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This user guide provides information to help you:
• Create an implementation plan based on supported configurations
• Install the IP Distance Gateway (mpx110)
• Configure the mpx110
• Manage the mpx110
• Upgrade mpx110 firmware
• Diagnose and troubleshoot error conditions
• Configure FCIP Routes

“About this Guide” topics include:
• Overview, page 11
• Conventions, page 12
• HP technical support, page 13
• Subscription service, page 13
• Other HP web sites, page 14

Overview
Overview topics include:
• Intended audience, page 11
• Related documentation, page 12

Intended audience
This guide is intended for system administrators responsible for installing, managing, and servicing the mpx110 and the storage area network (SAN) to which it is attached.
Related documentation

The following documents provide related information:

- HP StorageWorks Command View EVA user guide
- HP StorageWorks Continuous Access EVA administrator guide
- HP StorageWorks Continuous Access EVA planning guide
- HP StorageWorks EVA software compatibility reference
- HP StorageWorks Interactive Help for Command View EVA
- HP StorageWorks SAN design reference guide
- HP StorageWorks 4000/6000/8000 Enterprise Virtual Array user guide
- HP StorageWorks Enterprise Virtual Array 3000/5000 user guide
- HP StorageWorks Replication Solutions Manager installation guide

Conventions

Conventions consist of the following:

- Format
- Notes and symbol usage

Document conventions and symbols

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<th>Element</th>
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<td>Cross-reference links and e-mail addresses</td>
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<td>Web site addresses</td>
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| **Bold** text                  | • Keys that are pressed
|                                 | • Text typed into a GUI element, such as a box
|                                 | • GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes |
| *Italic* text                  | Text emphasis                                                           |
| **Monospace** text             | • File and directory names
|                                 | • System output                                                         |
|                                 | • Code                                                                  |
|                                 | • Commands, their arguments, and argument values                       |
| **Monospace, italic** text     | • Code variables                                                        |
|                                 | • Command variables                                                    |
| **Monospace, bold** text       | Emphasized monospace text                                               |

⚠️ **WARNING!**

Indicates that failure to follow directions could result in bodily harm or death.

⚠️ **CAUTION:**

Indicates that failure to follow directions could result in damage to equipment or data.
IMPORTANT:
Provides clarifying information or specific instructions.

NOTE:
Provides additional information.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP support web site:
http://www.hp.com/support/.

Collect the following information before calling:
• Technical support registration number (if applicable)
• Product serial numbers
• Product model names and numbers
• Error messages
• Operating system type and revision level
• Detailed questions

For continuous quality improvement, calls may be recorded or monitored.

Subscription service

HP strongly recommends that customers register online using the Subscriber’s choice web site:

Subscribing to this service provides you with e-mail updates on the latest product enhancements, newest
driver versions, and firmware documentation updates as well as instant access to numerous other product
resources.

After subscribing, locate your products by selecting Business support and then Storage under Product
Category.
Other HP web sites

For additional information, see the following HP web sites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/service_locator
- http://www.docs.hp.com
- http://www.hp.com/go/sandesignguide
1 Overview

This chapter includes the following:

• mpx110 product description, page 15
• Optional equipment, page 15
• Fibre Channel over IP (FCIP) overview, page 16
• Using FCIP to encapsulate FC packets, page 16
• Redundant FCIP network structure example, page 16

mpx110 product description

The HP StorageWorks IP Distance Gateway (referred to hereafter as the mpx110) provides Fibre Channel (FC) SAN extension over an IP network. Used in conjunction with the EVA family of storage systems and Continuous Access EVA software, the mpx110 provides long-distance remote replication for disaster tolerance.

A base FCIP configuration consists of a minimum of two mpx110 gateways, one each for the local and remote site:

HP part number AG680A: HP StorageWorks IP Distance Gateway (single mpx110, one per site required), see Figure 1.

Optional equipment

Additional equipment for hardware redundancy:

HP part number AG681A: HP StorageWorks IP Distance Gateway Upgrade (single mpx110 for redundancy, one per site required) see Figure 1 and Figure 4.

NOTE:

See Configuration rules and guidelines, page 17 for additional required and optional equipment, based on your configuration.
Fibre Channel over IP (FCIP) overview

FCIP enables connectivity between geographically dispersed FC devices over an IP network. To deploy FCIP, two mpx110 gateways are required. Each gateway is configured for FCIP and connected to a fabric. The gateways are connected to each other through an IP network (LAN/WAN), see Figure 1.

![Figure 1 FCIP overview](image1)

Local FC devices need no additional hardware or software to access remote FC devices via the mpx110 deployed for FCIP.

Using FCIP to encapsulate FC packets

With FCIP, gateways transport FC frames over an IP network. From the perspective of the local and remote fabrics the FC devices accessed through the gateways appear to be part of one unified fabric. FC traffic is carried over the IP network in such a way that the FC fabric and all FC devices on the fabric are unaware of the presence of the IP Network.

Once configured, FCIP instances on each gateway become active and establish their connectivity through the IP network. The FC devices in the local fabric access the FC devices in the remote fabric using FC frames. The FC frames are encapsulated in IP packets by the local gateway, and transmitted to the remote gateway. The remote gateway strips the IP packet data and passes only the FC frames to the remote FC devices.

The gateways deployed for FCIP are configured to use the TCP protocol. TCP protocol uses standard TCP flow control and error recovery algorithms.

Redundant FCIP network structure example

Figure 2 shows a high availability FCIP configuration, in which pairs of mpx110 gateways and two IP networks provide full redundancy. In this configuration, loss of an mpx110 or loss of connectivity through one of the IP networks can be tolerated with no loss of connectivity between the fabrics.

![Figure 2 FCIP fully redundant high availability configuration](image2)
2 Configuration rules and guidelines

This chapter includes the following:
• Supported configurations, page 17
• IP performance tuning, page 21

Supported configurations

The mpx110 supports the following configurations as illustrated in Figure 3 through Figure 6:

Figure 3 One pair of gateways, two long distance links

Figure 4 Redundant pairs of gateways, two long distance links
Configuration rules

The following sections define the configuration rules for using the mpx110 gateways for FCIP.

General

Review the following general configuration rules:

- All mpx110 configurations require a minimum of two mpx110 gateways, one local and one remote, connected through an IP network.
- The mpx110 gateway must connect to another mpx110. HP does not support FCIP connectivity between different gateway models.
- The mpx110 gateway is supported for FCIP extension with Continuous Access EVA, see EVA storage system rules and guidelines, page 19.

Operating system and multi-path support

The mpx110 gateway is supported using FCIP with all operating systems and multi-path software supported by HP for Continuous Access EVA. For additional information, see the HP StorageWorks SAN Design guide at: http://www.hp.com/go/sandesignguide.
EVA storage system rules

The EVA storage system rules follow:

- The mpx110 gateway configured for FCIP is supported for use with Continuous Access EVA XL 4000/6000/8000 using XCS 6.0xx, 5.1xx, 5.03x, 4.0xx, 3.1xx, or 3.028 and EVA GL 3000/5000 using VCS 4.0xx, 3.1xx, or 3.028.
- The mpx110 gateway is supported for use in all HP-supported Continuous Access EVA configurations, including the standard two-fabric, five-fabric, and six-fabric configurations. See the Continuous Access EVA documentation for more information.
- Continuous Access EVA supports Remote Copy Set (RCS) and non-RCS LUNs with FCIP extension.
- Supports the minimum IP bandwidth/maximum DR groups.

Table 2 defines the minimum IP bandwidth and maximum EVA DR groups for EVA XCS and VCS when using the IP distance Gateway for FCIP.

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<tbody>
<tr>
<td>Up to 36 mSec</td>
<td>Up to 36 mSec</td>
</tr>
<tr>
<td>Between 36 and 100 mSec</td>
<td>Between 36 and 100 mSec</td>
</tr>
</tbody>
</table>

- At 1 Gb/s IP bandwidth, up to 128 DR groups with VCS 3.x, 4.x, and XCS 5.03x. Up to 256 DR groups with XCS 5.1x and 6.x.

EVA storage system software

The mpx110 gateway is supported with current EVA storage software applications such as HP StorageWorks Continuous Access EVA, Command View EVA, Business Copy, SSSU, and Replication Solutions Manager.

Fibre Channel switch and firmware support

The mpx110 is supported with Fibre Channel switches as indicated in Table 3.

Table 3 Fibre Channel switch/fabric requirements

<table>
<thead>
<tr>
<th>Switch series</th>
<th>Model/Firmware level</th>
<th>Switch firmware version (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-Series</td>
<td>3.x</td>
<td>Contact your HP representative for supported switch versions.</td>
</tr>
<tr>
<td></td>
<td>5.x</td>
<td></td>
</tr>
<tr>
<td>C-Series</td>
<td>3.1x</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) At 1 Gb/s IP bandwidth, up to 128 DR groups with VCS 3.x, 4.x, and XCS 5.03x. Up to 256 DR groups with XCS 5.1x and 6.x.

**NOTE:**
The mpx110 is not supported with B-Series switches using 5.2.0x firmware.
**FC switch requirements**

As indicated in Table 3, the mpx110 is compatible with B-Series and C-Series Fibre Channel switches. The following additional FC switch requirements must be observed:

- Local and remote mpx110 gateway pairs must be connected to the same Fibre Channel switch product line series.
- The maximum distance between an mpx110 and a Fibre Channel switch is 300 meters at 2 Gb/s and 500 meters at 1 Gb/s.
- For B-Series switches with HP Continuous Access EVA, disable the exchange-based routing feature and configure the FC ports connected to an mpx110 to R_RDY mode.
- For C-Series switches with HP Continuous Access EVA, change the Fibre Channel switch default load balance setting to Src-ID/D-ID.

**IP network requirements**

HP requires the following:

- Supported network protocol is TCP/IP IPv4 Ethernet 1000 Mb/s, see Table 2 for minimum IP bandwidth requirements.
- mpx110 IP data — local and remote pairs are supported for up to 100 ms of IP network delay one-way, or 200 ms round-trip. HP requires dedicated IP bandwidth, see Continuous Access EVA with XCS 6x.
- mpx110 IP management—LAN/WAN supported.

**Table 4 Network requirements for the IP Distance Gateway (mpx110) with XCS and VCS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth¹</td>
<td>Must be dedicated to the Continuous Access storage replication function. There is no support for dynamic pacing of the gateway.</td>
</tr>
<tr>
<td>Maximum number of DR groups</td>
<td>See Table 2 for minimum supported bandwidth based on the average packet-loss ratio and one-way intersite latencies.</td>
</tr>
<tr>
<td>Maximum transmission unit (MTU) of the IP network</td>
<td>1,500 bytes</td>
</tr>
<tr>
<td>Maximum latency¹</td>
<td>100 mSec one-way or 200 mSec round-trip</td>
</tr>
<tr>
<td>Average packet-loss ratio²</td>
<td>Low-loss network: 0.0012% average over 24 hours High-loss network: 0.2% average over 24 hours; must not exceed 0.5% for more than 5 minutes in a 2-hour window</td>
</tr>
<tr>
<td>Latency jitter³</td>
<td>Must not exceed 10 mSec over 24 hours</td>
</tr>
</tbody>
</table>

¹Pre-existing restriction.
²A high packet-loss ratio indicates the need to retransmit data across the intersite link. Each retransmission delays transmissions queued behind the current packet, thus increasing the time to complete pending transactions.
³Latency jitter is the difference between the minimum and maximum values, and indicates how stable or predictable the network delay. The greater the jitter, the greater the variance in the delay, which lowers the performance predictability.
IP performance tuning

The mpx110 supports Fibre Channel service at transmission rates of 1 Gb/s or 2 Gb/s with a maximum frame size of 2148 bytes. It supports Ethernet service at transmission rates of 1000-, 100- or 10-Mbps with a MTU size of 1500 or 9000 (jumbo frames). Related performance characteristics include the following:

- Distance
- Bandwidth
- Latency
- Jumbo frames
- Compression
- TCP Window size/scaling performance tuning

Distance

Consider the physical distance between the mpx110 gateways. This is usually measured in round-trip delay. Round trip delays range anywhere from less than 1 millisecond to as great as 200 milliseconds.

Bandwidth

Bandwidth is a measure of the volume of data that can be transmitted at a given transmission rate. WAN data rates range from 1.5 megabits per second (T1) to greater than 600 megabits per second (OC-12).

The Bandwidth setting for the FCIP Route must be set to the guaranteed bandwidth of the link regardless of the physical speed of the link. See FCIP route information tab options, page 53.

Latency

Latency is the amount of time a packet takes to traverse the network from source to destination.

Jumbo frames

Jumbo frames can enhance the IP performance of the mpx110. Before enabling Jumbo Frames ensure that the entire network supports Jumbo Frame.

Compression

The mpx110 integrates a software compression options. Software compression should only be enabled for FCIP routes with a distance of greater than 50 ms RTT or less than 45 Mb/s of guaranteed bandwidth.

TCP Window size/scaling performance tuning

The mpx110 performance is maximized when properly configured. Knowing the round trip delay (distance) between mpx110 gateways and WAN effective data rate (connection type) allows the gateways to be tuned for optimal performance. The following tables provide TCP Window Scaling Factor and Window Size settings for specific WAN environments.

The mpx110 window size can be set to a maximum of 32 KB, the scaling factor is used as a multiplier. Modify the window size and scaling factor in the mpx110 gateway pairs based on the WAN round trip delay. A table is provided for each connection type.
### Table 5 T1 / DS-1: 1.554 Mbits/Sec

<table>
<thead>
<tr>
<th>Round trip delay</th>
<th>Total window size (bytes)</th>
<th>Scaling factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>64 K</td>
<td>1</td>
</tr>
<tr>
<td>100</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>25</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>1 or less</td>
<td>32 K</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 6 T3 / DS-3: 45 Mbits/Sec

<table>
<thead>
<tr>
<th>Round trip delay</th>
<th>Total window size (bytes)</th>
<th>Scaling factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>512 K</td>
<td>4</td>
</tr>
<tr>
<td>50</td>
<td>256 K</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>128 K</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>128 K</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>64–128 K</td>
<td>1 or 2</td>
</tr>
<tr>
<td>10</td>
<td>64 K</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>1 or less</td>
<td>32 K</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 7 DS-5: 400 Mbits/Sec

<table>
<thead>
<tr>
<th>Round trip delay</th>
<th>Total window size (bytes)</th>
<th>Scaling factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>512 K</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>256 K</td>
<td>3</td>
</tr>
<tr>
<td>2.5</td>
<td>128 K</td>
<td>2</td>
</tr>
<tr>
<td>1 or less</td>
<td>64 K</td>
<td>1</td>
</tr>
</tbody>
</table>
### Table 8: OC-1: 50 Mbits/Sec

<table>
<thead>
<tr>
<th>Round trip delay</th>
<th>Total window size (bytes)</th>
<th>Scaling factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>512 K</td>
<td>4</td>
</tr>
<tr>
<td>50</td>
<td>256 K</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>128 K</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>128 K</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>64–128 K</td>
<td>1 or 2</td>
</tr>
<tr>
<td>10</td>
<td>64 K</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>2.5</td>
<td>32 K</td>
<td>0</td>
</tr>
<tr>
<td>1 or less</td>
<td>32 K</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 9: OC-3: 150 Mbits/Sec

<table>
<thead>
<tr>
<th>Round trip delay</th>
<th>Total window size (bytes)</th>
<th>Scaling factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>512 K</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>512 K</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>256 K</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>256 K</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>128 K</td>
<td>2</td>
</tr>
<tr>
<td>2.5</td>
<td>64 K</td>
<td>1</td>
</tr>
<tr>
<td>1 or less</td>
<td>32 K</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 10: OC-12 and Above: 621 Mbits/Sec

<table>
<thead>
<tr>
<th>Round trip delay</th>
<th>Total window size (bytes)</th>
<th>Scaling factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>100</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>50</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>1 MB</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>512 K</td>
<td>4</td>
</tr>
<tr>
<td>2.5</td>
<td>256 K</td>
<td>3</td>
</tr>
<tr>
<td>1 or less</td>
<td>64 K</td>
<td>1</td>
</tr>
</tbody>
</table>
3 Installation and upgrades

This chapter includes the following:

- Verify mpx110 requirements, page 25
- Pre-installation checklist, page 26
- Rack mount the mpx110, page 26
- Install SFPs, page 27
- Set mpx110 management port parameters, page 30
- Cable the mpx110 Fibre Channel, GE and management ports, page 31
- Configure the mpx110 for connecting remote SANs, page 32
- Firmware upgrades, page 35
- Removal and replacement, page 37
- Diagnostics and troubleshooting, page 39

Verify mpx110 requirements

Obtain the following (one of each, unless otherwise noted) for the local and remote site:

- HP StorageWorks IP Distance Gateway (mpx110), Part Number: AG680A
- Continuous Access EVA software
- EVA4000/6000/8000 or EVA3000/5000 storage system
- FC fabrics consisting of HP B-Series or C-Series switches
- Cat 5e network cable, two per site
- Optical SFPs and FC cables, two per site

Additional optional equipment (one of each, unless otherwise noted) for the local and remote site:

- HP StorageWorks IP Distance Gateway Upgrade (mpx110 for redundancy) Part Number: AG681A
- Optical SFPs and FC cables, two per site

**NOTE:**

For the latest information about the minimum system requirements, see the HP StorageWorks IP Distance Gateway release notes at [http://www.hp.com/go/san](http://www.hp.com/go/san).
Pre-installation checklist

Before starting the configuration process, contact your System Administrator for the following mpx110 parameters:

- Symbolic Name of the mpx110
- IP address, subnet mask and gateway for the mpx110 management port (if not using DHCP)
- IP address, subnet mask & gateway for the GE1 port
- IP address of the remote mpx110 that connects to the GE1 port
- IP address, subnet mask & gateway for the GE2 port (if applicable)
- IP address of the remote mpx110 that connects to the GE2 port (if applicable)

Rack mount the mpx110

To rack mount the mpx110 (you will need one Phillips head screw driver):

⚠️ CAUTION:

If the mpx110 is mounted in a closed or multi-unit rack assembly, make sure that the operating temperature inside the rack enclosure does not exceed the maximum rated ambient temperature (70°C).

⚠️ NOTE:

The rear of the C-Shelf is the end without the knurled thumbscrews.

1. Assemble two slide brackets (right and left) on the back ends of the C-Shelf, using the four hole nut plates.
   a. Mount the C-Shelf with the open side up.
   b. The slide bracket fits along the 1U side at the back of the C-Shelf with its screw hole tab pointing outboard and its lip supporting the C-Shelf. There are a right-hand and a left-hand slide bracket.
   c. The nut plate is used outside the slide bracket with the dimpled threaded holes pointing outboard.
   d. Place two screws (10-32 Pan 0.625 XRCS) through the two holes at the back of the C-Shelf, through the slide plate slots and loosely into the front two threaded holes of the nut plate.
   e. Repeat with the opposite hand slide bracket.

2. Install the C-Shelf assembly into the rack.
   a. Locate a clear 1U area space within the rack.

⚠️ NOTE:

The 1U space in a rack includes three rail mounting holes, however the rack holes are not evenly spaced. For best installation the C-Shelf can be centered in a 1U space. The center can be located by finding a hole that is 5/8 on center from the hole immediately above and below. This is the center of a 1U mounting position. The holes two above and two below this center are only 1/2 on center from their adjacent holes.

b. At the front of the rack, in the center mounting holes, install two nuts (KEPs 10-32, 0.375AF’ CSZ EXT).

c. Carefully supporting the C-Shelf assembly, loosely thread the knurled thumbscrews through the rack into the two nuts just installed.
d. Go to the back of the rack and position a slide bracket next to the corresponding holes at the back of the rack. Slide the bracket to the rear until the threaded screw hole tabs are flush with the inside of the rack rail.

e. Insert two screws (10-32 Pan 0.325 XRCS) through the rack rail into the threaded screw hole tab and tighten loosely.

f. Repeat step e with the other side of the C-Shelf assembly.

g. Tighten all four screws (10-32 Pan 0.325 XRCS) at the rear of the C-Shelf assembly.

h. Tighten the front two knurled thumbscrews.

i. Tighten the two screws (10-32 Pan 0.625 XRCS) at each side of the back of the C-Shelf assembly.

3. Install the mpx110 into one of the two available positions in the C-Shelf:

   a. The front of the mpx110 is the end with the connections and faces the rear of the equipment rack. The mpx110 slides in from the front of the equipment rack.

   b. As the mpx110 slides in there are two tabs at the front and rear that catch and ensure that the mpx110 is firmly seated to the C-Shelf assembly. Take care to ensure that the mpx110 is engaged in all four tabs. To ensure that all four of the tabs engage, you may need to hold both the mpx110 and the C-Shelf assembly as you slide it in the last inch.

   c. Once the rear of the mpx110 is flush with the front of the C-Shelf assembly and all four clips are engaged, the bezel can be snapped on the front.

**Install SFPs**

To install SFPs:

An SFP transceiver is required for each of the FC ports that connect to a FC switch.

1. Align the SFP transceiver so that the key is oriented correctly to the port. Transceivers are keyed so that they can only be inserted one way.

2. Insert the transceiver into the port.

3. Press gently until the transceiver snaps into place.
Management

The GUI application and CLI execute on a management workstation that provides for the configuration, control, and maintenance of the mpx110. Supported platforms include Microsoft Windows, Solaris, and Linux. The GUI application is installed and executed on the workstation.

The mpx110 supports the following management interfaces:

- **mpx Manager GUI** — GUI application, which executes on a management workstation
- **CLI** — executes on the mpx110 and is accessed via telnet or the serial port, see Command line interface, page 67.
- **SNMP** — Provides mpx110 status, traps, and alerts, see Simple Network Management Protocol, page 135.

Install the management application

You can manage the mpx110 using the HP StorageWorks mpx Manager as a standalone application. The mpx Manager software is available in the HP StorageWorks IP Distance Gateway software kit. The Linux kit is provided in .tar format and the Windows kit is provided as a .zip file. The kits are available at [http://h18006.www1.hp.com/storage/networking/index.html](http://h18006.www1.hp.com/storage/networking/index.html).

Table 11 lists the requirements for the management servers running the HP StorageWorks mpx Manager.

### Table 11  mpx Manager server requirements

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td><em>Windows 2003</em></td>
</tr>
<tr>
<td></td>
<td>Linux</td>
</tr>
<tr>
<td></td>
<td>- SUSE LINUX Enterprise Server 10 (x86)</td>
</tr>
<tr>
<td></td>
<td>- SUSE LINUX Enterprise Server 9 (x86)</td>
</tr>
<tr>
<td></td>
<td>- SUSE LINUX Enterprise Server 8 (x86)</td>
</tr>
<tr>
<td></td>
<td>- Red Hat Enterprise Linux 3 Update 5 (x86)</td>
</tr>
<tr>
<td></td>
<td>- Red Hat Enterprise Linux 4 (x86)</td>
</tr>
<tr>
<td></td>
<td>- Red Hat Enterprise Linux 5 (x86)</td>
</tr>
<tr>
<td>Memory</td>
<td>256 MB or more</td>
</tr>
<tr>
<td>Disk space</td>
<td>150 MB per installation</td>
</tr>
<tr>
<td>Processor</td>
<td>500 MHz or faster</td>
</tr>
<tr>
<td>Hardware</td>
<td>CD-ROM drive, RJ-45 Ethernet port, RS-232 serial port (optional)</td>
</tr>
<tr>
<td>Internet browser</td>
<td>Microsoft® Internet Explorer® 5.0 and later</td>
</tr>
<tr>
<td></td>
<td>Netscape Navigator® 4.72 and later</td>
</tr>
<tr>
<td></td>
<td>Mozilla™ 1.02 and later</td>
</tr>
<tr>
<td></td>
<td>Safari®</td>
</tr>
<tr>
<td></td>
<td>Java 2 Runtime Environment to support web applet</td>
</tr>
</tbody>
</table>
HP StorageWorks mpx Manager for Windows

You can install HP StorageWorks mpx Manager on a Windows server. To install the HP StorageWorks mpx Manager application from the HP StorageWorks IP Distance Gateway installation file:

1. Close all programs currently running, and unzip the executable file to the system.
2. Double-click the executable to start the installation.

HP StorageWorks mpx Manager for Linux

This section describes how to install HP StorageWorks mpx Manager on a Linux server.

NOTE:
In the following procedure, replace n.n.nn and n.nnbn.nn with a file name (for example, 2.3.0.2 and 2.302).

   The .tar file contains the .bin file and a GUI install README file.
2. Unpack the file to a temporary directory. For example:
   tar -zxvf hpmpx_n.n.nn_linux_install.tar
3. Enter the following to start the install:
   ./hpmpxn.n.nnbn.nn_linux_install.bin.
   A chmod may be necessary prior to execution.
4. Follow the installation instructions on the screen and note the installation location. The default directory is /opt/Hewlett-Packard/pxManager.
Set mpx110 management port parameters

To set initial mpx110 configuration parameters:

**NOTE:**

If using telnet to initially configure the mpx110, your workstation IP address must be 10.0.0.x where x is a number other than 1, and the subnet mask is 255.0.0.0.

1. Connect the mpx110 management port to a workstation to configure the initial mpx110 parameters. You may connect the mpx110 management port to an IP switch, hub or directly to the workstation with an Ethernet crossover cable to the Management port, or use a serial cable to connect to the RS232 port.

2. Attach one end of the AC power cord to the mpx110 and the other end to the Power Distribution Unit (PDU). Verify that the mpx110’s Input power LED lights. The mpx110 runs a self-test and begins normal operation.

3. Verify that the heartbeat LED is blinking (once per second) and that the System fault LED does not light. Figure 7 shows the location of the ports and LEDs on the mpx110.

![Figure 7 mpx110 ports and LEDs](image)

**NOTE:**

See the Diagnostics and troubleshooting, page 39 for a description of the LED fault indications.
4. Telnet to the mpx110 using IP address 1.0.0.1 or use a terminal emulation program (serial cable) from your workstation as follows, see Figure 8:
   a. Type **guest** at the Login prompt.
   b. Type **password** at the Password prompt.

   ![Command Prompt](image)

   **Figure 8 Setting IP addressing via telnet**

5. Type **admin start** at the mpx110> prompt.
6. Type the default password: **config**.
7. Next, type the command **set mgmt** to set initial parameters.
8. Follow the onscreen prompts to define the following parameters (or press **Enter** to accept default parameters):
   - Mode (HP highly recommends using static address, Option 0)
   - IP address
   - Subnet mask
   - Gateway

   The management port is now configured with the appropriate IP address and network parameters.

   ________ IMPORTANT: ________

   At this point the telnet session disconnects. To restart the telnet session, use the IP address you just assigned to the management port.

---

Cable the mpx110 Fibre Channel, GE and management ports

To cable the mpx110:
1. Connect the management port cable to your Ethernet network that is accessible from the management server running the mpx Manager GUI.
2. Connect cables to GE1, GE2, FC1, and FC2 as shown in the suggested configurations in Figure 3, Figure 4, or Figure 5.
Configure the mpx110 for connecting remote fabrics

Before starting, verify SAN configuration requirements:

- At least one FC port of each mpx110 should be connected to an FC fabric.
- Use FC World Wide Port names (WWPN) based zoning.

Configure FCIP routes

**NOTE:**

Many of the FCIP Route parameters have an affect on the performance of the link. Be sure to read and understand the IP performance tuning section see IP performance tuning, page 21, before setting or modifying the FCIP Route parameters.

Use these steps to configure FCIP routes via the CLI or the mpx Manager Graphical User Interface (GUI).

**Using the CLI**

For each mpx110, configure the FCIP Route information as shown in Figure 9:

![Figure 9 Setting FCIP Route settings via the CLI](image-url)
Using the mpx Manager GUI

1. Double click the mpx110 icon on your desktop to invoke the mpx Manager GUI.

2. Click the Connect icon on the top left corner of the screen, see Figure 10.

3. Enter the mpx110 IP address and click the Connect button.

4. Select the pull down Wizard menu to run the FCIP Route Add Wizard, see Figure 11.

   a. A warning message displays. Click Yes to continue.
   b. The FC & GigE Port Selection screen displays. Select the FC/GE ports to configure. Optionally, you may enter the GE port speed and flow control parameters. Click Next to continue.
   c. The Local & Remote IP Address screen displays. Enter the local GE port IP address, subnet mask, gateway and the IP address of the remote mpx110. Click Next to continue.
d. The TCP/IP Options screen displays. Select the appropriate options for your configuration and ensure that the same options are selected on the remote port as well. Click Next to continue.

e. The FCIP Option screen displays. Select the appropriate options for your configuration and ensure that the same options are selected on the remote port as well. Click Finish to continue.

f. The Security Check screen displays. Enter the admin password (default password is config). Click OK to continue.

A message displays, indicating that the adding FCIP routes process is now complete.
Configure the Fibre Channel switches for the mpx110

This section provides HP StorageWorks Fibre Channel switch parameters.

**B-Series FC Switch parameters**

```
# iodset
# portCfgISLMode [slot/port], 1 (Set for all mpx110 switch ports)
# switchdisable
# aptpolicy 1
# switchenable
```

**C-Series FC Switch parameters**

```
MDS 1 #config
MDS 1 (config)# in-order-guarantee
MDS 1 (Config)# vsan databases
MDS 1 (config-vsan-db)# vsan x loadbalancing src-dst-id (where x = the VSAN(s) that will traverse the FCIP route)
MDS 1 (config-vsan-db)# exit
MDS 1 (Config)# exit
MDS 1 # copy run start
```

**Firmware upgrades**

Use the mpx Manager GUI or the CLI to install new firmware.

⚠️ **CAUTION:**

Installing new firmware is disruptive because the mpx110 must be rebooted to activate the new firmware. The reboot may result in incorrect data being transferred between devices connected to the mpx110. HP recommends suspending activity on the interfaces before activating the new firmware.

**Using the mpx Manager GUI to upgrade firmware**

To upgrade firmware:

1. Double-click the mpx110 in the topology display.
2. In the Firmware Upload window, click the **Select** button to browse and select the firmware file to be uploaded.
3. Click the **Start** button to begin the firmware load process. You will be shown a message warning you that the mpx110 will be reset to activate the firmware.
4. Click the **OK** to continue firmware installation or click the **Cancel** button to cancel the firmware installation.
Using the CLI to upgrade firmware

Using the CLI involves transferring the firmware image file from a workstation to the mpx110. Then issuing `image unpack` to install the new firmware image, as described in the following steps:

Password: config

mpx110 (admin) #>

```
image unpack mpx110-2_0_3_2.bin
```

The following prompt appears:

Unpack Completed. Please reboot the system for FW to take affect.

1. At the workstation prompt, use the `ftp` command to go to the location on the mpx110 where you want to transfer the firmware image. For example:

C:\fwImage>ftp 172.17.137.190
Connected to 172.17.137.190.
220 (none) FTP server (GNU inetutils 1.4.2) ready.

2. Enter your username and password. For example:

User (172.17.137.190:(none)): ftp
331 Guest login ok, type your name as password.
Password: ftp
230 Guest login ok, access restrictions apply.

3. At the ftp prompt, type `BIN` to set binary mode. For example:

```
ftp> bin
200 Type set to I.
```

4. Issue the `put` command to transfer the firmware image file from the workstation to the mpx110. For example:

```
ftp> put mpx110-2_0_3_2.bin
200 PORT command successful.
150 Opening BINARY mode data connection for mpx110-2_0_3_2.bin.
226 Transfer complete.
ftp: 4822816 bytes sent in 0.41Seconds 11878.86Kbytes/sec.
```

5. Type `quit`. The firmware image has been transferred to the mpx110.

6. Log into the mpx110 as an administrator:

```
(none) login: guest
Password: password
```

The following appears:

```
Command Line Interface (CLI)
mpx110 #> admin start
```

7. Type the following command from the gateway x stands for the firmware image name:

8. Type `reboot`.

9. Type `y` to reboot the system.
Recovery

Consider the following when developing a recovery process for the mpx110:

- Save all firmware image files (updates) in a safe place, because you may:
  - revert to a previous firmware version
  - need the firmware image when replacing an mpx110
  - need the firmware image when adding an mpx110 to your site
- Save the mpx110’s configuration (as a new file) after every configuration change, because you may:
  - revert to a previous configuration
  - configure a replacement mpx110
- Save the mpx110’s mappings (as a new file) after every mapping change, because you may:
  - revert to a previous mapping
  - map a replacement mpx110
  - duplicate the mapping on a second mpx110 (for redundancy)

Removal and replacement

Read the following sections for procedures.

Removing an mpx110

To remove an existing mpx110:

1. All I/O operations to the gateway should be quiescent at the host systems.
2. Save the mpx110 configuration data using the FRU command (see Command line interface, page 67) or Saving and restoring the mpx110 configuration, page 145).
3. Power down the mpx110.
4. Label all the cables to ensure proper connections to the mpx110.
5. Remove all the FC and Ethernet cables.
6. Remove the mpx110 from the enclosure where it is mounted.

Replacing an mpx110

To install a replacement mpx110:

The newly installed mpx110 is connected and ready for use.

1. Mount the mpx110 in the enclosure.
2. Reconnect the FC and Ethernet cables to the ports where they were previously connected.
3. Plug the mpx110 power cord in a power outlet.
4. Using a management station, configure the management port IP address. See Set mpx110 management port parameters.
5. Using a management workstation, restore the saved configuration or reconfigure mpx110 parameters. See FRU Command, page 77) or Saving and restoring the mpx110 configuration, page 145
Services

You can configure your mpx110 to suit the demands of your environment using a variety of mpx110 services. Familiarize yourself with the following mpx110 services and determine which ones you need:

- **Telnet** — manages the mpx110 over a telnet connection.
- **mpx Manager GUI** — provides out-of-band management.
- **Simple Network Management Protocol (SNMP)** — monitors the mpx110 through third-party SNMP applications.
- **Network time protocol (NTP)** — synchronizes the mpx110 and the workstation dates and times with an NTP server. NTP is disabled (not configured) by default.
- **File transfer protocol (FTP)** — transfers files rapidly between the workstation and mpx110 using FTP.

Security

Managing the mpx110 requires secure passwords. The GUI application uses a default password when connecting to an mpx110. Once connected, the GUI will prompt the operator for a password whenever a change is attempted.

The CLI requires a username and password to start. All set operations require an active **admin session**. To enter an **admin session**, the operator must enter a password.

The password can be changed by the operator.
Diagnostics and troubleshooting

Diagnostic information about the mpx110 is available through the chassis LEDs and the port LEDs, see Figure 12. Diagnostic information is also available through the mpx Manager GUI, CLI event logs and error displays. This section describes the following:

• Power-On Self-Test (POST) diagnostics
• Heartbeat LED
• Input Power LED
• System Fault LED

Figure 12 Locating LEDs

Power On Self-Test (POST) diagnostics

The mpx110 completes a series of tests as part of its power-on procedure:

• Memory
• FLASH validation
• PCI device discovery
• Management Ethernet port

Heartbeat LED (green)

The Heartbeat LED indicates the status of the internal mpx110 processor and any POST error results. Following a normal power-up, the Heartbeat LED blinks about once per second to indicate that the mpx110 passed the POST and that the internal mpx110 processor is running. See Table 12 for a description of all Heartbeat LED blink codes.

Table 12 Heartbeat LED blink patterns

<table>
<thead>
<tr>
<th>Heartbeat LED description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>One blink — One second ON followed by one second OFF.</td>
<td>Normal operation</td>
</tr>
<tr>
<td>Three blinks — Three blink pattern (once per second) followed by a two second pause.</td>
<td>System Error</td>
</tr>
<tr>
<td>Four blinks — Four blink pattern (once per second) followed by a two second pause.</td>
<td>Management port IP address conflict</td>
</tr>
<tr>
<td>Five blinks — Five blink pattern (once per second) followed by a two second pause.</td>
<td>Air temperature inside the mpx110 has exceeded the over temperature fault.</td>
</tr>
</tbody>
</table>
Input Power LED (green)

The Power LED indicates the input voltage status at the mpx110 logic circuit board. During normal operation, this LED lights indicating that the mpx110 logic circuit board is receiving the DC voltage from the power supply.

System Fault LED (amber)

The System Fault LED illuminates to indicate that a fault exists in the mpx110 firmware or hardware. Fault conditions include POST errors and over-temperature conditions. In addition, check the Heartbeat LED to confirm if the air temperature inside the mpx110 has exceeded the failure temperature, see Table 12, page 39.
4 Using the HP StorageWorks mpx Manager Utility

This chapter includes the following:

- Overview, page 41
- Launching the mpx110 Manager GUI, page 56
- Using Wizards, page 58

Overview

The HP StorageWorks mpx Manager graphical user interface (GUI) allows you to manage the mpx110 gateway from a workstation. Information can be monitored, configured, and modified. The mpx Manager GUI consists of a menu bar, a tool bar, a system tree, and information, status, data windows and tabs, see Figure 13 and Table 13.

![mpx Manager main window](image)

**Figure 13** mpx Manager main window
### Table 13 GUI main window sections

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu bar</td>
<td>Provides access to system functions and Wizards.</td>
</tr>
<tr>
<td>Tool bar</td>
<td>Provide quick access to the common application functions—Connect, View Logs, and Refresh.</td>
</tr>
<tr>
<td>System tree</td>
<td>Located on the left side of the display, shows the connected systems and their components. Click an entry handle or double-click the entry to expand or collapse a system tree entry.</td>
</tr>
<tr>
<td>Action menu</td>
<td>To open, right-click the mouse. This menu provides a short cut to actions available elsewhere in the GUI.</td>
</tr>
<tr>
<td>Information, Configuration, and Status windows</td>
<td>Shows the corresponding information, configuration, or status for the selected window tab.</td>
</tr>
<tr>
<td>Window tabs</td>
<td>Determines what displays in the window.</td>
</tr>
</tbody>
</table>

### Menu bar

**Figure 14** identifies menu bar options described in the following sections.

![Figure 14 Menu bar](image)

### File menu

The **File** drop-down menu includes the following options, see **Figure 15**.

- **Save FRU** — Saves the gateway’s configuration and persistent data to a file.
- **Restore FRU** — Restores the gateway’s configuration and persistent data from a file.
- **Exit** — Exits the mpx Manager GUI.

![Figure 15 File menu](image)
View menu

The **View** drop-down menu includes the **View Logs** option which opens the system logs, see Figure 16.

![Figure 16 View menu](image1)

Settings menu

The **Settings** drop-down menu includes the **Broadcast** option which opens the **Broadcast Settings** option, see Figure 17.

![Figure 17 Settings menu](image2)
Wizards menu

The Wizards drop-down menu includes the following options, see Figure 18.

**NOTE:**

Only Wizards applicable to the mpx110 are described next. Figure 18 shows Wizard menus unsupported by the gateway at the time of this document’s release.

- **FW Update Wizard** — Launches the Firmware Update Wizard, which allows you to update the mpx110 gateway’s firmware image. The firmware image is selected from a menu that allows browsing.

- **FCIP Route Add** — Launches the FCIP Route Add Wizard, which allows you to select the resources used for the route, the IP address of the remote FCIP peer, IP parameters, VLAN support, compression and bandwidth limit.

- **FCIP Route Remove** — Launches the FCIP Route Remove Wizard, which allows you to remove an existing FCIP Route freeing the resources (FC and GE ports) used by the route.

Figure 18 Wizards menu
Help menu

The **Help** drop-down menu includes the following options, see Figure 19.

- **Set Browser location** — Specifies the browser that launches when you view the online help for the mpx Manager GUI.
- **Browse Contents** — Launches the online Help.
- **About...** — Displays the application version information.

![Help menu](image)

**Figure 19** Help menu
Tool bar

The Tool bar consists of a row of graphical buttons that allow you to perform common functions: connect, view log files, and refresh the current display. The tool bar can be relocated in the display by clicking and dragging the handle at the left edge of the tool bar, see Figure 20.

- **Connect** button — Adds an mpx110 gateway to the system tree view.
- **View Logs** button — Opens a window to display the system log data.
- **Refresh** button — Updates the display with current information.

![Figure 20 Tool bar](image)

Action menu

The Action menu displays by right-clicking the mouse, and provides short cuts to actions available elsewhere in the GUI, see Figure 21.

**NOTE:**

Only Menu features applicable to the mpx110 are described next. Figure 21 shows features not supported at the time of this document’s release.

Action menu options include:

- **Connect** — Adds an mpx110 gateway to the system tree view.
- **Refresh** — Updates the display with current information.
- **Disconnect** — Disconnects from an mpx110 gateway, removing it from the system tree.
- **Reboot** — Reboots the mpx110 gateway.
- **View Logs** — Opens the View Logs window.
- **Ping** — Initiates a ping from the specified port (management, GE1, or GE2) to a specified IP address.
- **FCIP Route Add** — Launches the FCIP Route Add Wizard, which allows you to select the resources used for the route, the IP address of the remote FCIP peer, IP parameters, VLAN support, compression and bandwidth limit.
- **FCIP Route Remove** — Launches the FCIP Route Remove Wizard, which allows you to remove an existing FCIP Route freeing the resources (FC and GE ports) used by the route.
- **FW Update Wizard** — Launches a Wizard for updating the gateway’s firmware.
- **Beacon ON** — Turns on the mpx110 beacon to quickly locate the gateway.
- **Beacon OFF** — Turns off the mpx110 gateway beacon.
### Action menu

<table>
<thead>
<tr>
<th>Connect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refresh</td>
</tr>
<tr>
<td>Disconnect</td>
</tr>
<tr>
<td>Reboot</td>
</tr>
<tr>
<td>View Logs</td>
</tr>
<tr>
<td>Ping</td>
</tr>
<tr>
<td>Map Local Initiator/Target Wizard</td>
</tr>
<tr>
<td>Unmap Local Initiator/Target Wizard</td>
</tr>
<tr>
<td>Add Remote Router Wizard</td>
</tr>
<tr>
<td>Remove Remote Router Wizard</td>
</tr>
<tr>
<td>Map Remote Initiator/Target Wizard</td>
</tr>
<tr>
<td>Unmap Remote Initiator/Target Wizard</td>
</tr>
<tr>
<td>Discover iSCSI Target</td>
</tr>
<tr>
<td>FCIP Route Add</td>
</tr>
<tr>
<td>FCIP Route Remove</td>
</tr>
<tr>
<td>FW Update Wizard</td>
</tr>
<tr>
<td>Add Initiator Wizard</td>
</tr>
<tr>
<td>Remove Initiator</td>
</tr>
<tr>
<td>Remove Offline Target</td>
</tr>
<tr>
<td>Beacon ON</td>
</tr>
<tr>
<td>Beacon OFF</td>
</tr>
</tbody>
</table>

**Figure 21 Action menu**

### System tree window

**Figure 22** shows the **System tree** window. The **System tree** window is located in the left most window pane and contains the connected mpx110 gateways and the FCIP Routes for each gateway.

**Figure 22 System tree window**
For example, select **FCIP Routes** in the System tree to see component data in the tabbed pages to the right of the tree, see Figure 23.

![FCIP Routes information](mpx110 gateway)

The top of the **System tree** window displays the gateway system configuration and status. It contains the following tabs:

- Information
- SNMP management
- Security
- Features
- Topology

**Information tab**

The Information tab consists of three sections: **Basic Information**, **Management Information**, and **Network Time Protocol (NTP) Server Information**, see Figure 24:

- **Basic Information**
  - **Product Name**: Model mpx110
  - **Symbolic Name**: A symbolic name for the gateway that you can create
  - **Serial Number**: Gateway’s serial number
  - **IQN uses Symbolic Name**: Enable/disable the use of the symbolic name in the gateway’s iSCSI name
  - **Hardware Version**: The gateway hardware version number
  - **iSCSI Port Count**: The number of iSCSI ports (2)
  - **Fibre Channel Port Count**: The number of FC ports (2)
• **Management Information**
  — **DHCP Radio Buttons**: Select whether you want to define the management port IP address or have it obtained automatically through DHCP.
  — **IP Address**: The management port’s IP address. When the **Use the following IP address** button is selected, you can configure the IP address. When the **Obtain an IP address automatically (DHCP)** button is set, the IP address displayed is the address obtained automatically through DHCP.
  — **Subnet Mask**: The management port’s subnet mask. When the **Use the following IP address** button is selected, you can configure the subnet mask. When the **Obtain an IP address automatically (DHCP)** button is selected, the subnet mask displayed is the mask obtained automatically through DHCP.
  — **Set IP Address**: This button saves any IP address changes.
  — **MAC Address**: The management port’s MAC address.
  — **Link Status**: The management port link status (Link UP or Link Down).

• **Network Time Protocol (NTP) Server Information**
  — **System Time**: The current date and time set on the gateway.
  — **NTP Server Radio Buttons**: Disable or enable the use of NTP servers to set the gateway’s date and time.
  — **NTP Server 1**: IP address of the first NTP server to be queried by the gateway when setting its time and date.
  — **NTP Server 2**: IP address of the second NTP server to be queried by the gateway when setting its time and date. This server is used only if the first NTP server did not respond.
  — **NTP Server 3**: IP address of the third NTP server to be queried.
  — **Set NTP Address**: Saves changes made to the NTP server IP addresses.

![Figure 24 Information tabbed page](image-url)
SNMP management tab

The SNMP Management tab consists of two sections: SNMP Configuration and SNMP Trap Receivers, see Figure 25. The Save button saves any SNMP management changes. For more information, see Simple Network Management Protocol, page 135.

SNMP Management tab options include:

- **SNMP Configuration**
  - **System OID:** The system object identifier.
  - **System Description:** Text that describes the location of the gateway.
  - **Read Community:** A password that authorizes an SNMP management server to read information from the router. This is a write-only field. The value on the gateway and the SNMP management server must be the same. The read community password can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is public.
  - **Trap Community:** A password that authorizes an SNMP management server to receive traps. This is a write-only field. The value on the gateway and the SNMP management server must be the same. The trap community password can be up to 32 characters excluding the number sign (#), semicolon (;), and comma (,). The default is public.
  - **System Location:** Specifies the name of the gateway location. The name can be up to 64 characters excluding the number sign (#), semicolon (;), and comma (,).
  - **System Contact:** Specifies the name of the person to be contacted to respond to trap events. The name can be up to 64 characters excluding the number sign (#), semicolon (;), and comma (,).
  - **Authentication Traps:** Enables or disables the generation of authentication traps in response to authentication failures.

- **SNMP Trap receivers**
  - **Enabled:** A checkbox to enable the trap receiver specified by the IP address, trap port, and trap version.
  - **IP Address:** The IP address to which the SNMP traps are sent. A maximum of eight trap addresses are supported.
  - **Trap Port:** The port number on which the trap is sent. The default is 162.
  - **Trap Version:** Specifies the SNMP version (1 or 2) with which to format traps.
Figure 25 SNMP management tab page
Security tab

The Security tab enables you to set the gateway’s password, see Figure 26. Security tab options include:

- **Current Password:** The current password must be supplied before it can be changed
- **New Password:** The new gateway password
- **Verify New Password:** Same content as the New Password field, to verify that it was typed correctly
- **Apply:** Saves the password changes
- **Clear Fields:** Clears the **Current Password**, **New Password**, and **Verify Password** fields

Figure 26 Security tab page

FCIP routes

Selecting the FCIP Routes branch on the System tree does not provide any information in the right window. Select a FCIP Route Info # in the System tree to display the FCIP Route Information and Statistics tabbed pages, see Figure 27.

A summary of FCIP routes tab options follows Figure 27.
The FCIP Route Information tab options include the following:

- **FCIP Interface Status**: Provides a pull down dialog box for enabling and disabling the FCIP route. When the route is disabled the FC and GE ports are placed in a down state. All route configuration parameters are retained. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.
- **FC Port**: Identifies the FC port used for this FCIP route. The FC port can not be changed, it is selected when the route is created.
- **FC Link Status**: Provides the state of the FC port used in this FCIP route.
- **GigE Port**: Identifies the GigE port used for this FCIP route. The GigE port can not be changed, it is selected when the route is created.
- **GigE Link Status**: Provides the state of the GigE port used in this FCIP route.
• **Local IP Address:** The IP address to be used by the GigE port. An uninitialized port has an IP address of all zeros. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Remote IP Address:** The IP address of the GigE port on the remote router. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Subnet Mask:** The subnet mask used by the GigE port. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Gateway IP Address:** The gateway IP address used by the GigE port. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Jumbo Frames:** Provides a pull down dialog box for enabling and disabling Jumbo IP frames. When disabled the MTU will be 1500 bytes, when enabled the maximum MTU will be 9000 bytes. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **TCP Window Size:** Contains a pull down dialog box that provides three options for TCP window size; 8192, 16384 and 32768 bytes. The default is 32768. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Window Scaling:** Contains a pull down dialog box that provides for enabling and disabling TCP window scaling. The default is disabled. When enabled the Window Scaling Factor is used. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Window Scaling Factor:** Contains a pull down dialog box that provides six options for TCP window scaling; 0, 1, 2, 3, 4 and 5. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **TCP Port Number:** Provides a dialog box that allows the user to define the destination TCP port number used by the FCIP route. This port number must be the same on both routers participating in the FCIP route (local and remote routers must be using same port number). The default port number used by FCIP is 3225. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **GigE Link Rate:** Provides a pull down dialog box that contains four options for the GigE link rate; auto, 10, 100 and 1000; The default link rate is auto. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Link Rate Mode:** Provides a pull down dialog box that contains three options for the link rate mode; auto, half duplex and full duplex. This dialog box is available only when the GigE link rate is set to something other than auto. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **GigE Port Flow Control:** Provides a pull down dialog box for enabling and disabling GigE port flow control. The default is enabled. This dialog box is available only when the GigE link rate is set to something other than auto. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **VLAN Enabled:** Provides a pull down dialog box for enabling and disabling VLAN support. The default is disabled. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **VLAN ID:** Provides a dialog box that allows the user to define the VLAN ID. This dialog box is available only when VLAN is enabled. The VLAN ID must be the same on both gateways participating in the FCIP route (local and remote gateways must be using same VLAN ID) and the Ethernet switches. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **VLAN Priority:** Provides a pull down dialog box that contains eight options for the VLAN priority; 0 through 7. This dialog box is available only when VLAN is enabled. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Error Detect Timeout:** Provides a pull down dialog box that contains five options for the error detect timeout; 1 to 5 seconds. The default is one second. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.

• **Resource Allocate Timeout:** Provides a pull down dialog box that contains five options for the resource allocate timeout; 1 to 5 seconds. The default is one second. When you change this setting, you must click **Save** (at the bottom of the page) for the change to take effect.
• **FCIP Timestamp:** Provides a pull down dialog box for enabling and disabling FCIP timestamps. The default is enabled. When you change this setting, you must click Save (at the bottom of the page) for the change to take effect.

• **FCIP SW Compression:** Provides a pull down dialog box for enabling and disabling FCIP compression. The default is disabled. When you change this setting, you must click Save (at the bottom of the page) for the change to take effect.

• **Bandwidth (Mbit/sec):** Provides a dialog box that allows the user to define the maximum bandwidth (in megabits per second) used by the GigE port during transmits. The range of values supported is 1 to 1000 megabits per second. This setting allows the user to limit the bandwidth used by the FCIP route so as to not consume all the available link bandwidth. For example if the slowest link in the WAN being used is a DS-3 link then the maximum available bandwidth is 45 megabits per second. To limit the FCIP route to 33% of the overall link bandwidth set the bandwidth to 15 megabits per second. When you change this setting, you must click Save (at the bottom of the page) for the change to take effect.
Launching the mpx110 Manager GUI

To start the mpx110 Manager GUI:

1. Double click the mpx110 icon on your desktop to invoke the mpx Manager GUI.

   ![Figure 28 Connecting to an mpx110](image)

   **Figure 28 Connecting to an mpx110**

2. Enter the mpx110 IP address and click the Connect button in the top left corner of the screen, see Figure 28.

   The mpx Manager main window displays, see Figure 29.
3. Go to Using Wizards, page 58 for specific steps on setting additional mpx110 parameters.
Using Wizards

The **Wizards** menu contains step-by-step programs that help you configure and manage the mpx110 gateway, see **Figure 30**.

The following programs are available from the **Wizards** menu:

**NOTE:**

Only Wizards applicable to the mpx110 are described in this section.

- **FW Update Wizard:** Updates the mpx110 gateway firmware.
- **FCIP Route Add:** Launches the **FCIP Route Add** Wizard, which allows you to select the resources used for the route, the IP address of the remote FCIP peer, IP parameters, VLAN support, compression and bandwidth limit.
- **FCIP Route Remove:** Launches the **FCIP Route Remove** Wizard, which allows you to remove an existing FCIP Route freeing the resources (FC and GE ports) used by the route.

![Figure 30 Wizards menu](image-url)
FW update Wizard

The Firmware Update Wizard provides step-by-step instructions for updating the mpx110 gateway firmware. To update the firmware:

1. When the FW Update Wizard launches, the mpx Selection dialog box displays, see Figure 31. Select the check box next to the appropriate gateway, then click Next.

Figure 31 mpx Selection dialog box

2. The Firmware File Selection dialog box displays, see Figure 32.
   a. Type in the path to the firmware file, or click Browse to locate the firmware file.
   b. When the firmware file is displayed in the Firmware Image File box, click Next.

Figure 32 Firmware file selection dialog box

3. Click Save Configuration to File, see Figure 33.
Figure 33 Confirm changes dialog box

Read the information, then do the following:

a. If you want to save a copy of this firmware configuration, press **Save Configuration to File**. Browse to the desired directory, enter a file name, then click **Save**.

b. Click **Next**.

4. The **Security Check** dialog box requests the **Admin** password. Enter the appropriate password, then click **OK** to start the firmware update.

5. The **Firmware Update Status** dialog box shows the progress of the update in the message section.

When the firmware loads successfully, the **Finish** dialog box and **Update success** dialog box display. Click **Yes** to reboot, see **Figure 34**.

Figure 34 Finish dialog box (successful firmware update)

a. The new firmware will not take effect until the system is rebooted. If you want to reboot the system now, click **Yes**. Otherwise, click **No**.

b. Click **Finish**.
The FCIP route add Wizard provides step-by-step instructions for adding a FCIP route. To add a FCIP route:

**IMPORTANT:**
When the FCIP route add Wizard launches, a warning displays indicating that the operation about to be performed will change the operation of the selected GE and FC ports. If the selected ports are being used in FC or iSCSI mappings, the connectivity will be lost. Also connectivity is disrupted on the GE port not selected for the FCIP route.

1. A warning displays when you launch the FCIP route add Wizard, see Figure 35. Click Yes to proceed, or click No to cancel the Wizard.

![Figure 35 FCIP route add wizard—warning dialog box](image)

2. The FC and GigE Port Selection dialog box requests the selection of a FC-GigE port pair, see Figure 36. The gateway port pair selected are the ports to be used for the FCIP route.

![Figure 36 FCIP route add Wizard—port selection dialog box](image)

Additionally the following port route/parameters may be configured:

- **FCIP Interfaces FC & GE** —Provides a pull down dialog box for enabling and disabling the FCIP route. When the route is disabled the FC and GE ports are placed in a down state. All route configuration parameters are retained.
• **GigE Port Programmed Link Rate** — Provides a pull down dialog box that contains four options for the GigE link rate; auto, 10, 100 and 1000. The default link rate is auto.

• **Link Rate Mode** — Provides a pull down dialog box that contains three options for the link rate mode; auto, half duplex and full duplex. This dialog box is available only when the GigE link rate is set to something other than auto.

• **GigE Port Flow Control** — Provides a pull down dialog box for enabling and disabling GigE port flow control. The default is enabled. This dialog box is available only when the GigE link rate is set to something other than auto.

After selecting a port pair and setting GE port parameters, click **Next** to continue. Or click **Cancel** to quit the wizard.

3. Enter IP addresses per the **Local and Remote IP Address** dialog box, see Figure 37.

![Figure 37 FCIP route add wizard—local and remote IP address dialog box](image)

The following parameters are configured:

• **Local IP Address** — The IP address to be used by the GigE port. An uninitialized port has an IP address of all zeros.

• **Subnet Mask** — The subnet mask used by the GigE port.

• **Gateway IP Address** — The gateway IP address used by the GigE port.

• **Remote IP Address** — The IP address of the GigE port on the remote gateway.

After setting the IP address parameters, click **Next** to continue. Or click **Cancel** to quit the Wizard.

4. Enter TCP/IP parameters per the **TCP/IP Options** dialog box, see Figure 38.
Use the TCP/IP Options dialog box to configure the following parameters:

- **Jumbo Frames** — Provides a pull down dialog box for enabling and disabling Jumbo IP frames. When disabled the MTU will be 1500 bytes, when enabled the maximum MTU will be 9000 bytes.

- **TCP Window Size** — Contains a pull down dialog box that provides three options for TCP window size; 8192, 16384 and 32768 bytes. The default is 32768.

- **Window Scaling** — Contains a pull down dialog box that provides for enabling and disabling TCP window scaling. The default is disabled. When enabled the Window Scaling Factor is used.

- **Window Scaling Factor** — Contains a pull down dialog box that provides six options for TCP window scaling; 0, 1, 2, 3, 4 and 5.

- **VLAN Enabled** — Provides a pull down dialog box for enabling and disabling VLAN support. The default is disabled.

- **VLAN ID** — Provides a dialog box that allows the user to define the VLAN ID. This dialog box is available only when VLAN is enabled. The VLAN ID must be the same on both routers participating in the FCIP route (local and remote routers must be using same VLAN ID) and the Ethernet switches.

- **VLAN Priority** — Provides a pull down dialog box that contains eight options for the VLAN priority; 0 through 7. This dialog box is available only when VLAN is enabled.

After setting the TCP/IP parameters, click **Next** to continue. Or click **Cancel** to quit the Wizard.

5. Enter FCIP parameters per the **FCIP Options** dialog box, see Figure 39.
The following parameters are configured:

- **Error Detect Timeout** — Provides a pull down dialog box that contains five options for the error detect timeout; 1 to 5 seconds. The default is one second.
- **Resource Allocate Timeout** — Provides a pull down dialog box that contains five options for the resource allocate timeout; 1 to 5 seconds. The default is one second.
- **FCIP Timestamp** — Provides a pull down dialog box for enabling and disabling FCIP timestamps. The default is enabled.
- **FCIP SW Compression** — Provides a pull down dialog box for enabling and disabling FCIP compression. The default is disabled.
- **Bandwidth (Mbit/sec)** — Provides a dialog box that allows the user to define the maximum bandwidth (in megabits per second) used by the GigE port during transmits. The range of values supported is 1 to 1000 megabits per second. This setting allows the user to limit the bandwidth used by the FCIP route so as to not consume all the available link bandwidth. For example, if the slowest link in the WAN being used is a DS-3 link then the maximum available bandwidth is 45 megabits per second. To limit the FCIP route to 33% of the overall link bandwidth set the bandwidth to 15 megabits per second.

After setting the FCIP parameters, click *Next* to continue. Or click *Cancel* to quit the Wizard.

6. The *Security Check* dialog box requests the administrator password, see *Figure 40*. Enter the appropriate password, then click *OK* to confirm the add of the FCIP route.

![Security Check](image)

**Figure 40 FCIP route add Wizard—security check dialog box**
7. The Add FCIP Route Complete dialog box signifies the completion of the route add operation, see Figure 41. This dialog box may take a number of seconds before appearing. Click OK to exit the dialog box.

![Add FCIP Route](image)

**Figure 41 FCIP route add Wizard—completed dialog box**

**FCIP route remove**

The FCIP Route Remove Wizard provides step-by-step instructions for removing a FCIP route. To remove a FCIP route:

1. When the FCIP route remove Wizard launches, a warning is displayed cautioning that the operation about to be performed will change the operation of the selected GE and FC ports. Also connectivity on the GE port not part of the FCIP route being removed will be momentarily disrupted.

If you want to proceed, click Yes and continue with step 2. Otherwise, click No to cancel the Wizard.

![FCIP Routes Remove Confirm](image)

**Figure 42 FCIP route remove Wizard—warning dialog box**

2. Enter the FCIP route to be removed per the Route Remove Selection dialog box, see Figure 43.
3. Enter the administrator password per the Security Check dialog box.

4. Click OK to confirm the removal of the FCIP route.

5. The **Remove FCIP Route Complete** dialog box indicates the completion of the route remove operation, see Figure 44.

   Click OK to exit the dialogue box.

---

**Figure 43 FCIP route remove Wizard—route selection dialog box**

**Figure 44 Remove FCIP route complete message**
A Command line interface

CLI summary

This appendix includes the following:

- Logging on to the mpx110, page 67
- User accounts, page 67
- Working with SAN mpx110 configurations, page 67
- Commands, page 70

Logging on to the mpx110

To log on to an mpx110 using Telnet, open a command line window on the workstation, and then enter the Telnet command followed by the mpx110 IP address:

```
# telnet ip-address
```

A Telnet window opens prompting you for a login. Enter an account name and password.

To log on to a switch through the serial port, configure the server port with the following settings:

- 115200 baud
- 8-bit character
- 1 stop bit
- No parity

User accounts

The mpx110 ships with the following user account already defined:

Account name: guest
Password: password

See Password command on page 83 for more information about changing passwords.

Working with SAN mpx110 configurations

Successful management via the CLI depends on the effective use of mpx110 configurations. Modifying configurations, backing up configurations, and restoring configurations are key management tasks.
Modifying a configuration

The two major areas that require configuring include management port configuration and FCIP Route configuration:

Management port configuration uses the following commands:
- Set Mgmt
- Show Mgmt

FCIP Route configuration uses the following commands:
- fciproute add
- fciproute mod
- show fciproutes

Saving and restoring mpx110 configurations

See Saving and restoring the mpx110 configuration, page 145 for commands related to backing up and restoring a configuration.

Saving mpx110 configuration and persistence

Perform the following steps to save the configuration and persistent data. Persistent data consists of LUN mappings, discovered FC targets, and discovered iSCSI initiators.

1. Execute the Fru save CLI command (see FRU Command) to generate a file (HP_StorageWorks_mpx110_FRU.bin) containing the saved data. This file is stored locally on the mpx110 in an FTP directory.

2. Transfer the saved data from the mpx110 to a workstation by executing an FTP utility on a workstation. The following text is an example of an FTP transfer to get the saved mpx110 configuration data:

   c:\>ftp 172.17.137.102
   Connected to 172.17.137.102.
   220 (none) FTP server (GNU inetutils 1.4.2) ready.
   User (172.17.137.102:(none)): ftp
   331 Guest login ok, type your name as password.
   Password: ftp
   230 Guest login ok, access restrictions apply.
   ftp> bin
   200 Type set to I.
   ftp> get HP_StorageWorks_mpx110_FRU.bin
   200 PORT command successful.
   150 Opening BINARY mode data connection for 'HP_StorageWorks_mpx110_FRU.bin’ (6168 bytes).
   226 Transfer complete.
   ftp: 6168 bytes received in 0.00Seconds 6168000.00Kbytes/sec.
   ftp> quit
   221 Goodbye.
Restoring mpx110 configuration and persistence

Perform the following steps to restore the mpx110’s configuration and persistent data.

1. Transfer the saved data from a workstation to the mpx110 by executing an FTP utility on the workstation. The following text is an example of an FTP transfer to put previously saved mpx110 configuration data on the mpx110:

```
c:\> ftp 172.17.137.102
Connected to 172.17.137.102.
220 (none) FTP server (GNU inetutils 1.4.2) ready.
User (172.17.137.102:(none)): ftp
331 Guest login ok, type your name as password.
Password: ftp
230 Guest login ok, access restrictions apply.
ftp> bin
200 Type set to I.
ftp> put HP_StorageWorks_mpx110_FRU.bin
200 PORT command successful.
150 Opening BINARY mode data connection for ’HP_StorageWorks_mpx110_FRU.bin’.
226 Transfer complete.
ftp: 6168 bytes sent in 0.00Seconds 6168000.00Kbytes/sec.
ftp> quit
221 Goodbye.
```

2. Execute the Fru restore CLI command (see FRU Command) to update the mpx110 with the saved configuration data.

**NOTE:**
Always use the Full Configuration Restore with the mpx110. This allows you to restores the entire configuration.
Commands

The command syntax is as follows:

command
keyword
keyword [value]
keyword [value1] [value2]

The command is followed by one or more parameters. Consider the following rules and conventions:

- Commands and parameters are case insensitive.
- Required keyword values appear in standard font: [value]. Optional values are shown in italics: [value].
- Underlined portions of the keyword in the command format indicate the abbreviated form that can be used. For example, the Delete keyword can be abbreviated Del.

The command-line completion feature makes entering and repeating commands easier. Table 14 lists the command-line completion keystrokes.

Table 14 Command-line completion

<table>
<thead>
<tr>
<th>Keystroke</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tab</td>
<td>Completes the command line. Enter at least one character and press the Tab key to complete the command line. If more than one possibility exists, press the Tab key again to display all possibilities.</td>
</tr>
<tr>
<td>Up arrow</td>
<td>Scrolls backward through the list of previously entered commands.</td>
</tr>
<tr>
<td>Down arrow</td>
<td>Scrolls forward through the list of previously entered commands.</td>
</tr>
<tr>
<td>Ctrl+A</td>
<td>Moves cursor to the beginning of the command line.</td>
</tr>
<tr>
<td>Ctrl+E</td>
<td>Moves cursor to the end of the command line.</td>
</tr>
</tbody>
</table>

The command set performs monitoring and configuration tasks. Commands related to monitoring tasks are available to all account names. Commands related to configuration tasks are available only within an Admin session. An account must have Admin authority to enter the Admin Start command, which opens an Admin session. See the Admin command on page 71.
Admin command

Opens and closes the Admin session. The Admin session provides commands that change mpx110 configurations. Only one Admin session can be open on the mpx110 at any time. An inactive Admin session will time out after a period of 15 minutes.

<table>
<thead>
<tr>
<th>Authority</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>admin</td>
</tr>
<tr>
<td>Parameters</td>
<td></td>
</tr>
<tr>
<td>start (or begin)</td>
<td>Opens the Admin session.</td>
</tr>
<tr>
<td>end (or stop)</td>
<td>Closes the Admin session. The logout, shutdown, and reset commands will also end an Admin session.</td>
</tr>
<tr>
<td>cancel</td>
<td>Terminates an Admin session opened by another user. Use this parameter with care because it terminates the Admin session without warning the other user and without saving pending changes.</td>
</tr>
</tbody>
</table>

Notes

Closing a Telnet window during an admin session does not release the session. In this case, you must either wait for the Admin session to time out, or use the admin cancel command.

Examples

The following example shows how to start and end an Admin session:

```
mpx110 #> admin start
Password: ******
```

```
mpx110 (admin) #>.
.
.
mpx110 #> admin end
mpx110 #>
```
Beacon command

Enables or disables flashing the Heartbeat and System Fault LEDs. The Heartbeat and System fault LEDs are flashed synchronously (they are turned on and off together). No other LEDs are affected.

**Authority**
None

**Syntax**
beacon

**Parameters**

- **on**
  Turns on the mpx110 beacon.

- **off**
  Turns off the mpx110 beacon.

**Example**
mpx110 #> beacon on
Clear command

Allows you to remove all entries from the mpx110’s log file and/or reset the Fibre Channel and iSCSI statistic counters.

**Authority**  
Admin session

**Syntax**  
clear

**Parameters**  
logs  
Clears all entries from log file.

stats  
 Resets statistic counters.

**Examples**  
The following is an example of the Clear command:

mpx110 #>clear logs

mpx110 #>clear stats
Date command

Displays or sets the date and time. To set the date and time, the information string must be provided in this format: MMDDhhmmCCYY. The new date and time takes effect immediately.

Authority
Admin session only to set date

Syntax
date

[MMDDhhmmCCYY]

Parameters

[MMDDhhmmCCYY]
Specifies the date—This requires an admin session. If you omit [MMDDhhmmCCYY], the current date is displayed, which does not require an admin session.

Notes
Network Time Protocol (NTP) must be disabled to set the time with the Date command.
See Set command on page 89 for information about NTP.

Examples
The following is an example of the Date command:

mpx110 (admin) #> date 010314282006
Tue Jan 3 14:28:00 2006
mpx110 (admin) #> date
Tue Jan 3 14:28:14 2006
**FcipRoute command**

The fciproute command configures a new FCIP route and modifies or deletes an existing FCIP route. Each FCIP route requires a dedicated FC and Gigabit Ethernet port. Configuring an FCIP route, specifying an FC and GE port pair, take precedence over any previous configuration for the port pair (FC/GE).

**Authority**
Admin session only to set

**Syntax**
fciproute

**Parameters**

- **add**
The fciproute add command configures a new FCIP route.

- **mod**
The fciproute mod command modifies an existing FCIP route.

- **rm**
The fciproute rm command removes an existing FCIP route.

**Example**
The following is an example of the fciproute add command:

```
mpx110 (admin) #> fru add
A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.
WARNING:
The following command might cause a loss of connections to both GE ports.

Configuring FCIP Route: 2
--------------------------------
FCIP Interfaces FC & GE (0=Enable, 1=Disable) [Enabled ]
FC Port (1=FC1, 2=FC2) [FC2 ]
GE Port (1=GE1, 2=GE2) [GE2 ]
IP Address [0.0.0.0 ] 10.2.2.10
Subnet Mask [0.0.0.0 ] 255.255.255.0
Gateway IP Address [0.0.0.0 ]
Remote IP Address [0.0.0.0 ] 10.2.2.20
Jumbo Frames (0=Enabled, 1=Disabled) [Disabled ]
TCP Window Size (0=8KB, 1=16KB, 2=32KB) [32768 ]
Window Scaling (0=Enable, 1=Disable) [Disabled ]
TCP Port No. (Min=1024, Max=65535) [3225 ]
GE Link Rate (0=Auto, 1=10Mb, 2=100Mb, 3=1Gb) [Auto ]
FCIP Time Stamp (0=Enable, 1=Disable) [Enabled ]
Error Detect TimeOut (Min=1sec, Max=5sec) [1 ]
Resource Allocate TimeOut (Min=1sec, Max=5sec)[1 ]
Bandwidth, Mbit/sec (Min=1, Max=1000) [1000 ]
VLAN (0=Enable, 1=Disable) [Disabled ]
FCIP SW Compression (0=Enable, 1=Disable) [Disabled ]
All attribute values for FCIP Route 1 will now be saved.
```

The following is an example of the FCIP route modify command:

```
mpx110 (admin) #> fciproute mod
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
```
If you wish to terminate this process before reaching the end of the list
press ‘q’ or ’Q’ and the ENTER key to do so.
WARNING: The following command might cause a loss of
connections to both GE ports.

<table>
<thead>
<tr>
<th>Route FC Port ID</th>
<th>GE Port ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>-                -</td>
<td></td>
</tr>
</tbody>
</table>

Please select a FCIP route from the list above (’q’ to quit): 1

Configuring FCIP Route: 1

<table>
<thead>
<tr>
<th>FCIP Interfaces FC &amp; GE (0=Enable, 1=Disable)</th>
<th>[Enabled ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>[10.6.6.20 ]</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>[255.255.255.0 ]</td>
</tr>
<tr>
<td>Gateway IP Address</td>
<td>[10.6.6.1 ]</td>
</tr>
<tr>
<td>Remote IP Address</td>
<td>[10.6.6.10 ]</td>
</tr>
<tr>
<td>Jumbo Frames (0=Enabled, 1=Disabled)</td>
<td>[Disabled ]</td>
</tr>
<tr>
<td>TCP Window Size (0=8KB, 1=16KB, 2=32KB)</td>
<td>[32768 ]</td>
</tr>
<tr>
<td>Window Scaling (0=Enable, 1=Disable)</td>
<td>[Disabled ]</td>
</tr>
<tr>
<td>TCP Port No. (Min=1024, Max=65535) [3225 ]</td>
<td></td>
</tr>
<tr>
<td>GE Link Rate (0=Auto, 1=10Mb, 2=100Mb, 3=1Gb)</td>
<td>[Auto ]</td>
</tr>
<tr>
<td>FCIP Time Stamp (0=Enable, 1=Disable)</td>
<td>[Enabled ]</td>
</tr>
<tr>
<td>Error Detect TimeOut (Min=1sec, Max=5sec)</td>
<td>[1 ]</td>
</tr>
<tr>
<td>Resource Allocate TimeOut (Min=1sec, Max=5sec)</td>
<td>[1 ]</td>
</tr>
<tr>
<td>Bandwidth, Mbit/sec (Min=1, Max=1000)</td>
<td>[1000 ]</td>
</tr>
<tr>
<td>VLAN (0=Enable, 1=Disable)</td>
<td>[Disabled ]</td>
</tr>
<tr>
<td>FCIP SW Compression (0=Enable, 1=Disable)</td>
<td>[Disabled ]</td>
</tr>
</tbody>
</table>

All attribute values for FCIP Route 1 will now be saved.

Example

The following is an example of the FCIP route remove command:

```
mpx110 (admin) #> fciproute rm
```

A list of attributes with formatting and current values
will follow. Enter a new value or simply press the
ENTER key to accept the current value. If you wish to
terminate this process before reaching the end of the
list press ’q’ or ’Q’ and the ENTER key to do so.
WARNING: The following command might cause a loss of
connections to both GE ports.

<table>
<thead>
<tr>
<th>Route FC Port ID</th>
<th>GE Port ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>-                -</td>
<td></td>
</tr>
</tbody>
</table>

Please select a FCIP route from the list above (’q’ to quit): 1

FCIP Route 1 has been removed from the system.
FRU command

Saves and restores the mpx110 configuration.

**Authority**
Admin session only to set

**Syntax**
fru

**Parameters**

FRU restore requires that the user first ftp the tar file containing the desired configuration to the mpx110. When this command is issued it prompts the user for the restore level. The user has the option of fully restoring the mpx110’s configuration (all configuration parameters and LUN mappings) or restoring only the LUN mappings. The restored configuration will not take effect until the mpx110 is rebooted.

**save**

FRU save will create a tar file containing the mpx110’s persistent data, configuration and LUN mappings, storing the file in the mpx110’s /var/ftp directory. The user must then ftp the bin file from the mpx110.

**Examples**
The following is an example of the FRU restore command:

mpx110 (admin) #> fru restore

A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.

Type of restore (0=full, 1=mappings only) [full]
FRU restore completed.
Please reboot the system for configuration to take affect.

The following is an example of the FRU save command:

mpx110 (admin) #> fru save
FRU save completed. Configuration File is HP_StorageWorks_mpx110_fru.bin Please use FTP to extract the file out from the System.
Help command

Displays a list of the CLI commands and their syntax.

Authority

Syntax

Examples

The following is an example of the Help command:

```
mpx110 (admin) #> help
admin [ cancel | start | end ]
beacon [ on | off ]
date [ <MMDDhhmmCCYY> ]
discover [ <IP_ADDR> ]
clear [ logs | stats ]
fciproute [ add | mod | rm ]
discover
fru [ restore | save ]
history
image [ cleanup | unpack ]
image cleanup
image list
image unpack [ <filename> ]
logout
passwd
ping
quit
reboot
reset factory
reset factory
save [ capture | logs | traces ]
set [ chap | fc | features | iscsi | isns |
mgmt | ntp | properties | snmp | system ]
set chap
set fc [ <PORT_NUM> ]
set features
set mgmt
set ntp
set properties
set snmp [ trap_destinations [ <DEST_NUM> ] ]
set system
show [ chap | fc | fciproutes
features | initiators | iscsi
isns | localmaps | logs
memory | mgmt | ntp
perf | presented_initiators | presented_targets
properties | remotemaps | remotepeers
snmp | stats | system
targets ]
show chap
show fc [ <PORT_NUM> ]
show fciproutes [ <LINK_ID> ]
show features
show initiators [ fc | iscsi ]
show logs
show memory
show mgmt
show ntp
show perf [ byte | init_rbyte | init_wbyte |
tgt_rbyte | tgt_wbyte ]
show statsshow system
show properties
show snmp
show stats
show system
show targets [ fc | iscsi ]
```
show vlan [ <PORT_NUM> ]
shutdown
target [ add | rm ]
**History command**

Displays a numbered list of the previously entered commands.

**Authority**

Admin session only to set

**Syntax**

`history`

**Notes**

Closing a Telnet window during an admin session does not release the session. In this case, you must either wait for the admin session to time out, or use `Admin Cancel` command.

**Examples**

The following is an example of the `history` command:

```
mpx110 (admin) #> history
mpx110 (admin) #> history
1: admin start
2: help
3: history
mpx110 (admin) #>
```
Image command

Provides for updating the mpx110’s firmware image and the cleanup (removal) of image files in the mpx110’s /var/ftp directory.

**Authority**
Admin session only to set

**Syntax**
image

**Parameters**
cleanup
Removes any firmware image file(s) in the mpx110’s /var/ftp directory. These are files transferred by the user when updating the firmware image.

list
Displays a list of the firmware image files in the mpx110’s /var/ftp directory.

unpack [<filename>]
Unpacks the firmware image file specified in the <filename> parameter and installs the firmware image on the mpx110. The mpx110 must be rebooted for the new firmware image to be activated. The firmware image file must first have been transferred to the mpx110’s /var/ftp directory using FTP.

**Example**
The following is an example of the image cleanup command:

mpx110 (admin) #> image cleanup

**Example**
The following is an example of the image list command:

mpx110 (admin) #> image list

mpx110-2.0.3.2.bin

**Example**
The following is an example of the image unpack command:

mpx110 (admin) #> image unpack mpx110-2.0.3.2.bin

Unpack Completed. A reboot is required for the FW to take affect.

Do you wish to reboot the System at the current time (y/n): n
## Logout command

Exits the CLI and returns the operator to the login prompt.

<table>
<thead>
<tr>
<th>Authority</th>
<th>Admin session only to set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>logout</td>
</tr>
</tbody>
</table>

### Examples

```bash
mpx110 (admin) #> logout
(none) login:
```
Password command

Changes the guest and administrator passwords.

**Authority**
Admin session only to set

**Syntax**
password

**Examples**
The following is an example of the `passwd` command:

```bash
mpx110 (admin)
#> passwd
Press ‘q’ and the ENTER key to abort this command.
Select password to change (0=guest, 1=admin): 1
account OLD password : ******
account NEW password (6-128 chars) : ******
please confirm account NEW password : ******
Password has been changed.
```
Ping command

Verifies the connectivity of each Ethernet port, management, GE1 (iSCSI 1), and GE2 (iSCSI 2).

Authority
Admin session

Syntax
ping

Examples
The following is an example of the ping command:

mpx110 (admin) #> ping
A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.
IP Address [0.0.0.0] 10.3.5.105
Iteration Count (Min=1, Max=10) [10 ]
Outbound Port (0=Mgmt, 1=GE1, 2=GE2) [Mgmt ] 1
Pinging 10.3.5.105 with 32 bytes of data:
Pinging 10.3.5.105 with 32 bytes of data:
Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms Reply from 10.3.5.105:  bytes=32 time=0.1ms
Ping Statistics for 10.3.5.105:
Packets: Sent = 10, Received = 10, Lost = 0
Approximate round trip times in milli-seconds:
Minimum = 0.0ms, Maximum = 0.1ms, Average = 0.0ms
**Quit command**

Exits the CLI and returns the operator to the login prompt.

<table>
<thead>
<tr>
<th>Authority</th>
<th>Admin session only to set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>quit</td>
</tr>
<tr>
<td>Examples</td>
<td>The following is an example of the Quit command:</td>
</tr>
</tbody>
</table>

```plaintext
mpx110 (admin) #> quit
(none) login:
```
Reboot command

Restarts the mpx110 firmware.

Authority
Admin session only

Syntax
reboot

Examples
The following is an example of the reboot command:

mpx110 (admin) #> reboot
QAre you sure you want to reboot the System (y/n): y
System will now be rebooted...
Reset factory command

Restores the mpx110 factory default values. All LUN mappings are deleted as is all persistent data regarding targets, LUNs and initiators. The factory default IP addresses will be restored.

Authority
Admin session.

Syntax
reset

Parameters
factory

Restores mpx110 to factory default configuration.

Examples
The following is an example of the reset factory command:

mpx110 (admin) #> reset factory
Are you sure you want to restore to factory default settings (y/n): y Please reboot the System for the settings to take affect.
Save command

Saves logs and traces.

Authority
Admin session only

Syntax
save

Parameters
capture
save capture creates a debug file that captures all debug dump data. After the command completes, you must ftp the debug capture file from the mpx110.

logs
The save logs command will create a tar file containing the mpx110’s log data, storing the file in the mpx110’s /var/ftp directory. The operator must then ftp the logs tar file from the mpx110.

traces
The save traces command will create a tar file containing the mpx110’s dump data storing the tar file in the mpx110’s /var/ftp directory. The operator must then ftp the traces tar file from the mpx110. If the mpx110 does not have any dump data, the operator will be notified when executing this command. An event log entry is generated whenever a dump data is generated.

Example
The following is an example of the save capture command:
mpx110 (admin) #> save capture
Debug capture completed. Package is System_Capture.tar.gz Please use FTP to extract the file out from the System.

Example
The following is an example of the save logs command:
mpx110 (admin) #> save logs
Save Event Logs completed. Package is System_Evl.tar.gz Please use FTP to extract the file out from the System.

Example
The following is an example of the save traces command:
mpx110 (admin) #> save traces
Save ASIC Traces completed.
Package is System_Asic_Trace.tar.gz
Please use FTP to extract the file out from the System.
mpx110 (admin) #> save traces
No ASIC trace files exist to save. Command aborted.
Set command

Configures general parameters as well as the parameters for the FC, iSCSI, and management ports.

Authority
Admin session only

Syntax
set

Parameters

- **chap**
  Set CHAP secrets

- **mgmt**
  Set management port parameters.

- **ntp**
  Set network time protocol (NTP) parameters.

- **properties**
  Set CLI properties.

- **snmp**
  Sets the simple network management protocol (SNMP) parameters.

- **system**
  Set system parameters.

Examples
The following is an example of the set command:

mpx110 # set mgmt
**Set FC command**

Configures an FC port.

**Authority**
Admin session

**Syntax**
`set fc [port_num]`

**Parameter**
`port_num`
The number of the FC port to be configured.

**Examples**
The following is an example of the `set fc` command:

```bash
mpxl10 (admin) #> set fc 1
```
A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.

**WARNING:**
The following command might cause a loss of connections to both ports. Configuring FC Port: 1

```
-------------------------
Link Rate (0=Auto, 1=1Gb, 2=2Gb, 4=4Gb) [Auto ]
Frame Size (0=512B, 1=1024B, 2=2048B) [2048 ]
Execution Throttle (Min=16, Max=256) [64 ]
```
All attribute values for Port 1 that have been changed will now be saved.

Configuring FC Port: 2

```
-------------------------
Programmed Link Rate (0=Auto, 1=1Gb, 2=2Gb, 4=4Gb) [Auto ]
Frame Size (0=512B, 1=1024B, 2=2048B) [2048 ]
Execution Throttle (Min=16, Max=256) [64 ]
```
All attribute values for Port 2 that have been changed will now be saved.
**Set MGMT command**

Configures the mpx110 management port (10/100).

**Authority**
Admin session

**Syntax**
```
set mgmt
```

**Examples**
The following is an example of the `set mgmt` command:
```
mpx110 (admin) #> set mgmt
A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.
Mode (0=Static, 1=Dhcp, 2=Bootp, 3=Rarp) [Dhcp ] 1
IP Address [10.0.0.1 ]
Subnet Mask [255.0.0.0 ]
Gateway [0.0.0.0 ]
All attribute values that have been changed will now be saved.
```
Set NTP command

Configures NTP parameters.

**Authority**
- Admin session

**Syntax**
- `set ntp`

**Examples**
The following is an example of the `set ntp` command:

```plaintext
mpx110 (admin) #> set ntp
A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.
NTP (0=Enable, 1=Disable) [Enabled ]
TimeZone Offset from GMT (Min=-12hrs,Max=12hrs) [-8 ]
IP Address [0] [0.0.0.0 ] 207.126.97.57
IP Address [1] [0.0.0.0 ]
IP Address [2] [0.0.0.0 ]
All attribute values that have been changed will now be saved.
```
### Set properties command

Configures CLI properties.

<table>
<thead>
<tr>
<th>Authority</th>
<th>Admin session</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td>set properties</td>
</tr>
</tbody>
</table>

**Examples**

The following is an example of the `set properties` command:

```bash
mpx110 (admin) #> set properties
A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to do so.

CLI Inactivity Timer (0=Disable, 1=15min, 2=60min) [Disabled]
CLI Prompt (Max=32 Characters) [mpx110 ] RTR1
```

All attribute values that have been changed will now be saved.
Set SNMP command

Configures general SNMP properties. It also provides for configuration of up to eight trap destinations.

**Authority**
Admin session

**Syntax**
set snmp

**Parameters**
trap_destinations
The number of the trap destinations to be configured for SNMP.

**Examples**
The following is an example of the set snmp command:

```
mpx110 (admin) #> set snmp
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list
press ‘q’ or ‘Q’ and the ENTER key to do so.
Configuring SNMP:

Read Community [ ] Public
Trap Community [ ] Private
System Location [ ]
System Contact [ ]
Authentication Traps (0=Enable, 1=Disable) [Disabled ]
```

All attribute values that have been changed will now be saved.

**Examples**
The following is an example of configuring an SNMP trap destination:

```
mpx110 (admin) #> set snmp trap_destinations
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current value.
If you wish to terminate this process before reaching the end of the list
press ‘q’ or ‘Q’ and the ENTER key to do so.
Configuring SNMP Trap Destination 1 :

Destination enabled (0=Enable, 1=Disable) [Disabled ] 0
IP Address [0.0.0.0 ] 10.0.0.5
Destination Port [0 ] 1024
```

Trap Version [0 ] 2
Configuring SNMP Trap Destination 2 :

```
Destination enabled (0=Enable, 1=Disable) [Disabled ]
```

Configuring SNMP Trap Destination 3 :

```
```

Configuring SNMP Trap Destination 4 :

```
```

Configuring SNMP Trap Destination 5 :

```
```

Configuring SNMP Trap Destination 6 :

```
```

Configuring SNMP Trap Destination 7 :

```
```

Configuring SNMP Trap Destination 8 :

```
```

Destination enabled (0=Enable, 1=Disable) [Disabled ]
```

All attribute values that have been changed will now be saved.
Set System command

Configures general mpx110 parameters.

Authority
Admin session

Syntax
set system

Parameter
port_num
The number of the iSCSI port to be configured for iSNS.

Examples
The following is an example of the set system command:

mpx110 (admin) #> set system
A list of attributes with formatting and current values will follow.
Enter a new value or simply press the ENTER key to accept the current
value.
If you wish to terminate this process before reaching the end of the
list
press ‘q’ or ‘Q’ and the ENTER key to do so.
System Symbolic Name (Max = 64 characters) [ ] testing
Mode (0=Normal, 1=Transparent, 2=Encap.FC) [0 ]
System Log Level (Min = 0, Max = 3) [0 ]
All attribute values that have been changed will now be saved.
Show command

Displays operational information.

**Authority**
Admin session only to set

**Syntax**
`show [keyword]`

**Parameters**
- `fciproutes [link_id]` — Shows FCIP routes in effect and their configuration parameters.
- `logs` — Shows contents of the mpx110 logs.
- `memory` — Shows memory managed by mpx110. Includes total and available.
- `mgmt` — Shows the mpx110 management port configuration.
- `ntp` — Shows the network time protocol (NTP) configuration.
- `perf [ byte | init_rbyte | init_wbyte | tgt_rbyte | tgt_wbyte ]` — Shows performance data.
- `properties` — Shows the mpx110 CLI properties.
- `snmp` — Shows the mpx110 SNMP properties and trap configurations.
- `stats` — Shows the mpx110 statistics, both FC and iSCSI.
- `system` — Shows product information including serial number, software version, hardware version, configuration, and temperature.

**Examples**
The following is an example of the `show` command:

```bash
mpx110 #> show mpx110
```

QRouter Information
-------------------

<table>
<thead>
<tr>
<th>Product Name</th>
<th>QRouter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbolic Name</td>
<td>Rack3</td>
</tr>
<tr>
<td>QRouter Mode</td>
<td>iSCSI</td>
</tr>
<tr>
<td>Serial Number</td>
<td>0539A01070</td>
</tr>
<tr>
<td>HW Version</td>
<td>2</td>
</tr>
<tr>
<td>SW Version</td>
<td>1.0.5.0</td>
</tr>
<tr>
<td>No. of FC Ports</td>
<td>2</td>
</tr>
<tr>
<td>No. of iSCSI Ports</td>
<td>2</td>
</tr>
<tr>
<td>Log Level</td>
<td>0</td>
</tr>
<tr>
<td>Log Length (KB)</td>
<td>32768</td>
</tr>
<tr>
<td>Temperature (C)</td>
<td>32</td>
</tr>
</tbody>
</table>
Show FcipRoutes command

Shows FCIP route(s) configuration parameters.

Authority

None

Syntax

show fciproutes

Parameters

[link_id]
The number of the FCIP route to be displayed (1 or 2).

Examples

The following is an example of the show fciproutes command:

mpx110 #> show fciproutes

FCIP Route Information
------------------------
FCIP Route  1
FCIP Interfaces Status Enabled
FCIP Link Status Up
FC Port  FC1
GE Port  GE1
GE Link Status Up
Local IP Address  10.6.6.10
Remote IP Address  10.6.6.20
Subnet Mask  255.255.255.0
Gateway IP Address  0.0.0.0
Jumbo Frames Disabled
TCP Window Size  32768
Window Scaling Disabled
TCP Port No  3225
GE Link Rate Auto
FCIP Time Stamp Enabled
Error Detect TimeOut  1
Resource Allocate TimeOut  1
Bandwidth, Mbit/sec  1000
VLAN Disabled
FCIP SW Compression Disabled

FCIP Route  2
FCIP Interfaces Status Enabled
FCIP Link Status Up
FC Port  FC2
GE Port  GE2
GE Link Status Up
Local IP Address  10.2.2.10
Remote IP Address  10.2.2.20
Subnet Mask  255.255.255.0
Gateway IP Address  0.0.0.0
Jumbo Frames Disabled
TCP Window Size  32768
Window Scaling Disabled
TCP Port No  3225
GE Link Rate Auto
FCIP Time Stamp Enabled
Error Detect TimeOut  1
Resource Allocate TimeOut  1
Bandwidth, Mbit/sec  1000
VLAN Disabled
FCIP SW Compression Disabled
Show Logs command

Shows the mpx110 event log.

Authority
None

Syntax
show logs

Examples
The following is an example of the show logs command:

mpx110 #> show logs

01/01/1970 00:00:13 System 3 Thursday 01 January 12:13 AM
01/01/1970 00:00:21 QL4022 3 #0: QLIsrDecodeMailbox: Link up
01/01/1970 00:00:13 System 3 Thursday 01 January 12:13 AM
01/01/1970 00:00:22 QL4022 3 #0: QLIsrDecodeMailbox: Link up
Show Memory command

Shows the mpx110 memory usage. The FCIP memory usage will be zero if there are no FCIP routes configured.

**Authority**
None

**Syntax**
show memory

**Examples**
The following is an example of the show memory command:

```bash
mpx110 #> show memory

Memory Units Free/Total
-------------- ----------
Physical 15MB/505MB
Buffer Pool 11520/12544
Process Blocks 8192/8192
Request Blocks 8192/8192
Event Blocks 1024/1024
Control Blocks 256/256
FCIP Buffer Pool 0/0
FCIP Request Blocks 16384/16384
```

The following is an example of the show memory command with one FCIP route configured:

```bash
mpx110 #> show memory

Memory Units Free/Total
-------------- ----------
Physical 28MB/251MB
Buffer Pool 2176/4224
Process Blocks 4096/4096
Request Blocks 4096/4096
Event Blocks 512/512
Control Blocks 128/128
FCIP Buffer Pool 13320/16384
FCIP Request Blocks 15368/16384
```
Show MGMT command

Shows management port (10/100) configuration.

**Authority**  
None

**Syntax**  
`show mgmt`

**Examples**  
The following is an example of the `show mgmt` command:

```
mpx110 #> show mgmt
Management Port Information
----------------------------
Mode          Dhcp
Link Status   Up
IP Address    172.17.137.210
Subnet mask   255.255.254.0
Gateway       172.17.136.1
MAC Address   00-c0-dd-0c-60-10
```
Show NTP command

Shows Network Time Protocol (NTP) configuration.

**Authority**
None

**Syntax**
show ntp

**Examples**
The following is an example of the `show ntp` command:

```
mpxl10 #> show ntp
NTP Information
---------------
Mode            Disabled
Status          Offline
TimeZone Offset (Hours) 0
```

```
Show Performance command

Displays performance data.

**Authority**
None

**Syntax**
`show perf`

**Parameters**

- **byte**
  Shows data transfer rate of each port (FC and GE).
- **init_rbyte**
  Shows initiator read transfer rate per port.
- **init_wbyte**
  Shows initiator write transfer rate per port.
- **tgt_rbyte**
  Shows target read transfer rate per port.
- **tgt_wbyte**
  Shows target write transfer rate per port.

**Examples**

The following is an example of the `show performance (all)` command.

The following is an example of the Show Performance byte command.

Displaying bytes/sec (total)... (Press any key to stop display)

<table>
<thead>
<tr>
<th>GE1</th>
<th>GE2</th>
<th>FC1</th>
<th>FC2</th>
</tr>
</thead>
<tbody>
<tr>
<td>47M</td>
<td>93M</td>
<td>94M</td>
<td>48M</td>
</tr>
<tr>
<td>47M</td>
<td>94M</td>
<td>96M</td>
<td>47M</td>
</tr>
<tr>
<td>46M</td>
<td>96M</td>
<td>96M</td>
<td>47M</td>
</tr>
<tr>
<td>45M</td>
<td>94M</td>
<td>97M</td>
<td>48M</td>
</tr>
<tr>
<td>47M</td>
<td>92M</td>
<td>93M</td>
<td>48M</td>
</tr>
<tr>
<td>45M</td>
<td>93M</td>
<td>94M</td>
<td>46M</td>
</tr>
</tbody>
</table>
Show Properties command

Shows CLI properties.

**Authority**

None

**Syntax**

`show properties`

**Examples**

The following is an example of the `show properties` command:

mpxl10 #> show properties

CLI Properties

---------------
Inactivity Timer   Disabled
Prompt String     QRouter
Show SNMP command

Displays the mpX110’s SNMP properties and any traps that have been configured.

Authority
None

Syntax
show snmp

Examples
The following is an example of the show snmp command:

QRouter #> show snmp

SNMP configuration
-------------------------
Read Community           Public
Trap Community           Private
System Location          
System Contact           
Authentication traps
System OID               1.3.6.1.4.1.3873.1.4
System Description       HP StorageWorks mpX110

Trap Destination         1
IP Address               10.0.0.5
Trap Port                1024
Trap Version             2

104 Command line interface
Show Stats command

Displays mpx110 for statistics, FC and iSCSI.

Authority
None

Syntax
show stats

Examples
The following is an example of the show stats command:

mpx110 #> show stats

FC Port Statistics
-------------------
FC Port
Interrupt Count
Target Command Count
Initiator Command Count

FC Port
Interrupt Count
Target Command Count
Initiator Command Count

iSCSI Port Statistics
---------------------
iSCSI Port
Interrupt Count
Target Command Count
Initiator Command Count

MAC Xmit Frames
MAC Xmit Byte Count
MAC Xmit Multicast Frames
MAC Xmit Broadcast Frames
MAC Xmit Pause Frames
MAC Xmit Control Frames
MAC Xmit Deferrals
MAC Xmit Late Collisions
MAC Xmit Aborted
MAC Xmit Single Collisions
MAC Xmit Multiple Collisions
MAC Xmit Collisions
MAC Xmit Collisions
MAC Xmit Dropped Frames
MAC Xmit Jumbo Frames
MAC Rcvd Frames
MAC Rcvd Byte Count
MAC Rcvd Unknown Control Frames
MAC Rcvd Pause Frames
MAC Rcvd Control Frames
MAC Rcvd Dribbles
MAC Rcvd Frame Length Errors
MAC Rcvd Jabbers
MAC Rcvd Carrier Sense Errors
MAC Rcvd Dropped Frames
MAC Rcvd CRC Errors
MAC Rcvd Encoding Errors
MAC Rcvd Length Errors Large
MAC Rcvd Small Errors Small
MAC Rcvd Multicast Frames
MAC Rcvd Broadcast Frames

FCIP Link Statistics
-------------------

FCIP Link
FC Xmit Frames
FC Xmit Bytes
<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC Rcvd Frames</td>
<td>Frame count received from FC</td>
</tr>
<tr>
<td>FC Rcvd Bytes</td>
<td>Byte count received from FC</td>
</tr>
<tr>
<td>IP Xmit Packets</td>
<td>Packets transmitted on IP</td>
</tr>
<tr>
<td>IP Xmit Byte Count</td>
<td>Byte count transmitted on IP</td>
</tr>
<tr>
<td>IP Xmit Fragments</td>
<td>Fragmented packets transmitted on IP</td>
</tr>
<tr>
<td>IP Rcvd Packets</td>
<td>Packets received on IP</td>
</tr>
<tr>
<td>IP Rcvd Byte Count</td>
<td>Byte count received on IP</td>
</tr>
<tr>
<td>IP Rcvd Fragments</td>
<td>Fragmented packets received on IP</td>
</tr>
<tr>
<td>IP Datagram Reassembly Count</td>
<td>Reassembled datagrams received on IP</td>
</tr>
<tr>
<td>IP V6Pkt Rcvd</td>
<td>Packets received on IP V6Pkt</td>
</tr>
<tr>
<td>IP Error Packets</td>
<td>Error packets transmitted on IP</td>
</tr>
<tr>
<td>IP Reassembly Errors</td>
<td>Reassembled packets transmitted on IP</td>
</tr>
<tr>
<td>TCP Xmit Segment Count</td>
<td>Packets transmitted on TCP</td>
</tr>
<tr>
<td>TCP Xmit Byte Count</td>
<td>Byte count transmitted on TCP</td>
</tr>
<tr>
<td>TCP Xmit Acks</td>
<td>Acknowledgments transmitted on TCP</td>
</tr>
<tr>
<td>TCP Rcvd Segment Count</td>
<td>Packets received on TCP</td>
</tr>
<tr>
<td>TCP Rcvd Byte Count</td>
<td>Byte count received on TCP</td>
</tr>
<tr>
<td>TCP Rcvd Acks</td>
<td>Acknowledgments received on TCP</td>
</tr>
<tr>
<td>TCP Rcvd Window Probes</td>
<td>Window probes transmitted on TCP</td>
</tr>
<tr>
<td>TCP Timer Expired</td>
<td>Timer expired packets transmitted on TCP</td>
</tr>
<tr>
<td>TCP ECC Error Corections</td>
<td>ECC error corrections transmitted on TCP</td>
</tr>
<tr>
<td>MAC Xmit Frames</td>
<td>Packets transmitted on MAC</td>
</tr>
<tr>
<td>MAC Xmit Bytes</td>
<td>Byte count transmitted on MAC</td>
</tr>
<tr>
<td>MAC Xmit Multi Count</td>
<td>Packets transmitted with multiple addresses</td>
</tr>
<tr>
<td>MAC Xmit Broad Count</td>
<td>Packets transmitted with broadcast addresses</td>
</tr>
<tr>
<td>MAC Xmit Pause Count</td>
<td>Packets transmitted with pause frames</td>
</tr>
<tr>
<td>MAC Xmit Control Frames</td>
<td>Packets transmitted with control frames</td>
</tr>
<tr>
<td>MAC Xmit Deferrals</td>
<td>Packets transmitted with deferrals</td>
</tr>
<tr>
<td>MAC Xmit Late Collisions</td>
<td>Late collisions transmitted on MAC</td>
</tr>
<tr>
<td>MAC Xmit Aborted</td>
<td>Packets transmitted with abort frame</td>
</tr>
<tr>
<td>MAC Xmit Multiple Collisions</td>
<td>Multiple collisions transmitted on MAC</td>
</tr>
<tr>
<td>MAC Xmit Single Collisions</td>
<td>Single collisions transmitted on MAC</td>
</tr>
<tr>
<td>MAC Xmit Collisions</td>
<td>Collisions transmitted on MAC</td>
</tr>
<tr>
<td>MAC Xmit Dropped Frames</td>
<td>Packets transmitted with dropped frames</td>
</tr>
<tr>
<td>MAC Xmit Jumbo Frames</td>
<td>Packets transmitted with jumbo frames</td>
</tr>
<tr>
<td>MAC Rcvd Frames</td>
<td>Packets received on MAC</td>
</tr>
<tr>
<td>MAC Rcvd Bytes</td>
<td>Byte count received on MAC</td>
</tr>
<tr>
<td>MAC Rcvd Multi Count</td>
<td>Packets received with multiple addresses</td>
</tr>
<tr>
<td>MAC Rcvd Broad Count</td>
<td>Packets received with broadcast addresses</td>
</tr>
<tr>
<td>MAC Rcvd Pause Count</td>
<td>Packets received with pause frames</td>
</tr>
<tr>
<td>MAC Rcvd Control Frames</td>
<td>Packets received with control frames</td>
</tr>
<tr>
<td>MAC Rcvd Dribbles</td>
<td>Packets received with dribbles</td>
</tr>
<tr>
<td>MAC Rcvd Frame Length Errors</td>
<td>Frame length errors received on MAC</td>
</tr>
<tr>
<td>MAC Rcvd Jabbers</td>
<td>Packets received with jabbers</td>
</tr>
<tr>
<td>MAC Rcvd Carrier Sense Errors</td>
<td>Carrier sense errors received on MAC</td>
</tr>
<tr>
<td>MAC Rcvd Dropped Frames</td>
<td>Packets received with dropped frames</td>
</tr>
<tr>
<td>MAC Rcvd CRC Errors</td>
<td>CRC errors received on MAC</td>
</tr>
<tr>
<td>MAC Rcvd Encoding Error</td>
<td>Encoding errors received on MAC</td>
</tr>
<tr>
<td>MAC Rcvd Length Errors</td>
<td>Length errors received on MAC</td>
</tr>
<tr>
<td>FCIP Link</td>
<td>Frame count transmitted on FCIP</td>
</tr>
<tr>
<td>FC Xmit Frames</td>
<td>Frame count transmitted on FC</td>
</tr>
<tr>
<td>FC Xmit Bytes</td>
<td>Byte count transmitted on FC</td>
</tr>
<tr>
<td>FC Rcvd Frames</td>
<td>Frame count received from FCIP</td>
</tr>
<tr>
<td>FC Rcvd Bytes</td>
<td>Byte count received from FCIP</td>
</tr>
<tr>
<td>IP Xmit Packets</td>
<td>Packets transmitted on IP on FCIP</td>
</tr>
<tr>
<td>IP Xmit Byte Count</td>
<td>Byte count transmitted on IP on FCIP</td>
</tr>
<tr>
<td>IP Xmit Fragments</td>
<td>Fragmented packets transmitted on IP on FCIP</td>
</tr>
<tr>
<td>IP Rcvd Packets</td>
<td>Packets received on IP on FCIP</td>
</tr>
<tr>
<td>IP Rcvd Byte Count</td>
<td>Byte count received on IP on FCIP</td>
</tr>
<tr>
<td>IP Rcvd Fragments</td>
<td>Fragmented packets received on IP on FCIP</td>
</tr>
<tr>
<td>IP Datagram Reassembly Count</td>
<td>Reassembled datagrams received on IP on FCIP</td>
</tr>
<tr>
<td>IP V6Pkt Rcvd</td>
<td>Packets received on IP V6Pkt on FCIP</td>
</tr>
<tr>
<td>IP Error Packets</td>
<td>Error packets transmitted on IP on FCIP</td>
</tr>
<tr>
<td>IP Reassembly Errors</td>
<td>Reassembled packets transmitted on IP on FCIP</td>
</tr>
<tr>
<td>TCP Xmit Segment Count</td>
<td>Packets transmitted on TCP on FCIP</td>
</tr>
<tr>
<td>TCP Xmit Byte Count</td>
<td>Byte count transmitted on TCP on FCIP</td>
</tr>
</tbody>
</table>

106 Command line interface
TCP Xmit Acks
TCP Rcvd Segment Count
TCP Rcvd Byte Count
TCP Rcvd Acks
TCP Rcvd Window Probes
TCP Timer Expired
TCP ECC Error Corrections
MAC Xmit Frames
MAC Xmit Bytes
MAC Xmit Multi Count
MAC Xmit Broad Count
MAC Xmit Pause Count
MAC Xmit Control Frames
MAC Xmit Deferrals
MAC Xmit Late Collisions
MAC Xmit Aborted
MAC Xmit Multiple Collisions
MAC Xmit Single Collisions
MAC Xmit Collisions
MAC Xmit Dropped Frames
MAC Xmit Jumbo Frames
MAC Rcvd Frames
MAC Rcvd Bytes
MAC Rcvd Multi Count
MAC Rcvd Broad Count
MAC Rcvd Pause Count
MAC Rcvd Control Frames
MAC Rcvd Dribbles
MAC Rcvd Frame Length Errors
MAC Rcvd Jabbers
MAC Rcvd Carrier Sense Errors
MAC Rcvd Dropped Frames
MAC Rcvd CRC Errors
MAC Rcvd Encoding Error
MAC Rcvd Length Errors

FC Port
Interrupt Count
Target Command Count
Initiator Command Count

----------------------
FC Port
Interrupt Count
Target Command Count
Initiator Command Count

FC Port
Interrupt Count
Target Command Count
Initiator Command Count
### iSCSI Port

- Interrupt Count
- Target Command Count
- Initiator Command Count
- MAC Xmit Frames
- MAC Xmit Byte Count
- MAC Xmit Multicast Frames
- MAC Xmit Broadcast Frames
- MAC Xmit Pause Frames
- MAC Xmit Control Frames
- MAC Xmit Deferrals
- MAC Xmit Late Collisions
- MAC Xmit Aborted
- MAC Xmit Single Collisions
- MAC Xmit Multiple Collisions
- MAC Xmit Collisions
- MAC Xmit Dropped Frames
- MAC Xmit Jumbo Frames
- MAC Rcvd Frames
- MAC Rcvd Byte Count
- MAC Rcvd Unknown Control Frames
- MAC Rcvd Pause Frames
- MAC Rcvd Control Frames
- MAC Rcvd Dribbles
- MAC Rcvd Frame Length Errors
- MAC Rcvd Jabbers
- MAC Rcvd Carrier Sense Errors
- MAC Rcvd Dropped Frames
- MAC Rcvd CRC Errors
- MAC Rcvd Encoding Errors
- MAC Rcvd Length Errors Large
- MAC Rcvd Small Errors Small
- MAC Rcvd Multicast Frames
- MAC Rcvd Broadcast Frames

### iSCSI Shared Statistics

---

- PDUs Xmited
- Data Bytes Xmited
- PDUs Rcvd
- Data Bytes Rcvd
- I/O Completed
- Unexpected I/O Rcvd
- iSCSI Format Errors
- Header Digest Errors
- Data Digest Errors
- Sequence Errors
- PDU Xmit Count
- PDU Xmit Count
- PDU Xmit Count
- IP Xmit Packets
- IP Xmit Byte Count
- IP Xmit Fragments
- IP Rcvd Packets
- IP Rcvd Byte Count
- IP Rcvd Fragments
- IP Datagram Reassembly Count
- IP Error Packets
- IP Fragment Rcvd Overlap
- IP Fragment Rcvd Out of Order
- IP Datagram Reassembly Timeouts
- TCP Xmit Segment Count
- TCP Xmit Byte Count
- TCP Rcvd Segment Count
- TCP Rcvd Byte Count
TCP Persist Timer Expirations
TCP Rxmit Timer Expired
TCP Rcvd Duplicate Acks
TCP Rcvd Pure Acks
TCP Xmit Delayed Acks
TCP Rcvd Pure Acks
TCP Rcvd Segment Errors
TCP Rcvd Segment Out of Order
TCP Rcvd Window Probes
TCP Rcvd Window Updates
TCP ECC Error Corrections
**Show System command**

Displays product information including the serial number, software version, hardware version, configuration, and temperature.

**Authority**
None

**Syntax**
`show system`

**Examples**
The following is an example of the `show system` command:

```
mpx110 #> show system

System Information
-------------------
Product Name       HP StorageWorks mpx110
Symbolic Name      
Serial Number       0608A00471
HW Version          3
SW Version          2.1.1.0
No. of FC Ports     2
No. of iSCSI Ports  2
Log Level           0
Log Length (KB)     32768
Temperature (C)     36
```
Show Targets command

Shows targets discovered by the mpx110: FC, iSCSI or both.

Authority
None

Syntax
show targets
fc
iscsi

Parameters
fc
Specifies the display of FC targets
iscsi
Specifies the display of iSCSI targets.

Examples
The following is an example of the show targets fc command:

mpx110 #> show targets fc

Target Information
-------------------
WWNN 50:00:1f:e1:50:01:11:50
WWPN 50:00:1f:e1:50:01:11:58
Port ID 01-0d-00
Portal No. 1
State Online

WWNN 50:00:1f:e1:50:06:9d:20
WWPN 50:00:1f:e1:50:06:9d:2c
Port ID 01-08-00
Portal No. 1
State Online

The following is an example of the Show Targets iSCSI command:

mpx110 #> show targets iscsi

No Targets found.
**Show VLAN command**

Displays the mpx110’s VLAN configuration.

**Authority**
None

**Syntax**
`show vlan [<port_num>]`

**Parameter**
`port_num`
The iSCSI port number whose VLAN configuration is to be displayed.

**Example**
The following is an example of the `show vlan` command:

```bash
mpx110 #> show vlan
VLAN Information
------------------
Port 1
VLAN Disabled
ID 0
Priority 0

Port 2
VLAN Disabled
ID 0
Priority 0
```

```bash
mpx110 #> show vlan 1
VLAN Information
------------------
Port 1
VLAN Disabled
ID 0
Priority 0
```
**Shutdown command**

Provides for an orderly shutdown of mpx110 firmware. This command does not power down the mpx110.

**Authority**
Admin session only to set.

**Syntax**
```
shutdown
```

**Examples**
The following is an example of the `shutdown` command:

```
mpx110 (admin) #>shutdown
```
Target command

Removes targets from the mpx110’s database. This command is typically used to remove targets which are no longer connected to the mpx110.

**NOTE:**

The `target add` command is not currently supported.

<table>
<thead>
<tr>
<th>Authority</th>
<th>Admin session only to set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax</td>
<td><code>target</code></td>
</tr>
<tr>
<td>Parameter</td>
<td><code>rm</code></td>
</tr>
</tbody>
</table>

Remove a target from the mpx110 target database.

**Example**

The following is an example of the `target rm` command:

```
mpx110 (admin) #> target rm
Index   (WWNN,WWPN/iSCSI Name)
---------
 0 20:00:00:20:37:fd:8b:ab:00:00:00:fc:b6:1f:fa

Please select an ‘OFFLINE’ Target from the list above (‘q’ to quit): q
Command aborted.
```
The mpx110 maintains a message log that can be displayed and retrieved by the operator, either through the CLI or the mpx110 Manager GUI. The message log is persistent in that it is maintained across mpx110 power cycles and reboots. The three log message categories are:

- **Informational log messages**, page 115
- **Error log messages**, page 120
- **Fatal log messages**, page 129

The following sections describe the log message categories.

## Informational log messages

The following sections list the informational log messages by reporting module.

### Application modules

Table 15 lists informational log messages provided by application modules.

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>53254</td>
<td>System (router) Booting up</td>
<td>6</td>
<td>Router is booting up</td>
</tr>
<tr>
<td>53357</td>
<td>QLBA_ProcessTpbd: De-compression failed. Disabling compression temporarily</td>
<td>109</td>
<td>De-compression failed and will be temporarily disabled</td>
</tr>
<tr>
<td>54274</td>
<td>QLFC_Login: Origin 0x%x, VP Index 0x%x, Id 0x%x</td>
<td>1026</td>
<td>FC login occurred, origin xx (1 = HBA, 2 = target, 3 = initiator), VP (virtual port) xx, ID (loop ID) xx</td>
</tr>
<tr>
<td>54275</td>
<td>QLFC_Login: Port ID %.2x%.2x%.2x</td>
<td>1027</td>
<td>FC login occurred with port ID xx.xx.xx</td>
</tr>
</tbody>
</table>
### iSCSI driver

Table 16 lists log messages common to both iSCSI ports, 1 (GE1) and 2 (GE2). Log messages beginning with #0 apply to iSCSI port 1 (GE1), and log messages beginning with #1 apply to iSCSI port 2 (GE2).

**Table 16 iSCSI driver—informational log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>86343 #0: QLPortUp: Set link configuration 0x%x</td>
<td>327</td>
<td>iSCSI port enabled, port up 331 Restart iSCSI processor (RISC)</td>
<td></td>
</tr>
<tr>
<td>86347 #0: QLDisable: Restart RISC</td>
<td>331</td>
<td>Restart iSCSI processor (RISC)</td>
<td></td>
</tr>
<tr>
<td>86349 #0: QLEnable: Restart RISC to update EEPROM</td>
<td>333</td>
<td>EEPROM updated, restart iSCSI processor (RISC)</td>
<td></td>
</tr>
<tr>
<td>86352 #0: QLPortDown: Set link configuration 0x%x</td>
<td>336</td>
<td>iSCSI port disabled, port down</td>
<td></td>
</tr>
<tr>
<td>86874 #0: QLIsrDecodeMailbox: Link up</td>
<td>858</td>
<td>Link up reported by iSCSI processor for GE1 or GE2</td>
<td></td>
</tr>
</tbody>
</table>
Table 17 lists informational log messages common to both FC ports: 1 (FC1) and 2 (FC2). Log messages beginning with #0 apply to Fibre Channel port 1 (FC1) and log messages beginning with #1 apply to Fibre Channel port 2 (FC2).

### Table 17 FC driver—informational log messages

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>118882</td>
<td>#%d: QLlOctlDisable: Reset adapter</td>
<td>98</td>
<td>Request to reset the FC processor (adapter) received from IOCTL interface.</td>
</tr>
<tr>
<td>119088</td>
<td>#%d: QLIsrEventHandler: LIP occurred (%x): mailbox1 = %x</td>
<td>304</td>
<td>Fibre Channel loop initialization procedure (LIP) occurred. The LIP type is reported, as is the contents of the FC processor’s mailbox 1 register.</td>
</tr>
<tr>
<td>119089</td>
<td>#%d: QLIsrEventHandler: LIP reset occurred (%x): mailbox1 = %x</td>
<td>305</td>
<td>Fibre Channel LIP reset occurred. The LIP reset type is reported, as is the contents of the FC processor’s mailbox 1 register.</td>
</tr>
<tr>
<td>119090</td>
<td>#%d: QLIsrEventHandler: Link up (%x) mailbox1 = %x</td>
<td>306</td>
<td>Fibre Channel link up occurred. Event status is reported, as is the contents of the FC processor’s mailbox 1 register.</td>
</tr>
<tr>
<td>119092</td>
<td>#%d: QLIsrEventHandler: Link mode up (%x): RunTimeMode=%x</td>
<td>308</td>
<td>Fibre Channel link up occurred. Event status is reported, as is the RunTimeMode (0 = loop, 1 = point-to-point).</td>
</tr>
<tr>
<td>119093</td>
<td>#%d: QLIsrEventHandler: RSCN update (%x) rscnInfo: %x</td>
<td>309</td>
<td>A RSCN was received. Event status is reported, as is the RSCN information.</td>
</tr>
<tr>
<td>119097</td>
<td>#%d: QLIsrEventHandler: Port update (%x) mb1-3 %x %x %x</td>
<td>313</td>
<td>Fibre Channel port update. Event status is reported, as is the contents of the FC processor’s mailbox 1, 2, and 3 registers.</td>
</tr>
<tr>
<td>119552</td>
<td>#%d: QLFciplsrEventHandler: Link up (%x) mailbox1 = %x</td>
<td>768</td>
<td>FCIP - Fibre Channel link up occurred. Event status is reported, as is the contents of the FC processor’s mailbox 1 register.</td>
</tr>
<tr>
<td>119553</td>
<td>#%d: QLFciplsrEventHandler: Link down (%x)</td>
<td>769</td>
<td>FCIP - Fibre Channel link down occurred.</td>
</tr>
<tr>
<td>119554</td>
<td>#%d: QLFciplsrEventHandler: Link mode up (%x)</td>
<td>770</td>
<td>FCIP - Fibre Channel link up occurred. Event status is reported, as is the RunTimeMode (0 = loop, 1 = point-to-point).</td>
</tr>
</tbody>
</table>
Table 18 lists log messages provided by user modules

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>151842</td>
<td>FW Upgrade performed: new version is: %d.%d.%d.%d</td>
<td>290</td>
<td>Performed router firmware upgrade, new version number is d.d.d.d.</td>
</tr>
<tr>
<td>151843</td>
<td>REBOOT/SHUTDOWN Command from user. Code=%d</td>
<td>291</td>
<td>User performed a router reboot or shutdown.</td>
</tr>
<tr>
<td>151889</td>
<td>#%d: qapisetfcinterfaceparams_1_svc: FC port configuration changed</td>
<td>337</td>
<td>FC port configuration has been modified.</td>
</tr>
<tr>
<td>151890</td>
<td>#%d: qapisetiscsiinterfaceparams_1_svc: iSCSI port configuration changed</td>
<td>338</td>
<td>iSCSI port configuration has been modified.</td>
</tr>
<tr>
<td>151891</td>
<td>#%d: qapisetins_1_svc:iSNS configuration changed</td>
<td>339</td>
<td>iSNS configuration has been modified.</td>
</tr>
<tr>
<td>151892</td>
<td>qapisetntppparams_1_svc: NTP configuration changed</td>
<td>340</td>
<td>NTP configuration has been modified.</td>
</tr>
<tr>
<td>151893</td>
<td>#%d: qapisetvlanparams_1_svc: VLAN configuration changed</td>
<td>341</td>
<td>VLAN configuration has been modified.</td>
</tr>
<tr>
<td>151896</td>
<td>qapisetmgmtnfcparsms_1_svc:Management port configuration changed</td>
<td>344</td>
<td>Management ethernet port configuration has been modified.</td>
</tr>
<tr>
<td>151897</td>
<td>qapisetbridgebasicinfo_1_svc:Bridge configuration changed</td>
<td>345</td>
<td>Router configuration has been modified.</td>
</tr>
<tr>
<td>151898</td>
<td>QBRPC_Initialize:GetFcSfp Mem Allocation error</td>
<td>346</td>
<td>Remotemap added for local FC device WWPN xx.xx.xx.xx.xx.xx.xx.xx</td>
</tr>
<tr>
<td>151899</td>
<td>qapimapremote_1_svc: Remotemap added to remote device %2x:%2x:%2x:%2x:%2x:%2x</td>
<td>347</td>
<td>Remotemap added for remote FC device WWPN xx.xx.xx.xx.xx.xx.xx.xx</td>
</tr>
<tr>
<td>151900</td>
<td>qapimapremote_1_svc: Remotemap removed for local device %2x:%2x:%2x:%2x:%2x:%2x</td>
<td>348</td>
<td>Remotemap removed for local FC device WWPN xx.xx.xx.xx.xx.xx.xx.xx</td>
</tr>
<tr>
<td>151901</td>
<td>qapimapremote_1_svc: Remotemap removed to remote device %2x:%2x:%2x:%2x:%2x:%2x</td>
<td>349</td>
<td>Remotemap removed for remote FC device WWPN xx.xx.xx.xx.xx.xx.xx.xx</td>
</tr>
<tr>
<td>151902</td>
<td>qapimaptargettoinitiator_1_svc: Localmap added for initiator %2x:%2x:%2x:%2x:%2x:%2x</td>
<td>350</td>
<td>Localmap added for FC initiator WWPN xx.xx.xx.xx.xx.xx.xx.xx.xx.xx</td>
</tr>
<tr>
<td>151903</td>
<td>qapimaptargettoinitiator_1_svc: Localmap added to target device %2x:%2x:%2x:%2x:%2x:%2x:%2x:%2x</td>
<td>351</td>
<td>Localmap added to FC target device WWPN xx.xx.xx.xx.xx.xx.xx.xx.xx.xx.xx.xx</td>
</tr>
<tr>
<td>151904</td>
<td>qapimaptargettoinitiator_1_svc: Localmap removed for initiator device %2x:%2x:%2x:%2x:%2x:%2x:%2x:%2x</td>
<td>352</td>
<td>Localmap removed for FC initiator</td>
</tr>
<tr>
<td>151905</td>
<td>qapimaptargettoinitiator_1_svc: Localmap removed to target device %2x:%2x:%2x:%2x:%2x:%2x:%2x:%2x</td>
<td>353</td>
<td>Localmap removed to FC target device</td>
</tr>
</tbody>
</table>
**FCIP**

Table 19 lists log messages provided by the FCIP modules.

**Table 19 FCIP—informational log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>151906</td>
<td>qapimaptargettoinitiator_1_svc: Localmap</td>
<td>354</td>
<td>Localmap added for iSCSI initiator ign.ddd-dd.ttt.tttt.tttt........</td>
</tr>
<tr>
<td></td>
<td>added for initiator %s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>151907</td>
<td>qapunmaptargettoinitiator_1_svc: Localmap</td>
<td>355</td>
<td>Localmap removed for iSCSI initiator ign.ddd-dd.ttt.tttt.tttt........</td>
</tr>
<tr>
<td></td>
<td>removed for initiator %s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>151908</td>
<td>GE%d: Port status changed by user to ENABLED.</td>
<td>356</td>
<td>User enabled GE port d</td>
</tr>
<tr>
<td>151909</td>
<td>GE%d: Port status changed by user to DISABLED.</td>
<td>357</td>
<td>User disabled GE port d</td>
</tr>
<tr>
<td>151910</td>
<td>FC%d: Port status changed by user to ENABLED.</td>
<td>358</td>
<td>User enabled FC port d</td>
</tr>
<tr>
<td>151911</td>
<td>FC%d: Port status changed by user to DISABLED.</td>
<td>359</td>
<td>User disabled FC port d</td>
</tr>
<tr>
<td>152069</td>
<td>qapisetfcipparams_1_svc: FCIPROUTE %d Added</td>
<td>517</td>
<td>FCIP route #d added</td>
</tr>
<tr>
<td>152070</td>
<td>qapisetfcipparams_1_svc: FCIPROUTE %d Modified</td>
<td>518</td>
<td>FCIP route #d modified</td>
</tr>
<tr>
<td>152071</td>
<td>qapisetfcipparams_1_svc: FCIPROUTE %d Removed</td>
<td>519</td>
<td>FCIP route #d removed</td>
</tr>
</tbody>
</table>

**TOE driver**

Table 20 lists log messages provided by the TOE driver.

**Table 20 FCIP—informational log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>184524</td>
<td>qlFcip_Linkchange#%d: Gige Link Down</td>
<td>204</td>
<td>FCIP Route GigE link d (1 or 2) is down</td>
</tr>
<tr>
<td>184525</td>
<td>qlFcip_Linkchange#%d: Gige Link Up</td>
<td>205</td>
<td>FCIP Route GigE link d (1 or 2) is up</td>
</tr>
</tbody>
</table>

**System**

Table 21 lists log messages provided by the system modules.
Error log messages

The following sections list and describe, by reporting module, the error log messages.

Application modules

Table 22 lists error log messages provided by application modules.

**Table 22 Application module—error log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40967</td>
<td>QLBA_NullDoorbell: driver unloaded, port disabled</td>
<td>7</td>
<td>NULL doorbell routine for unloaded drivers. When a driver is unloaded, the doorbell routine is redirected to this NULL routine.</td>
</tr>
<tr>
<td>40996</td>
<td>QLBA_ProcessTrb: Processing unsupported ordered tag command</td>
<td>36</td>
<td>Processing unsupported ordered tag task management command</td>
</tr>
<tr>
<td>41004</td>
<td>QLBA_ProcessTrb: Processing unsupported head of queue tag command</td>
<td>44</td>
<td>Processing unsupported head-of-queue task management command</td>
</tr>
<tr>
<td>41058</td>
<td>QLBA_CreateTargetDeviceObject: Too many devices</td>
<td>98</td>
<td>Unable to create an object for the target device; exceeded the maximum number of target devices</td>
</tr>
<tr>
<td>41060</td>
<td>QLBA_CreateTargetNodeObject: Too many devices</td>
<td>100</td>
<td>Unable to create an object for the target node; exceeded the maximum number of target devices</td>
</tr>
<tr>
<td>41067</td>
<td>QLBA_CreateLunObject: LunObject memory unavailable</td>
<td>107</td>
<td>Memory unavailable for LUN object</td>
</tr>
<tr>
<td>41077</td>
<td>QLBA_CreateInitiatorObject: Too many initiators</td>
<td>117</td>
<td>Unable to create an object for initiator object; exceeded the maximum number of initiators</td>
</tr>
<tr>
<td>41096</td>
<td>QLBA_DisplayTargetOperationStatus: PCI Error, Status 0x%.2x</td>
<td>136</td>
<td>Process control block status indicates that a PCI error occurred during a target operation</td>
</tr>
<tr>
<td>41106</td>
<td>QLBA_DisplayInitiatorOperationStatus: DMA Error, Status 0x%.2x</td>
<td>146</td>
<td>Process control block status indicates that a DMA error occurred during an initiator operation</td>
</tr>
<tr>
<td>41107</td>
<td>QLBA_DisplayInitiatorOperationStatus: Transport Error, Status 0x%.2x</td>
<td>147</td>
<td>Process control block status indicates that a transport error (protocol) occurred during an initiator operation</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>------------------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>41111</td>
<td>QLBA_DisplayInitiatorOperationStatus: Data Overrun, Status 0x%.2x</td>
<td>151</td>
<td>Process control block status indicates that a data overrun error occurred during an initiator operation.</td>
</tr>
<tr>
<td>41234</td>
<td>QLIS_LoginPduContinue: Operation failed. Initiator 0x%x, TPB status 0x%x</td>
<td>274</td>
<td>iSCSI login failed between receipt of PDU and request for the data segment.</td>
</tr>
<tr>
<td>41238</td>
<td>QLKVValidateLoginTransitCsgNsgVersion failed (status 0x%x)</td>
<td>278</td>
<td>iSCSI login failed due to unsupported version number in received login PDU.</td>
</tr>
<tr>
<td>41257</td>
<td>QLIS_LoginPduContinue: Invalid initiator name. Initiator:</td>
<td>297</td>
<td>iSCSI Login PDU contains invalid initiator name. The format and character set used to form the initiator name is invalid.</td>
</tr>
<tr>
<td>41265</td>
<td>QLIS_LoginPduContinue: Target not configured for Portal</td>
<td>305</td>
<td>iSCSI target login was attempted to a portal (iSCSI1 or iSCSI2) on which the target is not presented.</td>
</tr>
<tr>
<td>41267</td>
<td>QLIS_LoginPduContinue: Target not found. Target name:</td>
<td>307</td>
<td>iSCSI Login PDU received for a target with a target name unknown to the router.</td>
</tr>
<tr>
<td>41268</td>
<td>iSCSI Login PDU received without a target name for a normal session.</td>
<td>308</td>
<td>iSCSI Login PDU received without a target name for a normal session.</td>
</tr>
<tr>
<td>41270</td>
<td>iSCSI Login PDU received without an initiator name key/value not provided.</td>
<td>310</td>
<td>iSCSI Login PDU received without an initiator name key/value.</td>
</tr>
<tr>
<td>41272</td>
<td>QLIS_LoginPduContinue: CONN_STATE_IN_LOGIN, Unknown InitTaskTag</td>
<td>312</td>
<td>iSCSI Login PDU received with an incorrect initiator task tag for a session which is partially logged in. This would occur if a login PDU other than the initial login PDU used an initiator task tag which was different than the initiator task tag provided in the initial login PDU.</td>
</tr>
<tr>
<td>41283</td>
<td>QLIS_LoginPduContinue: TSIH 0x%x out of range</td>
<td>323</td>
<td>iSCSI Login PDU was received with a TSIH out of range. This would occur if the iSCSI initiator attempting the login failed to used the TSIH value provided in the Target Login Response PDU (router is target) in subsequent login PDUs.</td>
</tr>
<tr>
<td>41284</td>
<td>QLIS_LoginPduContinue: Session does not exist, invalid TSIH 0x%x</td>
<td>324</td>
<td>iSCSI Login PDU was received with an invalid TSIH value. The TSIH is invalid because there is no session with that TSIH value.</td>
</tr>
<tr>
<td>41353</td>
<td>QLIS_LoginPduContinue CHAP Validation Failure</td>
<td>393</td>
<td>CHAP validation failed during login.</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>41354</td>
<td>QLIS_LoginPduContinue Unexpected CHAP key detected</td>
<td>394</td>
<td>Unexpected CHAP key</td>
</tr>
<tr>
<td>41508</td>
<td>QLBI_SetPortInfo: QLUT_AllocatePortalObject failed (PortType 0x%x, PortId 0x%x)</td>
<td>548</td>
<td>Failed to allocate object for Set Port Info IOCTL processing. PortType: 0 = FC, 1 = iSCSI. PortId: 0 = FC1 or iSCSI1(GE1), 1 = FC2 or iSCSI2 (GE2).</td>
</tr>
<tr>
<td>41626</td>
<td>QLBI_GetLunInfo: INQUIRY failed, TPB status 0x%x</td>
<td>666</td>
<td>Inquiry command failed. The Inquiry command was issued by the mp110 as part of its discovery process.</td>
</tr>
<tr>
<td>41629</td>
<td>QLBI_GetLunInfo: QLBI_PassthruCommand failed for INQUIRY (page code 0x83)</td>
<td>669</td>
<td>Inquiry command for page 83 failed. The Inquiry command was issued by the mp110 as part of its discovery process.</td>
</tr>
<tr>
<td>41635</td>
<td>QLBI_GetLunInfo: QLBI_PassthruCommand failed for READ CAPACITY.</td>
<td>675</td>
<td>Read Capacity command failed. The Read Capacity command was issued by the mp110 as part of its discovery process.</td>
</tr>
<tr>
<td>41636</td>
<td>QLBI_GetLunInfo: READ CAPACITY failed, TPB status 0x%x</td>
<td>676</td>
<td>Read Capacity command failed. The Read Capacity command was issued by the mp110 as part of its discovery process.</td>
</tr>
<tr>
<td>41696</td>
<td>QLBI_PassthruCommandCompletion: Passthru command aborted</td>
<td>736</td>
<td>Pass Through command issued by management application (such as GUI) was aborted.</td>
</tr>
<tr>
<td>41700</td>
<td>QLBI_Passthru: Invalid CDB length %d bytes</td>
<td>740</td>
<td>Pass Through command issued by management application (such as GUI) failed due to invalid CDB length.</td>
</tr>
<tr>
<td>41701</td>
<td>QLBI_Passthru: Invalid data length %d bytes</td>
<td>741</td>
<td>Pass Through command issued by management application (such as GUI) failed due to invalid data length.</td>
</tr>
<tr>
<td>41717</td>
<td>QLBI_PassthruCommand: command interrupted or timed out</td>
<td>757</td>
<td>Pass Through command issued by management application (such as GUI) was interrupted or timed out.</td>
</tr>
<tr>
<td>41750</td>
<td>QLBI_ioctl: ERROR: Operation (0x%x) not supported in this mode</td>
<td>790</td>
<td>IOCTL operation unsupported. Operation code provided in log message.</td>
</tr>
<tr>
<td>41768</td>
<td>QLBI_GetLunList: REPORT LUNS command failed</td>
<td>808</td>
<td>Report LUNs command failed. The Report LUNs command was issued by the mp110 as part of its discovery process.</td>
</tr>
<tr>
<td>41769</td>
<td>QLBI_GetLunList: REPORT LUNS command failed with CHECK CONDITION, SCSI STATUS 0x%02x</td>
<td>809</td>
<td>Report LUNs command failed with CHECK CONDITION status. The Report LUNs command was issued by the mp110 as part of its discovery process.</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>41771</td>
<td>QLBI_GetLunList: Lun allocation failed for LunId %d</td>
<td>811</td>
<td>Failed to allocate LUN object: out of resources.</td>
</tr>
<tr>
<td>41994</td>
<td>QLFC_Login: VpIndex (%d) out of range</td>
<td>1034</td>
<td>Failed to allocate LUN object: out of resources.</td>
</tr>
<tr>
<td>41995</td>
<td>QLFC_Login: VP Index 0x%x not configured</td>
<td>1035</td>
<td>Login attempted using Fibre Channel VP (virtual port) index which has not been configured. Operation attempted on an unconfigured VP.</td>
</tr>
<tr>
<td>42002</td>
<td>QLFC_Login: Can’t open connection</td>
<td>1042</td>
<td>Attempting login but Fibre Channel connection cannot be opened.</td>
</tr>
<tr>
<td>42024</td>
<td>QLFC_Logout: No active path to device. WWPN: %.2X%.2X%.2X%.2X%.2X%.2X%.2X%.2X</td>
<td>1064</td>
<td>Attempting logout of device for which there is no active path (WWPN not found).</td>
</tr>
<tr>
<td>42027</td>
<td>QLFC_Logout: VP Index 0x%x not configured</td>
<td>1067</td>
<td>Logout attempted using Fibre Channel VP (virtual port) index which has not been configured. Operation attempted on an unconfigured VP.</td>
</tr>
<tr>
<td>42068</td>
<td>QLFC_HandleTeb: System Error</td>
<td>1108</td>
<td>Event notification: Fibre Channel processor encountered a system error (unrecoverable firmware error).</td>
</tr>
<tr>
<td>42069</td>
<td>QLFC_HandleTeb: Driver Fatal Error</td>
<td>1109</td>
<td>Event notification: Fibre Channel driver encountered a fatal error.</td>
</tr>
<tr>
<td>42072</td>
<td>QLFC_HandleTeb: FC Logout.</td>
<td>1112</td>
<td>Event notification: Fibre Channel port logged out.</td>
</tr>
<tr>
<td>42242</td>
<td>QLIS_AllocateSessionObject: Out of session resources.</td>
<td>1282</td>
<td>Failed to allocate object for iSCSI session: out of session resources.</td>
</tr>
<tr>
<td>42252</td>
<td>QLIS_EnqueueiScsiPdu: Duplicate PDU, CmdSN %d (0x%x), dropping it.</td>
<td>1292</td>
<td>Received iSCSI PDU with duplicate CmdSN (command sequence number). Command PDU will be dropped.</td>
</tr>
<tr>
<td>42258</td>
<td>QLIS_InstantiateSession: Can’t add Initiator to the database</td>
<td>1298</td>
<td>Unable to allocate iSCSI initiator object while initiating a session.</td>
</tr>
<tr>
<td>42404</td>
<td>QLIS_ProcessStartTrb: [%d] CmdSN %ld is out of range (%ld—%ld), Cdb[0] 0x%02X, DataXferLen 0x%x.</td>
<td>1444</td>
<td>Failed to execute iSCSI command PDU due to its CmdSN (command sequence number) being out of range. Provided in log message are the incorrect CmdSN, the valid CmdSN range, the first byte of the CDB, and the data length.</td>
</tr>
<tr>
<td>42648</td>
<td>QLIS_HandleTeb: Driver Fatal Error</td>
<td>1688</td>
<td>Event notification: iSCSI driver encountered a fatal error.</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------</td>
<td>-----</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>42649</td>
<td>QLIS_HandleTeb: Unload Driver.</td>
<td>1689</td>
<td>Event notification: an IOCTL request was received to unload the iSCSI driver.</td>
</tr>
<tr>
<td>42654</td>
<td>QLIS_HandleTeb: iSNS Connection Failed</td>
<td>1694</td>
<td>Event notification: attempt to connect to the iSNS server failed.</td>
</tr>
<tr>
<td>43012</td>
<td>QLSC_CollectBUVUIO: Allocation of DSD failed</td>
<td>2052</td>
<td>iSNS connection failed</td>
</tr>
<tr>
<td>43013</td>
<td>QLSC_CollectBUVUIORecover: Allocation of DSD failed</td>
<td>2053</td>
<td>Break up I/O DSD allocation failed</td>
</tr>
<tr>
<td>43265</td>
<td>QLUT_AllocateTpbExtension: TPB allocation failed</td>
<td>2305</td>
<td>Break up I/O recover DSD allocation failed</td>
</tr>
<tr>
<td>43267</td>
<td>QLUT_AllocateTpbExtension: Data buffer allocation failed (length %d)</td>
<td>2307</td>
<td>Data buffer allocation failed (length %d) during tpb extension allocation</td>
</tr>
<tr>
<td>43268</td>
<td>QLUT_AllocateTpbExtension: Alloc of DSD failed for buffer len %d</td>
<td>2308</td>
<td>Allocation of DSD failed during Tpb extension allocation. Buffer length %d</td>
</tr>
<tr>
<td>43269</td>
<td>QLFCIP_IncomingFrame: BUGCHECK: Trb (0x%p) ValidFlag (0x%x) Direction (0x%xx)</td>
<td>2309</td>
<td>FCIP incoming frame: BUGCHECK: Trb (0x%p) ValidFlag (0x%x) Direction (0x%xx)</td>
</tr>
<tr>
<td>43270</td>
<td>QLFCIP_IncomingFrame: GetFcipMapPortal failed</td>
<td>2310</td>
<td>FCIP incoming frame: GetFcipMapPortal failed</td>
</tr>
<tr>
<td>43271</td>
<td>QLFCIP_IncomingFrame: Got Status aborted pTrb-&gt;pBufDescList[0].%p Trb Direc</td>
<td>2311</td>
<td>FCIP incoming frame: Got Status aborted pTrb-&gt;pBufDescList[0].%p Trb Direction:0x%xx</td>
</tr>
<tr>
<td>43272</td>
<td>QLFCIP_SystemError: System error</td>
<td>2312</td>
<td>FCIP system error</td>
</tr>
<tr>
<td>43273</td>
<td>QLFCIP_SystemError: QLOP_IssuePortEnable failed</td>
<td>2313</td>
<td>FCIP system error: QLOP_IssuePortEnable failed</td>
</tr>
<tr>
<td>43280</td>
<td>QLFCIP_HandleTeb: Driver Fatal error</td>
<td>2320</td>
<td>FCIP handle Teb: Driver Fatal error</td>
</tr>
<tr>
<td>43281</td>
<td>QLFCIP_ConfigPortal: Find portal object failed for QLUT_TYPE_FC, PortId (%d)</td>
<td>2321</td>
<td>FCIP configure portal: Find portal object failed for QLUT_TYPE_FC, PortId (%d)</td>
</tr>
<tr>
<td>43282</td>
<td>QLFCIP_ConfigPortal: QLFCIP_ConfigPortal: Invalid PortId for FCIP link Port</td>
<td>2322</td>
<td>FCIP configure portal: QLFCIP_ConfigPortal: Invalid PortId for FCIP link PortID(%d)</td>
</tr>
<tr>
<td>43283</td>
<td>QLUT_AllocateFcipTrbPool: Allocation failed (size 0x%x))</td>
<td>2323</td>
<td>FCIP allocate TRB pool: Allocation failed (size 0x%x))</td>
</tr>
<tr>
<td>43284</td>
<td>QLUT_GetFcipTrb: Null portal object in map table</td>
<td>2324</td>
<td>FCIP Trb: Null portal object in map table</td>
</tr>
<tr>
<td>43285</td>
<td>QLUT_GetFcipTrb: Unable to get the Free Trb</td>
<td>2325</td>
<td>FCIP get TRB: Null portal object in map table</td>
</tr>
<tr>
<td>43286</td>
<td>QLUT_GetFcipTrb: Duplicate allocation of FcipTrb (0x%p)</td>
<td>2326</td>
<td>FCIP get TRB: Duplicate allocation of FcipTrb (0x%p)</td>
</tr>
<tr>
<td>43287</td>
<td>QLUT_FreeFcipTrb: Null portal object in map table</td>
<td>2327</td>
<td>FCIP free TRB: Null portal object in map table</td>
</tr>
</tbody>
</table>
### Log Messages Common to Both iSCSI Ports

Table 23 lists error log messages common to both iSCSI ports, 1 (GE1) and 2 (GE2). Log messages beginning with #0 apply to iSCSI port 1 (GE1) and log messages beginning with #1 apply to iSCSI port 2 (GE2).

#### Table 23 iSCSI Driver—Error Log Messages

<table>
<thead>
<tr>
<th>ID</th>
<th>Log Message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>73990</td>
<td>QLUtmIoctlEnable: Initialize FW failed</td>
<td>262</td>
<td>The iSCSI processor failed firmware initialization.</td>
</tr>
<tr>
<td>74046</td>
<td>QLPortUp: MBOX_CMD_SET_PORT_CONFIG %04x failed %04x</td>
<td>318</td>
<td>The iSCSI processor command to enable a GE port failed.</td>
</tr>
<tr>
<td>74056</td>
<td>QLRunDiag: MBOX Diag test internal loopback failed %x %x</td>
<td>328</td>
<td>The iSCSI processor failed the internal loopback test.</td>
</tr>
<tr>
<td>74057</td>
<td>QLRunDiag: MBOX Diag test external loopback failed %x %x</td>
<td>329</td>
<td>The iSCSI processor failed the external loopback test.</td>
</tr>
<tr>
<td>74065</td>
<td>QLPortDown: MBOX_CMD_SET_PORT_CONFIG %04x failed %04x</td>
<td>337</td>
<td>The iSCSI processor command to disable a GE port failed.</td>
</tr>
<tr>
<td>74241</td>
<td>QLiSNSEnableCallback: iSNS Server TCP Connect failed</td>
<td>513</td>
<td>The iSCSI processor could not connect with the iSCSI name server (iSNS).</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------------</td>
<td>-----</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>74577</td>
<td>QLIsrDecodeMailbox: NVRAM invalid</td>
<td>849</td>
<td>The iSCSI processor reported that the iSCSI port NVRAM contains invalid data (checksum error).</td>
</tr>
<tr>
<td>74587</td>
<td>QLIsrDecodeMailbox: Link down</td>
<td>859</td>
<td>The iSCSI processor reported a link down condition.</td>
</tr>
<tr>
<td>74656</td>
<td>QLReadyTimer: Adapter missed heartbeat for %d seconds: Time left %d</td>
<td>928</td>
<td>The driver failed to receive a heartbeat from the iSCSI processor for the specified number of seconds.</td>
</tr>
<tr>
<td>74661</td>
<td>QLTimer: Abort pTpbe=%p, Type %x, Timeout 0x%x, DrvCount 0x%x, DdbIndex 0x%x</td>
<td>933</td>
<td>The driver timed out an iSCSI processor operation and is aborting the operation.</td>
</tr>
<tr>
<td>74663</td>
<td>QLReadyTimer: MBOX_CMD %04x %04x %04x %04x %04x %04x %04x %04x timed out</td>
<td>935</td>
<td>The driver timed out an iSCSI processor mailbox command.</td>
</tr>
<tr>
<td>74665</td>
<td>QLIsNSReenable failed</td>
<td>937</td>
<td>The driver timed out while attempting to reconnect with the iSNS.</td>
</tr>
<tr>
<td>74784</td>
<td>QLUpdateInitiatorData: No more room in Initiator Database</td>
<td>1056</td>
<td>The driver’s initiator database is full. The driver is capable of storing 1024 iSCSI initiators in its database. Use the CLI or GUI to remove unwanted/unused iSCSI initiators.</td>
</tr>
<tr>
<td>74800</td>
<td>QLSetTargetData: No more room in Target Database</td>
<td>1072</td>
<td>The driver’s target database is full. Use the CLI or GUI to remove unwanted/unused iSCSI targets.</td>
</tr>
</tbody>
</table>

### Fibre Channel driver

Table 24 lists error log messages common to both Fibre Channel ports, 1 (FC1) and 2 (FC2). Log messages beginning with #0 apply to Fibre Channel port 1 (FC1) and log messages beginning with #1 apply to Fibre Channel port 2 (FC2).

**Table 24 FC driver—error log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>106583</td>
<td>QLUtmReceiveio: Path invalid/FW No resource count %x</td>
<td>87</td>
<td>The FC processor received a SCSI command for an unknown target path or has run out of resources to execute additional commands.</td>
</tr>
<tr>
<td>106589</td>
<td>QLioctlEnable: Adapter disabled</td>
<td>93</td>
<td>The FC processor was disabled by an IOCTL request to the driver.</td>
</tr>
<tr>
<td>106590</td>
<td>QLioctlEnable: Initialize FW error</td>
<td>94</td>
<td>The FC processor firmware failed initialization. The request to initialize was received by the driver in an IOCTL request.</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>106592</td>
<td><code>%d: QLloctlRunDiag: Diagnostic loopback command failed %x %x %x %x</code></td>
<td>96</td>
<td>The FC processor failed the external loopback test.</td>
</tr>
<tr>
<td>106593</td>
<td><code>%d: QLloctlDisable: Re-initialize adapter failed</code></td>
<td>97</td>
<td>The FC processor failed to re-initialize in response to an IOCTL disable request.</td>
</tr>
<tr>
<td>106595</td>
<td><code>%d: QLUtmReceiveIo: Invalid VP Loop Id 0x%x</code></td>
<td>99</td>
<td>Invalid Virtual Port loop ID</td>
</tr>
<tr>
<td>106803</td>
<td><code>%d: QLUsrEventHandler: Link down (%x)</code></td>
<td>307</td>
<td>The FC processor reported a link down condition.</td>
</tr>
<tr>
<td></td>
<td>Table B-10. Fibre Channel Driver—Error Log Messages (Continued) ID Log Messages No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>106813</td>
<td><code>%d: QLUsrEventHandler: Unexpected async event (%x), MB1=%x, MB2=%x, MB3=%x, MB4=%x, MB5=%x, MB6=%x, MB7=%x</code></td>
<td>317</td>
<td>The FC processor reported an unexpected asynchronous event. The mailbox registers provide status, event code, and data related to the event.</td>
</tr>
<tr>
<td>106846</td>
<td><code>%d: QLProcessResponseQueueFS: TRB is NULL: %d</code></td>
<td>350</td>
<td>FCIP Response queue entry TRB pointer is NULL</td>
</tr>
<tr>
<td>106853</td>
<td><code>%d: QLTimer: Link error count (0x%x) exceeded, link down</code></td>
<td>357</td>
<td>The driver has determined that the FC link is unreliable and unusable due to the number of errors encountered. The link has been taken down.</td>
</tr>
<tr>
<td>106912</td>
<td><code>%d: QLReserveLoopId: out of loop Ids</code></td>
<td>416</td>
<td>The FC processor was unable to obtain the number of loop IDs required. This failure occurs only when the FC processor is running multi-ID firmware.</td>
</tr>
<tr>
<td>106928</td>
<td><code>%d: QLMarkDeviceOffline: Device Id: %x marked offline, cLinkDownTimeout = %x, cPortDownRetryCount=%x</code></td>
<td>432</td>
<td>The driver was unable to re-establish connection to the target within the timeout and retry counts, and is therefore marking it offline.</td>
</tr>
<tr>
<td>106948</td>
<td><code>%d: QLSnsGetAllNext: Name server login FAILED %x</code></td>
<td>452</td>
<td>The FC processor is unable to log into the FC fabric name server.</td>
</tr>
<tr>
<td>107029</td>
<td><code>%d: QLUpdateDeviceData: out of slots in host database</code></td>
<td>533</td>
<td>The driver’s host (initiator) database is full.</td>
</tr>
<tr>
<td>107041</td>
<td><code>%d: QLUpdateDeviceDatabase 0x%x: GET_ID failed %x</code></td>
<td>545</td>
<td>The driver’s target database is full.</td>
</tr>
<tr>
<td>107056</td>
<td><code>%d: QLUpdateDeviceDatabase 0x%x: out of slots in host database</code></td>
<td>560</td>
<td>The driver’s host (initiator) database is full. Maximum host database is 64.</td>
</tr>
<tr>
<td>107058</td>
<td><code>%d: QLUpdateDeviceDatabase 0x%x: MBOX_CMD_GET VP DATABASE failed %x</code></td>
<td>562</td>
<td>FC processor ‘Get VP Database entry command failed</td>
</tr>
</tbody>
</table>
### Error log messages in user modules

Table 25 lists error log messages provided by user modules.

#### Table 25 User modules — error log messages

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>139265</td>
<td>QBRPC_Initialize: Entered</td>
<td>1</td>
<td>RPC (remote procedure call) server initialization entry point.</td>
</tr>
<tr>
<td>139266</td>
<td>QBRPC_Initialize:GetBridge Mem Allocation error</td>
<td>2</td>
<td>Get System API memory allocation failed.</td>
</tr>
<tr>
<td>139268</td>
<td>QBRPC_Initialize:GetMgmt Mem Allocation error</td>
<td>4</td>
<td>Get Management API memory allocation failed.</td>
</tr>
<tr>
<td>139269</td>
<td>QBRPC_Initialize:Getiscsi Mem Allocation error</td>
<td>5</td>
<td>Get iSCSI API memory allocation failed.</td>
</tr>
<tr>
<td>139271</td>
<td>QBRPC_Initialize:Getsns Mem Allocation error</td>
<td>7</td>
<td>Get iSNS API memory allocation failed.</td>
</tr>
<tr>
<td>139272</td>
<td>QBRPC_Initialize:GetFcInfc Mem Allocation error</td>
<td>8</td>
<td>Get FC Interface API memory allocation failed.</td>
</tr>
<tr>
<td>139273</td>
<td>QBRPC_Initialize:GetFcAdv Mem Allocation error</td>
<td>9</td>
<td>Get FC Advanced API memory allocation failed.</td>
</tr>
<tr>
<td>139280</td>
<td>QBRPC_Initialize:GetFcSfp Mem Allocation error</td>
<td>16</td>
<td>Failed memory allocation for Get FC SFP API.</td>
</tr>
<tr>
<td>139281</td>
<td>QBRPC_Initialize:GetLog Mem Allocation error</td>
<td>17</td>
<td>Failed memory allocation for Get Log API.</td>
</tr>
<tr>
<td>139282</td>
<td>QBRPC_Initialize:GetStats Mem Allocation error</td>
<td>18</td>
<td>Failed memory allocation for Get Statistics API.</td>
</tr>
<tr>
<td>139283</td>
<td>QBRPC_Initialize:InitListMem Allocation error</td>
<td>19</td>
<td>Failed memory allocation for Get Initiator List API.</td>
</tr>
<tr>
<td>139284</td>
<td>QBRPC_Initialize:TargetList Mem Allocation error</td>
<td>20</td>
<td>Failed memory allocation for Get Target List API.</td>
</tr>
<tr>
<td>139285</td>
<td>QBRPC_Initialize:LunList Mem Allocation error</td>
<td>21</td>
<td>Failed memory allocation for Get LUN List API.</td>
</tr>
<tr>
<td>139286</td>
<td>QBRPC_Initialize:PresTarget Mem Allocation error</td>
<td>22</td>
<td>Failed memory allocation for Get Presented Targets List API.</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------</td>
<td>-----</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>139287</td>
<td>QBRPC_Initialize:LunMask Mem Allocation error</td>
<td>23</td>
<td>Failed memory allocation for Get LUN Mask API.</td>
</tr>
<tr>
<td>139288</td>
<td>QBRPC_Initialize:Init Mem Allocation error</td>
<td>24</td>
<td>Failed memory allocation for Initiator API.</td>
</tr>
<tr>
<td>139289</td>
<td>QBRPC_Initialize:TgtDevice Mem Allocation error</td>
<td>25</td>
<td>Failed memory allocation for Target Device API.</td>
</tr>
<tr>
<td>139296</td>
<td>QBRPC_Initialize:FcTgt Mem Allocation error</td>
<td>32</td>
<td>Failed memory allocation for FC Target API.</td>
</tr>
<tr>
<td>139297</td>
<td>QBRPC_Initialize:BridgeStatus Mem Allocation error</td>
<td>33</td>
<td>Failed memory allocation for System Status API.</td>
</tr>
<tr>
<td>139298</td>
<td>QBRPC_Initialize:Diag Mem Allocation error</td>
<td>34</td>
<td>Failed memory allocation for Diagnostic API.</td>
</tr>
<tr>
<td>139299</td>
<td>QBRPC_Initialize:DiagLog Mem Allocation error</td>
<td>35</td>
<td>Failed memory allocation for Diagnostic Log API.</td>
</tr>
<tr>
<td>139300</td>
<td>QBRPC_Initialize:FruImage Mem Allocation error</td>
<td>36</td>
<td>Failed memory allocation for FRU Image API.</td>
</tr>
<tr>
<td>139301</td>
<td>QBRPC_Initialize:OemMfg Mem Allocation error</td>
<td>37</td>
<td>Failed memory allocation for OEM Manufacturing API.</td>
</tr>
<tr>
<td>139302</td>
<td>QBRPC_Initialize:Status Mem Allocation error</td>
<td>38</td>
<td>Failed memory allocation for Status API.</td>
</tr>
<tr>
<td>139303</td>
<td>QBRPC_Initialize:TcplpStats Mem Allocation error</td>
<td>39</td>
<td>Failed memory allocation for TCP/IP Statistics API.</td>
</tr>
<tr>
<td>139304</td>
<td>QBRPC_Initialize:NtpStats Mem Allocation error</td>
<td>40</td>
<td>Failed memory allocation for NTP Status API.</td>
</tr>
<tr>
<td>139305</td>
<td>QBRPC_Initialize:LunList MemAlloc error</td>
<td>41</td>
<td>Failed memory allocation for LUN List API.</td>
</tr>
<tr>
<td>139315</td>
<td>QBRPC_FreeResources:Entered</td>
<td>51</td>
<td>RPC free resources entry point.</td>
</tr>
<tr>
<td>139553</td>
<td>checkDuplicateIp: Detected Error %08x %04x</td>
<td>289</td>
<td>Detected duplicate IP address for management port.</td>
</tr>
</tbody>
</table>

**System**

Table 26 lists error log messages provided by system modules.

**Table 26 System—error log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>237572</td>
<td>Failed to kill sys killer %d\n</td>
<td>4</td>
<td>Failed to kill system task.</td>
</tr>
<tr>
<td>237573</td>
<td>Temperature over high threshold %d\n</td>
<td>5</td>
<td>Reporting router exceeds maximum operating temperature.</td>
</tr>
</tbody>
</table>

**Fatal log messages**

The following sections list fatal log messages by the reporting module.
Table 27 lists fatal log messages common to both iSCSI ports, 1 (GE1) and 2 (GE2). Log messages beginning with #0 apply to iSCSI port 1 (GE1) and log messages beginning with #1 apply to iSCSI port 2 (GE2).

**Table 27 iSCSI driver—fatal log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>69652</td>
<td><code>%d: qlutm_init: Diagnostic failed, invalid SRAM</code></td>
<td>20</td>
<td>iSCSI processor SRAM test failed.</td>
</tr>
<tr>
<td>69653</td>
<td><code>%d: qlutm_init: Diagnostic failed, fail reboot</code></td>
<td>21</td>
<td>iSCSI processor failed diagnostic reboot.</td>
</tr>
<tr>
<td>69654</td>
<td><code>%d: qlutm_init: Diagnostic failed, invalid NVRAM</code></td>
<td>22</td>
<td>iSCSI processor failed NVRAM diagnostic.</td>
</tr>
<tr>
<td>69655</td>
<td><code>%d: qlutm_init: Diagnostic failed, invalid DRAM</code></td>
<td>23</td>
<td>iSCSI processor failed DRAM diagnostic.</td>
</tr>
<tr>
<td>69656</td>
<td><code>%d: qlutm_init: Failed to return diagnostic result to Bridge</code></td>
<td>24</td>
<td>iSCSI processor failed to return diagnostic results.</td>
</tr>
<tr>
<td>69941</td>
<td><code>%d: QLUtmProcessResponseQueue: Invalid handle %x EntryType %x</code></td>
<td>309</td>
<td>Response queue entry contains an invalid handle.</td>
</tr>
<tr>
<td>69951</td>
<td><code>%d: QLSetNvram: QLRebootTimer failed AF %x RS %x Time %d</code></td>
<td>319</td>
<td>Set NVRAM reboot timer failed.</td>
</tr>
<tr>
<td>69964</td>
<td><code>%d: QLDisable: QLRebootTimer failed AF %x RS %x Time %d</code></td>
<td>332</td>
<td>Port disable reboot timer failed.</td>
</tr>
<tr>
<td>69966</td>
<td><code>%d: QLEnable: QLRebootTimer failed AF %x RS %x Time %d</code></td>
<td>334</td>
<td>Port enable reboot timer failed.</td>
</tr>
<tr>
<td>70224</td>
<td><code>%d: QLProcSrblessiSNSResponse: Invalid handle %x</code></td>
<td>592</td>
<td>iSNS response contains an invalid handle.</td>
</tr>
<tr>
<td>70400</td>
<td><code>%d: QLInitializeDevice: QLStartAdapter failed</code></td>
<td>768</td>
<td>Start iSCSI processor failed.</td>
</tr>
<tr>
<td>70417</td>
<td><code>%d: QLInitializeAdapter: QLInitializeFW failed</code></td>
<td>785</td>
<td>iSCSI processor firmware initialization failed.</td>
</tr>
<tr>
<td>70432</td>
<td><code>%d: QLDoInterruptServiceRoutine: PortFatal interrupt. PortFatalErrorStatus %0x CSR %0x AS %x AF %x Time %d</code></td>
<td>800</td>
<td>iSCSI processor port fatal error.</td>
</tr>
<tr>
<td>70448</td>
<td><code>%d: QLStartAdapter: QLRebootTimer failed AF %x RS %x Time %d</code></td>
<td>816</td>
<td>Start iSCSI processor reboot timer failed.</td>
</tr>
<tr>
<td>70489</td>
<td><code>%d: QLsrDecodeMailbox: System Error 8002 MB[1-7] %04x %04x %04x %04x %04x %04x %04x </code></td>
<td>857</td>
<td>iSCSI processor fatal system error.</td>
</tr>
<tr>
<td>70499</td>
<td><code>%d: QLProcessResponseQueue: Invalid handle for ET_PASSTHROUGH_STATUS</code></td>
<td>867</td>
<td>Response queue invalid handle for ET pass-through.</td>
</tr>
<tr>
<td>70501</td>
<td><code>%d: QLProcessResponseQueue: Invalid entry type in response queue %x</code></td>
<td>869</td>
<td>Response queue invalid entry type.</td>
</tr>
<tr>
<td>70502</td>
<td><code>%d: QLProcessResponseQueue: Invalid handle %x EntryType %x</code></td>
<td>870</td>
<td>Response queue invalid handle for specified entry type.</td>
</tr>
<tr>
<td>70524</td>
<td><code>%d: QLProcessAen: Invalid event %x</code></td>
<td>892</td>
<td>Asynchronous event for unknown event type.</td>
</tr>
<tr>
<td>70544</td>
<td><code>%d: QLRebootTimer: Reboot failed!</code></td>
<td>912</td>
<td>Reboot timer failed.</td>
</tr>
<tr>
<td>ID</td>
<td>Log message</td>
<td>No.</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>70563</td>
<td>#%d: QLReadyTimer: Adapter missed heartbeat for 0x%x seconds. Rebooting</td>
<td>931</td>
<td>iSCSI driver missed iSCSI processor heartbeat. iSCSI processor rebooted.</td>
</tr>
<tr>
<td>70564</td>
<td>#%d: QLReadyTimer: Abort pTpb=%p failed, DrvCount 0x%x</td>
<td>932</td>
<td>iSCSI processor failed to complete operation before timeout.</td>
</tr>
<tr>
<td>70609</td>
<td>#%d: QLProcessSystemError: Restart RISC</td>
<td>977</td>
<td>iSCSI processor system error restart.</td>
</tr>
<tr>
<td>70784</td>
<td>#%d: QlConfigChip: invalid NVRAM</td>
<td>1152</td>
<td>iSCSI processor NVRAM invalid (checksum error).</td>
</tr>
<tr>
<td>70835</td>
<td>#%d: QLStartFw: MBOX_CMD_SET_FLASH failed %x</td>
<td>1203</td>
<td>iSCSI FLASH (NVRAM) command failed</td>
</tr>
<tr>
<td>70836</td>
<td>#%d: QLStartFw: Invalid Fw loader state 0x%x</td>
<td>1204</td>
<td>iSCSI firmware loader invalid state</td>
</tr>
<tr>
<td>70837</td>
<td>#%d: QLStartFw: Load Fw loader timeout</td>
<td>1205</td>
<td>iSCSI failed to load firmware in time allotted</td>
</tr>
</tbody>
</table>

**FC driver**

Table 28 lists fatal log messages common to both Fibre Channel ports, 1 (FC1) and 2 (FC2). Log messages beginning with #0 apply to Fibre Channel port 1 (FC1) and log messages beginning with #1 apply to Fibre Channel port 2 (FC2).

**Table 28 FC driver—fatal log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>102419</td>
<td>#%d: qlutm_init: Diagnostic failed, port 1 invalid SRAM</td>
<td>19</td>
<td>FC1 processor SRAM test failed.</td>
</tr>
<tr>
<td>102420</td>
<td>#%d: qlutm_init: Diagnostic failed, port 1 POST failed</td>
<td>20</td>
<td>FC1 processor power-on self-test (POST) failed.</td>
</tr>
<tr>
<td>102421</td>
<td>#%d: qlutm_init: Diagnostic failed, port 2 invalid SRAM</td>
<td>21</td>
<td>FC2 processor SRAM test failed.</td>
</tr>
<tr>
<td>102422</td>
<td>#%d: qlutm_init: Diagnostic failed, port 2 POST failed</td>
<td>22</td>
<td>FC2 processor POST failed.</td>
</tr>
<tr>
<td>102423</td>
<td>#%d: qlutm_init: Failed to return diagnostic result to Bridge</td>
<td>23</td>
<td>FC processor failed to return diagnostic results.</td>
</tr>
<tr>
<td>102656</td>
<td>#%d: QLInitializeAdapter: Reset ISP failed</td>
<td>256</td>
<td>FC processor failed reset.</td>
</tr>
<tr>
<td>102657</td>
<td>#%d: QLInitializeAdapter: Load RISC code failed</td>
<td>257</td>
<td>FC processor firmware load failed.</td>
</tr>
<tr>
<td>102658</td>
<td>#%d: QLInitializeAdapter: Load ISP2322 receive sequencer code failed</td>
<td>258</td>
<td>FC processor receive sequencer code load failed.</td>
</tr>
<tr>
<td>102659</td>
<td>#%d: QLInitializeAdapter: Load ISP2322 transmit sequencer code failed</td>
<td>259</td>
<td>FC processor transmit sequencer code load failed.</td>
</tr>
<tr>
<td>102662</td>
<td>#%d: QLInitializeAdapter: Verify Checksum command failed (%x)</td>
<td>262</td>
<td>FC processor firmware checksum failed.</td>
</tr>
</tbody>
</table>
### TOE driver

Table 29 lists fatal log messages provided by the TOE driver.

**Table 29 TOE—Fatal log messages**

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>102680</td>
<td><code>#%d: QLInitializeFW: FAILED</code></td>
<td>280</td>
<td>FC processor firmware initialization failed.</td>
</tr>
<tr>
<td>102688</td>
<td><code>#%d: QLInterruptServiceRoutine: Risc pause %x with parity error hccr %x, Disable adapter</code></td>
<td>288</td>
<td>FC processor paused due to internal parity error.</td>
</tr>
<tr>
<td>102689</td>
<td><code>#%d: QLInterruptServiceRoutine: Invalid interrupt status: %x</code></td>
<td>289</td>
<td>FC processor returned an invalid interrupt status.</td>
</tr>
<tr>
<td>10691</td>
<td><code>#%d: QLFcipInterruptServiceRoutine: Risc pause %x with parity error hccr %x, Disable adapter</code></td>
<td>291</td>
<td>FC processor invalid interrupt status.</td>
</tr>
<tr>
<td>10692</td>
<td><code>#%d: QLFcipInterruptServiceRoutine: Invalid interrupt status: %x</code></td>
<td>292</td>
<td>FC processor paused due to RAM parity error.</td>
</tr>
<tr>
<td>102716</td>
<td><code>#%d: QLIsrEventHandler: System error event (%x), MB1=%x, MB2=%x, MB3=%x, MB4=%x, MB5=%x, MB6=%x, MB7=%x</code></td>
<td>316</td>
<td>FC processor system error.</td>
</tr>
<tr>
<td>102746</td>
<td><code>#%d: QLProcessResponseQueue: Invalid handle %x, type %x</code></td>
<td>346</td>
<td>Response queue entry contains an invalid handle.</td>
</tr>
<tr>
<td>102747</td>
<td><code>#%d: QLProcessResponseQueueFS: Invalid type: %x</code></td>
<td>347</td>
<td>FCIP - Response queue entry contains an invalid buffer type</td>
</tr>
<tr>
<td>102748</td>
<td><code>#%d: QLProcessResponseQueueFS: Invalid EntryType (0x%x)</code></td>
<td>348</td>
<td>FCIP - Response queue entry contains an invalid entry type</td>
</tr>
<tr>
<td>102749</td>
<td><code>#%d: QLProcessResponseQueueFS: Invalid handle 0x%x, type 0x%x</code></td>
<td>349</td>
<td>FCIP - Response queue entry contains an invalid handle</td>
</tr>
<tr>
<td>102752</td>
<td><code>#%d: QLTimer: Ext Ram parity error exceed limit cnt 0x%x, limit 0x%x, Disabled adapter</code></td>
<td>352</td>
<td>FC processor external SRAM parity error count exceeded limit; FC port disabled.</td>
</tr>
<tr>
<td>102755</td>
<td><code>#%d: QLTimer: Heartbeat failed</code></td>
<td>355</td>
<td>FC processor heartbeat failed.</td>
</tr>
<tr>
<td>102800</td>
<td><code>#%d: QLRestartRisc: restart RISC</code></td>
<td>400</td>
<td>FC processor being restarted.</td>
</tr>
</tbody>
</table>

### System

Table 30 lists fatal log messages provided by system modules.
### Table 30 System—fatal log messages

<table>
<thead>
<tr>
<th>ID</th>
<th>Log message</th>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>233473</td>
<td>memory monitor: Detected Uncorrectable Ecc %08lx system is rebooting in 5 secs\n</td>
<td>1</td>
<td>Uncorrectable memory error detected at address provided in log message.</td>
</tr>
<tr>
<td>233474</td>
<td>Failed to register interrupt handler!\n</td>
<td>2</td>
<td>Attempt to register the interrupt handler failed.</td>
</tr>
<tr>
<td>233475</td>
<td>%s class_simple_create failed\n</td>
<td>3</td>
<td>Failed class_simple_create system call from memory monitor initialization routine.</td>
</tr>
</tbody>
</table>
C Simple Network Management Protocol

This appendix includes the following sections:
- SNMP properties, page 135
- SNMP trap configuration, page 135
- Management Information Base (MIB), page 136
- Notifications, page 143

SNMP provides monitoring and trap functions for managing the mpx110 through third-party applications that support SNMP. The mpx110 firmware supports SNMP versions 1 and 2 and an HP MIB Management Information Base (MIB) on page 136. Traps can be formatted using SNMP versions 1 or 2 Notifications on page 143.

SNMP properties

The SNMP properties can be set using either the CLI or the GUI. Table 31 describes the SNMP properties.

Table 31 SNMP properties

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read Community</td>
<td>Read community password that authorizes an SNMP management server to read information from the mpx110. This is a write-only field. The value on the mpx110 and the SNMP management server must be the same. The read community password can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is public.</td>
</tr>
<tr>
<td>Trap Community</td>
<td>Trap community password that authorizes an SNMP management server to receive traps. This is a write-only field. The value on the mpx110 and the SNMP management server must be the same. The trap community password can be up to 32 characters excluding #, semicolon (;), and comma (,). The default is public.</td>
</tr>
<tr>
<td>System Location</td>
<td>Specifies the name of the mpx110 location. The name can be up to 64 characters excluding #, semicolon (;), and comma (,). The default is undefined.</td>
</tr>
<tr>
<td>System Contact</td>
<td>Specifies the name of the person to be contacted to respond to trap events. The name can be up to 64 characters excluding #, semicolon (;), and comma (,). The default is undefined.</td>
</tr>
<tr>
<td>Authentication Traps</td>
<td>Enables or disables the generation of authentication traps in response to authentication failures. The default is disabled.</td>
</tr>
</tbody>
</table>

SNMP trap configuration

SNMP trap configuration supports the setting of up to eight trap destinations. Choose from Traps 1 - Trap 8 to configure each trap. Table 32 describes the parameters for configuring an SNMP trap.
Table 32 SNMP parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trap n Enabled</td>
<td>Enables or disables trap n. If disabled, the trap is not configured.</td>
</tr>
<tr>
<td>Trap Address(^1)</td>
<td>Specifies the IP address to which the SNMP traps are sent. A maximum of 8 trap addresses are supported. The default address for traps is 0.0.0.0.</td>
</tr>
<tr>
<td>Trap Port(^1)</td>
<td>The port number on which the trap is sent. The default is 162.</td>
</tr>
<tr>
<td>Trap Version</td>
<td>Specifies the SNMP version (1 or 2) with which to format traps.</td>
</tr>
</tbody>
</table>

\(^1\) Trap address (other than 0.0.0.) and trap port combinations must be unique. For example, if trap 1 and trap 2 have the same address, then they must have different port values. Similarly, if trap 1 and trap 2 have the same port value, they must have different addresses.

Management Information Base (MIB)

The following sections describe the MIB:
- System information, page 136
- Network port table, page 137
- Fibre Channel port table, page 139
- Sensor table, page 141

System information

The system information objects provide the system serial number, version numbers (hardware/software/agent), and number of ports (FC/GE).

qsrSerialNumber

- **Syntax**: SnmpAdminString
- **Access**: read-only
- **Description**: The system serial number.

qsrHwVersion

- **Syntax**: SnmpAdminString
- **Access**: read-only
- **Description**: The system hardware version number.

qsrSwVersion

- **Syntax**: SnmpAdminString
- **Access**: read-only
- **Description**: The system software (firmware) version number.

qsrNoOfFcPorts

- **Syntax**: Unsigned32
- **Access**: read-only
- **Description**: The number of Fibre Channel ports on the system.
qsrNoOfGbEPorts

Syntax: Unsigned32
Access: read-only
Description: The number of Gigabit Ethernet ports on the system.

qsrAgentVersion

Syntax: SnmpAdminString
Access: read-only
Description: The version number of the agent software on the system.

Network port table

A list of network ports that are operational on the mpx110. The entries in this table include the management port and the iSCSI and TOE ports on the mpx110. Note that a single Gigabit Ethernet port can function as an iSCSI port and a TOE simultaneously; thus, there may be up to two entries for a given Gigabit Ethernet port.

qsrNwPorttable

Syntax: QsrNwPortEntry
Access: not-accessible
Description: The entries in this table include the management port and the iSCSI and TOE ports on the mpx110.

qsrNwPortEntry

Syntax: QsrNwPortEntry
Access: not-accessible
Description: Each entry (row) contains information about a specific network port.

QsrNwPortEntry

A network port entry consists of the following sequence of objects:
**qsrNwPortRole**

**Syntax**

QsrPortRole

**Access**

not-accessible

**Description**

The operational role of this port i.e. as a management port, an iSCSI port, or a TOE. A positive integer indexing each network port in a given role.

**qsrNwPortIndex**

**Syntax**

Unsigned32

**Access**

not-accessible

**Description**

A positive integer indexing each network port in a given role.

**qsrNwPortAddressMode**

**Syntax**

INTEGER 1 - Static 2 - DHCP 3 - Bootp 4 - RARP

**Access**

read-only

**Description**

The method using which the port gets its IP address.

**qsrIPAddressType**

**Syntax**

InetAddressType

**Access**

read-only

**Description**

The type of the IP address i.e. ipv4 or ipv6.

**qsrIPAddress**

**Syntax**

InetAddress

**Access**

read-only

**Description**

The IP address of the port.
qsrNetMask

Syntax InetAddress
Access read-only
Description The subnet mask of the port.

qsrGateway

Syntax InetAddress
Access read-only
Description The gateway for this port.

qsrMacAddress

Syntax IMacAddress
Access read-only
Description The MAC address for this port.

qstNwLinkStatus

Syntax QsrLinkStatus
Access read-only
Description The operational link for this port.

qsrNwLinkRate

Syntax QsrLinkRate
Access read-only
Description The operational link rate for this port.

Fibre Channel port table

A list of the FC ports on the mpx110. There are as many entries in this table as there are FC ports on the mpx110.

qsrFcPortTable

Syntax QsrFcPortEntry
Access not-accessible
Description A list of the FC ports on the mpx110. There are as many entries in this table as there are FC ports on the mpx110.
qsrFcPortEntry

Syntax
Access
Description

Each entry (row) contains information about a specific FC port.

qsrFcPortEntry

A Fibre Channel port entry consists of the following sequence of objects:

qsrFcPortRole
qsrFcPortIndex
qsrFcPortNodeWwn
qsrFcPortWwn
qsrFcPortId
qsrFcPortType
qsrFcLinkStatus
qsrFcLinkRate

qsrFcPortRole

Syntax
Access
Description

The operational role of this port (that is in FCP mode or in frame shuttle mode).

qsrFcPortIndex

Syntax
Access
Description

A positive integer indexing each FC port in a given role.

qsrFcPortNodeWwn

Syntax
Access
Description

The world wide name of the node that contains this port.

qsrFcPortWwn

Syntax
Access
Description

The world wide name for this port.
qsrFcPortId

Syntax       PhysAddress
Access       read-only
Description  The interface’s 24-bit Fibre Channel address identifier.

qsrFcPortType

Syntax       Unsigned32
Access       read-only
Description  The type of a Fibre Channel port, as indicated by the use of the appropriate value assigned by IANA. The IANA-maintained registry for Fibre Channel port types is at http://www.iana.org/assignments/fc-port-types.

qsrFcLinkStatus

Syntax       QsrLinkStatus
Access       read-only
Description  The current link status for this port.

qsrFcLinkRate

Syntax       QsrLinkRate
Access       read-only
Description  The current link rate for this port.

Sensor table

A list of all the sensors on the mpx110. There are as many entries (rows) in this table as there are sensors.

qsrSensorTable

Syntax       QsrSensorEntry
Access       not-accessible
Description  A list of all the sensors on the mpx110. There are as many entries (rows) in this table as there are sensors.

qsrSensorEntry

Syntax       QsrSensorEntry
Access       not-accessible
Description  Each entry (row) corresponds to a single sensor.

QsrSensorEntry

A sensor entry consists of the following sequence of objects:
qsrsensorType

Syntax
INTEGER temperature = 1

Access
not-accessible

Description
The type of data being measured by this sensor.

qsrsensorIndex

Syntax
Unsigned32

Access
not-accessible

Description
A positive integer identifying each sensor of a given type.

qsrsensorUnits

Syntax
INTEGER celsius = 1

Access
read-only

Description
The unit of measurement for the sensor.

qsrsensorValue

Syntax
Integer32

Access
read-only

Description
The current value of the sensor.

qsrsupperThreshold

Syntax
Integer32

Access
read-only

Description
The upper-level threshold for this sensor.

qsrlowerThreshold

Syntax
Integer32

Access
read-only

Description
The lower-level threshold for this sensor.
**qsrSensorState**

**Syntax**
INTEGER

**Access**
read-only

**Description**
The state of this sensor, indicating the health of the system.
- **unknown**—The sensor value/threshold(s) cannot be determined.
- **normal**—The sensor value is within normal operational limits.
- **warning**—The sensor value is approaching a threshold.
- **critical**—The sensor value has crossed a threshold.

**Notifications**
The mpx110 provides six notification types. The following sections describe these notifications and the objects they use:
- Notification objects, page 143
- Agent startup notification, page 144
- Agent shutdown notification, page 144
- Network port down notification, page 144
- Fibre Channel port down notification, page 144
- Sensor notification, page 144
- Generic notification, page 144

**Notification objects**
This section defines objects used in notifications.

**qsrEventSeverity**

**Syntax**
INTEGER

**Access**
accessible-for-notify

**Description**
This indicates the severity of the event. The value **clear** is used to specify that a condition that caused an earlier trap is not present now.

**qsrEventDescription**

**Syntax**
SnmpAdminString

**Access**
accessible-for-notify

**Description**
A textual description of the event that occurred.

**qsrEventTimeStamp**

**Syntax**
DateAndTime

**Access**
accessible-for-notify

**Description**
This indicates when the event occurred.
Agent startup notification
The agent startup notification indicates that the agent on the mpx110 has started running.
qsrAgentStartup—uses the following objects:
• qsrEventTimeStamp

Agent shutdown notification
The agent shutdown notification indicates that the agent on the mpx110 is shutting down.
qsrAgentShutdown—uses the following objects:
• qsrEventTimeStamp

Network port down notification
The network port down notification indicates that the specified network port is down. If the port comes up thereafter, this event is sent with the qsrEventSeverity object set to clear.
qsrNwPortDown—Uses the following object:
• qsrNwLinkStatus
• qsrEventTimeStamp
• qsrEventSeverity

Fibre Channel port down notification
The Fibre Channel port down notification indicates that the specified Fibre Channel port is down. If the port comes up thereafter, this event is sent with the qsrEventSeverity object set to clear.
qsrFcPortDown—Uses the following object:
• qsrFcLinkStatus
• qsrEventTimeStamp
• qsrEventSeverity

Sensor notification
The sensor notification indicates that the state for the specified sensor is not normal. Once the sensor goes back to normal, this event is sent with the qsrEventSeverity object set to clear.
qsrSensorNotification—Uses the following object:
• qsrSensorValue
• qsrSensorState
• qsrEventTimeStamp
• qsrEventSeverity

Generic notification
The generic notification is used to report events other than the defined event types. It provides a description object that identifies the event.
qsrGenericEvent—Uses the following object:
• qsrEventTimeStamp
• qsrEventSeverity
• qsrEventDescription
D Saving and restoring the mpx110 configuration

The mpx110 configuration information is saved as a .bin or .tgz file, depending on the save method that is used to restore the mpx110 persistent data. The mpx110 configuration information is saved and restored using the mpx110 manager GUI or mpx110 CLI commands. This appendix includes the following sections:

• Saving the mpx110 configuration, page 145
• Restoring the mpx110 configuration, page 146

NOTE:
As with any important database, the mpx110 persistent data should be periodically saved to avoid data loss from hardware or software errors. It is also important to save the configuration information before replacing the mpx110.

Saving the mpx110 configuration

Using the mpx110 GUI to save configuration information allows you to save the file to any location available to the server running the GUI.

Using the mpx110 CLI command to save the configuration information places the file in the mpx110’s FTP directory. You must then move the file using FTP from the mpx110.

Saving the configuration using the mpx110 GUI

To save the configuration using the mpx110 GUI:

1. Select File > Save FRU.
   The Save FRU dialog box is displayed.
2. Click Save.
3. Enter a file name and select a location to save to.

NOTE:
Do not change the Files of Type value.

4. Enter the password config, and then click OK.
The configuration is saved to the selected location.

Saving the configuration using the mpx110 CLI

To save the configuration using the mpx110 CLI:

1. Log in to the mpx110 using a Telnet session to the management port or the console port.
   Username: guest
   Password: password
2. Enter the following command:
   mpx110> admin start
3. Enter config as the password.
4. Enter the following command:
   mpx110 (admin) #> fru save
   FRU save completed. Configuration File is HP_StorageWorks_mpx110_FRU.bin. Please use FTP to extract the file out from the System.
   mpx110 (admin) #>

**NOTE:**
The FRU save creates a bin file containing the mpx110's persistent data, configuration, and LUN mappings. The file is stored in the mpx110's /var/ftp directory. You must then FTP the tar file from the mpx110.

5. Establish an FTP connection to the mpx110 management port and login:
   Username: ftp
   Password: ftp
6. Enter the following command to set the FTP transfer type to Binary:
   ftp> bin
7. Enter the following command to get the HP_StorageWorks_mpx110_FRU.bin file:
   ftp> get HP_StorageWorks_mpx110_FRU.bin

**Restoring the mpx110 configuration**

Use the Full Configuration Restore option to fully restore the mpx110 configuration. The restored configuration takes effect after the mpx110 is rebooted.

**NOTE:**
Always use the Full Configuration Restore option with the mpx110.

**Restoring the configuration using the mpx110 GUI**

To restore the configuration using the mpx110 GUI:

1. Select File > Restore FRU.
   The Restore FRU dialog box is displayed.
2. Click Browse and select the appropriate file name to restore.
3. Select Full Configuration Restore or Partial Restore (Mappings).
4. Click Start.
   The Security Check dialog box is displayed.
5. Enter the password config, and then click OK.
6. Reboot the system for the configuration to take effect.

**Restoring the configuration using the mpx110 CLI**

To restore the configuration using the mpx110 CLI:

1. Establish an FTP connection to the mpx110 management port and login:
   Username: ftp
   Password: ftp
2. Enter the following command to set the FTP transfer type to binary:
   ftp> bin
3. Enter the following command to put the HP_StorageWorks_mpx110_FRU.bin file:
   ftp> put HP_StorageWorks_mpx110_FRU.bin

4. Log in to the mpx110 using a Telnet session to the management port or console port.
   Username: guest
   Password: password

5. Enter the following command:
   mpx110> admin start

6. Enter config as the password.

7. Enter the following command:
   mpx110 (admin) #> fru restore
   A list of attributes with formatting and current values will follow. Enter a new value or simply press the ENTER key to accept
   the current value. If you wish to terminate this process before reaching the end of the list press ‘q’ or ‘Q’ and the ENTER key to
   do so. Type of restore (0=full, 1=mappings only) [full]
   FRU restore completed.

8. Reboot the system for the configuration to take effect.
Saving and restoring the mpx110 configuration
E Regulatory compliance and safety

This appendix describes the following sections:

• Regulatory compliance, page 149
• Safety, page 152

Regulatory compliance

Federal Communications Commission notice for Class A equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user’s authority to operate the equipment.

Declaration of conformity for products marked with the FCC logo, United States only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, visit http://www.hp.com/.

For questions regarding this FCC declaration, contact us by mail or telephone:

• Hewlett-Packard Company
  P.O. Box 692000, Mailstop 510101
  Houston, TX 77269–2000
  1–281–514–3333

To identify this product, refer to the part, Regulatory Model Number, or product number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company my void the user’s authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.
Regulatory compliance identification numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique Regulatory Model Number. The RMN can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this RMN. The Regulatory Model Number should not be confused with the marketing name or model number of the product.

Laser device

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light.

Laser safety warning

⚠️ WARNING!
To reduce the risk of exposure to hazardous radiation:
• Do not try to open the laser device enclosure. There are no user-serviceable components inside.
• Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.
• Allow only HP authorized service technicians to repair the laser device.

Laser product label

The optional label in Figure 45 or equivalent may be located on the surface of the HP supplied laser device.

![CLASS 1 LASER PRODUCT](image)

**Figure 45 Class 1 laser product label**
This optional label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label may appear on the laser device installed in your product.

International notices and statements

Canadian notice (avis Canadien)

Class A equipment

This Class A Digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.
European Union notice

Products bearing the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1995/5/EC).

Compliance with these directives implies conformity to the following European Norms (the equivalent international standards and regulations are in parentheses):

- EN55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2, IEC61000-4-3, IEC61000-4-4, IEC61000-4-5, IEC61000-4-6, IEC61000-4-8, IEC61000-4-11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) — Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) — Power Line Flicker
- EN60950 (IEC60950) — Product Safety
- Also approved under UL 60950/CSA C22.2 No. 60950–00, Safety of Information Technology Equipment.

BSMI notice

警告使用者:
这是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Japanese notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。
Safety

Battery replacement notice

Your switch is equipped with a lithium manganese dioxide, a vanadium pentoxide, or an alkaline internal battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated. Replacement is to be done by an HP authorized service provider using the HP spare part designated for this product. For more information about battery replacement or proper disposal, contact an HP authorized service provider.

⚠️ WARNING!

Your switch contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose to temperatures higher than 60 ºC.
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the HP spare part designated for this product.

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use the public collection system or return them to HP, an authorized HP Partner, or their agents.

For more information about battery replacement or proper disposal, contact an HP authorized reseller or service provider.

Taiwan battery recycling notice

The Taiwan EPA requires dry battery manufacturing or importing firms in accordance with Article 15 of the Waste Disposal Act to indicate the recovery marks on the batteries used in sales, giveaway, or promotion. Contact a qualified Taiwanese recycler for proper battery disposal.

Power cords

The power cord set must meet the requirements for use in the country where the product was purchased. If the product is to be used in another country, purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00
mm² or 18 AWG, and the length of the cord must be between 1.8 m (6 ft) and 3.6 m (12 ft). If you have questions about the type of power cord to use, contact an HP authorized service provider.

**NOTE:**
Route power cords so that they will not be walked on and cannot be pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

---

**Japanese power cord statement**

製品には、同梱された電源コードをお使い下さい。
同梱された電源コードは、他の製品では使用出来ません。
<table>
<thead>
<tr>
<th>Glossary Item</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CHAP</strong></td>
<td>Challenge Handshake Authentication Protocol. An authentication technique for confirming the identity of one computer to another.</td>
</tr>
<tr>
<td><strong>Direct Connect</strong></td>
<td>Connecting a server or mpx110 Fibre Channel port directly to the EVA Fibre Channel port without a the need for a Fibre Channel switch.</td>
</tr>
<tr>
<td><strong>Fabric Connect</strong></td>
<td>Connecting a server or mpx110 Fibre Channel port to a Fibre Channel switch to access the EVA Fibre Channel ports.</td>
</tr>
<tr>
<td><strong>GbE</strong></td>
<td>Gigabit Ethernet Packet-based signaling technology that transmits data at throughput speeds up to 1000 megabits per second (Mbps), or 1 Gigabit per second (Gb/s).</td>
</tr>
<tr>
<td><strong>high availability</strong></td>
<td>Refers to the availability of resources in a computer system, if there are component failures in the system.</td>
</tr>
<tr>
<td><strong>Initiator</strong></td>
<td>A device that begins an iSCSI transaction by issuing a command to another device (the iSCSI target), giving it a task to perform.</td>
</tr>
<tr>
<td><strong>IP</strong></td>
<td>Internet Protocol The standard Internet protocol for moving packets of information from one computer to another. Commonly combined with TCP in the phrase TCP/IP.</td>
</tr>
<tr>
<td><strong>IP SAN</strong></td>
<td>A Storage Area Network (SAN) created using the Internet SCSI (iSCSI) protocol to connect servers and storage over a Gigabit Ethernet network.</td>
</tr>
<tr>
<td><strong>IQN</strong></td>
<td>iSCSI Qualified Name A name format for iSCSI that uniquely identifies every device in the world. For example: iqn.5886.com.acme.tapedrive.sn-a12345678.</td>
</tr>
<tr>
<td><strong>iSCSI</strong></td>
<td>Internet SCSI. An IP-based standard for linking data storage devices over a network and transferring data by carrying SCSI commands over IP networks.</td>
</tr>
<tr>
<td><strong>iSCSI CRC</strong></td>
<td>iSCSI cyclic redundancy check. A shortened cyclic code check used for error detection.</td>
</tr>
<tr>
<td><strong>iSNS</strong></td>
<td>Internet Storage Name Service A protocol designed to facilitate the automated discovery, management, and configuration of iSCSI and Fibre Channel devices on a TCP/IP network.</td>
</tr>
<tr>
<td><strong>mpx110</strong></td>
<td>Serves as the iSCSI data transport that transfers data to and from the server and the storage system.</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td>small computer system interface. A parallel interface standard used to attach peripheral devices to computers.</td>
</tr>
<tr>
<td><strong>Switch</strong></td>
<td>An IP network communications device that routes packets (messages or fragments of messages) between nodes across virtual circuits.</td>
</tr>
<tr>
<td><strong>teaming</strong></td>
<td>The concept of multiple network adapters working together as a single network adapter. See also virtual network adapter.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>target</td>
<td>An iSCSI device that executes a command from an iSCSI initiator to perform some task.</td>
</tr>
<tr>
<td>TOE</td>
<td>TCP Offload Engine&lt;br&gt;A piece of hardware that replaces a NIC and shifts TCP packet processing tasks from the server CPU to specialized TCP processors on the network adapter or storage device.</td>
</tr>
<tr>
<td>VLAN</td>
<td>virtual local area network.&lt;br&gt;A network of computers that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN.</td>
</tr>
<tr>
<td>virtual network adapter</td>
<td>The concept of multiple network adapters working together as a single network adapter, also referred to as teaming.</td>
</tr>
</tbody>
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