

reference manual
version 2.3



MIB

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Safety notices

Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

Format conventions

<i>variable</i>	Indicates that you must supply a value.
output	Denotes text displayed on the screen.
[]	Indicates that the enclosed element is optional and may be left out.
{ }	Indicates that you must specify one of the listed options.
	Separates alternatives.
...	Indicates a repetition of the preceding parameter.

Tip Denotes ideas for enhanced product usage.

Note Denotes significant concepts or operating instructions.

CAUTION Denotes a hazard that can cause hardware or software damage.



WARNING Denotes a hazard that can cause personal injury or death.

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Revision History

July 2001

First release.

PREFACE

About This Guide

This guide provides the following information about Management Information Bases (MIBs):

Chapter 1 MIB-II Object Types	Provides information about MIB-II object types.
Chapter 2 Fibre Alliance MIB Object Types	Provides information about FCMGMT-MIB object types.
Chapter 3 FC Fabric Element MIB Object Types	Provides information about FE-MIB object types.
Chapter 4 FC Switch MIB Object Types	Provides information about FC Switch MIB object types.
Appendix A MIB Functional Groupings	Provides information about how MIB object types can be grouped, according to their function.
Glossary	Provides definitions for common terms.

Note The tables within this document often contain a column labeled Description. This column contains information about those MIB objects that have been modified or in some way require explanation beyond the scope of the standard explanation.

If no information is present in the Description column for a particular MIB object, the standard return values apply.

Related Publications

Related product information can be found in the following publications. Those publications with part numbers are provided as printed copies with your product. The HP Surestore FC Switch 6164 Documentation CD contains all publications listed in the table below and is also provided with your product..

Title	Part Number
<i>HP Surestore FC Switch 6164 Documentation CD</i>	A7326-11011
<i>HP Surestore FC Switch 6164 Installation and Reference Guide</i>	A7326-90902
<i>HP Surestore FC Switch 6164 Quick Start Guide</i>	A7326-90901
<i>Distributed Fabrics User's Guide, version 2.2</i>	Available only on CD
<i>Fabric OS Reference Manual, version 2.4</i>	Available only on CD
<i>Fabric Watch User's Guide, version 2.2</i>	Available only on CD
<i>QuickLoop User's Guide, version 2.3</i>	Available only on CD
<i>Web Tools User's Guide, version 2.3</i>	Available only on CD
<i>Zoning User's Guide, version 2.2</i>	Available only on CD

For information about Fibre Channel standards, visit the Fibre Channel Association web site, located at

<http://www.fibrechannel.com>.

Getting Help

For support information, visit the HP web site located at:

<http://www.hp.com>

Getting Software Updates

Firmware and software updates are found on the HP web site at:

<http://www.hp.com>

New switch firmware can be installed from the following host operating systems:

- UNIX
- Windows NT
- Windows 2000
- Windows 98
- Windows 95

MIB-II OBJECT TYPES

This chapter provides descriptions and other information specific to MIB-II object types. The object types in MIB-II are organized into the following groupings:

- [“System Group” on page 19](#)
- [“Interfaces Group” on page 22](#)
- [“Address Translation Group” on page 35](#)
- [“IP Group” on page 38](#)
- [“ICMP Group” on page 59](#)
- [“TCP Group” on page 67](#)
- [“UDP Group” on page 76](#)
- [“EGP Group” on page 79](#)
- [“Transmission Group” on page 87](#)
- [“SNMP Group” on page 88](#)

MIB-II File System Organization

Figure 1 through Figure 4 depict the organization and structure of the MIB-II file system:

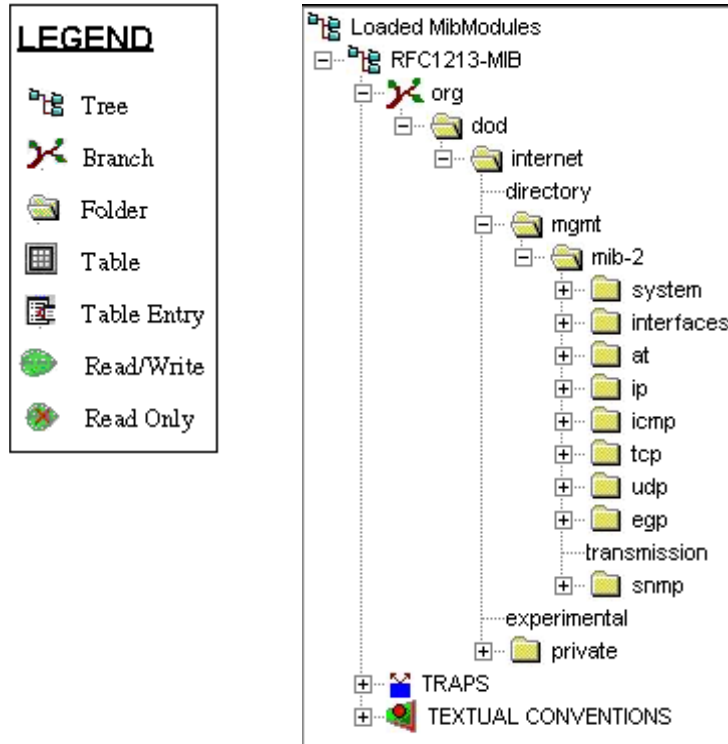


Figure 1. MIB-II Overall Tree Structure

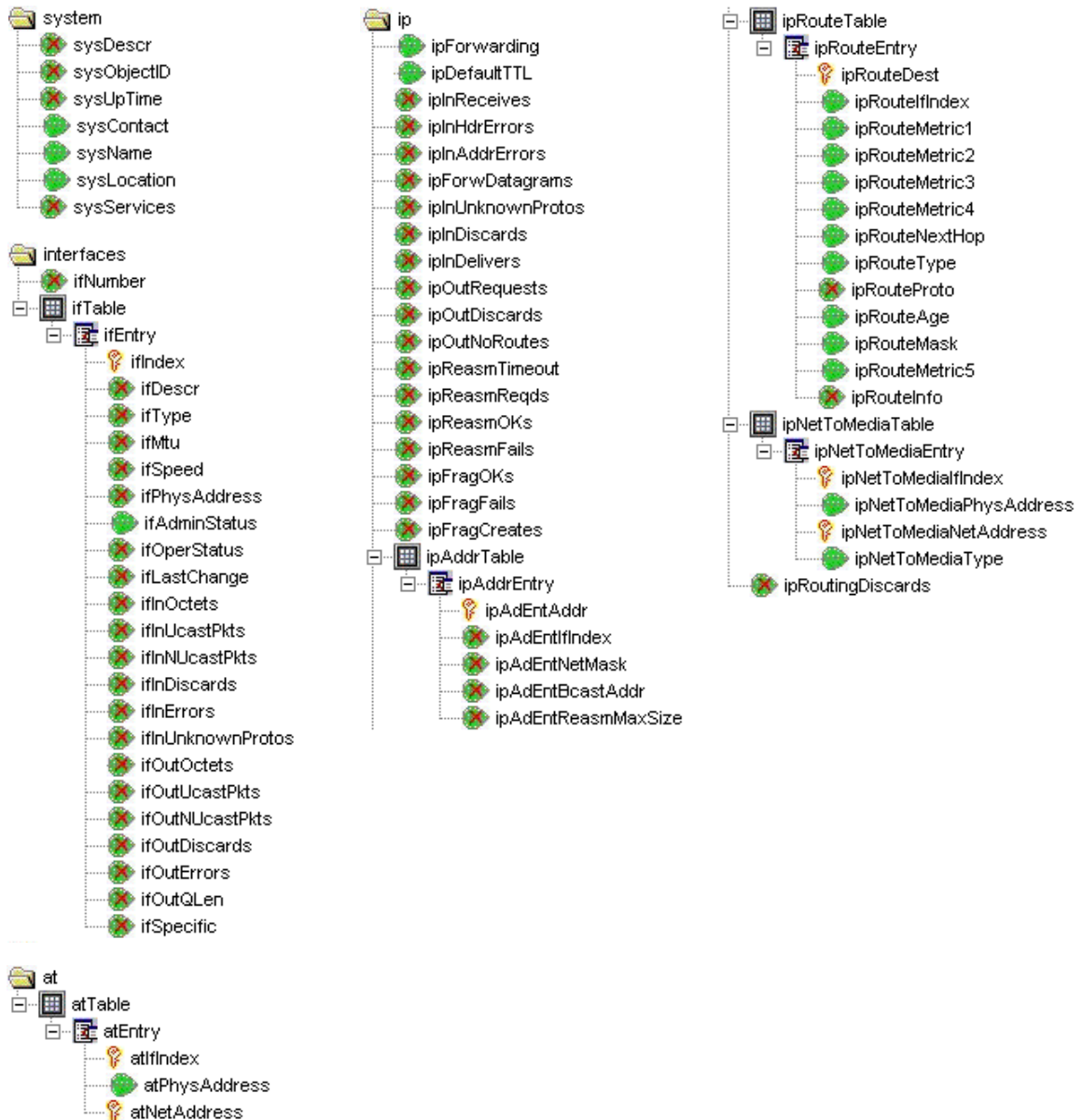


Figure 2. Tree Structure for MIB-II system, interfaces, at, and ip Groups

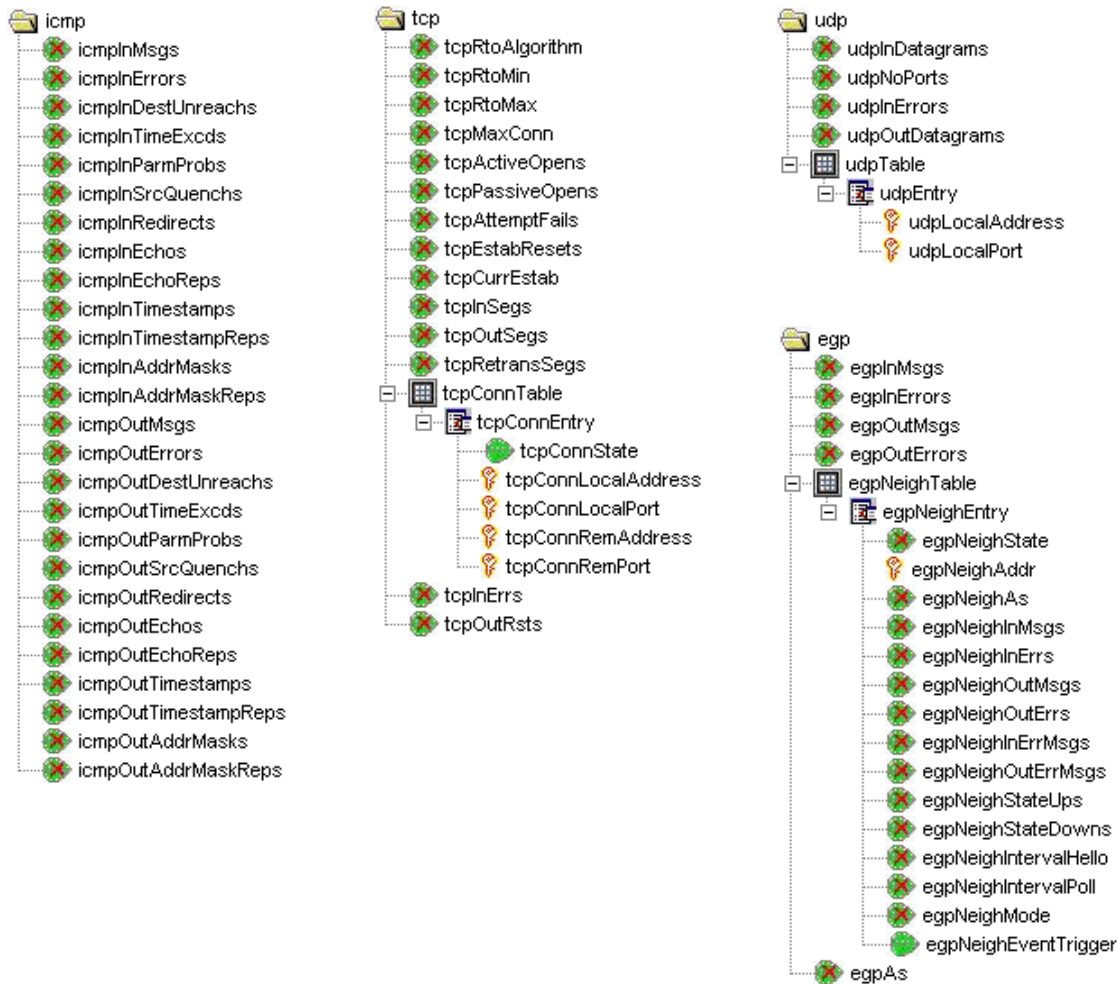


Figure 3. Tree Structure for MIB-II icmp, tcp, udp, and egp Groups

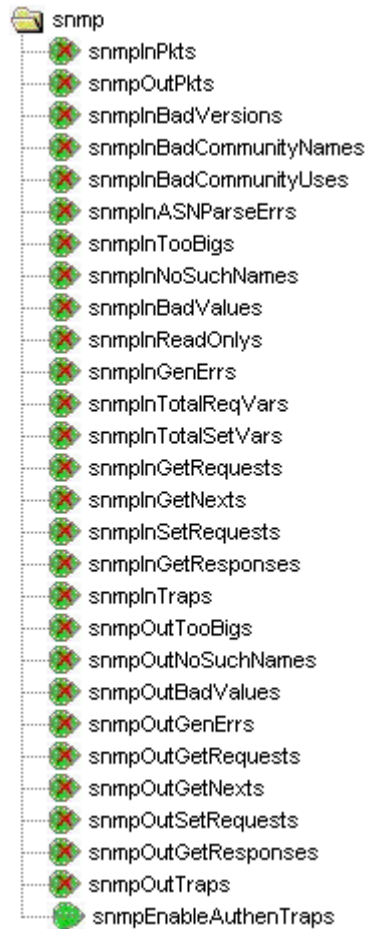


Figure 4. Tree Structure for MIB-II SNMP Group

Definitions for MIB-II

The following definitions are used for MIB-II.

Table 1. MIB-II Conventions

Type Definition	Value	Declaration	Description
Display String	Octet String of size 0 to 255		
PhysAddress	Octet String		

Imports

The following objects are imported from RFC1155-SMI:

- mgmt
- NetworkAddress
- IpAddress
- Counter
- Gauge
- Time Ticks

Object Identifiers

- mgmt = { iso org(3) dod(6) internet(1) mgmt(2) }
- directory = { internet 1 }
- experimental = { internet 3 }
- private = { internet 4 }
- enterprises = { private 1 }
- mib-2 = { mgmt 1 }

System Group

Implementation of the system group is mandatory for all systems. If an agent is not configured to have a value for any of these variables, a string of length 0 is returned.

sysDescr

Syntax Display String of size 0 to 255

Access Read-only

Status Mandatory

Description A textual description of the entity.

Note This value should include the full name and version identification of the system's hardware type, software operating-system, and networking software. It is mandatory that this contain only printable ASCII characters.

Default Value = fibre channel Switch.

Can be set using the agtcfgSet Telnet command.

sysObjectID

Syntax Object Identifier

Access Read-only

Status Mandatory

Description The vendor's authoritative identification of the network management subsystem contained in the entity.

Note This value is allocated within the SMI enterprises subtree (1.3.6.1.4.1) and provides an easy and unambiguous means for determining what kind of box is being managed. For example, if vendor “Flintstones, Inc.” was assigned the subtree 1.3.6.1.4.1.4242, it could assign the identifier 1.3.6.1.4.1.4242.1.1 to its “Fred Router”.

Default value =
iso.org.dod.internet.private.enterprises.bcsi.commDev.fibrechannel.fcSwitch.sw

sysUpTime

Syntax Time Ticks

Access Read-only

Status Mandatory

Description The time (in hundredths of a second) since the network management portion of the system was last re-initialized.

sysContact

Syntax Display String of size 0 to 255

Access Read-write

Status Mandatory

Description The textual identification of the contact person for this managed node, together with information on how to contact this person.

Note Default value = Field Support.

Can be set using the agtcfgSet Telnet command.

sysName

Syntax Display String of size 0 to 255

Access Read-write

Status Mandatory

Description An administratively-assigned name for this managed node. By convention, this is the node's fully-qualified domain name.

Note Default value = *pre-assigned name of the switch.*

sysLocation

Syntax Display String of size 0 to 255

Access Read-write

Status Mandatory

Description The physical location of this node, (for example, telephone closet, 3rd floor).

Note Default value = End User Premise.

Can be set using the agtcfgSet Telnet command.

sysServices

Syntax Integer of size 0 to 127

Access Read-only

Status Mandatory

Description A value that indicates the set of services that this entity primarily offers.

The value is a sum. This sum initially takes the value zero. Then, for each layer (L) in the range 1 through 7, which this node performs transactions for, 2 raised to (L - 1) is added to the sum.

For example, a node that primarily performs routing functions has a value of 4 (2^{3-1}). In contrast, a node that is a host and offers application services, has a value of 72 ($2^{4-1} + 2^{7-1}$). Note that in the context of the Internet suite of protocols, values should be calculated accordingly:

Layer Functionality

1 = physical. (For example, repeaters)

2 = datalink/subnetwork. (For example, bridges)

3 = internet. (For example, IP gateways)

4 = end-to-end. (For example, IP hosts)

7 = applications. (For example, mail relays)

Note For systems including OSI protocols, layers 5 and 6 can also be counted.

The return value is always 79.

Interfaces Group

Implementation of the interfaces group is mandatory for all systems.

ifNumber

Syntax Integer

Access Read-only

Status Mandatory

Description The number of network interfaces (regardless of their current state) present on this system.

Note When running FCIP, the return value is always 3. If not running FCIP, the value is 2.

Interfaces Table

The interfaces table contains information on the entity's interfaces. Each interface is thought of as being attached to a subnetwork. Note that this term should not be confused with subnet which refers to an addressing partitioning scheme used in the Internet suite of protocols.

ifTable

Syntax Sequence of IfEntry

Access Not accessible

Status Mandatory

Description A list of interface entries. The number of entries is given by the value of ifNumber.

ifEntry [ifTable]

Syntax IfEntry

Access Not accessible

Status Mandatory

Description An interface entry containing objects at the subnetwork layer and below, for a particular interface.

Index ifIndex*Table 2. IfEntry Objects and Object Types*

IfEntry Objects	See Page	Object Types
ifIndex	25	Integer
ifDescr	25	Display String
ifType	26	Integer
ifMtu	27	Integer
ifSpeed	28	Gauge
ifPhysAddress	29	PhysAddress
ifAdminStatus	29	Integer
ifOperStatus	30	Integer
ifLastChange	30	Time Ticks
ifInOctets	31	Counter
ifInUcastPkts	31	Counter
ifInNUcastPkts	31	Counter
ifInDiscards	31	Counter
ifInErrors	32	Counter
ifInUnknownProtos	32	Counter
ifOutOctets	32	Counter
ifOutUcastPkts	33	Counter
ifOutNUcastPkts	33	Counter
ifOutDiscards	33	Counter
ifOutErrors	34	Counter
ifOutQLen	34	Gauge
ifSpecific	34	Object Identifier

ifIndex [ifTable]

Syntax	Integer
Access	Read-only
Status	Mandatory

Description A unique value for each interface.

Note The values range between 1 and the value of ifNumber. The value for each interface must remain constant at least from one re-initialization of the entity's network management system to the next re-initialization.

The number of entries inside the switch is shown below:

SW2010/40/50: 1 to 3 for FCIP, otherwise the value is 1 or 2
SW2400: 1 to 3 for FCIP, otherwise the value is 1 or 2
SW2800: 1 to 3 for FCIP, otherwise the value is 1 or 2

ifDescr [ifTable]

Syntax	Display String of size 0 to 255
Access	Read-only
Status	Mandatory

Description A textual string containing information about the interface.

Note This string should include the name of the manufacturer, the product name, and the version of the hardware interface.

SW2010/40/50: fei0, lo0, fc0
SW2400: fei0, lo0, fc0
SW2800: fei0, lo0, fc0

ifType [ifTable]

Syntax

Table 3.

Value	Declaration	Description
Integer	1 (other)	None of the following
	2 (regular1822)	
	3 (hdh1822)	
	4 (ddn-x25)	
	5 (rfc877-x25)	
	6 (ethernet-csmacd)	
	7 (iso88023-csmacd)	
	8 (iso88024-tokenBus)	
	9 (iso88025-tokenRing)	
	10 (iso88026-man)	
	11 (starLan)	
	12 (proteon-10Mbit)	
	13 (proteon-80Mbit)	
	14 (hyperchannel)	
	15 (fddi)	
	16 (lapb)	
	17 (sdlc)	
	18 (ds1)	T-1
	19 (e1)	European equivalent of T-1
	20 (basicISDN)	
	21 (primaryISDN)	Proprietary serial
	22 (propPointToPointSerial)	
	23 (ppp)	

Table 3. (continued)

Value	Declaration	Description
Integer	24 (softwareLoopback)	
	25 (eon)	CLNP over IP [11]
	26 (ethernet-3Mbit)	
	27 (nsip)	XNS over IP
	28 (slip)	Generic SLIP
	29 (ultra)	Ultra Technologies
	30 (ds3)	T-3
	31 (sip)	SMDS
	32 (frame-relay)	

Access Read-only

Status Mandatory

Description The type of interface, designated by the physical and link protocols immediately below the network layer in the protocol stack.

Note fei0 maps to 6 (ethernet-csmacd).

lo0 maps to 24 (softwareLoopback).

fc0 maps to 56.

ifMtu [ifTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The size (in octets) of the largest datagram that can be sent and received on the interface.

Note For interfaces that are used to transmit network datagrams, the value is the size of the largest network datagram that can be sent on the interface.

fei0 returns 1500.

lo0 returns 4096.

fc0 returns 1500.

ifSpeed [ifTable]

Syntax Gauge

Access Read-only

Status Mandatory

Description An estimate (in bits per second) of the interface's current bandwidth.

Note For interfaces that do not vary in bandwidth or interfaces for which no accurate estimation can be made, this object should contain the nominal bandwidth.

fei0 returns 10^7 .

lo0 returns 0.

fc0 returns 10^9 .

ifPhysAddress [ifTable]

Syntax PhysAddress

Access Read-only

Status Mandatory

Description The interface's address at the protocol layer immediately below the network layer in the protocol stack.

Note For interfaces that do not have such an address (for example, a serial line), this object should contain an octet string of zero length.

fei0 returns MAC address of the Ethernet.

lo0 returns null.

fc0 returns MAC address of the Ethernet.

ifAdminStatus [ifTable]

Syntax

Table 4.

Value	Declaration	Description
Integer	1 (up)	Ready to pass packets
	2 (down)	Not ready to pass packets
	3 (testing)	In some test mode

Access Read-write

Status Mandatory

Description The desired state of the interface.

Note The 3 (testing) state indicates that no operational packets can be passed.

ifOperStatus [ifTable]

Syntax

Table 5.

Value	Declaration	Description
Integer	1 (up)	Ready to pass packets
	2 (down)	Not ready to pass packets
	3 (testing)	In some test mode

Access Read-only

Status Mandatory

Description The current operational state of the interface.

Note The 3 (testing) state indicates that no operational packets can be passed.

ifLastChange [ifTable]

Syntax Time Ticks

Access Read-only

Status Mandatory

Description The value of sysUpTime at the time the interface entered its current operational state. If the current state was entered prior to the last re-initialization of the local network management subsystem, this object contains a zero value.

ifInOctets [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of octets received on the interface, including framing characters.

ifInUcastPkts [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of subnetwork-unicast packets delivered to a higher-layer protocol.

ifInNUcastPkts [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of nonunicast packets (for example, subnetwork-broadcast or subnetwork-multicast) delivered to a higher-layer protocol.

ifInDiscards [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of inbound packets that were chosen to be discarded, even though no errors had been detected to prevent the packets being deliverable to a higher-layer protocol.

Note One possible reason for discarding such a packet could be to free up buffer space.

ifInErrors [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of inbound packets that contained errors, which thereby prevented them from being deliverable to a higher-layer protocol.

ifInUnknownProtos [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of packets received, using the interface, that were discarded because of an unknown or unsupported protocol.

ifOutOctets [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of octets transmitted out of the interface, including framing characters.

ifOutUcastPkts [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of packets that were requested, by higher-level protocols, to be transmitted to a subnetwork-unicast address, including those that were discarded or not sent.

ifOutNUcastPkts [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of packets that were requested, by higher-level protocols, to be transmitted to a nonunicast address (for example, a subnetwork-broadcast or subnetwork-multicast), including those that were discarded or not sent.

ifOutDiscards [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of outbound packets that were chosen to be discarded, even though no errors had been detected to prevent the packets being transmitted.

Note One possible reason for discarding such a packet could be to free up buffer space.

ifOutErrors [ifTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of outbound packets that could not be transmitted because of errors.

ifOutQLen [ifTable]

Syntax Gauge

Access Read-only

Status Mandatory

Description The length of the output packet queue (in packets).

ifSpecific [ifTable]

Syntax Object Identifier

Access Read-only

Status Mandatory

Description A reference to MIB definitions specific to the particular media being used to realize the interface.

For example, if the interface is realized by an Ethernet, the value of this object refers to a document defining objects specific to Ethernet. If this information is not present, its value should be set to the Object Identifier 0 0, which is a syntactically valid object identifier, and any conformant implementation of ASN.1 and BER must be able to generate and recognize this value.

Note fei0 returns null OID.

lo0 returns null OID.

fc0 returns null OID.

Address Translation Group

Implementation of the address translation group is mandatory for all systems. Note however that this group is deprecated by MIB-II. That is, it is being included solely for compatibility with MIB-I nodes, and will most likely be excluded from MIB-III nodes. From MIB-II and later, each network protocol group contains its own address translation tables.

Address Translation Table

The address translation group contains one table that is the union across all interfaces of the translation tables, for converting a NetworkAddress (for example, an IP address) into a subnetwork-specific address. For lack of a better term, this document refers to such a subnetwork-specific address as a physical address.

Examples of such translation tables include the following:

- For broadcast media where ARP is in use.
- The translation table is equivalent to the ARP cache.
- On an X.25 network where nonalgorithmic translation to X.121 addresses is required, the translation table contains the NetworkAddress to X.121 address equivalences.

atTable

Syntax Sequence of AtEntry

Access Not accessible

Status Deprecated

Description The address translation tables contain the NetworkAddress to physical address equivalences. Some interfaces do not use translation tables for determining address equivalences (for example, DDN-X.25 has an algorithmic method); if all interfaces are of this type, the address translation table is empty, and therefore has zero entries.

atEntry

Syntax At Entry

Access Not accessible

Status Deprecated

Description Each entry contains one NetworkAddress to physical address equivalence.

Index atIfIndex, atNetAddress

Table 6. At Entry Objects and Object Types

At Entry Objects	See Page	Object Types
atIfIndex	37	Integer
atPhysAddress	37	PhysAddress
atNetAddress	38	NetworkAddress

atIfIndex

Syntax Integer

Access Read-write

Status Deprecated

Description The interface on which this entry's equivalence is effective. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

atPhysAddress

Syntax PhysAddress

Access Read-write

Status Deprecated

Description The media-dependent physical address.

Note Setting this object to a null string (one of zero length) invalides the corresponding entry in the atTable object. That is, the string effectively disassociates the interface identified with said entry from the mapping identified with said entry. 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. Proper interpretation of such entries requires examination of the relevant atPhysAddress object.

atNetAddress

Syntax NetworkAddress

Access Read-write

Status Deprecated

Description The NetworkAddress (for example, the IP address) corresponding to the media-dependent physical address.

IP Group

Implementation of the IP group is mandatory for all systems.

ipForwarding

Syntax

Value	Declaration	Description
Integer	1 (forwarding)	Acting as a gateway
	2 (not forwarding)	Not acting as a gateway

Access Read-write

Status Mandatory

Description The indication of whether this entity is acting as an IP gateway in respect to the forwarding of datagrams received by, but not addressed to, this entity. IP gateways forward datagrams. IP hosts do not (except those source-routed using via the host).

Note For some managed nodes, this object can take on only a subset of the values possible. Accordingly, it is appropriate for an agent to return a “badValue” response if a management station attempts to change this object to an inappropriate value.

ipDefaultTTL

Syntax Integer

Access Read-write

Status Mandatory

Description The default value inserted into the time-to-live (TTL) field of the IP header of datagrams originated at this entity, whenever a TTL value is not supplied by the transport layer protocol.

ipInReceives

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of input datagrams received from interfaces, including those received in error.

ipInHdrErrors

Syntax Counter

Access Read-only

Status Mandatory

Description The number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, and so on.

ipInAddrErrors

Syntax Counter

Access Read-only

Status Mandatory

Description The number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported classes (for example, Class E). For entities that are not IP gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

ipForwDatagrams

Syntax Counter

Access Read-only

Status Mandatory

Description The number of input datagrams for which this entity is not their final IP destination, resulting in an attempt to find a route to forward them to that final destination. In entities that do not act as IP gateways, this counter includes only those packets that have been source-routed using this entity, and the source-route option processing has been successful.

ipInUnknownProtos

Syntax Counter

Access Read-only

Status Mandatory

Description The number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

ipInDiscards

Syntax Counter

Access Read-only

Status Mandatory

Description The number of input IP datagrams for which no problems are encountered to prevent their continued processing, but which are discarded (for example, for lack of buffer space).

Note This counter does not include any datagrams discarded while waiting for re-assembly.

ipInDelivers

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of input datagrams successfully delivered to IP user-protocols (including ICMP).

ipOutRequests

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of IP datagrams that local IP user-protocols (including ICMP) have supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in ipForwDatagrams.

ipOutDiscards

Syntax Counter

Access Read-only

Status Mandatory

Description The number of output IP datagrams for which no problem is encountered to prevent their transmission to their destination, but which are discarded (for example, for lack of buffer space).

Note This counter includes datagrams counted in ipForwDatagrams, if any such packets meet this (discretionary) discard criterion.

ipOutNoRoutes

Syntax Counter

Access Read-only

Status Mandatory

Description The number of IP datagrams discarded because no route can be found to transmit them to their destination.

Note This counter includes any packets counted in ipForwDatagrams that meet this “no-route” criterion. Note that this includes any datagrams that a host cannot route because all its default gateways are down.

ipReasmTimeout

Syntax Integer

Access Read-only

Status Mandatory

Description The maximum number of seconds, that received fragments are held while waiting for re-assembly at this entity.

ipReasmReqds

Syntax Counter

Access Read-only

Status Mandatory

Description The number of IP fragments received that need to be re-assembled at this entity.

ipReasmOKs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of IP datagrams successfully re-assembled.

ipReasmFails

Syntax Counter

Access Read-only

Status Mandatory

Description The number of failures detected by the IP re-assembly algorithm (for any reason, timed out, errors, and so on).

Note This is not necessarily a count of discarded IP fragments, because some algorithms (notably the algorithm in RFC 815) can lose track of the number of fragments by combining them as they are received.

ipFragOKs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of IP datagrams that have been successfully fragmented at this entity.

ipFragFails

Syntax Counter

Access Read-only

Status Mandatory

Description The number of IP datagrams that have been discarded because they need to be fragmented at this entity but cannot; for example, because their don't fragment flag was set.

ipFragCreates

Syntax Counter

Access Read-only

Status Mandatory

Description The number of IP datagram fragments that have been generated due to fragmentation at this entity.

IP Address Table

The IP address table contains this entity's IP addressing information.

ipAddrTable

Syntax Sequence of IpAddrEntry

Access Not accessible

Status Mandatory

Description The table of addressing information relevant to this entity's IP addresses.

ipAddrEntry

Syntax IpAddrEntry

Access Not accessible

Status Mandatory

Description The addressing information for one of this entity's IP addresses.

Index ipAdEntAddr

Table 7. IpAddrEntry Objects and Object Types

IpAddrEntry Objects	See Page	Object Types
ipAdEntAddr	46	IpAddress
ipAdEntIfIndex	46	Integer
ipAdEntNetMask	47	IpAddress
ipAdEntBcastAddr	47	Integer
ipAdEntReasmMaxSize	47	Integer of size 0 to 65535

ipAdEntAddr

Syntax IpAddress

Access Read-only

Status Mandatory

Description The IP address pertaining to this entry's addressing information.

ipAdEntIfIndex

Syntax Integer

Access Read-only

Status Mandatory

Description The index value that uniquely identifies the interface to which this entry is applicable. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

ipAdEntNetMask

Syntax IpAddress

Access Read-only

Status Mandatory

Description The subnet mask associated with the IP address of this entry. The value of the mask is an IP address with all network bits set to 1, and all host bits set to 0.

ipAdEntBcastAddr

Syntax Integer

Access Read-only

Status Mandatory

Description The value of the least-significant bit in the IP broadcast address used for sending datagrams on the (logical) interface, associated with the IP address of this entry. For example, when the Internet standard all-ones broadcast address is used, the value is 1. This value applies to both the subnet and network broadcast addresses used by the entity on this (logical) interface.

ipAdEntReasmMaxSize

Syntax Integer of size 0 to 65535

Access Read-only

Status Mandatory

Description The size of the largest IP datagram that this entity can re-assemble from incoming IP fragmented datagrams received on this interface.

IP Routing Table

The IP routing table contains an entry for each route presently known to this entity.

ipRouteTable

Syntax Sequence of IpRouteEntry

Access Not accessible

Status Mandatory

Description This entity's IP routing table.

ipRouteEntry

Syntax IpRouteEntry

Access Not accessible

Status Mandatory

Description A route to a particular destination.

Index ipRouteDest

Table 8. *IpRouteEntry* Objects and Object Types

IpRouteEntry Objects	See Page	Object Types
ipRouteDest	49	IpAddress
ipRouteIfIndex	50	Integer

Table 8. *IpRouteEntry Objects and Object Types (continued)*

IpRouteEntry Objects	See Page	Object Types
ipRouteMetric1	50	Integer
ipRouteMetric2	50	Integer
ipRouteMetric3	51	Integer
ipRouteMetric4	51	Integer
ipRouteNextHop	52	IpAddress
ipRouteType	52	Integer
ipRouteProto	53	Integer
ipRouteAge	54	Integer
ipRouteMask	54	IpAddress
ipRouteMetric5	55	Integer
ipRouteInfo	55	Object Identifier

ipRouteDest

Syntax IpAddress

Access Read-write

Status Mandatory

Description The destination IP address of this route.

Note An entry with a value of 0.0.0.0 is considered a default route. Multiple routes to a single destination can appear in the table, but access to such multiple entries is dependent on the table-access mechanisms defined by the network management protocol in use.

ipRouteIfIndex

Syntax Integer

Access Read-write

Status Mandatory

Description The index value that uniquely identifies the local interface through which the next hop of this route should be reached.

Note The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

ipRouteMetric1

Syntax Integer

Access Read-write

Status Mandatory

Description The primary routing metric for this route.

Note The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

ipRouteMetric2

Syntax Integer

Access Read-write

Status Mandatory

Description An alternate routing metric for this route.

Note The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

ipRouteMetric3

Syntax Integer

Access Read-write

Status Mandatory

Description An alternate routing metric for this route.

Note The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

ipRouteMetric4

Syntax Integer

Access Read-write

Status Mandatory

Description An alternate routing metric for this route.

Note The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

ipRouteNextHop

Syntax IpAddress

Access Read-write

Status Mandatory

Description The IP address of the next hop of this route. (In the case of a route bound to an interface that is realized using a broadcast media, the value of this field is the agent's IP address on that interface.)

ipRouteType

Syntax

Value	Declaration	Description
Integer	1 (other)	None of the following
	2 (invalid)	An invalidated route—route to directly
	3 (direct)	Connected (sub)network—route to a nonlocal
	4 (indirect)	Host/network/subnetwork

Access Read-write

Status Mandatory

Description The type of route.

Note The values direct (3) and indirect (4) refer to the notion of direct and indirect routing in the IP architecture.

Setting this object to the value invalid (2) invalidates the corresponding entry in the ipRouteTable object. That is, the value effectively disassociates the destination identified with said entry from the route identified with said entry. 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. Proper interpretation of such entries requires examination of the relevant ipRouteType object.

ipRouteProto

Syntax

Value	Declaration	Description
Integer	1 (other)	None of the following nonprotocol information, for example, manually configured
	2 (local)	localEntries set using a network
	3 (netmgmt)	netmgmtManagement protocol obtained using ICMP
	4 (icmp)	icmpFor example, redirect the remaining values to all gateway routing protocols
	5 (egp)	
	6 (ggp)	
	7 (hello)	
	8 (rip)	
	9 (is-is)	
	10 (es-is)	
	11 (ciscoIgrp)	
	12 (bbnSpfIgp)	
	13 (ospf)	
	14 (bgp)	

Access Read-only

Status Mandatory

Description The routing mechanism by which this route has been learned.

Note Inclusion of values for gateway routing protocols is not intended to imply that hosts should support those protocols.

ipRouteAge

Syntax Integer

Access Read-write

Status Mandatory

Description The number of seconds since this route was last updated or otherwise determined to be correct.

Note Older semantics cannot be implied except through knowledge of the routing protocol by which the route has been learned.

ipRouteMask

Syntax IpAddress

Access Read-write

Status Mandatory

Description The mask to be logical-ANDed with the destination address before being compared to the value in the ipRouteDest field. For those systems that do not support arbitrary subnet masks, an agent constructs the value of the ipRouteMask by determining whether the value of the correspondent

ipRouteDest field belongs to a class A, B, or C network, and then using one of the following:

mask	network
255.0.0.0	class-A
255.255.0.0	class-B
255.255.255.0	class-C

If the value of the ipRouteDest is 0.0.0.0 (a default route), the mask value is also 0.0.0.0. Note that all IP routing subsystems implicitly use this mechanism.

ipRouteMetric5

Syntax	Integer
Access	Read-write
Status	Mandatory

Description An alternate routing metric for this route.

Note The semantics of this metric are determined by the routing protocol specified in the route's ipRouteProto value. If this metric is not used, its value should be set to -1.

ipRouteInfo

Syntax	Object Identifier
Access	Read-only

Status Mandatory

Description A reference to MIB definitions specific to the particular routing protocol that is responsible for this route, as determined by the value specified in the route's ipRouteProto value. If this information is not present, its value should be set to the Object Identifier { 0 0 }, which is a syntactically valid object identifier, and any conformant implementation of ASN.1 and BER must be able to generate and recognize this value.

IP Address Translation Table

The IP address translation table contains the IP address to physical address equivalences. Some interfaces do not use translation tables for determining address equivalences (for example, DDN-X.25 has an algorithmic method); if all interfaces are of this type, the address translation table is empty, and therefore has zero entries.

ipNetToMediaTable

Syntax Sequence of IpNetToMediaEntry

Access Not accessible

Status Mandatory

Description The IP address translation table used for mapping from IP addresses to physical addresses.

ipNetToMediaEntry

Syntax IpNetToMediaEntry

Access Not accessible

Status Mandatory

Description Each entry contains one IP address to physical address equivalence.

Index ipNetToMediaIfIndex, ipNetToMediaNetAddress

Table 9. IpNetToMediaEntry Objects and Object Types

IpNetToMediaEntry Objects	See Page	Object Types
ipNetToMediaIfIndex	57	Integer
ipNetToMediaPhysAddress	57	PhysAddress
ipNetToMediaNetAddress	58	IpAddress
ipNetToMediaType	58	Integer

ipNetToMediaIfIndex

Syntax Integer

Access Read-write

Status Mandatory

Description The interface on which this entry's equivalence is effective.

Note The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex.

ipNetToMediaPhysAddress

Syntax PhysAddress

Access Read-write

Status Mandatory

Description The media-dependent physical address.

ipNetToMediaNetAddress

Syntax IpAddress

Access Read-write

Status Mandatory

Description The IP address corresponding to the media-dependent physical address.

ipNetToMediaType

Syntax

Value	Declaration	Description
Integer	1 (other)	None of the following
	2 (invalid)	An invalidated mapping
	3 (dynamic)	
	4 (static)	

Access Read-write

Status Mandatory

Description The type of mapping.

Note Setting this object to the value invalid (2) invalidates the corresponding entry in the ipNetToMediaTable. That is, the value effectively dissociates the interface identified with said entry from the mapping identified with said entry. 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. Proper interpretation of such entries requires examination of the relevant ipNetToMediaType object.

Additional IP Objects

ipRoutingDiscards

Syntax	Counter
Access	Read-only
Status	Mandatory

Description The number of routing entries that are chosen to be discarded even though they are valid. One possible reason for discarding such an entry could be to free-up buffer space for other routing entries.

ICMP Group

Implementation of the ICMP group is mandatory for all systems.

icmpInMsgs

Syntax	Counter
Access	Read-only
Status	Mandatory

Description The total number of ICMP messages that the entity received.

Note This counter includes all ICMP messages counted by icmpInErrors.

icmpInErrors

Syntax	Counter
Access	Read-only

Status Mandatory

Description The number of ICMP messages that the entity received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, and so on.).

icmplnDestUnreachs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP destination unreachable messages received.

icmplnTimeExcds

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP time exceeded messages received.

icmplnParmProbs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP parameter problem messages received.

icmpInSrcQuenches

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP source quench messages received.

icmpInRedirects

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP redirect messages received.

icmpInEchos

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP echo (request) messages received.

icmpInEchoReps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP echo reply messages received.

icmpInTimestamps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP timestamp (request) messages received.

icmpInTimestampReps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP timestamp reply messages received.

icmpInAddrMasks

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP address mask request messages received.

icmpInAddrMaskReps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP address mask reply messages received.

icmpOutMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of ICMP messages that this entity attempted to send.

Note This counter includes all messages counted by icmpOutErrors.

icmpOutErrors

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP messages that this entity did not send due to problems discovered within ICMP, such as a lack of buffers. This value should not include errors discovered outside the ICMP layer, such as the inability of IP to route the resultant datagram. In some implementations, there can be no types of error that contribute to this counter's value.

icmpOutDestUnreachs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP destination unreachable messages sent.

icmpOutTimeExcds

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP time exceeded messages sent.

icmpOutParmProbs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP parameter problem messages sent.

icmpOutSrcQuenchs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP source quench messages sent.

icmpOutRedirects

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP redirect messages sent. For a host, this object is always zero, because hosts do not send redirects.

icmpOutEchos

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP echo (request) messages sent.

icmpOutEchoReps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP echo reply messages sent.

icmpOutTimestamps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP timestamp (request) messages sent.

icmpOutTimestampReps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP timestamp reply messages sent.

icmpOutAddrMasks

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP address mask request messages sent.

icmpOutAddrMaskReps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of ICMP address mask reply messages sent.

TCP Group

Implementation of the TCP group is mandatory for all systems that implement the TCP.

Note Instances of object types that represent information about a particular TCP connection are transient; they persist only as long as the connection in question.

tcpRtoAlgorithm

Syntax

Value	Declaration	Description
Integer	1 (other)	None of the following
	2 (constant)	A constant rto
	3 (rsre)	MIL-STD-1778, Appendix B
	4 (rsre)	Van Jacobson's algorithm [10]

Access Read-only

Status Mandatory

Description The algorithm used to determine the time-out value used for retransmitting unacknowledged octets.

tcpRtoMin

Syntax Integer

Access Read-only

Status Mandatory

Description The minimum value permitted by a TCP implementation for the retransmission time-out, measured in milliseconds.

Note More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission time-out. In particular, when the time-out algorithm is rsre (3), an object of this type has the semantics of the LBOUND quantity described in RFC 793.

tcpRtoMax

Syntax Integer

Access Read-only

Status Mandatory

Description The maximum value permitted by a TCP implementation for the retransmission time-out, measured in milliseconds.

Note More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission time-out. In particular, when the time-out algorithm is rsre (3), an object of this type has the semantics of the UBOUND quantity described in RFC 793.

tcpMaxConn

Syntax Integer

Access Read-only

Status Mandatory

Description The limit on the total number of TCP connections the entity can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1.

tcpActiveOpens

Syntax Counter

Access Read-only

Status Mandatory

Description The number of times TCP connections have made a direct transition to the synsent state from the closed state.

tcpPassiveOpens

Syntax Counter

Access Read-only

Status Mandatory

Description The number of times TCP connections have made a direct transition to the synReceived state from the listen state.

tcpAttemptFails

Syntax Counter

Access Read-only

Status Mandatory

Description The number of times TCP connections have made a direct transition to the closed state from either the `synSent` state or the `synReceived` state, plus the number of times TCP connections have made a direct transition to the `listen` state from the `synReceived` state.

tcpEstabResets

Syntax Counter

Access Read-only

Status Mandatory

Description The number of times TCP connections have made a direct transition to the closed state from either the `established` state or the `closeWait` state.

tcpCurrEstab

Syntax Gauge

Access Read-only

Status Mandatory

Description The number of TCP connections for which the current state is either `established` or `closeWait`.

tcpInSegs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of segments received, including those received in error. This count includes segments received on currently established connections.

tcpOutSegs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of segments sent, including those on current connections but excluding those containing only retransmitted octets.

tcpRetransSegs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of segments retransmitted, that is, the number of TCP segments transmitted containing one or more previously transmitted octets.

TCP Connection Table

The TCP connection table contains information about this entity's existing TCP connections.

tcpConnTable

Syntax Sequence of TcpConnEntry

Access Not accessible

Status Mandatory

Description A table containing TCP connection-specific information.

tcpConnEntry

Syntax TcpConnEntry

Access Not accessible

Status Mandatory

Description Information about a particular current TCP connection. An object of this type is transient, in that it ceases to exist when (or soon after) the connection makes the transition to the closed state.

Index tcpConnLocalAddress, tcpConnLocalPort, tcpConnRemAddress, tcpConnRemPort

Table 10. *TcpConnEntry Objects and Object Types*

TcpConnEntry Objects	See Page	Object Types
tcpConnState	73	Integer
tcpConnLocalAddress	74	IpAddress
tcpConnLocalPort	74	Integer of size 0 to 65535
tcpConnRemAddress	75	IpAddress
tcpConnRemPort	75	Integer of size 0 to 65535

tcpConnState

Syntax

Value	Declaration	Description
Integer	1 (closed)	
	2 (listen)	
	3 (synSent)	
	4 (synReceived)	
	5 (established)	
	6 (finWait1)	
	7 (finWait2)	
	8 (closeWait)	
	9 (lastAck)	
	10 (closing)	
	11 (timeWait)	
	12 (delete TCB)	

Access Read-write

Status Mandatory

Description The state of this TCP connection.

Note The only value which can be set by a management station is deleteTCB(12). Accordingly, it is appropriate for an agent to return a badValue response if a management station attempts to set this object to any other value.

If a management station sets this object to the value deleteTCB(12), this has the effect of deleting the TCB (as defined in RFC 793) of the corresponding connection on the managed node, resulting in immediate termination of the connection.

As an implementation-specific option, a RST segment can be sent from the managed node to the other TCP endpoint. Note that RST segments are not sent reliably.

tcpConnLocalAddress

Syntax IpAddress

Access Read-only

Status Mandatory

Description The local IP address for this TCP connection. In the case of a connection in the listen state that is willing to accept connections for any IP interface associated with the node, the value 0.0.0.0 is used.

tcpConnLocalPort

Syntax Integer of size 0 to 65535

Access Read-only

Status Mandatory

Description The local port number for this TCP connection.

tcpConnRemAddress

Syntax IpAddress

Access Read-only

Status Mandatory

Description The remote IP address for this TCP connection.

tcpConnRemPort

Syntax Integer of size 0 to 65535

Access Read-only

Status Mandatory

Description The remote port number for this TCP connection.

Additional TCP Objects

tcpInErrs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of segments received in error (for example, bad TCP checksums).

tcpOutRsts

Syntax Counter

Access Read-only

Status Mandatory

Description The number of TCP segments sent containing the RST flag.

UDP Group

Implementation of the UDP group is mandatory for all systems that implement the UDP.

udpInDatagrams

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of UDP datagrams delivered to UDP users.

udpNoPorts

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of received UDP datagrams for which there was no application at the destination port.

udpInErrors

Syntax Counter

Access Read-only

Status Mandatory

Description The number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port.

udpOutDatagrams

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of UDP datagrams sent from this entity.

UDP Listener Table

The UDP listener table contains information about this entity's UDP end-points on which a local application is currently accepting datagrams.

udpTable

Syntax Sequence of UdpEntry

Access Not accessible

Status Mandatory

Description A table containing UDP listener information.

udpEntry

Syntax UdpEntry

Access Not accessible

Status Mandatory

Description Information about a particular current UDP listener.

Index udpLocalAddress, udpLocalPort

Table 11. UdpEntry Objects and Object Types

UdpEntry Objects	See Page	Object Types
udpLocalAddress	78	IpAddress
udpLocalPort	78	Integer of size 0 to 65535

udpLocalAddress

Syntax IpAddress

Access Read-only

Status Mandatory

Description The local IP address for this UDP listener. In the case of a UDP listener that is willing to accept datagrams for any IP interface associated with the node, the value 0.0.0.0 is used.

udpLocalPort

Syntax Integer of size 0 to 65535

Access Read-only

Status Mandatory

Description The local port number for this UDP listener.

EGP Group

Implementation of the EGP group is mandatory for all systems that implement the EGP.

egpInMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP messages received without error.

egpInErrors

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP messages received in error.

egpOutMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of locally generated EGP messages.

egpOutErrors

Syntax Counter

Access Read-only

Status Mandatory

Description The number of locally generated EGP messages not sent due to resource limitations within an EGP entity.

EGP Neighbor Table

The EGP neighbor table contains information about this entity's EGP neighbors.

egpNeighTable

Syntax Sequence of EgpNeighEntry

Access Not accessible

Status Mandatory

Description The EGP neighbor table.

egpNeighEntry

Syntax EgpNeighEntry

Access Not accessible

Status Mandatory

Description Information about this entity's relationship with a particular EGP neighbor.

Index `egpNeighAddr`

Table 12. EgpNeighEntry Object and Object Types

EgpNeighEntry Objects	See Page	Object Types
<code>egpNeighState</code>	81	Integer
<code>egpNeighAddr</code>	82	IpAddress
<code>egpNeighAs</code>	82	Integer
<code>egpNeighInMsgs</code>	83	Counter
<code>egpNeighInErrs</code>	83	Counter
<code>egpNeighOutMsgs</code>	83	Counter
<code>egpNeighOutErrs</code>	84	Counter
<code>egpNeighInErrMsgs</code>	84	Counter
<code>egpNeighOutErrMsgs</code>	84	Counter
<code>egpNeighStateUps</code>	84	Counter
<code>egpNeighStateDowns</code>	85	Counter
<code>egpNeighIntervalHello</code>	85	Integer
<code>egpNeighIntervalPoll</code>	85	Integer
<code>egpNeighMode</code>	86	Integer
<code>egpNeighEventTrigger</code>	86	Integer

egpNeighState

Syntax

Value	Declaration	Description
Integer	1 (idle)	
	2 (acquisition)	
	3 (down)	

Value	Declaration	Description
Integer	4 (up)	
	5 (cease)	

Access Read-only

Status Mandatory

Description The EGP state of the local system with respect to this entry's EGP neighbor. Each EGP state is represented by a value that is one greater than the numerical value associated with said state in RFC 904.

egpNeighAddr

Syntax IpAddress

Access Read-only

Status Mandatory

Description The IP address of this entry's EGP neighbor.

egpNeighAs

Syntax Integer

Access Read-only

Status Mandatory

Description The autonomous system of this EGP peer. Zero should be specified if the autonomous system number of the neighbor is not yet known.

egpNeighInMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP messages received without error from this EGP peer.

egpNeighInErrs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP messages received from this EGP peer in error (for example, bad EGP checksum).

egpNeighOutMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of locally generated EGP messages to this EGP peer.

egpNeighOutErrs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of locally generated EGP messages not sent to this EGP peer due to resource limitations within an EGP entity.

egpNeighInErrMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP-defined error messages received from this EGP peer.

egpNeighOutErrMsgs

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP-defined error messages sent to this EGP peer.

egpNeighStateUps

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP state transitions to the up state with this EGP peer.

egpNeighStateDowns

Syntax Counter

Access Read-only

Status Mandatory

Description The number of EGP state transitions from the up state to any other state with this EGP peer.

egpNeighIntervalHello

Syntax Integer

Access Read-only

Status Mandatory

Description The interval between EGP hello command retransmissions (in hundredths of a second). This represents the t1 timer as defined in RFC 904.

egpNeighIntervalPoll

Syntax Integer

Access Read-only

Status Mandatory

Description The interval between EGP poll command retransmissions (in hundredths of a second). This represents the t3 timer as defined in RFC 904.

egpNeighMode

Syntax

Value	Declaration	Description
Integer	1 (active)	
	2 (passive)	

Access Read-only

Status Mandatory

Description The polling mode of this EGP entity, either passive or active.

egpNeighEventTrigger

Syntax

Value	Declaration	Description
Integer	1 (start)	
	2 (stop)	

Access Read-write

Status Mandatory

Description A control variable used to trigger operator-initiated start and stop events.

Note When read, this variable always returns the most recent value to which `egpNeighEventTrigger` was set. If this variable has not been set since the last initialization of the network management subsystem on the node, it returns a value of stop.

When set, this variable causes a start or stop event on the specified neighbor, as specified on pages 8 through 10 of RFC 904. Briefly, a start

event causes an idle peer to begin neighbor acquisition, and a nonidle peer to re-initiate neighbor acquisition. A stop event causes a nonidle peer to return to the idle state until a start event occurs, either using `egpNeighEventTrigger` or another object.

Additional EGP Objects

egpAs

Syntax	Integer
Access	Read-only
Status	Mandatory

Description The autonomous system number of this EGP entity.

Transmission Group

Based on the transmission media underlying each interface on a system, the corresponding portion of the transmission group is mandatory for that system.

When Internet-standard definitions for managing transmission media are defined, the transmission group is used to provide a prefix for the names of those objects.

Typically, such definitions reside in the experimental portion of the MIB until they are proven. Then, as part of the Internet standardization process, the definitions are accordingly elevated and a new object identifier, under the transmission group is defined. By convention, the name assigned is:

type Object Identifier ::= { transmission number }

where “type” is the symbolic value used for the media in the `ifType` column of the `ifTable` object, and “number” is the actual integer value corresponding to the symbol.

SNMP Group

Implementation of the SNMP group is mandatory for all systems that support an SNMP protocol entity. Some of the objects defined below will be zero-valued in those SNMP implementations that are optimized to support only those functions specific to either a management agent or a management station. All of the objects below refer to an SNMP entity, and there can be several SNMP entities residing on a managed node (for example, if the node is acting as a management station).

snmplnPkts

Syntax	Counter
Access	Read-only
Status	Mandatory
Description	The total number of messages delivered to the SNMP entity from the transport service.

snmpOutPkts

Syntax	Counter
Access	Read-only
Status	Mandatory
Description	The total number of SNMP messages that were passed from the SNMP protocol entity to the transport service.

snmplnBadVersions

Syntax	Counter
Access	Read-only

Status Mandatory

Description The total number of SNMP messages that were delivered to the SNMP protocol entity, and were for an unsupported SNMP version.

snmplnBadCommunityNames

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP messages delivered to the SNMP protocol entity that used an SNMP community name not known to said entity.

snmplnBadCommunityUses

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP messages delivered to the SNMP protocol entity that represented an SNMP operation, which was not allowed by the SNMP community named in the message.

snmplnASNParseErrs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of ASN.1 or BER errors encountered by the SNMP protocol entity when decoding received SNMP messages.

Note SNMP 7 is not used.

snmplnTooBig

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs that were delivered to the SNMP protocol entity, and for which the value of the error-status field is tooBig.

snmplnNoSuchNames

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs, that were delivered to the SNMP protocol entity, and for which the value of the error-status field is noSuchName.

snmplnBadValues

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs that were delivered to the SNMP protocol entity, and for which the value of the error-status field is badValue.

snmplnReadOnly

Syntax	Counter
Access	Read-only
Status	Mandatory

Description The total number valid SNMP PDUs that were delivered to the SNMP protocol entity, and for which the value of the error-status field is readOnly.

Note It is a protocol error to generate an SNMP PDU that contains the value “readOnly” in the error-status field, as such this object is provided to detect incorrect implementations of the SNMP.

snmplnGenErrs

Syntax	Counter
Access	Read-only
Status	Mandatory

Description The total number of SNMP PDUs that were delivered to the SNMP protocol entity, and for which the value of the error-status field is genErr.

snmplnTotalReqVars

Syntax	Counter
Access	Read-only
Status	Mandatory

Description The total number of MIB objects that have been retrieved successfully by the SNMP protocol entity as the result of receiving valid SNMP Get-Request and Get-Next PDUs.

snmplnTotalSetVars

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of MIB objects that have been altered successfully by the SNMP protocol entity as the result of receiving valid SNMP Set-Request PDUs.

snmplnGetRequests

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Get-Request PDUs that have been accepted and processed by the SNMP protocol entity.

snmplnGetNexts

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Get-Next PDUs that have been accepted and processed by the SNMP protocol entity.

snmplnSetRequests

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Set-Request PDUs that have been accepted and processed by the SNMP protocol entity.

snmplnGetResponses

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Get-Response PDUs that have been accepted and processed by the SNMP protocol entity.

snmplnTraps

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Trap PDUs that have been accepted and processed by the SNMP protocol entity.

snmpOutTooBig

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs that were generated by the SNMP protocol entity, and for which the value of the error-status field is tooBig.

snmpOutNoSuchNames

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs that were generated by the SNMP protocol entity, and for which the value of the error-status is noSuchName.

snmpOutBadValues

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs that were generated by the SNMP protocol entity, and for which the value of the error-status field is badValue.

Note SNMP 23 is not used.

snmpOutGenErrs

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP PDUs that were generated by the SNMP protocol entity, and for which the value of the error-status field is genErr.

snmpOutGetRequests

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Get-Request PDUs that have been generated by the SNMP protocol entity.

snmpOutGetNexts

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Get-Next PDUs that have been generated by the SNMP protocol entity.

snmpOutSetRequests

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Set-Request PDUs that have been generated by the SNMP protocol entity.

snmpOutGetResponses

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Get-Response PDUs that have been generated by the SNMP protocol entity.

snmpOutTraps

Syntax Counter

Access Read-only

Status Mandatory

Description The total number of SNMP Trap PDUs that have been generated by the SNMP protocol entity.

snmpEnableAuthenTraps

Syntax

Value	Declaration	Description
Integer	1 (enabled)	
	2 (disabled)	

Access Read-write

Status Mandatory

Description Indicates whether the SNMP agent process is permitted to generate authentication-failure traps. The value of this object overrides any configuration information; as such, it can disable all authentication-failure traps.

Note It is strongly recommended that this object be stored in nonvolatile memory, so that the object remains constant between re-initializations of the network management system.

egpNeighborLoss

Enterprise SNMP

Variables egpNeighAddr

Description An egpNeighborLoss trap signifies that an EGP neighbor, for which the sending protocol entity was an EGP peer, has been marked down and the peer relationship no longer pertains.

FIBRE ALLIANCE MIB OBJECT TYPES

This chapter contains descriptions and other information specific to Fibre Alliance MIB (FCMGMT-MIB) object type. The object types in FAMGMT-MIB are organized into the following groupings:

- Connectivity
- Trap Registration
- Revision Number
- Statistic Set

FAMGMT-MIB File System Organization

Figure 5 through Figure 7 depict the organization and structure of the FAMGMT file system.

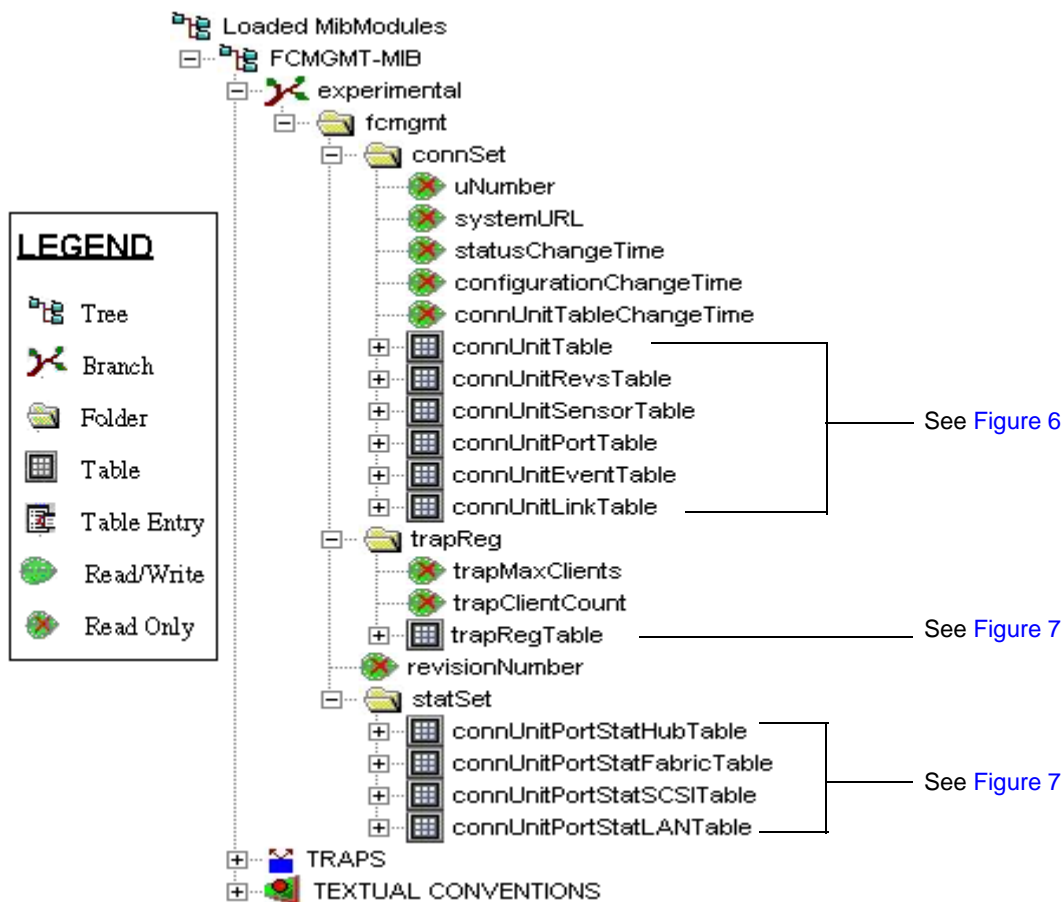


Figure 5. FAMGMT Overall Tree Structure

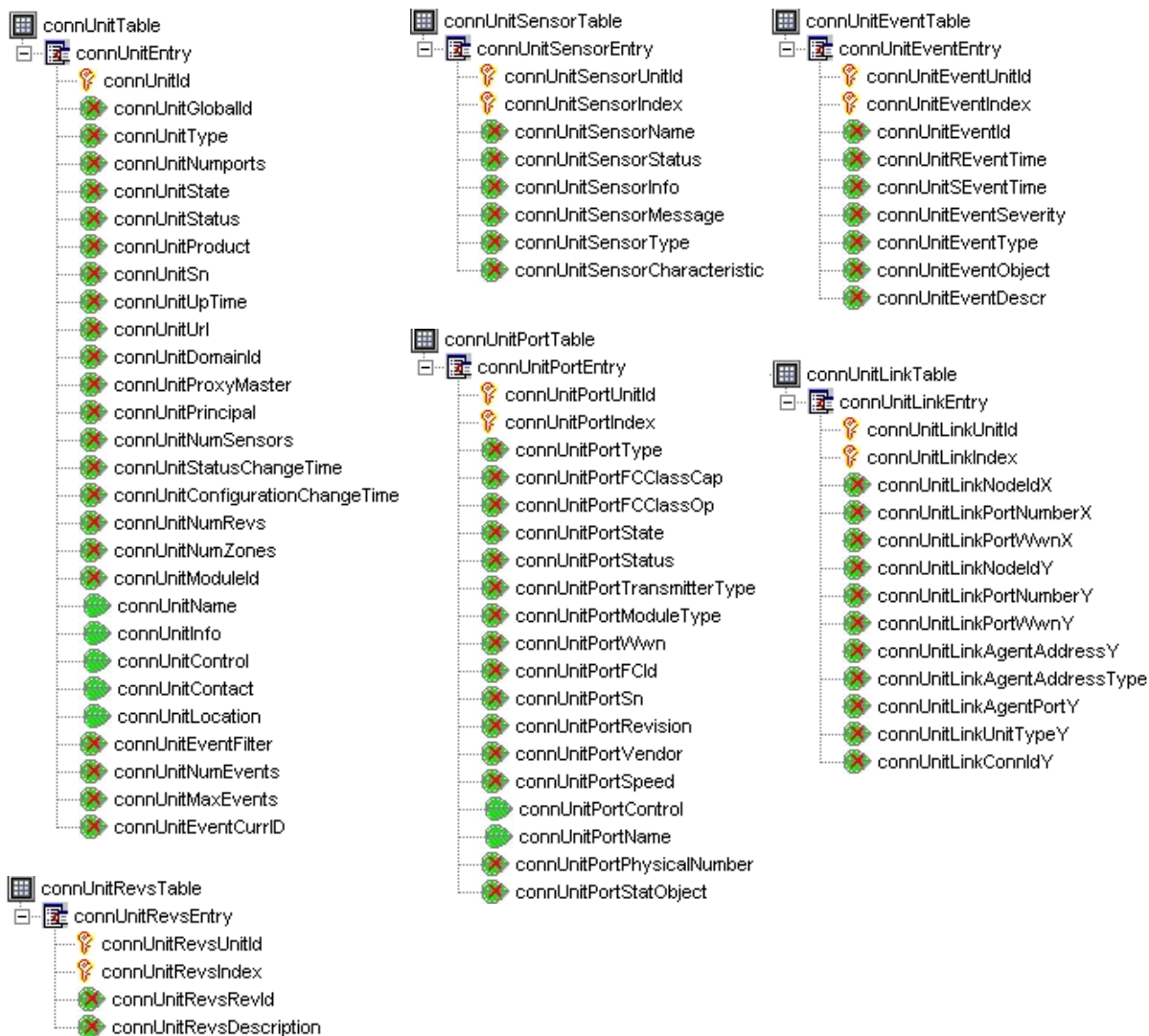


Figure 6. Tree Structure for connSet Tables

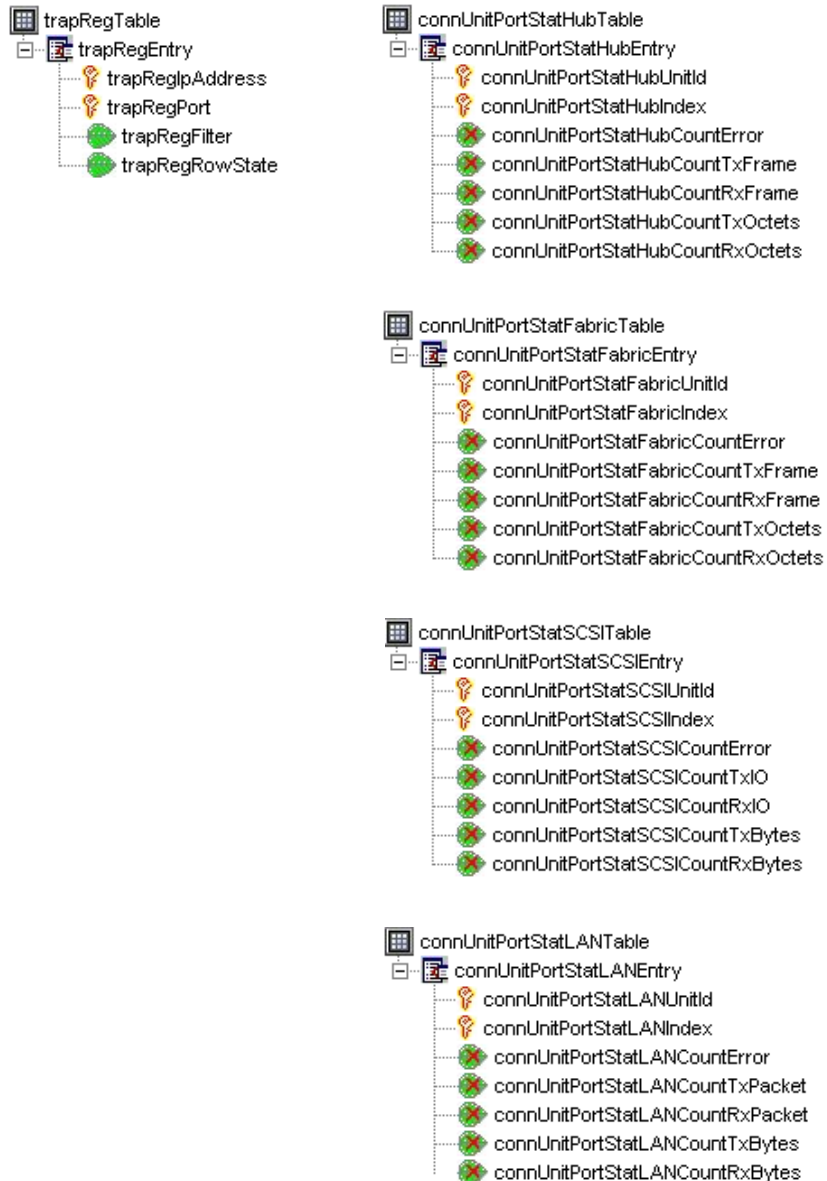


Figure 7. Tree Structure for trapReg Table and statSet Tables

Definitions for FAMGMT-MIB

The following definitions are used for FAMGMT-MIB.

Table 13. FAMGMT-MIB Definitions

Type Definition	Value	Declaration	Description
FcNameId	Octet String of size 8		
FcGlobalId	Octet String of size 16		
FcEventSeverity	Integer	1 (unknown)	
		2 (emergency)	Emergency status.
		3 (alert)	Alert status.
		4 (critical)	Critical status.
		5 (error)	Error status.
		6 (warning)	Warning status.
		7 (notify)	Notification status.
		8 (info)	Informational status.
		9 (debug)	Debug status.
		10 (mark)	All messages logged.
FcUnitType	Integer	1 (unknown)	
		2 (other)	None of the following.
		3 (hub)	Passive connectivity unit supporting loop protocol.
		4 (switch)	Active connectivity unit supporting multiple protocols.

Table 13. FAMGMT-MIB Definitions (continued)

Type Definition	Value	Declaration	Description
		5 (gateway)	Unit that converts not only the interface but also encapsulates the frame into another protocol. The assumption is that there are always two gateways connected together. For example, FC <-> ATM.
		6 (converter)	Unit that converts from one interface to another. For example, FC <-> SCSI.
		7 (hba)	Host bus adapter.
		8 (proxy-agent)	Software proxy-agent.
		9 (storage-device)	Disk, cd, tape, and so on.
		10 (host)	Host computer.
		11 (storage-subsystem)	Raid, library, and so on.
		12 (module)	Subcomponent of a system.
		13 (swdriver)	Software driver.
		14 (storage-access-device)	Provides storage management and access for heterogeneous hosts and heterogeneous devices.

Connectivity Group

Implementation of the connectivity group is mandatory for all systems.

uNumber

Syntax Integer

Access Read-only

Status Mandatory

Description The number of connectivity units present on this system (represented by this agent). Can be a count of the boards in a chassis, or the number of full boxes in a rack.

Note The connectivity unit is mapped to a switch. uNumber.0 is always set to 1.

systemURL

Syntax Display String

Access Read-only

Status Mandatory

Description The top-level URL of the system. If the value does not exist, it is an empty string. The URL format is implementation dependant and can have keywords embedded that are preceded by a percent sign (for example, %USER).

The following are the defined keywords that are recognized and replaced with data during a launch:

USER	Replace with username
PASSWORD	Replace with password
GLOBALID	Replace with globa lid
SERIALNO	Replace with serial number
DEFVAL	{“”}

Note The expected value for systemURL.0 is:

“http://{a.b.c.d}”

where {a.b.c.d} is the IP address of the switch.

“” (null)

statusChangeTime

Syntax Time Ticks

Access Read-only

Status Deprecated

Description The sysuptime timestamp (in centiseconds) at which the last status change occurred for any members of the set. In other words, this is the latest timestamp that connUnitStatus or connUnitPortStatus has changed.

configurationChangeTime

Syntax Time Ticks

Access Read-only

Status Deprecated

Description The sysuptime timestamp (in centiseconds) at which the last configuration change occurred for any members of the set. In other words, this is the latest timestamp of a Flash memory update. This represents a union of change information for connUnitConfigurationChangeTime.

connUnitTableChangeTime

Syntax Time Ticks

Access Read-only

Status Deprecated

Description The sysuptime timestamp (in centiseconds) at which the connUnitTable was updated (an entry was either added or deleted). The time is set at initialization of the connectivity table (connUnitTable)

Note The connectivity unit table contains general information on the system's units.

Connectivity Unit Table

connUnitTable

Syntax Sequence of connUnitEntry

Access Not accessible

Status Mandatory

Description A list of units under a single SNMP agent. The number of entries is given by the value of uNumber. The value is 1 for stand-alone system.

connUnitEntry [connUnitTable]

Syntax connUnitEntry

Access Not accessible

Status Mandatory

Description A connectivity unit entry containing objects for a particular unit.

Index connUnitId

Table 14. connUnitEntry Objects and Object Types

connUnitEntry Objects	See Page	Object Types
connUnitId	109	Octet String
connUnitGlobalId	110	FcGlobalId
connUnitType	112	FcUnitType
connUnitNumports	112	Integer
connUnitState	113	Integer
connUnitStatus	113	Integer
connUnitProduct	114	Display String
connUnitSn	114	Display String
connUnitUpTime	115	Time Ticks
connUnitUrl	115	Display String
connUnitDomainId	116	Octet String
connUnitProxyMaster	116	Integer
connUnitPrincipal	117	Integer
connUnitNumSensors	117	Integer
connUnitStatusChangeTime	118	Time Ticks
connUnitConfigurationChangeTime	118	Time Ticks
connUnitNumRevs	119	Integer
connUnitNumZones	119	Integer
connUnitModuleId	120	Octet String
connUnitName	120	Display String
connUnitInfo	121	Display String
connUnitControl	121	Integer

Table 14. *connUnitEntry Objects and Object Types (continued)*

connUnitEntry Objects	See Page	Object Types
connUnitContact	122	Display String
connUnitLocation	123	Display String
connUnitEventFilter	123	FcEventSeverity
connUnitNumEvents	124	Integer
connUnitMaxEvents	124	Integer
connUnitEventCurrID	124	Integer

connUnitId [connUnitTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The unique identification for this connectivity unit among those within this proxy domain.

The value must be unique within the proxy domain because it is the index variable for connUnitTable.

The value assigned to a given connectivity unit should be persistent across agent and unit resets.

The value should be the same as connUnitGlobalId if connUnitGlobalId is known and stable.

Note The HP FC 6164 implementation treats this ID as a very large (128-bit) integer, starting from 1. Therefore, in order to specify a particular instance of any columnar variable in the `connUnitEntry` (such as `connUnitType`), specify the instance identifier as a 16-octet value.

For example:

```
connUnitType.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.1
```

where the object instance identifier consists of 16 octets, each representing the byte value from high-byte order to low-byte order of this 128-bit integer.

This integer maps to the WWN.

connUnitGlobalId [connUnitTable]

Syntax FcGlobalId

Access Read-only

Status Mandatory

Description An optional global-scope identifier for this connectivity unit.

It must be a WWN for this connectivity unit or 16 octets of value zero.

The following characteristics are required:

- WWN formats requiring fewer than 16 octets must be extended to 16 octets with trailing zero octets.
- If a WWN is used for `connUnitId`, the same WWN must be used for `connUnitGlobalId`.

The following characteristics are strongly recommended:

When a nonzero value is provided, it should be persistent across agent and unit resets.

- This value should be globally unique.
- This value should be one of these FC-PH/PH3 formats:
 - IEEE (NAA=1)
 - IEEE Extended (NAA=2)
 - IEEE Registered (NAA=5)
 - IEEE Registered extended (NAA=6)

Use of the IEEE formats allows any IEEE-registered vendor to assure global uniqueness independently.

The following are some references on IEEE WWN formats:

<http://standards.ieee.org/regauth/oui/tutorials/fibreformat.html>

http://standards.ieee.org/regauth/oui/tutorials/fibrecomp_id.html

If one or more WWNs are associated with the connUnit using other management methods, one of the WWNs should be used for connUnitGlobalId.

If there is not a WWN assigned specifically to the connUnit, there is some merit, though not a requirement, to using a WWN assigned to one of its permanently attached FC/LAN interfaces. However this WWN must not be unique.

As a counter example, if your agent runs in a host and the host has an HBA, the agent, host, and HBA can be distinct connUnits, so the host and agent cannot use the WWN of the HBA.

Another example:

If your hub has a built-in Ethernet port, the hub can use its LAN address (prefixed with the appropriate NAA) as its connUnitId. But if the Ethernet were a replaceable PC Card, the hub should have an independent ID.

Note The HP FC 6164 implementation maps the switch WWN to the top 8 bytes of this variable and sets the remaining lower 8 bytes to 0. For example, if the switch WWN is 10:00:00:60:69:10:02:18, SNMP-GET `connUnitGlobalId.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.1` returns 10 00 00 60 69 10 02 18 00 00 00 00 00 00 00 00.

connUnitType [connUnitTable]

Syntax FcUnitType

Access Read-only

Status Mandatory

Description The type of this connectivity unit.

Note Set to 4 (switch).

connUnitNumports [connUnitTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Number of physical ports in the connectivity unit (internal/embedded, external).

Note The 6 switches comprising the HP FC 6164 each report a value of 16.

connUnitState [connUnitTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (online)	Set the state to online
	3 (offline)	Set the state to offline

Access Read-only

Status Mandatory

Description Overall state of the connectivity unit.

Note Mapped as follows:

switchState(ONLINE)	2 (online)
switchState(not ONLINE) (offline, testing, faulty)	3 (offline)

connUnitStatus [connUnitTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (unused)	
	3 (ok)	
	4 (warning)	Needs attention
	5 (failed)	

Access Read-only

Status Mandatory

Description Overall status of the connectivity unit.

Note switchStatus maps directly as follows:

connUnitStatus	switchStatus
1 (unknown)	Unknown
2 (unused)	Unmonitored
3 (ok)	Healthy/ok
4 (warning)	Marginal/Warning
5 (failed)	Down/Failed

connUnitProduct [connUnitTable]

Syntax Display String of size 0 to 79

Access Read-only

Status Mandatory

Description The connectivity unit vendor's product model name.

Note This is the same as for sysDescr (set for as many as 79 bytes).

connUnitSn [connUnitTable]

Syntax Display String of size 0 to 79

Access Read-only

Status Mandatory

Description The serial number for this connectivity unit.

Note Set to the SSN, which by default is the WWN, but is changeable through Telnet.

connUnitUpTime [connUnitTable]

Syntax Time Ticks

Access Read-only

Status Mandatory

Description The number of centiseconds since the last unit initialization.

Note Set when connUnitTable is initialized.

connUnitUrl [connUnitTable]

Syntax Display String

Access Read-only

Status Mandatory

Description URL to launch a management application, if applicable. Otherwise, an empty string. In a standalone unit, this URL is the same as the top-level URL, and has the same definition as systemURL for keywords.

Note Same as systemURL. The expected value for connUnitURL.0 is:

“http://{a.b.c.d}”

where {a.b.c.d} is the IP address of the switch.

“” (null)

connUnitDomainId [connUnitTable]

Syntax Octet String of size 3

Access Read-only

Status Mandatory

Description The 24-bit fibre channel address ID of this connectivity unit, right justified with leading zeros if required. If this value is not applicable, return all bits set to 1.

Note Set to the switch domain ID (as per FC-SW).

connUnitProxyMaster [connUnitTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (no)	
	3 (yes)	

Access Read-only

Status Mandatory

Description A value of “yes” means this is the proxy master unit for a set of managed units. For example, this could be the only unit with a management card in it for a set of units. A standalone unit should return “yes” for this object.

Note Set to 2 (no).

connUnitPrincipal [connUnitTable]

Syntax Integer

Value	Declaration	Description
Integer	1 (unknown)	
	2 (no)	
	3 (yes)	

Access Read-only

Status Mandatory

Description Whether this connectivity unit is the principal unit within the group of fabric elements. If this value is not applicable, return 1 (unknown).

Note If the switch is principal, this is set to 3 (yes), otherwise, it is set to 2 (no).

connUnitNumSensors [connUnitTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Number of sensors in the connUnitSensorTable.

Note The number of sensors includes the following:
SW2010/40/50

Note SW2400
SW2800: 13 (5 temp + 6 fans + 2 power supplies)

connUnitStatusChangeTime [connUnitTable]

Syntax Time Ticks

Access Read-only

Status Deprecated

Description The sysuptime timestamp (in centiseconds) at which the last status change occurred for any members of the set. In other words, this is the latest timestamp that connUnitStatus or connUnitPortStatus has changed.

Note This is the same as statusChangeTime.

connUnitConfigurationChangeTime [connUnitTable]

Syntax Time Ticks

Access Read-only

Status Deprecated

Description The sysuptime timestamp (in centiseconds) at which the last configuration change occurred for any members of the set. In other words, this is the latest timestamp of Flash memory update. This represents a union of change information for connUnitConfigurationChangeTime.

Note This is the same as configurationChangeTime.

connUnitNumRevs [connUnitTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The number of revisions in the connUnitRevsTable.

Note Set to 2.

connUnitNumZones [connUnitTable]

Syntax Integer

Access Read-only

Status Deprecated

Description Number of zones defined in connUnitZoneTable.

Note Set to 0 because the zone table is not supported.

connUnitModuleId [connUnitTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description This is a unique ID, persistent between boots, that can be used to group a set of connUnits together into a module. This ID creates a connUnit with a connUnitType of “module” to represent a physical or logical group of connectivity units. Then the value of the group is set to the value of connUnitId for this “container” connUnit.

The connUnitModuleId value should be zeros if this connUnit is not part of a module.

Note Set to WWN.

connUnitName [connUnitTable]

Syntax Display String of size 0 to 79

Access Read-write

Status Mandatory

Description A display string containing a name for this connectivity unit. This object value should be persistent between boots.

Note Set to switchName/sysName.

connUnitInfo

Syntax Display String

Access Read-write

Status Mandatory

Description A display string containing information about this connectivity unit. This object value should be persistent between boots.

Note Set to null and read-only.

connUnitControl [connUnitTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (invalid)	
	3 (resetConnUnitColdStart)	Reboot; the addressed unit performs a Cold Start reset.
	4 (resetConnUnitWarmStart)	Fastboot; the addressed unit performs a Warm Start reset.
	5 (offlineConnUnit)	Disable switch; the addressed unit puts itself into an implementation-dependant offline state. In general, if a unit is in an offline state, it cannot be used to perform meaningful fibre channel work.

Value	Declaration	Description
Integer	6 (onlineConnUnit)	Enable switch; the addressed unit puts itself into an implementation-dependant online state. In general, if a unit is in an online state, it is capable of performing meaningful fibre channel work.

Access Read-write

Status Mandatory

Description Controls the addressed connUnit. Each implementation can chose not to allow any or all of these values on a set.

Cold Start and Warm Start are as defined in MIB-II and are not meant to be a factory reset.

This is similar to swAdmStatus.

- resetConnunitColdStart = reboot
- resetConnunitWarmStart = fastboot
- offlineConnUnit = disable switch
- onlineConnUnit = enable switch
- default after reboot = unknown

The declaration 1 (unknown) maps to the default value upon rebooting, and 2 (invalid) is not applicable.

connUnitContact [[connUnitTable](#)]

Syntax Display String of size 0 to 79

Access Read-write

Status Mandatory

Description Contact information for this connectivity unit.

Note Set to sysContact.

connUnitLocation [**connUnitTable**]

Syntax Display String of size 0 to 79

Access Read-write

Status Mandatory

Description Location information for this connectivity unit.

Note Set to sysLocation.

connUnitEventFilter [**connUnitTable**]

Syntax FcEventSeverity

Access Read-only

Status Mandatory

Description This value defines the event severity that is logged by this connectivity unit. All events of severity less than or equal to connUnitEventFilter are logged in connUnitEventTable.

Note Returns (debug).

connUnitNumEvents

Syntax Integer

Access Read-only

Status Mandatory

Description Number of events currently in connUnitEventTable.

Note Returns the number of events that are currently in the buffer.

connUnitMaxEvents [connUnitTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Maximum number of events that can be defined in connUnitEventTable.

Note Maximum buffer is 2147483647

connUnitEventCurrID [connUnitTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The last used event ID (connUnitEventId).

Note Same as connUnitNumEvents.

Connectivity Unit Table of Revisions for Hardware/Software Elements

connUnitRevsTable

Syntax	Sequence of connUnitRevsEntry
Access	Not accessible
Status	Mandatory
Description	Table of the revisions supported by connectivity units managed by this agent.

Note This table lists the versions of hardware and software elements in the switch.

connUnitRevsEntry [connUnitRevsTable]

Syntax	connUnitRevsEntry
Access	Not accessible
Status	Mandatory
Description	Table of the revisions supported by connectivity units managed by this agent.
Index	connUnitRevsUnitId, connUnitRevsIndex

Table 15. *connUnitRevsEntry* Objects and Object Types

connUnitRevsEntry Objects	See Page	Object Types
connUnitRevsUnitId	126	Octet String
connUnitRevsIndex	126	Integer
connUnitRevsRevId	127	Display String
connUnitRevsDescription	127	Display String

connUnitRevsUnitId [[connUnitRevsTable](#)]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this revision table.

connUnitRevsIndex [[connUnitRevsTable](#)]

Syntax Integer of size 1 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all connUnitRevsEntrys with the same value of connUnitRevsUnitId, in the range between 1 and connUnitNumRevs.

Note Index 1 returns the hardware version. Index 2 returns the software version.

connUnitRevsRevId [connUnitRevsTable]

Syntax Display String

Access Read-only

Status Mandatory

Description A vendor-specific string identifying a revision of a component of the connUnit indexed by connUnitRevsUnitId.

Note Index 1 returns the switchType from the Telnet command switchShow. Index 2 returns the Fabric OS version from the Telnet command version, for example, v2.2.

connUnitRevsDescription [connUnitRevsTable]

Syntax Display String

Access Read-only

Status Mandatory

Description Description of a component to which the revision corresponds.

Note Index 1 returns the hardware version. Index 2 returns the Fabric OS version.

Connectivity Unit Sensor Table

connUnitSensorTable

Syntax Sequence of connUnitSensorEntry

Access Not accessible

Status Mandatory

Description Table of the sensors supported by each connectivity unit managed by this agent.

connUnitSensorEntry [connUnitSensorTable]

Syntax connUnitSensorEntry

Access Not accessible

Status Mandatory

Description Each entry contains the information for a specific sensor.

Index connUnitSensorUnitId, connUnitSensorIndex

Table 16. connUnitSensorEntry Objects and Object Types

connUnitSensorEntry Objects	See Page	Object Types
connUnitSensorUnitId	129	Octet String
connUnitSensorIndex	129	Integer of size 1 to 2147483647
connUnitSensorName	129	Display String
connUnitSensorStatus	130	Integer
connUnitSensorInfo	130	Display String
connUnitSensorMessage	131	Display String
connUnitSensorType	131	Integer
connUnitSensorCharacteristic	132	Integer

connUnitSensorUnitId [connUnitSensorTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this sensor table.

Note Set to connUnitId.

connUnitSensorIndex [connUnitSensorTable]

Syntax Integer of size 1 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all connUnitSensorEntrys with the same value of connUnitSensorUnitId, in the range between 1 and connUnitNumSensor.

Note The value for the HP FC 6164 switches is 13.

connUnitSensorName [connUnitSensorTable]

Syntax Display String

Access Read-only

Status Mandatory

Description A textual identification of the sensor intended primarily for operator use.

Note Each contains the name of the sensor in textual format. (For example, Temp #1, Fan #2, and so on.)

connUnitSensorStatus [connUnitSensorTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (other)	
	3 (ok)	The sensor indicates ok.
	4 (warning)	The sensor indicates a warning.
	5 (failed)	The sensor indicates failure.

Access Read-only

Status Mandatory

Description The status indicated by the sensor.

Note Nominal = 3 (ok). Not nominal = 5 (failed).

connUnitSensorInfo [connUnitSensorTable]

Syntax Display String

Access Read-only

Status Mandatory

Description Miscellaneous static information about the sensor, such as its serial number.

Note Each contains textual information about the sensor name.

Returns the serial ID if this is for the power supply. Otherwise, it returns null.

connUnitSensorMessage [connUnitSensorTable]

Syntax Display String

Access Read-only

Status Mandatory

Description This describes the status of the sensor as a message and can provide more resolution on the sensor indication. For example, cover temperature 1503 K, above nominal operating range.

Note Each contains the sensor status (and reading if applicable) in textual format.

connUnitSensorType [connUnitSensorTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (other)	
	3 (battery)	
	4 (fan)	
	5 (power supply)	
	6 (transmitter)	
	7 (enclosure)	

Value	Declaration	Description
Integer	8 (board)	
	9 (receiver)	

Access Read-only

Status Mandatory

Description The type of component being monitored by this sensor.

Note The following mapping is for each sensor, where applicable:

swSensorType	connUnitSensorType
1 (temperature)	8 (board)
2 (fan)	4 (fan)
3 (power supply)	5 (power supply)

connUnitSensorCharacteristic [[connUnitSensorTable](#)]

Syntax

Value	Declaration	Description	
Integer	1 (unknown)		
	2 (other)		
	3 (temperature)		
	4 (pressure)		
	5 (emf)		
	6 (currentValue)		Current is a keyword.
	7 (airflow)		

Value	Declaration	Description
Integer	8 (frequency)	
	9 (power)	

Access Read-only

Status Mandatory

Description The characteristics being monitored by this sensor.

Note The following mapping is for each sensor, where applicable:

swSensorType	connUnitSensorCharacteristic
1 (temperature)	3 (temperature)
2 (fan)	7 (airflow)
3 (power supply)	9 (power)

Connectivity Unit Port Table

connUnitPortTable

Syntax Sequence of connUnitPortEntry

Access Not accessible

Status Mandatory

Description Generic information on ports for a specific connUnit. For the 2800, there are 16 entries (16 external FC ports).

connUnitPortEntry [connUnitPortTable]

Syntax connUnitPortEntry

Access Not accessible

Status Mandatory

Description Each entry contains the information for a specific port.

Index connUnitPortUnitId, connUnitPortIndex

Table 17. connUnitPortEntry Objects and Object Type

connUnitPortEntry Objects	See Page	Object Types
connUnitPortUnitId	135	Octet String
connUnitPortIndex	135	Integer
connUnitPortType	136	Integer
connUnitPortFCClassCap	137	Octet String
connUnitPortFCClassOp	138	Octet String
connUnitPortState	138	Integer
connUnitPortStatus	139	Integer
connUnitPortTransmitterType	140	Integer
connUnitPortModuleType	141	Integer
connUnitPortWwn	141	FcNameId
connUnitPortFCId	142	Octet String
connUnitPortSn	143	Display String
connUnitPortRevision	143	Display String
connUnitPortVendor	143	Display String
connUnitPortSpeed	144	Integer
connUnitPortControl	144	Integer

Table 17. *connUnitPortEntry* Objects and Object Type (continued)

connUnitPortEntry Objects	See Page	Object Types
connUnitPortName	147	Display String
connUnitPortPhysicalNumber	147	Integer
connUnitPortStatObject	148	Object Identifier

connUnitPortUnitId [**connUnitPortTable**]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this port.

Note Same value as connUnitId.

connUnitPortIndex [**connUnitPortTable**]

Syntax Integer of size 1 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all connUnitPortEntrys on this connectivity unit, between 0 and connUnitNumPort.

Note The valid values for each of the HP FC 6164 switches (external FC ports only) are 1 through 16.

connUnitPortType [connUnitPortTable]

Syntax Integer

Value	Declaration	Description
Integer	1 (unknown)	
	2 (other)	
	3 (not-present)	
	4 (hub-port)	
	5 (n-port)	End port for fabric
	6 (l-port)	End port for loop
	7 (fl-port)	Public loop
	8 (f-port)	Fabric port
	9 (e-port)	Fabric expansion port
	10 (g-port 1)	Generic fabric port
	11 (domain-ctl)	Domain controller
	12 (hub-controller)	
	13 (scsi)	Parallel SCSI port
	14 (escon)	
	15 (lan)	
	16 (wan)	

Access Read-only

Status Mandatory

Description The port type.

Note Mapped as:

U-Port	10 (g-port)
F-Port	8 (f-port)
FL-Port	7 (fl-port)
E-Port	9 (e-port)

connUnitPortFCClassCap [connUnitPortTable]

Syntax Octet String of size 2

Access Read-only

Status Mandatory

Description Bit mask that specifies the classes of service capability of this port. If this is not applicable, return all bits set to zero.

The bits have the following definition:

Value	Declaration	Description
Integer	0 (unknown)	
	1 (class-f)	
	2 (class-one)	
	4 (class-two)	
	8 (class-three)	
	16 (class-four)	Current is a keyword.
	32 (class-five)	
	64 (class-six)	

Note For an F or FL port, this value is 0x000C. For a G or E port, this value is 0x000D.

connUnitPortFCClassOp [connUnitPortTable]

Syntax Octet String of size 2

Access Read-only

Status Mandatory

Description Bit mask that specifies the classes of service that are currently operational. If this is not applicable, return all bits set to zero. This object has the same definition as connUnitPortFCClassCap.

Note For an F or FL port, this value is 0x000C. For a G or E port, this value is 0x000D.

connUnitPortState [connUnitPortTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (online)	
	3 (offline)	
	4 (bypassed)	

Access Read-only

Status Mandatory

Description The state of the port hardware.

Note For an E, F, or FL port, the value is online. For a U port, the value is offline (disabled, testing, faulted).

connUnitPortStatus [connUnitPortTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	Needs attention
	2 (unused)	
	3 (ok)	
	4 (warning)	
	5 (failure)	
	6 (not participating)	
	7 (initializing)	
	8 (bypass)	

Access Read-only

Status Mandatory

Description An overall protocol status for the port.

Note For an E, F, or FL port, the value is 3 (ok). For a U port, the value is 2 (unused) if not faulty with GBIC, 4 (warning) if not faulty but no GBIC, or 5 (failure) if faulty.

connUnitPortTransmitterType [connUnitPortTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (other)	
	3 (unused)	
	4 (shortwave)	
	5 (longwave)	
	7 (scsi)	
	8 (longwaveNoOFC)	
	9 (shortwaveNoOFC)	
	10 (longwaveLED)	

Access Read-only

Status Mandatory

Description The technology of the port transceiver.

Note For an external FC port, this value should be 9 (shortwaveNoOFC) or 8 (longwaveNoOFC).

connUnitPortModuleType [connUnitPortTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (other)	
	3 (GBIC)	
	4 (embedded)	Fixed (oneXnine)
	5 (glm)	
	6 (gbicSerialId)	
	7 (gbicNoSerialId)	
	8 (gbicNotInstalled)	
	9 (smallFormFactor)	

Access Read-only

Status Mandatory

Description The module type of the port connector.

Note For an external FC port with GBIC, this value should be 6 (gbicSerialId) or 7 (gbicNoSerialId). For an external FC port without GBIC, this value is set to 8 (gbicNotInstalled).

connUnitPortWwn [connUnitPortTable]

Syntax FcNameId

Access Read-only

Status Mandatory

Description The worldwide Name (WWN) of the port if applicable, otherwise returns an empty string.

This is in IEEE Extended format, and the extension contains the internal port number of each port.

Note The internal port number is 1 less than the port index. For example, if the switch has WWN 10:00:00:60:69:10:02:18, port numbers 0 and 6 have WWN 20:00:00:60:69:10:02:18 and 20:06:00:60:69:10:02:18, respectively. However, the embedded port has WWN 10:00:00:60:69:10:02:18, which is the same as the switch.

connUnitPortFCId [connUnitPortTable]

Syntax Octet String of size 3

Access Read-only

Status Mandatory

Description This is the assigned fibre channel ID of this port. This value is expected to be a Big Endian value of 24 bits. If this is loop, it is the ALPA that is connected. If this is an E port, it contains only the domain ID left justified, zero filled. If this port does not have a fibre channel address, return all bits set to 1.

Note For an F port, this is the fibre channel ID to which the connected N port is assigned. For an FL port, this is the fibre channel ID of the FL port (alpa = 0). For a U or E port, this is similar to an F port.

connUnitPortSn [connUnitPortTable]

Syntax Display String of size 0 to 79

Access Read-only

Status Mandatory

Description The serial number of the unit (for example, for a GBIC). If this is not applicable, returns an empty string.

Note If GBIC is the serial ID, this returns the GBIC part number. Otherwise it returns a null value.

connUnitPortRevision [connUnitPortTable]

Syntax Display String of size 0 to 79

Access Read-only

Status Mandatory

Description The port revision (for example, GBIC).

Note If GBIC is the serial ID, this returns the GBIC revision number. Otherwise it returns a null value.

connUnitPortVendor [connUnitPortTable]

Syntax Display String of size 0 to 79

Access Read-only

Status Mandatory

Description The port vendor (for example, for a GBIC).

Note If GBIC is the serial ID, this returns the GBIC vendor name. Otherwise it returns a null value.

connUnitPortSpeed [connUnitPortTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The speed of the port in kilobytes per second.

Note The valid values for each of the HP FC 6164 switches is 10^5 .

connUnitPortControl [connUnitPortTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (invalid)	
	3 (resetConnUnitPort)	portDisable (F or E, loop for U)
	4 (bypassConnUnitPort)	portDisable (FL port)
	5 (unbypassConnUnitPort)	portEnable (FL port)
	6 (offlineConnUnitPort)	portDisable (E, F, FL)
	7 (onlineConnUnitPort)	portEnable (U)
	8 (resetConnUnitPortCounters)	Clear the port stats counter when rebooted, defaults to 1 (unknown)

Access Read-write (or possibly write-only)

Status Mandatory

Description Controls the addressed connUnit port. Valid commands are:

- **resetConnUnitPort:**

If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific reset operation.

Examples of these operations are:

- Link Reset protocol
- Loop Initialization protocol
- Resynchronization occurring between the transceiver in the addressed port to the transceiver to which that the port is connected.

- **bypassConnUnitPort:**

If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific bypass operation.

Examples of these operations are:

- Transitioning from online to offline
- A request (NONPARTICIPATING) command to the Loop Port state machine
- Removal of the port from an arbitrated loop by a hub

- **unbypassConnUnitPort:**

If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific unbypass operation.

Examples of these operations are:

- Link Failure protocol
- A request (PARTICIPATING) command to the Loop Port state machine
- Addition of the port to an arbitrated loop by a hub

- **offlineConnUnitPort:**

If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific offline operation. Examples of these operations are:

- Disabling a ports transceiver
- Link Failure protocol
- Request (NONPARTICIPATING) command to the Loop Port state machine

- **onlineConnUnitPort:**

If the addressed connUnit allows this operation to be performed to this port, the addressed port performs a vendor-specific online operation. Examples of these operations are:

- Enabling a ports transceiver
- Link Failure protocol, request (PARTICIPATING) command to the Loop Port state machine
- Addition of the port from an arbitrated loop by a hub

Each implementation can choose not to allow any or all of these values on a set.

If the Management Station uses in-band communication (FC-IP) with the switch, either of the two following actions can result in a loss of in-band communication with the switch:

- Disabling the FC port that is connected to the Management Station
- Disabling the embedded port

Note Return values are as follows:

resetConnUnitPort - portDisable (F or E, loop for U).

bypassConnUnitPort - portDisable (FL port).

unbypassConnUnitPort - portEnable (FL port).

offlineConnUnitPort - portDisable (E, F, FL).

onlineConnUnitPort - portEnable (U).
resetConnUnitPortCounters - clear the port stats counter. When rebooted, this defaults to 1 (unknown)

connUnitPortName [connUnitPortTable]

Syntax Display String

Access Read-write

Status Mandatory

Description A string describing the addressed port.

Note For an external FC port, this enables the port for the embedded port, thus enabling the switch.

Each implementation can chose not to allow any or all of the following values on a set.

If the Management Station uses in-band communication (FC-IP) with the switch, either of the two following actions cannot be possible in-band:

- Enabling the FC port that is connected to the Management Station
- Enabling the embedded port

This returns null and is read-only.

connUnitPortPhysicalNumber [connUnitPortTable]

Syntax Integer

Access Read-only

Status Mandatory

Description This is the internal port number by which this port is known. In many implementations, this should be the same as `connUnitPortIndex`. Some implementations can have an internal port representation that is not compatible with the rules for table indices. In that case, provide the internal representation of this port in this object. This value can also be used in the `connUnitLinkPortNumberX` or `connUnitLinkPortNumberY` objects of the `connUnitLinkTable`.

Note The internal port numbers for each of the HP FC 6164 switches are 0 through 15.

connUnitPortStatObject [connUnitPortTable]

Syntax Object Identifier

Access Read-only

Status Mandatory

Description This contains the OID of the first object of the table that contains the statistics for this particular port. If this has a value of zero, there are no statistics available for this port. The port type information helps identify the statistics objects that are found in the table. From this point, you can do a `getNext` to get the next statistics object. When the first part of the OID changes, the end of the table is reached.

Note Mapped to `connUnitPortStatFabricUnitId`.

Connectivity Unit Event Table

connUnitEventTable

- Syntax** Sequence of connUnitEventEntry
- Access** Not accessible
- Status** Mandatory
- Description** The table of connectivity unit events. Errors, warnings, and information should be reported in this table.

connUnitEventEntry [connUnitEventTable]

- Syntax** connUnitEventEntry
- Access** Not accessible
- Status** Mandatory
- Description** Each entry contains information on a specific event for the given connectivity unit.
- Index** connUnitEventUnitId, connUnitEventIndex

Table 18. connUnitEventEntry Objects and Object Types

connUnitEventEntry Objects	See Page	Object Types
connUnitEventUnitId	150	Octet String
connUnitEventIndex	150	Integer of size 1 to 2147483647
connUnitEventId	151	Integer
connUnitREventTime	152	Display String
connUnitSEventTime	152	Time Ticks

Table 18. *connUnitEventEntry Objects and Object Types (continued)*

connUnitEventEntry Objects	See Page	Object Types
connUnitEventSeverity	153	FcEventSeverity
connUnitEventType	153	Integer
connUnitEventObject	154	Object Identifier
connUnitEventDescr	154	Display String

connUnitEventUnitId [connUnitEventTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this event table.

Note Same as connUnitId.

connUnitEventIndex [connUnitEventTable]

Syntax Integer of size 1 to 2147483647

Access Read-only

Status Mandatory

Description Each connectivity unit has its own event buffer. As the buffer wraps, it can write over previous events. This object is an index into the buffer. It is recommended that this table be read using “getNexts” to retrieve the initial table. The management application should read the event table at periodic intervals, and then determine if any new entries were added by comparing the last known index value with the current highest index value. The management application should then update its copy of the event table. If

the read interval is too long, there can be events that cannot be contained in the agent's internal event buffer.

For example, an agent can read events 50 through 75.

At the next read interval, `connUnitEventCurrID` is 189. If the management app tries to read event index 76, and the agent's internal buffer is 100 entries max, event index 76 is no longer available.

The index value is an incrementing integer starting from 1 every time there is a table reset. On table reset, all contents are emptied and all indices are set to zero 0. When an event is added to the table, the event is assigned the next higher integer value than the last item entered into the table. If the index value reaches its maximum value, the next item entered causes the index value to roll over and start at one 1 again.

Note Mapped to `swEventIndex`.

connUnitEventId [connUnitEventTable]

Syntax Integer

Access Read-only

Status Deprecated

Description The internal event ID. Incremented for each event, ranging between 0 and `connUnitMaxEvents`. Not used as table index to simplify the agent implementation. When this reaches the end of the range specified by `connUnitMaxEvents`, the ID rolls over to start at 0. This value is set back to 0 at reset. The relationship of this value to the index is that the internal event ID can represent a smaller number than a 32-bit integer (for example, max 100 entries), and has a value range up to `connUnitMaxEvents`.

Note Same as `connUnitEventIndex`.

connUnitREventTime [connUnitEventTable]

Syntax Display String of size 15

Access Read-only

Status Mandatory

Description This is the real time when the event has occurred, and has the following format:

DDMMYYYY HHMMSS

where:

DD = day number

MM = month number

YYYY = year number

HH = hour number

MM = minute number

SS = seconds number

If not applicable, return a null string.

connUnitSEventTime [connUnitEventTable]

Syntax Time Ticks

Access Read-only

Status Mandatory

Description This is the sysuptime timestamp when the event occurred.

connUnitEventSeverity [connUnitEventTable]

Syntax FcEventSeverity

Access Read-only

Status Mandatory

Description The event severity level.

Note Severity is explained in the front of this chapter. See FcEventSeverity in [Table 13](#).

connUnitEventType [connUnitEventTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	
	2 (other)	
	3 (status)	
	4 (configuration)	
	5 (topology)	

Access Read-only

Status Mandatory

Description The type of this event.

Note Always set to 2 (other).

connUnitEventObject [connUnitEventTable]

Syntax Object Identifier

Access Read-only

Status Mandatory

Description This is used with connUnitEventType to identify to which object the event refers. It can be the OID of a connectivity unit or of another object, for example connUnitPortStatus[...].

Note Always set to null.

connUnitEventDescr [connUnitEventTable]

Syntax Display String

Access Read-only

Status Mandatory

Description The description of the event.

The link table is intended to organize and communicate any information the agent has, that might assist a management application to discover the connectivity units in the framework and the topology of their interconnect.

That is, the goal is to assist the management application by mapping the elements of the framework in addition to listing them.

With this goal, the agent should include as much as it possesses about any links from its own connectivity units to others, including links among its own units.

An agent should include partial information about links if it is not able to fully define them in accord with the following structure; however, the

information must include either a nonzero connUnitNodeId, or a nonzero connUnitPortWwn, for each end of the link.

If the agent is able to discover links that do not directly attach to members of its agency, and the agent's discovery algorithm gives some assurance that the links are recently valid, it can include these links.

Link information entered by administrative action can be included even if not validated directly, if the link has at least one endpoint in this agency, but otherwise this information should not be included.

A connectivity unit should fill the table in as best it can. One of the methods to fill this in is to use the RNID ELS (ANSI document 99-422v0). This allows you to query a port for the information needed for the link table.

This table is accessed either directly if the management software has an index value, or using "GetNext". The value of the indices are not required to be contiguous. Each entry created in this table is assigned an index. This relationship is kept persistent until the entry is removed from the table or the system is reset. The total number of entries is defined by the size of the table.

For an entry to be considered valid, both the X (local) and the Y (remote) need to have one valid value.

Note Same as the string shown in the Telnet command errShow.

Connectivity Unit Link Table

connUnitLinkTable

Syntax Sequence of connUnitLinkEntry

Access Not accessible

Status Mandatory

Description A list of links know to this agent from this connectivity unit to other connectivity units.

Note X = switch data, Y = other end.

connUnitLinkEntry [connUnitLinkTable]

Syntax connUnitLinkEntry

Access Not accessible

Status Mandatory

Description An entry describing a particular link to another.

Index connUnitLinkUnitId, connUnitLinkIndex

Table 19. connUnitLinkTable Objects and Object Types

connUnitLinkTable Objects	See Page	Object Types
connUnitLinkUnitId	157	Octet String
connUnitLinkIndex	157	Integer
connUnitLinkNodeIdX	158	Octet String
connUnitLinkPortNumberX	158	Integer
connUnitLinkPortWwnX	159	Octet String
connUnitLinkNodeIdY	159	Octet String
connUnitLinkPortNumberY	159	Integer
connUnitLinkPortWwnY	160	Octet String
connUnitLinkAgentAddressY	160	Octet String
connUnitLinkAgentAddressTypeY	161	Integer

Table 19. connUnitLinkTable Objects and Object Types (continued)

connUnitLinkTable Objects	See Page	Object Types
connUnitLinkAgentPortY	161	Integer
connUnitLinkUnitTypeY	161	FcUnitType
connUnitLinkConnIdY	162	Octet String

connUnitLinkId [connUnitLinkTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this link table.

Note Set to WWN of the local switch.

connUnitLinkIndex [connUnitLinkTable]

Syntax Integer of size 0 to 2147483647

Access Read-only

Status Mandatory

Description This value is used to create a unique value for each entry in the link table with the same connUnitLinkId. The value can only be reused if it is not currently in use and the value is the next candidate to be used. This value is allowed to wrap at the highest value represented by the number of bits. This value is reset to zero when the system is reset and the first value to be used is one.

Note Indices 1 through 16 are reserved for ISL

Indices 17 and higher are reserved for end devices, and are calculated based on portID of the end devices.

connUnitLinkNodeIdx [connUnitLinkTable]

Syntax Octet String of size 64

Access Read-only

Status Mandatory

Description The node WWN of the unit at one end of the link. If the node WWN is unknown and the node is a connUnit in the responding agent, the value of this object must be equal to its connUnitID.

Note WWN of the local switch.

connUnitLinkPortNumberX [connUnitLinkTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The port number on the unit specified by connUnitLinkNodeIdx if known, otherwise -1. If the value is nonnegative, it is equal to connUnitPortPhysicalNumber.

Note ISL: Physical port number of the E port.

Device: Physical port number to which the device is connected.

connUnitLinkPortWwnX [connUnitLinkTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The port WWN of the unit specified by connUnitLinkNodeIdx, if known; otherwise 16 octets of binary 0.

Note WWN of the port to which the device is connected.

connUnitLinkNodeIdY [connUnitLinkTable]

Syntax Octet String of size 64

Access Read-only

Status Mandatory

Description The node WWN of the unit at the other end of the link. If the node WWN is unknown and the node is a connUnit in the responding SNMP agency, the value of this object must be equal to its connUnitID.

Note ISL: WWN of the remote switch.

Device: Node name of the device.

connUnitLinkPortNumberY [connUnitLinkTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The port number on the unit specified by connUnitLinkNodeIdY if known, otherwise -1. If the value is nonnegative, it is equal to connUnitPortPhysicalNumber.

Note ISL: Physical port number of the remote port.

Device: -1.

connUnitLinkPortWwnY [connUnitLinkTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The port WWN on the unit specified by connUnitLinkNodeIdY, if known; otherwise 16 octets of binary 0.

Note ISL: WWN of the remote port.

Device: Port name.

connUnitLinkAgentAddressY [connUnitLinkTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The address of an FCMGMT MIB agent for the node identified by connUnitLinkNodeIdY, if known; otherwise 16 octets of binary 0.

Note ISL: IP address (v6).

Device: 0 (null).

connUnitLinkAgentAddressTypeY [connUnitLinkTable]

Syntax Integer

Access Read-only

Status Mandatory

Description If connUnitLinkAgentAddressY is nonzero, it is a protocol address. ConnUnitLinkAgentAddressTypeY is the “address family number” assigned by IANA to identify the address format. (For example, 1 is Ipv4, 2 is Ipv6).

Note ISL: Type 2.

Device: 0 (null).

connUnitLinkAgentPortY [connUnitLinkTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The IP port number for the agent. This is provided in case the agent is at a nonstandard SNMP port.

Note ISL: IP port.

Device: 0 (null).

connUnitLinkUnitTypeY [connUnitLinkTable]

Syntax FcUnitType

Access Read-only

Status Mandatory

Description Type of the FC connectivity unit as defined in connUnitType.

Note ISL: Switch device.
End devices: (End device types based on an FCP inquiry)

Storage System	Storage Sub-system	Unknown	Other
Direct Access	Medium Changer	Unknown	Anything else (printer device, processor device, scanner, and so on)
Sequential Access	Array		
Write-Once	SES		
CD-ROM			
Optical			

Note The HP FC 6164 does not support hubs.

connUnitLinkConnIdY [connUnitLinkTable]

Syntax Octet String of size 3

Access Read-only

Status Mandatory

Description This is the fibre channel ID of this port. If the connectivity unit is a switch, this is expected to be a Big Endian value of 24 bits. If this is loop, it is the ALPA that is connected. If this is an E port, it contains only the domain ID. If not any of those, unknown or cascaded loop, return all bits set to 1.

Note ISL: Port ID of the remote port.

Device: Port ID of the remote port.

SNMP Trap Registration Group

trapMaxClients

Syntax Integer

Access Read-only

Status Mandatory

Description The maximum number of SNMP trap recipients supported by the connectivity unit.

Note Set to 6.

trapClientCount

Syntax Integer

Access Read-only

Status Mandatory

Description The current number of rows in the trap table.

Note Number of valid entries.

SNMP Trap Registration Table

trapRegTable

Syntax Sequence of trapRegEntry

Access Not accessible

Status Mandatory

Description A table containing a row for each IP address/port number to which traps are sent.

trapRegEntry [trapRegTable]

Syntax trapRegEntry

Access Not accessible

Status Mandatory

Description IP/Port pair for a specific client.

Index trapRegIpAddress, trapRegPort

Table 20. trapRegEntry Objects and Object Types

TrapRegEntry Objects	See Page	Object Types
trapRegIpAddress	165	IpAddress
trapRegPort	165	Integer of size 1 to 2147483647
trapRegFilter	165	FcEventSeverity
trapRegRowState	166	Integer

trapRegIpAddress [trapRegTable]

Syntax IpAddress

Access Read-only

Status Mandatory

Description The IP address of a client registered for traps.

trapRegPort [trapRegTable]

Syntax Integer of size 1 to 2147483647

Access Read-only

Status Mandatory

Description The UDP port to send traps to for this host. Normally this is the standard trap port(162). This object is an index and must be specified to create a row in this table.

Note Set to 162.

trapRegFilter [trapRegTable]

Syntax FcEventSeverity

Access Read-write

Status Mandatory

Description This value defines the trap severity filter for this trap host. The connUnit sends traps to this host that have a severity level less than or equal to this value. The default value of this object is “Warning”.

Note This severity applies to all entries. See FcEventSeverity in [Table 13](#).

trapRegRowState [trapRegTable]

Syntax

Value	Declaration	Description
Integer	1 (rowDestroy)	Remove row from table.
	2 (rowInactive)	Row exists, but TRAPs disabled.
	3 (rowActive)	Row exists and is enabled for sending traps.

Access Read-write

Status Mandatory

Description Specifies the state of the row.

Table 21. TrapRegRowState for Read-Write

TrapRegRowState	Read	Write
rowDestroy	Can never happen.	Remove this row from the table.
rowInactive	Indicates that this row exists, but that traps are not enabled to be sent to the target.	If the row does not exist, and the agent allows writes to the trap table, a new row is created. The values of the optional columns are set to default values. Traps are not enabled to be sent to the target. If the row exists, traps are disabled from being sent to the target.

Table 21. TrapRegRowState for Read-Write (continued)

TrapRegRowState	Read	Write
rowActive	Indicates that this row exists, and that traps are enabled to be sent to the target.	If the row does not exist, and the agent allows writes to the trap table, then a new row is created. The values of the optional columns are set to default values. Traps are enabled to be sent to the target. If the row exists, traps are enabled to be sent to the target.

Note This entry always returns rowActive and allows for read-only.

Revision Number

revisionNumber

Syntax Display String of size 4

Access Read-only

Status Mandatory

Description This is the revision number for this MIB. The format of the revision value is as follows:

0 = High order major revision number

1 = Low order major revision number

2 = High order minor revision number

3 = Low order minor revision number

The value is stored as an ASCII value. The following is the current value of this object.

0 = "0"

1 = "2"

2 = "2"

3 = "0"

This defines a revision of 02.20.

Note Set to 0220.

Statistics Group

Following is a statistics table for each port type class. Port types are aggregated into a port type class, such as all the fabric port types. There is one statistics table for each port. For all objects in statistics tables, if the object is not supported by the conn unit the high-order bit is set to 1 with all other bits set to 0. The high-order bit is reserved to indicate whether the object is supported. All objects start at a value of 0 at hardware initialization, and continue incrementing until the end of 63 bits and then wrap to 0.

Connectivity Unit Port Statistics Hub Table

Note The HP FC 6164 does not support Hub statistics; this section is not applicable.

connUnitPortStatHubTable

Syntax Sequence of connUnitPortStatHubEntry

Access Not accessible

Status Mandatory

Description A list of statistics for the hub port type.

connUnitPortStatHubEntry [connUnitPortStatHubTable]

Syntax connUnitPortStatHubEntry

Access Not accessible

Status Mandatory

Description An entry describing port statistics.

Index connUnitPortStatHubUnitId, connUnitPortStatHubIndex

Table 22. connUnitPortStatHubEntry Objects and Object Types

connUnitPortStatHubEntry Objects	See Page	Object Types
connUnitPortStatHubUnitId	169	Octet String
connUnitPortStatHubIndex	170	Integer
connUnitPortStatHubCountError	170	Octet String
connUnitPortStatHubCountTxFrame	170	Octet String
connUnitPortStatHubCountRxFrame	171	Octet String
connUnitPortStatHubCountTxOctets	171	Octet String
connUnitPortStatHubCountRxOctets	171	Octet String

connUnitPortStatHubUnitId [connUnitPortStatHubTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this port statistic table.

connUnitPortStatHubIndex [connUnitPortStatHubTable]

Syntax Integer of size 0 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all entries in this table, between 0 and connUnitNumPort.

connUnitPortStatHubCountError [connUnitPortStatHubTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description A count of the errors that have occurred on this port.

connUnitPortStatHubCountTxFrame [connUnitPortStatHubTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of frames that have been transmitted by this port.

connUnitPortStatHubCountRxFrame [connUnitPortStatHubTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of frames that have been received by this port.

connUnitPortStatHubCountTxOctets [connUnitPortStatHubTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of octets that have been transmitted by this port.

connUnitPortStatHubCountRxOctets [connUnitPortStatHubTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of octets that have been received by this port.

Connectivity Unit Port Statistics Fabric Table

connUnitPortStatFabricTable

Syntax Sequence of connUnitPortStatFabricEntry

Access Not accessible

Status Mandatory

Description A list of statistics for the fabric port types.

connUnitPortStatFabricEntry [connUnitPortStatFabricTable]

Syntax connUnitPortStatFabricEntry

Access Not accessible

Status Mandatory

Description An entry describing port statistics.

Index connUnitPortStatFabricUnitId, connUnitPortStatFabricIndex

Table 23. connUnitPortStatFabricEntry Objects and Object Types

connUnitPortStatFabricEntry Objects	See Page	Object Types
connUnitPortStatFabricUnitId	172	Octet String
connUnitPortStatFabricIndex	173	Integer
connUnitPortStatFabricCountError	173	Octet String
connUnitPortStatFabricCountTxFrame	173	Octet String
connUnitPortStatFabricCountRxFrame	174	Octet String
connUnitPortStatFabricCountTxOctets	174	Octet String
connUnitPortStatFabricCountRxOctets	174	Octet String

connUnitPortStatFabricUnitId [connUnitPortStatFabricTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this port statistic table.

connUnitPortStatFabricIndex [connUnitPortStatFabricTable]

Syntax Integer of size 0 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all entries in this table, between 0 and connUnitNumPort.

Note The valid values for HP FC 6164 switches are 1 through 16.

connUnitPortStatFabricCountError [connUnitPortStatFabricTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description A count of the errors that have occurred on this port.

Note This is an aggregation of MIBs from swFCPortRxEncInFrs to swFCPortMcastTimedOuts, as a 64-bit unsigned integer.

connUnitPortStatFabricCountTxFrame [connUnitPortStatFabricTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of frames that have been transmitted by this port.

Note Returns swFCPortTxFrames.

connUnitPortStatFabricCountRxFrame [connUnitPortStatFabricTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of frames that have been received by this port.

Note Returns swFCPortRxFrames.

connUnitPortStatFabricCountTxOctets [connUnitPortStatFabricTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of octets that have been transmitted by this port.

Note Returns four times the value of swFCPortTxWords.

connUnitPortStatFabricCountRxOctets [connUnitPortStatFabricTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of octets that have been received by this port.

Note Returns four times the value of swFCPortRxWords.

Connectivity Unit Port Statistics SCSI Table

Note The HP FC 6164 does not support SCSI statistics; this section is not applicable.

connUnitPortStatSCSITable

Syntax Sequence of connUnitPortStatSCSIEntry

Access Not accessible

Status Mandatory

Description A list of statistics for the SCSI port type.

connUnitPortStatSCSIEntry [connUnitPortStatSCSITable]

Syntax connUnitPortStatSCSIEntry

Access Not accessible

Status Mandatory

Description An entry describing port statistics.

Index connUnitPortStatSCSIUnitId, connUnitPortStatSCSIIndex

Table 24. connUnitPortStatSCSIEntry Objects and Object Types

connUnitPortStatSCSIEntry Objects	See Page	Object Types
connUnitPortStatSCSIUnitId	176	Octet String
connUnitPortStatSCSIIndex	176	Integer
connUnitPortStatSCSICountError	177	Octet String
connUnitPortStatSCSICountTxIO	177	Octet String
connUnitPortStatSCSICountRxIO	177	Octet String
connUnitPortStatSCSICountTxBytes	177	Octet String
connUnitPortStatSCSICountRxBytes	178	Octet String

connUnitPortStatSCSIUnitId [connUnitPortStatSCSITable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this port statistic table.

connUnitPortStatSCSIIndex [connUnitPortStatSCSITable]

Syntax Integer of size 0 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all entries in this table, between 0 and connUnitNumPort.

connUnitPortStatSCSICountError [connUnitPortStatSCSITable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description A count of the errors that have occurred on this port.

connUnitPortStatSCSICountTxIO [connUnitPortStatSCSITable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of I/Os that have been transmitted by this port.

connUnitPortStatSCSICountRxIO [connUnitPortStatSCSITable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of I/Os that have been received by this port.

connUnitPortStatSCSICountTxBytes [connUnitPortStatSCSITable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of bytes that have been transmitted by this port.

connUnitPortStatSCSICountRxBytes [connUnitPortStatSCSITable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of bytes that have been received by this port.

Connectivity Unit Port Statistics LAN/WAN Table

Note The HP FC 6164 does not support LAN/WAN statistics; this section is not applicable.

connUnitPortStatLANTable

Syntax Sequence of connUnitPortStatLANEntry

Access Not accessible

Status Mandatory

Description A list of statistics for the LAN/WAN port type.

connUnitPortStatLANEntry [connUnitPortStatLANTable]

Syntax connUnitPortStatLANEntry

Access Not accessible

Status Mandatory

Description An entry describing port statistics.

Index connUnitPortStatLANUnitId, connUnitPortStatLANIndex

Table 25. connUnitPortStatLANEntry Objects and Object Types

connUnitPortStatLANEntry Objects	See Page	Object Types
connUnitPortStatLANUnitId	179	Octet String
connUnitPortStatLANIndex	179	Integer
connUnitPortStatLANCountError	180	Octet String
connUnitPortStatLANCountTxPacket	180	Octet String
connUnitPortStatLANCountRxPacket	180	Octet String
connUnitPortStatLANCountTxBytes	181	Octet String
connUnitPortStatLANCountRxBytes	181	Octet String

connUnitPortStatLANUnitId [connUnitPortStatLANTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The connUnitId of the connectivity unit that contains this port statistic table.

connUnitPortStatLANIndex [connUnitPortStatLANTable]

Syntax Integer of size 0 to 2147483647

Access Read-only

Status Mandatory

Description A unique value among all entries in this table, between 0 and connUnitNumPort.

connUnitPortStatLANCountError [connUnitPortStatLANTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description A count of the errors that have occurred on this port.

connUnitPortStatLANCountTxPacket [connUnitPortStatLANTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of packets that have been transmitted by this port.

connUnitPortStatLANCountRxPacket [connUnitPortStatLANTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of packets that have been received by this port.

connUnitPortStatLANCountTxBytes [connUnitPortStatLANTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of bytes that have been transmitted by this port.

connUnitPortStatLANCountRxBytes [connUnitPortStatLANTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The number of bytes that have been received by this port.

Related Traps

connUnitStatusChange

Enterprise fcmgmt

Variables connUnitStatus, connUnitState

Description The overall status of the connectivity unit has changed.

Recommended severity level (for filtering): alert.

Note Generated when connUnitStatus changes, refer to the connUnitStatus section for a description of how the value is calculated.

connUnitDeletedTrap

Enterprise fcmgmt

Variables connUnitId

Description A connUnit has been deleted from this agent.

Recommended severity level (for filtering): warning.

Note Not implemented.

connUnitEventTrap

Enterprise fcmgmt

Variables connUnitEventId, connUnitEventType, connUnitEventObject,
connUnitEventDescr

Description An event has been generated by the connectivity unit.

Recommended severity level (for filtering): info.

connUnitSensorStatusChange

Enterprise fcmgmt

Variables connUnitSensorStatus

Description The overall status of the connectivity unit has changed.

connUnitPortStatusChange

Enterprise fcmgmt

Variables connUnitPortStatus, connUnitPortState

Description Overall status of the connectivity unit changed. Recommended severity level (for filtering): alert.

FC FABRIC ELEMENT MIB OBJECT TYPES

This chapter contains information that is specific to FC Fabric Element MIB (FE-MIB) object types. The object types in FE-MIB are organized into five groupings:

- Configuration
- Operation
- Error
- Accounting
- Capability

FE-MIB File System Organization

Figure 8 through Figure 10 depict the organization and structure of the FE-MIB file system.

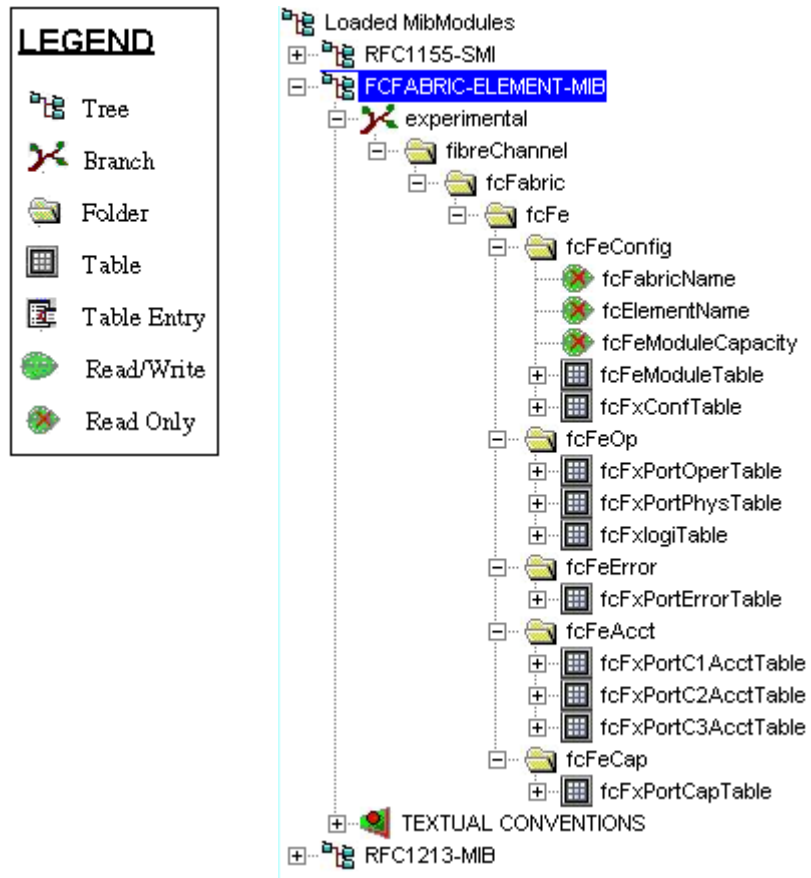


Figure 8. FE-MIB Overall Tree Structure



Figure 9. Tree Structure for fcFeConfig and fcFeOpTables

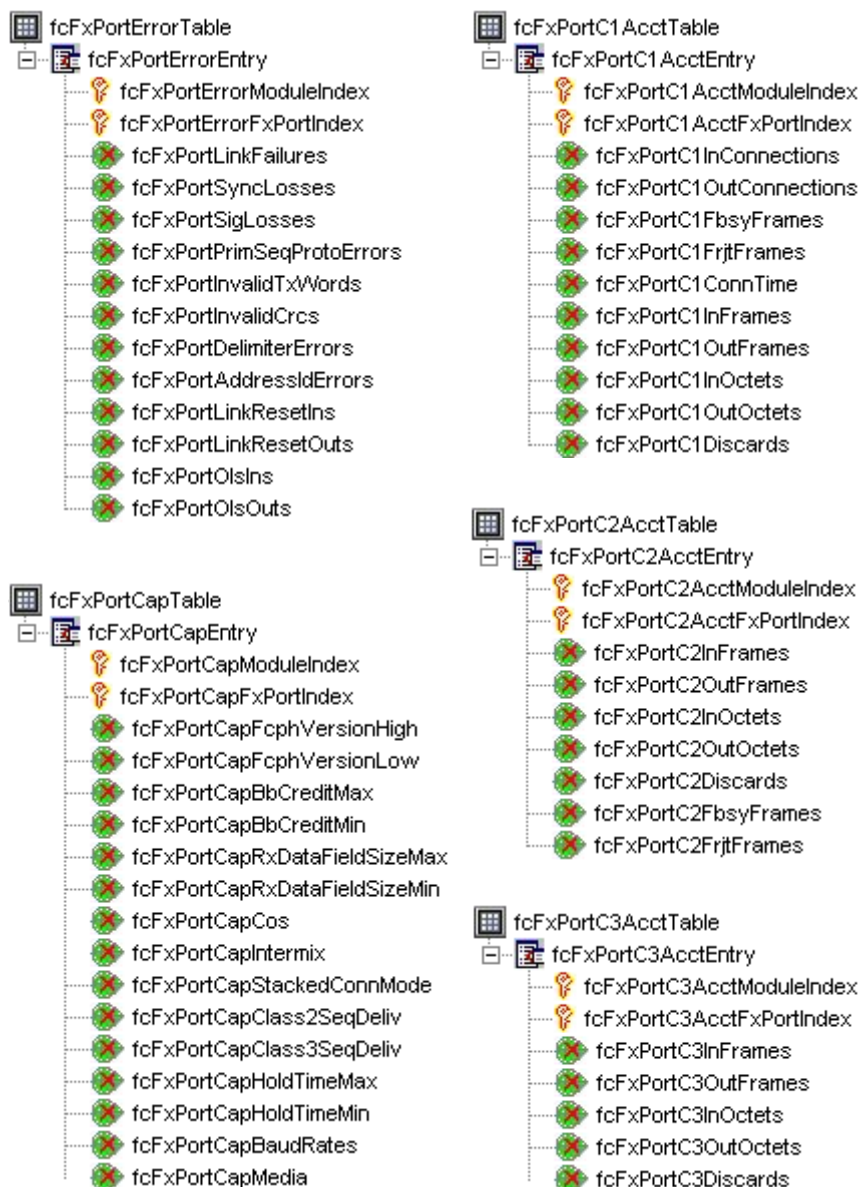


Figure 10. Tree Structure for *fcFeError*, *fcFeAcct*, and *fcFeCap* Tables

Definitions for FE-MIB

Table 26 lists the definitions that are used for FE-MIB.

Table 26. MIB-II Conventions

Type Definition	Value	Declaration	Description
Display String	Octet String of size 0 to 255		
MilliSeconds	Integer from 0 to 2147383647		
MicroSeconds	Integer from 0 to 2147383647		
FcNameId	Octet String of size 8	Name_Identifier hex values:	
Worldwide Name or fibre channel Name associated with an FC entity. It is a Network_Destination _ID or Network_Source_ID composed of a value up to 60 bits wide, occupying the remaining 8 bytes while the first nibble identifies the format of the Name_Identifier.		0 (Ignored) 1 (IEEE 48-bit address) 2 (IEEE extended) 3 (Locally assigned) 4 (32-bit IP address)	
FcNameId	Octet String of size 8		

Table 26. MIB-II Conventions (continued)

Type Definition	Value	Declaration	Description
FabricName	Octet String of size 8	IEEE48	
FcNameId - The Name Identifier of a Fabric. Each Fabric provides a unique Fabric Name.		Local	
FabricName	Octet String of size 8	IEEE48	
FcNameId - The Name Identifier associated with a port.		IEEE extended Local	
FcAddressId	Octet String of size 8	IEEE48	
A 24-bit value unique within the address space of a Fabric		IEEE extended Local	
FcRxDataFieldSize	Integer from 128 to 2112		
FcBbCredit	Integer from 0 to 32767		
FcphVersion	Integer from 0 to 255		
FcStackedConnMode	Integer from 1 to 3	1 (none) 2 (transparent) 3 (lockedDown)	

Table 26. MIB-II Conventions (continued)

Type Definition	Value	Declaration	Description
FcCosCap	Integer from 1 to 127	bit 0 (Class F)	
		bit 1 (Class 1)	
		bit 2 (Class 2)	
		bit 3 (Class 3)	
		bit 4 (Class 4)	
		bit 5 (Class 5)	
		bit 6 (Class 6)	
		bit 7 (Reserved for future)	
Fc0BaudRate	Integer according to FC-0 Baud Rates	1 (other)	None of below
		2 (oneEighth)	155 Mbaud (12.5 MBs)
		4 (quarter)	266 Mbaud (25.0 MBs)
		8 (half)	532 Mbaud (50.0 MBs)
		16 (full)	1 Gbaud (100 MBs)
		32 (double)	2 Gbaud (200 MBs)
		64 (quadruple)	4 Gbaud (400 MBs)

Table 26. MIB-II Conventions (continued)

Type Definition	Value	Declaration	Description
Fc0BaudRateCap	Integer from 0 to 127	bit 0 (other) bit 1 (oneEighth) bit 2 (quarter) bit 3 (half) bit 4 (full) bit 5 (double) bit 6 (quadruple) bit 7 (Reserved for future)	

Table 26. MIB-II Conventions (continued)

Type Definition	Value	Declaration	Description
Fc0MediaCap	Integer from 0 to 65535	bit 0 (unknown) bit 1 (single mode fibre [sm]) bit 2 (multi-mode fibre 50 micron [m5]) bit 3 (multi-mode fibre 62.5 micron [m6]) bit 4 (video cable [tv]) bit 5 (miniature cable [mi]) bit 6 (shielded twisted pair [stp]) bit 7 (twisted wire [tw]) bit 8 (long video [lv]) bits 9 to 15 (Reserved for future use)	

Table 26. MIB-II Conventions (continued)

Type Definition	Value	Declaration	Description
Fc0Medium	Integer	1 (unknown)	
		2 (sm)	
		4 (m5)	
		8 (m6)	
		16 (tv)	
		32 (mi)	
		64 (stp)	
		128 (tw)	
Fc0TxType	Integer	256 (lv)	
		1 (unknown)	
		2 (longWaveLaser [LL])	
		3 (shortWaveLaser [SL])	
		4 (longWaveLED [LE])	
		5 (electrical [EL])	
6 (shortWaveLaser-noOFC [SN])			

Table 26. MIB-II Conventions (continued)

Type Definition	Value	Declaration	Description
Fc0Distance	Integer	The FC-0 distance range associated with a port transmitter	1 (unknown) 2 (long) 3 (intermediate) 4 (short)
FcFeModuleCapacity	Integer from 1 to 256		
FcFeFxPortCapacity	Integer from 1 to 256		
FcFeModuleIndex	Integer from 1 to 256		
FcFeFxPortIndex	Integer from 1 to 256		
FcFeNxPortIndex	Integer from 1 to 256		
FcFxPortMode	Integer	1 (unknown) 2 (fPort) 3 (flPort)	
FcBbCreditModel	Integer	1 (regular) 2 (alternate)	

Configuration Group

The configuration group consists of scalar objects and tables, and contains the configuration and service parameters of the Fabric Element and the FxPorts.

This group represents a set of parameters associated with the Fabric Element or an FxPort to support its NxPorts.

Implementation of this group is mandatory.

fcFabricName

Syntax FabricName

Access Read-only

Status Mandatory

Description The Name_Identifier of the Fabric to which this Fabric Element belongs.

Note Returns the WWN of the switch.

fcElementName

Syntax FcNameId

Access Read-only

Status Mandatory

Description The Name_Identifier of the Fabric Element.

Note Returns the WWN of the switch.

fcFeModuleCapacity

Syntax FcFeModuleCapacity

Access Read-only

Status Mandatory

Description The maximum number of modules in the Fabric Element, regardless of their current state.

Note

SW2010/40/50: 1

SW2400: 1

SW2800: 1

fc Fabric Element Module Table

This table contains one entry for each module.

fcFeModuleTable

Syntax Sequence of FcFeModuleEntry

Access Not accessible

Status Mandatory

Description A table that contains, one entry for each module in the Fabric Element.

fcFeModuleEntry [fcFeModuleTable]

Syntax FcFeModuleEntry

Access Not accessible

Status Mandatory

Description An entry containing the configuration parameters of a module.

Index fcFeModuleIndex

Table 27. fcFeModuleEntry Objects and Object Types

fcFeModuleEntry Objects	See Page	Object Types
fcFeModuleIndex	198	FcFeModuleIndex
fcFeModuleDescr	198	Display String
fcFeModuleObjectID	199	Object Identifier
fcFeModuleOperStatus	200	Integer
fcFeModuleLastChange	200	Time Ticks
fcFeModuleFxpPortCapacity	200	FcFeFxpPortCapacity
fcFeModuleName	201	FcNameId

fcFeModuleIndex [fcFeModuleTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module within the Fabric Element for which this entry contains information. This value is never greater than fcFeModuleCapacity.

fcFeModuleDescr [fcFeModuleTable]

Syntax Display String

Access Read-only

Status Mandatory

Description A textual description of the module. This value should include the full name and version identification of the module, and should contain printable ASCII characters.

Note See sysDescr in [Chapter 1, “MIB-II Object Types”](#).

fcFeModuleObjectID [fcFeModuleTable]

Syntax Object Identifier

Access Read-only

Status Mandatory

Description The vendor’s authoritative identification of the module. This value can be allocated within the SMI enterprises subtree (1.3.6.1.4.1) and provides a straight-forward and unambiguous way to determine what kind of module is being managed.

For example, this object could take the value 1.3.6.1.4.1.99649.3.9, if vendor “Neufe Inc.” was assigned the subtree 1.3.6.1.4.1.99649, and had assigned the identifier 1.3.6.1.4.1.99649.3.9 to its FeFiFo-16 PlugInCard.

Note See sysObjectID in [Chapter 1, “MIB-II Object Types”](#).

fcFeModuleOperStatus [fcFeModuleTable]

Syntax

Value	Declaration	Description
Integer	1 (online)	The module is functioning properly.
	2 (offline)	The module is not available.
	3 (testing)	The module is under testing.
	4 (faulty)	The module is defective.

Access Read-only

Status Mandatory

Description Indicates the operational status of the module.

fcFeModuleLastChange [fcFeModuleTable]

Syntax Time Ticks

Access Read-only

Status Mandatory

Description Contains the value of sysUpTime when the module entered its current operational status. A value of 0 indicates that the operational status of the module has not changed since the agent last restarted.

fcFeModuleFxpPortCapacity [fcFeModuleTable]

Syntax FcFeFxpPortCapacity

Access Read-only

Status Mandatory

Description The number of FxPorts that can be contained within the module. Within each module, the ports are uniquely numbered in the range from 1 to fcFeModuleFxPortCapacity inclusive. However, the numbers are not required to be contiguous.

Note

SW2010/40/50: 8

SW2400: 8

SW2800: 16

fcFeModuleName [fcFeModuleTable]

Syntax FcNameId

Access Read-only (instead of read-write)

Status Mandatory

Description The Name_Identifier of the module.

Note The return value is the WWN of the switch.

FxPort Configuration Table

This table contains one entry for each FxPort, and the configuration parameters of the ports.

fcFxConfTable

Syntax Sequence of FcFxConfEntry

Access Not accessible

Status Mandatory

Description A table that contains, one entry for each FxPort in the Fabric Element, and configuration and service parameters of the FxPorts.

fcFxConfEntry [fcFxConfTable]

Syntax FcFxConfEntry

Access Not accessible

Status Mandatory

Description An entry containing the configuration and service parameters of an FxPort.

Index FcFxConfModuleIndex, fcFxConfFxPortIndex

Table 28. FcFxConfEntry Objects and Object Types

FcFxConfEntry Objects	See Page	Object Types
fcFxConfModuleIndex	203	FcFeModuleIndex
fcFxConfFxPortIndex	203	FcFeFxPortIndex
fcFxPortName	204	FcPortName
FxPort Common Service Parameters		
fcFxPortFcphVersionHigh	204	FcphVersion
fcFxPortFcphVersionLow	204	FcphVersion
fcFxPortBbCredit	205	FcBbCredit
fcFxPortRxBufSize	205	FcRxDataFieldSize
fcFxPortRatov	205	Milliseconds
fcFxPortEdtov	206	Milliseconds
FxPort Class Service Parameters		
fcFxPortCosSupported	206	FcCosCap
fcFxPortIntermixSupported	206	Integer

Table 28. FcFxConfEntry Objects and Object Types (continued)

FcFxConfEntry Objects	See Page	Object Types
fcFxPortStackedConnMode	207	FcStackedConnMode
fcFxPortClass2SeqDeliv	207	Integer
fcFxPortClass3SeqDeliv	208	Integer
Other FxPort Parameters		
fcFxPortHoldTime	208	MicroSeconds
fcFxPortBaudRate	208	Fc0BaudRate
fcFxPortMedium	209	Fc0Medium
fcFxPortTxType	209	Fc0TxType
fcFxPortDistance	209	Fc0Distance

fcFxConfModuleIndex [fcFxConfTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxPort for which this entry contains information.

fcFxConfFxPortIndex [fcFxConfTable]

Syntax FcFeFxPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxPort until the module is re-initialized.

fcFxpPortName [fcFxpConfTable]

Syntax FcPortName

Access Read-only

Status Mandatory

Description The name identifier of this FxPort. Each FxPort has a unique port name within the address space of the fabric.

Note The return value is the WWN of the port.

FxPort Common Service Parameters

fcFxpPortFcphVersionHigh [fcFxpConfTable]

Syntax FcphVersion

Access Read-only

Status Mandatory

Description The highest or most recent version of FC-PH that the FxPort is configured to support.

fcFxpPortFcphVersionLow [fcFxpConfTable]

Syntax FcphVersion

Access Read-only

Status Mandatory

Description The lowest or earliest version of FC-PH that the FxPort is configured to support.

fcFxBbCredit [fcFxBbCreditTable]

Syntax FcBbCredit

Access Read-only

Status Mandatory

Description The total number of receive buffers available for holding a Class 1 connect-request, and Class 2 or 3 frames from the attached NxPort. This enables buffer-to-buffer flow control in the direction from the attached NxPort (if applicable) to FxPort.

fcFxBufSize [fcFxBufSizeTable]

Syntax FcRxDataFieldSize

Access Read-only

Status Mandatory

Description The largest Data_Field Size (in octets) for an FT_1 frame that can be received by the FxPort.

fcFxBbRatov [fcFxBbRatovTable]

Syntax MilliSeconds

Access Read-only

Status Mandatory

Description The Resource_Allocation_Timeout value configured for the FxPort. This is used as the timeout value for determining when to re-use an NxPort resource such as a Recovery_Qualifier. This value represents E_D_TOV (see next object), and twice the maximum time that a frame can be delayed within the Fabric and still be delivered.

fcFxpOrtEdtov [fcFxpConfTable]

Syntax MilliSeconds

Access Read-only

Status Mandatory

Description The E_D_TOV value configured for the FxPort. The Error_Detect_Timeout value is used as the timeout value for detecting an error condition.

FxPort Classes of Service Parameters

fcFxpOrtCosSupported [fcFxpConfTable]

Syntax FcCosCap

Access Read-only

Status Mandatory

Description A value indicating the set of classes of service supported by the FxPort.

fcFxpOrtIntermixSupported [fcFxpConfTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	FxPort supports an intermixed dedicated connection.
	2 (no)	FxPort does not support an intermixed dedicated connection.

Access Read-only

Status Mandatory

Description A flag indicating whether the FxPort supports an intermixed dedicated connection.

fcFxPortStackedConnMode [fcFxConfTable]

Syntax FcStackedConnMode

Access Read-only

Status Mandatory

Description A value indicating the mode of stacked connect supported by the FxPort.

fcFxPortClass2SeqDeliv [fcFxConfTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	Class 2 sequential delivery is supported by the FxPort.
	2 (no)	Class 2 sequential delivery is not supported by the FxPort.

Access Read-only

Status Mandatory

Description A flag indicating whether Class 2 sequential delivery is supported by the FxPort.

fcFxpPortClass3SeqDeliv [fcFxpConfTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	Class 3 sequential delivery is supported by the FxpPort.
	2 (no)	Class 3 sequential delivery is not supported by the FxpPort.

Access Read-only

Status Mandatory

Description A flag indicating whether Class 3 sequential delivery is supported by the FxpPort.

Other FxpPort Parameters

fcFxpPortHoldTime [fcFxpConfTable]

Syntax MicroSeconds

Access Read-only

Status Mandatory

Description The maximum time (in microseconds) that the FxpPort holds a frame before discarding the frame, if it is unable to deliver the frame. The value 0 means that the FxpPort does not support this parameter.

fcFxpPortBaudRate [fcFxpConfTable]

Syntax Fc0BaudRate

Access Read-only

Status Deprecated

Description The FC-0 baud rate of the FxPort.

Note Valid values include the following:
SW2010/40/50: 16 (full)

SW2400: 16 (full)

W2800: 16 (full)

fcFxpPortMedium [fcFxpConfTable]

Syntax Fc0Medium

Access Read-only

Status Deprecated

Description The FC-0 medium of the FxPort.

fcFxpPortTxType [fcFxpConfTable]

Syntax Fc0TxType

Access Read-only

Status Deprecated

Description The FC-0 transmitter type of the FxPort.

fcFxpPortDistance [fcFxpConfTable]

Syntax Fc0Distance

Access Read-only

Status Deprecated

Description The FC-0 distance range of the FxPort transmitter.

Operation Group

The operation group consists of tables that contain operational status and established service parameters for the Fabric Element and the attached NxPorts.

Implementation of this group is mandatory.

FxPort Operation Table

This table contains one entry for each FxPort, the operational status, and parameters of the FxPorts.

fcFxPortOperTable

Syntax Sequence of FcFxPortOperEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort in the Fabric Element, and operational status and parameters of the FxPorts.

fcFxPortOperEntry [fcFxPortOperTable]

Syntax FcFxPortOperEntry

Access Not accessible

Status Mandatory

Description An entry containing operational status and parameters of an FxPort.

Index fcFxFPortOperModuleIndex, fcFxFPortOperFxFPortIndex

Table 29. fcFxFPortOperEntry Objects and Object Types

fcFxFPortOperEntry Objects	See Page	Object Types
fcFxFPortOperModuleIndex	211	FcFeModuleIndex
fcFxFPortOperFxFPortIndex	212	FcFeFxFPortIndex
fcFxFPortID	212	FcAddressId
fcFxFPortAttachedPortName	212	FcPortName
fcFxFPortConnectedPort	213	FcAddressId
fcFxFPortBbCreditAvailable	213	Gauge
fcFxFPortOperMode	213	FcFxFPortMode
fcFxFPortAdminMode	214	FcFxFPortMode

fcFxFPortOperModuleIndex [fcFxFPortOperTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxPort for which this entry contains information.

fcFxpPortOperFxpPortIndex [fcFxpPortOperTable]

Syntax FcFeFxpPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxpPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxpPort until the module is re-initialized.

fcFxpPortID [fcFxpPortOperTable]

Syntax FcAddressId

Access Read-only

Status Mandatory

Description The address identifier by which this FxpPort is identified within the Fabric. The FxpPort can assign its address identifier to its attached NxPorts during Fabric Login.

fcFPortAttachedPortName [fcFxpPortOperTable]

Syntax FcPortName

Access Read-only

Status Deprecated

Description The port name of the attached N_Port, if applicable. If the value of this object is '0000000000000000'H, this FxpPort has no NxPort attached to it. This variable has been deprecated and can be implemented for backward compatibility.

fcFPortConnectedPort [fcFPortOperTable]

Syntax FcAddressId

Access Read-only

Status Deprecated

Description The address identifier of the destination FxPort with which this FxPort is currently engaged in a either a Class 1 or loop connection. If the value of this object is '000000'H, this FxPort is not engaged in a connection. This variable has been deprecated and can be implemented for backward compatibility.

fcFPortBbCreditAvailable [fcFPortOperTable]

Syntax Gauge

Access Read-only

Status Mandatory

Description The number of buffers currently available for receiving frames from the attached port in the buffer-to-buffer flow control. The value should be less than or equal to fcFPortBbCredit.

fcFPortOperMode [fcFPortOperTable]

Syntax FcFPortMode

Access Read-only

Status Mandatory

Description The current operational mode of the FxPort.

fcFxpPortAdminMode [fcFxpPortOperTable]

Syntax FcFxpPortMode

Access Read-only (instead of read-write)

Status Mandatory

Description The desired operational mode of the FxPort.

F_Port Fabric Login Table

This table contains one entry for each F_Port in the Fabric Element, and the service parameters that have been established from the most recent Fabric Login, whether implicit or explicit.

Note This table is deprecated since FE-MIB v1.9, and is not supported in agents after firmware v1.5. Instead, the new table, FxPort Fabric Login Table (to follow after FxPort Physical Level Table), is supported.

FxPort Physical Level Table

This table contains one entry for each FxPort in the Fabric Element, and the physical level status and parameters of the FxPorts.

fcFxpPortPhysTable

Syntax Sequence of FcFxpPortPhysEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort in the Fabric Element, and the physical level status and parameters of the FxPorts.

fcFxpPortPhysEntry [fcFxpPortPhysTable]

Syntax FcFxpPortPhysEntry

Access Not accessible

Status Mandatory

Description An entry containing physical level status and parameters of an FxPort.

Index fcFxpPortPhysModuleIndex, fcFxpPortPhysFxPortIndex

Table 30. fcFxpPortPhysEntry Objects and Object Types

fcFxpPortPhysEntry Objects	See Page	Object Types
fcFxpPortPhysModuleIndex	215	FcFeModuleIndex
fcFxpPortPhysFxPortIndex	216	FcFeFxPortIndex
fcFxpPortPhysAdminStatus	216	Integer
fcFxpPortPhysOperStatus	217	Integer
fcFxpPortPhysLastChange	217	Time Ticks
fcFxpPortPhysRttov	218	MilliSeconds

fcFxpPortPhysModuleIndex [fcFxpPortPhysTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxPort for which this entry contains information.

fcFxPortPhysFxPortIndex [fcFxPortPhysTable]

Syntax FcFeFxPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxPort until the module is re-initialized.

fcFxPortPhysAdminStatus [fcFxPortPhysTable]

Syntax

Value	Declaration	Description
Integer	1 (online)	Place port online.
	2 (offline)	Take port offline.
	3 (testing)	Initiate test procedures.

Access Read-write

Status Mandatory

Description The desired state of the FxPort. A management station can place the FxPort in a desired state by setting this object accordingly. The 3 (testing) state indicates that no operational frames can be passed. When a Fabric Element initializes, all FxPorts start with fcFxPortPhysAdminStatus in the 2 (offline) state. As the result of either explicit management action or per configuration information accessible by the Fabric Element, fcFxPortPhysAdminStatus is then changed to either the 1 (online) or 3 (testing) state, or remains in the 2 (offline) state.

fcFxpPortPhysOperStatus [fcFxpPortPhysTable]

Syntax

Value	Declaration	Description
Integer	1 (online)	Login can proceed.
	2 (offline)	Login cannot proceed.
	3 (testing)	Port is under test.
	4 (link-failure)	Failure after online/testing.

Note Other values can be used to indicate diagnostics for a failed test.

Access Read-only

Status Mandatory

Description The current operational status of the FxPort. The 3 (testing) state indicates that no operational frames can be passed. If fcFxpPortPhysAdminStatus is 2 (offline), fcFxpPortPhysOperStatus should be 2 (offline). If fcFxpPortPhysAdminStatus is changed to 1 (online), fcFxpPortPhysOperStatus should change to 1 (online). If the FxPort is ready to accept a Fabric Login request from the attached NxPort, it should accept the request and remain in the 4 (link-failure) state, if there is a fault that prevents it from going to the 1 (online) state.

fcFxpPortPhysLastChange [fcFxpPortPhysTable]

Syntax Time Ticks

Access Read-only

Status Mandatory

Description The value of sysUpTime at the time the FxPort entered its current operational status. A value of 0 indicates that the FxPort's operational status has not changed since the agent last restarted.

fcFxPortPhysRttov [fcFxPortPhysTable]

Syntax MilliSeconds

Access Read-only

Status Mandatory

Description The Receiver_Transmitter_Timeout value of the FxPort. This is used by the receiver logic to detect loss of synchronization.

FxPort Fabric Login Table

This table contains one entry for each FxPort in the Fabric Element, and the service parameters that have been established from the most recent Fabric Login, whether implicit or explicit.

fcFxlogiTable

Syntax Sequence of FcFxlogiEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort in the Fabric Element, and the services parameters established from the most recent Fabric Login, whetherexplicit or implicit.

fcFxlogiEntry [fcFxlogiTable]

Syntax FcFxlogiEntry

Access Not accessible

Status Mandatory

Description An entry containing service parameters established from a successful Fabric Login.

Index fcFxlabelogixModuleIndex, fcFxlabelogixFxlabelPortIndex, fcFxlabelogixNxPortIndex

Table 31. FcFxlabelogixEntry Objects and Object Types

FcFxlabelogixEntry Objects	See Page	Object Types
fcFxlabelogixModuleIndex	219	FcFeModuleIndex
fcFxlabelogixFxlabelPortIndex	220	FcFeFxlabelPortIndex
fcFxlabelogixNxPortIndex	220	FcFeNxPortIndex
fcFxlabelPortFxlabelVersionAgreed	220	FxlabelVersion
fcFxlabelPortNxPortBbCredit	221	FcBbCredit
fcFxlabelPortNxPortRxlabelDataFieldSize	221	FcRxlabelDataFieldSize
fcFxlabelPortCosSuppAgreed	221	FcCosCap
fcFxlabelPortIntermixSuppAgreed	222	Integer
fcFxlabelPortStackedConnModeAgreed	222	FcStackedConnMode
fcFxlabelPortClass2SeqDelivAgreed	223	Integer
fcFxlabelPortClass3SeqDelivAgreed	223	Integer
fcFxlabelPortNxPortName	224	FcPortName
fcFxlabelPortConnectedNxPort	224	FcAddressId
fcFxlabelPortBbCreditModel	224	FcBbCreditModel

fcFxlabelogixModuleIndex [fcFxlabelogixTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxlabelPort for which this entry contains information.

fcFxlgiFxpPortIndex [fcFxlgiTable]

Syntax FcFeFxpPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxpPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxpPort until the module is re-initialized.

fcFxlgiNxPortIndex [fcFxlgiTable]

Syntax FcFeNxPortIndex

Access Read-only

Status Mandatory

Description The object identifies the associated NxPort in the attachment for which the entry contains information.

fcFxpPortFcphVersionAgreed [fcFxlgiTable]

Syntax FcphVersion

Access Read-only

Status Mandatory

Description The version of FC-PH that the FxpPort has agreed to support from the Fabric Login.

fcFxpPortNxPortBbCredit [fcFxplogiTable]

Syntax FcBbCredit

Access Read-only

Status Mandatory

Description The total number of buffers available for holding a Class 1 connect-request, and Class 2 or Class 3 frames to be transmitted to the attached NxPort. This enables buffer-to-buffer flow control in the direction from FxPort to NxPort. The buffer-to-buffer flow control mechanism is indicated in the respective fcFxpPortBbCreditModel.

fcFxpPortNxPortRxDataFieldSize [fcFxplogiTable]

Syntax FcRxDataFieldSize

Access Read-only

Status Mandatory

Description The Receive Data Field Size of the attached NxPort. This is a binary value that specifies the largest Data Field Size for an FT_1 frame that can be received by the NxPort. The value is in number of bytes and ranges from 128 to 2112 inclusive.

fcFxpPortCosSuppAgreed [fcFxplogiTable]

Syntax FcCosCap

Access Read-only

Status Mandatory

Description Indicates that the attached NxPort has requested the FxPort for the support of classes of services, and the FxPort has granted the request.

fcFxpPortIntermixSuppAgreed [fcFxpLogiTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	The attached NxPort has requested the FxpPort for the support of intermix, and the FxpPort has granted the request.
	2 (no)	The attached NxPort has not requested the FxpPort for the support of intermix.

Access Read-only

Status Mandatory

Description A variable indicating that the attached NxPort has requested the FxpPort for the support of intermix, and the FxpPort has granted the request. This flag is valid only if Class 1 service is supported.

fcFxpPortStackedConnModeAgreed [fcFxpLogiTable]

Syntax FcStackedConnMode

Access Read-only

Status Mandatory

Description Indicates whether the FxpPort has agreed to support stacked connect from the Fabric Login. This flag is valid only if Class 1 service is supported.

fcFxpPortClass2SeqDelivAgreed [fcFxpLogiTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	The FxpPort has agreed to support Class 2 sequential delivery from the Fabric Login.
	2 (no)	The FxpPort has not agreed to support Class 2 sequential delivery from the Fabric Login.

Access Read-only

Status Mandatory

Description A variable indicating whether the FxpPort has agreed to support Class 2 sequential delivery from the Fabric Login. This flag is valid only if Class 2 service is supported.

fcFxpPortClass3SeqDelivAgreed [fcFxpLogiTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	The FxpPort has agreed to support Class 3 sequential delivery from the Fabric Login.
	2 (no)	The FxpPort has not agreed to support Class 3 sequential delivery from the Fabric Login.

Access Read-only

Status Mandatory

Description A flag indicating whether the FxpPort has agreed to support Class 3 sequential delivery from the Fabric Login. This flag is valid only if Class 3 service is supported.

fcFxpPortNxPortName [fcFxpLogiTable]

Syntax FcPortName

Access Read-only

Status Mandatory

Description The port name of the attached NxPort, if applicable. If the value of this object is '0000000000000000'H, this FxPort has no NxPort attached to it.

fcFxpPortConnectedNxPort [fcFxpLogiTable]

Syntax FcAddressId

Access Read-only

Status Mandatory

Description The address identifier of the destination FxPort with which this FxPort is currently engaged in a either a Class 1 or loop connection. If the value of this object is '000000'H, this FxPort is not engaged in a connection.

fcFxpPortBbCreditModel [fcFxpLogiTable]

Syntax FcBbCreditModel

Access Read-only

Status Mandatory

Description Identifies the BB_Credit model used by the FxPort. The regular model refers to the buffer-to-buffer flow control mechanism (as defined in FC-PH [1]) is used between the F_Port and the N_Port. For FL_Ports, the alternate buffer-to-buffer flow control mechanism (as defined in FC-AL [4]) is used between the FL_Port and any attached NL_Ports.

Error Group

The error consists of tables that contain information about the various types of errors detected. The management station can use the information in this group to determine the quality of the link between the FxPort and its attached NxPort.

Implementation of this group is optional.

FxPort Error Table

This table contains one entry for each FxPort in the Fabric Element, and counters that record the numbers of errors detected since the management agent re-initialized.

Note The first six columnar objects after the port index corresponds to the counters in the Link ErrorStatus Block.

fcFxPortErrorTable

Syntax Sequence of FcFxPortErrorEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort, and counters that record the numbers of errors detected.

fcFxPortErrorEntry [fcFxPortErrorTable]

Syntax FcFxPortErrorEntry

Access Not accessible

Status Mandatory

Description An entry containing the error counters of an FxPort.

Index fcFxPortErrorModuleIndex, fcFxPortErrorFxPortIndex

Table 32. FcFxPortErrorEntry Objects and Object Types

FcFxPortErrorEntry Objects	See Page	Object Types
fcFxPortErrorModuleIndex	226	FcFeModuleIndex
fcFxPortErrorFxPortIndex	227	FcFeFxPortIndex
fcFxPortLinkFailures	227	Counter
fcFxPortSyncLosses	227	Counter
fcFxPortSigLosses	227	Counter
fcFxPortPrimSeqProtoErrors	228	Counter
fcFxPortInvalidTxWords	228	Counter
fcFxPortInvalidCrcs	228	Counter
fcFxPortDelimiterErrors	229	Counter
fcFxPortAddressIdErrors	229	Counter
fcFxPortLinkResetIns	229	Counter
fcFxPortLinkResetOut	229	Counter
fcFxPortOlsIns	230	Counter
fcFxPortOlsOuts	230	Counter

fcFxPortErrorModuleIndex [fcFxPortErrorTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxPort for which this entry contains information.

fcFxpPortErrorFxpPortIndex [fcFxpPortErrorTable]

Syntax FcFeFxpPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxpPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxpPort until the module is re-initialized.

fcFxpPortLinkFailures [fcFxpPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of link failures detected by this FxpPort.

fcFxpPortSyncLosses [fcFxpPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of loss of synchronization errors detected by the FxpPort.

fcFxpPortSigLosses [fcFxpPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of loss of signal errors detected by the FxPort.

fcFxPortPrimSeqProtoErrors [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of primitive sequence protocol errors detected by the FxPort.

fcFxPortInvalidTxWords [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of invalid transmission word errors detected by the FxPort.

fcFxPortInvalidCrcs [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of invalid Cyclic Redundancy Checks (CRCs) detected by this FxPort.

fcFxPortDelimiterErrors [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of delimiter errors detected by this FxPort.

fcFxPortAddressIdErrors [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of address identifier errors detected by this FxPort.

fcFxPortLinkResetIns [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of link reset protocol errors received by this FxPort from the attached NxPort.

fcFxPortLinkResetOuts [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of link reset protocol errors issued by this FxPort to the attached NxPort.

fcFxPortOlsIns [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of offline sequence errors received by this FxPort.

fcFxPortOlsOuts [fcFxPortErrorTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of offline sequence errors issued by this FxPort.

Accounting Group

These tables contain accounting information for the FxPorts in the Fabric Element.

- Class 1 accounting table
- Class 2 accounting table
- Class 3 accounting table

Implementation of each table is optional.

Note The HP FC 6164 switches do not support Class 1 class of service.

Class 1 Accounting Table

This table contains one entry for each FxPort in the Fabric Element, and counters for certain types of events that have occurred in the FxPorts since the management agent has re-initialized.

Implementation of this group is optional.

fcFxPortC1AcctTable

Syntax Sequence of FcFxPortC1AcctEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort in the Fabric Element, and Class 1 accounting information recorded since the management agent has re-initialized.

fcFxPortC1AcctEntry [fcFxPortC1AcctTable]

Syntax FcFxPortC1AcctEntry

Access Not accessible

Status Mandatory

Description An entry containing Class 1 accounting information for each FxPort.

Index fcFxPortC1AcctModuleIndex, fcFxPortC1AcctFxPortIndex

Table 33. FcFxFPortC1AcctEntry Objects and Object Types

FcFxFPortC1AcctEntry Objects	See Page	Object Types
fcFxFPortC1AcctModuleIndex	232	FcFeModuleIndex
fcFxFPortC1AcctFxFPortIndex	232	FcFeFxFPortIndex
fcFxFPortC1InConnections	233	Counter
fcFxFPortC1OutConnections	233	Counter
fcFxFPortC1FbsyFrames	233	Counter
fcFxFPortC1FrjtFrames	234	Counter
fcFxFPortC1ConnTime	234	Counter
fcFxFPortC1InFrames	234	Counter
fcFxFPortC1OutFrames	235	Counter
fcFxFPortC1InOctets	235	Counter
fcFxFPortC1OutOctets	235	Counter
fcFxFPortC1Discards	235	Counter

fcFxFPortC1AcctModuleIndex [fcFxFPortC1AcctTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxFPort for which this entry contains information.

fcFxFPortC1AcctFxFPortIndex [fcFxFPortC1AcctTable]

Syntax FcFeFxFPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxPort until the module is re-initialized.

fcFxPortC1InConnections [fcFxPortC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 connections successfully established in which the attached NxPort is the source of the connect-request.

fcFxPortC1OutConnections [fcFxPortC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 connections successfully established in which the attached NxPort is the destination of the connect-request.

fcFxPortC1FbsyFrames [fcFxPortC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of F_BSY frames generated by this FxPort against the Class 1 connect-request.

fcFxpPortC1FrjtFrames [fcFxpPortC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of F_RJT frames generated by this FxpPort against the Class 1 connect-request.

fcFxpPortC1ConnTime [fcFxpPortC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The cumulative time that this FxpPort has been engaged in a Class 1 connection. The amount of time of each connection (in octets) is counted from after a connect-request has been accepted until the connection is disengaged, either by an EOFdt or link reset.

fcFxpPortC1InFrames [fcFxpPortC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 frames (other than a Class 1 connect-request) received by this FxpPort from its attached NxPort.

fcFxpOrtC1OutFrames [fcFxpOrtC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 frames (other than a Class 1 connect-request) delivered through this FxpOrt to its attached NxPort.

fcFxpOrtC1InOctets [fcFxpOrtC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 frame octets, including the frame delimiters, received by this FxpOrt from its attached NxPort.

fcFxpOrtC1OutOctets [fcFxpOrtC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 frame octets, including the frame delimiters, delivered through this FxpOrt to its attached NxPort.

fcFxpOrtC1Discards [fcFxpOrtC1AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 1 frames discarded by this FxPort.

Class 2 Accounting Table

This table contains one entry for each FxPort in the Fabric Element, and counters for certain types of events that have occurred in the FxPorts since the management agent has re-initialized.

Implementation of this group is optional.

fcFxPortC2AcctTable

Syntax Sequence of FcFxPortC2AcctEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort in the Fabric Element, and Class 2 accounting information recorded since the management agent has re-initialized.

fcFxPortC2AcctEntry [fcFxPortC2AcctTable]

Syntax FcFxPortC2AcctEntry

Access Not accessible

Status Mandatory

Description An entry containing Class 2 accounting information for each FxPort.

Index fcFxPortC2AcctModuleIndex, fcFxPortC2AcctFxPortIndex

Table 34. FcFxFPortC2AcctEntry Objects and Object Types

FcFxFPortC2AcctEntry Objects	See Page	Object Types
fcFxFPortC2AcctModuleIndex	237	FcFeModuleIndex
fcFxFPortC2AcctFxFPortIndex	237	FcFeFxFPortIndex
fcFxFPortC2InFrames	238	Counter
fcFxFPortC2OutFrames	238	Counter
fcFxFPortC2InOctets	238	Counter
fcFxFPortC2OutOctets	239	Counter
fcFxFPortC2Discards	239	Counter
fcFxFPortC2FbsyFrames	239	Counter
fcFxFPortC2FrjtFrames	239	Counter

fcFxFPortC2AcctModuleIndex [fcFxFPortC2AcctTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxFPort for which this entry contains information.

fcFxFPortC2AcctFxFPortIndex [fcFxFPortC2AcctTable]

Syntax FcFeFxFPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxPort until the module is re-initialized.

fcFxPortC2InFrames [fcFxPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 2 frames received by this FxPort from its attached NxPort.

fcFxPortC2OutFrames [fcFxPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 2 frames delivered through this FxPort to its attached NxPort.

fcFxPortC2InOctets [fcFxPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 2 frame octets, including the frame delimiters, received by this FxPort from its attached NxPort.

fcFxpPortC2OutOctets [fcFxpPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 2 frame octets, including the frame delimiters, delivered through this FxpPort to its attached NxPort.

fcFxpPortC2Discards [fcFxpPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 2 frames discarded by this FxpPort.

fcFxpPortC2FbsyFrames [fcFxpPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of F_BSY frames generated by this FxpPort against Class 2 frames.

fcFxpPortC2FrjtFrames [fcFxpPortC2AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of F_RJT frames generated by this FxPort against Class 2 frames.

Class 3 Accounting Table

This table contains one entry for each FxPort in the Fabric Element, and counters for certain types of events that have occurred in the FxPorts since the management agent has re-initialized.

Implementation of this group is optional.

fcFxPortC3AcctTable

Syntax Sequence of fcfxportc3acctentry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort in the Fabric Element, and Class 3 accounting information recorded since the management agent has re-initialized.

fcFxPortC3AcctEntry [fcFxPortC3AcctTable]

Syntax FcFxPortC3AcctEntry

Access Not accessible

Status Mandatory

Description An entry containing Class 3 accounting information for each FxPort.

Index fcFxPortC3AcctModuleIndex, fcFxPortC3AcctFxPortIndex

Table 35. FcFxFPortC3AcctEntry Objects and Object Types

FcFxFPortC3AcctEntry Objects	See Page	Object Types
fcFxFPortC3AcctModuleIndex	241	FcFeModuleIndex
fcFxFPortC3AcctFxFPortIndex	241	FcFeFxFPortIndex
fcFxFPortC3InFrames	242	Counter
fcFxFPortC3OutFrames	242	Counter
fcFxFPortC3InOctets	242	Counter
fcFxFPortC3OutOctets	242	Counter
fcFxFPortC3Discards	243	Counter

fcFxFPortC3AcctModuleIndex [fcFxFPortC3AcctTable]

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxFPort for which this entry contains information.

fcFxFPortC3AcctFxFPortIndex [fcFxFPortC3AcctTable]

Syntax FcFeFxFPortIndex

Access Read-only

Status Mandatory

Description Identifies the FxFPort within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxFPort until the module is re-initialized.

fcFxpOrtC3InFrames [fcFxpOrtC3AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 3 frames received by this FxpOrt from its attached NxPort.

fcFxpOrtC3OutFrames [fcFxpOrtC3AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 3 frames delivered through this FxpOrt to its attached NxPort.

fcFxpOrtC3InOctets [fcFxpOrtC3AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 3 frame octets, including the frame delimiters, received by this FxpOrt from its attached NxPort.

fcFxpOrtC3OutOctets [fcFxpOrtC3AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 3 frame octets, including the frame delimiters, delivered through this FxPort to its attached NxPort.

fcFxPortC3Discards [fcFxPortC3AcctTable]

Syntax Counter

Access Read-only

Status Mandatory

Description The number of Class 3 frames discarded by this FxPort.

Capability Group

The capability group consists of a table describing information about what each FxPort is inherently capable of operating or supporting. A capability can be used, as expressed in its respective object value in the configuration group.

Implementation of this group is optional.

Fx Port Capability Table

fcFxPortCapTable

Syntax Sequence of FcFxPortCapEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each FxPort, and the capabilities of the port within the Fabric Element.

fcFxpPortCapEntry [fcFxpPortCapTable]

Syntax FcFxpPortCapEntry

Access Not accessible

Status Mandatory

Description An entry containing the capabilities of a FxpPort.

Index fcFxpPortCapModuleIndex, fcFxpPortCapFxpPortIndex

Table 36. FcFxpPortCapEntry Objects and Object Types

FcFxpPortCapEntry Objects	See Page	Object Types
fcFxpPortCapModuleIndex	245	FcFeModuleIndex
fcFxpPortCapFxpPortIndex	245	FcFeFxpPortIndex
fcFxpPortCapFcphVersionHigh	245	FcphVersion
fcFxpPortCapFcphVersionLow	246	FcphVersion
fcFxpPortCapBbCreditMax	246	FcBbCredit
fcFxpPortCapBbCreditMin	246	FcBbCredit
fcFxpPortCapRxDataFieldSizeMax	246	FcRxDataFieldSize
fcFxpPortCapRxDataFieldSizeMin	247	FcRxDataFieldSize
fcFxpPortCapCos	247	FcCosCap
fcFxpPortCapIntermix	248	Integer
fcFxpPortCapStackedConnMode	248	FcStackedConnMode
fcFxpPortCapClass2SeqDeliv	249	Integer
fcFxpPortCapClass3SeqDeliv	249	Integer
fcFxpPortCapHoldTimeMax	250	MicroSeconds
fcFxpPortCapHoldTimeMin	250	MicroSeconds
fcFxpPortCapBaudRates	250	Fc0BaudRateCap
fcFxpPortCapMedia	251	Fc0MediaCap

fcFxCapModuleIndex

Syntax FcFeModuleIndex

Access Read-only

Status Mandatory

Description Identifies the module containing the FxCap for which this entry contains information.

fcFxCapFxCapIndex [fcFxCapTable]

Syntax FcFeFxCapIndex

Access Read-only

Status Mandatory

Description Identifies the FxCap within the module. This number ranges from 1 to the value of fcFeModulePortCapacity for the associated module. The value remains constant for the identified FxCap until the module is re-initialized.

fcFxCapFcpVersionHigh [fcFxCapTable]

Syntax FcphVersion

Access Read-only

Status Mandatory

Description The highest or most recent version of FC-PH that the FxCap is capable of supporting.

fcFxpPortCapFcphVersionLow [fcFxpPortCapTable]

Syntax FcphVersion

Access Read-only

Status Mandatory

Description The lowest or earliest version of FC-PH that the FxpPort is capable of supporting.

fcFxpPortCapBbCreditMax [fcFxpPortCapTable]

Syntax FcBbCredit

Access Read-only

Status Mandatory

Description The maximum number of receive buffers available for holding a Class 1 connect-request, and Class 2 or Class 3 frames from the attached NxPort.

fcFxpPortCapBbCreditMin [fcFxpPortCapTable]

Syntax FcBbCredit

Access Read-only

Status Mandatory

Description The minimum number of receive buffers available for holding a Class 1 connect-request, and Class 2 or Class 3 frames from the attached NxPort.

fcFxpPortCapRxDataFieldSizeMax [fcFxpPortCapTable]

Syntax FcRxDataFieldSize

Access Read-only

Status Mandatory

Description The maximum size in bytes of the Data Field in a frame that the FxPort is capable of receiving from its attached NxPort.

fcFxPortCapRxDataFieldSizeMin [fcFxPortCapTable]

Syntax FcRxDataFieldSize

Access Read-only

Status Mandatory

Description The minimum size in bytes of the Data Field in a frame that the FxPort is capable of receiving from its attached NxPort.

fcFxPortCapCos [fcFxPortCapTable]

Syntax FcCosCap

Access Read-only

Status Mandatory

Description A value indicating the set of classes of service that the FxPort is capable of supporting.

fcFxPortCapIntermix [fcFxPortCapTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	The FxPort is capable of supporting the intermixing of Class 2 and Class 3 frames during a Class 1 connection.
	2 (no)	The FxPort is not capable of supporting the intermixing of Class 2 and Class 3 frames during a Class 1 connection.

Access Read-only

Status Mandatory

Description A flag indicating whether the FxPort is capable of supporting the intermixing of Class 2 and Class 3 frames during a Class 1 connection. This flag is valid only if the port is capable of supporting Class 1 service.

fcFxPortCapStackedConnMode [fcFxPortCapTable]

Syntax FcStackedConnMode

Access Read-only

Status Mandatory

Description A value indicating the mode of the stacked connect request that the FxPort is capable of supporting.

fcFxpPortCapClass2SeqDeliv [fcFxpPortCapTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	The FxPort is capable of supporting Class 2 sequential delivery.
	2 (no)	The FxPort is not capable of supporting Class 2 sequential delivery.

Access Read-only

Status Mandatory

Description A flag indicating whether the FxPort is capable of supporting Class 2 sequential delivery.

fcFxpPortCapClass3SeqDeliv [fcFxpPortCapTable]

Syntax

Value	Declaration	Description
Integer	1 (yes)	The FxPort is capable of supporting Class 3 sequential delivery.
	2 (no)	The FxPort is not capable of supporting Class 3 sequential delivery.

Access Read-only

Status Mandatory

Description A flag indicating whether the FxPort is capable of supporting Class 3 sequential delivery.

fcFxPortCapHoldTimeMax [fcFxPortCapTable]

Syntax MicroSeconds

Access Read-only

Status Mandatory

Description The maximum holding time (in microseconds) that the FxPort is capable of supporting.

fcFxPortCapHoldTimeMin [fcFxPortCapTable]

Syntax MicroSeconds

Access Read-only

Status Mandatory

Description The minimum holding time (in microseconds) that the FxPort is capable of supporting.

fcFxPortCapBaudRates [fcFxPortCapTable]

Syntax Fc0BaudRateCap

Access Read-only

Status Deprecated

Description A value indicating the set of baud rates that the FxPort is capable of supporting. This variable has been deprecated and can be implemented for backward compatibility.

fcFxpPortCapMedia [fcFxpPortCapTable]

Syntax Fc0MediaCap

Access Read-only

Status Deprecated

Description A value indicating the set of media that the FxpPort is capable of supporting. This variable has been deprecated and can be implemented for backward compatibility.

FC SWITCH MIB OBJECT TYPES

This chapter contains information that is specific to FC Switch MIB (SW-MIB) object types.

Table 37. FC Switch Organizational Listing

bcsi	enterprises (1588)
Product Lines or Generic Product Information	
	bcsi (1) = Reserved
commDev	bcsi (2) = Communication devices
fibrechannel	commDev (1)
fcSwitch	fibrechannel (1)
sw	fcSwitch (1)
sw28k	fcSwitch (2)
sw21kN24k	fcSwitch (3)
sw20x0	fcSwitch (4)

The object types in SW-MIB are organized into the following groupings:

- swSystem
- swFabric
- swActCfg
- swFCport
- swNs
- swEvent
- swFwSystem
- swEndDevice

SW-MIB File System Organization

Figure 11 through Figure 13 depict the organization and structure of the SW-MIB file system.

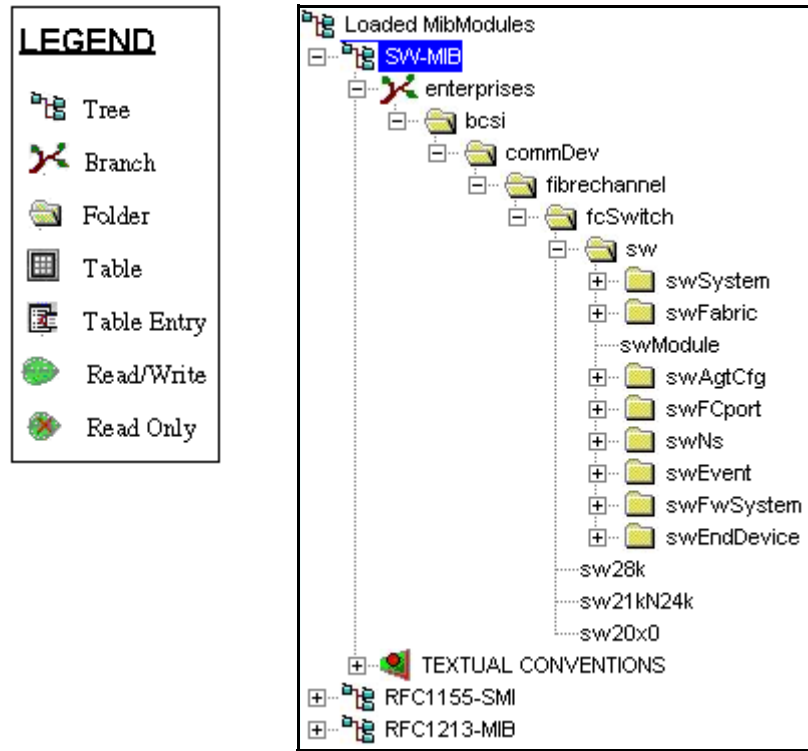


Figure 11. SW-MIB Overall Tree Structure



Figure 12. Tree Structure for swSystem, swFabric, swAgtCfg, swFCPort, and swNs Groups

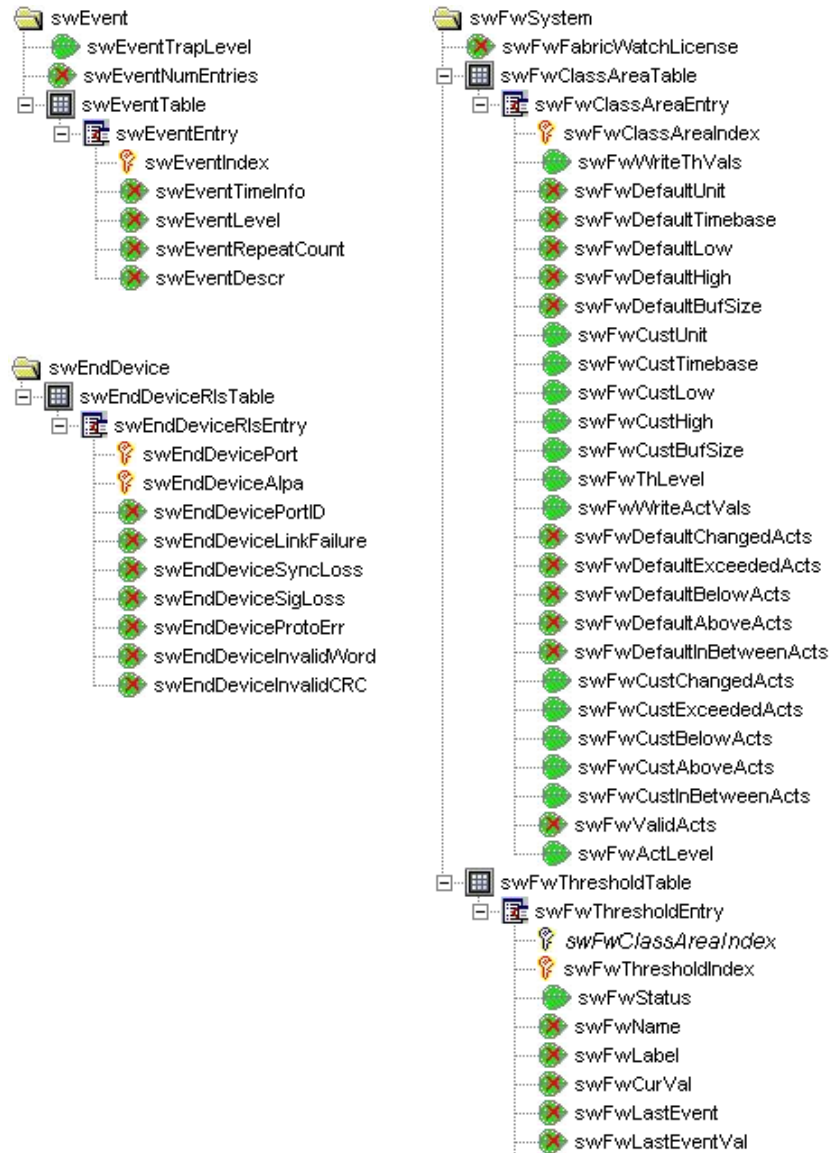


Figure 13. Tree Structure for swEvent, swFwSystem, and swEndDevice Groups

Definitions for SW-MIB

Table 38 lists the definitions that are used for SW-MIB.

Table 38. SW-MIB Definitions

Type Definition	Value	Declaration	Description
Display String	Octet String		
FcWwn	Octet String of size 8		
SwDomainIndex	Integer of size 0 to 239		
SwNbIndex	Integer of size 0 to 2048		
SwSensorIndex	Integer of size 0 to 1024		
SwFwActs	Integer	0 (swFwNoAction) 1 (swFwErrlog) 2 (swFwSnmpttrap) 3 (swFwErrlogSnmpttrap) 4 (swFwPortloglock) 5 (swFwErrlogPortloglock) 6 (swFwSnmpttrapPortloglock) 7 (swFwErrlogSnmpttrapPortloglock)	
SwFwLevels	Integer	1 (swFwReserved) 2 (swFwDefault) 3 (swFwCustom)	

Table 38. SW-MIB Definitions (continued)

Type Definition	Value	Declaration	Description
SwFwClassesAreas	Integer	1 (swFwEnvTemp)	
		2 (swFwEnvFan)	
		3 (swFwEnvPs)	
		4 (swFwGbicTemp)	
		5 (swFwGbicRxp)	
		6 (swFwGbicTxp)	
		7 (swFwGbicCurrent)	
		8 (swFwPortLink)	
		9 (swFwPortSync)	
		10 (swFwPortSignal)	
		11 (swFwPortPe)	
		12 (swFwPortWords)	
		13 (swFwPortCrcs)	
		14 (swFwPortRXPerf)	
		15 (swFwPortTXPerf)	
		16 (swFwPortState)	
		17 (swFwFabricEd)	
		18 (swFwFabricFr)	
		19 (swFwFabricDi)	

Table 38. SW-MIB Definitions (continued)

Type Definition	Value	Declaration	Description
SwFwClassesAreas (continued)	Integer	20	(swFwFabricSc)
		21	(swFwFabricZc)
		22	(swFwFabricFq)
		23	(swFwFabricFl)
		24	(swFwFabricGs)
		25	(swFwEPortLink)
		26	(swFwEPortSync)
		27	(swFwEPortSignal)
		28	(swFwEPortPe)
		29	(swFwEPortWords)
		30	(swFwEPortCrcs)
		31	(swFwEPortRXPerf)
		32	(swFwEPortTXPerf)
		33	(swFwEPortState)
		34	(swFwFCUPortLink)
35	(swFwFCUPortSync)		

Table 38. SW-MIB Definitions (continued)

Type Definition	Value	Declaration	Description
SwFwClassesAreas (continued)	Integer	36	(swFwFCUPortSignal)
		37	(swFwFCUPortPe)
		38	(swFwFCUPortWords)
		39	(swFwFCUPortCrcs)
		40	(swFwFCUPortRXPerf)
		41	(swFwFCUPortTXPerf)
		42	(swFwFCUPortState)
		43	(swFwFOPPortLink)
		44	(swFwFOPPortSync)
		45	(swFwFOPPortSignal)
		46	(swFwFOPPortPe)
		47	(swFwFOPPortWords)
		48	(swFwFOPPortCrcs)
		49	(swFwFOPPortRXPerf)
		50	(swFwFOPPortTXPerf)
51	(swFwFOPPortState)		
SwFwWriteVals	Integer	1	(swFwCancelWrite)
		2	(swFwApplyWrite)

Table 38. SW-MIB Definitions (continued)

Type Definition	Value	Declaration	Description
SwFwTimebase	Integer	1 (swFwTbNone)	
		2 (swFwTbSec)	
		3 (swFwTbMin)	
		4 (swFwTbHour)	
		5 (swFwTbDay)	
SwFwStatus	Integer	1 (disabled)	
		2 (enabled)	
SwFwEvent	Integer	1 (started)	
		2 (changed)	
		3 (exceeded)	
		4 (below)	
		5 (above)	
		6 (inBetween)	
SwFwBehavior	Integer	1 (triggered)	
		2 (continuous)	
SwFwState	Integer	1 (swFwInformative)	
		2 (swFwNormal)	
		3 (swFwFaulty)	
SwFwLicense	Integer	1 (swFwLicensed)	
		2 (swFwNotLicensed)	

System Group

swCurrentDate

Syntax Display String of size 0 to 64

Access Read-only

Status Mandatory

Description The current date and time.

Note The return string is displayed using the following format:

ddd MMM DD hh:mm:ss yyyy

Where:

ddd = Day
MMM = Month
DD = Date
hh = Hour
mm = Minute
ss = Seconds
yyyy = Year

For example: Thu Aug 17 15:16:09 2000.

swBootDate

Syntax Display String of size 0 to 64

Access Read-only

Status Mandatory

Description The date and time when the system last booted.

Note The return string is displayed using the following format:
ddd MMM DD hh:mm:ss yyyy

Where:

ddd = Day
MMM = Month
DD = Date
hh = Hour
mm = Minute
ss = Seconds
yyyy = Year

For example: Thu Aug 17 15:16:09 2000.

swFWLastUpdated

Syntax Display String of size 0 to 64

Access Read-only

Status Mandatory

Description The date and time when the firmware was last loaded to the switch.

Note The return string is displayed using the following format:

ddd MMM DD hh:mm:ss yyyy

Where:

ddd = Day
MMM = Month
DD = Date
hh = Hour

mm = Minute
ss = Seconds
yyyy = Year

For example: Thu Aug 17 15:16:09 2000.

swFlashLastUpdated

Syntax Display String

Access Read-only

Status Mandatory

Description The date and time when the firmware was last downloaded or the configuration file was last changed.

Note The return string is displayed using the following format:

ddd MMM DD hh:mm:ss yyyy

Where:

ddd = Day
MMM = Month
DD = Date
hh = Hour
mm = Minute
ss = Seconds
yyyy = Year

For example: Thu Aug 17 15:16:09 2000.

swBootPromLastUpdated

Syntax Display String of size 0 to 64

Access Read-only

Status Mandatory

Description The date and time when the BootPROM was last updated.

Note The return string is displayed using the following format:

ddd MMM DD hh:mm:ss yyyy

Where:

ddd = Day
MMM = Month
DD = Date
hh = Hour
mm = Minute
ss = Seconds
yyyy = Year

For example: Thu Aug 17 15:16:09 2000.

swFirmwareVersion

Syntax Display String of size 0 to 24

Access Read-only

Status Mandatory

Description The current version of the firmware.

Note The return value is displayed using the following format:
vM.m.f

Where:

v = The deployment indicator

M = Major version

m = Minor version

f = Software maintenance version

For example: v2.2.1 (indicating FOS version 2.2.1).

swOperStatus

Syntax

Value	Declaration	Description
Integer	1 (online)	The switch is accessible by an external fibre channel port.
	2 (offline)	The switch is not accessible.
	3 (testing)	The switch is in a built-in test mode and is not accessible by an external fibre channel port.
	4 (faulty)	The switch is not operational.

Access Read-only

Status Mandatory

Description The current operational status of the switch.

swAdmStatus

Syntax

Value	Declaration	Description
Integer	1 (online)	Set the switch to be accessible by an external fibre channel port.
	2 (offline)	Set the switch to be inaccessible.
	3 (testing)	Set the switch to run the built-in test.
	4 (faulty)	Set the switch to a “soft” faulty condition.
	5 (reboot)	Set the switch to reboot in 1 second.
	6 (fastboot)	Set the switch to fastboot in 1 second. Fastboot causes the switch to boot but skip over the POST.

Access Read-write

Status Mandatory

Description The desired administrative status of the switch. A management station can place the switch in a desired state by setting this object accordingly.

Note When the switch is in the faulty state, only two states can be set: faulty and reboot/fastboot.

swTelnetShellAdmStatus

Syntax

Value	Declaration	Description
Integer	0 (unknown)	The status of the current Telnet shell task is unknown.
	1 (terminated)	The current Telnet shell task is deleted.

Access Read-write

Status Mandatory

Description The desired administrative status of the Telnet shell.

Note By setting it to 1 (terminated), the current Telnet shell task is deleted. When this variable instance is read, it reports the value last set through SNMP.

swSsn

Syntax Display String of size 0 to 128

Access Read-only

Status Mandatory

Description The soft serial number of the switch.

Note By default, the return value is the WWN of the switch.

Flash Administration

The next five objects are related to firmware or configuration file management. The underlying method in the transfer of the firmware or configuration file is based on either FTP or remote shell. If a password is provided, FTP is used. If no password is provided, remote shell is used.

Use one of the two following methods to manage the firmware or switch configuration file in the switch Flash:

1. Set swFlashDLHost.0, swFlashDLUser.0, and swFlashDLFile.0 to an appropriate host IP address in user dot notation (for example, 192.168.1.7), a user name (for example, administrator), and file name of the firmware or configuration file (for example, /home/fcsw/v2.2) respectively.

Or,

1. Set swFlashDLPassword.0 to an appropriate value (for example, secret) if FTP is the desired method of transfer.
2. Set swFlashDLAdmStatus.0 to 2 (swFwUpgrade), 3 (swCfUpload), or 4 (swCfDownload) accordingly.

swFlashDLOperStatus

Syntax

Value	Declaration	Description
Integer	1 (swCurrent)	The Flash contains the current firmware image or configuration file.
	2 (swFwUpgraded)	The Flash contains the image upgraded from the swFlashDLHost.0.
	3 (swCfUploaded)	The switch configuration file has been uploaded to the host.
	4 (swCfDownloaded)	The switch configuration file has been downloaded from the host.

Access Read-only

Status Mandatory

Description The operational status of the Flash.

swFlashDLAdmStatus

Syntax

Value	Declaration	Description
Integer	1 (swCurrent)	The Flash contains the current firmware image or configuration file.
	2 (swFwUpgrad)	The firmware in the Flash is to be upgraded from the host specified.
	3 (swCfUpload)	The switch configuration file is to be uploaded to the host specified.
	4 (swCfDownload)	The switch configuration file is to be downloaded from the host specified.

Access Read-write

Status Mandatory

Description The desired state of the Flash.

The host is specified in swFlashDLHost.0. In addition, the user name is specified in swFlashDLUser.0, and the file name is specified in swFlashDLFile.0.

Note For more information about the following commands, see the appropriate user manual.

- firmwareDownload
 - configUpload
 - configDownloadsw
-

FlashDLHost

Syntax Display String of size 0 to 64

Access Read-write

Status Mandatory

Description The name or IP address (in dot notation) of the host to download or upload a relevant file to the Flash.

swFlashDLUser

Syntax Display String of size 0 to 64

Access Read-write

Status Mandatory

Description The user name on the host that is used for downloading or uploading a relevant file, to or from the Flash.

swFlashDLFile

Syntax Display String of size 0 to 256

Access Read-write

Status Mandatory

Description The name of the file to be downloaded or uploaded.

swFlashDLPassword

Syntax Display String of size 0 to 100

Access Read-write

Status Mandatory

Description The password to be used for FTP transfer of files in the download or upload operation.

swBeaconOperStatus

Syntax

Value	Declaration	Description
Integer	1 (on)	The LEDs on the front panel of the switch run alternately from left to right, and right to left. The color is yellow.
	2 (off)	Each LED is in its regular status, indicating color and state.

Access Read-only

Status Mandatory

Description The current operational status of the switch beacon. When the beacon is on, the LEDs on the front panel of the switch run alternately from left to right, and right to left. In this state, the color of the LED is yellow. When the beacon is off, each LED is in its regular status, indicating color and state.

swBeaconAdmStatus

Syntax

Value	Declaration	Description
Integer	1 (on)	Set the LEDs on the front panel of the switch to run alternately from left to right, and right to left. Set the color to yellow.
	2 (off)	Set each LED to its regular status, indicating color and state.

Access Read-write

Status Mandatory

Description The desired status of the switch beacon. When the beacon is set to on, the LEDs on the front panel of the switch run alternately from left to right, and right to left. The color is yellow. When the beacon is set to off, each LED is in its regular status, indicating color and state.

swDiagResult

Syntax

Value	Declaration	Description
Integer	1 (sw-ok)	The switch is OK.
	2 (sw-central-memory-fault)	The switch has experienced a central memory fault.
	3 (sw-embedded-port-fault)	The switch has experienced an embedded port fault.

Access Read-only

Status Mandatory

Description The result of the power-on startup (POST) diagnostics.

Operating Environment Sensor Table (Temperature, Fan, Power Supply, and Others)

swNumSensors

Syntax Integer

Access Read-only

Status Mandatory

Description The number of sensors inside the switch is shown as follows:

- W2010/40/50: 13
- SW2400: 13
- SW2800: 13

swSensorTable

Syntax Sequence of swSensorEntry

Access Not accessible

Status Mandatory

Description The table of sensor entries.

swSensorEntry [swSensorTable]

Syntax SwSensorEntry

Access Not accessible

Status Mandatory

Description An entry of the sensor information.

Index swSensorIndex

Table 39. SwSensorEntry Objects and Object Types

SwSensorEntry Objects	See Page	Object Types
swSensorIndex	276	Index
swSensorType	276	Integer
swSensorStatus	277	Integer
swSensorValue	278	Integer
swSensorInfo	278	Display String of size 0 to 255

swSensorIndex [swSensorTable]

Syntax SwSensorIndex

Access Read-only

Status Mandatory

Description The index of the sensor.

Note Values for the index range from 1 to 13.

swSensorType [swSensorTable]

Syntax

Value	Declaration	Description
Integer	1 (temperature)	Temperature sensor
	2 (fan)	Fan sensor
	3 (power supply)	Power-supply sensor

Access Read-only

Status Mandatory

Description The type of sensor.

swSensorStatus [swSensorTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	The status of the sensor is unknown.
	2 (faulty)	The status of the sensor is in a faulty state.
	3 (below-min)	The sensor value is below the minimal threshold.
	4 (nominal)	The status of the sensor is in a nominal state.
	5 (above-max)	The sensor value is above the maximum threshold.
	6 (absent)	The sensor is missing.

Access Read-only

Status Mandatory

Description The current status of the sensor.

Note See the following list for valid values:

- For temperature, valid values include 3 (below-min), 4 (nominal), and 5 (above-max).
 - For fan, valid values include 3 (below-min), 4 (nominal), and 6 (absent).
 - For power supply, valid values include 2 (faulty), 4 (nominal), and 6 (absent).
-

swSensorValue [swSensorTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The current value (reading) of the sensor.

The value, -2147483648, represents an unknown quantity.

This value also means that the sensor does not have the capability to measure the actual value. In V2.0, the temperature sensor value is in Celsius; the fan value is in RPM (revolution per minute); and the power-supply sensor reading is unknown.

Note For fan, the value -2147483648 indicates that the unit is missing. For power supply, the return value is always -2147483648.

swSensorInfo [swSensorTable]

Syntax Display String of size 0 to 255

Access Read-only

Status Mandatory

Description Additional displayable information on the sensor. In V2.x, it contains the sensor type and number in textual format. For example, Temp 3 or Fan 6.

Note For swSensorIndex 1 through 5, valid return values include:

- Temp #1
- Temp #2
- Temp #3
- Temp #4
- Temp #5

For swSensorIndex 6 through 11, valid return values include:

- Fan #1
- Fan #2
- Fan #3
- Fan #4
- Fan #5
- Fan #6

For swSensorIndex 12 and 13, valid return values include:

- Power Supply #1
 - Power Supply #2
-

swTrackChangesInfo

Syntax Display String of size 0 to 256

Access Read-only

Status Mandatory

Description Track changes string. For trap only.

Note If there are no events to track, the default return value is “No event so far.”

If there are events to track, the following are valid return values:

- Successful login
 - Unsuccessful login
 - LogoutConfiguration file change from task [*name of task*]
 - Track-changes on
 - Track-changes off
-

Fabric Group

swDomainID

Syntax SwDomainIndex

Access Read-write

Status Mandatory

Description The current fibre channel domain ID of the switch. To set a new value, the switch (swAdmStatus) must be in the offline or testing state.

swPrincipalSwitch

Syntax

Value	Declaration	Description
Integer	1 (yes)	This is the principal switch for FC-SW.
	2 (no)	This is not the principal switch for FC-SW.

Access Read-only

Status Mandatory

Description Indicates whether the switch is the principal switch as per FC-SW.

Immediate Neighborhood ISL Family Table

swNumNbs

Syntax Integer

Access Read-only

Status Mandatory

Description The number of inter-switch links (ISLs) in the (immediate) neighborhood.

swNbTable

Syntax Sequence of SwNbEntry

Access Not accessible

Status Mandatory

Description This table contains the ISLs in the immediate neighborhood of the switch.

swNbEntry [swNbTable]

Syntax SwNbEntry

Access Not accessible

Status Mandatory

Description An entry containing each neighbor ISL parameters.

Index swNbIndex

Table 40. SwNbEntry Objects and Object Types

SwNbEntry Objects	See Page	Object Types
swNbIndex	282	SwNbIndex
swNbMyPort	283	Integer
swNbRemDomain	284	SwDomainIndex
swNbRemPort	284	Integer
swNbBaudRate	286	Integer
swNbIslState	286	Integer
swNbIslCost	287	Integer
swNbRemPortName	287	Octet String of size 8

swNbIndex [swNbTable]

Syntax SwNbIndex

Access Read-only

Status Mandatory

Description The neighborhood ISL entry.

swNbMyPort [swNbTable]

Syntax

Value	Declaration	Description
Integer	1 (portNum-0)	
	2 (portNum-1)	
	3 (portNum-2)	
	4 (portNum-3)	
	5 (portNum-4)	
	6 (portNum-5)	
	7 (portNum-6)	
	8 (portNum-7)	
	9 (portNum-8)	
	10 (portNum-9)	
	11 (portNum-10)	
	12 (portNum-11)	
	13 (portNum-12)	
	14 (portNum-13)	
	15 (portNum-14)	
	16 (portNum-15)	

Access Read-only

Status Mandatory

Description This is the port that has an ISL to another switch.

Note The physical port number of the local switch, plus one. Valid values include the following:

SW2010/40/50: portNum-0 to portNum-7

SW2400: portNum-0 to portNum-7

SW2800: portNum-0 to portNum-15

swNbRemDomain [swNbTable]

Syntax SwDomainIndex

Access Read-only

Status Mandatory

Description This is the fibre channel domain on the other end of the ISL.

Note This is the domain ID of the remote switch. Valid values are 1 to 239 as defined by FCS-SW.

swNbRemPort [swNbTable]

Syntax

Value	Declaration	Description
Integer	1 (portNum-0)	
	2 (portNum-1)	
	3 (portNum-2)	
	4 (portNum-3)	
	5 (portNum-4)	
	6 (portNum-5)	
	7 (portNum-6)	
	8 (portNum-7)	

Value	Declaration	Description
Integer	9 (portNum-8)	
	10 (portNum-9)	
	11 (portNum-10)	
	12 (portNum-11)	
	13 (portNum-12)	
	14 (portNum-13)	
	15 (portNum-14)	
	16 (portNum-15)	

Access Read-only

Status Mandatory

Description This is the port index on the other end of the ISL.

Note The physical port number of the remote switch, plus one. Valid values include the following:

SW2010/40/50: portNum-0 to portNum-7

SW2400: portNum-0 to portNum-7

SW2800: portNum-0 to portNum-15

swNbBaudRate [swNbTable]

Syntax

Value	Declaration	Description
Integer	1 (other)	None of below
	2 (oneEighth)	155 Mbaud
	4 (quarter)	266 Mbaud
	8 (half)	532 Mbaud
	16 (full)	1 Gbaud
	32 (double)	2 Gbaud
	64 (quadruple)	4 Gbaud

Access Read-only

Status Mandatory

Description The baud rate of the ISL.

Note Valid values include the following:

SW2010/40/50: 16 (full)

SW2400: 16 (full)

SW2800: 16 (full)swNbIslState [swNbTable]

Syntax

Value	Declaration	Description
Integer	0 (sw-down)	
	2 (sw-init)	
	2 (sw-internal2)	
	3 (sw-internal3)	
	4 (sw-internal4)	
	5 (sw-active)	

Access Read-only

Status Mandatory

Description

The current state of the ISL. [swNbIsICost \[swNbTable\]](#)

Syntax Integer

Access Read-write

Status Mandatory

Description The current link cost of the ISL. In other words, the cost of a link to control the routing algorithm.

[swNbRemPortName \[swNbTable\]](#)

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The WWN of the remote port.

SW Agent Configuration Group

SNMP Agent Configuration Table

swAgtCmtyTable

Syntax Sequence of SwAgtCmtyEntry

Access Not accessible

Status Mandatory

Description A table that contains one entry for each community, and the access control and parameters of the community.

swAgtCmtyEntry [swAgtCmtyTable]

Syntax SwAgtCmtyEntry

Access Not accessible

Status Mandatory

Description An entry containing the community parameters.

Index swAgtCmtyIdx

Table 41. SwAgtCmtyEntry Objects and Object Types

SwAgtCmtyEntry Objects	See Page	Object Types
swAgtCmtyIdx	289	Integer of size 1 to 6
swAgtCmtyStr	289	Display String of size 0 to 16
swAgtTrapRcp	290	NetworkAddress

swAgtCmtyIdx [swAgtCmtyTable]

Syntax Integer of size 1 to 6

Access Read-only

Status Mandatory

Description The SNMPv1 community entry.

Note The return value for this entry is always 4 to 6, which are communities that are read-only.

swAgtCmtyStr [swAgtCmtyTable]

Syntax Display String of size 0 to 16

Access Read-write

Status Mandatory

Description This is a community string supported by the agent. If a new value is set successfully, it takes effect immediately.

Note Default values for communities are as follows:

- Secret COde
- OrigEquipMfr
- private
- public
- common
- FibreChannel

Change the community setting using the agtcfgSet Telnet command.

swAgtTrapRcp [swAgtCmtyTable]

Syntax NetworkAddress

Access Read-write

Status Mandatory

Description This is the trap recipient associated with the community. If a new value is set successfully, it takes effect immediately.

Note If not otherwise set, the default IP address for this trap recipient is 0.0.0.0, and the SNMP trap is not sent for the associated community string.

A setting of non-0.0.0.0 IP address, SNMP traps are sent to the host with the associated community string.

Fibre Channel Port Group

The fibre channel port group contains information about the physical state, operational status, performance, and error statistics of each fibre channel port on the switch. A fibre channel port is one which supports the fibre channel protocol. For example, F_Port, E_Port, U_Port, FL_Port.

swFCPortCapacity

Syntax	Integer
Access	Read-only
Status	Mandatory

Description The number of fibre channel ports on this switch. It includes U_Port, F_Port, FL_Port, and any other types of fibre channel port.

Note Valid values for the switches include the following:

SW2010/40/50: 8
SW2400: 8
SW2800: 16

Fibre Channel Port Table

swFCPortTable

Syntax	Sequence of SwFCPortEntry
Access	Not accessible
Status	Mandatory

Description A table that contains one entry for each switch port, and configuration and service parameters of the port.

swFCPortEntry [swFCPortTable]

Syntax SwFCPortEntry

Access Not accessible

Status Mandatory

Description An entry containing the configuration and service parameters of the switch port.

Index swFCPortIndex

Table 42. SwFCPortEntry Objects and Object Types

SwFCPortEntry Objects	See Page	Object Types
swFCPortIndex	294	Integer
swFCPortType	295	Integer
swFCPortPhyState	296	Integer
swFCPortOpStatus	297	Integer
swFCPortAdmStatu	297	Integer
swFCPortLinkState	298	Integer
swFCPortTxType	299	Integer
The following are mapped to gstat_t		
swFCPortTxWords	299	Counter
swFCPortRxWords	299	Counter
swFCPortTxFrames	300	Counter
swFCPortRxFrames	300	Counter
swFCPortRxC2Frames	300	Counter
swFCPortRxC3Frames	300	Counter
swFCPortRxCs	301	Counter
swFCPortRxCasts	301	Counter

Table 42. SwFCPortEntry Objects and Object Types (continued)

SwFCPortEntry Objects	See Page	Object Types
swFCPortTooManyRdys	301	Counter
swFCPortNoTxCredits	302	Counter
swFCPortRxEncInFrs	302	Counter
swFCPortRxCrcs	302	Counter
swFCPortRxTruncs	302	Counter
swFCPortRxTooLongs	303	Counter
swFCPortRxBadEofs	303	Counter
swFCPortRxEncOutFrs	303	Counter
swFCPortRxBadOs	304	Counter
swFCPortC3Discards	304	Counter
swFCPortMcastTimedOuts	304	Counter
swFCPortTxMcasts	304	Counter
LIP statistics		
swFCPortLipIns	305	Counter,
swFCPortLipOuts	305	Counter,
swFCPortLipLastAlpa	305	Octet String of size 4
swFCPortWwn	306	Octet String

swFCPortIndex [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	1 (portNum-0)	
	2 (portNum-1)	
	3 (portNum-2)	
	4 (portNum-3)	
	5 (portNum-4)	
	6 (portNum-5)	
	7 (portNum-6)	
	8 (portNum-7)	
	9 (portNum-8)	
	10 (portNum-9)	
	11 (portNum-10)	
	12 (portNum-11)	
	13 (portNum-12)	
	14 (portNum-13)	
	15 (portNum-14)	
	16 (portNum-15)	

Access Read-only

Status Mandatory

Description The switch port index.

Note The physical port number of the switch, plus one. Valid values include the following:

SW2010/40/50: portNum-0 to portNum-7

SW2400: portNum-0 to portNum-7

SW2800: portNum-0 to portNum-15

swFCPortType [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	1 (stitch)	
	2 (flannel)	
	3 (loom)	

Access Read-only

Status Mandatory

Description The type of ASIC for the switch port.

Note Valid values includes the following:

SW2010/40/50: 3 (loom)

SW2400: 3 (loom)

SW2800: 3 (loom)

1 (stitch) and 2 (flannel) are no longer supported.

swFCPortPhyState [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	1 (noCard)	No card is present in this switch slot.
	2 (noGbic)	No GBIC module is in this port.
	3 (laserFault)	The module is signaling a laser fault (defective GBIC).
	4 (noLight)	The module is not receiving light.
	5 (noSync)	The module is receiving light but is out of sync.
	6 (inSync)	The module is receiving light and is in sync.
	7 (portFault)	The port is marked faulty (defective GBIC, cable, or device).
	8 (diagFault)	The port failed diagnostics (defective G_Port or FL_Port card or motherboard).
	9 (lockRef)	Port is locking to the reference signal.

Access Read-only

Status Mandatory

Description The physical state of the port.

swFCPortOpStatus [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	0 (unknown)	The port module is physically absent.
	1 (online)	User frames can be passed.
	2 (offline)	No user frames can be passed.
	3 (testing)	No user frames can be passed.
	4 (faulty)	The port module is physically faulty.

Access Read-only

Status Mandatory

Description The operational status of the port.

swFCPortAdmStatus [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	1 (online)	User frames can be passed.
	2 (offline)	No user frames can be passed.
	3 (testing)	No user frames can be passed.
	4 (faulty)	No user frames can be passed.

Access Read-write

Status Mandatory

Description The desired state of the port. A management station can place the port in a desired state by setting this object accordingly.

The 3 (testing) state indicates that no user frames can be passed. As the result of either explicit management action or per configuration information accessible by the switch, swFCPortAdmStatus is then changed to either the 1 (online) or 3 (testing) state, or remains in the 2 (offline) state.

swFCPortLinkState [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	1 (enabled)	The port is allowed to participate in the FC-PH protocol with its attached port (or ports if it is in an FC-AL loop).
	2 (disabled)	The port is not allowed to participate in the FC-PH protocol with its attached port (or ports).
	3 (loopback)	The port can transmit frames through an internal path to verify the health of the transmitter and receiver path.

Access Read-write

Status Mandatory

Description Indicates the link state of the port.

Note When the port's link state changes, its operational status (swFCPortOpStatus) is affected.

swFCPortTxType [swFCPortTable]

Syntax

Value	Declaration	Description
Integer	1 (unknown)	Cannot determined to the port driver.
	2 (lw)	Long wave laser
	3 (sw)	Short wave laser
	3 (ld)	Long wave LED

Access Read-only

Status Mandatory

Description Indicates the media transmitter type of the port.

swFCPortTxWords [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of fibre channel words that the port has transmitted.

swFCPortRxWords [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of fibre channel words that the port has received.

swFCPortTxFrames [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of fibre channel frames that the port has transmitted.

swFCPortRxFrames [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of fibre channel frames that the port has received.

swFCPortRxC2Frames [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of Class 2 frames that the port has received.

swFCPortRxC3Frames [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of Class 3 frames that the port has received.

swFCPortRxLCs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of link control frames that the port has received.

swFCPortRxMcasts [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of multicast frames that the port has received.

swFCPortTooManyRdys [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of times when RDYs exceeds the frames received.

swFCPortNoTxCredits [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of times when the transmit credit has reached zero.

swFCPortRxEnclnFrs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of encoding errors or disparity errors inside frames received.

swFCPortRxCrcs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of CRC errors detected for frames received.

swFCPortRxTruncs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of truncated frames that the port has received.

swFCPortRxTooLongs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of received frames that are too long.

swFCPortRxBadEofs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of received frames that have a bad EOF delimiter.

swFCPortRxEncOutFrs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of encoding errors or disparity errors outside frames received.

swFCPortRxBadOs [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of invalid ordered sets received.

swFCPortC3Discards [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of Class 3 frames that the port has discarded.

swFCPortMcastTimedOuts [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of multicast frames that has been timed out.

swFCPortTxMcasts [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of multicast frames that has been transmitted.

swFCPortLipIns [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of loop initializations that has been initiated by loop devices attached.

swFCPortLipOuts [swFCPortTable]

Syntax Counter

Access Read-only

Status Mandatory

Description Counts the number of loop initializations that has been initiated by the port.

swFCPortLipLastAlpa [swFCPortTable]

Syntax Octet String of size 4

Access Read-only

Status Mandatory

Description Indicates the physical address (AL_PA) of the loop device that initiated the last loop initialization.

swFCPortWwn [swFCPortTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The WWN of the fibre channel port. The contents of an instance are in the IEEE extended format as specified in FC-PH.

Name Server Database Group

swNsLocalNumEntry

Syntax Integer

Access Read-only

Status Mandatory

Description The number of local name server entries.

sw Name Server Local Table

swNsLocalTable

Syntax Sequence of SwNsEntry

Access Not accessible

Status Mandatory

Description The table of local name server entries.

swNsLocalEntry [swNsLocalTable]

Syntax SwNsEntry

Access Not accessible

Status Mandatory

Description An entry from the local name server database.

Index swNsEntryIndex

Table 43. SwNsEntry Objects and Object Types

SwNsEntry Objects	See Page	Object Types
swNsEntryIndex	307	Integer
swNsPortID	308	Octet String of size 4
swNsPortType	308	Integer
swNsPortName	308	FcWwn
swNsPortSymb	309	Octet String
swNsNodeName	309	FcWwn
swNsNodeSymb	309	Octet String
swNsIPA	310	Octet String
swNsIpAddress	310	Octet String
swNsCos	311	Integer
swNsFc4	312	Octet String

swNsEntryIndex [swNsLocalTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The index of the name server database entry.

swNsPortID [swNsLocalTable]

Syntax Octet String of size 4

Access Read-only

Status Mandatory

Description The fibre channel port address ID of the entry.

swNsPortType [swNsLocalTable]

Syntax

Value	Declaration	Description
Integer	0 (unknown)	The type is defined in FC-GS-2.
	1 (nPort)	The type is defined in FC-GS-2.
	2 (nlPort)	The type is defined in FC-GS-2.

Access Read-only

Status Mandatory

Description The type of port for this entry.

swNsPortName [swNsLocalTable]

Syntax FcWwn

Access Read-only

Status Mandatory

Description The fibre channel WWN of the port entry.

swNsPortSymb [swNsLocalTable]

Syntax Octet String of size 0 to 255

Access Read-only

Status Mandatory

Description The contents of a symbolic name of the port entry. In FC-GS-2, a symbolic name consists of a byte array of 1 to 256 bytes, and the first byte of the array specifies the length of its contents. This object variable corresponds to the contents of the symbolic name, with the first byte removed.

swNsNodeName [swNsLocalTable]

Syntax FcWwn

Access Read-only

Status Mandatory

Description The fibre channel WWN of the associated node as defined in FC-GS-2.

swNsNodeSymb [swNsLocalTable]

Syntax Octet String of size 0 to 255

Access Read-only

Status Mandatory

Description The contents of a symbolic name of the node associated with the entry. In FC-GS-2, a symbolic name consists of a byte array of 1 to 256 bytes, and the first byte of the array specifies the length of its contents. This object variable corresponds to the contents of the symbolic name, with the first byte removed.

swNsIPA [swNsLocalTable]

Syntax Octet String of size 8

Access Read-only

Status Mandatory

Description The initial process associators of the node for the entry as defined in FC-GS-2.

swNsIpAddress [swNsLocalTable]

Syntax Octet String of size 16

Access Read-only

Status Mandatory

Description The IP address of the node for the entry as defined in FC-GS-2. The format of the address is in IPv6.

swNsCos [swNsLocalTable]

Syntax

Value	Declaration	Description
Integer	0 (class-unknown)	
	1 (class-F)	
	2 (class-1)	
	3 (class-F-1)	
	4 (class-2)	
	5 (class-F-2)	
	6 (class-1-2)	
	7 (class-F-1-2)	
	8 (class-3)	
	9 (class-F-3)	
	10 (class-1-3)	
	11 (class-F-1-3)	
	12 (class-2-3)	
	13 (class-F-2-3)	
	14 (class-1-2-3)	
15 (class-F-1-2-3)		

Access Read-only

Status Mandatory

Description The class of services supported by the port.

swNsFc4 [swNsLocalTable]

Syntax Octet String of size 32

Access Read-only

Status Mandatory

Description The FC-4s supported by the port as defined in FC-GS-2.

Event Group (To Map the errLog)

Note Logically, the swEventTable is separate from the error log because it is essentially a view of the error log within a particular time window. The value of swEventIndex indicates the event number that has occurred since the switch booted. The values range from 1 to 2147383647 ($2^{31} - 1$).

swEventTrapLevel

Syntax

Value	Declaration	Description
Integer	0 (none)	
	1 (critical)	
	2 (error)	
	3 (warning)	
	4 (informational)	
	5 (debug)	

Access Read-write

Status Mandatory

Description Specifies the swEventTrap level in conjunction with an event's severity level. When an event occurs, if its severity level is at or below the specified numeric value, the agent sends the associated swEventTrap to the configured recipients.

For example, if this variable is set to 3 (warning), all error logs of severity 1 (critical), 2 (error), and 3 (warning) are sent as an SNMP trap of swEventTrap as shown in “swEventTrap” on [page 343](#).

swEventNumEntries

Syntax Integer

Access Read-only

Status Mandatory

Description The number of entries in the event table.

See the note on [page 312](#).

swEventTable

Syntax Sequence of SwEventEntry

Access Not accessible

Status Mandatory

Description The table of event entries.

swEventEntry [swEventTable]

Syntax SwEventEntry

Access Not accessible

Status Mandatory

Description An entry in the event table.

Index swEventIndex

Table 44. swEventIndex Objects and Object Types

swEventIndex Objects	See Page	Object Types
swEventIndex	314	Integer
swEventTimeInfo	314	Display String
swEventLevel	315	Integer
swEventRepeat	316	CountInteger
swEventDescr	316	Display String

swEventIndex [swEventTable]

Syntax Integer

Access Read-only

Status Mandatory

Description The index of the event entry.

See the note on [page 312](#).

swEventTimeInfo [swEventTable]

Syntax Display String

Access Read-only

Status Mandatory

Description The date and time when this event occurred.

Note The return string is displayed using the following format:

ddd MMM DD hh:mm:ss yyyy

Where:

ddd = Day
MMM = Month
DD = Date
hh = Hour
mm = Minute
ss = Seconds
yyyy = Year

For example: Thu Aug 17 15:16:09 2000.

swEventLevel [swEventTable]

Syntax

Value	Declaration	Description
Integer	1 (critical)	
	2 (error)	
	3 (warning)	
	4 (informational)	
	5 (debug)	

Access Read-only

Status Mandatory

Description The severity level of this event entry.

swEventRepeatCount [swEventTable]

Syntax Integer

Access Read-only

Status Mandatory

Description If the most recent event is the same as the previous event, this number is incremented by one, and is the count of consecutive times this particular event has occurred.

swEventDescr [swEventTable]

Syntax Display String

Access Read-only

Status Mandatory

Description A textual description of the event.

Note The return string is displayed using the following format:

taskId (taskname) errorname description

Where:

taskId = FOS taskId in hex

taskname = FOS taskname that generated this event

errorname = Category-subcategory (for example, SYS-BOOT)

description = Textual description of the event

For example, 0x10fb7670 (tSwitch) SYS-BOOT Restart reason:

Reboot

For more information on error messages, see the Fabric OS manual.

Fabric Watch Group

The Fabric Watch subsystem consists of two tables. SwFwClassAreaEntry contains control information for a particular class/area's thresholds. These thresholds are contained in SwFwThresholdEntry.

Note This is the first of the elements declared for Fabric Watch; one scalar and two tables. A scalar, swFwFabricWatchLicense is used to tell if the switch has the proper license for Fabric Watch.

One table contains classarea information such as threshold unit string, time base, low thresholds, and so forth. The other table contains individual threshold information such as name, label, last event, and so forth.

License Scalar

swFwFabricWatchLicense

Syntax SwFwLicense

Access Read-only

Status Mandatory

Description If the license key is installed on the switch for the Fabric Watch, the return value is swFwLicensed. Otherwise, the value is swFwNotLicensed.

ClassArea Table

swFwClassAreaTable

Syntax Sequence of SwFwClassAreaEntry

Access Not accessible

Status Mandatory

Description The table of classes and areas.

swFwClassAreaEntry [swFwClassAreaTable]

Syntax SwFwClassAreaEntry

Access Not accessible

Status Mandatory

Description An entry of the classes and areas.

Index swFwClassAreaIndex

Table 45. SwFwClassAreaEntry Objects and Object Types

SwFwClassAreaEntry Objects	See Page	Object Types
swFwClassAreaIndex	319	SwFwClassesAreas
swFwWriteThVals	319	SwFwWriteVals
swFwDefaultUnit	320	Display String of size 0 to 256
swFwDefaultTimebase	320	SwFwTimebase
swFwDefaultLow	321	Integer
swFwDefaultHigh	321	Integer
swFwDefaultBufSize	321	Integer
swFwCustUnit	322	Display String of size 0 to 256
swFwCustTimebase	322	SwFwTimebase
swFwCustLow	322	Integer
swFwCustHigh	323	Integer
swFwCustBufSize	323	Integer
swFwThLevel	323	SwFwLevels

Table 45. SwFwClassAreaEntry Objects and Object Types (continued)

SwFwClassAreaEntry Objects	See Page	Object Types
swFwWriteActVals	324	SwFwWriteVals
swFwDefaultChangedActs	325	SwFwActs
swFwDefaultExceededActs	325	SwFwActs
swFwDefaultBelowActs	326	SwFwActs
swFwDefaultAboveActs	326	SwFwActs
swFwCustChangedActs	326	SwFwActs
swFwCustExceededActs	326	SwFwActs
swFwCustBelowActs	327	SwFwActs
swFwCustAboveActs	327	SwFwActs
swFwValidActs	328	SwFwActs
swFwActLevel	328	SwFwLevel

swFwClassAreaIndex [swFwClassAreaTable]

Syntax SwFwClassesAreas

Access Read-only

Status Mandatory

Description This index represents the Fabric Watch classArea combination.

swFwWriteThVals [swFwClassAreaTable]

Syntax SwFwWriteVals

Access Read-write

Status Mandatory

Description This applies or cancels the configuration value changes.

Note For a read operation, the return value is always swFwCancelWrite. The following custom configuration variables can be modified:

- swFwCustUnit
- swFwCustTimebase
- swFwCustLow
- swFwCustHigh
- swFwCustBufSize

Changes to these custom configuration variables can be saved by setting this variable to swFwApplyWrite, and they can be removed by setting this variable to swFwCancelWrite.

swFwDefaultUnit [swFwClassAreaTable]

Syntax Display String of size 0 to 256

Access Read-only

Status Mandatory

Description A default unit string name, used to identify the unit of measure for a Fabric Watch classArea combination. For example:

- C = environment (class), temperature (area)
- RPM = environment (class), fan (area)

swFwDefaultTimebase [swFwClassAreaTable]

Syntax SwFwTimebase

Access Read-only

Status Mandatory

Description A default polling period for the Fabric Watch classArea combination. For example:

- swFwTbMin = port (class), link loss (area)
- swFwTbNone = environment (class), temperature (area)

swFwDefaultLow [swFwClassAreaTable]

Syntax Integer

Access Read-only

Status Mandatory

Description A default low-threshold value.

swFwDefaultHigh [swFwClassAreaTable]

Syntax Integer

Access Read-only

Status Mandatory

Description A default high-threshold value.

swFwDefaultBufSize [swFwClassAreaTable]

Syntax Integer

Access Read-only

Status Mandatory

Description A default buffer size value.

swFwCustUnit [swFwClassAreaTable]

Syntax Display String of size 0 to 256

Access Read-write

Status Mandatory

Description A customizable unit string name, used to identify the unit of measure for a Fabric Watch classArea combination. For example:

- C = environment (class), temperature (area)
- RPM = environment (class), fan (area)

swFwCustTimebase [swFwClassAreaTable]

Syntax SwFwTimebase

Access Read-write

Status Mandatory

Description A customizable polling period for the Fabric Watch classArea combination. For example:

- swFwTbMin = port (class), link loss (area)
- swFwTbNone = environment (class), temperature (area)

swFwCustLow [swFwClassAreaTable]

Syntax Integer

Access Read-write

Status Mandatory

Description A customizable low-threshold value for a Fabric Watch ClassArea combination.

swFwCustHigh [swFwClassAreaTable]

Syntax Integer

Access Read-write

Status Mandatory

Description A customizable high-threshold value for a Fabric Watch ClassArea combination.

swFwCustBufSize [swFwClassAreaTable]

Syntax Integer

Access Read-write

Status Mandatory

Description A customizable buffer size value for a Fabric Watch ClassArea combination.

swFwThLevel [swFwClassAreaTable]

Syntax SwFwLevels

Access Read-write

Status Mandatory

Description swFwThLevel is used to point to the current level for classArea values, and is either default or customizable.

Note For a read operation, the return value is either 2 (swFwDefault) or 3 (swFwCustom). 1 (swFwReserved) is obsolete.

If the write operation sets the variable to 2 (swFwDefault), the following default configuration variables are used for the Fabric Watch classArea combination:

- swFwDefaultUnit
- swFwDefaultTimebase
- swFwDefaultLow
- swFwDefaultHigh
- swFwDefaultBufSize

If the write operation sets the variable to 3 (swFwCustom), the following custom configuration variables are used for the Fabric Watch classArea combination:

- swFwCustUnit
- swFwCustTimebase
- swFwCustLow
- swFwCustHigh
- swFwCustBufSize

swFwWriteActVals [swFwClassAreaTable]

Syntax SwFwWriteVals

Access Read-write

Status Mandatory

Description This applies or cancels the alarm value changes.

Note For a read operation, the return value is always swFwCancelWrite.

The following custom alarm variables can be modified:

- swFwCustChangedActs
- swFwCustExceededActs
- swFwCustBelowActs
- swFwCustAboveActs
- swFwCustInBetweenActs

Changes to these custom alarm variables can be saved by setting this variable to swFwApplyWrite.

Changes to these custom alarm variables can be removed by setting this variable to swFwCancelWrite.

swFwDefaultChangedActs[swFwClassAreaTable]

Syntax SwFwActs

Access Read-only

Status Mandatory

Description Default action matrix for changed event.

swFwDefaultExceededActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-only

Status Mandatory

Description Default action matrix for an exceeded event. The exceeded value can be either above the high-threshold or below the low-threshold.

swFwDefaultBelowActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-only

Status Mandatory

Description Default action matrix for below event.

swFwDefaultAboveActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-only

Status Mandatory

Description Default action matrix for above event.

swFwDefaultInBetweenActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-only

Status Mandatory

Description Default action matrix for in-between event.

swFwCustChangedActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-write

Status Mandatory

Description Custom action matrix for changed event.

swFwCustExceededActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-write

Status Mandatory

Description Custom action matrix for an exceeded event.

swFwCustBelowActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-write

Status Mandatory

Description Custom action matrix for below event.

swFwCustAboveActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-write

Status Mandatory

Description Custom action matrix for above event.

swFwCustInBetweenActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-write

Status Mandatory

Description Custom action matrix for in-between event.

swFwValidActs [swFwClassAreaTable]

Syntax SwFwActs

Access Read-only

Status Mandatory

Description Matrix of valid acts for ClassArea.

swFwActLevel [swFwClassAreaTable]

Syntax SwFwLevels

Access Read-write

Status Mandatory

Description swFwActLevel is used to point to the current level for classArea values, and is either default or customizable.

Note For a read operation, the return value is either 2 (swFwDefault) or 3 (swFwCustom). 1 (swFwReserved) is obsolete.

If the write operation sets the variable to 2 (swFwDefault), the following default action matrix variables are used for the Fabric Watch classArea combination:

- swFwDefaultChangedActs
- swFwDefaultExceededActs
- swFwDefaultBelowActs
- swFwDefaultAboveActs
- swFwDefaultInBetweenActs

If the write operation sets the variable to 3 (swFwCustom), the following custom action matrix variables are used for the Fabric Watch classArea combination:

- swFwCustChangedActs
- swFwCustExceededActs
- swFwCustBelowActs
- swFwCustAboveActs
- swFwCustInBetweenActs

swFwThresholdTable

Syntax Sequence of SwFwThresholdEntry

Access Not accessible

Status Mandatory

Description The table of individual thresholds.

swFwThresholdEntry [swFwThresholdTable]

Syntax SwFwThresholdEntry

Access Not accessible

Status Mandatory

Description An entry of an individual threshold.

Index swFwClassAreaIndex, swFwThresholdIndex

Table 46. SwFwThresholdEntry Objects and Object Types

SwFwThresholdEntry Objects	See Page	Object Types
swFwThresholdIndex	330	Integer
swFwStatus	332	SwFwStatus
swFwName	332	Display String of size 0 to 32
swFwLabel	334	Display String of size 0 to 32
swFwCurVal	335	Integer
swFwLastEvent	335	SwFwEvent
swFwLastEventVal	335	Integer
swFwLastEventTime	335	Display String of size 0 to 32
swFwLastState	336	SwFwState
swFwBehaviorType	336	SwFwBehavior
swFwBehaviorInt	336	Integer

swFwThresholdIndex [swFwThresholdTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Represents the element index of a threshold.

Note For environment class, the indexes are from 2 through (*number of environment sensors+1*).

For example, the indexes for environment class temperature area are:

- envTemp001: index of 2
- envTemp002: index of 3
- envTemp003: index of 4
- envTemp004: index of 5
- envTemp005: index of 6

For port-related classes such as E_Port, the indexes are from 1 through (*number of ports*). For example, the indexes for E_Port classlink loss area are:

- eportLink000: index of 1
 - eportLink001: index of 2
 - eportLink002: index of 3
 - eportLink003: index of 4
 - eportLink004: index of 5
 - eportLink005: index of 6
 - eportLink006: index of 7
 - eportLink007: index of 8
 - eportLink008: index of 9
 - eportLink009: index of 10
 - eportLink010: index of 11
 - eportLink011: index of 12
 - eportLink012: index of 13
 - eportLink013: index of 14
 - eportLink014: index of 15
 - eportLink015: index of 16
-

swFwStatus [swFwThresholdTable]

Syntax SwFwStatus

Access Read-write

Status Mandatory

Description Indicates whether a threshold is enabled or disabled.

swFwName [swFwThresholdTable]

Syntax Display String of size 0 to 32

Access Read-only

Status Mandatory

Description Name of the threshold.

For examples, see the following table.

Table 47. swFwName Threshold Names

envFan001	Env Fan 1
envPS002	Env Power Supply 2
envTemp001	Env Temperature 1
gbicTemp001	GBIC Temperature 1
gbicRXP001	GBIC RX power 1
gbicTXP001	GBIC TX power 1
gbicCrnt001	GBIC Current 1
eportCRCs007	E_Port Invalid CRCs 7
eportLink007	E_Port Link Failures 7
eportProtoErr007	E_Port Protocol Errors 7
eportRXPerf007	E_Port RX Performance 7

Table 47. swFwName Threshold Names (continued)

eportSignal007	E_Port Loss of Signal 7
eportState007	E_Port State Changes 7
eportSync007	E_Port Loss of Sync 7
eportTXPerf007	E_Port TX Performance 7
eportWords007	E_Port Invalid Words 7
fabricDI000	Fabric Domain ID
fabricED000	Fabric E_Port Down
fabricFL000	Fabric Fabric Login
fabricFQ000	Fabric Fabric<->QL
fabricFR000	Fabric Reconfigure
fabricGS000	Fabric GBIC Change 0
fabricSC000	Fabric Segmentation
fabricZC000	Fabric Zoning Change
fcuportCRCs013	FCU Port Invalid CRCs 13
fcuportLink013	FCU Port Link Failures 13
fcuportProtoErr0	FCU Port Protocol Errors 13
fcuportRXPerf013	FCU Port RX Performance 13
fcuportSignal013	FCU Port Loss of Signal 13
fcuportState013	FCU Port State Changes 13
fcuportSync013	FCU Port Loss of Sync 13
fcuportTXPerf013	FCU Port TX Performance 13
fcuportWords013	FCU Port Invalid Words 13
portCRCs000	Port Invalid CRCs 0
portLink000	Port Link Failures 0
portProtoErr000	Port Protocol Errors 0
portRXPerf000	Port RX Performance 0

Table 47. *swFwName Threshold Names (continued)*

portSignal000	Port Loss of Signal 0
portState000	Port State Changes 0
portSync000	Port Loss of Sync 0
portTXPerf000	Port TX Performance 0
portWords000	Port Invalid Words 0
foportCRCs013	FOP Port Invalid CRCs 13
foportLink013	FOP Port Link Failures 13
foportProtoErr0	FOP Port Protocol Errors 13
foportRXPerf013	FOP Port RX Performance 13
foportSignal013	FOP Port Loss of Signal 13
foportState013	FOP Port State Changes 13
foportSync013	FOP Port Loss of Sync 13
foportTXPerf013	FOP Port TX Performance 13
foportWords013	FOP Port Invalid Words 13

swFwLabel [swFwThresholdTable]

Syntax Display String of size 0 to 32

Access Read-only

Status Mandatory

Description Label of the threshold.

Note See [Table 47](#) for swFwName threshold names.

swFwCurVal [swFwThresholdTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Current counter of the threshold.

swFwLastEvent [swFwThresholdTable]

Syntax SwFwEvent

Access Read-only

Status Mandatory

Description Last event type of the threshold.

swFwLastEventVal [swFwThresholdTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Last event value of the threshold.

swFwLastEventTime [swFwThresholdTable]

Syntax Display String of size 0 to 32

Access Read-only

Status Mandatory

Description Last event time of the threshold.

Note This value is in the same format as in swCurrentDate.

swFwLastState [swFwThresholdTable]

Syntax SwFwState

Access Read-only

Status Mandatory

Description Last event state of the threshold.

swFwBehaviorType [swFwThresholdTable]

Syntax SwFwBehavior

Access Read-write

Status Mandatory

Description A behavior of which the thresholds generate events.

swFwBehaviorInt [swFwThresholdTable]

Syntax Integer

Access Read-write

Status Mandatory

Description An integer of which the thresholds generate continuous events.

End Device RIs Table

swEndDeviceRIsTable

Syntax Sequence of SwEndDeviceRIsEntry

Access Not accessible

Status Mandatory

Description The table of rIs of individual end devices.

swEndDeviceRIsEntry [swEndDeviceRIsTable]

Syntax SwEndDeviceRIsEntry

Access Not accessible

Status Mandatory

Description An entry of an individual end devices rIs.

Index swEndDevicePort, swEndDeviceAlpa

Table 48. SwEndDeviceRIsEntry Objects and Object Types

SwEndDeviceRIsEntry Objects	See Page	Object Types
swEndDevicePort	338	Integer
swEndDeviceAlpa	338	Integer
swEndDeviceLinkFailure	338	Integer
swEndDeviceSyncLoss	339	Integer
swEndDeviceSigLoss	339	Integer
swEndDeviceProtoErr	339	Integer
swEndDeviceInvalidWord	340	Integer
swEndDeviceInvalidCRC	340	Integer

Note Because switches start with port 0, the SNMP port number should be physical port number + 1. In turn, that means that SNMP port 3 translates to port 2.

swEndDevicePort [swEndDeviceRIsTable]

Syntax Integer

Access Not accessible

Status Mandatory

Description This object represents the port of the local switch to which the end device is connected.

swEndDeviceAlpa [swEndDeviceRIsTable]

Syntax Integer

Access Not accessible

Status Mandatory

Description This object represents the AL_PA of the end device. The SNMP AL_PA number should be the logical AL_PA number + 1. For example, SNMP AL_PA number 0xf0 translates to 0xef.

swEndDevicePortID [swEndDeviceRIsTable]

Syntax Octet String of size 4

Access Read-only

Status Mandatory

Description The fibre channel port address ID of the entry.

swEndDeviceLinkFailure [swEndDeviceRIsTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Link failure count for the end device.

swEndDeviceSyncLoss [swEndDeviceRIsTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Synchronization loss count for the end device.

swEndDeviceSigLoss [swEndDeviceRIsTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Signal loss count for the end device.

swEndDeviceProtoErr [swEndDeviceRIsTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Protocol error count for the end device.

swEndDeviceInvalidWord [swEndDeviceRIsTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Invalid word count for the end device.

swEndDeviceInvalidCRC [swEndDeviceRIsTable]

Syntax Integer

Access Read-only

Status Mandatory

Description Invalid CRC count for the end device.

sw Trap Types

This section contains information that is specific to sw trap types, and includes the following subsections:

- [“sw Traps” on page 341](#)
- [“Traps for Fabric Watch Subsystems” on page 343](#)
- [“Traps for Track Changes Subsystems” on page 344](#)

sw Traps

swFault

Enterprise sw

Variables swDiagResult

Description A 1 (swFault) is generated whenever the diagnostics detect a fault with the switch.

#TYPE	Switch is faulty.
#SUMMARY	Faulty reason: %d
#ARGUMENTS	0
#SEVERITY	Critical
#TIMEINDEX	1
#STATE	Non-operational

swSensorScn (Obsoleted by swFabricWatchTrap)

Enterprise sw

Variables swSensorStatus, swSensorIndex, swSensorType, swSensorValue, swSensorInfo

Description A 2 (swSensorScn) is generated whenever an environment sensor changes its operational state. For example, a fan stops working. The VarBind in the Trap Data Unit contains the corresponding instance of the sensor status, sensor index, sensor type, sensor value (reading), and sensor information.

Note that the sensor information contains the type of sensor and its number in textual format.

#TYPE	A sensor (temperature, fan, or other) changed its operational state.
#SUMMARY	%s: is currently in state %d
#ARGUMENTS	4, 0
#SEVERITY	Informational
#TIMEINDEX	1
#STATE	Operational

swFCPortScn

Enterprise sw

Variables swFCPortOpStatus, swFCPortIndex

Description A 3 (swFCPortScn) is generated whenever an FC_Port changes its operational state. For example, the FC_Port goes from online to offline. The VarBind in the Trap Data Unit contains the corresponding instance of the FC_Ports operational status and index.

#TYPE	A fibre channel Port changed its operational state.
#SUMMARY	Port Index %d changed state to %d
#ARGUMENTS	1, 0
#SEVERITY	Informational
#TIMEINDEX	1
#STATE	Operational

swEventTrap

Enterprise sw

Variables swEventIndex, swEventTimeInfo, swEventLevel, swEventRepeatCount, swEventDescr

Description This trap is generated when an event level is at or below swEventTrapLevel.

#TYPE	A firmware event has been logged.
#SUMMARY	Event %d: %s (severity level %d) - %s
#ARGUMENTS	0, 1, 2, 4
#SEVERITY	Informational
#TIMEINDEX	1
#STATE	Operational

Traps for Fabric Watch Subsystems

swFabricWatchTrap

Enterprise sw

Variables swFwClassAreaIndex, on [page 319](#)

swFwThresholdIndex, on [page 330](#)

swFwName, on [page 332](#)

swFwLabel, on [page 334](#)

swFwLastEvent, on [page 335](#)

swFwLastEventVal, on [page 335](#)

swFwLastEventTime, on [page 335](#)

swFwLastState, on [page 336](#)

Description Trap to be sent by Fabric Watch to notify of an event.

#TYPE	Fabric Watch has generated an event.
#SUMMARY	Threshold %s Class/Area %d at index %d has generated event %d with %d on %s.This event is %d
#ARGUMENTS	2, 0, 1, 6, 4, 5, 7
#SEVERITY	Warning
#TIMEINDEX	1
#STATE	Operational

Traps for Track Changes Subsystems

swTrackChangesTrap

Enterprise sw

Variables swTrackChangesInfo

Description Trap to be sent for tracking logins/logouts/ and configuration changes.

#TYPE	Track changes has generated a trap.
#SUMMARY	%s
#ARGUMENTS	0
#SEVERITY	Informational
#TIMEINDEX	1
#STATE	Operational

MIB FUNCTIONAL GROUPINGS

Overview

This appendix provides a function-based listing of MIB objects. For information about the correlation of various objects to a particular function.

Switch Variables

MIB variables that assist in monitoring or modifying the status or state of switches are in the following tables or group:

- “Connectivity Unit Table” on page 107
- “Connectivity Unit Table of Revisions for Hardware/Software Elements” on page 125
- “fc Fabric Element Module Table” on page 197
- “Flash Administration” on page 270

Sensor Variables

MIB variables that assist in monitoring or modifying the status or state of fans, power supply, and temperature are in the following tables:

- “Connectivity Unit Sensor Table” on page 127
- “Operating Environment Sensor Table (Temperature, Fan, Power Supply, and Others)” on page 274

Port Variables

MIB variables that assist in monitoring or modifying ports are in the following tables or group:

Variables for State and Status

- “Connectivity Unit Port Table” on page 133
- “FxPort Configuration Table” on page 201
- “FxPort Operation Table” on page 210
- “FxPort Physical Level Table” on page 214
- “Fx Port Capability Table” on page 243
- “Fibre Channel Port Group” on page 291

Variables for Statistics and Measurement

- “Connectivity Unit Port Statistics Fabric Table” on page 171
- “FxPort Error Table” on page 225
- “Class 2 Accounting Table” on page 236
- “Class 3 Accounting Table” on page 240

Event Variables

MIB variables that assist in monitoring or modifying events are in the following table or group:

- “Connectivity Unit Event Table” on page 149
- “Event Group (To Map the errLog)” on page 312

ISL and End Device Variables

MIB variables that assist in monitoring or modifying ISL and end-devices are in the following tables or groups:

ISL Variables

- “Connectivity Unit Link Table” on page 155
- “Fabric Group” on page 280

End Device Variables

- “Connectivity Unit Link Table” on page 155
- “FxpPort Fabric Login Table” on page 218
- “Name Server Database Group” on page 306

SNMP Configuration Variables

MIB variables that assist in configuring SNMP are in the following tables or group:

- “SNMP Trap Registration Table” on page 164
- “SW Agent Configuration Group” on page 288
- “Connectivity Unit Link Table” on page 155
- “Connectivity Unit Link Table” on page 155

8b/10b encoding	Encoding scheme that converts each 8-bit data byte into a 10-bit transmission character. Used to balance ones and zeros in high speed transports.
Address identifier	Value used to identify source or destination of a frame.
AL_PA	Arbitrated Loop Physical Address. Unique 8-bit value assigned during loop initialization to each port in an arbitrated loop.
Alias address identifier	An address identifier recognized by a port in addition to its standard identifier. An alias address identifier can be shared by multiple ports.
Alias AL_PA	An AL_PA value recognized by an L_Port in addition to the AL_PA assigned to the port. See also AL_PA.
Alias server	Fabric software facility that supports multicast group management.
ANSI	American National Standards Institute. Governing body for fibre channel standards in the U.S.A.
API	Application Programming Interface. Defined protocol that allows applications to interface with a set of services.
Arbitrated loop	A fibre channel transport structured as a loop. Allows communication between ports without using a switch. Requires successful arbitration by a port before a circuit is established. Supports up to 126 devices and 1 fabric attachment.
Arbitrating state	The state in which a port has become the loop master. This state is only available from the open state.
ASIC	Application-Specific Integrated Circuit.

ATM	Asynchronous Transfer Mode. Transport for transmitting data over LANs or WANs that transmit fixed-length units of data. Provides any-to-any connectivity and allows nodes to transmit simultaneously.
AW_TOV	Arbitration Wait Timeout Value. The minimum time an arbitrating L_Port waits for a response before beginning loop initialization.
Bandwidth	The total transmission capacity of a link, cable, or system.
BB_Credit	Buffer-to-buffer credit. The number of frames that can be transmitted to a directly connected recipient or within an arbitrated loop. Determined by number of available receive buffers. See also Buffer-to-buffer flow control, EE_Credit.
Beginning running disparity	The disparity at the transmitter or receiver when the special character associated with an ordered set is encoded or decoded. See also Disparity.
BER	Bit Error Rate. Rate at which bits are expected to be received in error. Expressed as ratio of error bits to total bits transmitted. See also Error.
Bit synchronization	The delivery of correctly clocked bits at the required BER. See also BER.
Block	As applied to fibre channel, upper-level application data that is transferred in a single sequence.
Broadcast	Transmission of data from a single source to all devices in fabric, regardless of zoning. See also Multicast, Unicast.
Buffer-to-buffer flow control	Management of frame transmission rate between directly-connected ports or within an arbitrated loop. See also BB_Credit.
Cascade	Two or more interconnected fibre channel switches.
Circuit	Established communication path between ports. Consists of two virtual circuits that transmit in opposite directions. See also Link.
Class 1	A connection-oriented service that provides a dedicated connection between two ports, with notification of delivery or nondelivery.
Class 2	A multiplex and connectionless frame switching service between two ports, with notification of delivery or nondelivery.

Class 3	A connectionless frame switching service between two ports, without notification of delivery or nondelivery. Can also be used to provide a multicast connection between originator and recipients, with notification of delivery or nondelivery.
Class 4	Connection-oriented service that provides a virtual circuit between two ports, including notification of delivery or non-delivery. Allows fractional parts of the bandwidth to be used in a virtual circuit.
Class 6	Connection-oriented service that provides a multicast connection between the multicast originator and recipients, including notification of delivery or nondelivery.
Class F	A connectionless service for control traffic between switches, with notification of delivery or nondelivery between the E_Ports.
Classes of service	A set of specific delivery characteristics and attributes for frame delivery.
CLS	Close Primitive Signal. The protocol used by a port in an arbitrated loop to close a circuit.
Code balance	The ratio of one bit to the total number of transmitted bits
Comma	Unique pattern (either 1100000 or 0011111) used in 8b/10b encoding to specify character alignment within a data stream. See also K28.5.
Community (SNMP)	Relationship between a group of SNMP managers and an SNMP agent, in which authentication, access control, and proxy characteristics are defined.
Connection initiator	A port that has originated a Class 1 dedicated connection and received a response from the recipient.
Connection recipient	A port that has received a Class 1 dedicated connection request and transmitted a response to the originator.
CRC	Cyclic Redundancy Check. A check for transmission errors; included in every data frame.
Credit	As applies to fibre channel, the number of receive buffers available for transmission of frames between ports. See also BB_Credit and EE_Credit.
CT_HDR	Common Transport Header. A header that conforms to the Fibre Channel Common Transport (FC_CT) protocol.

CT_IU	Common Transport Information Unit. An information unit that conforms to the Fibre Channel Common Transport (FC_CT) protocol.
Current fill word	The fill word currently selected by the LPSM (loop port state machine). See also Fill word.
Cut-through	Switching technique that allows selection of a transmission route for a frame as soon as destination address is received. See also Route.
Data word	Type of transmission word that occurs within frames. The frame header, data field, and CRC consist of data words. See also Frame, Ordered set, Transmission word.
Defined configuration	The complete set of all zone objects defined in the fabric; can include multiple zone configurations. See also Enabled configuration, Zone configuration.
Disparity	The relationship of ones and zeros in an encoded character. Neutral disparity indicates an equal number of each, positive disparity a majority of ones, and negative disparity a majority of zeros.
Distributed Fabrics	The combined user's guides for Extended Fabrics and Remote Switch. Not a software product.
DLS	Dynamic Load Sharing. Dynamic distribution of traffic over available paths. Allows for redistribution when an Fx_Port or E_Port comes up or down.
Domain ID	A unique number between 1 and 239 that identifies the switch to the fabric.
E_D_TOV	Error Detect Timeout Value. Time allowed for round-trip transmission before recovery is initiated. Can also be defined as the minimum time an L_Port waits for sequence completion before initiating recovery. See also R_A_TOV.
E_Port	Expansion Port. A switch port that has the ability to connect to a similar port on another switch, allowing creation of an interswitch link. See also ISL.
EE_Credit	End-to-end credit. The number of receive buffers allocated by recipient port to originating port. Used by Class 1 and 2 services to manage exchange of frames across intervening ports in fabric. See also End-to-end flow control, BB_Credit.
Enabled configuration	The currently enabled zone configuration. Only one configuration can be enabled at a time. See also Defined configuration, Zone configuration.

End-to-end flow control	Governs flow of Class 1 and 2 frames between N_Ports. See also Buffer-to-buffer flow control, EE_Credit.
Error	As applies to fibre channel, a missing or corrupted frame, time-out, loss of synchronization, or loss of signal. See also Loop failure.
Exchange	As applies to fibre channel, a communication session between N_Ports involving the transmission of one or more related sequences, in one or both directions. See also Sequence.
Extended Fabrics	Product that allows interconnection of fibre channel fabric over distances of up to 100 km.
F_Port	Fabric Port. A port that can transmit using fabric protocol and can interface over links. Can be used to connect N_Ports to a switch. See also FL_Port, Fx_Port.
Fabric	A fibre channel network of two or more switches. Also called a “switched fabric.” See also SAN, Cascade.
Fabric name	Unique 64-bit identifier assigned to each separate fabric. Communicated during login and port discovery.
Fabric OS	Proprietary operating system on switches.
Fabric Watch	Product that allows monitoring and configuration of fabric and switch elements.
FC-AL-3	The Fibre Channel Arbitrated Loop standard. Defined on top of FC-PH standards.
FC-FLA	The Fibre Channel Fabric Loop Attach standard.
FCP	Fibre Channel Protocol. Mapping of protocols onto fibre channel standard protocols. For example, SCSI FCP maps SCSI-3 onto fibre channel.
FC-PH-1, 2, 3	The Fibre Channel Physical and Signaling Interface standards.
FC-PI	The Fibre Channel Physical Interface standard.
FC-PLDA	The Fibre Channel Private Loop Direct Attach standard. Applies to operation of peripheral devices on private loops.

FC-SW-2	The Fibre Channel Switch Fabric standard, second generation. Specifies tools and algorithms for interconnection and initialization of fibre channel switches.
Fibre channel transport	Protocol service that supports communication between fibre channel service providers. See also <i>FSP</i> .
FIFO	First In, First Out. May refer to a data buffer that follows the first in, first out rule.
Fill word	A word transmitted to keep a fibre active. Either an idle or ARB ordered set.
FL_Port	Fabric Loop Port. A port that can transmit under both fabric protocol and loop protocol. Can be used to connect NL_Ports to a switch. See also F_Port, Fx_Port.
FLOGI	Fabric Login. Process by which a node makes a logical connection to fabric. Used by ports to determine if fabric is present, and if fabric is present, to exchange service parameters with it. See also PLOGI.
Frame	Fibre channel structure used to transmit data. Consists of start-of-frame delimiter, header, any optional headers, data payload, cyclic redundancy check (CRC), and end-of-frame delimiter. There are two types: data frames and link control frames. Similar to the networking concept “packet.” See also Sequence, Data word.
FRU	Field Replaceable Unit. A component that can be replaced on site.
FS	Fibre Channel Service. A service that is defined by fibre channel standards and exists at a well-known address. For example, name server is a fibre channel service. See also <i>FSP</i> .
FS_ACC	Fibre Channel Services Accept. The information unit used to indicate acceptance of a request for a fibre channel service.
FS_IU	Fibre Channel Services Information Unit. An information unit that has been defined by a specific fibre channel service.
FS_REQ	Fibre Channel Services Request. A request for a fibre channel services function, or notification of a fabric condition or event.
FS_RJT	Fibre Channel Services Reject. An indication that a request for fibre channel services could not be processed.

FSP	Fibre Channel Service Protocol. The common protocol used for all fabric services, transparent to fabric type or topology. See also FS.
FSPF	Fabric Shortest Path First. Routing protocol for fibre channel switches.
Full-duplex	Mode of communication that allows a port to simultaneously transmit and receive frames. See also Half-duplex.
Fx_Port	Fabric port that can operate either as F_Port or FL_Port. See also F_Port, FL_Port.
G_Port	Generic Port. Port that can operate either as E_Port or F_Port. Ports are defined as G_Ports when disconnected or have not assumed specific function within fabric.
Gateway	IP address assignment that provides translation for incompatible networks. For example, ATM gateway can connect a fibre channel link to an ATM connection.
GBIC	Gigabit Interface Converter. Removable serial transceiver module that allows gigabit physical-layer transport for fibre channel.
Gbps	Gigabits (1,062,500,000 bits) per second.
GBps	Gigabytes (1,062,500,000 bytes) per second.
Half-duplex	Mode of communication that allows a port to either transmit or receive frames, but not both simultaneously. The only exception is link control frames, which can be transmitted at any time. See also Full-duplex.
Hard address	The AL_PA that an NL_Port attempts to acquire during loop initialization.
Hardware translative mode	A method for achieving address translation. The following two hardware translative modes are available to a QuickLoop enabled switch: <ul style="list-style-type: none"> • Standard Translative Mode: Allows public devices to communicate with private devices that are directly connected to the fabric. • QuickLoop Mode: Allows initiator devices to communicate with private or public devices that are not in the same loop.
HBA	Host Bus Adapter. Interface card between a server or workstation bus and the fibre channel network. Similar to a network interface card.

Hub	Fibre channel wiring concentrator that collapses loop topology into physical star topology. Nodes are automatically added when active and removed when inactive.
Idle	Continuous transmission of an ordered set when no data is being transmitted to maintain an active fibre channel link and synchronization. See also Fill word.
IN_ID	Initial Identifier. The field in the CT_HDR that displays the port ID of the client originator of a fibre channel services request.
Initiator	Server or workstation that initiates communications with storage devices over a fibre channel network. See also Target.
IOD	In Order Delivery. A parameter that, when set, guarantees that frames are delivered in order if possible, otherwise, frames are dropped.
IPA	Initial process associator. An identifier associated with a process at an N_Port.
ISL	Interswitch Link. Fibre channel link from the E_Port of one switch to E_Port of another.
Isolated E_Port	A port that is online but not operational between switches due to overlapping domain ID or nonidentical parameters such as E_D_TOVs.
IU	Information Unit. An individual set of information as defined by higher-level process protocol definition, or upper-level protocol mapping.
JBOD	Just a Bunch Of Disks. A number of disks connected in a single chassis to one or more controllers. See also RAID.
K28.5	Special 10-bit character used to indicate beginning of transmission words that perform fibre channel control and signaling functions. First seven bits are comma pattern. See also Comma.
L_Port	Loop Port. Node or fabric port that can use loop protocol or fabric protocol. See also Nonparticipating mode, Participating mode.
Latency	Time required to transmit a frame, from the time sent until time of arrival.
Link	As applies to fibre channel, a physical connection between two ports, consisting of both transmit and receive fibres. See also Circuit.

Link services	Protocol for link-related actions.
LIP	Loop Initialization Primitive. The signal used to begin initialization in a loop. Indicates either loop failure or resetting of a node. See also Loop initialization.
LIS_HOLD_TIME	The maximum period of time for a node to forward a loop initialization sequence.
LM_TOV	Loop Master Timeout Value. The minimum time that the loop master waits for a loop initialization sequence to return.
Login BB_Credit	The number of receive buffers a receiving L_Port has available when a circuit is first established. Communicated through PLOGI, PDISC link services, or FLOGI.
Loop circuit	A temporary bidirectional communication path established between L_Ports.
Loop failure	Loss of signal within a loop for any period of time, or loss of synchronization for longer than the timeout value. See also E_D_TOV.
Loop initialization	Logical procedure used by L_Ports to discover environment. Can be used to assign AL_PA addresses, detect loop failure, or reset a node. See also LIP.
Loop_ID	Hex value representing 1 of 127 possible AL_PA values in a loop.
Looplet	Set of devices connected in a loop to a port that is part of another loop.
LPSM	Loop Port State Machine. Logical entity that performs arbitrated loop protocols and defines behavior of L_Ports when they require access to an arbitrated loop.
LWL	Long wavelength fibre optic cable. Based on 1300-nm lasers supporting 1.0625-Gbps link speeds. Connectors are color-coded blue. See also SWL.
MIB	Management Information Base. SNMP structure that provides configuration and device information to assist with device management.
Monitoring state	The state in which a port is monitoring the flow of information for data relevant to the port.
Multicast	Transmission of data from a single source to a number of specified N_Ports. See also Broadcast, Unicast.

Multimode	Fibre-optic cabling specification allowing up to 500 m between devices.
N_Port	Node Port. Port that can attach to a fibre channel port. See also NL_Port, Nx_Port.
NAA	Network Address Authority. An identifier that indicates the format of a network address.
Name server	Service of storing names, addresses, and attributes for up to 15 minutes, provided by a switch to other entities in fabric. Defined by fibre channel standards, and existing at a well-known address. Also called Simple Name Server, SNS, or directory service. See also FS.
NL_Port	Node Loop Port. An N_Port that can use loop protocol. See also N_Port, Nx_Port.
Node	Fibre channel entity with one or more N_Ports or NL_Ports.
Node name	Unique identifier for a node, communicated during login and port discovery.
Nonparticipating mode	Mode in which L_Port is inactive in loop and cannot arbitrate or send frames, but can retransmit received transmissions. Port enters mode if there are more than 127 devices in loop, and an AL_PA cannot be acquired. See also Participating mode.
Nx_Port	Node port that can operate as either an N_Port or NL_Port.
Open originator	The L_Port that wins arbitration in an arbitrated loop and sends an OPN ordered set to the destination port, then enters the open state.
Open recipient	The L_Port that receives the OPN ordered set from the open originator, and then enters the open state.
Open state	The state in which a port can establish a circuit with another port. A port must be in the open state before it can arbitrate.
OPN	Open Primitive Signal. The protocol used by a port that has won arbitration in an arbitrated loop to establish a circuit.
Ordered set	A type of transmission word that occurs outside of frames, and is used to manage frame transport and differentiate fibre channel control information from data. See also Data word, Transmission word.

Participating mode	Mode in which an L_Port in a loop has valid AL_PA and can arbitrate, send frames, and retransmit received transmissions. See also Nonparticipating mode.
Path selection	The selection of a transmission path through the fabric. Switches use the FSPF protocol.
Phantom device	Device not physically in a loop but logically included by phantom address.
Phantom address	AL_PA value assigned to device not physically in loop. Also called phantom AL_PA.
PLOGI	Port Login. Port-to-port login process by which initiators establish sessions with targets. See also FLOGI.
Point-to-point	Two fibre channel devices connected by a direct link. See also Topology.
Port_Name	Unique FC identifier for port, communicated during login and port discovery.
POST	Power On Self Test. Series of self-tests run after a switch is rebooted or reset.
Private NL_Port	NL_Port that does not log into the fabric, and communicates only with private NL_Ports in same loop.
Private device	Device that supports arbitrated loop protocol and understands 8-bit addresses, but cannot log into fabric.
Private loop	An arbitrated loop with no fibre channel attachment.
Protocol	A defined method and standards for communication.
Public NL_Port	NL_Port that logs into the fabric, can function within public or private loops, and can communicate with public or private NL_Ports.
Public device	Device that supports arbitrated loop protocol, understands 8-bit addresses, and can log into fabric.
Public loop	An arbitrated loop attached to a switch.
QuickLoop	Can indicate either the product that allows private devices within loops to communicate over the fabric with other devices, or the set of actual devices or looplets connected in a loop by QuickLoop technology.

R_A_TOV	Resource Allocation Timeout Value. Maximum time a frame can be delayed in the fabric and still be delivered. See also E_D_TOV.
RAID	Redundant Array of Independent Disks. Collection of disk drives that appear as a single volume to the server, and are fault-tolerant through mirroring or parity checking. See also JBOD.
Remote switch	Product that enables two switches to connect over an ATM connection. Requires compatible fibre channel-to-ATM gateways. Can be up to 10 km distance between each switch and respective gateway.
Request rate	The rate at which requests arrive at a servicing entity. See also Service Rate.
Route	As applies to fabric, a communication path between two switches. See also FSPF.
RR_TOV	Resource Recovery Timeout Value. The minimum time a target device in a private loop must wait after a LIP before logging out a SCSI initiator. See also E_D_TOV, R_A_TOV.
RSCN	Registered State Change Notification. Switch function that sends notification of fabric changes from the switch to specified nodes.
SAN	Storage Area Network. Network of systems and storage devices that usually communicate using fibre channel protocols. See also Fabric.
Sequence	A fibre channel structure containing one or more frames transmitted in a unidirectional manner between N_Ports. See also Exchange, Frame.
Service rate	The rate at which an entity can service requests. See also Request Rate.
SI	Sequence Initiative.
Single mode	Fibre-optic cabling standard that provides for distances of up to 10 km between devices.
SNMP	Simple Network Management Protocol. Internet management protocol that does not rely on underlying communication protocols and can therefore be made available over other protocols, such as UDP/IP. See also Community (SNMP).
SNMPv1	The original standard for SNMP, now labeled v1.
SNS	Simple Name Server. See Name server.

Switch	A combination of hardware and firmware that routes frames according to fibre channel protocol. Switches can have G_Ports, E_Ports, F_Ports, and FL_Ports.
Switch Domain_ID	Unique identifier for a switch, used in routing frames. Usually automatically assigned by the switch, but can be manually assigned by administrator.
Switch name	Arbitrary name assigned to switch by administrator. See also Switch Domain_ID.
Switch port	Port on a switch. Switch ports can be E_Ports, F_Ports, or FL_Ports.
SWL	Short wavelength fiber-optic cable. Based on 850-nm lasers supporting 1.0625-Gbps link speeds. Connectors are color-coded black. See also LWL.
Target	Storage device that receives communications from a server or workstation over a fibre channel network. See also Initiator.
Tenancy	The time from when a port wins arbitration in a loop until the same port returns to the monitoring state. Also referred to as loop tenancy.
Throughput	The rate of data flow achieved within a cable, link, or system. See also Bandwidth.
Topology	As applies to fibre channel, the structure of the fibre channel network and the resulting possible communication paths. There are three fibre channel topologies: point-to-point, fabric, and arbitrated loop.
Transfer state	A state in which a port can establish circuits with multiple ports without re-entering the arbitration cycle for each circuit. This state can only be accessed by an L_Port in the open state.
Translative mode	Mode in which public devices can communicate with private devices across fabric.
Transmission character	A 10-bit character encoded according to the rules of the 8b/10b algorithm. See also 8b/10b encoding, Transmission word.
Transmission word	Group of 4 transmission characters, totaling 40 bits. Two types: data words and ordered sets. See also Data word, Ordered set, Transmission character.
Trap (SNMP)	Message sent by SNMP agent to inform SNMP management station of critical error. See also SNMP.

Tunneling	Technique for enabling source and destination hosts to communicate when on same type of network, but connected by a different type of network.
U_Port	Universal Port. Switch port that can operate as G_Port, E_Port, F_Port, or FL_Port. A port is defined as a U_Port if not connected, or if it has not assumed a specific function in the fabric.
UDP	User Datagram Protocol. A protocol that runs on top of IP and provides port multiplexing for higher layer protocols.
ULP	Upper Layer Protocol. Protocol that runs on top of fibre channel. Typical upper layer protocols: SCSI, IP, HIPPI, IPI.
ULP_TOV	Upper Level Timeout Value. The minimum time that a SCSI ULP process waits for SCSI status before initiating ULP recovery.
Unicast	Transmission of data from a single source to single destination. See also Broadcast, Multicast.
Web Tools	Product that provides a graphical interface for monitoring and managing individual switches or entire fabrics from standard workstations.
Well-known address	As applies to fibre channel, a logical address stored on the switch and defined by fibre channel standards as being assigned to a specific function.
WWN	Worldwide Name. Identifier that is unique world-wide. Each entity in a fabric has a separate WWN.
Xmitted close state	The state in which an L_Port cannot send messages, but can retransmit messages within the loop. A port in the Xmitted Close state cannot attempt to arbitrate.
Zone	Set of hosts and devices attached to same fabric and having access permission, including RSCNs and user data, to each other. Entities inside a zone are not visible to entities outside the same zone, even if the outside entities are in another zone.
Zone configuration	A specified set of zones. Enabling a zone configuration enables all zones in that configuration. See also Defined configuration, Enabled configuration.
Zoning	Product that allows partitioning of fabric into logical groupings of devices. See also Zone.