

# scramble

To enable scrambling (encryption) of the payload on a T3 or E3 controller or on the PA-T3 and PA-E3 port adapters, use the **scramble** command in interface configuration mode. To disable scrambling, use the **no** form of this command.

**scramble**

**no scramble**

## Syntax Description

This command has no arguments or keywords.

## Defaults

Scrambling is disabled.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.1 CA	This command was introduced.
12.2(11)YT	This command was integrated into Cisco IOS Release 12.2(11)YT and implemented on the following platforms: Cisco 2650XM, Cisco 2651XM, Cisco 2691, Cisco 3660 series, Cisco 3725, and Cisco 3745 routers.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.

## Usage Guidelines

T3/E3 scrambling is used to assist clock recovery on the receiving end. Scrambling is designed to randomize the pattern of 1s and 0s carried in the physical layer frame. Randomizing the digital bits can prevent continuous, nonvariable bit patterns—in other words, long strings of all 1s or all 0s. Several physical layer protocols rely on transitions between 1s and 0s to maintain clocking.

Scrambling can prevent some bit patterns from being mistakenly interpreted as alarms by switches placed between the Data Service Units (DSUs).

The local interface configuration must match the remote interface configuration. For example, if you enable scrambling on the local port, you must also do the same on the remote port.

To verify that scrambling is configured on the interface, use the **show controllers serial** or the **show interfaces serial** commands.

For T3 controllers, all the DSU modes support scrambling except Clear mode.

For E3 controllers, only Kentrox mode supports scrambling.

## Examples

The following example enables scrambling on the PA-E3 port adapter in slot 1, port adapter slot 0, interface 0:

```
Router(config)# interface serial 1/0/0
Router(config-if)# scramble
```

The following example enables scrambling on the controller in slot 1, port 0:

```
Router(config)# interface serial 1/0  
Router(config-if)# scramble
```

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**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show controllers serial</b>	Displays information that is specific to the serial controllers.
<b>show interfaces serial</b>	Displays information that is specific to the interface hardware.

# serial restart-delay

To set the amount of time that the router waits before trying to bring up a serial interface when it goes down, use the **serial restart-delay** command in interface configuration mode. To restore the default, use the **no** form of the command.

**serial restart-delay** *count*

**no serial restart-delay**

<b>Syntax Description</b>	<i>count</i>	Frequency, in milliseconds, at which the hardware is reset. Range is from 0 to 900. Default is 0.
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<b>Defaults</b>	0 milliseconds
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<b>Command Modes</b>	Interface configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2 P	This command was introduced.
	12.2(4)T	The <i>count</i> value was changed to set time in milliseconds rather than in seconds.

**Usage Guidelines**

The router resets the hardware each time the serial restart timer expires. This command is often used with the dial backup feature and with the **pulse-time** command, which sets the amount of time to wait before redialing when a DTR dialed device fails to connect.

When the *count* value is set to the default of 0, the hardware is not reset when it goes down. In this way, if the interface is used to answer a call, it does not cause DTR to drop, which can cause a communications device to disconnect.

**Examples**

The following example shows how to set the restart delay on serial interface 0 to 0:

```
Router(config)# interface serial 0
Router(config-if)# serial restart-delay 0
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>pulse-time</b>	Enables pulsing DTR signal intervals on the serial interfaces.
	<b>show interfaces serial</b>	Displays information about a serial interface.

# service single-slot-reload-enable

To enable single line card reloading for all line cards in the Cisco 7500 series router, use the **service single-slot-reload-enable** command in global configuration mode. To disable single line card reloading for the line cards in the Cisco 7500 series router, use the **no** form of this command.

**service single-slot-reload-enable**

**no service single-slot-reload-enable**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Single line card reloading is disabled.

**Command Modes** Global configuration

## Command History

Release	Modification
12.0(13)S	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.

## Examples

In the following example, single line card reloading is enabled for all lines cards on the Cisco 7500 series router:

```
Router(config)# service single-slot-reload-enable
```

## Related Commands

Command	Description
<b>show diag</b>	Displays hardware information for a networking device.
<b>show running-config</b>	Displays configuration information.

## service-module 56k clock rate

To configure the network line speed for a serial interface on a 4-wire, 56/64-kbps CSU/DSU module, use the **service-module 56k clock rate** command in interface configuration mode. To enable a network line speed of 56 kbps, which is the default, use the **no** form of this command.

**service-module 56k clock rate** *speed*

**no service-module 56k clock rate** *speed*

<b>Syntax Description</b>	<p><i>speed</i> Network line speed in kbps. The default speed is 56 kbps. Choose from one of the following optional speeds:</p> <ul style="list-style-type: none"> <li>• <b>2.4</b>—2.4 kbps</li> <li>• <b>4.8</b>—4.8 kbps</li> <li>• <b>9.6</b>—9.6 kbps</li> <li>• <b>19.2</b>—19.2 kbps</li> <li>• <b>38.4</b>—38.4 kbps</li> <li>• <b>56</b>—56 kbps (default)</li> <li>• <b>64</b>—64 kbps</li> <li>• <b>auto</b>—Automatic line speed mode. Configure this option if your line speed is constantly changing.</li> </ul>				
<b>Defaults</b>	56 kbps				
<b>Command Modes</b>	Interface configuration				
<b>Command History</b>	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>11.2</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	11.2	This command was introduced.
Release	Modification				
11.2	This command was introduced.				

**Usage Guidelines** The 56-kbps line speed is available in switched mode, which is enabled using the **service-module 56k network-type** interface configuration command on the 4-wire CSU/DSU. If you have a 2-wire CSU/DSU module, the default is automatically set to switched mode.

The 64-kbps line speed cannot be used with back-to-back digital data service (DDS) lines. The substrate line speeds are determined by the service provider.

The **auto** keyword enables the CSU/DSU to decipher current line speed from the sealing current running on the network. Use the **auto** keyword only when transmitting over telco DDS lines and the clocking source is taken from the line.

**Examples**

The following example displays two routers connected in back-to-back DDS mode. However, notice that at first the configuration fails because the **auto** option is used. Later in the example the correct matching configuration is issued, which is 38.4 kbps.

```
Router1(config)# interface serial 0
Router1(config-if)# service-module 56k clock source internal
Router1(config-if)# service-module 56k clock rate 38.4

Router2(config-if)# service-module 56k clock rate auto

Router1# ping 10.1.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)

Router2(config-if)# service-module 56k clock rate 38.4

Router1# ping 10.1.1.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.1.2, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 52/54/56 ms
```

When transferring from DDS mode to switched mode, you must set the correct clock rate, as shown in the following example:

```
Router2(config-if)# service-module 56k network-type dds
Router2(config-if)# service-module 56k clock rate 38.4
Router2(config-if)# service-module 56k network-type switched
% Have to use 56k or auto clock rate for switched mode
% Service module configuration command failed: WRONG FORMAT.

Router2(config-if)# service-module 56k clock rate auto
% WARNING - auto rate will not work in back-to-back DDS.
Router2(config-if)# service-module 56k network-type switched
```

**Related Commands**

Command	Description
<b>service-module 56k clock source</b>	Sets up the clock source on a serial interface for a 4-wire, 56/64-kbps CSU/DSU module.
<b>service-module 56k network-type</b>	Sends packets in switched dial-up mode or DDS mode using a serial interface on a 4-wire, 56/64-kbps CSU/DSU module.

# service-module 56k clock source

To set up the clock source on a serial interface for a 4-wire, 56/64-kbps CSU/DSU module, use the **service-module 56k clock source** command in interface configuration mode. To specify that the clocking come from line, use the **no** form of this command.

```
service-module 56k clock source {line | internal}
```

```
no service-module 56k clock source {line | internal}
```

## Syntax Description

<b>line</b>	Uses the clocking provided by the active line coming in to the router. This is the default.
<b>internal</b>	Uses the internal clocking provided by the hardware module.

## Defaults

Line clock

## Command Modes

Interface configuration

## Command History

Release	Modification
11.1	This command was introduced.

## Usage Guidelines

In most applications, the CSU/DSU should be configured with the **clock source line** command. For back-to-back configurations, configure one CSU/DSU with the **clock source internal** command and the other with **clock source line** command.

## Examples

The following example configures internal clocking and transmission speed at 38.4 kbps.

```
Router(config)# interface serial 0
Router(config-if)# service-module 56k clock source internal
Router(config-if)# service-module 56k clock rate 38.4
```

## Related Commands

Command	Description
<b>clock source (interface)</b>	Controls the clock used by a G.703-E1 interface.
<b>service-module 56k clock rate</b>	Configures the network line speed for a serial interface on a 4-wire, 56/64-kbps CSU/DSU module.

## service-module 56k data-coding

To prevent application data from replicating loopback codes when operating at 64 kbps on a 4-wire CSU/DSU, use the **service-module 56k data-coding** command in interface configuration mode. To enable normal transmission, use the **no** form of this command.

```
service-module 56k data-coding {normal | scrambled}
```

```
no service-module 56k data-coding {normal | scrambled}
```

### Syntax Description

<b>normal</b>	Specifies normal transmission of data. This is the default.
<b>scrambled</b>	Scrambles bit codes or user data before transmission. All control codes such as out-of-service and out-of-frame are avoided.

### Defaults

Normal data transmission

### Command Modes

Interface configuration

### Command History

Release	Modification
11.2	This command was introduced.

### Usage Guidelines

Enable the scrambled configuration only in 64-kbps digital data service (DDS) mode. If the network type is set to switched, the configuration is refused.

If you transmit scrambled bit codes, both CSU/DSUs must have this command configured for successful communication.

### Examples

The following example scrambles bit codes or user data before transmission:

```
Router(config)# interface serial 0
Router(config-if)# service-module 56k clock rate 64
Router(config-if)# service-module 56k data-coding scrambled
```

### Related Commands

Command	Description
<a href="#">service-module 56k clock rate</a>	Configures the network line speed for a serial interface on a 4-wire, 56/64-kbps CSU/DSU module.

# service-module 56k network-type

To transmit packets in switched dial-up mode or digital data service (DDS) mode using a serial interface on a 4-wire, 56/64-kbps CSU/DSU module, use the **service-module 56k network-type** command in interface configuration mode. To transmit from a dedicated leased line in DDS mode, use the **no** form of this command.

**service-module 56k network-type { dds | switched }**

**no service-module 56k network-type { dds | switched }**

## Syntax Description

<b>dds</b>	Transmits packets in DDS mode or through a dedicated leased line. The default is DDS enabled for the 4-wire CSU/DSU.
<b>switched</b>	Transmits packets in switched dial-up mode. On a 2-wire, switched 56-kbps CSU/DSU module, this is the default and only setting.

## Defaults

DDS is enabled for the 4-wire CSU/DSU.  
Switched is enabled for the 2-wire CSU/DSU.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

In switched mode, you need additional dialer configuration commands to configure dial-out numbers. Before you enable the **service-module 56k network-type switched** command, both CSU/DSUs must use a clock source coming from the line and have the clock rate configured to **auto** or **56** kbps. If the clock rate is not set correctly, this command will not be accepted.

The 2-wire and 4-wire, 56/64-kbps CSU/DSU modules use V.25 *bis* dial commands to interface with the router. Therefore, the interface must be configured using the **dialer in-band** command. Data terminal ready (DTR) dial is not supported.



### Note

Any loopbacks in progress are terminated when switching between modes.

## Examples

The following example configures transmission in switched dial-up mode:

```
Router(config)# interface serial 0
Router(config-if)# service-module 56k clock rate auto
Router(config-if)# service-module 56k network-type switched
Router(config-if)# dialer in-band
Router(config-if)# dialer string 5550111
Router(config-if)# dialer-group 1
```

Related Commands	Command	Description
	<b>dialer in-band</b>	Specifies that DDR is to be supported.
	<a href="#">service-module 56k clock rate</a>	Configures the network line speed for a serial interface on a 4-wire, 56/64-kbps CSU/DSU module.
	<a href="#">service-module 56k clock source</a>	Sets up the clock source on a serial interface for a 4-wire, 56/64-kbps CSU/DSU module.
	<a href="#">service-module 56k switched-carrier</a>	Selects a service provider to use with a 2- or 4-wire, 56/64-kbps dial-up serial line.

# service-module 56k remote-loopback

To enable the acceptance of a remote loopback request on a serial interface on a 2- or 4-wire, 56/64-kbps CSU/DSU module, use the **service-module 56k remote-loopback** command in interface configuration mode. To disable the module from entering loopback, use the **no** form of this command.

**service-module 56k remote-loopback**

**no service-module 56k remote-loopback**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Enabled

**Command Modes** Interface configuration

Command History	Release	Modification
	11.2	This command was introduced.

**Usage Guidelines** The **no service-module 56k remote-loopback** command prevents the local CSU/DSU from being placed into loopback by remote devices on the line. The line provider is still able to put the module into loopback by reversing sealing current. Unlike the T1 module, the 2- or 4-wire, 56/64-kbps CSU/DSU module can still initiate remote loopbacks with the **no** form of this command configured.

**Examples** The following example enables transmitting and receiving remote loopbacks:

```
Router(config)# interface serial 0
Router(config-if)# service-module 56k remote-loopback
```

Related Commands	Command	Description
	<b>loopback remote (interface)</b>	Loops packets through a CSU/DSU, over a DS3 link or a channelized T1 link, to the remote CSU/DSU and back.

# service-module 56k switched-carrier

To select a service provider to use with a 2- or 4-wire, 56/64-kbps dial-up serial line, use the **service-module 56k switched-carrier** command in interface configuration mode. To enable the default service provider, use the **no** form of this command.

**service-module 56k switched-carrier {att | sprint | other}**

**no service-module 56k switched-carrier {att | sprint | other}**

## Syntax Description

<b>att</b>	AT&T or other digital network service provider. This is the default on the 4-wire, 56/64-kbps CSU/DSU module.
<b>sprint</b>	Sprint or other service provider whose network requires echo cancelers. This is the default on the 2-wire, switched 56-kbps CSU/DSU module.
<b>other</b>	Any other service provider.

## Defaults

ATT is enabled on the 4-wire, 56/64-kbps CSU/DSU module.  
Sprint is enabled on the 2-wire, switched 56-kbps CSU/DSU module.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

On a Sprint network, echo-canceler tones are sent during call setup to prevent the echo cancelers from damaging digital data. The transmission of echo-canceler tones may increase call setup times by 8 seconds on the 4-wire module. Having echo cancellation enabled does not affect data traffic.

This configuration command is ignored if the network type is DDS.

## Examples

The following example configures AT&T as a service provider:

```
Router(config)# interface serial 0
Router(config-if)# service-module 56k network-type switched
Router(config-if)# service-module 56k switched-carrier att
```

## Related Commands

Command	Description
<a href="#">service-module 56k network-type</a>	Sends packets in switched dial-up mode or DDS mode using a serial interface on a 4-wire, 56/64-kbps CSU/DSU module.

# service-module content-engine reload

To perform a graceful halt and reboot of a content engine (CE) network module operating system, use the **service-module content-engine reload** command in privileged EXEC mode.

## **service-module content-engine slot/unit reload**

Syntax Description	slot	Number of the router chassis slot for the network module.
	unit	Number of the daughter card on the network module. For CE network modules, always use 0.

Command Modes	Privileged EXEC
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Command History	Release	Modification
	12.2(11)YT	This command was introduced.
	12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

**Usage Guidelines** At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

**Examples** The following example gracefully halts and reboots the CE network module operating system in slot 1:

```
Router# service-module content-engine 1/0 reload

Do you want to proceed with reload?[confirm]
```

Related Commands	Command	Description
	<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
	<a href="#">service-module content-engine reset</a>	Resets the hardware on a CE network module.
	<a href="#">service-module content-engine shutdown</a>	Gracefully halts a CE network module.
	<b>show controllers content-engine</b>	Displays controller information for CE network modules.
	<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module content-engine reset

To reset the hardware on a content engine (CE) network module, use the **service-module content-engine reset** command in privileged EXEC mode.

**service-module content-engine slot/unit reset**

## Syntax Description

<i>slot</i>	Number of the router chassis slot for the network module.
<i>unit</i>	Number of the daughter card on the network module. For CE network modules, always use 0.

## Command Modes

Privileged EXEC

## Command History

Release	Modification
12.2(11)YT	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

## Usage Guidelines

At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.



### Note

Use the **service-module content-engine reset** command only to recover from a shutdown or failed state because you may lose data.

## Examples

The following example resets the hardware on the CE network module in slot 1:

```
Router# service-module content-engine 1/0 reset
```

```
Use reset only to recover from shutdown or failed state
Warning: May lose data on the hard disc!
Do you want to reset?[confirm]
```

## Related Commands

Command	Description
<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
<a href="#">service-module content-engine reload</a>	Performs a graceful halt and reboot of a CE network module operating system.
<a href="#">service-module content-engine shutdown</a>	Gracefully halts a CE network module.
<b>show controllers content-engine</b>	Displays controller information for CE network modules.
<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module content-engine session clear

To clear an existing content engine (CE) configuration session on a CE network module, use the **service-module content-engine session clear** command in privileged EXEC mode.

**service-module content-engine *slot/unit* session clear**

Syntax Description	slot	Number of the router chassis slot for the network module.
	<i>unit</i>	Number of the daughter card on the network module. For CE network modules, always use 0.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.2(11)YT	This command was introduced.
	12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

**Usage Guidelines** Press **Enter** when asked to confirm this command or **n** to cancel.

**Examples** The following example clears the session that had been used to configure the CE in the network module in slot 1:

```
Router# service-module content-engine 1/0 session clear

[confirm]
[OK]
```

Related Commands	Command	Description
	<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
	<b>service-module content-engine session</b>	Accesses a CE network module console and begins a configuration session.
	<b>show controllers content-engine</b>	Displays controller information for CE network modules.
	<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module content-engine session

To access a content engine (CE) network module console and begin a configuration session, use the **service-module content-engine session** command in privileged EXEC mode.

## service-module content-engine *slot/unit* session

### Syntax Description

<i>slot</i>	Number of the router chassis slot for the network module.
<i>unit</i>	Number of the daughter card on the network module. For CE network modules, always use 0.

### Command Modes

Privileged EXEC

### Command History

Release	Modification
12.2(11)YT	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

### Usage Guidelines

Only one session at a time is allowed into the content engine from the internal CE network-module-side interface. This interface provides console access to the CE network module from the router command-line interface (CLI) by initiating a reverse Telnet connection that uses the IP address of the CE interface and the terminal (TTY) line associated with the CE network module. The TTY line number is calculated using the formula  $(n*32)+1$ , where  $n$  is the number of the chassis slot that contains the CE network module. The CE interface must be up before you can use this command.

Once a session is started, you can perform any CE configuration task. You first access the CE console in a user-level shell. To access the privileged EXEC command shell, where most commands are available, use the **enable** command. Note that this is a Cisco Application and Content Networking System (ACNS) software command, not a Cisco IOS software command.

CE configuration tasks are described in the documentation for [Cisco Application and Content Networking Software](#), Release 4.2. Initial CE configuration tasks are covered in the [Cisco Content Delivery Networking Products Getting Started Guide](#), section 6, "Perform an Initial Startup Configuration."

After you finish CE configuration and exit the CE console session, use the **service-module content-engine session clear** command to clear the session.

### Examples

The following example shows a CE session being opened for a CE network module in slot 2:

```
Router# service-module content-engine 2/0 session
Trying 10.10.10.1, 2129 ... Open
CE-netmodule con now available
```

Press RETURN to get started!

```
CE-netmodule> enable
CE-netmodule#
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
<b>service-module content-engine session clear</b>	Clears an existing CE configuration session on a CE network module.
<b>show controllers content-engine</b>	Displays controller information for CE network modules.
<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module content-engine shutdown

To gracefully halt a content engine (CE) network module, use the **service-module content-engine shutdown** command in privileged EXEC mode.

## service-module content-engine *slot/unit* shutdown

### Syntax Description

<i>slot</i>	Number of the router chassis slot for the network module.
<i>unit</i>	Number of the daughter card on the network module. For CE network modules, always use 0.

### Command Modes

Privileged EXEC

### Command History

Release	Modification
12.2(11)YT	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

### Usage Guidelines

At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

The **service-module content-engine shutdown** command brings down the operating system of the specified content engine network module in an orderly fashion to protect the network module's hard drive. When the system has been shut down, the network module can be removed from the router.

### Examples

The following example gracefully halts the CE network module in slot 1:

```
Router# service-module content-engine 1/0 shutdown
```

```
Shutdown is used for Online removal of Service Module.
Do you want to proceed with shutdown?[confirm]
Use service module reset command to recover from shutdown.
```

### Related Commands

Command	Description
<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
<b>service-module content-engine reload</b>	Performs a graceful halt and reboot of a CE network module operating system.
<b>service-module content-engine reset</b>	Resets the hardware on a CE network module.
<b>show controllers content-engine</b>	Displays controller information for CE network modules.
<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module content-engine status

To display configuration information related to the hardware and software on the content engine (CE) side of a CE network module, use the **service-module content-engine status** command in privileged EXEC mode.

## **service-module content-engine slot/unit status**

Syntax Description	slot	Number of the router chassis slot for the network module.
	unit	Number of the daughter card on the network module. For CE network modules, always use 0.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.2(11)YT	This command was introduced.
	12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

## Examples

The following example displays information for a CE network module in router slot 1:

```
Router# service-module content-engine 1/0 status

Service Module is Cisco Content-Engine1/0
Service Module supports session via TTY line 33
Service Module is in Steady state
Getting status from the Service Module, please wait..
Application and Content Networking Software (ACNS)
Copyright (c) 1999-2002 by Cisco Systems, Inc.
Application and Content Networking Software Release 4.2.2 (build b3 May  6 2002)
Version: ce2636-sw-<unknown-version>
Compiled 18:03:40 May  6 2002 by smith
Compile Time Options: PP

System was restarted on Mon Jan  7 20:30:37 1980.
The system has been up for 8 minutes, 30 seconds.

Core CPU is GenuineIntel Pentium III (Coppermine) (rev 8) running at 498MHz.
246 Mbytes of Physical memory.
2 FastEthernet interfaces
1 Console interface

List of disk drives:
disk00: Normal          (h00 c00 i00 100)    19075MB( 18.6GB)
```

Related Commands	Command	Description
	<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
	<b>show controllers content-engine</b>	Displays controller information for CE network modules.
	<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module external ip address

To define the IP address for the external LAN interface on a content engine (CE) network module, use the **service-module external ip address** command in content-engine interface configuration mode. To delete the IP address associated with this interface, use the **no** form of this command.

**service-module external ip address** *external-ip-addr subnet-mask*

**no service-module external ip address**

## Syntax Description

<i>external-ip-addr</i>	IP address of the external LAN interface on a CE network module.
<i>subnet-mask</i>	Subnet mask to append to the IP address.

## Defaults

No default behavior or values

## Command Modes

Content-engine interface configuration

## Command History

Release	Modification
12.2(11)YT	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

## Examples

The following example defines an IP address for the external LAN interface on the CE network module in slot 1:

```
Router(config)# interface content-engine 1/0
Router(config-if)# service-module external ip address 172.18.12.28 255.255.255.0
Router(config-if)# exit
```

## Related Commands

Command	Description
<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
<b>show controllers content-engine</b>	Displays controller information for CE network modules.
<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module ip address

To define the IP address for the internal network-module-side interface on a content engine (CE) network module, use the **service-module ip address** command in content-engine interface configuration mode. To delete the IP address associated with this interface, use the **no** form of this command.

```
service-module ip address ce-side-ip-addr subnet-mask
```

```
no service-module ip address
```

## Syntax Description

<i>ce-side-ip-addr</i>	IP address of the internal network-module-side interface on a CE network module.
<i>subnet-mask</i>	Subnet mask to append to the IP address.

## Defaults

No default behavior or values

## Command Modes

Content-engine interface configuration

## Command History

Release	Modification
12.2(11)YT	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

## Examples

The following example defines an IP address for the internal network-module-side interface on the CE network module in slot 1:

```
Router(config)# interface content-engine 1/0
Router(config-if)# service-module ip address 172.18.12.26 255.255.255.0
Router(config-if)# exit
```

## Related Commands

Command	Description
<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
<b>show controllers content-engine</b>	Displays controller information for CE network modules.
<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module ip default-gateway

To define a default gateway (router) for a content engine (CE) network module, use the **service-module ip default-gateway** command in content-engine interface configuration mode. To remove the default gateway from the CE configuration, use the **no** form of this command.

```
service-module ip default-gateway gw-ip-addr
```

```
no service-module ip default-gateway
```

## Syntax Description

<i>gw-ip-addr</i>	IP address of the default gateway.
-------------------	------------------------------------

## Defaults

No default behavior or values

## Command Modes

Content-engine interface configuration

## Command History

Release	Modification
12.2(11)YT	This command was introduced.
12.2(13)T	This command was integrated into Cisco IOS Release 12.2(13)T.

## Examples

The following example configures a default gateway for the CE network module in slot 1:

```
Router(config)# interface content-engine 1/0
Router(config-if)# service-module ip default-gateway 172.18.12.1
Router(config-if)# exit
```

## Related Commands

Command	Description
<b>interface content-engine</b>	Configures an interface for a CE network module and enters interface configuration mode.
<b>show controllers content-engine</b>	Displays controller information for CE network modules.
<b>show interfaces content-engine</b>	Displays basic interface configuration information for a CE network module.

# service-module t1 clock source

To specify the clock source for the fractional T1/T1 CSU/DSU module, use the **service-module t1 clock source** command in interface configuration mode. To return to the default line clock, use the **no** form of this command.

```
service-module t1 clock source {internal | line}
```

```
no service-module t1 clock source
```

## Syntax Description

<b>internal</b>	Specifies the CSU/DSU internal clock.
<b>line</b>	Specifies the line clock. This is the default.

## Defaults

Line clock

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Examples

The following example sets an internal clock source on serial line 0:

```
Router(config)# interface serial 0
Router(config-if)# service-module t1 clock source internal
```

## Related Commands

Command	Description
<a href="#">service-module 56k clock source</a>	Sets up the clock source on a serial interface for a 4-wire, 56/64-kbps CSU/DSU module.

# service-module t1 data-coding

To guarantee the ones density requirement on an alternate mark inversion (AMI) line using the fractional T1/T1 module, use the **service-module t1 data-coding** command in interface configuration mode. To enable normal data transmission, use the **no** form of this command.

```
service-module t1 data-coding {inverted | normal}
```

```
no service-module t1 data-coding
```

Syntax Description	inverted	Inverts bit codes by changing all 1 bits to 0 bits and all 0 bits to 1 bits.
	normal	Requests that no bit codes be inverted before transmission. This is the default.

Defaults	Normal transmission
----------	---------------------

Command Modes	Interface configuration
---------------	-------------------------

Command History	Release	Modification
	11.2	This command was introduced.

**Usage Guidelines**

Data inversion is used to guarantee the ones density requirement on an AMI line when using bit-oriented protocols such as High-Level Data Link Control (HDLC), PPP, X.25, and Frame Relay. If the time slot speed is set to 56 kbps, this command is rejected because line density is guaranteed when transmitting at 56 kbps. Use this command with the 64-kbps line speed.

If you transmit inverted bit codes, both CSU/DSUs must have this command configured for successful communication.

**Examples**

The following example inverts bit codes using a time slot speed of 64 kbps:

```
Router(config)# interface serial 0
Router(config-if)# service-module t1 timeslots all speed 64
Router(config-if)# service-module t1 data-coding inverted
```

Related Commands	Command	Description
	<a href="#">service-module t1 linecode</a>	Selects the linecode for the fractional T1/T1 module.
	<a href="#">service-module t1 timeslots</a>	Defines time slots that constitute a fractional T1/T1 (FT1/T1) channel.

## service-module t1 fdl

To set the facilities data link (FDL) parameter to either ATT or ANSI, use the **service-module t1 fdl** command in interface configuration mode. To ignore the FDL parameter, use the **no** form of this command.

```
service-module t1 fdl {ansi | att}
```

```
no service-module t1 fdl
```

### Syntax Description

<b>ansi</b>	Sets the FDL parameter to ANSI.
<b>att</b>	Sets the FDL parameter to ATT.

### Defaults

Determined by the telephone company

### Command Modes

Interface configuration

### Command History

Release	Modification
11.2 P	This command was introduced.

### Usage Guidelines

The default is **no service-module t1 fdl**. The **ansi** or **att** options are determined by your service provider or telephone company.

### Examples

The following example sets the FDL parameter to ANSI:

```
Router(config)# interface serial 0
Router(config-if)# service-module t1 fdl ansi
```

# service-module t1 framing

To select the frame type for a line using the fractional T1/T1 (FT1/T1) module, use the **service-module t1 framing** command in interface configuration mode. To revert to the default, Extended Super Frame, use the **no** form of this command.

```
service-module t1 framing {esf | sf}
```

```
no service-module t1 framing {esf | sf}
```

## Syntax Description

<b>esf</b>	Specifies extended super frame (ESF) as the T1 frame type. This is the default.
<b>sf</b>	Specifies D4 super frame (SF) as the T1 frame type.

## Defaults

esf

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

Use this command in configurations in which the router communicates with FT1/T1 data lines. The service provider determines which framing type, either **esf** or **sf**, is required for your circuit.

## Examples

The following example enables Super Frame as the FT1/T1 frame type:

```
Router(config-if)# service-module t1 framing sf
```

# service-module t1 lbo

To configure the CSU line-build-out (LBO) on a fractional T1/T1 CSU/DSU module, use the **service-module t1 lbo** command in interface configuration mode. To disable line-build-out, use the **no** form of this command.

```
service-module t1 lbo {-15 db | -7.5 db | none}
```

```
no service-module t1 lbo {-15 db | -7.5 db | none}
```

## Syntax Description

<b>-15 db</b>	Decreases outgoing signal strength by 15 dB.
<b>-7.5 db</b>	Decreases outgoing signal strength by 7.5 dB.
<b>none</b>	Transmits packets without decreasing outgoing signal strength.

## Defaults

Disabled

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

Use this command to decrease the outgoing signal strength to an optimum value for a fractional T1 line receiver. The ideal signal strength should be  $-15$  dB to  $-22$  dB, which is calculated by adding the phone company loss, cable length loss, and line build out.

You may use this command in back-to-back configurations, but it is not needed on most actual T1 lines.

## Examples

The following example sets the LBO to  $-7.5$  dB:

```
Router(config)# interface serial 0
Router(config-if)# service-module t1 lbo -7.5 db
```

# service-module t1 linecode

To select the line code for the fractional T1/T1 module, use the **service-module t1 linecode** command in interface configuration mode. To select the default, the B8ZS line code, use the **no** form of this command.

```
service-module t1 linecode {ami | b8zs}
```

```
no service-module t1 linecode {ami | b8zs}
```

## Syntax Description

<b>ami</b>	Specifies alternate mark inversion (AMI) as the line code.
<b>b8zs</b>	Specifies binary 8 zero substitution (B8ZS) as the line code. This is the default.

## Defaults

The default line code is B8ZS.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

Configuring B8ZS is a method of ensuring the ones density requirement on a T1 line by substituting intentional bipolar violations in bit positions four and seven for a sequence of eight zero bits. When the CSU/DSU is configured for AMI, you must guarantee the ones density requirement in your router configuration using the **service-module t1 data-coding inverted** command or the **service-module t1 time slots speed 56** command.

Your T1 service provider determines which line code, either **ami** or **b8zs**, is required for your T1 circuit.

## Examples

The following example specifies AMI as the line code:

```
Router(config)# interface serial 0
Router(config-if)# service-module t1 linecode ami
```

## Related Commands

Command	Description
<a href="#">service-module t1 data-coding</a>	Guarantees the ones density requirement on an AMI line using the fractional T1/T1 module.
<a href="#">service-module t1 timeslots</a>	Defines time slots that constitute a fractional T1/T1 (FT1/T1) channel.

# service-module t1 remote-alarm-enable

To generate remote alarms (yellow alarms) at the local CSU/DSU or detect remote alarms sent from the remote CSU/DSU, use the **service-module t1 remote-alarm-enable** command in interface configuration mode. To disable remote alarms, use the **no** form of this command.

**service-module t1 remote-alarm-enable**

**no service-module t1 remote-alarm-enable**

**Syntax Description** This command has no arguments or keywords.

**Defaults** Remote alarms are disabled.

**Command Modes** Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

Remote alarms are transmitted by the CSU/DSU when it detects an alarm condition, such as a red alarm (loss of frame) or blue alarm (unframed ones). The receiving CSU/DSU then knows that there is an error condition on the line.

With D4 Super Frame configured, a remote alarm condition is transmitted by setting the bit 2 of each time slot to zero. For received user data that has the bit 2 of each time slot set to zero, the CSU/DSU interprets the data as a remote alarm and interrupts data transmission, which explains why remote alarms are disabled by default. With Extended Super Frame configured, the remote alarm condition is signalled out of band in the facilities data link.

You can see if the FT1/T1 CSU/DSU is receiving a remote alarm (yellow alarm) by issuing the **show service-module serial** command.

## Examples

The following example enables remote alarm generation and detection:

```
Router(config)# interface serial 0
Router(config-if)# service-module t1 remote-alarm-enable
```

## Related Commands

Command	Description
<a href="#">service-module t1 framing</a>	Selects the frame type for a line using the fractional T1/T1 (FT1/T1) module.
<b>show service-module serial</b>	Displays performance statistics for an integrated CSU/DSU.

# service-module t1 remote-loopback

To specify if the fractional T1/T1 CSU/DSU module enters loopback mode when it receives a loopback code on the line, use the **service-module t1 remote-loopback** command in interface configuration mode. To disable remote loopbacks, use the **no** form of this command.

```
service-module t1 remote-loopback {full | payload} [alternate | v54]
```

```
no service-module t1 remote-loopback {full | payload}
```

## Syntax Description

<b>full</b>	Configures the remote loopback code used to transmit or accept CSU loopback requests. This is the default, along with <b>payload</b> .
<b>payload</b>	Configures the loopback code used by the local CSU/DSU to generate or detect payload-loopback commands. This is the default, along with <b>full</b> .
<b>alternate</b>	(Optional) Transmits a remote CSU/DSU loopback request using a 4-in-5 pattern for loopup and a 2-in-3 pattern for loopdown. This is an inverted version of the standard loopcode request.
<b>v54</b>	(Optional) Industry standard loopback code. Use this configuration for CSU/DSUs that may not support the Accunet loopup standards. This keyword is used only with a <b>payload</b> request, not a <b>full</b> request.



### Note

By entering the **service-module t1 remote-loopback** command without specifying any keywords, you enable the standard-loopup codes, which use a 1-in-5 pattern for loopup and a 1-in-3 pattern for loopdown.

## Defaults

Full and payload loopbacks with standard-loopup codes

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

You can simultaneously configure the **full** and **payload** loopback points. However, only one loopback code can be configured at a time. For example, if you configure the **service-module t1 remote-loopback payload alternate** command, a **payload v54** request cannot be transmitted or accepted.

The **no** form of this command disables loopback requests. For example, the **no service-module t1 remote-loopback full** command ignores all full-bandwidth loopback transmissions and requests. Configuring the **no** form of this command may not prevent telco line providers from looping your router in esf mode, because fractional T1/T1 lines use facilities data link messages to initiate loopbacks.

If you enable the **service-module t1 remote-loopback** command, the **loopback remote** commands on the FT1/T1 CSU/DSU module will not be successful.

**Examples**

The following example displays two routers connected back-to-back through a fractional T1/T1 line:

```
Router(config-if)# no service-module t1 remote-loopback full
Router(config-if)# service-module t1 remote-loopback payload alternate

Router(config-if)# loopback remote full
%SERVICE_MODULE-5-LOOPUPFAILED: Unit 0 - Loopup of remote unit failed

Router(config-if)# service-module t1 remote-loopback payload v54
Router(config-if)# loopback remote payload
%SERVICE_MODULE-5-LOOPUPFAILED: Unit 0 - Loopup of remote unit failed

Router(config-if)# service-module t1 remote-loopback payload alternate
Router(config-if)# loopback remote payload
%SERVICE_MODULE-5-LOOPUPREMOTE: Unit 0 - Remote unit placed in loopback
```

**Related Commands**

Command	Description
<b>loopback remote (interface)</b>	Loops packets through a CSU/DSU, over a DS3 link or a channelized T1 link, to the remote CSU/DSU and back.

# service-module t1 timeslots

To define time slots that constitute a fractional T1/T1 (FT1/T1) channel, use the **service-module t1 timeslots** command in interface configuration mode. To resume the default setting (all FT1/T1 time slots transmit at 64 kbps), use the **no** form of this command.

```
service-module t1 timeslots {range | all} [speed {56 | 64}]
```

```
no service-module t1 timeslots {range | all}
```

## Syntax Description

<i>range</i>	The DS0 time slots that constitute the FT1/T1 channel. The range is from 1 to 24, where the first time slot is numbered 1 and the last time slot is numbered 24. Specify this field by using a series of subranges separated by commas.
<b>all</b>	Selects all FT1/T1 time slots.
<b>speed</b>	(Optional) Specifies the time slot speed.
<b>56</b>	(Optional) 56 kbps.
<b>64</b>	(Optional) 64 kbps. This is the default.

## Defaults

64 kbps is the default for all time slots.

## Command Modes

Interface configuration

## Command History

Release	Modification
11.2	This command was introduced.

## Usage Guidelines

This command specifies which time slots are used in fractional T1 operation and determines the amount of bandwidth available to the router in each FT1/T1 channel.

The time-slot range must match the time slots assigned to the channel group. Your service provider defines the time slots that comprise a channel group.

To use the entire T1 line, enable the **service-module t1 timeslots all** command.

## Examples

The following example displays a series of time-slot ranges and a speed of 64 kbps:

```
Router(config-if)# service-module t1 timeslots 1-10,15-20,22 speed 64
```

## Related Commands

Command	Description
<a href="#">service-module t1 data-coding</a>	Guarantees the ones density requirement on an AMI line using the fractional T1/T1 module.
<a href="#">service-module t1 linecode</a>	Selects the linecode for the fractional T1/T1 module.

# set ip df

To change the Don't Fragment (DF) bit value in the IP header, use the **set ip df** command in route-map configuration mode. To disable changing the DF bit value, use the **no** form of this command.

```
set ip df {0 | 1}
```

```
no set ip df {0 | 1}
```

Syntax Description	0	Sets the DF bit to 0 (clears the DF bit ) and allows packet fragmentation.
	1	Sets the DF bit to 1 which prohibits packet fragmentation.

**Defaults** The DF bit value is not changed in the IP header.

**Command Modes** Route-map configuration

Command History	Release	Modification
	12.1(6)	This command was introduced.

**Usage Guidelines** Using Path MTU Discovery (PMTUD) you can determine an MTU value for IP packets that avoids fragmentation. If ICMP messages are blocked by a router, the path MTU is broken and packets with the DF bit set are discarded. Use the **set ip df** command to clear the DF bit and allow the packet to be fragmented and sent. Fragmentation can slow the speed of packet forwarding on the network but access lists can be used to limit the number of packets on which the DF bit will be cleared.



**Note**

Some IP transmitters (notably some versions of Linux) may set the identification field in the IP header (IPid) to zero when the DF bit is set. If the router should clear the DF bit on such a packet and if that packet should subsequently be fragmented, then the IP receiver will probably be unable to correctly reassemble the original IP packet.

**Examples** The following example shows how to clear the DF bit to allow fragmentation. In this example a router is blocking ICMP messages and breaking the path MTU. Using policy routing both the inbound and outbound packets on interface serial 0 will have their DF bit set to 0 which allows fragmentation.

```
interface serial 0

ip policy route-map clear-df-bit
route-map clear-df-bit permit 10
match ip address 111
set ip df 0

access-list 111 permit tcp any any
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip tcp path-mtu-discovery</b>	Enables Path MTU Discovery.
<b>route-map</b>	Defines a route map to control where packets are output.

# shelf-id

To change the shelf number assigned to the router shelf or dial shelf on the Cisco AS5800, use the **shelf-id** command in global configuration mode. To return the shelf numbers to the default value, use the **no** form of this command.

**shelf-id** *number* {**router-shelf** | **dial-shelf**}

**no shelf-id** *number*

## Syntax Description

<i>number</i>	Number to assign to the shelf. Range is from 0 to 9999.
<b>router-shelf</b>	Assigns the specified number to the router shelf.
<b>dial-shelf</b>	Assigns the specified number to the dial shelf.

## Defaults

The default shelf number for the router shelf is 0.  
The default shelf number for the dial shelf is 1 or one number higher than the specified router shelf number.

## Command Modes

Global configuration

## Command History

Release	Modification
11.3(2)AA	This command was introduced.

## Usage Guidelines

The shelf number is used to distinguish between cards on the router shelf and cards on the dial shelf.



### Caution

You must reload the Cisco AS5800 for the shelf number to take effect. The shelf numbers are part of the interface names. When you reload the Cisco AS5800, all NVRAM interface configuration information is lost.

You can specify the shelf number through the setup facility during initial configuration of the Cisco AS5800. This is the recommended method to specify shelf numbers.

To display the shelf numbers, use the **show running-config** command. If a shelf number has been changed, the pending change is shown in the output of the **show version** command (for example, the dial-shelf ID is 87; will change to 2 on reload).

## Examples

In the following example, the dial shelf is assigned the number 456:

```
Router(config)# shelf-id 456 dial-shelf
Router(config)# exit
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show version</b>	Displays the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images.

# show alarm-interface

To display the alarm interface controller (AIC) configuration setting and the information sent to the Cisco IOS software by the AIC, use the **show alarm-interface** command in privileged EXEC mode.

**show alarm-interface** [*slot-number*] [**summary**]

Syntax Description	
<i>slot-number</i>	(Optional) Slot number in which the AIC was placed.
<b>summary</b>	(Optional) Selects the summary format for the output message.

**Defaults** Displays verbose message output and displays all AICs in all slot numbers on the router.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.2(2)XG	This command was introduced on the Cisco 2600 series and Cisco 3600 series.
	12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.

**Examples** The following is sample output from the **show alarm-interface summary** command:

```
Router# show alarm-interface 5 summary

      Alarm Interface Card in Slot 5:
Configured IP address:10.2.130.102
Status: KEEPALIVE TIMER EXPIRED
Alarm Interface Card in Slot 5:
Configured IP address:10.2.130.102
Status:KEEPALIVE TIMER EXPIRED
```

The following is an example of a verbose **show alarm-interface** display:

```
Router# show alarm-interface 4

      Alarm Interface Card in Slot 4:
Configured IP address: 10.10.10.2
Status: RUNNING
Timer expires in < 11 min.
Reported version: 00 00 00 01
Expected version: 00 00 00 01
Last Self Test result: READY
Last Start-Up message:
-----
<AIC>: Hardware Version 1, Revision A Software Version 2, Revision A 1.0.1 Installed and
running, POST passed.
-----
Last Status severity: 0
Last Status message:
-----
Status
-----
```

Table 11 describes significant fields shown in this output.

**Table 11** *show alarm-interface Field Descriptions*

Field	Description
Alarm Interface Card in Slot	Card type and slot number.
Configured IP address	Configured IP address
Status	AIC card status. Can be one of the following: <ul style="list-style-type: none"> <li>• HARDWARE DETECTED</li> <li>• RUNNING</li> <li>• HARDWARE NOT PRESENT</li> <li>• KEEPALIVE TIMER EXPIRED</li> </ul>
Timer expires in	Current value of the KEEPALIVE TIMER, or states if the timer has been disabled. This line is only active when the status line reads HARDWARE DETECTED or RUNNING.  Used in troubleshooting to detect operational failures of the AIC.
Reported version	Active software version number.  Comparing the reported version to the expected version may reveal possible incompatibilities between the AIC's software and the IOS image.
Expected version	Expected software version number.  Comparing the reported version to the expected version may reveal possible incompatibilities between the AIC's software and the IOS image.
Last Self Test result	Result of the AIC's power on self-test (POST).
Last Start-Up message	Startup messages.
<AIC>	AIC. Includes version and activity information.
Last Status severity	Rates the severity of the status message. Any number other than 0 indicates a need for intervention. The number 1 indicates the most severe condition.
Last Status message	Last status message.

#### Related Commands

Command	Description
<a href="#">alarm-interface</a>	Enters the alarm interface mode and configures the AIC.

# show aps

To display information about the current automatic protection switching (APS) feature, use the **show aps** command in privileged EXEC mode.

```
show aps
```

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	11.1 CC	This command was introduced.

**Examples** The following is sample output from the **show aps** command on a router configured with a working interface. In this example, POS interface 0/0/0 is configured as a working interface in group 1, and the interface is selected (that is, active).

```
Router1# show aps

POS0/0/0 working group 1 channel 1 Enabled Selected
```

The following is sample output from the **show aps** command on a router configured with a protect interface. In this example, POS interface 2/0/0 is configured as a protect interface in group 1, and the interface is not selected (the ~ indicates that the interface is not active). The output also shows that the working channel is located on the router with the IP address 10.1.6.1 and that the interface is currently selected (that is, active).

```
Router2# show aps

POS2/0/0 protect group 1 channel 0 bidirectional ~Selected
      Rx_K1= 0, Rx_K2= 0 Tx_K1= 0 Tx_K2= 5
      Working channel 1 at 10.1.6.1 Enabled
```

For the K1 field (8 bits), the first 4 bits indicate the channel number that has made the request, and the last 4 bits map to the requests (local or external) listed in [Table 12](#). For the K2 field (8 bits), the first 4 bits indicate the channel number bridged onto the protect line, the next bit is the architecture used, and the last 3 bits indicate the mode of operation or non-APS use listed in [Table 12](#).

**Table 12 K1 Bit Descriptions**

Bits (Hexadecimal)	Description
<b>K1 bits 8765</b>	K1 bits 8 through 5: Channel number that made the request.
<b>K1 bits 4321</b>	K1 bits 4 through 1: Type of request.
1111 (0xF)	Lockout of protection request.
1110 (0xE)	Forced switch request.
1101 (0xD)	Signal failure (SF)—high priority request.

**Table 12** *K1 Bit Descriptions (continued)*

<b>Bits (Hexadecimal)</b>	<b>Description</b>
1100 (0xC)	Signal failure (SF)—low priority request.
1011 (0xB)	Signal degradation (SD)—high priority request.
1010 (0xA)	Signal degradation (SD)—low priority request.
1001 (0x9)	Not used.
1000 (0x8)	Manual switch request.
0111 (0x7)	Not used.
0110 (0x6)	Wait to restore request.
0101 (0x5)	Not used.
0100 (0x4)	Exercised request.
0011 (0x3)	Not used.
0010 (0x2)	Reverse request.
0001 (0x1)	Do not revert request.
0000 (0x0)	No request.