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Stinger™

DS3-ATM Trunk Module Guide

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About This Guide

What is in this guide

This guide describes how to configure and monitor the Stinger™ DS3-ATM trunk module and includes configuration examples and module specifications. This module also describes how to configure LIM redundancy.

Warning: Before installing your Stinger unit, be sure to read the safety instructions in the *Edge Access Safety and Compliance Guide*. For information specific to your unit, see the "Safety-Related Physical, Environmental, and Electrical Information" appendix in the *Stinger Getting Started Guide* for your Stinger unit.

What you should know

To make use of the procedures and sample configurations in this guide, you should have a general knowledge of Stinger products and a working knowledge of the command line interface (CLI). You should understand the fundamental concepts of digital subscriber line (DSL) technology and be familiar with the relationship between DSL interfaces and associated configuration profiles.

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.
`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.

Convention	Meaning
[ ]	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:

- **Read me first:**
  - *Edge 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.

  - 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 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.
  - *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.

Configuring a DS3-ATM Trunk Module 1

The DS3-ATM trunk module provides a coaxial copper interface between the Stinger™ unit and the carrier ATM core network. Each DS3-ATM trunk module supports two 44.736 Mbps interfaces. Each DS3-ATM interface connects to one ATM switch.

This guide provides specifications and status lights information, and describes how to connect the DS3-ATM module to a switch. The parameters of the trunk module profiles and line configuration are defined and DS3-ATM framing formats and clocking are discussed. An example configuration shows how to enable the ports on one trunk module and designate the ports on a second module as spare ports, and how to set up virtual channel switching on the active ports.

Introducing the DS3-ATM trunk module

Stinger units support one-port and two-port DS3-ATM trunk modules.

Platform	Product code	Description
Stinger FS	STGR-TM-DS3-1	One-port trunk module with DS3 (coax) interface for operation at 44.736Mbps.
Stinger LS	STGRLS-TM-DS3-1	
Stinger FS	STGR-TM-DS3-2	Two-port trunk module with DS3 (coax) interfaces for operation at 44.736Mbps per port.
Stinger LS	STGRLS-TM-DS3-2	

Installing a DS3-ATM trunk module

See the *Stinger Getting Started Guide* for installation instructions. You can install up to two DS3-ATM trunk modules in a Stinger™ unit.After installing a DS3-ATM trunk module and connecting it to a network, you verify connections by checking the status lights. You then configure the physical link. Use a status profile to display the state of the DS3 line and any error conditions.

DS3-ATM trunk module specifications

The two-port DS3-ATM trunk module provides two active and two standby trunk connections at data rates of 44.736 Mbps at each port. You can configure each port as one of the following:

- User-to-Network Interface (UNI)
- Interim Interswitch Signaling Protocol (IISP) connection
- Direct trunk

The Stinger unit provides a maximum of four DS3 active ports per unit (four active, four standby).

Table 1-1 provides DS3-ATM trunk module specifications.

Table 1-1. DS3-ATM trunk module spefications

Category	Specification
Physical dimensions	Height: 15 inches (38.1 cm). Width: 1.06 inches (2.69 cm). Depth: 5 inches (12.7 cm). Weight: 1.5 pounds (0.68 kg).
Power requirements	11.5 W.
Temperature range	FS/LT version: 32°F to 131°F (0°C to 55°C) RT version: -40°F to 149°F (-40°C to 65°C)
Operating humidity	0% to 90%, noncondensing.
Agency approvals	Electromagnetic Emissions Certifications: FCC Part 15 Class A, CISPR Class A.
Interface standards	ITU G.703. ANSI T1.102.

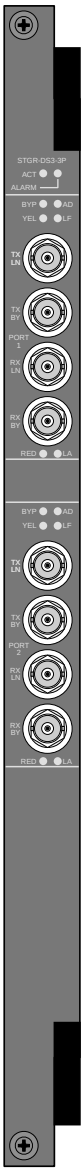
Table 1-1. DS3-ATM trunk module spefications (continued)

Category	Specification
Other standards supported	ANSI T1E1.1/94-002R1. ANSI T1.107. ANSI T1.107a. ANSI T1.403. ATM Forum UNI 3.0/3.1. Bellcore TR-NWT 001112. Bellcore TR-TSY-000499. Bellcore TR-NWT-000820. ITU G.804. RFC 1407. TR54014 (AT&T ACCUNET T45 and T45R).
Physical interfaces	Four (two active, two standby) ATM UNI 3.0/3.1 cell-bearing DS3 ports supporting C-bit/M-framing, PLCP according to TR-TSY-000773, and direct cell mapping according to G.804. BNC connector according to ANSI T1.404.
Maximum modules per unit	Two.

Status indicators

Several status lights on the front panel of the DS3ATM trunk module indicate the status of the module and its ports. Figure 1-1 shows the front panel and status lights of the DS3ATM trunk module.

Figure 1-1. DS3-ATM trunk module.



Interpreting DS3-ATM status lights

All status lights except line active (LA) are lit upon startup or restart and remain lit until the trunk module passes power-on self test (POST). If no status lights are lit, the DS3 interface either is disabled or is receiving an alarm indication signal.

Table 1-2 explains the DS3-ATM trunk module status lights.

Table 1-2. DS3-ATM trunk module status lights

Light	Color	Status
Red	Red	Red Alarm. ON indicates the DS3 interface is experiencing loss of receive signal.
Yel	Yellow	Yellow Alarm. ON indicates the DS3 interface has detected Far End Receive Failure indication transmitted from the other side.
Byp	Yellow	Bypass. ON indicates the line is in bypass mode.
LA	Green	Link active. ON indicates the DS3 interface is enabled and has not detected any error conditions.
LF	Yellow	Loss of frame. ON indicates the DS3 interface is out of frame alignment.
LA	Yellow	AIS detected. ON indicates the local device has received an alarm indication signal.

Configuring a DS3-ATM trunk module

The Stinger unit creates a DS3-ATM profile containing the following parameters for each DS3 interface detected in the system. The parameters are shown with default settings for the first port of a trunk module in slot 17.

```
[in DS3-ATM/{ shelf-1 trunk-module-1 1 }]
name = 1:17:1
physical-address* = { shelf-1 trunk-module-1 1 }
enabled = no
spare-physical-address = { any-shelf any-slot 0 }
sparing-mode = inactive

[in DS3-ATM/{ shelf-1 trunk-module-1 1 }:line-config]
trunk-group = 9
nailed-group = 801
activation = static
call-route-info = { any-shelf any-slot 0 }
loopback = no-loopback
high-tx-output = no
framer-mode = C-BIT-PLCP
vpi-vci-range = vpi-0-255-vci-32-8191
vc-switching-vpi = [ 0 0 0 0 0 0 0 ]
clock-source = not-eligible
clock-priority = middle-priority
```

Parameter	Specifies
Name	Name of the interface. The default value is the interface address in *shelf*`:`*slot*`:`*item* format (for example, `1:2:3`), but you can assign a text string of up to 16 characters.
Physical-Address	Physical address of the trunk port in the Stinger unit.
Enabled	Enable/disable the DS3-ATM interface. (Disabled by default.)
Spare-Physical-Address	Physical address of the trunk port to be used as a spare.
Sparing-Mode	Redundancy mode for the port.
Trunk-Group	*Not currently used.* Leave the default value (zero).
Nailed-Group	Nailed-group number for the DS3-ATM physical interface. A Connection or RADIUS profile specifies this number to make use of the interface. Each interface is assigned a unique default number, so you do not need to modify this parameter. If you assign a new value, it must be a number from 1 to 1024 that is unique within the system. See "Displaying DS3 port status and nailed groups" on page 1-7 for related information.
Activation	Line activation mode. Only the `static` setting is currently supported.
Call-Route-Info	*Not currently used.* Leave the default value (the zero address).
Loopback	Enable/disable loopback for diagnosing connectivity or possible equipment problems. Loopback is disabled by default, which is required for normal operations.
High-Tx-Output	Enable/disable high transmit output. The default is `no`, which is correct for DS3 cables that are less than 255 feet (78 m) long. For cables longer than 255 feet, set to `yes`.
Framer-Mode	DS3-ATM framer mode. Following are valid values `C-bit-ADM`, `C-BIT-PLCP`, `c-bit-adm-loop-timed`, `c-bit-plcp-loop-timed`, `c-bit-adm-frame-locked`, and `c-bit-plcp-frame-locked`. For more information, see "Setting DS3 framing formats" on page 1-7.
VPI-VCI-Range	Valid range of virtual channel identifier (VCI) numbers to be used with specified virtual path identifier (VPIs) for virtual channel connections (VCCs).
VC-Switching-VPI	Array of up to seven VPIs to use for virtual channel (VC) switching.
Clock-Source	Enable/disable obtaining the system clock signal from the port.
Clock-Priority	Priority of the interface as the system's clock source.

Displaying DS3 port status and nailed groups

To see the nailed-group numbers for trunk ports, use the `atmtrunks` command. For example, the command output that follows shows the nailed-group numbers for DS3 trunks. In this example, the system has one DS3-ATM trunk module installed in slot 18.

```
admin> atmtrunks  -a

All OC3 ATM trunks:
OC3 Lines                    (dvOp   dvUpSt  dvRq    sAdm    nailg)

All DS3 ATM trunks:
DS3 Lines                    (dvOp   dvUpSt  dvRq    sAdm    nailg)
Line    {    1 18  1 }       (Up      Idle    UP      UP     00851)
Line    {    1 18  2 }       (Up      Idle    UP      UP     00852)
```

Setting DS3 framing formats

You can specify C-bit Physical Layer Convergence Protocol (PLCP) or C-bit ATM direct mapping (ADM) framing format for a DS3-ATM interface. Both sides of a DS3-ATM link must agree about the framing format.

The PLCP format incurs some overhead for framing. ADM format does not. When ADM framing is used, the entire DS3 payload is used for ATM cells. Within each format, the framer can operate in the following modes:

Free-running and fixed-stuffing	The DS3 transmit clock signal and the PLCP frame are derived from an onboard oscillator. This mode is typically used when the line is neither providing the clock signal (frame-locked) nor synchronizing to an incoming clock (loop-timed).
Loop-timed	The Stinger unit obtains the clock signal from the other side of the link.
Frame-locked	The Stinger unit provides the clock signal.

Configuring call-control

Using the call-control procedures, you can configure the Stinger to allow connections to be established even when the line state is not fully up. You can configure the unit to use these procedures system-wide or on a per-port basis on the DS3-ATM, OC3-ATM, and E3-ATM trunk modules and on the SDSL, ADSL, and HDSL2 LIMs.

The call-control mechanism enables the Stinger unit to establish and maintain soft PVCs (SPVCs) across port state changes. This allows xDSL subscribers to establish connections on LIM interfaces in the operating states before they are fully trained, as well as in the standard port-up state (in which the modem has successfully trained up). SPVC connections are accepted when the modem has not fully trained up to the port-up state. If a LIM interface with an active SPVC connection changes from a port-up state to the state before it was fully trained, the SPVC remains connected. Connections are broken only if the physical slot or line stops operating or is disabled by an administrator.

By default, the Stinger unit monitors the physical line state of its interfaces and allows connections to be established only when the line state is fully up.

Following are examples of the relevant parameters, shown with default settings:

```
[in SYSTEM]
ignore-lineup = no

[in SDSL/{ any-shelf any-slot 0 }]
ignore-lineup = system-defined

[in DS3-ATM/{ any-shelf any-slot 0 }]
ignore-lineup = system-defined
```

Parameter	Specifies
`SYSTEM: ignore-lineup`	Enable/disable the Stinger system's ability to ignore line status when determining whether calls are established or not. Specify one of the following values: • `no` (the default)—The Stinger call-control mechanism allows calls to be established when the line state is up and disallow calls when the line state is down. • `yes`—The Stinger call-control mechanism ignores the line state and allows calls to be established on a port as long as the specified slot is operational and the specified port is enabled.
`line profile:` `ignore-lineup`	Whether the line status of a slot has an effect on the Stinger call control mechanism on the specified port. Specify one of the following values: • `system-defined` (the default)—Sets the Stinger to inherit the Ignore-Lineup value from the system profile. • `no`—Sets the Stinger call-control mechanism to ignore the system-wide setting and allows calls to be established when the line state is operational and disallow calls on the port when the line state is down. • `yes`—Sets the Stinger call-control mechanism to ignore the line state and the system-wide setting and allows calls to be established on the specified port as long as the specified slot is operational and the specified port is enabled.

The commands in the following example configure the unit to use the new call-control procedures system-wide:

```
admin> read system
SYSTEM read

admin> set ignore-lineup = yes

admin> write
SYSTEM written
```

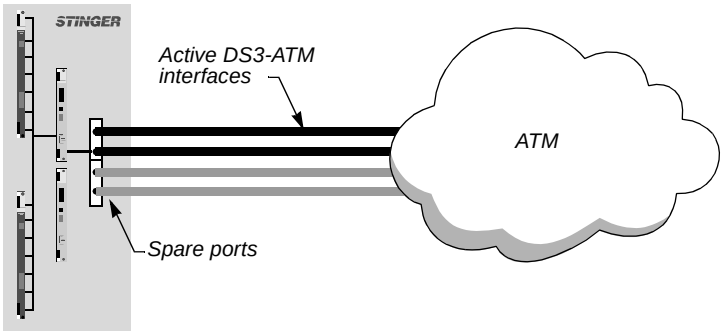
When call-control is enabled system-wide, you can disable it on specific interfaces by modifying the line profile. The commands in the following example disable call-control procedures on port one of the SDSL 48-port LIM in slot 12:

```
admin> read sdsl { 1 12 1 }
SDSL/{ shelf-1 slot-12 1 } read
admin> set ignore-lineup = no
admin> write
SDSL/{ shelf-1 slot-12 1 } written
```

Example of DS3-ATM configuration

In this example (see Figure 1-2), the administrator enables two DS3-ATM interfaces and designates the ports of the other DS3-ATM trunk module as spare ports, for use if the primary trunk ports becomes inactive. Because two ports are spares, the administrator increases the number of VCCs that can be handled by both of the primary ports from 8K to 16K.

Figure 1-2. DS3 interfaces to the ATM network



The following commands list the trunk port profiles:

```
admin> dir ds3-atm
40  08/03/1999 15:33:35  { shelf-1 trunk-module-1 2 }  1:17:2
25  08/03/1999 15:37:13  { shelf-1 trunk-module-2 1 }  1:18:1
25  08/03/1999 15:38:25  { shelf-1 trunk-module-2 2 }  1:18:2
40  08/04/1999 10:18:22  { shelf-1 trunk-module-1 1 }  1:17:1
```

The following commands enable the ports of the first trunk module and make them spares:

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

admin> set enabled = yes

admin> set spare-physical-address shelf = 1

admin> set spare-physical-address slot = 18

admin> set spare-physical-address item-number = 1

admin> set sparing-mode = automatic

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 enabled = yes

admin> set spare-physical-address shelf = 1
```

```
admin> set spare-physical-address slot = 18

admin> set spare-physical-address item-number = 2

admin> set sparing-mode = automatic

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

The following commands add VPI 10 and VPI 20 as valid VPI, for virtual channel switching on the first and second active ports, respectively. The addition of these VPIs doubles the number of VCCs the ports can handle from 8K to 16K:

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

admin> set line-config vc-switching-vpi 2 = 10

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 vc-switching-vpi 2 = 20

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

Checking ATM trunk interface status

The Stinger unit creates a DS3-ATM-Stat profile for each of its DS3 interfaces. The profiles provide information about the state of the physical interfaces, error counters, and other status information. The error counters in the DS3-ATM-Stat profile are cleared when the DS3 physical interface becomes active (synchronized). The counts accumulate every second if an error occurs.

Following are the DS3-ATM-Stat parameters, shown with sample settings for an active line:

```
[in DC3-ATM-STAT/{ shelf-1 trunk-module-2 1 }]
physical-address* = { shelf-1 trunk-module-2 1 }
line-state = active
spare-physical-address = { any-shelf any-slot 0 }
sparing-state = sparing-none
vpi-vci-range = vpi-0-255-vci-32-8191
vc-switching-vpi = 0
vcc-vpi = [ 0 0 0 0 0 0 0 ]
f-bit-error-count = 0
p-bit-error-count = 0
cp-bit-error-count = 0
feb-error-count = 0
bpv-error-count = 0
loss-of-signal = False
loss-of-frame = False
yellow-receive = False
ais-receive = False
```

Parameter	Indicates
Physical-Address	Physical location of the DS3-ATM line within the Stinger system.
Line-State	Overall state of the DS3 line, which can be any of the following states: • `active`—Line is enabled and a multipoint connection is established. • `does-not-exist`—Link is not physically on the trunk module. • `disabled`–Line is disabled. • `loss-of-signal`—Near end has loss of signal. • `loss-of-frame`—Near end has loss of frame (also known as Red Alarm). • `yellow-alarm`—Near end is receiving a Yellow Alarm from the far end, indicating a loss of frameing. • `ais-receive`—Near end is receiving an alarm indication signal (AIS).
Spare-Physical-Address	The redundant peer of this trunk port. If the current port is the primary trunk port, the value identifies its spare (secondary) trunk port. If the current port is the secondary trunk, the value identifies the primary trunk port.
Sparing-State	The state of the redundancy function. `sparing-none` indicates that redundancy is not enabled. If redundancy is enabled and the current port is the primary trunk port, the value can be `primary-active` or `primary-inactive.` If redundancy is enabled and the current port is the secondary trunk port, the value can be `secondary-active` or `secondary-inactive`.
VPI-VCI-Range	Current valid VCI range configured for the port.
VC-Switching-VPI	Array of VPIs used for virtual channel switching.
VCC-VPI	*For internal use only.*
F-Bit-Error-Count	Number of F-bit errors. If three or more errors occur in up to 16 consecutive F-bits in a DS3 M-frame, a DS3 out-of-frame defect is detected. If an out-of-frame defect is consistent for up to 10 seconds, a DS3 loss-of-frame detect is detected.
P-Bit-Error-Count	Number of P-bit parity errors. These errors occur when the system receives P-bit code on a DS3 M-frame that is not identical to the corresponding P-bit code that was calculated locally.
CP-Bit-Error-Count	Number of CP-bit parity errors.
FEB-Error-Count	Number of far-end C-bit coding violations reported through the far-end block error count.
BPV-Error-Count	Number of bipolar violation (BPV) errors. BPV errors can indicate that the line sent consecutive one bits with the same polarity. It could also mean that three or more consecutive zeroes were sent.
Loss-of-Signal	Loss of signal on the line. `False` indicates that the carrier is maintaining a connection.

Parameter	Indicates
Loss-of-Frame	Loss of frame on the line (also known as a Red Alarm.) `False` indicates that the line is up and in frame.
Yellow-Receive	Far end loss-of-frame (Yellow Alarm) occurred on the line. `False` indicates that a Yellow Alarm was not received.
AIS-Receive	Far end is sending an alarm indication signal (AIS). `False` indicates that the local device has not received an AIS.

For details about DS3 line errors, see RFC 1407, *Definitions of Managed Objects for the DS3/E3 Interface Type*.

Configuring Trunk Port Redundancy

2

Administrators can choose to run the full trunk-side bandwidth or to set up a redundant configuration.

The Stinger unit can obtain its system clock by sourcing the ATM network clock on one of the trunk ports. One or more of the ports can be designated as eligible clock sources, and assigned a priority for use as the clock source

Introducing trunk port redundancy

Trunk port redundancy provides a 1:1 sparing function for trunk port failure. The trunk port to be backed up (the primary trunk port) does not have to be of the same type as the spare trunk port. Both automatic and manual trunk port redundancy are supported.

When the redundancy function is invoked, the primary trunk port is deactivated. Its logical connections are terminated and then reestablished on the spare trunk port. With *manual* trunk port redundancy, an administrator invokes the sparing function manually by setting the Sparing-Mode parameter to `manual`, and manually disables it by setting the Sparing-Mode parameter to `inactive`. When the sparing function is disabled, the spare trunk port is deactivated. Its logical connections are terminated and reestablished on the primary trunk port.

Automatic trunk port redundancy is invoked when the system detects that a primary port has become inactive. At that point, the spare port becomes active, and the primary port's logical connections are brought up on the spare. The connections are maintained on the spare until the spare becomes inactive, at which point the system reestablishes the logical connections on the primary port.

Trunk port redundancy settings

Following are the trunk port redundancy parameters, shown with default settings:

```
[in DS3-ATM/{ any-shelf any-slot 0 }]
name = ""
spare-physical-address = { any-shelf any-slot 0 }
sparing-mode = inactive
```

```
[in OC3-ATM/{ any-shelf any-slot 0 }]
name = ""
spare-physical-address = { any-shelf any-slot 0 }
sparing-mode = inactive
```

Parameter	Specifies
Spare-Physical-Address	Physical address of the trunk port to be used as a spare for this port. The value is a complex field that specifies the shelf-number, slot-number, and item (port) number of the spare port.
Sparing-Mode	If set to `inactive` (the default), the sparing function is disabled. The `automatic` setting means the active port changes from primary to the spare port and back, based on the line status of the active port. Setting this parameter to `manual` inactivates the primary trunk port and activates the spare trunk port. Setting it back to `inactive` brings down the spare and reactivates the primary port.

Example of automatic redundancy configuration

To use automatic trunk port redundancy, you modify the profile of a primary trunk port to specify a spare trunk port and enable automatic redundancy. For example, the following commands specify that the first port in slot 17 is a primary trunk port, and the first trunk port in slot 18 is its spare:

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

admin> set spare-physical-address shelf = 1

admin> set spare-physical-address slot = 18

admin> set spare-physical-address item-number = 1

admin> set sparing-mode = automatic

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

Note that Spare-Physical-Address is a complex field. You can set its value by specifying the parameter name and the relevant subfield on the Set command line, as shown immediately above, or by listing the complex field and then setting its values directly. For example:

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

admin> list spare-physical-address
[in OC3-ATM/{ shelf-1 trunk-module-2 1 }:spare-physical-address]
shelf = any-shelf
slot = any-slot
item-number = 0

admin> set shelf = 1

admin> set slot = 18

admin> set item-number = 1

admin> list ..
```

```
admin> set sparing-mode = automatic
admin> write
OC3-ATM/{ shelf-1 trunk-module-1 1 } written
```

Example of manual redundancy configuration

To use manual trunk port redundancy, you modify the profile of a primary trunk port to specify a spare trunk port and enable manual sparing. For example, the following commands specify that the first port in slot 17 is a primary trunk port, designate the first trunk port in slot 18 as its spare, and invoke the sparing function manually:

```
admin> read oc3-atm {1 trunk-module-1 1}
OC3-ATM/{ shelf-1 trunk-module-1 1 } read
admin> set spare-physical-address shelf = 1
admin> set spare-physical-address slot = 18
admin> set spare-physical-address item-number = 1
admin> set sparing-mode = manual
admin> write
OC3-ATM/{ shelf-1 trunk-module-1 1 } written
```

To deactivate the spare trunk port and activate the primary port again, set the Sparing-Mode to `inactive`. For example:

```
admin> read oc3-atm {1 trunk-module-1 1}
OC3-ATM/{ shelf-1 trunk-module-1 1 } read
admin> set sparing-mode = inactive
admin> write
OC3-ATM/{ shelf-1 trunk-module-1 1 } written
```