Interface Commands

This chapter describes the function and displays the syntax of each interface command. For more information about defaults and usage guidelines, see the corresponding chapter of the *Router Products Command Reference* publication.

access-list *access-list-number* {**permit** | **deny**} *address mask*
(MAC address)
no access-list *access-list-number*

Use the **access-list** global configuration command to establish MAC address access lists. Use the **no** form of this command to remove a single access list entry.

access-list-number	Integer from 700 to 799 that you select for the list.
permit	Permits the frame.
deny	Denies the frame.
address mask	48-bit MAC addresses written in dotted triplet form. The ones bits in the *mask* argument are the bits to be ignored in *address*.

access-list *access-list-number* {**permit | deny**} *type-code wild-mask*
(type code)
no access-list *access-list-number*

Use the **access-list** global configuration command to build type-code access lists. Use the **no** form of this command to remove a single access list entry.

access-list-number	User-selectable number between 200 and 299 that identifies the list.
permit	Permits the frame.
deny	Denies the frame.

type-code 16-bit hexadecimal number written with a leading "0x"; for example, 0x6000. You can specify either an Ethernet type code for Ethernet-encapsulated packets, or a DSAP/SSAP pair for 802.3 or 802.5-encapsulated packets. Ethernet type codes are listed in the "Ethernet Type Codes" appendix of the *Router Products Command Reference* publication.

wild-mask 16-bit hexadecimal number whose ones bits correspond to bits in the *type-code* argument that should be ignored when making a comparison. (A mask for a DSAP/SSAP pair should always be at least 0x0101. This is because these two bits are used for purposes other than identifying the SAP codes.)

async default ip address *ip-address*
no async default ip address

To assign the interface address that is used by the device connecting to the router via PPP or SLIP, unless you override the address at the command line, use the **async default ip address** interface configuration command. Use the **no** form of the command to remove the address from your configuration.

ip-address Address of the client interface.

[**no**] **async dynamic address**

To specify an address on an asynchronous interface (rather than using the default address), use the **async dynamic address** interface configuration command. Use the **no** form of this command to disable dynamic addressing.

[**no**] **async dynamic routing**

To implement asynchronous routing on an interface, use the **async dynamic routing** interface configuration command. The **no** form of this command disables use of routing protocols; static routing will still be used.

async mode dedicated
no async mode

To place a line into network mode using SLIP or PPP encapsulation, use the **async mode dedicated** interface configuration command. The **no** form of this command returns the line to interactive mode.

async mode interactive
no async mode

To enable the **slip** and **ppp** EXEC commands, use the **async mode interactive** line configuration command. Use the **no** form of this command to prevent users from implementing SLIP and PPP at the EXEC level.

[**no**] **auto-polarity**

To enable automatic receiver polarity reversal on a hub port connected to an Ethernet interface of a Cisco 2505 or Cisco 2507, use the **auto-polarity** hub configuration command. To disable this feature, use the **no** form of this command.

[**no**] **backup delay** {*enable-delay* | **never**} {*disable-delay* | **never**}

To define how much time should elapse before a secondary line is set up or taken down after a primary line transition, use the **backup delay** interface configuration command. Use the **no** form of this command to remove the definition.

enable-delay	Integer that specifies the delay in seconds after the primary line goes down before the secondary line is activated.
never	Prevents the secondary line from being activated.
disable-delay	Integer that specifies the delay in seconds after the primary line goes up before the secondary line is deactivated.
never	Prevents the secondary line from being deactivated.

[**no**] **backup interface serial** *number*
[**no**] **backup interface serial** *slot/port*
(for the Cisco 7000 series)

To configure the serial interface as a secondary, or dial backup line, use the **backup interface serial** interface configuration command. Use the **no** form of this command with the appropriate serial port designation to turn disable this feature.

number	Number of the serial port to be set as the secondary, or dial backup, interface line.
slot	On the Cisco 7000 series, specifies the slot number.
port	On the Cisco 7000 series, specifies the port number.

[**no**] **backup load** {*enable-threshold* | **never**} {*disable-load* | **never**}

To set the traffic load thresholds for dial backup service, use the **backup load** interface configuration command. Use the **no** form of this command to remove the setting.

enable-threshold	Integer that specifies a percentage of the primary line's available bandwidth.
never	Sets the secondary line to never be activated due to load.
disable-load	Integer that specifies a percentage of the primary line's available bandwidth.
never	Sets the secondary line to never be deactivated due to load.

bandwidth *kilobits*
no bandwidth

To set a bandwidth value for an interface, use the **bandwidth** interface configuration command. Use the **no** form of this command to restore the default values.

kilobits	Intended bandwidth in kilobits per second. For a full bandwidth DS3, enter the value **44736**.

channel-group *number* **timeslots** *range* [**speed** {**48** | **56** | **64**}]

Use the **channel-group** controller configuration command to define the timeslots that belong to each T1 or E1 circuit.

number	Channel-group number. When configuring a T1 data line, channel-group numbers can be a value from 0 to 23. When configuring an E1 data line, channel-group numbers can be a value from 0 to 30.
timeslots *range*	Timeslot or range of timeslots belonging to the channel-group. The first timeslot is numbered 1. For a T1 controller, the timeslot range is from 1 to 24. For an E1 controller, the timeslot range is from 1 to 31.
speed {**48** | **56** | **64**}	(Optional) Specifies the line speed (in kilobits per second) of the T1 or E1 link. Default is 56 for T1 and is 64 for E1.

clear controller {**t1** | **e1**} *slot*/*port* (Cisco 7000)
clear controller {**t1** | **e1**} *number* (Cisco 4000)

Use the **clear controller** EXEC command to reset the T1 or E1 controller interface on the Cisco 7000 series or Cisco 4000 series routers.

slot	Backplane slot number; can be 0, 1, 2, 3, or 4. The slots are numbered from left to right.
port	Port number of the interface. It can be **0** or **1** on the MIP (MultiChannel Interface Processor). Ports on each interface processor are numbered from the top down.
number	Network interface module (NIM) number, in the range 0 through 2.

clear controller lex *number* [**prom**]
clear controller lex *slot/port* [**prom**] (for the Cisco 7000 series)

To reboot the LAN Extender and restart its operating software, use the **clear controller lex** privileged EXEC command.

number	Number of the LAN Extender interface corresponding to the LAN Extender to be rebooted.
prom	(Optional) Forces a reload of the PROM image, regardless of any Flash image.
slot	On the Cisco 7000 series, specifies the backplane slot number. On the Cisco 7000, the value can be 0, 1, 2, 3, or 4. On the Cisco 7010, the value can be 0, 1, or 2.
port	On the Cisco 7000 series, specifies the port number of the interface. The value can be 0, 1, 2, or 3 for the serial interface.

clear counters [*type number*] [**ethernet** | **serial**]
clear counters [*type slot/port*] [**ethernet** | **serial**] (for the Cisco 7000 series)

To clear the interface counters, use the **clear counters** EXEC command.

type	(Optional) Specifies the interface type. See this command in the *Router Products Command Reference* publication for a list of supported values.
number	(Optional) Specifies the interface counter displayed with the **show interfaces** command.
ethernet	(Optional) If the *type* is **lex**, you can clear the interface counters on the Ethernet interface.
serial	(Optional) If the *type* is **lex**, you can clear the interface counters on the serial interface.
slot	(Optional) On the Cisco 7000 series, specifies the backplane slot number. On the 7000, value can be 0, 1, 2, 3, or 4. On the 7010, value can be 0, 1, or 2.

port	(Optional) On the Cisco 7000 series, specifies the port number of the interface. Value can be 0, 1, 2, or 3 for the serial interface.

clear hub ethernet *number*

To reset and reinitialize the hub hardware connected to an interface of a Cisco 2505 or Cisco 2507, use the **clear hub** EXEC command.

ethernet	Indicates the hub in front of an Ethernet interface.
number	Hub number to clear, starting with 0. Since there is currently only one hub, this number is 0.

clear hub counters [**ether** *number* [*port* [*end-port*]]]

To set to zero the hub counters on an interface of a Cisco 2505 or Cisco 2507, use the **clear hub counters** EXEC command.

ether	(Optional) Indicates the hub in front of an Ethernet interface.
number	(Optional) Hub number for which to clear counters. Since there is currently only one hub, this number is 0. If the keyword **ether** is specified, the *number* is required.
port	(Optional) Port number on the hub. On the Cisco 2505, port numbers range from 1 through 8. On the Cisco 2507, port numbers range from 1 through 16. If a second port number follows, then this port number indicates the beginning of a port range. If no port number is specified, counters for all ports are cleared.
end-port	(Optional) Ending port number of a range.

clear interface *type number*
clear interface *type slot/port* (on a Cisco 7000 series)
clear interface *type slot/port* [**:***channel-group*] (on a Cisco 7000 series MIP T1 interface)

To reset the hardware logic on an interface, use the **clear interface** EXEC command.

type	Specifies the interface type. See this command in the *Router Products Command Reference* publication for a list of supported values.
number	Specifies the port, connector, or interface card number.
slot	In a Cisco 7000, specifies the backplane slot number and can be 0, 1, 2, 3, or 4. In a Cisco 7010, the value can be 0, 1, or 2.
port	On a Cisco 7000 series, specifies the port number of the interface and can be 0, 1, 2, 3, 4 or 5 depending on the type of interface, as follows: **AIP** (ATM Interface Processor)—0 **EIP** (Ethernet Interface Processor)—0, 1, 2, 3, 4, or 5 **FIP** (FDDI Interface Processor)—0 **HIP** (HSSI Interface Processor)—0 **MIP** (Multichannel Interface Processor) 0 or 1 **TRIP** (Token Ring Interface Processor)—0, 1, 2, or 3
:*channel-group*	(Optional) On the Cisco 7000 series supporting channelized T1, specifies the channel in the range of 0 to 23.

clear rif-cache

To clear entries from the Routing Information Field (RIF) cache, use the **clear rif-cache** EXEC command.

clock rate *bps*
no clock rate

To configure the clock rate for appliques (connector hardware) on the serial interface of the MCI and SCI cards to an acceptable bit rate, use the **clock rate** interface configuration command. Use the **no** form of this command to remove the clock rate if you change the interface from a DCE to a DTE device.

bps	Desired clock rate in bits per second: 1200, 2400, 4800, 9600, 19200, 34800, 56000, 64000, 72000, 125000, 148000, 500000, 800000, 1000000, 1300000, 2000000, or 4000000.

clock source {**line** | **internal**} (controller)

Use the **clock source** controller configuration command to set the T1-line clock-source for the MIP in the Cisco 7000 series.

line	Specifies the T1 line as the clock source.
internal	Specifies the MIP as the clock source.

clock source {**line** | **internal**} (interface)
no clock source

To control which clock a G.703-E1 interface will use to clock its transmitted data from, use the **clock source** interface configuration command. The **no** form of this command restores the default value.

line	Specifies that the interface will clock its transmitted data from a clock recovered from the line's receive data stream (default).
internal	Specifies that the interface will clock its transmitted data from its internal clock.

cmt connect [*interface-name* [**phy-a** | **phy-b**]]

To start the processes that perform the connection management (CMT) function and allow the ring on one fiber to be started, use the **cmt connect** EXEC command.

interface-name	(Optional) Specifies the FDDI interface.
phy-a	(Optional) Selects Physical Sublayer A.
phy-b	(Optional) Selects Physical Sublayer B.

cmt disconnect [*interface-name* [**phy-a** | **phy-b**]]

To stop the processes that perform the connection management (CMT) function and allow the ring on one fiber to be stopped, use the **cmt disconnect** EXEC command.

interface-name	(Optional) Specifies the FDDI interface.
phy-a	(Optional) Selects Physical Sublayer A.
phy-b	(Optional) Selects Physical Sublayer B.

[**no**] **compress** [**predictor** | **stac**]

To configure point-to-point software compression for LAPB, HDLC, or PPP, use the **compress** interface configuration command. To disable compression, use the **no** form of this command.

predictor	(Optional) Specifies that a predictor compression algorithm will be used on LAPB and PPP encapsulation.
stac	(Optional) Specifies that a Stacker (LZS) compression algorithm will be used on HDLC and PPP encapsulation.

controller [**t1** | **e1**] *slot*/*port* (on the Cisco 7000)
controller [**t1** | **e1**] *number* (on the Cisco 4000)

To configure a T1 or E1 controller and enter controller configuration mode, use the **controller** global configuration command.

t1	T1 controller.
e1	E1 controller.
slot	Backplane slot number; can be 0, 1, 2, 3, or 4. On the 7010, the slot number can be 0, 1, or 2. The slots are numbered from left to right.
port	Port number of the interface. It can be **0** or **1** for the MIP (MultiChannel Interface Processor). Ports on each interface processor are numbered from the top down.
number	Network interface module (NIM) number, in the range 0 through 2.

copy flash lex *number*

To download an executable image from Flash memory on the core router to the LAN Extender, use the **copy flash lex** privileged EXEC command.

number	Number of the LAN Extender interface to which to download an image from Flash.

copy tftp lex *number*

To download an executable image from a TFTP server to the LAN Extender, use the **copy tftp lex** privileged EXEC command.

number	Number of the LAN Extender interface to which to download an image.

crc *size*
no crc

To set the length of the cyclic redundancy check (CRC) on a Fast Serial Interface Processor (FSIP) of the Cisco 7000 series, use the **crc** interface configuration command. To set the CRC length to 16 bits, use the **no** form of this command.

size	CRC size (16 or 32 bits); the default is 16 bits.

[**no**] **crc4**

To enable generation of the G.703-E1 CRC4, use the **crc4** interface configuration command. To disable this feature, use the **no** form of this command.

[**no**] **dce-terminal-timing enable**

When running a line at high speeds and long distances, use the **dce-terminal-timing enable** interface configuration command to prevent phase shifting of the data with respect to the clock. If SCTE is not available from the DTE, use the **no** form of this command, which causes the DCE to use its own clock instead of SCTE from the DTE.

delay *tens-of-microseconds*
no delay

To set a delay value for an interface, use the **delay** interface configuration command. Use the **no** form of this command to restore the default delay value.

tens-of-microseconds	Integer that specifies the delay in tens of microseconds for an interface or network segment.

description *string* (controller configuration)
no description

To add a description to a T1 or E1 controller on a Cisco 7000 series router, use the **description** controller configuration command. Use the **no** form of this command to remove the description.

string	Comment or a description to help you remember what is attached to the interface.

description *string* (interface configuration)
no description

To add a description to an interface configuration, use the **description** interface configuration command. Use the **no** form of this command to remove the description.

string	Comment or a description to help you remember what is attached to this interface.

down-when-looped

To configure an interface to inform the system it is down when loopback is detected, use the **down-when-looped** interface configuration command.

[**no**] **dte-invert-txc**

On the Cisco 4000 platform, you can specify the serial Network Interface Module timing signal configuration. When the board is operating as a DTE, the **dte-invert-txc** command inverts the TXC clock signal it gets from the DCE that the DTE uses to transmit data. Use the **no** form of this command if the DCE accepts SCTE from the DTE.

[**no**] **early-token-release**

To enable early token release, use the **early-token-release** interface configuration command. Once enabled, use the **no** form of this command to disable this feature.

encapsulation *encapsulation-type*

To set the encapsulation method used by the interface, use the **encapsulation** interface configuration command.

encapsulation-type	Encapsulation type. See this command in the *Router Products Command Reference* publication for a list of supported values.

[**no**] **encapsulation atm-dxi**

Use the **encapsulation atm-dxi** interface configuration command to enable ATM-DXI encapsulation. The **no** form of this command disables ATM-DXI encapsulation.

encapsulation lapb [**dte** | **dce**] [**multi** | *protocol*]

To set the LAPB encapsulation method used by the interface, use the **encapsulation lapb** interface configuration command.

dte	(Optional) DDN X.25 DTE operation (for serial interface).
dce	(Optional) DDN X.25 DCE operation (for serial interface).
multi	(Optional) Multi-protocol support.
protocol	(Optional) Protocol type. See this command in the *Router Products Command Reference* publication for a list of supported values.

encapsulation x25 [**dte** | **dce**] [**ddn** | **bfe** | **ietf**]

To specify an serial interface's operation as an X.25 device, use the **encapsulation x25** interface configuration command.

dce	(Optional) DDN X.25 DCE operation (for serial interface).
dte	(Optional) DDN X.25 DTE operation (for serial interface).

bfe	(Optional) Blacker Front End attachment encapsulation.
ddn	(Optional) Defense Data Network attachment encapsulation.
ietf	(Optional) IETF RFC-1356 encapsulation.

fddi burst-count *number*
no fddi burst-count

To allow the FCI card to preallocate buffers to handle bursty FDDI traffic (for example, NFS bursty traffic), use the **fddi burst-count** interface configuration command. Use the **no** form of this command to revert to the default value.

number	Number of preallocated buffers. Valid values are in the range from 1 to 10; the default is 3 buffers.

fddi c-min *microseconds*
no fddi c-min

To set the C-Min timer on the PCM, use the **fddi c-min** interface configuration command. Use the **no** form of this command to revert to the default value.

microseconds	Sets the timer value in microseconds. The default is 1600 microseconds.

fddi cmt-signal-bits *signal-bits* [**phy-a** | **phy-b**]

To control the information transmitted during the connection management (CMT) signaling phase, use the **fddi cmt-signal-bits** interface configuration command. If neither the **phy-a** nor **phy-b** keyword is specified, the signal bits apply to both physical connections.

signal-bits	A hexadecimal number preceded by 0x; for example, 0x208. The FDDI standard defines ten bits of signaling information that must be transmitted, as follows: **bit 0**—Escape bit. Reserved for future assignment by the FDDI standards committee. **bits 1 and 2**—Physical type. **bit 3**—Physical compatibility. Set if topology rules include the connection of a physical-to-physical type at the end of the connection. **bits 4 and 5**—Link Confidence test duration. **bit 6**—Media Access Control (MAC) available for link confidence test. **bit 7**—Link confidence test failed. The setting of bit 7 indicates that the link confidence was failed by the Cisco end of the connection. **bit 8**—MAC for local loop. **bit 9**—MAC on physical output. For more information about setting these values, see this command in the *Router Products Command Reference* publication.
phy-a	(Optional) Selects Physical Sublayer A.
phy-b	(Optional) Selects Physical Sublayer B.

[**no**] **fddi duplicate-address-check**

To enable the duplicate address detection capability on the FDDI, use the **fddi duplicate-address-check** interface configuration command. Use the **no** form of this command to disable this feature.

[**no**] **fddi encapsulate**

To specify encapsulating bridge mode on the CSC-C2/FCIT interface card, use the **fddi encapsulate** interface configuration command. Use the **no** form of this command to turn off encapsulation bridging and return the FCIT interface to its translational, nonencapsulating mode.

[**no**] **fddi smt-frames**

To enable the SMT frame processing capability on the FDDI, use the **fddi smt-frames** interface configuration command. Use the **no** form of this command to disable this feature, in which case the router will not generate or respond to SMT frames.

fddi tb-min *milliseconds*
no fddi tb-min

To set the TB-Min timer in the physical connection management (PCM), use the **fddi tb-min** interface configuration command. Use the **no** form of this command to revert to the default value.

milliseconds	Sets the TM-Min timer value in milliseconds. The default is 100 milliseconds.

fddi tl-min-time *microseconds*

To control the TL-Min time (the minimum time to transmit a Physical Sublayer, or PHY line state, before advancing to the next physical connection management (PCM) state, as defined by the X3T9.5 specification), use the **fddi tl-min-time** interface configuration command.

microseconds	Integer that specifies the time used during the connection management (CMT) phase to ensure that signals are maintained for at least the value of TL-Min so the remote station can acquire the signal. The default is 30 microseconds.

fddi token-rotation-time *microseconds*

To control ring scheduling during normal operation and to detect and recover from serious ring error situations, use the **fddi token-rotation-time** interface configuration command.

microseconds	Integer that specifies the token rotation time (TRT). The default is 5000 microseconds.

fddi t-out *milliseconds*
no fddi t-out

To set the timeout timer in the physical connection management (PCM), use the **fddi t-out** interface configuration command. Use the **no** form of this command to revert to the default value.

milliseconds	Sets the timeout timer. The default is 100 milliseconds.

fddi valid-transmission-time *microseconds*

To recover from a transient ring error, use the **fddi valid-transmission-time** interface configuration command.

microseconds	Integer that specifies the transmission valid timer (TVX) interval. The default is 2500 microseconds.

framing {**sf** | **esf**} (for T1 lines)
framing {**crc4** | **no-crc4**} [**australia**] (for E1 lines)

Use the **framing** controller configuration command to select the frame type for the T1 or E1 data line.

sf	Specifies super frame as the T1 frame type; this is the default on a T1 line.
esf	Specifies extended super frame as the T1 frame type.
crc4	Specifies CRC4 frame as the E1 frame type; this is the default on an E1 line.

no-crc4	Specifies no CRC4 frame as the E1 frame type.
australia	(Optional) Specifies the E1 frame type used in Australia.

hold-queue *length* {**in** | **out**}
no hold-queue {**in** | **out**}

To specify the hold-queue limit of an interface, use the **hold-queue** interface configuration command. Use the **no** form of this command with the appropriate keyword to restore the default values for an interface.

length	Integer that specifies the maximum number of packets in the queue. Default input hold-queue limit is 75 packets. Default output hold-queue limit is 40 packets.
in	Specifies the input queue.
out	Specifies the output queue.

[**no**] **hssi external-loop-request**

To allow the router to support a CSU/DSU that uses the LC signal to request a loopback from the router, use the **hssi external-loop-request** interface configuration command. Use the **no** form of this command to disable the feature.

[**no**] **hssi internal-clock**

To convert the HSSI interface into a 45-MHz clock master, use the **hssi internal-clock** interface configuration command. Use the **no** form of this command to disable the clock master mode.

hub ethernet *number port* [*end-port*]

To enable and configure a port on an Ethernet hub of a Cisco 2505 or Cisco 2507, use the **hub** global configuration command.

ethernet	Indicates that the hub is in front of an Ethernet interface.
number	Hub number, starting with 0. Since there is currently only one hub, this number is 0.
port	Port number on the hub. On the Cisco 2505, port numbers range from 1 through 8. On the Cisco 2507, port numbers range from 1 through 16. If a second port number follows, then the first port number indicates the beginning of a port range.
end-port	(Optional) Last port number of a range.

[**no**] **ignore-dcd**

Use the **ignore-dcd** interface configuration command to configure the serial interface to monitor the DSR signal (instead of the DCD signal) as the line up/down indicator. Use the **no** form of this command to restore the default behavior.

interface *type number*
interface *type slot*/*port* (for the Cisco 7000 series)
interface serial *slot*/*port***:***channel-group* (for channelized T1 or E1 on the Cisco 7000)
interface serial *number***:***channel-group* (for channelized T1 or E1 on the Cisco 4000)

To configure an interface type and enter interface configuration mode, use one of the **interface** global configuration command shown above. The keywords and arguments are defined on the next page.

interface *type number.subinterface-number* [**multipoint** | **point-to-point**]
interface *type slot*/*port.subinterface-number* [**multipoint** | **point-to-point**] (for the Cisco 7000 series)

To configure a subinterface, use one of the **interface** global configuration commands shown on the preceding page.

type — Type of interface to be configured. See this command in the *Router Products Command Reference* publication for a list of supported values.

number — Port, connector, or interface card number. The numbers are assigned at the factory at the time of installation or when added to a system, and can be displayed with the **show interfaces** command.

slot — On the Cisco 7000 series, specifies the backplane slot number; can be 0, 1, 2, 3, or 4 on the Cisco 7000. On the Cisco 7010, can be 0, 1, or 2. The slots are numbered from left to right.

port — On the Cisco 7000 series, specifies the port number of the interface. It can be **0**, **1**, **2**, **3**, **4**, or **5** depending on the type of interface, as follows:

- **AIP** (ATM Interface Processor)—0
- **EIP** (Ethernet Interface Processor)—**0**, **1**, **2**, **3**, **4**, or **5**
- **FIP** (FDDI Interface Processor)—**0**
- **FSIP** (Fast Serial Interface Processor)—**0**, **1**, **2**, or **3**
- **HIP** (HSSI Interface Processor)—**0**
- MIP (MultiChannel Interface Processor) **0** or **1**
- **TRIP** (Token Ring Interface Processor)—**0**, **1**, **2**, or **3**

Ports on each interface processor are numbered from the top down.

channel-group	On the Cisco 7000, specifies the T1 circuit number in the range of 0 to 23 defined with the **channel-group** controller configuration command.
.*subinterface-number*	Subinterface number in the range 1 to 4294967293. The *number* that precedes the period (.) must match the *number* this subinterface belongs to.
multipoint | **point-to-point**	(Optional) Specifies a multipoint or point-to-point subinterface. The default is **multipoint**.

[**no**] **invert-transmit-clock**

Delays between the SCTE clock and data transmission indicate that the transmit clock signal might not be appropriate for the interface rate and length of cable being used. Different ends of the wire may have variances that differ slightly. To invert the clock signal to compensate for these factors, use the **invert-transmit-clock** interface configuration command. This command applies to the Cisco 7000 series. To return to the transmit clock signal to its initial state, use the **no** form of this command.

ip address-pool dhcp-proxy-client
no ip address-pool dhcp-proxy-client

To make temporary IP addresses available for dial-in asynchronous clients using Serial Line Internet Protocol (SLIP)/PPP, use the **ip address-pool** global configuration command. Use the **no** form of the command to disable IP address pooling on all interfaces.

ip dhcp-server [*ip-address* | *name*]
no ip dhcp-server [*ip-address* | *name*]

To specify which Dynamic Host Configuration Protocol (DHCP) servers to use on your network, specify the IP address of one or more DHCP servers available on the network by using the **ip dhcp-server** global configuration command. Use the **no** form of the command to remove a DHCP server's IP address.

[**no**] **keepalive** [*seconds*]

Use the **keepalive** interface configuration command to set the keepalive timer for a specific interface. The **no** form of this command turns off keepalives entirely.

seconds	(Optional) Unsigned integer value greater than 0. The default is 10 seconds.

lex burned-in-address *ieee-address*
no lex burned-in-address

To set the burned-in MAC address for a LAN Extender interface, use the **lex burned-in-address** interface configuration command. To clear the burned-in MAC address, use the **no** form of this command.

ieee-address	48-bit IEEE MAC address written as a dotted triplet of four-digit hexadecimal numbers

lex input-address-list *access-list-number*
no lex input-address-list

To assign an access list that filters on MAC addresses, use the **lex input-address-list** interface configuration command. To remove an access list from the interface, use the **no** form of this command.

access-list-number	Number of the access list you assigned with the **access-list** global configuration command. It can be a number from 700 to 799.

lex input-type-list *access-list-number*
no lex input-type-list

To assign an access list that filters Ethernet packets by type code, use the **lex input-type-list** interface configuration command. To remove an access list from the interface, use the **no** form of this command.

access-list-number	Number of the access list you assigned with the **access-list** global configuration command. It can be a number in the range 200 to 299.

lex priority-group *group*
no lex priority-group

To activate priority output queuing on the LAN Extender, use the **lex priority-group** interface configuration command. To disable priority output queuing, use the **no** form of this command.

group	Number of the priority group. It can be a number in the range 1 to 10.

lex retry-count *number*
no lex retry-count [*number*]

To define the number of times to resend commands to the LAN Extender, use the **lex retry-count** interface configuration command. To return to the default value, use the **no** form of this command.

number	Number of times to retry sending commands to the LAN Extender. It can be a number in the range 0 to 100. The default is 10 times.

lex timeout *milliseconds*
no lex timeout [*milliseconds*]

To define the amount of time to wait for a response from the LAN Extender, use the **lex timeout** interface configuration command. To return to the default time, use the **no** form of this command.

milliseconds	Time, in milliseconds, to wait for a response from the LAN Extender before resending the command. It can be a number in the range 500 to 60000. The default is 2000 milliseconds (2 seconds).

linecode {**ami** | **b8zs** | **hdb3**}

Use the **linecode** controller configuration command to select the line-code type for the T1 or E1 line.

ami	Specifies alternate mark inversion (AMI) as the line-code type. Valid for T1 or E1 controllers. This is the default for T1 lines.
b8zs	Specifies B8ZS as the line-code type. Valid for T1 controller only.
hdb3	Specifies high-density bipolar 3 (hdb3) as the line-code type. Valid for E1 controller only. This is the default for E1 lines.

[**no**] **link-test**

To re-enable the link test function on a port on an Ethernet hub of a Cisco 2505 or Cisco 2507, use the **link-test** hub configuration command. Disable this feature if a pre-10BaseT twisted-pair device not implementing link test is connected to the hub port with the **no** form of this command.

[**no**] **local-lnm**

To enable Lanoptics Hub Networking Management of a PCbus Token Ring interface, use the **local-lnm** command. Use the **no** form of this command to disable management.

[**no**] **loopback** (E1 controller)

To loop an entire E1 line (including all channel-groups defined on the controller) toward the line and back toward the router, use the **loopback** controller configuration command. To remove the loop, use the **no** form of this command.

[**no**] **loopback** (interface)

To diagnose equipment malfunctions between interface and device, use the **loopback** interface configuration command. The **no loopback** command disables the test.

[**no**] **loopback applique**

To configure an internal loop on the HSSI applique, use the **loopback applique** interface configuration command. To remove the loop, use the **no** form of this command.

[**no**] **loopback dte**

To loop packets to DTE internally within the CSU/DSU at the DTE interface, when the device supports this feature, use the **loopback dte** interface configuration command. To remove the loop, use the **no** form of this command.

[**no**] **loopback line**

To loop packets completely through the CSU/DSU to configure the CSU loop, when the device supports this feature, use the **loopback line** interface configuration command. To remove the loop, use the **no** form of this command.

[**no**] **loopback local** (controller)

To loop an entire T1 line (including all channel-groups defined on the controller) toward the line and back toward the router, use the **loopback local** controller configuration command. To remove the loop, use the **no** form of this command.

[**no**] **loopback local** (interface)

To loop a channelized T1 or channelized E1 channel-group, use the **loopback local** interface configuration command. To remove the loop, use the **no** form of this command.

[**no**] **loopback remote** (controller)

To loop packets from a MIP through the CSU/DSU, over a dedicated T1 link, to the remote CSU at the single destination for this T1 link and back, use the **loopback remote** controller configuration command. To remove the loop, use the **no** form of this command.

[**no**] **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** interface configuration command. To remove the loop, use the **no** form of this command.

[**no**] **media-type** [**aui** | **10baset**]

To specify the Ethernet Network Interface Module configuration on the Cisco 4000 series, use the **media-type** interface configuration command. To remove a previous media-type specification for the Ethernet interface, use the **no** form of this command.

aui	(Optional) Selects a 15-pin physical connection.
10baset	(Optional) Selects an RJ45 10BaseT physical connection.

[**no**] **mop enabled**

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

[**no**] **mop sysid**

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

mtu *bytes*
no mtu

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

bytes	Desired size in bytes.

[**no**] **nrzi-encoding**

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

[**no**] **peer default ip address pool**

You can selectively disable DHCP proxy-client status on an individual asynchronous interface on a router by using the **no peer default ip address pool** interface configuration command. You can turn a single interface back on by issuing the standard command after it is turned off.

ppp authentication {**chap** | **pap**} [**if-needed**] [*listname*]
no ppp authentication

To enable Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP), and to enable a TACACS+ authorization method on a serial interface, use the **ppp authentication** interface configuration command. Use the **no** form of the command to disable this authentication.

chap	Enables CHAP on a serial interface.
pap	Enables PAP on a serial interface.
if-needed	(Optional) Used with TACACS and XTACACS. Do not perform CHAP or PAP authentication if the user has already provided authentication. This option is available only on asynchronous interfaces.

list-name (Optional) Used with AAA/TACACS+. Specify the name of a list of TACACS+ methods of authentication to use. If no listname is specified, the system uses the default. Lists and default are created with the **aaa authentication ppp** command.

ppp quality *percentage*
no ppp quality

To enable Link Quality Monitoring (LQM) on a serial interface, use the **ppp quality** interface configuration command. Use the **no** form of this command to disable LQM.

percentage Specifies the link quality threshold. Range is 1 to 100.

pri-group [**timeslots** *range*]
no pri-group

To specify ISDN Primary Rate Interface (PRI) on a channelized T1 card on the Cisco 7000 series, use the **pri-group** controller configuration command. Use the **no** form of this command to remove the ISDN PRI.

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

pulse-time *seconds*
no pulse-time

To enable pulsing DTR signal intervals on the serial interfaces, use the **pulse-time** interface configuration command. Use the **no** form of this command to restore the default interval.

seconds Integer that specifies the DTR signal interval in seconds. The default is 0 seconds.

ring-speed *speed*

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

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

show async status

To list the status of the asynchronous interface 1 associated with the router auxiliary port, use the **show async status** user EXEC command.

show compress

To display compression statistics, use the **show compress** EXEC command.

show controllers cbus

Use the **show controllers cbus** privileged EXEC command on the AGS+ to display all information under the ciscoBus controller card. This command also shows the capabilities of the card and reports controller-related failures.

show controllers cxbus

Use the **show controllers cxbus** privileged EXEC command to display information about the switch processor (SP) CxBus controller on the Cisco 7000 series. This command displays information that is specific to the interface hardware. The information displayed is generally useful for diagnostic tasks performed by technical support personnel only.

show controllers e1 [*slot*/*port*]

Use the **show controllers e1** privileged EXEC command on the Cisco 4000 or Cisco 7000 to display information about the E1 links supported by the Network Processor Module (NPM) (Cisco 4000) or MultiChannel Interface Processor (MIP) (Cisco 7000).

slot	Specifies the backplane slot number and can be 0, 1, 2, 3, or 4.
port	Specifies the port number of the controller and can be 0 or 1.

show controllers ethernet *interface-number*

Use the **show controllers ethernet** EXEC command to display information on the Cisco 2500, Cisco 3000, or Cisco 4000.

interface-number	Interface number of the Ethernet interface.

show controllers fddi

Use the **show controllers fddi** user EXEC command to display all information under the FDDI controller card on the AGS+ or FDDI Interface Processor (FIP) on the Cisco 7000 series.

show controllers lex [*number*]
show controllers lex [*slot*/*port*] (for the Cisco 7000 series)

To show hardware and software information about the LAN Extender, use the **show controllers lex** EXEC command.

number	(Optional) Number of the LAN Extender interface about which to display information.
slot	(Optional) Specifies the backplane slot number on the Cisco 7000 series, and can be 0, 1, 2, 3, or 4.
port	(Optional) Specifies the port number of the controller and can be 0 or 1.

show controllers mci

Use the **show controllers mci** privileged EXEC command to display all information under the Multiport Communications Interface card or the SCI.

show controllers pcbus

To display all information about the ISA bus interface, use the **show controllers pcbus** privileged EXEC command.

show controllers serial

Use the **show controllers serial** privileged EXEC command to display information specific to the interface hardware.

show controller t1 [*slot*/*port*]

Use the **show controller t1** privileged EXEC command on the Cisco 4000 or Cisco 7000 to display information about the T1 links supported by the Network Processor Module (NPM) (Cisco 4000) or the Multichannel Interface Processor (MIP) (Cisco 7000).

slot	(Optional) Specifies the backplane slot number and can be 0, 1, 2, 3, or 4.
port	(Optional) Specifies the port number of the controller and can be 0 or 1.

show controllers token

Use the **show controllers token** privileged EXEC command to display information about memory management and error counters, and about the CSC-R, CSC-1R, CSC-2R, C2CTR, and CSC-R16 (or CSC-R16M) Token Ring interface cards or Token Ring Interface Processor (TRIP) in the case of the Cisco 7000 series.

show hub [**ethernet** *number* [*port* [*end-port*]]]

To display information about the hub on an Ethernet interface of a Cisco 2505 or Cisco 2507, use the **show hub** EXEC command.

ethernet	(Optional) Indicates that this is an Ethernet hub.
number	(Optional) Hub number, starting with 0. Since there is currently only one hub, this number is 0.
port	(Optional) Port number on the hub. On the Cisco 2505, port numbers range from 1 through 8. On the Cisco 2507, port numbers range from 1 through 16. If a second port number follows, then this port number indicates the beginning of a port range.
end-port	(Optional) Ending port number of a range.

show interfaces [*type number*] [*first*] [*last*] [**accounting**]
show interfaces [*type* [*slot*/*port*] [**accounting**] (for the Cisco 7000)

Use the **show interfaces** EXEC command to display statistics for all interfaces configured on the router. The resulting output varies, depending on the network for which an interface has been configured.

type	(Optional) Interface type. Allowed values for type include **async**, **bri0**, **ethernet**, **fddi**, **hssi**, **loopback**, **null**, **serial**, **tokenring**, and **tunnel**. For the Cisco 7000 series, *type* can be **atm**, **ethernet**, **fddi**, **serial**, or **tokenring**.
number	Port number on the selected interface controller.
first last	(Optional) For the Cisco 2500 and 3000 ISDN Basic Rate Interface (BRI) only. The argument *first* can be either 1 or 2. The argument *last* can only be 2, indicating B-channels 1 and 2. D-channel information is obtained by using the command without the optional arguments.
accounting	(Optional) Displays the number of packets of each protocol type that has been sent through the interface.

slot	Specifies the backplane slot number and can be 0, 1, 2, 3, or 4.
port	Specifies the port number of the interface and can be 0, 1, 2, 3, 4, or 5 depending on the type of interface, as follows: **AIP** (ATM Interface Processor)—0 **EIP** (Ethernet Interface Processor)—0, 1, 2, 3, 4, or 5 **FIP** (FDDI Interface Processor)—0 **FSIP** (Fast Serial Interface Processor)—0, 1, 2, or 3 **HIP** (HSSI Interface Processor) 0 **MIP** (Multichannel Interface Processor) 0 or 1 **TRIP** (Token Ring Interface Processor)—0, 1, 2, or 3

show interfaces async [*number*] [**accounting**]

Use the **show interfaces async** privileged EXEC command to display information about the serial interface.

number	(Optional) Must be 1.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.

show interfaces atm [*slot*/*port*]

Use the **show interfaces atm** EXEC command to display information about the ATM interface.

slot/*port*	(Optional) In the Cisco 7000, *slot* can be 0, 1, 2, 3, or 4. In the Cisco 7010, *slot* can be 0, 1, or 2. Port must be 0.

show interfaces ethernet *number* [**accounting**]
show interfaces ethernet [*slot*/*port*] [**accounting**] (for the Cisco 7000 series)

Use the **show interfaces ethernet** privileged EXEC command to display information about an Ethernet interface on the router.

number	Must match a port number on the selected interface.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
slot	(Optional) On a Cisco 7000 **series**, slot location of the interface processor.
port	(Optional) On a Cisco 7000 **series**, port number on the interface.

show interfaces fddi *number* [**accounting**]
show interfaces fddi [*slot*/*port*] [**accounting**] (for the Cisco 7000 series)

Use the **show interfaces fddi** user EXEC command to display information about the FDDI interface.

number	Port number on the selected interface.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
slot	(Optional) On a Cisco 7000 series, slot location of the interface processor.
port	(Optional) On a Cisco 7000 series, port number on the interface.

show interfaces hssi *number* [**accounting**]
show interfaces hssi [*slot*/*port*] [**accounting**] (for the Cisco 7000 series)

Use the **show interfaces hssi** privileged EXEC command to display information about the HSSI interface.

number	Port number on the selected interface.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
slot	(Optional) On a Cisco 7000 series, slot location of the interface processor.
port	(Optional) On a Cisco 7000 series, port number on the interface.

show interfaces lex *number* [**ethernet** | **serial**]

To display statistics about a LAN Extender interface, use the **show interface lex** EXEC command.

number	Number of the LAN Extender interface that resides on the core router about which to display statistics.
ethernet	(Optional) Displays statistics about the Ethernet interface that resides on the LAN Extender.
serial	(Optional) Displays statistics about the serial interface that resides on the LAN Extender.

show interfaces loopback [*number*] [**accounting**]

Use the **show interfaces loopback** privileged EXEC command to display information about the loopback interface.

number	(Optional) Port number on the selected interface.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.

show interfaces serial [*number*] [**accounting**]
show interfaces serial [*number*[**:***channel-group*] [**accounting**]
(for the Cisco 4000 series)
show interfaces serial [*slot*/*port* [**:***channel-group*]][**accounting**]
(for the Cisco 7000 series)

Use the **show interfaces serial** privileged EXEC command to display information about a serial interface.

number	(Optional) Interface port number.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
slot	(Optional) On a Cisco 7000 series, slot location of the interface processor.
port	(Optional) On a Cisco 7000 series, port number.
:*channel-group*	(Optional) On the Cisco 7000 series supporting channelized T1, specifies the channel in the range of 0 to 23.

show interfaces tokenring [*number*] [**accounting**]
show interfaces tokenring [*slot*/*port*] [**accounting**] (for the Cisco 7000 series)

Use the **show interfaces tokenring** privileged EXEC command to display information about the Token Ring interface and the state of source route bridging.

number	(Optional) Must match an interface port line number.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.
slot	On a Cisco 7000 series, optional slot location of the interface processor. Value can be 0, 1, 2, 3, or 4 in the Cisco 7000. In the Cisco 7010, value can be 0, 1, or 2.

port	On a Cisco 7000 series, optional port number on interface. Value can be 0, 1, 2, or 3.

show interfaces tunnel *number* [**accounting**]

To list tunnel interface information, use the **show interfaces tunnel** privileged EXEC command.

number	Port line number.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.

show interfaces vty *number*

Use the **show interfaces vty** EXEC command to display information about virtual asynchronous interfaces.

number	Number of the virtual terminal (VTY) that has been configured for asynchronous protocol features (vty-async).

show ip interface [**brief**] [*type*] [*number*]

To list a summary of an interface's IP information and status, use the **show ip interface** privileged EXEC command.

brief	(Optional) Displays a brief summary of IP status and configuration.
type	(Optional) Specifies that information be displayed about that interface type only. The possible value depends on the type of interfaces the system has. For example, it could be **ethernet**, **null**, **serial**, **tokenring**, and so forth.
number	(Optional) Interface number.

show rif

Use the **show rif** EXEC command to display the current contents of the RIF cache.

[**no**] **shutdown** (interface)

To disable an interface, use the **shutdown** interface configuration command. To restart a disabled interface, use the **no** form of this command.

[**no**] **shutdown** (hub configuration)

To shut down a port on an Ethernet hub of a Cisco 2505 or Cisco 2507, use the **shutdown** hub configuration command. To restart the disabled hub, use the **no** form of this command.

smt-queue-threshold *number*
no smt-queue-threshold

To set the maximum number of unprocessed FDDI station management (SMT) frames that will be held for processing, use the **smt-queue-threshold** global configuration command. Use the **no** form of this command to restore the queue to the default.

number	Number of buffers used to store unprocessed SMT messages that are to be queued for processing. Acceptable values are positive integers.The default threshold value is equal to the number of FDDI interfaces installed in the router.

source-address [*mac-address*]
no source-address

To configure source address control on a port on an Ethernet hub (repeater) of a Cisco 2505 or Cisco 2507, use the **source-address** hub configuration command. To remove a previously defined source address, use the **no** form of this command.

mac-address	(Optional) MAC address in the packets that the hub will allow to access the network.

[**no**] **squelch** {**normal** | **reduced**}

To extend the Ethernet twisted-pair 10BaseT capability beyond the standard 100 meters on the Cisco 4000 platform, use the **squelch** interface configuration command. To restore the default, use the **no** form of this command.

normal	Allows normal capability. The default value is normal range.
reduced	Allows extended 10BaseT capability.

timeslot *start-slot – stop-slot*
no timeslot

To enable framed mode on a G.703-E1 interface, use the **timeslot** interface configuration command. To restore the default, use the **no** form of this command or set the start-slot to 0.

start-slot	The first subframe in the major frame. Range is 1 to 31 and must be less than or equal to *stop-slot*.
stop-slot	The last subframe in the major frame. Range is 1 to 31 and must be greater than or equal to *start-slot*.

[**no**] **transmit-clock-internal**

When a DTE does not return a transmit clock, use the **transmit-clock-internal** interface command to enable the internally generated clock on a serial interface on a Cisco 7000. Use the **no** form of this command to disable the feature.

transmitter-delay {*microseconds* | *hdlc-flags*}
no transmitter-delay

To specify a minimum dead-time after transmitting a packet, use the **transmitter-delay** interface configuration command. The **no** form of this command restores the default.

microseconds	Approximate number of microseconds of minimum delay after transmitting a packet on the MCI and SCI interface cards. The default is 0 microseconds.
hdlc-flags	Minimum number of HDLC flags to be sent between packets on the HIP, HSCI, FSIP, or HSSI. The valid range on the HSSI is 2 to 128000.

[**no**] **ts16**

To control the use of time slot 16 for data on a G.703-E1 interface, use the **ts16** interface configuration command. To restore the default, use the **no** form of this command.

[**no**] **tunnel checksum**

To enable encapsulator-to-decapsulator checksumming of packets on a tunnel interface, use the **tunnel checksum** interface configuration command. To disable checksumming, use the **no** form of this command.

tunnel destination {*hostname* | *ip-address*}
no tunnel destination

To specify a tunnel interface's destination, use the **tunnel destination** interface configuration command. To remove the destination, use the **no** form of this command.

hostname	Name of the host destination.
ip-address	IP address of the host destination expressed in decimal in four-part, dotted notation.

tunnel key *key-number*
no tunnel key

To enable an ID key for a tunnel interface, use the **tunnel key** interface configuration command. To remove the ID key, use the **no** form of this command.

key-number	Integer from 0 to 4294967295.

tunnel mode {**aurp** | **cayman** | **dvmrp** | **eon** | **gre ip** | **nos**}
no tunnel mode

To set the encapsulation mode for the tunnel interface, use the **tunnel mode** interface configuration command. To set to the default, use the **no** form of this command.

aurp	AppleTalk Update Routing Protocol (AURP).
cayman	Cayman TunnelTalk AppleTalk encapsulation.
dvmrp	Distance Vector Multicast Routing Protocol.
eon	EON compatible CLNS tunnel.
gre ip	Generic route encapsulation GRE) protocol over IP.
nos	KA9Q/NOS compatible IP over IP.

[**no**] **tunnel sequence-datagrams**

To configure a tunnel interface to drop datagrams that arrive out of order, use the **tunnel sequence-datagrams** interface configuration command. To disable this function, use the **no** form of this command.

tunnel source {*ip-address* | *type number*}
no tunnel source

To set a tunnel interface's source address, use the **tunnel source** interface configuration command. To remove the source address, use the **no** form of this command.

ip-address	IP address to use as the source address for packets in the tunnel.
type	All types.
number	Specifies the port, connector, or interface card number. The numbers are assigned at the factory at the time of installation or when added to a system, and can be displayed with the **show interfaces** command.

tx-queue-limit *number*

To control the number of transmit buffers available to a specified interface on the MCI and SCI cards, use the **tx-queue-limit** interface configuration command.

number	Maximum number of transmit buffers that the specified interface can subscribe.