

Monitoring Performance

This chapter describes how to use the console interface to monitor the performance of the Cisco Catalyst 1800 Token Ring switch. This chapter contains the following sections:

- Accessing the Monitor Menu
- Monitoring Bridge Configuration Parameters
- Monitoring MAC Addresses
- Monitoring NetBIOS Name Caching Status
- Monitoring Physical Port Statistics
- Monitoring Serial Port Configuration
- Monitoring SRT Statistics
- Monitoring STP Port Configuration Parameters
- Monitoring System Statistics

Accessing the Monitor Menu

The Monitor menu allows you to view system status.

Type this command from the Main menu:

```
Monitor
```

The Monitor menu appears (see Figure 4-1).

Figure 4-1 Monitor Menu

Cisco Systems Catalyst 1800 Token Ring Switch

Select From

- Bridge
- FDDI
- MAC Addresses
- NetBIOS Names
- Physical Ports
- Serial Port
- SRT Statistics
- STP Ports
- System

Catalyst 1800> Monitor

The following table describes the parameters displayed on the Monitor Bridge Configuration screen and shows where to find additional information.

Table 4-1 Monitor Bridge Menu Selections

Parameter	Displays . . .	For more information, see the section:
Bridge	All Bridge related values	“Monitoring Bridge Configuration Parameters”
FDDI	FDDI menus	These two chapters: “Configuring FDDI Software” and “Monitoring FDDI Performance.”
MAC Addresses	All MAC addresses in the network and the ports on which they were learned	“Monitoring MAC Addresses”
NetBIOS Names	NetBIOS Name Caching enable/disable status for each switch port	“Monitoring NetBIOS Name Caching Status”
Physical Ports	802.5 ring statistics for the selected port	“Monitoring Physical Port Statistics”
Serial Port	The current Serial Port configuration for the switch console port	“Monitoring Serial Port Configuration”
SRT Statistics	802.5 Source Route statistics for the selected port	“Monitoring SRT Statistics”
STP Ports	STP port-related values	“Monitoring STP Port Configuration Parameters”
System	Ring activity statistics for every port	“Monitoring System Statistics”

Monitoring Bridge Configuration Parameters

The Bridge screen displays bridge-related values.

Type this command from the Main menu:

```
Monitor Bridge
```

The Monitor Bridge Configuration screen appears (see Figure 4-2).

Figure 4-2 Monitor Bridge Configuration Screen

```

Cisco Systems Catalyst 1800 Token Ring Switch

                                Bridge Configuration

Number of Bridge Ports      : 2
STP Protocol Spec.         : 802.1d
Bridge Group Address        : 0xC00000000100

Spanning-Tree Protocol     : Enabled
STP Priority                : 0x8001
STP Time Since Change      : 0
STP Topology Changes       : 1
STP Designated Root        : 0x800100a0eeffff00
STP Root Cost               : 0
STP Root Port              : 0
STP Maximum Age            : 20
STP Hello Time             : 2
STP Hold Time              : 1
STP Forward Delay          : 15

```

Catalyst 1800> Monitor Bridge

The following table describes the parameters displayed on the Monitor Bridge Configuration screen.

Table 4-2 Monitor Bridge Configuration Parameters

Parameter	Description
Number of Bridge Ports	The current number of bridge ports configured for this node
STP Protocol Spec	The version of the Spanning-Tree Protocol that is being run on this node
Bridge Group Address	The current multicast address used in the spanning-tree frames generated by this node
Spanning-Tree Protocol	The current enabled/disabled state of the Spanning-Tree Protocol
STP Priority	The current value of the writable portion of the bridge ID, which is the first two octets of the eight-octet long bridge ID
STP Time Since Change	The time since the last time a topology change was detected by this node
STP Topology Changes	The total number of topology changes detected by this node since power on
STP Designated Root	The bridge identifier of the root of the spanning tree as determined by the Spanning-Tree Protocol as executed by this node
STP Root Cost	The cost of the path to the root as seen from this node

Parameter	Description
STP Root Port	The port number of the port that offers the lowest cost path from this node to the root bridge node
STP Maximum Age	The maximum age of Spanning-Tree Protocol information learned from the network on any port before it is discarded. This value is displayed in seconds.
STP Hello Time	The amount of time between the transmission of configuration bridge frames by this node on any port when it is the root of the spanning tree or trying to become the root of the spanning tree. This value is displayed in seconds.
STP Hold Time	This time value determines the interval length during which no more than two configuration bridge frames shall be transmitted by this node. This value is displayed in seconds.
STP Forward Delay	This time value, displayed in seconds, controls how fast a port changes its spanning state when moving towards the forwarding state. The value determines how long the port stays in each of the listening and learning states, which precede the forwarding state. When a topology change has been detected and is underway, this value is also used to age all dynamic entries in the forwarding database.

Monitoring MAC Addresses

The MAC Address screen displays all MAC addresses learned by the Catalyst 1800 switch and on which port they were learned. You can select whether you want to display all ports or just one.

If all addresses cannot fit on a single screen, a message appears, stating “more addresses are available.” If you reenter a MAC address that was previously displayed, the display resumes where it had left off at the previously issued command.

Type this command from the Main menu:

```
Monitor MAC port_number
```

where *port_number* can either be 0 for all ports or a specific port number. Depending on your system, this number can be between 1 and 8, 1 and 12, or 1 and 16.

The MAC Address Database screen appears (see Figure 4-3). In this example, the user typed 0 for all ports.

Figure 4-3 MAC Address Database Screen

```

Cisco Systems Catalyst 1800 Token Ring Switch

MAC Address Database

Port=4 Addr=00-05-77-1b-cb-84
Port=6 Addr=00-05-77-1b-64-fb
Port=5 Addr=00-05-77-1b-b5-6a
Port=7 Addr=00-05-77-1b-b8-47
    
```

```
Catalyst 1800>monitor mac 0
```

The following table describes the entries on this screen.

Table 4-3 MAC Address Database Entries

Parameter	Description
Port	The number of the port on which the MAC address was learned
Addr	The MAC address

Monitoring NetBIOS Name Caching Status

The NetBIOS Names screen displays the current NetBIOS name caching enable/disable status for each switch port.

Type this command from the Main menu:

```
Monitor NetBIOS
```

The Monitor NetBIOS Name Database screen appears (see Figure 4-4).

Figure 4-4 Monitor NetBIOS Name Database

```
Cisco Systems Catalyst 1800 Token Ring Switch
NetBIOS Name Database
```

```
Port=4 Addr= 00-00-F6-1b-c2-29 Name= Netbios-n1
```

The following table describes the parameters on this screen.

Table 4-4 NetBIOS Parameters

Parameter	Description
Port	The number of the switch port for this node
Addr	The source MAC address learned for this entry
Name	The NetBIOS name learned for this entry

Monitoring Physical Port Statistics

The Token Ring Physical Port Statistics screen displays 802.5 MAC layer statistics for the selected port.

Step 1 Type this command from the Main menu:

```
Monitor Physical
```

The system responds:

```
Enter port number
```

Step 2 Enter the port number and press **Return**.

If the port you specified is a Token Ring port, the Token Ring Physical Ports Statistics screen appears (Figure 4-5). (See Figure 4-6 for an example of an FDDI screen.)

Figure 4-5 Token Ring Physical Ports Statistics Screen

```

Cisco Systems Catalyst 1800 Token Ring Switch

Port Number :1      Segment Number :101(x065)
Speed       :16Mb   MAC Address(MSB):00-05-77-00-02-01
Ring Status :Opened Ring State      :Opened

          Receive   Transmit
Frames 11255      6734
Octets 5256773   876325
Mcasts 489       332
Errors 0         0

Line Errors      0      Token Errors    0
Burst Errors    0      Soft Errors    0
ACErrors        0      Hard Errors    0
Abort Trans Errs 0      Signal Loss    0
Internal Errs   0      TX Beacons    0
Lost Frames     0      Recoverys     0
RX Congstns    0      Lobe Wires    0
Frm Copy Errs  0      Removes       0
Singles        0      Freq Errors   0
    
```

Catalyst 1800> Monitor Physical

The following table describes the parameters on the Token Ring Physical Ports Statistics screen.

Table 4-5 Token Ring Physical Ports Statistics Parameters

Parameter	Description
Port Number	The specified port number being monitored
Segment Number	The segment number being monitored
Speed	The speed of the port, in megabits per second
MAC Address (MSB)	The MAC address of the specified port
Ring Status	This object indicates the success or reason for failure, of the most recent attempt of the port to enter the ring. The possible status conditions are <ul style="list-style-type: none"> • Bad Parameter • Ring Beaconing • Duplicate MAC Address • Insert Timeout • Lobe Failure • Not-Opened • Opened • Remove Received • Request Failed • Ring Fail • Signal Loss • Unknown

Parameter	Description
Ring State	The current interface state with respect to entering or leaving the ring. The possible status conditions are <ul style="list-style-type: none"> • Closed • Closing • Open Failure • Opened • Opening • Ring Error • Unknown
Frames	The number of LLC frames received/transmitted on this port since powering up. This includes multicast/broadcast frames but does not include error frames.
Octets	The number of octets (8-bit bytes) received/transmitted on this port since powering up. This includes multicast/broadcast frames but does not include error frames.
Mcasts	The number of multicast and broadcast frames received/transmitted on the port since powering up. This does not include error frames.
Errors	Number of total errors found on this port since powering up. This includes physical Token Ring errors, source route errors, and any internal system errors that were found.
Line Errors	This counter is incremented when a station copies or repeats a frame or token, the E bit is zero in the frame or token, and one of the following conditions exists: <ul style="list-style-type: none"> • There is a nondata bit (J or K bit) between the start delimiter (SD) and the end delimiter (ED) of the frame or token. • There is an FCS error in the frame.
Burst Errors	This counter is incremented when a station detects the absence of transitions for five half-bit timers (burst-five error).
ACErrors	This counter is incremented when a station receives an AMP or SMP frame in which A = C = 0, and then receives another SMP frame with A = C = 0 without first receiving an AMP frame. It denotes a station that cannot set the A and C bits properly.
Abort Trans Errs	This counter is incremented when a station transmits an abort delimiter.
Internal Errs	This counter is incremented when a station recognizes an internal error.
Lost Frames	This counter is incremented when a station is transmitting and its TRR timer expires. This condition denotes a condition in which a transmitting station in strip mode does not receive the trailer of the frame before the TRR timer goes off.
RX Congstns	This counter is incremented when a station recognizes a frame addressed to it, but there is no available buffer space. This indicates station congestion.
Frm Copy Errs	This counter is incremented when a station recognizes a frame addressed to its specific address and detects that the frame station (FS) field A bits are set to 1. This indicates a line hit or duplicate address.
Singles	The number of times the interface has sensed that it is the only station on the ring. This happens if the interface is the first one up on a ring, or if there is a hardware problem.
Token Errors	This counter is incremented when a station acting as the active monitor recognizes an error condition that needs a token transmitted.

Parameter	Description
Soft Errors	The number of soft errors the interface has detected. It directly corresponds to the number of report error MAC frames that this interface has transmitted. Soft errors are those that are recoverable by the MAC layer protocols.
Hard Errors	The number of times this interface has detected an immediately recoverable fatal error. It denotes the number of times this interface is either transmitting or receiving beacon MAC frames.
Signal Loss	The number of times this interface has detected the loss of signal condition from the ring
TX Beacons	The number of times this interface has transmitted a beacon frame
Recoveries	The number of claim token MAC frames received or transmitted after the interface has received a ring purge MAC frame. This counter signifies the number of times the ring has been purged and is being recovered back into a normal operating state.
Lobe Wires	The number of times the interface has detected an open or short circuit in the lobe data path. The adapter is closed and dot5RingState signifies this condition.
Removes	The number of times the interface has received a remove ring station MAC frame request. When this frame is received, the interface enters the close state and dot5RingState signifies this condition.
Freq Errors	The number of times the interface detects that the frequency of the incoming signal differs from the expected frequency by more than the maximum deviation specified by the IEEE 802.5 standard.

If the port number entered on the Physical Port Statistics screen corresponds to the FDDI port, the following screen appears (see Figure 4-6).

Figure 4-6 FDDI Physical Ports Statistics Screen

```

Cisco Systems Catalyst 1800 Token Ring Switch

Port Number      : 5                Segment Number   : 102(x066)
Speed            : 100Mb           MAC Address(MSB) : 00-05-77-00-02-05
Ring State A    : Active           Ring State B     : Active

          Receive                Transmit
Frames      11255                6734
Octets      5256773              876325
Mcasts      489                  332
Errors      0                    0

MAC Error Count : 0                MAC Lost Count   : 0
LCT Fail Count A : 0              LCT Fail Count B : 0
LEM Reject Count A: 0             LEM Reject Count B: 0
LEM Count A     : 0                LEM Count B     : 0
    
```

Catalyst 1800> Monitor Physical

The following table describes the parameters on the FDDI Physical Ports Statistics screen.

Table 4-6 FDDI Physical Ports Statistics Parameters

Parameters	Description
Port Number	The number of the port being monitored
Segment Number	The number of the segment being monitored
Speed	The current speed at the specified port
MAC Address (MSB)	The current MAC address
Ring State A & B	The current interface state with respect to entering or leaving the ring. The possible status conditions are <ul style="list-style-type: none"> • Disabled • Connecting • Standby • Active
Frames	The number of LLC frames received/transmitted on this port since powering up. This includes multicast/broadcast frames but does not include error frames.
Octets	The number of octets (8-bit bytes) received/transmitted on this port since powering up. This includes multicast/broadcast frames but does not include error frames.
Mcasts	The number of multicast and broadcast frames received/transmitted on the port since powering up. This does not include error frames.
Errors	The number of FDDI errors found on this port
MAC Error Count	The number of frames detected in error by this MAC
MAC Lost Count	The number of instances that this MAC detected a format error during frame reception
LCT Fail Count (A & B)	The number of consecutive times the link confidence test (LCT) has failed during connection management, listed for port A and port B separately
LEM Reject Count (A & B)	The number of times a link has been rejected, listed for port A and port B separately
LEM Count (A & B)	The link error monitor error count, listed for port A and port B separately

Monitoring Serial Port Configuration

The Serial Port Configuration screen displays the current configuration of the switch console port.

Type this command from the Main menu:

```
mon se
```

The Serial Port Configuration screen appears (see Figure 4-7).

Figure 4-7 Serial Port Configuration Screen

```
Cisco Systems Catalyst 1800 Token Ring Switch

Serial Port Configuration

Type          : Console      Graphics Mode  : Enabled
Speed         : 9600         Parity         : None
Bits Per Char : 8           Stop Bits     : 1
```

Catalyst 1800> Mon se

The following table describes the parameters listed on the Serial Port Configuration screen.

Table 4-7 Serial Port Configuration Parameters

Parameter	Description
Type	The type of terminal emulation on the current system, such as ANSI
Speed	The serial port speed for console operation
Bits Per Char	The number of bits per character on the serial port for console operation. The options are 7 or 8.
Graphics Mode	Specifies whether graphics mode is enabled or disabled
Parity	The parity for console operation. The options are none, even or odd.
Stop Bits	The number of stop bits for console operation. The options are 1, 1.5, or 2.

Monitoring SRT Statistics

The SRT Statistics screen displays source route (SR) and source routing transparent (SRT) statistics for the selected port.

Type this command from the Main menu:

```
Monitor SR
```

The SRT Statistics screen appears (see Figure 4-8).

Figure 4-8 SRT Statistics Screen

```

Cisco Systems Catalyst 1800 Token Ring Switch

PortNo: 1      Logical Segment: 101(x065)      Speed: 16 Mb

                Receive          Transmit
                -----          -
SRF              0                0
ARE              0                0
STE              0                0

Segment Mismatches          0
Duplicate Segments          0
Hop Count Exceeded          0
Duplicate LanIds            0
LanId Mismatches            0
SRF Unknowns                0

```

```
Catalyst 1800>monitor sr
```

The following table describes the parameters on the SRT Statistics screen.

Table 4-8 SRT Statistics Parameters

Parameter	Description
PortNo	The port number being monitored
Logical Segment	The logical segment number of the port
Speed	The speed of the port, specified in megabits per second
SRF	The number of source routed frames, also referred to as specifically routed frames, that the port has received/transmitted on its segment since powering up
ARE	The number of all routes explorer frames (also referred to as all paths explorer frames) that have been received/transmitted by this port from its segment since powering up
STE	The number of spanning-tree explorer frames that have been received/transmitted by this port from its segment since powering up
Segment Mismatches	The number of explorer frames that have been discarded by this port because the routing descriptor field contained an invalid adjacent segment value
Duplicate Segments	The number of frames that have been discarded by this port since powering up because the routing descriptor field contained a duplicate segment identifier
Hop Count Exceeded	The number of explorer frames that have been discarded by this port because the Routing Information Field (RIF) has exceeded the maximum route descriptor length
Duplicate LanIds	The number of duplicate LAN IDs or tree errors. This statistic helps in detection of problems in networks containing older IBM source routing bridges.

Parameter	Description
LanId Mismatches	The number of ARE and STE frames that were discarded because the last LAN ID in the Routing Information Field did not equal the LAN-in ID. This error can occur in implementations that only perform a LAN-in ID and bridge number check instead of a LAN-in ID, bridge number, and LAN-out ID check before forwarding broadcast frames.
SRF Unknowns	The number of Source Routed Frames that are discarded due to invalid RIF data. Examples include RIFs with the same segment number listed multiple times and a RIF with a mismatched bridge number.

Monitoring STP Port Configuration Parameters

The STP Port Configuration screen displays STP port related values.

Step 1 Type this command from the Main menu:

```
Monitor STP
```

The system responds:

```
Enter logical segment number in hex
```

Step 2 Enter the segment number in hexadecimal notation and press **Return**.

The STP Port Configuration screen appears (see Figure 4-9).

Figure 4-9 STP Port Configuration Screen

```

Cisco Systems Catalyst 1800 Token Ring Switch

                                STP Port Configuration

STP Port (Segment)           : 1 (20)
Physical Ports in Segment   : 1 - 4

STP Priority                  : 0x8000
STP State                    : Forwarding
STP Enable                   : Enabled
STP Path Cost                : 63
STP Designated Root         : 0x800100a0eeffff00
STP Designated Cost         : 0
STP Designated Bridge       : 0x800100a0eeffff00
STP Designated Port         : 0x8000
STP Forward Transitions     : 1
    
```

```
Catalyst 1800>monitor stp
```

The following table describes the parameters listed on the STP Port Configuration screen.

Table 4-9 STP Port Configuration Parameters

Parameter	Description
STP Port (Segment)	The STP port displayed as a logical bridge port number and the associated segment number
Physical Ports in Segment	A listing of the physical ports associated with this segment
STP Priority	The value of the priority field that is contained in the first octet of the two-octet port ID. This octet is the first octet shown on the screen; the second octet is the bridge port number, which is not configurable.
STP State	The port's current state as defined by the Spanning-Tree Protocol specification. This state controls what action a port takes upon reception of a frame. The valid states are <ul style="list-style-type: none"> • Disabled • Blocking • Listening • Learning • Forwarding • Broken
STP Enable	The enabled/disabled status of this bridge port
STP Path Cost	The contribution of this port to the path cost of paths towards the spanning-tree root that includes this port. The spanning-tree specification recommends that this value be in inverse proportion to the speed of the attached LAN.
STP Designated Root	The unique bridge identifier of this node. It is recorded as the root in the configuration frame transmitted by the destination bridge for the segment to which the port is attached.
STP Designated Cost	The path cost of the designated port of the segment connected to this port. This value is compared to the root path cost field in received bridge frames.
STP Designated Bridge	The bridge identifier of the node that this port considers to be the designated bridge for this port's segment
STP Designated Port	The port identifier of the port on the designated bridge for this port's segment
STP Forward Transitions	The number of transitions this port has made from the learning state to the forwarding state

Monitoring System Statistics

The System Overview screen displays ring activity for every port.

Type this command from the Main menu:

```
Monitor System
```

The System Overview screen appears. Figure 4-10 applies to systems with only Token Ring ports; Figure 4-11 applies to systems with FDDI ports.

Figure 4-10 System Overview Screen

```
Cisco Systems Catalyst 1800 Token Ring Switch

System Overview

Time      : 22:45:34                UpTime: 4 days   23:05:33
Date     : Tuesday, 27 June 1996

Port#    RingStatus Ring#      Frms Rx  Frms Tx  Errors
-----
1        Opened    101(x065)  0        31       0
2        Opened    101(x065)  31       0        0
3        Opened    101(x065)  0        31       0
4        Opened    101(x065)  0        31       0
5        Opened    101(x065)  0        31       0
6        Opened    101(x065)  0        31       0
7        Opened    101(x065)  0        31       0
8        Opened    101(x065)  0        31       0
```

Catalyst 1800>monitor system

If you are using the FDU option, the following screen appears (see Figure 4-11). The ports 5A and 5B refer to the FDDI port.

Figure 4-11 System Overview Screen (FDDI)

```
Cisco Systems Catalyst 1800 Token Ring Switch

System Overview

Time      : 22:45:34                UpTime: 4 days   23:05:33
Date     : Tuesday, 27 June 1996

Port#    RingStatus Ring#      Frms Rx  Frms Tx  Errors
-----
1        Opened    101(x065)  0        31       0
2        Opened    101(x065)  31       0        0
3        Opened    101(x065)  0        31       0
4        Opened    101(x065)  0        31       0
5A       Active    101(x066)  0        31       0
5B       Active    101(x066)  0        31       0
```

Catalyst 1800>monitor system

The following table describes the parameters on the System Overview screen:

Table 4-10 System Overview Parameters

Parameter	Description
Time	The time of the monitoring session
Date	The date of the monitoring session
Uptime	The amount of time the system has been operating
Port#	The number of the port. In the case of FDDI, the ports are 5A and 5B.
RingStatus	The status of the ring (either opened or closed). For Token Ring, valid values are listed in Table 4-5. For FDDI, this value indicates the state of the connection. Valid values are <ul style="list-style-type: none">• Active• Connecting• Disabled• Open• Standby
Ring#	The number of the ring
Frms Rx	The number of frames received at this port since powering up
Frms Tx	The number of frames transmitted from this port since powering up
Errors	The amount of communication errors received at this port since powering up. After 4,294,967,295 errors, this counter resets to 1 without notification.

