Chapter 1 Adjusting Interface Characteristics

This chapter describes how to make adjustments to—or how to *fine tune*—the router interfaces, and how to enable loopback tests. The tasks in this chapter include:

- Switching and scheduling priorities
- Priority output queuing
- Interface hold queues
- Setting the bandwidth
- Setting delay
- Setting loopback testing on an interface

To adjust or test an interface, you must be in the configuration command collection mode. To enter this mode, type the EXEC command **configure** at the EXEC prompt; the **configure** command will place the system into the configuration command collection mode. Once in the command collection mode, start configuring the interface by entering the **interface** command.

A summary of the interface subcommands described in this chapter is included at the end of the chapter.

Adjusting Serial Interface Characteristics

The following sections describe adjustments that can be made to serial interfaces.

Specifying Transmit Delay

Since the MCI and SCI interface cards can send back-to-back data packets over serial interfaces faster than some hosts can receive them, you can specify a minimum dead-time after transmitting a datagram using the following subcommand which is especially useful for serial interfaces. Use the **transmitter-delay** interface subcommands to do this. The full syntax of the command follows.

transmitter-delay *microseconds*
no transmitter-delay

The argument *microseconds* specifies the approximate number of microseconds of minimum delay after transmitting a datagram. The default value is zero; the **no transmitter-delay** command restores this default.

Example:

This command specifies a delay of 300 microseconds on interface serial 0.

```
interface serial 0
transmitter-delay 300
```

For the serial interface on the IGS router and the High Speed Serial Interface (HSSI) on the AGS+, the command is specified as follows:

transmitter-delay *hdlc-flags*

The argument *hdlc-flags* causes a minimum of HDLC flags to be sent between each packet. The maximum number of flags between packets that can be transmitted on the IGS is 62; the minimum is 2.

Configuring DTR Signal Pulsing

The **pulse-time** interface subcommand enables pulsing DTR signals on the Cisco MCI and SCI serial interfaces. The full syntax of the command follows.

pulse-time *seconds*
no pulse-time

The argument *seconds* specifies the interval.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.

The default interval is zero seconds, which is restored by the **no pulse-time** command.

Example:

This command enables DTR pulse signals for three seconds on interface serial 2.

```
interface serial 2
pulse-time 3
```

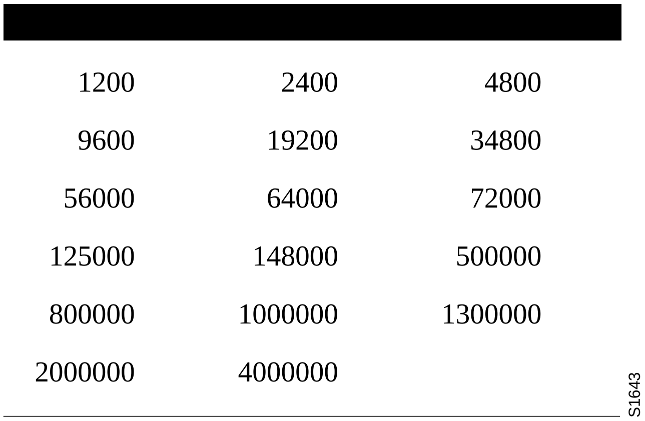
Configuring for DCE Appliques

You may configure the clock rate on the serial interface of the SCI and MCI cards to an acceptable bit rate using the **clockrate** interface subcommand. The full syntax is as follows:

clockrate *speed*
no clockrate

The argument *speed* is the desired clock rate, and may be one of any of the rates in Table 1-1.

Table 1-1 Legal Bits per Second Values



1200	2400	4800
9600	19200	34800
56000	64000	72000
125000	148000	500000
800000	1000000	1300000
2000000	4000000	

Be aware that the fastest speeds may not work if your cable is too long, and that speeds faster than 148,000 bits per second are too fast for RS-232 signaling. Cisco recommends you only use the synchronous serial RS-232 signal at speeds up to 64,000 bits per second. To permit a faster speed, use an RS-449 or V.35 applique.

Use the **no clockrate** command to remove the clock rate if you change the interface from a DCE to a DTE device.

Example:

These sample commands set the clock rate on the first serial interface to 64,000 bits per second.

```
interface serial 0
clockrate 64000
```

Adjusting Characteristics That Apply to All Interface Types

The following sections describe adjustments that apply to all interface types.

Configuring Switching and Scheduling Priorities

The normal operation of the network server allows the switching operations to use as much of the central processor as is required. In the event that the network is running unusually heavy loads that do not allow the processor the time to handle the routing protocols, more priority can be given to the system process scheduler using the **scheduler-interval** global configuration command. The full command syntax follows.

scheduler-interval *milliseconds*
no scheduler-interval

The **scheduler-interval** command controls the maximum amount of time that may elapse without running the lowest priority system processes. The minimum interval that may be specified is 500 milliseconds; there is no maximum value. The default is to allow high-priority operations to use as much of the central processor as needed. The **no scheduler-interval** command restores that default.

Example:

This command changes the low-priority process schedule to an interval of 750 milliseconds.

```
scheduler-interval 750
```

Priority Output Queuing

Priority output queuing is a fine tuning mechanism allowing the administrator to set priorities on the type of traffic passing through the network. It is a mechanism for prioritizing datagrams transmitted on an interface. Datagrams are classified according to various criteria, including protocol and subprotocol type, and then queued on one of four output queues.

When the network server is ready to transmit a datagram, it scans the priority queues in order, from highest to lowest, to find the highest priority datagram. After that datagram is completely transmitted, the network server scans the priority queues again. If a priority output queue fills up, datagrams will be dropped and, for protocols such as IP and CLNS, quench indications will be sent to the original transmitter.

Although priority queuing may be enabled for any interface, the intended application was for low bandwidth, congested serial interfaces.

Cisco's priority output queuing mechanism allows traffic control based on protocol or interface type. Commands are also offered to set the size of the queue, and defaults for what happens to packets that are not defined by priority output queue rules.

The priority output queuing mechanism can be used to manage traffic from all networking protocols and from bridges. Additional fine tuning capability is available for IP, and for setting boundaries on the packet size.

Note: Priority queuing introduces extra overhead that is acceptable for slow interfaces, but may not be acceptable for higher speed interfaces such as Ethernet, Token Ring, or FDDI.

There are four priority queues—high, medium, normal, low—listed in order from highest to lowest priority.

Management traffic sourced by the network server is always assigned to the high priority queue to ensure the correct operation of the network. Datagrams that are not classified by the priority list mechanism are assigned to the normal queue.

A priority list is a set of rules that describes how datagrams should be assigned to priority queues. A priority list may also describe a default priority or the queue size limits of the various priority queues.

Assigning Priority by Protocol Type

Use the **priority-list** command to establish queuing priorities based upon the protocol type. The full syntax of this command follows:

priority-list *list* **protocol** *protocol-name queue-keyword* [*args*]
no priority-list *list* **protocol**

The argument *list* is an arbitrary integer between 1 and 10 that identifies the priority list selected by the user.

The keyword **protocol** is used with the argument *protocol-name* to specify the protocol you are using, and is one of the following: **ip**, **pup**, **chaos**, **xns**, **decnet**, **appletalk**, **clns**, **novell**, **apollo**, **vines**, **stun** (for Serial Tunneling), **bridge** (for transparent bridging traffic), or **rsrb** (for remote source-route bridged traffic).

The argument *queue-keyword* is a priority queue name, one of **high**, **medium**, **normal**, or **low**.

Optional arguments (*args*) may be specified, depending on the *protocol-name* keyword, as follows.

- **gt** *byte-count*—Specifies a greater-than count. The priority level assigned goes into effect when a packet exceeds the value entered for the argument *byte-count*. The size of the packet must also include additional bytes due to MAC encapsulation on the outgoing interface.
- **lt** *byte-count*—Specifies a less-than count. The priority level assigned goes into effect when a packet size is less than the value entered for *byte-count*. The size of the packet must also include additional bytes due to MAC encapsulation on the outgoing interface.
- **bridge list** *list-number*—Assigns the priority level to bridged traffic according to access list number using the bridge and **list** keywords. The *list-number* argument is the Ethernet-type code access list number assigned by the **access-list** global configuration command and the access-group list interface subcommand.
- **list** *list-number*—Assigns traffic priorities according to a specific list. The *list-number* argument is the IP access list number assigned by the access-group list interface subcommand. (For use with the IP protocol, only.)
- **tcp** *port*—Assigns the priority level defined to TCP packets originating from or destined to a specified port. (For use with the IP protocol only.) Table 1-2 lists common TCP services and their port numbers.

Table 1-2 Common TCP Services and Their Port Numbers

Service	**Port**
Telnet	23
SMTP	25
FTP	20, 21

- **udp** *port*—Assigns the priority level defined to UDP packets originating from or destined to the specified port. (For use with the IP protocol, only.) The following table lists common UDP services and their port numbers:

Table 1-3 Common UDP Services and Their Port Numbers

Service	**Port**
TFTP	69
NFS	2049
SNMP	161
RPC	111
DNS	53

Use the **no priority-list** global configuration command followed by the appropriate list argument and the **protocol** keyword to remove a priority list entry assigned by protocol type.

Examples:

This command assigns one as the arbitrary priority list number, specifies DECnet as the protocol type, and assigns a high priority to the datagrams transmitted on this interface:

```
priority-list 1 protocol decnet high
```

When classifying a datagram, the system searches the list of rules specified by **priority-list** commands for a matching protocol type. When a match is found, the datagram is assigned to the appropriate queue. The list is searched in the order it is specified and the first matching rule terminates the search.

This command assigns a medium priority level to every DECnet packet with a size greater than 200 bytes.

```
priority-list 2 protocol decnet medium gt 200
```

This command assigns a medium priority level to every DECnet packet with a size less than 200 bytes.

```
priority-list 4 protocol decnet medium lt 200
```

This command assigns a high priority to traffic that matches IP access list 10:

```
priority-list 1 protocol ip high list 10
```

This command assigns a medium priority level to Telnet packets:

```
priority-list 4 protocol ip medium tcp 23
```

This command assigns a medium priority level to UDP Domain Name service packets:

```
priority-list 4 protocol ip medium udp 53
```

This command assigns a high priority to traffic that matches Ethernet type code access list 201.

```
priority-list 1 protocol bridge high list 201
```

When using multiple rules for a single protocol, remember that the order of the rules matters.

Assigning Priority by Interface Type

Use this variation of the **priority-list** command to establish queuing priorities on packets entering from a given interface (full syntax follows):

priority-list *list* **interface** *interface-name queue-keyword*
no priority-list *list* **interface** *interface-name queue-keyword*

The argument *list* is an arbitrary integer between one and ten that identifies the priority list selected by the user.

The keyword **interface** applies to the priority queuing mechanism to packets arriving from an interface. The argument *interface-name* specifies the name of the interface.

The argument *queue-keyword* is a priority queue name, one of **high**, **medium**, **normal**, or **low**.

Use the **no priority-list** command with the appropriate arguments to remove an entry from the list.

Example:

The following sample command sets any packet type entering on interface Ethernet 2 to a medium priority:

```
priority-list 3 interface ethernet 2 medium
```

Assigning a Default Priority

Use the following command to assign a priority queue for those datagrams that did not match any other rule in the priority list:

priority-list *list* **default** *queue-keyword*

no priority-list *list* **default**

If no default is specified, or the **no** form of the command is specified, the **normal** queue is assumed.

Specifying the Maximum Packets in the Priority Queues

Use this variation of the **priority-list** command to specify the maximum number of packets that may be waiting in each of the priority queues (full syntax shown):

priority-list *list* **queue-limit** *high-limit medium-limit normal-limit low-limit*

no priority-list *list* **queue-limit**

If a priority queue overflows, excess datagrams are discarded and quench messages may be sent, if appropriate, for the protocol. The default **queue-limit** arguments are 20 datagrams for the **high** priority queue, 40 for **medium**, 60 for **normal**, and 80 for **low**.

The **no** p**riority-list** command with the appropriate keywords and arguments restores these defaults.

Example:

The following is a sample of a priority list, including the access list referenced by one of the priority list rules.

```
priority-list 1 protocol bridge high list 201
priority-list 1 protocol ip medium
priority-list 1 protocol decnet medium
priority-list 1 default low
priority-list 1 queue-limit 20 20 20 10
!
access-list 201 permit  0x6004  0x0000
```

Bridged traffic that matches access list 201 is given high priority. Since type code 6004 is the Local Area Transport (LAT), this rule has the effect of making LAT traffic have high priority. IP and DECnet traffic are given medium priority, and everything else is given low priority. In this instance, the network administrator has assigned queue limits of 20 packets for every queue except the low priority queue, which is limited to 10 untransmitted packets.

Assigning a Priority Group to an Interface

Use the **priority-group** interface subcommand to assign the specified priority group to an interface.

priority-group *list*

The argument *list* is the priority list number assigned to the interface.

Example:

This example causes packets exiting interface serial 0 to be classified by priority list 1.

```
interface serial 0
priority-group 1
```

Monitoring the Priority Queuing Lists

When priority queuing is enabled on an interface, the EXEC command **show interfaces** displays information about the input and output queues. This information is a triplet of numbers: the first is the number of packets currently in the queue, the second is the maximum number of packets permitted in the queue, and the third is the number of packets discarded because the queue is full.

```
 Input queue: 0/75/4 (size/max/drops); Total output drops: 0
  Output queue: high 0/20/0, medium 0/40/00, normal 0/60/0, low 0/80/0
```

The total `output drops` number is the sum of the discarded numbers from the output queues, plus the count of packets discarded before being prioritized, or because of fast-switching activity.

The **show priority-lists** command gives a brief summary of the rules in the priority lists. Enter this command at the EXEC prompt:

show priority-lists

A sample display follows:

```
Group  Protocol   Priority         List
    1  ip         medium
    1  decnet     medium
    1  bridge     high             201
```

Configuring Transmit Queue Limits on CSC-MCI and CSC-SCI Cards

The interface subcommand **tx-queue-limit** controls the size of the transmit queue available to a specified interface on the MCI and SCI cards themselves. The command syntax follows:

tx-queue-limit *number*

This command should be used only under the guidance of a technical support representative. *Number* is the number of packets that can be queued for transmission on the card for the specified interface.

Example

The following command sets the queue limit to five packets:

```
tx-queue-limit 5
```

Controlling Interface Hold Queues

Each network interface in a network server has a hold-queue limit. This limit is the number of data packets that the interface can store in its hold queue before rejecting new packets. When the interface empties the hold queue by one or more packets, the interface can accept new packets again.

To specify the hold-queue limit of an interface, use the **hold-queue** interface subcommand. Its full syntax is as follows:

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

The argument *length* is the maximum number of packets in the queue. The **in** keyword specifies the input queue; the **out** keyword specifies the output queue.

The **no hold-queue** command with the appropriate keyword restores the default values for an interface. There is no fixed upper limit to a queue size.

The input hold queue prevents a single interface from flooding the network server with too many input packets. Further input packets are discarded if the interface has too many input packets outstanding in the system. The default input hold queue is 75 packets. The default output hold-queue limit is 100 packets. This limit prevents a malfunctioning interface from consuming an excessive amount of memory.

If priority output queueing is being used, the length of the four output queues is set using the **priority-list** configuration command. The **hold-queue** command cannot be used to set an output hold queue length in this situation.

For slow links, use a small output hold-queue limit. This approach prevents storing packets at a rate that exceeds the transmission capability of the link. For fast links, use a large output hold-queue limit. A fast link may be busy for a short time (and thus require the hold queue), but can empty the output hold queue quickly when capacity returns.

To display the current hold queue setting and the number of packets discarded because of hold queue overflows, use the EXEC command **show interfaces**.

Setting Bandwidth

Higher-level protocols may use bandwidth information to make operating decisions. For example, IGRP uses the minimum path bandwidth to determine a routing metric. The TCP protocol adjusts initial retransmission parameters based on the apparent bandwidth of the outgoing interface.

To set a bandwidth value for an interface, use the **bandwidth** interface subcommand. Its full syntax follows:

bandwidth *kilobits*
no bandwidth

The argument *kilobits* specifies the intended bandwidth in kilobits per second. For a full bandwidth DS3, enter the value 45045. Default bandwidth values are set during start up and can be displayed with the EXEC command **show interfaces.**

The **bandwidth** subcommand sets an informational parameter only; you cannot adjust the actual bandwidth of an interface with this subcommand. For some media, such as Ethernet, the bandwidth is fixed; for other media, such as serial lines, you can change the actual bandwidth by adjusting hardware. For both classes of media, you can use the **bandwidth** subcommand to communicate the current bandwidth to the higher-level protocols.

Use the **no bandwidth** command to restore the default values.

Setting Delay

Higher-level protocols may use delay information to make operating decisions. For example, IGRP can use delay information to differentiate between a satellite link and a land link.

To set a delay value for an interface, use the **delay** interface subcommand. The full syntax of this command follows.

delay *tens-of-microseconds*
no delay

The argument *tens-of-microseconds* specifies the delay for an interface or network segment in tens of microseconds. Default delay values may be displayed with the EXEC command **show interfaces**. The **no delay** command restores the default.

Note: The **delay** subcommand sets an informational parameter only; you cannot adjust the actual delay of an interface with this subcommand.

Setting Error Count Reset Frequency

The Cisco interface software provides a mechanism for protection against packet overload and resultant recount errors on the MCI interface cards. This mechanism is set using the **error-threshold** interface subcommand, as follows:

error-threshold *milliseconds*

The argument *milliseconds* is the frequency at which the error recount will be set. The default value is 1000 milliseconds.

Example:

These commands set the error recount threshold on Ethernet interface 2 to 10,000 milliseconds.

```
interface ethernet 2
error-threshold 10000
```

Setting and Adjusting Packet Sizes

Each interface has a default maximum packet size or maximum transmission unit (MTU) size. This number generally defaults to the largest size possible for that type interface. For example, the Ethernet MTU size defaults to 1500 bytes. On serial interfaces, the MTU size varies, but cannot be set smaller than 64 bytes. You can adjust the MTU using the **mtu** interface subcommand. Its full syntax is:

mtu *bytes*
no mtu

The arguments *bytes* is the desired size in bytes. The **no mtu** command restores this value to its original, default value.

Enabling the Loopback Test

The Cisco software provides a loopback test to detect and distinguish equipment malfunctions between line and modem or CSU/DSU (Channel Service Unit/Digital Service Unit) problems on the network server. If correct data transmission is not possible when an interface is in loopback mode, the interface is the source of the problem. The DSU may have similar loopback functions you can use to isolate the problem, if the interface loopback tests passes. If the device does not support local loopback, then this function will have no effect.

You can specify hardware loopback tests on the Cisco Ethernet and serial interfaces, and all Token Ring interfaces except the CSC-R 4 megabit card that are attached to CSU/DSUs, and that support the local loopback signal. The CSU/DSU acts as a DCE device; the Cisco router as a DTE device. The local loopback test generates a CSU loop—a signal that goes through the CSU/DSU to the line, then back through the CSU/DSU to the router.

The **ping** command can also be useful during loopback operation; it is described in the section on "Testing Connectivity with the Ping Command" in the chapter "Managing the System."

The following sections describe the various loopback tests available for the supported interfaces.

Note: The loopback tests do not work on the Ethernet interface of the Cisco IGS router product.

Enabling Loopback on the HSSI

The HSSI supports the loopback test from the router to any of the following:

- Applique
- CSU/DSU (DTE side of the CSU/DSU)
- Line side of the CSUDSU
- Remote CSU/DSU

These concepts are illustrated in Figure 1-1.

Figure 1-1 HSSI Loopback Test

The commands to enable these tests are described next. In the following commands, the **loopback** command with no argument defaults to the **loopback applique** command.

To start loopback operation, use the **loopback** interface subcommand with the appropriate keyword. To restore an interface in loopback mode to normal operation, use the **no loopback** interface subcommand with the appropriate keyword. Each keyword variation of the **loopback** command is described in the following sections.

Internal Loop to the Applique

Use the following command to configure an internal loop on the HSSI applique. The full syntax of this command follows:

loopback applique
no loopback applique

Once enabled, the command loops the packets on the applique, thereby establishing a loopback inside the Cisco router. This command is useful for "sending pings to yourself" to check functionality of the applique. The HSSI applique (HSA card) uses an internal 44.736 MHz crystal clock during the applique loopback to drive its internal circuits. See the document *HSSI Specification*, available from Cisco Systems, for more information.

This command is functionally equivalent to entering the loopback command with no arguments; however, when the HSCI card is installed, the configuration displayed after the write terminal command is entered will show loopback applique set.

Loopback to the DTE

Use the **loopback dte** command to loop packets to DTE within the CSU/DSU at the DTE interface, when the device supports this function. The full syntax of this command is:

loopback dte
no loopback dte

This command is useful for testing the DTE to DCE cable.

Loopback to the Line

Use the **loopback line** subcommand to loop the packets completely through the CSU/DSU to configure a CSU loop, when the device supports this feature. The full syntax of this command follows:

```
loopback line
no loopback line
```

This command is used for testing the DCE device (CSU/DSU) itself.

Loopback to the Remote CSU/DSU

If you want to loop the packets through the CSU/DSU, over the DS3 link and to the remote CSU/DSU and back, use the **loopback remote** subcommand. Its full syntax follows:

```
loopback remote
no loopback remote
```

This is applicable only when the device supports the remote function and it is used for testing the data communications channels. The loopback is usually performed at the line port, as opposed to the DTE port, of the remote CSU/DSU.

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

HSSI Externally Requested Loopback

The HSA applique (on the HSSI), contains an LED that indicates the LA, LB, and LC signals transiting through the devices. The CSU/DSU uses the LC signal to request a loopback from the router. The CSU/DSU may want to do this so that its own network management diagnostics can independently check the integrity of the connection between the CSU/DSU and the Cisco router.

By default, this feature is enabled on the Cisco router, to support those CSU/DSUs that support this function. To enable and disable an external loopback request on HSSI from the CSU/DSU, use these commands:

```
hssi external-loop-request
no hssi external-loop-request
```

When the CSU/DSU asserts the LC signal and the Cisco router enables the external loopback, the connection is blocked by the loopback, and the router no longer has access to the data communication channel. Figure 1-2 illustrates the extent of the signal during an external loopback request.

Figure 1-2 HSSI External Loopback Request

If your CSU/DSU does not support this feature, it should be disabled in the Cisco router. This prevents spurious line noise from accidentally tripping the external loopback request line, which would interrupt the normal data flow.

HSCI Card Ribbon Cable Loopback Test

Cisco provides a useful diagnostic that allows fault isolation of possible defects on the HSCI card. This diagnostic is not part of the normal system diagnostics, but is offered to help technicians test for controller defects at installation or when the system is upgraded. The diagnostic involves recabling of the HSCI card and then entering a diagnostic script. The procedures to perform this diagnostic are described in the Cisco publication *Modular Products Hardware Installation and Reference.*

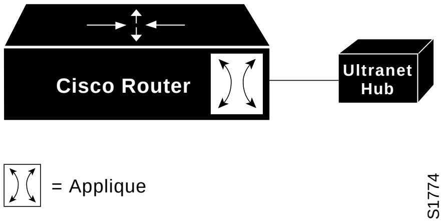
Enabling Loopback on an UltraNet Connection

For users with UltraNet connections, the loopback function is enabled with the **loopback** command (full syntax follows):

loopback
no loopback

Enabling the function places an internal and external loopback on the ULA applique, as seen in the following illustration.

Figure 1-3 UltraNet Loopback Test



Data being transmitted from the router is returned to the router, and incoming data from outside is transmitted back outside.

Enabling Loopback on MCI and SCI Serial Cards

The MCI and SCI serial interface cards support the loopback function when a CSU/DSU or equivalent device is attached to the router. Use the **loopback** command to enable loopback on the interface. The full syntax of this command follows:

loopback
no loopback

The **loopback** interface subcommand loops the packets through the CSU/DSU to configure a CSU loop, when the device supports this feature. The **no loopback** command disables the function.

Enabling Loopback on MCI and MEC Ethernet Cards

Cisco-designed Ethernet interfaces may also be placed into loopback mode. During loopback operation, the interface receives back every packet it sends. Loopback operation has the additional effect of disconnecting network server functionality from the network. Use these commands to enable or disable the loopback test:

loopback
no loopback

Configuring the Ethernet Loopback Server

The Cisco network server provides an Ethernet loopback server that supports Xerox, Intel, and DEC systems specified by the "blue book," a joint specification written by Xerox, Digital Equipment Corporation, and Intel that defines the Ethernet protocol. The loopback server responds to forward data loopback messages sent either to the server's MAC address, or to the broadcast address. Currently, the Ethernet loopback server does not respond to the loopback assistance multicast address.

Use the Ethernet loopback server to test communications between Cisco internetworking products and DEC systems that do not support the IP **ping** command, such as DECnet-only VMS systems.

To originate a loop test on your VMS system with a Cisco server, use the DEC Network Control Program (NCP) command **Loop Circuit.** For more information about the **Loop Circuit** command, consult the DECnet VAX documentation. Cisco network servers support all options that can be specified by the VMS hosts.

Enabling Loopback on the CSC-FCI FDDI Card

The Cisco FDDI (CSC-FCI) may also be placed into loopback mode. During loopback operation, the interface receives back every packet it sends. Loopback operation has the additional effect of disconnecting network server functionality from the network. Use these commands to enable or disable the loopback test:

loopback
no loopback

Enabling Loopback on Token Ring Cards

All of Cisco's Token Ring interface cards (except the 4 megabit CSC-R card) may also be placed into loopback mode. During loopback operation, the interface receives back every packet it sends. Loopback operation has the additional effect of "disconnecting" network server functionality from the network. Use this command to enable the loopback test: Use these commands to enable or disable loopback on the interface:

loopback
no loopback

Interface Configuration Subcommand Summary

This section provides an alphabetical list of all the interface commands described in this chapter.

[**no**] **bandwidth** *kilobits*

Sets a bandwidth value for an interface. The argument *kilobits* specifies the intended bandwidth in kilobits per second. Default bandwidth values are set during start up and can be displayed with the EXEC command **show interfaces.** The **no** form of the command restores the default.

[**no**] **clockrate** *speed*

Configures the clock rate on the serial interface of the SCI and MCI cards to an acceptable bit rate. The argument *speed* is the desired clock rate in bits per second. The **no** form removes the command from the configuration.

[**no**] **delay** *tens-of-microseconds*

Sets a delay value for an interface. The argument *tens-of-microseconds* specifies the delay for an interface or network segment in tens of microseconds. Default delay values may be displayed with the EXEC command **show interfaces**. The **no** form of the command restores the default.

Note: The **delay** subcommand sets an informational parameter only; you cannot adjust the actual delay of an interface with this subcommand.

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

Specifies the hold-queue limit of an interface. The argument *length* is the maximum number of packets in the queue. The **in** keyword specifies the input queue; the **out** keyword specifies the output queue. The **no** keyword restores the default values for an interface. There is no fixed upper limit to a queue size.

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

Enables and disables an external loopback request on HSSI from the CSU/DSU. When the CSU/DSU asserts the LC signal and the Cisco router enables the external loopback, the connection is blocked by the loopback, and the router no longer has access to the data communication channel.

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

On HSSI—Configures an internal loopback loop on the specified interface. This makes the interface loop the packets to the applique, thereby establishing loopback inside the Cisco router. This is the same as the **loopback applique** command.

On UltraNet—Configures a two-way, internal and external loopback on the ULA applique.

On MCI and SCI serial cards—Loops the packets through the CSU/DSU to configure a "CSU loop," when the device supports this feature. This is similar to the **loopback line** command on the HSSI.

On MCI and MEC Ethernet cards—Loops the packets at the interface within the router.

On the CSC-R16 card—Loops the packets at the interface within the router.

The **no** form of the command disables the loopback test.

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

Configures an internal loop on the HSSI. This makes the interface loop the packets to the applique, thereby establishing loopback inside the Cisco router. This command is useful for sending pings to yourself to check functionality of the applique. For use with HSSI connections only.

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

Loops packets from the router out to the CSU/DSU and back. For use with HSSI connections only to check connectivity between the router and the CSU/DSU.

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

Loops the packets through the CSU/DSU to configure a CSU loop. Loopback occurs on the line side of the CSU/DSU to test functionality of the CSU/DSU. For use with HSSI connections only.

[**no**] **loopback remote**

Loops the packets through the CSU/DSU, over the DS3 link and to the remote CSU/DSU. This is applicable only when the device supports the remote function. For use with HSSI connections only.

[**no**] **priority-list** *list* **default** *queue-keyword*

Assigns a priority queue for those datagrams that did not match any other rule in the priority list. If no default or the **no** form of the command is specified, the **normal** queue is assumed.

[**no**] **priority-list** *list* **interface** *interface-name queue-keyword*

Sets up priority queuing on the specified interface. The keyword **interface** applies to the priority queuing mechanism to an interface. The argument *interface-name* specifies the name of the interface. The arguments *list* and *queue-keyword* are described in the section “Assigning Priority by Interface Type.” The **no** form of the command removes the item from the list.

[**no**] **priority-list** *list* **protocol** *protocol-name queue-keyword* [*args*]

Sets up priority queuing on the specified interface. The keyword **protocol** applies to the priority queuing mechanism to a protocol. The argument *protocol-name* specifies the name of the protocol. The arguments *list*, *queue-keyword*, and the optional *args* are described in the section “Assigning Priority by Protocol Type.” The **no** form of the command removes the item from the list.

[**no**] **priority-list** *list* **queue-limit** *high-limit medium-limit normal-limit low-limit*

Specifies the maximum number of packets that may be waiting in each of the priority queues. If a priority queue overflows, excess datagrams are discarded and quench messages may be sent, if appropriate, for the protocol. The **no** form of the command resets all four queue sizes to their default values as follows: *high-limit* = 20; *medium-limit* = 40; *normal-limit* = 60; *low-limit* = 80.

[**no**] **pulse-time** *seconds*

Enables pulsing DTR signals on the Cisco MCI and SCI serial interfaces for a minimum interval of *seconds*.

[**no**] **scheduler-interval** *milliseconds*

Controls the maximum amount of time that may elapse without running the lowest priority system processes. The minimum interval that may be specified is 500 milliseconds; there is no maximum value. The default is to allow high priority operations to use as much of the central processor as needed. The **no scheduler-interval** command restores that default.

[**no**] **transmitter-delay** *microseconds*

Specifies a minimum dead-time after transmitting a datagram. The argument *microseconds* specifies the approximate number of microseconds of minimum delay after transmitting a datagram. For MCI and SCI serial cards only. The **no** form of the command restores the default value of zero microseconds.

[**no**] **transmitter-delay** *hdlc-flags*

Specify this command syntax for the IGS router and the High Speed Serial Interface (HSSI) connector. The argument *hdlc-flags* causes a minimum of HDLC flags to be sent between each packet. The **no** form of the command restores the default value of zero microseconds.