loopback remote (interface)

To loop packets through a CSU/DSU, over a DS-3 link or a channelized T1 link, to the remote CSU/DSU and back, use the **loopback remote** command in interface configuration mode. To remove the loopback, use the **no** form of this command.

FT1/T1 CSU/DSU Modules

loopback remote {**full** | **payload** | **smart-jack**} [**0in1** | **1in1** | **1in2** | **1in5** | **1in8** | **3in24** | **qrw** | **user-pattern** *24bit-binary-value*]

no loopback remote {**full** | **payload** | **smart-jack**}

2- and 4-Wire, 56/64-kbps CSU/DSU Modules

loopback remote [**2047** | **511** | **stress-pattern** *pattern-number*]

no loopback remote

Syntax Description

full	Transmits a full-bandwidth line loopback request to a remote device, which is used for testing.
payload	Transmits a payload line loopback request to a remote device, which is used for testing the line and remote DSU.
smart-jack	Transmits a loopback request to the remote smart-jack, which some service providers attach on the line before the customer premises equipment (CPE). You cannot put the local smart jack into loopback.
0in1	(Optional) Transmits an all-zeros test pattern used for verifying B8ZS line encoding. The remote end my report a loss of signal when using alternate mark inversion (AMI) line coding.
1in1	(Optional) Transmits an all-ones test pattern used for signal power measurements.
1in2	(Optional) Transmits an alternating ones and zeroes test pattern used for testing bridge taps.
1in5	(Optional) Transmits the industry standard test-pattern loopback request.
1in8	(Optional) Transmits a test pattern used for stressing timing recovery of repeaters.
3in24	(Optional) Transmits a test pattern used for testing the ones density tolerance on AMI lines.
qrw	(Optional) Transmits a quasi-random word test pattern, which is a random signal that simulates user data.
user-pattern *24bit-binary-value*	(Optional) Transmits a test pattern that you define. Enter a binary string up to 24 bits long. For the fixed patterns such 0in1 and 1in1, the T1 framing bits are jammed on top of the test pattern; for the user-pattern, the pattern is simply repeated in the time slots.

2047	(Optional) Transmits a pseudorandom test pattern that repeats after 2047 bits.
511	(Optional) Transmits a pseudorandom test pattern that repeats after 511 bits.
stress-pattern *pattern-number*	(Optional) Transmits a DDS stress pattern available only on the 4-wire 56/64-kbps CSU/DSU module. You may enter a stress pattern from 1 to 4. A 1 pattern sends 100 bytes of all 1s and then 100 bytes of all 0s to test the stress clocking of the network. A 2 pattern sends 100 bytes of a 0x7e pattern and then 100 bytes of all 0s. A 3 pattern sends continuous bytes of a 0x46 pattern. A 4 pattern sends continuous bytes of 0x02 pattern.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

This command applies only when the remote CSU/DSU device is configured for this function. It is used for testing the data communication channels along with or without remote CSU/DSU circuitry. The loopback is usually performed at the line port, rather than the DTE port, of the remote CSU/DSU.

For a multiport interface processor connected to a network via a channelized T1 link, the **loopback remote** interface configuration command applies if the remote interface is served by a DDS line (56 kbps or 64 kbps) and the device at the remote end is a CSU/DSU. In addition, the CSU/DSU at the remote end *must* react to latched DDS CSU loopback codes. Destinations that are served by other types of lines or that have CSU/DSUs that do not react to latched DDS CSU codes cannot participate in an interface remote loopback. Latched DDS CSU loopback code requirements are described in AT&T specification TR-TSY-000476, “OTGR Network Maintenance Access and Testing.”

For the integrated FT1/T1 CSU/DSU module, the **loopback remote full** command sends the loopup code to the remote CSU/DSU. The remote CSU/DSU performs a full-bandwidth loopback through the CSU portion of the module. The **loopback remote payload** command sends the loopup code on the configured time slots, while maintaining the D4-Extended Superframe. The remote CSU/DSU performs the equivalent of a loopback line payload request. The remote CSU/DSU loops back only those time slots that are configured on the remote end. This loopback reframes the data link, regenerates the signal, and corrects bipolar violations and extended super frame CRC errors. The **loopback remote smart-jack** command sends a loopup code to the remote smart jack. You cannot put the local smart jack into loopback.

Failure to loopup or initiate a remote loopback request could be caused by enabling the **no service-module t1 remote-loopback** command or having an alternate remote-loopback code configured on the remote end. When the loopback is terminated, the result of the pattern test is displayed.

For the 2- and 4-wire, 56/64-kbps CSU/DSU module, an active connection is required before a loopup can be initiated while in switched mode. When transmitting V.54 loopbacks, the remote device is commanded into loopback using V.54 messages. Failure to loopup or initiate a remote loopback request could be caused by enabling the **no service-module 56k remote-loopback** command.

To show interfaces that are currently in loopback operation, use the **show interfaces loopback** command in EXEC mode.

Examples

The following example configures a remote loopback test:

```
Router(config)# interface serial 0
Router(config-if)# loopback remote
```

The following example configures the remote device into full-bandwidth line loopback while specifying the **qrw** test pattern over the T1 CSU/DSU module on a Cisco 2524 or Cisco 2525 router:

```
Router(config)# interface serial 0
Router(config-if)# loopback remote full qrw
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0, changed state to down
%LINK-3-UPDOWN: Interface Serial0, changed state to down
%SERVICE_MODULE-5-LOOPUPREMOTE: Unit 0 - Remote unit placed in loopback
```

The following example transmits a remote loopback stress pattern over the 4-wire, 56/64-kbps CSU/DSU module, which tests the stress clocking of the network:

```
Router(config-if)# loopback remote stress-pattern 1
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1, changed state to down
%LINK-3-UPDOWN: Interface Serial1, changed state to down
%SERVICE_MODULE-5-LOOPUPREMOTE: Unit 1 - Remote unit placed in loopback
```

Related Commands

Command	Description
clear service-module serial	Resets an integrated CSU/DSU.
loopback dte	Loops packets back to the DTE device from the CSU/DSU.
loopback line	Loops packets completely through the CSU/DSU to configure the CSU loop.
service-module 56k remote-loopback	Enables the acceptance of a remote loopback request on a serial interface on a 2- or 4-wire, 56/64-kbps CSU/DSU module.
service-module t1 remote-loopback	Specifies whether the fractional T1/T1 CSU/DSU module enters loopback mode when it receives a loopback code on the line.
show interfaces loopback	Displays information about the loopback interface.
show service-module serial	Displays the performance report for an integrated CSU/DSU.

mdl

To configure the Maintenance Data Link (MDL) message defined in the ANSI T1.107a-1990 specification for the CT3 in a Cisco AS5800 universal access server, or for the CT3IP in Cisco 7500 series routers, use the **mdl** command in interface configuration mode. To remove the message, use the **no** form of this command.

mdl {**transmit** {**path** | **idle-signal** | **test-signal**} | **string** {**eic** | **lic** | **fic** | **unit** | **pfi** | **port** | **generator**} *string*}

no mdl {**transmit** {**path** | **idle-signal** | **test-signal**} | **string** {**eic** | **lic** | **fic** | **unit** | **pfi** | **port** | **generator**} *string*}

Syntax Description

transmit path	Enables transmission of the MDL Path message.
transmit idle-signal	Enables transmission of the MDL Idle Signal message.
transmit test-signal	Enables transmission of the MDL Test Signal message.
string eic *string*	Specifies the Equipment Identification Code; can be up to 10 characters.
string lic *string*	Specifies the Location Identification Code; can be up to 11 characters.
string fic *string*	Specifies the Frame Identification Code; can be up to 10 characters.
string unit *string*	Specifies the Unit Identification Code; can be up to 6 characters.
string pfi *string*	Specifies the Facility Identification Code sent in the MDL Path message; can be up to 38 characters.
string port *string*	Specifies the Port number string sent in the MDL Idle Signal message; can be up to 38 characters.
string generator *string*	Specifies the Generator number string sent in the MDL Test Signal message; can be up to 38 characters.

Defaults

No MDL message is configured.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

Use the **show controllers t3** command to display MDL information (received strings). MDL information is displayed only when framing is set to C-bit.

Note MDL is supported only when the DS3 framing is C-bit parity.

Examples

The following examples show several of the **mdl** commands for the CT3IP in slot 9:

```
Router(config)# controller t3 9/0/0
Router(config-controller)# mdl string eic Router A
Router(config-controller)# mdl string lic Test Network
Router(config-controller)# mdl string fic Building B
Router(config-controller)# mdl string unit ABC
```

Related Commands

Command	Description
show controllers t3	Displays information about the CT3IP on Cisco 7500 series routers.

media-type

To specify the physical connection on an interface, use the **media-type** command in interface configuration mode. To restore the default value, use the **no** form of this command.

media-type {**aui** | **10baset** | **100baset** | **mii**}

no media-type {**aui** | **10baset** | **100baset** | **mii**}

Syntax Description

aui	Selects an AUI 15-pin physical connection. This is the default on Cisco 4000 series routers.
10baset	Selects an R-J45 10BASE-T physical connection.
100baset	Specifies an RJ-45 100BASE-T physical connection. This is the default on Cisco 7000 series and Cisco 7200 series routers.
mii	Specifies a media-independent interface.

Defaults

An AUI 15-pin physical connection is the default setting on Cisco 4000 series routers.

100BASE-T physical connection is the default setting on Cisco 7000 series and Cisco 7200 series routers.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

To specify the physical connection on an interface, use the following interface configuration:

- Ethernet network interface module configuration on Cisco 4000 series routers
- Fast Ethernet Interface Processor (FEIP) on Cisco 7000 series, 7200 series, and 7500 series routers
- Full-duplex or half-duplex mode on a serial interface

Examples

The following example selects an RJ-45 10BASE-T physical connection on Ethernet interface 1:

```
Router(config)# interface ethernet 1
Router(config-if)# media-type 10baset
```

The following example specifies a media-independent interface physical connection to Fast Ethernet slot 0, port 1 on the Cisco 7000 or 7200 series:

```
Router(config)# interface fastethernet 0/1
Router(config-if)# media-type mii
```

The following example specifies a media-independent interface physical connection to Fast Ethernet slot 0, port adapter 1, port 1 on the Cisco 7500 series:

```
Router(config)# interface fastethernet 0/1/1
Router(config-if)# media-type mii
```

media-type half-duplex

The **media-type half-duplex** command is replaced by the **half-duplex** command. See the description of the **half-duplex** command in this chapter for more information.

modem dtr-delay

To control the time that a data terminal ready (DTR) signal is held down when a line clears, use the **modem dtr-delay** command in line configuration mode. To restore the default hold down time, use the **no** form of this command.

modem dtr-delay *seconds*

no modem dtr-delay *seconds*

Syntax Description

seconds	Number of seconds. The default is 5.

Defaults

The default DTR signal hold down time is 5 seconds.

Command Modes

Line configuration

Command History

Release	Modification
12.1	This command was introduced.

Usage Guidelines

Use this command to reduce the time that a DTR signal is held down after an asynchronous line clears and before the DTR signal is raised again to accept new calls. Incoming calls may be rejected in heavily loaded systems even when modems are unused because the default DTR hold down interval may be too long. The **modem dtr-delay** command is designed for lines used for an unframed asynchronous session such as Telnet. Lines used for a framed asynchronous session such as PPP should use the **pulse-time** interface command.

Examples

The following example shows how to specify a DTR hold down interval of 2 seconds:

```
Router(config)# line 7
Router(config-line)# modem dtr-delay 2
```

Related Commands

Command	Description
pulse-time	Enables pulsing DTR signal intervals on serial interfaces.

mop enabled

To enable an interface to support the Maintenance Operation Protocol (MOP), use the **mop enabled** command in interface configuration mode. To disable MOP on an interface, use the **no** form of this command.

mop enabled

no mop enabled

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled on Ethernet interfaces and disabled on all other interfaces.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example enables MOP for serial interface 0:

```
Router(config)# interface serial 0
Router(config-if)#  mop enable
```

Related Commands

Command	Description
mop retransmit-timer	Configures the length of time that the Cisco IOS software waits before sending boot requests again to a MOP server.
mop retries	Configures the number of times the Cisco IOS software will send boot requests again to a MOP server.
mop sysid	Enables an interface to send out periodic MOP system identification messages.

mop sysid

To enable an interface to send out periodic Maintenance Operation Protocol (MOP) system identification messages, use the **mop sysid** command in interface configuration mode. To disable MOP message support on an interface, use the **no** form of this command.

mop sysid

no mop sysid

Syntax Description

This command has no arguments or keywords.

Defaults

Enabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

You can still run MOP without having the background system ID messages sent. This command lets you use the MOP remote console, but does not generate messages used by the configurator.

Examples

The following example enables serial interface 0 to send MOP system identification messages:

```
Router(config)# interface serial 0
Router(config-if)# mop sysid
```

Related Commands

Command	Description
mop device-code	Identifies the type of device sending MOP sysid messages and request program messages.
mop enabled	Enables an interface to support the MOP.

mtu

To adjust the maximum packet size or maximum transmission unit (MTU) size, use the **mtu** command in interface configuration mode. To restore the MTU value to its original default value, use the **no** form of this command.

mtu *bytes*

no mtu

Syntax Description

bytes	Desired size in bytes.

Defaults

Table 13 lists default MTU values according to media type.

Table 13 Default Media MTU Values

Media Type	Default MTU (Bytes)
Ethernet	1500
Serial	1500
Token Ring	4464
ATM	4470
FDDI	4470
HSSI (HSA)	4470

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

Each interface has a default maximum packet size or MTU size. This number generally defaults to the largest size possible for that interface type. On serial interfaces, the MTU size varies, but cannot be set smaller than 64 bytes.

Caution Changing an MTU size on a Cisco 7500 series router results in the recarving of buffers and resetting of all interfaces. The following message is displayed:

```
%RSP-3-Restart:cbus complex.
```

Protocol-Specific Versions of mtu Command

Changing the MTU value with the **mtu** interface configuration command can affect values for the protocol-specific versions of the command (the **ip mtu** command, for example). If the value specified with the **ip mtu** interface configuration command is the same as the value specified with the **mtu** interface configuration command, and you change the value for the **mtu** interface configuration command, the **ip mtu** value automatically matches the new **mtu** interface configuration command value. However, changing the values for the **ip mtu** configuration commands has no effect on the value for the **mtu** interface configuration command.

ATM and LANE Interfaces

ATM interfaces are not bound by what is configured on the major interface. By default, MTU on a subinterface is equal to the default MTU (4490); if a client is configured the default is 1500. MTU can be changed on subinterfaces, but it may result in recarving of buffers to accommodate the new maximum MTU on the interface.

Examples

The following example specifies an MTU of 1000 bytes:

```
Router(config)# interface serial 1
Router(config-if)# mtu 1000
```

Related Commands

Command	Description
encapsulation smds	Enables SMDS service on the desired interface.
ip mtu	Sets the MTU size of IP packets sent on an interface.

national bit

To set the E3 national bit in the G.751 frame used by the PA-E3 port adapter, use the **national bit** command in interface configuration mode. To return to the default E3 national bit, use the **no** form of this command.

national bit {**0** | **1**}

no national bit

Syntax Description

0 | **1**	Specifies the E3 national bit in the G.751 frame. The default is 0.

Defaults

0 national bit

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CA	This command was introduced.

Usage Guidelines

The **national bit** command sets bit 12 in the E3 frame.

To verify the national bit configured on the interface, use the **show controllers serial** EXEC command.

Examples

The following example sets the national bit to 1 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)# national bit 1
```

Related Commands

Command	Description
international bit	Sets the E3 international bit in the G.751 frame used by the PA-E3 port adapter.
show controllers serial	Displays information that is specific to the interface hardware.

national reserve

To set the E1 national bit, enter the **national reserve** command in interface configuration mode. To return to the default E1 national bit, use the **no** form of this command.

national reserve <0-1><0-1><0-1><0-1><0-1><0-1>

no national reserve

Syntax Description

This command has no arguments or keywords.

Defaults

111111

Command Modes

Interface configuration

Command History

Release	Modification
12.0(5)XE	This command was introduced.
12.0(7)XE1	Support for Cisco 7100 series routers was added.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.

Usage Guidelines

This command applies only for E1. This command not only sets the national reserve bits but also sets the international bit as well. The far left digit represents the international bit. All six digits must be present for the pattern to be valid.

Examples

On Cisco 7100 series routers, the following example sets the national bit on interface 1 on the port adapter in slot 0 to no scrambling:

```
interface atm1/0
 national reserve 011011
```

negotiation

To configure speed, duplex, and flow control on the Gigabit Ethernet port of the Cisco 7200-I/O-GE+E, use the **negotiation** command in interface configuration mode. To disable automatic negotiation, use the **no negotiation auto** command .

negotiation {**forced** | **auto**}

no negotiation auto

Syntax Description

forced	Disables flow control and configures the Gigabit Ethernet interface in 1000/full-duplex mode.
auto	Enables the autonegotiation protocol to configures the speed, duplex, and automatic flow-control of the Gigabit Ethernet interface.

Defaults

Negotiation auto

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CC	This command was introduced.
12.0(7)S, 12.0(6)T	The **forced** keyword was added.
12.1(3a)E	Support for the Cisco 7200-I/O-GE+E controller was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.

Usage Guidelines

The **negotiation** command is applicable only to the Gigabit Ethernet interface of the Cisco 7200-I/O-GE+E. The **negotiation auto** command is used instead of the **duplex** and **speed** commands (which are used on Ethernet and Fast Ethernet interfaces) to automatically configure the duplex and speed settings of the interfaces. The **negotiation forced** command is used to configure the Gigabit Ethernet interface to be 1000/full-duplex only and to disable flow control. The Gigabit Ethernet interface of the Cisco 7200-I/O-GE+E is restricted to 1000 Mbps/full duplex only. Autonegotiation negotiates only to these values.

Examples

The following example configures the Gigabit Ethernet interface of the Cisco 7200-I/O-GE +E to autonegotiate:

```
configure terminal
interface gigabitethernet 0/0
negotiation auto
```

Related Commands

Command	Description
show interfaces gigabitethernet	Checks the status and configuration settings of the Gigabit Ethernet interface of the Cisco 7200-I/O-GE+E.

nrzi-encoding

To enable nonreturn-to-zero inverted (NRZI) line-coding format, use the **nrzi-encoding** command in interface configuration mode. To disable this capability, use the **no** form of this command.

nrzi-encoding [**mark**]

no nrzi-encoding

Syntax Description

mark	(Optional) Specifies that NRZI mark encoding is required on the PA-8T and PA-4T+ synchronous serial port adapters on Cisco 7200 and 7500 series routers. If mark is not specified, NRZI space encoding is used.

Defaults

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
11.3	The **mark** keyword was added for the Cisco 7200 series routers and Cisco 7500 series routers.

Usage Guidelines

All FSIP, PA-8T, and PA-4T+ interface types support nonreturn-to-zero (NRZ) and NRZI format. This is a line-coding format that is required for serial connections in some environments. NRZ encoding is most common. NRZI encoding is used primarily with EIA/TIA-232 connections in IBM environments.

Examples

The following example configures serial interface 1 for NRZI encoding:

```
Router(config)# interface serial 1
Router(config-if)#  nrzi-encoding
```

The following example configures serial interface 3/1/0 for NRZI mark encoding:

```
Router(config)# interface serial 3/1/0
Router(config-if)#  nrzi-encoding mark
```

physical-layer

To specify the mode of a slow-speed serial interface on a router as either synchronous or asynchronous, use the **physical-layer** command in interface configuration mode. To return the interface to the default mode of synchronous, use the **no** form of this command.

physical-layer {**sync** | **async**}

no physical-layer

Syntax Description

sync	Places the interface in synchronous mode. This is the default.
async	Places the interface in asynchronous mode.

Defaults

Synchronous mode

Command Modes

Interface configuration

Command History

Release	Modification
11.2	This command was introduced.

Usage Guidelines

This command applies only to low-speed serial interfaces available on Cisco 2520 through 2523 series routers.

If you specify the **no physical-layer** command, you return the interface to its default mode (synchronous).

In synchronous mode, low-speed serial interfaces support all interface configuration commands available for high-speed serial interfaces, except the following two commands:

- **half-duplex timer cts-delay**
- **half-duplex timer rts-timeout**

When placed in asynchronous mode, low-speed serial interfaces support all commands available for standard asynchronous interfaces.

When you enter this command, it does not appear in the output of **more system:running-config** and **more nvram:startup-config** commands because the command is a physical-layer command.

Examples

This example changes a low-speed serial interface from synchronous to asynchronous mode:

```
Router(config)# interface serial 2
Router(config-if)# physical-layer async
```

Related Commands

Command	Description
more	Displays a specified file.

port

To enable an interface on a PA-4R-DTR port adapter to operate as a concentrator port, use the **port** command in interface configuration mode. To restore the default station mode, use the **no** form of this command.

port

no port

Syntax Description

This command has no arguments or keywords.

Defaults

Station mode

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3)T	This command was introduced.

Usage Guidelines

By default, the interfaces of the PA-4R-DTR operate as Token Ring stations. Station mode is the typical operating mode. Use this command to enable an interface to operate as a concentrator port.

Examples

The following example configures the PA-4R-DTR ports to operate in concentrator mode on a Cisco 7000 series router:

```
Router# configure terminal
Router(config)# interface tokenring 3/0/0
Router(config-if)# port
```

pos ais-shut

To send the line alarm indication signal (LAIS) when the Packet-Over-SONET (POS) interface is placed in any administrative shut down state, use the **pos ais-shut** command in interface configuration mode.

pos ais-shut

Syntax Description

This command has no keywords or arguments.

Defaults

No LAIS is sent.

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CC	This command was introduced.

Usage Guidelines

In Automatic Protection Switching (APS) environments, LAIS can be used to force a protection switch. This command forces an APS switch when the interface is placed in administrative shut down state.

For more information on APS, refer to the "Configuring Serial Interfaces" chapter in the *Cisco IOS Interface Configuration Guide*.

This command does not have a **no** form.

Examples

The following example forces the alarm indication on POS OC-3 interface 0 in slot 3:

```
Router(config)# interface pos 3/0
Router(config-if)# shutdown
Router(config-if)# pos ais-shut
```

pos flag

To set the SONET overhead bytes in the frame header to meet a specific standards requirement or to ensure interoperability with the equipment of another vendor, use the **pos flag** command in interface configuration mode. To remove the setting of the SONET overhead bytes, use the **no** form of this command.

pos flag {**c2** | **j0** | **s1s0**} *value*

no pos flag {**c2** | **j0** | **s1s0**} *value*

Syntax Description

c2 *value*	Path signal identifier used to identify the payload content type. The default value is 0xCF.
j0 *value*	Section trace byte (formerly the C1 byte). For interoperability with Synchronous Digital Hierarchy (SDH) equipment in Japan, use the value 0x1. The byte value can be 0 to 255.
sls0 *value*	S1 and S0 bits (bits 5 and 6 of the H1 #1 payload pointer byte). Use the following values to tell the SONET transmission equipment the SS bit: • For OC-3c, use 0 (this is the default). • For AU-4 container in SDH, use 2. The S1 and S0 bits can be 0 to 3. Values 1 and 3 are undefined. The default value is 0.

Defaults

The default **c2** value is 0xCF, and the default **sls0** value is 0.

Command Modes

Interface configuration

Command History

Release	Modification
11.2 GS	This command was introduced to support the Cisco 12000 series Gigabit Switch Routers.

Usage Guidelines

Use the following values to tell the SONET transmission equipment the payload type:

- For PPP, or High-Level Data Link Control (HDLC) when required, use 0xCF (this is the default).
- For ATM, use 0x13.
- For other equipment, use any nonzero value.
- The byte value can be 0 to 255.

Examples

The following example sets the path signal identifier used to identify the payload content type to ATM on the **pos** interface in slot 9:

```
Router(config)# interface pos 9/0
Router(config-if)# pos flag c2 0x13
Router(config-if)# end
Router#
```

pos framing

To specify the framing used on the POS (Packet-over-SONET) interface, use the **pos framing** command in interface configuration mode. To return to the default SONET STS-3c framing mode, use the **no** form of this command.

pos framing {**sdh** | **sonet**}

no pos framing

Syntax Description

sdh	Selects SDH STM-1 framing. This framing mode is typically used in Europe.
sonet	Selects SONET STS-3c framing. This is the default.

Defaults

SONET STS-3c framing

Command Modes

Interface configuration

Command History

Release	Modification
11.2	This command was introduced.
11.3	This command was modified to change the **posi framing-sdh** command to **pos framing-sdh**.
11.2 GS	The command syntax was changed from **pos framing-sdh** to **pos framing**. The **sonet** keyword was added.

Examples

The following example configures the interface for SDH STM-1 framing:

```
Router(config)# interface pos 3/0
Router(config-if)# pos framing sdh
Router(config-if)# no shutdown
```

Related Commands

Command	Description
clock source (interface)	Controls the clock used by a G.703-E1 interface.
interface	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
pos internal-clock	The **clock source** interface command replaces this command.

pos framing-sdh

The **pos framing-sdh** command is replaced by the **pos framing** command. See the description of the **pos framing** command in this chapter for more information.

pos internal-clock

The **pos internal-clock** command is replaced by the clock source (interface) command. See the description of the **clock source** (interface) command in this chapter for information on transmit clock source.

pos report

To permit selected SONET alarms to be logged to the console for a POS (Packet-Over-SONET) interface, use the **pos report** command in interface configuration mode. To disable logging of select SONET alarms, use the **no** form of this command.

pos report {**b1-tca** | **b2-tca** | **b3-tca** | **lais** | **lrdi** | **pais** | **plop** | **prdi** | **rdool** | **sd-ber** | **sf-ber** | **slof** | **slos**}

no pos report {**b1-tca** | **b2-tca** | **b3-tca** | **lais** | **lrdi** | **pais** | **plop** | **prdi** | **rdool** | **sd-ber** | **sf-ber** | **slof** | **slos**}

Syntax Description

b1-tca	Reports B1 bit-error rate (BER) threshold crossing alarm (TCA) errors.
b2-tca	Reports B2 BER crossing TCA errors.
b3-tca	Reports B3 BER crossing TCA errors.
lais	Reports line alarm indication signal errors.
lrdi	Reports line remote defect indication errors.
pais	Reports path alarm indication signal errors.
plop	Reports path loss of pointer errors.
prdi	Reports path remote defect indication errors.
rdool	Reports receive data out of lock errors.
sd-ber	Reports signal degradation BER errors.
sf-ber	Reports signal failure BER errors.
slof	Reports section loss of frame errors.
slos	Reports section los of signal errors.

Defaults

The following alarms are reported by default:

- **b1-tca**
- **b2-tca**
- **b3-tca**
- **plop**
- **sf-ber**
- **slof**
- **slos**

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CC	This command was introduced.

Usage Guidelines

Reporting an alarm means that the alarm can be logged to the console. Just because an alarm is permitted to be logged does not guarantee that it is logged. SONET alarm hierarchy rules dictate that only the most severe alarm of an alarm group is reported. Whether an alarm is reported or not, you can view the current state of a defect by checking the "Active Defects" line from the **show controllers pos** command output. A defect is a problem indication that is a candidate for an alarm.

For B1, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B1 byte of the following frame. Differences indicate that section level bit errors have occurred.

For B2, the bit interleaved parity error report is calculated by comparing the BIP-8/24 code with the BIP-8 code extracted from the B2 byte of the following frame. Differences indicate that line level bit errors have occurred.

For B3, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B3 byte of the following frame. Differences indicate that path level bit errors have occurred.

PAIS is sent by line terminating equipment (LTE) to alert the downstream path terminating equipment (PTE) that it has detected a defect on its incoming line signal.

PLOP is reported as a result of an invalid pointer (H1, H2) or an excess number of new data flag (NDF) enabled indications.

SLOF is detected when a severely error framing (SEF) defect on the incoming SONET signal persists for 3 milliseconds.

SLOS is detected when an all-zeros pattern on the incoming SONET signal lasts 19 plus or minus 3 microseconds or longer. This defect might also be reported if the received signal level drops below the specified threshold.

To determine the alarms that are reported on the interface, use the **show controllers pos** command.

Examples

The following example enables reporting of SD-BER and LAIS alarms on the interface:

```
Router(config)# interface pos 3/0/0
Router(config-if)# pos report sd-ber
Router(config-if)# pos report lais
Router(config-if)# end
Router#
```

Related Commands

Command	Description
interface	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
show controllers pos	Displays information about the POS controllers.

pos scramble-atm

To enable SONET payload scrambling on a POS (Packet-Over-SONET) interface, use the **pos scramble-atm** command in interface configuration mode. To disable scrambling, use the **no** form of this command.

pos scramble-atm

no pos scramble-atm

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.

Usage Guidelines

SONET payload scrambling applies a self-synchronous scrambler ($x^{43}+1$) to the Synchronous Payload Envelope (SPE) of the interface to ensure sufficient bit transition density. Both ends of the connection must use the same scrambling algorithm. When enabling POS scrambling on a VIP2 POSIP on the Cisco 7500 series router that has a hardware revision of 1.5 or higher, you can specify CRC 16 only (that is, CRC 32 is currently not supported).

To determine the hardware revision of the POSIP, use the **show diag** command.

To determine whether scrambling is enabled on the interface, use the **show interface pos** command or the **more nvram:startup-config** command.

Note SONET payload scrambling is enabled with the **pos scramble-atm** command. SONET payload scrambling applies a self-synchronous scrambler ($x^{43}+1$) to the Synchronous Payload Envelope (SPE) of the interface to ensure sufficient bit transition density. Both sides of the connection must be configured using the **pos scramble-atm** command. Currently, when connecting to a Cisco 7500 series router and using the **pos scramble-atm** command, you must specify the **crc 16** command rather than the **crc 32** command.

Examples

The following example enables scrambling on the interface:

```
Router(config)# interface pos 3/0
Router(config-if)# pos scramble-atm
Router(config-if)# no shutdown
Router(config-if)# end
Router#
```

Related Commands

Command	Description
crc	Sets the length of the CRC on an FSIP or HIP of the Cisco 7500 series routers or on a 4-port serial adapter of the Cisco 7200 series routers.
interface	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
more	Displays a specified file.
show diag	Displays hardware information for the router
show interfaces pos	Displays information about the Packet OC-3 interface in Cisco 7500 series routers.

pos threshold

To set the bit-error rate (BER) threshold values of the specified alarms for a POS (Packet-Over-SONET) interface, use the **pos threshold** command in interface configuration mode. To return to the default setting, use the **no** form of this command.

pos threshold {**b1-tca** | **b2-tca** | **b3-tca** | **sd-ber** | **sf-ber**} *rate*

no pos threshold {**b1-tca** | **b2-tca** | **b3-tca** | **sd-ber** | **sf-ber**} *rate*

Syntax Description

b1-tca	B1 BER threshold crossing alarm. The default is 6.
b2-tca	B2 BER threshold crossing alarm. The default is 6.
b3-tca	B3 BER threshold crossing alarm. The default is 6.
sd-ber	Signal degrade BER threshold. The default is 6.
sf-ber	Signal failure BER threshold. The default is 3 (10e-3).
rate	Bit-error rate from 3 to 9 (10-n).

Defaults

The default *rate* is 6 for **b1-tca**, **b2-tca**, **b3-tca**, and **sd-ber**.

The default *rate* is 3 (10e-3) for **sf-ber**.

Command Modes

Interface configuration

Command History

Release	Modification
11.1 CC	This command was introduced.

Usage Guidelines

For B1, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B1 byte of the following frame. Differences indicate that section level bit errors have occurred.

For B2, the bit interleaved parity error report is calculated by comparing the BIP-8/24 code with the BIP-8 code extracted from the B2 byte of the following frame. Differences indicate that line level bit errors have occurred.

For B3, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B3 byte of the following frame. Differences indicate that path level bit errors have occurred.

SF-BER and SD-BER are sourced from B2 BIP-8 error counts (as is B2-TCA). However, SF-BER and SD-BER feed into the automatic protection switching (APS) machine and can lead to a protection switch (if APS is configured).

B1-TCA, B2-TCA, and B3-TCA do nothing more than print a log message to the console (if reports for them are enabled).

To determine the BER thresholds configured on the interface, use the **show controllers pos** command.

Examples

The following example configures thresholds on the interface:

```
Router(config)# interface pos 3/0/0
Router(config-if)# pos threshold sd-ber 8
Router(config-if)# pos threshold sf-ber 4
Router(config-if)# pos threshold b1_tca 4
Router(config-if)# end
Router#
```

Related Commands

Command	Description
interface	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
pos report	Permits selected SONET alarms to be logged to the console for a POS interface.
show controllers pos	Displays information about the POS controllers.

posi framing-sdh

The **posi framing-sdh** command is replaced by the **pos framing** command. See the description of the **pos framing** command for more information.

pri-group

To specify ISDN PRI on a channelized E1 or T1 card on a Cisco 7500 series router, use the **pri-group** command in controller configuration mode. To remove the ISDN PRI, use the **no** form of this command.

pri-group [**timeslots** *range*]

no pri-group

Syntax Description

timeslots *range*	(Optional) Specifies a single range of values from 1 to 23.

Defaults

Disabled

Command Modes

Controller configuration

Command History

Release	Modification
11.0	This command was introduced.

Usage Guidelines

When you configure ISDN PRI, you must first specify an ISDN switch type for PRI and an E1 or T1 controller.

Examples

The following example specifies ISDN PRI on T1 slot 1, port 0:

```
Router# isdn switch-type primary-4ess
Router(config)# controllers t1 1/0
Router(config-controller)# framing esf
Router(config-controller)# linecode b8zs
Router(config-controller)# pri-group timeslots 2-6
```

Related Commands

Command	Description
controller	Configures a T1 or E1 controller and enters controller configuration mode.
interface serial	Specifies a serial interface created on a channelized E1 or channelized T1 controller (for ISDN PRI, CAS, or robbed-bit signaling).
isdn switch-type (PRI)	Specifies the central office switch type on the ISDN PRI interface.

pulse-time

To enable pulsing data terminal ready (DTR) signal intervals on the serial interfaces, use the **pulse-time** command in interface configuration mode. To restore the default interval, use the **no** form of this command.

pulse-time [**msec**] *seconds*

no pulse-time

Syntax Description

msec	(Optional) Specifies the use of milliseconds for the DTR signal interval.
seconds	Integer that specifies the DTR signal interval in seconds. If the **msec** keyword is configured the DTR signal interval is specified in milliseconds. The default is 0.

Defaults

0 seconds

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
12.1(5)T	The optional **msec** keyword was added to configure the DTR signal interval in milliseconds.

Usage Guidelines

When the serial line protocol goes down (for example, because of loss of synchronization), the interface hardware is reset and the DTR signal is held inactive for at least the specified interval. This function is useful for handling encrypting or other similar devices that use the toggling of the DTR signal to resynchronize.

Use the optional **msec** keyword to specify the DTR signal interval in milliseconds. A signal interval set to milliseconds is recommended on high-speed serial interfaces (HSSI).

Examples

The following example enables DTR pulse signals for 3 seconds on serial interface 2:

```
Router(config)# interface serial 2
Router(config-if)# pulse-time 3
```

The following example enables DTR pulse signals for 150 milliseconds on HSSI interface 2/1/0:

```
Router(config)# interface hssi 2/1/0
Router(config-if)# pulse-time msec 150
```

ring-speed

To set the ring speed for the CSC-1R and CSC-2R Token Ring interfaces, use the **ring-speed** command in interface configuration mode.

ring-speed *speed*

Syntax Description

speed	Integer that specifies the ring speed, either 4 for 4-Mbps operation or 16 for 16-Mbps operation. The default is 16.

Defaults

16-Mbps operation

Caution Configuring a ring speed that is wrong or incompatible with the connected Token Ring causes the ring to beacon, which makes the ring nonoperational.

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

This command does not have a **no** form.

Examples

The following example sets a Token Ring interface ring speed to 4 Mbps:

```
Router(config)# interface tokenring 0
Router(config-if)# ring-speed 4
```

scramble

To enable scrambling of the payload on the PA-E3 and PA-T3 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.

Usage Guidelines

E3/T3 scrambling is used to assist clock recovery on the receiving end.

Scrambling can prevent some bit patterns from being mistakenly interpreted as alarms by switches placed between the 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** EXEC command.

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
```

Related Commands

Command	Description
show controllers serial	Displays information that is specific to the interface hardware.

sdlc cts-delay

The **sdlc cts-delay** command is replaced by the **half-duplex timer** command. See the description of the **half-duplex timer** command in this chapter for more information.

sdlc hdx

The **sdlc hdx** command is replaced by the **half-duplex** command. See the description of the **half-duplex** command in this chapter for more information.

sdlc rts-delay

The **sdlc rts-delay** command is replaced by the **half-duplex timer** command. See the description of the **half-duplex timer** command in this chapter for more information.

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

Syntax Description

count	Value from 0 to 900 in seconds. This is the frequency at which the hardware is reset.

Defaults

0 is the default value.

Command Modes

Interface configuration

Command History

Release	Modification
11.2 P	This command was introduced.
12.0(5)XK and 12.0(7)T	Support was added for the Cisco MC3810.

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

This examples shows the restart delay on serial interface 0 set to 0:

```
interface Serial0
 serial restart-delay 0
```

Related Commands

Command	Description
pulse-time	Enables pulsing DTR signal intervals on the serial interfaces.
show interfaces serial	Displays information about a serial interface.

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*

Syntax Description

speed	Network line speed in kbps. The default speed is 56 kbps. Choose from one of the following optional speeds: • **2.4**—2400 kbps • **4.8**—4800 kbps • **9.6**—9600 kbps • **19.2**—19200 kbps • **38.4**—38400 kbps • **56**—56000 kbps • **64**—64000 kbps • **auto**—Automatic line speed mode. Configure this option if your line speed is constantly changing.

Defaults

56 kbps

Command Modes

Interface configuration

Command History

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 subrate 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

a1# 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
service-module 56k clock source	Sets up the clock source on a serial interface for a 4-wire, 56/64-kbps CSU/DSU module.
service-module 56k network-type	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

line	Uses the clocking provided by the active line coming in to the router. This is the default.
internal	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
clock source (interface)	Controls the clock used by a G.703-E1 interface.
service-module 56k clock rate	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

normal	Specifies normal transmission of data. This is the default.
scrambled	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
service-module 56k clock rate	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

dds	Transmits packets in DDS mode or through a dedicated leased line. The default is DDS enabled for the 4-wire CSU/DSU.
switched	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 5551111
Router(config-if)# dialer-group 1
```

Related Commands

Command	Description
dialer in-band	Specifies that DDR is to be supported.
service-module 56k clock rate	Configures the network line speed for a serial interface on a 4-wire, 56/64-kbps CSU/DSU module.
service-module 56k clock source	Sets up the clock source on a serial interface for a 4-wire, 56/64-kbps CSU/DSU module.
service-module 56k switched-carrier	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
loopback remote (interface)	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

att	AT&T or other digital network service provider. This is the default on the 4-wire, 56/64-kbps CSU/DSU module.
sprint	Sprint or other service provider whose network requires echo cancelers. This is the default on the 2-wire, switched 56-kbps CSU/DSU module.
other	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
service-module 56k network-type	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 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 {**internal** | **line**}

Syntax Description

internal	Specifies the CSU/DSU internal clock.
line	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 line
```

Related Commands

Command	Description
service-module 56k clock source	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 {**inverted** | **normal**}

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
service-module t1 linecode	Selects the linecode for the fractional T1/T1 module.
service-module t1 timeslots	Defines time slots that constitute a fractional T1/T1 (FT1/T1) channel.

service-module t1 fdl

To set the 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

ansi	Sets the FDL parameter to ANSI.
att	Sets the FDL parameter to ATT.

Defaults

Determined by the telephone company.

Command Modes

Interface configuration mode

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.

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

esf	Specifies Extended Super Frame as the T1 frame type. This is the default.
sf	Specifies D4 Super Frame as the T1 frame type.

Defaults

Extended Super Frame (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

-15 db	Decreases outgoing signal strength by 15 dB.
-7.5 db	Decreases outgoing signal strength by 7.5 dB.
none	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

ami	Specifies alternate mark inversion (AMI) as the line code.
b8zs	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
service-module t1 data-coding	Guarantees the ones density requirement on an AMI line using the fractional T1/T1 module.
service-module t1 timeslots	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** 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
service-module t1 framing	Selects the frame type for a line using the fractional T1/T1 (FT1/T1) module.

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

full	Configures the remote loopback code used to transmit or accept CSU loopback requests. This is the default, along with **payload**.
payload	Configures the loopback code used by the local CSU/DSU to generate or detect payload-loopback commands. This is the default, along with **full**.
alternate	(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.
v54	(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 **payload** request, not a **full** 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# no service-module t1 remote-loopback full
Router# service-module t1 remote-loopback payload alternate

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

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

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

Related Commands

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