IntraChassis 9000
Ethernet Switch

User's Manual

Copyright Notice

Trademarks

FCC Information

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

Operation of this equipment in a residential area is likely to cause interference, in which case, the user, at his or her own risk and expense, will be required to correct the interference.

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Subject to the limitations and exclusions below, Asanté warrants to the original end user purchaser that the covered products will be free from defects in title, materials and manufacturing workmanship for a period of five years from the date of purchase. This warranty excludes fans, power supplies, non-integrated software and accessories. Asanté warrants that the fans and power supplies will be free from defects in title, materials and manufacturing workmanship for one year from date of purchase. Asanté warrants that non-integrated software included with its products will be free from defects in title, materials, and workmanship for a period of 90 days from date of purchase, and the Company will support such software for the purpose for which it was intended for a period of 90 days from the date of purchase. This warranty expressly excludes problems arising due to compatibility with other vendors products, or future compatibility due to third party software or driver updates.

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Contents

1
Introduction

This chapter introduces the IntraChassis 9000 architecture, then gives a description of the chassis and the various modules that can be installed in it. There are also tables of the key features, default settings, and specifications of the IntraChassis 9000, and explanations of the different LED indicators used by the various modules.

IntraCore Architecture Overview

Asanté has developed the IntraCore™ Architecture to meet the needs of multi-service networks that support all applications and data types. The architecture is standards-based and provides

- ❑ multi-vendor inter operability
- ❑ a migration path from current systems
- ❑ investment protection

With the IntraCore Architecture, Asanté has found innovative ways of embracing industry standards and technology advances to create products capable of meeting real world requirements for converged, multi-service networks.

The overall design incorporates a family of tightly integrated ASICs, designed as system building blocks. These building blocks enable the rapid development of advanced networking systems that are timed to meet market requirements. The architecture ensures consistent high performance as systems scale their capacity and feature capability. This approach extends the useful life of the system and protects customer investments.

The Core Switching Engine

The Core Switching Engine is the centerpiece for all IntraCore products. Based on advanced silicon ASICs, the Core Switching Engine is a high performance, non-blocking, multi-gigabit switching fabric with scalable bandwidth capacity. The Core Switching Engine is data format independent and can support either frame or cell based interfaces. This capability is becoming increasingly

important as enterprise (primarily frame-based) and service provider (primarily cell-based) networks move closer together.

Infrastructure Connectivity

The second key element of the architecture is Infrastructure Connectivity. IntraCore specifies standards based, high performance, cost effective technologies for connectivity among devices in the network.

In the LAN –

At the network edge, Layer 2 switched 10/100/1000 Ethernet meets the requirements for high-speed connectivity of desktop computers and scalable, cost effective data transmission for trunks to the network core.

In the network core, Layer 2/3+-switched 10/100/1000 Ethernet meets the requirements for high speed, scalable, cost effective data transmission and support for all multi-service data types. High performance servers can be centrally located for added physical security.

Throughout the LAN, advanced queuing techniques combined with multiple priority levels and support for industry standard 802.1Q and 802.1p enable Quality of Service within the network.

In the MAN/WAN –

Long haul Gigabit Ethernet, ATM, and Packet over SONET meet the requirements for all of the following:

- ❑ scalable, cost effective data transmission
- ❑ support for all multi-service data types
- ❑ service provider inter operability

Network Management, Security, Performance, and Control

IntraCore includes a rich suite of features required for the effective management, security, performance and control of the network. The following table illustrates the features and standards supported as part of this section of the overall architecture.

Feature	Manage-ment	Security	Perfor-mance	Control
Web Browser Management	Supported			
SNMP, RMON	Supported		Supported	Supported
Standard MIsS	Supported		Supported	Supported
802.1P Priority			Supported	Supported
802.1Q VLAN Tagging	Supported		Supported	Supported
802.1D – Spanning Tree		Supported	Supported	Supported
IGMP V1, V2 Snooping			Supported	Supported
RSVP Snooping			Supported	Supported
GARP Multicast Registration			Supported	Supported
Duplicate IP addr. detection	Supported	Supported		
Station movement notification	Supported	Supported		
IP to MAC address binding	Supported	Supported		
Controlled management access		Supported		
GVRP (Group VLAN Registration Protocol)	Supported		Supported	Supported
Advanced Port Configuration: Broadcast & Multicast rate limit & port priority	Supported		Supported	Supported
Policy management: IntServ (RSVP), DiffServ, COPS	Supported	Supported	Supported	Supported
Directory services: DNS, DHCP, LDAP	Supported	Supported	Supported	Supported

Table 1-1 Summary of IntraCore's supported features

The IntraCore Product Family

The Asanté IntraCore architecture is the basis for a family of switching system products in fixed, stackable and chassis form factors that allow customers to integrate telephony, video and data applications. Initially two systems will be offered that provide high performance, high port count Layer 2 switching. Additional configurations will be introduced to offer advanced Layer 3 and above routing, traffic classification, advanced QoS, higher bandwidth and port capacity. All systems will be consistent in their operation and management allowing customers to seamlessly deploy any model in their network.

Edge Switches

Providing the first point of connectivity to the network are the Edge Switches. These connect to an Enterprise switch in the network core and provide aggregation of traffic from desktop computers over high capacity trunks. The initial product introduced in the Edge Switch category is the IntraStack 8000.

The IntraStack 8000 is a stackable, high performance solution for enterprise edge applications. Each stack supports up to 192 10/100Mbps switched Ethernet connections for cost-effective high-density connectivity in wiring closets. The system can operate as a stand-alone network or be used in combination with IntraChassis 9000 in the backbone.

Enterprise Switches

In the network core, Enterprise Switches are deployed to aggregate traffic from wiring closets and provide high-speed connectivity to network servers. Typically these switches are modular in form factor, and can be easily upgraded or reconfigured. This flexibility provides for customized configurations to meet a wide variety of requirements. The initial product introduced in this category is the IntraChassis 9000.

The IntraChassis 9000

The IntraChassis 9000 is a chassis based modular Gigabit Ethernet enterprise switch designed for either high density wiring closets or as the core of the network backbone. The system can support up to 192 10/100Mbps switched Ethernet or 16 switched Gigabit Ethernet connections. System modules offer choice in media and connector types to best suit existing wiring infrastructure systems.

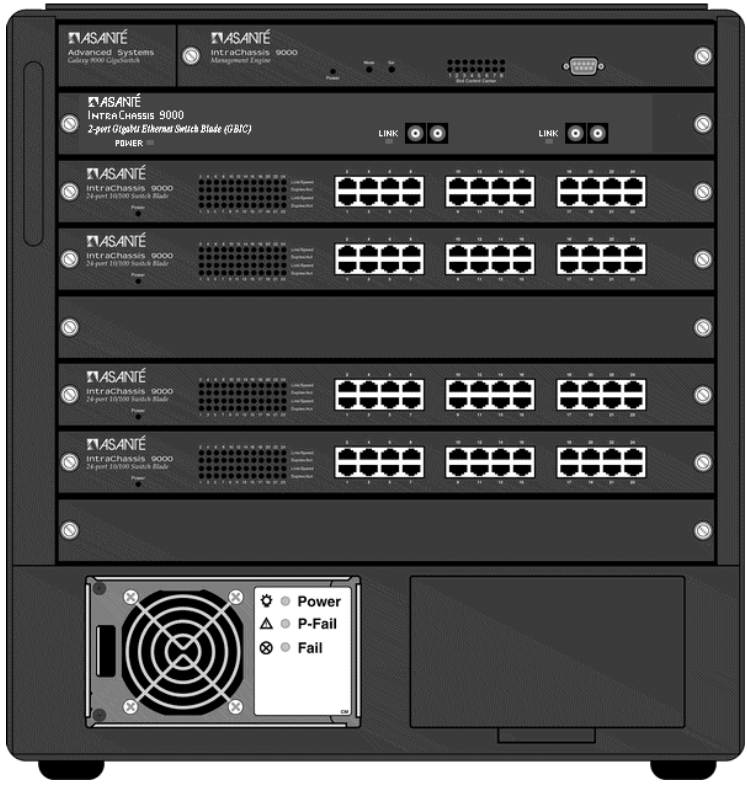


Figure 1-1 IntraChassis 9000 Front Panels

Modules

The following modules can be installed in the IntraChassis 9000 chassis.

Network Management Module

This module is included with the IntraChassis 9000 chassis, and provides management for it and all other modules you install. It occupies one slot, and has a single DB-9 port for the console. The module supports Telnet and Web

Browser management via industry standard SNMP with support for MIB II, RMON (four groups), Bridge MIB, and Asanté private MIBs.

Figure 1-2 Management Module

24-port 10/100 Switch Module

This module provides 24 ports supporting switched 100BaseTX or 10BaseT per port. Each module occupies a single slot and has either 24 RJ-45 connectors, or 2 RJ-21 connectors.

Figure 1-3 24-port 10/100 Switch Module

2-port Gigabit Ethernet Switch Module

This module provides slots for two switched Gigabit Ethernet ports. Each module occupies a single slot and has 2 GBIC interfaces, which accept Asanté or third party GBIC interfaces. The following subsections describe the possible GBIC interfaces.

Figure 1-4 2-port Gigabit Ethernet Switch Module

1000Base SX GBIC

This module provides a GBIC interface with SC-type fiber connectors. The interface supports 62.5 and 50 micron multimode fiber media. The 62.5 micron multimode fiber can be up to 260 meters long, and the 50 micron multimode fiber can be up to 525 meters long.

1000BaseLX Long Haul GBIC

This module provides a GBIC interface for SC-type fiber connectors. The interface supports 10 micron single mode fiber for distances up to 100 kilometers.

1000BaseLX GBIC

This module provides a GBIC interface for SC-type fiber connectors. The interface supports 10 micron single mode fiber for distances up to 3 kilometers.

Power Supply

One Power Supply is provided with the IntraChassis 9000. A second Power Supply can be added to provide additional power and redundancy for the other modules.

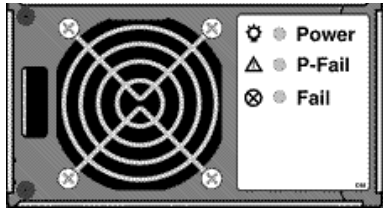


Figure 1-5 Power Supply

Features

The following table lists the major features of the IntraChassis 9000 switch.

Feature	Description
Media Flexibility	Expansion module options include 24-port 10/100 Base-TX switched Ethernet modules, 2-port Gigabit Ethernet modules with GBIC slots, and 24-port 10/100 Base-TX switched Ethernet RJ-21 modules for compatibility with existing wiring.
High Density	Supports up to 192 10/100 switched Ethernet ports or up to 16 switched Gigabit Ethernet ports in a single chassis. This saves space in crowded equipment rooms.
ASIC-Based Architecture	ASIC-based packet processing provides wire speed performance on all interfaces.
High Performance 16Gbps Backplane	The system supports current requirements for multi-service voice, video, and data applications with bandwidth to spare. The high-capacity backplane is designed so that it may be scaled up to 128Gbps, extending the useful life of the chassis.
Multiple Priority Queues	The "application aware" system ensures that mission critical applications get the bandwidth and priority they need, even under heavy traffic conditions. Low latency requirements are managed by the system when network congestion occurs.
Chassis Based Form Factor	The nine slot modular chassis allows configuration flexibility and cost effective network expansion. A wide variety of switched 10/100/1000 Ethernet interfaces are supported, with flexible media options to meet all network requirements. The IntraChassis 9000 can be configured as a high-density switch for campus wiring closets, or a high-capacity switch for Gigabit Ethernet backbones.
Configuration Flexibility and Growth	Expansion modules can be mixed and matched in any configuration and quantity to meet design requirements. You can add capacity only when your business requires it.
GBIC Modules for Gigabit Ethernet Media Flexibility	The two GBIC Gigabit Ethernet modules can be configured with any combination of 1000SX, 1000LX or 1000LX (Long Haul) GBIC interfaces. Either Asanté or third party GBIC interfaces can be used, and the interfaces can be "hot swapped." This means that GBIC interfaces can be re-deployed if equipment is retired.

Feature (Cont.)	Definition (Continued)
Reliability and Redundancy	For maximum uptime and minimum network disruption, the interface and management modules are hot-swappable. Configuration options include support for up to two load-sharing, hot-swappable power supplies.
Installation Options	The system can be rack-mounted to save space.
Security	Node summary tracks MAC and IP addresses per device, for multiple devices on each port. The New Node Detection feature provides per-port security, allowing the network manager to specify which MAC is authorized on each port. Only the device with that MAC address is allowed to connect to that specific port.
Web Based Management	Built-in Web-based interface is provided for chassis management, module management, port-level control, and monitoring. The IntraChassis 9000 can also be managed via Telnet, Console, or third party SNMP console.
VLANs	Supports up to 64 port-based VLANs (IEEE 802.1Q compliant) for security, logical network design, and the control of broadcast traffic. The 802.1Q standard specifies VLAN tagging for trunking VLANs from switch to switch, or switch to router. Compatible with all 802.1Q equipment for easy integration into existing networks.
Multicast Control	The IntraChassis 9000 supports standards based IGMP snooping and GMRP for control of multicast traffic generated by bandwidth-hungry applications like video, ensuring maximum application and network performance.
RMON	The administrator can use a RMON probe for in-depth traffic analysis, with support for four groups of RMON.
Spanning Tree Protocol	Spanning Tree Protocol (STP) detects and eliminates data loops to prevent broadcast storms from overwhelming your network.
Y2K compliance	All IntraChassis 9000 modules are Y2K compliant.

Table 1-2 IntraChassis 9000 Features

Defaults and Specifications

The IntraChassis 9000 is shipped with the following factory default settings and specifications:

Configuration	Default Setting
Backplane Speed	32Gbps.
Switching Method	Store-and-forward
Forwarding Rates: (64 byte packets)	Switched 10Mbps = 14,880 pps Switched 100Mbps = 148,810 pps Switched 1000Mbps = 1,488,100 pps
Buffer Size	4MB
MAC Address Table	8K
Full-Duplex	Standards based Auto-negotiation enabled
VLAN	64 port based VLANs, GVRP support, 802.1Q VLAN Tagging
Spanning Tree Protocol	802.1D, enabled
Flood Rate Limiting	Broadcast traffic
Priority	802.1Q, 8 levels mapped to 4 Queues
RMON	Groups 1-3, 9
SNMP	MIB-II, Bridge MIB, RMON MIB, Asanté private MIBs
Console Baud Rate	9600
Password	Asanté
Power Requirements	90 - 224 V, 50 - 60 Hz
Environmental Operating Range	Temperature: 0° - 45° C (Storage: -40° - 85° C) Relative Humidity: 5% - 95% non-condensing

Table 1-3 Defaults and Specifications

LEDs

The following indicator lights are used on the various modules of the IntraChassis 9000.

LED	Color and Meaning
Management Module	
Power	Green - Power is on when lit
Slot Control Center	Green - upper row - For future functionality Green - lower row - Module is installed in this slot.
Gigabit Switch (GBIC)	
Power	Green - Power is on when lit
Link	Green - connection and link has been made.
24-port 10/100 Switch	
Link/Speed	Green - Link at 100Mbps Amber - Link at 10Mbps
Duplex/Activity	Green -Full Duplex Amber - Half Duplex Blinking - Active
Power Module	
Power	Green - Power is available to IntraChassis 9000
P-Fail	Amber - Power is not available to module
Fail	Amber - Power module is not delivering power

Table 1-4 LEDs and their meanings

2
Installation and Set-up

This chapter explains how to install, connect, and configure the IntraChassis 9000 chassis and modules to work with your network. It also explains how to set up your IntraChassis 9000 for management, either from a console, via telnet, via SNMP, or by using a Web browser.

Installation Guidelines

The following guidelines will help you prepare to install your IntraChassis 9000 in such a way that it has the proper power supply and environment.

Safety Information

The following sections provide guidelines and procedures to help you install and use the IntraChassis 9000 safely.

Safety First

Use the following guidelines to ensure your safety and protect the equipment. This list is not inclusive of all potentially hazardous situations that you may be exposed to as you install the switch, so *be alert*.

- ❑ Never try to lift an IntraChassis 9000 chassis by yourself; two people are required to lift these switches.
- ❑ Always unplug all power cords before installing or removing a chassis or removing the chassis front panel.
- ❑ Keep the chassis area clear and free of dust during and after installation.
- ❑ Keep tools and chassis components off the floor and away from foot traffic.
- ❑ Avoid wearing jewelry (including rings and chains) or other items that could get caught in the chassis. Avoid wearing any loose clothing or securely fasten items such as ties, scarves, or sleeves.
- ❑ Install the system in compliance with the following local and national electrical codes:

- ❑ United States—National Fire Protection Association (NFPA 70); United States National Electrical Code
- ❑ Canada—Canadian Electrical Code, Part I, CSA C22.1
- ❑ Other countries—International Electrotechnical Commission (IEC) 364, Part 1 through Part 7

▲ **Important:** Take the following precautions when installing the IntraChassis 9000:

Only trained and qualified personnel should be allowed to install or replace this equipment.

This equipment is to be installed and maintained by service personnel only as defined by AS/NZS 3260 Clause 1.2.14.3 Service Personnel.

Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

Unplug the power cord before you work on a system that does not have an on/off switch.

Before installing the IntraChassis 9000, unplug the power cord.

Do not work on the system or connect or disconnect cables during periods of lightning activity.

Do not touch the power supply when the power cord is connected. Line voltages are present within the power supply when the power cord is connected.

Read the installation instructions before you connect the system to its power source.

This unit might have more than one power cord. To reduce the risk of electric shock, disconnect the two power supply cords before servicing the unit.

Do not stack the chassis on any other equipment. If the chassis falls, it can cause severe bodily injury and equipment damage.

Lifting the Chassis Safely

The IntraChassis 9000 is not intended to be moved frequently. Before you install the switch, ensure that your site is properly prepared so that you can avoid moving the chassis later to accommodate power sources and network connections.

Two people are required to lift the IntraChassis 9000. Whenever you lift the chassis or any heavy object, follow these guidelines:

- ❑ Never attempt to lift a chassis by yourself. The size and weight of a chassis requires two people to safely lift and move it without causing injury or damaging the equipment.
- ❑ Ensure that your footing is solid, and balance the weight of the chassis between your feet.
- ❑ Lift the IntraChassis 9000 slowly; never move suddenly or twist your body as you lift.
- ❑ Keep your back straight and lift with your legs, not your back. If you must bend down to lift the chassis, bend at the knees, not at the waist, to reduce the strain on your lower back muscles.
- ❑ Leave all switch and power modules in place once they are properly installed.
- ❑ Always disconnect all external cables before lifting or moving the chassis.

Safety With Electricity

The secondary power supply is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system. Before removing a redundant power supply, ensure that the other power supply is turned on.

Follow these basic guidelines when working with any electrical equipment:

- ❑ Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- ❑ Disconnect all power and external cables before installing or removing a chassis.
- ❑ Do not work alone when potentially hazardous conditions exist.
- ❑ Never assume that power has been disconnected from a circuit;

always check.

- ❑ Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ❑ Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.
- ❑ Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- ❑ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- ❑ Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Power Requirements

The source electrical outlet should be installed near the IntraChassis 9000 and easily accessible. It must also be properly grounded.

Make sure the power source adheres to the following guidelines:

- ❑ Voltage range: 100 to 240 VAC
- ❑ Frequency range: 60/50 Hz
- ❑ Maximum current: 10 A per power supply at 110 volts

Environmental Requirements

The IntraChassis 9000 must be installed in a clean, dry, dust-free area with adequate air circulation to maintain the following environmental limits:

- ❑ Temperature: 0° to 40° C (32° to 104° F)104°
- ❑ Relative Humidity: 5% to 85% non-condensing

Avoid direct sunlight, heat sources, or areas with high levels of electromagnetic interference.

Cooling and Airflow

Do not restrict air flow by covering or obstructing air vents on the sides of the chassis.

Installation Overview

The table below describes the steps needed to install the IntraChassis 9000. The steps that are optional are labeled “optional” and the steps that are required are labeled “required.” The sections that follow explain each step in detail.

Step	Action to Be Taken
1 (Required)	Open the box and check the contents. See the Package Contents sheet for a complete list of the items included with your IntraChassis 9000.
2 (Required)	Install the IntraChassis 9000 chassis in an equipment rack or wall rack, or prepare it for desktop placement. See page 2-5. **Important! When fully loaded, the IntraChassis 9000 can weigh over 100 lbs (45 Kg). Use proper lifting equipment and techniques to prevent back and other injuries.**
3 (Required)	Install the modules you have purchased for your IntraChassis 9000 and ensure each is properly seated and locked in place. See page 2-9.
4 (Optional)	Install a second power supply module and make sure it is properly seated in the chassis. See page 2-11.
5 (Required)	Connect the power supply or power supplies. See page 2-11.
6 (Required)	Connect the modules to your network cables. See page 2-12.
7 (Required)	Configure the IntraChassis 9000 for management capabilities. See page 2-13.

Table 2-1 Installation Overview

Rack Mounting/Desktop Placement

The IntraChassis 9000 chassis can be installed in a standard 19-inch equipment rack. It can also be placed on a stable horizontal surface with support capabilities of 150 pounds (68.2 kilograms).

▲ **Important:** The equipment rack or desk on which you install your IntraChassis 9000 *must* be secure and stable. Equipment racks must be fastened to the floor; desks must be resting on a flat, stable surface.

Equipment Rack Installation of the Chassis

To install the unit in an equipment rack, use the following procedure. Refer to Figure 2-1 below.

Safety Precautions for Rack Installation

- **Important!** Disconnect all cables from the IntraChassis 9000 before continuing. Also, do not install the modules you have purchased until the chassis has been installed in the rack. This will reduce the weight of the chassis during rack installation.
- **Important!** Before installing the chassis in a rack, read the "Safety Information" section earlier in this chapter to familiarize yourself with the proper site and environmental conditions. Failure to read and follow these guidelines could lead to an unsuccessful installation and possible damage to the system and components.
- **Important!** To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:
  - This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
  - When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.

Rack Guidelines

Guideline	Specification
Size	Width; 17.75 inches (45.09 cm). Depth: 19.25 inches (48.9 cm) to 32 inches (81.3 cm).
Stability	Rack must be bolted to the floor**.** Mount heavier units at the bottom of the rack, and mount the IntraChassis 9000 at the bottom of the rack if it is the only unit mounted; this will ensure that the rack does not become top-heavy. If the rack has stabilizing devices, make sure they are installed before mounting the IntraChassis 9000.

Guideline	Specification
Ventilation	Ensure that the rack is installed in a room where the temperature remains below 40° C (104° F). Ensure also that there are no obstructions, such as other equipment or cables, blocking airflow to or from the IntraChassis 9000 vents.
Clearance	In addition to providing clearance for ventilation, ensure that there is adequate clearance for servicing the modules of the IntraChassis 9000 from the front.

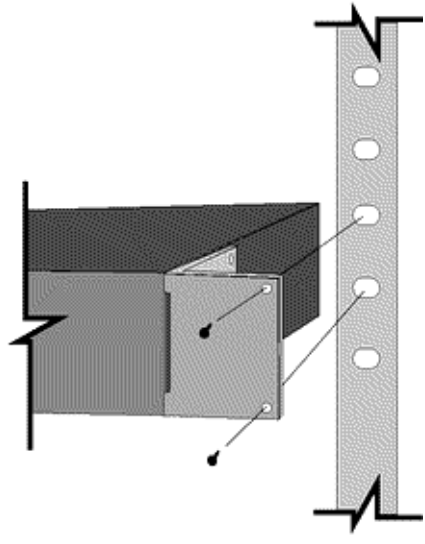


Figure 2-1 Mounting rack bracket on the IntraChassis 9000 chassis

1. Place the IntraChassis 9000 chassis on a flat, stable surface.
2. Locate a rack-mounting bracket (supplied) and place it over the mounting holes on one side of the unit.
3. Insert five screws (supplied) into the holes and tighten with a Phillips screwdriver. Do not use less than six screws for this mounting.
4. Repeat the two previous steps for the unit's other side.

5 Place the unit in the equipment rack.

▲ **Important!** When fully loaded, the IntraChassis 9000 can weigh over 100 lbs. Use proper lifting equipment and techniques, as described in "Lifting the Chassis Safely" earlier in this chapter, to prevent back and other injuries.

6 Secure the unit by screwing its mounting brackets to the equipment rack. Use a minimum of six {right?} screws for this purpose.

▲ **Important!** Make sure the unit is supported until all the mounting screws for each bracket are secured to the equipment rack. Failure to do so could cause the unit to fall, resulting in personal injury or damage to the unit, or both.

7 Proceed to the "Cable Guide Installation" section.

Free-Standing/Desktop Installation of the Chassis

The IntraChassis 9000 chassis has four rubber feet on the bottom of the chassis that allow for free-standing installation of the unit.

For free-standing/desktop placement:

1 Attach the four rubber pads (supplied) to the bottom of each corner of the IntraChassis 9000 chassis.

2 Place the unit on a flat surface with a minimum area of 17.1" x 13.5" (434.3 mm x 342.9 mm) and support capacity of 150 lbs (68.2 kg).

3 Make sure there is enough ventilation space between the IntraChassis 9000 and surrounding objects.

4 Proceed to "Cable Guide Installation" below.

Cable Guide Installation

Before installing any of the modules in your IntraChassis 9000, place the cable guide hook units on each side of the front panel and attach them with the screws provided. Make sure you install the guides in such a way that the hooks open upward.

Installing Modules

Up to eight IntraChassis modules can be installed in the IntraChassis 9000 chassis, in addition to the Management Engine module, which is pre-installed in the factory.

Before installing any modules, make sure the cable guides have been installed, as explained in the previous section of this chapter.

To install any combination of 2-port Gigabit Ethernet Switch (GBIC) modules and 24-port 10/100 Switch modules, use the following procedure.

▲ **Important:** Make sure the IntraChassis 9000 chassis is properly installed in an equipment rack or resting on a flat, stable surface capable of supporting 150 pounds (68.2kg). Also make sure the power cord for the power module is disconnected for initial installation.

1 Pull the small ejector lever on each end of the module's face plate out, away from the face plate.

2 Align the bottom of the module with the rails on the inside of the chassis slot where you want to install the module, as shown in Figure 2-2.

3 Slide the module into the slot until it stops, then push the module in gently until it seats with the connector.

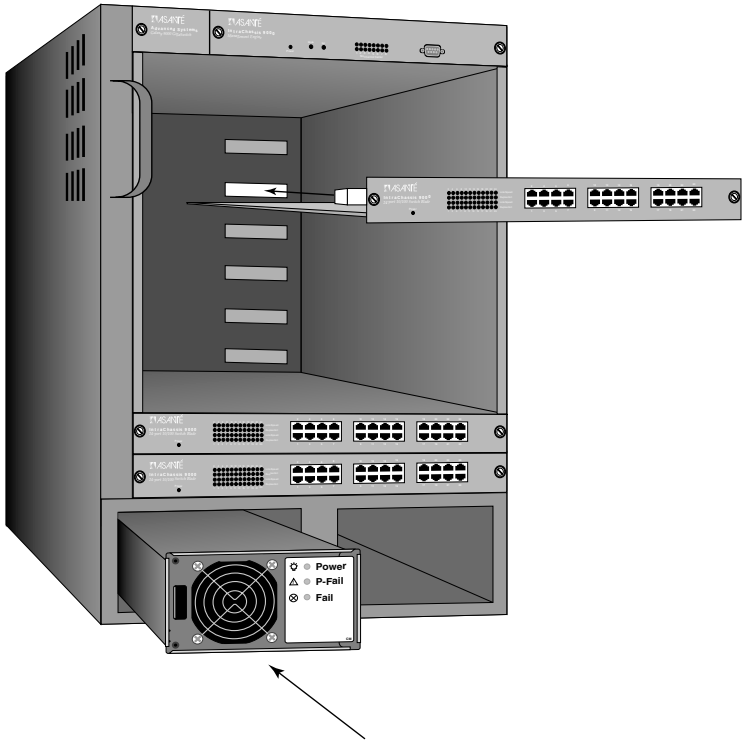


Figure 2-2 Installing module and power supply

4 Press both ejector levers in, toward the module's face plate, simultaneously. This will lock the module in place and insure proper contact of all connecting surfaces.

5 Tighten the thumbscrews at the ends of the module's face plate, next to the ejector levers. Use a straight-bladed screwdriver, so the thumbscrews cannot be loosened by hand.

Installation of the module is complete. Repeat this procedure for each module you have purchased, then proceed to "Connecting Power".

▲ **Important:** Modules are not to be removed from the Intra-Chassis 9000 except by a qualified System Administrator.

Installing GBIC Interfaces

If you have installed modules for GBIC interfaces, install each interface itself by sliding it into the port, until the locking tabs on either side of the GBIC interface unit click into the locked position. You can then connect the SC-type fiber media.

To remove a GBIC interface, squeeze the locking tabs against the sides of the unit until they release it, then slide the interface out of the port.

Installing Second Power Supply

To install a power supply module in your IntraChassis 9000, first loosen and undo the thumbscrew holding the cover plate, then remove the plate and slide the second power supply into the chassis from the front, as shown in Figure 2-2. Tighten the thumbscrew to hold the power supply firmly in place.

Connecting Power

To connect power to the IntraChassis 9000, use the following procedure.

▲ **Important:** Carefully review the power requirements on page 2-4 before connecting power to the IntraChassis 9000.

1 If you have purchased a second power supply, insert it in the bay provided at the bottom of the IntraChassis 9000 chassis, as shown in Figure 2-2.

2 Plug one end of the supplied power cord into the power connector on the back of the unit.

3 Plug the other end into a grounded AC outlet.

▲ **Important:** If the power does not come on, refer to Appendix A, “Troubleshooting.”

The IntraChassis 9000 is ready for connection to the network.

Connecting to the Network

The IntraChassis 9000 unit may be connected to an Ethernet network, with the unit powered either on or off. Use the following procedure to make your network connections.

1. Connect network devices to the IntraChassis 9000, following the cable guidelines outlined below.
2. Route the cables through the cable supports at the ends of each module, to keep cables from the different modules from interfering with each other.
3. After the unit is connected to the network, it can be configured for management capabilities. See "Configuring for Management" later in this chapter.

10/100BaseX Ports Cabling Procedures

The 24 fixed ports on each 10/100 module allow for the connection of 10Base-T or 100Base-TX network devices. The ports are compatible with IEEE 802.3 and 802.3u standards.

▲ **Important:** The IntraChassis 9000 must be located within 100 meters of its attached 10Base-T or 100Base-TX devices.

Connecting To	Cable Required
Network Station	Category 5 UTP (Unshielded Twisted-Pair) straight-through cable (100 meters maximum) with RJ-45 connectors.
Repeater/Hub	Category 5, UTP cross-over cable (100 meters maximum) with RJ-45 connectors.
Repeater/Hub's Uplink port	Category 5, UTP straight-through cable (100 meters maximum) with RJ-45 connectors.

Table 2-2 10/100BaseTX cabling requirements

1000BaseX Ports Cabling Procedures

Cabling requirements for the 2-port Gigabit Ethernet modules depend on which type of GBIC interface has been installed. Use the following chart to determine the cabling requirements for your GBIC.

Connecting To	Cable Required
1000BaseSX GBIC	Cables with SC-type fiber connectors: 62.5 micron multimode fiber media up to 260 meters long, or 50 micron multimode fiber media up to 525 meters long.
1000BaseLX Long Haul GBIC	Cables with SC-type fiber connectors: 10 micron single mode fiber media up to 100 kilometers long.
1000BaseLX GBIC	Cables with SC-type fiber connectors: 10 micron single mode fiber media up to 3 kilometers long.

Table 2-3 1000BaseX cabling requirements

Configuring for Management

To use the IntraChassis 9000 as a managed switch, it must be configured with an IP address. This can be accomplished in one of two ways:

- ❑ automatically using BootP (default)
- ❑ manually via the unit's Console port

BootP Configuration

The IntraChassis 9000 is shipped with BootP support. BootP allows the IntraChassis 9000 to be automatically configured with an IP address when it is connected to the network and is powered on, if your network contains a BootP server configured with available, valid IP addresses. Use the following procedure to set up BootP.

▲ **Important:** BootP configuration only works if the IntraChassis 9000 does not have an IP address assigned to it.

1. Make sure your network has a BootP server configured with a valid IP address entry for the IntraChassis 9000.
2. When the IntraChassis 9000 is connected to the network and is powered on, it automatically transmits a BootP request across the network (up to 10 times) until it receives a valid IP address from the BootP server.
3. After an IP address is received, the IntraChassis 9000 can be managed via in-band access. See Chapter 3, "Basic Configuration" for more information.

To verify that a valid IP address was received, try to 'ping' the IntraChassis 9000; if you can access the IntraChassis 9000, it is properly configured with an IP address.

See "Bootstrap Configuration" in Chapter 3 for more information on using BootP.

Connecting To a Console

Use the following procedure to make the cable connection from a terminal to the console port on the Management Engine of the IntraChassis 9000.

1. Using a **straight-through** RS-232 cable with a 9-pin male D-subminiature plug at one end, connect a terminal or workstation (PC or Macintosh) running a terminal emulator to the Console port on the front of the IntraChassis 9000.
2. Make sure both units are powered on.

   If using a PC with a terminal emulator, make sure it is configured with the following terminal settings:

   - ❑ Baud: 9600
   - ❑ Data Bits: 8
   - ❑ Parity: None
   - ❑ Stop Bits: 1
   - ❑ Flow Control: None
3. Once connected, the Local Management Main Menu appears on the terminal screen.

For further information on setting an IP address for configuration of a terminal, or a PC running a VT100 terminal or emulator (such as HyperTerminal, ProComm, or ZTerm), see "System IP Configuration" in Chapter 3.

Management Options

The IntraChassis 9000 can be managed using any of the following methods:

Method	Type	Description
Console	Out-of-band management	Local connection to the IntraChassis 9000 via the Console port
Telnet (**four** sessions maximum)	In-band management	Remote connection over the network to the IntraChassis 9000 via Telnet session
HTTP Server	In-band management	Remote connection to the IntraChassis 9000 via a Web browser
SNMP-Based Network Management Software	In-band management	Remote connection to the IntraChassis 9000 via any SNMP-based network management application

Table 2-4 Management Methods

The remaining sections of this chapter describe how to connect to the IntraChassis 9000 using either out-of-band or in-band management.

Out-of-Band Management

Out-of-band network management allows you to configure, manage, and monitor the IntraChassis 9000 and all of the installed modules. You can perform these functions by attaching a terminal (or a terminal emulator) to the Console port on the management engine and using the menu-driven **Local Management Interface.**

Out-of-band network management is guaranteed even when the in-band Ethernet network is down.

To access the IntraChassis 9000 Local Management Interface using out-of-band management, first follow the procedure in “Connecting To a Console” and then go on to the “Management Interface” section, later in this chapter.

In-Band Management

In-band network management allows you to manage, control, and monitor the IntraChassis 9000 over the Ethernet network.

You can perform these functions by accessing the IntraChassis 9000 via any of the following methods:

- ❑ By connecting with a Telnet program and using the **Local Management Interface**.
- ❑ By connecting with any World Wide Web browser, and using the Web Management Interface.
- ❑ By connecting with any SNMP-based network management application and using its interface.

To manage the IntraChassis 9000 via in-band management, use the following procedure.

1. Make sure the network to which the IntraChassis 9000 is connected is functioning.
2. Make sure the IntraChassis 9000 is configured with valid IP information.

   See "Configuring for Management" earlier in this chapter.
3. Connect to the IntraChassis 9000 via Telnet, with a Web browser, or with any SNMP-based network management application.

Telnet

Use a network connection to any PC and enter the **`telnet`** command to access the IntraChassis 9000. The Main Menu of the Management Interface will appear. Go on to the "Management Interface" section below.

- ◆ *Note:* Almost all management screens using a Telnet connection are identical to those of the out-of-band Console Interface. On the Main Menu, however, there will be a **q** option for closing the connection to the IntraChassis 9000.

Web Browser

Refer to Chapter 6, "Web Browser Management", for information on managing the IntraChassis 9000 with a Web browser.

SNMP-Based Management

Refer to Chapter 5, “Advanced Management” and your SNMP Software Manual for information on managing the IntraChassis 9000 with SNMP-based management software.

The Asanté private MIB for the IntraChassis 9000 is available from the Asanté ftp site, *ftp.asante.com*, or you can copy it from the Installation CD-ROM.

Access to Remote Network Monitoring (RMON) features is available only by using an SNMP manager. See “SNMP and RMON Management” in Chapter 5 for details.

Management Interface

After you connect to the Local Management Interface using either an out-of-band Console connection or an in-band Telnet connection as described in “Configuring for Management”, the Main Menu appears, as in Figure 2-3.

```
================================================================
IntraChassis 9000  Local Management System Version 1.000
Compiled Date: May 7 1999 15:33:24
Asante Technologies, Inc.
Copyright (c) 1999 Asante Technologies, Inc.
================================================================

Main Menu

<Cmd>          <Description>
  g            General Information
  c            Configuration
  s            Statistics


Command>
```

Figure 2-3 Local Management Main menu

From the Main Menu, you can access three submenus:

- General Information — 2-19
- Configuration — 2-20
- Statistics — 4-1

If you are using Telnet, a fourth option, for closing the connection, will also be available.

Accessing a Submenu

To access a submenu, type the command letter of the corresponding option (e.g., type **g** for General Information).

Exiting a Submenu

To exit a submenu, type **q**. To exit a command line without changing the configuration setting (e.g., the "Set Password" option in the User Interface Configuration Menu), press **ctrl-c.**

General Information Screen

The General Information Screen displays the current operating information of the IntraChassis 9000, such as its name, IP address, and boot information.

- *Note:* The information displayed on this screen is read-only.

Accessing General Information

To view General Information for your IntraChassis 9000, type **g** in the Local Management Main menu. A screen similar to Figure 2-4 appears.

```
IntraChassis 9000  General Information

System up for:  000days, 21hrs, 45mins, 45secs
Software Version
   Bank 1 Image Version/Date:   1.10/Dec  7 1999 12:14:38 (Running)
   Bank 2 Image Version/Date:   1.10/Dec  7 1999 11:54:14
System Information
   Prom Image Ver/Date:         1.01/Sep  8 1999 15:59:14
   DRAM Size:         4MB       Flash Size:           2.0MB
   EEPROM Size:       32KB      Console Baud Rate:    9600 bps
Administration Information
   System Name:       Asante IntraChassis Switch
   System Location:   ZLabs Head Office
   System Contact:    CLB
System MAC Address, IP Address, Subnet Mask and Router
   MAC Address:       00:00:94:8E:F3:7B
   IP Address:        192.168.54.240
   Subnet Mask:       255.255.255.0
   Router:            192.168.54.2
Bootstrap Configuration
   Boot Load Mode:    LOCAL

Press any key to continue...
```

Figure 2-4 General Information Screen

- *Note:* For a description of each parameter on the General Information Screen, see "Viewing Current Operating Information" on page 3-48.

To exit the General Information Screen, press any key on your keyboard.

Configuration Menu

The Configuration Menu allows you to manage and configure the IntraChassis 9000 and each of its ports.

Logging into the Configuration Menu

1. Type **c** from the Local Management Interface Main Menu.
2. Enter your password at the "Enter Password" prompt, then press **Return**.

   ▲ **Important:** The default password is **Asante**. The password is case-sensitive; enter it exactly as shown. For information on changing the password, see "Changing the Password" in Chapter 3.

   The Configuration Menu appears, as shown in Figure 2-5.

```
IntraChassis 9000  Configuration Menu

<Cmd>        <Description>
  a          System Administration Configuration
  i          System IP Configuration
  b          Bootstrap Configuration
  n          SNMP Configuration
  p          Port Configuration
  d          Unicast Forwarding Database Configuration
  f          File Downloading Configuration
  r          System Reset Options
  l          System Log
  u          User Interface Configuration
  s          Spanning Tree Configuration
  t          Security Management
  v          VLAN Management
  q          Return to previous Menu


Command>
```

Figure 2-5 Configuration Menu

3 Type the command letter of the configuration option you need to use. For example, type **a** for the System Administration Configuration menu.

Configuration Menu Options

Table 2-5 on the next page describes each of the options in the Configuration menu.

Menu Item	Description
System Administration Configuration	Displays and allows you to change the name, location, and contact information for the IntraChassis 9000. See page 3-2.
System IP Configuration	Displays and allows changing the IP Address of the IntraChassis 9000. This address is for network access to the switch. See page 3-3.
Bootstrap Configuration	Allows you to change boot bank and method for loading switch software, or change downloading parameters. See page 3-5.
SNMP Configuration	Displays and allows you to change the SNMP (Simple Network Management Protocol) parameters of the IntraChassis 9000; such as read/write community strings. See page 3-11.
Port Configuration	Allows you to configure manually each of the switch's ports for speed, connection, link mode, and auto-negotiation. Also displays overall port status. See page 3-14.
Unicast Forwarding Database Configuration	Allows you to display all of the forwarding database, or display it by port or VLAN, either with or without showing IP addresses. Also lets you search for MAC or IP addresses and lets you set the age-out time for MAC addresses. See page 3-28.
Image File Downloading Configuration	Allows you to download an Image file for the purpose of upgrading the IntraChassis 9000 software. See page 3-37.
System Reset Configuration	Allows you to reset the switch by a "warm" reboot, or arrange for an automatic reset (up to 24 hours) in advance. See page 3-44.
System Log	Allows you to view a record of any major system events or errors that have occurred on the IntraChassis 9000. See page 3-46
User Interface Configuration	Allows you to set the idle time-out period and password when using Console or Telnet access. See page 3-50.

Menu Item	Description
Spanning Tree Configuration	Displays and allows you to change Spanning Tree parameters, to make sure you prevent loops in network paths. See page 5-2.
Security Management	Allows you to use various features such as Duplicate IP traps, for port security. See page 5-8.
VLAN Management	Allows you to set up virtual networks. See page 5-11
Return to Previous Menu	Allows you to Exit the Configuration menu to the Local Management Interface menu.

Table 2-5 Configuration Menu Options

The first ten options for configuration are described in detail in Chapter 3, “Basic Configuration” and the more advanced options are discussed in Chapter 5, the “Advanced Management” chapter.

3
Basic Configuration

This chapter describes how to manage the IntraChassis 9000 using the out-of-band Console or in-band Telnet interface.

This chapter contains the following sections:

- Overview
- System Administration Configuration
- System IP Configuration
- Bootstrap Configuration
- SNMP Configuration
- Port Configuration
  - Advanced Port Configuration
  - Global Port Configuration
- Unicast Forwarding Database Configuration
- Image File Downloading Configuration
- System Reset Configuration
- Viewing the System Log
- Viewing Current Operating Information
- User Interface Configuration

Basic Configuration Overview

The IntraChassis 9000 Local Management Interface is a menu-driven application which provides management and configuration support for the IntraChassis 9000 and each of the ports in its different modules.

The Local Management Interface can be accessed via two methods:

- Out-of-band connection to the Console port
- In-band connection via Telnet (*four* sessions maximum).

For details on accessing the Local Management Interface, see Chapter 2, “Installation and Set-up”.

System Administration Configuration

This menu displays and allows you to change the IntraChassis 9000’s name, location, and contact information.

To access the System Administration Configuration Menu, type a in the Configuration Menu. A screen similar to Figure 3-1 appears.

```
IntraChassis 9000  System Admin. Configuration Menu

System Name:       Asante IntraChassis Switch
System Location:   ZLabs Main Office
System Contact:    CLB

<Cmd>      <Description>
  n        Set System Name
  l        Set System Location
  c        Set System Contact Information
  q        Return to Previous Menu

Command>
```

Figure 3-1 System Administration Configuration Menu

Current Settings

The following table describes each setting on the System Administration Configuration Menu.

Setting	Description
System Name	The name of the IntraChassis 9000 (up to 64 characters, including spaces).
System Location	Place where you have installed the IntraChassis 9000 (up to 64 characters, including spaces).
System Contact	The name of the person or entity responsible for the IntraChassis 9000 (up to 64 characters, including spaces).

Table 3-1 System Administration settings

Changing System Administration Info

To change the name, location, or contact information for the IntraChassis 9000, use the following procedure.

1. Open the System Administration Configuration Menu by typing **a** in the Configuration Menu.
2. Type the command letter of the item to be changed in the System Administration Configuration Menu.
3. Type the information at the prompt.

   See Table 3-1 for a description of each parameter.

   - *Note:* Each parameter is limited to 64 characters, including spaces.

   To cancel a selected option, press **ctrl-c** at the command prompt.
4. Press **Return.**

   The IntraChassis 9000 system administration information changes take effect.
5. Type **q** to quit and return to the Configuration menu.

System IP Configuration

This menu displays and allows you to change the information needed to access the IntraChassis 9000 over the network via in-band management.

To access the System IP Configuration Menu, type **i** in the Configuration Menu. A screen similar to Figure 3-2 appears.

```
IntraChassis 9000  System IP Configuration Menu

System MAC Address:       00:00:92:CC:BB:AA
System IP Address:        192.168.54.240 (intrach.asante.com)
System Subnet Mask:       255.255.255.0
System Default Router:    192.168.54.2

<Cmd>     <Description>
  i       Set IP Address
  m       Set Subnet Mask
  r       Set Default Router
  n       Set Domain Name Server
  q       Return to Previous Menu

Command>
```

Figure 3-2 System IP Configuration Menu

▲ **Important:** By default, each address is set to 0.0.0.0.

Current Settings

Table 3-2 describes each setting on the System IP Configuration menu.

Setting	Description
System IP Address	The IP (Internet Protocol) address of the IntraChassis 9000.
System Subnet Mask	The filter which determines how the IntraChassis 9000 IP address is split into network and host portions.
System Default Router	The IP address of the default router for the IntraChassis 9000.

Table 3-2 System IP settings

Changing System IP Information

To change the IP address, subnet mask, or default router of the IntraChassis 9000, use the following procedure.

1. Open the System IP Configuration Menu by typing **i** in the Configuration Menu.
2. Type the command letter of the option you want to change.

3 Type the new address at the prompt.

See Table 3-2 for a description of each address.

▲ **Important:** follow the format:

number.number.number.number

To cancel a change, press **ctrl-c** at the command prompt.

4 Press **Return.**

The IP setting change for the IntraChassis 9000 takes effect.

5 Type **q** to quit and return to the Configuration Menu.

Bootstrap Configuration

This menu displays (and allows you to change) the bootstrap parameters used for loading the software for the IntraChassis 9000 at startup, and for downloading a new version of software when one is issued.To access the Bootstrap Configuration Menu, type **b** in the Configuration Menu. If the Load Mode is set to LOCAL, a screen similar to Figure 3-3 appears.

```
IntraChassis 9000 Bootstrap Configuration Menu

Bank 1 Image Version/Date:      1.00B/May 3 1999 10:00:07  (Running)
Bank 2 Image Version/Date:      1.00G/May 5 1999 17:32:18

Load Mode:  Local
Boot Bank:  2

<Cmd>      <Description>
  r        Set Load Mode to REMOTE
  a        Toggle Boot Bank
  q        Return to previous menu

Command>
```

Figure 3-3 Local Bootstrap Configuration Menu

When the IntraChassis 9000 is powered on, it loads its software via one of two methods: locally (via its internal flash memory which is the default setting) or remotely over the network.

▲ **Important:** The default Load Mode setting for the IntraChassis 9000 is **Local.**

Image Banks

The IntraChassis 9000 has two banks to store its runtime software. The banks are referred to as bank 1 and bank 2.

Either of these banks may be the Boot Bank, which is the bank from which the runtime code will be loaded the next time the IntraChassis 9000 is booted.

When downloading new runtime image codes, you may specify either of the two banks as the Destination Bank in which the new code will be loaded.

Loading Software Locally

The IntraChassis 9000 will always boot locally unless you set it to boot load remotely. It would then download the new image code and reset to load locally.

1. Open the Bootstrap Configuration Menu by typing **b** in the Configuration Menu.
2. Type **a** in the Bootstrap Configuration Menu if you need to toggle the Boot Bank setting for the next boot. Typically, you will want to set the boot bank to be the one on which the latest version of the Image resides.

The IntraChassis 9000 is set to load software locally from its flash memory. This occurs whenever the unit is powered on or reset.

Loading Software Remotely

To set the IntraChassis 9000 to download its software over the network from a remote server, use the following procedure.

1. Open the Local Bootstrap Configuration Menu by typing **b** in Configuration Menu.
2. Open the Remote Bootstrap Configuration Menu by typing **r** in the Local Bootstrap Configuration Menu. The menu appears, as shown in Figure 3-4.

```
IntraChassis 9000  Bootstrap Configuration Menu

Bank 1 Image Version/Date:    1.10J/Dec 7 1999 12:14:38  (Running)
Bank 2 Image Version/Date:    1.00G/May 5 1999 17:32:18

Load Mode:        Remote
Boot Mode:        TFTP only
Boot Server IP:   192.168.54.150
Boot File Name:   c:\base\newcrc.ima
Retry Count:      5
Boot Bank:        1

<Cmd>      <Description>
  b        Set Boot Mode to BOOTP-TFTP
  t        Set Boot Mode to TFTP only
  l        Set Load Mode to LOCAL
  s        Set Boot Server IP Address
  f        Set Boot File Name
  c        Set Remote Boot Retry Count
  a        Toggle Boot Bank
  q        Return to Previous Menu

Command>
```

Figure 3-4 Remote Bootstrap Configuration Menu

Current Settings

Table 3-3 explains each setting on the Remote Bootstrap Configuration Menu.

Setting	Description
Running Image Version/ Date	The version and compilation date of runtime code that is currently running on the IntraChassis 9000.
Load Mode	The current method for loading software for the IntraChassis 9000. Remote — Loads the image file from a server on the network. Local — Executes the software image file from the IntraChassis 9000's internal flash memory (default setting; the IntraChassis 9000 automatically reverts to this setting after downloading a new software file).
Boot Mode	The method for requesting the image file from the network. This option is available only if you have selected Remote Load Mode. BootP-TFTP — Sets the IntraChassis 9000 to request an IP address from a BootP server AND to download the software's image file through TFTP (Trivial File Transfer Protocol). ▲ **Important:** To use this option, the IntraChassis 9000 IP address must be set to 0.0.0.0. TFTP ONLY — Sets the IntraChassis 9000 to only download the software image file through TFTP. ▲ **Important:** To use this option, the switch must already have an assigned IP address and the Load Mode must be set to Remote.
Boot Server IP	The Internet Protocol (IP) address of the TFTP server providing the TFTP capabilities on your network. Not Available if Boot Mode is BootP-TFTP.
Boot File Name	The name of the file you are going to request for download. Not available if boot mode is BootP/TFTP.
Retry Count	Number of attempts the IntraChassis 9000 makes to download the image file if errors occur. The default is 5.
Boot Bank	Number of the destination bank for the image file you are downloading (1 or 2).

Table 3-3 Bootstrap Settings

3. Type **b** to set the Boot Mode to BootP-TFTP, or type **t** to set Boot Mode to TFTP only. If you choose BootP-TFTP mode, the options for setting the IP Address of the TFTP server and the Boot File Name become unavailable; in this case, skip Steps 4-7 and go on to Step 8.
4. Type **s** in the Bootstrap Configuration Menu, to select the option **Set Boot Server IP Address**.
5. At the prompt, type the IP address of the remote boot server which contains the switch's software image file. Then press **Return**. The Bootstrap Configuration Menu appears.
6. Type **f** to select the option **Set Boot File Name.**
7. Type the software's file name/network path at the prompt.
8. Press **Return.**

- *Note:* If you decide to use Local Load Mode rather than Remote, type **l**. The Local Bootstrap Configuration Menu appears, as shown in Figure 3-3.

The IntraChassis 9000 is now set to download its software remotely from the network. This will occur the next time the unit is powered on or reset.

SNMP Configuration

The **s** option in the Configuration menu displays the SNMP (Simple Network Management Protocol) Configuration Menu of the IntraChassis 9000, as shown in Figure 3-5. For further details on using SNMP and RMON for remote management of your network, see Chapter 5, "Advanced Management".

This menu allows you to configure the unit's read and write community strings, and enable or disable authentication traps. It also allows you to specify which of your network management stations will receive traps from the IntraChassis 9000.

```
IntraChassis 9000  SNMP Configuration Menu

SNMP Read Community:    public
SNMP Write Community:   private
Authentication Trap:    Enabled

SNMP Trap Receivers:
     IP Address         Community
1. 192.168.54.150       private
2. 192.168.54.110       Sarah
3. <EMPTY>              <EMPTY>
4. <EMPTY>              <EMPTY>

<Cmd>      <Description>
  r        Set SNMP Read Community
  w        Set SNMP Write Communtiy
  t        Toggle Trap Authentication Enable/Disable
  a        Add/Update SNMP Trap Receiver
  d        Delete SNMP Trap Receiver
  q        Return to Previous Menu

Command>
```

Figure 3-5 SNMP Configuration menu

Current Settings

Table 3-4 describes each setting on the SNMP Configuration Menu.

Setting	Description
SNMP Read Community	The string that defines access rights for reading SNMP data objects. The default is **public.**
SNMP Write Community	The string that defines access rights for writing SNMP data objects. The default is **private.**
Trap Authentication	The status of the SNMP agent for authentication trap generation. The default is **disabled**.
SNMP Trap Receivers	The IP addresses of the network management stations that can receive traps from the IntraChassis 9000. Normally, these addresses are the same as your network management software systems' IP addresses. ▲ **Important:** A maximum of four trap receivers is allowed.

Table 3-4 SNMP Settings

Changing Community Strings

To change the IntraChassis 9000 community strings, use the following procedure.

1. Open the SNMP Configuration Menu by typing **n** in the Configuration Menu.
2. Type **r** to change the read community string or **w** to change the write community string.
3. Type a new community string at the prompt.

   See Table 3-4 for a description of read and write community strings.

   To cancel a selected option, press **ctrl-c** at the command prompt.
4. Press **Return**. The new string takes effect.
5. Type **q** to quit and return to the Configuration Menu.

Enabling Authentication Traps

The IntraChassis 9000 can be set to generate authentication traps. Authentication traps are messages sent across the network to an SNMP network management station. They alert you when someone attempts to read or change data without the proper community string.

To set the IntraChassis 9000 to generate traps, use the following procedure.

1. Open the SNMP Configuration Menu by typing **n** in the Configuration Menu.
2. Type **a** to toggle trap authentication to **enabled**.

   To cancel the change, press **ctrl-c** at the command prompt.
3. Press **Return.** The new setting takes effect.
4. Type **q** to quit and return to the Configuration Menu.

Adding or Updating a Trap Receiver

Trap receivers are network management stations designated to receive traps from the IntraChassis 9000.

▲ **Important:** The maximum number of trap receivers that can be set is **four**.

To add or update a trap receiver entry, use the following procedure.

1. Open the SNMP Configuration Menu by typing **n** in the Configuration Menu.
2. Type **a** to **Add a Trap Receiver**. An IP prompt appears.
3. Type the new or updated IP address of the network management station you want to receive traps, then press **Return**.

   To cancel an entry, press **ctrl-c** at the command prompt.
4. Type the trap receiver's community string at the prompt for it, then press **Return** again.

   The trap receiver entry is added or updated. Type **q** to return to the Configuration Menu.

Deleting a Trap Receiver

Use the following procedure to delete a trap receiver you have previously designated.

1. Open the SNMP Configuration Menu by typing **n** in the Configuration Menu.
2. Type **d** to **Delete a Trap Receiver**. A prompt for the entry of the trap receiver appears.
3. Enter the number of the entry you want to delete (1,2,3, or 4) and press **Return**.

The trap receiver is deleted from the SNMP Trap Receivers list.

Port Configuration

This menu allows you to configure manually each of the IntraChassis 9000's ports for port speed, duplex, and auto-negotiation.

It also provides an overview of the entire IntraChassis 9000 system's port operating status.

To access the Port Configuration Menu, type **p** in the Configuration Menu. A screen similar to Figure 3-6 appears.

```
System Module Map
=================

Please select one of the following slots

  Slot        Description (Module Type)
  ----        -------------------------------------
    1         24 10/100BaseTX ports Module (24-100TX)
    2         2 1000BaseX ports Module (2-GBIC)
    3         24 10/100BaseTX ports Module (24-100TX)
    4         2 1000BaseX ports Module (2-GBIC)
    5         <none>
    6         <none>
    7         <none>
    8         <none>
    9         <none>


Enter Module Number (1-8)>
```

Figure 3-6 System module map screen

Choose the module for which you want see a port configuration menu. If, for example, you chose slot **1**, you would see a screen similar to Figure 3-7.

```
IntraChassis 9000 Basic Port Configuration MenuModule Type: (24-100TX)
Module: [1]              Port:   [1]
                     1      8  9     16  17    24
                     ========  ========  ========
Operating Status:    +-------  --------  --------
Auto Negotiation:    ********  ********  ********
Link Speed/Duplex:   Fhhhhhhh  hhhhhhhh  hhhhhhhh

Port Status:   Enabled         Link Status: Up           (24-100TX)
Auto-Neg:      Enabled [ABCD]  Link Speed:  10Mbps (Half Duplex)

<Cmd>      <Description>
  h        Help for legends
  t        Toggle Port Status Enable/Disable
  u        Toggle Auto-Negotiation/Manual
  l        Toggle 10M/100M bps Link Speed
  d        Toggle Half/Full Duplex
  o        Modify Auto-Negotiation Advertisement
  r        Restart Auto-Negotiation
  a        Advanced Port Configuration
  g        Global Port Configuration
  q        Return to Previous Menu

Command>

Select module  Next module  Prev module  Select port  Next port  Prev port
```

Figure 3-7 Port Configuration Menu for 10/100BaseTX modules

Viewing Legends for Configuration Settings

To see legends explaining the symbols used for both the basic and global port configuration menu settings, type **h**. A screen similar to Figure 3-8 appears.

```
Legends for port  status:                Legends for port speed & duplex:

    X - Absent                                f - 10  Mbps & full duplex
    - - Link down                             F - 100 Mbps & full duplex
    D - Disabled by Mgmt Action               h - 10  Mbps & half duplex
    d - Disabled by Security Violation        H - 100 Mbps & half duplex
    B - Blocking
    S - Listening
    R - Learning                         Legends for port priority:
    + - Forwarding                        (The range is from 0 to 3)
                                              0 - priority 0 (lowest)
Legends for Enable/Disable State:             1 - priority 1 (lower)
    - - Disabled                              2 - priority 2 (higher)
    * - Enabled                               3 - priority 3 (highest)

Legends for Auto-Negotiation Advertisement:

    A - 100Base-TX full duplex mode
    B - 100Base-TX half duplex mode
    C - 10Base-T full duplex mode
    D - 10Base-T half duplex mode


Press any key to continue...
```

Figure 3-8 Legends for all Port Configuration menus

Current Port Settings

The current module and port for which statistics are displayed is shown in the top right corner of the Port Configuration menu. Table 3-5 describes each setting on the Port Configuration menu.

Setting	Description
Module Number	The number of the module of which the selected port is a member.
Module Type	Code for the type of module: 24-100TX, or 2-GBIC: See Figure 3-6 for the full names of each module type.
Port Number	The number of the port for which parameters are shown.
Operating Status	This field displays status symbols for each of the current module's ports. See the legend in Figure 3-8 for details.
Auto Negotiation	This field displays disabled/enabled symbols for each of the current ports. See the legend in Figure 3-8 for details.
Link Speed/Duplex	This field displays speed/duplex setting symbols for each of the current ports. See the legend in Figure 3-8 for details.
Port Status	Tells whether the selected port is enabled or disabled.
Link Status	Tells whether the selected port's link is up or down. 'Up' indicates a network device is connected to the port. 'Down' indicates that either a device isn't connected or that the device is powered down. The port's link speed and duplex mode are in parentheses.
Auto-Neg	Tells whether auto-negotiation is enabled or disabled for the selected port, and for which modes, A, B, C, or D. See the legend in Figure 3-8 for details.
Link Speed	Tells the speed and duplex mode of the port's current link.

Table 3-5 Port Configuration Menu settings

Enabling or Disabling a Port

The enabling or disabling of a port is a manual operation that can be used to isolate network devices possibly causing problems on the network or to prevent unauthorized use of a port or station.

To enable or disable a port, use the following procedure.

1. Access the Port Configuration menu by typing **p** in the Configuration menu.
2. Choose a module in the System Module Map.
3. In the Basic Port Configuration Menu, use **s**, **n**, or **p** to select the port you want to enable or disable.
4. Type **t** to toggle the port's connection to either **enabled** or **disabled** status, as desired.

The port's status is changed immediately, and it is reflected in the **Port Status** displayed near the top of the Port Configuration menu, and the Operating Status symbol shown for the port.

Configuring Auto-negotiation

Auto-negotiation is a feature of the Fast Ethernet standard that enables two devices on a common segment to communicate their transmission speed capabilities. This feature allows the devices to determine and use their highest common speed and best communication parameters.

▲ **Important:** By default, all of the ports are set to Auto-negotiation, as shown in Figure 3-7.

To enable Auto-negotiation, or return to manual-setting mode, use the following procedure.

1. Access the Port Configuration menu by typing **p** in the Configuration menu.
2. Choose a module in the System Module Map.
3. In the Basic Port Configuration Menu, use **s**, **n**, or **p** to select the port for which you want to set the auto-negotiation mode.
4. Type **u** to toggle the port's auto-negotiation mode to **enabled** or to return it to manual.

The auto-negotiation status changes immediately, and is displayed on the **Auto Negotiation** line near the top of the Port Configuration menu.

▲ **Important:** If you change the status of the port from **Manual** to **Enabled** you must type **r** to restart Auto-negotiation.

Configuring a Port Manually

If you have changed the Auto-negotiation status of a port to **Manual,** as described in the previous section, you can toggle the link speed from 10Mbps to 100Mbps and back, and toggle the port from half to full duplex and back.

Toggling Port Link Speed

Use the following procedure to toggle the port's link speed.

1. Access the Port Configuration menu by typing **p** in the Configuration menu.
2. Choose a module in the System Module Map.
3. In the Basic Port Configuration Menu, use **s**, **n**, or **p** to select the port for which you want to set the link speed.
4. Type **l** to toggle the port's link speed.

The link speed is changed immediately, and the change is reflected on the **Link Speed** line near the top of the Port Configuration menu.

Toggling Half to Full Duplex

Half duplex mode allows transmission in two directions on the same channel, but only in one direction at a time. Full duplex mode allows transmission in two directions on the same channel at the same time.

▲ **Important:** To use full duplex mode, the device to which the port is connected must support and be configured for duplex mode.

Use the following procedure to change the duplex mode setting for a port that is in **Manual** status.

1. Access the Port Configuration menu by typing **p** in the Configuration menu.
2. Choose a module in the System Module Map.
3. In the Basic Port Configuration Menu, use **s**, **n**, or **p** to select the port for which you want to set the duplex mode.
4. Type **d** to toggle the port's duplex mode.

The change in mode is reflected immediately in the **Link Speed/Duplex** line near the top of the Port Configuration menu.

Configuration of 1000BaseX ports

The following sections describe the configuration options in the Port Configuration Menu for a 1000BaseX port. Since the 1000BaseX ports are always in full duplex mode, the only configuration possible is enabling and disabling the port.

To access the 1000BaseX port menu, type **p** in the Configuration menu, and when you see the System Module Map, as shown in Figure 3-6, enter the number of a module with 1000BaseX ports (such as module **2** in the map shown in Figure 3-6). The Configuration menu for 1000BaseX ports appears, as shown in Figure 3-9.

```
IntraChassis 9000 Basic Port Configuration Menu Module Type: (2-GBIC)
Module: [1]              Port:   [1]
                    Port      1             Port      2
                    ==========              ==========
Operating Status:   SX-LinkUp (Forwarding)  SX-LinkDown

Port Status: Enabled           Link Status: Up [1000Mbps-Full]

<Cmd>     <Description>
  h       Help for legends
  t       Toggle Port Status Enable/Disable
  a       Advanced Port Configuration
  g       Global Port Configuration
  q       Return to Previous Menu

Command>

Select module  Next module  Prev module  Select port  Next port  Prev port
```

Figure 3-9 Port Configuration menu for 1000BaseX ports

For a description of the current settings shown in the top portion of the screen, see “Current Port Settings” on page 3-17.

Enabling or Disabling a Port

The enabling or disabling of a port is a manual operation that can be used to isolate network devices possibly causing problems on the network.

To enable or disable a port, use the following procedure.

1. Access the Port Configuration menu by typing **p** in the Configuration menu.
2. Choose a module in the System Module Map.
3. In the Basic Port Configuration Menu, use **s**, **n**, or **p** to

select the port you want to enable or disable.

4 Type **t** to toggle the port's connection to either **enabled** or **disabled** status, as desired.

The port's status is changed immediately, and it is reflected in the **Port Status** displayed near the top of the Port Configuration menu.

Advanced Port Configuration

The Advanced Port Configuration menu allows you to control the port broadcast and multicast rate, to enable or disable 802.3x flow control, and to set the default priority of the port. To access the Advanced Port Configuration menu, first access either the 10/100BaseTX or the 1000BaseX Port Configuration menu, as described earlier in this chapter, then type **a** to see the Advanced Port Configuration menu, as shown in Figure 3-10 and Figure 3-11.

Advanced 10/100BaseTX Port Configuration

The following sections explain the configuration options in the Advanced Port Configuration menu for 10/100BaseTX ports.

```
IntraChassis 9000 Advanced Port Configuration Menu  Module Type: (24-100TX)
Module: [1]              Port:   [1]
                     1      8  9     16  17    24
                     ========  ========  ========
Operating Status:    +-------  --------  --------
Flow Ctrl:           *-------  --------  --------
Priority:            10001111  11111122  23333333

Max. Broadcast Rate:       N/A
Max. Multicast Rate:       N/A
802.3x Flow Control:       Enabled
Port Default Priority:     1

<Cmd>      <Description>
  h        Help for legends
  r        Set Max. Broadcast/Multicast Rate
  f        Toggle 802.3x Flow Control Enable/Disable
  i        Set Port Default Priority
  q        Return to Previous Menu

Command>

Select module  Next module  Prev module  Select port  Next port  Prev port
```

Figure 3-10 Advanced Port Configuration menu - 10/100BaseTX port

For a legend of the symbols used for the flow control and port priority table, type **h** and you will see the screen displayed in Figure 3-8.

Current Settings

The settings shown in the top portion of the Advanced Port Configuration menu are described in Table 3-6.

Setting	Description
Module Number	The number of the module of which the selected port is a member.
Module Type	Code for the type of module: 24-100TX, 2-GBIC, or 8-100FX: See Figure 3-6 for the full names of each module type.
Operating Status	This field displays status symbols for each of the current module's ports. See the legend in Figure 3-8 for details.
Flow Control	The status of flow control for the current port.When enabled, it allows you to control traffic and avoid congestion, such as when the port is receiving too much traffic for the available buffer resources.
Priority	The priority ranking for the port in regards to data transmission during periods of peak or heavy on the network. Ports with higher priority take precedence when there is traffic congestion.
Max. Broadcast Rate	The maximum number of packets per second that can be broadcast by the current port to the network
Max. Multicast Rate	The maximum number of packets that can be multicast to all or selected ports on the network by the current port.

Table 3-6 Advanced Port Configuration menu settings

Setting the Maximum Broadcast or Multicast Rate

Use the following procedure to set a limit on how many packets may be either broadcast or multicast from the current port.

1. Access the Port Configuration menu by typing **p** in the Configuration menu.
2. Choose a module in the System Module Map.
3. In the Basic Port Configuration Menu, type **a** to open the Advanced Port Configuration menu.
4. Use **s**, **n**, or **p** to select the port for which you want to set the broadcast or multicast rate.
5. Type **r** to set the maximum broadcast or multicast rate for the selected port.

6 Enter the rate for broadcast or multicast and press **Return**.

The new maximum rate is displayed on the Advanced Port Configuration menu.

Enabling or Disabling 802.3x Flow Control

Use the following procedure to control traffic and avoid congestion, such as when there is a shortage of buffer resources for the port. Flow control is accomplished by means of standard PAUSE control frames for each port, independent of all others. The port must be configured to operate in Full Duplex mode. If you enable flow control on a port which is overwhelmed (run-low in the buffer resources), that port will transmit PAUSE frames; the link partner will obey the PAUSE frame. When the low-resource situation is relieved, the port sends out PAUSE frames with zero time value to un-pause the end-station. To enable flow control, first access the Port Configuration menu by typing **p** in the Configuration menu, then take the following steps.

1 Choose a module in the System Module Map.

2 In the Basic Port Configuration Menu, type **a** to open the Advanced Port Configuration menu.

3 Use **s**, **n**, or **p** to select the port for which you want to enable or disable flow control.

4 Type **f** to toggle flow control for the selected port.

The flow control symbol for the selected port reflects its change in state, as does the 802.3x Flow Control setting.

▲ **Important:** The link partner must be configured to recognize PAUSE frames when using this method of flow control.

Setting Port Default Priority

Use the following procedure to set a higher or lower priority for a port. This priority setting determines the order in which the port forwards packets. Each port is associated with a traffic class; 0 (zero) is the lowest, and the default priority level, and 1 is the highest priority level.

1 Access the Port Configuration menu by typing **p** in the Configuration menu.

2 Choose a module in the System Module Map.

3. In the Basic Port Configuration Menu, type **a** to open the Advanced Port Configuration menu.
4. Use **s**, **n**, or **p** to select the port for which you want to set the default priority.
5. Type **i** to set the priority for the selected port.
6. Enter the priority, from 0 or 1, and press **Return**.

The new default priority is shown on the Advanced Port Configuration menu.

Advanced 1000BaseX Port Configuration

If you are in the Basic Port Configuration menu for a 1000BaseX port and type **a** the menu shown in Figure 3-11.

```
IntraChassis 9000 Basic Port Configuration Menu Module Type: (2-GBIC)
Module: [1]
Port:   [1]          Port      1             Port      2
                     ==========               ==========
Flow Ctrl:           SX-LinkUp (Forwarding)   SX-LinkDown
Priority:            1            1

Max. Broadcast Rate:       N/A
Max. Multicast Rate:       N/A
802.3x Flow Control:       Enabled
Port Default Priority:     1

<Cmd>      <Description>
  h        Help for legends
  r        Set Max. Broadcast/Multicast Rate
  f        Toggle 802.3x Flow Control Enable/Disable
  i        Set Port Default Priority
  q        Return to Previous Menu

Command>

Select module  Next module  Prev module  Select port  Next port  Prev port
```

Figure 3-11 Advanced Port Configuration menu - 1000BaseX port

To change the maximum broadcast or multicast rate, or to enable or disable flow control, or to set the default priority for a 1000BaseX port, use the procedures in the "Advanced 10/100BaseTX Port Configuration" section.

Global Port Configuration

This menu allows you to change the configuration information for all ports simultaneously. This feature is helpful in cases where you want the same configuration for all ports in a module.

Type **g** in the Basic Port Configuration menu for either 10/100BaseTX or 1000BaseX ports to display the Global Port Configuration Menu, as shown in Figure 3-12 and Figure 3-13.

```
IntraChassis 9000 Global Port Configuration MenuModule Type: (24-100TX)
Module: [1]
                     1      8  9     16  17    20
                     ========  ========  ========
Operating Status:    +-------  --------  --------
Auto Negotiation:    ********  ********  ********
Link Speed/Duplex:   Fhhhhhhh  hhhhhhhh  hhhhhhhh
Flow Ctrl:           *-------  --------  --------
Priority:            00001111  11111122  22333333


<Cmd>      <Description>
  h        Help for legends
  t        Select Global Ports Status Enable/Disable
  u        Select Global Auto-Negotiation/Manual
  l        Select Global 10M/100M bps Link Speed
  d        Select Global Half/Full Duplex
  o        Modify Global Auto-Negotiation Advertisement
  r        Set Global Max. Broadcast/Multicast Rate
  f        Toggle Global 802.3x Flow Control Enable/Disable
  i        Set Global Port Devault Priority
  q        Return to Previous Menu

Command>

Select module  Next module  Prev module
```

Figure 3-12 Global Port Configuration menu - 10/100BaseTX ports

```
IntraChassis 9000 Global Port Configuration MenuModule Type: (2-GBIC)
Module: [1]
                     Port      1   Port      2
                     ==========    ==========
Operating Status:    SX-Enabled    SX-Enabled
Flow Ctrl:           Disabled      Disabled
Priority:            1             0

<Cmd>      <Description>
  h        Help for legends
  t        Select Global Port Status Enable/Disable
  r        Set Global Max. Broadcast/Multicast Rate
  f        Toggle Global 802.3x Flow Control Enable/Disable
  i        Set Global Port Default Priority
  q        Return to Previous Menu


Command>

Select module  Next module  Prev module
```

Figure 3-13 Global Port Configuration menu - 1000BaseX ports

Use the procedures in the "Port Configuration" and "Advanced Port Configuration" sections of this chapter. The same procedures are used for global configuration, except that you do not need to choose a module and port to configure. Notice that the advanced configuration options, such as enabling or disabling flow control, are also included in the menu.

Unicast Forwarding Database Configuration

This menu allows the user to view and search for addresses in the IntraChassis 9000's MAC Forwarding Table. It also provides options for displaying MAC addresses and IP/MAC binding by individual port or by VLAN.

The MAC Forwarding Table is a table of node addresses that the IntraChassis 9000 automatically builds by "learning," It performs this task by monitoring the packets that pass through the IntraChassis 9000, checking the source and destination addresses, and then recording the source address information in the table.

The IntraChassis 9000 uses the information in this table to decide whether a frame should be forwarded to a particular destination port or "flooded" to all the ports other than the received port. Each entry consists of the MAC address of the device and an identifier for the port on which it was received.

- ***Note:*** The MAC address table can hold a maximum of 8,192 entries.

When you type **d** in the Configuration menu, the Unicast Forwarding Database Configuration menu appears, as shown in Figure 3-14.

```
IntraChassis 9000 Unicast Forwarding Database Configuration Menu

Age-out Time:          300 sec.
MAC Address Count:     33
IP Address Count:      21

<Cmd>      <Description>
  a        Display All Forwarding Database With/Without IP
  p        Display Forwarding Database By Port With/Without IP
  v        Display Forwarding Database by VLAN With/Without IP
  m        Search for MAC Address
  i        Search for IP Address
  t        Set Age-Out Time
  q        Return to Previous Menu


Command>
```

Figure 3-14 Unicast Forwarding Configuration menu

Current Settings

Table 3-7 explains each setting on the Forwarding Database Configuration Menu.

Setting	Description
Age-out Time	The number of seconds that addresses are retained in the table. The default is 300 seconds. The range is from 10 to 1,000,000.
MAC Address Count	The number of entries currently in the MAC Address Table.
IP Address Count	The number of entries in the MAC Address Table that contain a corresponding IP address.

Table 3-7 Forwarding Database Configuration menu settings

Displaying the Forwarding Database

You can display the Forwarding Database MAC address table with or without IP addresses. Use the following procedure to view the table.

1. Open the **Unicast Forwarding Database Configuration** Menu by typing **d** in the Configuration Menu.
2. Type either **a**, **p**, or **v**, depending on the range of MAC addresses you want to view.

   Type **a** to display the MAC address table with the MAC addresses of all ports on the IntraChassis 9000.

   Type **p** to specify a port, then see the MAC addresses for that port only.

   Type **v** to specify a VLAN, then see the MAC addresses for the member ports of that VLAN only.
3. At the prompt which appears, type **y** to see IP addresses in the display or type **n** to see the display without IP addresses, then press **Return**. The selected display appears, as shown in Figure 3-15.

- *Notes:* The **Age** field in the MAC address tables indicates the amount of time remaining before an entry ages out.

  The **Type** field refers to the type of entry for the MAC address of a device; the setting may be static, **S** (set by management, and will *not* age out), or dynamic, **D** (learned by the switch, and will be aged out) or multiple, **M** (associated with multiple IP addresses, as in the case of a router), or **I** (management module's MAC address).

  The **Self** entry represents the IntraChassis 9000 MAC address and IP address.

  The **Pri** field refers to the priority setting for the port.

```
Entry Type: (D = Dynamic, S = Static, I = Self)
+------+----+----+-----------------+-----+---+
|Module|Port|Type|   MAC Address   | Age |Pri|
+------+----+----+-----------------+-----+---+
   1     6    D   00:00:94:10:80:1D  159   0
   1     6    D   00:E0:52:01:44:46  147   0
   1     6    D   00:00:94:A2:DE:56  300   0
   1     6    D   00:00:94:7A:CF:48    9   0
   1     6    D   00:00:94:92:F1:A8  300   0
   --    --   I   00:00:94:8E:F2:CC   --   0
   1     6    D   00:00:94:5D:E0:41  285   0
   1     6    D   00:00:94:5D:E1:9E  234   0
   1     6    D   08:00:20:80:5E:9C  270   0
   1     6    D   00:00:94:5D:E2:15  300   0
   1     6    D   00:00:94:5D:E2:8D  276   0
   1     6    D   00:00:94:10:E3:12  246   0
   1     6    D   08:00:20:72:A0:1C   81   0
   1     6    D   00:00:94:7B:02:C0  291   0
   1     6    D   00:00:94:75:34:DE    3   0
   1     6    D   00:00:94:75:31:DB   21   0
   1     6    D   00:A0:CC:2C:60:CB  144   0
   1     6    D   00:00:94:9A:2F:1C  150   0
   1     6    D   00:00:94:75:2F:CF  297   0
Press Next, Previous, or Quit
```

Figure 3-15 Unicast Forwarding Database, all ports, without IP displayed

The first screen of the MAC address display for all ports shows the entries for devices connected to the ports of the first module; if you scroll through the database, you can see the entries for each port of each module. For example, some MAC addresses for devices connected to port 6 of module 1 are shown in Figure 3-15.

```
Entry Type [T]: (D = Dynamic, S = Static, M = Multiple, I = Self)
+-+-+-+-----------------+---------------+
|M|P|T|   MAC Address   |       IP      |
+-+-+-+-----------------+---------------+
 1 6 D 00:00:94:10:80:1D  199.35.192.185
 1 6 D 00:E0:52:01:44:46  199.35.192.189
 1 6 D 00:00:94:A2:DE:56  199.35.192.181
 1 6 D 00:00:94:7A:CF:48  199.35.192.188
 1 6 D 00:00:94:92:F1:A8  199.35.192.182
 - - I 00:00:94:8E:F2:CC  199.35.192.187
 1 6 D 00:00:94:5D:E0:41  199.35.192.183
 1 6 D 00:00:94:5D:E1:9E  199.35.192.186
 1 6 D 08:00:20:80:5E:9C  199.35.192.184
 1 6 D 00:00:94:5D:E2:15  199.35.192.195
 1 6 D 00:00:94:5D:E2:8D  199.35.192.199
 1 6 D 00:00:94:10:E3:12  199.35.192.191
 1 6 D 08:00:20:72:A0:1C  199.35.192.198
 1 6 D 00:00:94:7B:02:C0  199.35.192.192
 1 6 D 00:00:94:75:34:DE  199.35.192.197
 1 6 D 00:00:94:75:31:DB  199.35.192.193
 1 6 D 00:A0:CC:2C:60:CB  199.35.192.196
 1 6 D 00:00:94:9A:2F:1C  199.35.192.194
 1 6 D 00:00:94:75:2F:CF  199.35.192.175
 Press Next, Previous, or Quit
```

Figure 3-16 Unicast Forwarding Database, all ports, with IP displayed

The Unicast Forwarding Database display does not show the age or priority of the devices, as you can see in Figure 3-16.

```
Module: [1]  Port: [6]
Entry Type: (D = Dynamic, S = Static,I = Self)
+----+-----------------+-----+---+
|Type|   MAC Address   | Age |Pri|
+----+-----------------+-----+---+
  D   00:00:94:10:80:1D  159   0
  D   00:E0:52:01:44:46  147   0
  D   00:00:94:A2:DE:56  300   0
  D   00:00:94:7A:CF:48    9   0
  D   00:00:94:92:F1:A8  300   0
  D   00:00:94:8E:F2:CC    0   0
  D   00:00:94:5D:E0:41  285   0
  D   00:00:94:5D:E1:9E  234   0
  D   08:00:20:80:5E:9C  270   0
  D   00:00:94:5D:E2:15  300   0
  D   00:00:94:5D:E2:8D  276   0
  I   00:00:94:10:E3:12   --   0
  D   08:00:20:72:A0:1C   81   0
  D   00:00:94:7B:02:C0  291   0
  D   00:00:94:75:34:DE    3   0
  D   00:00:94:75:31:DB   21   0
  D   00:A0:CC:2C:60:CB  144   0
  D   00:00:94:9A:2F:1C  150   0
  D   00:00:94:75:2F:CF  297   0
Press Next, Previous, or Quit
```

Figure 3-17 Unicast Forwarding Database for a port, without IP displayed

The Unicast Forwarding Database display for a single port shows only the entries for the devices connected to the selected port, as you can see in Figure 3-17.

```
Module: [1]  Port: [6]
Entry Type [T]: (D = Dynamic, S = Static, M = Multiple, I = Self)
+-+-+-+-----------------+---------------+
|M|P|T|   MAC Address   |       IP      |
+-+-+-+-----------------+---------------+
 1 6 D 00:00:94:10:80:1D  199.35.192.185
 1 6 D 00:E0:52:01:44:46  199.35.192.189
 1 6 D 00:00:94:A2:DE:56  199.35.192.181
 1 6 D 00:00:94:7A:CF:48  199.35.192.188
 1 6 D 00:00:94:92:F1:A8  199.35.192.182
 - - I 00:00:94:8E:F2:CC  199.35.192.187
 1 6 D 00:00:94:5D:E0:41  199.35.192.183
 1 6 D 00:00:94:5D:E1:9E  199.35.192.186
 1 6 D 08:00:20:80:5E:9C  199.35.192.184
 1 6 D 00:00:94:5D:E2:15  199.35.192.195
 1 6 D 00:00:94:5D:E2:8D  199.35.192.199
 1 6 D 00:00:94:10:E3:12  199.35.192.191
 1 6 D 08:00:20:72:A0:1C  199.35.192.198
 1 6 D 00:00:94:7B:02:C0  199.35.192.192
 1 6 D 00:00:94:75:34:DE  199.35.192.197
 1 6 D 00:00:94:75:31:DB  199.35.192.193
 1 6 D 00:A0:CC:2C:60:CB  199.35.192.196
 1 6 D 00:00:94:9A:2F:1C  199.35.192.194
 1 6 D 00:00:94:75:2F:CF  199.35.192.175
 Press Next, Previous, or Quit
```

Figure 3-18 Unicast Forwarding Database for a port, with IP displayed

The Unicast Forwarding Database display does not show the age or priority of the devices, as you can see in Figure 3-18.

```
VLAN ID: [1]
Entry Type: (D = Dynamic, S = Static, I = Self)
+------+----+----+-----------------+-----+---+
|Module|Port|Type|   MAC Address   | Age |Pri|
+------+----+----+-----------------+-----+---+
   1      6    D   00:00:94:10:80:1D  159   0
   1      6    D   00:E0:52:01:44:46  147   0
   1      6    D   00:00:94:A2:DE:56  300   0
   1      6    D   00:00:94:7A:CF:48    9   0
   1      6    D   00:00:94:92:F1:A8  300   0
  --     --    I   00:00:94:8E:F2:CC   --   0
   1      6    D   00:00:94:5D:E0:41  285   0
   1      6    D   00:00:94:5D:E1:9E  234   0
   1      6    D   08:00:20:80:5E:9C  270   0
   1      6    D   00:00:94:5D:E2:15  300   0
   1      6    D   00:00:94:5D:E2:8D  276   0
   1      6    D   00:00:94:10:E3:12  246   0
   1      6    D   08:00:20:72:A0:1C   81   0
   1      6    D   00:00:94:7B:02:C0  291   0
   1      6    D   00:00:94:75:34:DE    3   0
   1      6    D   00:00:94:75:31:DB   21   0
   1      6    D   00:A0:CC:2C:60:CB  144   0
   1      6    D   00:00:94:9A:2F:1C  150   0
   1      6    D   00:00:94:75:2F:CF  297   0
Press Next, Previous, or Quit
```

Figure 3-19 Unicast Forwarding Database for a VLAN, without IP displayed

The display for a single VLAN shows only the entries for devices connected to the member ports of the selected VLAN, as seen in Figure 3-19.

```
VLAN ID: [1]
Entry Type [T]: (D = Dynamic, S = Static, M = Multiple, I = Self)
+-+-+-+-----------------+---------------+
|M|P|T|   MAC Address   |       IP      |
+-+-+-+-----------------+---------------+
 1 6 D 00:00:94:10:80:1D  199.35.192.185
 1 6 D 00:E0:52:01:44:46  199.35.192.189
 1 6 D 00:00:94:A2:DE:56  199.35.192.181
 1 6 D 00:00:94:7A:CF:48  199.35.192.188
 1 6 D 00:00:94:92:F1:A8  199.35.192.182
 - - I 00:00:94:8E:F2:CC  199.35.192.187
 1 6 D 00:00:94:5D:E0:41  199.35.192.183
 1 6 D 00:00:94:5D:E1:9E  199.35.192.186
 1 6 D 08:00:20:80:5E:9C  199.35.192.184
 1 6 D 00:00:94:5D:E2:15  199.35.192.195
 1 6 D 00:00:94:5D:E2:8D  199.35.192.199
 1 6 D 00:00:94:10:E3:12  199.35.192.191
 1 6 D 08:00:20:72:A0:1C  199.35.192.198
 1 6 D 00:00:94:7B:02:C0  199.35.192.192
 1 6 D 00:00:94:75:34:DE  199.35.192.197
 1 6 D 00:00:94:75:31:DB  199.35.192.193
 1 6 D 00:A0:CC:2C:60:CB  199.35.192.196
 1 6 D 00:00:94:9A:2F:1C  199.35.192.194
 1 6 D 00:00:94:75:2F:CF  199.35.192.175
 Press Next, Previous, or Quit
```

Figure 3-20 Unicast Forwarding Database for a VLAN, with IP displayed

The VLAN display does not show the age or priority of the devices, as you can see in Figure 3-20.

Searching for a MAC Address

The MAC address table can be searched by MAC address or by IP address. To search the MAC address table for a specific MAC or IP address, use the following procedure.

1. Access the Unicast Forwarding Database Configuration Menu by typing **d** in the Configuration menu.
2. Type **m** to search for a MAC address.

   Type **i** to search for an IP address.
3. Type the MAC or IP address at the prompt.
4. Press return.

The address, if located is displayed, with its associated information, as shown in Figure 3-21. If the address is not located, a message appears, stating this.

```
The MAC Address Search Summary
==============================
Module:       1
Port:         6
Type:         Dynamic
Age:          200
Priority:     0
MAC Address:  00:00:94:11:12:13
IP Address:   192.203.54.111



press any key to continue...
```

Figure 3-21 MAC Address Search summary

The summary screen tells the location of the MAC or IP address; the module, port, and the Domain Name. Configuration information, such as the priority, type, and age are also displayed.

Setting the MAC Address Age-Out Time

This option sets the Age-Out Time for the MAC Forwarding Table.

The Age-Out Time is the number of seconds that addresses remain in the table after being learned by the IntraChassis 9000. The default is 300 seconds.

Use the following procedure to set the MAC address Age-Out Time.

1. Access the Unicast Forwarding Database Configuration Menu by typing **d** in the Configuration menu.
2. Type **t** to set the MAC Address Age-Out Time.
3. Enter the new Age-Out time (in seconds) at the prompt.
4. Press **Return**.

The MAC Address Age-Out Time is changed and is displayed at the top of the Unicast Forwarding Database Configuration menu.

Image File Downloading Configuration

You can upgrade your IntraChassis 9000 system easily, using either TFTP or X/Y/Z modem protocol and the Image File Downloading option of the Configuration menu.

Type **f** in the configuration menu to see the Image File Downloading Configuration menu, as shown in Figure 3-22.

```
IntraChassis 9000  Image File Downloading Configuration Menu

<Cmd>          <Description>
  t            TFTP Image File Downloading Configuration
  x            X/Y/ZMODEM Image File Downloading Configuration
  q            Return to Previous Menu

Command>
```

Figure 3-22 Image File Downloading Configuration menu

This menu lets you select the downloading protocol. Type **t** to download the image file via TFTP, and type **x** to download using the X/Y/Z modem protocol. The two subsections that follow describe downloading by each of the two protocols.

When Asanté issues a new version of software for the IntraChassis 9000, you can obtain it from the Asanté World Wide Web site or by contacting Asanté Technical Support (see Appendix A, "Technical Support" for details).

Image Downloading Through TFTP

To download a new image file in-band through TFTP, type **t** in the Image Download Configuration Menu (option g in Configuration Menu). A screen similar to Figure 3-23 appears.

```
IntraChassis 9000  TFTP File Downloading Menu

Bank 1 Image Version/Date      1.00T/May 07 1999 11:34:46
Bank 2 Image Version/Date      1.00U/Jul 29 1999 15:55:34 (Running)

File Type:          Image
Server IP:          192.203.52.211
File Name:          c:\base\main\gxrt.ima
Retry Count:        5
Destination Bank:   1

<Cmd>       <Description>
  s         Set Server IP Address
  f         Set File Name
  d         Download Image File to Destination Bank
  b         Download and Reboot from the Image File
  r         Set Retry count
  a         Toggle Destination Bank
  q         Return to Previous Menu

Command>
```

Figure 3-23 TFTP Image Downloading menu

Current Settings

Table 3-8 describes each setting on the TFTP Image Downloading menu.

Setting	Description
Bank 1 Image Version/ Date	The version number and compilation date of runtime code that is stored in memory Bank 1 on the IntraChassis 9000.
Bank 2 Image Version/ Date	The version number and compilation date of runtime code that is stored in memory Bank 2 on the IntraChassis 9000. The (Running) designation indicates that the runtime code is currently running on this Bank. The same as the image file in the boot bank.
Server IP	IP address of network server containing software image file.
File Name	The software image file's name and network path.
Retry Count	Number of attempts the switch will make to download image file.
Destination Bank	Number of the memory bank where the image file will download.

Table 3-8 TFTP Image Download menu settings

Performing a Software Upgrade at Runtime

The software image file must be downloaded from a server on your network that is running a TFTP server application.

▲ **Important:** Make sure the IntraChassis 9000 is configured with an IP address (see "Changing System IP Information" earlier in this chapter for details).

Use the following procedure to upgrade the IntraChassis 9000 software via TFTP.

1. Access the TFTP Image File Downloading Configuration menu by typing **t** in the Image File Downloading Configuration menu.
2. Type **s** to set the image server IP address.
3. At the prompt, enter the IP address of the server containing the image file, then press **Return**.
4. Type **f** to set the image file name.
5. At the prompt, enter the image file's name and path, then press **Return**.
6. Type **r** to set the retry count.
7. At the prompt, enter the number of attempts the IntraChassis 9000 will make to download the image file, then press **Return**.
8. Select the Destination Image Bank by using the **a** option. In a typical situation, you will want to select the Bank on which the software is not currently running, as shown in Figure 3-23.
9. Type **d** to download the image file to the destination bank (this option allows you to change the boot bank at a later time and use the Reset menu to schedule a reset, at which time the new software will be run).

   OR

   Type **b** to download the image file and reset the switch (this option immediately boots the IntraChassis 9000 with the new version of software).

10 Type **q** to return to the Image File Downloading menu.

Serial Downloading Configuration

The X/Y/Z Modem Image file Downloading Configuration option lets you download a new software image file for the IntraChassis 9000 without interrupting the current operation.

To download a new image through the IntraChassis 9000 management module's serial (console) port, type **x** in the Image File Download Configuration Menu. The X/Y/Z Modem Image File Downloading menu appears, as shown in Figure 3-24.

```
IntraChassis 9000  X/Y/ZMODEM Image File Downloading Menu

Bank 1 Image Version/Date      1.00T/May 07 1999 11:34:46
Bank 2 Image Version/Date      1.00U/Jul 29 1999 15:55:34 (Running)

Download Protocol:   ZMODEM
Current Baud Rate:   9600 bps
Destination Bank:    1

<Cmd>       <Description>
  x         Set download protocol to XMODEM
  y         Set download protocol to YMODEM
  z         Set download protocol to ZMODEM
  c         Change Baud Rate Setting
  d         Download Image File
  b         Download and Boot Image File
  a         Toggle Destination Bank
  q         Return to Previous Menu

Command>
```

Figure 3-24 X/Y/Z Modem Image File Downloading menu

Current Settings

Table 3-9 describes the settings shown in the X/Y/Z Modem Image File Downloading menu.

Setting	Description
Bank 1 Image Version/ Date	The version number and compilation date of runtime code that is stored in memory Bank 1 on the IntraChassis 9000.
Bank 2 Image Version/ Date	The version number and compilation date of runtime code that is stored in memory Bank 2 on the IntraChassis 9000.The (Running) designation indicates that the runtime code is currently running on this Bank. The same as the image file in the boot bank.
Download Protocol	Current setting of the IntraChassis 9000's serial download protocol.
Current Baud Rate	Transmission rate for the IntraChassis 9000's serial port.
Destination Bank	Number of the memory bank where the image file will download.

Table 3-9 X/Y/Z Modem Image File Downloading settings

Performing a Software Upgrade

Use the following procedure to upgrade the IntraChassis 9000 software through its serial (console) port.

1. In the Image File Download Configuration menu, type **x** to open the X/Y/Z Modem Image File Downloading menu.
2. Type **x, y,** or **z** to select the corresponding modem protocol.
   - *Note:* For information about these protocols, see the manual for your communications software.
3. Type **c** to select the console baud rate. The Baud Rate Setting menu appears, as shown in Figure 3-25. The maximum baud rate currently supported is 57,600 bps.

```
Current Baud Rate:  9600 bps

Please select one from the following baud rate settings, or
press any other key to quit:

WARNING:  The user must use the same baud rate setting of the terminal
          after he/she confirms to change the baud rate setting of the
          console in order to work correctly.

<Cmd>     <Description>
  a       Set Baud Rate to 1200 bps
  b       Set Baud Rate to 2400 bps
  c       Set Baud Rate to 4800 bps
  d       Set Baud Rate to 9600 bps
  e       Set Baud Rate to 19200 bps
  f       Set Baud Rate to 38400 bps
  g       Set Baud Rate to 57600 bps

Choice>
```

Figure 3-25 Baud Rate menu

4. Select one of the options in the above screen to select the required baud rate and confirm it by typing **y**.
5. Type **a** to select the Destination Bank.
6. Use any serial communications software like Procomm Plus, HyperTerminal, ZTerm, etc., to download the image file. Follow the instruction manual of the serial communications software for file transfer instructions.

   - *Note:* The terminal on which serial communications software is running must have the same baud rate as the IntraChassis 9000 management module console. The connection from the terminal to the switch Console port must be an RS232C straight-through cable.

7. Type **d** to download to the selected destination bank or **b** to download and reset.
8. Type **q** to return to the previous menu after performing a successful download.

   - *Note:* The baud rate default for Console management is 9600 bps. If you select a baud rate for the console port other than 9600 bps, the screen will display garbage data until the connected terminal is set to the same baud rate as the console.

System Reset Configuration

The System Reset Configuration Menu allows you to reset the IntraChassis 9000 by performing a "warm" reboot. It also allows you to schedule a reset up to 24 hours in advance.

To reset the IntraChassis 9000, type **r** in the Configuration Menu. A screen similar to Figure 3-26 appears.

```
IntraChassis 9000  System Reset Configuration Menu

Reset Status:        Stop
Reset Type:          Normal
Reset Countdown:     1 sec.

<Cmd>      <Description>
  s        Schedule Reset Time
  c        Cancel Reset
  r        Reset System
  d        Reset Switch to Factory Default
  i        Reset Switch to Factory Default except IP and Bootstrap
  q        Return to Previous Menu

Command>
```

Figure 3-26 System Reset Configuration menu

Current Options

Table 3-10 describes the settings shown in the Reset Configuration menu.

Option	Description
Schedule Reset Time	Number of seconds until the scheduled reset.
Cancel Reset	Stops the scheduled reset.
Reset Switch	Resets the IntraChassis 9000 immediately.
Reset Switch to Factory Default	Resets the IntraChassis 9000 to the original factory settings.
Reset Switch to Factory Default except IP & Bootstrap	Resets the IntraChassis 9000 to the original factory settings without modifying the IP and Bootstrap configuration.

Table 3-10 Reset Configuration options

Resetting the IntraChassis 9000

To reset the IntraChassis 9000, use the following procedure.

1. Open the Reset Menu by typing **r** in the Configuration Menu.
2. Type **r** to reset the IntraChassis 9000.
   - *Note:* Typing **d** will reset the IntraChassis 9000 to the factory default. Typing **i** will reset the IntraChassis 9000 to the factory default without affecting its IP and Bootstrap configuration.
3. Type **y** to confirm the reset,

   OR type **n** to cancel the reset.
   - *Note:* During the scheduled reset operation, you can see the reset countdown increment by refreshing the screen.

Scheduling a Reset

You can schedule the IntraChassis 9000 to automatically perform a reset from one second up to 24 hours (86,400 seconds) in advance.

To schedule a reset, use the following procedure.

1. Open the Reset Menu by typing **r** in the Configuration Menu.
2. Type **s** to schedule a reset time (within the specified range).
3. Enter the number of seconds the IntraChassis 9000 will wait before it automatically resets.

   ▲ **Important:** The maximum number of seconds that can be entered is **86,400** (24 hours).
4. Press **Return.**

The IntraChassis 9000 will reset automatically after the number of seconds you specified.

Viewing the System Log

The IntraChassis 9000 System Log records and displays any major system events on the switch, such as fatal errors, plugging in or removing a module, etc.

To view the system log, use the following procedure.

1 Type **l** in the Configuration menu. the System Log menu appears, as shown in Figure 3-27.

```
IntraChassis 9000 System Log Menu

<Cmd>    <Description>
  l      Display System Log
  c      Clear System Log
  q      Return to previous menu


Command>
```

Figure 3-27 System Log menu

2 Type **d** to display the current system log, as shown in Figure 3-28.

```
IntraChassis 9000 System Log Summary
=====================================================================
No.   D: H: M: S  Event
 1. 000:00:00:00  Reset NVDB sections to factory default
 2. 000:00:00:07  Spanning Tree Task Disabled
 3. 000:00:32:53  Spanning Tree Task Enabled
 4. 000:00:33:45  Spanning Tree Task Disabled
 5. 000:00:41:11  Spanning Tree Task Enabled
 6. 000:00:00:00  Reset NVDB section  0 to factory default
 7. 000:00:32:51  Spanning Tree Task Disabled
 8. 000:00:33:08  Spanning Tree Task Enabled
Quit  Next Page
```

Figure 3-28 System Log Display

The system log displays any major system events that have occurred on the IntraChassis 9000. If no major events have occurred, “System up” messages are displayed.

- *Note:* The system Log holds a maximum of 64 entries.

3 Press any key to display the next page of System Log information.

Clearing the System Log

Use the following procedure to clear all entries from the current System Log.

1. Open the System Log menu by typing **l** in the Configuration menu.
2. Type **c** to clear the current System Log.

New entries will begin to accrue as events occur.

Viewing Current Operating Information

The IntraChassis 9000 switch's current operating information can be viewed by accessing the General Information screen within the switch's Local Management Interface.

To view the current operating information of the switch:

1. Access the IntraChassis 9000 Local Management Interface.
   - *Note:* See Chapter 2, "Installation and Set-up" for instructions on how to connect to the Local Management Interface.
2. Type g in the Local Management Interface Main Menu. A screen similar to Figure 3-29 appears.

```
IntraChassis 9000  General Information

System up for:  000days, 21hrs, 45mins, 45secs
Software Version
   Bank 1 Image Version/Date:   1.10/Dec  7 1999 12:14:38 (Running)
   Bank 2 Image Version/Date:   1.10/Dec  7 1999 11:54:14
System Information
   Prom Image Ver/Date:         1.01/Sep  8 1999 15:59:14
   DRAM Size:        4MB        Flash Size:          2.0MB
   EEPROM Size:      32KB       Console Baud Rate:   9600 bps
Administration Information
   System Name:      Asante IntraStack Switch
   System Location:  ZLabs Head Office
   System Contact:   CLB
System MAC Address, IP Address, Subnet Mask and Router
   MAC Address:      00:00:94:8E:F3:7B
   IP Address:       192.168.54.240
   Subnet Mask:      255.255.255.0
   Router:           192.168.54.2
Bootstrap Configuration
   Boot Load Mode:   LOCAL

Press any key to continue...
```

Figure 3-29 General Information Screen

Table 3-11 describes each parameter in the General Information screen. To exit the screen, press any key.

Setting	Description
System Up Time	The amount of time the system has been running since last reset or power on.
Bank 1 Image Version/ Date	The version and compilation date of the runtime code that is stored in Bank 1. **(Running)** indicates code is currently active.
Bank 2 Image Version/ Date	The version and compilation date of the runtime code that is stored in Bank 2.
Prom Image Vers/Date	The version and compilation date of {{what?}}.
DRAM Size	The size in megabytes (MB) of the unit's Dynamic Random Access Memory.
EEPROM Size	The size in megabytes (MB) of the unit's EEPROM.
Flash Size	The size, in MB, of the switch's flash memory, or non-volatile RAM.
Console Baud Rate	The current rate which data transfers to the console from the IntraChassis 9000.
System Name	The name assigned to the IntraStack for network purposes.
System Location	The physical location of the IntraStack.
System Contact	Person responsible for configuration of the unit.
MAC Address	The hardware address of the IntraChassis 9000; this address cannot be changed
IP Address	The unit's IP (Internet Protocol) address.
Subnet Mask	The IP subnet mask for the IntraChassis 9000.
Router	The IP address of the default gateway router to which the switch belongs.
Boot Load Mode	The current method in use for loading the switch's software.

Table 3-11 General Information settings

User Interface Configuration

The User Interface Configuration option lets you set the idle time-out periods for both the Console and Telnet user interfaces, and also lets you change the password used for logging in to the configuration menu. Typing **u** in the Configuration menu displays the User Interface Configuration menu, as shown in Figure 3-30.

```
IntraChassis 9000 User Interface Configuration menu

Console UI Idle Time Out      5 min
Telnet UI Idle Time Out       5 min

Telnet Session Status:
Session     Status          Source IP
   1        Active          192.203.54.240
   2        Inactive        <none>
   3        Inactive        <none>
   4        Inactive        <none>

<Cmnd>          <Description>
  c             Set Console UI Time Out
  t             Set Telnet UI Time Out
  p             Change Administrator Password
  q             Return to previous menu

Command>
```

Figure 3-30 User Interface Configuration menu

Current Settings

Table 3-12 describes the settings in the UI Time-out Configuration Menu.

Setting	Description
Console UI Idle Time-out	Duration of time the Console will remain idle before returning to the main menu.
Telnet UI Idle Time-out	Duration of time the console will remain idle before closing the Telnet connection.
Telnet Session Status	Inactive or Active, depending on whether session is in progress.
Telnet Session Source IP	The IP address of the device being used for Telnet Management.

Table 3-12 UI Time-out Settings

Setting Console Idle Time-out Period

Use the following procedure to set the Console Idle Time-out.

1. Type **c** in the User Interface Configuration Menu.

   A prompt for the number of minutes is displayed.

2. Enter the Idle Time-out in minutes at the prompt.

   - *Note:* The default time-out is 5 minutes. Range for time-out is 0-60 minutes (0 indicates no time-out).

   To exit without making any changes, press **ctrl-c.**

3. Press **Return.**

The change of the Console Idle Time-out period is reflected in the User Interface Configuration menu.

Setting Telnet Idle Time-out Period

Use the following procedure to change the Telnet Time-out.

1. Type **t** in the User Interface Configuration Menu.

   A prompt for the number of minutes is displayed.

2. Enter the Idle Time-out in minutes at the prompt.

   - *Note:* The default time-out is 5 minutes. Range for time-out is 1-60. To exit without changes, press **ctrl-c.**

3. Press **Return.**

The change of the Telnet Idle Time-out period is reflected in the User Interface Configuration menu.

After you have configured the desired time-outs, type **q** to return to the previous menu.

Changing the Password

Use this option to change the password that the user must enter to log in to the configuration menu when using either the console or the Web server interface.

▲ **Important:** The factory default password is **Asante.** The password is case-sensitive.

To change the current Local Management Interface or Web-based Interface password, use the following procedure.

1. Type **p** in the User Interface Configuration Menu.
2. Type the password you have been using at the prompt.
3. Type a new password at the "Enter Current Password" prompt.

   ▲ **Important:** The password is case-sensitive. The password can be up to a maximum of 20 characters in length. The password characters can be any ASCII code.
4. Press **Return.**
5. Type the new password again at the confirmation password prompt.

   To cancel the change in password, type **ctrl-c.**
6. Press **Return.**

   The password change takes effect.
7. Type **q** to return to the Configuration menu.

You will now need to enter the new password each time you log in to the Configuration menu.

4
Statistics

This chapter describes how to access the statistics for any module in the Galaxy 9000, and how to change your view of those statistics and the counters displayed in it.

Viewing Statistics

Viewing statistics on a regular basis allows you to evaluate your network's performance. You can view current statistics for the IntraChassis 9000 on a per-port basis by accessing the Statistics Menu in the Local Management Interface.

To view statistics use the following procedure.

1. Access the IntraChassis 9000 Local Management Interface, as explained in Chapter 2, "Installation and Set-up".
2. Type **s** in the Local Management Interface Main menu. The System Module Map is displayed, as shown in Figure 4-1.

```
System Module Map
=================

Please select one of the following slots

 Slot     Description (Module Type)
 ----     -----------------------------
   1      24 10/100BaseTX ports Module (24-100TX)
   2      <none>
   3      1000BaseX ports Module (2-GBIC)
   4      <none>
   5      24 10/100BaseTX ports Module (24-100TX)
   6      <none>
   7      <none>
   8      <none>

Enter Module Number (1-8)>
```

Figure 4-1 Systems Module Map

3. Select the module for which you want to see statistics. The Port Statistics Counters screen is displayed, as shown in Figure 4-2.

```
IntraChassis 9000 Port Statistics Counters          Module: 2  Port: 1

Elapsed Time Since Up:      000:00:00:55

<Counter Name>    <Total>   <Avg./s>  <Counter Name>  <Total>  <Avg./s>

Total RX Pkts       1474        26      Total RX Bytes  116246     2113
Dropped Pkts         185         3      Good Broadcast     57        1
Good Multicast         6         0      Undersize Pkts      0        0
Oversize Pkts          0         0      CRC/Align Errors    0        0
Fragments              0         0      FCS Errors          0        0
Collisions             0         0      Late Events         0        0
64-Byte Pkts         283         5      65-127 Pkts      1174       21
128-255 Pkts          12         0      256-511 Pkts        5        0
512-1023 Pkts          0         0      1024-1518 Pkts      0        0



<Cmd>  <Description>    <Cmd>  <Description>    <Cmd>  <Description>
   r     since reset       x     next module       n     next port
   t     stop refresh      v     prev module       p     prev port
   q     quit              g     select module     s     select port


Command>
```

Figure 4-2 Port Statistics Counters since system up

4 Use the **s** command to select a port for which you want to see the counters, or use **n** and **p** to find the port.

5 Use the **g** command to select a different module (group) in which you want to select a port, or use **x** and **v** to find the module.

6 Type **t** to stop the periodic updating of the counters, so you can record what they are at that time.

7 Type **r** to see a display of the same counters, but accrued since the last reset of the counters as shown in Figure 4-3.

```
IntraChassis 9000 Port Statistics Counters          Module: 2  Port: 1

Elapsed Time Since Reset:     000:00:00:55

<Counter Name>    <Total>   <Avg./s>  <Counter Name>  <Total>  <Avg./s>

Total RX Pkts       1474        26     Total RX Bytes 116246     2113
Dropped Pkts         185         3     Good Broadcast    57        1
Good Multicast         6         0     Undersize Pkts     0        0
Oversize Pkts          0         0     CRC/Align Errors   0        0
Fragments              0         0     FCS Errors         0        0
Collisions             0         0     Late Events        0        0
64-Byte Pkts         283         5     65-127 Pkts     1174       21
128-255 Pkts          12         0     256-511 Pkts       5        0
512-1023 Pkts          0         0     1024-1518 Pkts     0        0



<Cmd>  <Description>    <Cmd>  <Description>    <Cmd>  <Description>
  u    since system up   x     next module       n     next port
  t    stop refresh      v     prev module       p     prev port
  q    quit              g     select module     s     select port


Command>
```

Figure 4-3 Port Statistics Counters since reset

8 Type **r** to in the “since reset” screen reset the statistics counters so you can see them accrue again from zero.

9 Type **q** to quit either statistics screen and return to the Local Management System Main Menu.

For definitions of the counters, see Appendix B, "MIB Statistics".

5
Advanced Management

This chapter describes advanced topics for SNMP and RMON management of the IntraChassis 9000, Multicast Traffic Management, and configuration of Spanning Tree Protocol parameters.

Spanning Tree Protocol

The Spanning Tree Protocol (STP) is a part of the IEEE 802.1D standard that provides for redundancy in a bridged LAN by allowing multiple links between points in the LAN.

Without the use of STP, multiple links in a bridged network will result in bridging loops, which allow excess broadcast traffic which can bring down an entire network.

Overview

The spanning tree protocol reduces a network with multiple, redundant connections to one in which all points are connected (the protocol spans the network), but in which there is only one path between any two points (the paths are branched, as in a tree).

For example, in a large network with multiple paths, the same message will get broadcast over the network through multiple paths, resulting in a great amount of extra network traffic, and possibly, network downtime. This “closed path” or “bridged loop” among the networks can also start an unending packet-passing process.

▲ **Important:** To explain STP more effectively, the IntraChassis 9000 is described as a bridge for this section of the manual.

How It Works

All bridges on the network communicate with each other using special packets called Bridge Protocol Data Units (BPDUs). The information exchanged in the BPDUs enables bridges on the network to:

- ❑ Elect a single bridge to be the Root Bridge.
- ❑ Calculate the shortest path from each bridge to the root.
- ❑ Select a Designated Bridge on each segment which lies closest to the root, and will forward traffic to the root.
- ❑ Select a port on each bridge to forward traffic to the root.
- ❑ Select the ports on each bridge which will forward traffic, and place the redundant ports in blocking state.

Enabling and Disabling STP

The IntraChassis 9000 is shipped with Spanning Tree enabled on all ports. It can be manually enabled or disabled following the instructions below

To enable or disable STP on your IntraChassis 9000, use the following procedure.

1. Type **c** to open the Configuration Menu.
2. Open the Spanning Tree Configuration Menu by typing **s** in the Configuration Menu. See Figure 5-1.
3. Type **t** to toggle STP to **enabled** or **disabled**.
4. If you select **disabled**, you are prompted to confirm the change.

   The STP status is changed. The status is displayed near the top of the Spanning Tree Configuration menu.

Configuring Spanning Tree Parameters

To view the Spanning Tree Configuration menu, as shown in Figure 5-1, type **s** in the Configuration menu.

```
IntraChassis 9000 Spanning Tree Configuration Menu

STP Status:       Enabled
Bridge ID:        8000 0000948EF37B

Designated Root:  0001 00503EA8B000
Root Port:        Module: 3  Port: 8
Root Path Cost:   110

Hello Time:       2 Sec.          Bridge Hello Time:      2 Sec.
Maximum Age:      20 Sec          Bridge Maximum Age:     20 Sec.
Forward Delay:    15 Sec.         Bridge Forward Delay:   15 Sec.

<Cmd>     <Description>
  t       Toggle STP Enable/Disable
  i       Set Bridge Priority
  h       Set Bridge Hello Time
  a       Set Bridge Maximum Age
  d       Set Bridge Forward Delay
  p       Spanning Tree Port Configuration
  q       Return to Previous Menu


Command>
```

Figure 5-1 Spanning Tree Configuration menu

Spanning Tree Parameters

The operation of the Spanning Tree Algorithm is governed by several parameters. You should only attempt to set these parameters if you have experience with the 802.1D specification.

Bridge Priority

Setting the Bridge Priority to a low value will make it more likely that the current bridge will become the root bridge. If the current bridge is located physically near the center of your network, you may wish to decrease the Bridge Priority from its default value of 0x8000. If the current bridge is near the edge of your network, it is best to leave the value of the Bridge Priority at its default.

Hello Time

This is the time period between BPDUs transmitted by each bridge.

Maximum Age

Each bridge should receive regular configuration BPDUs from the direction of the root bridge. If the Maximum Age timer expires before the bridge receives

another BPDU, it assumes that a change in the topology has occurred and begins recalculating the spanning tree.

Forward Delay

The Forward Delay parameter regulates the delay before each port begins transmitting traffic after a recalculation of the spanning tree. If a port begins forwarding traffic too soon, the network can be adversely affected. The permitted range of the Forward Delay is 4 to 30 seconds.

- *Note:* The Hello Time, Maximum Age, and Forward Delay are constrained by the following formula:

  ```
  (Hello Time + 1) <= Maximum Age <= 2 x (Forward Delay -1)
  ```

  In general, reducing the values of these timers will make the spanning tree react faster in the case of changes in the topology, but may cause temporary loops as the tree stabilizes in a new configuration. Lengthening the timers will make the tree react more slowly to changes in configuration but will make an unintended reconfiguration less likely. All of the bridges in the tree must agree on the values of these timers, so each bridge uses the ones advertised by the root.

Port Priority

If two ports are connected to the same segment, the manager can affect the probability that either one will be chosen for inclusion in the tree by changing this value.

Current STP Settings

The following settings are displayed in the Spanning Tree Port Configuration menu screen, as shown in Figure 5-2.

Setting	Description
STP Status	Whether spanning tree protocol is currently enabled or disabled.
Bridge ID	The Bridge Identifier of this bridge. The first part of the Bridge ID is the Bridge Priority. (If the Bridge ID is shown as 8000 000094EE5080, the 8000 is the Bridge Priority. The remainder is the MAC address of this bridge, which cannot be changed.).
Designated Root	The Bridge Identifier of the bridge that is currently the root bridge for the spanning tree.
Root Port	The port this bridge will use to forward traffic to the root. If this bridge is the root, the root port will be 0.
Root Path Cost	The cost as calculated by the spanning tree for messages to reach the root. If this bridge is the root, the cost will be 0.
Hello Time	The value of the timer currently being used by the bridge.
Maximum Age	The value of the maximum age timer currently being used.
Forward Delay	The value of the forward delay timer currently being used.
Bridge Hello Time	The value that will be used by the spanning tree if this bridge becomes the root bridge.
Bridge Maximum Age	The value that will be used by the spanning tree if this bridge becomes the root bridge.
Bridge Forward Delay	The value that will be used by the spanning tree if this bridge becomes the root bridge.

Spanning Tree Port Configuration

To set the Port Priority and Port Path Cost values for STP, access the Spanning Tree Port Configuration menu shown in Figure 5-2 by typing **p** in the Spanning Tree Configuration menu.

```
IntraChassis 9000 Spanning Tree Port Config. Menu   Module Type: (24-
100TX)
Module: [1]
Port:   [1]

Port Speed:        100 Mbps
Port Status:       Enabled
Port State:        Forwarding
Port MAC Address:  00:00:93:8F:E3:7C
Port Priority:     0x80
Port Path Cost:    10

<Cmd>     <Description>
  i       Set Port Priority
  c       Set Port Path Cost
  q       Return to Previous Menu


Command>
```

Figure 5-2 Spanning Tree Port Configuration menu

Setting Port Priority and Path Cost

Use the following procedure to set the STP Port Priority and Path Cost values.

The port priority is a Bridge Spanning Tree parameter that ranks each port. When 2 or more ports have the same path cost, the STP selects the path with the highest priority (lowest numerical value). By changing the priority of a port, you can make it more or less likely to become the root port. The default value is 128, and the range is 0-255.

Port path cost is the Bridge Spanning Tree parameter that assigns a cost factor to the port. The lower the assigned port path cost, the more likely the port is to be accessed. The default value is a result of the equation

`path cost = 1000/LAN speed (in Mbps)`

Thus, for 10Mbps ports, the assigned default port path cost is 100, for 100Mbps ports the default port path cost is 10, and for 1000Mbps ports, the assigned default port path cost is 1. The range is 1-65,535.

1. Access the Spanning Tree Port Configuration menu by typing **p** in the Spanning Tree Configuration menu.
2. Use the **m**, **x**, and **v** commands to select the module with the port you want to configure.
3. Use the **s**, **n**, and **p** commands to select the port you want to

configure.

4 Type **i** to set the Port Priority.

Type **c** to set the Port Path Cost.

5 Enter a value for the setting you are making.

6 Press **Return**.

The new Port Priority or Port Path Cost is displayed in the Spanning Tree Port Configuration menu.

SNMP and RMON Management

The SNMP (Simple Network Management Protocol) may be used to manage the IntraChassis 9000. The SNMP agent supports database objects that are defined in the following management information bases (MIBs):

- ❑ MIB II (RFC 1213)
- ❑ Bridge MIB (RFC 1493)
- ❑ RMON (RFC 1757) 4 groups - Ethernet Statistics, Ethernet History, Alarm, and Events (See next section for details)
- ❑ Private IntraChassis 9000 MIB

Any SNMP-based network management application can be used to manage the IntraChassis 9000. Refer to your SNMP software manual for information on management of switches.

For details on console-based SNMP settings, see “SNMP Configuration” in Chapter 3.

RMON Management

Remote Network Monitoring allows the network manager to gather data on the network’s traffic for future retrieval. RMON is an Internet Standard defined in RFC1757.

Using RMON, a network monitor (also called a probe) listens to traffic on the network and gathers statistics which may be retrieved later by a network management station using the Simple Network Management Protocol (SNMP) as described in the previous section. The four groups of RMON that are supported by the IntraChassis 9000 are described in the following sub-sections.

Ethernet Statistics Group

This group contains statistics measured on each port of the IntraChassis 9000. These are cumulative counters which start at zero each time the IntraChassis 9000 is reset. The Statistics Group is automatically implemented by the IntraChassis 9000.

Ethernet History Group

This group records periodic statistical samples from ports on the IntraChassis 9000 and stores them for later retrieval. A network manager can use the data to analyze how network traffic has varied over a period of time.

Alarm Group

This group takes periodic statistical samples from variables in the IntraChassis 9000 and compares them to previously configured thresholds. If the monitored variable crosses a threshold, an event is generated.

Event Group

This group controls the generation and notification of events from the IntraChassis 9000. The Alarm and Event groups together allow the network manager to configure RMON so that if a particular statistic such as the number of bad frames goes higher than a certain level, the IntraChassis 9000 will send a trap to its configured trap receivers, notifying the manager of the event. For information on configuring trap receivers, see “SNMP Configuration” in Chapter 3.

The IntraChassis 9000 switches provide control of the RMON groups only through SNMP. Please see the documentation for your SNMP management application for information.

For more information about RMON, please see RFC1757, “Remote Network Monitoring Management Information Base”, available from the FTP site listed in Appendix A.

Security

There are three security options you can use on ports of the IntraChassis 9000. These are duplicated IP detection/trapping, station movement trapping, and new node trapping.

You can designate a device as a trap receiver as explained in "Adding or Updating a Trap Receiver" in the "SNMP Configuration" section of Chapter 3. This receiver device will get the following information from the specified traps.

Trap	Duplicated IP	Station Movement	New Node
Information shown:	MAC addresses of both stations using IP address; number of port(s) on switch	Station's MAC address and IP address (if available); number of port	Intruder's MAC address and IP address (if available); number of port

Table 5-1 Security Traps

The following subsections describe each of the three security options in detail.

Duplicated IP Detection/Trap

These two security measures allow you to set up detection and the sending of a trap (alert) for the use of a single IP address by two stations. If you enable Duplicated IP detection, the switch starts monitoring the broadcast ARP (Address Resolution Protocol) traffic from all of its ports, to detect duplicated IP address conditions. If you enable detection *and* the sending of a trap, then the designated trap receiver will get an alert each time a duplicated IP address is used on the system.

- *Note:* In order to send Duplicated IP traps, Duplicated IP detection must be enabled.

Station Movement Trap

This security measure ensures that when any end station is moved from one switch port to another, an alert (Station Movement Trap) will be sent to the designated trap receiver. The information displayed in the alert is listed in Table 5-1. The station movement is detected when the station's MAC address (already learned by the switch) appears on a different switchboard.

New Node Detection Trap

This security measure ensures that when any new device is connected to the secured port, an alert (New Node Detection Trap) will be sent to the designated trap receiver. The information shown in the alert is listed in Table 5-1. The new device is detected when it is connected and its MAC address is recognized as one not present in the current table.

Once a device has been connected and has generated traffic on the network, the trap will not be re-sent. If the switch ages out the MAC address of a connected device from its forwarding database, new traffic from that device will result in a New Node trap being sent. The default age-out time is 300 seconds. You may reduce the number of traps sent by lengthening the age-out time, as explained in "Setting the MAC Address Age-Out Time" in Chapter 3.

Enabling and Disabling Duplicated-IP Detection

To enable or disable detection of duplicated IP addresses, access the Security Management menu by typing **t** in the Configuration menu. Then type **d** to toggle Duplicated-IP detection from enabled to disabled, or disabled to enabled. By default, Duplicated-IP detection is enabled.

Enabling and Disabling Duplicated-IP Trap

To enable or disable the sending of a trap when a Duplicated-IP is detected, first enable Duplicated-IP detection as explained in the previous section. Then type **i** in the Security Management menu to toggle Duplicated-IP Trap from enabled to disabled, or disabled to enabled. By default, Duplicated-IP Trap is enabled.

Enabling and Disabling Station Movement Trap

To enable or disable detection of the movement of a station on the IntraChassis 9000, access the Security Management menu by typing **t** in the Configuration menu. Then type **s** to toggle the Station Movement Trap from enabled to disabled, or disabled to enabled. By default, the Station Movement Trap is disabled.

Enabling and Disabling New Node Detection Trap

To enable or disable detection of a new node on the system, access the Security Management menu by typing **t** in the Configuration menu. Then type **n** to toggle New Node detection from enabled to disabled, or disabled to enabled. By default, New Node detection is disabled {right?}.

Viewing a List of Duplicated-IP Addresses

To see a list of duplicated IP addresses that have been detected at the IntraChassis 9000, type **l** in the Security Management menu. A screen appears, similar to Figure 5-3.

```
Duplicated-IP List
+-------------+-----------------+-+-+-----------------+-+-+
|  IP Address  |    Owner MAC    |M|P|   Spoofer MAC   |M|P|
+-------------+-----------------+-+-+-----------------+-+-+
 192.203.54.222 00:00:94:00:00:01 1 1 00:00:94:00:00:02 1 2
 192.203.54.223 00:00:94:00:00:04 1 3 00:00:94:00:00:02 1 2
 192.203.54.224 00:00:94:00:00:05 1 4 00:00:94:00:00:02 1 2









Press <q> to Quit, or, press any key to continue...
```

Figure 5-3 List of Duplicated-IP Addresses

Resetting Security to Defaults

To reset the security measures on the IntraChassis 9000 to the factory defaults, access the Security Management menu by typing **t** in the Configuration menu. Then type **r** to reset all of the security configurations that have been changed back to the factory-set defaults. These defaults and their meanings are discussed in the sections on each security measure, earlier in this chapter.

VLAN Management

A *virtual* LAN, or VLAN, is a logical segmentation/grouping that allows stations/users to communicate as if they were physically connected to a single LAN, independent of physical configuration of the network. Though a VLAN

group presents to the user a picture of connection to a single LAN, it is different from a LAN in the sense that it localizes the broadcast, multicast, and flooded traffic to *parts* of LAN segments, rather than to the whole LAN. In essence, a VLAN segment/group can be considered the Layer-2 broadcast segment equivalent of a Layer-3 network.

The real need for VLANs in traditional Layer-2 bridges and switches arises from their use of a basic flooding mechanism which results in unnecessary flooding traffic (broadcast, multicast, and unknown destination traffic) that causes clogging and band-width wastage in a LAN. As today's networks expand rapidly, the Layer-2 flooding problem can become a bottleneck.

The present-day technology provides various means of controlling these flooding traffic problems, which mainly include deployment of Layer-3 devices that provide broadcast firewalls. Other methods include IP multicast control, customized packet filtering, etc. It is evident that these solutions press the requirement for Layer-3 routers. As all of us know, more and more deployment of legacy routers increases the latency of traffic forwarding and eventually degrades network performance. Also, the cost of maintenance increases and configuration becomes more complex with more Layer-3 devices.

In contrast, VLAN technology offers a simple and efficient solution that enhances the network performance, bandwidth utilization, and more importantly, network security, by localizing the broadcast, multicast, and unicast flooding traffic.

Port based VLANs provide one of the many VLAN approaches that solve the problem of unnecessary flooding. They allow ports to be grouped in VLAN segments, so as to limit the transmission of incoming broadcast, multicast, and unknown destination address frames in a VLAN segment to only those ports that are grouped in that segment. This grouping produces selective flooding, rather than flooding to all ports in the system. This, in turn, greatly reduces the unnecessary flooding traffic in a network.

Other VLAN approaches include MAC-based VLANs and policy-based VLANs. The present version of the IntraChassis 9000 supports port-based VLANs in compliance with IEEE P802.1Q/Draft 8 standards. The following sections of the chapter describe the concepts and details needed to configure and manage VLANs on Intrachassis switches.

VLAN Specifications for the IntraChassis 9000

The present IntraChassis 9000 supports the following IEE P802.1Q features:

- ❑ Up to 64 Manually Configurable VLANs
- ❑ Default VLAN
- ❑ VLAN creation and deletion
- ❑ VLAN port member addition and deletion
- ❑ VLAN untagged set addition and deletion
- ❑ Configurable VID range: 2 - 4094
- ❑ Port VID configurable range: 1 - 4094
- ❑ Port Ingress Filtering
- ❑ Port Admit Frame Type
- ❑ Independent VLAN learning (IVL)
- ❑ Shared VLAN learning (SVL)
- ❑ GVRP for dynamic VLAN learning (to be supported; later versions)
- ❑ Single STP (Spanning Tree Protocol) spanning multiple VLANs
- ❑ SNMP based VLAN management

Other VLAN Features in IntraChassis 9000

- ❑ VLAN management security
- ❑ VLAN MAC address insertion and removal
- ❑ Console UI management of VLANs
- ❑ Web interface management of VLANs

The subsections following the Abbreviations below describe these features and how each is configured.

Abbreviations

The following abbreviations are used throughout this chapter.

GARP:	General Attribute Registration Protocol
GVRP	GARP VLAN Registration Protocol
MGMT:	Management.
PVID:	A tagged port's VLAN ID. Range is 1…4094.
STP:	Spanning tree protocol.
Tagged Frame:	Frame with 802.1Q VLAN Tag header.
Untagged Frame:	Frame either without 802.1Q VLAN Tag header, or with this header and with VID = 0.
VID:	VLAN ID in the range of 1…4095.

- ◆ *Note:* The terms "groups" and "segments" are both used to represent VLAN segments in the system. They are numbered from 1 to 64. VLAN Groups

The IntraChassis 9000 supports 64 manually configurable VLAN Groups. A VLAN group is uniquely identified by a 12-bit (1-4095) VLAN ID (VID). No two VLAN Groups can have the same VID if they reside on the same switch. Each VLAN group has a portmap that specifies the port members of the VLAN and a set of untagged ports, which specifies the port members of the VLAN group that transmit only VLAN untagged frames. The untagged set can be a subset of the portmap, or it can be the same as the portmap, but it cannot have ports that are not part of the portmap. If a port is in the VLAN portmap and not in the VLAN untagged set, then the port transmits tagged frames only. A VLAN group can be shared with other VLAN groups for MAC address learning purposes.

The management operations allowed on a VLAN group are:

- ❑ Creation
- ❑ Deletion
- ❑ Name configuration.
- ❑ VID Change configuration.
- ❑ Adding and deleting port members
- ❑ Adding and deleting untagged sets
- ❑ Sharing and unsharing VLANs
- ❑ Inserting and removing MAC addresses
- ❑ Toggling Management Access

Default VLAN

As per IEEP802.1Q specifications, the only VLAN that exists by default in the IntraChassis 9000 is the default VLAN, with VID = 1, and all ports as its members. Also, all ports belong to the default VLAN's untagged set. The following table summarizes the Default VLAN configuration in the IntraChassis 9000.

Default VLAN Information	Operations Allowed for Default VLAN
Name: Default VLAN VID: 1 Port Members: All ports Untagged Set: All Ports Port PVID: 1 for all Ports Management Access: Enabled	Creation/Deletion: Not allowed Set VLAN Name: Allowed Change VID: Not allowed Port member Addition/Deletion: Allowed Untagged member Addition/Deletion: Allowed MAC address Insertion/Removal: Allowed Toggle Management Access: Allowed Share/Unshare VLAN: Allowed

Table 5-2 Default VLAN information and operations

Port VLAN ID

Port VLAN ID or PVID is used for VLAN classification of incoming untagged frames and has meaning only when a port is configured to receive both untagged and tagged frames. The untagged frames get classified to the VLAN represented by the PVID of the ingress port and the tagged frames get classified to the VLAN represented by the VID carried in the tag header of the received

frame. Ports should have a non-zero VID associated with them. By default, the PVID of all ports is 1, in compliance with IEE P802.1Q specifications. The allowed PVID range is 1-4094. The PVID of 4095 is assigned to ports that are configured to receive only 802.1Q tagged frames. See the “Port Admit Frame Type” section for details.

Port Admit Frame Type

All ports are set by default to receive both 802.1Q VLAN tagged frames and untagged frames. According to IEEE P802.1Q, a port should be configurable to admit only 802.1Q VLAN tagged frames. Untagged frames are filtered unconditionally on the ports that are set to admit only 802.1Q tagged frames; the source MAC addresses of the incoming untagged frames are not learned either. When a port is set to receive only 802.1Q tagged frames, it’s PVID has no meaning, and is therefore assigned the value of 4095. Incoming tagged frames are classified to the VLAN represented by the VID in the tag header of the frame. See the “Port Ingress Filtering” section for more information about forwarding and filtering of received tagged frames.

This feature is helpful in setting up Intra Switch Link (ISL) configuration. {need more information}

Port Ingress Filtering

This feature controls the learning and filtering behavior of the ports for which there are incoming untagged and tagged frames. If a port’s ingress filtering is disabled, the learning of incoming source addresses and the forwarding of untagged and tagged frames happens in the switch regardless of whether the ingress port is a member of the incoming frame’s VLAN classification or not. But when ingress filtering is enabled, incoming untagged and tagged frames are filtered unconditionally, as long as the ingress port is not a member of the frame’s VLAN classification. There is also no learning of the source address.

This feature is helpful in setting up Intra Switch Link (ISL) configuration. {{need more information}}

VLAN Port Membership and Untagging

Port members can be added to and deleted from a VLAN Group. This operation is mainly useful in defining the configuration discussed in the {cf IVL/SVL} section. When you add a port member to a VLAN, it is added to the untagged set by default; this means the frames sent out on this port will be untagged. To change the egress frame type, the port has to be deleted from the

VLAN untagged set. Deleting a port from the untagged set means that the port is still a member of this VLAN, but it can transmit tagged frames only. Ports can be added to the untagged set of a VLAN group. When added to the untagged set, the port is added to the VLAN's port member set also. So in essence, a port in a VLAN can transmit either tagged or untagged frames, depending on its association with the VLAN's untagged set. No port can transmit both tagged and untagged frames on the same VLAN.

6
Web Browser Management

This chapter tells how to manage the IntraChassis 9000 by means of a Web browser, using Web pages to monitor and configure the switch.

Accessing with a Web Browser

This section explains how to access the HTTP server and view the management features it offers. To use Web browser management, the IntraChassis must be configured with an IP address. See "Configuring for Management" in Chapter 2 for instructions.

1. Locate a computer with a functioning World Wide Web browser and open the browser.
2. Type the Switch IP address at the URL prompt.
3. Enter user name **IntraChassis** and a password. The default password is A**sante**.
4. Press **Return**. The Switch Web Browser Management Overview Page appears, as shown in Figure 6-1.

   - *Note:* The browser pages shown in this chapter are typical of those used for the IntraChassis and settings are given only as examples. The user must configure the IntraChassis with parameters that are specific to the user's application and site requirements.

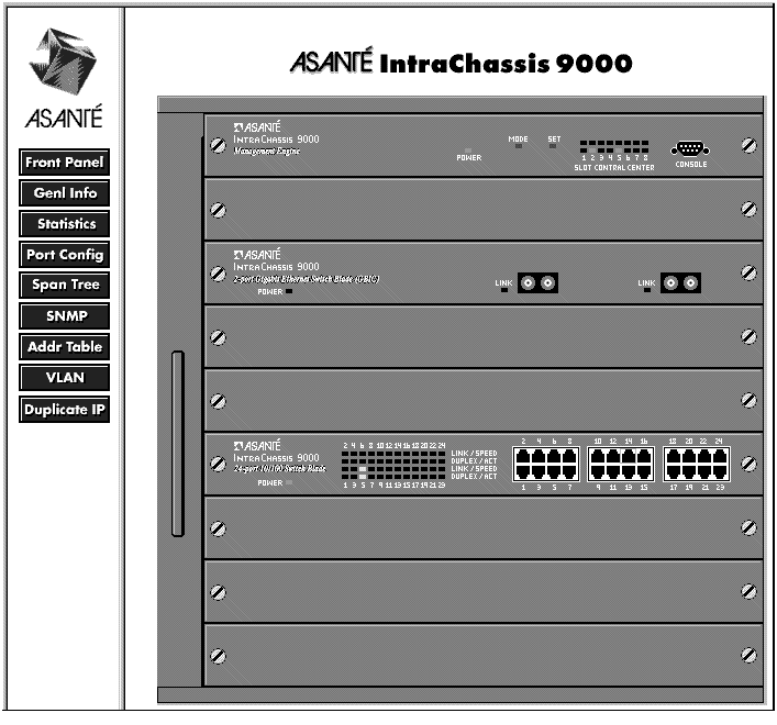


Figure 6-1 Web Browser Overview Page

The Switch Web Browser Overview Page contains a sidebar with nine management option buttons, and a view of the IntraChassis front panel that displays real-time IntraChassis 9000 operating information.

Management Buttons

The left sidebar frame buttons provide the following options:

- ❑ Front Panel
- ❑ Genl Info (General Information)
- ❑ Statistics
- ❑ Port Config (Port Configuration)
- ❑ Span Tree (Spanning Tree Protocol Configuration)

- ❑ SNMP (Simple Network Management Protocol)
- ❑ Addr Table (IP/MAC Address Table)
- ❑ VLAN (Virtual LAN Configuration)
- ❑ Duplicate IP (Duplicate IP Trap Log)

The following sections describe and explain the pages that are displayed when you click each of the buttons.

Front Panel Button

This button opens (or refreshes) the IntraChassis Web Browser Management Page. This is the top-level or opening page. It contains the following elements.

Front Panel display

The front panel graphic displays the image of the connected switch, its LED panel, and the active data ports.

The front panel LED display simulates the IntraChassis in real-time operating mode. It approximates all switch activity as it occurs.

Port Selector Feature

If you point the cursor to a port connector and click the mouse, a port-specific page is displayed, which shows the selected port's configuration and traffic statistics.

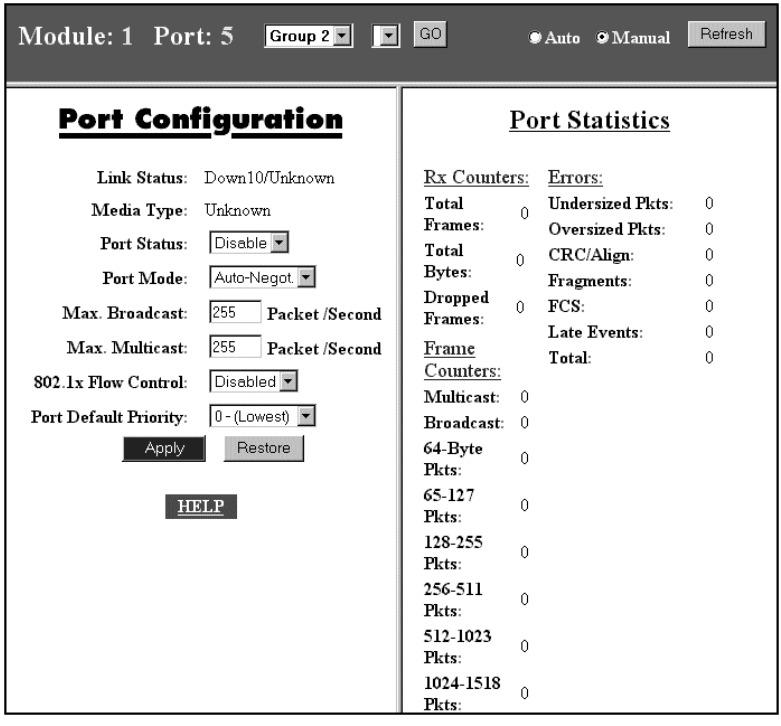


Figure 6-2 Port configuration and statistics page

GenI Info (General Information) Button

This button opens the IntraChassis's General Information page. The page has seven sub-levels, as shown in Figure 6-3. The General Information fields are described fully in "Viewing Current Operating Information" in Chapter 3.

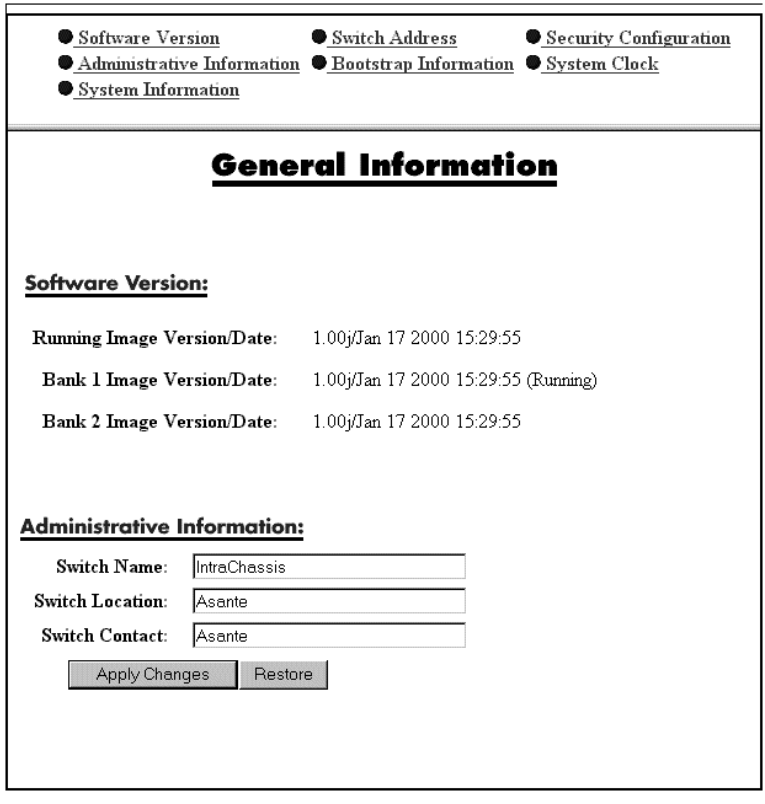


Figure 6-3 General Information page

The first two sub-levels, Software Version and Administrative Information, are displayed on the opening page. To view the other sub-levels, click the links for them at the top of the General Information page.

Statistics Button

This button opens the Statistics page, which presents a graphical image of the IntraChassis statistics, as shown in Figure 6-4. On this page, the user can view system statistics since the last system reset. See "Viewing Statistics" in Chapter 4 for a description of the statistics counters.

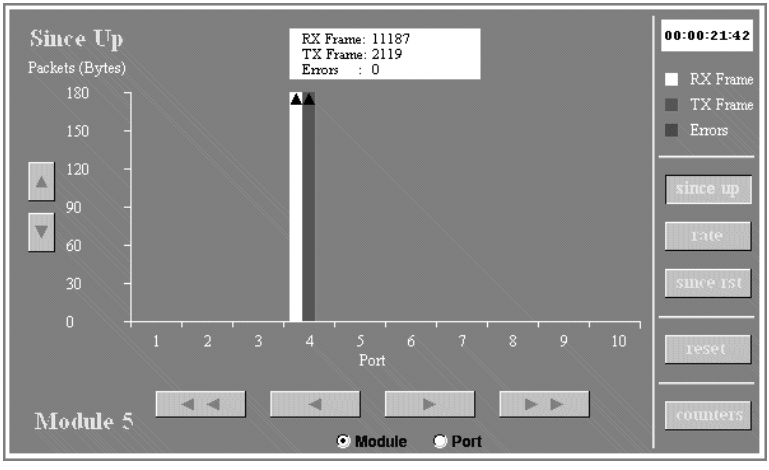


Figure 6-4 Statistics - Bar Chart

The following features allow you to modify the statics bar chart.

- Up-Down Arrows – The left-most up and down arrows let you scroll the screen up to view the counter graph, when the counters have run off the screen due to the system having been up for a long time.
- Right-Left Arrows - These arrows beneath the Bar Chart let you view the statistics for different ports on the same module (if the **Port** radio button is selected) or ports in different modules (if the **Module** radio button is selected).
- Since Up Button – Brings up a graph of the total packets/bytes switched on the ports since the switch was last reset or powered on.
- Rate Button – Displays the rate of the packets or bytes per port.
- Since Rst – Displays the packets/bytes switched since the management counters were last reset or cleared.

- ❑ Reset – Clears the counters for future samplings.
- ❑ Counters – Displays the statistical counters of the associated view, since up or since reset, a shown in Figure 6-6 and Figure 6-7.
- ◆ *Note:* You may also view a summary of the frames per port by placing the cursor on the desired bar. A box with the statistics appears, as shown in

To see either a line graph or a table display of the system's statistics, click on a bar, then choose the option you want from the pop-up menu at the top of the Statistics page, and click **Apply**. {{right?}}

In Figure 6-5 the Received Frames statistics for a single port are displayed in a line graph.

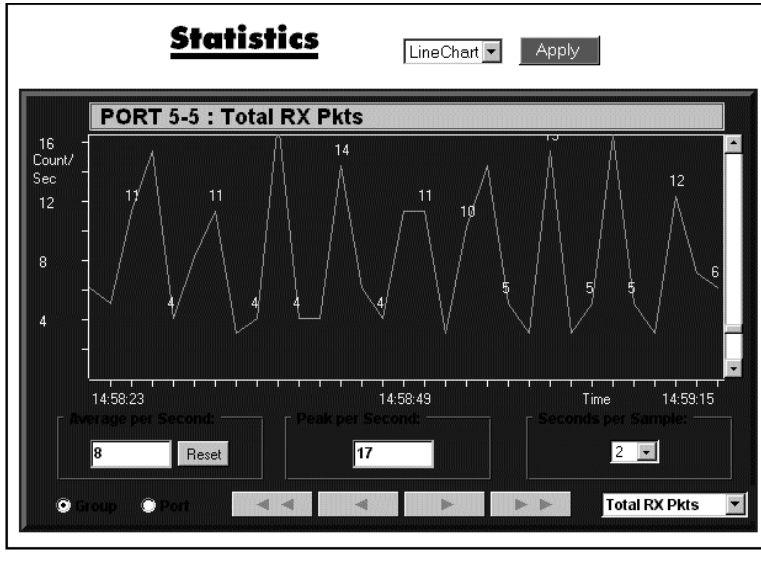


Figure 6-5 Line Chart of received frames for a port

In Figure 6-6, a summary of the counters for a port is displayed in table format.

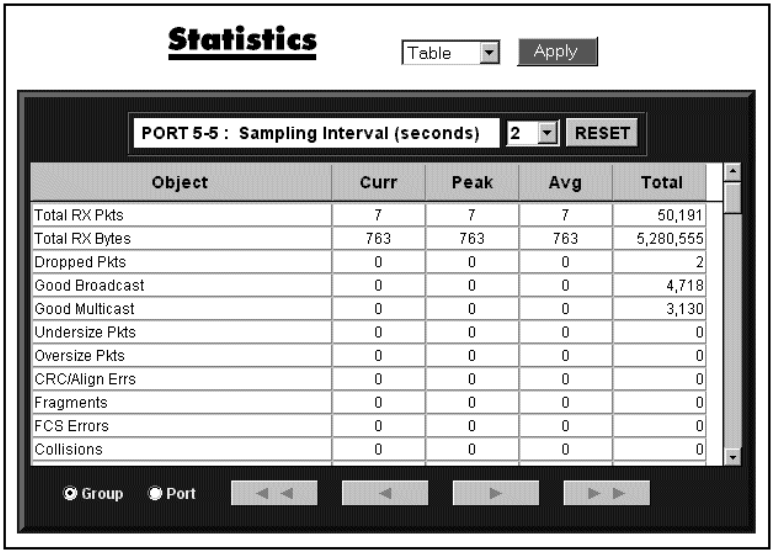


Figure 6-6 Summary of counters for a port

In Figure 6-7 the counters for a port are displayed in bar graph form.

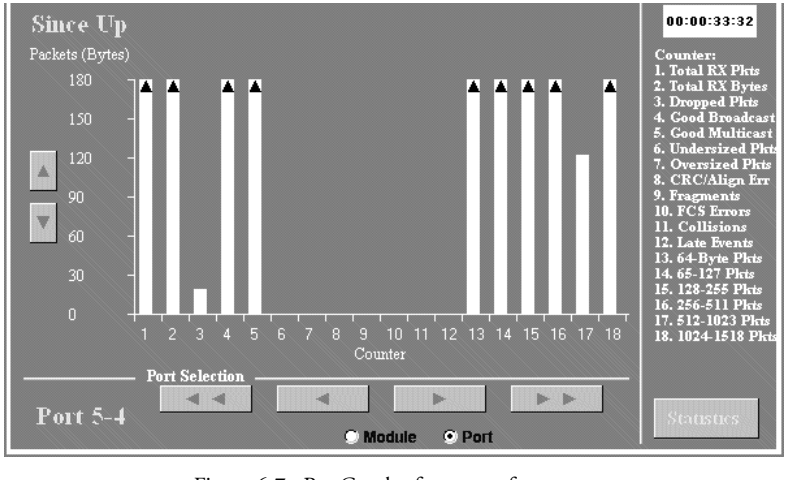
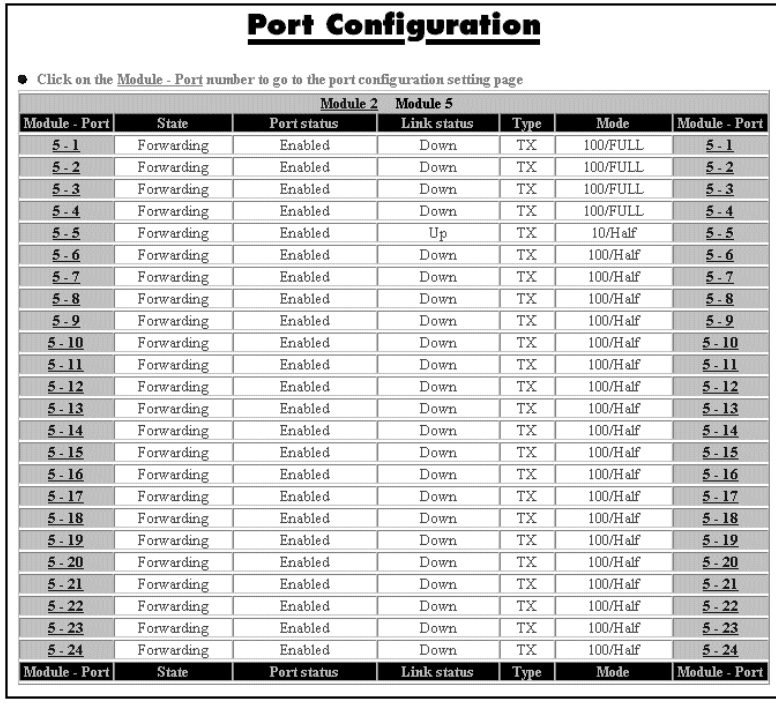


Figure 6-7 Bar Graph of counters for a port

Port Config (Port Configuration) Button

This button opens the Port Configuration page, which provides a comprehensive overview of the status of each port on the IntraChassis, as shown in Figure 6-8. The configuration page for any individual port can be accessed by single clicking on the associated blue number in the right or left hand margin.



Port Configuration

Click on the Module - Port number to go to the port configuration setting page

Module 2 Module 5

Module - Port	State	Port status	Link status	Type	Mode	Module - Port
5 - 1	Forwarding	Enabled	Down	TX	100/FULL	5 - 1
5 - 2	Forwarding	Enabled	Down	TX	100/FULL	5 - 2
5 - 3	Forwarding	Enabled	Down	TX	100/FULL	5 - 3
5 - 4	Forwarding	Enabled	Down	TX	100/FULL	5 - 4
5 - 5	Forwarding	Enabled	Up	TX	10/Half	5 - 5
5 - 6	Forwarding	Enabled	Down	TX	100/Half	5 - 6
5 - 7	Forwarding	Enabled	Down	TX	100/Half	5 - 7
5 - 8	Forwarding	Enabled	Down	TX	100/Half	5 - 8
5 - 9	Forwarding	Enabled	Down	TX	100/Half	5 - 9
5 - 10	Forwarding	Enabled	Down	TX	100/Half	5 - 10
5 - 11	Forwarding	Enabled	Down	TX	100/Half	5 - 11
5 - 12	Forwarding	Enabled	Down	TX	100/Half	5 - 12
5 - 13	Forwarding	Enabled	Down	TX	100/Half	5 - 13
5 - 14	Forwarding	Enabled	Down	TX	100/Half	5 - 14
5 - 15	Forwarding	Enabled	Down	TX	100/Half	5 - 15
5 - 16	Forwarding	Enabled	Down	TX	100/Half	5 - 16
5 - 17	Forwarding	Enabled	Down	TX	100/Half	5 - 17
5 - 18	Forwarding	Enabled	Down	TX	100/Half	5 - 18
5 - 19	Forwarding	Enabled	Down	TX	100/Half	5 - 19
5 - 20	Forwarding	Enabled	Down	TX	100/Half	5 - 20
5 - 21	Forwarding	Enabled	Down	TX	100/Half	5 - 21
5 - 22	Forwarding	Enabled	Down	TX	100/Half	5 - 22
5 - 23	Forwarding	Enabled	Down	TX	100/Half	5 - 23
5 - 24	Forwarding	Enabled	Down	TX	100/Half	5 - 24
Module - Port	State	Port status	Link status	Type	Mode	Module - Port

Figure 6-8 Port Configuration table

To view the Port Configuration table for the ports of a different module, click on the module number link at the top of the table. For example in Figure 6-8, you could see the table for the ports in Module 2 by clicking on the Module 2 link at the top of the table.

Span Tree (Spanning Tree) Button

This button opens the Spanning Tree Protocol (STP) Configuration page, which shows the STP Configuration of the IntraChassis, as shown in Figure 6-9. STP configuration is explained in Chapter 5, Advanced Management. Click the STP Port Configuration button to display the STP Configuration settings for each port.

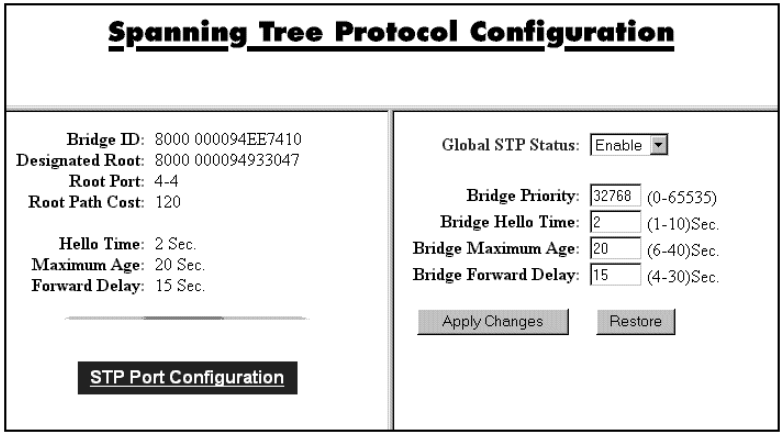


Figure 6-9 Spanning Tree Configuration page

▲ **Important:** Do NOT configure any STP parameters unless you have knowledge of and experience with the IEEE 802.1d specification.

SNMP Button

This button displays the SNMP (Simple Network Management Protocol) page, as shown in Figure 6-10. See “SNMP Configuration” in Chapter 3 for an explanation of SNMP settings.

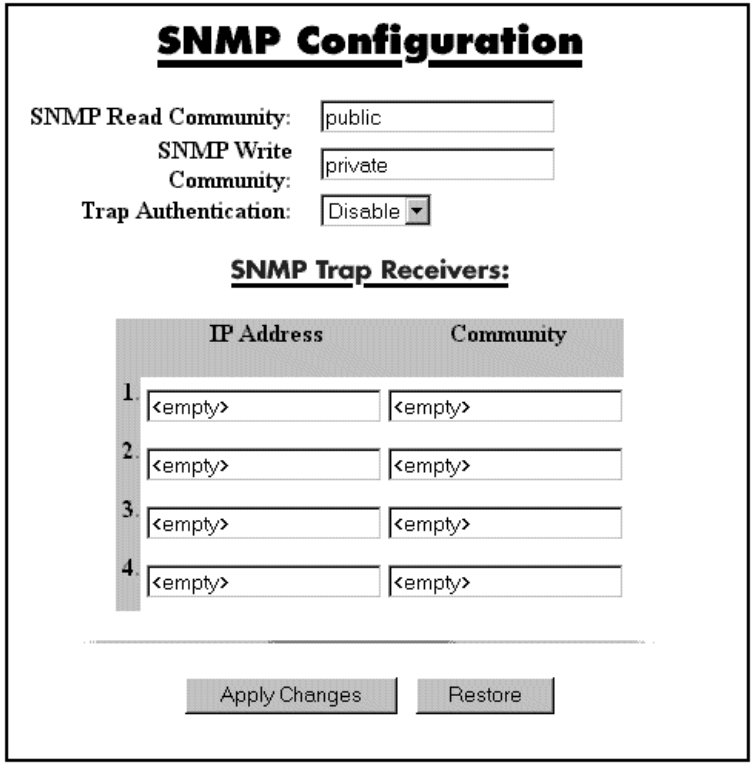
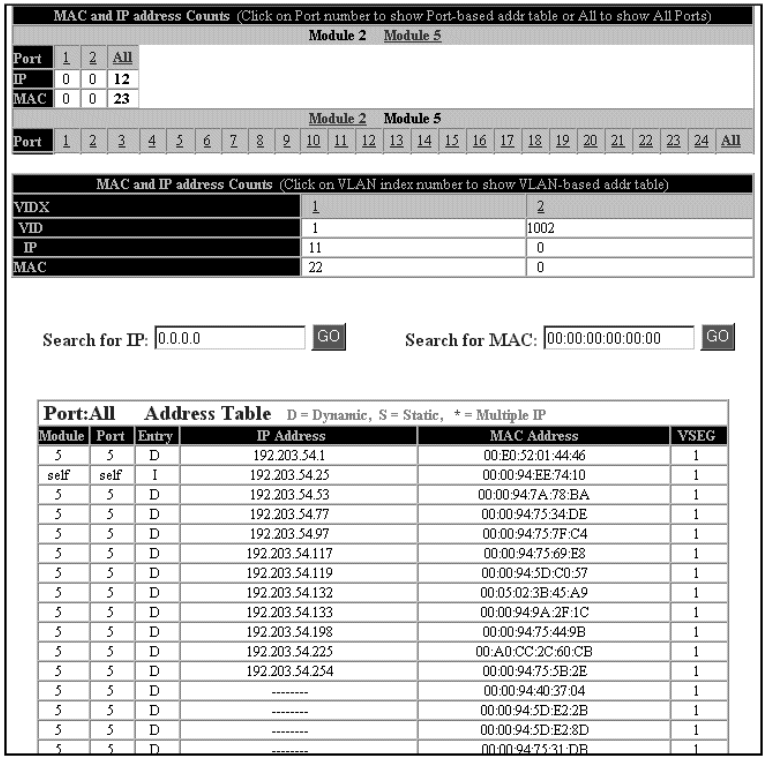


Figure 6-10 SNMP Configuration page

Addr (Address) Table Button

The Addr Table button opens the MAC and IP Address Table page, which displays two tables, as shown in Figure 6-11. The top table displays the counts of IP and MAC addresses for each port. The lower table displays IP and MAC addresses for either a particular port, or **All** ports. The display for all ports is shown in Figure 6-11. The activity status (Entry) and VLAN segment (VSEG) are also displayed for each device.



MAC and IP address Counts (Click on Port number to show Port-based addr table or All to show All Ports)

Module 2 Module 5

Port	1	2	All
IP	0	0	**12**
MAC	0	0	**23**

Module 2 **Module 5**

Port	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	All

MAC and IP address Counts (Click on VLAN index number to show VLAN-based addr table)

VIDX	1	2
VID	1	1002
IP	11	0
MAC	22	0

Search for IP: 0.0.0.0 GO Search for MAC: 00:00:00:00:00:00 GO

Port:All Address Table D = Dynamic, S = Static, * = Multiple IP

Module	Port	Entry	IP Address	MAC Address	VSEG
5	5	D	192.203.54.1	00:E0:52:01:44:46	1
self	self	I	192.203.54.25	00:00:94:EE:74:10	1
5	5	D	192.203.54.53	00:00:94:7A:78:BA	1
5	5	D	192.203.54.77	00:00:94:75:34:DE	1
5	5	D	192.203.54.97	00:00:94:75:7F:C4	1
5	5	D	192.203.54.117	00:00:94:75:69:E8	1
5	5	D	192.203.54.119	00:00:94:5D:C0:57	1
5	5	D	192.203.54.132	00:05:02:3B:45:A9	1
5	5	D	192.203.54.133	00:00:94:9A:2F:1C	1
5	5	D	192.203.54.198	00:00:94:75:44:9B	1
5	5	D	192.203.54.225	00:A0:CC:2C:60:CB	1
5	5	D	192.203.54.254	00:00:94:75:5B:2E	1
5	5	D	--------	00:00:94:40:37:04	1
5	5	D	--------	00:00:94:5D:E2:2B	1
5	5	D	--------	00:00:94:5D:E2:8D	1
5	5	D	--------	00:00:94:75:31:DB	1

Figure 6-11 IP and MAC Address Table page

To see the MAC and IP addresses, the activity status, and the VLAN segment for the devices connected to a particular port, click the port's number in the top table. Use the **Search** boxes to search for either an IP or MAC address on the IntraChassis.

VLAN Button

This button opens the VLAN Port Selection page, as shown in Figure 6-12. The page shows the modules of the IntraChassis 9000. There is also a panel indicating the current Port VLAN ID and its settings. For information on VLANs, see Chapter 5.

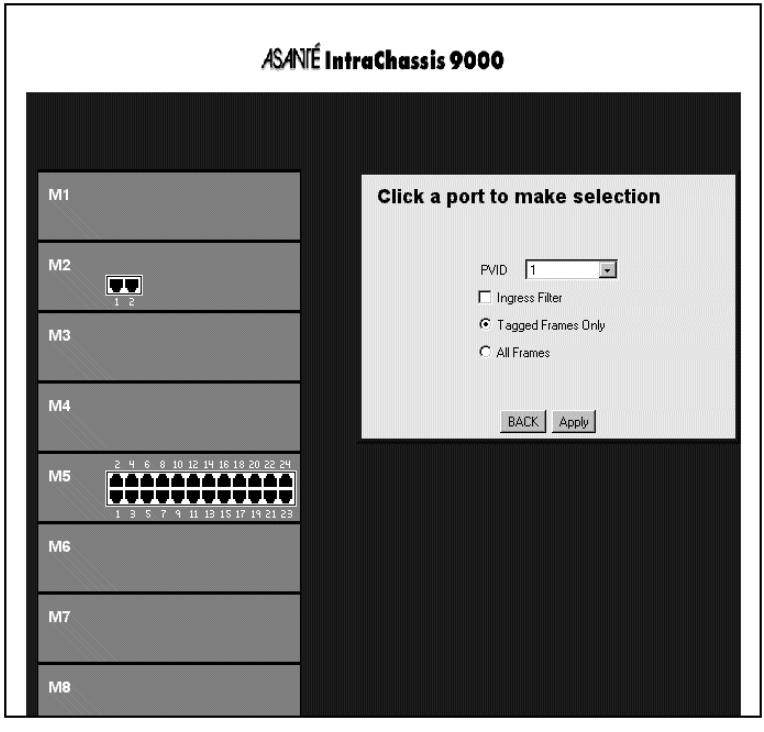


Figure 6-12 VLAN Port Selection page

To see the PVID and settings for a port, click on the connector for it in the module simulation. To see the options for VLAN Group Configuration, {{Do What?}}.

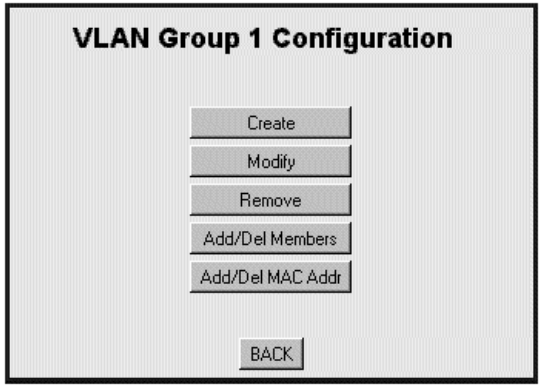


Figure 6-13 VLAN Group Configuration options

To add or delete MAC addresses for devices connected to the IntraChassis 9000, click the **Add/Del MAC Addr** button in the VLAN Group Configuration dialog box. The dialog box shown in Figure 6-14 appears.

Figure 6-14 Add/Delete MAC Address dialog box

When you have added or deleted the MAC address, the VLAN Group Configuration page is displayed again.

To create or modify the basic attributes of a VLAN group, click the button for the option in the VLAN Group Configuration dialog box. {{right?}} The VLAN Attributes dialog box is displayed, as shown in Figure 6-15.

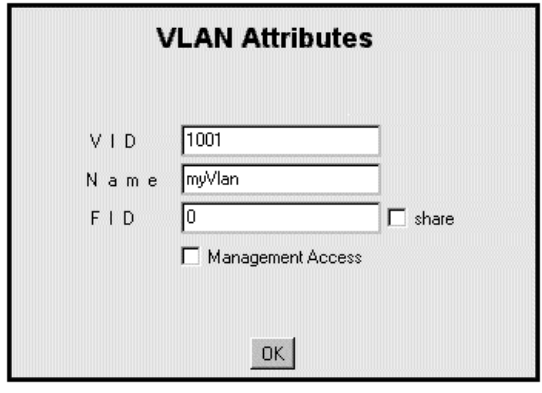


Figure 6-15 VLAN Attributes dialog box

Enter or change the basic attributes, then click OK.

To see advanced management options for the current VLAN {{do what?}}

The Advanced VLAN Management dialog box is displayed, as shown in Figure 6-16.

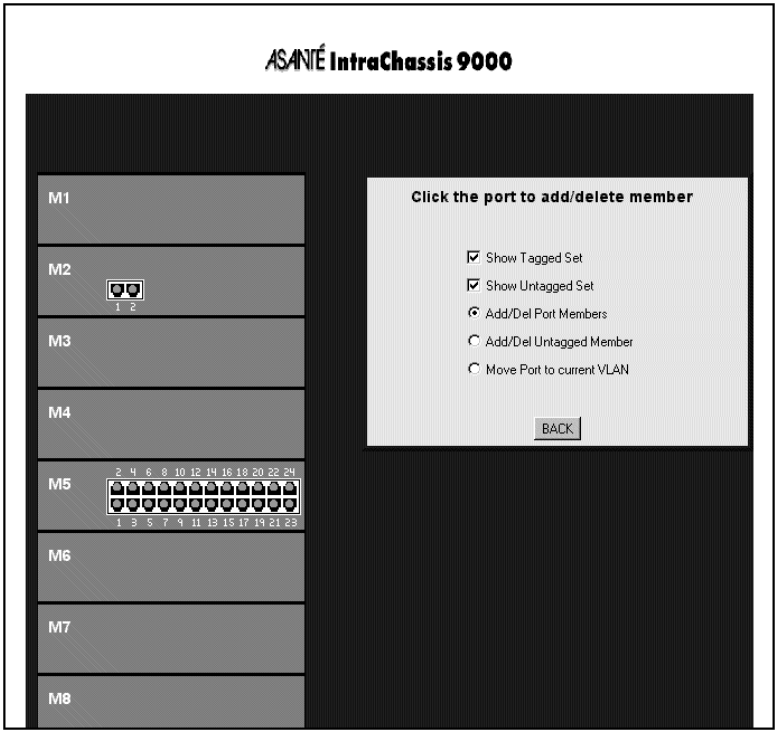


Figure 6-16 Advanced VLAN Management dialog box

Select the port you want to manage, and click the appropriate radio button to move the port, or to add or delete members from it.

Duplicate IP Button

This button lights up if a duplicate IP number has been detected on the system. If you click the button, it opens the Duplicate IP Trap Log page, which, if the trap is enabled, displays a record of duplicate IP Addresses detected. The Log shows the MAC address of the device that is the original or rightful owner of the IP address, and the MAC address of the spoofer device that is using a copy of the IP address.

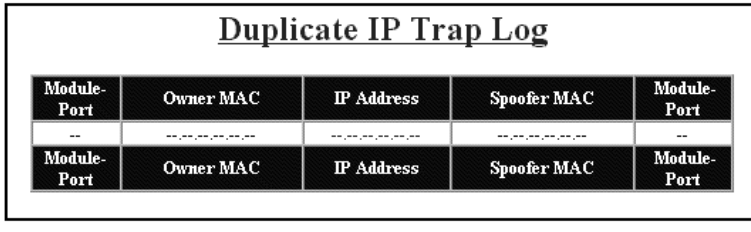


Figure 6-17 Duplicate IP Trap Log page

For more information on enabling the Duplicate IP trap, see "Enabling and Disabling Duplicated-IP Trap" in Chapter 5.

A
Technical Support

Contacting Technical Support

To contact Asanté Technical Support:

Telephone	(800) 622-7464
Fax	(801) 566-3787
Fax-Back	(800) 741-8607
E-mail	support@asante.com
World Wide Web Site	http://www.asante.com
FTP site for RMON information	<ftp://ftp.isi.edu/in-notes/rfc1757.txt>

Technical Support Hours

6:00 a.m. to 5:00 p.m. Pacific Standard Time USA, Monday - Friday.

B
MIB Statistics

MIB Object Definitions for Counters

The following MIB objects are those for which counters are displayed in the Statistics Counters screens shown in both the console and Web interface. The definitions and references are quoted from RFC 1516.

Readable Frames

"This object is the number of frames of valid frame length that have been received on this port. This counter is incremented by one for each frame received on this port whose OctetCount is greater than or equal to minFrameSize and less than or equal to maxFrameSize (Ref: IEEE 802.3 Std, 4.4.2.1) and for which the FCSError and CollisionEvent signals are not asserted.

This statistic provides one of the parameters necessary for obtaining the packet error rate. The approximate minimum time for rollover of this counter is 80 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aReadableFrames

Readable Octets

"This object is the number of octets contained in valid frames that have been received on this port. This counter is incremented by OctetCount for each frame received on this port which has been determined to be a readable frame (i.e., including FCS octets but excluding framing bits and dribble bits).

This statistic provides an indicator of the total data transferred. The approximate minimum time for rollover of this counter is 58 minutes."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aReadableOctets

FCS Errors

"This counter is incremented by one for each frame received on this port with the FCSError signal asserted and the FramingError and CollisionEvent signals deasserted and whose OctetCount is greater than or equal to minFrameSize and less than or equal to maxFrameSize (Ref: 4.4.2.1, IEEE 802.3 Std).

The approximate minimum time for rollover of this counter is 80 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aFrameCheckSequenceErrors

Alignment Errors

"This counter is incremented by one for each frame received on this port with the FCSError and FramingError signals asserted and CollisionEvent signal deasserted and whose OctetCount is greater than or equal to minFrameSize and less than or equal to maxFrameSize (Ref: IEEE 802.3 Std, 4.4.2.1). If rptrMonitorPortAlignmentErrors is incremented then the rptrMonitorPortFCSErrors Counter shall not be incremented for the same frame.

The approximate minimum time for rollover of this counter is 80 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aAlignmentErrors

Frame Too Longs

"This counter is incremented by one for each frame received on this port whose OctetCount is greater than maxFrameSize (Ref: 4.4.2.1, IEEE 802.3 Std). If rptrMonitorPortFrameTooLongs is incremented then neither the rptrMonitorPortAlignmentErrors nor the rptrMonitorPortFCSErrors counter shall be incremented for the frame.

The approximate minimum time for rollover of this counter is 61 days."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aFramesTooLong

Short Events

"This counter is incremented by one for each CarrierEvent on this port with ActivityDuration less than ShortEventMaxTime. ShortEventMaxTime is greater than 74 bit times and less than 82 bit times. ShortEventMaxTime has tolerances included to provide for circuit losses between a conformance test point at the AUI and the measurement point within the state machine.

Note: shortEvents may indicate externally generated noise hits which will cause the repeater to transmit Runts to its other ports, or propagate a collision (which may be late) back to the transmitting DTE and damaged frames to the rest of the network.

Implementors may wish to consider selecting the ShortEventMaxTime towards the lower end of the allowed tolerance range to accommodate bit

losses suffered through physical channel devices not budgeted for within this standard.

The approximate minimum time for rollover of this counter is 16 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aShortEvents

Runts

"This counter is incremented by one for each CarrierEvent on this port that meets one of the following two conditions. Only one test need be made.

a) The ActivityDuration is greater than ShortEventMaxTime and less than ValidPacketMinTime and the CollisionEvent signal is deasserted.

b) The OctetCount is less than 64, the ActivityDuration is greater than ShortEventMaxTime and the CollisionEvent signal is deasserted. ValidPacketMinTime is greater than or equal to 552 bit times and less than 565 bit times.

An event whose length is greater than 74 bit times but less than 82 bit times shall increment either the shortEvents counter or the runts counter but not both. A CarrierEvent greater than or equal to 552 bit times but less than 565 bit times may or may not be counted as a runt.

ValidPacketMinTime has tolerances included to provide for circuit losses between a conformance test point at the AUI and the measurement point within the state machine.

Runts usually indicate collision fragments, a normal network event. In certain situations associated with large diameter networks a percentage of collision fragments may exceed ValidPacketMinTime.

The approximate minimum time for rollover of this counter is 16 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aRunts

Collisions

"This counter is incremented by one for any CarrierEvent signal on any port for which the CollisionEvent signal on this port is also asserted.

The approximate minimum time for rollover of this counter is 16 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aCollisions

Late Events

"This counter is incremented by one for each CarrierEvent on this port in which the CollIn(X) variable transitions to the value SQE (Ref: 9.6.6.2, IEEE

802.3 Std) while the ActivityDuration is greater than the LateEventThreshold. Such a CarrierEvent is counted twice, as both a collision and as a lateEvent.

The LateEventThreshold is greater than 480 bit times and less than 565 bit times. LateEventThreshold has tolerances included to permit an implementation to build a single threshold to serve as both the LateEventThreshold and ValidPacketMinTime threshold.

The approximate minimum time for rollover of this counter is 81 hours."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aLateEvents

Very Long Events

"This counter is incremented by one for each CarrierEvent on this port whose ActivityDuration is greater than the MAU Jabber Lockup Protection timer TW3 (Ref: 9.6.1 & 9.6.5, IEEE 802.3 Std).

Other counters may be incremented as appropriate." Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aVeryLongEvents

D.R. Mismatches

"This counter is incremented by one for each frame received on this port that meets all of the following conditions:

a) The CollisionEvent signal is not asserted.

b) The ActivityDuration is greater than ValidPacketMinTime.

c) The frequency (data rate) is detectably mismatched from the local transmit frequency.

The exact degree of mismatch is vendor specific and is to be defined by the vendor for conformance testing.

When this event occurs, other counters whose increment conditions were satisfied may or may not also be incremented, at the implementor's discretion. Whether or not the repeater was able to maintain data integrity is beyond the scope of this standard."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aDataRateMismatches

Auto Partitions

"This counter is incremented by one for each time the repeater has automatically partitioned this port. The conditions that cause port partitioning are specified in the partition state machine in Section 9 [IEEE 802.3 Std]. They are not differentiated here."

Reference: IEEE 802.3 Rptr Mgt, 19.2.6.2, aAutoPartitions

Total Errors

"The total number of errors which have occurred on this port. This counter is the summation of the values of other error counters (for the same port), namely:

rptrMonitorPortFCSErrors,

rptrMonitorPortAlignmentErrors,

rptrMonitorPortFrameTooLongs,

rptrMonitorPortShortEvents,

rptrMonitorPortLateEvents,
rptrMonitorPortVeryLongEvents, and

rptrMonitorPortDataRateMismatches.

This counter is redundant in the sense that it is the summation of information already available through other objects. However, it is included specifically because the regular retrieval of this object as a means of tracking the health of a port provides a considerable optimization of network management traffic over the otherwise necessary retrieval of the summed counters."