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 ARP Entries
- 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 the **monitor** command from the Main menu. It can be abbreviated to one letter:

    m

The Monitor menu appears:

```
                              Cisco Systems Catalyst 1800 Token Ring Switch




                                      Select From

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




    Catalyst 1800> m
```

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:
ARP	All ARP entries learned by the Catalyst 1800 switch	Monitoring ARP Entries
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 ARP Entries

The ARP Table screen displays all ARP entries learned by the Catalyst 1800 switch.

Type the following command from the Main menu:

```
Monitor ARP
```

The ARP Table screen appears:

```
                  Address Translation Table
     Port Number     IP Address          MAC Address
     -----------     --------------      ----------------
     3               204.242.251.100     08-00-5a-a4-55-f4
```

The following table describes the entries on this screen.

Table 4-2   ARP Translation Table Entries

Parameter	Description
Port Number	The number of the port from which the ARP entry was learned
IP Address	The IP address learned for this entry
MAC Address	The MAC address associated with this IP address

Monitoring Bridge Configuration Parameters

The Bridge screen displays bridge-related values.

Type the **monitor bridge** command from the Main menu. It can be abbreviated:

```
m b
```

The Monitor Bridge Configuration screen appears:

```
                        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 4-3   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
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 the **monitor mac** command from the Main menu. It can be abbreviated:

```
m m 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. In this example, the user typed 0 to monitor all ports:

```
                              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 4-4   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 the **monitor netbios** command from the Main menu. It can be abbreviated:

```
m n
```

The Monitor NetBIOS Name Database screen appears:

```
                              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 4-5   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 the **monitor physical** command from the Main menu. It can be abbreviated:

```
m p
```

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. The first example shows the screen for Token Ring ports, and the second example (after the table) shows the screen for FDDI ports.

```
                                        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 State  :Opened   Ring Status     :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 4-6   **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

Parameter	Description
Ring State	The current interface state with respect to entering or leaving the ring. The possible status conditions are • Closed • Closing • Open Failure • Opened • Opening • Ring Error • Unknown
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 • Auto Remove Error • Bad Parameter • Did Not Complete • Duplicate MAC Address • Hard Error • Insert Timeout • Inserted • Lobe Failure • Not-Opened • Opened • Recovery • Remove Received • Request Failed • Ring Beaconing • Ring Fail • Signal Loss • Single Station on Ring • Soft Error • Transmitting Beacon • 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.

Parameter	Description
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: • 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.
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:

```
                    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 4-7   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 • 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 the **monitor serial** command from the Main menu. It can be abbreviated:

```
m se
```

The Serial Port Configuration screen appears:

```
              Cisco Systems Catalyst 1800 Token Ring/FDDI Uplink
                        Serial Port Configuration
        Type         : Console             Graphics Mode:   Disabled
        Speed        : 9600                Parity:          None
        Bits Per Char: 8                   Stop Bits:       1
        25th Line    : ON
   Catalyst 1800> mon se
```

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

Table 4-8   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 the **monitor srt** command from the Main menu. It can be abbreviated:

```
m sr
```

It prompts you for a port number. When you enter a port number, the SRT Statistics screen appears:

```
             Cisco Systems Catalyst 1800 Token Ring/FDDI Uplink
       PortNo: 13      Logical Segment:      065      Speed: 16 Mb
                         Receive          Transmit
                SRF          0                 0
                ARE         202                0
                STE        8709              8717
       _____

       Segment Mismatches          0
       Duplicate Segments          0
       Hop Count Exceeded          0
       Duplicate LanIds            0
       LanId Mismatches            0
       SRF Unknowns                0
   Catalyst 1800> mon sr 13
```

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

Table 4-9   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 the **monitor stpBruce** command from the Main menu:

```
m st
```

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:

```
                           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 srt
```

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

Table 4-10   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

Parameter	Description
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
	• 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:

Mon Sys

The System Overview screen appears. The first example shows the screen for systems with Token Ring ports; the second example shows the screen for systems with FDDI ports.

```
          Cisco Systems Catalyst 1800 Token Ring/FDDI Uplink
Time:  05:41:32                             UpTime:  3  days  2:34:46
Date:  Monday, July 14, 1997 DST
Port#    RingState   Segment(dec)    Frms Rx      Frms Tx      Errors
-----    ----------  ------------   ----------   ----------   ----------
   1        Opened    65 ( 101)             0           31            0
   2        Opened    65 ( 101)            31            0            0
   3        Opened    65 ( 101)             0           78            0
   4        Opened    65 ( 101)             0           78            0
   5        Opened    65 ( 101)          2151        72268            0
   6        Opened    65 ( 101)             0        70117            0
   7        Opened    65 ( 101)             0        70117            0
   8        Opened    65 ( 101)             0        70117            1
Catalyst 1800> mon sys
```

If you are using the FDU option, the following screen appears. The ports 5A and 5B refer to the FDDI port.

```
          Cisco Systems Catalyst 1800 Token Ring/FDDI Uplink
Time:  05:41:32                             UpTime:  3  days  2:34:46
Date:  Monday, July 14, 1997 DST
Port#    RingState   Segment(dec)    Frms Rx      Frms Tx      Errors
-----    ----------  ------------   ----------   ----------   ----------
   1        Opened    65 ( 101)             0           31            0
   2        Opened    65 ( 101)            31            0            0
   3        Opened    65 ( 101)             0           78            0
   4        Opened    65 ( 101)             0           78            0
   5A    Connecting    66V ( 102)        22295        31995            0
   5B        Active    66V ( 102)        22295        31995            0
Catalyst 1800> mon sys
```

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

Table 4-11   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.

Parameter	Description
RingStatus	The status of the ring (either opened or closed). For Token Ring, valid values are listed in Table 4-6.
	For FDDI, this value indicates the state of the connection. Valid values are
	• Active
	• Connecting
	• Disabled
	• Open
	• Standby
Segment	The number of the ring segment
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.