BROADCOM®

Boot for the Fibre Channel Protocol

User Manual

Versions 11.0 and 11.1
March 1, 2016

pub-005276

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Chapter 1: Introduction

This manual describes installing, updating, enabling, and configuring Broadcom® Fibre Channel (FC) boot code. This manual also describes the Broadcom boot from SAN implementation and its operation with distinct hardware and operating system requirements. Boot from SAN is booting servers directly from disk operating system images located on a storage area network (SAN) by way of Emulex® adapters using Broadcom FC boot code.

When booting from SAN, the storage device is typically identified by its World Wide Port Name (WWPN) and a logical unit number (LUN). By extending the server system boot basic input/output system (BIOS), boot from SAN functionality is provided by the bootBIOS contained on an Broadcom Emulex adapter in the server. When properly configured, the adapter then permanently directs the server to boot from a logical unit (disk) on the SAN as if it were a local disk.

> **NOTE**   Broadcom Emulex drivers support multi-path boot configurations. Refer to your storage vendor's documentation for details on how to configure multi-path booting.

> **NOTE**   Screenshots in this manual are for illustrative purposes only. Your system information can vary.

1.1 Broadcom Boot Code Files

Broadcom is unique in providing Universal Boot and Pair Boot images of boot code. Universal Boot images contain x86 BootBIOS, OpenBoot, and EFIBoot boot code. Pair Boot boot code images contain x86 BootBIOS and EFIBoot boot code. These images provide multi-platform support for boot from SAN.

Universal Boot and Pair Boot transparently determine your system platform type and automatically execute the proper boot code image in the adapter. These boot code images reside in the adapter's flash memory, which allows for easier adapter portability and configuration between servers.

Broadcom provides the following types of boot code:

- x86 BootBIOS works with the existing system BIOS on x64 and x86 systems.
- OpenBoot works with the existing system firmware on SPARC systems. OpenBoot is also called FCode.
- UEFIBoot provides system boot capability through the use of the Unified Extensible Firmware Interface (UEFI) shell. It also functions on UEFI 2.*x*-based x64 platforms through the Human Interface Infrastructure (HII) interface.

1.2 Abbreviations

ACL	Access Control List
AL_PA	Arbitrated Loop Physical Address
API	application programming interface
ARP	Address Resolution Protocol
BBS	BIOS Boot Specification
BFS	byte file system
BIOS	basic input/output system
CLI	command line interface

DHCP	Dynamic Host Control Protocol
DID	device ID
DMA	direct memory access
DNS	Domain Name System
EDD	Enhanced Disk Device
FC	Fibre Channel
FC-AL	Fibre Channel Arbitrated Loop
FCF	FC over Ethernet Forwarder
FL_Port	fabric loop port
FoD	Feature on Demand
FTP	File Transfer Protocol
FUI	FoD Unique Identifier
Gb/s	gigabits per second
GPT	GUID partition table
GUI	Graphical User Interface
GUID	Globally Unique Identifier
HBA	host bus adapter
HII	Human Interface Infrastructure
HTTP	Hypertext Transfer Protocol
IEEE	Institute of Electrical and Electronics Engineers
INTx	PCIe legacy interrupts, where "x" is variable
I/O	input/output
IOCTL	input/output control
IP	Internet Protocol
JBOD	just a bunch of disks
KB	1024 bytes (Kilobyte or Kibibyte)
LACP	Link Aggregation Control Protocol
LDAP	Lightweight Directory Access Protocol
LUN	logical unit number
MAC	Media Access Control
MBR	master boot record
MPIO	multipath I/O
MSI	message signaled interrupt
MSI-X	message signaled interrupts - extended
MTU	maximum transmission unit
NBP	network boot program
NIS/NIS+	Network Information Service/Network Information Service Plus
NIV	Network Interface Virtualization
NLB	network loopback
NPIV	N_Port ID virtualization

NVRAM	non-volatile random-access memory
OBP	OpenBoot PROM
OCSD	Option Card Sensor Data
OEM	original equipment manufacturer
OS	operating system
PC	personal computer
PCI	Peripheral Component Interconnect
PCIe	Peripheral Component Interconnect Express
PDU	protocol data unit
PLOGI	port login
POST	power-on self-test
PXE	Preboot Execution Environment
RAID	redundant array of independent disks
RHEL	Red Hat® Enterprise Linux
RIS	Remote Installation Services
ROM	read-only memory
RPM	RPM package manager
RSS	receive-side scaling
SAN	storage area network
SCSI	Small Computer System Interface
SLES	SUSE® Linux Enterprise Server
SLI	Service Level Interface
SMS	System Management Services
SNP	Simple Network Protocol
X	Denotes a variable
TB	terabyte
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
UCNA	universal converged network adapter
UDP	User Datagram Protocol
UFP	Unified Fabric Protocol
UEFI	Unified Extensible Firmware Interface
USB	Universal Serial Bus
WWN	World Wide Name
WWNN	World Wide Node Name
WWPN	World Wide Port Name
ZB	zettabyte

Chapter 2: Booting from SAN

This section provides instructions for installing and using all of the types of boot code provided by Broadcom.

When booting from SAN, the storage device is typically identified by its WWPN and a LUN. By extending the server system BIOS, boot from SAN capability is provided by the boot BIOS contained on an Broadcom Emulex adapter in the server. If properly configured, the adapter then permanently directs the server to boot from a logical unit (disk) on the SAN as if it were a local disk.

NOTE	Not all procedures are required. Broadcom Emulex HBAs usually ship from the factory with the latest version of boot code installed and enabled, so you do not need to install or enable boot code in those cases. However, if boot code is not installed, you must install it, and if it is not enabled, you must enable it. Check http://www.broadcom.com for the latest version of boot code.

This section describes setting up a system to boot from SAN. The specific procedure to follow is determined by the system architecture and the operating system.

Table 1 Boot from SAN Procedures

Architecture	Operating System	Procedure
x86 and x64	Windows Server®	Section 2.1.2, Installing Windows Server on an FC Boot Disk.
	Linux®	Section 2.2.1, Configuring Boot from SAN on Linux or VMware (x86 and x64).
	VMware®	
	Solaris (SFS driver)®	Section 2.3.1, Configuring Boot from SAN on Solaris (SPARC).
SPARC and PowerPC	Linux	Section 2.2.2, Configuring Boot from SAN on Linux or VMware (UEFI).
	Solaris (SFS driver)	Section 2.3.0.1, Configuring Boot from SAN on Solaris (x86 and x64).

2.1 Windows Server

This section describes configuring boot from SAN for Windows® systems and installing Windows Server on an FC boot disk.

2.1.1 Configuring Boot from SAN on Windows Server (x64)

To configure boot from SAN, perform these steps:

1. If necessary, update the boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
2. If necessary, enable the boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
3. Enable the adapter to boot from SAN (see Section 4.2.1, Enabling an Adapter to Boot from SAN).
4. By default, the boot adapter uses auto topology with loop first. You can set the boot adapter to use a different topology (see Section 4.4.3, Changing Topology).
5. Configure boot devices (see Section 4.3, Configuring Boot Devices).
6. If desired, configure the boot options on the adapter (see Section 4.4, Configuring Adapter Parameters).
7. Install the operating system on an FC boot disk (see Section 2.1.2, Installing Windows Server on an FC Boot Disk).

2.1.1.1   Installing a New Windows UEFI–aware Operating System on a UEFI-based x64 Server

This installation procedure assumes LUNs are created in the SAN storage device and zoned appropriately to the host adapter's WWN.

1. From the server system UEFI setup, ensure that CD/DVD is the first device in the boot order list.

2. Enable the adapter BIOS setting to allow SAN boot in the Emulex UEFI configuration utility.

3. Configure the boot target and LUN in the Emulex UEFI configuration utility to point to the desired target (see Section 6.10, Configuring Boot Parameters).

4. Boot the host server with the Windows Server operating system DVD inserted. Follow the on-screen prompts to install the appropriate version of Windows Server.

5. The Windows installation exposes all available and visible LUNs as disks and partitions numbered 0 to N, where N is the highest number available. These numbers typically are the LUN numbers assigned by the array.

6. Select the disk on which you want to install the operating system.

7. Follow the system prompts in the Windows installation.

> **NOTE**   The operating system image is installed with the GPT disk partition.
> See Section 2.1.1.3, GUID Partition Table for a brief description of GPT
> disk partitions.

8. After the installation is complete, a Boot Option variable called Windows Boot Manager is populated with a Media Device path pointing to the Windows boot loader utility. The Windows Boot Manager can be found in the Start Options menu of the host server UEFI.

   The Windows Boot Manager option is inserted as the first boot option in the boot order list of the Host Server UEFI. The CD/DVD boot is the second device in the boot order list.

Upon reboot, the system boots from the LUN set up on the SAN.

2.1.1.2   Directing a UEFI-based Server to a Windows Server Operating System Image (Installed as UEFI-Aware) Already Installed on the SAN

This installation procedure assumes a LUN exists in the SAN storage device, is zoned appropriately to the host adapter's WWN, and a UEFI-aware operating system resides on the target LUN.

To direct a UEFI-based server to a Windows Server operating system image, perform these steps:

1. Enable boot from SAN in the Emulex UEFI configuration utility.

2. Configure the boot target and LUN in the Emulex UEFI configuration utility to point to the desired target (see Section 6.10, Configuring Boot Parameters).

3. Select **Boot Manager** from the System UEFI configuration manager.

4. Select **Add Boot Option**.

5. Identify the desired target in the list, and continue down the explorer path until you locate the `bootmgfw.efi` file. This file is the boot loader utility for your Windows Server UEFI-aware operating system installation.

6. Input a boot device description (such as Win2K8_UEFI_SAN) and optional data (if desired) for this device and select **Commit Changes**.

7. From the Boot Manager, select **Change Boot Order**.

8. Move the previous input description name (Win2K8_UEFI_SAN) to the desired position in the boot order.

9. Select **Commit Changes**.

   The Start Options list now reflects the boot order changes. Upon reboot, the server is able to boot from this target LUN on the SAN.

2.1.1.3   GUID Partition Table

The GPT provides a more flexible mechanism for partitioning disks than the older MBR partitioning scheme that has been common to PCs. MBR supports four primary partitions per hard drive and a maximum partition size of 2 TB. If the

disk is larger than 2 TB (the maximum partition size in a legacy MBR), the size of this partition is marked as 2 TB and the rest of the disk is ignored.

The GPT disk itself can support a volume up to 2^{64} blocks in length (for 512-byte blocks, this is 9.44 ZB). The GPT disk also can also theoretically support unlimited partitions.

NOTE	By default, Microsoft Windows Server operating systems install with a GPT-formatted disk on a UEFI-aware server.

For more information on the GUID partition table, refer to the Microsoft® website and search for the terms *Windows* and *GPT FAQ*.

2.1.2   Installing Windows Server on an FC Boot Disk

This procedure installs Windows Server onto an unformatted FC disk drive and configures the system to boot from the SAN disk drive.

NOTE	The computer's system BIOS might require that another controller take precedence over the Broadcom Emulex adapter during boot. If this occurs, you must disconnect or disable the other adapter. This allows you to configure and build the operating system on the drive connected to the Broadcom Emulex adapter.

To install Windows Server on a boot disk, perform these steps:

1. Install the Emulex driver for Windows as described in the *Emulex Drivers Version for Windows User Manual*.
2. In Windows Explorer, navigate to the folder you specified during driver installation.
3. In the `\AutoPilot Installer\Drivers\`*drivername* folder, open the folder that corresponds to your computer type, such as x64. *drivername* is the type of driver you downloaded.
4. Copy all of the files in this folder onto a formatted disk or a USB device.
5. Boot the target system with the Windows Server setup media.
   The **Install Windows** splash screen is displayed.
6. Verify and if necessary change the Language, Time and Date, and Keyboard values. Click **Next**.
   Another splash screen is displayed.
7. Click **Install Now**.
   The **Where do you want to install Windows?** window is displayed.
8. Click **Load Driver**. Browse to the disk or USB device specified in step 4 where the driver is located to load the Storport Miniport driver for the appropriate operating system. When selected, the correct driver location and driver are displayed under the **Select driver to be installed** window.
9. Select **Next**.
   After the driver is loaded, the Where do you want to install Windows? screen is displayed.
10. Select the same drive you configured as the boot device (see Section 4.3, Configuring Boot Devices).

2.2   Linux, Citrix, and VMware

This section describes configuring boot from SAN on Linux, Citrix, and VMware operating systems.

2.2.1   Configuring Boot from SAN on Linux or VMware (x86 and x64)

To configure boot from SAN, perform these steps:

1. If necessary, install or update the boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
2. If necessary, enable the boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
3. Enable the adapter to boot from SAN (see Section 4.2.1, Enabling an Adapter to Boot from SAN).
4. By default, the boot adapter uses auto topology with loop first. If you want to set the boot adapter to use a different topology, change it (see Section 4.4.3, Changing Topology).
5. Configure boot devices (see Section 4.3, Configuring Boot Devices).
6. If desired, configure the boot options on the adapter (see Section 4.4, Configuring Adapter Parameters).
7. Use the driver on the operating system distribution disk to boot the system. If necessary, you can then update the driver to the desired version.

2.2.2   Configuring Boot from SAN on Linux or VMware (UEFI)

To configure boot from SAN, perform these steps:

1. If necessary, update the latest boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
2. If necessary, enable the boot code on the adapter (see Section 3, Updating and Enabling Boot Code)
3. Configure boot devices. See Section 4.2.1, Enabling an Adapter to Boot from SAN for more information.
4. If desired, configure the boot options on the adapter. See Section 4.4, Configuring Adapter Parameters for more information.
5. Use the driver on the operating system distribution disk to boot the system. If necessary, you can update the driver to the latest version.

2.3   Solaris

This section explains how to configure boot from SAN on the Solaris operating system.

2.3.0.1   Configuring Boot from SAN on Solaris (x86 and x64)

To configure boot from SAN, perform these steps:

1. If necessary, update the boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
2. If necessary, enable the boot code on the adapter (see Section 3, Updating and Enabling Boot Code).
3. Enable the adapter to boot from SAN (see Section 4.2.1, Enabling an Adapter to Boot from SAN).
4. By default, the boot adapter uses auto topology with loop first. You can set the boot adapter to use a different topology (see Section 4.4.3, Changing Topology).
5. Configure boot devices (see Section 4.3, Configuring Boot Devices).
6. If desired, configure the boot options on the adapter (see Section 4.4, Configuring Adapter Parameters).
7. Boot the Solaris installation CD and follow the prompts.

> **NOTE**   If you need help determining the LUNs to select for boot from SAN, see Section 2.3.0.1.1, Determining LUNs to Select for Boot from SAN.

2.3.0.1.1   Determining LUNs to Select for Boot from SAN

To determine which LUNs to select, perform these steps:

1. Open a terminal window and leave it open.

2. In the terminal window, select the LUN you are going to use as the SAN boot disk (not the local drive) using the `luxadm` probe command. This command shows all the available LUNs. Record this LUN information, which is used throughout this procedure. LUN 0 is used in the example:

```
luxadm probe

Found Fibre Channel device(s):
Node WWN:50060e8003823800 Device Type:Disk device
Logical Path:/dev/rdsk/c5t226000C0FF9833AFd6s2
Node WWN:50060e8003823800 Device Type:Disk device
Logical Path:/dev/rdsk/c5t226000C0FF9833AFd6s2
Node WWN:50060e8003823800 Device Type:Disk device
```

3. Copy the /dev/rdsk/nnn part of the path statement for a drive.

4. In the terminal window, use the luxadm display command to show the WWPN or the LUN for which you selected the path in the prior step:

```
luxadm display </dev/rdsk/nnn>
```

5. Record this LUN or WWPN information for use in the procedure.

2.3.1 Configuring Boot from SAN on Solaris (SPARC)

To configure boot from SAN, perform these steps:

1. If necessary, update the boot code on the adapter (see "Updating and Enabling Boot Code" on page 17).

2. If necessary, enable the boot code on the adapter (see "Updating and Enabling Boot Code" on page 17).

3. Type the following at the OBP prompt:

```
show-devs
```

The ID information for each found adapter is displayed, such as:

```
/pci@5d,700000/lpfc@1
Enable boot from SAN on each Emulex adapter in the system by typing the
following set of commands, replacing adapter_id with the ID information (as
shown above), for each Emulex adapter. There is a space between the first
quotation mark and the first character of the adapter ID.
" adapter_id" select-dev [for example, "/pci@5d,700000/lpfc@1" select-dev]
set-sfs-boot
unselect-dev
```

4. After all Broadcom Emulex adapters have been enabled to boot from SAN, reboot the system with the following command:

```
reset-all
```

5. After the system reboots, boot the Solaris installation CD and follow the prompts.

6. After the installation completes successfully, you will be prompted to reboot or exit the system. Press ! and then press Enter to go to the UNIX® prompt.

7. After the UNIXprompt appears, append the following line to the system file at `/a/etc/system`:

```
set pcie:pcie_max_mps=0
```

8. Save and reboot server.

2.3.2   Installing Solaris from a Network Image

The system must have a DVD drive and must be part of the site's network and naming service. If you use a naming service, the system must already be in a service, such as NIS, NIS+, DNS, or LDAP. If you do not use a naming service, you must distribute information about this system by following your site's policies.

> **NOTE**   This procedure assumes that the system is running the Volume Manager. If you are not using the Volume Manager to manage media, refer to the *Oracle Microsystems System Administration Guide: Devices and File Systems.*

To install from a network image, perform these steps:

1. Log on as a superuser or equivalent.

2. Insert the Solaris DVD in the system's drive.

3. Create a directory to contain the DVD image.

    ```
    # mkdir -p install_dir_path
    ```

    Install_dir_path specifies the directory where the DVD image is to be copied.

4. Change to the `Tools` directory on the mounted disk.

    ```
    # cd /cdrom/cdrom0/Solaris_10/Tools
    ```

5. For Solaris 10 only:

    a. Remove the SUNWemlxu and SUNWemlxs from the `/install_dir_path/Solaris/Tools/Boot` directory.

    b. Unzip the lpfc driver to a temporary directory:

        ```
        pkgadd -R/install_dir_path/Solaris/Tools/Boot -d/tmp
        ```

    c. Modify the `elxfc.conf` file to use persistent binding. For more information, refer to the *Emulex Drivers for Solaris User Manual*, which is available at www.broadcom.com.

6. Copy the DVD image in the drive to the install server's hard disk.

    ```
    # ./setup_install_server install_dir_path
    ```

    install_dir_path specifies the directory where the DVD image is to be copied.

    The `setup_install_server` command indicates whether you have enough disk space available for the Solaris software disk images. To determine available disk space, use the `df -kl` command.

7. Decide whether you need to make the install server available for mounting:

    — If the install server is on the same subnet as the system to be installed or you are using DHCP, you do not need to create a boot server. Proceed to step 8.

    — If the install server is not on the same subnet as the system to be installed and you are not using DHCP, complete the following steps:

    a. Verify that the path to the install server's image is shared appropriately.

        ```
        # share | grep install_dir_path
        ```

        install_dir_path specifies the path to the installation image where the DVD image was copied:

        ● If the path to the install server's directory is displayed and anon=0 is displayed in the options, proceed to step 8.

        ● If the path to the install server's directory is not displayed or anon=0 is not in the options, continue and make the install server available to the boot server. Using the **share** command, add this entry to the `/etc/dfs/dfstab` (all on one line).

        ```
        share -F nfs -o ro,anon=0 -d "install server directory" install_dir_path
        ```

    b. Verify that the nfsd daemon is running, or start the nfsd daemon.

        ● If the install server is running the current Solaris release, or a compatible version, type the following command.

```
# svcs -l svc:/network/nfs/server:default
```

If the nfsd daemon is online, continue to step c. If the nfsd daemon is not online, start it.

```
# svcadm enable svc:/network/nfs/server
```

c. Share the install server.

```
# shareall
```

8. Change directories to root (/).

```
# cd /
```

9. Eject the Solaris DVD.

10. (Optional) Patch the files that are located in the miniroot on the net install image that was created by `setup_install_server`. Patching a file might be necessary if a boot image has problems. For more information, refer to the Solaris operating system documentation.

2.3.2.1 Installing Solaris by Migrating an Image from a Local SCSI Disk

To install Solaris by migrating an image from a local SCSI disk, perform these steps:

1. Type the following at the OBP prompt:

```
show-devs
```

The ID information for each found adapter is displayed, such as:

```
/pci@5d,700000/lpfc@1 select-dev
```

2. Select the Broadcom Emulex adapter on which you want to enable boot from SAN by entering the path to the adapter, for example:

```
" /pci@5d,700000/lpfc@1" select-dev
```

3. To view the current boot device ID, type:

```
show-devs
" /pci@5d,700000/lpfc@1" select-dev /* to select lpfc@1 (for example) */
.boot-id
```

Make a note of the WWPN, DID, or AL_PA returned from the probe and write down the corresponding boot entry.

4. To enable boot from the SAN, set the boot device ID to the SAN device from which you want to boot, for example:

```
" /pci@5d,700000/lpfc@1" select-dev
wwpn|did|alpa lun target_id set-boot-id
unselect-dev
```

where:

— wwpn|did|alpa is the device WWPN, DID, or AL_PA of the storage device.
— `lun` is the LUN number in hexadecimal. To enter it in decimal, enter `d# [lun]`.
— `target_id` is the target ID in hexadecimal. To enter it in decimal, enter `d# [target_id]`.

> **NOTE** Use the WWPN in most cases. The DID and AL_PA might change between boots, causing the SAN boot to fail, unless the DID and AL_PA are specifically configured to not change between boots.

Example 1: alpa=e1, lun=100 (decimal) and target id=10 (decimal):

```
alpa e1 d# 100 d# 10 set-boot-id
```

Example 2: wwpn=50000034987AFE, lun=af (hexadecimal) and target id=10 (decimal):

```
wwpn 50000034987AFE af d# 10 set-boot-id
```

Example 3: did=6312200, lun=25 (hexadecimal) and target id=f (hexadecimal):

```
did 6312200 25 f set-boot-id
```

5. Boot to the original local disk to set up the newly defined FC disk. Type

```
boot local_disk
```

where local_disk is the complete path or the alias of the original boot disk.

6. Run the format utility:

   format

7. Select the target disk to become the new boot disk (for example, c1t1d0).

8. Select the partition option and partition the disk as desired.

9. Select the label option and write a volume label to the target disk.

   For help with the format utility, refer to the man page `man format`.

10. Install the boot on partition 0 of the target disk. (Type this command on one line.)

    ```
    installboot /usr/platform/ `uname -i`/lib/fs/ufs/bootblk /dev/rdsk/clt1d0s0
    ```

11. Create a file system for each partition that contains a mounted file system.

    ```
    newfs -v /dev/rdsk/clt1d0s0 (becomes root)
    newfs -v /dev/rdsk/clt1d0s6 (becomes usr)
    newfs -v /dev/rdsk/clt1d0s7 (becomes export/home)
    ```

12. Create temporary mount points for the new partitions.

    ```
    mkdir root2
    mkdir usr2
    mkdir export2
    ```

13. Mount, copy, then unmount the usr2 file system.

    ```
    mount /dev/dsk/clt1d0s6 /usr2
    c0t0d0s6 ufsdump 0f - /dev/rdsk/c0t0d0s6 | (cd /usr2; ufsrestore rf -)
    umount /usr2
    ```

14. Copy the export/home file system.

    ```
    mount /dev/dsk/clt1d0s7 /export2
    ufsdump 0f - /dev/rdsk/c0t0d0s7 | (cd /export2; ufsrestore rf -)
    umount /export2
    ```

15. Perform copy.

    ```
    mount /dev/dsk/clt1d0s0 /root2
    ufsdump 0f - /dev/rdsk/c0t0d0s0 | (cd /root2; ufsrestore rf -)
    ```

16. Edit `/root2/etc/vfstab`, changing the controller number, target number, and LUN number to point to the new FC boot disk. For example, if the FC boot disk is c1t1d0, replace all local disk entries of c0t0d0 with c1t1d0.

    Currently the file shows.

    ```
    /dev/dsk/c0t0d0s1 (swap)

    /dev/dsk/c0t0d0s0 and /dev/rdsk/c0t0d0s0 (root)
    /dev/dsk/c0t0d0s6 and /dev/rdsk/c0t0d0s6 (usr)
    /dev/dsk/c0t0d0s7 and /dev/rdsk/c0t0d0s7 (export)
    ```

    Edit the file to show.

    ```
    /dev/dsk/c1t1d1s1 (swap)

    /dev/dsk/clt1d0s0 and /dev/rdsk/c1t1d0s1 (root)
    /dev/dsk/clt1d0s6 and /dev/rdsk/c1t1d0s6 (usr)
    /dev/dsk/clt1d0s7 and /dev/rdsk/c1t1d0s7 (export)
    ```

17. Reboot the system.

    ```
    sync
    sync
    halt
    ```

```
reset-all
```

18. Boot to disk.

```
boot disk
```

The system should boot to the FC disk.

19. View the current dump device setting.

```
dumpadm
```

20. Change the dump device to the swap area of the FC drive.

```
dumpadm -d /dev/dsk/c1t1d0s1
```

where `/dev/dsk/c1t1d0s1` is a sample path to the swap area of the FC drive.

Chapter 3: Updating and Enabling Boot Code

Use the Emulex utilities to update boot code to a newer version and enable boot code. The utility that you use depends on the operating system and, in some cases, the driver type or system architecture. Table 2 indicates the utilities you can use to install and update boot code.

Table 2 Utilities that Update and Enable Boot Code

Operating System	OneCommand Manager GUI	OneCommand Manager CLI	UEFI Utility	CIM Provider*	FCA emlxadm	Offline Utilities
Windows	X	X	X			X
Linux	X	X	X			X
Solaris	X	X			X	
VMware	X	x	X	X		

***VMware only; refer to the *CIM Provider Package Installation Guide**

After you decide which utility to use, refer to the appropriate procedure:

- OneCommand Manager GUI: refer to the *OneCommand Manager User Manual.*
- OneCommand Manager CLI: refer to the *OneCommand Manager Command Line Interface User Manual.*
- UEFI utility: see Section 6, Configuring Boot using UEFI HII in a UEFI 2.1 System.
- FCA emlxadm utility: refer to the *FCA Utilities User Manual.*
- Offline utility: refer to the *Offline and Online Adapter Management Utilities User Manual.*

Chapter 4: Emulex BIOS Utility

Before using the Emulex BIOS utility, ensure that the boot code is loaded and enabled on the adapter as described in Section 3, Updating and Enabling Boot Code.

NOTE	This section reflects the most recent release of the BIOS utility. Some selections might not be available if you are using an older version of the utility.
NOTE	Changes made to parameters common to UEFI and x86 drivers are changed in both driver configuration utilities.
NOTE	After exiting the Emulex BIOS configuration utility, the system will reboot regardless of whether any changes were made.

4.1   Navigating the FCoE BIOS Utility

Use the following methods to navigate the BIOS utility:

■ Press the up and down arrows on your keyboard to move through and select menu options or configuration fields. If multiple adapters are listed, use the up/down arrows to scroll to the additional adapters.

■ Press PageUp to scroll to the previous page.

■ Press PageDn to scroll to the next page.

■ Press Enter to select a menu option, to select a changed value, to select a row in a screen, or to change a configuration default.

■ Press Esc to go back to the previous menu.

4.2   Starting the Emulex BIOS Utility

To start the Emulex BIOS Utility, perform these steps, perform these steps:

1. Turn on the computer and press and hold down Alt or Ctrl and press E immediately (within five seconds) when the Emulex bootup message to enter the BIOS utility is displayed.

   An adapter listing screen is displayed (Figure 1 on page 19).

NOTE	Links must be connected and established before entering the BIOS utility; otherwise, you will receive an error message.
NOTE	If the bootup message does not appear, you must enable x86 BootBIOS. See Section 4.2.1, Enabling an Adapter to Boot from SAN for more information.
NOTE	After exiting the Emulex BIOS configuration utility, the system will reboot regardless of whether any changes were made.

Figure 1 Adapter Listing Screen
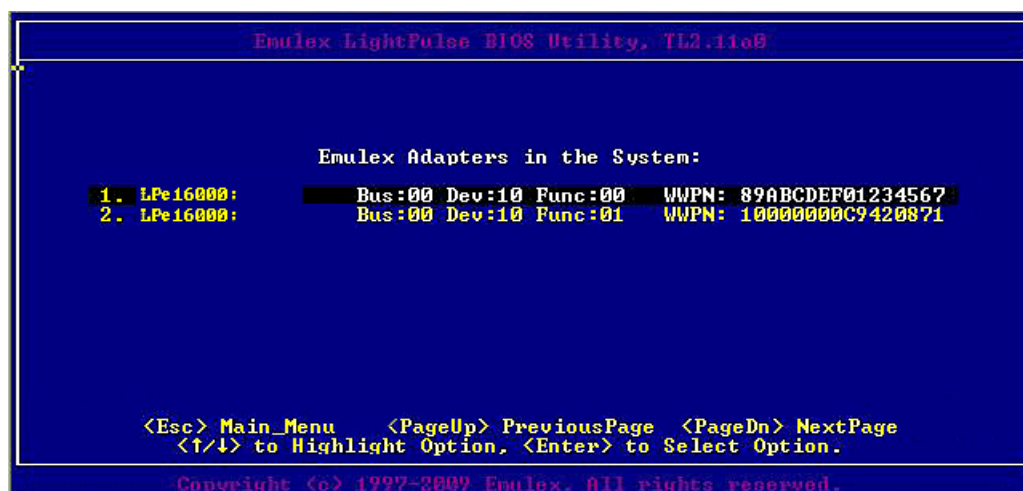
2.   Select the adapter to configure and press Enter.

The main configuration menu is displayed (Figure 2).

Figure 2 Main Configuration Menu

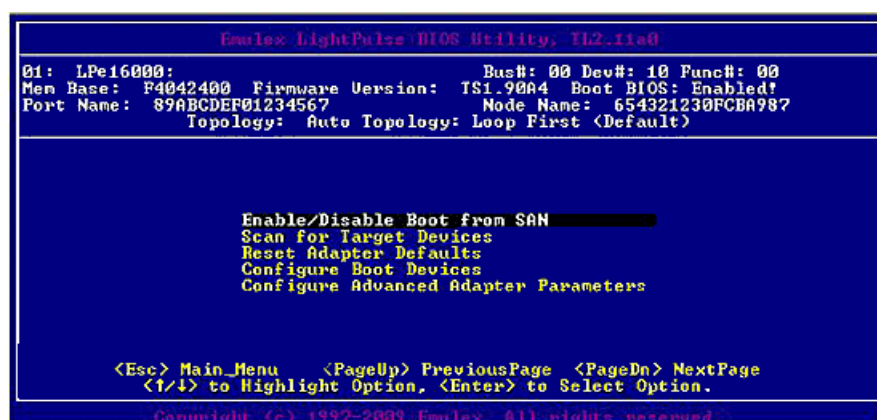Under normal circumstances, you would first configure boot devices using the BIOS Utility (see "Configuring Boot Devices" on page 20). However, in the following two situations, you must perform the indicated procedure first:

■   The adapter is not enabled to boot from SAN: You must enable the adapter's BIOS to boot from SAN (see Section 4.2.1, Enabling an Adapter to Boot from SAN).

■   You want to use a topology other than the default (auto topology with loop first): You must change the topology setting before configuring boot devices (see Section 4.4.3, Changing Topology).

4.2.1   Enabling an Adapter to Boot from SAN

To enable an adapter to boot from SAN, perform these steps:

1.   From the main configuration menu (Figure 2), select **Enable/Disable Boot from SAN** and press Enter.

> **NOTE**   Adapters are disabled by default.

Boot from SAN must be enabled on one adapter to use remote boot functionality. After you enable an adapter, the status of the Boot BIOS changes as shown in Figure 3 on page 20.

NOTE   x86 BootBIOS supports a maximum of 16 or 32 ports depending on the adapter.

Figure 3 BIOS Status Screen
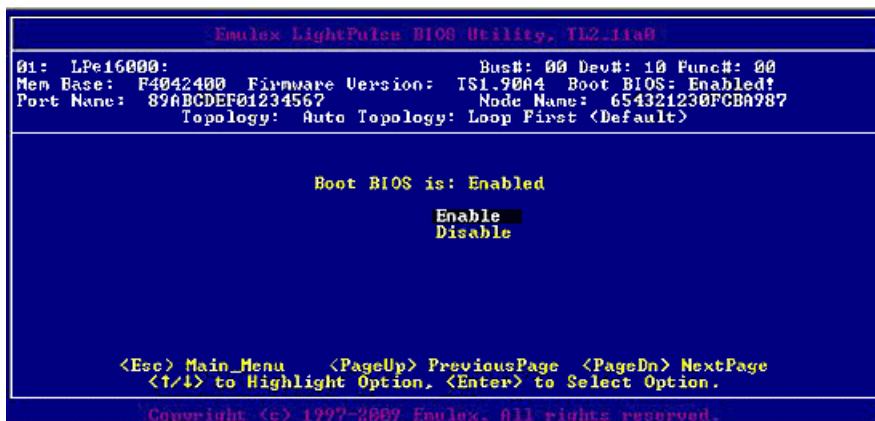
4.3   Configuring Boot Devices

This option supports FC_AL: (public and private loop) and fabric point-to-point. When operating in loop (FC_AL) topology, the system automatically determines whether you are configured for a public or private loop. The BIOS looks for a fabric loop (FL_Port) first. If a fabric loop is not detected, the BIOS looks for a private loop. For the **Configure Boot Devices** option, the eight boot entries are zero by default (D key).

NOTE   If you must change the topology, do it before you configure boot devices. The default topology is auto topology with loop first. For FC-AL, each adapter has a default AL_PA of 01 (hexadecimal).

To configure boot devices, perform these steps:

1. On the main configuration menu (Figure 2 on page 19), select **Configure Boot Devices**.

   A list of eight boot devices is shown (Figure 4 on page 21). The primary boot device is the first entry shown, and it is the first bootable device.

   If the first boot entry fails due to a hardware error, the system can boot from the second bootable entry. If the second boot entry fails, the system boots from the third bootable entry and so on, if it is configured in the system BIOS on a BBS system.

NOTE   The Emulex BIOS utility only presents the boot devices to the system BIOS. The system BIOS must enumerate and attempt to boot from the drive as the primary hard drive from which to boot. See Section 4.4.12, Using Multi-Path Boot from SAN.

Figure 4 List of Saved Boot Devices Screen
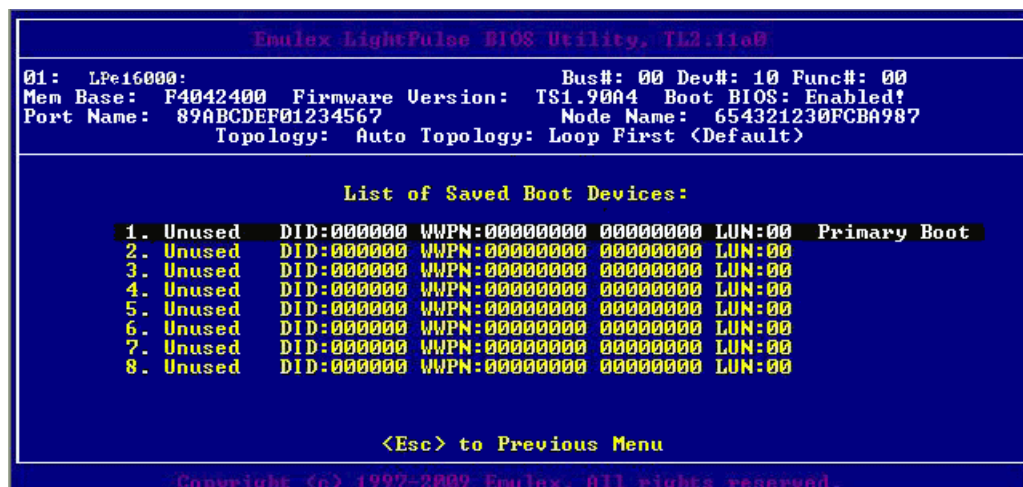
2.   Select a boot entry and press Enter.

A screen similar to Figure 5 is displayed.

Figure 5 Device Selection List Example (Array) Screen
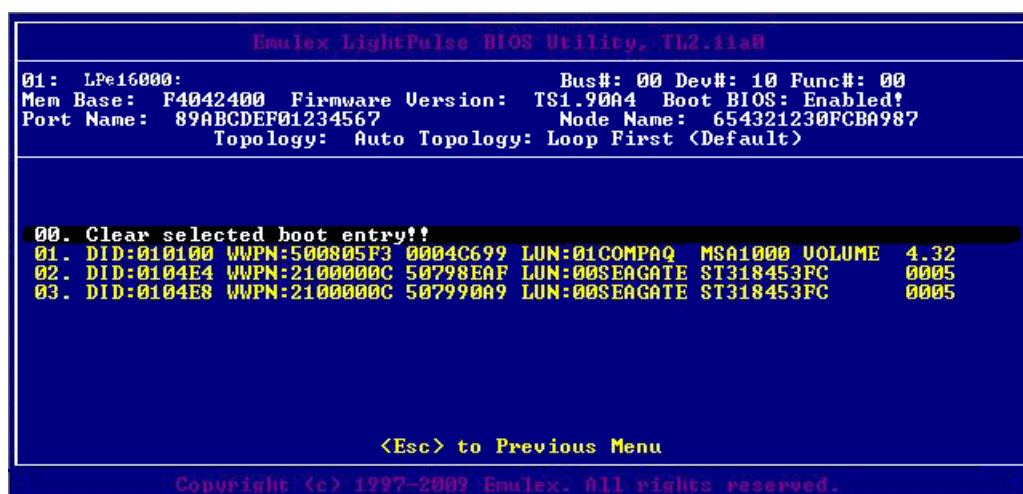
NOTE	To minimize the amount of time needed to locate the boot device, select the drive with the lowest AL_PA as the boot device when connected to devices on a FC arbitrated loop.

3.   Select **00** and press Enter to clear the selected boot entry, or select the WWPN or DID of a device to configure.

4.   If you select a device, you are prompted for the starting LUN. Enter the starting LUN (Figure 6 on page 22). The starting LUN can be any number from 0 to 255.

Figure 6 LUN Listing Screen
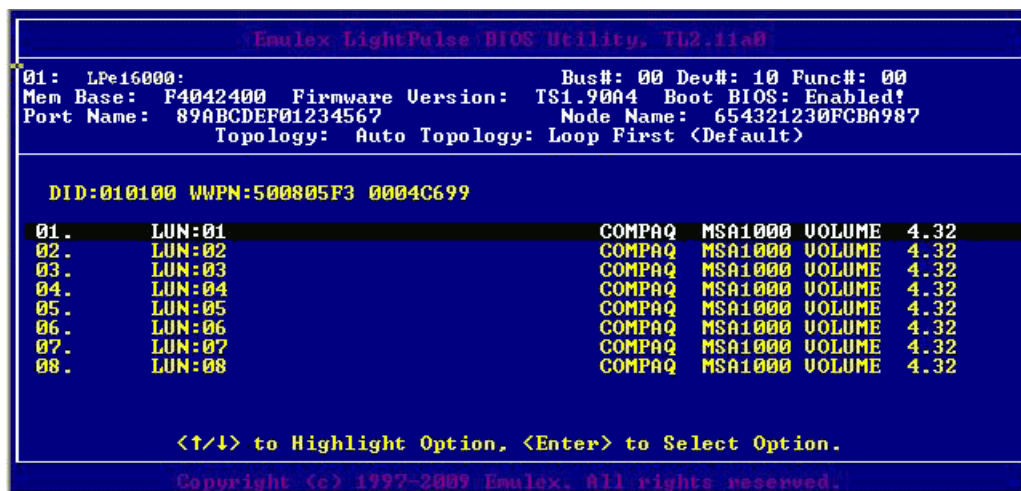
You can define 256 LUNs per adapter, but the screen displays only 16 consecutive LUNs at a time. In front of each entry, B#D or B#W specifies the boot entry number and whether the device boots by DID or WWPN. For example, B1D means that boot entry 1 boots from the DID. B2W means that boot entry 2 boots from WWPN.

5. Type the two digits corresponding to the entry you are selecting.

    The Boot Devices menu (Figure 7) is displayed.

Figure 7 Boot Devices Menu
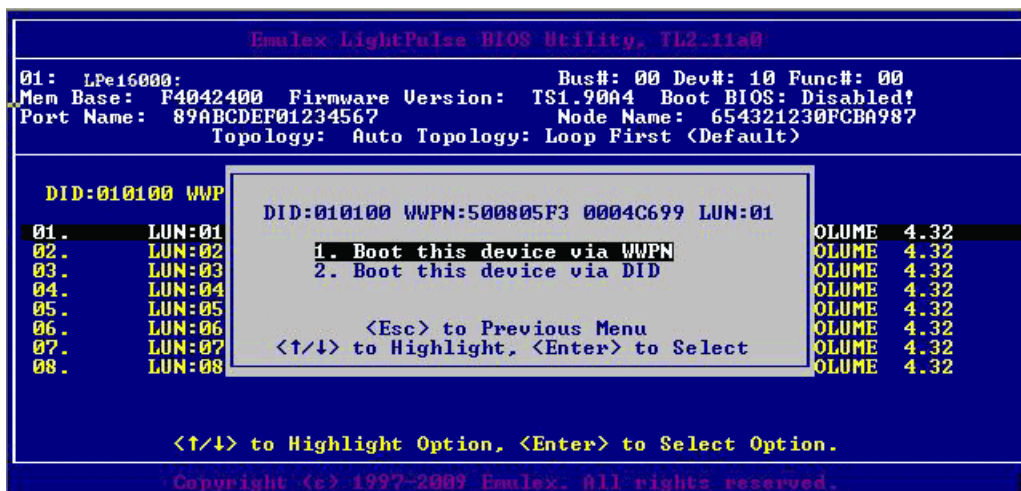
6. Use the up arrow and down arrow to select the boot method you want. If you select to boot the device by WWPN, the WWPN of the earlier selected entry is saved in the flash memory. However, during the initial BIOS scan, the utility issues a Name Server Inquiry GID_PN (Get Port Identifier), converting the WWPN to a DID. Then, based on this DID, it continues with the remainder of the scanning.

    If you select to boot this device by DID, the earlier selected entry is saved in the flash memory (Figure 8 on page 23).

Figure 8 Primary Boot Device Set Up Screen
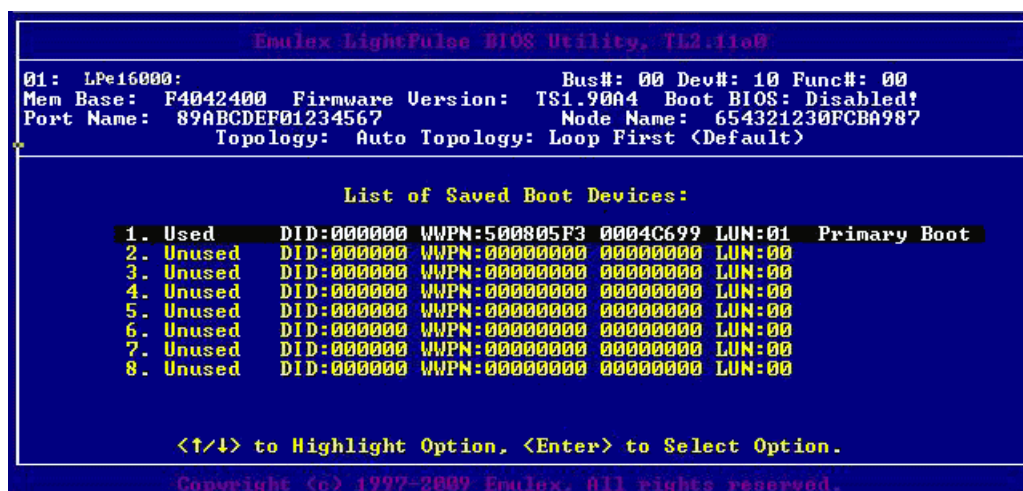
7. Press Enter to select the change.

8. Press Esc until you exit the BIOS utility.

9. Reboot the system for the new boot path to take effect.

4.4   Configuring Adapter Parameters

The BIOS utility has numerous options that can be modified to provide for different behavior. Use the BIOS utility to perform the following tasks:

■   Change the default AL_PA of the adapter.

■   Change the PLOGI retry timer.

■   Select a topology.

■   Enable or disable spinup delay.

■   Set autoscan.

■   Enable or disable EDD 3.0.

■   Enable or disable the start unit command.

■   Enable or disable the environment variable.

■   Enable or disable the auto boot sector.

■   Select a link speed.

> **NOTE**   The default topology is auto topology with loop first. Change this topology setting, if necessary, before configuring boot devices.

To access the adapter configuration menu, from the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

The adapter configuration menu is displayed (Figure 9 on page 24).

Figure 9 Adapter Configuration Menu
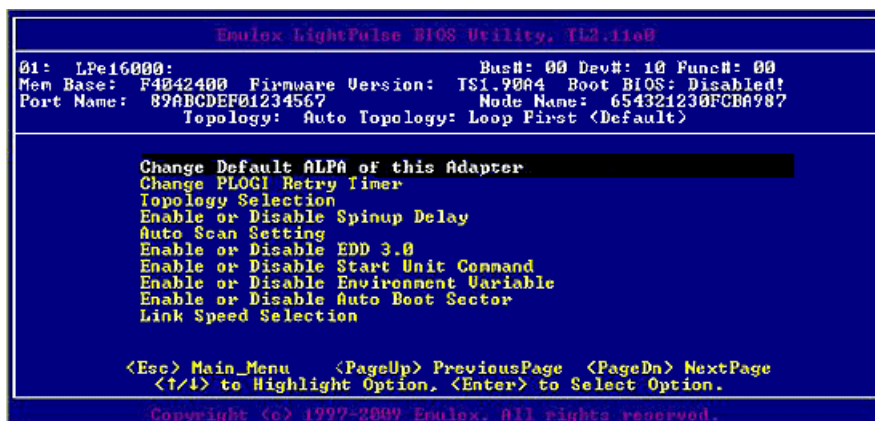
Default settings are acceptable for most installations.

To reset all values to their defaults, from the main configuration menu (Figure 2 on page 19), select **Reset Adapter Defaults** and press Enter.

4.4.1 Changing the Default AL_PA

The default value of the AL_PA for the adapter BIOS is 00 (hexadecimal). All adapters or boot drives can be configured to other AL_PAs rather than their default values.

> **NOTE**   This option applies only to arbitrated loop (FC-AL).

To change the default AL_PA, perform these steps:

1. From the main configuration menu (Figure 2 on page 19), select Configure Advanced Adapter Parameters.
   The adapter configuration menu is displayed (Figure 9).
2. Select **Change Default ALPA of this Adapter** and press Enter.
   Information similar to Figure 10 is displayed.

Figure 10 Change Default ALPA Screen
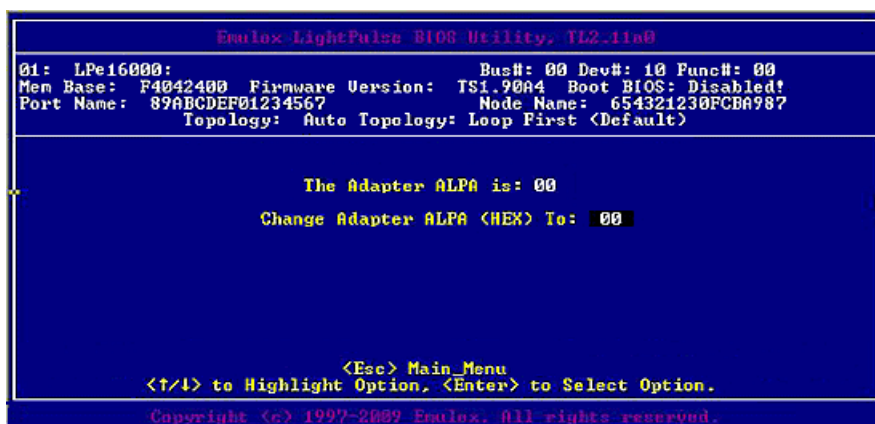
> **NOTE**   To change the default AL_PA, use the up arrow and down arrow keys
> to scroll through the valid ALPAs. Table 3 on page 25 lists the valid

AL_PA values.If the adapter's AL_PA is changed, it does not appear on the NVRAM AL_PA until the system has been reset.

Table 3 Valid AL_PA Values

0x00	0x01	0x02	0x04	0x08	0x0F	0x10	0x17
0x18	0x1B	0x1D	0x1E	0x1F	0x23	0x25	0x26
0x27	0x29	0x2A	0x2B	0x2C	0x2D	0x2E	0x31
0x32	0x33	0x34	0x35	0x36	0x39	0x3A	0x3C
0x43	0x45	0x46	0x47	0x49	0x4A	0x4B	0x4C
0x4D	0x4E	0x51	0x52	0x53	0x54	0x55	0x56
0x59	0x5A	0x5C	0x63	0x65	0x66	0x67	0x69
0x6A	0x6B	0x6C	0x6D	0x6E	0x71	0x72	0x73
0x74	0x75	0x76	0x79	0x7A	0x7C	0x80	0x81
0x82	0x84	0x88	0x8F	0x90	0x97	0x98	0x9B
0x9D	0x9E	0x9F	0xA3	0xA5	0xA6	0xA7	0xA9
0xAA	0xAB	0xAC	0xAD	0xAE	0xB1	0xB2	0xB3
0xB4	0xB5	0xB6	0xB9	0xBA	0xBC	0xC3	0xC5
0xC6	0xC7	0xC9	0xCA	0xCB	0xCC	0xCD	0xCE
0xD1	0xD2	0xD3	0xD4	0xD5	0xD6	0xD9	0xDA
0xDC	0xE0	0xE1	0xE2	0xE4	0xE8	0xEF	

3. Press Enter to accept the new value.

4. Press Esc until you exit the BIOS utility.

5. Reboot the system.

4.4.2 Changing the PLOGI Retry Timer

This option is useful for Tachyon-based RAID arrays. In rare situations, a Tachyon-based RAID array resets itself and the port goes offline temporarily. When the port returns to operation, the port login scans the loop to discover this device. The port login retry interval is the time it takes for one port login to scan the whole loop (if 126 AL_PAs are on the loop). You can choose:

- No PLOGI Retry: 0 msec – Default
- 50 msec takes 5 to 6 seconds per device
- 100 msec takes 12 seconds per device
- 200 msec takes 22 seconds per device

To set the interval for the port login retry timer, perform these steps:

1. On the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

   The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Change PLOGI Retry Timer** and press Enter. Information similar to Figure 11 on page 26 is displayed.

Figure 11 Change the PLOGI Retry Timer Screen
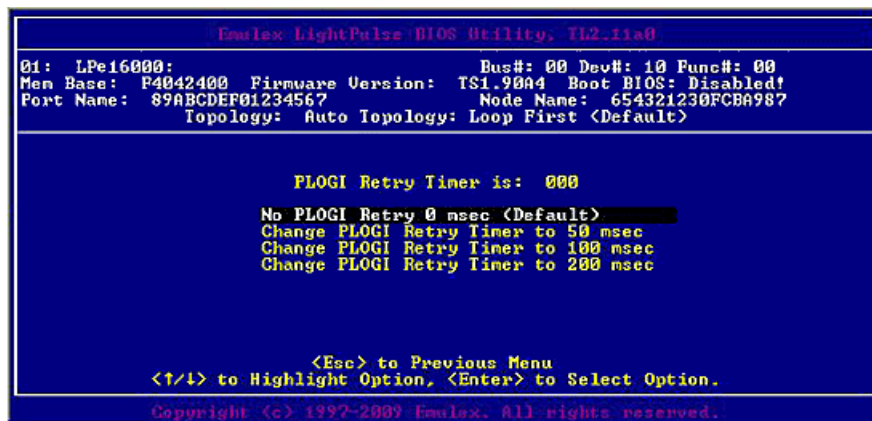
3. Select the retry timer interval.

4. Press Enter to accept the new interval.

5. Press Esc until you exit the BIOS utility.

6. Reboot the system.

4.4.3 Changing Topology

Broadcom Emulex drivers support arbitrated loop and point-to-point topologies. If you must change the topology, do it before you configure boot devices. The default topology is auto topology with loop first. For FC-AL, each adapter has a default AL_PA of 01 (hexadecimal).You can configure these items:

■ Auto topology with loop first – default

■ Auto topology with point-to-point first

■ FC-AL

■ Fabric point-to-point

To select the adapter topology, perform these steps:

1. On the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

    The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Topology Selection** and press Enter. Information similar to Figure 12 on page 27 is displayed.

Figure 12 Topology Menu

3.   Select the topology for the adapter.

4.   Press Enter to accept the new topology.

5.   Press Esc until you exit the BIOS utility.

6.   Reboot the system.

4.4.4   Enabling or Disabling the Spinup Delay

This option allows you to enable or disable the disk spinup delay. The factory default setting is disabled.

If at least one boot device has been defined, and the spinup delay is enabled, the BIOS searches for the first available boot device.

■   If a boot device is present, the BIOS boots from it immediately.

■   If a boot device is not ready, the BIOS waits for the spinup delay and, for up to three additional minutes, continues the boot scanning algorithm to find another multi-boot device.

If boot devices have not been defined and auto scan is enabled, the BIOS waits for five minutes before scanning for devices.

■   In a private loop, the BIOS attempts to boot from the lowest target AL_PA it finds.

■   In an attached fabric, the BIOS attempts to boot from the first target found in the NameServer data.

To enable or disable the spinup delay, perform these steps:

1.   On the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

The adapter configuration menu is displayed (Figure 9 on page 24).

2.   Select **Enable or Disable Spinup Delay** and press Enter.

The Enable or Disable Spinup Delay screen (Figure 13 on page 28) is displayed.

Figure 13 Enable or Disable Spinup Delay Screen

3. Select whether to enable or disable spinup delay.

4. Press Enter to accept the new value.

5. Press Esc until you exit the BIOS utility.
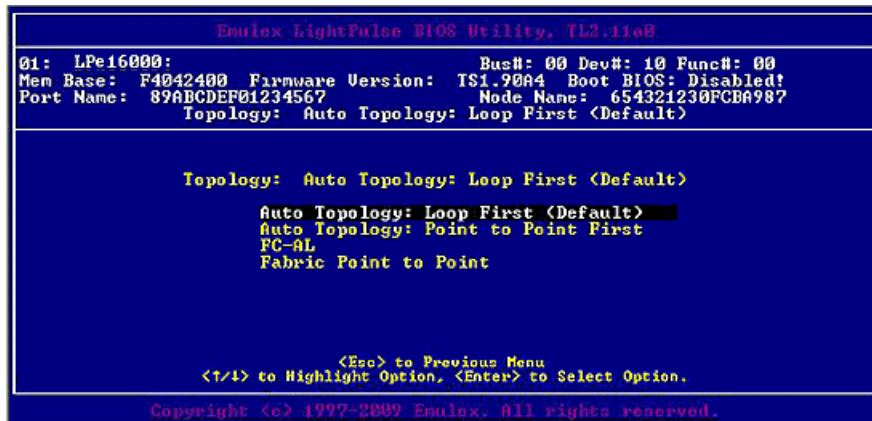
6. Reboot the system.

4.4.5   Setting Auto Scan

This option allows you to set auto scan and enable the first device in the boot entry list to issue a Name Server Inquiry. Auto scan is available only if none of the eight boot entries are configured to boot from DID or WWPN. The factory default is disabled. If there is more than one adapter with the same PCI Bus number exists in the system, and each has a boot drive attached, the first PCI-scanned adapter is the boot adapter.

Use the Boot Devices menu (Figure 7 on page 22) to configure up to eight boot entries for fabric point-to-point, public loop, or private loop configurations. The first adapter is usually in the lowest PCI slot in the system. This device is the only boot device and it is the only device exported to the multi-boot menu.

The following auto scan options are available:

- Autoscan disabled – Default.
- Any first device – The first adapter issues a Name Server Inquiry and the first D_ID from the inquiry becomes the boot device. The adapter attempts to log in to a public loop first. If it fails, it logs in to a private loop. The first successfully scanned device becomes the boot device. Only this device is exported to the multi-boot menu.
- First LUN 0 device
- First NOT LUN 0 device (a device other than LUN 0)

To set auto scan, perform these steps:

1. From the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

    The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Auto Scan Setting** and press Enter.

    Figure 14 on page 29 is displayed.

Figure 14 Set Auto Scan Menu
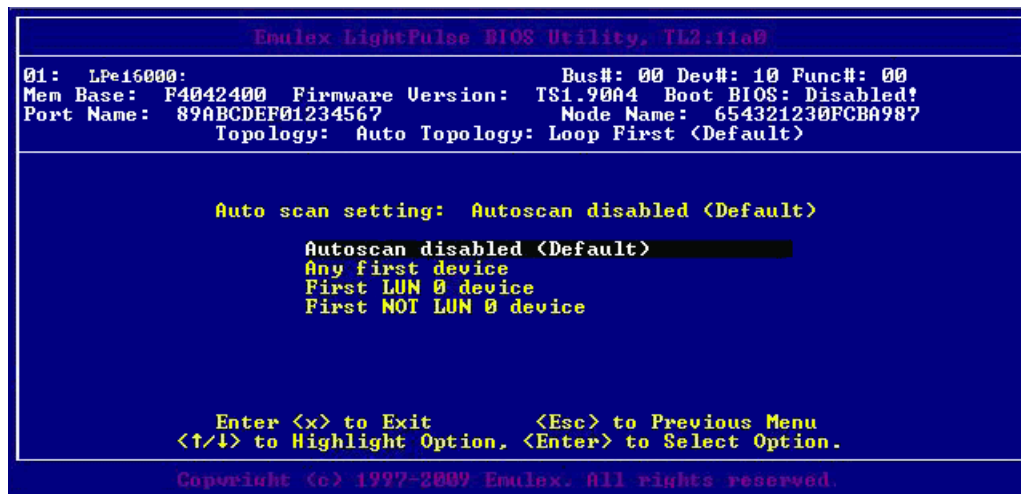
3. Select the desired auto scan option.

4. Press Enter to accept the new option.

5. Press Esc until you exit the BIOS utility.

6. Reboot the system.

4.4.6   Enabling or Disabling EDD 3.0

EDD 3.0 provides additional data to the operating system boot loader during the INT-13h function 48h (get device parameters) call. This information includes the path to the boot device and disk size. The default setting for EDD 3.0 is enabled.

> **NOTE**   If EDD 3.0 is disabled, then EDD 2.1 is enabled.

To enable or disable EDD 3.0, perform these steps:

1. From the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

    The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Enable or Disable EDD 3.0**.

    The Enable or Disable EDD 3.0 screen (Figure 15 on page 30) is displayed.

Figure 15 Enable or Disable EDD 3.0 Screen

3.   Select the desired EDD 3.0 setting.

4.   Press Enter to accept the new setting.

5.   Press Esc until you exit the BIOS utility.

6.   Reboot the system.

4.4.7   Enabling or Disabling the Start Unit Command

This option allows a start unit command to be sent to a particular disk. This option might be needed if the disk you want to boot from is not yet spun up or started. You must know the specific LUN to issue the SCSI start unit command. The default setting is disabled.

To enable or disable the start unit command, perform these steps:

1.   From the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

     The adapter configuration menu is displayed (Figure 9 on page 24).

2.   Select **Enable or Disable Start Unit Command** and press Enter.

     The Enable or Disable Start Unit Command screen (Figure 16) is displayed.

Figure 16 Enable or Disable Start Unit Command Screen
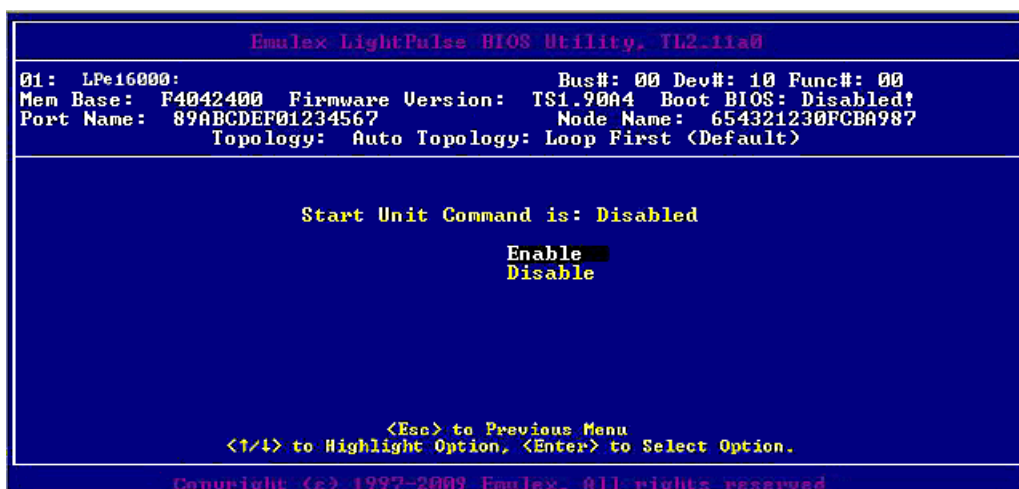
3. Select the desired Start Unit Command setting.

4. Press Enter to accept the new setting.

5. Press Esc until you exit the BIOS utility.

6. Reboot the system.

4.4.8 Enabling or Disabling the Environment Variable

This option sets the boot controller order if the system supports the environment variable. The default setting is disabled.

To enable or disable the environment variable, perform these steps:

1. From the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

   The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Enable or Disable** and press Enter.

   The Enable or Disable Environment Variable screen (Figure 17) is displayed.

Figure 17 Enable or Disable Environment Variable Screen

3. Select the desired setting.

4. Press Enter to accept the new setting.

5. Press Esc until you exit the BIOS utility.

6. Reboot the system.

## 4.4.9 Enabling or Disabling Auto Boot Sector

This option automatically defines the boot sector of the target disk for the migration boot process, which applies only to HP MSA1000 arrays. If there is no partition on the target, the default boot sector format is 63 sectors. The default setting is disabled.

To enable or disable auto sector format select, perform these steps:

1. From the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

   The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Enable or Disable Auto Boot Sector** and press Enter.

The Enable or Disable Auto Boot Sector Format Select screen (Figure 18 on page 32) is displayed.

Figure 18 Enable or Disable Auto Boot Sector Format Select Screen

3.   Select the desired setting.

4.   Press Enter to accept the new setting.

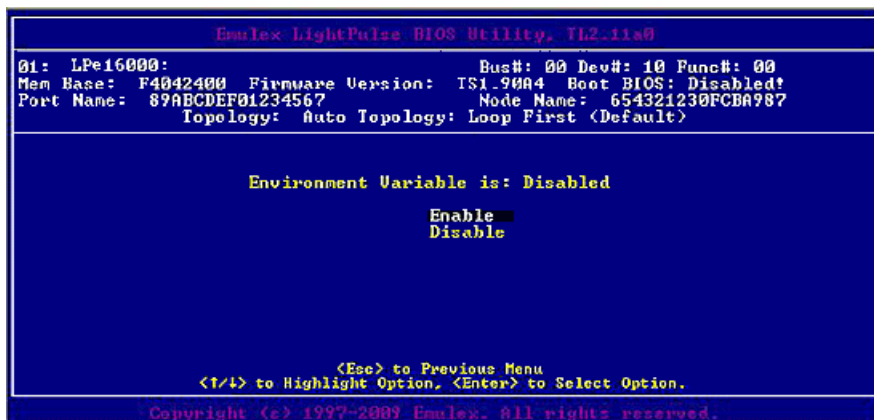5.   Press Esc until you exit the BIOS utility.
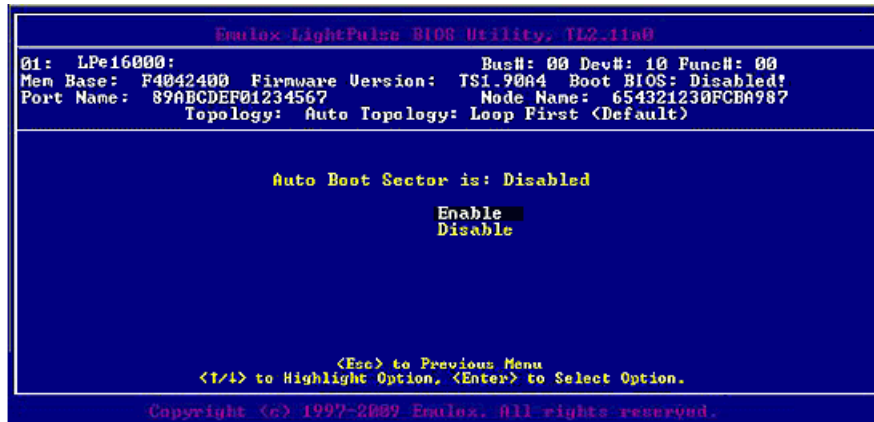
6.   Reboot the system.

4.4.10   Changing Link Speed

The default link speed is Auto Select, which automatically selects the link speed based on the adapter model.

NOTE	The Link Speed setting will be overwritten by the FC driver and will not take effect during a regular boot into the local operating system. Therefore, the link speed BIOS setting will work for the actual boot, but will be overwritten once the operating system loads.

Possible link speeds (depending upon your adapter model):

■   Auto Select – default

■   1 Gb/s

■   2 Gb/s

■   4 Gb/s

■   8 Gb/s

■   16 Gb/s

■   32 Gb/s

NOTE	Broadcom Emulex 8 Gb/s adapters do not support 1 Gb/s link speed. Broadcom Emulex 16 Gb/s adapters do not support 1 Gb/s or 2 Gb/s link speed. Additionally, some older devices do not support auto link speed detection; therefore, the link speed must be forced to match the speed of those devices.

To change the adapter's link speed, perform these steps:

1.   From the main configuration menu (Figure 2 on page 19), select **Configure Advanced Adapter Parameters** and press Enter.

The adapter configuration menu is displayed (Figure 9 on page 24).

2. Select **Link Speed Selection** and press Enter.

    The Link Speed Selection menu () is displayed.

Figure 19 Link Speed Selection Menu

3. Use the up arrow and down arrow to select the desired FC link speed you would like to use.

4. Press Enter to accept the new link speed.

5. Press Esc until you exit the BIOS utility.

6. Reboot the system.

4.4.11   Resetting to Default Values

The BIOS utility enables you to reset BIOS boot parameters to their factory default settings. These defaults are listed in Table 4 on page 33.

Table 4 Adapter Defaults

| Parameter	Default	Valid Values
Boot from SAN	Disabled	Enabled Disabled
ALPA Value	0x00 Fibre	See the ALPA reference table (Section 4.4.1, Changing the Default AL_PA.
EDD 3.0	EDD 3.0	Disabled (EDD 2.1) Enabled (EDD 3.0)
PLOGI Retry Timer	Disabled	Disabled 50 msec 100 msec 200 msec
Spinup Delay	Disabled	Enabled Disabled
Auto Scan	Disabled	Enabled Disabled
Start Unit	Disabled	Enabled Disabled
Environmental Variable	Disabled	Enabled Disabled

Table 4 Adapter Defaults (Continued)

Parameter	Default	Valid Values
Auto Boot Sector	Disabled	Enabled Disabled
Topology	Auto (start FC-AL)	Auto (start FC-AL) Point-to-Point Auto (start Point-to-Point) FC-AL
Link Speed	Auto (highest successfully negotiated speed)	

To reset parameters to their factory default settings, perform these steps:

1. On the main configuration menu (Figure 2 on page 19) select **Reset Adapter Defaults** and press Enter.

   A screen similar to Figure 20 is displayed asking if you want to reset to the default settings.

Figure 20 Reset Adapter Configuration to Defaults
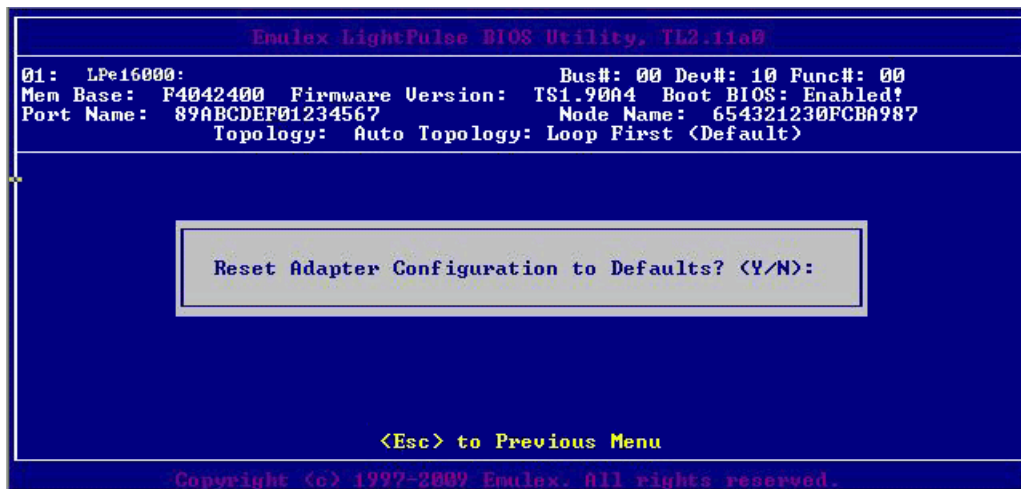
2. Press Y.

   All settings revert to their factory default values.

4.4.12   Using Multi-Path Boot from SAN

Multi-boot BIOS is in compliance with the BIOS Boot Specification (BBS). The system must have a Multi-boot system BIOS to use this feature. Multi-boot system BIOS allows you to select any boot disk in the system BIOS setup menu. The boot disk can be an FC drive, a SCSI drive, an IDE drive, a USB device, or drive. The Emulex BIOS supplies the first eight drives to the system BIOS menu. The Multi-boot system BIOS can override the FC drive that is selected in the BIOS utility.

For example, the system has only eight FC disks. The boot disk has ALPA 02. However, you can select ALPA 23 in the system BIOS setup menu. The boot device is the FC disk with ALPA 23 instead of ALPA 02, as is set in the BIOS utility.

If your system supports Multi-boot BBS, the local boot disk (drive C) is the first entry in Multi-boot on the system BIOS setup menu. The list of entries is determined by the list of configured boot entries in the BIOS utility. For example:

```
Adapter 1: boot_entry0, boot_entry1
Adapter 2: boot_entry2, boot_entry3
```

The order of boot entries exported to Multi-boot (BBS) is:

```
boot_entry0, boot_entry1, boot_entry2, and boot_entry3.
```

However, Multi-boot allows changing the boot order in the server BIOS, which allows any disk to become the C drive.

Chapter 5: OpenBoot

OpenBoot commands are supported on SPARC systems.

5.1 Attribute Commands

The following commands show the boot device ID, boot list, OpenBoot versions, and so on.

5.1.1 .boot-id

Syntax	`.boot-id`
Description	Shows the current boot device ID.
Parameters	None

5.1.2 devalias

Syntax	`.devalias`
Description	Shows the boot list.
Parameters	None

5.1.3 .fcode

Syntax	`.fcode`
Description	Shows the current version of OpenBoot.
Parameters	None

5.1.4 host-did

Syntax	`.host-did`
Description	Shows the actual current AL_PA of the adapter.
Parameters	None

5.1.5 .nvram

Syntax	`.nvram`
Description	Shows the current flags for OpenBoot.
	`show-devs "/pci@1f,0/pci@1/lpfc@1" select-dev/* select lpfc@1 (for example) */.nvram`
Parameters	None

5.1.6 probe-scsi-all

Syntax	`.probe-scsi-all`

Description	Shows the current SCSI and FC devices.
Parameters	None

5.1.7 show-devs

Syntax	`.show-devs`
Description	Shows a list of the devices found.
Parameters	None

5.1.8 .topology

Syntax	`.topology`
Description	Shows the current topology.
Parameters	None

5.2 Functional Commands

The following commands remove boot IDs, resets default values, sets link speed, and so on.

5.2.1 .remove-boot-id

Syntax	`.remove-boot-id`
Description	Removes the boot ID from the boot list.
	`"/pci@1f,0/pci@1/lpfc@1" select-dev remove-boot-id /* to clear boot id settings */unselect-dev`
	or
	`"/pci@1f,0/pci@1/lpfc@1" select-dev set-default-mode /* to clear boot id settings */unselect-dev`
Parameters	None

5.2.2 set-default-mode

Syntax	`set-default-mode`
Description	Resets to the default value mode.
Parameters	None

5.2.3 set-link-speed

NOTE	The Link Speed setting will be overwritten by the FC driver and will not take effect during a regular boot into the local operating system. Therefore, the link speed BIOS setting will work for the actual boot, but will be overwritten after the operating system loads.

Syntax	`set-link-speed`

Description	Shows the current link-speed setting. Changes and sets the link speed. The default is `0`=Auto Select Link Speed.
Parameters	`0`=Auto Select Link Speed (Default)
	`1`=1 Gb/s Link Speed – Only
	`2`=2 Gb/s Link Speed – Only
	`4`=4 Gb/s Link Speed – Only
	`8`=8 Gb/s Link Speed – Only
	`16`=16 Gb/s Link Speed – Only
	`32`=32 Gb/s Link Speed – Only

5.2.4   set-max-lun

Syntax	`set-max-lun`
Description	Shows the current maximum LUN support. Changes and sets the support setting, the default max lun is 256.
Parameters	0=Set Max Lun to 255 (Default)
	1=Set Max Lun to 1023
	2=Set Max Lun to 2047
	3=Set Max Lun to 4095

5.2.5   set-post-linkup

Syntax	`set-post-linkup`
Description	Controls if a linkup is to occur during a POST. The default is off.
Parameters	0=Set Linkup Switch OFF (Default)
	1=Set Linkup Switch ON

5.2.6   OpenBoot Signature

Target ID can be bound to either DID (destination ID) or WWPN and saved in an adapter NVRAM. It can also be saved in an environmental variable boot-device.

Table 5 OpenBoot Signature Table

Signature	OpenBoot Signature
`Valid_flag`	Internal flag for OpenBoot
`Host_did`	Shows host DID number
`Enable_flag`	Internal flag for OpenBoot
`Topology_flag`	Topology flag for OpenBoot
`Link_Speed_Flag`	Set link speed
`Diag_Switch`	Set fcode diag switch
`Boot_id`	Shows target ID number
`Lnk_timer`	Internal use for OpenBoot
`Plogi_timer`	Internal use for OpenBoot

Table 5 OpenBoot Signature Table

Signature	OpenBoot Signature
LUN	Shows boot LUN in use
DID	Shows boot ID in use
WWPN	Shows boot WWPN in use

Chapter 6: Configuring Boot using UEFI HII in a UEFI 2.1 System

You can configure boot functions using the Emulex Configuration Utility. If you have several adapters in your system, the UEFI system firmware or boot code uses the highest version driver that is on one of your adapters.

> **NOTE**   Adapters with older versions of EFIBoot are managed by the more recent version, but only as long as the adapter with the most recent version is in the system. The adapters must be updated to actually update and not just use the most recent version available. EFIBoot is not supported on legacy CNAs, such as the LP21000 and LP21002.

6.1   Updating an Adapter's Firmware or Boot Code

The Emulex UEFI Boot driver supports firmware updates by implementing the UEFI Firmware Management Protocol.

> **NOTE**   If a secure version of firmware (version 11.0 or later) is installed on an LPe31000-series or LPe32000-series adapter and you want to update to an earlier unsecure version of firmware, you must remove the secure firmware jumper block before performing the update. Refer to the adapter installation manual for more information.
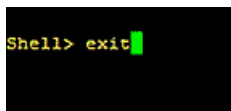
6.2   Starting the Emulex Configuration Utility

Depending on the OEM UEFI configuration, the Emulex Configuration Utility might appear under different setup menus in the OEM system firmware or BIOS.

To start the Emulex Configuration utility using HII, perform these steps:

1.   Exit the UEFI shell (Figure 21).

Figure 21   Exiting the UEFI Shell

A front page is displayed.

> **NOTE**   Depending on the vendor UEFI configuration, the menu item on the front page that allows you to configure devices can be called Storage, Device Manager, Device Settings, or something else; refer to the documentation that accompanied the server.

2.   Select the menu item that allows you to configure devices. On the screen that appears (Figure 22 on page 41), a list of all the adapters in the system is displayed. Your list might vary depending on the installed adapters.
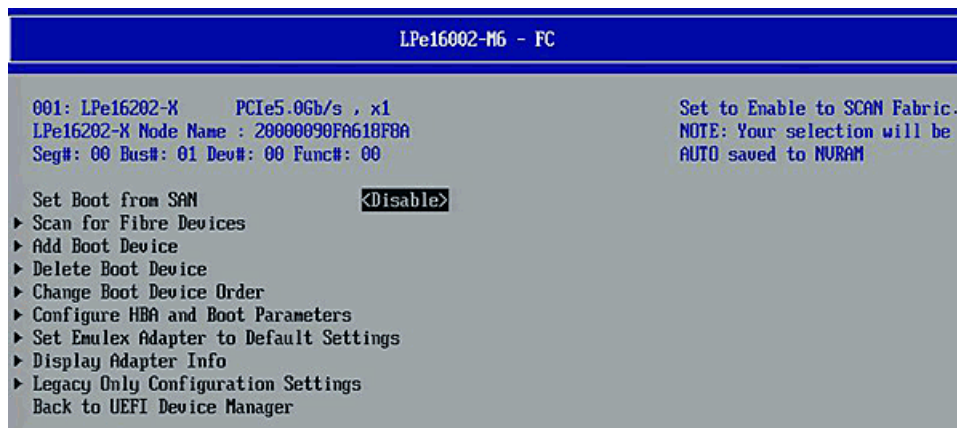
Figure 22 Device Configuration Screen Example

3.   Select the adapter you want to configure and press Enter.

The Emulex Adapter Configuration main menu screen (Figure 23) is displayed

Figure 23 Emulex Adapter Configuration Main Menu Screen

6.2.1   Emulex Configuration Utility Conventions in UEFI/HII

The Emulex Configuration Utility has menus and configuration screens. Use the following methods to navigate them:

■   Press the up and down arrows on your keyboard to move through and select menu options or configuration fields. When multiple adapters are listed, use the up and down arrows to scroll to the additional adapters.

■   Press the +, -, or Enter keys to change numeric values.

■   Press Enter to select a menu option, to select a row in a configuration screen, or to change a configuration default.

■   Use the navigation entries on the page to move about the utility.

■   Select **Commit** to save changes. Select **Discard** to not save changes.

6.3 Configuring Boot in UEFI/HII

The Emulex Configuration Utility utility has numerous options that can be modified to provide for different behavior. Use the Emulex Configuration Utility utility to do the following tasks:

■ Set boot from SAN

■ Scan for fibre devices

■ Add and delete boot devices

■ Change boot device order

■ Configure boot settings that apply only to Broadcom Emulex Legacy boot

■ Configure HBA and boot parameters

■ Set adapters to their default settings

■ Display adapter information

> **NOTE**   Changes made to parameters common to UEFI and x86 drivers are changed in both driver configuration utilities.

6.4 Setting Boot from SAN

To set boot from SAN, perform these steps:

1. From the Adapter Selection screen (Figure 22 on page 41), select the adapter whose boot from SAN setting you want to change and press Enter.

2. From the Main menu (Figure 23 on page 41), select **Set Boot from SAN**. The current boot setting is displayed. Press Enter.

   A Disable/Enable menu appears (Figure 24).

Figure 24 Main Menu, Boot from SAN Options Menu
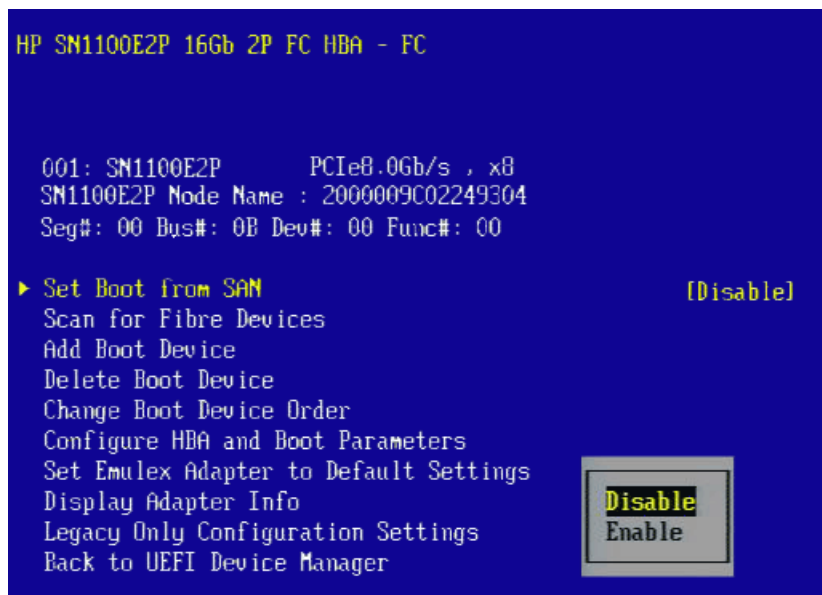
3. Make your selection and press Enter.

The utility displays the new boot from SAN setting (Figure 25 on page 43.

Figure 25 New Boot From SAN Setting


```
HP SN1100E2P 16Gb 2P FC HBA - FC


  001: SN1100E2P        PCIe8.0Gb/s , x8
  SN1100E2P Node Name : 2000009C02249304
  Seg#: 00 Bus#: 0B Dev#: 00 Func#: 00

▶ Set Boot from SAN                       [Enable]
  Scan for Fibre Devices
  Add Boot Device
  Delete Boot Device
  Change Boot Device Order
  Configure HBA and Boot Parameters
  Set Emulex Adapter to Default Settings
  Display Adapter Info
  Legacy Only Configuration Settings
  Back to UEFI Device Manager
```
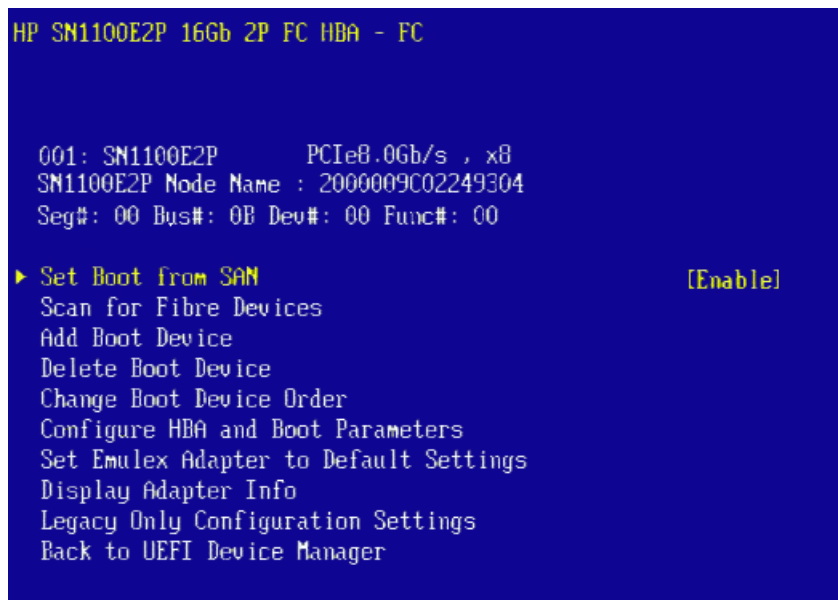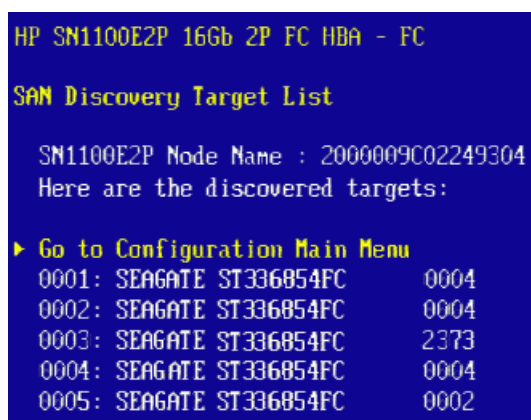)

6.5   Scanning for Fibre Devices

To scan for fibre devices, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter that you want to scan for Fibre devices and press Enter.
2. From the Main menu (Figure 23 on page 41), select **Scan for Fibre Devices** and press Enter.

   A list of the discovered targets is displayed (Figure 26). This is only a list of discovered target devices to determine SAN connectivity. To add or configure boot devices, see the following sections.

Figure 26 Discovered Targets Screen


```
HP SN1100E2P 16Gb 2P FC HBA - FC

SAN Discovery Target List

  SN1100E2P Node Name : 2000009C02249304
  Here are the discovered targets:

▶ Go to Configuration Main Menu
  0001: SEAGATE ST336854FC        0004
  0002: SEAGATE ST336854FC        0004
  0003: SEAGATE ST336854FC        2373
  0004: SEAGATE ST336854FC        0004
  0005: SEAGATE ST336854FC        0002
```

6.6 Adding Boot Devices

To add a boot device, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter to which you want to add a boot device and press Enter.
2. From the Main menu (Figure 23 on page 41), select **Add Boot Device** and press Enter.

   A screen appears displaying the discovered targets (Figure 27).

Figure 27 Discovered Targets Screen

3. Select the target you want and press Enter.

   A list of bootable LUNS is displayed (Figure 28)
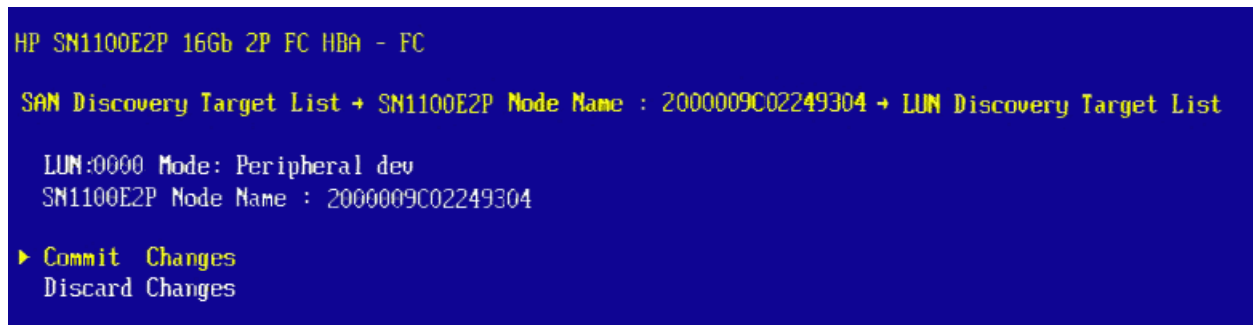
Figure 28 Boot Device Screen

4. Select the boot device you want to add and press Enter.

   A menu appears that enables you to commit or discard your changes (Figure 29 on page 45).

Figure 29 Commit/Discard Changes Menu

```
HP SN1100E2P 16Gb 2P FC HBA - FC

SAN Discovery Target List → SN1100E2P Node Name : 2000009C02249304 → LUN Discovery Target List

  LUN:0000 Mode: Peripheral dev
  SN1100E2P Node Name : 2000009C02249304

▶ Commit  Changes
  Discard Changes
```
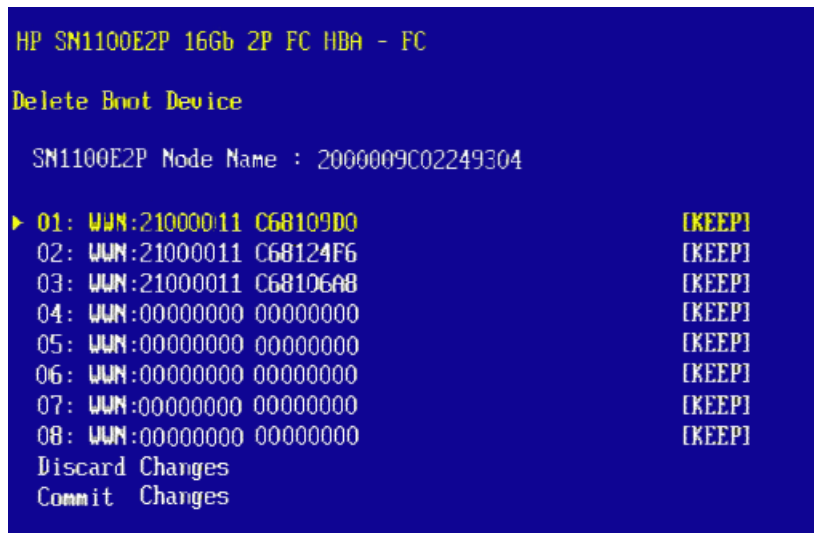
5. Select **Commit Changes** and press Enter.

6.7 Deleting Boot Devices

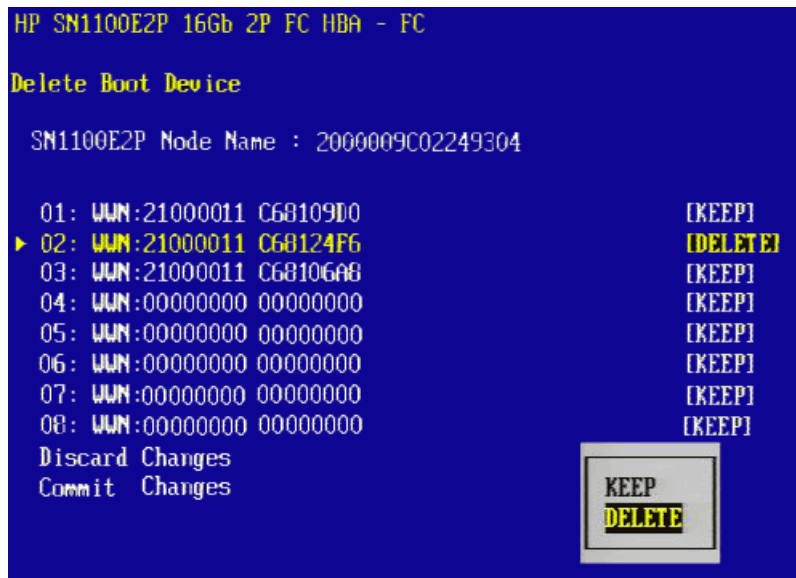To delete boot devices, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter from which you want to delete a boot devices and press Enter.

2. From the Main menu (Figure 23 on page 41), select Delete Boot Device and press Enter.

    A list of boot devices is displayed (Figure 30).

Figure 30 Boot Device Screen

```
HP SN1100E2P 16Gb 2P FC HBA - FC

Delete Boot Device

  SN1100E2P Node Name : 2000009C02249304

▶ 01: WWN:210000811 C68109D0              [KEEP]
  02: WWN:21000011 C68124F6               [KEEP]
  03: WWN:21000011 C68106A8               [KEEP]
  04: WWN:00000000 00000000               [KEEP]
  05: WWN:00000000 00000000               [KEEP]
  06: WWN:00000000 00000000               [KEEP]
  07: WWN:00000000 00000000               [KEEP]
  08: WWN:00000000 00000000               [KEEP]
  Discard Changes
  Commit  Changes
```

3. Select the boot device you want to delete and press the space bar.

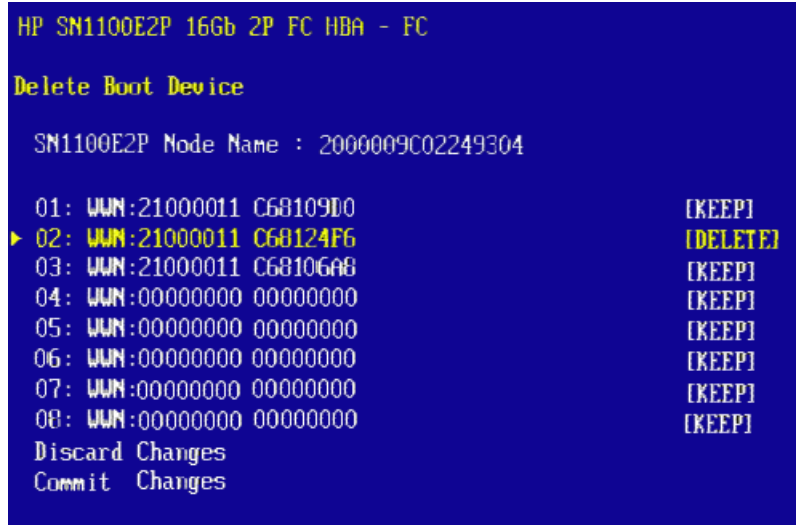   The device is highlighted and KEEP changes to DELETE. (Figure 31 on page 46).

Figure 31 Selected Boot Device is highlighted

> **NOTE**   This screen is different for LPe16000, LPe31000, and LPe32000-series adapters, but the functionality is the same.

4. Select **Commit Changes** and press Enter.

**Figure 32 Confirm Boot Device Delete**

6.8   Changing Boot Device Order

> **NOTE**   Changing the boot device order only changes the order that the targets are discovered by the boot driver. The system BIOS controls the order that available boot devices in a system are prioritized.

To change boot device order, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose boot device order you want to change and press Enter.

2. From the Main menu (Figure 23 on page 41), select **Change Boot Device Order** and press Enter.

   A screen that displays the discovered targets appears (Figure 33 on page 47).

Figure 33 Discovered Targets Screen
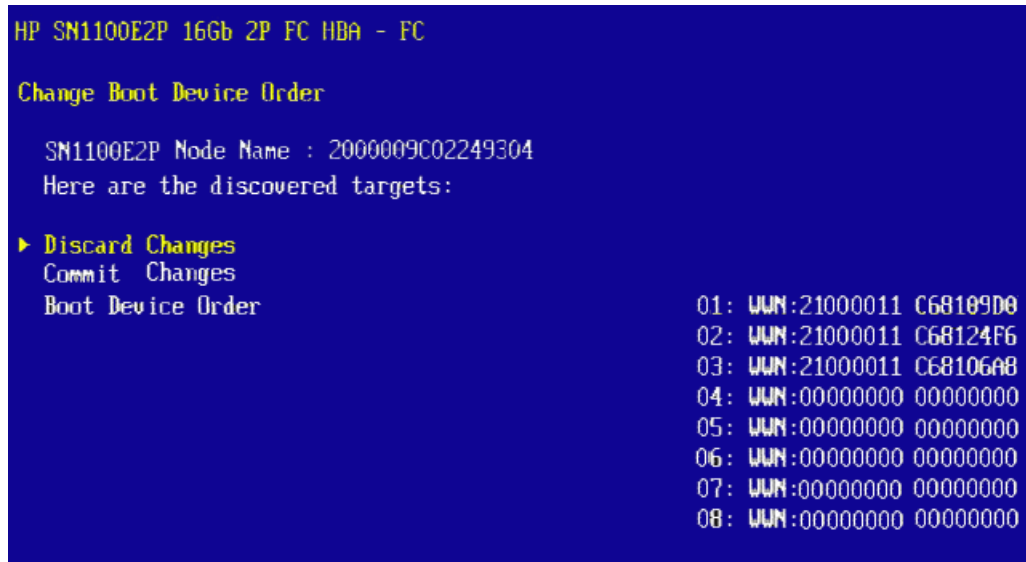
3. Select **Boot Device Order** and press Enter.

   A screen appears that displays the boot device order (Figure 34).

Figure 34 Boot Device Order Screen
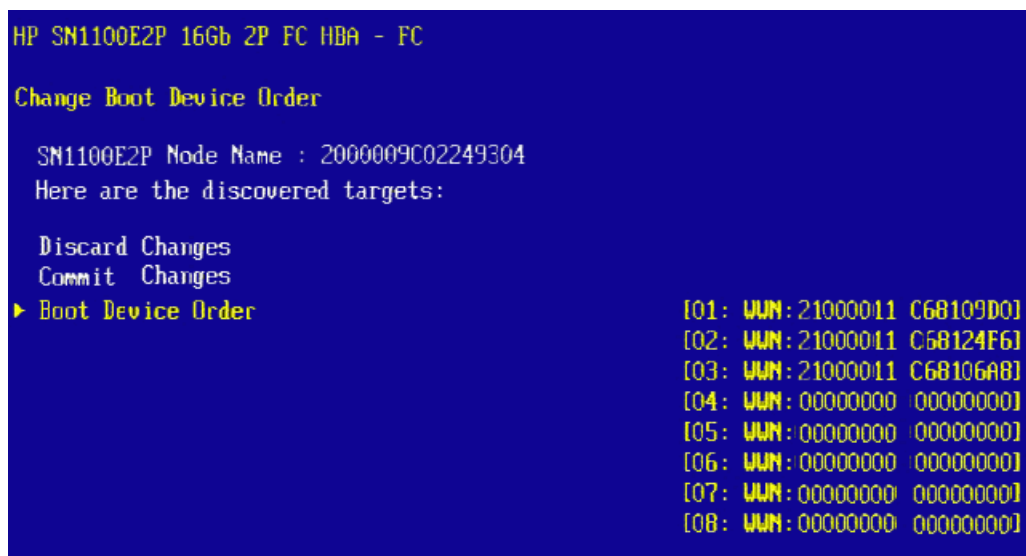
4. Press **Enter**.

   The Boot Device Order menu screen appears (Figure 35 on page 48).

Figure 35 Boot Device Order Menu
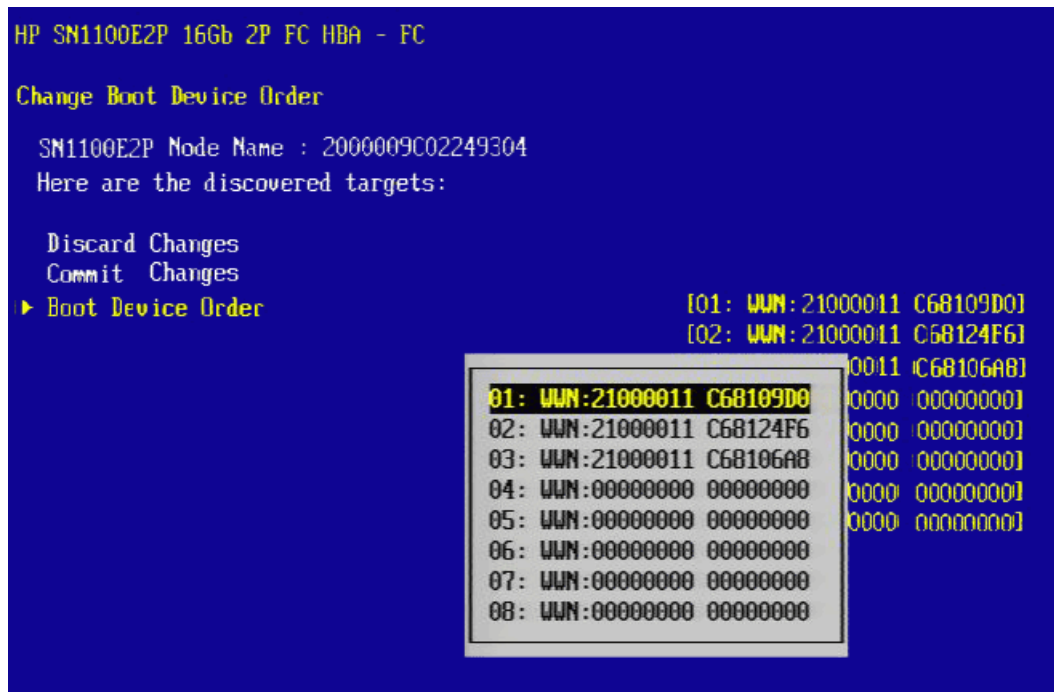
5. From the menu, select the device whose boot order you want to change. Use the + or - keys to change the order of the selected device and press Enter.

   A screen appears showing the new boot device order.

6. Press Enter to confirm the changes.

6.9   Configuring Adapter Parameters

The Emulex Configuration Utility enables you to configure the following adapter parameters:

■   Topology
■   Port login (PLOGI) retry timer
■   Link speed

6.9.1   Changing the Topology

> **NOTE**   Point to point is the only topology supported on 32 Gb/s adapters.

Broadcom Emulex drivers support arbitrated loop and point-to-point topologies. You can configure:

■   Auto Loop first – Default
■   Auto point to point first
■   Point to point
■   FC-AL

To change the topology, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose topology you want to change and press Enter.

2. From the Main menu (Figure 23 on page 41), select **Configure HBA and Boot Parameters** and press Enter.

3. From the Configure HBA and Boot Parameters menu, navigate to Topology Selection and press Enter.

   The Topology menu screen appears (Figure 36).

Figure 36 Topology Menu
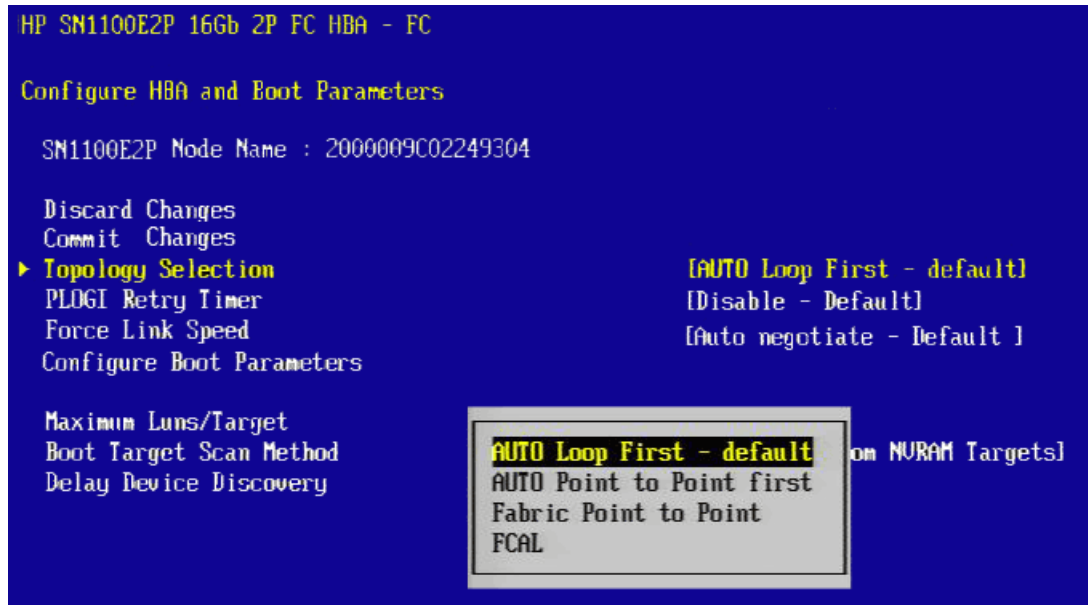
4. Select a topology and press Enter.

   The screen is refreshed with the new value.

   > **NOTE**   The presence of a fabric is detected automatically.

5. Press Esc to return to the Emulex Configuration Utility menu.

6. Select **Commit Changes** and press Enter.

6.9.2   Changing the PLOGI Retry Timer

This option allows you to set the interval for the PLOGI retry timer. This option is especially useful for Tachyon-based RAID arrays. Under very rare occasions, a Tachyon-based RAID array resets itself, and the port goes offline temporarily in the loop. When the port comes to life, the PLOGI retry interval scans the loop to discover this device.

You can choose one of these options:

- Disable – Default
- 50 msec
- 100 msec
- 200 msec

To change timer values, perform these steps:

1. From the Device Configuration screen (Figure 23 on page 41), select the adapter whose PLOGI retry timer information you want to change and press Enter.

2. From the Main menu (Figure 23 on page 41), select **Configure HBA and Boot Parameters** and press Enter.

3. From the Configure HBA and Boot Parameters menu (Figure 36), navigate to PLOGI Retry Timer and press Enter. The PLOGI Retry Timer menu appears (Figure 37 on page 50).

Figure 37 PLOGI Retry Timer Menu Screen
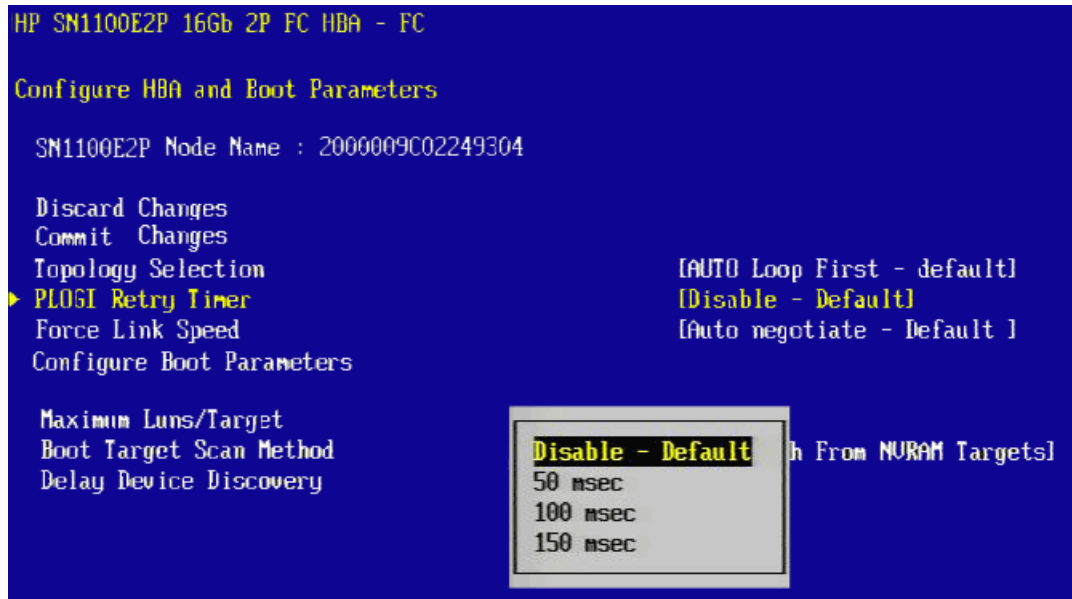
4. Select a retry timer option and press Enter.
   The screen is refreshed with the new value.

5. Press Esc to return to the Emulex Configuration Utility menu.

6. Select **Commit Changes** and press Enter.

6.9.3   Changing the Link Speed

Use this feature to change, or force, the link speed between ports instead of auto-negotiating. The supported link speeds depend upon the adapter. The menu only displays options that are valid for the selected adapter.

> **NOTE**   The Link Speed setting will be overwritten by the FC driver and will not take effect during a regular boot into the local operating system. Therefore, the link speed BIOS setting will work for the actual boot, but will be overwritten once the operating system loads.

Possible link speed choices:

- Auto negotiate – Default
- 1 Gb/s
- 2 Gb/s
- 4 Gb/s
- 8 Gb/s
- 16 Gb/s
- 8 Gb/s or 4 Gb/s
- 16 Gb/s or 8 Gb/s or 4 Gb/s
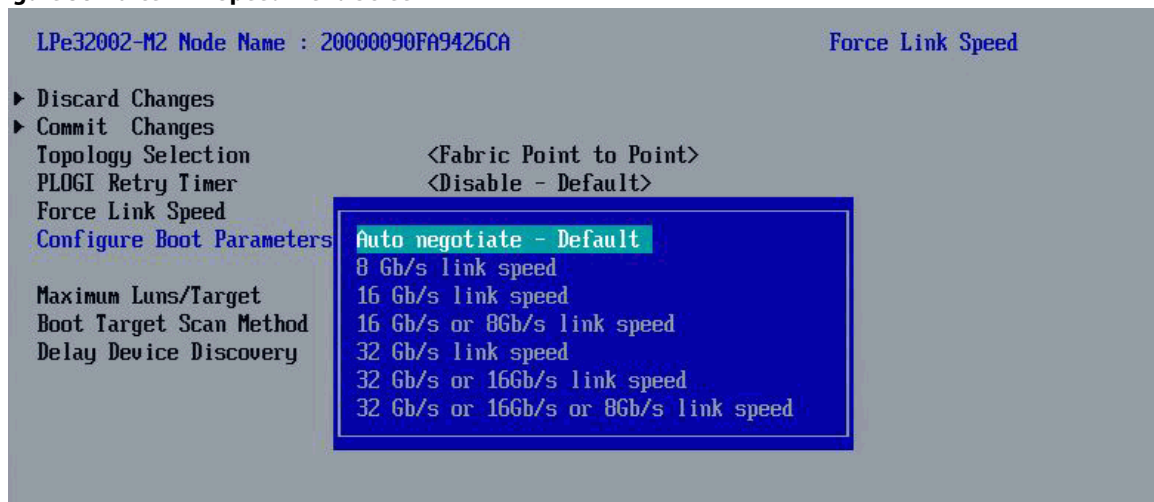- 16 Gb/s or 8 Gb/s
- 32Gb/s

- 32 Gb/s or 16Bps
- 32 Gb/s or 16 Gb/s or 8 Gb/s

To change the link speed, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose link speed you want to change and press Enter.
2. From the Main menu (Figure 23 on page 41), select **Configure HBA and Boot Parameters** and press Enter.
3. From the Configure HBA and Boot Parameters menu (Figure 36 on page 49), navigate to Force Link Speed and press Enter.

   The Force Link Speed menu appears (Figure 38).

Figure 38 Force Link Speed Menu Screen

4. Select a link speed and press Enter.

NOTE	Broadcom Emulex 8 Gb/s adapters do not support 1 Gb/s link speed. Broadcom Emulex 16 Gb/s adapters do not support 1Gb/s or 2 Gb/s link speed.

   The screen is refreshed with the new value.

5. Press Esc to return to the Emulex Configuration Utility menu.
6. Select **Commit Changes** and press Enter.

6.10   Configuring Boot Parameters

You can change the following parameters:

- Maximum LUNS per target
- Boot target scan method
- Device discovery delay

### 6.10.1   Changing the Maximum LUNs per Target

The maximum number of LUNs represents the maximum number of LUNs that are polled during device discovery. The minimum value is 1, the maximum value is 4096. The default is 256.

To change the maximum number of LUNs, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose maximum LUNs per target information you want to change and press Enter.

2. From the Main menu (Figure 23 on page 41), select **Configure HBA and Boot Parameters** and press Enter.

3. From the Configure HBA and Boot Parameters menu (Figure 36 on page 49), navigate to Maximum Luns/Target and press Enter.

    The screen becomes editable (Figure 39).

Figure 39 Maximum LUNs/Target Screen
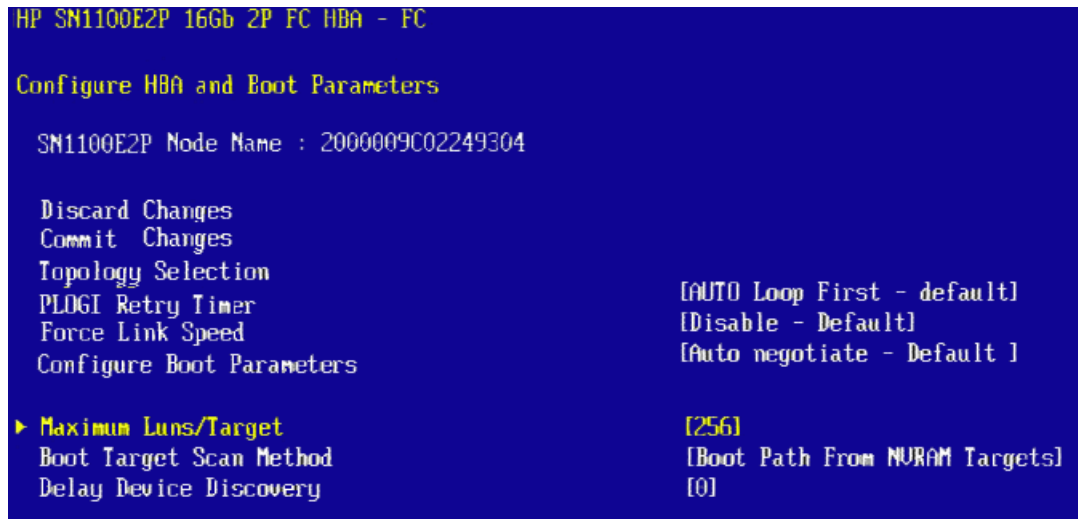
4. Type the maximum LUN value (between 1 and 4096) and press Enter.

    The screen is refreshed with the new value.

NOTE	256 is the default, and typical, maximum number of LUNs in a target device. A higher number of maximum LUNs causes the discovery to take more time.

5. Press Esc to return to the Emulex Configuration Utility menu.

6. Select **Commit Changes** and press Enter.

6.10.2   Changing Boot Target Scan Method

This option is available only if none of the eight boot entries are configured to boot from DID or WWPN. The Configure Boot Devices menu configures up to eight boot entries for fabric point-to-point, public loop, or private loop configurations.

The boot scan options follow:

■   Boot Path from NVRAM Targets – Boot scan discovers only LUNs that are saved to the adapter's NVRAM. Select up to eight attached devices to use as potential boot devices. Limiting discovery to a set of eight selected targets can greatly reduce the time it takes for the EFIBoot driver to complete discovery.

■   Boot Path from Discovered Targets – Boot scan discovers all devices that are attached to the FC port. Discovery can take a long time on large SANs if this option is used.

■   Do not create a boot path.

■ Boot Scan from EFIFCScanLevel – Allows third-party software to toggle between Boot Path from NVRAM and Boot Path from Discovered Targets by manipulating an UEFI system NVRAM variable. After the scan is set to EFIFCScanLevel, the scan method can be changed without entering the UEFI Boot configuration utility.

If EFIFCScanLevel is selected, the scan is determined by the value of the EFIFCScanLevel variable maintained by the UEFI system firmware or boot code. The value of this variable can be changed either by using the menu in the EFIBoot Configuration utility, or by using third-party software.

To change the boot target scan method, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose boot target scan method you want to change and press Enter.

2. From the Main menu (Figure 23 on page 41), select **Configure HBA and Boot Parameters** and press Enter.

3. From the Configure HBA and Boot Parameters menu (Figure 36 on page 49), navigate to Boot Target Scan Method and press Enter.

The Boot Target Scan Method menu appears (Figure 40).

Figure 40 Boot Target Scan Method Menu Screen
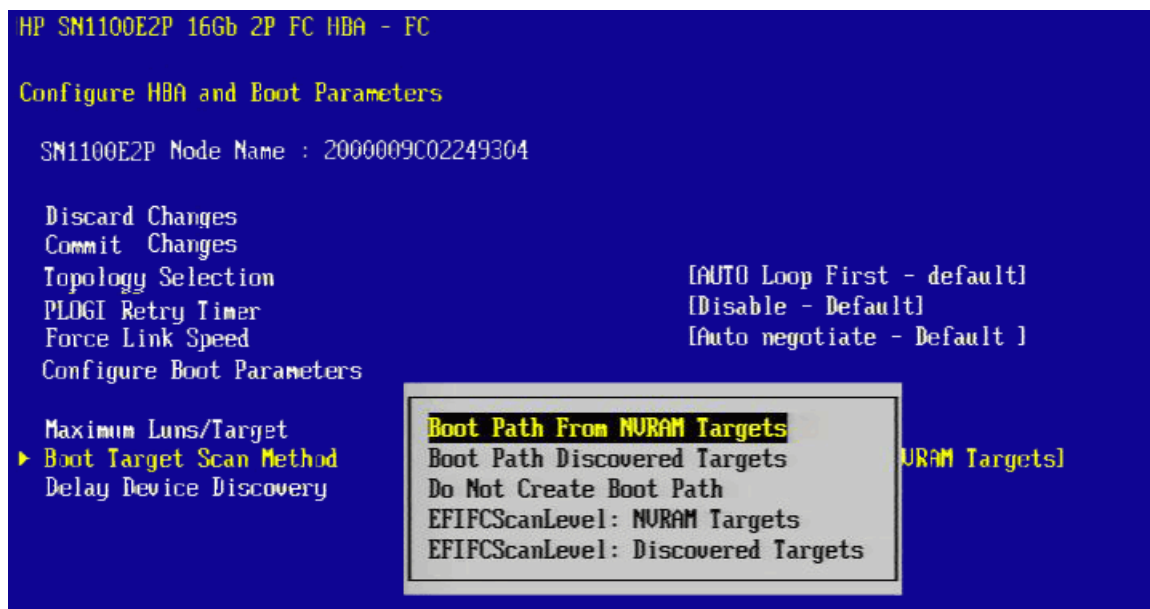
4. Select a boot scan setting and press Enter.

The screen is refreshed with the new value. If you have a large SAN and set the boot path to **Boot Path Discovered Targets**, discovery takes a long time.

5. Press Esc to return to the Emulex Configuration Utility menu.

6. Select **Commit Changes** and press Enter.

6.10.3   Changing Device Discovery Delay

This parameter sets a delay to occur after an loop initialization and before a scan is initiated to discover the target. The default is off or 0 seconds.

Change the default if you have an HP MSA1000 or HP MSA1500 RAID array and if both of the following conditions exist:

■ The MSA array is direct-connected or is part of an arbitrated loop (for example, daisy chained with a JBOD).

■ The boot LUN is not reliably discovered. In this case, a delay might be necessary to allow the array to complete a reset.

> **CAUTION**   Do not change the delay device discovery time if your MSA array is connected to a fabric switch. Setting it to any other time guarantees that the maximum delay time is seen on every loop initialization.
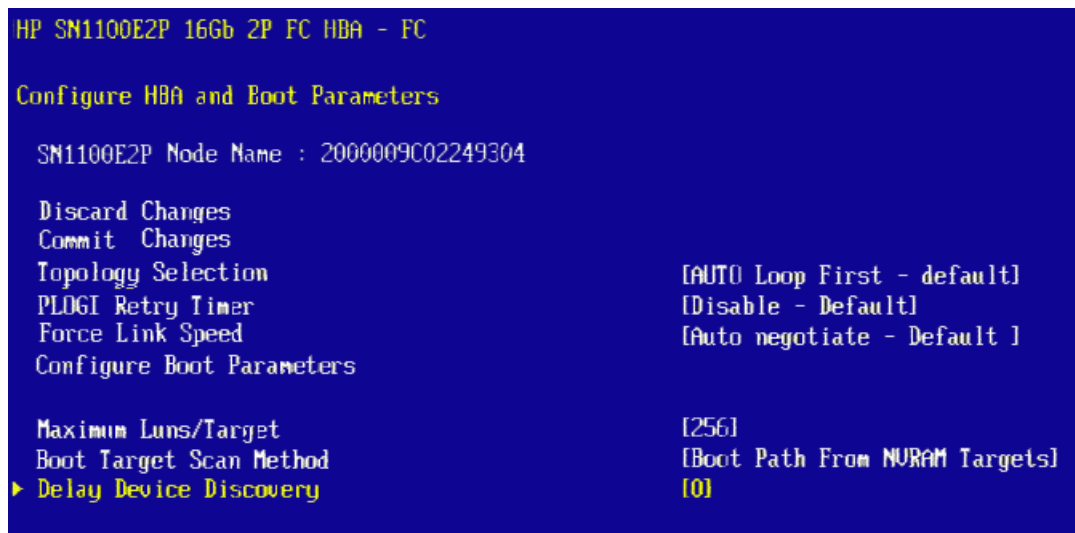
If both of the conditions exist, typically set this parameter to 20 seconds. However, the delay only needs to be long enough for the array to be reliably discovered after a reset. Your value might be different.

To change the delay device discovery value, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose device discovery delay settings you want to change and press Enter.
2. From the Main menu (Figure 23 on page 41), select **Configure HBA and Boot Parameters** and press Enter.
3. From the Configure HBA and Boot Parameters menu (Figure 36 on page 49), select **Delay Device Discovery** and press Enter.

   The screen becomes editable (Figure 41).

Figure 41 Delay Device Discovery Screen


```
HP SN1100E2P 16Gb 2P FC HBA - FC

Configure HBA and Boot Parameters

   SN1100E2P Node Name : 2000009C02249304

   Discard Changes
   Commit  Changes
   Topology Selection                         [AUTO Loop First - default]
   PLOGI Retry Timer                          [Disable - Default]
   Force Link Speed                           [Auto negotiate - Default ]
   Configure Boot Parameters

   Maximum Luns/Target                        [256]
   Boot Target Scan Method                    [Boot Path From NVRAM Targets]
 ▶ Delay Device Discovery                     [0]
```

4. Use the +/- keys to change the delay device discovery value in increments of 10 seconds and press Enter.

   The screen is refreshed with the new value.

5. Press Esc to return to the Emulex Configuration Utility menu.
6. Select **Commit Changes** and press Enter.

6.11   Resetting Broadcom Emulex Adapters to Default Values

The Emulex Configuration Utility enables you to clear the NVRAM target list and set all boot device WWNNs back to 0.

These defaults are listed in Table 6.

Table 6 Adapter Defaults

Parameter	Default	Valid Values
Enable/Disable BIOS	Disabled	Enabled Disabled
PLOGI Retry Timer	Disabled	Disabled 50 msec 100 msec 200 msec
Boot Target Scan	Boot path from NVRAM targets	Boot path from NVRAM targets Boot path discovered targets Do not create boot path
Max LUNs Setting	256	0-4096
Topology	Auto (start FC-AL)	Auto (start FC-AL) Point-to-Point Auto (start Point-to-Point) FC-AL
Delay Device Discovery	0000	0000-0255
Link Speed	0 (Auto-select)	0 = Auto Select (the adapter's speed is selected automatically based on its model). 1 = 1 Gb/s 2 = 2 Gb/s 4 = 4 Gb/s 8 = 8 Gb/s 6 = 16 Gb/s 32 = 32 Gb/s

To set Broadcom Emulex adapters to their default settings, perform these steps:

1. From the Device Configuration screen (Figure 22 on page 41), select the adapter whose default settings you want to change and press Enter.
2. From the Main menu (Figure 23 on page 41), select **Set Emulex Adapters to Default Settings** and press Enter.

   A menu screen appears that enables you to set defaults or cancel default settings (Figure 42).
3. Select **Set Adapter Defaults** and press Enter.

Figure 42 Adapter Selection Screen
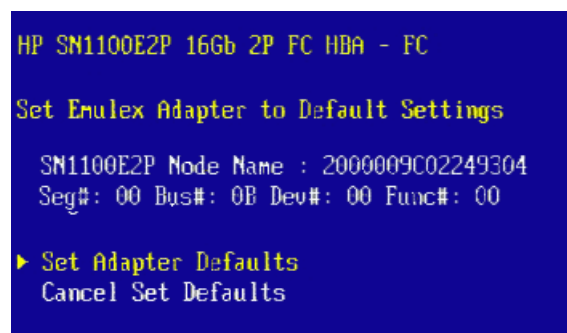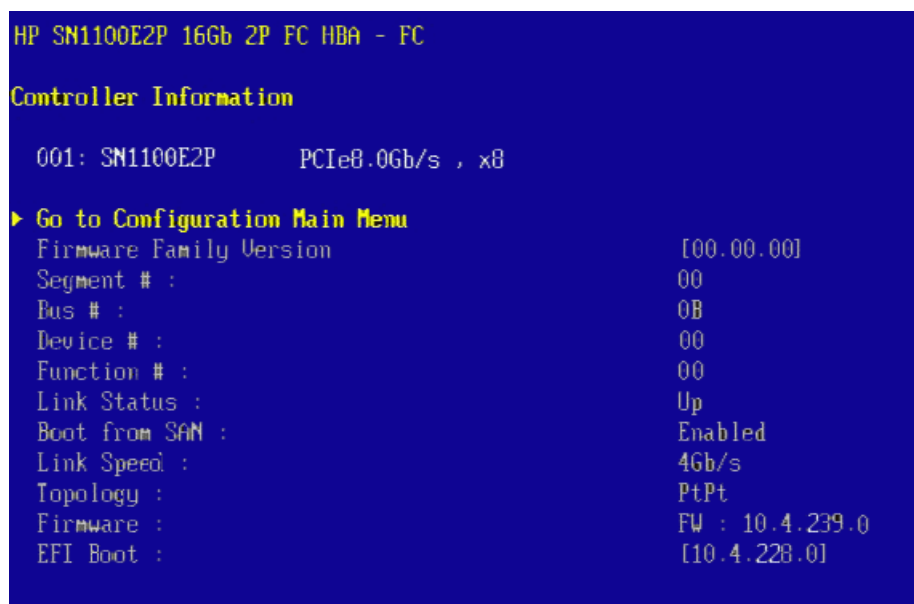
6.12   Displaying Adapter Information

The Adapter Information screen displays the following information about the selected adapter:

■   HBA status
■   Boot from SAN status
■   Link speed
■   Topology
■   Firmware version
■   Universal Boot version
■   UEFI Boot version

To display adapter information, perform these steps:

1.   From the Device Configuration screen (Figure 22 on page 41), select the adapter whose information you want to view and press Enter.

2.   From the Main menu (Figure 23 on page 41), select **Display Adapter Info** and press Enter.

A screen appears that displays information about the selected adapter (Figure 43).

Figure 43 Adapter Information Screen


```
HP SN1100E2P 16Gb 2P FC HBA - FC

Controller Information

 001: SN1100E2P        PCIe8.0Gb/s , x8

▶ Go to Configuration Main Menu
  Firmware Family Version              [00.00.00]
  Segment # :                          00
  Bus # :                              0B
  Device # :                           00
  Function # :                         00
  Link Status :                        Up
  Boot from SAN :                      Enabled
  Link Speed :                         4Gb/s
  Topology :                           PtPt
  Firmware :                           FW : 10.4.239.0
  EFI Boot :                           [10.4.228.0]
```

6.13   Legacy Only Configuration Settings

To change legacy only configuration settings, perform these steps:

1.   From the Device Configuration screen (Figure 22 on page 41), select the adapter whose Legacy settings you want to change and press Enter.

2.   From the Main menu (Figure 23 on page 41), select **Legacy Only Configuration Settings** and press Enter.

A screen appears that displays settings that apply only to the Broadcom Emulex Legacy boot driver (Figure 44 on page 57).

Figure 44 Legacy Only Configuration Settings Screen
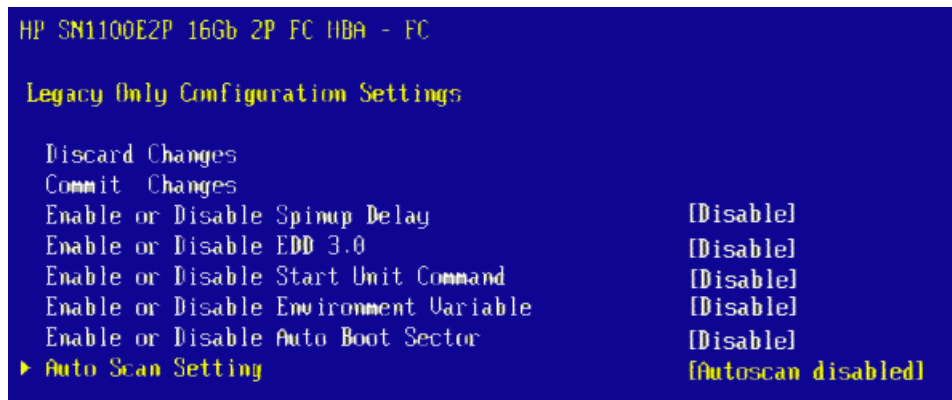
3.   Make desired changes to any of these settings and select **ESC** or **Commit Changes**.

See the "Emulex BIOS Utility" on page 18 for a description of the Legacy Only settings displayed in Figure 44.

## 6.14   Enabling or Disabling OCSD Settings (HP Systems Only)

During a POST, this setting causes the EFIBoot driver to register (ENABLED), or not register (DISABLED), the device (that is, to add any entries) in the OCSD or OCBB buffers, as defined in the Option Card Sensor Data Reporting specification.

NOTE   This menu is for HP systems only and does not appear on other systems.

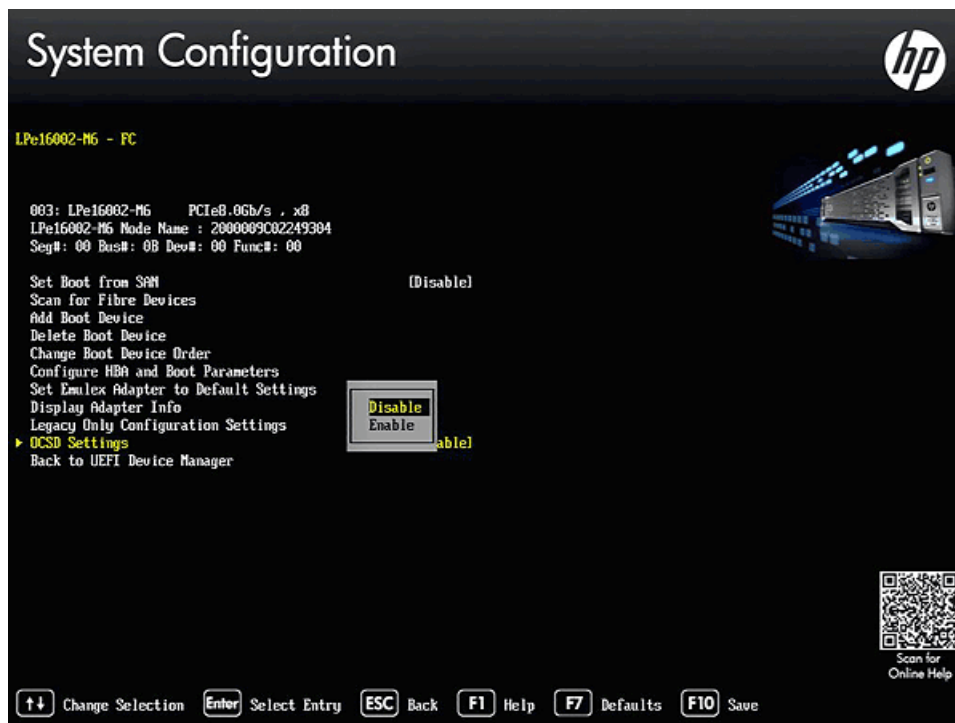To enable or disable OCSD, perform these steps:

1.   Open the HP System Configuration menu (Figure 45 on page 58).

Figure 45 HP System Configuration Menu Screen
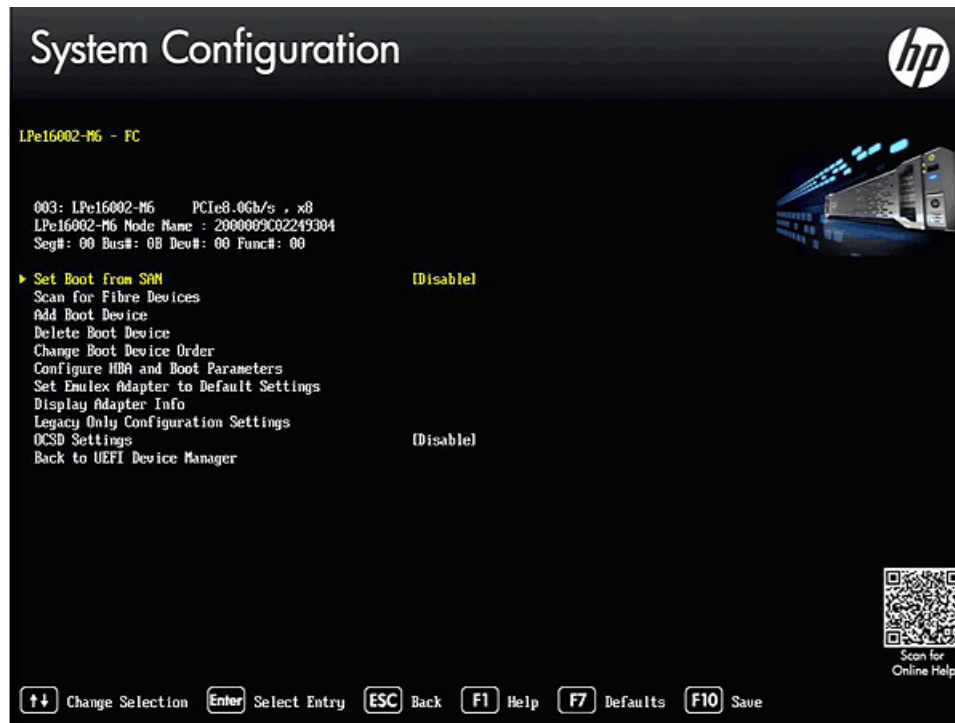
2.   Navigate to **OCSD Settings** and press Enter.

The Disable/Enable menu appears. (Figure 46).

Figure 46 OCSD Settings Menu Screen

3. Make your selection and press F10 to save it.

6.15   Returning to the UEFI Device Manager

To return to the UEFI Device Manager, select **Back to UEFI Device Manager** to return to the Device Configuration
screen (Figure 22 on page 41).

Chapter 7: Troubleshooting

Circumstances exist in which your system might operate in an unexpected manner. This section describes several of these circumstances and offers one or more workarounds for each situation.

7.1   x86 BootBIOS

The following table lists X86 BootBIOS issues and their resolutions.

Table 7 x86 BootBIOS Troubleshooting

Issue	Situation	Resolution
The Bootup Message Does Not Appear As the System Boots	You want to access the BIOS utility, but the bootup message does not appear.	Make sure that x86 BootBIOS has been loaded and enabled.
Retry This Adapter Message	The message `Retry This Adapter` appears during BIOS scanning.	Check the hardware configuration or reconfigure the adapter BIOS using the BIOS utility.
Cannot Mount Root File System Message (Solaris SFS Driver)	The message `Cannot Mount Root File System` appears during bootup.	Make sure the correct storage device is identified in the `scsi_vhci.conf` file.
Cannot Find UNIX Kernel Message (Solaris SFS Driver)	The message `Cannot Find UNIX Kernel` appears during bootup.	Set up the correct LUN to boot in the BIOS utility. The correct LUN can be seen at the end of the Device Address line when you issue a `luxadm display <device>` command. Refer to the luxadm documentation from Oracle for more information.
No Such Partition Message (Solaris SFS Driver)	The message `No Such Partition` appears during bootup.	Make sure the correct boot device is selected at the GRUB menu. Refer to the GRUB documentation from Oracle and the `/boot/grub/menu.lst` for more information.

7.2 OpenBoot

The following table lists OpenBoot issues and their resolutions.

Table 8 OpenBoot Troubleshooting

Issue	Situation	Resolution
The System Cannot mount or fsck /etc/vfstab a FC Boot Disk (Solaris LPFC Driver)	During the boot process, the system cannot mount or `fsck /etc/vfstab` a FC boot disk.	Make sure that persistent binding is implemented correctly.
A Loaded File Is Not Executable (Solaris LPFC Driver)	After entering boot disk, a message states that the file that was loaded is not executable.	The boot block might not be installed correctly to the FC drive. See "Configure Boot from SAN on Solaris LPFC (SPARC)" on page 16.
The System Hangs or Reboots After Displaying Driver Information (Solaris LPFC Driver)	The system hangs for a long time after displaying driver information, or it reboots after displaying driver information.	Possible incorrect topology set in the `/kernel/drv/lpfc.conf` file on the target disk.
FC Disk Is Not Found (Solaris LPFC Driver)	You have performed the setup tasks and the FC disk is not found when you reboot the system.	If the FC disk is not found when the system is rebooted, it might be necessary to do the following: 1. Type `cfgadm -a` to list the target. 2. Type `cfgadm -vc configure c1::c5t2200002037AE0091` to configure the FC target. 3. Type `cfgadm -c unconfigure c1` to remove the FC target. It also might be necessary to add an entry for the boot drive to the `sd.conf` file.
The Displayed List of Broadcom Emulex Adapters Ends with "fibre-channel" (Solaris LPFC Driver)	After all Broadcom Emulex adapters have been enabled to boot from SAN, the system has been rebooted, and you show all system devices, the path to an Emulex adapter ends with `fibre-channel`, for example: `/pci@1f,2000/fibre-channel` instead of `lpfc@#`, for example: `/pci@1f,4000/lpfc@2`	The OpenBoot code is not loaded in the adapter's firmware. You must install OpenBoot before you can set up boot from SAN on the adapter. See "Install, Update, and Enable Boot Code" on page 22.