SAS-1/SAS-2 Compatibility Upgrade Guide

For the Sun Blade 6000 Modular System

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Using This Documentation

This document describes how to upgrade SAS-1 Network Express Modules (NEMs) and disk modules in Sun Blade 6000 Modular System from Oracle to allow SAS-1/SAS-2 device coexistence.

Related Documentation

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SAS-1/SAS-2 Compatibility Upgrade Guide For the Sun Blade 6000 Modular System.

CHAPTER 1

SAS-1/SAS-2 Compatibility Upgrade Instructions

This document provides information on compatibility requirements for a server module with a SAS-2 RAID Expansion Module (REM) in a Sun Blade 6000 Modular System chassis that has SAS-1 Network Express Modules (NEMs), or SAS-1 NEMs and Sun Blade 6000 Disk Modules (which are SAS-1 devices).

You *must* perform the firmware upgrade procedure in this document before inserting your server module with a SAS-2 REM into a SAS-1 system chassis.

Note – Refer to your device's documentation to determine its SAS level. Alternatively, you can identify SAS-1 and SAS-2 devices by the maximum data transfer speeds supported by the devices. SAS-1 devices support a maximum data transfer speed of 3 Gb per second. SAS-2 devices support a maximum data transfer speed of 6 Gb per second.

The following topics are covered:

- "Overview" on page 1
- "System Requirements for the SAS-1/SAS-2 Compatibility Upgrade" on page 2
- "Upgrading Disk Module and SAS-NEM Expander Firmware" on page 4

Overview

A server module with a SAS-2 REM might hang when inserted into a Sun Blade 6000 Modular System chassis under the following conditions:

- If the chassis contains SAS-1 NEMs, such as:
  - Sun Blade 6000 Multi-Fabric Network Express Module

    - Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module
- If the chassis contains Sun Blade 6000 Disk Modules (SAS-1 devices)

To ensure optimal system performance and avoid the potential for a system hang, you need to upgrade the SAS expander firmware of all SAS-1 NEMs and Sun Blade 6000 Disk Modules in the chassis to the latest available firmware update that supports SAS-1/SAS-2 coexistence.

The Sun Blade X6270 M2 is an example of a server module that ships with a SAS-2 REM. If you install a SAS-2 REM into a server module that previously did not have one, you will need to perform this upgrade before installing the server module into the chassis. Refer to your product documentation to determine whether your server module includes a SAS-2 REM (for more on available SAS-2 REMs, refer to "System Requirements for the SAS-1/SAS-2 Compatibility Upgrade" on page 2).

After performing the SAS-1/SAS-2 compatibility upgrade, the server module with the SAS-2 REM will be supported in the SAS-1 chassis with the following conditions:

- The SAS-2 server module will function properly in the chassis and be able to use its own internal SAS-2 storage and its PCIe Express Modules (EMs).
- The SAS-2 server module will be able to use the network component of SAS-1 NEMs.
- The SAS-2 server module **cannot** use disks in a Sun Blade 6000 Disk Module (a SAS-1 device). This is an unsupported configuration.
- The SAS-2 server module **must** be installed in a chassis slot that **does not** have a Sun Blade 6000 Disk Module in an adjacent slot.

System Requirements for the SAS-1/SAS-2 Compatibility Upgrade

Currently available SAS-1 NEMs and disk modules that include SAS expanders that require the SAS-1/SAS-2 compatibility upgrade are listed below.

- Sun Blade 6000 Disk Module (B18-AA)
- Sun Blade 6000 Multi-Fabric Network Express Module (X4212A)
- Sun Blade 6000 10GbE Multi-Fabric Network Express Module (X4236A)
- Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module (X4238)

In addition, if your device contains an Integrated Lights Out Manager (ILOM) service processor, it might also require an upgrade to match the new expander firmware.

TABLE 1-1 lists the currently available server module SAS-2 REMs affected by this issue, and the minimum required SAS-1/SAS-2 compatibility firmware for SAS-1 devices to fix the issue.

TABLE 1-1 Supported SAS-2 REMs and Required SAS-1 Device Firmware

If Your Server Module Has One of These SAS-2 REMs:	Minimum Required SAS-1 Expander Firmware for Sun Blade 6000 Disk Modules:	Minimum Required SAS-1 Expander Firmware for Sun Blade 6000 Multi-Fabric NEMs:	Minimum Required SAS-1 Expander and ILOM Firmware for Sun Blade 6000 Virtualized Multi-Fabric 10GbE NEMs:
• Sun Storage 6 Gb SAS REM RAID HBA (SGX-SAS6-R-REM-Z) • Sun Storage 6 Gb SAS REM HBA (SGX-SAS6-REM-Z)	Expander version 5.04.03, available in Sun Blade 6000 Disk Module software release 2.1	Expander version 5.04.03, available in Sun Blade 6000 Disk Module software release 2.1	Expander version 5.04.03 and ILOM version 2.0.3.12, available in Sun Blade 6000 Virtualized Multi-Fabric 10GbE NEM software release 2.2.

Proceed to "Upgrading Disk Module and SAS-NEM Expander Firmware" on page 4 for instructions on performing the upgrade.

List of SAS-1 Server Modules That Are Compatible With SAS-2 Upgrade

TABLE 1-2 lists server modules equipped with either an LSI SAS-1 on-board chip or a supported SAS-1 REM HBA that you can use to perform the SAS-1/SAS-2 compatibility upgrade. Since the upgrade to the affected SAS-1 devices (NEMs and disk modules) must be done through the SAS-1 bus, the server module(s) at which the upgrade will be performed must have one of the supported HBAs.

Note – The REM HBAs must have a minimum firmware level of v1.25.00 (also referred to as Phase 13); otherwise, the firmware upgrade will not work. For instructions on how to check HBA versions, see "Checking Host Bus Adapter Firmware Versions on x86 Server Blades" in the *Sun Blade 6000 Disk Module Administration Guide*.

TABLE 1-2 Supported Server Blades With LSI SAS-1 On-board Chips and SAS-1 REM Host Bus Adapters

Server	Supported On-board SAS-1 Controller Chip	Supported SAS-1 RAID Expansion Module (REM)
T6300	LSI 1068E	REMs are not supported in this server
T6320	None	• T6320 RAID 0/1 Expansion Module (LSI) • Sun Blade RAID 0/1 G2 Expansion Module (LSI)
T6340	None	Sun Blade RAID 0/1 G2 Expansion Module (LSI)
X6220	LSI 1068E	REMs are not supported in this server.
X6240	None	• Sun Blade RAID 0/1 G2 Expansion Module (LSI) • Sun Blade RAID 5 Expansion Module (Intel/Adaptec)
X6250	None	Sun Blade RAID 5 Expansion Module (Intel/Adaptec)
X6270	None	• Sun Blade RAID 0/1 G2 Expansion Module (LSI) • Sun Blade RAID 5 Expansion Module (Intel/Adaptec)
X6440	None	• Sun Blade RAID 0/1 G2 Expansion Module (LSI) • Sun Blade RAID 5 Expansion Module (Intel/Adaptec)
X6450	None	• Sun Blade RAID 0/1 G2 Expansion Module (LSI) • Sun Blade RAID 5 Expansion Module (Intel/Adaptec)

Upgrading Disk Module and SAS-NEM Expander Firmware

Perform the SAS-1/SAS-2 compatibility upgrade on all SAS-1 NEMs and Sun Blade 6000 Disk Modules before attempting to install your SAS-2 server module into the chassis. The upgrade can only be performed from server modules in the chassis and only from server modules with a supported SAS-1 REM or on-board LSI controller chip.

A list of server modules with SAS-1 Host Bus Adapters (HBAs) capable of performing the upgrade can be found in "List of SAS-1 Server Modules That Are Compatible With SAS-2 Upgrade" on page 3.

Obtain the Latest Disk Module and SAS-NEM Expander Firmware for SAS-1/SAS-2 Coexistence

To support SAS-1/SAS-2 coexistence, SAS expanders for both the Sun Blade 6000 Disk Modules and SAS-1 NEMs must be at firmware version 5.04.03, at a minimum. You need to download the latest available firmware update for your platform.

- For Sun Blade 6000 Disk Modules, download **Sun Blade 6000 Disk Module Software 2.1**. This version also includes expander firmware for the Sun Blade 6000 Multi-Fabric Network Express Module.
- For the Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module, download **Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module Software 2.2**. This version includes both expander firmware and ILOM firmware.
- For the Sun Blade 6000 10GbE Multi-Fabric Network Express Module, check My Oracle Support (MOS) Patches and Updates for a supported release that contains expander firmware version 5.04.03 or later firmware update.

  To download the appropriate software release, go to My Oracle Support (MOS) `(http://support.oracle.com)` and do the following:

- Select `Patches & Updates` -> `Product or Family (Advanced Search)`.
- Search for the following updates:
- Sun Blade 6000 Disk Module (minimum version 2.1)
- Sun Blade 6000 10GbE VMF (minimum version 2.2)
- Sun Blade 6000 10GbE Switched NEM (version containing 5.04.03)

TABLE 1-3 lists the download image names for each SAS-1 NEM and disk module that requires a firmware upgrade.

TABLE 1-3 SAS-1 NEM and Disk Module Download Image Names

SAS-1 NEM or Disk Module	Download Image Names
Sun Blade 6000 Disk Module Software 2.1 (B18-AA)	• `mfgImageCust03V.5.04.03.bin` • `sasxfwnv.5.04.03.fw`
Sun Blade 6000 Multi-Fabric Network Express Module (X4212A)	• `mfgImageCust03N.5.04.03.bin` • `sasxfwnv.5.04.03.fw`
Sun Blade 6000 10GbE Multi-Fabric Network Express Module (X4236A)	• `mfgImageCust03G.5.04.03.bin` • `sasxfwgv.5.04.03.fw`
Sun Blade 6000 Virtualized Multi-Fabric 10GbE Network Express Module Software 2.2 (X4238)	• `mfgImageCust03N.5.04.03.bin` • `sasxfwhv.5.04.03.fw`

Note – You might need to set up an online account before downloading the software release.

Obtain the Firmware Update Utility to Deploy the Required Expander Firmware

To upgrade the disk module and SAS-NEM expander firmware to the required level for SAS-1/SAS-2 coexistence, you can use the Firmware Update command-line tool (`fwupdate`) included in **Oracle Hardware Management Pack** (minimum supported version 2.0.1. Upgrade instructions in this document describe using this tool).

The `fwupdate` tool included with Hardware Management Pack 2.0.1 can be run from supported Sun x86 or SPARC servers from Oracle. The tool is also supported on Oracle Solaris, Linux, and Windows operating systems. Refer to the Hardware Management Pack 2.0 documentation for details.

To obtain Hardware Management Pack 2.0.1, go to My Oracle Support (MOS) `(http://support.oracle.com)` and do the following:

1. Select `Patches & Updates` -> `Product or Family (Advanced Search)`.
2. Search for Oracle Hardware Management Pack (minimum version 2.0.1).

Note – You might need to first setup an online account before downloading the software release.

▼ Upgrade Disk Module and SAS-NEM Firmware Using the `fwupdate` Utility

The Hardware Management Pack 2.0.1 includes a firmware update command-line tool that works across platforms (x86/64 and SPARC) and operating systems (Oracle Solaris, Windows, Linux). You must use this tool to perform the SAS-1/SAS-2 coexistence firmware upgrade. It is recommended that you stop all SAS I/O traffic before performing the SAS-NEM firmware upgrade.

Note – Upgrading SAS-NEM and disk module firmware can disrupt SAS I/O traffic throughout the chassis. Plan on performing the SAS-NEM firmware upgrade at a time when you can temporarily stop host to disk module I/O. Performing the upgrade while booted from the disk module is not supported.

Before You Begin:

- Ensure complete backup of your data is available. Use lsiutil to make snapshot backups of all LSI HBAs attached to Disk Module. For more information, see Appendix a.
- If your chassis has Sun Blade 6000 Disk Modules installed, download the appropriate Sun Blade 6000 Disk Module software package from the Oracle download site to *each* server module equipped with a SAS-1 REM that is slot-paired with a Sun Blade 6000 Disk Module. See "Obtain the Latest Disk Module and SAS-NEM Expander Firmware for SAS-1/SAS-2 Coexistence" on page 5.
- Download the appropriate SAS-1 NEM software package to a server module. If you have Sun Blade 6000 Disk Modules installed, download it to *one* server module equipped with a SAS-1 REM that is slot-paired with a Sun Blade 6000 Disk Module. See "Obtain the Latest Disk Module and SAS-NEM Expander Firmware for SAS-1/SAS-2 Coexistence" on page 5.
- Download the Oracle Hardware Management Pack 2.0.1 version required (several OS versions are available) to a server module. If you have Sun Blade 6000 Disk Modules installed, download it to *each* server module equipped with a SAS-1 REM that is slot-paired with a Sun Blade 6000 Disk Module. Extract the archive file and run the component installer to install the `fwupdate` tool. See "Obtain the Firmware Update Utility to Deploy the Required Expander Firmware" on page 6.

Note – The `fwupdate` tool and firmware image files must be copied to and run from servers in the chassis. They cannot be run from a network share.

If available, start at a server module slot-paired with a Sun Blade 6000 Disk Module, then do the following:

1. **Open a terminal or command prompt at the host.**

Note – You must be logged in with root permission level to run `fwupdate` commands on Unix-based platforms, or Administrator permission level for Windows platforms. These instructions can be used on servers running Oracle Solaris, Linux, or Windows.

2. Change directories to where the `fwupdate` tool is located.

Note – It is not necessary to change directories if `fwupdate` is in your search path.

3. **Identify the SAS expanders by entering the command:**

   `fwupdate list all`

   All controllers, expanders, and connected devices are listed. Expanders for both the SAS-NEMs and the slot-paired disk module will be identified. Make a note of all the expander IDs.

   Example output might look like this:

```
CONTROLLER c0
=============
Manufacturer   Model      Product Name     F/W Version         BIOS Version
------------------------------------------------------------------------------
LSI Logic      0x0058    LSIREM           01.26.92.00         06.24.01.00

EXPANDERS
===============
ID      Chassis Manufacturer   Model          Expander Name   FW Version
------------------------------------------------------------------------------
c0x0    0       SUN            NEMHydra_C10   Master          5.2.14.0
c0x1    1       SUN            NEMHydra_C10   Master          5.2.14.0
c0x2    2       SUN            Blade Storage  Master          5.2.14.0
c0x3    3       SUN            Blade Storage  Slave           5.2.14.0

DISKS
===============
ID    Brand    Model           Chassis Slot  Type   Media  Size(GB)Firmware Rev.
-------------------------------------------------------------------------------
c0d0   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146     0603
c0d1   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146     0400
c0d2   HITACHI   H101414SCSUN146G   -       -     sas    HDD    146     SA02
c0d3   SEAGATE   ST973402SSUN72G    -       -     sas    HDD    73      0603
c0d4   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146     0603
c0d5   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146     0400
c0d6   HITACHI   H101414SCSUN146G   -       -     sas    HDD    146     SA02
c0d7   SEAGATE   ST973402SSUN72G    -       -     sas    HDD    73      0603
```

   The following expander components must be upgraded:

   - Network Express Module (NEM) expanders:
     - The expander manufacturing image
     - The expander firmware
   - Disk module expanders (*both* Master and Slave):
     - The expander manufacturing image
     - The expander firmware

Note – It can take up to 2 minutes to upgrade expander firmware on each disk module.

Note – Though not recommended, if you later attempt to downgrade your expander firmware, it must be done in the reverse order listed above (disk module expanders first, then NEM expanders).

4. Upgrade the expander firmware of the SAS-1 disk module or NEM as follows:

a. Rename the manufacturing image from */path/*`mfgImageCust03`*x*`.5.04.03.bin` **to** `mfgImageCust03`*x*`.bin`**.**

Where *x* is a variable that is determined by the name of the image file for the specific NEM expander being upgraded. For manufacturing image file names for SAS-1 NEMs, see TABLE 1-3.

b. Upgrade the manufacturing image by entering:

`fwupdate update expander-manufacturing-image -n c0x0 -f /`*`path`***`/mfgImageCust03`***x***`.bin`**

Where c0x0 is the ID for the target NEM expander, and *path* is the directory path to where the image file is located, and *x* is determined by the name of the manufacturing image file for the specific SAS-1 NEM expander being upgraded (see TABLE 1-3).

Example output might look like:

```
The following components will be upgraded:
c0x0 [y/n]? y
Upgrade of c0x0 from 5.2.14.0 to 5.4.3.0 succeeded.
```

If the upgrade is not successful, review the `fwupdate` error log file to isolate the problem and retry the upgrade. The `fwupdate.log` file is located in `/var/log/fwupdate/fwupdate.log` in Solaris and Linux, and `/temp/log/fwupdate/fwupdate.log` in Windows.

Note – The firmware upgrade is successful if you see the keywords “succeeded” or “success.” Wait until the firmware of the target expander has been successfully upgraded before attempting any additional commands. The new manufacturing image is not active until after the system has been power cycled. Ignore any messages after the firmware was successfully upgraded.

c. **Upgrade the expander firmware by entering:**

`fwupdate update expander-firmware -n c0x0 -f /`*`path`***`/sasxfw`***`x`**
`v.5.04.03.fw`

Where c0x0 is the ID for the target NEM expander, *path* is the directory path to where the image file is located, and *x* is determined by the name of the expander firmware file. For the name of the expander firmware file for the specific SAS-1 NEM being upgraded, see TABLE 1-3.

Example output might look like this:

```
The following components will be upgraded:
c0x0 [y/n]? y
Upgrade of c0x0 from 5.2.14.0 to 5.4.3.0 succeeded.
```

Note – Wait until the firmware of the target expander has been successfully upgraded before attempting any additional commands. If you see an "Upgrade succeeded, but is not yet active" message, it can be safely ignored.

---

d. **If the chassis has two SAS-1 NEMs, repeat the upgrade process described in** Step b **and** Step c **for the second NEM.**

The example used here would include upgrading expander `c0x1`.

5. **Upgrade the expander firmware of the host-paired Sun Blade 6000 Disk Module as follows:**

a. **Rename the manufacturing image from** */path/*`mfgImageCust03`*x*`.5.04.03.bin` **to** `mfgImageCust03`*x*`.bin`**.**

Where *x* is a variable that is determined by the name of the manufacturing image file for the specific disk module expander being upgraded (see TABLE 1-3).

Note – The version of manufacturing image may not be machine readable. And after the expander firmware is updated, the new version of the manufacturing image is not readable until after the system has been power cycled.

---

b. Upgrade the manufacturing image by entering:

fwupdate update expander-manufacturing-image -n c0x0 -f /*path***/mfgImageCust03***x***.bin**

Where c0x0 is the ID for the target NEM expander, and *path* is the directory path to where the image file is located, and *x* is determined by the name of the manufacturing image file for the specific disk module expander being upgraded (see TABLE 1-3).

Example output might look like:

```
The following components will be upgraded as shown:
ID Priority Action Status OldFirmwareVer. ProposedVer.
NewFirmwareVer. SysReboot
c0x0 1     CheckFW  Success  N/A        Not Provided   N/A
None
Do you wish to process all of the above component upgrades? [y/n]? y
Updating c0x0: Success
```

Note – Wait until the firmware of the target expander has been successfully upgraded before attempting any additional commands. If you see an "Upgrade succeeded, but is not yet active" message, it can be safely ignored.

If the upgrade is not successful, review the `fwupdate` error log file to isolate the problem and retry the upgrade. The `fwupdate.log` file is located in `/var/log/fwupdate/fwupdate.log` in Solaris and Linux, and `/temp/log/fwupdate/fwupdate.log` in Windows.

c. Upgrade the expander firmware by entering:

fwupdate update expander-firmware -n c0x2 -f /*path***/sasxfw***x***v.5.04.03.fw**

Where c0x2 is the ID for the target disk module expander, *path* is the directory path to where the image file is located, and *x* is determined by the name of the disk module expander firmware file. For the name of the disk module expander firmware file, see TABLE 1-3.

Example output might look like this:

```
The following components will be upgraded as shown:
ID Priority Action Status OldFirmwareVer. ProposedVer.
NewFirmwareVer. SysReboot
c0x2 1     CheckFW  Success  5.2.14.0    Not Provided   N/A
None
Do you wish to process all of the above component upgrades? [y/n]? y
Updating c0x2: Success
```

Note – Wait until the firmware of the target expander has been successfully upgraded before attempting any additional commands. If you see an "Upgrade succeeded, but is not yet active" message, it can be safely ignored.

If the upgrade is not successful, review the `fwupdate` error log file to isolate the problem and retry the upgrade. The `fwupdate.log` file is located in `/var/log/fwupdate/fwupdate.log` in Solaris and Linux, and `/log/fwupdate/fwupdate.log` in Windows.

d. Repeat Step b **and** Step c **for the second expander in the disk module.**

The example used here would include upgrading expander `c0x3`.

Note – Both Master and Slave expanders in the disk module must be upgraded.

6. Shut down the host OS and power cycle the chassis.

If you are shutting down from a CMM, see (http://docs.sun.com/source/820-0051-11/service_preparation.html#50409492_pgfId-1045755)

or use the following CLI:

```
-> stop -f /CH
-> start /CH
```

7. When done, check that all host viewable SAS expanders are at the supported version for SAS-1/SAS-2 coexistence (5.04.03) by entering the command:

`fwupdate list all`

Example output might look like this:

```
CONTROLLER c0
=============
Manufacturer   Model     Product Name     F/W Version         BIOS Version
------------------------------------------------------------------------------
LSI Logic      0x0058    LSIREM           01.26.92.00         06.24.01.00

EXPANDERS
===============
ID      Chassis Manufacturer   Model          Expander Name   FW Version
------------------------------------------------------------------------------
c0x0    0       SUN            NEMHydra_C10   Master          5.4.3.0
c0x1    1       SUN            NEMHydra_C10   Master          5.4.3.0
c0x2    2       SUN            Blade Storage  Master          5.4.3.0
c0x3    3       SUN            Blade Storage  Slave           5.4.3.0

DISKS
```

```
===============
ID    Brand    Model           Chassis Slot  Type   Media  Size(GB)Firmware Rev.
-------------------------------------------------------------------------------
c0d0   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146      0603
c0d1   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146      0400
c0d2   HITACHI   H101414SCSUN146G   -       -     sas    HDD    146      SA02
c0d3   SEAGATE   ST973402SSUN72G    -       -     sas    HDD    73       0603
c0d4   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146      0603
c0d5   SEAGATE   ST914602SSUN146G   -       -     sas    HDD    146      0400
c0d6   HITACHI   H101414SCSUN146G   -       -     sas    HDD    146      SA02
c0d7   SEAGATE   ST973402SSUN72G    -       -     sas    HDD    73       0603
```

8. **Proceed to the next SAS-1 server module slot-paired with a Sun Blade 6000 Disk Module and repeat** Step 3 **to obtain the expander IDs.**

9. **Repeat** Step 5 **through** Step 8 **until all SAS-1 disk modules in the chassis have had their expanders upgraded.**

10. **If your SAS-1 NEMs have an ILOM service processor, you might also need to upgrade its ILOM firmware to achieve a supported firmware level that is matched to the new expander firmware.**

    For instructions on upgrading the ILOM service processor firmware for a SAS-1 NEM, refer to the NEM user's guide. For more information on SAS-1 NEMs, see "System Requirements for the SAS-1/SAS-2 Compatibility Upgrade" on page 2.

11. **After you have upgraded all of your SAS-1 NEMs and disk modules, you can safely insert your SAS-2 server module into the chassis.**

    The SAS-2 server module will be supported in the SAS-1 chassis with the following conditions:

    - The SAS-2 server module will function properly in the chassis and be able to use its own internal SAS-2 storage and its PCIe Express Modules (EMs).
    - The SAS-2 server module will be able to use the network component of SAS-1 NEMs.
    - The SAS-2 server module **cannot** use disks in a Sun Blade 6000 Disk Module (a SAS-1 device). This is an unsupported configuration.
    - The SAS-2 server module **must** be installed in a chassis slot that **does not** have a Sun Blade 6000 Disk Module in an adjacent slot.

    Refer to the documentation that comes with your SAS-2 server module for additional installation and configuration instructions.

APPENDIX **A**

Using the `lsiutil` Software

Some procedures in this manual require the use of a software program called `lsiutil`. This appendix provides information on where to obtain the software and how to use it.

Caution – The `lsiutil` software has many features and capabilities. Executing certain combinations of commands can leave your system in an unrecoverable state. When you use this software, be sure you execute the procedures exactly as they are documented here, command by command. Do not skip commands or steps and do not add commands or steps that are not in the documented procedure.

The following topics are covered in this chapter:

- "Where to Obtain the `lsiutil` Software" on page 15
- "Installing `lsiutil`" on page 16
- "Why Save LSI Host Bus Adapter Persistent Mappings?" on page 20
- "When to Save LSI Host Bus Adapter Persistent Mappings" on page 20
- "Saving and Restoring a Persistence Map" on page 21

Where to Obtain the `lsiutil` Software

To use `lsiutil` for the procedures in this appendix, you must have version 1.60 at minimum.

To obtain the latest `lsiutil` software, go to the disk blade download site:

`(http://www.sun.com/servers/blades/downloads.jsp#6000dm)`

Installing `lsiutil`

Download `lsiutil` and unzip it in a temporary directory. It will create operating system-specific subdirectories. If you are running `lsiutil` on a SPARC blade, use the `Solaris` subdirectory. Otherwise, use the `Solaris x86` subdirectory.

▼ Using `lsiutil` From the Command Line

Several of the procedures in this appendix use the `lsiutil` software at the command line.

Caution – To avoid harm to your system, you must use the commands exactly as they are presented in this document.

To run an `lsiutil` command from the command line, log in as `root` and then follow these steps:

1. **Change to the directory where you extracted the lsiutil zip file. For example,**

   # **cd** *directoryname*

2. **Change to the subdirectory for your operating system. For example:**

   # **cd Solaris x86**

3. **Change the permissions (read and execute access) on the lsiutil file by entering the following command:**

   # **chmod 755 lsiutil**

4. **Enter the command with parameters. For example,**

   # **./lsiutil -p1 -a 0 8**

▼ Using the Interactive `lsiutil` Menus

To open the interactive `lsiutil` menus, log in as `root` and then follow these steps:

1. **Change to the directory that contains the appropriate version of `lsiutil` for your operating system. For example,**

   # **cd** *directoryname***/Solaris x86**

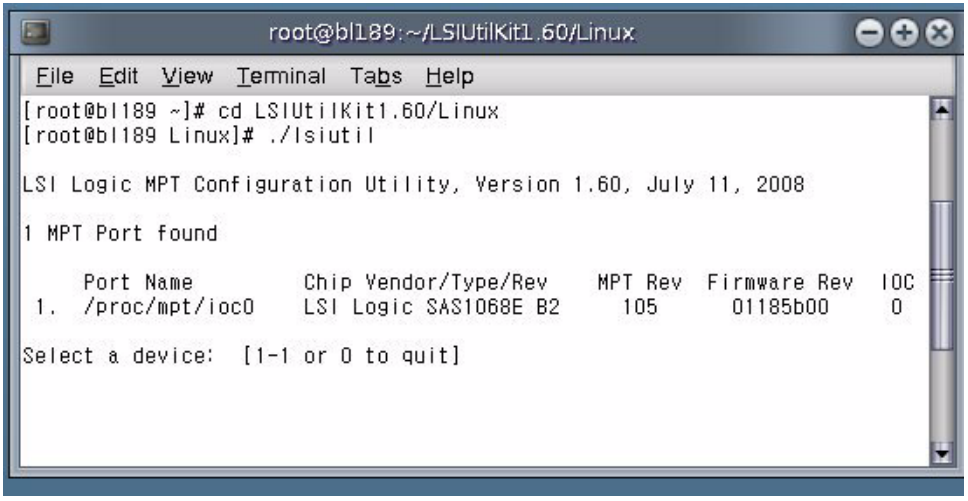
2. **If you have not done so already, change the permissions (read and execute access) on the lsiutil file by entering the following command:**

   # **chmod 755 lsiutil**

3. **Start `lsiutil` by entering the command:**

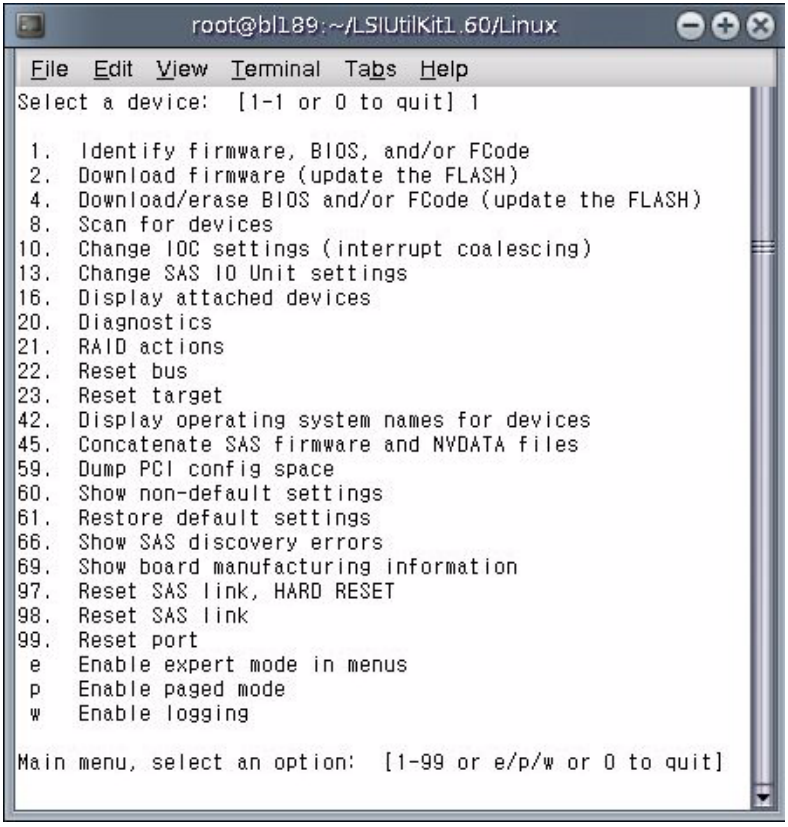
   # **./lsiutil**

   The opening screen appears.



4. **Type `1` and press Enter.**

   The main menu appears. Because there are so many menu items (100), not all the items are shown.

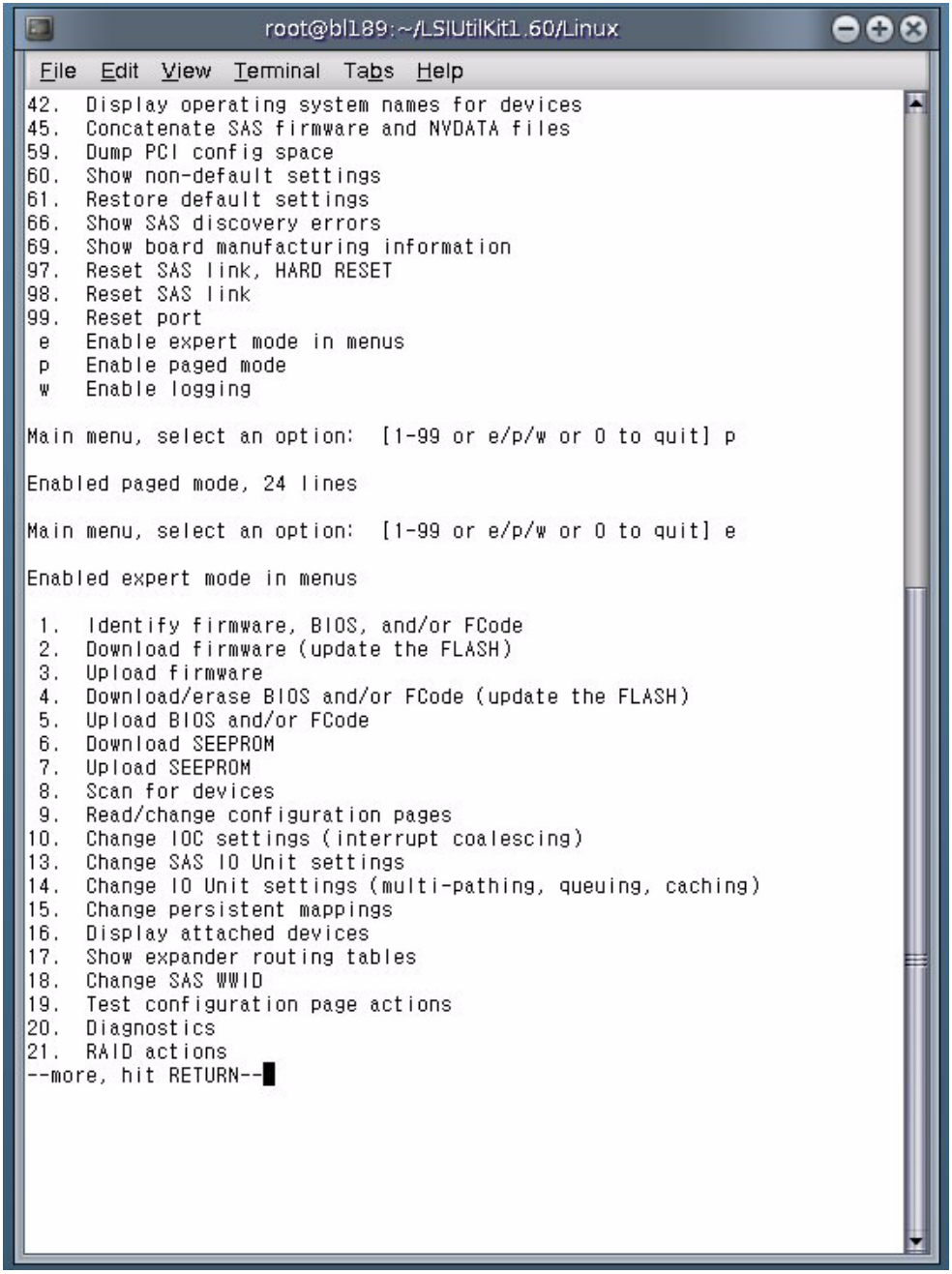


Tip – You do not have to see a command to enter it. If you know its number, just enter it. Alternatively, you can choose to see the entire menu if you want to, as shown in Step 4.

---

5. **Enter `p` to enable paged mode, or `e` to enable expert mode.**

   The complete menu appears in expert mode.



Each time you press Enter you will see a new page of menu items until you reach the end.

Why Save LSI Host Bus Adapter Persistent Mappings?

Replacing a failed LSI host bus adapter on a server blade running the Solaris OS can lead to significant downtime if your replacement adapter does not know how the old adapter was addressing the disks in its server blade and in the disk blade. Among other problems, your system will not know where your boot drive is located.

The `lsiutil` software is used to export a snapshot of the addressing configuration (persistent mappings) of a healthy LSI host bus adapter to a file. Then, if the adapter fails at a later date, the persistent mappings snapshot can be reloaded on the replacement adapter and your system will operate as before.

Caution – You need to keep a persistent mappings snapshot for the LSI host bus adapters on all server blades in your chassis that are running the Solaris OS. A copy of each file must be kept on *external* media.

When to Save LSI Host Bus Adapter Persistent Mappings

You need to keep a snapshot of the persistent mappings of your LSI host bus adapters under any of these conditions:

- A new server blade, running the Solaris OS and paired with a disk blade, has been added to the chassis.

  Make the snapshot of the LSI host bus adapter on this server blade after you have completed its installation and configuration. This means after you have finished creation of RAID volumes and chosen a boot volume or disk.

- You have replaced a disk blade in the chassis that is paired with a server blade running the Solaris OS.

  Make the snapshot of the LSI host bus adapter on this server blade after you have replaced the disk blade.

- You have replaced a SAS-NEM in your chassis and the chassis contains server blades running both CAM (or a CAM agent) and the Solaris OS.

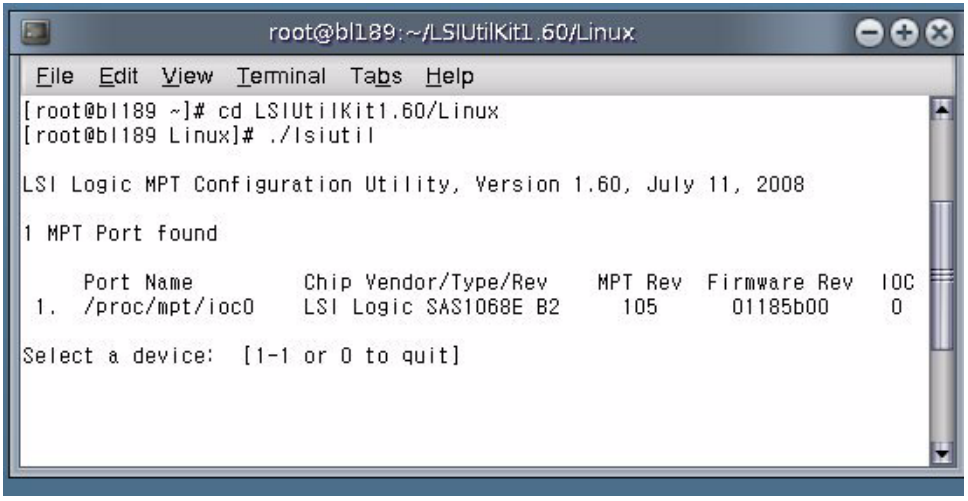
  Make the snapshot of the LSI host bus adapter on these server blades after you have replaced the SAS-NEM

Saving and Restoring a Persistence Map

You can use `lsiutil` to both save and restore a snapshot of your persistence mapping.

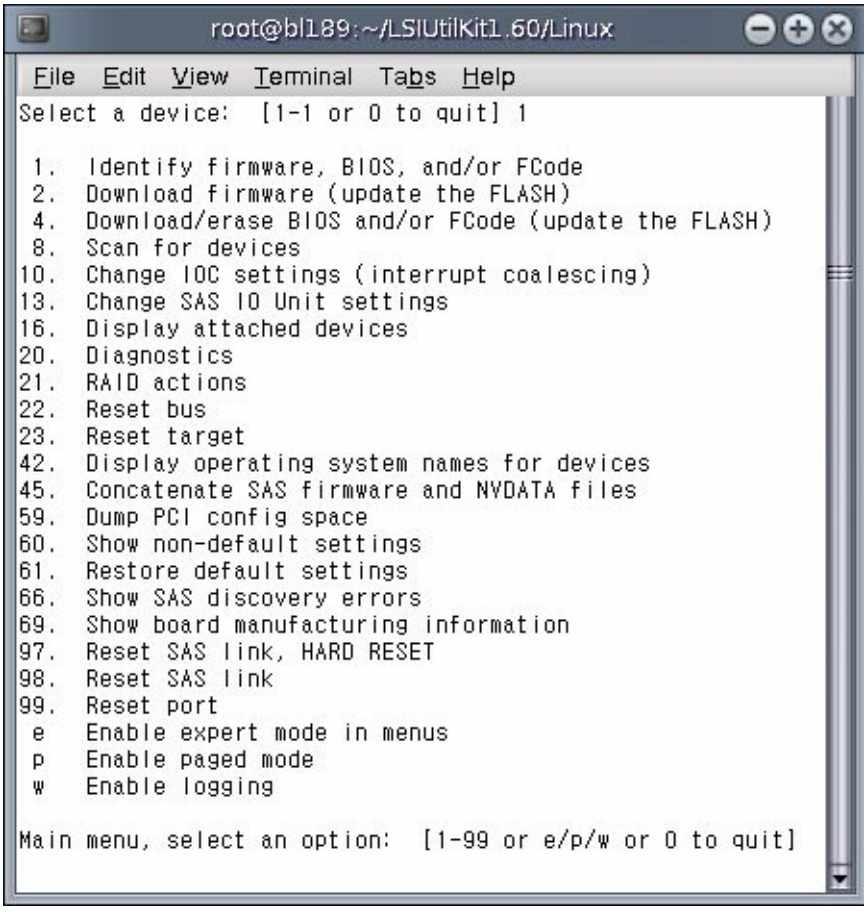
▼ Save a Snapshot of Your Host Bus Adapter Persistent Mappings

1. Run `lsiutil` in interactive mode.



2. Type 1 and press Enter.

The basic (incomplete) interactive menu opens.

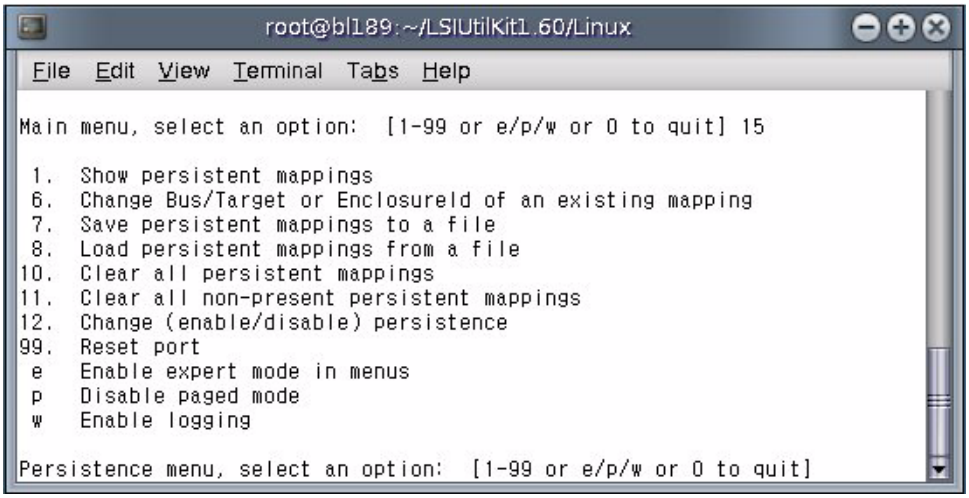


Tip – You cannot see all the commands in the menu, but you can enter any command number if you know what it is. In this case you want to open the Persistence menu. This is done with command 15.

---

3. **Type 15 and press Enter.**

   The Persistence menu opens.



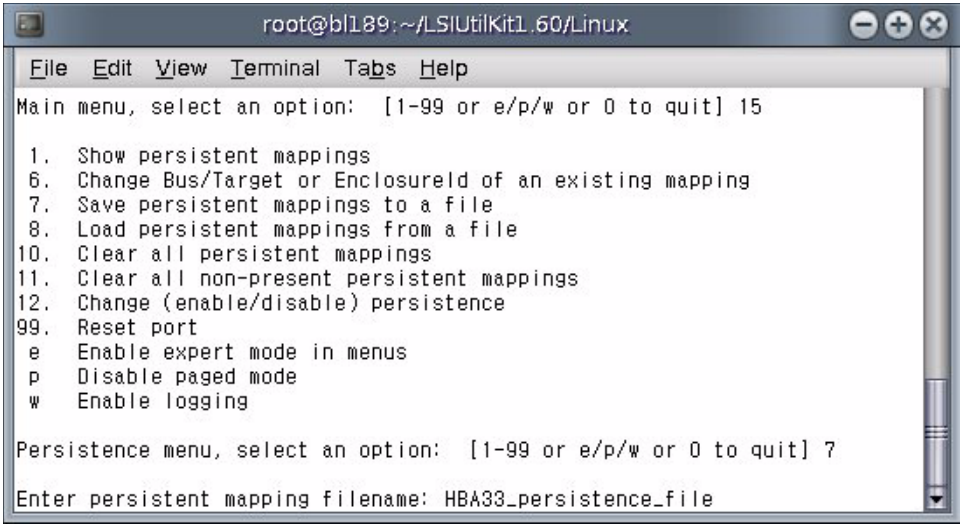
4. **Type 7 and press Enter.**

   You are prompted for the name of the file where you want to store the host bus adapter persistent mappings snapshot.

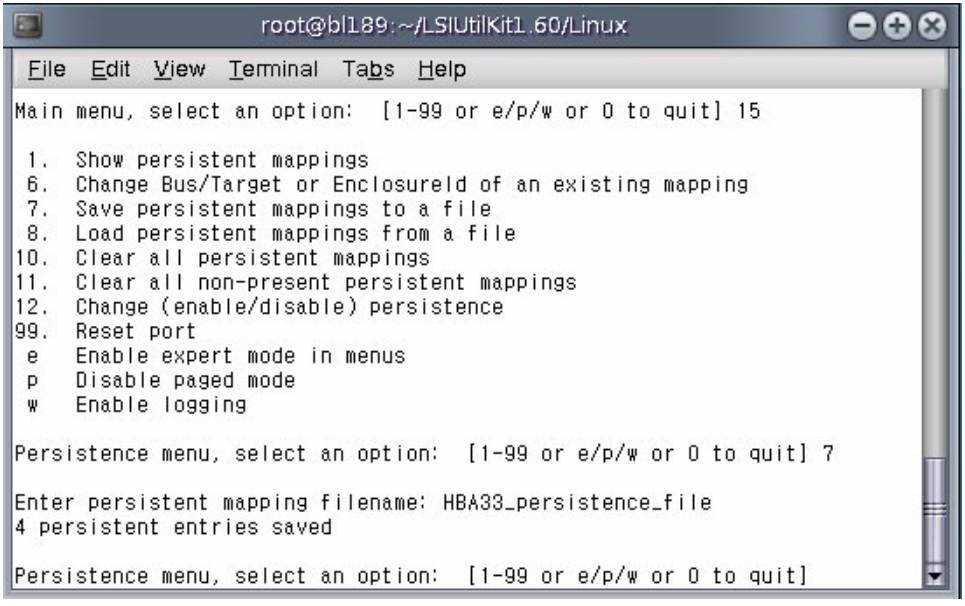
Note – If you expect to boot from DOS when you restore the persistent mappings snapshot, you must restrict the file name to 8 characters.

---

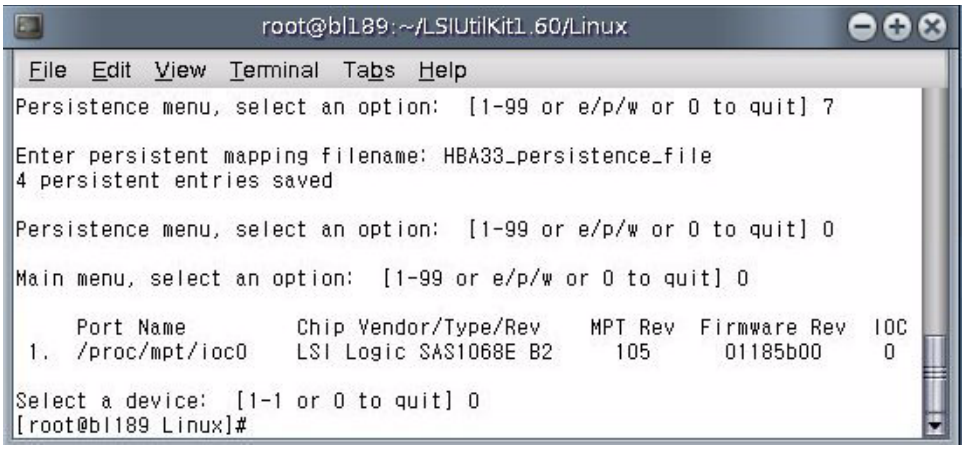
5. **Enter a file name. For example, `HBA33_persistence_file`.**



The file is saved to the current directory. `lsiutil` confirms this by displaying a statement of the number of persistent entries saved.



6. Type `0` (zero) and press Enter three times to exit `lsiutil`.



Caution – You *must* save the persistence table snapshot to external media as you will not be able to reinstall it from a local disk if your LSI host bus adapter fails.

You must have a snapshot for *every* server blade in the chassis. Label them carefully.

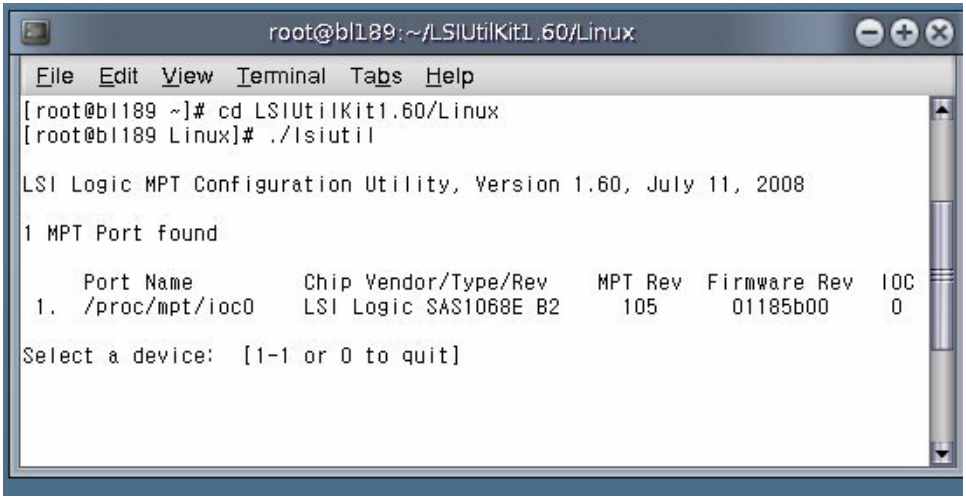
▼ Restore a Snapshot of Your Host Bus Adapter Persistent Mappings

The stored snapshot files are used when a host bus adapter fails and must be replaced. They are not needed for any other purpose.

Note – Unless your OS is installed on a single disk on your server blade, or a RAID volume with at least one member disk installed on your server blade (always true for SPARC systems, for example), you need to reboot with an external OS (a bootable DOS disk is preferred, if possible) to perform this procedure.

To restore the persistent mappings from a previously saved snapshot file (`for example, HBA33_persistance_file`), do the following:

1. **Make sure that your saved the persistence mappings snapshot file in the same directory as the `lsiutil` software you are using. Copy the file from external media if necessary.**
2. **Run `lsiutil` in interactive mode.**



3. Type 1 and press Enter.

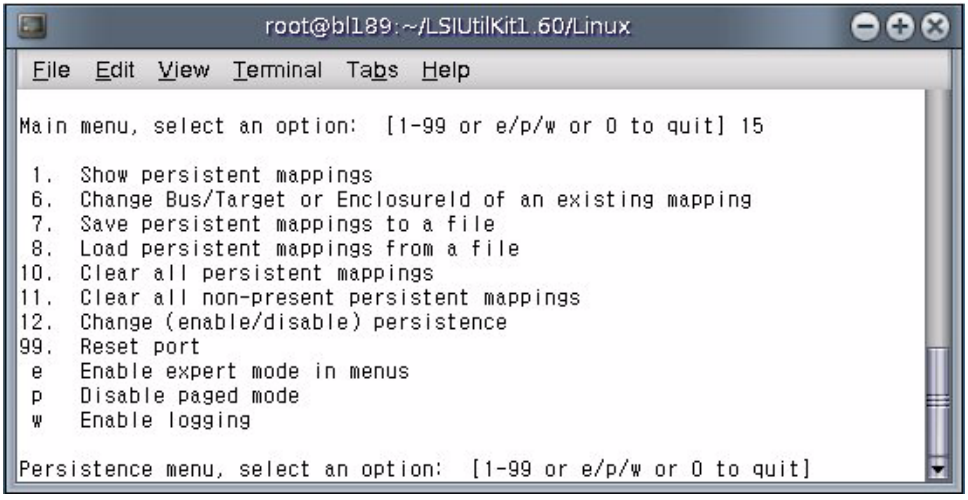
The basic (incomplete) interactive menu opens.

Tip – You cannot see all the commands in the menu, but you can enter any command number if you know what it is. In our case we want to open the Persistence menu. This is done with command 15.

---

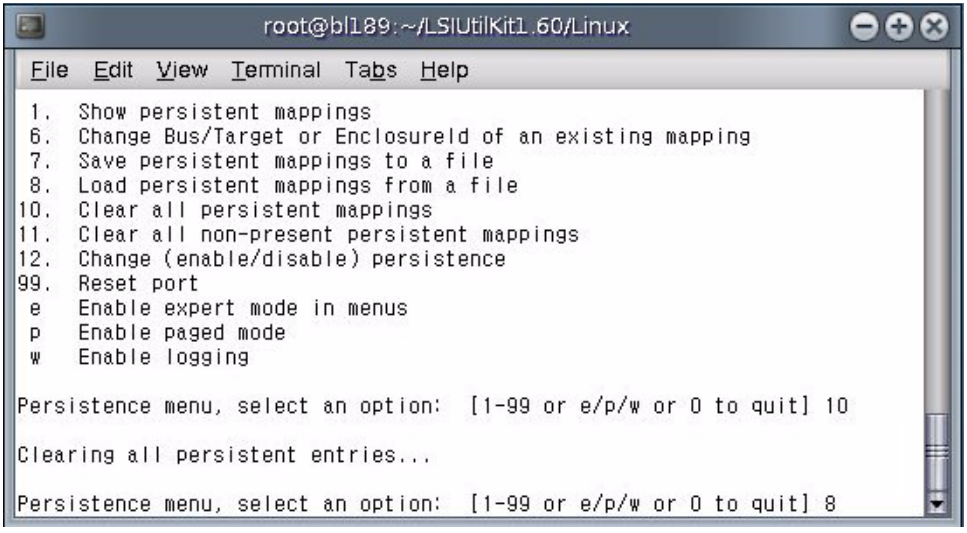
4. Type 15 and press Enter.

The Persistence menu opens.



5. **Type `10` and press Enter.**

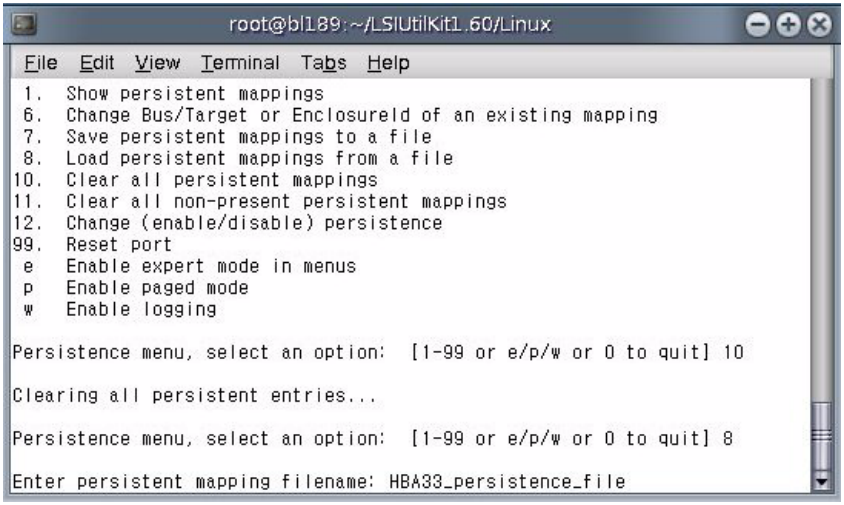
   This clears any persistence map that is present in the host bus adapter.



6. **Type 8 and press Enter.**

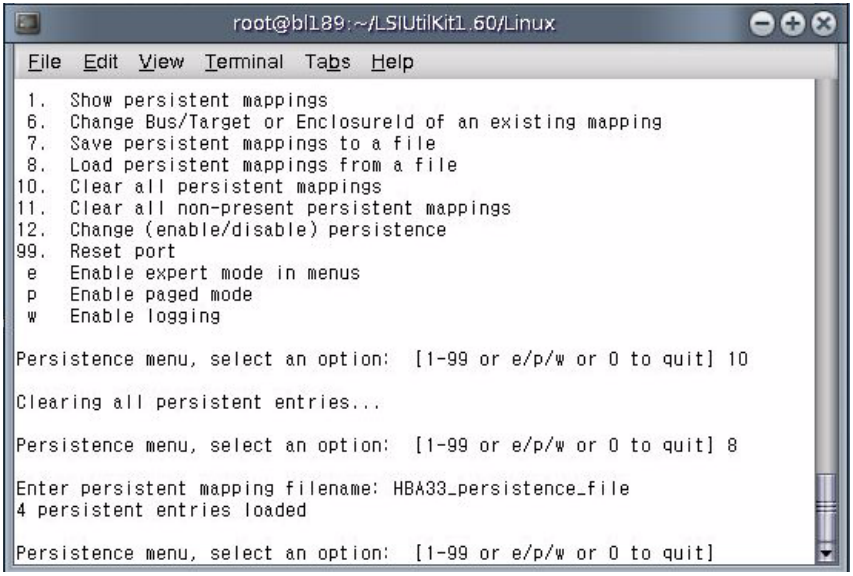
   You are prompted for the name of a persistent mappings snapshot file to load.

   Type the name of the snapshot file. For example, **`HBA33_persistence_file`**.



7. **Press Enter.**

   The persistence map is loaded. `lsiutil` confirms that four persistence entries were loaded.



8. Type `0` (zero) and press Enter three times to exit `lsiutil`.

Note – The adapter persistent mappings snapshot file you just loaded is *still valid*. Make sure that you save a copy of it on external media.

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