Lucent Technologies
Bell Labs Innovations

Stinger® FS/Stinger FS+

Getting Started Guide

Part Number: 7820-0794-007
For software version 9.4-185.3
July 2003

Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing, but information is subject to change. For latest information, refer to online product documentation at www.lucent.com/support.

European Community (EC) RTTE compliance

CE Hereby, Lucent Technologies, declares that the equipment documented in this publication is in compliance with the essential requirements and other relevant provisions of the Radio and Telecommunications Technical Equipment (RTTE) Directive 1999/5/EC.

To view the official *Declaration of Conformity* certificate for this equipment, according to EN 45014, access the Lucent INS online documentation library at http://www.lucentdocs.com/ins.

Safety, compliance, and warranty Information

Before handling any Lucent Access Networks hardware product, read the *Edge Access and Broadband Access Safety and Compliance Guide* included in your product package. See that guide also to determine how products comply with the electromagnetic interference (EMI) and network compatibility requirements of your country. See the warranty card included in your product package for the limited warranty that Lucent Technologies provides for its products.

Security statement

In rare instances, unauthorized individuals make connections to the telecommunications network through the use of access features.

Trademarks

Lucent, the Lucent logo, and all Lucent brand and product names are trademarks or registered trademarks of Lucent Technologies Inc. Other brand and product names are trademarks of their respective holders.

Ordering Information

You can order the most up-to-date product information and computer-based training online at http://www.lucentdocs.com/bookstore.

Feedback

Lucent Technologies appreciates customer comments about this manual. Please send them to techcomm@lucent.com.

Lucent Technologies

Customer Service

Product and service information, and software upgrades, are available 24 hours a day. Technical assistance options accommodate varying levels of urgency.

Finding information and software

To obtain software upgrades, release notes, and addenda for this product, log in to Lucent OnLine Customer Support at `http://www.lucent.com/support`.

Lucent OnLine Customer Support also provides technical information, product information, and descriptions of available services. The center is open 24 hours a day, seven days a week. Log in and select a service.

Obtaining technical assistance

Lucent OnLine Customer Support at `http://www.lucent.com/support` provides easy access to technical support. You can obtain technical assistance through email or the Internet, or by telephone. If you need assistance, make sure that you have the following information available:

- Active service or maintenance contract number, entitlement ID, or site ID
- Product name, model, and serial number
- Software version or release number
- Software and hardware options
- If supplied by your carrier, service profile identifiers (SPIDs) associated with your line
- Your local telephone company's switch type and operating mode, such as AT&T 5ESS Custom or Northern Telecom National ISDN-1
- Whether you are routing or bridging with your Lucent product
- Type of computer you are using
- Description of the problem

Obtaining assistance through email or the Internet

If your services agreement allows, you can communicate directly with a technical engineer through Email Technical Support or a Live Chat. Select one of these sites when you log in to `http://www.lucent.com/support`.

Calling the technical assistance center (TAC)

If you cannot find an answer through the tools and information of Lucent OnLine Customer Support or if you have a very urgent need, contact TAC. Access Lucent OnLine Customer Support at `http://www.lucent.com/support` and click `Contact Us` for a list of telephone numbers inside and outside the United States.

Alternatively, call 1-866-LUCENT8 (1-866-582-3688) from any location in North America for a menu of Lucent services. Or call +1 510-769-6001 for an operator. If you do not have an active services agreement or contract, you will be charged for time and materials.

Contents

Figures

Tables

About This Guide

What is in this guide

This guide explains how to perform the following installation and basic configuration tasks on a Stinger FS or Stinger FS+ unit:

- Physical installation of the Stinger chassis
- Connection of an administrative terminal to the control module(s)
- Configuration of the control module(s) for basic network connectivity

This guide also provides Stinger technical specifications and an operational overview of the Stinger. When you finish performing the instructions in this guide, the Stinger will be installed and you will be able to access it via a Telnet connection for further configuration.

Note: You may also use this guide to configure the basic control module functions of the Stinger IP2000 control module. For detailed configuration information for the gigabit Ethernet interface, ATM configuration and aggregation, IGMP multicast, and other IP2000 capabilities, see the *Stinger IP2000 Configuration Guide*.

What you should know

Warning: Before installing your Stinger unit, be sure to read the safety instructions in the *Edge Access and Broadband Access Safety and Compliance Guide*. For information specific to your unit, see Appendix C, “Safety-Related Electrical, Physical, and Environmental Information.”

The procedures in this guide require you to understand and follow the safety practices at your site, as well as those identified in this guide. Before installing any hardware, check the installation location for adequate temperature, humidity, and electrical requirements. Work closely with the network manager and other systems integration personnel to ensure a functional installation.

Documentation conventions

Following are the special characters and typographical conventions that might be used in this manual:

Convention	Meaning
`Monospace text`	Represents text that appears on your computer’s screen, or that could appear on your computer’s screen.

Convention	Meaning
Boldface monospace text	Represents characters that you enter exactly as shown (unless the characters are also in ***`italics`***—see *Italics*, below). If you could enter the characters but are not specifically instructed to, they do not appear in boldface.
Italics	Represent variable information. Do not enter the words themselves in the command. Enter the information they represent. In ordinary text, italics are used for titles of publications, for some terms that would otherwise be in quotation marks, and to show emphasis.
[ ]	Square brackets indicate an optional argument you might add to a command. To include such an argument, type only the information inside the brackets. Do not type the brackets unless they appear in boldface.
|	Separates command choices that are mutually exclusive.
>	Points to the next level in the path to a parameter or menu item. The item that follows the angle bracket is one of the options that appear when you select the item that precedes the angle bracket.
Key1-Key2	Represents a combination keystroke. To enter a combination keystroke, press the first key and hold it down while you press one or more other keys. Release all the keys at the same time. (For example, Ctrl-H means hold down the Control key and press the H key.)
Press Enter	Means press the Enter, or Return, key or its equivalent on your computer.
Note:	Introduces important additional information.
Caution:	Warns that a failure to follow the recommended procedure could result in loss of data or damage to equipment.
Warning:	Warns that a failure to take appropriate safety precautions could result in physical injury.
Warning:	Warns of danger of electric shock.

Stinger documentation set

The Stinger documentation set consists of the following manuals, which can be found at `http://www.lucentdocs.com/ins`:

- **Read me first:**
  - *Edge Access and Broadband Access Safety and Compliance Guide*. Contains important safety instructions and country-specific information that you must read before installing a Stinger unit.
  - *TAOS Command-Line Interface Guide*. Introduces the TAOS command-line environment and shows you how to use the command-line interface effectively. This

guide describes keyboard shortcuts and introduces commands, security levels, profile structure, and parameter types.

- **Installation and basic configuration:**
  - *Getting Started Guide* for your unit. Shows how to install your Stinger chassis and hardware. This guide also shows you how to use the command-line interface to configure and verify IP access and basic access security on the unit, and how to configure Stinger control module redundancy.
  - Module guides. For each Stinger line interface module (LIM), trunk module, or other type of module, an individual guide describes the module's features and provides instructions for configuring the module and verifying its status.
- **Configuration:**
  - *Stinger ATM Configuration Guide*. Describes how to use the command-line interface to configure Asynchronous Transfer Mode (ATM) operations on a Stinger unit. The guide explains how to configure permanent virtual circuits (PVCs), and shows how to use standard ATM features such as quality of service (QoS), connection admission control (CAC), and subtending.
  - *Stinger IP2000 Configuration Guide*. For Stinger systems with the IP2000 control module, this guide describes how to integrate the system into the IP infrastructure. Topics include IP-routed switch-through ATM PVCs and RFC 1483 PVCs that terminate on the IP2000, IEEE 802.1Q VLAN, and forwarding multicast video transmissions on DSL interfaces.
  - *Stinger Private Network-to-Network Interface (PNNI) Supplement*. Provides quick-start instructions for configuring PNNI and soft PVCs (SPVCs), and describes the related profiles and commands in the Stinger command-line interface.
  - *Stinger SNMP Management of the ATM Stack Supplement.* Describes SNMP management of ATM ports, interfaces, and connections on a Stinger unit to provide guidelines for configuring and managing ATM circuits through any SNMP management utility.
  - *Stinger T1000 Module Routing and Tunneling Supplement.* Describes how to configure the Layer 3 routing and virtual private network (VPN) capabilities supported by a Stinger T1000 module.
  - *TAOS RADIUS Guide and Reference*. Describes how to set up a TAOS unit to use the Remote Authentication Dial-In User Service (RADIUS) server and contains a complete reference to RADIUS attributes.
- **Administration and troubleshooting:**
  - *Stinger Administration Guide*. Describes how to administer the Stinger unit and manage its operations. Each chapter focuses on a particular aspect of Stinger administration and operations. The chapters describe tools for system management, network management, and Simple Network Management Protocol (SNMP) management.
- **Reference**:
  - *Stinger Reference*. An alphabetic reference to Stinger profiles, parameters, and commands.
  - *TAOS Glossary.* Defines terms used in documentation for Stinger units.

Preparing for the Installation

1

Selecting an installation site

Before you choose a setup location for the Stinger unit, read and follow the site and electrical requirements defined in the *Edge Access and Broadband Access Safety and Compliance Guide*.

Select the setup location carefully. Keep in mind that the unit requires proper ventilation and space for current and future cabling requirements. You can rack-mount the Stinger FS or Stinger FS+ in a standard equipment cabinet that is 19 inches or 23 inches (48.26cm or 58.42cm) wide, or place it on a flat surface as a free-standing unit. For more information, see “Setting up the unit” on page 2-1.

Required tools and equipment

To install and configure the Stinger hardware, you need the following tools and equipment:

- Console terminal connection to the control module’s serial port to configure the unit
- ASCII or VT100 console terminal (Internal Lucent number: ITE 6938) or equivalent with the following setup:
  - 9600 bps
  - Direct connection
  - 8 data bits
  - No parity
  - 1 stop bit
  - No flow control
- RS-232 straight-through modem cable for connecting the console terminal or equivalent to the unit (Internal Lucent number: ITE-6801 List 22)

- Antistatic wrist strap (Internal Lucent number: R-4987C)
- Number 2 Phillips screwdriver
- 1/8-inch and 3/16-inch flathead screwdrivers
- 3/8-inch wrench or socket
- *(Recommended)* Mechanical lift
- *(Optional)* Ethernet LAN connection for connecting the unit to the Ethernet (Internal Lucent number for the 7-foot (2.13m) cable: ITE-7131; for the 12-foot (3.67m) cable: ITE-7180)
- A Clee-top fiber cleaning tool, if an OC3-ATM trunk module is being installed

Preventing static discharge damage

Modules and semiconductor devices in general can be easily and permanently damaged due to electrostatic discharge during installation or removal. A person walking across a floor can generate electrostatic voltages in excess of 5000V. Although you might not notice a discharge of less than 3500V, discharges below 100V can damage semiconductor components.

You can destroy a component without noticing any electrostatic discharge. Because these discharges have very little current, they are harmless to people.

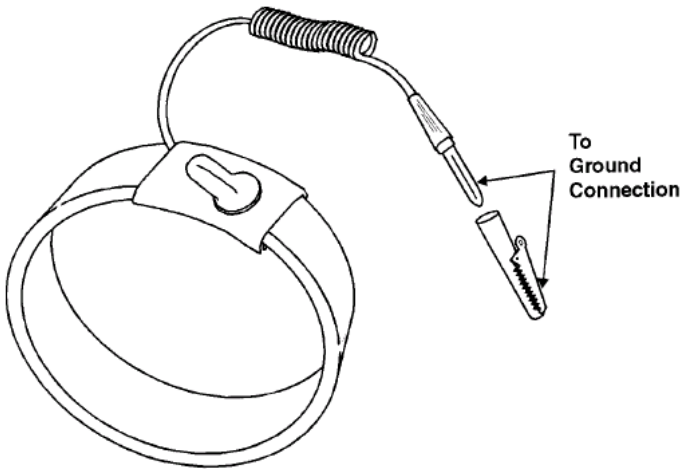
To prevent damage to components from electrostatic discharge, always follow the proper guidelines for equipment handling and storage.

Use a wrist strap

To reduce the static potential on your body by proper grounding, wear an approved antistatic wrist strap (Figure 1-1) when installing, removing, or handling modules, or while handling any Lucent device containing semiconductor components.

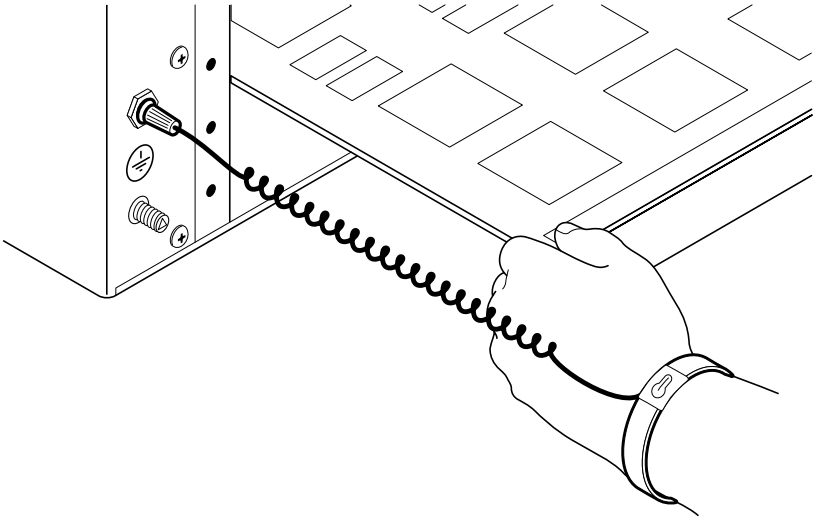
⚠ **Caution:** Correct use of an approved antistatic wrist strap is the only reliable way to prevent damage to components by electrostatic discharge from your body

Figure 1-1. Wrist grounding strap



To minimize entanglement, right-handed people can wear the strap on the left hand. Plug the other end of the wrist strap into the grounding jack provided on most Lucent products, as shown in Figure 1-2.

Figure 1-2. Wrist strap plugged into a grounding jack



If a grounding jack is not available, use an alligator clip to connect the strap to electrical ground.

Use the following two simple tests to verify that the wrist strap is functioning properly:

- Measure the resistance between the wrist strap and its grounding plug. Overall resistance between these two points must be approximately 1 megohm. If it is not, replace the strap.
- Physically examine the strap for visible damage. If you see any damage, replace the strap.

Remove plastics from your work area

Work areas must be kept clear of common plastics, such as the following items:

- Polystyrene packing containers
- Clear plastic bags
- Plastic drinking cups
- Food wrappers
- Clear cellophane tape

These types of common plastic materials can carry a static charge that is not easily discharged to ground and must not make direct contact with modules or any other solid state components.

Store components properly

Protect modules immediately after removal from a chassis by placing them in their original factory packing materials. Storage in approved antistatic packaging is acceptable when factory packaging is unavailable.

Caution: Never place unprotected modules directly on ungrounded metal shelving or on ungrounded carts without insulating surfaces.

Unpacking the Stinger

The Stinger unit is delivered in a protective shipping carton, with all the ordered modules installed. The Stinger chassis is attached to a wooden pallet with screws and L-brackets.

Before you remove the Stinger unit from the shipping carton and delivery pallet, check for damage. If you see any damage, follow the instructions described in your product warranty.

Due to the large size and weight of a fully configured unit, Lucent Technologies recommends moving the unit to the installation site *before* unpacking it from the shipping carton.

Warning: A fully configured Stinger FS or Stinger FS+ weighs up to 160 pounds (72.6kg). To avoid potential injury, use a mechanical lift for moving or rack-mounting the unit.

To unpack the unit:

1. Open the carton and remove all enclosed packing materials. Save the packing materials in case you need to repack the unit later.
2. Verify that the contents of the carton match the items listed on the packing slip.
3. Using a number 2 Phillips screwdriver, remove the screws from the L-brackets on the delivery pallet.
4. Carefully remove the unit from the pallet.

Verifying the hardware configuration

The Stinger FS and Stinger FS+ have a midplane design that enables the control module and line interface modules in the front of a unit to connect to the line protection modules (LPMs) and trunk modules in the back. The Stinger FS+ contains an enhanced midplane bus that can accommodate high-density, 72-port line interface modules (LIMs).

The modules ordered with the unit are installed prior to shipment. Check the unit to verify that it is configured as ordered and to identify the connection points for power and data. The cable connectors and power supply inlets are located at the back of the chassis.

Caution: Wear an antistatic wrist strap before handling any of the unit components. This can be connected to one of two electrostatic discharge (ESD) grounding jacks (banana jacks), located at the top left corner of the front of the unit (Figure 1-3) and also on the rear of the unit (Figure 1-5).

Checking the chassis

The Stinger FS chassis (STGFS) and Stinger FS+ chassis (STGFSP) are almost identical in their external characteristics. The Stinger FS can be identified by the name *Stinger* stenciled

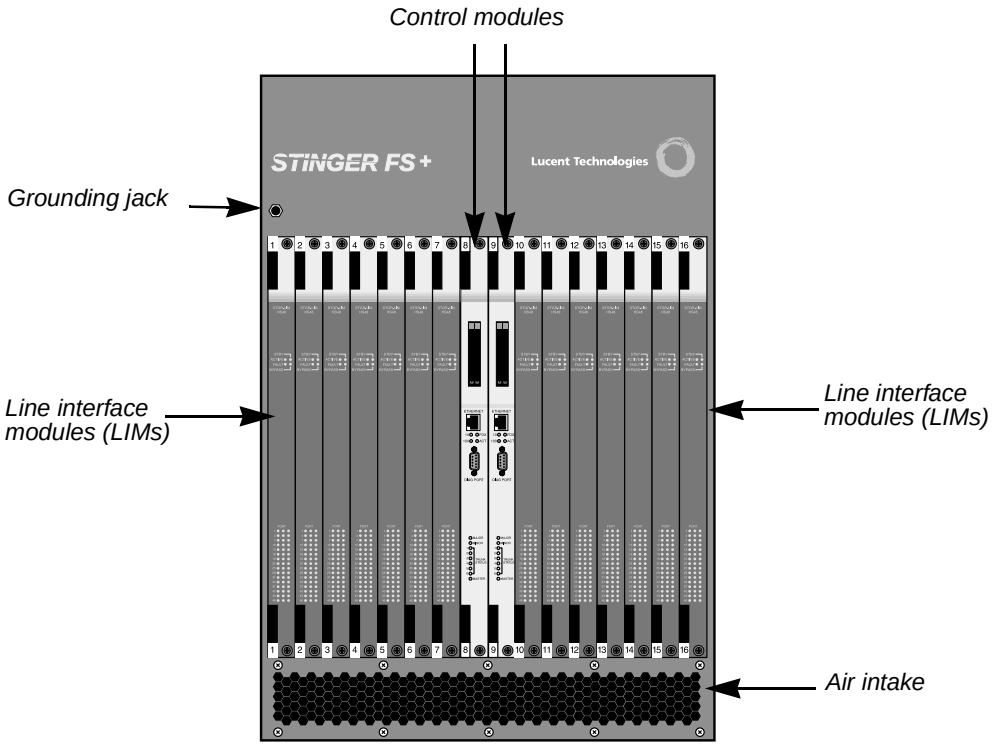
above the card slots on the front of the unit. The Stinger FS+ displays the name *Stinger FS+* on the chassis.

Internally, the Stinger FS+ has an enhanced internal bus that allows it to use LIMs with more than 48 ports. Although LIMs with more than 48 ports can be physically installed the original Stinger chassis, only the first 48 ports of their full capacity are supported.

Checking the control modules and chassis

Figure 1-3 shows the front slots of a Stinger FS or Stinger FS+ and an example configuration that includes redundant control modules.

Figure 1-3. Front view of a Stinger FS+ chassis



The middle two slots in the front of the Stinger FS and Stinger FS+ (slots 8 and 9) are reserved for the control modules; they cannot be used for line interface modules (LIMs). Slots that are not occupied by modules must be masked with blank covers to ensure proper air flow through the unit.

Verifying the control module model

The Stinger FS and Stinger FS+ units support three different revision 2 control modules, and a revision 2.1 control module. In addition, Stinger FS units still support the original revision 1 control module.

The following table details the Stinger FS and Stinger FS+ control modules:

Table 1-1. Control module model designations and product codes

Model	Control module product code	Revision designation
A	STGR-CM-A	2.0
A-J	STGR-CM-A-J	2.0
B	STGR-CM-B	2.0
C	STGR-CM-C	2.0
E	STGR-CM-A2	2.1

Note: Stinger units can also be equipped with the specialized IP2000 control module. Information specific to the IP2000 control module is found in the *Stinger IP2000 Configuration Guide*.

Table 1-2 shows the features provided by the revision 2 and 2.1 Stinger control modules.

Table 1-2. Control module models and features

STGR-CM-A	STGR-CM-A2	STGR-CM-B	STGR-CM-C	Features
Yes	Yes	Yes	Yes	Accepts seven alarm inputs from external devices to centralize alarm reporting.
Yes	Yes	Yes	Yes	Memory increased to 128Mb of internal synchronous dynamic RAM (SDRAM) and 32Mb of nonvolatile RAM on a PCMCIA card.
No	No	Yes	Yes	Contains an internal 56Kbps modem for dial-in remote administration.
No	No	No	Yes	Contains an internal Stratum 3 clock.

Note: The `version` command displays information about the version and type of control module installed in a Stinger unit. For details, see “Verifying software and control module versions” on page 4-5.

Control module support

The original, revision 1, Stinger control module (STGR-CM) is supported by the current release of TAOS, although it must be upgraded to support some features.

Note: The original Stinger control module does not include an Alarm Input port, or an internal modem. It must be equipped with at least 64Mb of DRAM and at least one 32Mbyte flashcard to support features introduced in TAOS 9.0 and later.

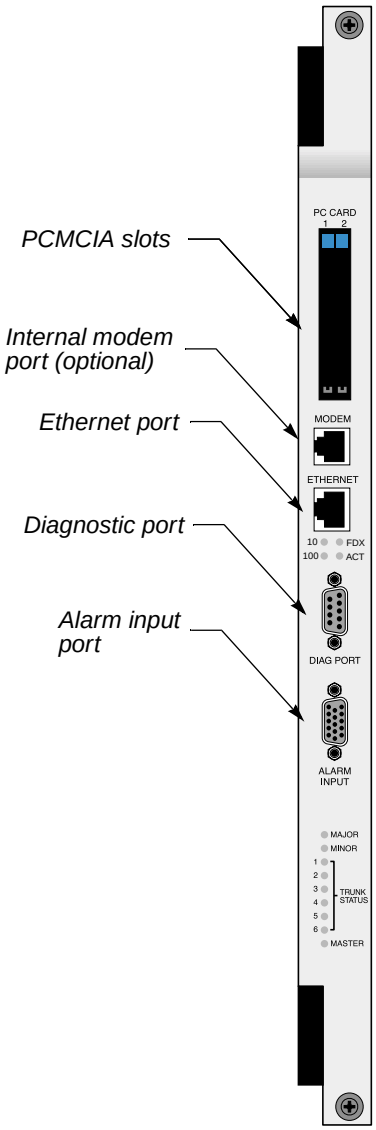
TAOS 9.4-185.2 introduces support for a Model E version of the control module (STGR-CM-A2). The Model E control module utilizes enhanced chipsets and replaces the older Model A control module. The Model E control module is identified in TAOS as hardware revision 2.1. The Stinger Model A control module (STGR-CM-A), introduced with TAOS 9.1-142.1, is also supported by the current version of TAOS.

Control module interfaces

Figure 1-4 shows the location of the modem port, Ethernet port, serial diagnostic port, alarm input port, and Personal Computer Memory Card International Association (PCMCIA) slots on a model B control module. The modem port is not present on all models. Revision 1 control modules do not have an alarm input port.

Note: See the *Stinger IP2000 Configuration Guide* for information about the specialized interfaces on the IP2000 control module.

Figure 1-4. Model B control module interfaces



The system comes with onboard flash memory, and each PCMCIA card provides its own additional memory. The PCMCIA cards store the software and the configuration information for all modules. The system configuration is also stored in the onboard nonvolatile RAM (NVRAM).

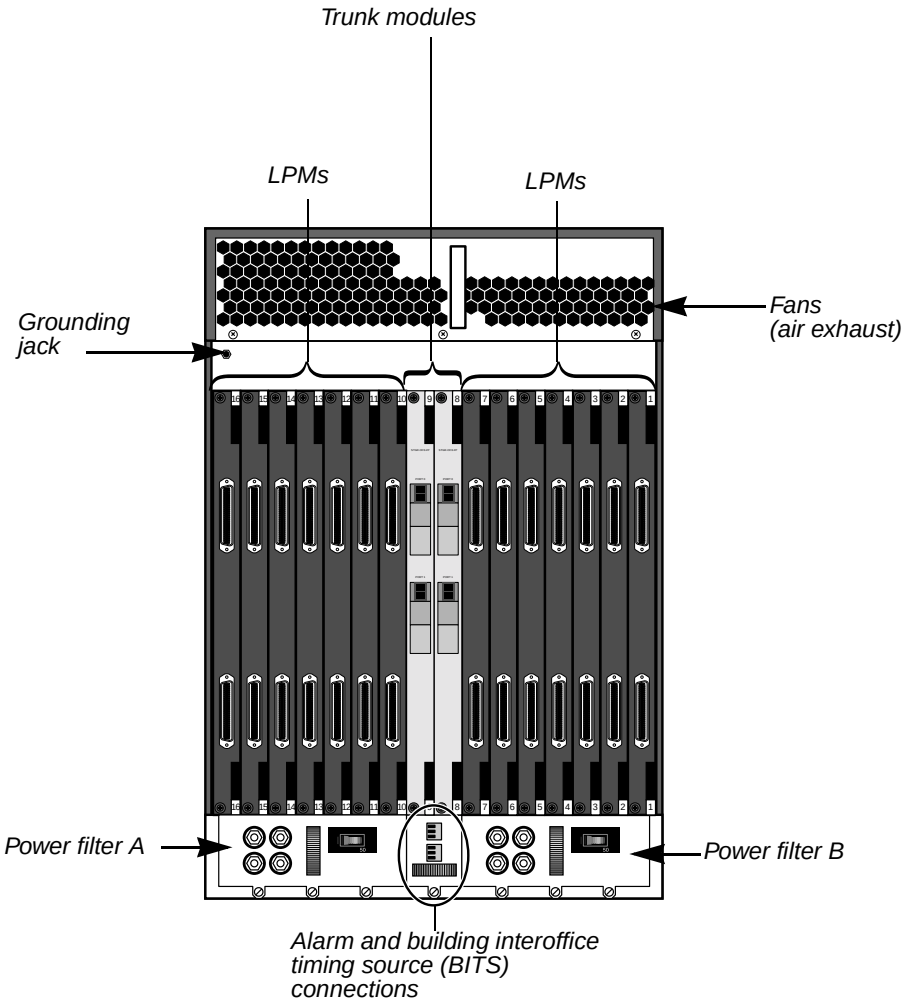
Checking the LIMs

Several line interface modules (LIMs) are available to provide different types of line service. Line interface modules are installed in slots 1 through 7, and 10 through 16 in the front of the chassis. All LIMs connect to their respective line facilities through an associated line protection module (LPM) that is located in the slot behind the LIM. The Stinger FS+ can use high-density 72-port LIMs and their associated 72-port LPMs.

Checking the LPMs

Figure 1-5 shows the back of the Stinger FS or Stinger FS+ chassis.

Figure 1-5. Rear view of a Stinger FS or Stinger FS+ chassis



For each LIM installed in the unit, a corresponding LPM must be installed in the same slot at the back of the unit. If 72-port LIMs are installed in a Stinger FS+, 72-port LPMs must be installed in the corresponding slots at the back of the unit. The middle two slots in the back of the Stinger FS and Stinger FS+ (slots 8 and 9) are reserved for the trunk modules; they cannot be used for LPMs. Slots that are not occupied by modules must be masked with blank covers to ensure proper air flow through the unit.

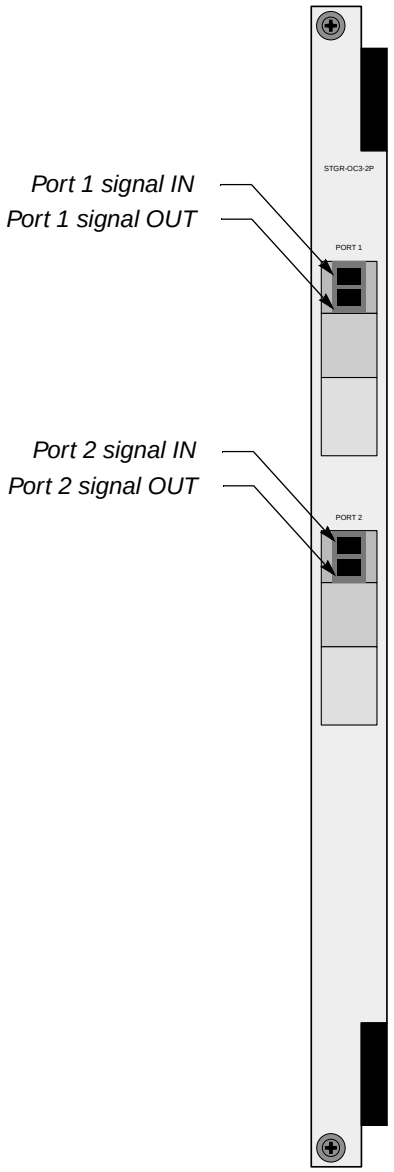
Checking the trunk modules

One or both middle slots in the rear of the chassis of the Stinger FS and Stinger FS+ can contain a trunk module. Each trunk module supports connection to either optical or copper media, depending on the type of module supplied. These center rear slots are physically numbered as slots 8 and 9 to correspond to the slot numbering across the front of the chassis. However, they are logically referred to by the operating system as slots 17 and 18.

OC3-ATM trunk modules

Figure 1-6 shows the location of the optical fiber connections on an OC3-ATM trunk module.

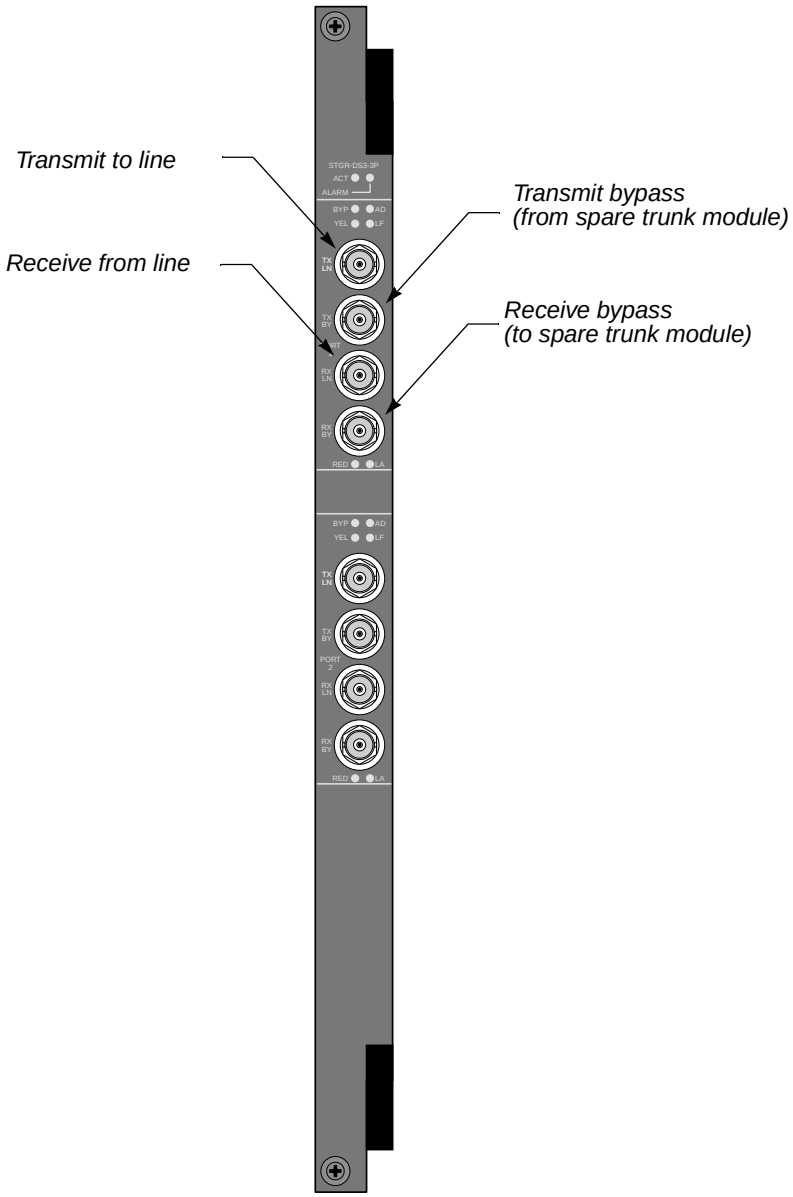
Figure 1-6. OC-3-ATM trunk module fiber optic connection points



DS3-ATM and E3-ATM trunk modules

Figure 1-7 shows the location of the coaxial connections on a DS3-ATM or E3-ATM trunk module.

Figure 1-7. DS3-ATM or E3-ATM trunk module connection points



Installing a Stinger FS or Stinger FS+ 2

Before you begin

Verify that you have completed the following tasks:

- Selected the installation site
- Unpacked the Stinger unit
- Gathered the tools and equipment needed for installation
- Checked the module configuration in the unit

Warning: Before installing the Stinger hardware, be sure to read the safety instructions in the *Edge Access and Broadband Access Safety and Compliance Guide*. See Appendix C, "Safety-Related Electrical, Physical, and Environmental Information," for information specific to your product.

Setting up the unit

Position the unit for installation, keeping in mind that cables connect to the back of the unit. The Stinger FS or Stinger FS+ can be placed on a flat surface as a free-standing unit, or rack-mounted in a standard equipment cabinet that is 19 inches or 23 inches (48.26cm or 58.42cm) wide. The following sections describe the steps involved for each method of installation.

As a free-standing unit

Position the Stinger unit on the selected flat surface. Remember to allow space for proper ventilation.

As a rack-mounted unit

Note: The rack-mount spacing meets IEC 297-2 and ANSI/EIA-RS-310-C standards.

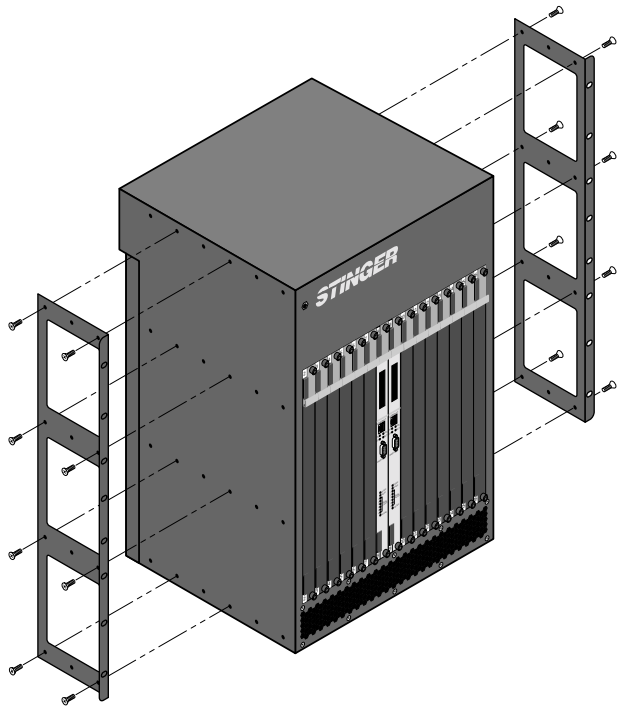
Warning: The weight and position of the Stinger unit within the cabinet might make the cabinet top-heavy or unstable. Take all necessary precautions to anchor the cabinet securely before installing the unit.

Installing the mounting brackets

To install mounting brackets onto the unit:

1 Position a mounting bracket onto one side of the Stinger unit, lining up the 12 screw holes on the bracket with the screw holes on the side of the unit, as shown in Figure 2-1.

Figure 2-1. Installing mounting brackets



2 Using a number 2 Phillips screwdriver, install 12 of the 1/4-inch number 8 flathead screws that came with the brackets through the mounting bracket holes into the unit, as shown in Figure 2-1 (only 8 of the 12 screws are displayed on each side).

Caution: Failure to use the proper screws may damage the unit.

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

Installing the Stinger into a cabinet

The procedure for installing the unit into a cabinet requires that you supply a minimum of four cross-head screws of the appropriate size to support the unit in the cabinet.

⚠ **Warning:** The procedure for rack-mounting a unit with all components installed requires more than one installer. Because a fully populated Stinger FS or Stinger FS+ weighs up to 160 pounds (72.6kg), Lucent Technologies recommends using a mechanical lift to raise it into the cabinet.

To rack-mount a Stinger unit into an equipment cabinet:

1 Using a mechanical lift (or a minimum of three installers), raise the unit to the appropriate installation height.

2 Align the screw holes on the mounting bracket with the screw holes on the equipment cabinet.

3 Using a number 2 Phillips screwdriver, install cross-head screws of the appropriate size through the mount bracket on the unit into the mounting bracket on the equipment cabinet.

Connecting cables to a Stinger unit

Once the Stinger unit is set up in the desired location, connect the unit to the local facilities or to its frame access point by attaching the appropriate cables to the LPMs. Connect the Stinger unit to the ATM network by attaching the copper or fiber connections to the trunk modules.

Connecting the LPMs

The LPMs connect their associated LIMs to their respective line facilities. For cable pinouts, see “LPM cable specifications” on page B-3.

To connect the cables to the USOC RJ-21X 50-pin telephone company connectors on an LPM:

1 Carefully insert the head of the cable into the connector on the LPM, as shown in Figure 2-2.

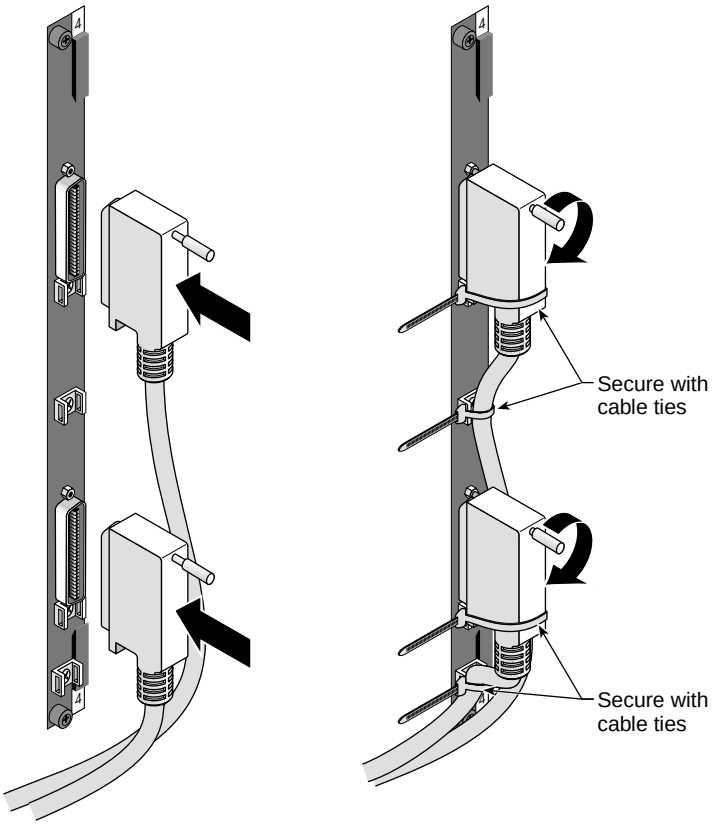
2 Tighten the screw on the top end of the connector.

3 Tighten the cable tie around the connector.

4 Secure the cable to the LPM using the cable ties provided on the LPM.

5 Repeat step 1 through step 4 for the other connector on the LPM.

Figure 2-2. Connecting an LPM



Note: A 48-port LPM is pictured in Figure 2-2. A 72-port LPM has an additional 50-pin connector, located between the connectors illustrated for the 48-port LIM. See “LPM cable specifications” on page B-3 for wiring details.

Connecting the trunk modules

The trunk module cables are either coaxial (for DS3 or E3) or fiber optic (for OC-3/STM-1 optical).

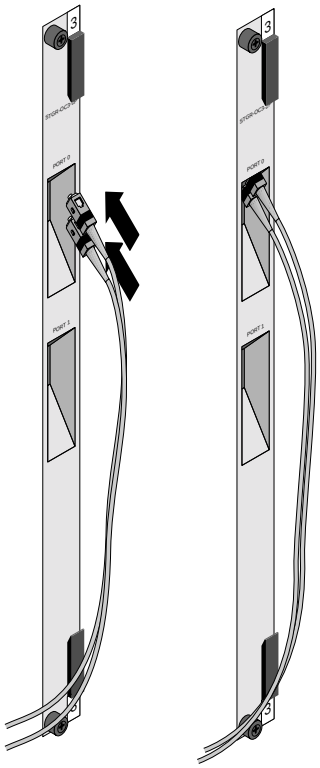
OC3-ATM trunk module connections

An OC3-ATM trunk module requires duplex SC fiber optic cable. Bind excess cable lengths in a figure-eight pattern. Do not wind excess cable into circular coils.

Note: Clean any fiber optic cables prior to connecting them.

To connect the cables to an OC3-ATM trunk module, carefully insert the head of each cable into a connector on the trunk module. See Figure 2-3.

Figure 2-3. Connecting an OC3-ATM trunk module

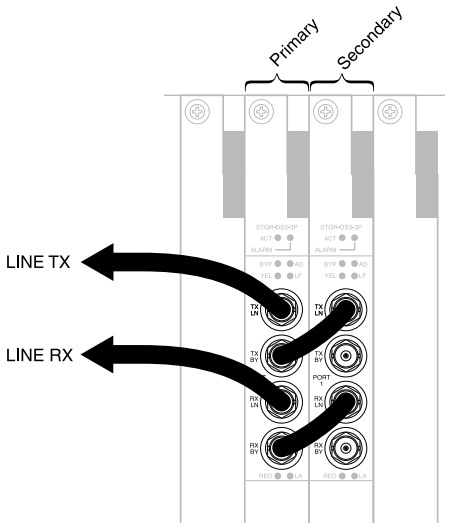


DS3-ATM or E3-ATM trunk module connections

Connect the DS3 or E3 line to the RX LN and TX LN connectors on a DS3-ATM or E3-ATM trunk module, using two 75-ohm coaxial cables (RG 59/U).

To configure a redundant DS3 or E3 connection, connect the BY connectors on the primary trunk module to the LN connectors on the backup trunk module as shown in Figure 2-4. If the primary port fails, the traffic is switched over to the secondary module's port.

Figure 2-4. Connecting redundant DS3-ATM or E3-ATM trunk modules

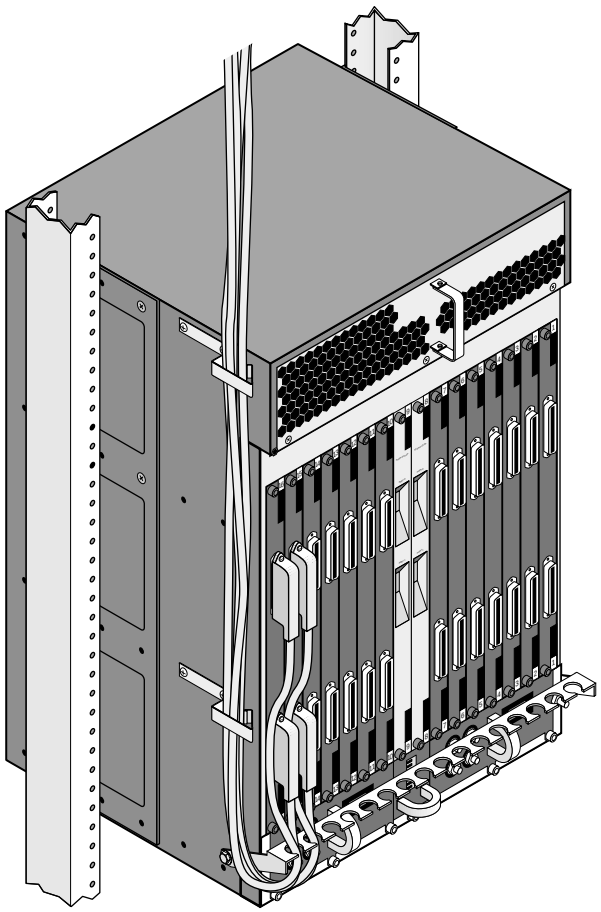


Inform your service provider that the equipment is connected, so they can activate the line.

Dressing the cables

After connecting the cables to the LPMs and trunk modules, dress the cables down and thread them through the cable management brackets on the rear of the Stinger FS or Stinger FS+ chassis as shown in Figure 2-5.

Figure 2-5. Dressing the Stinger FS cables



Network management connections

The control module provides the ports needed to connect the Stinger unit to a workstation or a console. See Appendix B, “Cables and Connectors,” for console cable pinouts.

Each control module supports three types of network management connections for communication with the Stinger unit:

- Serial connection of a console terminal to the female DB-9 serial port (labeled DIAG PORT) on the control module, by means of an RS-232 shielded straight-through cable (ITE6801).
- Dial-in connection through a modem.
  - Revision 2 control module models B and C contain internal autoanswer modems that can be connected directly to the telephone line through the RJ-11 jack on the control module face.
  - Revision 1 control modules with no model designation, model A revision 2 control modules, and revision 2.1 control modules can be connected to an external modem through the serial port on the control module face.

- Network connection through an Ethernet network using the Ethernet RJ-45 interface on the control module, using a 10BaseT or 100BaseT unshielded twisted pair (UTP) cable.

For more information about these connections, see “Primary (or single) control module configuration” on page 4-2 and “Administrative connections” on page 5-2.

System clocking

An active control module has four possible timing sources:

- External. The Stinger unit can accept timing from a T1 line, or a building interoffice timing source (BITS) clock.
- Trunk. The Stinger unit can accept timing from an OC3, DS3, or E3 line clock.
- LIMs. The Stinger unit can accept timing from an ADSL or SDSL line clock.
- Internal clock source. If the selected clock sources fail, the system is automatically reconfigured so that it is synchronized with the control module’s internal clock.

The T1 or BITS timing inputs work with DS1 timing references that comply with the ANSI T1.102 standard. The system timing is configured through the TAOS command-line interface. For more information, see “Configuring system clocking” on page 5-18.

Alarm monitoring

The alarm relay in the alarm relay panel can be connected to external hardware that monitors the status of the Stinger unit.

With a revision 2 or revision 2.1 control module installed, you can use the Stinger unit to monitor the status of up to seven external devices.

Connecting to monitor Stinger alarm status

The Stinger FS and Stinger FS+ units are equipped with an alarm relay panel that contains alarm terminals for the unit. The unit can monitor itself for major and minor alarm conditions and illuminate appropriate status lights on the control module. In addition, you can connect audio and visual alarms (normally open, contact closed) to the alarm terminals to remotely monitor the unit for these conditions.

The alarm board panel on the back of the unit, between the power filters, contains three sets of connectors for connecting the following:

- Major alarms
- Minor alarms
- External BITS clock

The alarm-relay contacts open during loss of power, during hardware failure, or whenever the Stinger unit is being reset, such as during its power-on self test (POST). During normal operation, the alarm-relay contacts remain closed.

The gauge of the wire you use to connect to the Stinger alarm relay must be based on the current flow of the circuit that the relay is attached to and the capacity of the alarm relay.

Because the Stinger alarm relay can carry a maximum of 2 amps, 18 AWG to 20 AWG (0.8mm² to 0.5mm²) wire is adequate.

To connect a remote alarm:

1. Locate the appropriate terminal for the alarm connection you want to make.
2. Using a 1/8-inch flathead screwdriver, loosen the screws on the positive (Major and Minor) and return (RTN) terminals.
3. Using 18AWG to 20AWG (0.8mm² to 0.5mm²) solid or stranded wire, strip the ends of the wire approximately 1/4 inch (6.35 mm).
4. Insert the wire leads into the appropriate positive terminal connector and its return.
5. Using a 1/8-inch flathead screwdriver, tighten the screws on the positive and return terminals to secure the leads.

Connecting a Stinger unit to monitor the alarm status of other devices

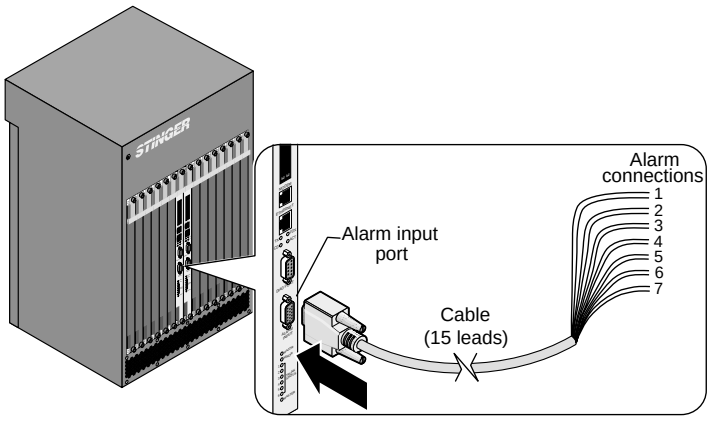
Revision 2 and revision 2.1 control modules have a DB-15 connector that can accept connections to monitor the alarm status of up to seven external devices. The connection for each external device consists of a pair of 24-gauge to 28-gauge connectors. One connector supplies ground, and the other senses the status of the remote alarm by applying 3.3Vdc, which draws less than 10mA of current through the closed contacts of the alarm relay on the remote device. For the pinout arrangement of these connectors on the DB-15 connector, see “Alarm input port pinouts” on page B-2.

Connections from the control module

To connect to a remote device:

1. Using a male DB-15 connector, connect a 15-lead cable to the ALARM INPUT connector of the control module. One lead is unused.
2. Run one pair of leads to the alarm connectors of each remote device to be monitored by the Stinger unit, as shown in Figure 2-6.

Figure 2-6. Connecting to the alarm input port



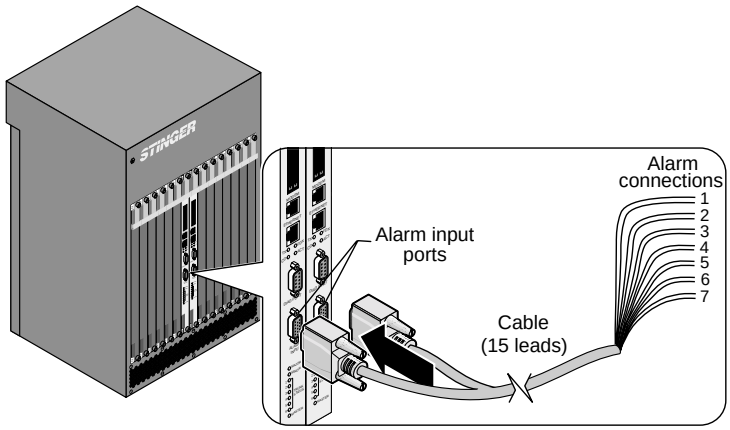
The alarm relays of external devices can be either normally opened or normally closed. The Stinger unit can be configured to sense an alarm condition for the opening of a normally closed relay, or the closing of a normally open relay. For information on the configuration of these

parameters, see the information about SNMP alarm support for input relay alarms in the *Stinger Administration Guide*.

Connections from redundant control modules

A Y-cable can be used to give primary and secondary control modules the ability to monitor the alarm status of the same remote devices. One end of this type of cable consists of two male DB-15 connectors, bridged pin for pin. The other end of this cable consists of individual wires to the alarm connections of the remote devices, as shown in Figure 2-7.

Figure 2-7. Redundant alarm monitoring connections



This type of connection allows either control module to be the primary control module and monitor the same set of remote alarm conditions.

Note: For information about configuration and alarm profiles, see the *Stinger Reference* and the *Stinger Administration Guide*. For information on enhancements to alarm profiles, and the alarm command to support revision 2 and revision 2.1 control modules, see the *Stinger Administration Guide*.

What's next

When you finish physically installing the Stinger unit you can proceed to Chapter 3, "Determining the Operating Status."

Determining the Operating Status

3

Before you begin

Before you begin, verify that the following tasks are complete:

- Set up the Stinger hardware (as either a free-standing or rack-mounted unit)
- Connected cables and console terminal to the Stinger unit
- Set up the workstation to configure the Stinger unit
- Connected the workstation to the Stinger unit
- *(Optional)* Connected the system clock source
- *(Optional)* Connected the remote alarms

Evaluating power consumption

Table 3-1 identifies the power consumption of each Stinger component to help you determine the current and power required for the unit.

Table 3-1. Stinger component power requirements

Stinger component	dc amps per component	Watts per component
Base system (one control module and fan)	2.80	134.40
Redundant control module	0.78	37.44
OC3-ATM trunk module (dual)	0.24	11.52
DS3-ATM trunk module (dual)	0.25	12

Table 3-1. Stinger component power requirements (continued)

Stinger component	dc amps per component	Watts per component
E3-ATM trunk module (dual)	0.25	12
48-port SDSL LIM operating at 2.3Mbps	1.7*	81.6
48-port SDSL LIM operating at 784Kbps	1.3*	62.4
32-port HSDL2/SHDSL LIM	1.46*/167*	70/80
72-port SHDSL LIM (Stinger FS+ only)	2.59*	119
32-port ISDL LIM	1.56	75
72-port ADSL Annex A LIM (Stinger FS+ only)	2.7	130
48-port ADSL Annex A LIM	2.81	135
48-port ADSL Annex B LIM	2.81	135
40-port ADSL Annex C LIM	1.75 (typical)	84 (typical)
24-port ADSL LIM	2.22	106.56
48-port ASDL G.lite LIM	2.08	100
8-port T1 or E1 modules	1.15	55
24-port T1 or E1 modules	1.25	60
Line protection module (LPM)	0.05	2.4
Copper loop test (CLT) module	0.2	9.6

* These modules can provide sealing current to individual DSL lines, if required. When engineering power for the Stinger, allow .01Adc for each line that requires sealing current.

Connecting power to a Stinger unit

Caution: Before connecting power, see the *Edge Access and Broadband Access Safety and Compliance Guide* for safety instructions and circuit regulatory information.

Warning: Verify that the power is off or disconnected at the source before beginning this procedure.

To connect the unit to dc power:

1 Verify that the correct power source is available for the Stinger unit.

2 Verify that the dc power cables comply with national standards and specifications as described in IEC 60950 and are terminated in number 10 ring lugs.

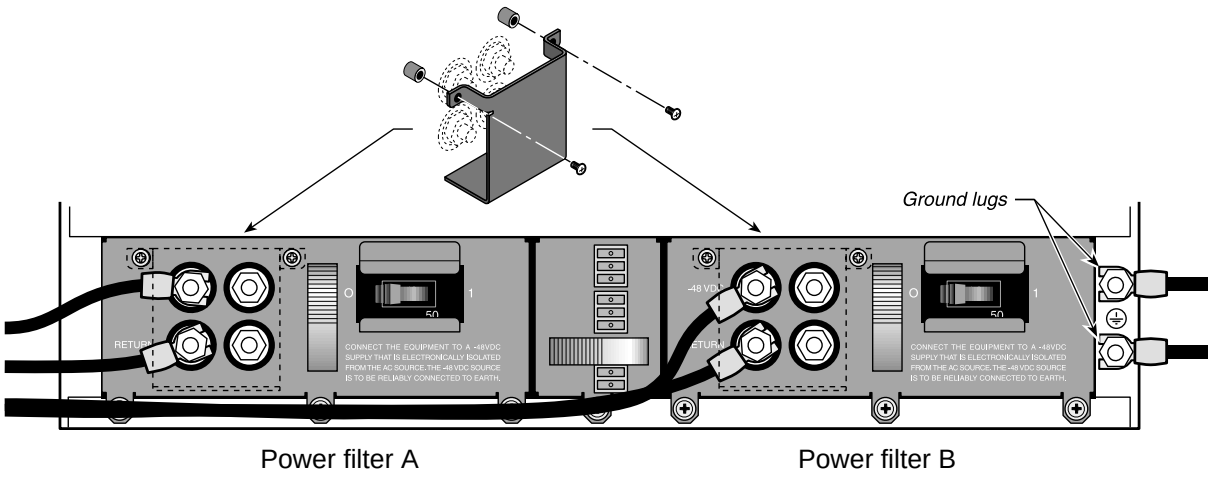
3 Figure 3-1 shows how to connect power to the Stinger unit. Be sure to attach a power cable to each set of power connectors as follows. Both power cables must be connected at all times when the unit is in operation.

- Verify that the power switch on the power filters is set to the OFF position.
- Locate the number 10 studs on the back of the unit.
- Using a number 2 Phillips screwdriver, remove the two screws that secure the protective cover over the studs. Then remove the protective cover.
- Using a 3/8-inch wrench or socket, remove the top locking nut from each of the two studs (labeled -48V and RTN). Do not remove the bottom locking nut.
- Install the ring lugs onto the appropriate posts.

Note: You can optionally ground the chassis to the enclosure by attaching dual mount ground lugs to the ground terminals on the back of the unit. Do not remove the ground lugs.

- Reinstall the locking nut onto each post, then use a 3/8-inch wrench or socket to tighten the nut.
- Reinstall the protective cover with the two screws.

Figure 3-1. Connecting the -48Vdc power filters



Turning on power to a Stinger unit

Caution: Do not turn on power to a Stinger unit without a control module installed in the chassis. Starting up a unit with no control module installed can damage hardware components.

To turn on power to the unit, press the power switch on each power filter to the ON (|) position.

All Stinger status lights, except the MASTER light, momentarily turn ON just after startup.

On the primary control module, the MAJOR status light turns ON at startup. It then starts blinking slowly while the control module runs its POST in the boot loader. It continues to blink while the control module loads its operational code from the PCMCIA flash card. If the control module successfully loads its operational image from the PCMCIA flash card and again passes POST, the MAJOR status light turns OFF. If the MAJOR status light continues to blink, it indicates a failure.

After startup, all six TRUNK STATUS lights and the MINOR status light turn OFF. Then after the system comes up, each light monitors a particular status as described in the next section.

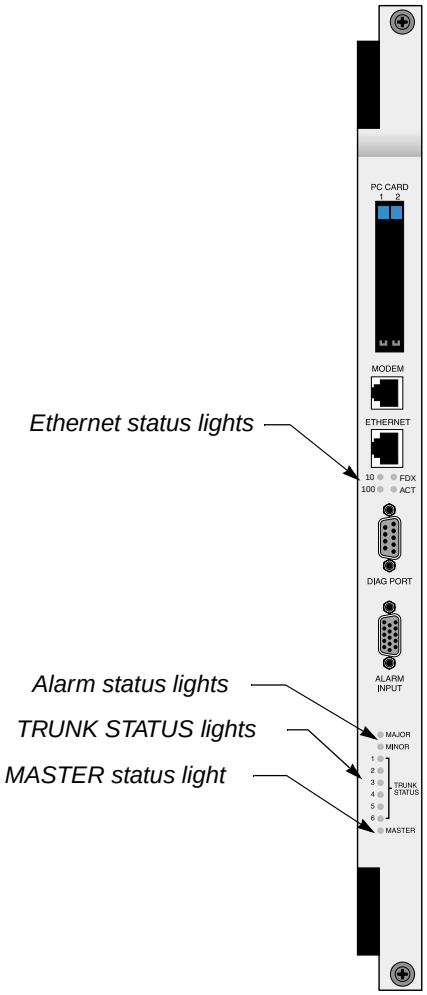
Status lights

The status lights on the modules in the Stinger unit indicate the operating status of each module.

Control module status lights

Figure 3-2 shows the locations of the control module status lights.

Figure 3-2. Control module status lights



All control module status lights except the MASTER light momentarily turn ON just after startup, and all six TRUNK STATUS lights turn OFF. After the system starts up, each light monitors a state as described in Table 3-2.

The status lights in the upper portion of the control module indicate the status of the Ethernet interface. The status lights at the bottom of the control module indicate the status of the control module and the trunk modules.

Table 3-2. Status lights on the control module

Status light	Color	Condition	Indicates
10	Green	ON	10BaseT Ethernet activity has been detected.
100	Green	ON	100BaseT Ethernet activity has been detected.
FDX	Green	ON	Full-duplex mode is active.

Table 3-2. Status lights on the control module (continued)

Status light	Color	Condition	Indicates
ACT	Green	ON	Activity detected on the Ethernet interface.
MAJOR	Amber	ON or blinking	The control module has detected a major alarm. For information about configuring major alarms, see the *Stinger Administration Guide*. The MAJOR status light turns ON at startup. It then starts blinking slowly while the control module runs its POST in the boot loader. It continues to blink while the control module loads its operational code from the PCMCIA flash card. If the control module successfully loads its operational image from the PCMCIA flash card and again passes POST, the MAJOR status light turns OFF. If the MAJOR status light continues to blink, it indicates a failure.
MINOR	Amber	ON or blinking	The control module has detected a minor alarm. For information about configuring minor alarms, see the *Stinger Administration Guide*. The MINOR status light is ON at startup. It remains ON until the control module passes all POST tests. It then stays OFF until a minor alarm occurs. If the control module fails POST, the MINOR status light remains ON.
TRUNK STATUS	Green	ON	The six TRUNK STATUS lights indicate the status of up to six module card ports attached through the backplane to the control module. Port 1 is the top (or only) port in slot 17. Port 4 is the top (or only) port in slot 18. On the secondary control module, the TRUNK STATUS lights cycle. If a TRUNK STATUS light is ON, the port is fully operational.
TRUNK STATUS	Green	blinking	The port is installed but not operating.
TRUNK STATUS	Green	OFF	The trunk module corresponding to the port is not present. Note that if a two-port trunk module is installed in slot 17, light 3 is unlit. If a two-port trunk module is installed in slot 18, light 6 is unlit.

Table 3-2. Status lights on the control module (continued)

Status light	Color	Condition	Indicates
MASTER	Green	ON	Indicates that the control module is the master (primary). If the secondary control module is installed but cannot be primary because of some failure, the MINOR alarm light is ON.

LIM status lights

For detailed information about the status lights on each LIM and their expected behavior, see the module guide for the specific module in question.

Trunk module status lights

For detailed information about the status lights on each trunk module and their expected behavior, see the module guide for the specific trunk module in question.

Fan status lights

The Stinger has two lights on the rear of the chassis, located on the right and above the holes of the air exhaust vent, that indicate the operating status of the fans. The status indicted by these lights is described in Table 3-3.

Table 3-3. Fan status lights

Status light	Color	Condition	Indicates
POWER	Green	ON	The fan has power.
FAULT	Amber	ON	The fan is in a fault state.

What's next

Once the hardware installation is complete and the Stinger unit is powered up, you can begin basic configuration as described in the following chapters, or download a previous software configuration.

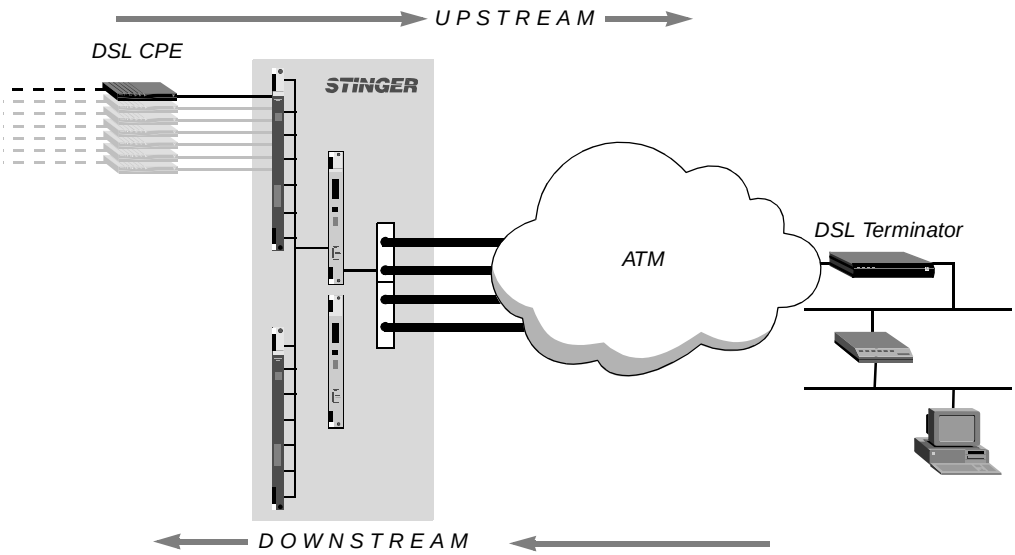
Stinger Operational Overview

4

Stinger operation as a DSL access multiplexer

A Stinger unit typically operates as an ATM switch-through digital subscriber line access multiplexer (DSLAM). It switches data from multiple xDSL subscribers onto a high-speed ATM backbone. Figure 4-1 shows this type of operation.

Figure 4-1. Example of DSLAM operations



Note: A Stinger unit equipped with an IP2000 control module can also process IP traffic. With the IP2000, a Stinger unit typically routes IP traffic from subscribers to the IP infrastructure across a Gigabit Ethernet interface, and forwards IP multicast video transmissions to xDSL multicast clients. Configuration for this type of operation is described in the *Stinger IP2000 Configuration Guide*.

Stinger ATM switching overview

A Stinger unit receives ATM cells on a link that is identified by a pair of unique attributes. These attributes are known as the virtual path identifier (VPI) and the virtual channel identifier (VCI). The Stinger unit switches the cells from an incoming link to an outgoing link, based on the VPI and VCI attributes of each link. The connection between these links is usually a static configuration entered by an administrator, although a more dynamic method of forming link connections, known as a private network-to-network interface (PNNI), might be used.

This guide covers only basic installation information and configuration of the control module. More detailed information about configuring the unit to support ATM traffic can be found in the *Stinger ATM Configuration Guide* and the *Stinger Private Network-to-Network Interface (PNNI) Supplement.*

Stinger configuration overview

Before you configure a Stinger unit, create a diagram that illustrates how the unit will interoperate with your current network configuration. Creating a comprehensive network diagram helps prevent problems during installation and configuration, and can help in troubleshooting any problems later.

Stinger configuration tasks include the following:

- Configuring the primary or single control module
- Configuring the DSL line interface modules (LIMs)
- Configuring the trunk modules
- Defining ATM traffic contracts
- Configuring connections, either locally or through RADIUS

Primary (or single) control module configuration

Most sites operate the unit with redundant controllers, although it can operate with a single controller. If the unit has two control modules installed, check the status lights on the control module front panel to see which control module is the primary module. For details, see Table 3-2 on page 3-5.

Each control module has an RS-232 serial port (labeled DIAG PORT) and a 10/100BaseT Ethernet port. The serial port is for system management from a local workstation. It is also the standard port for error output, stack traces, and messages in the event of a system crash. Until you have configured IP addresses on the system's Ethernet interfaces, you must use a local terminal or workstation connected to the serial port of the primary control module to configure the Stinger unit. There is no other way to log into the unit to perform the initial configuration.

The system's Ethernet ports are intended for light data and management traffic. Once you have assigned IP addresses, you can Telnet into the unit from a local host and download configuration files from a TFTP server to the Stinger system.

A Stinger unit has a range of options for configuring IP and for protecting the unit from unauthorized administrative access. In addition, if you are using redundant control modules, verify that the default control module redundancy configuration is appropriate for your site.

Note: All configuration must take place on the primary control module. The configuration repository of the primary control module overwrites that of the secondary control module immediately after every configuration change and at regular intervals.

Line interface module (LIM) configuration

A Stinger unit supports any combination of ADSL, HDSL2, SHDSL, IDSL, or SDSL ATM modules. However, only the first 48 ports on 72-port LIMs are supported on the original Stinger FS chassis. Each port on a LIM has a variety of configuration options, including line rates and bandwidth. The way you configure each line depends on your connectivity needs.

A T1 or E1 LIM is also available to provide up to 8 or 24 DS1 or E1 lines for traffic exiting the network (egress traffic), when the DS3, E3, or OC3 bandwidth of a trunk module is not needed.

For specific information about LIM configuration, see the module guide for the desired LIM.

Trunk module configuration

A Stinger unit can support up to two trunk modules, which can be OC3-ATM, DS3-ATM, or E3-ATM trunk modules. You can set up the unit to use the full trunk-side bandwidth actively, or you can designate one or two of the trunk ports as spares, to be used only if another trunk port fails.

Each trunk module can connect the Stinger unit to another ATM switch. The line configuration includes settings that must match between the local and far-end switch interfaces.

For specific information about trunk module configuration, see the module guide for the desired trunk module.

System clocking modes

The Stinger unit requires a clock source for its timing subsystem. By default, it uses a built-in 8kHz clock on the primary or single control module as its timing source. You can configure the system to take its clock source from a trunk port or from an external building interoffice timing source (BITS) clock connected to the Stinger alarm relay.

For detailed configuration information, see “Configuring system clocking” on page 5-18.

Stinger management features

To enable you to configure the system and monitor its activity, Stinger units support profiles, commands, and status windows in the command-line interface. Stinger units also support SNMP management, RADIUS profiles, and the ability to upload (back up) and download software and configuration files over TFTP or serial connections.

A Stinger system provides several permission levels to control the management and configuration functions that are accessible in the command-line interface. For information about User profiles and other management features, see the *Stinger Administration Guide*.

For an introduction to the command-line interface and its shortcuts, see the *TAOS Command-Line Interface Guide*.

Using the command-line interface

The Stinger command-line interface provides access to commands, profiles, and status windows. You must use the command-line interface to provide the initial system and IP configuration for the unit, although you can choose to perform subsequent configuration tasks remotely through a Telnet session or SNMP, or by downloading configuration files using TFTP.

Onboard flash memory and software updates

You can perform software upgrades of the onboard flash memory in the field. You upgrade the Stinger unit by accessing it locally through its serial (DIAG) port and downloading software upgrades from a TFTP server. For details, see the *Stinger Administration Guide*.

SNMP support

In addition to managing a Stinger unit by means of the command-line interface, you can manage the unit by using an SNMP management station such as the NavisAccess™ product. A Stinger unit can generate SNMP traps (notifications) to indicate alarm conditions, and it relies on SNMP community strings to implement SNMP security.

For information about using SNMP with Stinger units, see the *Stinger Administration Guide* and the *Stinger SNMP Management of the ATM Stack Supplement*.

RADIUS support

You can use RADIUS to store user profiles for ATM circuits and terminating connections. The RADIUS server must be compliant with vendor-specific attributes (VSAs), as defined in RFC 2138. To use RADIUS, you must also configure the Stinger unit to communicate with the RADIUS server.

For information about configuring and using RADIUS, see the *TAOS RADIUS Guide and Reference*.

Tracking system activity

A Stinger unit supports many commands for monitoring system activity. To display the commands that are available with the permission settings in the current User profile, enter the `help` (or `?`) command. The following example shows the commands available for the `admin` login. The left column shows command names, and the right column shows the command *class*, which determines the permissions required to use the command.

```
admin> ?
 ?                              ( user )
 arptable                       ( system )
 auth                           ( user )
 callroute                      ( diagnostic )
 clear                          ( user )
 clock-source                   ( diagnostic )
```

```
 clr-history                    ( system )
 connection                     ( system )
 date                           ( update )
 debug                          ( diagnostic )
 delete                         ( update )
 device                         ( diagnostic )
 dir                            ( system )
 dircode                        ( system )
 ether-display                  ( diagnostic )
 fatal-history                  ( system )
 format                         ( code )
 fsck                           ( code )
 get                            ( system )
 hdlc                           ( system )
[More? <ret>=next entry, <sp>=next page, <^C>=abort]
```

For details about each command, see the *Stinger Reference*. For more information about command help, see the *TAOS Command-Line Interface Guide*.

Verifying software and control module versions

The `version` command displays the version of TAOS that is currently running in the Stinger unit and also displays the version and type of control module installed.

For example a model E revision 2.1 control module provides the following response to the `version` command:

```
admin> version

software version 9.4-185.2
* * * 9_4-185_2/stngrcm2 <tststngr> Apr 01 2003 04:09 * * *
Hardware revision: 2.1 Model E
```

Status windows

The command-line interface supports several status windows that focus on different aspects of system activity (such as connection status and log messages). The windows provide a great deal of read-only information about what is currently happening in the unit. To display a status window, enter the Status command:

```
admin> status
```

The system prompt moves to just below the status window. To close the status window, enter the command again:

```
admin> status
```

If the system prompt is not visible below the status window, press Escape to display it.

Note: Stinger configuration settings are stored in onboard flash memory, and must be backed up to a TFTP host whenever changes are made. For details about backing up and restoring the Stinger configuration, see the *Stinger Administration Guide*.

What's next

When you have planned your network, you are ready to configure the Stinger unit. You can perform configuration tasks in any order you want. Table 4-1 shows where to look for the information you need.

Table 4-1. Location of configuration information

Configuration task	Location
Determine which control module is primary	"Control module status lights" on page 3-4
Establish a serial connection	"Serial connection to a console" on page 5-2
Set up basic access security	"Restricting administrative access" on page 5-7
Configure IP	"Providing a basic system IP configuration" on page 5-9 and the *Stinger IP2000 Configuration Guide*
Configure the unit to use RADIUS	*TAOS RADIUS Guide and Reference*
Check the redundancy settings	"Configuring control module redundancy" on page 5-14
Configure the unit's LIMs	LIM guide for the desired module
Checking LIM port status	LIM guide for the desired module
Configure the unit's trunk lines	Trunk module guide for the desired module
Checking trunk status	Trunk module guide for the desired module
Define ATM traffic contracts	*Stinger ATM Configuration Guide* and the *Stinger Private Network-to-Network Interface (PNNI) Supplement*
Configure ATM circuits	*Stinger ATM Configuration Guide*, the *Stinger Private Network-to-Network Interface (PNNI) Supplement*, and *the Stinger IP2000 Configuration Guide*
Configure virtual path switching	*Stinger ATM Configuration Guide* and the *Stinger Private Network-to-Network Interface (PNNI) Supplement*
Check details about parameters and commands	*Stinger Reference*
Use SNMP with the unit	*Stinger Administration Guide* and the *Stinger SNMP Management of the ATM Stack Supplement*
Configure IP2000 gigabit Ethernet interfaces	*Stinger IP2000 Administration Guide*
Configure login permissions	*Stinger Administration Guide*
Back up the system configuration	*Stinger Administration Guide*
Test lines and ports	*Stinger Administration Guide*

Configuring the Control Modules and System Timing

5

Control module configuration overview

The primary (or single) control module controls the operations of the Stinger unit. It manages and boots the LIMs, maintains a central repository of the unit's configuration, performs call control and processing operations, and manages all centralized functions, such as SNMP access or communication with a RADIUS server.

The secondary control module, if present, does not perform controller operations unless the primary control module resets or you manually change the primary or secondary status of the control modules. However, you can Telnet into the secondary control module and run commands. The secondary control module has up-to-date configuration and system activity information.

Control module configuration includes the following tasks:

- Connecting a console workstation to the serial port on the primary (or single) control module of the Stinger unit
- Logging into the Stinger unit
- Changing default security settings to protect the unit
- Configuring IP to make the system accessible by Telnet, SNMP, and Ping
- Configuring RADIUS access (if appropriate)
- Checking the Redundancy profile settings, and modifying them if appropriate

Stinger units equipped with the IP2000 control module can also be configured to support termination and aggregation of RFC 1483 Asynchronous Transfer MOde (ATM) PVCs, IGMP multicast v1/v2 and IEEE 802.1Q tagged virtual local area networks (VLANs). Information about these capabilities is contained in the *Stinger IP2000 Configuration Guide*. However, the following information will allow you to perform basic administrative configuration for IP2000 control modules.

Administrative connections

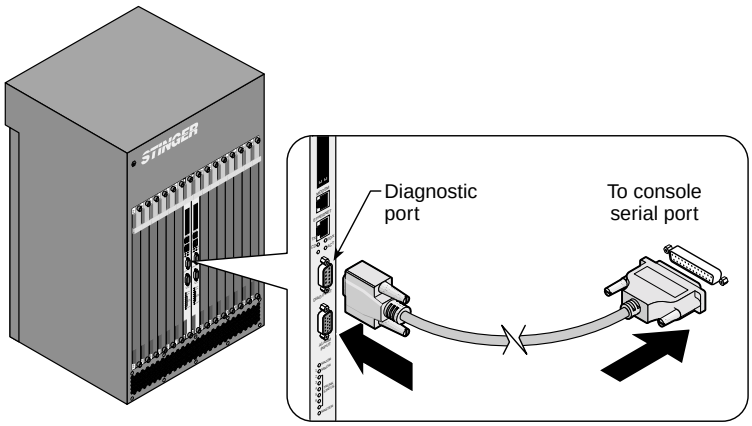
The serial port of a Stinger unit's primary (or single) control module is used for initial configuration from a console device. The port can also be configured to connect to a modem to provide dial-in administrative access to the unit. Revision 2 control module models B and C contain an internal modem, configured by default for autoanswer. On these models, you need only to connect the RJ-11 modem jack to the telephone line and then call in to the Stinger unit for an administrative connection.

Once the Stinger unit has been configured with an IP address, it can be reached on the IP network via a Telnet connection. The following information provides details of these connection methods.

Serial connection to a console

Figure 5-1 shows a cable connection from a Stinger FS or Stinger FS+ to a console terminal.

Figure 5-1. Serial management connection to a Stinger FS or Stinger FS+



To connect the console terminal to the Stinger unit, connect one end of a shielded straight-through cable to the diagnostic port (DIAG PORT) on the control module. Then connect the other end of the cable to the serial port on the console device.

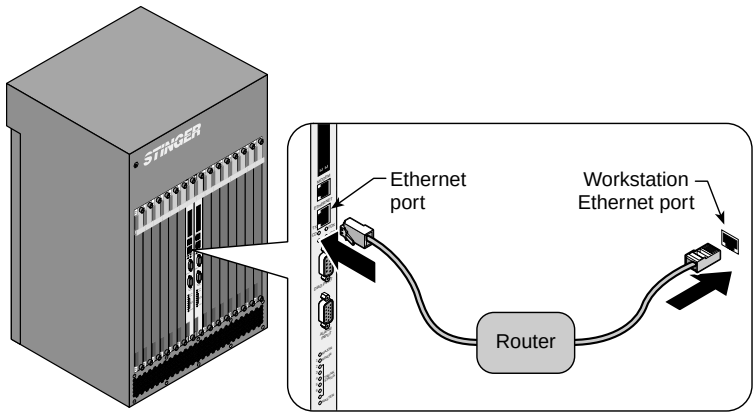
The diagnostic port on the control module consists of a female DB-9 connector. Examine the serial connector of your PC or dumb terminal to ensure that your shielded straight-through cable has the proper connectors. If needed, you can use DB-9-to-DB-25 converters or gender converters to complete this connection.

See Appendix B, "Cables and Connectors," for detailed information about the pinouts on the console serial port.

Network connection to a workstation console

After the IP address of the Stinger unit has been configured, and the unit has been connected to a network, an administrative Telnet connection can be established through the network. Figure 5-2 shows an Ethernet network connection from the Stinger unit to the management workstation.

Figure 5-2. Ethernet connection



To connect a management workstation to the Stinger unit using an indirect Ethernet connection:

1. Connect one end of the Ethernet cable to the Ethernet RJ-48 port on the control module.
2. Connect the other end of the Ethernet cable to the local LAN.
3. Ensure that the management workstation has connectivity to the LAN on which the unit resides.
4. Ensure the Ethernet transceivers are connected properly to the network.

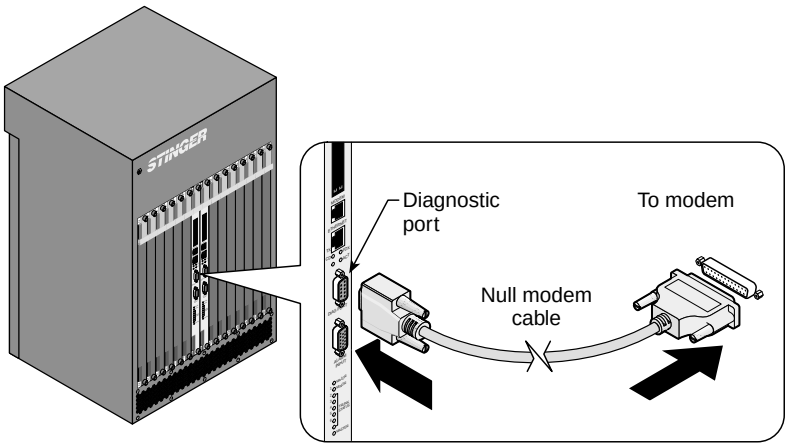
Connecting a dial-in backup management connection

Lucent Technologies recommends that you provision dial-up or some other access to each unit for backup administrative access. Dial-up access to a Stinger unit equipped with a revision 1 control module, a revision 2 model A control module, or a revision 2.1 model E control module, requires a properly configured *external* modem connected to the DIAG port on the control module. Revision 2 control module models B and C are equipped with an *internal* modem to support this type of backup management connection.

Backup management with an external modem

To configure a backup administrative connection with an external modem, connect the modem to the Stinger diagnostic port (DIAG PORT) with a null modem (crossover) cable. In addition, you might need a DB-25-to-DB-9 adapter. Figure 5-3 shows the backup administrative connection with a modem to the Stinger unit.

Figure 5-3. Backup administrative connection with a modem to the Stinger unit



The modem you use to connect to the Stinger unit must be configured as follows:

- Dumb mode. Dumb mode causes the modem to ignore data on the receive data (RD) lead.
- Ignore on-to-off transitions of the data-terminal ready (DTR) lead.
- Auto answer enabled.
- 8 bits, 1 stop bit, and no parity.

Configure the following AT commands on the modem:

`at&d0`	Ignore DTR state.
`ats0=1`	Answer automatically after one ring.
`ate0`	No echo (required).
`at&c0`	Assert the data carrier detect (DCD) signal.
`atq1`	Result codes are not sent.
`at&w0`	Store in nonvolatile RAM (NVRAM) as profile 0 (zero).
`at&y0`	Use stored configuration from profile 0 (zero) on startup.

Modem country codes

You can configure the internal modem in a revision 2 control module to support the national regulations of telephone companies in specific countries. If the modem supports the country that you have specified, the system programs the modem with the settings necessary for that country. The `country-code` parameter in the `modem` profile, shown here with its default value, is used for this setting.

```
[in MODEM/{ shelf-1 first-control-module 3 }]

physical-address* = { shelf-1 first-control-module 3 }
country-code = unitedstates
```

The `cmmodemShowCurrentCountry` debug command displays the country code that is currently configured in the modem.

The `cmmodemShowCountries` system-level command displays a list of countries that the modem installed in the revision 2 control module supports. The following is a sample output of this command:

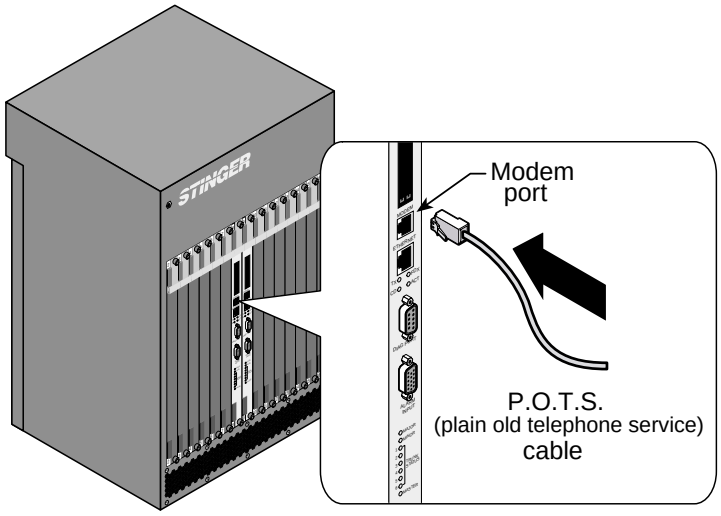
```
admin> cmmodemShowCountries

The country codes supported by this modem are:
0, Japan
9, Australia
a, Austria
f, Belgium
16, Brazil
26, China
31, Denmark
3c, Finland
3d, France
42, Germany
46, Greece
53, India
57, Ireland
59, Italy
61, Korea
6c, Malaysia
73, Mexico
7b, Netherlands
82, Norway
8a, Poland
8b, Portugal
9c, Singapore
9f, South Africa
a0, Spain
a5, Sweden
a6, Switzerland
b4, United Kingdom
b5, United States
fd, unknown
fe, Taiwan
```

For additional information about this parameter and these commands, see the *Stinger Reference*.

Backup management with an internal modem

Revision 2 control module models B and C are equipped with an internal modem. This modem is configured by default to automatically answer any incoming calls. For this reason, you need only connect the telephone line to the RJ-11 jack on the face of the control module. Figure 5-4 shows a connection for an internal modem.

Figure 5-4. Connection for internal modem



Use the Modem profile to set the autoanswer configuration of this modem. Following is a sample of this profile with its default setting:

```
[in MODEM/{ shelf-1 first-control-module 3 }]
physical-address* = { shelf-1 first-control-module 3 }
auto-answer = on
```

The `auto-answer` parameter has three valid settings:

Setting	Specifies
`on`	The internal modem automatically answers any incoming call and attempts to negotiate modem protocols with the caller.
`off`	The internal modem ignores incoming calls.
`primary-only`	The internal modem automatically answers incoming calls only if the control module is the primary control module for the Stinger unit. When the control module is set as the secondary control module, the modem ignores incoming calls. This setting allows redundant controllers to share a single telephone line. (See “Remote modem administration of redundant control modules” on page 5-18.)

Logging into the primary control module

To configure the unit initially, or after clearing its NVRAM, you must connect a workstation to the primary (or single) control module serial port (labeled DIAG PORT). For information about checking the status lights to determine which control module has been elected primary, see “Control module status lights” on page 3-4.

After connecting the management workstation, launch a communications program that supports terminal emulation. Make sure that the terminal emulation settings specify 9600bps, 8 data bits, 1 stop bit, and no parity or flow control.

The default settings for the serial port profile allow anyone connecting to the diagnostics port to access the system as the administrative (`admin`) user, without logging in or being authenticated. When you connect to an unconfigured Stinger unit to which power has been applied, you are presented with the prompt for the `admin` user:

```
admin>
```

After you have supplied basic IP information, as described in "Providing a basic system IP configuration" on page 5-9, you can access the Stinger command-line interface by using Telnet from an IP host. Or, you can log in by using an SNMP management station, such as NavisAccess™, from an IP host. These types of connections require that you authenticate a User profile and supply a password to acquire administrative permissions. During basic configuration, Lucent Technologies recommends that you also configure the serial port to require username and password authentication.

For details about User profiles, see the *Stinger Administration Guide*.

Restricting administrative access

Each Stinger unit is shipped from the factory with its security features set to defaults that allow you to easily access the unit so you can configure it without any restrictions. Before you bring the unit online, you must change the default security settings to protect the configured unit from unauthorized access.

Changing defaults for serial-port logins

The factory default setting for the control module serial interface specifies that any connection to that interface will use the `admin` User profile. To help protect the system from unauthorized administrative access on the serial interface, change the following default setting:

```
[in SERIAL/{ shelf-1 control-module 2 }]
user-profile = admin
```

Parameter	Setting
User-Profile	Name of the User profile to be used for logins on the control module serial port. User profiles set permissions and other parameters for logins to the Stinger command-line interface. If no name is specified, the system prompts for both the name and password of a User profile, as it does for Telnet logins.

A Stinger unit automatically creates a Serial profile for each installed control module. To list the Serial profiles, use the Dir command as follows:

```
admin> dir serial
12 03/06/2003 02:57:48 { shelf-1 first-control-module 1 }
12 03/06/2003 03:01:46 { shelf-1 second-control-module 1 }
```

The designations `first-control-module` and `second-control-module` refer to the slot position, not the primary or secondary status of each control module.

To make serial logins more secure, modify the Serial profile of each control module to specify a null User profile name, as shown in the following example. Anyone trying to establish a connection through the serial port is then required to provide a username and password.

```
admin> read serial {1 8 2}
SERIAL/{ shelf-1 first-control-module 2 } read

admin> set user-profile =

admin> write
SERIAL/{ shelf-1 first-control-module 2 } written

admin> read serial {1 9 2}
SERIAL/{ shelf-1 second-control-module 2 } read

admin> set user-profile =

admin> write
SERIAL/{ shelf-1 second-control-module 2 } written
```

Changing the default admin password

Because the admin User profile controls permissions that enable most levels of activity, access to that login must be carefully restricted. To protect the admin login, change its well-known default password the first time you log into the unit. Following is the password parameter, shown with its factory default setting:

```
[in USER/admin]
password = "Ascend"
```

Parameter	Setting
Password	Text string of up to 20 characters, which must be entered by a user to log in with permissions authorized by the admin profile. The value is case sensitive.

You can specify any password up to 20 characters. All future logins governed by the admin User profile must provide the new password.

For example, the following commands change the admin password to x1!35DPG:

```
admin> read user admin
USER/admin read

admin> set password = x1!35DPG

admin> write
USER/admin written
```

When an administrator Telnets into the Stinger unit, the system prompts for the name and password of a User profile and authenticates the information before allowing the Telnet session. For example:

```
% telnet 1.1.1.1
Trying 1.1.1.1...
Connected to 1.1.1.1
Escape character is '^]'.

User: admin
Password: x1!35DPG
```

Setting a Telnet password

A Telnet password is a global, system-wide password required for Telnet logins to the unit. The Telnet password is requested before the system accepts the connection and prompts for the username. Following are the default parameters associated with Telnet logins to a Stinger unit:

```
[in IP-GLOBAL]
telnet-password = ""
user-profile = ""
```

Parameter	Setting
Telnet-Password	Text string of up to 20 characters, required from all users requesting a Telnet session. A user is allowed three attempts, with 60 seconds per attempt, to enter the correct password. A third unsuccessful attempt terminates the login process. The value is case sensitive.
User-Profile	Sets the name of a default User profile for authenticating all Telnet logins. If no name is specified, the system prompts the user to enter the name of a User profile.

For example, the following commands set the Telnet password to `dpg01!`:

```
admin> read ip-global
IP-GLOBAL read

admin> set telnet-password = dpg01!

admin> write
IP-GLOBAL written
```

When a Telnet password has been specified, the system requires a two-tier password authentication for Telnet logins, first the Telnet password, then the username and its associated password. For example:

```
% telnet 1.1.1.1
<stinger01> Enter Password: dpg01!

Trying 1.1.1.1...
Connected to 1.1.1.1
Escape character is '^]'.

User: admin
Password: **********
```

If the user enters an incorrect Telnet password, the system prompts again, allowing up to three attempts before timing out. If the user specifies the correct password, the connection is established and the user is prompted to enter the name and password of a valid User profile.

Providing a basic system IP configuration

To enable Telnet and SNMP access to the unit, and to allow connectivity between the unit and local IP hosts, you must assign IP addresses to the Stinger Ethernet ports and configure basic IP routing. A basic configuration for remote inband management can be saved in a special file called `default.cfg`. If the basic configuration is saved in this way, the system can restart

with the configured remote management capability, even after nonvolatile memory has been cleared with the NVRAM command. For more information about retaining a configuration after clearing NVRAM, see the *Stinger Administration Guide*.

Note: A Stinger unit *does not require* IP routing to operate as a DSLAM. IP routing is not used by the DSLAM activities. The system does not provide IP routing for DSLAM user data.

IP address syntax

The Stinger unit uses dotted decimal notation (not hexadecimal) for IP addresses. Netmask information is appended to the IP address after a forward slash (/).

Netmasks

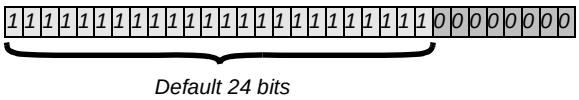
If no netmask is specified, the unit uses a default mask based on the class of the IP address that is supplied. Table 5-1 shows address classes and the number of network bits in the default mask for each class.

Table 5-1. IP address classes and number of network bits

Class	Address range	Default network bits
Class A	0.0.0.0 through 127.255.255.255	8
Class B	128.0.0.0 through 191.255.255.255	16
Class C	192.0.0.0 through 223.255.255.255	24

For example, a class C address, such as 198.5.248.40, has 24 network bits, leaving 8 bits for the host portion of the address. If no subnet mask is specified for a class C address, the Stinger unit uses the default mask of 24 bits, as shown in Figure 5-5.

Figure 5-5. Default netmask for class C IP address



By default, this address is displayed as 198.5.248.40/24.

Subnets

Subnets are permitted under the same syntax. A subnet address specifies a number of network bits that does not adhere to the Class A, B, or C network limits. For example, the following address specifies a 29-bit subnet:

```
ip-address = 198.5.248.40/29
```

In this address, 29 bits of the address are used to specify the network. The 3 remaining bits are used to specify eight addresses on the subnet. With 3 bits used to specify hosts on a 29-bit subnet, eight different bit combinations are possible. Of those eight possible host addresses, two are reserved:

000 — Reserved for the network (base address)
001
010
100
110
101
011
111 — Reserved for the broadcast address of the subnet

Note: Early implementations of TCP/IP did not allow zero subnets (subnets with the same base address as a class A, B, or C network). For example, the subnet 192.32.8.0/30 was illegal because it had the same base address as the class C network 192.32.8.0/24, while the subnet 192.32.8.4/30 was legal. Modern implementations of TCP/IP support zero subnets, and the Stinger implementation of Routing Information Protocol (RIP) treats these subnets the same as any other network. Make sure that you treat zero subnets consistently throughout your network. Otherwise, you might encounter routing problems.

Table 5-2 shows subnet masks and prefix lengths for a class C network.

Table 5-2. Decimal subnet masks and prefix lengths

Subnet mask	Number of host addresses	Prefix length
255.255.255.0	254 hosts + 1 broadcast address, 1 network base address	/24
255.255.255.128	126 hosts + 1 broadcast address, 1 network base address	/25
255.255.255.192	62 hosts + 1 broadcast address, 1 network base address	/26
255.255.255.224	30 hosts + 1 broadcast address, 1 network base address	/27
255.255.255.240	14 hosts + 1 broadcast address, 1 network base address	/28
255.255.255.248	6 hosts + 1 broadcast address, 1 network base address	/29
255.255.255.252	2 hosts + 1 broadcast address, 1 network base address	/30
255.255.255.254	Invalid mask (no hosts)	/31
255.255.255.255	1 host—a host route	/32

The broadcast address of any subnet has the host portion of the IP address set to all 1s (ones). The network address (or base address) represents the network itself, because the host portion of the IP address is all 0s (zeros). For example, suppose that the Stinger configuration assigns the following address to a remote router:

```
198.5.248.120/29
```

The Ethernet network attached to that router has the following address range:

```
198.5.248.120 – 198.5.248.127
```

A host route is a special-case IP address with a prefix length of /32. For example:

```
198.5.248.40/32
```

Host routes are routes to a single host, rather than to a network or subnet. This is determined by the fact that a 32-bit netmask does not allow for any host addresses on the network, other than the single address that is specified. It is, in effect, a one-address subnet.

Assigning the Ethernet IP addresses

A Stinger unit creates an IP interface for the Ethernet port of each control module. Use the Dir command to list the IP interfaces, as follows:

```
admin> dir ip-interface
18  03/06/2003 16:36:32  { { any-shelf any-slot 0 } 0 }
29  03/06/2003 16:27:57  { { shelf-1 first-control-module 1 } 0 }
18  03/06/2003 23:53:47  { { shelf-1 second-control-module 1 } 0 }
```

The designations `first-control-module` and `second-control-module` refer to slot positions 8 and 9 respectively, not the primary or secondary status of each control module. The IP-Interface profile with the zero index (the default `any-shelf any-slot` index) is reserved for the soft interface, which is described in "Defining the soft IP interface for fault tolerance" on page 5-12.

In this example, the control module in the first control module slot position is the primary control module. The following commands assign to the primary control module the address 1.1.1.1/24:

```
admin> read ip-interface { { shelf-1 8 1 } 0 }
IP-INTERFACE/{ { shelf-1 first-control-module 1 } 0 } read

admin> set ip-address = 1.1.1.1/24

admin> write
IP-INTERFACE/{ { shelf-1 first-control-module 1 } 0 } written
```

The following commands assign the address 1.1.1.2/24 to the secondary control module:

```
admin> read ip-interface { { shelf-1 9 1 } 0 }
IP-INTERFACE/{ { shelf-1 second-control-module 1 } 0 } read

admin> set ip-address = 1.1.1.2/24

admin> write
IP-INTERFACE/{ { shelf-1 second-control-module 1 } 0 } written
```

After you assign IP addresses, you can verify that the Stinger unit is a valid IP host on its configured network by pinging other network hosts, as shown in the following example:

```
admin> ping 1.1.1.56
PING 1.1.1.56: 56 Data bytes
64 bytes from 1.1.1.56: icmp_seq=0 ttl=255 time=0 ms
64 bytes from 1.1.1.56: icmp_seq=3 ttl=255 time=0 ms
^C
--- 1.1.1.56: Ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0/0/0 ms
```

Defining the soft IP interface for fault tolerance

A Stinger unit supports a soft IP interface that can be assigned its own IP address. It can be reached through the Ethernet interface of whichever control module is the primary control

module. Therefore, as long as one of the unit's control modules is functioning as the primary control module for the chassis, the soft interface address is reachable.

When power is applied to the system, the soft IP interface address is not initialized until a control module assumes the role of primary control for the Stinger unit. The Ethernet interface of the primary control module can then respond to ARP requests for the soft IP interface address in addition to requests for its own IP address, which was previously configured. If the secondary control module becomes primary, the system reinitializes the soft IP interface address to the Ethernet interface of the new primary control module.

The soft IP interface is configured in the IP-Interface profile with the zero index.

The following commands set the soft interface IP address to 1.1.1.128/24:

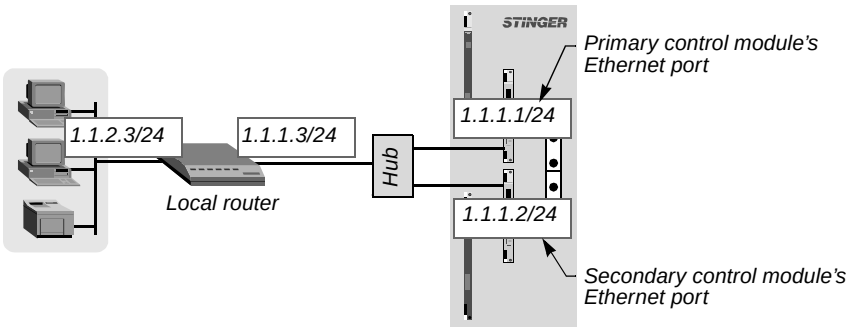
```
admin> read ip-interface {{ 0 0 0 }}
IP-INTERFACE/{ { any-shelf any-slot 0 } 0 } read

admin> set ip-addr = 1.1.1.128/24

admin> write
IP-INTERFACE/{ { any-shelf any-slot 0 } 0 } written
```

Configuring a default route

A default route is a static route that specifies a destination for addresses that are not on the local network and to which a known route does not exist. The default route is generally the IP address of an external router that has more route information about how specific destinations can be reached. When the default route is configured, the Stinger unit routes all IP packets with unknown destinations to the specified external router. If no default route is defined, the unit drops IP packets for which it has no route.

Figure 5-6 shows the Stinger Ethernet interfaces on a subnet, connected to the same Ethernet segment as a local backbone router. In this network, the Stinger unit can use the local router as its default route.

Figure 5-6. Local backbone router to be used as default route



If a local router is the unit's default route, or gateway, the Stinger unit can pass all IP packets with an unrecognized address to that router, so its own routing table can remain small. The external router maintains larger routing tables and assumes the responsibility and overhead of routing most packets.

For example, the following commands define a default route to the LAN router in Figure 5-6:

```
admin> new ip-route default
IP-ROUTE/default read
admin> set gateway-address = 1.1.1.3
admin> set active-route = yes
admin> write
IP-ROUTE/default written
```

The system can support multiple default routes. The profile name does not have to be `default`. The only requirements are that the destination address must be zero, and Gateway-Address must specify a valid, accessible router.

For information about other settings in the IP-Route profile, see the *Stinger Reference*.

Verifying a LAN connection for administrators

To enable administrators to log into the Stinger unit's interface from IP hosts, you must also make sure your local network can route to the unit. Your network router must have network connectivity through intermediate routers so that the administrative host can access the Stinger unit via its IP address. You can test this connectivity by pinging the unit from the local host. For example, the following command entered on a local host tests connectivity to the Stinger soft interface, identified previously:

```
% ping 1.1.1.128
PING 1.1.1.128 (1.1.1.128): 56 Data bytes
64 bytes from 1.1.1.128: icmp_seq=0 ttl=255 time=0 ms
64 bytes from 1.1.1.128: icmp_seq=7 ttl=255 time=0 ms
^C
--- 1.1.1.128 Ping statistics ---
8 packets transmitted, 8 packets received, 0% packet loss
round-trip min/avg/max = 0/0/0 ms
```

Configuring control module redundancy

If two control modules are installed and both modules are available, the system chooses one of the modules to be the primary control module when the system starts up. If the Redundancy profile specifies that one of the controllers is preferred, the system makes that control module primary. If no preference is configured in the Redundancy profile, the system chooses the controller that was primary most recently. If neither of these criteria apply, the system chooses the controller in the second control module slot (slot 9).

Upon installation, the system default setting allows either control module to become primary without agreement from the other control module, and does not specify a preference for either control module to become primary. When two new control modules are installed in a Stinger unit with default settings, the control module in the first slot (slot 8) becomes primary. If you keep the default settings, no configuration is required for control module redundancy. The default settings are recommended for the current software version.

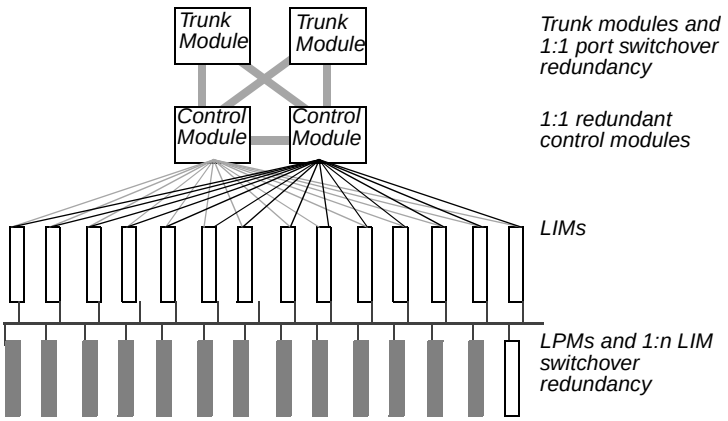
Note: To maintain administrative IP connectivity to the Stinger unit when the unit transfers control to a redundant control module, the soft IP interface of the unit must be properly configured and connections to the unit must use the address of the soft interface. (See "Defining the soft IP interface for fault tolerance" on page 5-12.)

Overview of redundancy operations

The primary and secondary control modules use a heartbeat protocol to monitor each other and maintain synchronized repositories of the system configuration stored in the primary control module's flash memory. If the primary control module resets, the system switches over to the standby control module. The mechanism for switchover is built into the control module hardware and allows the switchover to occur instantaneously.

To maintain full functional redundancy, the primary and secondary control modules have separate paths to each LIM and trunk module, as shown in Figure 5-7.

Figure 5-7. Redundant paths to each control module



The primary control module manages the LIMs and assumes all the normal controller responsibilities of managing the unit and handling the call control and circuit management functions.

In the event of a control module switchover, the LIMs are not subject to a hardware reset (to avoid the need to retrain the DSL modems). However, the system drops all connections and rebuilds them after the new primary control module completes its initialization. Log messages notify you of the following significant events related to control module redundancy:

- Control module becomes primary.
- Control module became primary and no secondary is present.
- Primary control module has lost heartbeat communication with the secondary control module.
- Primary control module has established heartbeat communication with the secondary.
- Control module has a software crash (Fatal log message).

Overview of the Redundancy profile settings

The Redundancy profile stores information, or *contexts*, that the two control modules exchange within the heartbeat protocol to track each other's status. The contexts are stored as two arrays. The first array (context 1) represents the first control module slot, and the second array (context 2) represents the second control module slot.

Most of the settings in the Redundancy profile are visible only when debug permissions are enabled in the current User profile, and cannot be changed. But you can modify the following Redundancy parameters, shown with default settings:

```
[in REDUNDANCY]
primary-preference = no-preference

[in REDUNDANCY:context[1]]
must-agree = False

[in REDUNDANCY:context[2]]
must-agree = False
```

Parameter	Setting
Primary-Preference	Control module that is given preference to become primary. With the default `no-preference` setting, the decision is left up to the system. The system chooses the controller that was primary most recently, or the controller in slot 9. If the parameter is set to `first-controller-preferred`, the system gives preference to the controller in the first control module slot (slot 8). If the control module in the first slot is not available, the system designates the control module in the second slot as primary. If the parameter is set to `second-controller-preferred`, the system gives preference to the controller in the second control module slot (slot 9). If that control module is not available, the system designates the control module in the first slot as primary.
Must-Agree	Enable/disable the requirement that the controllers must agree about which control module is primary. The default setting of `False`, which is the recommended setting for this release, allows a control module to become primary without agreement from the other control module.

Note: Most of the parameter settings in context 1 and context 2 of the Redundancy profile are for internal use and cannot be set by administrators.

Example of specifying a primary control module preference

In the following example, the administrator configures the controller in the second control module slot to be elected primary unless the controller is unavailable:

```
admin> read redundancy
REDUNDANCY read

admin> set primary-preference = second-controller-preferred

admin> write
REDUNDANCY written
```

Y-cable administration of redundant control modules

The serial ports of both redundant control modules can be connected to a single administrative terminal with a Y-cable. One end of this cable consists of a pair of bridged male DB-9 connectors that connect to the control modules. The other end has a single DB-9 or DB-25 serial connector that connects to the console device (see Figure 5-8).

Before you can use this type of connection, you must change the `console-mode` parameter setting in the Serial profile for the diagnostic port of the primary control module.

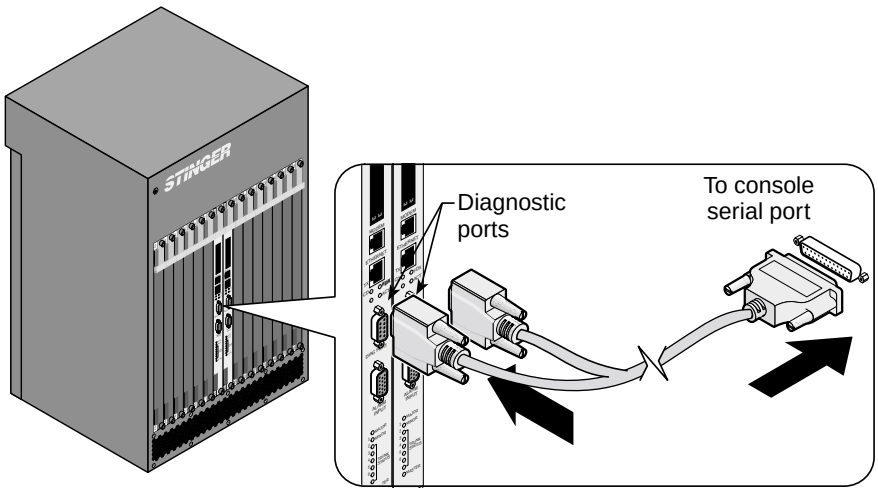
The `console-mode` parameter can be set to the following values:

Setting	Specifies
`on`	Control module's diagnostic port is available for administrative use.
`off`	Administrative access through a control module's diagnostic port is disabled. **Note:** TAOS does not allow the diagnostic ports of both control modules to be disabled at the same time.
`y-cable`	Only the diagnostic port of the primary control module is available for administrative use. The diagnostic port of the secondary control module is disabled.

The following example shows how to change this setting on the primary control module, so that a Y-cable can be connected to both control modules:

```
admin> read serial {1 first-control-module 2}
SERIAL/{ shelf-1 first-control-module 2 }

admin> set console-mode = y-cable

admin> write
```

Figure 5-8. Connecting a Y-cable to a Stinger FS or Stinger FS+

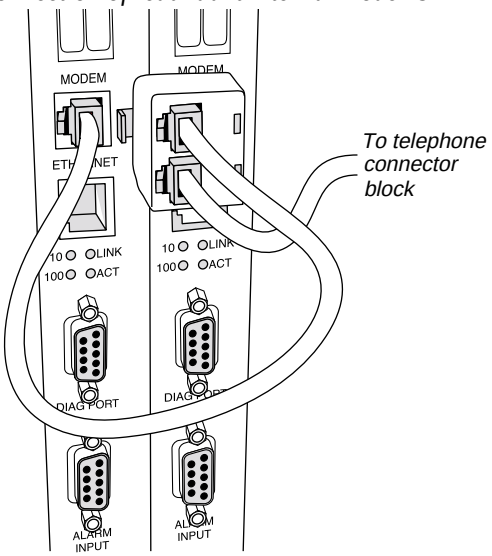


Remote modem administration of redundant control modules

You can also create a bridged connection to the modems of control modules that are equipped with internal modems. A telephone line can be bridged to both modems so that dial-in administrative access to the primary control module takes place through one telephone line.

To do so, you can either connect a two-wire line to the RJ-11 connector of the modem port on each control module and then bridge the lines at a connector block, or use an RJ-11 bridge adapter. Several types of adapters are available for bridging RJ-11 connections. One example is shown in Figure 5-9.

Figure 5-9. Bridged connection of redundant internal modems



When you bridge internal modems to a single line in this way, you must change the status of the internal modems so that only the control module designated as primary can answer incoming calls. If the first control module is the primary control module, proceed as in the following example to set the status of the internal modems to answer calls only on the primary control module:

```
admin> read modem {1 first-control-module 3}
MODEM/{ shelf-1 first-control-module 3 } read

admin> set auto-answer = primary-only

admin> write
```

Setting the `auto-answer` parameter on the primary control module to `primary-only` automatically configures the secondary control module with the same setting.

Configuring system clocking

The Stinger unit requires a clock source for its timing subsystem. By default, it uses a built-in 8kHz clock on the primary control module as its timing source. You can configure the system to take its clock source from a trunk port or from an external building interoffice timing source (BITS) clock connected to the Stinger alarm relay.

Using the default (controller) clock source

The Stinger unit has an internal 8kHz clock on its control modules. By default, the unit uses the clock on the primary control module as the source for its timing subsystem. To configure the unit to obtain its clock signal from another source, set the following parameter (shown with its default setting):

```
[in SYSTEM]
system-8k-clock = controller
```

Parameter	Setting
System-8K-Clock	Source for the master system clock. With the default `controller` setting, the Stinger unit uses the built-in 8kHz clock on the primary control module. If set to `lim-or-trunk-module`, the unit obtains its clock signal from a trunk port that has been configured as an eligible clock source, using the ports in order of their priority. If no eligible trunk ports are available, it uses the control module clock. If set to `bits`, the unit sources its clock from the building interoffice timing source (BITS) T1 framer on its alarm relay. If set to `ami-8k`, a model A-J control module sources the 400Hz ISDN reference clock used in Japan, from the BITS input across the backplane for use by Annex C LIMs. (The model A-J control module is available only for the Stinger LS.)

Using the BITS clock source

The following commands cause the system to first attempt to use a BITS clock as its clock source, and to use the built-in clock only if it does not find a valid BITS signal:

```
admin> read system
SYSTEM read

admin> set system-8k-clock = bits

admin> write
SYSTEM written
```

Loss of BITS signal indications and fall-back

If the `system-8K-clock` parameter in the `system` profile is set to `bits` and the system detects a loss of signal, it displays the following message:

```
LOG alert, Shelf 1, Controller-1, Time: 17:02:01--
BITS clock source has been lost - 8kHz clock is free running
```

If no other clock source is eligible, the system then displays the following message:

```
LOG notice, Shelf 1, Controller-1, Time: 17:02:01
Master clock source changed to local oscillator
```

When the Stinger unit recovers the BITS signal, it displays the following messages:

```
LOG alert, Shelf 1, Controller-1, Time: 17:02:03--
BITS clock source has been recovered - 8kHz clock is locked

LOG notice, Shelf 1, Controller-1, Time: 17:02:03--
Master clock source changed to T1 framer
```

If the Stinger unit detects a T1 signal in the BITS input, it prioritizes the clock source list as follows:

- If the `system-8K-clock` parameter of the `system` profile is set to `bits`, its priority is set to the highest (1) and the T1 framer is selected regardless of other available clock sources and priorities.
- If the `system-8K-clock` parameter of the `system` profile is set to a value other than `bits`, its priority is set as the lowest (3) and the T1 framer is selected as a clock source only if no other slot clock sources are available.

Changing the BITS clock source

The following examples show how to change the `system-8K-clock` parameter setting from `bits` to `lim-or-trunk-module` and use the `slot-clock-source` command to view the changes in clock source priority:

```
admin> set system-8k-clock = bits

admin> write

LOG notice, Shelf 1, Controller-1, Time: 17:55:34--
Master clock source changed to T1 framer

SYSTEM written

admin> slot-clock-source

Master line: T1 framer
Source List:

   Source: line 1 Available*       priority: 2
   Source: line 2 Available*       priority: 1
   Source: T1 framer Available*    priority: 1


admin> set system-8k-clock = lim-or-trunk-module

admin> write

LOG notice, Shelf 1, Controller-1, Time: 17:56:05--
Master clock source changed to slot-1/8 line 2

SYSTEM written

admin> slot-clock-source

Master line: 2
source List:

Source: line 1 Available*       priority: 2
Source: line 2 Available*       priority: 1
Source: T1 framer Available*     priority: 3
```

Using a LIM or trunk module clock source

The following commands cause the system to first attempt to use a trunk port as its clock source, and to use the built-in clock only if it finds no ports that are eligible clock sources:

```
admin> read system
SYSTEM read

admin> set system-8k-clock = lim-or-trunk-module

admin> write
SYSTEM written
```

Configuring trunk ports as eligible clock sources

The DS3-ATM, OC3-ATM, and E3-ATM profiles support Clock-Source and Clock-Priority parameters for specifying whether the port can be used to source the ATM network clock and feed it to the primary control module as the master clock for the unit. Each of the four trunk ports can be configured as eligible or ineligible for this use, and can be assigned a high, middle, or low priority for being elected as the clock source. Following are the relevant parameters, shown with default settings:

```
[in DS3-ATM/{ any-shelf any-slot 0 }:line-config]
clock-source = not-eligible
clock-priority = middle-priority

[in OC3-ATM/{ any-shelf any-slot 0 }:line-config]
clock-source = not-eligible
clock-priority = middle-priority

[in E3-ATM/{ any-shelf any-slot 0 }:line-config]
clock-source = not-eligible
clock-priority = middle-priority
```

Parameter	Setting
Clock-Source	Enable/disable obtaining the system clock signal from the port. By default, ports are not eligible clock sources.
Clock-Priority	Priority of the interface as the system's clock source (high, middle, or low priority). Once the Stinger unit chooses a clock source, it uses that source until the interface becomes unavailable or a higher-priority source becomes available.

If more than one line is eligible to be the clock source, the system chooses the one with the highest priority, as specified by the Clock-Priority setting. If multiple sources of equal priority are present, the system selects the first valid clock source. (A clock source is valid if the Clock-Source parameter is set to `eligible` and the DS3, OC3, or E3 interface is synchronized.)

Once it has selected a clock source, the system uses that source until the source becomes unavailable or a higher-priority source becomes available. If no eligible external sources exist, the system uses an internal clock generated by the primary control module.

Typical trunk port clock source configurations

The following sample commands configure both ports of the first DS3-ATM module as eligible clock sources, with the first port assigned a higher priority for this use:

```
admin> read ds3-atm { 1 trunk-module-1 1 }
DS3-ATM/{ shelf-1 trunk-module-1 1 } read

admin> set line-config clock-source = eligible

admin> set line-config clock-priority = high

admin> write
DS3-ATM/{ shelf-1 trunk-module-1 1 } written

admin> read ds3-atm { 1 trunk-module-1 2 }
DS3-ATM/{ shelf-1 trunk-module-1 2 } read

admin> set line-config clock-source = eligible

admin> set line-config clock-priority = low

admin> write
DS3-ATM/{ shelf-1 trunk-module-1 2 } written
```

For another example, the following commands configure only the first port of the second OC3-ATM trunk module as an eligible clock source. If this port becomes unavailable and is not backed up, the unit begins using the built-in clock on the primary control module.

```
admin> read oc3-atm { 1 trunk-module-1 1 }
OC3-ATM/{ shelf-1 trunk-module-1 1 } read

admin> set line-config clock-source = eligible

admin> set line-config clock-priority = high

admin> write
OC3-ATM/{ shelf-1 trunk-module-1 1 } written
```

Additional information about configuring OC3-ATM, DS3-ATM, and E3-ATM trunk modules can be found in the *Stinger OC3-ATM Trunk Module Guide*, the *Stinger DS3-ATM Trunk Module Guide*, and the *Stinger E3-ATM Trunk Module Guide*.

Installing and Removing Modules

6

Installation and replacement considerations

The Stinger unit design enables you to install, remove, and replace most modules without shutting the unit off. However, you can turn off power to the unit as a precaution, if the unit is not currently providing service.

Warning: Do not attempt to replace the power filter on a Stinger FS or Stinger FS+ unit. Doing so, you risk contact with live, electrically charged components of the unit.

Warning: Before installing your Stinger unit, be sure to read the safety instructions in the *Edge Access and Broadband Access Safety and Compliance Guide*. For information specific to your unit, see Appendix C, “Safety-Related Electrical, Physical, and Environmental Information,” in this guide.

Warning: If power to the unit is not turned off, an electrical energy hazard is present within the card cage. Remove all metallic objects from hands and wrist to prevent bridging of live contact points.

Caution: Wear an antistatic wrist strap before handling any of the unit components.

Replacing and installing control modules

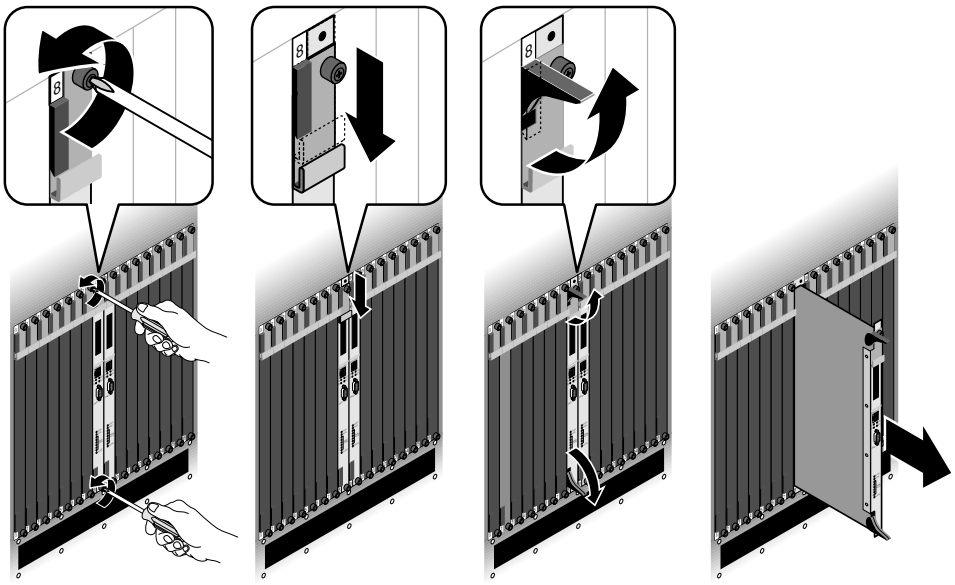
Caution: Hot-swap replacement of an active control module causes a Stinger unit to crash. If the unit contains a redundant control module configuration, and only one of the control modules is being replaced, verify that the module being replaced is not the primary control module. If it is the primary control module, you must use the `redundant-controller-switch` command at the command-line interface to switch control of the unit to the secondary (redundant) control module. For syntax information, see the *Stinger Reference*.

Removing a control module

To remove a control module:

1. Put on the antistatic wrist strap, as recommended in "Preventing static discharge damage" on page 1-2, and plug it into the ESD grounding jack located on the front of the Stinger unit. (See Figure 1-3 on page 1-5.)
2. If the unit does not contain a redundant control module, or if both the primary control module and the secondary control module are being replaced simultaneously, notify all users that the unit is being shut down.
3. Turn off power to the unit.
4. Using a number 2 Phillips screwdriver, loosen the thumbscrews located on the top and bottom of the control module, as shown in Figure 6-1. Other screwdrivers might damage the screw heads.

Figure 6-1. Removing a control module



5. Slide the ejector lock at the top of the control module down to access the top card ejector. This puts the module into a reset state.
6. Lift the top and bottom card ejectors simultaneously to remove the module from the unit.

7 Carefully slide the control module out of the chassis, and place it into an antistatic container.

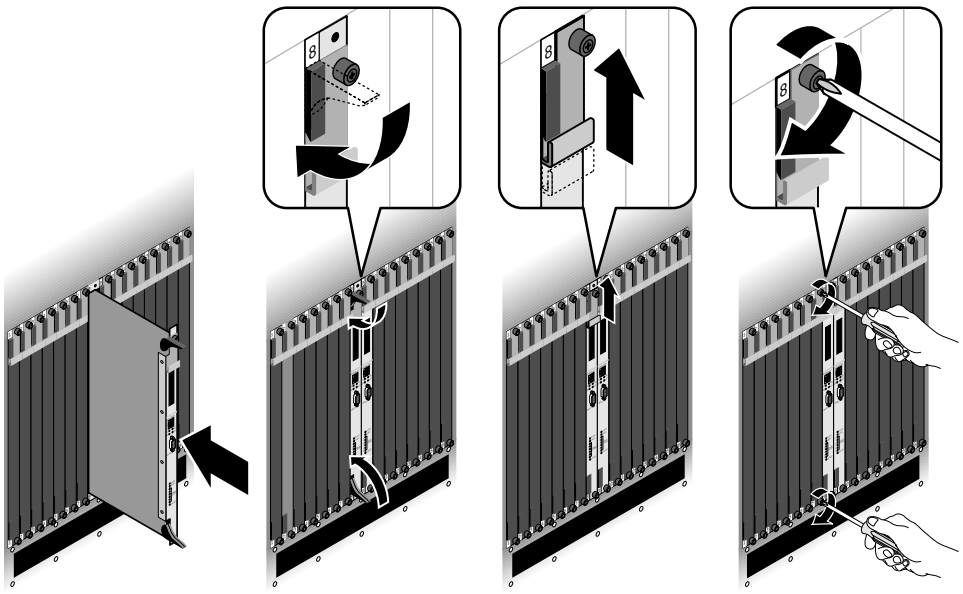
Installing a control module

To install a control module:

1 Put on the antistatic wrist strap, as recommended in "Preventing static discharge damage" on page 1-2, and plug it into the ESD grounding jack located on the front of the unit. (See Figure 1-3 on page 1-5.)

2 Align the replacement control module with the card guide and carefully slide the module into the unit, as shown in Figure 6-2.

Figure 6-2. Installing a control module



3 Depress the card ejectors simultaneously to seat the module into the midplane.

4 Slide the card ejector lock up.

5 Using a number 2 Phillips screwdriver, tighten the two thumbscrews.

6 If necessary, restore power to the unit.

7 Verify the following behavior of the status lights on the control module to verify its operational status:

- The MAJOR alarm light on the newly installed control module turns ON (amber) when you turn on power to the unit, and then blinks while the TAOS software image is downloading. After several minutes of operation, the MAJOR alarm light turns OFF.
- *On a single or primary control module*, the MASTER light at the bottom is ON (solid green) to indicate that the module is active.

– *On a redundant (secondary) control module*, the MASTER light at the bottom is OFF to indicate that the module is in a standby mode.

Note: The MAJOR alarm light on the newly installed control module blinks while the TAOS software image is downloading. This is not an error condition.

Note: If the original operating system (loaded at the factory before shipping the control module) becomes lost or corrupted, follow the instructions in the appropriate Stinger TAOS release note to download a new version of the operating system.

Installing a redundant control module

To install a redundant control module:

1. Put on the antistatic wrist strap, as recommended in "Preventing static discharge damage" on page 1-2, and plug it into the ESD grounding jack located on the front of the unit. (See Figure 1-3 on page 1-5.)
2. Align the replacement control module with the card guide and carefully slide the module into the unit, as shown in Figure 6-2.
3. Depress the card ejectors simultaneously to seat the module into the midplane.
4. Slide the card ejector lock up.
5. Using a number 2 Phillips screwdriver, tighten the two thumbscrews.
6. If necessary, restore power to the unit.
7. Verify the following behavior of the status lights on the control modules to verify their operational status:
   – The MAJOR alarm light on the newly installed control module turns ON (amber) when you turn on power to the unit, and then blinks while the TAOS software image is downloading. After several minutes of operation, the MAJOR alarm light turns OFF.
   – *On the redundant (secondary) control module*, the MASTER light at the bottom is OFF to indicate that the module is in standby mode.
   – *On the primary control module*, the MASTER light at the bottom is ON (solid green) to indicate that the module is active.
8. Configure the unit for redundant control module configuration. For instructions, see "Configuring control module redundancy" on page 5-14.

Note: If the original operating system (loaded at the factory before the control module was shipped) becomes lost or corrupted, follow the instructions in the appropriate Stinger TAOS release note to download a new operating system and configuration.

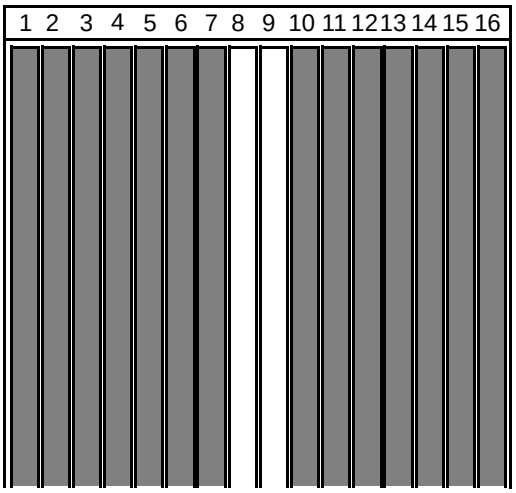
Slot numbering and module placement

Figure 6-3 shows the slots in the Stinger FS or Stinger FS+ chassis that accept LIMs. Front slots are numbered from left to right. LIMs can be installed in slots 1 through 7 and 10 through 16 in the front of the unit. Slots 8 and 9 are reserved for control modules only.

On the rear of the unit, slots are numbered from right to left. Slots 8 and 9 are logically numbered 17 and 18 by the operating system and are reserved for the trunk modules. The

remaining slots accept LPMs. Because LPMs and LIMs work together in pairs, each LPM must correspond to a LIM in the front slot of the same number.

Figure 6-3. LIM slots in the front of a Stinger FS or Stinger FS+



Installing and replacing LIMs

Physical installation and replacement of a LIM are similar procedures to the installation and replacement of a control module. Refer to the illustration in Figure 6-2 on page 6-3, if necessary.

Installing a LIM

To install a LIM:

1 Put on the antistatic wrist strap, as recommended in “Preventing static discharge damage” on page 1-2, and plug it into the ESD grounding jack located on the front of the unit. (See Figure 1-3 on page 1-5.)

2 Remove the blank slot cover on the desired slot on the front of the unit. (See “Slot numbering and module placement” on page 6-4.)

3 Align the LIM with the card guides and carefully slide the module into the unit.

Note: Keep the connector on the LIM being inserted away from components on adjacent LIMs. Do not force the card. Once the card has engaged its bus connector, press firmly to be sure it is fully seated.

4 Depress the ejectors simultaneously.

5 Slide the card ejector lock up.

6 Using a number 2 Phillips screwdriver, secure the LIM by tightening the thumbscrews.

7 If necessary, if all other installation tasks are complete, including the installation of an associated LPM, turn on power to the Stinger unit.

8 Wait several minutes and then verify the behavior of the status lights on the LIM to verify its operational status.

For status light information, see the module guide for the LIM you are installing.

Replacing a LIM

Caution: Lucent Technologies recommends setting the administrative status of the LIM to Down (through the command-line interface) before replacing the module. When a LIM is removed, all its ports and circuits are terminated, and data loss might occur. For instructions on changing a LIM's state to Down and then back to Up, see the *Stinger Administration Guide*.

Refer to the illustration in Figure 6-1 on page 6-2, if necessary.

To replace a LIM:

1. Put on the antistatic wrist strap, as recommended in "Preventing static discharge damage" on page 1-2, and plug it into the ESD grounding jack located on the front of the unit. (See Figure 1-3 on page 1-5.)
2. Using a number 2 Phillips screwdriver, loosen the top and bottom thumbscrews attaching the module to the unit.
3. Slide the ejector lock located at the top of the LIM down to disconnect the module from the network.
4. Lift the top and bottom card ejectors simultaneously to remove the module from the unit. Lift both ejectors simultaneously to avoid damage to the module.
5. Carefully slide the LIM out of the unit and place it into an antistatic container.
6. Align the LIM with the card guides and carefully slide the module into the unit.

   Note: Keep the connector on the LIM being inserted away from components on adjacent LIMs. Do not force the card. Once the card has engaged its bus connector, press firmly to be sure it is fully seated.
7. Depress the ejectors simultaneously.
8. Slide the card ejector lock up.
9. Using a number 2 Phillips screwdriver, secure the module into the unit by tightening the thumbscrews on the LIM.
10. Wait several minutes and then verify the behavior of the status lights on the LIM to verify its operational status.

    For status light information, see the module guide for the LIM you are installing.

Installing and replacing LPMs

Installation and replacement of line protection modules (LPMs) is similar to the procedure for line interface modules (LIMs), except that LPMs are installed in the rear of the chassis and their top ejector levers are not protected by ejector locks.

Openings for unused LPM slots are protected by blank covers. A companion LPM must be installed in the back of the unit for each LIM.

Installing an LPM

To install an LPM:

1. Put on the antistatic wrist strap, as recommended in "Preventing static discharge damage" on page 1-2, and plug it into the ESD grounding jack located on the front of the unit. (See Figure 1-3 on page 1-5.)
2. Remove the blank filler module covering the LPM's slot.
3. Align the LPM with the card guides and gently slide the LPM into the unit.
4. Using a number 2 Phillips screwdriver, secure the module into the unit by tightening the thumbscrews on the LPM.
5. Connect the cables as described in "Connecting the LPMs" on page 2-3.

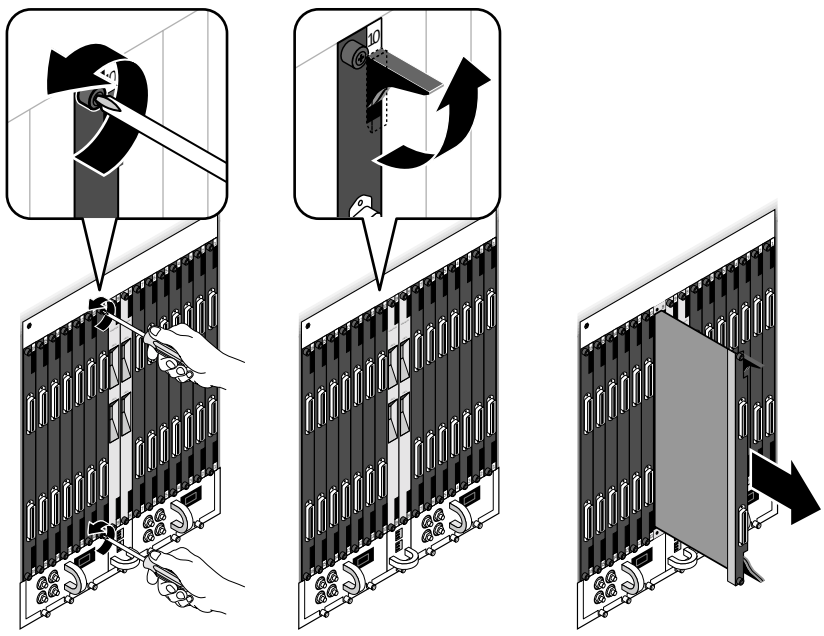
Replacing an LPM

⚠ **Caution:** Any circuits running through the LPM are interrupted when it is removed, which can result in data loss. Lucent Technologies recommends setting the associated LIM's administrative status to Down before removing the LPM from the unit. For instructions on changing a LIM's state to Down and then back to Up, see the *Stinger Administration Guide*.

To replace an LPM:

1. Put on the antistatic wrist strap, as recommended in "Preventing static discharge damage" on page 1-2, and plug it into an ESD grounding jack located on the front or back of the unit. (See Figure 1-3 on page 1-5 and Figure 1-5 on page 1-8.)
2. Carefully unhook the cable ties connecting the cables and connectors from the card.
3. Using a number 2 Phillips screwdriver, loosen the top and bottom thumbscrews attaching the module to the unit, as shown in Figure 6-4.

Figure 6-4. Removing LPMs



4 Lift the top and bottom card ejectors simultaneously to remove the module from the unit. Lift both ejectors simultaneously to avoid damage to the module.

5 Carefully slide the LPM out of the unit and place it into an antistatic container.

6 Align the new or replacement LPM with the card guides and carefully slide the module into the unit. Press firmly to be sure it has engaged the midplane connectors.

7 Depress the ejectors simultaneously.

8 Using a number 2 Phillips screwdriver, secure the module into the unit by tightening the thumbscrews on the LPM.

9 Reconnect the cables, as described in "Connecting the LPMs" on page 2-3.

Installing and replacing PCMCIA cards

To remove the PCMCIA cards from the control module, push the square, flat black buttons at the bottom of each PCMCIA card to eject the cards. After the cards are removed, make sure they remain guarded against static discharge.

To install the PCMCIA cards in the control module, line the card edge up with the guides, and push the card in until the black ejector button pops back up.

Replacing the air filter

You can optionally order and install an air filter in the Stinger unit. The filter slides into the air intake on the bottom of the front of the chassis.

You are not required to turn off power to the unit to install or replace the air filter.

Caution: The air filter must be vacuumed or replaced once a month to prevent heat from building up inside the chassis.

To install or replace the air filter:

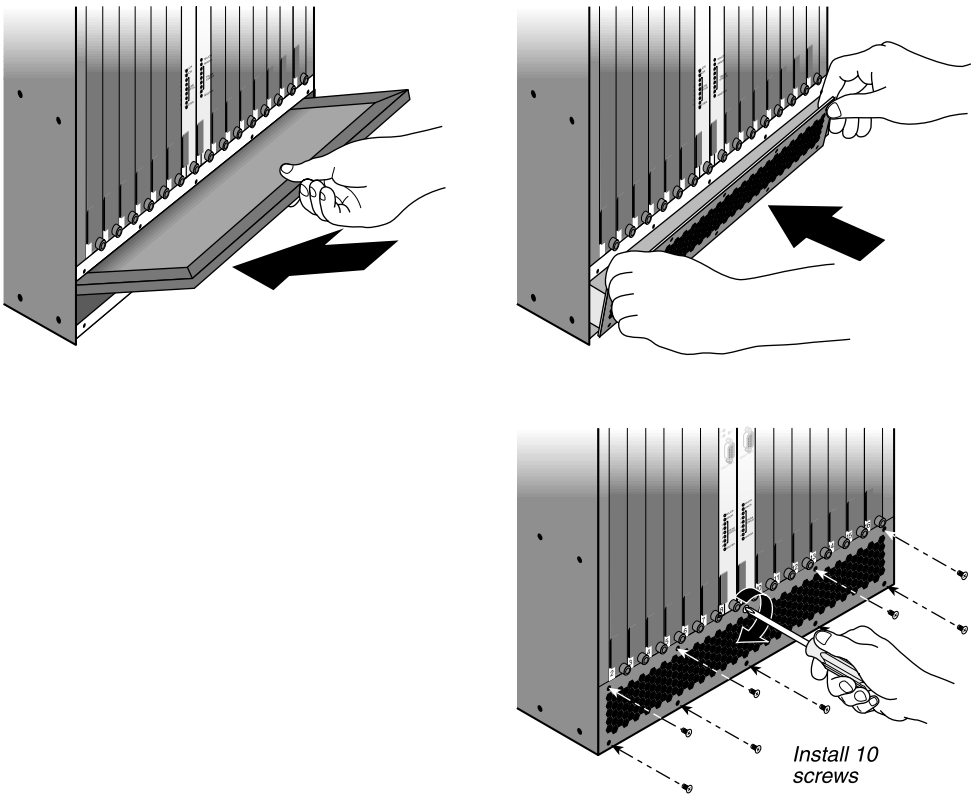
1 Using a number 1 Phillips screwdriver, remove the screws on the top and bottom of the air intake grill located on the bottom front of the unit, as shown in Figure 6-5.

2 Grasp the edges of the grill and pull to remove it.

3 Slide the old air filter diagonally to remove it from the air intake area.

4 Slide the new (or cleaned) air filter diagonally into the air intake area.

Figure 6-5. Replacing the air filter



5 Replace the grill, attaching it with the screws removed in step 1.

Stinger Intended Use

A

The Stinger unit is a DSL ATM switch that provides DSL connections for individual users. Users connect to the unit over DSL lines supported by line interface modules (LIMs) that are installed in the Stinger unit. Every Stinger unit contains a special control module that controls the operation of the unit. Two control modules can be installed in a redundant arrangement, with one active and primary, and the other a spare. The physical interfaces on the unit provide DSL or ATM network connections to digital lines, and a serial or Ethernet LAN connection for configuration and administration. Units equipped with revision 2, or later, control modules also provide interfaces for monitoring the alarm status of other devices, and an optional internal modem.

User line interfaces

Depending on the LIMs that are installed, users can connect to the Stinger unit over DSL lines supporting several DSL protocols. LIMs are available to support the following DSL connections:

- HDSL2
- IDSL
- ADSL Annex A, B, or C
- ADSL G.lite
- SDSL
- SHDSL

See the module guide of a specific LIM for an explanation of installation and configuration options.

User connection to each LIM is provided through an associated line protection module (LPM).

Network interfaces

The Stinger unit extracts data from the digital subscriber line and switches it to remote ATM switches depending on the configuration of virtual circuit and path information. Stinger

modules are available that support ATM connections to ATM network switches over the following types of digital lines:

- T1 (individual lines or aggregated bandwidth)
- E1 (individual lines or aggregated bandwidth)
- DS3
- E3
- OC3

For an explanation of installation and configuration options, see the guide for a specific module.

Control module interfaces

The control module is equipped with the following interfaces for configuration and administration. For an explanation of basic configuration options, see Chapter 5, “Configuring the Control Modules and System Timing.”

- A DB-9 female connector for an RS-232 serial connection, with the following default settings:
  - 9600bps
  - Direct connection
  - 8 data bits
  - No parity
  - 1 stop bit
  - No flow control
- A DB-9 female connector for alarm monitoring connections (revision 2 control modules).
- An RJ-45 connector for a 10/100BaseT Ethernet connection.
- An RJ-11 connector for the optional internal modem.
- A PCMCIA interface, designed to accept PCMCIA flash-memory cards. Other PCMCIA devices are not supported.
- An RJ-45 connector for copper gigabit Ethernet connections, if equipped with an appropriate IP2000 control module.
- A duplex LC connector for optical gigabit Ethernet connectons, if equipped with an appropriate IP2000 control module.

Cables and Connectors

B

Diagnostic port and cable pinouts

The control port uses a standard DB-9 female connector that conforms to the EIA RS-232 standard for serial interfaces. Table B-1 applies to all Stinger models that use the RS-232 pinouts.

Table B-1. Control port and cable pinouts

DB-9 pin number	RS-232 signal name	Function	I/O
1	DCD	Data Carrier Detect	O
2	RD	Serial Receive Data	O
3	SD	Serial Transmit Data	I
4	DTR	Data Terminal Ready	I
5	GND	Signal Ground	
6	DSR	Data Set Ready	O
7	RTS	Request to Send	I
8	CTS	Clear to Send	O
9*	RI	Ring Indicator	O

* Pin 9 is not active. (Ring Indication signal not supplied.)

Alarm input port pinouts

The alarm input port, found on revision 2 control modules, consists of a DB-15 female connector. This connector provides seven pairs of pins that can be connected to the alarm relays of up to seven external devices. Operation or nonoperation of these alarm relays is sensed by the TAOS software, based on continuity or lack of continuity between the pair of pins to which it is connected.

The sensing connections apply 3.3Vdc at less than 10mA through the closed contacts of the remote relay. The cable associated with this connector must consist of 24-gauge to 28-gauge conductors.

Table B-2 provides the pinouts for the DB-15 alarm input port.

Table B-2. Alarm input pinouts

Alarm Relay Number	Sensing Connection	Ground Connection
Alarm 1	Pin 1	Pin 2
Alarm 2	Pin 3	Pin 4
Alarm 3	Pin 5	Pin 6
Alarm 4	Pin 7	Pin 8
Alarm 5	Pin 10	Pin 11
Alarm 6	Pin 12	Pin 13
Alarm 7	Pin 14	Pin 15

Ethernet interface specifications

The base Stinger unit has an Ethernet interface that supports the physical specifications of IEEE 802.3 and IEEE 802.14 with Ethernet 2 (Ethernet/DIX) framing. The unit provides a single Ethernet interface that automatically senses the Ethernet type to which it is connected. It supports the following types of Ethernet interfaces:

- 10BaseT (unshielded twisted pair): Twisted-pair Ethernet and IEEE 802.3 (10BaseT) with an RJ-45 connector, labeled LAN UTP
- 100BaseT: 100Mbps baseband modulation on twisted pair

The Ethernet address used to identify the Ethernet interface resides in the Stinger unit's motherboard.

To install the Ethernet interface, you must have the cables described in either of the following two sections.

10BaseT cables

To install a 10BaseT interface, you need a twisted-pair Ethernet cable and a dual twisted-pair cable terminated with RJ-45 modular jacks.

Use an EIA/TIA 568 or IEEE 802.3 10BaseT cable.

100BaseT cables

To install a 100BaseT interface, you need a twisted-pair Ethernet cable and a dual twisted-pair cable terminated with RJ-45 modular jacks.

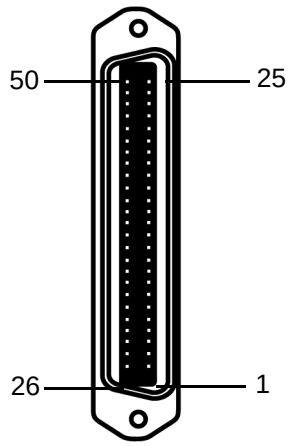
Use one of the following cables: 100BaseT2, 100BaseT4 (not very popular), 100BaseTX, or 100BaseFX.

LPM cable specifications

Depending on the type of DSL service being provided by the associated LIM, LPMs support two-wire or four-wire connections to the DSL end user.

The LPMs use USOC RJ-21X 50-pin telephone company connectors, as shown in Figure B-1.

Figure B-1. USOC RJ-21X 50-pin connector



LPM two-wire cable specifications

Depending on the number of ports provided by the associated LIM, an LPM can have one, two, or three connectors:

- Table B-3 shows the cable pinouts for the single 50-pin connector for two-wire connections on an LPM that supports LIMs with 24 ports
- Table B-4 shows the cable pinouts for the upper 50-pin connector for two-wire connections on an LPM that supports LIMs with more than 48 ports.

- Table B-5 shows the cable pinouts for the middle 50-pin connector for two-wire connections on an LPM that supports LIMs with 72 ports.

Table B-3. Single or lower connector pin assignments for two-wire connections

Pin	Signal	Color code	Pin	Signal	Color code
1	1R (line 1 ring)	Blue/white	26	1T (line 1 tip)	White/blue
2	2R	Orange/white	27	2T	White/orange
3	3R	Green/white	28	3T	White/green
4	4R	Brown/white	29	4T	White/brown
5	5R	Slate/white	30	5T	White/slate
6	6R	Blue/red	31	6T	Red/blue
7	7R	Orange/red	32	7T	Red/orange
8	8R	Green/red	33	8T	Red/green
9	9R	Brown/red	34	9T	Red/brown
10	10R	Slate/red	35	10T	Red/slate
11	11R	Blue/black	36	11T	Black/blue
12	12R	Orange/black	37	12T	Black/orange
13	13R	Green/black	38	13T	Black/green
14	14R	Brown/black	39	14T	Black/brown
15	15R	Slate/black	40	15T	Black/slate
16	16R	Blue/yellow	41	16T	Yellow/blue
17	17R	Orange/yellow	42	17T	Yellow/orange
18	18R	Green/yellow	43	18T	Yellow/green
19	19R	Brown/yellow	44	19T	Yellow/brown
20	20R	Slate/yellow	45	20T	Yellow/slate
21	21R	Blue/violet	46	21T	Violet/blue
22	22R	Orange/violet	47	22T	Violet/orange
23	23R	Green/violet	48	23T	Violet/green
24	24R	Brown/violet	49	24T	Violet/brown

Table B-3. Single or lower connector pin assignments for two-wire connections (continued)

Pin	Signal	Color code	Pin	Signal	Color code
25	Not used	N/A	50	Not used	N/A

Modules supporting more than 24 lines use the connections indicated in Table B-4 for the upper 50-pin connector.

Table B-4. Upper connector pin assignments for two-wire connections

Pin	Signal	Color code	Pin	Signal	Color code
1	25R (channel 1 ring)	Blue/white	26	25T (channel 1 tip)	White/blue
2	26R	Orange/white	27	26T	White/orange
3	27R	Green/white	28	27T	White/green
4	28R	Brown/white	29	28T	White/brown
5	29R	Slate/white	30	29T	White/slate
6	30R	Blue/red	31	30T	Red/blue
7	31R	Orange/red	32	31T	Red/orange
8	32R	Green/red	33	32T	Red/green
9	33R	Brown/red	34	33T	Red/brown
10	34R	Slate/red	35	34T	Red/slate
11	35R	Blue/black	36	35T	Black/blue
12	36R	Orange/black	37	36T	Black/orange
13	37R	Green/black	38	37T	Black/green
14	38R	Brown/black	39	38T	Black/brown
15	39R	Slate/black	40	39T	Black/slate
16	40R	Blue/yellow	41	40T	Yellow/blue
17	41R	Orange/yellow	42	41T	Yellow/orange
18	42R	Green/yellow	43	42T	Yellow/green
19	43R	Brown/yellow	44	43T	Yellow/brown
20	33R	Slate/yellow	45	33T	Yellow/slate
21	45R	Blue/violet	46	45T	Violet/blue

Table B-4. Upper connector pin assignments for two-wire connections (continued)

Pin	Signal	Color code	Pin	Signal	Color code
22	46R	Orange/violet	47	46T	Violet/orange
23	47R	Green/violet	48	47T	Violet/green
24	48R	Brown/violet	49	48T	Violet/brown
25	Not used	N/A	50	Not used	N/A

Modules supporting 72 lines have a third 50-pin connector that uses connections indicated in Table B-5.

Table B-5. Middle connector pin assignments for two-wire connections (72-port LIM only)

Pin	Signal	Color code	Pin	Signal	Color code
1	49R (channel 1 ring)	Blue/white	26	49T (channel 1 tip)	White/blue
2	50R	Orange/white	27	50T	White/orange
3	51R	Green/white	28	51T	White/green
4	52R	Brown/white	29	52T	White/brown
5	53R	Slate/white	30	53T	White/slate
6	54R	Blue/red	31	54T	Red/blue
7	55R	Orange/red	32	55T	Red/orange
8	56R	Green/red	33	56T	Red/green
9	57R	Brown/red	34	57T	Red/brown
10	58R	Slate/red	35	58T	Red/slate
11	59R	Blue/black	36	59T	Black/blue
12	60R	Orange/black	37	60T	Black/orange
13	61R	Green/black	38	61T	Black/green
14	62R	Brown/black	39	62T	Black/brown
15	63R	Slate/black	40	63T	Black/slate
16	64R	Blue/yellow	41	64T	Yellow/blue
17	65R	Orange/yellow	42	65T	Yellow/orange

Table B-5. Middle connector pin assignments for two-wire connections (72-port LIM only) (continued)

Pin	Signal	Color code	Pin	Signal	Color code
18	66R	Green/yellow	43	66T	Yellow/green
19	67R	Brown/yellow	44	67T	Yellow/brown
20	68R	Slate/yellow	45	68T	Yellow/slate
21	69R	Blue/violet	46	69T	Violet/blue
22	70R	Orange/violet	47	70T	Violet/orange
23	71R	Green/violet	48	71T	Violet/green
24	72R	Brown/violet	49	72T	Violet/brown
25	Not used	N/A	50	Not used	N/A

LPM four-wire cable specifications

A LIM that supports 24 four-wire connections, such as a T1 or E1 module, must use a 48-port LPM. Optionally, a 24-port LPM can be used for any LIM supporting 12 or fewer four-wire ports. Table B-6 shows the USOC RJ-21X cable pinouts for the lower 50-pin connector for four-wire connection. Table B-7 shows the cable pinouts for the upper 50-pin connector.

Table B-6. Lower connector pin assignments for four-wire connections

Four-wire interface	Transmit tip	Transmit ring	Receive tip	Receive ring
1	Pin 26	Pin 1	Pin 27	Pin 2
2	Pin 28	Pin 3	Pin 29	Pin 4
3	Pin 30	Pin 5	Pin 31	Pin 6
4	Pin 32	Pin 7	Pin 33	Pin 8
5	Pin 34	Pin 9	Pin 35	Pin 10
6	Pin 36	Pin 11	Pin 37	Pin 12
7	Pin 38	Pin 13	Pin 39	Pin 14
8	Pin 40	Pin 15	Pin 41	Pin 16
9	Pin 42	Pin 17	Pin 43	Pin 18
10	Pin 44	Pin 19	Pin 45	Pin 20
11	Pin 46	Pin 21	Pin 47	Pin 22

Table B-6. Lower connector pin assignments for four-wire connections (continued)

Four-wire interface	Transmit tip	Transmit ring	Receive tip	Receive ring
12	Pin 48	Pin 23	Pin 49	Pin 24

Table B-7. Upper connector pin assignments for four-wire connections

Four-wire interface	Transmit tip	Transmit ring	Receive tip	Receive ring
13	Pin 26	Pin 1	Pin 27	Pin 2
14	Pin 28	Pin 3	Pin 29	Pin 4
15	Pin 30	Pin 5	Pin 31	Pin 6
16	Pin 32	Pin 7	Pin 33	Pin 8
17	Pin 34	Pin 9	Pin 35	Pin 10
18	Pin 36	Pin 11	Pin 37	Pin 12
19	Pin 38	Pin 13	Pin 39	Pin 14
20	Pin 40	Pin 15	Pin 41	Pin 16
21	Pin 42	Pin 17	Pin 43	Pin 18
22	Pin 44	Pin 19	Pin 45	Pin 20
23	Pin 46	Pin 21	Pin 47	Pin 22
24	Pin 48	Pin 23	Pin 49	Pin 24

Safety-Related Electrical, Physical, and Environmental Information

C

See the *Edge Access and Broadband Access Safety and Compliance Guide* for safety instructions and country-specific information.

Warning: Before installing your Stinger unit, be sure to read the *Edge Access and Broadband Access Safety and Compliance Guide*.

Electrical and electronic information

Electrical and electronic information for Stinger units includes specifications, universal service order code (USOC) information, ground wire size, and electromagnetic interference (EMI) class.

Electronic and electrical specifications

The Stinger unit is nominally powered from a -48Vdc source. This source is wired to the power filters on the left side at the front of the chassis. Table C-1 describes Stinger electronic and electrical specifications.

Table C-1. Stinger electronic and electrical specifications

Application	Specification
-48Vdc	2100 watts (W) maximum
Input voltage	-42Vdc to -57.6Vdc
Inrush current	Minimal because all modules have inrush-limiting circuits
Power cable	In accordance with national standards and specifications as described in IEC 60950
Connectors	Number 10 terminal lugs

Table C-1. Stinger electronic and electrical specifications (continued)

Application	Specification
Circuit breaker	50A
Standards	Bellcore GR-1089-CORE, classified A2

USOC jack and code information

Stinger equipment complies with Part 68 of the U.S. Federal Communications Commission (FCC) Rules and uses the universal service order code (USOC) jack type and code shown in Table C-2. For information about FCC Part 68, see the *Edge Access and Broadband Access Safety and Compliance Guide*.

Table C-2. Stinger T1 module USOC jacks and codes

Model name	Facility interface code	Service order code	Jack type
STGR-LIM-T1-8	04DU9-BN	6.0N	RJ-48C
STGR-LIM-T1-8	04DU9-DN	6.0N	RJ-48C
STGR-LIM-T1-8	04DU9-1KN	6.0N	RJ-48C
STGR-LIM-T1-8	04DU9-1SN	6.0N	RJ-48C
STGR-LIM-T1-8	04DU9-1ZN	6.0N	RJ-48C
STGR-LIM-T1-24	04DU9-BN	6.0N	RJ-48C
STGR-LIM-T1-24	04DU9-DN	6.0N	RJ-48C
STGR-LIM-T1-24	04DU9-1KN	6.0N	RJ-48C
STGR-LIM-T1-24	04DU9-1SN	6.0N	RJ-48C
STGR-LIM-E1-24	04DU9-1ZN	6.0N	RJ-48C
STGR-LIM-E1-8	04DU9-BN	6.0N	RJ-48C
STGR-LIM-E1-8	04DU9-DN	6.0N	RJ-48C
STGR-LIM-E1-8	04DU9-1KN	6.0N	RJ-48C
STGR-LIM-E1-8	04DU9-1SN	6.0N	RJ-48C
STGR-LIM-E1-8	04DU9-1ZN	6.0N	RJ-48C
STGR-LIM-E1-24	04DU9-BN	6.0N	RJ-48C
STGR-LIM-E1-24	04DU9-DN	6.0N	RJ-48C
STGR-LIM-E1-24	04DU9-1KN	6.0N	RJ-48C

Table C-2. Stinger T1 module USOC jacks and codes (continued)

Model name	Facility interface code	Service order code	Jack type
STGR-LIM-E1-24	04DU9-1SN	6.0N	RJ-48C
STGR-LIM-E1-24	04DU9-1ZN	6.0N	RJ-48C

EMI class

The Stinger product belongs to EMI class A.

Minimum ground wire size

The DSL lines connected to the Stinger FS and Stinger FS+ can be subject to lightning surges. These surges must be discharged to ground through an adequate ground wire. An adequate ground wire must present a resistance of approximately 0.02 ohms to a surge of 500 amps. The wire gauges shown in Table C-3 are appropriate for the wire lengths indicated.

Table C-3. Stinger FS minimum ground wire sizes

Length	Wire gauge
0 to 10 feet (0m to 3.05m)	12 AWG (3.31mm²)
10 to 25 feet (3.05m to 7.62m)	9 AWG (6.63mm²)
25 to 50 feet (7.62m to 15.24m)	6 AWG (13.3mm²)
50 to 100 feet (15.24m to 30.48m)	3 AWG (26.7mm²)

Lucent Technologies does not recommend use of a ground wire longer than 100 feet (30.48m).

Physical specifications

Table C-4 describes the Stinger physical specifications.

Table C-4. Stinger physical specifications

Specification	Description
ATM standards	ATM Forum UNI (Version 3.0 and Version 3.1), ATM Forum Interim Interswitch Signaling Protocol (IISP)
WAN interfaces	DS3 and E3 (cell-based), OC3c/STM-1 (optical and electrical), T1, E1, and Ethernet
Management interfaces	Ethernet and RS-232

Table C-4. Stinger physical specifications (continued)

Specification	Description
Physical characteristics	Basic unit includes two dc power filter modules, one cooling fan module, and two control modules (one active, one standby)
Overall chassis size*	Height: 24.5 inches (62.23cm) Depth: 16 inches (40.64cm) Width: 19.0 inches (48.26cm)
Unit weight	160 pounds (72.6kg) maximum (fully configured)

* The depth measurement does not include calculations for cable spacing.

Site specifications

Stinger units require a particular operating environment and minimum clearance for proper operation.

Operating environment

Table C-5 describes the environmental requirements for selecting an installation site for the Stinger hardware. The site requirements are based on Network Equipment Building System (NEBS) GR-63-CORE and GR-1089-CORE.

Table C-5. Stinger site specifications

Parameter	Requirement
Ambient operating temperature	0°C to 55°C (32°F to 131°F)
Relative humidity	10% to 95% (noncondensing)
Operating altitude	To 13,123 feet (4000m)
Ambient storage temperature	-40°C to +85°C (-40°F to +185°F), 95% relative humidity
Storage altitude	-1,000 feet to +30,000 feet (-305m to 9150m)

Space requirements

The Stinger FS and Stinger FS+ hardware requires the following minimum clearances for the chassis:

- 6 inches (15cm) at the back panel for cable routing and airflow
- 20 inches (54cm) at the front panel for module replacement and airflow

Special requirements and recommendations for installation and maintenance

Follow these requirements and recommendations for Stinger installation and maintenance.

Lifting requirements

Use a mechanical lift or at least three people to lift a Stinger chassis for rack mounting. For more information, see “Setting up the unit” on page 2-1.

Air filter maintenance

The air filter must be inspected once a month and vacuumed or replaced as needed to prevent heat from building up inside the chassis. For instructions, see “Replacing the air filter” on page 6-8.

Caution: For maximum air flow and cooling, Lucent Technologies recommends that you do not use an air filter with a Stinger RT unit installed in an outdoor enclosure.

Index

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

V

W

Y