

In-Band Management

This chapter describes how to use Telnet or SNMP to access the FastHub through a workstation and configure the FastHub for SNMP management using the Bootstrap Protocol/Dynamic Host Control Protocol (BOOTP/DHCP). The chapter lists the actions for managing and configuring a FastHub, the Management Information Base (MIB) objects associated with each action, and the traps generated by the BMM.

Using SNMP, the BMM communicates with a third-party network-management application through its in-band management interface (the SNMP agent). The BMM can be managed in-band through any SNMP-compatible workstation or through Telnet.

Using Telnet

You can use any Telnet TCP/IP package to access the management console. The BMM supports up to seven simultaneous Telnet sessions. The Telnet package must support VT100 terminal emulation. See the “Out-of-Band Management” chapter for details on using the management console.

Configuring the BMM for SNMP Management with BOOTP/DHCP

Before beginning any in-band management, you must configure the BMM for SNMP management by assigning an IP address to the BMM. You can assign an individual IP address to each BMM or use the BOOTP/DHCP protocol to maintain a centralized database of these addresses. To assign an individual IP address to a BMM, use the IP Configuration menu described in the “IP Configuration Menu” section in the “Out-of-Band Management” chapter.

Note DHCP is a set of extensions to the BOOTP. BOOTP servers that do not understand DHCP options simply discard them.

To assign an IP address to a BMM using BOOTP/DHCP protocol, set up a database containing a list of physical MAC addresses and corresponding IP addresses on a host machine with a BOOTP/DHCP server program. You can store other information in the database, such as the corresponding subnet masks, default gateway addresses, and host names, but this information is optional. The BMM must be able to access the BOOTP/DHCP server through a BMM port.

After a system reset, the BMM searches its nonvolatile random-access memory (NVRAM) for a configured BMM IP address. If one exists, the BMM then searches for a default gateway address and an IP subnet mask.

If a BMM IP address has not been configured, the BMM transmits a BOOTP/DHCP request to all physically connected ports, requesting a mapping for each port's physical MAC address. A valid response includes the IP address, which is mandatory, along with the subnet mask, the default gateway, and the host name, which are optional.

The reception of a valid BOOTP/DHCP response immediately activates the rest of the system's protocol suite, without requiring a system reset. The information is also saved in NVRAM, so the next reset does not have to use BOOTP/DHCP. For more information about using BOOTP/DHCP, see the BOOTP/DHCP server documentation.

FastHub and SNMP Management Platforms

In general, you use SNMP network-management applications to locate the FastHub icon and access the table of BMM objects. You can then view the characteristics and counters describing the BMM and set object values as defined in the BMM-supported MIBs.

CiscoWorks applications, one method of SNMP network management, are integrated on several SNMP-based network management platforms, including SunNet Manager, HP Open View, and IBM NetView. Contact your authorized Cisco sales representative for detailed information on CiscoWorks.

The complete set of BMM MIB objects are listed by function (user action) in the “Standard MIBs and MIB Extensions” section in this chapter. These MIB objects and other SNMP-based management techniques are described in detail in the software code comments of each MIB.

Standard MIBs and MIB Extensions

This section lists the actions you use to configure and manage a BMM and the MIB objects associated with each action. The following MIBs are supported:

- MIB II – RFC 1213
- Enterprise-Specific MIB
- Ethernet Transmission MIB – RFC 1643
- Bridge MIB – RFC1 1493
- Repeater MIB – RFC 1516
- Remote Monitoring MIB – RFC 1757
- RS-232 MIB – RFC 1317
- Cisco Discovery Protocol (CDP) MIB
- Cisco StackMaker MIB
- Cisco Memory Pool MIB

Note The MIB II is not documented in this manual. See RFC 1213.

Note EIA/TIA-232 was known as recommended standard RS-232 before its acceptance by the Electronics Industries Association (EIA) and Telecommunications Industry Association (TIA). However, because RS-232 appears in the names of supported MIB objects, this manual uses RS-232.

Enterprise-Specific MIB

Action	Associated MIB Objects
View/Configure Hub Stack	mrStackUnitCapacity mrStackNumberOfUnitsPresent mrStackSelectPrimarySupervisorUnit
Clear Stack Statistics	mrStackClearStatistics
View/Configure POST	mrStackPOSTSelect
Reset Hub Stack	mrStackReset mrStackDefaultReset
View number of short event loops and jabber loops corrected	mrStackShortJabberLoopCorrections
View/Configure supervisor log	mrSupervisorClearLogTable mrSupervisorLogIndex mrSupervisorLogTime mrSupervisorLogInfo
View/Configure FastHub (Unit)	mrStackUnitIndex mrStackUnitPresent mrStackUnitFirstGroupIndex mrStackUnitLastGroupIndex mrStackUnitSupervisorPresent mrStackUnitSupervisorMajorVersion mrStackUnitSupervisorMinorVersion mrStackUnitSupervisorBootstrapMajorVersion mrStackUnitSupervisorBootstrapMinorVersion mrStackPortVisualIndicatorSelect mrStackUnitBasePortVisualIndicatorGreenMap mrStackUnitBasePortVisualIndicatorAmberMap mrStackUnitActivityVisualIndicator mrStackUnitCollisionVisualIndicator mrStackUnitInternalPowerState
View POST Results	mrStackUnitPOSTResult
View Primary BMM	mrStackUnitSupervisorIsPrimary
View/Configure 100BaseTX/16 Port Expansion Module	mrStackUnitExpansionModulePresent mrStackUnitExpansionPortVisualIndicatorGreenMap mrStackUnitExpansionPortVisualIndicatorAmberMap

Action	Associated MIB Objects
View Unit Redundant Power System (RPS) Status	mrStackUnitRPSStatus mrStackUnitRPSVisualIndicator mrStackUnitRPSState
View/Configure Bridge Management Module (BMM)	mrStackUnitNumberOfBridgePorts mrStackUnitFirstBridgeIfIndex mrStackUnitLastBridgeIfIndex mrStackUnitBridgeBuffersUsed mrStackUnitMaxBridgeBuffersUsedExceeds mrStackUnitBridgeAddressCapacity mrStackUnitBridgeRestrictedAddressCapacity mrStackUnitBridgeVisualIndicatorGreenMap mrStackUnitBridgeVisualIndicatorAmberMap mrStackUnitBridgeMode mrStackUnitBridgeMulticastStoreAndForward mrStackUnitBridgeEnableMonitor mrStackUnitBridgeMonitorPort
View/Configure Bridging Functionality	mrBridgeHeuristics mrBridgeEnableSTP mrBridgeBroadcastStormAction mrBridgeBroadcastStormAlert mrBridgeBroadcastStormThreshold mrBridgeBroadcastReenableThreshold mrBridgeBroadcastStormLastTime mrBridgePortExceedBroadcastStorm

Standard MIBs and MIB Extensions

Action	Associated MIB Objects
View/Configure Bridge Ports	mrBridgePortIndex mrBridgePortName mrBridgePortMediaCapability mrBridgePortConnectorType mrBridgePortEnhancedCongestionControl mrBridgePortFullDuplex mrBridgePortDuplexStatus mrBridgePortBackPressure mrBridgePortFlowControl mrBridgePortACR mrBridgePortStatus mrBridgePortAdminStatus mrBridgePortLastStatus mrBridgePortStatusChanges mrBridgePortAddressTableSize mrBridgePortNumberOfLearnedAddresses mrBridgePortNumberOfStaticAddresses mrBridgePortEraseAddresses mrBridgePortFloodUnrecognizedMulticasts mrBridgePortFloodUnknownUnicasts mrBridgePortMonitoring mrBridgePortLinkbeatStatus mrBridgePortLinkbeatLosses mrBridgePortJabberStatus mrBridgePortJabbers mrBridgePortRxNoBufferDiscards mrBridgePortTxQueueFullDiscards
View/Configure the Management Console	mrNetMgmtConsoleInactTime mrNetMgmtConsolePasswordThreshold mrNetMgmtConsoleSilentTime
View/Configure Network Addressing and Routing Information Protocol (RIP)	mrNetMgmtIpAddress mrNetMgmtIpSubnetMask mrNetMgmtDefaultGateway mrNetMgmtEnableRIP
View/Configure Network Domain Server and Path	mrNetMgmtDomainServer1IpAddress mrNetMgmtDomainServer2IpAddress mrNetMgmtDefaultSearchDomain

Action	Associated MIB Objects
Configure a Modem (RS-232 port)	mrNetMgmtModemInitString mrNetMgmtModemDialString mrNetMgmtModemDialDelay mrNetMgmtModemAutoAnswer
View/Configure Network Management Traps	mrNetMgmtEnableAuthenTraps mrNetMgmtEnableLinkTraps
View/Configure Set Clients	mrNetMgmtSetClientIndex mrNetMgmtSetClientName mrNetMgmtSetClientStatus
View/Configure Trap Clients and Traps	mrNetMgmtTrapClientIndex mrNetMgmtTrapClientName mrNetMgmtTrapClientComm mrNetMgmtTrapClientStatus mrLogonIntruder mrHubStackDiagnostic mrRpsFailed mrIpAddressChange mrBroadcastStorm
Upgrade FastHub Firmware	mrUpgradeFlashSize mrUpgradeLastUpgradeTime mrUpgradeLastUpgradeSource mrUpgradeLastUpgradeStatus mrUpgradeTFTPServerAddress mrUpgradeTFTPLoadFilename mrUpgradeTFTPInitiate mrUpgradeTFTPAccept

Ethernet MIB

Action	Associated MIB Objects
View/Configure Ethernet-Like Statistics	dot3StatsIndex dot3StatsAlignmentErrors dot3StatsFCSErrors dot3StatsSQETestErrors dot3StatsDeferredTransmissions dot3StatsInternalMacTransmitErrors dot3StatsCarrierSenseErrors dot3StatsFrameTooLongs dot3StatsInternalMacReceiveErrors dot3StatsEtherChipSet
View/Configure Ethernet-Like Collision Statistics	dot3StatsSingleCollisionFrames dot3StatsMultipleCollisionFrames dot3StatsLateCollisions dot3StatsExcessiveCollisions dot3CollCount dot3CollFrequencies

Bridge MIB

Action	Associated MIB Objects
View the Bridge MAC Address	dot1dBaseBridgeAddress
View the Bridging Type	dot1dBaseType
View Bridge Port Information	dot1dBaseNumPorts dot1dBasePort dot1dBasePortIfIndex dot1dBasePortCircuit dot1dBasePortDelayExceededDiscards dot1dBasePortMtuExceededDiscards
View Transparent Bridge Port Information	dot1dTpPort dot1dTpPortMaxInfo dot1dTpPortInFrames dot1dTpPortOutFrames dot1dTpPortInDiscards

Action	Associated MIB Objects
View Port Number for Spanning-Tree Protocol	dot1dStpPort
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
View/Configure Address Aging Parameters	dot1dTpLearnedEntryDiscards dot1dTpAgingTime
View/Configure the Bridge Forwarding Database	dot1dTpFdbAddress dot1dTpFdbPort dot1dTpFdbStatus
View/Configure the Static Address Table	dot1dStaticAddress dot1dStaticReceivePort dot1dStaticAllowedToGoTo dot1dStaticStatus

Repeater MIB

Action	Associated MIB Objects
View FastHub Operational Status	rpTrGroupCapacity rpTrOperStatus rpTrHealthText rpTrTotalPartitionedPorts rpTrMonitorTransmitCollisions
Reset/Test FastHub	rpTrReset rpTrNonDisruptTest
View/Configure FastHub Ports	rpTrPortGroupIndex rpTrPortIndex rpTrPortAdminStatus rpTrPortAutoPartitionState rpTrPortOperStatus rpTrPortConnectorType rpTrPortLinkbeatStatus rpTrPortName
View/Configure FastHub Groups	rpTrGroupIndex rpTrGroupDescr rpTrGroupObjectID rpTrGroupOperStatus rpTrGroupLastOperStatusChange rpTrGroupPortCapacity
View FastHub Group Statistics	rpTrMonitorGroupIndex rpTrMonitorGroupTotalFrames rpTrMonitorGroupTotalOctets rpTrMonitorGroupTotalErrors
View FastHub Port Statistics	rpTrMonitorPortGroupIndex rpTrMonitorPortIndex rpTrMonitorPortReadableFrames rpTrMonitorPortReadableOctets rpTrMonitorPortFCSErrors rpTrMonitorPortAlignmentErrors rpTrMonitorPortFrameTooLongs rpTrMonitorPortShortEvents rpTrMonitorPortRunts rpTrMonitorPortCollisions

Action	Associated MIB Objects
View FastHub Port Statistics (continued)	rpTrMonitorPortLateEvents rpTrMonitorPortVeryLongEvents rpTrMonitorPortDataRateMismatches rpTrMonitorPortAutoPartitions rpTrMonitorPortTotalErrors rpTrMonitorPortIsolates rpTrMonitorPortSymbolErrors
View Address Tracking Information	rpTrAddrTrackGroupIndex rpTrAddrTrackPortIndex rpTrAddrTrackLastSourceAddress rpTrAddrTrackSourceAddrChanges rpTrAddrTrackNewLastSrcAddress
View/Configure Repeater Traps	rpTrHealth rpTrGroupChange rpTrResetEvent

Remote Monitoring MIB

Action	Associated MIB Objects
View/Configure Ethernet Statistics Group	etherStatsIndex etherStatsDataSource etherStatsDropEvents etherStatsOctets etherStatsPkts etherStatsBroadcastPkts etherStatsMulticastPkts etherStatsCRCAlignErrors etherStatsUndersizePkts etherStatsOversizePkts etherStatsFragments etherStatsJabbers etherStatsCollisions etherStatsPkts64Octets etherStatsPkts65to127Octets etherStatsPkts128to255Octets etherStatsPkts256to511Octets

Standard MIBs and MIB Extensions

Action	Associated MIB Objects
View/Configure Ethernet Statistics Group (continued)	etherStatsPkts512to1023Octets etherStatsPkts1024to1518Octets etherStatsOwner etherStatsStatus
View/Configure History Control Group	historyControlIndex historyControlDataSource historyControlBucketsRequested historyControlBucketsGranted historyControlInterval historyControlOwner historyControlStatus
View History Group Statistics	etherHistoryIndex etherHistorySampleIndex etherHistoryIntervalStart etherHistoryDropEvents etherHistoryOctets etherHistoryPkts etherHistoryBroadcastPkts etherHistoryMulticastPkts etherHistoryCRCAlignErrors etherHistoryUndersizePkts etherHistoryOversizePkts etherHistoryFragments etherHistoryJabbers etherHistoryCollisions etherHistoryUtilization
View/Configure Alarm Group	alarmIndex alarmInterval alarmVariable alarmSampleType alarmValue alarmStartupAlarm alarmRisingThreshold alarmFallingThreshold alarmRisingEventIndex alarmFallingEventIndex

Action	Associated MIB Objects
View/Configure Alarm Group (continued)	alarmOwner alarmStatus
View/Configure Event Group	eventIndex eventDescription eventType eventCommunity eventLastTimeSent eventOwner eventStatus logEventIndex logIndex logTime logDescription
View Remote Monitoring Traps	risingAlarm fallingAlarm

RS-232 MIB

Action	Associated MIB Objects
View/Configure RS-232 Port Characteristics	rs232Number rs232PortIndex rs232PortType rs232PortInSigNumber rs232PortOutSigNumber rs232PortInSpeed rs232PortOutSpeed
View RS-232 Port Input/Output Signals	rs232InSigPortIndex rs232InSigName rs232InSigState rs232InSigChanges rs232OutSigPortIndex rs232OutSigName rs232OutSigState rs232OutSigChanges

Standard MIBs and MIB Extensions

Action	Associated MIB Objects
View/Configure RS-232 Async Port Characteristics	rs232AsyncPortIndex rs232AsyncPortBits rs232AsyncPortStopBits rs232AsyncPortParity rs232AsyncPortAutobaud
View RS-232 Async Port Statistics	rs232AsyncPortParityErrs rs232AsyncPortFramingErrs rs232AsyncPortOverrunErrs

Cisco Discovery Protocol MIB

Action	Associated MIB Objects
View/Configure CDP Interfaces	cdpInterfaceIfIndex cdpInterfaceEnable cdpInterfaceMessageInterval cdpInterfaceGroup cdpInterfacePort
View CDP Cache	cdpCachelfIndex cdpCacheDeviceIndex cdpCacheAddressType cdpCacheAddress cdpCacheVersion cdpCacheDeviceId cdpCacheDevicePort cdpCachePlatform cdpCacheCapabilities

StackMaker MIB

Action	Associated MIB Objects
View/Configure Stack Name	csmStackName
View Stack Index	csmStackIndex
View/Configure Stack IP Address	csmStackIpAddress
Clear Stack Table	csmClearStackTable

Cisco Memory Pool MIB

Action	Associated MIB Objects
View Memory Pool Monitoring Entries	ciscoMemoryPoolType ciscoMemoryPoolName ciscoMemoryPoolAlternate ciscoMemoryPoolValid ciscoMemoryPoolUsed ciscoMemoryPoolFree ciscoMemoryPoolLargestFree

Trap Clients and Traps

A trap client is a management workstation configured to receive and process traps. The FastHub supports up to four trap clients with separate community strings. At least one trap client must be defined before any traps are generated. See the section “SNMP Management Menu” in the “Out-of-Band Management” chapter for instructions on defining trap clients. The FastHub generates the traps described in the following sections.

MIB II Traps

warmStart

Generated when the repeater is reset or after the completion of a firmware upgrade.

coldStart

Generated upon a power-up reset.

linkDown

This trap is currently not generated by the FastHub.

linkUp

This trap is currently not generated by the FastHub.

authenticationFailure

Generated when the FastHub receives an SNMP message that is not accompanied by a valid community string.

Enterprise-Specific Traps

mrLogonIntruder

A user is repeatedly trying to log on to the management console using an invalid password. You can define the number of invalid passwords permitted before this trap is generated. The BMM can shut down the management console following the generation of this trap.

mrHubStackDiagnostic

The BMM issues this trap when its power-on self-test (POST) does not pass all tests. However, note that some failures are catastrophic, preventing the generation of this trap.

mrRpsFailed

A redundant power source is connected to the BMM, but a failure exists in the power system.

mrIpAddressChange

This trap is issued when the BMM supervisor is unable to complete its DHCPDISCOVER/DHCPREQUEST process, when it fails to extend the lease for the current address, or when it accepts an address change from the user.

mrBroadcastStorm

This trap is issued when broadcast storm control is enabled and the number of broadcast packets per second received from a port is higher than the broadcast threshold. Use the object mrBridgeBroadcastStormAlert to enable or suppress the generation of this trap.

Bridge Traps

newRoot

This trap is issued when a bridge becomes the new spanning-tree root. The trap occurs at the end of the time period provided by the Topology Change Timer.

topologyChange

This trap is issued when a bridge port transitions from learning mode to forwarding mode, or from forwarding mode to blocking mode. The trap is not issued if a newRoot trap is issued for the same transition.

Repeater Traps

rprrHealth

This trap conveys information related to the operational status of the FastHub. This trap is sent either when the value of rprrOperStatus changes or when a nondisruptive test completes.

rprrGroupChange

This trap is sent when a change occurs in the group structure of the FastHub. This occurs only when a group is logically or physically removed from or added to a repeater.

rprrResetEvent

This trap conveys information related to the operational status of the FastHub. This trap is sent on completion of a reset action (such as an SNMP Set on the rprrReset object).

Remote Network Monitoring Traps

risingAlarm

This SNMP trap is generated when an alarm entry crosses its rising threshold and generates an event that is configured for sending SNMP traps.

fallingAlarm

This SNMP trap is generated when an alarm entry crosses its falling threshold and generates an event that is configured for sending SNMP traps.