=	This is the port's Power Spectral Density region (annex A or annex B).
`State`	=	Displays whether the G.SHDSL port is enabled or disabled, and the G.SHDSL line's operational state. If this parameter is disabled, then the G.SHDSL port and line is forced down. If this parameter is enabled, then the G.SHDSL port and line may be up or down. The operational state is either "Up" for a port that has a connection or "Down" for a port that does not have a connection.

25.3.9 List Ports Command

Syntax:

```
192.168.1.1 gshdsl> list ports
```

This command shows the configured minimum speeds (if applicable), maximum speeds, mode (n-wire, bonded or normal), Power Spectral Density region and states of all G.SHDSL ports.

25.3.10 Set Profile Command

Syntax:

```
192.168.1.1 gshdsl> set profile <profile name> <Cmax> [<Cmin>] [annexA | annexB]
```

where

`< profile name>`	=	The name of the profile (up to 18 characters except `DEFVAL`).
`<Cmax>`	=	The maximum transmission rate in Kbps.

`<Cmin>`	=	The minimum transmission rate in Kbps. This setting is optional. 192 Kbps is the default if you do not configure a value for this parameter. Setting `Cmax` and `Cmin` to the same rate fixes the rate for that port.
`annexA | annexB`	=	The Power Spectral Density region, omitted for annexB.

Configure <Cmax> and <Cmin> parameters between 192 and 2304 Kbps.

Speed Configuration

Even though you can specify arbitrary numbers for port speeds using the `set profile` command, the SAM1008 port speed is always adjusted to be a multiple of 32 Kbps. See *25.2 Configured Versus Actual Speed* and the examples shown next.

Speed Configuration Example 1:

The configuration

```
192.168.1.1 gshdsl> set profile economy 2000 200
```

sets the speed for the economy profile between 1984 and 192 Kbps.

Speed Configuration Example 2:

This example sets the speed of the economy profile at 768 Kbps.

```
192.168.1.1 gshdsl> set profile economy 800 800
```

25.3.11 Delete Profile Command

Syntax:

```
192.168.1.1 gshdsl> delete profile <name>
```

where

`<name>` = The profile name.

The `delete profile` command allows you to delete an individual profile by its name.

25.3.12 List Profiles Command

Syntax:

```
192.168.1.1 gshdsl> list profiles
```

The `list profiles` command displays all of the configured G.SHDSL profiles and which G.SHDSL ports are assigned to each.

An example is shown next. This display shows that there are two profiles (DEFVAL and gold) and that port 3 belongs to the gold profile while ports 1, 2, 4, 5, 6, 7 and 8 belong to the DEFVAL profile.

```
192.168.1.1 gshdsl> list profiles

Profile contents:
Profile name                     Cmax  Cmin  PSD region
-------------------------------+-----+-----+-----------
DEFVAL                           2304   192  annexB
gold                             2048   192  annexB

Profile assignment:
Port      Profile name
--------+-------------------------------
gshdsl1   DEFVAL
gshdsl2   DEFVAL
gshdsl3   gold
gshdsl4   DEFVAL
gshdsl5   DEFVAL
gshdsl6   DEFVAL
gshdsl7   DEFVAL
gshdsl8   DEFVAL
```

Figure 25-2 List Profiles Command Example

25.3.13 Show Profile Command

Syntax:

```
192.168.1.1 gshdsl> show profile <name>
```

where

<name> = A profile name.

The `show profile` command displays the settings of a G.SHDSL profile.

An example is shown next.

```
192.168.1.1 gshdsl> show profile gold


Profile contents:

Profile name                     Cmax  Cmin  PSD region

-------------------------------+-----+-----+-----------

gold                             2048   192  annexB
```

This display shows that the gold profile's maximum transmission rate is set to 2048 Kbps and the minimum transmission rate is set to 192 Kbps.

25.3.14 Show Profiles Command

Syntax:

```
192.168.1.1 gshdsl> show profiles
```

The `show profiles` command displays the settings of all the G.SHDSL profiles.

25.3.15 Set Port Command

Syntax:

```
192.168.1.1 gshdsl> set port <port #> <profile name>
```

where

`<port #>`	=	The number of the port to which you want to assign a profile.
`<profile name>`	=	The profile that defines the minimum and maximum transfer rates for this port.

The `set port` command assigns a specific profile to an individual port. The profile defines the maximum and minimum transmission rates and the Power Spectral Density region.

25.3.16 Set Ports Command

Syntax:

```
192.168.1.1 gshdsl> set ports <profile name>
```

where

`<profile name>`	=	The profile that defines the minimum and maximum transfer rates for this port.

This CI command is like the *Set Port Command* described in section *25.3.15* except that this command configures all G.SHDSL ports to have a specified profile. Enter the `list ports` command to view the status of all ports.

25.3.17 Set PVC Command

Syntax:

```
192.168.1.1 gshdsl> set pvc <port #> <multiplexing mode> <tx vpi> <tx vci>
[<rx vpi> <rx vci>]
```

where

`<port #>`	=	A port number, from 1 to 8.
`<multiplexing mode>`	=	Either "llc" or "vc"
`<tx vpi>`	=	The VPI setting of the G.SHDSL port for use with a Tx based network.
`<tx vci>`	=	The VCI setting for the G.SHDSL port for use with a Tx based network.
`<rx vpi>`	=	The VPI setting for the G.SHDSL port for use with Rx based networks.
`<rx vci>`	=	The VCI setting for the G.SHDSL port for use with Rx based

networks.

The <rx vpi> and <rx vci> settings will be equal to those of <tx vpi> and <tx vci> if the rx settings are not configured.

The `set pvc` command allows the configuration of a PVC (permanent virtual circuit) for an individual G.SHDSL port.

25.3.18 Set PVCs Command

Syntax:

```
192.168.1.1 gshdsl> set pvcs <multiplexing mode> <tx vpi> <tx vci> [<rx
vpi> <rx vci>]
```

where

<multiplexing mode>	=	Either "llc" or "vc".
<tx vpi>	=	The VPI setting of the G.SHDSL ports for use with a Tx based network.
<tx vci>	=	The VCI setting for the G.SHDSL ports for use with a Tx based network.
<rx vpi>	=	The VPI setting for the G.SHDSL ports for use with Rx based networks.
<rx vpi>	=	The VCI setting for the G.SHDSL ports for use with Rx based networks.

The <rx vpi> and <rx vci> settings will be equal to those of <tx vpi> and <tx vci> if the rx settings are not configured.

The `set pvcs` command allows you to configure a single PVC for all of the G.SHDSL ports at once.

25.3.19 Show PVC Command

Syntax:

```
192.168.1.1 gshdsl> show pvc <port #>
```

where

<port #>	=	A port number, from 1 to 8.

This command allows you to display the PVC parameters of an individual G.SHDSL port. This command is equal to the `show chs <port #>` command (see section *26.3.5 Show Channels Command*).

25.3.20 Show PVCs Command

Syntax:

```
192.168.1.1 gshdsl> show pvcs
```

This command allows you to display the PVC parameters of all G.SHDSL ports.

25.3.21 Display All G.SHDSL Line Information

Syntax:

```
192.168.1.1 gshdsl> monitor [<start port> [<stop port>]]
```

where

`<start port>`	=	The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.
`<stop port>`	=	The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

This command displays all G.SHDSL line information. Information is updated every five seconds. Press any key and then press [ENTER] to stop updating information. Use `monitor` without any port numbers to display line information for every port. This command is also equal to the `show chs` command (see section *26.3.5 Show Channels Command*).

25.3.22 Set Central Side N-wire Mode Command

Syntax:

```
192.168.1.1 gshdsl> set nwirec   <mode>   <group name>   <group#>
```

where

`<mode>`	=	Type "4w" to physically bundle together two ports into an N-wire group. Type "8w" to physically bundle together four ports into an N-wire group. You can bundle multiple groups of ports as long as they do not overlap.
`<group name>`	=	The name of the n-wire bundling group (up to 31 characters).
`<group#>`	=	Specify which ports are to be members of this bundled n-wire group. With a 4-wire group, type "4" for ports 7 and 8, "3" for ports 5 and 6, "2" for ports 3 and 4 or "1" for ports 1 and 2. **You must configure 4-wire group 4 before group 3 and group 2 before group 1.** Although you can configure groups 2 and 1 before configuring groups 4 and 3, it is recommended that you configure 4-wire groups from higher numbers to lower numbers and delete them from lower numbers to higher numbers. With an 8-wire group, type "2" for ports 5 to 8 or "1" for ports 1 to 4.

This command bundles the specified ports into an n-wire group for the STU-C (SHDSL Termination Unit – Central). One SAM1008 must be set to be the central side and the other must be set to be the remote side. Configure both with the same number of ports set to connect to the other SAM1008 and n-wire bundled.

You can n-wire bundle multiple groups of ports as long as they do not overlap. One SAM1008 module can have both STU-C and STU-R groups.

Make sure that G.SHDSL ports one through four are all the same end of their connections (all STU-C or all STU-R).

Make sure that G.SHDSL ports five through eight are all the same end of their connections (all STU-C or all STU-R).

G.SHDSL ports one through four do not need to be set to be the same end of the connection as G.SHDSL ports five through eight. For example, G.SHDSL ports one through four could be set to be STU-C while G.SHDSL ports five through eight are set to be STU-R.

The following example sets an STU-C 8-wire mode (4 ports) group with the name "N-wire-A" for ports 1 to 4.

```
192.168.1.1 gshdsl> set nwirec 8w N-wire-A 1
```

Make sure you set all of the ports in an n-wire group to have the same PVID see section *31.3.3 PVID Command*.

If the ports are enabled and you change them from central side to remote side or vice versa (all ports are set to the central side by default), the system will take a few moments to process the change. If the ports are not enabled, the processing occurs when you enable them. During this processing the system appears to be hanging.

25.3.23 Set Remote Side N-wire Mode Command

Syntax:

```
192.168.1.1 gshdsl> set nwirer   <mode>   <group name>   <group#>
```

where

`<mode>`	=	Type "4w" to physically bundle together two ports into an N-wire group.
		Type "8w" to physically bundle together four ports into an N-wire group.
		You can bundle multiple groups of ports as long as they do not overlap.
`<group name>`	=	The name of the n-wire bundling group (up to 31 characters).
`<group#>`	=	Specify which ports are to be members of this bundled n-wire group.
		With a 4-wire group, type "4" for ports 7 and 8, "3" for ports 5 and 6, "2" for ports 3 and 4 or "1" for ports 1 and 2.
		You must configure 4-wire group 4 before group 3 and group 2 before group 1.
		Although you can configure groups 2 and 1 before configuring groups 4 and 3, it is recommended that you configure 4-wire groups from higher numbers to lower numbers and delete them from lower numbers to higher numbers.
		With an 8-wire group, type "2" for ports 5 to 8 or "1" for ports 1 to 4.

This command bundles the specified ports into an n-wire group for the STU-R (SHDSL Termination Unit – Remote). One SAM1008 must be set to be the central side and the other must be set to be the remote side. Configure both with the same number of ports set to connect to the other SAM1008 and n-wire bundled.

You can n-wire bundle multiple groups of ports as long as they do not overlap. One SAM1008 module can have both STU-C and STU-R groups.

Make sure that G.SHDSL ports one through four are all the same end of their connections (all STU-C or all STU-R).

Make sure that G.SHDSL ports five through eight are all the same end of their connections (all STU-C or all STU-R).

G.SHDSL ports one through four do not need to be set to be the same end of the connection as G.SHDSL ports five through eight. For example, G.SHDSL ports one through four could be set to be STU-C while G.SHDSL ports five through eight are set to be STU-R.

The following example sets an STU-R 8-wire mode (4 ports) group with the name "N-wire-B" for ports 1 to 4.

```
192.168.1.1 gshdsl> set nwirer 8w N-wire-B 1
```

Make sure you set all of the ports in an n-wire group to have the same PVID see section *31.3.3 PVID Command*.

If the ports are enabled and you change them from central side to remote side or vice versa (all ports are set to the central side by default), the system will take a few moments to process the change. If the ports are not enabled, the processing occurs when you enable them. During this processing the system appears to be hanging.

25.3.24 Set Central Side Port Bonding Command

Syntax:

```
192.168.1.1 gshdsl> set bondc <bond name> <port list>
or
192.168.1.1 gshdsl> set bondc <mode> <bond name> <group list>
```

where

<bond name>	=	The name of the bonding group (up to 31 characters).
<port list>	=	Two to eight G.SHDSL ports.
<mode>	=	Type "4w" to bond 4-wire (two port) n-wire groups together. Type "8w"to bond 8-wire (four port) n-wire groups together. **You must use the set nwirec command to configure the 4 or 8-wire bundled groups before you can use this command to bond them.**
<group list>	=	When you select 4-wire or 8-wire mode, list the member groups for this port bonding group. You must have already used the set nwirec command to configure the 4 or 8-wire groups and the groups cannot be members of another port bonding group. Configure the groups on both ends of a connection with the same number of 4 or 8-wire groups.

This command bonds the specified member list into a single port for the STU-C (SHDSL Termination Unit – Central). One SAM1008 must be set to be the central side and the other must be set to be the remote side. Configure both with the same number of ports set to connect to the other SAM1008 and bonded.

You can bond multiple groups of ports as long as they do not overlap. One SAM1008 module can have both STU-C and STU-R groups.

Make sure that G.SHDSL ports one through four are all the same end of their connections (all STU-C or all STU-R).

Make sure that G.SHDSL ports five through eight are all the same end of their connections (all STU-C or all STU-R).

G.SHDSL ports one through four do not need to be set to be the same end of the connection as G.SHDSL ports five through eight. For example, G.SHDSL ports one through four could be set to be STU-C while G.SHDSL ports five through eight are set to be STU-R.

The following example sets an STU-C port bonding group named "c1" for ports 2-4 and 8.

```
192.168.1.1 gshdsl> set bondc c1 2-4 8
```

Make sure you set all of the bonded ports to have the same PVID see section *31.3.3 PVID Command*.

If the ports are enabled and you change them from central side to remote side or vice versa (all ports are set to the central side by default), the system will take a few moments to process the change. If the ports are not enabled, the processing occurs when you enable them. During this processing the system appears to be hanging.

25.3.25 Set Remote Side Port Bonding Command

Syntax:

```
192.168.1.1 gshdsl> set bondr <bond name> <port list>
or
192.168.1.1 gshdsl> set bondr <mode> <bond name> <group list>
```

where

`<bond name>`	=	The name of the bonding group (up to 31 characters).
`<port list>`	=	Two to eight G.SHDSL ports.
`<mode>`	=	Type "4w" to bond 4-wire (two port) n-wire groups together. Type "8w" to bond 8-wire (four port) n-wire groups together. **You must use the `set nwirer` command to configure the 4 or 8-wire bundled groups before you can use this command to bond them.**
`<group list>`	=	When you select 4-wire or 8-wire mode, list the member groups for this port bonding group. You must have already used the `set nwirer` command to configure the 4 or 8-wire groups and the groups cannot be members of another port bonding group. Configure the groups on both ends of a connection with the same number of 4 or 8-wire groups.

This command bonds the specified member list into a single port for the STU-R (SHDSL Termination Unit – Remote). One SAM1008 must be set to be the central side and the other must be set to be the remote side. Configure both with the same number of ports set to connect to the other SAM1008 and bonded.

You can bond multiple groups of ports as long as they do not overlap. One SAM1008 module can have both STU-C and STU-R groups.

Make sure that G.SHDSL ports one through four are all the same end of their connections (all STU-C or all STU-R).

Make sure that G.SHDSL ports five through eight are all the same end of their connections (all STU-C or all STU-R).

G.SHDSL ports one through four do not need to be set to be the same end of the connection as G.SHDSL ports five through eight. For example, G.SHDSL ports one through four could be set to be STU-C while G.SHDSL ports five through eight are set to be STU-R.

The following example sets an STU-R port bonding group named "r1" for ports 3 to 6.

```
192.168.1.1 gshdsl> set bondr r1 3-6
```

Make sure you set all of the bonded ports to have the same PVID see section *31.3.3 PVID Command*.

If the ports are enabled and you change them from central side to remote side or vice versa (all ports are set to the central side by default), the system will take a few moments to process the change. If the ports are not enabled, the processing occurs when you enable them. During this processing the system appears to be hanging.

25.3.26 Port Bonding for 4-wire Groups Examples

This example creates three 4-wire mode STU-R groups and then bonds them together.

This line sets an STU-R 4-wire mode (2 ports) group with the name "N-wire-A" for ports 7 and 8.

```
192.168.1.1 gshdsl> set nwirer 4w N-wire-A 4
```

This line sets an STU-R 4-wire mode (2 ports) group with the name "N-wire-B" for ports 5 and 6.

```
192.168.1.1 gshdsl> set nwirer 4w N-wire-B 3
```

This line sets an STU-R 4-wire mode (2 ports) group with the name "N-wire-C" for ports 3 and 4.

```
192.168.1.1 gshdsl> set nwirer 4w N-wire-C 2
```

This line sets an STU-R port bonding group named "r1" for the "N-wire-A", "N-wire-B" and "N-wire-C" n-wire groups.

```
192.168.1.1 gshdsl> set bondr 4w r1 2-4
```

25.3.27 Port Bonding for 8-wire Groups Examples

This example creates two 8-wire mode STU-R groups and then bonds them together.

This line sets an STU-R 8-wire mode (4 ports) group with the name "N-wire-A" for ports 1 to 4.

```
192.168.1.1 gshdsl> set nwirer 8w N-wire-A 1
```

This line sets an STU-R 8-wire mode (4 ports) group with the name "N-wire-B" for ports 5 to 8.

```
192.168.1.1 gshdsl> set nwirer 8w N-wire-B 2
```

This line creates an STU-R port bonding group named "r1" for the "N-wire-A" and N-wire-B" n-wire groups.

```
192.168.1.1 gshdsl> set bondr 8w r1 1 2
```

25.3.28 Delete N-wire Group Command

Syntax:

```
192.168.1.1 gshdsl> delete nwire <group name>
```

where

`<group name>` = The name of the n-wire group.

This command removes the specified n-wire group.

An example is shown next.

```
192.168.1.1 gshdsl> delete N-wire-A
```

This removes the n-wire group so the ports function as individual ports as opposed to being part of one physically bundled link.

25.3.29 Delete Port Bonding Command

Syntax:

```
192.168.1.1 gshdsl> delete bond <bond name>
```

where

`<bond name>` = The name of the bonding group.

This command removes the specified bonding group.

An example is shown next.

```
192.168.1.1 gshdsl> delete bond c1
```

This removes the bond for ports 2, 3, 4 and 8 so they function as individual ports as opposed to being part of one logical link.

25.3.30 List N-wire Groups Command

Syntax:

```
192.168.1.1 gshdsl> list nwire
```

The `list nwire` command displays all of the n-wire groups.

The following is an example.

```
192.168.1.1 gshdsl> list nwire

N-wire configuration:
Group name                        Mode          Group#   Bundled ports
-------------------------------+-------------+--------+--------------
c1                                4-wire STU-R  group1   1-2
c2                                4-wire STU-R  group2   3-4
c3                                4-wire STU-R  group3   5-6
c4                                4-wire STU-R  group4   7-8
```

Figure 25-3 List N-wire Groups Command Example

25.3.31 List Bonded Members Command

Syntax:

```
192.168.1.1 gshdsl> list bond
```

The `list bond` command displays all of the bonded members.

An example is shown next.

```
192.168.1.1 gshdsl> list bond

Port-bonding configuration:
Bonding name                     Mode          Member list
--------------------------------+-------------+--------------------------------
c1                               2-wire STU-C  port 2-4 8
```

This displays the members that have been bound together in order to form a logical link.

Chapter 26 Virtual Channel Management

This chapter shows you how to use commands to configure virtual channels.

26.1 About Virtual Channels

See the web configurator chapter on virtual channel management for background information on virtual channels. The configuration of virtual channels is the same for both the AAM and SAM network modules.

26.2 Virtual Channel Profile Commands

Use the following commands to configure virtual channel profiles.

26.2.1 Set VCP Command

The syntax is as follows whenever the class is cbr or ubr.

```
192.168.1.1 adsl> set vcp <profile name> <encap> <aal> <class> <pcr> <cdvt>
[<scr/mcr> <bt/nrm>]
```

The syntax is as follows whenever the class is rt-vbr or nrt-vbr.

```
192.168.1.1 adsl> set vcp <profile name> <encap> <aal> <class> <pcr> <cdvt>
<scr> <bt>
```

The syntax is as follows whenever the class is abr.

```
192.168.1.1 adsl> set vcp <profile name> <encap> <aal> <class> <pcr> <cdvt>
<mcr> <nrm>
```

where

`<profile name>`	=	The name of the virtual channel profile (up to 31 ASCII characters). You cannot change the DEFVAL profile.
`<encap>`	=	The type of encapsulation (llc or vc).
`<aal>`	=	The ATM Adaptation Layer (aal0, aal3, aal4 or aal5).
`<class>`	=	The type of ATM traffic class: cbr (constant bit rate), rt-vbr (real-time variable bit rate), nrt-vbr (non real-time variable bit rate), ubr (unspecified bit rate) or abr (available bit rate).
`<pcr>`	=	The Peak Cell Rate (0 to 300000 or *), the maximum rate at which the sender can send cells.
`<cdvt>`	=	The accepted tolerance of the difference between a cell's transfer delay and the expected transfer delay. 0 to 255 or * (means 0)

`<scr/mcr>`	=	The Sustained Cell Rate (scr) sets the average cell rate (long-term) that can be transmitted. SCR applies with the rt-vbr and nrt-vbr traffic classes. Minimum Cell Rate (mcr) is the minimum rate at which the sender can send cells. MCR applies with the abr traffic class.0 to 300000 or * to meet port speed
`<bt/nrm>`	=	Burst Tolerance (bt) is the maximum number of cells that the port is guaranteed to handle without any discards. BT applies with the rt-vbr and nrt-vbr traffic classes. The Number of Resource Management (nrm) cells is the maximum number of cells a source may send for each forward Resource Management cell. NRM applies with the abr traffic class.0 to 255 or * (means 0)

The `set vcp` command creates a virtual channel profile.

The following example creates a virtual channel profile named gold that uses LLC encapsulation and AAL 5. It uses constant bit rate and has the maximum rate (peak cell rate) set to 300,000 cells per second. The acceptable tolerance of the difference between a cell's transfer delay and the expected transfer delay (CDVT) is set to 5 cells.

```
192.168.1.1 adsl> set vcp gold llc aal5 cbr 300000 5
```

The following example creates a virtual channel profile named silver that uses VC encapsulation and AAL 5. It uses real time variable bit rate and has the maximum rate (peak cell rate) set to 3000,000 cells per second. The acceptable tolerance of the difference between a cell's transfer delay and the expected transfer delay (CDVT) is set to 5 cells. The average cell rate that can be transmitted (SCR) is set to 250,000 cells per second. The maximum number of cells that the port is guaranteed to handle without any discards (BT) is set to 200.

```
192.168.1.1 adsl> set vcp silver vc aal5 rt-vbr 300000 5 250000 200
```

The following example creates a virtual channel profile named economy that uses LLC encapsulation and AAL 5. It uses unspecified bit rate and has the maximum rate (peak cell rate) set to 50,000 cells per second. The acceptable tolerance of the difference between a cell's transfer delay and the expected transfer delay (CDVT) is set to 100 cells.

```
192.168.1.1 adsl> set vcp economy llc aal5 ubr 50000 100
```

26.2.2 Delete VCP Command

Syntax:

```
192.168.1.1 adsl> delete vcp <profile name>
```

where

`<profile name>`	=	The name of the virtual channel profile (up to 31 ASCII characters). You cannot delete the DEFVAL profile.

The `delete vcp` command deletes the specified virtual channel profile. You cannot delete a virtual channel profile that is assigned to any of the network module's DSL channels. Assign a different profile to any DSL channels that are using the profile that you want to delete, and then you can delete the profile.

The following example deletes the silver virtual channel profile.

```
192.168.1.1 adsl> delete vcp silver
```

26.2.3 Delete VCPs Command

Syntax:

```
192.168.1.1 adsl> delete vcps
```

The `delete vcps` command deletes all of the virtual channel profiles, except the DEFVAL profile. You cannot delete a virtual channel profile that is assigned to any of the network module’s DSL channels. Assign a different profile to any DSL channels that are using the profile that you want to delete, and then you can delete the profile.

26.2.4 Show VCP Command

Syntax:

```
192.168.1.1 adsl> show vcp <profile name>
```

where

`<profile name> =` The name of the virtual channel profile (up to 31 ASCII characters).

Displays the contents of the specified virtual channel profile.

The following example displays the virtual channel profile named “gold”.

```
192.168.1.1 adsl> show vcp gold
```

```
192.168.1.1 adsl> show vcps

      VC profile name           Encap  AAL  Class    PCR   CDVT SCR/MCR BT/NRM
-------------------------------+-----+----+-------+-------+----+-------+------
gold                            llc   aal5 cbr      300000    5
```

Figure 26-1 Show VCP Command Example

26.2.5 Show VCPs Command

Syntax:

```
192.168.1.1 adsl> show vcps
```

Displays the contents of all of the virtual channel profiles. See the following example.

```
192.168.1.1 adsl> show vcps

      VC profile name           Encap  AAL  Class    PCR   CDVT SCR/MCR BT/NRM
-------------------------------+-----+----+-------+-------+----+-------+------
DEFVAL                          llc   aal5 ubr           *    *
DEFVAL_VC                       vc    aal5 ubr           *    *
gold                            llc   aal5 cbr      300000    5
```

Figure 26-2 Show VCPs Command Example

26.3 PVC Channels

Channels (also called Permanent Virtual Circuits or PVCs) let you set priorities for different services or subscribers. You can define up to eight channels on each DSL port and use them for different services or levels of service. You set the PVID that is assigned to untagged frames received on each channel. You also set an IEEE 802.1p priority for each of the PVIDs. In this way you can assign different priorities to different channels (and consequently the services that get carried on them or the subscribers that use them). Use the following commands to define channels.

26.3.1 Set Channel Command

Syntax:

```
192.168.1.1 adsl> set ch <port> <vpi> <vci> <pvid> <priority> <vcp name>
```

or:

```
192.168.1.1 adsl> set ch <port> <vpi> <vci> super <vcp name>
```

where

`<port>`	=	A port number (1 to 8) or (*) means all 8 ports.
`<vpi>`	=	The VPI setting (0 to 255).
`<vci>`	=	The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).
`<pvid>`	=	The default VID (0 to 4094). Each PVC must have a unique VID (since the network module forwards traffic back to the subscribers based on the VLAN ID).
`<priority>`	=	The IEEE 802.1p default priority (0 to 7).
`<vcp name>`	=	A virtual channel profile's name.
`super`	=	Sets this channel as the super channel for this port.

The `set ch` command creates a new PVC channel or modifies an existing one.

The following example creates a PVC channel for port 8 that uses VPI 0, VCI 33, PVID 6 IEEE 802.1p default priority of 3 and the gold virtual channel profile.

```
192.168.1.1 adsl> set ch 8 0 33 6 3 gold
```

26.3.2 Delete Channel Command

Syntax:

```
192.168.1.1 adsl> delete ch <port> <vpi> <vci>
```

where

`<port>`	=	A port number (1 to 8) or (*) means all 8 ports.
`<vpi>`	=	The VPI setting (0 to 255).
`<vci>`	=	The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).

The `delete ch` command deletes the specified PVC channel.

The following example deletes the PVC channel for port 8 that uses VPI 0 and VCI 33.

```
192.168.1.1 adsl> delete ch 8 0 33
```

26.3.3 Delete Channels Command

Syntax:

```
192.168.1.1 adsl> delete chs [<start port> [<stop port>]]
```

where

`<start port>` = The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.

`<stop port>` = The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

The `delete chs` command deletes all PVC channels for the specified ports.

The following example deletes the PVC channels for ports 5 to 8.

```
192.168.1.1 adsl> delete chs 5 8
```

26.3.4 Show Channel Command

Syntax:

```
192.168.1.1 adsl> show ch <port> <vpi> <vci>
```

where

`<port>` = A port number (1 to 8) or (*) means all 8 ports.

`<vpi>` = The VPI setting (0 to 255).

`<vci>` = The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).

The `show ch` command displays the contents of the specified PVC channel.

The following example displays the contents of the PVC channel for port 8 that uses VPI 0 and VCI 33.

```
192.168.1.1 adsl> show ch 8 0 33

PORT    VPI     VCI   PVID   PRIORITY   VC profile name                ENABLE
-----+------+-------+------+----------+-------------------------------+------
  8       0      33      6       3      gold                               Yes
```

Figure 26-3 Chow Channel Command Example

26.3.5 Show Channels Command

Syntax:

```
192.168.1.1 adsl> show chs [<start port> [<stop port>]]
```

where

<start port>	=	The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.
<stop port>	=	The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

The `show chs` command displays the contents of all PVC channels for the specified ports.

The following example displays the contents of the PVC channels for ports 5 to 8.

```
192.168.1.1 adsl> show chs 5 8

PORT    VPI     VCI   PVID   PRIORITY   VC profile name                  ENABLE
-----+------+-------+------+----------+-------------------------------+------
  5       8      33      *       *      DEFVAL                             Yes
  6       0      33      *       *      DEFVAL                             Yes
  7       0      33      *       *      DEFVAL                             Yes
  8       0      33      6       3      gold                               Yes
```

Figure 26-4 Chow Channel Command Example

26.3.6 Enable Channel Command

Syntax:

```
192.168.1.1 adsl> enable ch <port> <vpi> <vci>
```

where

<port>	=	A port number (1 to 8) or (*) means all 8 ports.
<vpi>	=	The VPI setting (0 to 255).
<vci>	=	The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).

The `enable ch` command turns on the specified PVC channel.

The following example turns on the PVC channel for port 8 that uses VPI 0 and VCI 33.

```
192.168.1.1 adsl> enable ch 8 0 33
```

26.3.7 Enable Channels Command

Syntax:

```
192.168.1.1 adsl> enable chs [<start port> [<stop port>]]
```

where

`<start port>`	=	The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.
`<stop port>`	=	The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

The `enable chs` command turns on the PVC channels for the specified ports.

The following example turns on the PVC channels for ports 5 to 8.

```
192.168.1.1 adsl> enable chs 5 8
```

26.3.8 Disable Channel Command

Syntax:

```
192.168.1.1 adsl> disable ch <port> <vpi> <vci>
```

where

`<port>`	=	A port number (1 to 8) or (*) means all 8 ports.
`<vpi>`	=	The VPI setting (0 to 255).
`<vci>`	=	The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).

The `disable ch` command turns off the specified PVC channel.

The following example turns off the PVC channel for port 8 that uses VPI 0 and VCI 33.

```
192.168.1.1 adsl> disable ch 8 0 33
```

26.3.9 Disable Channels Command

Syntax:

```
192.168.1.1 adsl> disable chs [<start port> [<stop port>]]
```

where

`<start port>`	=	The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.
`<stop port>`	=	The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

The `disable chs` command turns off the PVC channels for the specified ports.

The following example turns off the PVC channels for ports 5 to 8.

```
192.168.1.1 adsl> disable chs 5 8
```

26.3.10 Channel Statistics Command

Syntax:

```
192.168.1.1 adsl> stat ch <port> <vpi> <vci>
```

where

`<port>` = A port number (1 to 8) or (*) means all 8 ports.

`<vpi>` = The VPI setting (0 to 255).

`<vci>` = The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).

The `stat ch` command shows the statistics of the specified PVC channel.

The following example displays the statistics for the PVC channel for port 8 that uses VPI 0 and VCI 33.

```
192.168.1.1 adsl> stat ch 8 0 33

PORT  VPI  VCI   TX pkts    RX pkts   TXrate   RXrate   TX cells   RX cells
                                      ( B/s )  ( B/s )
----+----+----+----------+----------+--------+--------+----------+----------
  8     0   33          0          0        0        0          0          0
```

Figure 26-5 Channel Statistics Command Example

26.3.11 Channels Statistics Command

Syntax:

```
192.168.1.1 adsl> stat chs [<start port> [<stop port>]]
```

where

`<start port>` = The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.

`<stop port>` = The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

The `stat chs` command shows the statistics of the PVC channels for the specified ports.

The following example displays the statistics for the PVC channels for ports 5 to 8.

```
192.168.1.1 adsl> stat chs 5 8

PORT  VPI  VCI   TX pkts    RX pkts   TXrate   RXrate   TX cells   RX cells
                                      ( B/s )  ( B/s )
----+----+----+----------+----------+--------+--------+----------+----------
  5    8   33          0          0        0        0          0          0
  6    0   33          0          0        0        0          0          0
  7    0   33          0          0        0        0          0          0
  8    0   33          0          0        0        0          0          0
```

Figure 26-6 Channel Statistics Command Example

26.3.12 Clear Channel Command

Syntax:

```
192.168.1.1 adsl> clear ch <port> <vpi> <vci>
```

where

`<port>`	=	A port number (1 to 8) or (*) means all 8 ports.
`<vpi>`	=	The VPI setting (0 to 255).
`<vci>`	=	The VCI setting (32 to 65535 if vpi = 0) or (1 to 65535 if the vpi does not = 0).

The `clear ch` command erases the statistics of the specified PVC channel.

The following example erases the statistics for the PVC channel for port 8 that uses VPI 0 and VCI 33.

```
192.168.1.1 adsl> clear ch 8 0 33
```

26.3.13 Clear Channels Command

Syntax:

```
192.168.1.1 adsl> clear chs [<start port> [<stop port>]]
```

where

`<start port>`	=	The first port number in a range of ports for which you want to display line information. 1 is used if you leave this blank.
`<stop port>`	=	The last port number in a range of ports for which you want to display line information. 8 is used if you leave this blank.

The `clear chs` command erases the statistics of the PVC channels for the specified ports.

The following example erases the statistics for the PVC channels for ports 5 to 8.

```
192.168.1.1 adsl> clear chs 5 8
```

Chapter 27
10/100M Fast Ethernet Port Commands

The Ethernet subsystem allows you to configure and monitor the 10/100M fast Ethernet port.

27.1 10/100M Fast Ethernet Overview

Refer to the web configurator chapter on the ADSL module ports for background information on the 10/100M auto-sensing Ethernet ports.

27.2 Ethernet Commands

Use these commands to configure a network module's Ethernet port.

27.2.1 Set Auto Command

Syntax:

```
192.168.1.1 ethernet> set auto <on|off>
```

where

`<on|off>  = on` or `off`

This command sets the auto-negotiation of the Ethernet port to either on or off.

27.2.2 Set Duplex Command

Syntax:

```
192.168.1.1 ethernet> set duplex <mode>
```

where

`<mode>  = full` or `half`

This command sets the duplex mode used when auto-negotiation is turned off.

27.2.3 Set Speed Command

Syntax:

```
192.168.1.1 ethernet> set speed <speed>
```

where

`<speed>  = 10` or `100`

This command sets the connection speed used when auto-negotiation is turned off. `10` stands for 10Mbps and `100` stands for 100Mbps.

27.2.4 Status Command

Syntax:

```
192.168.1.1 ethernet> status
```

This command shows the current status of the Ethernet port.

Chapter 28 Bridge Commands

This chapter discusses the bridge subsystem. It allows you to configure and monitor the bridging, configure MAC filters, port-based VLANs (port filter) and tagged frame functions of the IES-1000.

28.1 Bridge Commands Overview

See the web configurator *Getting Started Screens* chapter for background information on the IES-1000's bridge features.

28.2 Bridge Port Numbers

The bridge subsystem of the IES-1000 defines its own numbering convention for ports.

The bridge has a total of nine ports: bridge port 1 stands for the Ethernet port, bridge port 2 stands for DSL port 1, bridge port 3 stands for DSL port 2, and so on.

Be sure you have clarified the relation between bridge ports and DSL ports.

28.3 Basic Commands

28.3.1 Config Save Command

Syntax:

```
192.168.1.1 bridge> config save
```

This command saves the bridge configuration into nonvolatile memory. You must use this command to save any configurations that you make, otherwise the IES-1000 will return to its default settings when it is restarted.

Do not turn off your IES-1000 while saving your configuration.

28.3.2 Device Command

Syntax:

```
192.168.1.1 bridge> device
```

This command shows information on all bridge ports.

28.3.3 Status Command

Syntax:

```
192.168.1.1 bridge> status
```

This command displays the bridge management statistics.

28.4 MAC Filter Commands

Use MAC filter commands to filter incoming frames based on MAC (Media Access Control) address(es) that you specify. If you do not use this command, your IES-1000 will not filter frames. MAC filter commands are listed next. You may specify up to five MAC addresses per port.

28.4.1 MAC Filter Command

Syntax:

```
192.168.1.1 bridge> macfilter [<port>]
```

where

`port` = A bridge port number.

This command displays the MAC filtering status and the fixed source MAC addresses on a port or on all ports if no port is specified.

28.4.2 MAC Filter Enable Command

Syntax:

```
192.168.1.1 bridge> macfilter enable [<port>]
```

where

`<port>` = A bridge port number.

This command enables the MAC filtering feature on a specific port or on all ports if no port is specified.

28.4.3 MAC Filter Disable Command

Syntax:

```
192.168.1.1 bridge> macfilter disable [<port>]
```

where

`<port>` = A bridge port number.

This command disables the MAC filtering feature on a specific port or on all ports if no port is specified.

28.4.4 MAC Filter Add Command

Syntax:

```
192.168.1.1 bridge> macfilter add <port> <mac>
```

where

<port> = A bridge port number.

<mac> = The source MAC address in "00:a0:c5:12:34:56" format.

This command adds a source MAC address fixed on a specified port. You may add up to five MAC addresses.

28.4.5 MAC Filter Delete Command

Syntax:

```
192.168.1.1 bridge> macfilter delete <port> <mac>
```

where

<port> = A bridge port number.

<mac> = The source MAC address in "00:a0:c5:12:34:56" format.

This command removes a configured source MAC address from a port specified by you.

28.5 Filter Commands

28.5.1 Filter Command

Syntax:

```
192.168.1.1 bridge> filter
```

This command displays the filtering database.

28.5.2 Mfilter Command

Syntax:

```
192.168.1.1 bridge> mfilter
```

This command displays the multicast filtering database. The `mfilter` command is what allows you to monitor the IES-1000's IGMP snooping activities.

The following is an example of a multicast filtering database.

```
192.168.1.1 bridge> mfilter
 ID    VLAN ID            GDA            MAC      Member Ports
==============================================================================
  1        0       239.255.255.250    7f-ff-fa     1
  2        0       224.000.001.022    00-01-16     1

Total 2 entries.

IGMP Snooping Enabled
IGMP version 1
Query Received 949
Max Response Time 100 * 1/10 seconds
Query Interval 15 seconds
```

Figure 28-1 Mfilter Command Example

where

`ID`	=	The location of the entry in the multicast filtering database.
`VID`	=	The VLAN ID of the entry in the multicast filtering database.
`GDA`	=	Group Destination Address. The IP address of a multicast group destination.
`MAC`	=	The last 3 bytes of the multicast MAC that the GDA is mapped to.
`Member Ports`	=	The ports that belong to this multicast group. 1= Ethernet, 2= DSL port 1, 3=DSL port 2 and so on.
`IGMP version`	=	The version of IGMP being used in the network.
`Query Received`	=	The number of query packets received by the IES-1000.
`Max Response Time`	=	The longest period of time used to respond to a query packet, measured in tenths of a second.
`Query Interval`	=	The time period between query packets.

28.5.3 Filterage Command

Syntax:

```
192.168.1.1 bridge> filterage [age]
```

where

`age` = The aging out timer period in seconds.

This command sets or shows the aging out timer period of the filtering database. It is recommended that you use the default setting. If the time interval is set too short, it could increase broadcast traffic and reduce the available bandwidth.

28.5.4 Flush Command

Syntax:

```
192.168.1.1 bridge> flush [port]
```

where

`port` = A bridge port number.

This command flushes out the filtering database of the specified bridge port. If the `<port>` field is omitted, this command will flush out the filtering databases of all ports.

28.5.5 Info Command

Syntax:

```
192.168.1.1 bridge> info
```

This command shows the software version number of the bridge implementation and the maximum size of the filtering database.

28.5.6 Ethertype Command

Syntax:

```
192.168.1.1 bridge> ethertype [<port> <any|ip|pppoe>]
```

where

`<port>`	=	A bridge port number.
`any`	=	The filter allows all packet types to be forwarded to and from the specified port.
`ip`	=	The filter allows IP packets only to be forwarded to and from the specified port.
`pppoe`	=	The filter allows PPPoE packets only to be forwarded to and from the specified port.

The Ethernet type filter controls which types of packets to forward to individual ports. Use `ether type` without the port number and packet type to display the Ethernet type filter settings.

28.6 Port Filter Commands (Port-Based VLAN)

See the web configurator *Getting Started Screens* chapter for background information on the port filter.

28.6.1 Portfilter Command

Syntax:

```
192.168.1.1 bridge> portfilter [<source port> all|<dest ports>]
```

where

`<source port>`	=	An incoming bridge port number.
`all`	=	All bridge ports are allowed outgoing ports.
`<dest ports>`	=	The outgoing bridge ports. Separate by a space if there is more than one port.

This command sets or displays the port-based VLAN configuration.

An example is shown next.

```
192.168.1.1 > bridge
192.168.1.1 bridge> portfilter
Port 1 (ethernet):       all
Port 2 (dsl1):        1
Port 3 (dsl2):        1
Port 4 (dsl3):        1
Port 5 (dsl4):        1
Port 6 (dsl5):        1
Port 7 (dsl6):        1
Port 8 (dsl7):        1
Port 9 (dsl8):        1
```

Figure 28-2 Portfilter Command Example

The above shows the current configuration of the port-based VLAN. It is the same as the default settings.

An example with an altered configuration is shown next.

```
192.168.1.1 > bridge
192.168.1.1 bridge> portfilter 2 1 3
192.168.1.1 bridge> portfilter 3 1 2
```

This example sets the allowed outgoing bridge ports of port 2 (DSL port 1) to port 1 (Ethernet port) and port 3 (DSL port 2). The allowed outgoing bridge ports of port 3 (DSL port 2) are set to port 1 (Ethernet port) and port 2 (DSL port1). This way, DSL ports 2 and 3 can communicate with each other and the Ethernet port. You can see the effects of this example by using the following command:

```
192.168.1.1 bridge> portfilter
Port 1 (ethernet):       all
Port 2 (dsl1):         1 3
Port 3 (dsl2):         1 2
Port 4 (dsl3):         1
Port 5 (dsl4):         1
Port 6 (dsl5):         1
Port 7 (dsl6):         1
Port 8 (dsl7):         1
Port 9 (dsl8):         1
```

Figure 28-3 Portfilter Command Example 2

The following figures illustrate the above example. Notice that ports 2 (DSL port 1) and 3 (DSL port 2) are able to communicate with each other, as well as with the Ethernet. All of the other ports will only be able to communicate with the Ethernet port.

The following figure illustrates the

```
192.168.1.1 bridge> portfilter 2 1 3
```

command line. Port 2 (DSL port 1) is able to send to both the Ethernet port and port 3 (DSL port 2).

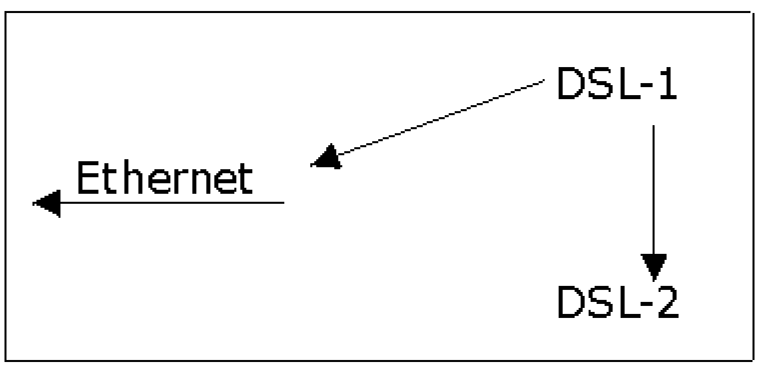


Figure 28-4 Example of Modified Port Filter Port 2

The following figure illustrates the

```
192.168.1.1 bridge> portfilter 3 1 2
```

command line.

Port 3 (DSL port 2) is able to send to both the Ethernet port and port 2 (DSL port 1).

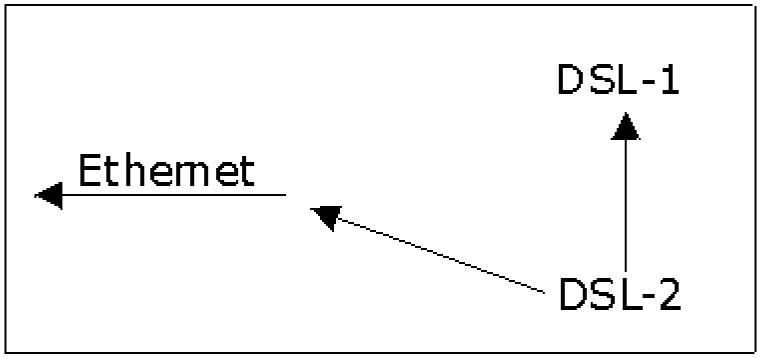


Figure 28-5 Example of Modified Port Filter Port 3

The following figure illustrates that port 1 (the Ethernet port) is linked to ports 2 (DSL port 1) and 3 (DSL port 2). Ports 2 (DSL port1) and 3 (DSL port 2) are also linked to each other. Or, in other words, the following figure is a result of the following commands:

```
192.168.1.1 bridge> portfilter 2 1 3
192.168.1.1 bridge> portfilter 3 1 2
```

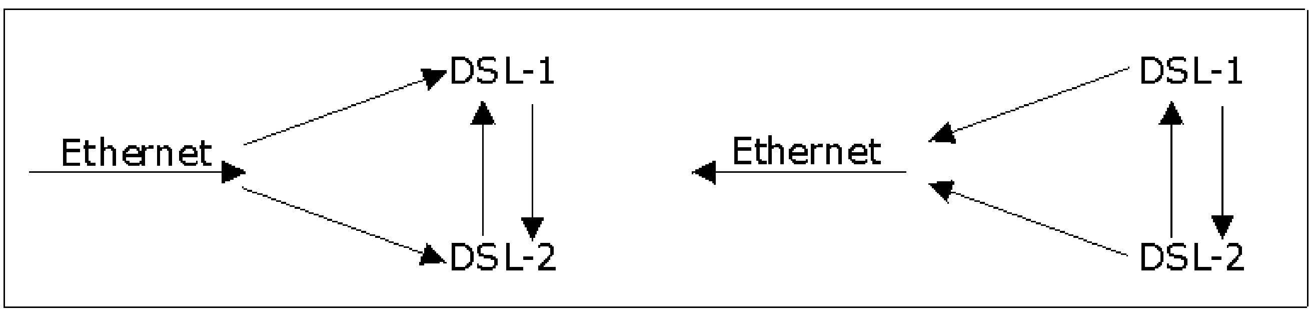


Figure 28-6 Example of Modified Port Filter Settings

28.7 Tagged Ethernet Frames Commands (Fast Mode)

The network module's fast mode makes use of the "tag" subset of the IEEE 802.1Q standard to identify the source port of an Ethernet frame and speed traffic through a service gateway. In this way, the source port of a frame can be recognized across switches. Fast mode reduces overhead by basing the forwarding decisions on the 802.1Q tag instead of checking and filtering MAC addresses. Fast mode allows only one port per PVID. Use normal mode (see *23.3.5*) and the 802.1Q VLAN commands (see *Chapter 31*) to configure VLANs or PVIDs with multiple ports.

28.7.1 FPVID Command

Syntax:

```
192.168.1.1 bridge> fpvid [<port> <vid>]
```

where

`<port> =` The port number on the network module. Port 0 is the CPU's port, port 1 is the Ethernet port and ports 2-9 are the bridge ports on network module modules. These are logical ports.

`<vid> =` The tag number (or IEEE 802.1Q identification) that identifies the source port of an Ethernet frame. Allocate tag numbers for all logical ports on your network module.

This command lets you allocate IEEE 802.1Q identification numbers (tags) on a port-by-port basis.

The command `192.168.1.1 bridge> fpvid` displays the default port identification of all network module ports.

The IEEE 802.1Q standard uses an explicit tag in the header to specify the VLAN ID (VID) of an Ethernet frame. In this way, the VLAN membership of a frame can be carried across switches. The following table displays the physical port and corresponding default PVID tag on the IES-1000.

Table 28-1 Physical Ports, Port Numbers and IES-1000 Default PVID Tags in Fast Mode

PHYSICAL PORT	PORT NUMBER	DEFAULT PVID TAG
CPU (Central Processing Unit)	0	1
Network Module LAN Port (Ethernet)	1	N/A
DSL Port 1	2	2
DSL Port 2	3	3
DSL Port 3	4	4
DSL Port 4	5	5
DSL Port 5	6	6
DSL Port 6	7	7
DSL Port 7	8	8
DSL Port 8	9	9

Chapter 29
DHCP Relay Commands

This chapter describes how to use the DHCP Relay commands.

29.1 DHCP Relay Overview

Refer to the web configurator part for background information on DHCP.

29.2 DHCP Relay Commands

Use these commands to configure the DHCP relay feature.

29.2.1 Add Command

Syntax:

```
192.168.1.1 dhcprelay> add <ip>
```

where

`<ip> =` The IP address of a DHCP server.

The `add` command adds a DHCP server to the list of servers to which the IES-1000 relays client TCP/IP configuration requests.

29.2.2 Config Command

Syntax:

```
192.168.1.1 dhcprelay> config
```

The `config` command displays the list of servers to which the IES-1000 relays client TCP/IP configuration requests.

29.2.3 Delete Command

Syntax:

```
192.168.1.1 dhcprelay> delete [<ip> | all]
```

where

`<ip> =` The IP address of a DHCP server.

`[all]=` All of the DHCP servers in the relay list.

The `delete` command removes the specified DHCP server or all servers from the list of servers to which the IES-1000 relays client TCP/IP configuration requests.

29.2.4 Enable Command

Syntax:

```
192.168.1.1 dhcprelay> enable
```

This command turns on the DHCP relay feature.

29.2.5 Disable Command

Syntax:

```
192.168.1.1 dhcprelay> disable
```

This command turns off the DHCP relay feature.

29.2.6 Reset Command

Syntax:

```
192.168.1.1 dhcprelay> reset
```

The `reset` command resets and restarts the DHCP relay feature. This causes changes that you have made to the DHCP relay list to take effect.

29.2.7 Pool Command

Syntax:

```
192.168.1.1 dhcprelay> pool
```

The `pool` command shows the DHCP relay memory pool status.

An example is shown next. This display shows that the entire DHCP relay memory pool is free (none of the memory is allocated for entries).

```
192.168.1.1 dhcprelay> pool
DHCP relay Memory Pool Status
total pool size  19968
free             19968
allocated        0
mean alloc chunk 0
max free chunk   19952
```

Figure 29-1 Pool Command Example

29.2.8 Status Command

Syntax:

```
192.168.1.1 dhcprelay> status
```

The `status` command displays whether or not the DHCP relay feature is activated.

29.2.9 Trace Command

Syntax:

```
192.168.1.1 dhcprelay> trace
```

The `trace` command activates trace option(s).

29.2.10 Untrace Command

Syntax:

```
192.168.1.1 dhcprelay> untrace
```

The un`trace` command deactivates trace option(s).

29.2.11 Version Command

Syntax:

```
192.168.1.1 dhcprelay> version
```

The `version` command displays the DHCP software version.

29.3 DHCP Relay Agent Information Option

Use the following commands to configure the DHCP relay agent information option feature.

29.3.1 Relayinfo Enable Command

Syntax:

```
192.168.1.1 dhcprelay> relayinfo enable
```

The `relayinfo enable` command turns on the DHCP relay agent information (Option 82) feature.

29.3.2 Relayinfo Disable Command

Syntax:

```
192.168.1.1 dhcprelay> relayinfo disable
```

The `relayinfo disable` command turns off the DHCP relay agent information (Option 82) feature.

29.3.3 Relayinfo Status Command

Syntax:

```
192.168.1.1 dhcprelay> relayinfo status
```

The `relayinfo status` command displays the current status of the DHCP relay agent information (Option 82) feature.

29.3.4 Relayinfo Add Command

Syntax:

```
192.168.1.1 dhcprelay> relayinfo add [<info>]
```

where

`[<info>]=`	Up to 24 ASCII characters of additional information for the Integrated Ethernet Switch to add to the DHCP client TCP/IP configuration requests that it relays to a DHCP server. Examples of information you could add would be the name of the Integrated Ethernet Switch or the ISP.

The `relayinfo add` command adds the specified information for the relay agent.

Chapter 30 IEEE 802.1X Commands

This chapter describes how to use the dot1x commands.

30.1 IEEE 802.1X Overview

The IES-1000 supports IEEE 802.1X port-based authentication (refer to the web configurator part for background information).

30.2 IEEE 802.1X Commands

Use these commands to configure the IEEE 802.1X feature.

30.2.1 Enable Command

Syntax:

```
192.168.1.1 dot1x> enable
```

This command turns on the IEEE 802.1X security feature.

30.2.2 Disable Command

Syntax:

```
192.168.1.1 dot1x> disable
```

This command turns off the IEEE 802.1X security feature.

30.2.3 Status Command

Syntax:

```
192.168.1.1 dot1x> status
```

This command displays the current status of the IEEE 802.1X security feature.

30.2.4 Debug Command

Syntax:

```
192.168.1.1 dot1x> debug [level]
```

where

`[level]`	=	Use 1 to turn on the packet debug level. This has the IES-1000 display the contents of EAPOL (Extensible Authentication Protocol Over LAN) frames. This can help you determine whether or not the subscriber is sending IEEE 802.1X packets. If necessary, customer support may instruct you to use another level and send them the results. Enter the command without a level to turn off all of the debug levels.

This command turns individual debug levels on or off.

30.2.5 Port Enable Command

Syntax:

```
192.168.1.1 dot1x> port enable <port>
```

where

`<port>`	=	A port number (1 to 8).

This command turns on the IEEE 802.1X security feature on the specified port(s).

30.2.6 Port Disable Command

Syntax:

```
192.168.1.1 dot1x> port disable <port>
```

where

`<port>`	=	A port number (1 to 8).

This command turns off the IEEE 802.1X security feature on the specified port(s).

30.2.7 Port Control Command

Syntax:

```
192.168.1.1 dot1x> port control <port> <auto|auth|unauth>
```

where

`<port>`	=	A port number (1 to 8).
`<auto|auth|unauth>`	=	This field sets how the IES-1000 uses IEEE 802.1X. Use `auto` to authenticate all subscribers before they can access the network through this port. Use `auth` to allow all connected users to access the network through this port without authentication. Use `unauth` to deny all subscribers access to the network through this port.

This command sets how the IES-1000 applies IEEE 802.1X on a specified port.

30.2.8 Port Re-authentication Command

Syntax:

```
192.168.1.1 dot1x> port reauth <port> <on|off>
```

where

`<port>`	=	A port number (1 to 8).
`<on|off>`	=	Use `on` to require a subscriber to periodically re-enter his or her username and password to stay connected to the port (some IEEE 802.1X clients do this automatically). Use `off` to not require a subscriber to periodically re-enter his or her username and password to stay connected to the port.

This command sets whether or not a subscriber has to periodically re-enter his or her username and password to stay connected to the specified port.

30.2.9 Port Period Command

Syntax:

```
192.168.1.1 dot1x> port period <port> <value>
```

where

`<port>`	=	A port number (1 to 8).
`<value>`	=	How often (60~65535 seconds) a subscriber has to re-enter his or her username and password to stay connected to the port.

This command sets how often a subscriber has to re-enter his or her username and password to stay connected to the specified port.

30.2.10 Port Status Command

Syntax:

```
192.168.1.1 dot1x> port status <port>
```

where

`<port>`	=	A port number (1 to 8).

This command displays the current status of the IEEE 802.1X security feature on the specified port.

30.2.11 RADIUS IP Command

Syntax:

```
192.168.1.1 dot1x> radius ip <addr>
```

where

`<addr>` = The IP address of the external RADIUS server.

This command sets the external RADIUS server IP address.

30.2.12 RADIUS Port Command

Syntax:

```
192.168.1.1 dot1x> radius port <portnum>
```

where

`<portnum>` = The UDP port number of the external RADIUS server.

This command sets the external RADIUS server UDP port number.

30.2.13 RADIUS Secret Command

Syntax:

```
192.168.1.1 dot1x> radius secret <secret>
```

where

`<secret>` = A password (up to 31 alphanumeric characters) to be shared between the external RADIUS server and the IES-1000. This key is not sent over the network. This key must be the same on the external RADIUS server and the IES-1000.

This command sets the authentication and encryption key.

30.2.14 RADIUS Show Command

Syntax:

```
192.168.1.1 dot1x> radius show
```

This command displays the external RADIUS server settings.

Chapter 31 IEEE 802.1Q Tagged VLAN Commands

This chapter generally describes the IEEE 802.1Q Tagged VLAN and associated CI Commands.

31.1 IEEE 802.1Q Tagged VLAN Introduction

The IEEE 802.1Q Tagged VLAN allows your network module to deliver tagged/untagged frames to and from its ports. The standard gives the network module the ability to recognize VLAN-aware and VLAN-unaware devices and automatically strips tags from frames destined for ports that would normally drop tagged frames. See the web configurator chapter on VLAN for more background information.

31.2 Configuring the Tagged VLAN

In a typical setup, each DSL port is assigned a different VLAN ID (VID) to isolate the subscribers, while the uplink port should be a member of every subscriber VID and the management VID. The port-based VLAN is always active; it is *NOT* mutually exclusive of the tag-based VLAN. The system performs tagged-VLAN processing first and then port-based VLAN in tandem.

The deletion of the default management VLAN and the enabling of the VLAN *MUST* be the last steps in the configuration procedure, because once you change the settings, you will not be able to connect to the network module with your computer, which is without tagged VLAN capability. You can configure the VLAN associated with the DSL ports before the uplink ports, or you can do this over the network after the network module is put into service.

See the examples with the following procedure.

Procedure:

Step 1. Use the IEEE 802.1Q tagged VLAN commands to configure tag-based VLAN for the subscribers.

- Use the `svlan setentry` command to configure a VLAN ID for each subscriber.
    - For a typical setup, use "fixed" for the administration control for the DSL port (numbered 2-9) and the uplink port (number 1).
    - Select "untag" for the tag control for the DSL port and "tag" for the uplink port.
    - Ignore any messages telling you to use the `vlan enable` command in order to enable GVRP. Use the `vlan enable` command when you are finished configuring the VLAN (see the last step).
- Use the `pvid command` to set the VLAN ID you created for a port to that specific port in the PVID table.
- Repeat these steps for the rest of the DSL ports.

Example:

```
1.    192.168.1.1> vlan1q
2.    192.168.1.1 vlan1q> svlan setentry 11 2 fixed untag
3.    192.168.1.1 vlan1q> svlan setentry 11 1 fixed tag
4.    192.168.1.1 vlan1q> pvid 2 11
5.    192.168.1.1 vlan1q> svlan setentry 12 3 fixed untag
6.    192.168.1.1 vlan1q> svlan setentry 12 1 fixed tag
7.    192.168.1.1 vlan1q> pvid 3 12
8.    192.168.1.1 vlan1q> svlan setentry 13 4 fixed untag
9.    192.168.1.1 vlan1q> svlan setentry 13 1 fixed tag
10.   192.168.1.1 vlan1q> pvid 4 13
11.   192.168.1.1 vlan1q> svlan setentry 14 5 fixed untag
12.   192.168.1.1 vlan1q> svlan setentry 14 1 fixed tag
13.   192.168.1.1 vlan1q> pvid 5 14
14.   192.168.1.1 vlan1q> svlan setentry 15 6 fixed untag
15.   192.168.1.1 vlan1q> svlan setentry 15 1 fixed tag
16.   192.168.1.1 vlan1q> pvid 6 15
………………..
17.   192.168.1.1 vlan1q> svlan setentry 18 9 fixed untag
18.   192.168.1.1 vlan1q> svlan setentry 18 1 fixed tag
19.   192.168.1.1 vlan1q> pvid 9 18
```

Step 2. Configure your management VLAN.

- Use the `svlan setentry` command to configure a VLAN ID for your device (the "management" or "CPU" VLAN.
- Use the `svlan cpu` command to register your device as a member of the management VLAN.

Example:

```
1.    192.168.1.1 vlan1q> svlan setentry 2 1 fixed tag
2.    192.168.1.1 vlan1q> svlan cpu 2
```

Step 2. Perform the procedure below to complete the VLAN setup after you have configured all the network modules in the chassis. Note that this must be the last step before you lose the connection to the network module.

- Telnet to the operational IP address of a network module.
- Use the `svlan delentry` command to remove the default VLAN ID (1).
- Use the `vlan enable` command to activate the VLAN after you have finished all of your configuration.

Example:

```
1.    192.168.1.1 vlan1q> svlan delentry 1
```

2. `192.168.1.1 vlan1q> vlan enable`

31.3 IEEE 802.1Q Tagged VLAN Commands

Bridge port 1 stands for the Ethernet port, bridge port 2 stands for DSL port 1, bridge port 3 stands for DSL port 2, and so on.

31.3.1 VLAN Enable Command

The default for the IEEE 802.1Q Tagged VLAN is disabled. Enable the IEEE 802.1Q Tagged VLAN by following the example shown next.

Syntax:

```
192.168.1.1 vlan1q> vlan enable
```

31.3.2 VLAN Disable Command

You can disable the IEEE 802.1Q Tagged VLAN by using the `VLAN Disable` command.

Syntax:

```
192.168.1.1 vlan1q> vlan disable
```

This command disables the IEEE 802.1Q Tagged VLAN.

31.3.3 PVID Command

Syntax:

```
192.168.1.1 vlan1q> pvid [<port #> <vlan id>]
```

where

`<port #>`	=	A bridge port number. Valid parameter range = [1 - 9].
`<vlan id>`	=	The VLAN ID. Valid parameter range = [1 - 4094].

This command sets the VLAN ID to a specific port in the PVID table. To display the PVID table simply enter this command without parameters, as shown next.

```
192.168.1.1 vlan1q> pvid
port# pvid
----- -----
    1     1
    2     1
    3     1
    4     1
    5     1
    6     1
    7     1
    8     1
    9     1
```

Figure 31-1 Example: PVID Command Display

Make sure you set all bonded ports to have the same PVID.

31.3.4 SVLAN CPU Command

Syntax:

```
192.168.1.1 vlan1q> svlan cpu [<vid>]
```

where

`<vid>` = A VLAN ID. Valid parameter range = [1 – 4094].

This command registers your CPU as a port member of the static VLAN with `<vid>`. To display the CPU static VLAN identification, simply enter this command without parameters, as shown next.

```
192.168.1.1 vlan1q> svlan cpu
```

31.3.5 SVLAN List Command

Syntax:

```
192.168.1.1 vlan1q> svlan list
```

This command displays the static VLAN registration table. The following figure is an example of what is displayed when you use this command.

```
192.168.1.1 vlan1q> svlan list
vid       port#     ad_control     tag_control
--------  -------   ------------   ------------
   1         1         fixed          tag
             2         normal         untag
             3         normal         untag

   2         1         normal         untag
             2         fixed          untag
             3         normal         untag

   3         1         normal         untag
             2         normal         untag
             3         fixed          untag
```

Figure 31-2 Example: SVLAN List Command Display

For more information about the *Svlan List* command display, refer to the *Svlan Setentry* command (shown next).

31.3.6 SVLAN Setentry Command

Syntax:

```
192.168.1.1 vlan1q> svlan setentry <vid> <port#> <ad_control>
<tag_control>
```

where

`<vid>`	=	A VLAN ID. Valid parameter range = [1 – 4094].
`<port#>`	=	A bridge port number. Valid parameter range = [1 – 9].
`<ad_control>`	=	Registrar administration control flag. Valid parameters = [fixed, forbidden, normal]. Select *fixed* to register a `<port #>` to the static VLAN table with `<vid>`. Select *normal* to confirm registration of the `<port #>` to the static VLAN table with `<vid>`. Select *forbidden* to block a `<port #>` from joining the static VLAN table with `<vid>`.
`<tag_control>`	=	The tag control flag. Valid parameters = [tag, untag]. Select `tag` to add tags to outgoing frames. Select *untag* if you do not want to tag outgoing frames.

This command adds or modifies an entry into the static VLAN table. Display your configuration by using the `Svlan List` command. An example of a configuration is shown next.

Modify a Static VLAN Table Example

The following is an example of how to modify a static VLAN table.

1. `192.168.1.1 vlan1q> svlan setentry  3  3  fixed  untag`
2. `192.168.1.1 vlan1q> svlan setentry  2  2  fixed  untag`
3. `192.168.1.1 vlan1q> svlan setentry  1  1  fixed  tag`
4. `192.168.1.1 vlan1q> svlan list`

The arrows in the figure shown next point to the lines that have been modified in this table as a result of the previous commands.

```
          vid        port#      ad_control     tag_control
          --------   -------    ------------   ------------
3.          1          1          fixed          tag
                       2          normal         untag
                       3          normal         untag

            2          1          normal         untag
2.                     2          fixed          untag
                       3          normal         untag

            3          1          normal         untag
                       2          normal         untag
1.                     3          fixed          untag
```

Figure 31-3 Example: SVLAN List Command Display

Forwarding Process Example

The switch uses the SVLAN in making frame-forwarding decisions.

First the switch checks the MAC address in a frames header against the MAC filtering database.

Next the switch checks the VLAN ID (VID) of tagged frames or assigns temporary VIDs to untagged frames (see the *PVID Command*).

The switch then checks the VID in a frame's tag against the SVLAN table.

The switch notes what the SVLAN table says (that is, the SVLAN tells the switch whether or not to forward a frame and if the forwarded frames should have tags).

Then the switch applies the port filter to finish the forwarding decision. This means that frames may be dropped even if the SVLAN says to forward them. Frames might also be dropped if they are sent to a CPE (customer premises equipment) DSL device that does not accept tagged frames.

The following figure shows the flow of the decision process used with a broadcast frame (one that is meant to go to all of the ports).

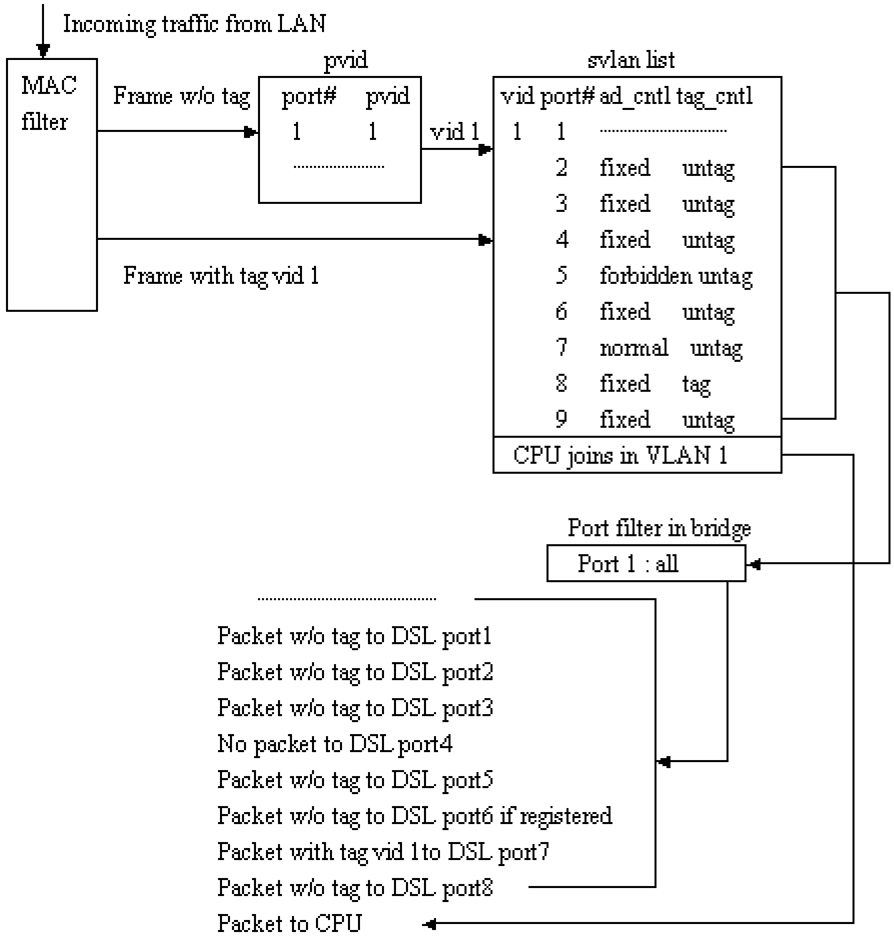


Figure 31-4 SVLAN Example

An untagged frame comes in from the LAN.

The switch checks the PVID table and assigns a temporary VID of 1.

The switch ignores port# 1 (the LAN port where the frame came in), because the switch does not send a frame to the port that it came in through.

The switch sees that port #s 2, 3, 4, 6, 7 and 9 (DSL ports 1, 2, 3, 5, 6 and 8) are all set to "fixed" and "untag" which means the SVLAN allows the frame to be sent to those ports without a tag.

Port # 5 is "forbidden" so the frame is not forwarded to DSL port # 4.

Port # 7 (DSL port 6) is "normal" which means that it was entered dynamically, so the frame is permitted to be forwarded to port # 7 if port # 7 is registered in the DVLAN table.

After looking at the SVLAN, the switch sees that the port filter is set for port 1 (the LAN port) to forward frames to all of the ADSL ports, so the switch forwards everything that the SVLAN permits.

Please note that the switch also sends the frame to "CPU" (the switch itself), because the switch is a member of this VLAN. The switch can be a member of only one VLAN at a time.

31.3.7 SVLAN Getentry Command

Syntax:

```
192.168.1.1 vlan1q> svlan getentry <vid>
```

where

`<vid>` = A VLAN ID. Valid parameter range = [1 – 4094].

This command displays an entry with a specified VLAN ID in the static VLAN table.

Display a Static VLAN Table Entry Example

The following figure is an example display of the following command.

```
192.168.1.1 vlan1q> svlan getentry 2
```

```
vid       port#     ad_control    tag_control
--------  -------   ------------  ------------
   2         1        normal        untag
             2        fixed         untag
             3        normal        untag
```

Figure 31-5 Example: Svlan Getentry 2 Command Display

31.3.8 SVLAN Delentry Command

Syntax:

```
192.168.1.1 vlan mgr> svlan delentry <vid>
```

where

`<vid>` = A VLAN ID. Valid parameter range = [1 – 4094].

This command deletes an entry with a specified VLAN ID in the static VLAN table

Delete a Static VLAN Entry Example

The following example will delete the entry with VLAN ID 2 in the static VLAN table.

```
192.168.1.1 vlan mgr> svlan delentry 2
```

31.3.9 DVLAN List Command

Syntax:

```
192.168.1.1 vlan1q> dvlan list
```

This command displays the dynamic VLAN registration table. The following figure is an example of what is displayed when you use this command.

```
vid     01      02      03      04      05      06      07      08      09
----    ----    ----    ----    ----    ----    ----    ----    ----    ----
2       ||      >>      ||      ||      >>      >>      ||      ||      >>
3       >>      >>      ||      ||      ||      >>      >>      >>      ||
4       >>      ||      ||      >>      >>      ||      ||      >>      >>
5       ||      >>      ||      ||      >>      >>      ||      ||      >>
6       >>      >>      ||      ||      ||      >>      >>      >>      ||
7       ||      >>      ||      >>      >>      ||      ||      >>      >>
8       >>      ||      ||      >>      ||      >>      >>      >>      >>
9       ||      >>      ||      ||      ||      >>      ||      >>      >>
```

Figure 31-6 Example: DVLAN List Command Display

In the figure above, "||" denotes "filter" and ">>" denotes "forward".

31.3.10 DVLAN Getentry Command

Syntax:

```
192.168.1.1 vlan1q> dvlan getentry <vid>
```

where

`<vid>` = A VLAN ID. Valid parameter range = [1 – 4094].

This command displays an entry with a specified VLAN ID in dynamic GVRP table.

Display a Dynamic VLAN Table Entry Example

The following figure is an example display of the following command.

```
192.168.1.1 vlan1q> dvlan getentry 2
```

```
vid     01      02      03      04      05      06      07      08      09
----    ----    ----    ----    ----    ----    ----    ----    ----    ----
2       ||      >>      ||      ||      >>      >>      ||      ||      >>
```

Figure 31-7 Example: DVLAN Getentry 2 Command Display

In the figure above, "||" denotes "filter" and ">>" denotes "forward".

31.3.11 VLAN List Command

Syntax:

```
192.168.1.1 vlan1q> vlan list
```

This command displays the entire VLAN table. The display refreshes periodically. Press [ENTER] and then enter the `stop` command to stop the display from refreshing. The following figure is an example what is displayed when you use this command.

```
vid   01   02   03   04   05   06   07   08   09
---- ---- ---- ---- ---- ---- ---- ---- ---- ----
1     O         O         O         O
      V    X    X    X    X    X    X    X    X
2          O         O
      X    X    X    X    X    X    X    X    X
3               O         O    O
      X    X    V    X    X    X    X    X    V
```

Figure 31-8 Example: VLAN List Command Display

In the figure above “O" denotes “egress port”, “V” denotes “tagged” and “X” denotes “ untagged”.

Chapter 32 IEEE 802.1p Priority Commands

This chapter explains IEEE 802.1p Priority CI Commands.

32.1 Introduction

IEEE 802.1p Priority CI Commands assign priority levels to individual ports. IEEE 802.1p defines up to eight priorities (0-7) by inserting a tag into a MAC-layer frame that contains bits to define priority of service.

32.2 IEEE 802.1p Priority Commands

Bridge port 1 stands for the Ethernet port, bridge port 2 stands for DSL port 1, bridge port 3 stands for DSL port 2, and so on.

32.2.1 Priority Port Command

Syntax:

```
192.168.1.1 vlan1q> priority port <port #> <priority>
```

where

`<port #>`	=	A bridge port number. Valid parameter range = [1 – 9 or *], where * means all ports.
`<priority>`	=	The default priority for the specified port. Valid parameter range = [0 - 7], where 0 is the lowest priority and 7 is the highest priority.

This command sets the default priority that is assigned to untagged frames from a specified ingress port.

To display the default port priority table, simply use the `Priority Port` command without parameters, as shown next.

```
192.168.1.1 vlan1q> priority port
```

32.2.2 Regen Port Command

Syntax:

```
192.168.1.1 vlan1q> regen port [<port #> <user priority> <regenerated
priority>]
```

where

<port #>	=	A bridge port number. Valid parameter range = [1 – 9].
<user priority>	=	The user priority for a frame received on this port. Valid parameter range = [0 – 7 or *], where 0 is the lowest priority, 7 is the highest priority and * means all user priorities.
<regenerated priority>	=	The regenerated user priority the incoming user priority is mapped to for `<port #>.` Valid parameter range = [0 - 7], where 0 is the lowest priority and 7 is the highest priority.

This command changes the priority of a tagged frame from a specified ingress port from the original user priority to the regenerated priority.

To display the regeneration table, simply use the `Regen Port` command without parameters, as shown next.

```
192.168.1.1 vlan1q> regen port
```

Chapter 33 IP Commands

This chapter shows you how to configure the IP (Internet Protocol) parameters. The IP host implementation in the IES-1000 allows you to manage it over the network.

More often than not, you have more than one IES-1000 for a particular installation. Before you start configuring the IES-1000s, make sure that you

1. Plan ahead.
2. Have a complete diagram showing the whole network.
3. Record the IP parameters assigned to the equipment in your network.

33.1 Setting the IP Address

To set the IP address, default gateway and the subnet mask of the Ethernet port of a network module, use the following command sequence.

```
1.  192.168.1.1> ip
2.  192.168.1.1 ip> enable ether [<new ip address> [<ip mask>]]
3.  <new ip address> ip> route delete default
4.  <new ip address> ip> route add default 0.0.0.0 <default gateway>
    00:00:00:00
5.  <new ip address> ip> config save
```

where

`<new ip address>`	=	The IP address you want to configure for the network module.
`<ip mask>`	=	The subnet mask of the IP address you want to configure for the network module, for example "255.255.255.0".
`<default gateway>`	=	The default gateway IP address of the network module.

Line 1 brings you to the IP subsystem.

Line 2 allows you to add a new IP address for the IES-1000. The IP address of the IES-1000 is displayed in the command prompt. If you don't enter the subnet mask, the system automatically computes the subnet mask when the system is restarted.

Line 3 deletes the existing default route.

Line 4 adds the new default route. The default route tells the system where the gateway (next hop) is when the IES-1000 sends packets to a destination that is not on the same subnet as the IES-1000.

Line 5 saves the new configuration to the nonvolatile memory.

For example, if you want the IES-1000 to have 192.168.1.3 as the IP address, 255.255.255.0 for the subnet mask and 192.168.1.233 for the default gateway, you may use the following command sequence:

```
192.168.1.1> ip
192.168.1.1 ip> enable ether 192.168.1.3 255.255.255.0
192.168.1.1 ip> route delete default
192.168.1.1 ip> route add default 0.0.0.0 192.168.1.233 00:00:00:00
192.168.1.1 ip> config save
```

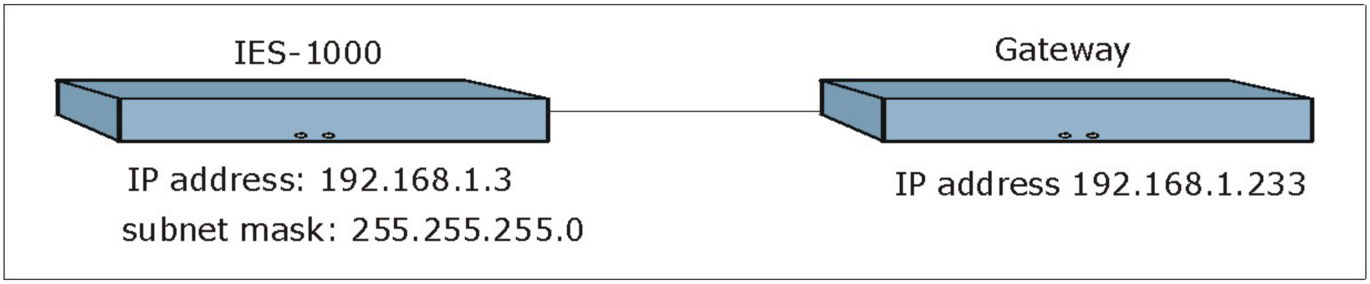


Figure 33-1 Setting IP Address and Default Gateway

The IES-1000 leaves the factory with a default IP address of 192.168.1.1 and a subnet mask of 255.255.255.0, (ff:ff:ff:0 in hexadecimal notation), and the default gateway set at 192.168.1.254. Make sure that you configure the IP parameters correctly before you connect an IES-1000 to the network, otherwise, you may interrupt services already running.

33.2 General IP Commands

The following is a list of general IP commands that help with the management of the IP parameters.

33.2.1 Config Command

Syntax:

```
192.168.1.1 ip> config [save]
```

This command shows the IP configuration. The `save` option saves the configuration to the nonvolatile memory.

33.2.2 Version Command

Syntax:

```
192.168.1.1 ip> version
```

This command shows the IP version and MAC address of the network module.

33.2.3 Ping Command

Syntax:

```
192.168.1.1 ip> ping <host> [<ttl> [<size>]]
```

where

`<host>`	=	The IP address of the target.
`<ttl>`	=	Time to Live (optional). This parameter limits the number of hops (routers) that the echo request can travel before it reaches the target.
`<size>`	=	The parameter specifies the size of the payload, that is, not counting the headers, of the echo request. The default size is 32 octets.

This is an IP facility to check for network functionality by sending an echo request to another IP host and waiting for the reply.

33.2.4 Statistics Command

Syntax:

```
192.168.1.1 ip> stats <sub cmd> [reset]
```

This command shows or resets the statistics for the traffic of the type specified by the sub-command. Statistics are available for the following traffic types: ARP, ICMP, IP, raw, TCP and UDP.

33.2.5 Subnet Add Command

Syntax:

```
192.168.1.1 ip> subnet add <net name> <i/f name> a.b.c.d am:bm:cm:dm
```

where

`<net name>`	=	Define the name of the subnet for identification purposes.
`<i/f name>`	=	The name of an interface ("ether" for this device).
`a.b.c.d`	=	The subnet's IP address.
`am:bm:cm:dm`	=	The subnet's subnet mask.

This command defines a subnet. Type "subnet" without any parameters to view a list of the configured subnets.

33.2.6 Subnet Delete Command

Syntax:

```
192.168.1.1 ip> subnet delete <net name>
```

where

`<net name>`	=	The name of the subnet.

This command removes a subnet.

33.2.7 Subnet Flush Command

Syntax:

```
192.168.1.1 ip> subnet flush
```

This command removes all of the subnets.

33.2.8 Route Add Command

Syntax:

```
192.168.1.1 ip> route add <dom name> a.b.c.d <relay> [am:bm:cm:dm [<cost>
[<timeout>]]]
```

where

`<dom name>`	=	The name of the static route.
`a.b.c.d`	=	The destination IP address of packets that this static route is to route.
`<relay>`	=	The IP address of the gateway that you want to send the packets through.
`am:bm:cm:dm`	=	The destination subnet mask of packets that this static route is to route.
`<cost>`	=	The metric (hop count) of this static route.
`<timeout>`	=	The timeout period of this static route in seconds.

This command defines a new, static IP forwarding route or edits an existing one. Type "route" without any parameters to view a list of the configured static routes.

Use 0's for the destination IP address and subnet mask to configure a default static route for the device. The device uses the default static route to forward packets for which it cannot find another route. The following is the syntax for configuring a static route.

```
192.168.1.1 ip> route add <dom name> 0.0.0.0 <relay> 00:00:00:00
```

33.2.9 Route Delete Command

Syntax:

```
192.168.1.1 ip> route delete <dom name>
```

where

`<dom name>`	=	The name of the static route.

This command removes a static, IP forwarding route.

33.2.10 Route Flush Command

Syntax:

```
192.168.1.1 ip> route flush
```

This command removes all of the static IP forwarding routes.

33.2.11 Enable Command

Your telnet session disconnects when you change the Ethernet port's IP address. Initiate a telnet session to the new IP address in order to reconnect.

Syntax:

```
192.168.
1.1 ip> enable [<if> [mtu <size> [<ip> [<ipmask>]]]
```

where

<i/f>	=	The name of an interface ("ether" for this device).
[mtu <size>]	=	Maximum Transmit Unit. The maximum packet size that this interface is to send.
<ip>	=	The IP address of the device's interface.
<ipmask>	=	The subnet mask of the device's IP address.

This command sets the Ethernet port's IP address, subnet mask and the largest packet size that this interface sends.

Chapter 34
Remote Management

This chapter shows you how to manage the IES-1000 remotely.

34.1 Remote Management Introduction

More often than not, you will have the IES-1000 located remotely making its remote management features very useful. See the web configurator chapter on SNMP for background information on SNMP.

34.2 Management by Telnet

After you have set up the IP parameters and connected the IES-1000 to the network, you can manage it remotely with telnet. You can use any telnet client that you find convenient. The configuration procedures with telnet are exactly the same as those using the direct connection via the console port. The default password for a telnet session is "1234". Although telnet will work while the console port is being used, only one telnet session is allowed at a time.

34.3 SNMP Access Configuration

To control access to the agent in the network module, use the `access` commands in the SNMP subsystem. Note that "community" is SNMP's terminology for password. After configuring the SNMP access parameters, save the configuration to the nonvolatile memory with the `config save` command. The default write community string is "1234", and the default read community string is "public".

34.3.1 SNMP Access Read/Write Command

Syntax:

```
access <read | write> <community> [<IP addr>]
```

where

`<read | write>`	=	Specifies read-only/read-write permission.
`<community>`	=	The password needed to access the SNMP agent on the network module.
`[<IP addr>]`	=	The optional IP address of the allowed SNMP manager.

This command allows read-only or read-write access. If the IP address is specified, access is allowed for the manager station with that address only.

34.3.2 SNMP Access Delete Command

Syntax:

```
access delete <community> [<IP addr>]
```

This command revokes SNMP access by the specified community (password). If the IP address is specified, access is denied for that manager station only.

34.3.3 SNMP Access Flush Command

Syntax:

```
access flush
```

This command revokes access by any and all manager stations.

34.3.4 SNMP Access List Command

Syntax:

```
access list
```

This command shows the allowed access.

34.4 SNMP Trap Configuration

The network module uses the SNMP trapping facility to proactively report unusual events to one or more trap servers. To configure the trap parameters, use the `trap` commands in the SNMP subsystem. After configuring the SNMP trap parameters, save the configuration to the nonvolatile memory with the `config save` command.

34.4.1 Trap Add Command

Syntax:

```
trap add <community> <IP addr>
```

where

`<community>`	=	The password used by the network module to authenticate itself to the trap server.
`<IP addr>`	=	The IP address of the trap server.

This command adds a trap server.

34.4.2 Trap Delete Command

Syntax:

```
trap delete <community> <IP addr>
```

This command deletes a trap destination. The parameters are the same as the `trap add` command.

34.4.3 Trap Flush Command

Syntax:

```
trap flush
```

This command deletes all trap destinations.

34.4.4 Trap List Command

Syntax:

```
trap list
```

This command lists all the trap destinations.

Chapter 35 Configuration Backup/Restore

This chapter describes the process for backing up your user settings (configuration) from the network module onto your computer and how to restore them to the network module.

The network modules use FTP for configuration backup/restore through their built-in FTP servers. You can use any FTP client (for example, ftp.exe in Windows) to backup/restore the network module's configuration.

35.1 Configuration Files of the Network Module

The network module uses configuration files to store the user's settings, so they can be applied the next time the network module is booted. The network module has the following configuration file:

init = The system configuration file for the network module.

35.2 Configuration Backup

You can backup all or some configuration files from the network module to your computer. Backup the system configuration by following the example shown next.

Connect to the network module with your favorite FTP client. The command for the network module is generally

```
C:\> ftp <network module IP address>
```

at the computer command prompt.

Enter the User name (just press [ENTER]).

```
User: <ENTER>
```

Enter the management password (1234 by default).

```
Password: 1234
230 Logged in
```

Get the configuration files from the network module

```
ftp> get init
```

Quit FTP.

```
ftp> quit
```

35.3 Configuration Restore

You can restore configuration files from your computer to the network module. Restore the system configuration by following the example shown next.

Do *not* turn off the network module during the restore process, as it may corrupt the firmware and make your network module unusable.

Connect to the network module with your favorite FTP client. The command for the network module is generally

```
C:\> ftp < network module IP address>
```

at the computer command prompt.

Enter the User name (just press [ENTER]).

```
User: <ENTER>
```

Enter the management password (1234 by default).

```
Password: 1234
```

```
230 Logged in
```

Transfer the configuration files to the network module

```
ftp> put init
```

Quit FTP.

```
ftp> quit
```

Wait for the update to finish. The network module will restart automatically.

Chapter 36 Firmware Upload and Recovery

This chapter describes how to load new firmware onto your device, or recover firmware that is in the non-volatile memory.

The network modules use FTP to upload firmware and no longer support TFTP uploads. If the firmware in the non-volatile memory is damaged, the network module uses BOOTP/TFTP to recover the firmware. The differences between these two methods are as follows:

- Upload timing:

  An FTP upload is done during operation (run-time), while a BOOTP/TFTP recovery is done when the network module is restarted.

- Protocols used:

  An FTP upload uses FTP protocol, while a BOOTP/TFTP recovery uses BOOTP and TFTP protocols.

- Remote upload:

  An FTP upload does not require the network module and your computer to be on the same LAN, while a BOOTP/TFTP recovery does.

- Firmware files used:

  An FTP upload uses a file with an ".img" extension name, while a BOOTP/TFTP recovery uses a file with a ".bin" extension name.

- The role of the network module:

  An FTP upload uses the network module's built-in FTP server and a BOOTP/TFTP recovery uses the network module's built-in BOOTP/TFTP client.

- The impact to the network module:

  An FTP upload overwrites the network module's firmware only while a BOOTP/TFTP recovery overwrites the network module's firmware and all configuration files.

36.1 FTP Firmware Upload on the Network Module

ZyXEL periodically releases new firmware for the network modules for bug fixes and enhancements. Please check the web site at www.zyxel.com periodically for the latest firmware release.

The network modules use FTP for firmware uploads through their built-in FTP server when the network module is operational. To update the firmware, first download it (the file will have an "**img**" extension name) from the ZyXEL web site and store it on your computer. You can use any FTP client (for example, ftp.exe in Windows) to upgrade the network module's firmware. The procedure for FTP upgrade is as follows.

Do *not* turn off the network module during the updating process, as it may corrupt the firmware and make your network module unusable.

1. Connect to the network module with your favorite FTP client.
   The command for the network module is generally: `ftp <network module IP address>` at the computer command prompt.
2. Enter the user name (just press [ENTER]). For example,
   `User: <ENTER>`
3. Enter the management password (1234 by default). For example,
   ```
   Password: 1234
   230 Logged in
   ```
4. Transfer the firmware file to the network module. For example,
   `ftp> put 201AS0b1.img image`

   where

   `201AS0b1.img` = The firmware file that you want to upload.

   `image` = The internal firmware name in the network module.
5. Quit FTP. For example,

   `ftp> quit`

Wait for the update to finish. The network module will restart automatically.

Do *not* turn off the IES-1000 during the updating process, as it may corrupt the firmware and make your unit unusable.

36.2 BOOTP/TFTP Firmware Recovery of the Network Module

The network modules use BOOTP/TFTP for firmware recovery through their built-in BOOTP/TFTP client when the network modules are restarted. To recover the firmware, first download it from the ZyXEL web site and store it on your computer. You can use any BOOTP/TFTP server (for example, BootpTftp.exe) to update the network module's firmware. The update procedure for BootpTftp.exe is as follows:

Do *not* turn off the IES-1000 during the updating process, as it may corrupt the firmware and make your unit unusable.

1. Connect your network module's LAN port to a computer's LAN port directly using a crossover Ethernet cable, or connect both to an Ethernet hub/switch using straight-through cables.
2. Connect your network module's console port to a computer's serial port with a console cable.
3. Run any terminal emulation program, for example, Windows' built-in HyperTerminal, with the following parameters:

   VT100 terminal emulation

   9600 bps

   No parity, 8 data bits, 1 stop bit

   No flow control

4. Run `BootpTftp.exe`, to bring up the following window. Click **New** to create a MAC address entry.

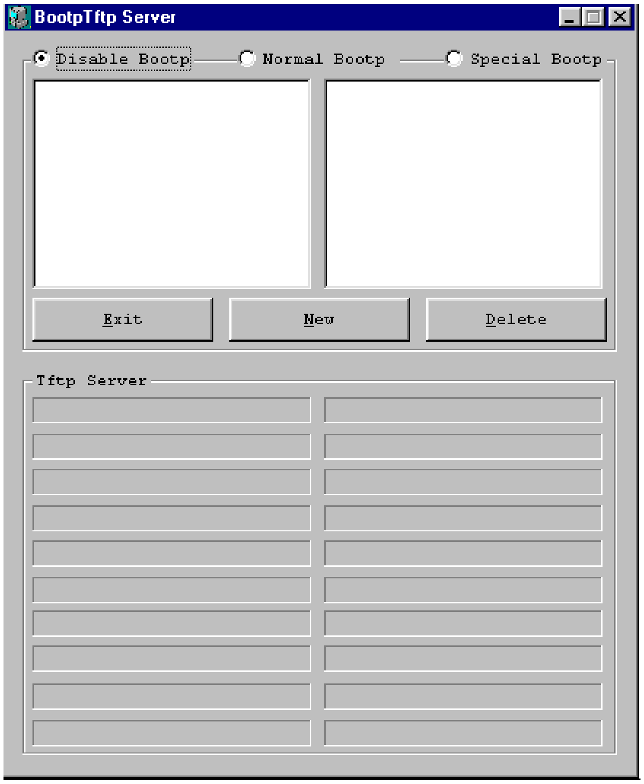


Figure 36-1 BOOTP/TFTP Server

5. The **Input Box** window will pop up as shown next. Type the MAC address of the network module and then click **OK**. You can find the MAC address of the network module on its boot console.

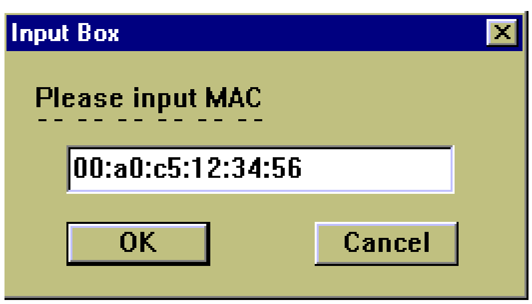


Figure 36-2 Input MAC

6. Type the host IP address (the IP address you want to assign to the network module), server IP address (the IP address of this computer), net mask, gateway and filename (the new firmware name) into the appropriate fields in the screen shown next. Click **Update Database**.

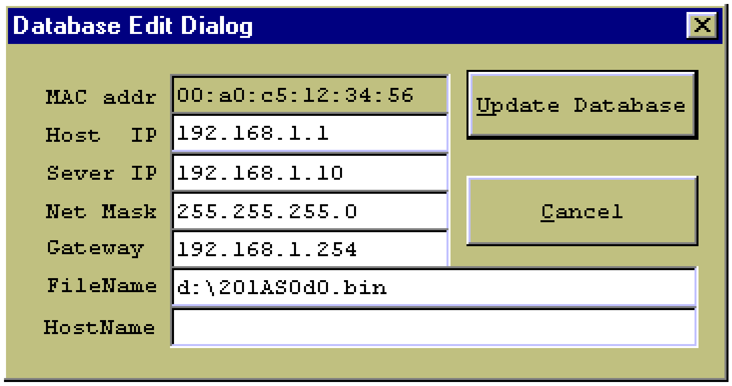


Figure 36-3 Database Edit Dialog

7. Select **Normal Bootp** to enable normal BOOTP/TFTP functions.

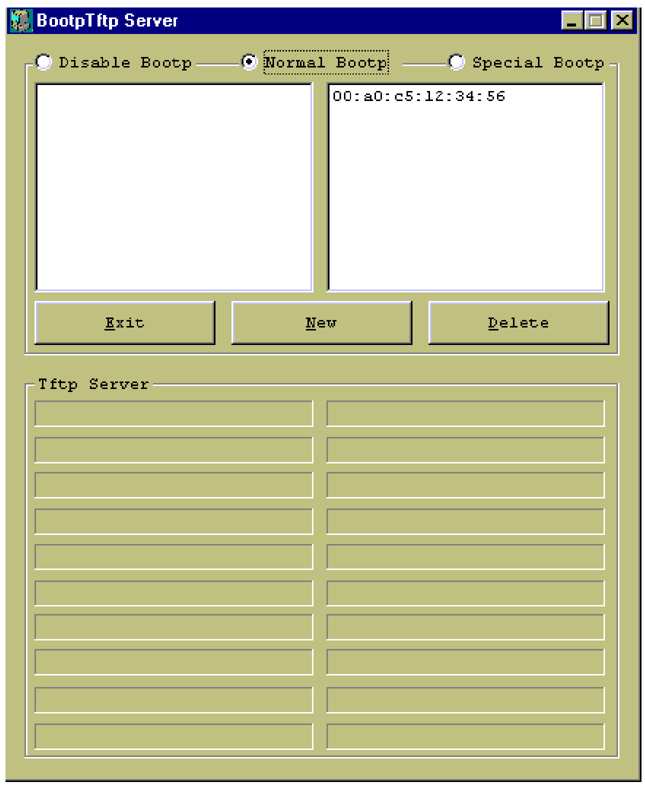


Figure 36-4 Enable BOOTP/TFTP

8. Restart the network module and press any key within three seconds to get the following screen.

```
SDRAM Testing ...
Mac address 00:A0:C5:12:34:56
```

Figure 36-5 Enter Debug Mode

9. Press any key at the "`Press any key within 3 seconds to enter debug mode` ...." message, to enter the debug mode.

10. Enter `atnb` at the network module boot console.
11. Wait for the firmware upload to finish.
12. Use the following command sequence on the network module to write new firmware to flash memory.

```
192.168.1.1> flashfs
192.168.1.1 flashfs> wipe
192.168.1.1 flashfs> update
```

13. Wait for the update to complete and then restart the network module.

Chapter 37 Troubleshooting

This chapter covers potential problems and possible remedies. After each problem description, some steps are provided to help you to diagnose and to solve the problem.

37.1 SHDSL or ADSL LED(s)

An SHDSL or ADSL LED is not on.

Table 37-1 Troubleshooting the DSL LED(s)

STEPS	CORRECTIVE ACTION
1	Make sure the DSL port is enabled and properly configured (refer to *Chapter 25* and *Chapter 24*).
2	Connect a DSL modem directly to the DSL port of the network module using a different telephone wire. If the LED turns on, go to step 4.
3	Check to see that the settings in the DSL modem or router match those of the DSL port (refer to *Chapter 25* and *Chapter 24*). If the DSL LED stays off, there may be a problem with the port. Contact the distributor.
4	Take the DSL modem to the subscriber's location. If the DSL LED stays off, check for a problem with the telephone wiring that connects to the subscriber.

37.2 Data Transmission

The SHDSL or ADSL LED is on, but data cannot be transmitted.

Table 37-2 Troubleshooting Data Transmission

STEPS	CORRECTIVE ACTION
1	Check to see that the VPI/VCI settings in the subscriber's DSL modem or router match those in the network module (refer to *sections 25.3.19* and *24.3.24)*. Also make sure that it is using RFC 1483 encapsulation, bridge mode and LLC- based multiplexing.
2	Make sure that the network module's IP settings are configured properly (refer to *Chapter 33*).
3	Check the VLAN configuration of the network module (refer to *Chapter 28*).
4	Check the Ethernet type filter configuration (refer to *28.5.6*).
5	Check the IEEE 802.1X port-based authentication configuration (refer to *30.2.3*).
6	Ping the network module from the subscriber's computer.
7	If you cannot ping, connect a DSL modem to a DSL port (that is known to work) on the same network module. If the DSL modem or router works with a different DSL port, there may be a problem with the original port. Contact the distributor.
8	If using a different port does not work, try a different DSL modem or router with the original port.

37.3 SHDSL or ADSL LED(s) Turn On and Off

An SHDSL or ADSL LED turns on and off intermittently.

Table 37-3 Troubleshooting a Non-Constant DSL LED

STEPS	CORRECTIVE ACTION
1	Use the `lineinfo` command with G.SHDSL (refer to *25.3.6*) or the `linerate` command with ADSL (refer to 24.3.9) to check the subscriber's telephone wiring.
2	Connect a DSL modem directly to the DSL port of the network module using a different telephone wire. If the DSL LED still turns on and off repeatedly, contact the distributor.

37.4 Data Rate

The SYNC-rate is not the same as the configured rate.

Table 37-4 Troubleshooting the SYNC-rate

STEPS	CORRECTIVE ACTION
1	Connect the DSL modem or router directly to the DSL port of the network module using a different telephone wire. If the rates match, the regular phone wire quality may be limiting the speed to a certain rate (see section *25.2*).
2	Use the `lineperf` command to check the subscriber's regular telephone wire (refer to section *24.3.8* with the AAM1008 or section *25.3.7* with the SAM1008). If they do not match when a good wire is used, contact the distributor.

37.5 Port Bonding

A bonded port's LED is off or the `list ports` command (see section *25.3.9*) shows a bonded port with a dropped status.

Table 37-5 Troubleshooting Port Bonding

STEPS	CORRECTIVE ACTION
1	Check the transmission rate setting of the port's profile. It is recommended that you set all of the bonded ports on both ends (central and remote) to use the same profile settings.
2	Use the `lineperf` command (refer to section *25.3.7*) and note the fastest transmission rate of the members of the port bonding group. You will need this information if you do step 6.

Table 37-5 Troubleshooting Port Bonding

STEPS	CORRECTIVE ACTION
3	Swap the telephone wiring between the non-transmitting port and one of the bonded group's transmitting ports. For example, SHDSL ports 1 and 2 are bonded. Port 2 is transmitting but port 1 is being dropped. Connect port 2's telephone wire to port 1 and port 1's telephone wire to port 2. If port 1 does not transmit when using port 2's telephone wire, there may be a problem with port 1. Contact the distributor. If port 1 transmits when using port 2's telephone wire (and port 2 does not transmit when using port 1's telephone wire), there may be a problem with port 1' s original telephone wire or the port at the other end of the connection. Go to the next step.
4	Check the other end of the connection. Swap the telephone wiring between the non-transmitting port and one of the bonded group's transmitting ports. For example, SHDSL ports 1 and 2 are bonded. Port 2 is transmitting but port 1 is being dropped. Connect port 2's telephone wire to port 1. If port 1 does not transmit when using port 2's telephone wire, there may be a problem with port 1. Contact the distributor. If port 1 transmits when using port 2's telephone wire (and port 2 does not transmit when using port 1's telephone wire), there may be a problem with port 1' s original telephone wire. Go to the next step.
5	Remove the port bonding group (see section 25.3.29).
6	Connect a DSL modem to the other end of the telephone wiring for the connection that was not transmitting. If the port's DSL LED does not turn on, there may be a problem with the telephone wiring. If the port's DSL LED turns on, use the `lineperf` command (refer to section *25.3.7*) again to determine the port's transmission rate. If the port's actual transmission rate (not just the configured transmission rate) does not come within 640 Kbps of the fastest transmission rate of the members of the port bonding group (you recorded this in step 2), the quality of the line may be too low.

37.6 Configured Settings

The network module's configured settings do not take effect at restart.

Table 37-6 Troubleshooting the Network Module's Configured Settings

CORRECTIVE ACTION
After you finish configuring the settings, remember to use the `config save` command to save your settings to the network module. If this does not work, contact the distributor.

37.7 Password

I forgot the password to my network module.

Table 37-7 Troubleshooting the Password

CORRECTIVE ACTION
Refer to section *36.2* to update your firmware. All settings will return to default values, so any configurations you have made will be lost.

37.8 Local Server

The computer behind a DSL modem or router cannot access a local server connected to the IES-1000.

Table 37-8 Troubleshooting a Local Server

STEPS	CORRECTIVE ACTION
1	Refer to section *37.2* to make sure that the subscriber is able to transmit to the IES-1000.
2	Make sure the computer behind the DSL device has the correct gateway IP address configured.
3	Check the VLAN configuration of the Ethernet port on the network module (refer to *Chapter 28*).
4	Check the cable and connections between the IES-1000 and the local server.
5	Try to access another local server. If data can be transmitted to a different local server, the local server that could not be accessed may have a problem.

37.9 SNMP

The SNMP manager server cannot get information from the network module.

Table 37-9 Troubleshooting SNMP

STEPS	CORRECTIVE ACTION
1	Ping the network module from the SNMP server. If you cannot, change the cable or IP configuration (see *Chapter 33*).
2	Check to see that the community (or trusted host) in the IES-1000 matches the SNMP server's community. If these steps fail to correct the problem, contact the distributor.

37.10 Telnet

I cannot telnet into the network module.

Table 37-10 Troubleshooting Telnet

STEPS	CORRECTIVE ACTION
1	Make sure that a telnet session is not already operating. The network module will only accept one Telnet session at a time.
2	Ping the network module from your computer. If you are able to ping the network module but are still unable to telnet, contact the distributor. If you cannot ping the network module, check the IP addresses in the network module and your computer. Make sure that both IP addresses are located in the same subnet (refer to *Chapter 33*).

Table 37-10 Troubleshooting Telnet

STEPS	CORRECTIVE ACTION
3	If you are attempting to telnet from the DSL side of the network module, refer to section *37.2* to make sure that you can transmit data to the network module.
4	If you are attempting to telnet from the Ethernet side of the network module, check the Ethernet cable.
5	Make sure that the network module’s IP settings are configured properly (refer to *Chapter 33*). If these steps fail to correct the problem, contact the distributor.

37.11 Ethernet Port

Use the following commands if the Ethernet port connection repeatedly goes down without any logical explanation.

37.11.1 Ethernet Device Driver Test Command

Syntax:

```
192.168.1.1 edd> test <ip>
```

`where`

`<ip> =` The IP address of the device that you want the Ethernet port to continuously ping. Use 0.0.0.0 to stop the test.

The `test` command sets the network module’s Ethernet port to ping the specified IP address every ten seconds. If there is no ping response after the timeout period expires (see the `set timeout` command), the IES-1000 performs a physical reset on the network module’s Ethernet port.

37.11.2 Ethernet Device Driver Set Timeout Command

Syntax:

```
192.168.1.1 edd> set timeout <# of minutes>
```

`where`

`<# of minutes> =` The number of minutes you want the IES-1000 to wait for a response to a test ping. The default number of minutes is 30 and the minimum is 1.

The `set timeout` command sets how long the IES-1000 is to wait for a response to a test ping before performing a physical reset on the network module’s Ethernet port.

Part VI:

Appendices and Index

This part gives appendices and an index.

Appendix A
Safety Warnings

- Refer to the *Hardware Specifications appendix* for the gauge of wire to use for each connection.
- The length of exposed (bare) IES-1000 power wire should not exceed 7mm.
- Do not use this product near water, for example, in a wet basement.
- Only a qualified technician should service or disassemble this device.

Appendix B
Removing and Installing a Fuse

This appendix shows you how to remove and install fuses for the AC power IES-1000.

The AC power IES-1000 uses one 250V-3A fuse. The IES-1000 comes with two 250V-3A fuses; one is installed at the factory (in the fuse housing) and the other is a spare (also located inside the fuse housing). If you need to install a new fuse, follow the procedure below.

Before you begin, you will need:

- A small flat head screwdriver
- A 250V 3A fuse
- Good lighting

Removing and Installing Fuses

Removing Fuses

Safety first! Disconnect all power from the IES-1000 before you begin this procedure.

Step 1. Place the front panel of the IES-1000 in front of you.

Step 2. Remove the power cord for easy access to the fuse housing.

Step 3. Using a small flat head screwdriver, gently pry open the right side of the fuse housing (located to the left of the power cord port receptacle) as shown next.

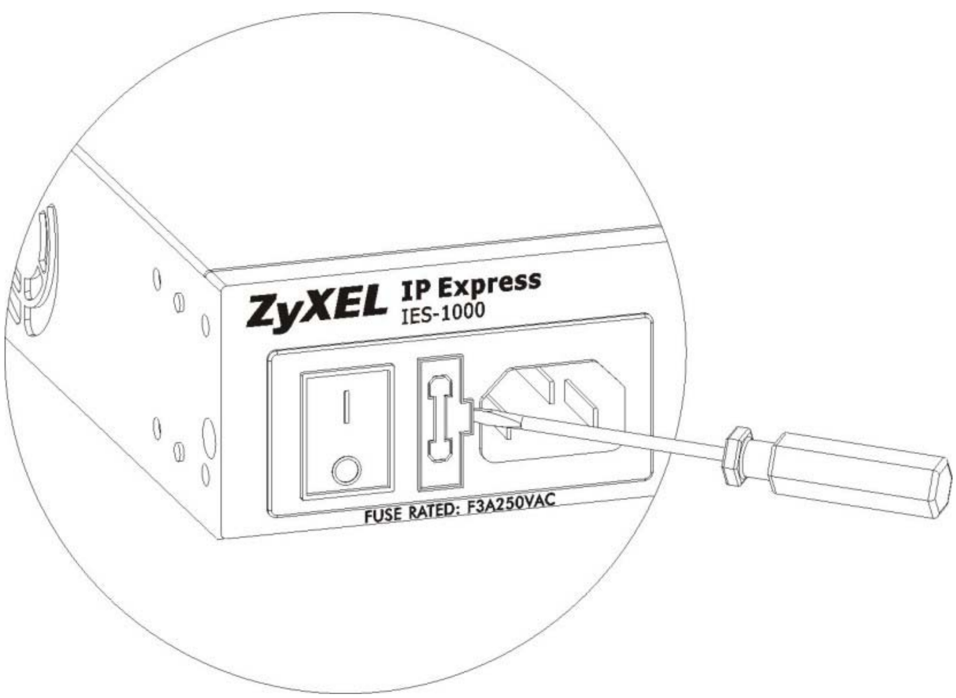


Diagram 1 Opening the Fuse Housing

Step 4. Gently pull the fuse casing from the IES-1000. The installed fuse is located attached to, and on the outside of the fuse housing; the spare fuse is located inside the fuse housing.

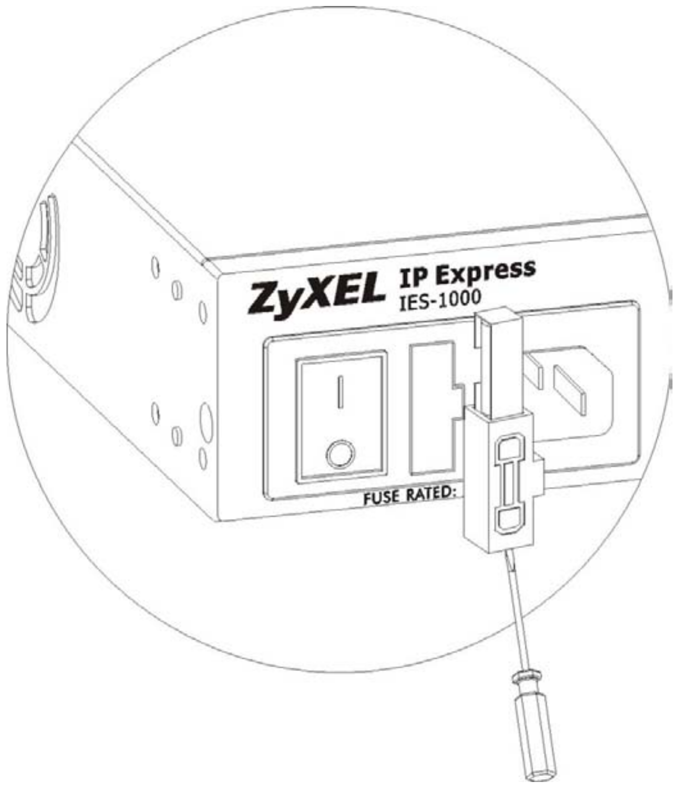


Diagram 2 Accessing the Spare Fuse

Step 5. Remove the burnt-out fuse from the IES-1000. A burnt-out fuse is blackened, darkened or cloudy inside its glass casing. A working fuse has a completely clear glass casing. Dispose of the burnt-out fuse.

Installing Fuses

Step 1. After removing the burnt-out fuse, gently push the replacement fuse into the same location as the old fuse until you hear a click.

Step 2. Firmly, but gently, push the fuse housing back into the IES-1000 housing until you hear a click.

Step 3. Plug the power cord back into the IES-1000.

Appendix C
Pin Assignments

Mini RJ-11 4P4C (Console Port) Pin Assignments

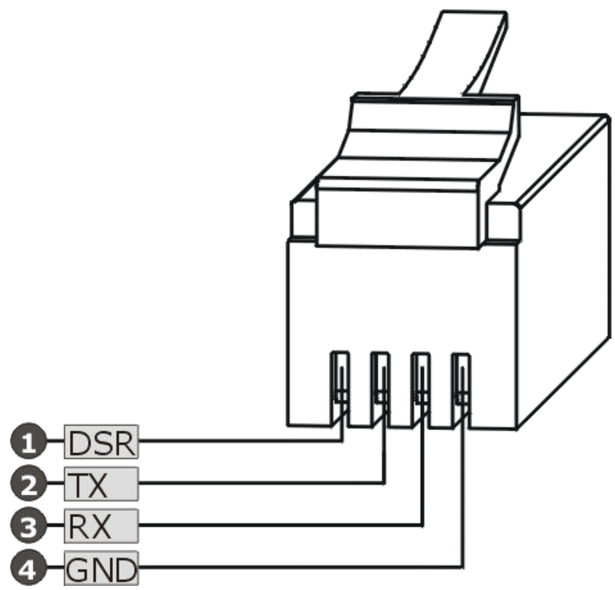


Diagram 3 RJ-11 4P4C (Console Port) Pin Assignments

RJ-11 6P2C (SHDSL Ports on the SAM1008 and ADSL USER or CO Ports on the AAM1008) Pin Assignments

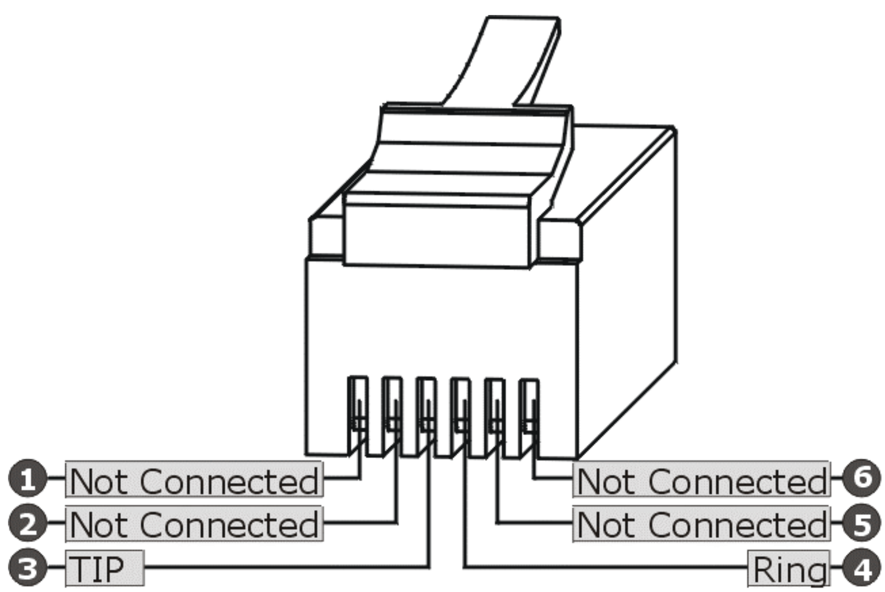


Diagram 4 RJ-11 6P2C (SHDSL Port) Pin Assignments

Note that a 2, 4 or 6 pin connector can be used with this port provided pins 3 and 4 connect to a SAM1008 SHDSL port.

RJ-45 (LAN Port) Pin Assignments

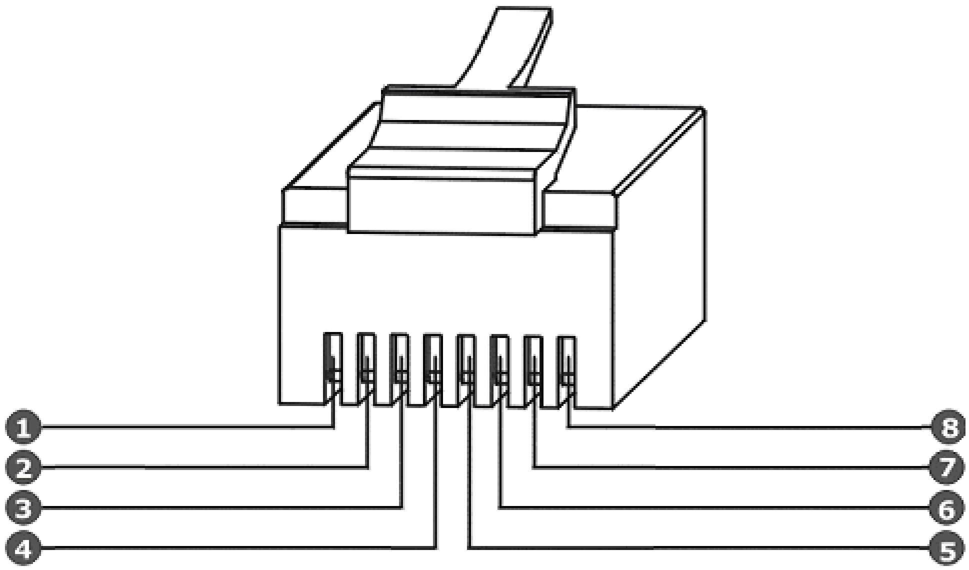


Diagram 5 RJ-45 (LAN Port) Pin Assignments

1 = TX+	8 = Not Connected
2 = TX-	7 = Not Connected
3 = RX+	6 = RX-
4 = Not Connected	5= Not Connected

Appendix D
Hardware Specifications

Physical Interfaces

IES-1000

- Two slots for a total of up to two hot-swappable DSL network modules
- Power receptacle
- 19" 1U rack-mountable, wall-mountable unit
- Each network module has one mini RJ-11 console port for local configuration and management

SAM1008 G.SHDSL Network Module

- Eight RJ-11 6P2C interfaces for G.SHDSL service that conform to the G.991.2 standard
- One mini-RJ-11 4P4C interface for local console connection
- One RJ-45 10/100Base-TX auto-negotiation interface. This Fast Ethernet port is compliant with IEEE802.3 and IEEE802.3u standards
- LED indicators for system status, overheat warning (ALM), 10/100M Ethernet (LAN) and G.SHDSL interface status

AAM1008 ADSL Network Module

- Eight RJ-11 6P2C interfaces for ADSL service
- One mini-RJ-11 4P4C interface for local console connection
- One RJ-45 10/100Base-TX auto-negotiation interface. This Fast Ethernet port is compliant with IEEE802.3 and IEEE802.3u standards
- LED indicators for system status, overheat warning (ALM), 10/100M Ethernet (LAN) and ADSL interface status

Other Hardware Features

- Built-in fans
- Temperature sensors for temperature monitoring
- Surge protection to prevent lightening damage

Dimensions

440mm (W) x 320mm (D) x 44.45mm (H)

Weight

- One AC power IES-1000 (no modules) = 4 kg
- One DC power IES-1000 (no modules) = 5 kg
- One SAM1008 = .8 kg

- One AAM1008 = 1.1 kg

Wire Gauge Specifications

Chart 1 Wire Gauge Specifications

WIRE TYPE	REQUIRED AWG NO. (DIAMETER)
Telephone Wire	26 or larger
DC Power Model IES-1000 Power Wire	16 to 18

American Wire Gauge (AWG) is a measurement system for wire that specifies its thickness. As the thickness of the wire increases, the AWG number decreases.

AC Power Model Power Source

100-240VAC/1A, 50/60Hz

DC Power Model Power Source

36~72VDC /75Watt

AC Power Model Power Consumption

- 60 watts maximum
- 100-240VAC/1A, 50/60Hz

AC Power Model Fuse Rating

T3A 250VAC

DC Power Model Fuse Rating

T4A 250VDC

Operating Environment

- Temperature: 0ºC — 50ºC
- Humidity: 5% — 95%

Storage Environment

- Temperature: -25ºC — 70ºC
- Humidity: 5% — 95%

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