CHAPTER 1

Introduction

This manual describes how to configure and manage a Catalyst 2820 or Catalyst 1900 using a standard SNMP-based network-management application. This manual also describes the standard MIB objects and MIB object extensions supported by these switches.

Using the Simple Network Management Protocol (SNMP), a Catalyst 2820 or 1900 communicates with the third-party network-management application via its in-band management interface (the SNMP agent). The management information used to monitor and configure a Catalyst 2820 or 1900 and its ports is represented as objects in a database called a Management Information Base (MIB). The Catalyst 2820 or 1900 support standard MIB II objects as well as custom extensions designed to maximize control of the switch's hub and switching capabilities.

Working with SNMP Management Platforms

In general, you use the SNMP application to locate the switch icon and access the table of Catalyst 2820 or 1900 objects. You can then view the characteristics and counters that describe the switch and set certain object values as defined in the Catalyst 2820- or 1900-supported MIBs.

Supported TCP/IP Protocols

The Catalyst 2820 or 1900 uses a subset of the Transmission Control Protocol/Internet Protocol (TCP/IP) suite as the underlying mechanism to transport the SNMP. The following protocols are implemented in a Catalyst 2820 or 1900 switch:

- Internet Protocol (IP)
- Internet Control Message Protocol (ICMP)

- User Datagram Protocol (UDP)
- Trivial File Transfer Protocol (TFTP)
- Bootstrap Protocol (BOOTP)
- Address Resolution Protocol (ARP)

Configuring Catalyst 2820 or 1900 for SNMP with BOOTP

A Catalyst 2820 or 1900 switch must be configured with an IP address before it can make available any in-band management. You can assign IP addresses individually in the administrative domain, or you can use BOOTP to maintain a database of such addresses.

To run this procedure you need a host machine with a BOOTP server program. Connect the Catalyst 2820 or 1900 to this host through one of its ports. The host must also have a database listing the physical Media Access Control (MAC) addresses and corresponding IP addresses. Other information such as the corresponding subnet masks, default gateway addresses, and host names, are optional but are used by the BOOTP protocol.

When the Catalyst 2820 or 1900 is reset, it looks into its Non-Volatile Random Access Memory (NVRAM) for a configured IP address and, if they exist, for a default gateway address and IP subnet mask. If an IP address has not been configured, the Catalyst 2820 or 1900 transmits a BOOTP broadcast request to all of its ports having a physical connection, requesting mapping for its physical MAC address. A valid response includes the IP address, which is mandatory, and the subnet mask, default gateway, and host name, all of which are optional.

When the Catalyst 2820 or 1900 receives a valid BOOTP response, it activates the rest of its protocol suite without having to be reset. It also saves the information in the NVRAM so that BOOTP is not needed when the system is next reset.

If the Catalyst 2820 or 1900 does not receive a response from the host, it continues to send BOOTP requests indefinitely. Your BOOTP server documentation can provide more information about BOOTP.

Configuring the Catalyst 2820 or 1900 for SNMP

As an alternative to the BOOTP protocol, you can configure the IP address by using a combination of the out-of-band management console and MIB object extensions.

The first step is to configure the IP address using the IP Configuration Menu from the management console. You can then continue to use this menu to configure the corresponding subnet masks and default gateway addresses, or you can use the in-band MIB objects described below.

MIB objects are followed by the type of value required in parentheses. There is then a brief description, possible values, and the default value, if any.

The Management Group

netMgmtIpAddress

This is the Catalyst 2820 or 1900 administrative IP address. The Catalyst 2820 or 1900 can automatically discover a value for this object using BOOTP. The object value is also duplicated in the MIB-II ipAddrTable.

When Virtual Local Area Networks (VLANs) are present, the Catalyst 2820 or 1900 can be configured with up to four administrative IP addresses, one per VLAN. This MIB object configures the IP address for the first VLAN. See the object vlanTable for how to configure the other IP addresses.

Assigning multiple VLAN IP addresses is only necessary if the VLANs in use represent separate physical IP subnets. This allows a management station residing on a VLAN to directly manage Catalyst 2820 or 1900 switches without the need for an intervening router or gateway.

Note Once a value has been set for this object, the next write takes effect only after a system reset.

Default Value: 0.0.0.0 or no address

netMgmtIpSubnetMask (IpAddress)

The Catalyst 2820 or 1900 can automatically discover a value for this read-write MIB object using BOOTP. The object value is also duplicated in the MIB-II ipAddrTable.

When VLANs are present, the Catalyst 2820 or 1900 can be configured with up to four administrative IP subnet masks, one per VLAN. This object configures the subnet mask for the first VLAN. See the MIB object vlanTable for how to configure the other subnet masks. Assigning multiple VLAN subnet masks is only necessary if the VLANs in use represent separate physical IP subnets.

A write to this MIB object takes effect immediately.

Default Value: 0.0.0.0 or no subnet mask

netMgmtDefaultGateway (IpAddress)

The default gateway IP address is the address of the next-hop router the Catalyst 2820 or 1900 uses to reach a non-local IP host when the Catalyst 2820 or 1900 does not know the return route. During a normal management protocol exchange with an IP client host, the Catalyst 2820 or 1900 simply sends its response onto the same route from which the request was received. The default gateway route is only used when the Catalyst 2820 or 1900 itself initiates an exchange, such as a TFTP upgrade with the client.

The default gateway IP address is global to all VLANs, which is unlike the unique per-VLAN management IP address and subnet mask.

A write to this read-write MIB object takes effect immediately, replacing the previous address, if any.

Default Value: 0.0.0.0 or no address

Community Strings

The Catalyst 2820 or 1900 supports trivial authentication with community strings. You can change these strings with the management console as described in the *Catalyst 2820 and Catalyst 1900 User Guide*. There are two distinct community strings:

- Get

  This community string, or password, has a default ASCII value of public and can be used by a network-management application to send Get and Get-Next requests to the Catalyst 2820 or 1900.

Note For multiple VLAN configurations, follow this example:

```
VLAN1 Get String Public
VLAN2 Get String Public2
VLAN3 Get String Public3
```

- Set

  With a default value of private, this community string can be used for Set requests.

Note For multiple VLAN configurations, follow this example:

```
VLAN1 Set String Public
VLAN2 Set String Public2
VLAN3 Set String Public3
```

When configured to do so, the Catalyst 2820 or 1900 can generate authenticationFailure traps when it receives a request with an invalid community string.

Set Clients

Up to four IP addresses can be defined as Set clients, giving them authority to issue Set requests and add other Set clients. The list of Set clients is initially empty; any Set client workstation can then set the first address. To configure Set clients, use the following MIB objects.

netMgmtSetClientTable

This read-only MIB object displays a table (four entries) containing a list of IP addresses of workstations permitted to issue Set requests. Such a workstation is called a Set client. If this table is empty, then any Set request with a matching Set community string is allowed. If at least one Set client is specified, then an incoming Set request must have its source IP address matched against an entry in this table before the Set is allowed.

A Set client entry whose IP address is 0.0.0.0 is considered invalid and is ignored. This table is considered empty when all Set client addresses are zeros (0.0.0.0).

netMgmtSetClientEntry

This read-only MIB object displays an IP address of a management station allowed to issue SET requests to this management agent.

netMgmtSetClientIndex (integer)

This read-only MIB object provides identification of a Set client entry.

Valid Values: 1 to 4

netMgmtSetClientAddr (IpAddress)

The SET client is assumed to be Internet UDP/IP based. This read-write MIB object is the client's IP address.

netMgmtSetClientStatus (integer)

Setting this read-write MIB object to the value invalid has the effect of invalidating the corresponding entry. That is, it effectively disassociates the IP address identified with said entry from the table. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use.

Valid Values:	other	(1)
	invalid	(2)
	permanent	(3)

Trap Clients

A trap client is a management workstation configured to receive and process traps. The Catalyst 2820 or 1900 supports up to four trap clients but has no trap clients defined as a default. An empty trap client list disables the generation of all traps.

Traps use their own community strings and receiver messages. You can use the MIB objects described in the following sections to configure a trap client.

netMgmtTrapClientTable

This table contains a list of Network Management Stations (NMS) that are to receive traps generated by this Network Management Agent. Such an NMS is called a trap client. A trap client entry whose IP address is 0.0.0.0 is considered invalid and is ignored.

netMgmtTrapClientEntry

This read-only MIB object displays a destination address and community string to a particular trap client.

netMgmtTrapClientIndex (integer)

This read-only MIB object provides identification of a trap client entry.

Valid Values: 1 to 4

netMgmtTrapClientAddr (IpAddress)

The trap client is assumed to be Internet UDP/IP based. This read-write MIB object is the client's IP address.

netMgmtTrapClientComm (display string)

This read-write MIB object displays the community string of up to 32 characters used for traps sent to this trap client.

netMgmtTrapClientStatus (integer)

When this read-write MIB object is set to the value invalid, it has the effect of invalidating the corresponding entry. That is, it effectively disassociates the IP address/community string identified with said entry from the table. It is an implementation-specific matter as to whether the agent removes an invalidated entry from the table. Accordingly, management stations must be prepared to receive tabular information from agents that corresponds to entries not currently in use.

Valid Values:	other	(1)
	invalid	(2)
Default Value	permanent	(3)

Catalyst 2820 and 1900 Traps

The Catalyst 2820 and 1900 can generate five standard traps and two enterprise-specific traps. You can use MIB objects to suppress the generation of the authenticationFailure traps and the linkUp and linkDown traps.

The coldStart Trap

This trap is generated at power-on reset.

The warmStart Trap

This trap is generated by setting the sysConfigReset MIB object or sysConfigDefaultReset object. This trap is automatically generated after a firmware upgrade or by executing the **reset** command from one of the out-of-band management console menus.

The linkDown Trap

This trap is produced whenever a port changes to a suspended or disabled state due to a secure address violation (mismatch or duplication), network connection error (loss of Link Beat, jabber error), or an explicit management disable action. The trap frame carries the index value of the port. The following MIB is used to enable or disable the generation of this trap.

netMgmtEnableLinkTraps (integer)

This read-write MIB object indicates whether the Catalyst 2820 or 1900 is permitted to generate linkUp/linkDown traps. The value of this object overrides any configuration information, providing a means whereby all linkUp/linkDown traps can be disabled.

Valid Values: enabled (1)

disabled (2)

Default Value: enabled (1)

The linkUp Trap

This trap reports a port transition from a suspended or disabled state to the enabled state. The trap frame contains the index value of the affected port. The netMgmtEnableLinkTraps MIB, described under the section “The linkDown Trap,” can be used to enable or disable this trap.

The authenticationFailure Trap

This trap is generated whenever the Catalyst 2820 or 1900 receives an SNMP message that is not properly authenticated, that is, not accompanied by a valid community string. Use the following MIB to set this trap.

netMgmtEnableAuthenTraps (integer)

This read-write MIB object indicates whether the Catalyst 2820 or 1900 is permitted to generate authenticationFailure traps. The value of this object overrides any configuration information, providing a means whereby all authenticationFailure traps can be disabled.

This object manipulates the same value for the snmpEnableAuthenTraps object instance. The object is specified in this group for convenience.

Valid Values: enabled (1)

disabled (2)

Default Value: enabled (1)

The logonIntruder Trap

This enterprise-specific trap is generated when the out-of-band management console experiences successive logon failures due to invalid passwords. You can define the number of unsuccessful attempts with the netMgmtConsolePasswordThresh MIB object. Depending on the configuration of the netMgmtConsoleSilentTime MIB object, the Catalyst 2820 or 1900 can shut down the management console after the generation of this trap. The trap frame contains the name of the Catalyst 2820 or 1900 (the value of the sysName MIB object or a null name).

logonIntruder

A user is repeatedly trying to log on using an invalid password. The number of attempts exceeds the preset limit given in netMgmtConsolePasswordThresh. Depending on how the object netMgmtConsoleSilentTime is configured, the Catalyst 2820 or 1900 can shut down the management console following the generation of this trap.

The switchDiagnostic Trap

The Catalyst 2820 or 1900 issues this enterprise-specific trap when its power-on self-test (POST) does not pass all tests. Some POST failures are fatal and can prevent the generation of this trap. The trap frame contains the name of the sending Catalyst 2820 or 1900 (the value of the sysName MIB object) or a null name. If a POST failure is not fatal, a trap client can query the Catalyst 2820 or 1900 for the actual failure codes stored in the sysInfoPOSTResult and sysInfoPOSTPortVector MIB objects.

The addressViolation Trap

The addressViolation trap is issued when an address violation is detected on a secured port. The generation of the addressViolation trap can be enabled or suppressed using the object sysConfigAddressViolationAlert.

The broadcastStorm Trap

The broadcastStorm trap is issued when the number of broadcast packets received in a second from a port is higher than the broadcast threshold (via sysConfigBroadcastThreshold). The generation of this trap can be enabled or suppressed using the object sysConfigBroadcastStorm.

The rpsFailed Trap

This trap is issued when the redundant power supply connected to the switch failed.

Traps for Use by Bridges

The following traps are for the Spanning-Tree Protocol.

The newRoot Trap

The newRoot trap indicates that the sending agent has become the new root of the spanning tree. The trap is sent by a bridge upon expiration of the Topology Change Timer immediately after its election as the new root.

The topologyChange Trap

A topologyChange trap is sent by a bridge when any of its configured ports changes from the Learning state to the Forwarding state or from the Forwarding state to the Blocking state. The trap is not sent if a newRoot trap is sent for the same transition.

Standard MIBs and MIB Extensions

The Catalyst 2820 and 1900 support all groups in MIB II except the Transmission Control Protocol (TCP) and the Exterior Gateway Protocol.

Tables 1-1 through 1-5 on the following pages list the actions you use to manage and configure a Catalyst 2820 or 1900 and the MIB objects associated with each action.

The following are the five supported MIBs:

- Catalyst 2820 and 1900 enterprise-specific MIB
- Catalyst 2820 Module MIB (Catalyst 2820 only)
- Bridge MIB: RFC 1493
- FDDI MIB: SMT 7.3 (Catalyst 2820 only)
- EIA/TIA-232 MIB: RFC 1373

Note EIA/TIA-232 was known as recommended standard RS-232 before its acceptance as a standard by the Electronic Industries Association (EIA) and Telecommunications Industry Association (TIA). Because RS-232 appears on the out-of-band management screens and in names of supported MIB objects, this manual also uses RS-232.

Catalyst 2820 or 1900 Enterprise-Specific MIB

Table 1-1 Catalyst 2820 or 1900 MIB Objects

Action	Associated MIB Objects
View Self-Test Results	sysInfoPOSTResult
	sysInfoPOSTPortFailedPostMap
View System Information	sysInfoFwdEngineRevision
	sysInfoBoardRevision
	sysInfoTotalNumberOfPorts
	sysInfoNumberOfSwitchPorts
	sysInfoNumberOfInstalledModules
	sysInfoNumberOfSharedPorts
	sysInfoAddrCapacity
	sysInfoRestrictedStaticAddrCapacity
	sysInfoBroadcastStormLastTime
	sysInfoPortExceedBroadcastStorm
	sysInfoRedundantPowerState
	sysInfoInternalPowerState
View/Configure RS-232 Port for an Attached Modem	netMgmtModemInitString
	netMgmtModemAutoAnswer
	netMgmtModemDialString
	netMgmtModemDialDelay
View/Configure Logon Security	netMgmtConsolePasswordThresh
	netMgmtConsoleSilentTime
	netMgmtConsoleInactTime
View/Configure Switching Mode	sysConfigSwitchingMode
	sysConfigMulticastStoreAndForward

Action	Associated MIB Objects
View/Configure Port Monitoring Mode	sysConfigMonitor
	sysConfigMonitorPort
	sysConfigHigherProtocolMonitor
	swPortMonitoring
View/Configure Virtual LAN Information	vlanMaxSupported
	vlanAllowMembershipOverlap
View/Configure Virtual LAN Membership	vlanIndex
	vlanName
	vlanMemberPorts
	vlanMemberIndex
	vlanMemberPortIndex
	vlanMemberPortOfVlan
View/Configure Address Security	swPortAddressingSecurity
	swPortAddressTableSize
	swPortSecuredAddressViolations
	sysConfigAddressViolationAlert
	sysConfigAddressViolationAction

Action	Associated MIB Objects
View/Configure Performance Information	sysInfoBuffersUsed
	sysInfoMaxBuffers
	sysInfoUtilDisplay
	swPortTxQueueFullDiscards
	swPortRxNoBufferDiscards
	bandwidthUsageCurrent
	bandwidthUsageMaxPeakEntries
	bandwidthUsagePeakInterval
	bandwidthUsagePeakRestart
	bandwidthUsageCurrentPeakEntry
	bandwidthUsagePeakIndex
	bandwidthUsageStartTime
	bandwidthUsagePeak
	bandwidthUsagePeakTime
View/Configure Broadcast Storm Control	sysConfigBroadcastStormAction
	sysConfigBroadcastStormAlert
	sysConfigBroadcastThreshold
	sysConfigBroadcastReEnableThreshold
View/Configure Port Characteristics	swPortIndex
	swPortName
	swPortMediaCapability
	swPortControllerRevision
	swPortMtu
	swPortSpeed
	swPortConnectorType
	sysConfigPort25Connector
	swPortFullDuplex

Action	Associated MIB Objects
View/Configure Port Address Status	swPortNumberOfLearnedAddresses
	swPortNumberOfStaticAddresses
	swPortEraseAddresses
	swPortFloodUnregisteredMulticasts
	swPortFloodUnknownUnicasts
View Port Receive Statistics	swPortRxStatIndex
	swPortRxTotalOctets
	swPortRxTotalOctetsWraps
	swPortRxTotalFrames
	swPortRxUnicastFrames
	swPortRxUnicastOctets
	swPortRxUnicastOctetsWraps
	swPortRxBroadcastFrames
	swPortRxBroadcastOctets
	swPortRxBroadcastOctetsWraps
	swPortRxMulticastFrames
	swPortRxMulticastOctets
	swPortRxMulticastOctetsWraps
	swPortRxForwardedFrames
	swPortRxFilteredFrames
	swPortRxNoBufferDiscards
	swPortRxFCSErrors
	swPortRxAlignmentErrors
	swPortRxFrameTooLongs
	swPortRxRunts

Action	Associated MIB Objects
View/Configure Port Status	swPortStatus
	swPortAdminStatus
	swPortLastStatus
	swPortStatusChanges
	swPortLinkbeatStatus
	swPortLinkbeatLosses
	swPortJabberStatus
	swPortJabbers
	swPortBroadcastStormBlocked

Action	Associated MIB Objects
View Port Transmit Statistics	swPortTxStatIndex
	swPortTxTotalOctets
	swPortTxTotalOctetsWraps
	swPortTxTotalFrames
	swPortTxUnicastFrames
	swPortTxUnicastOctets
	swPortTxUnicastOctetsWraps
	swPortTxBroadcastFrames
	swPortTxBroadcastOctets
	swPortTxBroadcastOctetsWraps
	swPortTxMulticastFrames
	swPortTxMulticastOctets
	swPortTxMulticastOctetsWraps
	swPortTxDeferrals
	swPortTxSingleCollisions
	swPortTxMultipleCollisions
	swPortTxLateCollisions
	swPortTxExcessiveCollisions
	swPortTxExcessiveDeferrals
	swPortTxExcessiveCollisions16s
	swPortTxExcessiveCollisions4s
	swPortTxQueueFullDiscards
	swPortTxErrors
View/Configure Collision Histograms	swPortTxCollIndex
	swPortTxCollCount
	swPortTxCollFrequencies
View/Configure Spanning-Tree Protocol	sysConfigEnableSTP

Action	Associated MIB Objects
View/Configure for In-Band Management	netMgmtIpAddress
	netMgmtDefaultGateway
	netMgmtIpSubnetMask
	vlanIpAddress
	vlanIpSubnetMask
View/Configure Set Clients	netMgmtSetClientIndex
	netMgmtSetClientAddr
	netMgmtSetClientStatus
View/Configure Trap Clients and Traps	netMgmtTrapClientIndex
	netMgmtTrapClientAddr
	netMgmtTrapClientComm
	netMgmtTrapClientStatus
	netMgmtEnableLinkTraps
	netMgmtEnableAuthenTraps
	logonIntruder
	topologyChange
	switchDiagnostic
	newRoot
View/Configure Firmware Upgrades	upgradeFirmwareSource
	upgradeEPROMRevision
	upgradeFlashSize
	upgradeFlashBankStatus
	upgradeTFTPServerAddress
	upgradeTFTPLoadFilename
	upgradeTFTPInitiate
	upgradeAutoExecute
	upgradeTFTPAccept

Action	Associated MIB Objects
Reset System	sysConfigReset
	sysConfigDefaultReset
Clear Port Statistics	sysConfigClearPortStats
	swPortClearStatistics

Catalyst 2820 Module MIB

Table 1-2 Catalyst 2820 Module MIB Objects

Action	Associated MIB Objects
View/Configure High-Speed Modules	esModuleCapacity
	esModuleIndex
	esModuleStatus
	esModuleAdminStatus
	esModuleDescr
	esModuleID
	esModuleVersion
	esModuleObjectID
	esModulePortCapacity
	esModuleReset
	esModuleLastStatusChange
	esModuleCollisionPeriods
	esModulePortTable
	esModulePortIndex
	esModulePortDescr
	esModulePortAdminStatus
	esModulePortAutoPartitionState
	esModulePortOperStatus
	esModulePortLinkbeatStatus
	esModulePortConnectorType
	esModulePortReceivePeriods
FDDI Portion of Module MIB	
View FDDI POST Results	fmCfgPOSTResult
	fmCfgPOSTTest
	fmCfgPOSTLoopbackResult

Action	Associated MIB Objects
Reset FDDI Module	fmCfgResetToFactoryDefaults
	fmCfgResetModule
View/Configure FDDI to Ethernet Frame Translation	fmCfgNovellFDDISNAPTranslation
	fmCfgUnmatchedSNAPDestination
View/Configure SMT Authorization	fmCfgAuthorizationChecking
	fmCfgAuthorizationString
View/Configure FDDI Module Firmware Status	fmCfgFirmwareVersion
	fmCfgBOOTCodeVersion
	fmCfgFlashStatus
View FDDI Translation to Ethernet Statistics	fmXlateToEthIndex
	fmXlateToEthNovellSnapToRaw8023Frames
	fmXlateToEthNovellSnapToEthIIFrames
	fmXlateToEthNovellSnapToSnapFrames
	fmXlateToEthAppleTalkSnapToSnapFrames
	fmXlateToEthIpSnapForFragmentationFrames
	fmXlateToEthIpSnapFragmentedFrames
	fmXlateToEthBridgeTunnelToEthIIFrames
	fmXlateToEthOtherSnapToEthIIFrames
	fmXlateToEthOtherSnapToSnapFrames
	fmXlateToEth8022To8022Frames
View FDDI Translation to FDDI	fmXlateToFDDIIndex
	fmXlateToFDDINovellRaw8023ToSnapFrames
	fmXlateToFDDINovellEthIIToSnapFrames
	fmXlateToFDDINovellSnapToSnapFrames
	fmXlateToFDDIEthIIToBridgeTunnelFrames
	fmXlateToFDDIEthIIToSnapFrames
	fmXlateToFDDIOtherSnapToSnapFrames
	fmXlateToFDDI8022To8022Frames

Action	Associated MIB Objects
View FDDI Frame Filtering Statistics	fmFilterIndex
	fmFilterFcsInvalidFrames
	fmFilterDataLengthFrames
	fmFilterErrorIndFrames
	fmFilterFddiFifoOverrunFrames
	fmFilterFddiInternalErrorFrame
	fmFilterNoEndDelimitFrames
	fmFilterNoLlcHeaderFrames
	fmFilterSourceRouteFrames
	fmFilterNoSnapHeaderFrames
	fmFilterTooLargeFrames
	fmFilterNovellSnapFilteredFrames
	fmFilterCantFragmentFrames
	fmFilterBadIpHeaderFrames
	fmFilterRingDownDiscards
	fmFilterNovellOtherFilteredFrames
View FDDI Performance Information	fmFilterNoBufferSpaceFrames
	fmCfgUnmatchedSNAPDestination

Bridge MIB (RFC 1493)

Table 1-3 Bridge MIB Objects

Action	Associated MIB Objects
View Spanning-Tree Protocol Status	dot1dStpTimeSinceTopologyChange
	dot1dStpTopChanges
	dot1dStpDesignatedRoot
	dot1dStpMaxAge
	dot1dStpHelloTime
	dot1dStpHoldTime
	dot1dStpFowardDelay
	dot1dStpProtocolSpecification
	dot1dStpRootCost
	dot1dStpRootPort
View/Configure Spanning-Tree Protocol Parameters when this Bridge is Acting as Root	dot1dBridgeHelloTime
	dot1dBridgeMaxAge
	dot1dBridgeForwardDelay
View/Configure Spanning-Tree Protocol Parameters	dot1dStpPriority
View/Configure Per Port Spanning-Tree Protocol Status	dot1dStpPortPriority
	dot1dStpPortState
	dot1dStpPortEnable
	dot1dStpPortPathCost
	dot1dStpPortDesignatedRoot
	dot1dStpPortDesignatedCost
	dot1dStpPortDesignatedBridge
	dot1dStpPortDesignatedPort
	dot1dStpPortForwardTransitions

Action	Associated MIB Objects
View/Configure Address Aging Parameters	dot1dTpLearnedEntryDiscards
	dot1dTpAgingTime
View/Configure the Forwarding Database of the Bridge	dot1dTpFdbAddress
	dot1dTpFdbPort
	dot1dTpFdbStatus
View/Configure the Static Address Table	dot1dStaticAddress
	dot1dStaticReceivePort
	dot1dStaticAllowedToGoTo
	dot1dStaticStatus

FDDI MIB: SMT 7.3

Table 1-4 FDDI MIB Objects

Action	Associated MIB Objects
View SMT Information	fddimibSMTStationId
	fddimibSMTOpVersionId
	fddimibSMTMIBVersionId
	fddimibSMTMACCts
	fddimibSMTNonMasterCts
	fddimibSMTConnectionPolicy
	fddimibSMTBypassPresent
	fddimibSMTECMState
	fddimibSMTCFState
	fddimibSMTRemoteDisconnectFlag
	fddimibSMTStationStatus
View/Configure SMT Information	fddimibSMTNotify

Action	Associated MIB Objects
View MAC Information	fddimibMACFrameStatusFunctions
	fddimibMACAvailablePaths
	fddimibMACUpstreamNbr
	fddimibMACDownstreamNbr
	fddimibMACOldUpstreamNbr
	fddimibMACOldDownstreamNbr
	fddimibMACDownstreamPORTType
	fddimibMACTReq
	fddimibMACTNeg
	fddimibMACFrameErrorThreshold
View MAC Traffic Statistics	fddimibMACFrameCts
	fddimibMACCopiedCts
	fddimibMACTransmitCts
	fddimibMACErrorCts
	fddimibMACLostCts
	fddimibMACTokenCts
	fddimibMACTvxExpiredCts
	fddimibMACNotCopiedCts
	fddimibMACLateCts
	fddimibMACRingOpCts
	fddimibMACNotCopiedRatio
	fddimibMACNotCopiedFlag

Action	Associated MIB Objects
View Port Information	fddimibPORTMyType
	fddimibPORTNeighborType
	fddimibPORTConnectionPolicies
	fddimibPORTCurrentPath
	fddimibPORTAvailablePaths
	fddimibPORTPMDClass
	fddimibPORTLCTFailCts
	fddimibPORTLemRejectCts
	fddimibPORTLemCts
	fddimibPORTPCMState

RS-232 MIB (RFC 1317)

Table 1-5 RS-232 MIB Objects

Action	Associated MIB Objects
View RS-232 Port Input/Output Signals	rs232InSigPortIndex
	rs232InSigName
	rs232InSigState
	rs232InSigChanges
	rs232OutSigPortIndex
	rs232OutSigName
	rs232OutSigState
	rs232OutSigChanges
View/Configure RS-232 Port Characteristics	rs232Number
	rs232PortIndex
	rs232PortType
	rs232PortInSigNumber
	rs232PortOutSigNumber
	rs232PortInSpeed
	rs232PortOutSpeed
View/Configure RS-232 Async Port Characteristics	rs232AsyncPortIndex
	rs232AsyncPortBits
	rs232AsyncPortStopBits
	rs232AsyncPortParity
	rs232AsyncPortAutobaud
View RS-232 Async Port Statistics	rs232AsyncPortParityErrs
	rs232AsyncPortFramingErrs
	rs232AsyncPortOverrunErrs