



# Emulex<sup>®</sup> Boot for the Fibre Channel Protocol

**User Guide**  
**Release 12.0**

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# Chapter 1: Introduction

This guide describes installing, updating, enabling, and configuring Emulex® FC boot code. This guide also describes the Emulex 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 SAN by way of Emulex adapters using Emulex FC boot code.

When booting from SAN, the storage device is typically identified by its WWPN and a LUN. By extending the server system Boot BIOS, boot from SAN functionality is provided by the Boot BIOS contained on an 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:** Emulex drivers support multipath boot configurations. Refer to your storage vendor's documentation for details on how to configure multipath booting.

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

## 1.1 Emulex Boot Code Files

Emulex is unique in providing Universal Boot and Pair Boot images of boot code. Universal Boot images contain x86 Boot BIOS, OpenBoot, and EFIBoot code. Pair Boot images of boot code contain x86 Boot BIOS and EFIBoot 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 flash memory, which allows for easier adapter portability and configuration between servers.

Emulex provides the following types of boot code:

- x86 Boot BIOS works with the existing system BIOS on x64 and x86 systems.
- OpenBoot works with the existing system firmware on SPARC and IBM-Power series systems. OpenBoot is also called FCode.
- EFIBoot 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

The table below lists the acronyms and abbreviations used in this document.

**Table 1: Acronyms and Abbreviations**

Acronym/Abbreviation	Description
BBS	BIOS Boot Specification
BIOS	basic input/output system
DHCP	Dynamic Host Control Protocol
DID	device ID
EDD	Enhanced Disk Device
FA-PWWN	Fabric Assigned Port Word Wide Name
FC	Fibre Channel

**Table 1: Acronyms and Abbreviations (Continued)**

<b>Acronym/Abbreviation</b>	<b>Description</b>
FC-AL	Fibre Channel Arbitrated Loop
FL_Port	fabric loop port
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
I/O	input/output
JBOD	just a bunch of disks
LDAP	Lightweight Directory Access Protocol
LUN	logical unit number
MBR	master boot record
NIS/NIS+	Network Information Service/Network Information Service Plus
NVRAM	non-volatile random-access memory
OBP	OpenBoot PROM
OEM	original equipment manufacturer
PCI	Peripheral Component Interconnect
PLOGI	port login
POST	power-on self-test
RAID	redundant array of independent disks
SAN	storage area network
SCSI	Small Computer System Interface
TB	terabyte
UEFI	Unified Extensible Firmware Interface
USB	Universal Serial Bus
WWN	World Wide Name
WWPN	World Wide Port Name
ZB	zettabyte

## Chapter 2: Booting from SAN

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

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 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. 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 [www.broadcom.com](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 2: Boot from SAN Procedures**

Architecture	Operating System	Procedure
x86 and x64	Windows Server	<a href="#">Section 2.2, Linux, Citrix, and VMware.</a>
	Linux	<a href="#">Section 2.2.1, Configuring Boot from SAN on Linux or VMware (x86 and x64/UEFI).</a>
	VMware	
	Solaris (SFS driver)	<a href="#">Section 2.3.1, Configuring Boot from SAN on Solaris (x86 and x64).</a>
SPARC and PowerPC	Linux	<a href="#">Section 2.2.1, Configuring Boot from SAN on Linux or VMware (x86 and x64/UEFI).</a>
	Solaris (SFS driver)	<a href="#">Section 2.3.2, Configuring Boot from SAN on Solaris (SPARC).</a>

### 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 [Chapter 3, Updating and Enabling Boot Code](#)).
2. If necessary, enable the boot code on the adapter (see [Chapter 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. If you want to use a topology other than the default, you must change the topology setting before configuring boot devices (see [Section 4.4.3, Changing the 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 2.2, Linux, Citrix, and VMware](#)).



### 2.1.1.1 Installing Windows Server on an FC Boot Disk

This installation procedure installs the Windows Server onto an unformatted FC disk drive and configures the system to boot from the SAN disk drive. The LUNs must be created in the SAN storage device and zoned appropriately to the host adapter WWN before starting the installation.

**NOTE:** The computer system BIOS might require that another controller take precedence over the 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 Emulex adapter.

**NOTE:** Restrict the number of paths (from the host bus adapter (HBA) to the boot disk) to one during installation. Additional paths can be added after the operating system is installed and the multipath/MPIO software is configured.

1. From the server system UEFI setup, ensure that the CD/DVD is the first device in the boot order list.
2. Enable the adapter BIOS setting to allow SAN boot in the Emulex x86 and x64/UEFI configuration utility.
3. Configure the boot target and LUN in the Emulex x86 and x64/UEFI configuration utility to point to the desired target (for configuring x86 and x64, see [Section 4.3, Configuring Boot Devices](#), and for configuring UEFI, see [Section 6.10.4, Changing the Maximum LUNs per Target](#)).
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.

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.

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

**NOTE:** If the FC disk is not visible at this point, download the driver kit from the Broadcom website to your system. Extract/copy the driver files to a formatted disk or USB drive.

6. Click **Load Driver**. Browse to the disk or USB device specified in step 1 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 in the **Select driver to be installed** window. After the driver is loaded, the FC disks should be visible.
7. Select the disk and follow the system prompts in the Windows installation.
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 bootloader utility.

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.

9. If multipath to the HBA is required, install or enable multipathing software (or Windows native MPIO Feature) and reboot the server.
10. After rebooting, verify the multipath configuration.

### 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 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 6.10.4, Changing the Maximum LUNs per Target](#)).
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 bootloader 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 master boot record (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 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*.

## 2.2 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/UEFI)

To configure boot from SAN on Linux or VMware, perform these steps:

1. If necessary, install or update the boot code on the adapter. For x86 and x64, see [Chapter 3, Updating and Enabling Boot Code](#), and for UEFI, see [Chapter 6 Configuring Boot using UEFI HII](#).
2. If necessary, enable the boot code on the adapter. For x86 and x64, see [Chapter 3, Updating and Enabling Boot Code](#), and for UEFI, see [Chapter 6 Configuring Boot using UEFI HII](#).
3. Enable the adapter to boot from SAN. For x86 and x64, see [Section 4.2.1, Enabling an Adapter to Boot from SAN](#), and for UEFI, see [Section 6.5, Setting Boot from SAN](#).
4. If you want to use a topology other than the default, you must change the topology setting before configuring boot devices. For x86 and x64, see [Section 4.4.3, Changing the Topology](#), and for UEFI, see [Section 6.10.1, Changing the Topology](#).
5. Configure boot devices. For x86 and x64, see [Section 4.3, Configuring Boot Devices](#), and for UEFI, see [Section 6.10.4, Changing the Maximum LUNs per Target](#).
6. If desired, configure the boot options on the adapter. For x86 and x64, see [Section 4.4, Configuring Adapter Parameters](#), and for UEFI, see [Section 6.10, Configuring HBA and Boot 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.

### 2.2.1.1 Installing Linux or VMware on an FC Boot Disk

The LUNs should be created in the SAN storage device and zoned appropriately to the host adapter's WWN before starting the installation.

**NOTE:** The computer system BIOS might require that another controller take precedence over the 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 Emulex adapter.

Ensure that all paths (from the HBA to the boot disk) are enabled during installation.

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 x86 and x64/UEFI configuration utility.
3. Configure the boot target and LUN in the Emulex x86 and x64/UEFI configuration utility to point to the desired target. For configuring x86 and x64, see [Section 4.3, Configuring Boot Devices](#), and for configuring UEFI, see [Section 6.10.4, Changing the Maximum LUNs per Target](#).
4. Boot the host server with the operating system DVD inserted. Follow the on-screen prompts to install the OS.
5. The installation exposes all available and visible LUNs as disks and partitions.
6. Select the disk on which you want to install the OS.

**NOTE:** On Linux distributions, if the FC disk is not visible at this point, contact Broadcom Technical Support for the DUD (driver update diskette). The DUD iso image contains the drivers.

Restart the installation process. On the installation splash screen, press **Tab** and in the boot command line, add `linux dd` option to boot the command line. This will prompt you for driver disks, at which point you must provide the DUD iso image.

7. Select the disk and follow the system prompts in the Linux or VMware installation.
8. After the installation is complete, a Boot Option variable specific to the OS installed is populated with a Media Device path pointing to the bootloader utility.  
Upon reboot, the system boots from the LUN set up on the SAN.
9. After rebooting, on Linux or VMware systems verify the multipath configuration.

## 2.3 Solaris

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

### 2.3.1 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 [Chapter 3, Updating and Enabling Boot Code](#)).
2. If necessary, enable the boot code on the adapter (see [Chapter 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. If you want to use a topology other than the default, you must change the topology setting before configuring boot devices (see [Section 4.4.3, Changing the 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 2.3.1.1, Determining LUNs to Select for Boot from SAN](#).

#### 2.3.1.1 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/rdisk/c5t226000C0FF9833AFd6s2  
Node WWN:50060e8003823800 Device Type:Disk device  
Logical Path:/dev/rdisk/c5t226000C0FF9833AFd6s2  
Node WWN:50060e8003823800 Device Type:Disk device
```

3. Copy the `/dev/rdisk/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/rdisk/nnn>
```

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

## 2.3.2 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 [Chapter 3, Updating and Enabling Boot Code](#)).
2. If necessary, enable the boot code on the adapter (see [Chapter 3, Updating and Enabling Boot Code](#)).
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 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 UNIX prompt appears, append the following line to the system file at `/a/etc/system`:  

```
set pcie:pcie_max_mps=0
```
8. Save and reboot server.

## 2.3.3 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 `SUNWemlxs` 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 for LightPulse Adapters User Guide* available at [//www.broadcom.com](http://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 -k1` 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 Dynamic Host Control Protocol (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.

### 2.3.3.1 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 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, device ID (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, clt1d0).

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/rdisk/clt1d0s0
```

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

```
newfs -v /dev/rdisk/clt1d0s0 (becomes root)
```

```
newfs -v /dev/rdisk/clt1d0s6 (becomes usr)
```

```
newfs -v /dev/rdisk/clt1d0s7 (becomes export/home)
```

12. Create temporary mount points for the new partitions.

```
mkdir root2
```

```
mkdir usr2
```

```
mkdir export2
```

**13. Mount, copy, and then unmount the `usr2` file system.**

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

**14. Copy the `export/home` file system.**

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

**15. Perform copy.**

```
mount /dev/dsk/clt1d0s0 /root2
ufsdump 0f - /dev/rdisk/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/rdisk/c0t0d0s0 (root)
/dev/dsk/c0t0d0s6 and /dev/rdisk/c0t0d0s6 (usr)
/dev/dsk/c0t0d0s7 and /dev/rdisk/c0t0d0s7 (export)
```

Edit the file to show.

```
/dev/dsk/clt1d1s1 (swap)

/dev/dsk/clt1d0s0 and /dev/rdisk/clt1d0s1 (root)
/dev/dsk/clt1d0s6 and /dev/rdisk/clt1d0s6 (usr)
/dev/dsk/clt1d0s7 and /dev/rdisk/clt1d0s7 (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/clt1d0s1
```

where `/dev/dsk/clt1d0s1` 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 3](#) indicates the utilities you can use to install and update boot code.

**Table 3: Utilities that Update and Enable Boot Code**

Operating System	OneCommand® Manager GUI	OneCommand Manager CLI	UEFI Utility	CIM Provider <sup>a</sup>	FCA emlxadm	Offline Utilities
Windows	X	X	X	—	—	X
Linux	X	X	X	—	—	X
Solaris	X	X	—	—	X	—
VMware	X	X	X	X	—	—

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

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

- OneCommand Manager GUI: Refer to the *Emulex OneCommand Manager Application User Guide*.
- OneCommand Manager CLI: Refer to the *Emulex OneCommand Manager CLI User Guide*.
- UEFI utility: See [Section 6, Configuring Boot using UEFI HII](#).
- FCA emlxadm utility: Refer to the *Emulex FCA Utilities for LightPulse Adapters User Guide*.
- Offline utility: Refer to the *Emulex Elxflash and LpCfg Management Utilities User Guide*.

## 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.
- Changes made to parameters common to UEFI and x86 drivers are changed in both driver configuration utilities.
- After exiting the Emulex BIOS configuration utility, the system will reboot regardless of whether any changes were made.

### 4.1 Navigating the FC 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 and 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 four seconds) when the Emulex bootup message to enter the BIOS utility is displayed.

An adapter listing screen is displayed ([Figure 1](#)).

### NOTE:

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

Figure 1: Adapter Listing Screen

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0

This utility displays and saves changes when selected.
You will be prompted to reboot for all changes to take effect.

Emulex FC Ports in the System:

1. LPe32000:      Bus:03 Dev:00 Func:00   WWPN: 10000090FA942A14
2. LPe32000:      Bus:03 Dev:00 Func:01   WWPN: 10000090FA942A15

Enter <Esc> to exit  <PageDn> to Next Page
<↑/↓> to Highlight, <Enter> to Select

```

2. Select the adapter to configure and press **Enter**.  
The main configuration menu is displayed (Figure 2).

Figure 2: Main Configuration Menu

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0

01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Enabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.94.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Unknown

Enable/Disable Boot from SAN
Scan for Target Devices
Reset Adapter Defaults
Configure Boot Devices
Configure Advanced Adapter Parameters

Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select

```

Under normal circumstances, you would first configure boot devices using the BIOS utility (see [Section 4.3, Configuring Boot Devices](#)). 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](#)).
- If you want to use a topology other than the default, you must change the topology setting before configuring boot devices (see [Section 4.4.3, Changing the 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 to enabled as shown in Figure 3.

**NOTE:** x86 Boot BIOS supports a maximum of 16 or 32 ports depending on the adapter model.

Figure 3: BIOS Status Screen

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0
-----
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Enabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.94.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Unknown
-----

          Boot BIOS is: Enabled

          Enable
          Disable

Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select

```

2. From the Adapter Listing screen (Figure 1), select the adapter that you want to scan for target devices and press **Enter**.
3. From the main configuration menu (Figure 2), select **Scan for Target Devices** and press **Enter**. A list of the discovered targets is displayed. This is only a list of discovered target devices to determine SAN connectivity.

## 4.3 Configuring Boot Devices

This option supports FC\_AL: (public and private loop) and 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 port (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:** Loop topology (FC-AL) is only supported at speeds equal to 8G or lower.

**NOTE:** If you want to use a topology other than the default, you must change the topology setting before configuring boot devices (see Section 4.4.3, [Changing the Topology](#)). For Fibre Channel Arbitrated Loop (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), select **Configure Boot Devices**.

A list of eight boot devices is shown (Figure 4). 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 4.4.13, Using Multipath Boot from SAN](#).

**Figure 4: List of Saved Boot Devices Screen**

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0
-----
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Enabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.94.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Unknown
-----

                List of Saved Boot Devices:

 1. Unused  DID:000000 WWPN:00000000 00000000 LUN:00 Primary Boot
 2. Unused  DID:000000 WWPN:00000000 00000000 LUN:00
 3. Unused  DID:000000 WWPN:00000000 00000000 LUN:00
 4. Unused  DID:000000 WWPN:00000000 00000000 LUN:00
 5. Unused  DID:000000 WWPN:00000000 00000000 LUN:00
 6. Unused  DID:000000 WWPN:00000000 00000000 LUN:00
 7. Unused  DID:000000 WWPN:00000000 00000000 LUN:00
 8. Unused  DID:000000 WWPN:00000000 00000000 LUN:00

<↑/↓> to Highlight, <Enter> to Select

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```

2. Select a boot entry and press **Enter**.

A screen similar to [Figure 5](#) is displayed.

**Figure 5: Device Selection List Example (Array) Screen**

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0
-----
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Enabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.94.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Unknown
-----

00. Clear selected boot entry!!
01. DID:060400 WWPN:247000C0 FF1E206D LUN:01  HP      MSA 2040 SAN  G200

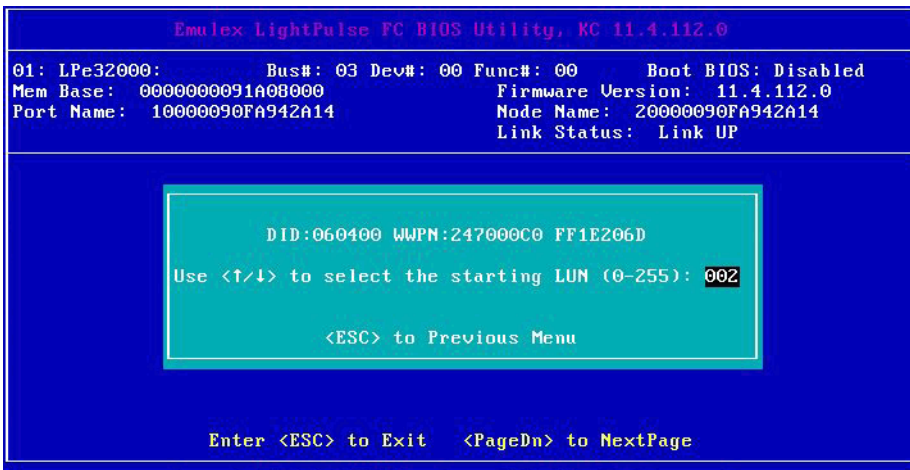
Enter <ESC> to Exit  <PageDn> to NextPage
<↑/↓> to Highlight, <Enter> to Select

```

**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.

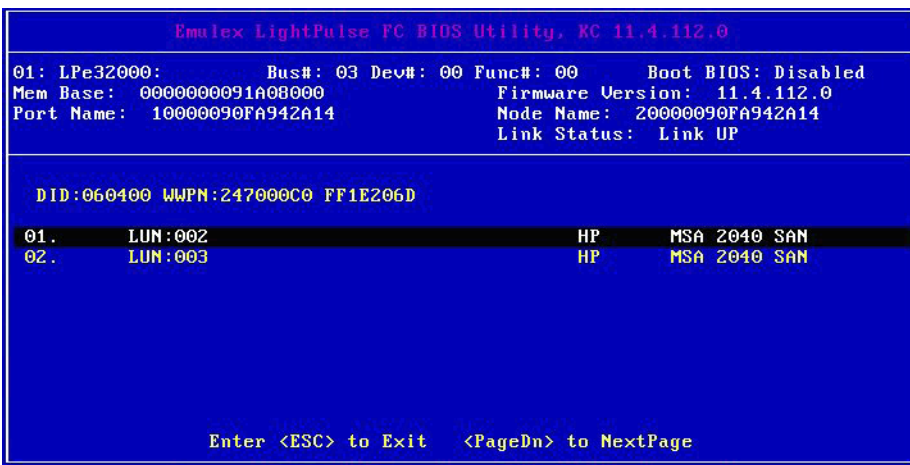
3. Select **00** and press **Enter** to clear the selected boot entry, or select the WWPN or DID of a device to configure.

Figure 6: Starting LUN Offset Screen



- If you select a device, you are prompted for the starting LUN. Select the starting LUN, by using the up and down arrow keys (Figure 6). The starting LUN can be any number from 0 to 255.

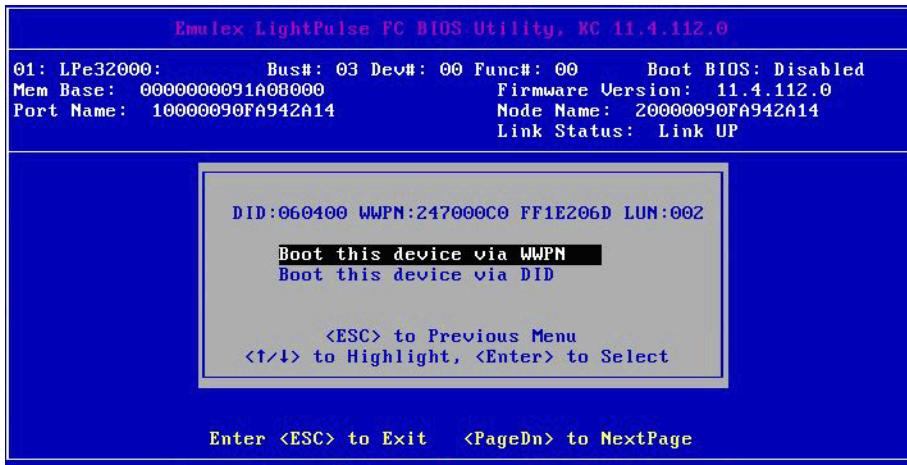
Figure 7: LUN Listing Screen



You can define 256 LUNs per adapter. The screen shows only 8 LUNs per page, from the starting LUN offset, up to 256 consecutive LUNs.

- Use the arrow key up and down to select the LUN you want to setup as a boot device. The Boot Devices menu (Figure 8) is displayed.

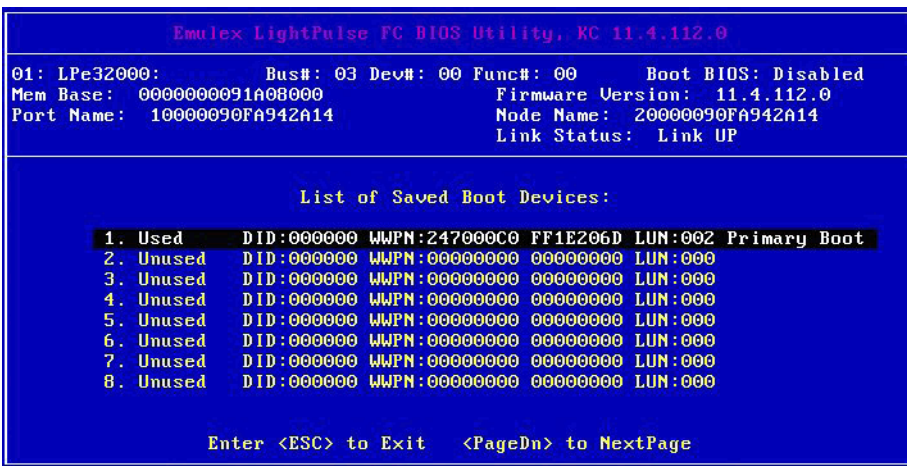
Figure 8: Boot Devices Menu



- 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 9).

Figure 9: Primary Boot Device Set Up Screen



- Press **Enter** to select the change.
- Press **Esc** until you exit the BIOS utility.
- 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 spin-up 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.
- Enable or disable Brocade FA-PWWN.
- Select a link speed.

**NOTE:** If you want to use a topology other than the default, you must change the topology setting before configuring boot devices (see [Section 4.4.3, Changing the Topology](#)).

To access the adapter configuration menu, from the main configuration menu ([Figure 2](#)), select **Configure Advanced Adapter Parameters** and press **Enter**.

The adapter configuration menu is displayed ([Figure 10](#)).

**Figure 10: Adapter Configuration Menu in the LPe12000-Series, LPe16000-Series, LPe31000-Series, and LPe32000-Series Adapters**

```

Emulex LightPulse FC BIOS Utility, KC 11.4.126.0
-----
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Disabled
Mem Base: 0000000091A08000      Firmware Version: 11.4.132.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Unknown
-----
  Change PLOGI Retry Timer
  Topology Selection
  Enable or Disable Spinup Delay
  Auto Scan Setting
  Enable or Disable EDD 3.0
  Enable or Disable Start Unit Command
  Enable or Disable Environment Variable
  Enable or Disable Auto Boot Sector
  Enable or Disable Brocade FA-PWWN
  Link Speed Selection

  Enter <Esc> to Previous Menu
  <↑/↓> to Highlight, <Enter> to Select

```

Default settings are acceptable for most installations.

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



## 4.4.1 Changing the Default AL\_PA

**NOTE:** This option is available only on the LPe12000-series and LPe16000-series adapters and is not available on the LPe31000-series and LPe32000-series adapters.

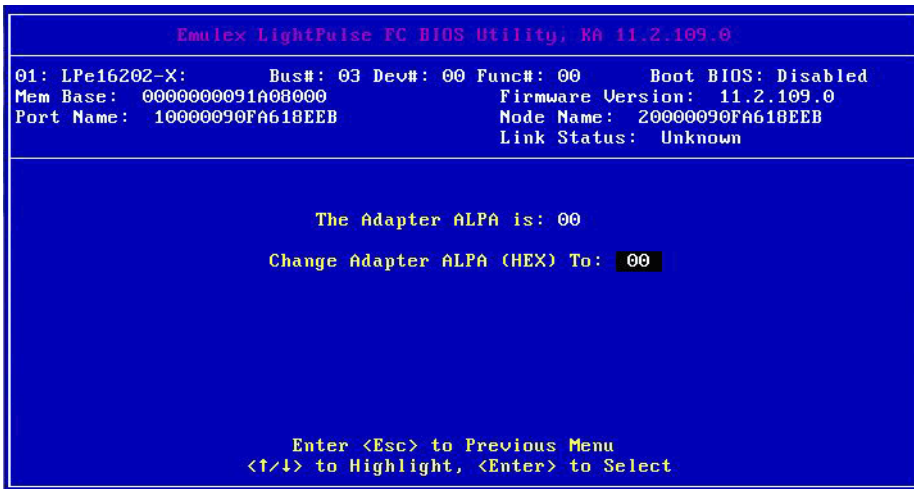
The default value of the AL\_PA for the adapter BIOS is 00 (hexadecimal). All adapters or boot drives can be configured to other AL\_PAs rather than their default values.

**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), select **Configure Advanced Adapter Parameters**.  
The adapter configuration menu is displayed (Figure 10).
2. Select **Change Default ALPA of this Adapter** and press **Enter**.  
Information similar to Figure 11 is displayed.

Figure 11: Change Default ALPA Screen



**NOTE:** To change the default AL\_PA, use the up arrow and down arrow keys to scroll through the valid AL\_PAs. Figure 4 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 4: 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

**Table 4: Valid AL\_PA Values (Continued)**

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 (PLOGI) scans the loop to discover this device. The PLOGI retry interval is the time it takes for one PLOGI to scan the whole loop (if 126 AL\_PAs are on the loop). You can choose:

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

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

1. On the main configuration menu (Figure 2), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed (Figure 10).
2. Select **Change PLOGI Retry Timer** and press **Enter**. Information similar to Figure 12 is displayed.

**Figure 12: Change the PLOGI Retry Timer Screen**

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0
-----
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Enabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.94.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Link UP
-----

          PLOGI Retry Timer is: 000

  No PLOGI Retry 0 msec (Default)
  Change PLOGI Retry Timer to 50 msec
  Change PLOGI Retry Timer to 100 msec
  Change PLOGI Retry Timer to 200 msec

          Enter <Esc> to Previous Menu
          <↑/↓> to Highlight, <Enter> to Select

```

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 the Topology

**NOTE:** Point to point is the only topology supported on the LPe31000-series and LPe32000-series adapters.

By default, the LPe12000-series and LPe16000-series adapters use auto topology with loop first. If you want to use a topology other than the default, you must change the topology setting before configuring boot devices. For FC-AL, each adapter has a default AL\_PA of 01 (hexadecimal).

The topology options available in LPe12000-series and LPe16000-series adapters are shown in [Figure 13](#).

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](#)), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed ([Figure 10](#)).
2. Select **Topology Selection** and press **Enter**. Information similar to [Figure 13](#) is displayed.

**Figure 13: Topology Menu in the LPe12000-Series and LPe16000-Series Adapters**

```

Emulex LightPulse FC BIOS Utility, KA 11.2.109.0
-----
01: LPe16202-X:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Disabled
Mem Base:  0000000091A08000      Firmware Version:  11.2.109.0
Port Name:  10000090FA618EEB      Node Name:  20000090FA618EEB
                                           Link Status:  Unknown

-----
Topology:  Auto Topology: Loop First (Default)

Auto Topology: Loop First (Default)
Auto Topology: Point to Point First
FC-AL
Fabric Point to Point

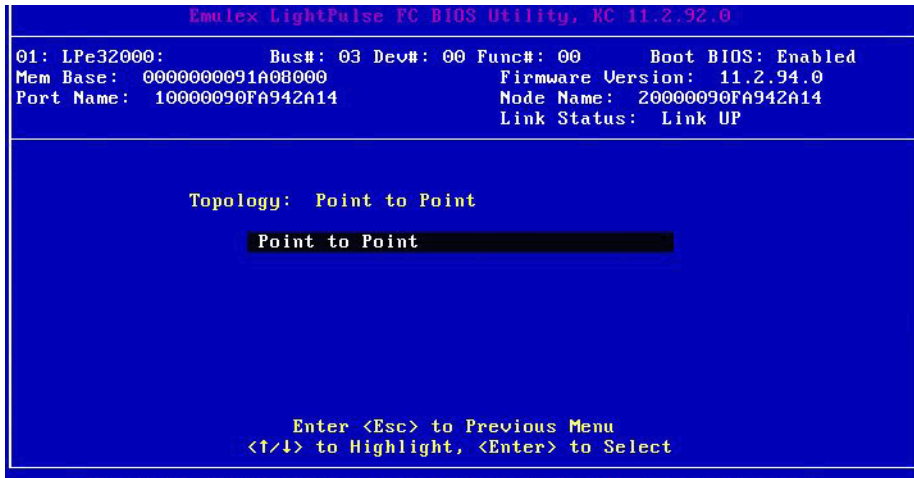
-----
Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select

```

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.

The LPe31000-series and LPe32000-series adapters use point-to-point topology and cannot be changed. The topology options available in the LPe31000-series and LPe32000-series adapters is shown in [Figure 14](#).

**Figure 14: Topology Menu in the LPe31000-Series and LPe32000-Series Adapters**



#### 4.4.4 Enabling or Disabling the Spin-up Delay

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

If at least one boot device has been defined, and the spin-up 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 spin-up delay and, for up to three additional minutes, continues the boot scanning algorithm to find another multi-boot device.

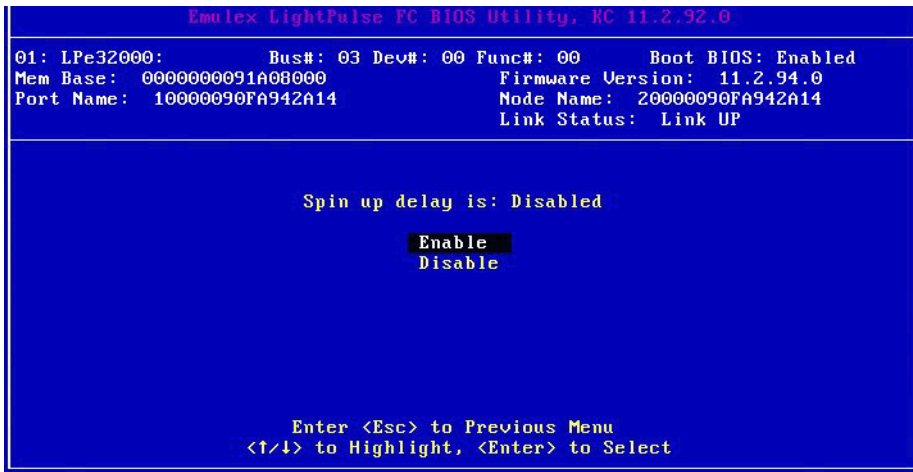
If boot devices have not been defined and auto scan is enabled, the BIOS waits for five minutes before scanning for devices.

- 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 spin-up delay, perform these steps:

1. On the main configuration menu ([Figure 2](#)), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed ([Figure 10](#)).
2. Select **Enable or Disable** spin-up Delay and press **Enter**. The Enable or Disable Spin-up Delay screen ([Figure 15](#)) is displayed.

Figure 15: Enable or Disable Spin-up Delay Screen



3. Select whether to enable or disable spin-up 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 8) 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), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed (Figure 10).
2. Select **Auto Scan Setting** and press **Enter**. Figure 16 is displayed.

Figure 16: Set Auto Scan Menu

```

Emulex LightPulse FC BIOS Utility, KC 11.2.92.0
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Enabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.94.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                      Link Status: Link UP

Auto scan setting: Autoscan disabled (Default)

Autoscan disabled (Default)
Any first device
First LUN 0 device
First NOT LUN 0 device

Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select

```

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

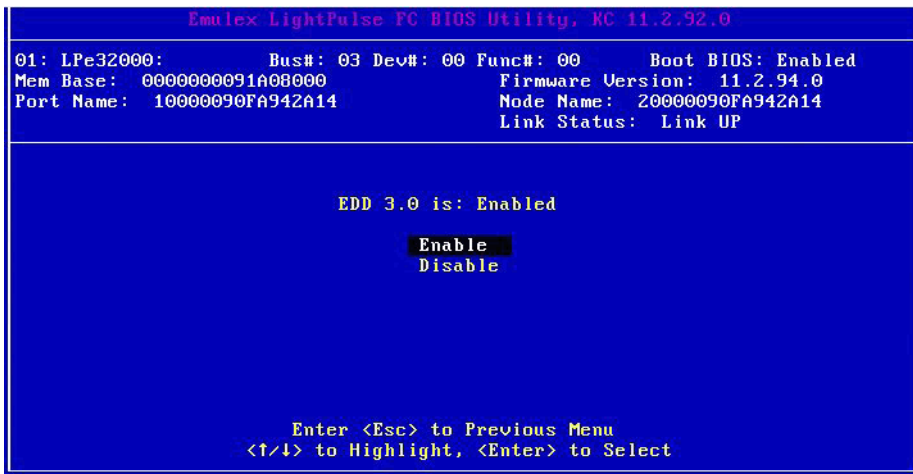
EDD 3.0 provides additional data to the operating system bootloader during the INT-13h function 48h (get device parameters) call. This information includes the path to the boot device and disk size. The default setting for EDD 3.0 is enabled.

**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), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed (Figure 10).
2. Select **Enable or Disable EDD 3.0**. The Enable or Disable EDD 3.0 screen (Figure 17) is displayed.

Figure 17: 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.

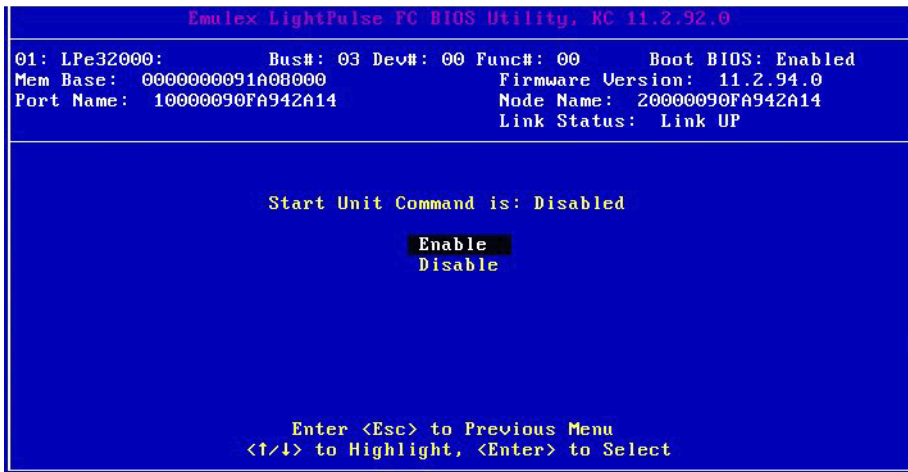
#### 4.4.7 Enabling or Disabling the Start Unit Command

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), select **Configure Advanced Adapter Parameters** and press **Enter**.  
The adapter configuration menu is displayed (Figure 10).
2. Select **Enable or Disable Start Unit Command** and press **Enter**.  
The Enable or Disable Start Unit Command screen (Figure 18) is displayed.

Figure 18: 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

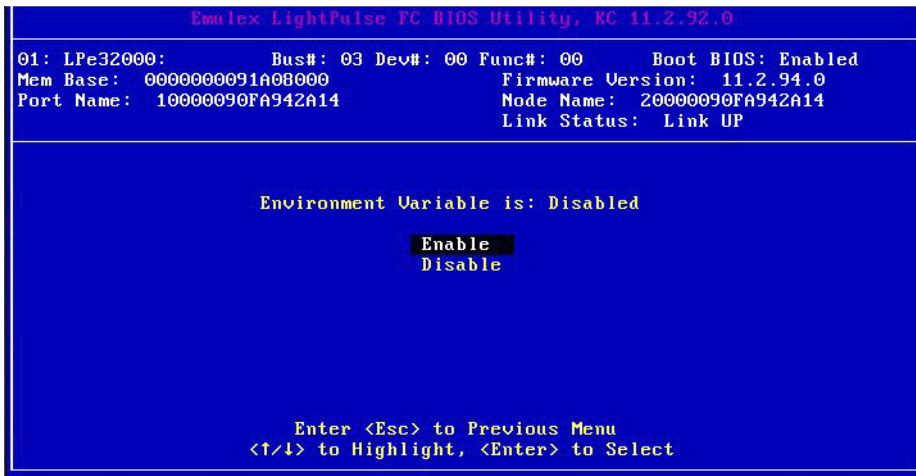
This option sets the boot controller order if the system supports the environment variable. The default setting is disabled.

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

1. From the main configuration menu (Figure 2), select **Configure Advanced Adapter Parameters** and press **Enter**.  
The adapter configuration menu is displayed (Figure 10).
2. Select **Enable or Disable** and press **Enter**.  
The Enable or Disable Environment Variable screen (Figure 19) is displayed.



Figure 19: 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.

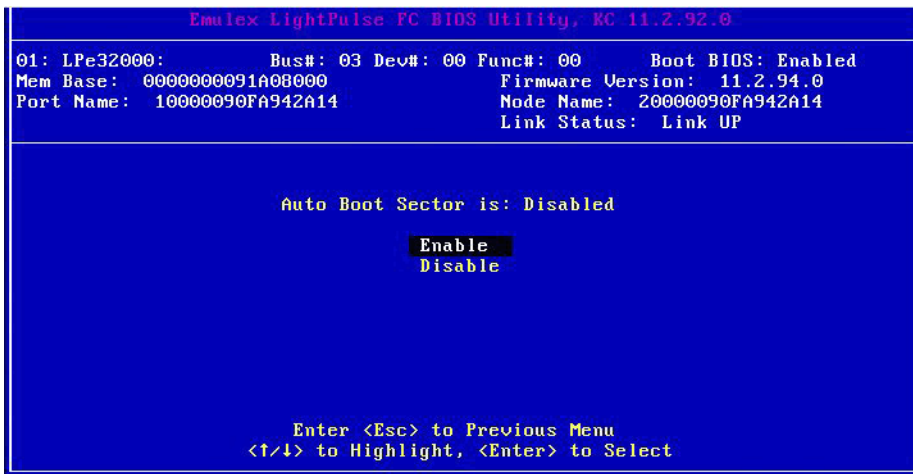
#### 4.4.9 Enabling or Disabling Auto Boot Sector

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), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed (Figure 10).
2. Select **Enable or Disable Auto Boot Sector** and press **Enter**. The Enable or Disable Auto Boot Sector Format Select screen (Figure 20) is displayed.

Figure 20: 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.

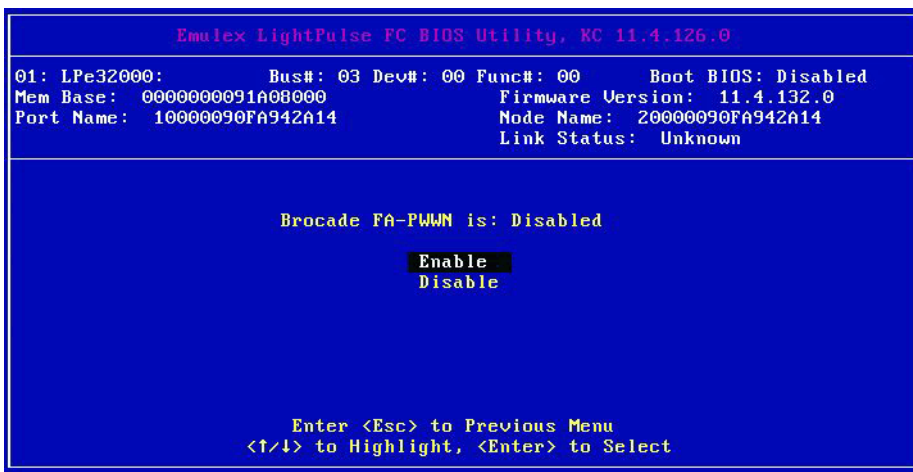
#### 4.4.10 Enabling or Disabling Brocade FA-PWWN

This option enables or disables the Fabric Assigned Port Word Wide Name (FA-PWWN). The default setting is disabled.

To enable or disable FA-PWWN select, perform these steps:

1. From the main configuration menu (Figure 2), select **Configure Advanced Adapter Parameters** and press **Enter**. The adapter configuration menu is displayed (Figure 10).
2. Select **Enable or Disable Brocade FA-PWWN** and press **Enter**. The Enable or Disable Brocade FA-PWWN screen (Figure 20) is displayed.

Figure 21: Enable or Disable Brocade FA-PWWN 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.

## 4.4.11 Changing the Link Speed

**NOTE:** Supported link speeds are specific to the adapter model and the optics installed. Examples of the LPe12000-series and LPe16000-series adapters are shown in [Figure 22: Link Speed Selection Menu in the LPe16000-Series Adapters](#). Examples of LPe31000-series and LPe32000-series adapters are shown in [Figure 23: Link Speed Selection Menu in the LPe32000-Series Adapters](#).

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

**NOTE:** In LPe12000-series adapters, the Link Speed setting will be overwritten by the operating system 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
- 1Gb/s (if available)
- 2Gb/s (if available)
- 4Gb/s (if available)
- 8Gb/s (if available)
- 16Gb/s (if available)
- 32Gb/s (if available)

**NOTE:** 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](#)), select **Configure Advanced Adapter Parameters** and press **Enter**.  
The adapter configuration menu is displayed ([Figure 10](#)).
2. Select **Link Speed Selection** and press **Enter**.  
The Link Speed Selection menu ([Figure 22](#)) is displayed.

Figure 22: Link Speed Selection Menu in the LPe16000-Series Adapters

```
Emulex LightPulse FC BIOS Utility, KA 11.2.109.0
01: LPe16202-X:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Disabled
Mem Base: 0000000091A08000      Firmware Version: 11.2.109.0
Port Name: 10000090FA618EEB      Node Name: 20000090FA618EEB
                                   Link Status: Unknown

Link Speed is:      Auto Select (Default)
Auto Select (Default)
4 Gb/s
8 Gb/s
16 Gb/s

Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select
```

Figure 23: Link Speed Selection Menu in the LPe32000-Series Adapters

```
Emulex LightPulse FC BIOS Utility, KC 11.4.126.0
01: LPe32000:      Bus#: 03 Dev#: 00 Func#: 00      Boot BIOS: Disabled
Mem Base: 0000000091A08000      Firmware Version: 11.4.132.0
Port Name: 10000090FA942A14      Node Name: 20000090FA942A14
                                   Link Status: Unknown

Link Speed is:      Auto Select (Default)
Auto Select (Default)
4 Gb/s
8 Gb/s
16 Gb/s

Enter <Esc> to Previous Menu
<↑/↓> to Highlight, <Enter> to Select
```

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.

## 4.4.12 Resetting to Default Values

**NOTE:** Resetting the adapter to default setting will clear all entries made while configuring the boot device, as detailed in [Section 4.3, Configuring Boot Devices](#)).

The BIOS utility enables you to reset BIOS boot parameters to their factory default settings. These defaults are listed in [Table 5](#).

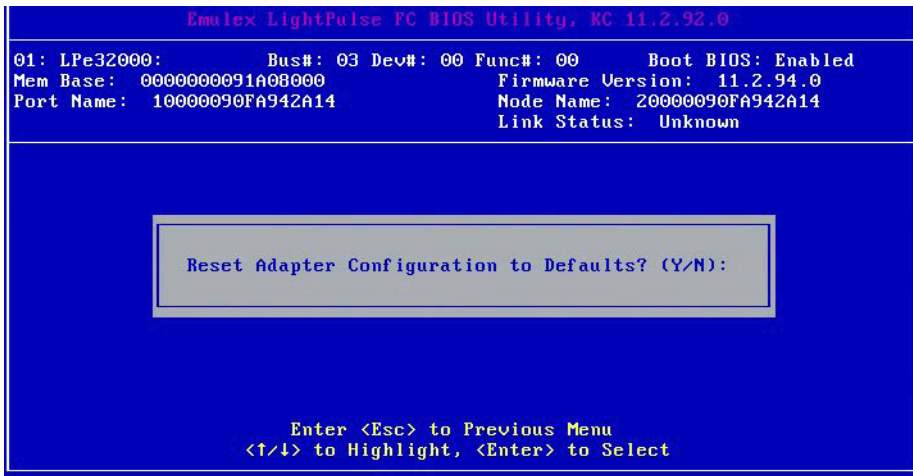
**Table 5: Adapter Defaults**

Parameter	Default	Valid Values
Boot from SAN	Disabled	Enabled Disabled
ALPA Value	0x00 Fibre	See the ALPA reference table in <a href="#">Section 4.4.1, Changing the Default AL_PA</a> .
EDD 3.0	EDD 3.0	Disabled (EDD 2.1) Enabled (EDD 3.0)
PLOGI Retry Timer	Disabled	Disabled 50 ms 100 ms 200 ms
Spinup Delay	Disabled	Enabled Disabled
Auto Scan	Disabled	Enabled Disabled
Start Unit	Disabled	Enabled Disabled
Environmental Variable	Disabled	Enabled Disabled
Auto Boot Sector	Disabled	Enabled Disabled
Topology	Auto Topology: Loop First (Default) <b>NOTE:</b> On LPe31000-series and LPe32000-series adapters, only Point-to-Point is available.	Auto Topology: Loop First (Default) Auto Topology: Point-to-Point First FC-AL Point-to-Point
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](#)) select **Reset Adapter Defaults** and press **Enter**.  
A screen similar to [Figure 24](#) is displayed asking if you want to reset to the default settings.

Figure 24: Reset Adapter Configuration to Defaults



2. Press **Y**.

All settings revert to their factory default values.

### 4.4.13 Using Multipath 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 the 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	<code>.boot-id</code>
Description	Shows the current boot device ID.
Parameters	None

#### 5.1.2 devalias

Syntax	<code>.devalias</code>
Description	Shows the boot list.
Parameters	None

#### 5.1.3 .fcode

Syntax	<code>.fcode</code>
Description	Shows the current version of OpenBoot.
Parameters	None

#### 5.1.4 host-id

Syntax	<code>.host-did</code>
Description	Shows the actual current AL_PA of the adapter.
Parameters	None

#### 5.1.5 .nvram

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

## 5.1.6 probe-scsi-all

Syntax	<code>..probe-scsi-all</code>
Description	Shows the current SCSI and FC devices.
Parameters	None

## 5.1.7 show-devs

Syntax	<code>.show-devs</code>
Description	Shows a list of the devices found.
Parameters	None

## 5.1.8 .topology

Syntax	<code>.topology</code>
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 set-boot-id

Syntax	<code>set-boot-id</code>
Description	Sets the boot device ID.
Parameters	<code>wwpn &lt;wwpn&gt; &lt;lun&gt; set-boot-id</code>

### 5.2.2 remove-boot-id

Syntax	<code>remove-boot-id</code>
Description	Removes the boot ID from the boot list. <code>"/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</code>
Parameters	None

### 5.2.3 set-default-mode

Syntax	<code>set-default-mode</code>
Description	Resets to the default value mode.
Parameters	None



## 5.2.4 set-link-speed

**NOTE:** In LPe12000-series adapters, 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	<code>set-link-speed</code>
Description	Sets the current link-speed setting. Changes and sets the link speed. The default is 0 = Auto Select Link Speed.
Parameters	<ul style="list-style-type: none"> <li>0 = Auto Select Link Speed (Default)</li> <li>1 = 1Gb/s Link Speed – Only</li> <li>2 = 2Gb/s Link Speed – Only</li> <li>4 = 4Gb/s Link Speed – Only</li> <li>8 = 8Gb/s Link Speed – Only</li> <li>16 = 16Gb/s Link Speed – Only</li> <li>32 = 32Gb/s Link Speed – Only</li> </ul>

## 5.2.5 set-max-lun

Syntax	<code>set-max-lun</code>
Description	Shows the current maximum LUN support. Changes and sets the support setting, the default maximum LUN is 256.
Parameters	<ul style="list-style-type: none"> <li>0 = Set Max LUN to 255 (Default)</li> <li>1 = Set Max LUN to 1023</li> <li>2 = Set Max LUN to 2047</li> <li>3 = Set Max LUN to 4095</li> </ul>

## 5.2.6 set-post-linkup

Syntax	<code>set-post-linkup</code>
Description	Controls if a linkup is to occur during a POST. The default is off.
Parameters	<ul style="list-style-type: none"> <li>0 = Set Linkup Switch OFF (Default)</li> <li>1 = Set Linkup Switch ON</li> </ul>

## 5.2.7 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 6: OpenBoot Signature**

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

**Table 6: OpenBoot Signature (Continued)**

<b>Signature</b>	<b>OpenBoot Signature</b>
Diag_Switch	Set fcode diag switch
Boot_id	Shows target ID number
Lnk_timer	Internal use for OpenBoot
Plogi_timer	Internal use for OpenBoot
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

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 present on your adapters.

### 6.1 Prerequisites

Before you configure any UEFI parameters on your system, ensure all the adapters in the system have the same and latest UEFI version in order to prevent incompatibilities with the firmware support.

**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. Dell is not supporting UEFI boot on the LPe12000-series adapters.

### 6.2 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 guide for more information.

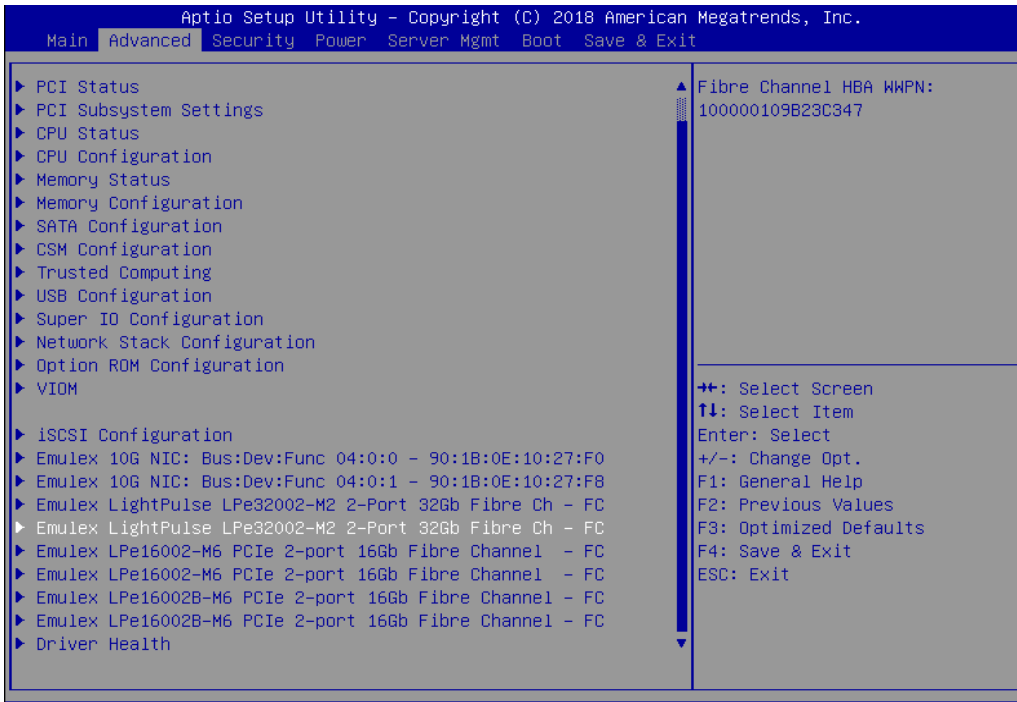
### 6.3 Starting the Emulex Configuration Utility

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:

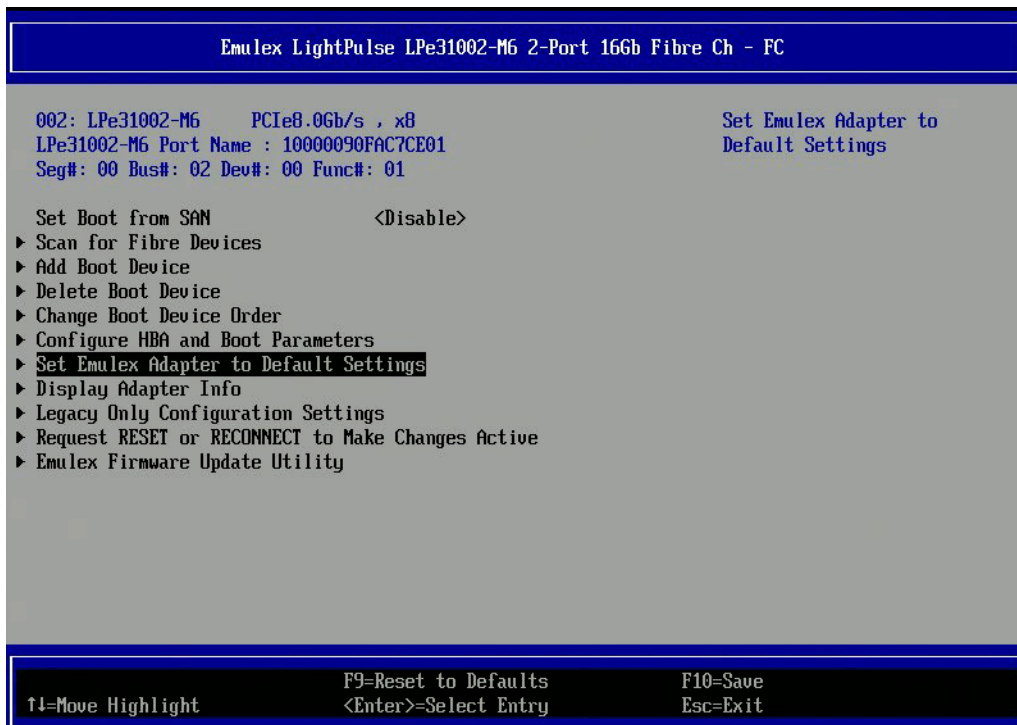
1. Press F1 or F2 based on the server model on the system BIOS screen to enter into UEFI HII.
2. Select the menu item that allows you to configure devices. On the screen that appears ([Figure 25](#)), a list of all the adapters in the system is displayed. Your list might vary depending on the installed adapters.

Figure 25: Device Configuration Screen Example



3. Select the adapter you want to configure and press **Enter**.  
The Emulex Adapter Configuration main menu screen (Figure 26) is displayed.

Figure 26: Emulex Adapter Configuration Main Menu Screen



## 6.3.1 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.

## 6.4 Configuring Boot in UEFI/HII

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

- Set boot from SAN (see [Section 6.5, Setting Boot from SAN](#))
- Scan for fibre devices (see [Section 6.6, Scanning for Fibre Devices](#))
- Add and delete boot devices (see [Section 6.7, Adding Boot Devices](#) and [Section 6.8, Deleting Boot Devices](#))
- Change boot device order (see [Section 6.9, Changing Boot Device Order](#))
- Configure HBA and boot parameters (see [Section 6.10, Configuring HBA and Boot Parameters](#))
- Set adapters to their default settings (see [Section 6.11, Resetting Emulex Adapters to Default Values](#))
- Display adapter information (see [Section 6.12, Displaying Adapter Information](#))
- Legacy only configuration settings (see [Section 6.13, Legacy Only Configuration Settings](#))
- Request Reset or Reconnect to make changes active (see [Section 6.14, Requesting a RESET or RECONNECT](#))
- Emulex firmware update utility (see [Section 6.15, Emulex Firmware Update Utility](#))

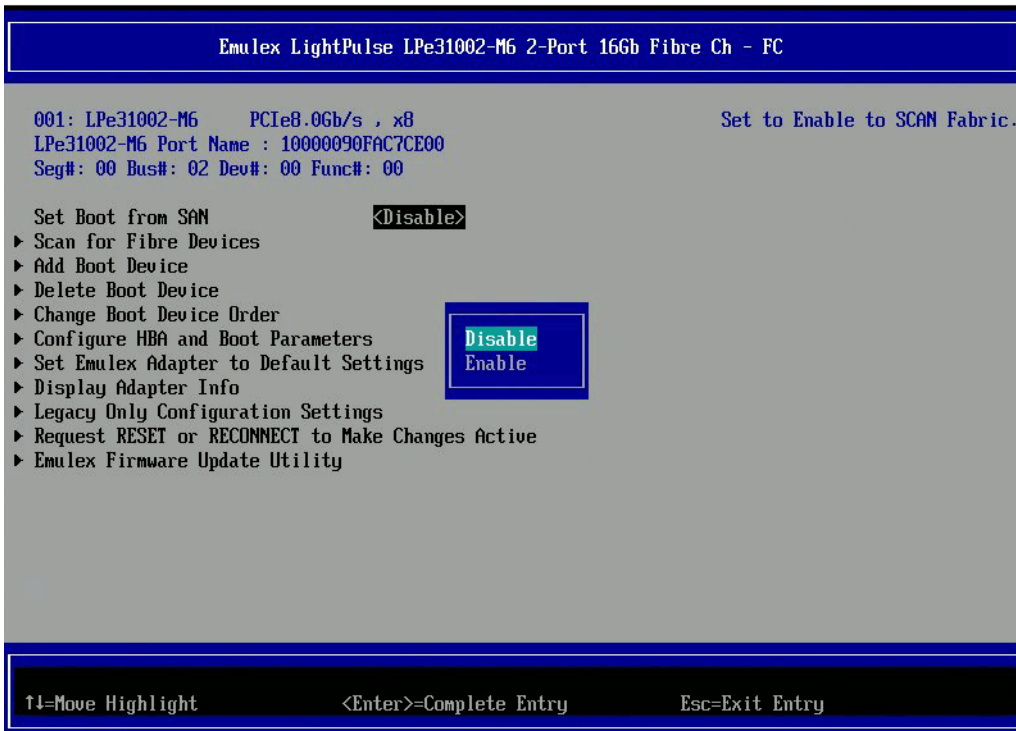
**NOTE:** Changes made to parameters common to UEFI and x86 drivers are changed in both driver configuration utilities.

## 6.5 Setting Boot from SAN

To set boot from SAN, perform these steps:

1. From the Device Configuration screen ([Figure 25](#)), select the adapter whose boot from SAN setting you want to change and press **Enter**.
2. From the Main menu ([Figure 26](#)), select **Set Boot from SAN** and press **Enter**. The current boot setting is displayed. A Disable/Enable menu appears ([Figure 27](#)).

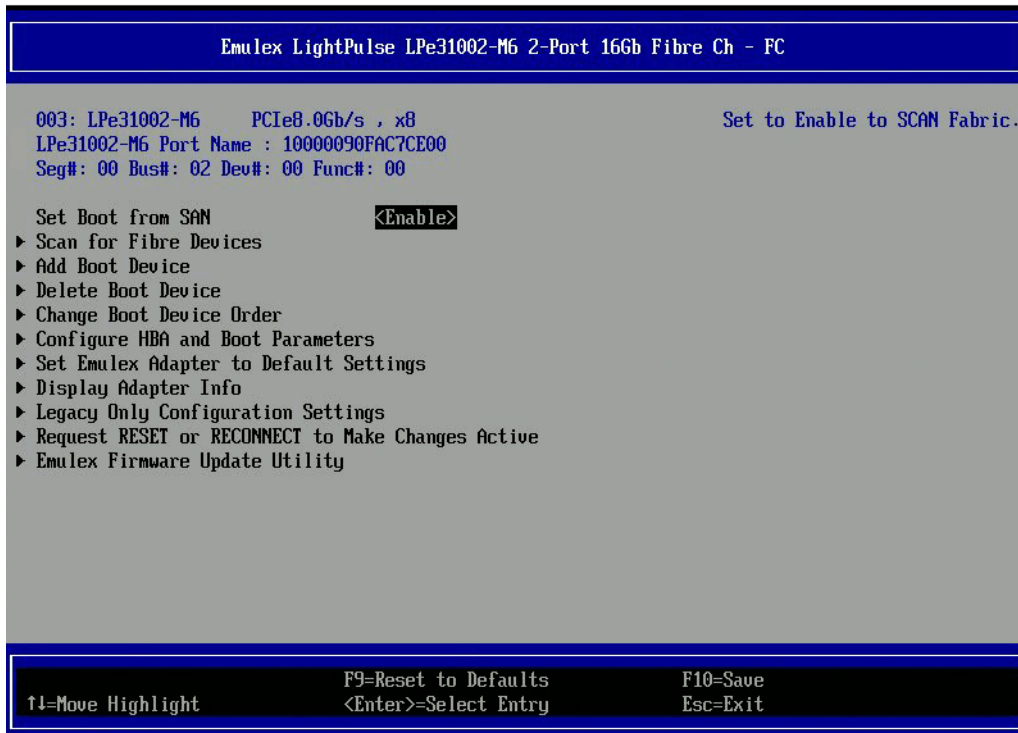
Figure 27: Main Menu, Boot from SAN Options Menu



3. Make your selection and press **Enter**.

The utility displays the new boot from SAN setting ([Figure 28](#)).

Figure 28: New Boot from SAN Setting



4. Press **F10** to save the changes.

## 6.6 Scanning for Fibre Devices

To scan for fibre devices, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter that you want to scan for Fibre devices and press **Enter**.
2. From the Main menu (Figure 26), select **Scan for Fibre Devices** and press **Enter**.  
A list of the discovered targets is displayed (Figure 29). This is only a list of discovered target devices to determine SAN connectivity.

Figure 29: Discovered Targets Screen



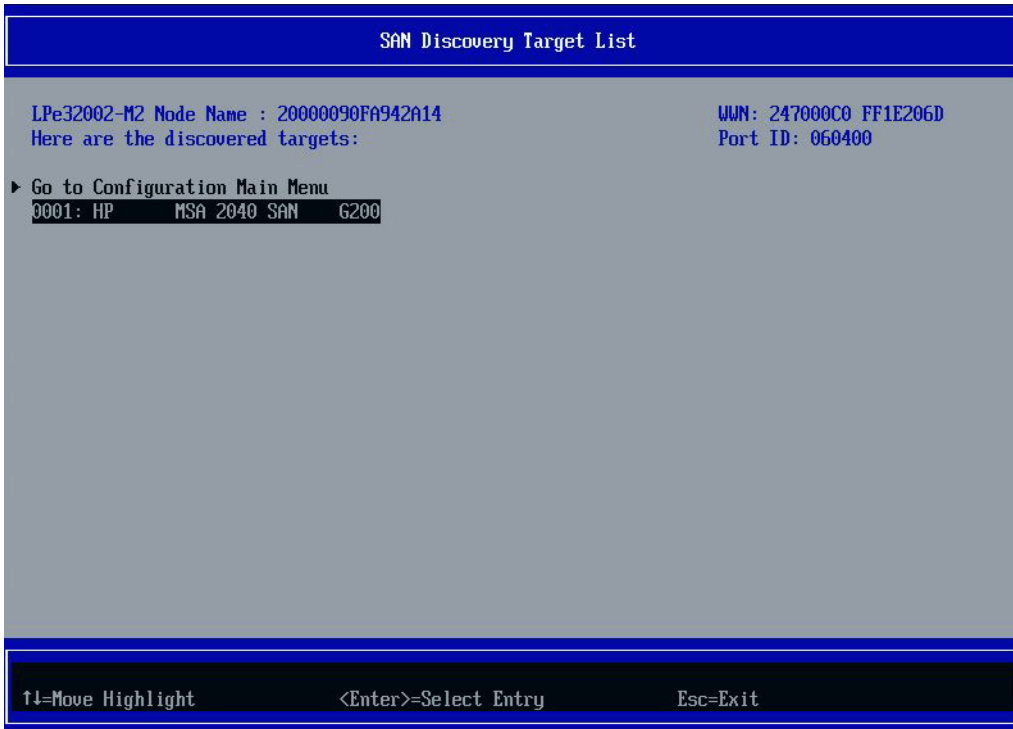
## 6.7 Adding Boot Devices

To add a boot device, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter to which you want to add a boot device and press **Enter**.
2. From the Main menu (Figure 26), select **Add Boot Device** and press **Enter**.  
A screen appears displaying the discovered targets (Figure 30).

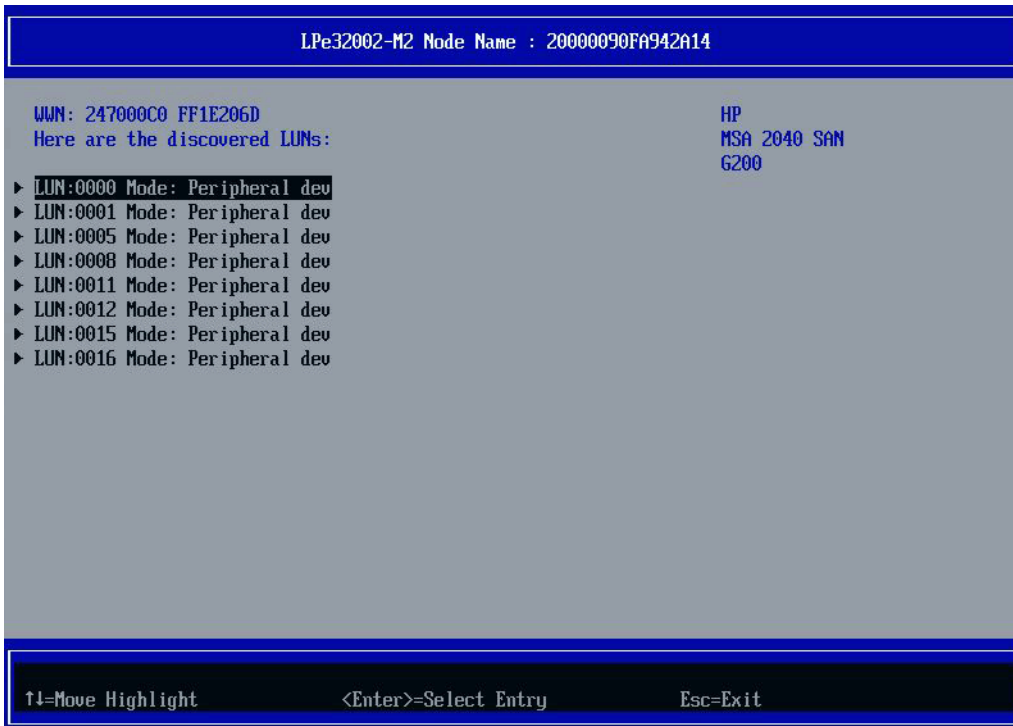


Figure 30: Discovered Targets Screen



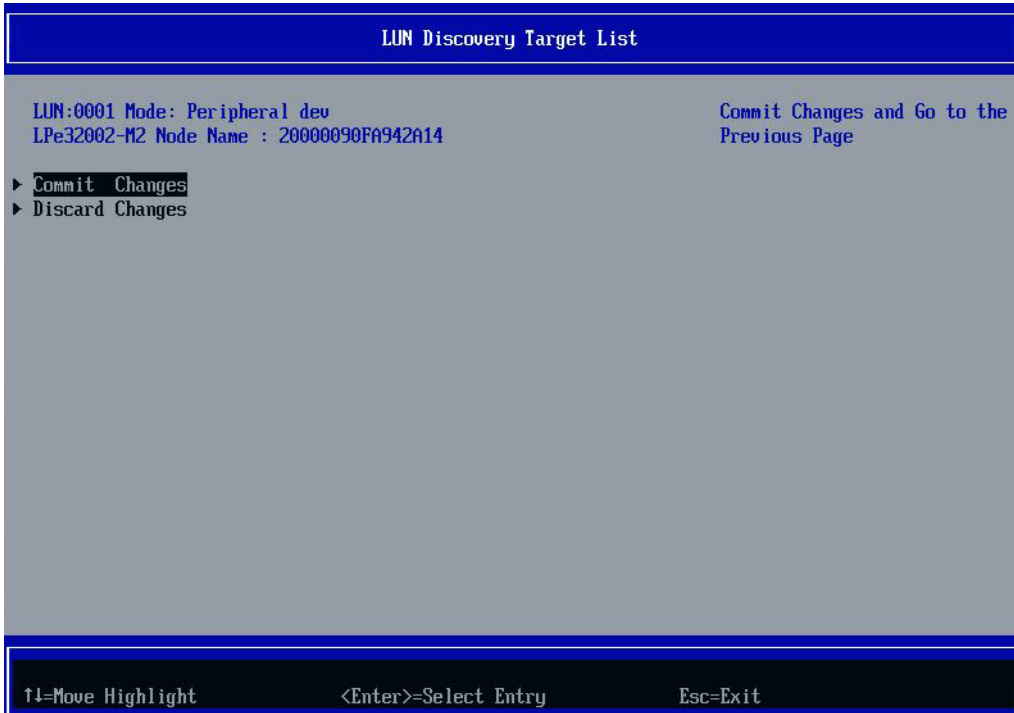
3. Select the target you want and press **Enter**.  
A list of bootable LUNS is displayed (Figure 31)

Figure 31: 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 32).

**Figure 32: Commit/Discard Changes Menu**



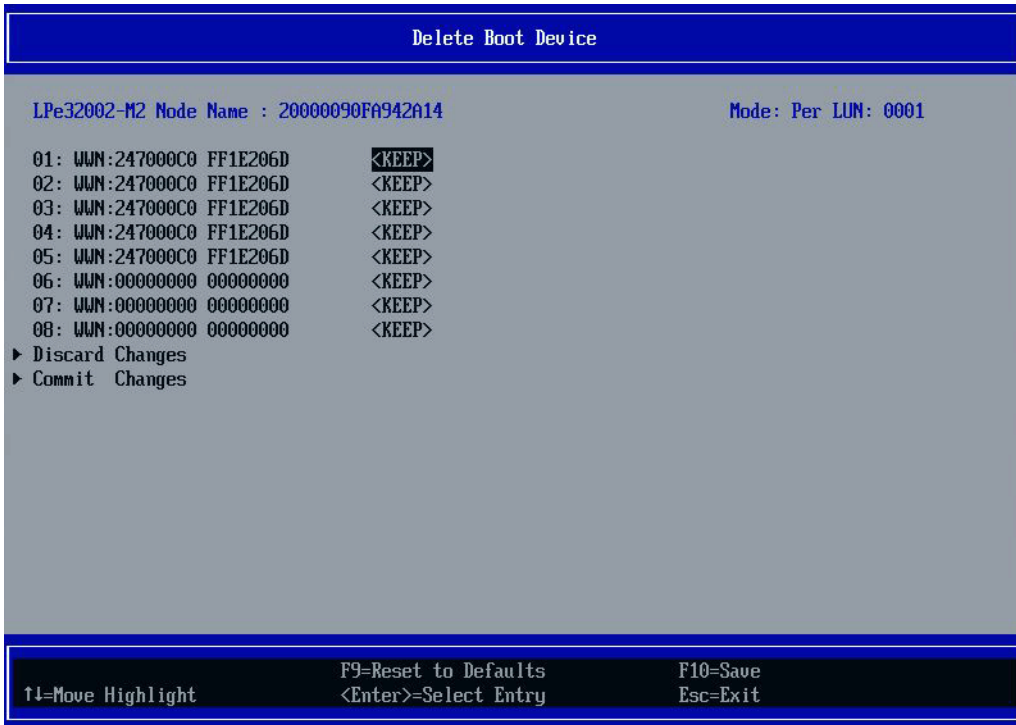
5. Select **Commit Changes** and press **Enter**.

## 6.8 Deleting Boot Devices

To delete boot devices, perform these steps:

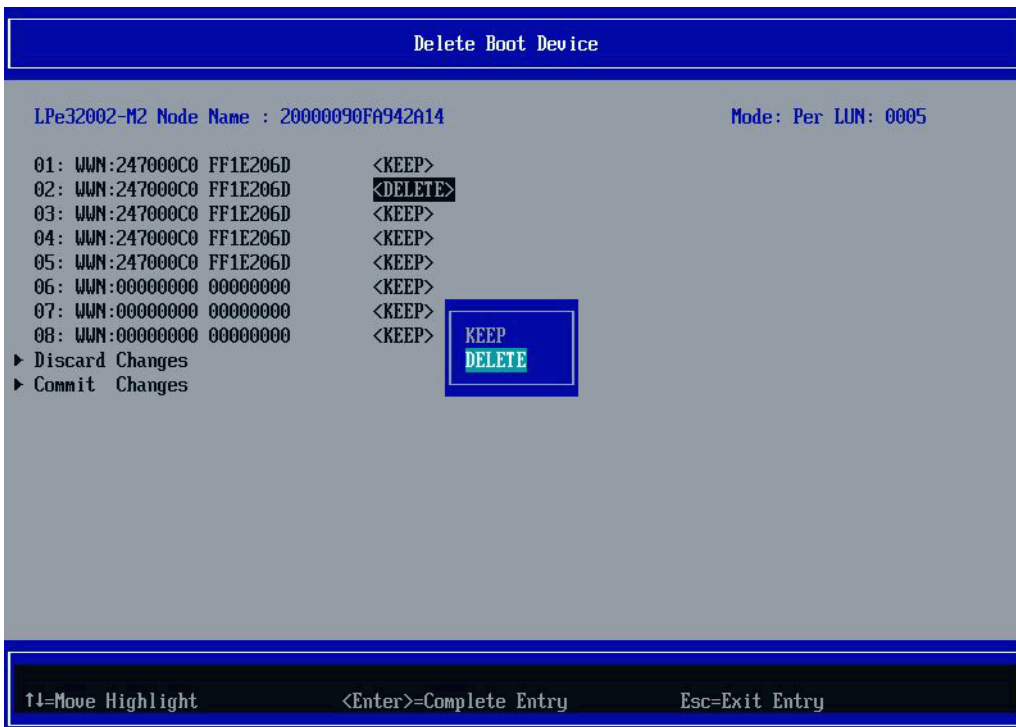
1. From the Device Configuration screen (Figure 25), select the adapter from which you want to delete a boot device and press **Enter**.
2. From the Main menu (Figure 26), select **Delete Boot Device** and press **Enter**.  
A list of boot devices is displayed (Figure 33).

Figure 33: Boot Device Screen



3. Select the boot device you want to delete and press **Enter**.  
The device is highlighted and **<KEEP>** changes to **<DELETE>** as shown in [Figure 34](#).

Figure 34: Selected Boot Device is Highlighted



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

**Figure 35: Confirm Boot Device Delete**



## 6.9 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 prioritizes the available boot devices in a system.

To change boot device order, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose boot device order you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Change Boot Device Order** and press **Enter**.  
A screen that displays the discovered targets appears (Figure 36).

Figure 36: Discovered Targets Screen



3. Select **Boot Device Order**.

A screen appears that displays the boot device order (Figure 37).

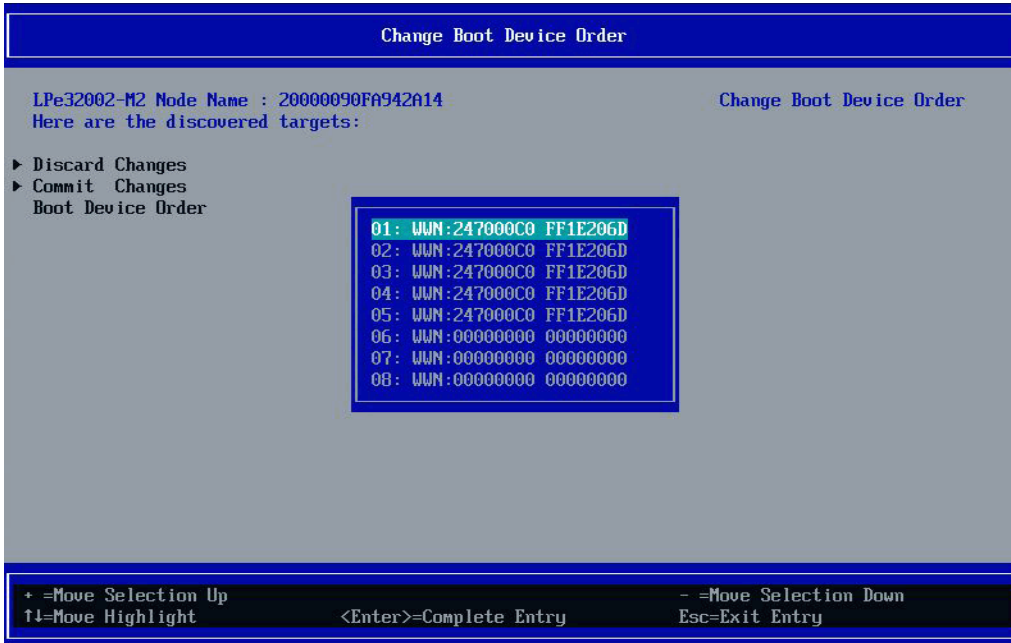
Figure 37: Boot Device Order Screen



4. Press **Enter**.

The Boot Device Order menu screen appears (Figure 38).

**Figure 38: 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.

## 6.10 Configuring HBA and Boot Parameters

The Emulex Configuration utility enables you to configure the following HBA parameters:

- Topology

**NOTE:** Applicable only on the LPe12000 series and LPe16000x series adapters.

- PLOGI retry timer
- Force link speed
- Maximum LUNs/Target
- Boot target scan method
- Enable or Disable Brocade FA-PWWN
- Enable or Disable Brocade Boot LUN

Figure 39: LPe12000-Series Adapters with Delay Device Discovery

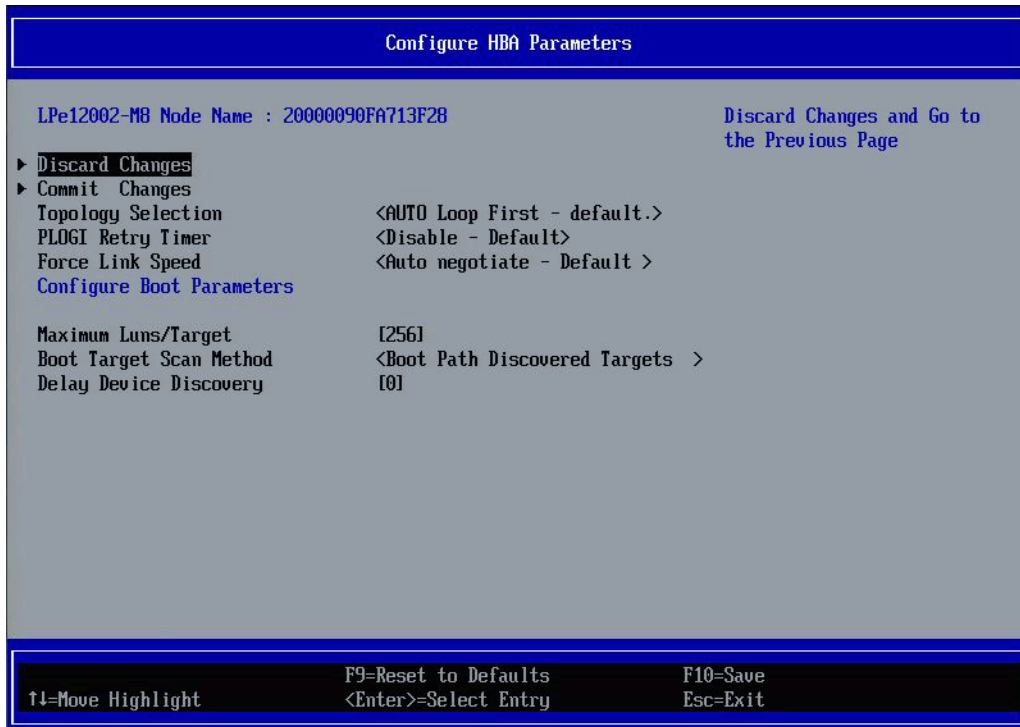
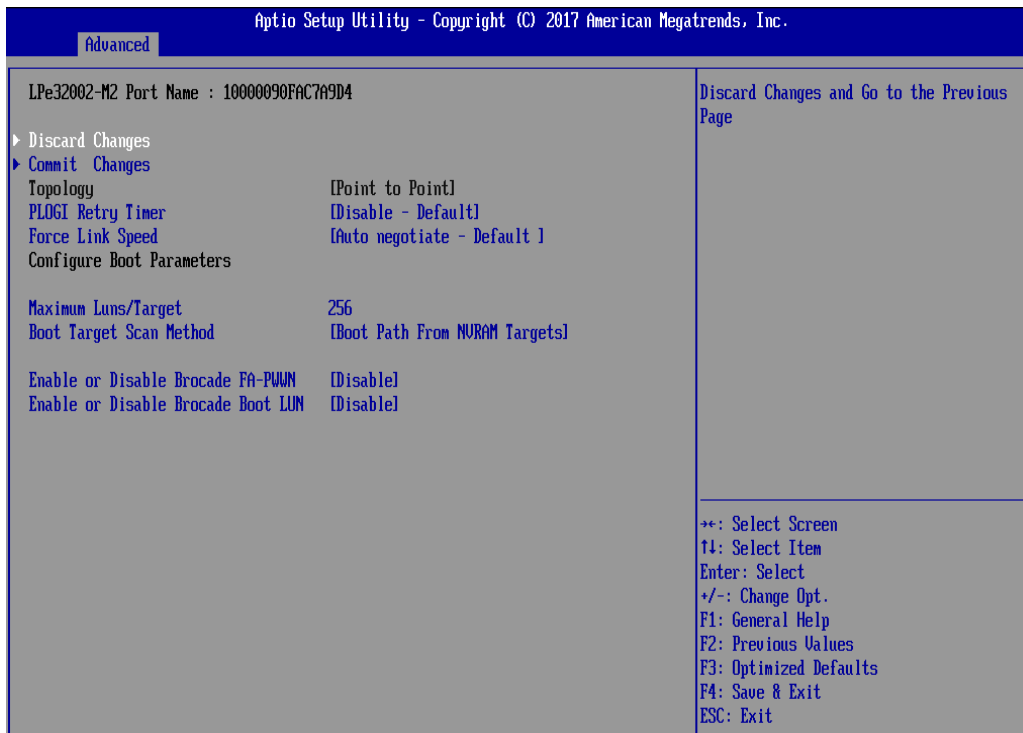


Figure 40: LPe16000 and LPe3X000-Series Adapters with no Delay Device Discovery



## 6.10.1 Changing the Topology

**NOTE:** Point to point is the only topology supported on the LPe31000-series and LPe32000-series adapters.

By default, the LPe12000-series and LPe16000-series adapters use auto topology with loop first. If you want to use a topology other than the default, you must change the topology setting before configuring boot devices. For FC-AL, each adapter has a default AL\_PA of 01 (hexadecimal).

The topology options available in LPe12000-series and LPe16000-series adapters are shown in [Figure 41](#).

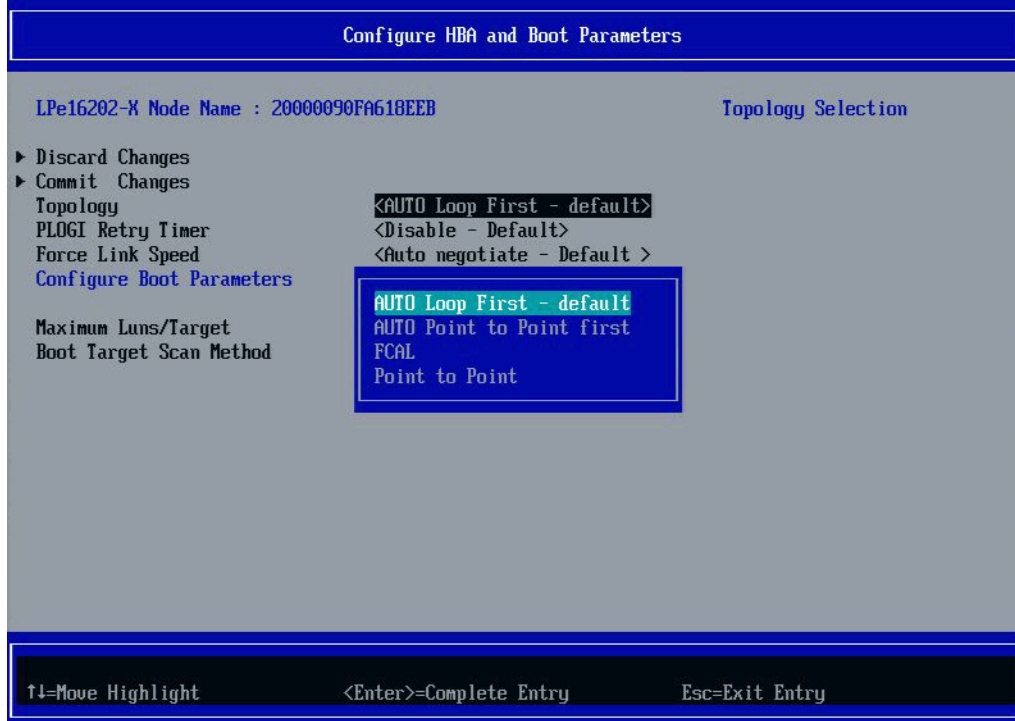
You can configure these items:

- Auto topology with loop first – default
- Auto topology with point-to-point first
- FC-AL
- Point-to-point

To select the adapter topology, perform these steps:

1. From the Device Configuration screen ([Figure 25](#)), select the adapter whose topology you want to change and press **Enter**.
2. From the Main menu ([Figure 26](#)), 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**. Information similar to [Figure 41](#) is displayed.

**Figure 41: Topology Menu in the LPe12000-Series and LPe16000-Series Adapters**





4. Select a topology and press **Enter**.

The screen is refreshed with the new value.

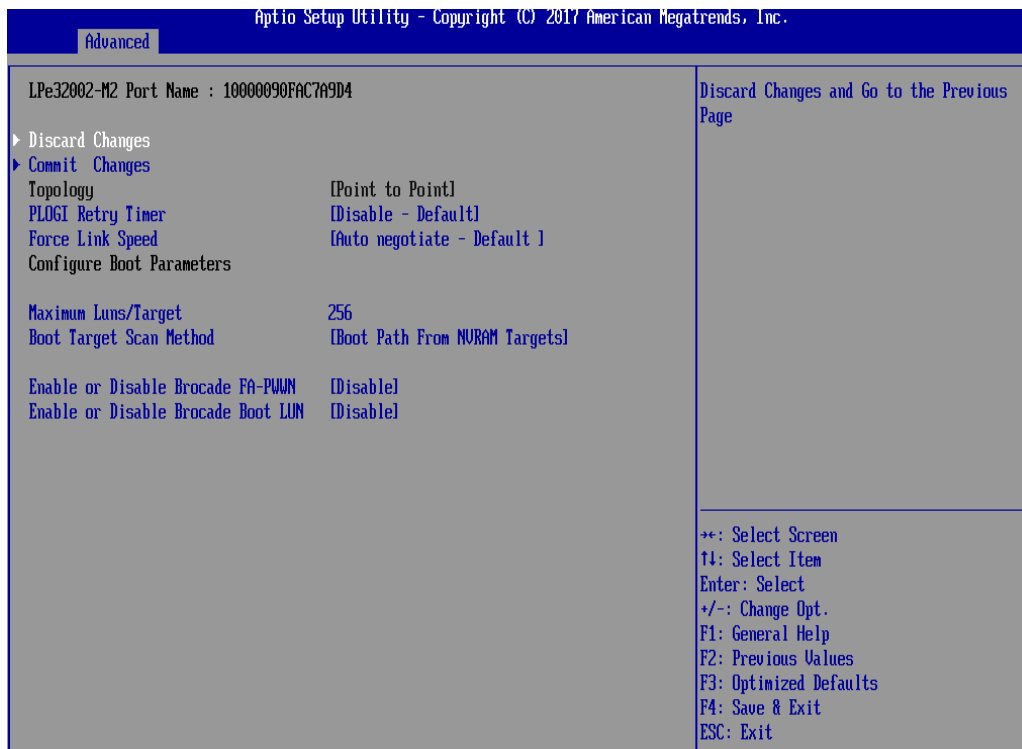
**NOTE:** The presence of a fabric is detected automatically.

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

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

The LPe31000-series and LPe32000-series adapters use point-to-point topology and cannot be changed. The topology options available in the LPe31000-series and LPe32000-series adapters are shown in [Figure 42](#).

**Figure 42: Topology Menu in the LPe31000-Series and LPe32000-Series Adapters**



## 6.10.2 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.

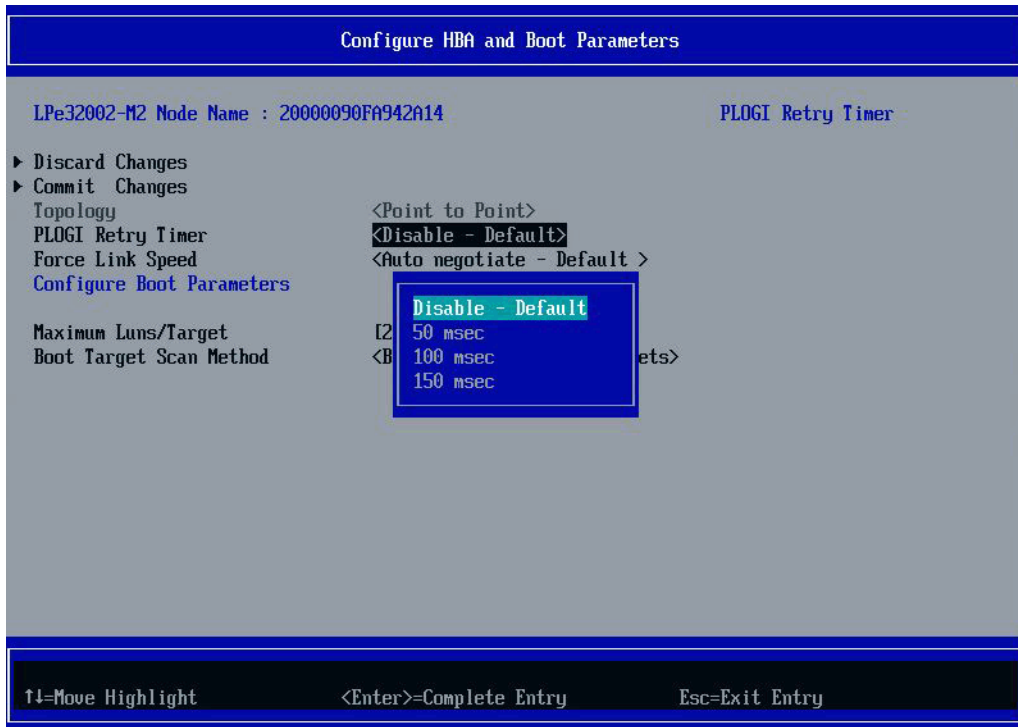
You can choose one of these options:

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

To change timer values, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose PLOGI retry timer information you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 41), navigate to **PLOGI Retry Timer** and press **Enter**. The PLOGI Retry Timer menu appears (Figure 43).

Figure 43: 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**.

### 6.10.3 Changing the Link Speed

Use this feature to change, or force, the link speed between ports instead of auto-negotiating. Supported link speeds are specific to the adapter model and the optics installed. The menu only displays options that are valid for the selected adapter.

**NOTE:** In LPe12000-series adapters 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
- 1Gb/s (if available)
- 2Gb/s (if available)
- 4Gb/s (if available)
- 8Gb/s (if available)
- 16Gb/s (if available)
- 32Gb/s (if available)

To change the link speed, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose link speed you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 41), navigate to **Force Link Speed** and press **Enter**.  
The Force Link Speed menu appears (Figure 44).

**Figure 44: Force Link Speed Menu in the LPe16000-Series Adapters**

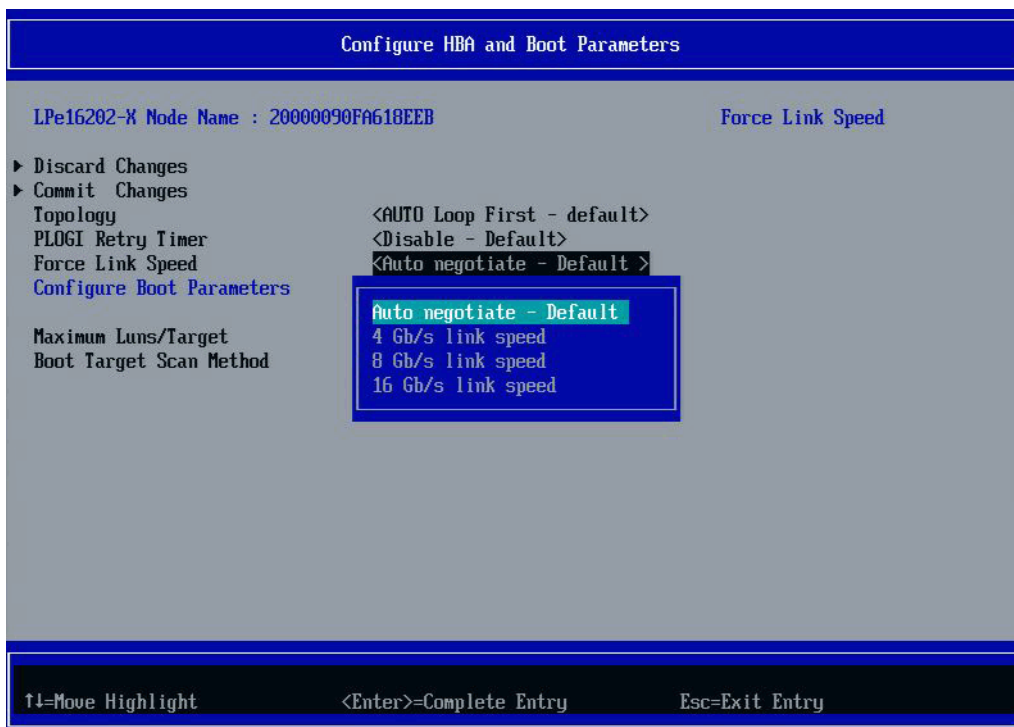
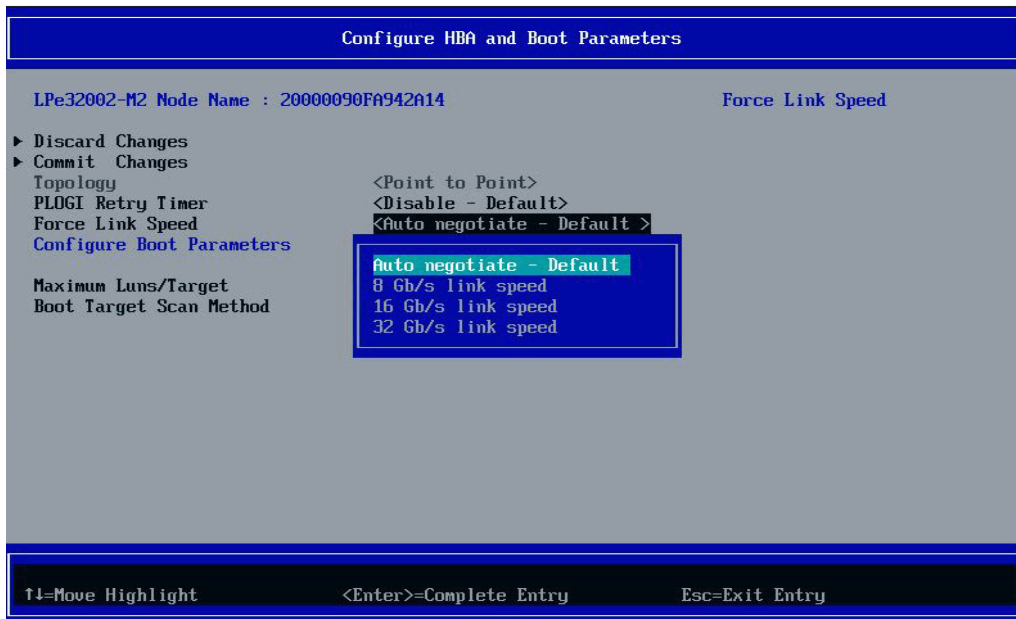


Figure 45: Force Link Speed Menu in the LPe31000-Series and LPe32000-Series Adapters



4. Select a link speed 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**.

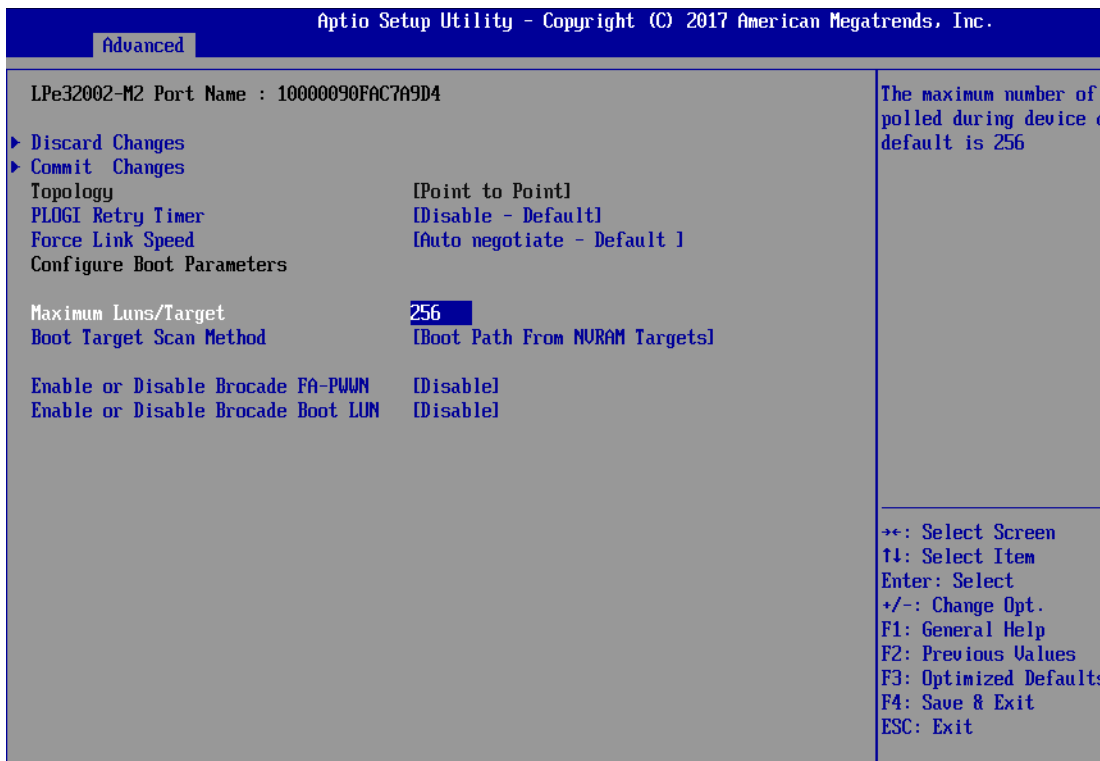
#### 6.10.4 Changing the Maximum LUNs per Target

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 25), select the adapter whose maximum LUNs per target information you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 41), navigate to **Maximum Luns/Target** and press **Enter**.  
The screen becomes editable (Figure 46).

Figure 46: 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**.

### 6.10.5 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.

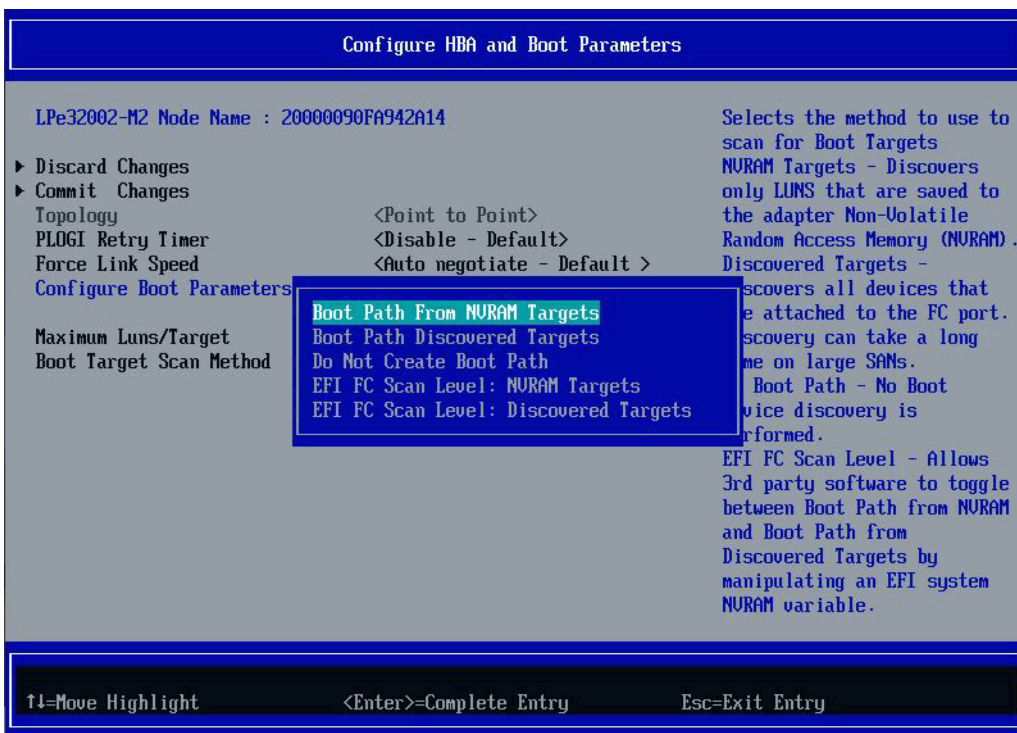
If EFIFCScanLevel is selected, the scan is determined by the value of the EFIFCScanLevel variable maintained by the UEFI system firmware or boot code. The value of this variable can be changed either by using the menu in the EFIBoot Configuration utility, or by using third-party software.

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

1. From the Device Configuration screen (Figure 25), select the adapter whose boot target scan method you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 41), navigate to **Boot Target Scan Method** and press **Enter**.

The Boot Target Scan Method menu appears (Figure 47).

Figure 47: 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**.

## 6.10.6 Changing Device Discovery Delay

**NOTE:** This option is available only in the LPe12000-series adapters and is not available in the LPe16000-series, LPe31000-series, and LPe32000-series adapters.

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.

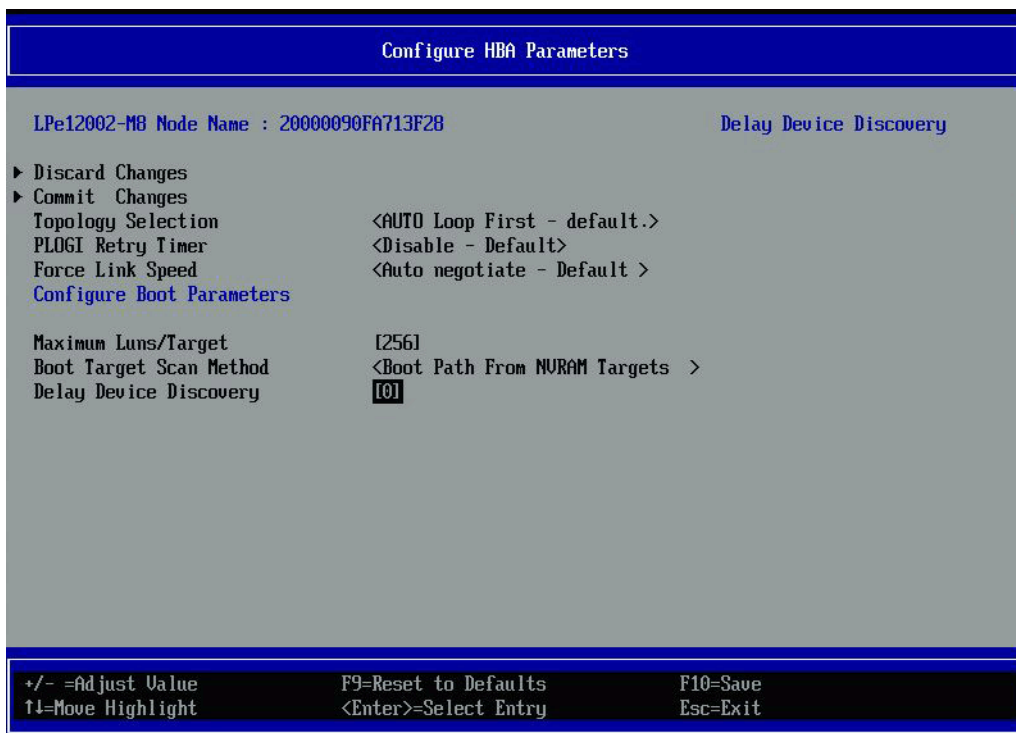
**CAUTION!** Do not change the delay device discovery time if your MSA array is connected to a fabric switch. Setting it to any other time guarantees that the maximum delay time is seen on every loop initialization.

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 25), select the adapter whose device discovery delay settings you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 41), select **Delay Device Discovery** and press **Enter**.  
The screen becomes editable (Figure 48).

**Figure 48: Delay Device Discovery Screen**



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**.

## 6.10.7 Configuring Brocade FA-PWWN

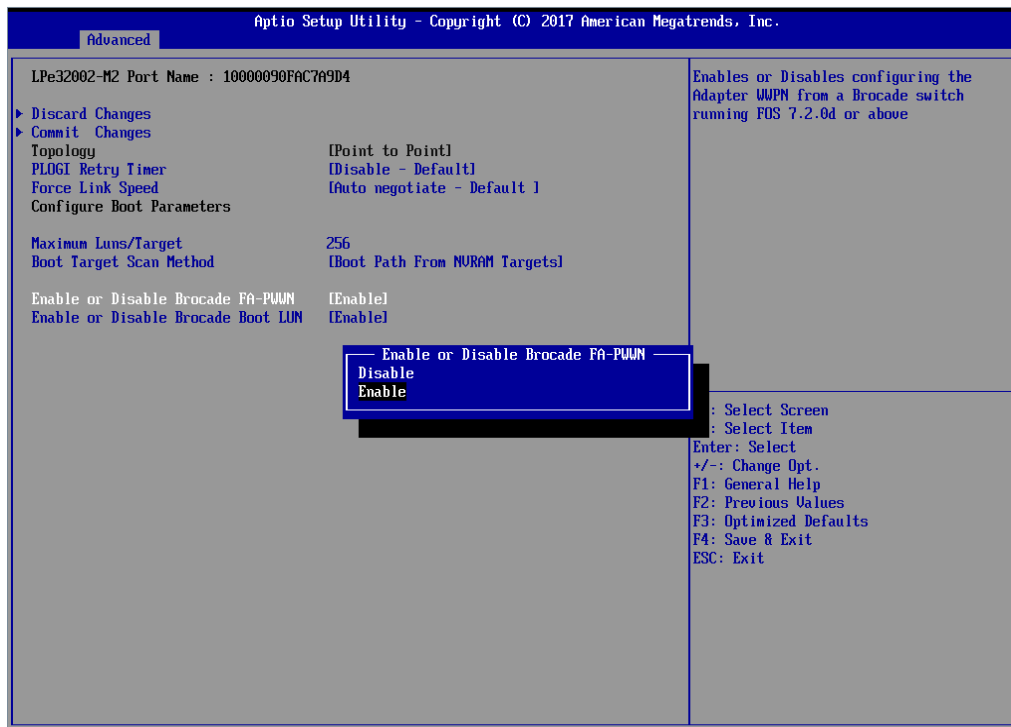
**NOTE:** This feature is available in the LPe16000-series, LPe31000-series, and LPe32000-series adapters only.

This option enables or disables the Brocade Fabric Assigned Port Word Wide Name (FA-PWWN). The default setting is disabled.

To enable or disable the Brocade FA-PWWN, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose Brocade FA-PWWN you want to enable or disable and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 40), navigate to **Brocade FA-PWWN**. The current setting is displayed. Press **Enter**.
4. The Enable or Disable Brocade FA-PWWN menu appears (Figure 49).

**Figure 49: Enable or Disable Brocade FA-PWWN menu**



5. Make your selection and press **Enter**. The utility displays the new setting. Press **Esc** to return to the Emulex Configuration Utility menu.



6. Select **Commit Changes** and press **Enter**.
7. Reboot the system.

After enabling the feature in the Configure HBA and Boot Parameters screen, the Port WWPN gets the configured FA-PWWN from the switch.

## 6.10.8 Configuring Brocade Boot LUN

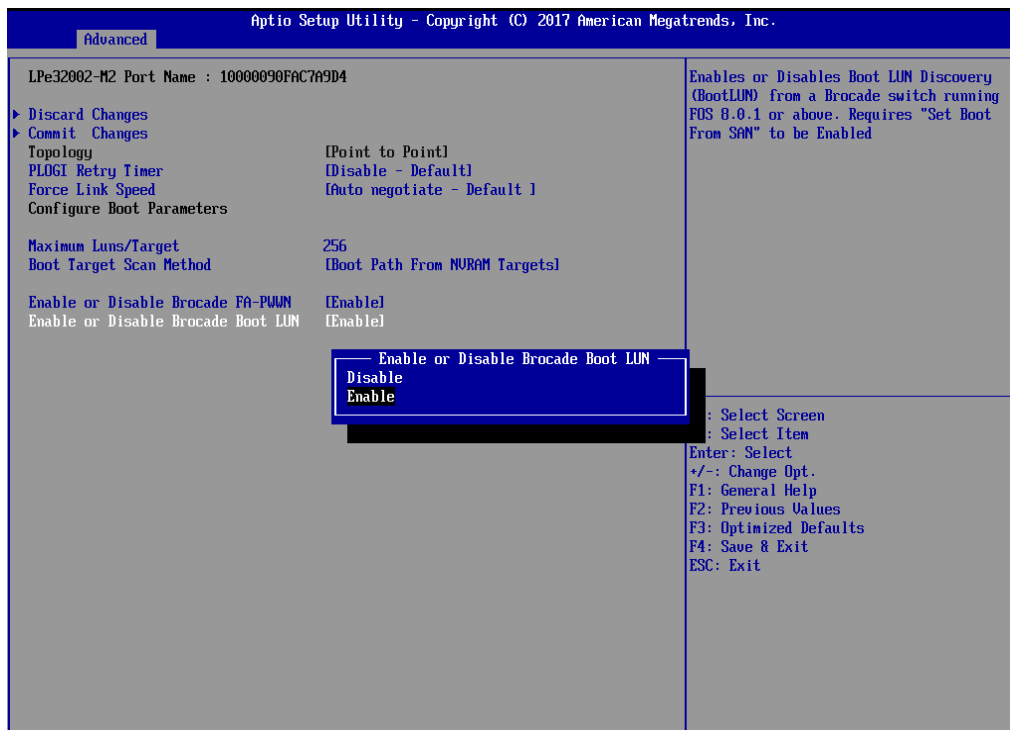
**NOTE:** This feature is available in LPe16000-series, LPe31000-series, and LPe32000-series adapters only.

This option enables or disables the Brocade Boot LUN. The default setting is disabled.

To enable or disable the Brocade Boot LUN, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose Brocade Boot LUN you want to enable or disable and press **Enter**.
2. From the Main menu (Figure 26), select **Configure HBA and Boot Parameters** and press **Enter**.
3. From the Configure HBA and Boot Parameters menu (Figure 40), navigate to **Brocade Boot LUN**. The current setting is displayed. Press **Enter**.
4. The Enable or Disable Brocade Boot LUN menu appears (Figure 50).

**Figure 50: Enable or Disable Brocade Boot LUN menu**



5. Make your selection and press **Enter**. The utility displays the new setting.
6. Press **Esc** to return to the Emulex Configuration Utility menu.

7. Select **Commit Changes** and press **Enter**.
8. Reboot the system.

After enabling the feature in the Configure HBA and Boot Parameters screen, the HBA gets the Boot target and LUN from the switch.

## 6.11 Resetting Emulex Adapters to Default Values

**NOTE:** Resetting the adapter to default setting will clear all entries made while configuring the boot device, as detailed in [Section 4.3, Configuring Boot Devices](#)).

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 7](#).

**Table 7: Adapter Defaults**

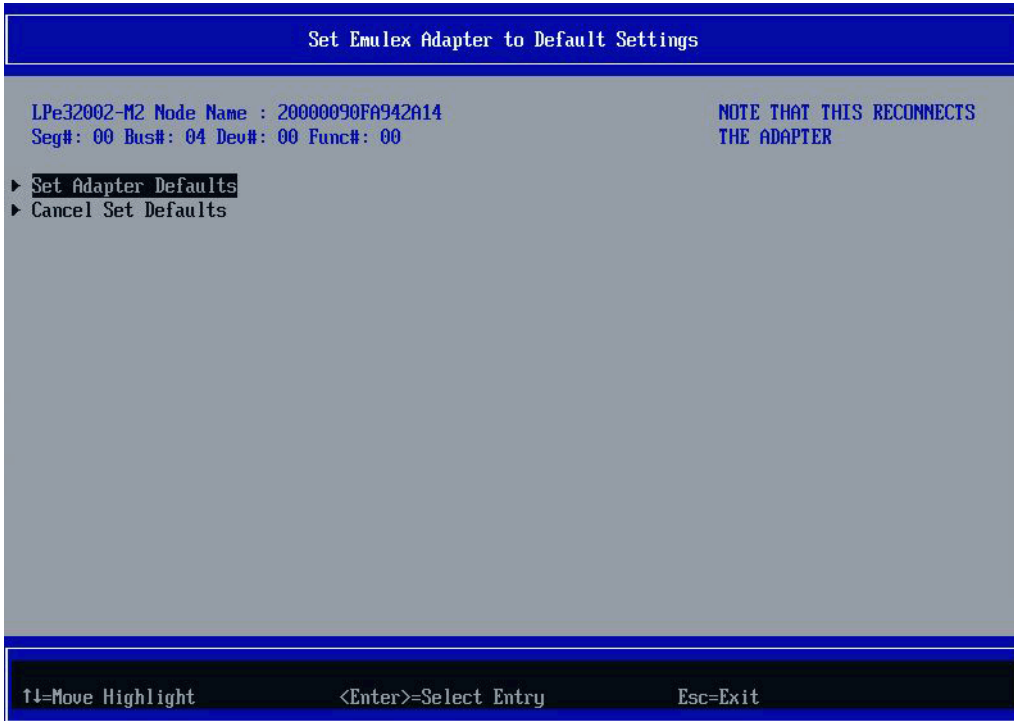
Parameter	Default	Valid Values
Enable/Disable BIOS	Disabled	Enabled Disabled
PL0GI Retry Timer	Disabled	Disabled 50 msec 100 msec 200 msec
Boot Target Scan	Boot path from NVRAM targets	Boot path from NVRAM targets Boot path discovered targets Do not create boot path
Max LUNs Setting	256	0-4096
Topology	Auto Topology: Loop First (Default) <b>NOTE:</b> On LPe31000-series and LPe32000-series adapters, only Point-to-Point is available.	Auto Topology: Loop First (Default) Auto Topology: Point-to-Point First FC-AL Point-to-Point
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 = 1Gb/s 2 = 2Gb/s 4 = 4Gb/s 8 = 8Gb/s 6 = 16Gb/s 32 = 32Gb/s

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

1. From the Device Configuration screen ([Figure 25](#)), select the adapter whose default settings you want to change and press **Enter**.
2. From the Main menu ([Figure 26](#)), 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 51](#)).

3. Select **Set Adapter Defaults** and press **Enter**.

Figure 51: Adapter Selection Screen



## 6.12 Displaying Adapter Information

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

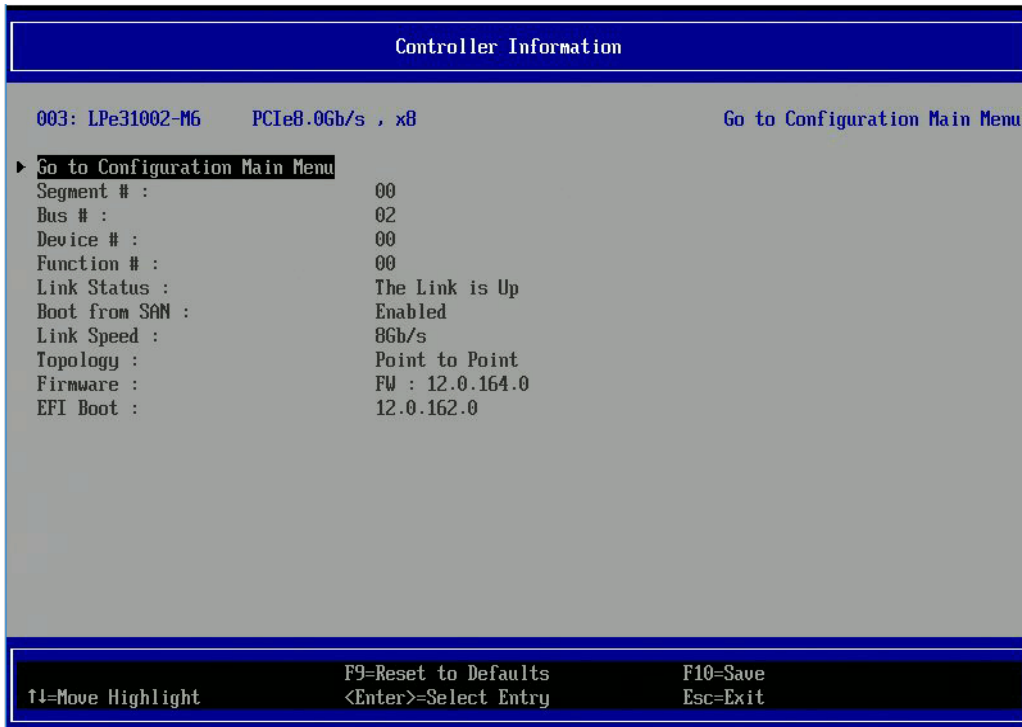
- HBA status
- Boot from SAN status
- Link speed
- Topology
- Firmware version
- Universal Boot version
- UEFI Boot version

To display adapter information, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose information you want to view and press **Enter**.
2. From the Main menu (Figure 26), select **Display Adapter Info** and press **Enter**.  
A screen appears that displays information about the selected adapter (Figure 52).

**NOTE:** Only Dell adapters will show the firmware family version.

Figure 52: Adapter Information Screen

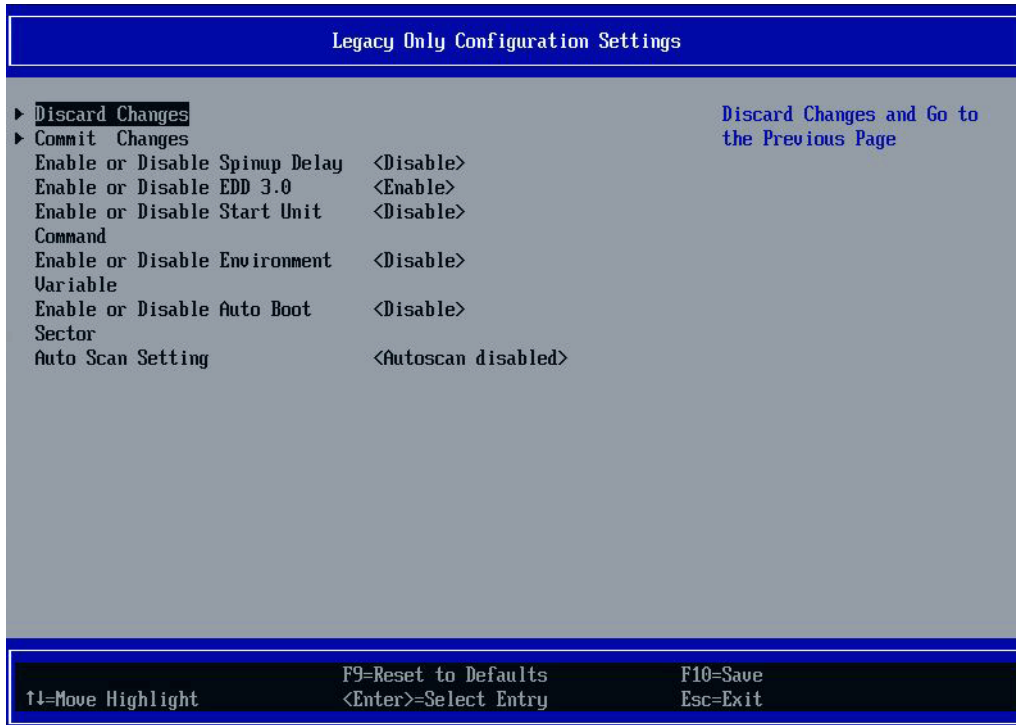


## 6.13 Legacy Only Configuration Settings

To change legacy only configuration settings, perform these steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose Legacy settings you want to change and press **Enter**.
2. From the Main menu (Figure 26), select **Legacy Only Configuration Settings** and press **Enter**.  
A screen appears that displays settings that apply only to the Emulex Legacy boot driver (Figure 53).

Figure 53: Legacy Only Configuration Settings Screen



3. Make desired changes to any of these settings and select **Esc** or **Commit Changes**.

See [Emulex BIOS Utility](#) for a description of the Legacy Only settings displayed in [Figure 53](#).

## 6.14 Requesting a RESET or RECONNECT

**NOTE:** This feature is available in the LPe16000-series, LPe31000-series, and LPe32000-series adapters only.

After you have made changes to the UEFI BIOS, you might need to reset or reconnect the adapter for the changes to take effect. Reset or Reconnect is disabled by default, and you must enable it if you want the adapter to automatically reset or reconnect. Otherwise, the changes will not take effect until you manually reboot the server.

Reset forces the system to reboot after you exit the UEFIBoot (HII) utility.

Reconnect unloads and reloads the driver. This allows any changes to take effect immediately without requiring a reboot. The Reconnect feature also requires UEFI 2.5-compliant BIOS to enable this functionality. If the server BIOS is not UEFI 2.5-compliant, this option will be unavailable (grayed-out).

To request a reset or reconnect, perform these steps:

1. From the Device Configuration screen ([Figure 25](#)), select the adapter which you want to reset or reconnect and press **Enter**.
2. From the Main menu ([Figure 26](#)), select **Request RESET or RECONNECT to Make Changes Active**. The Request RESET or RECONNECT to Make Changes Active screen appears [Figure 54](#).

Figure 54: Request RESET or RECONNECT to Make Changes Active Screen - Reset

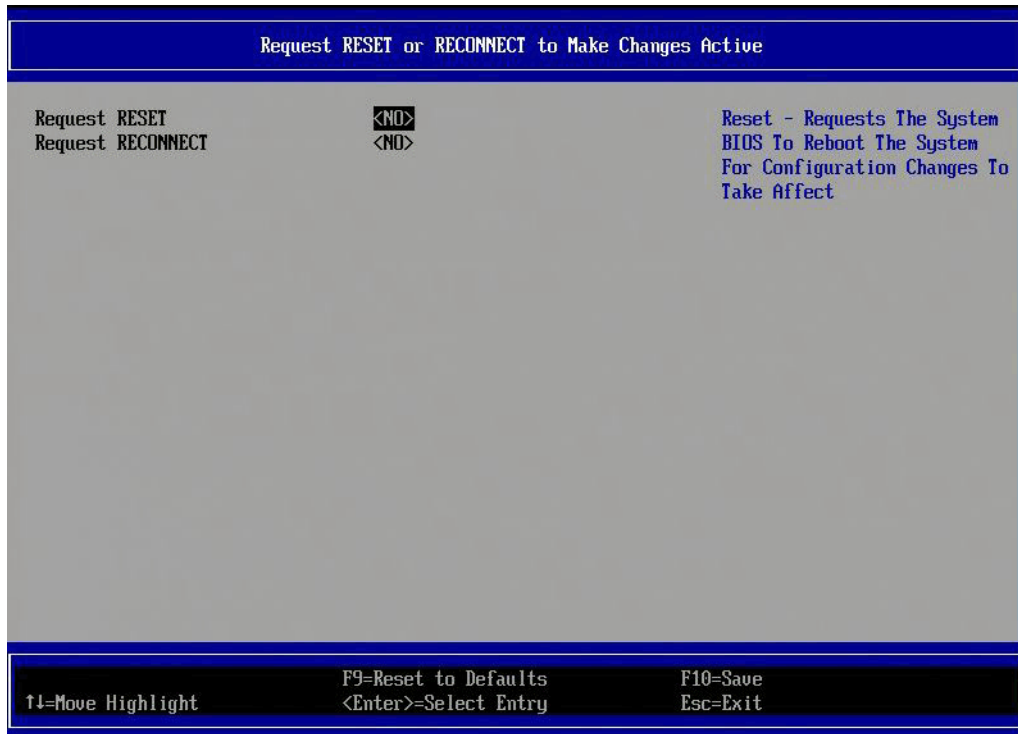
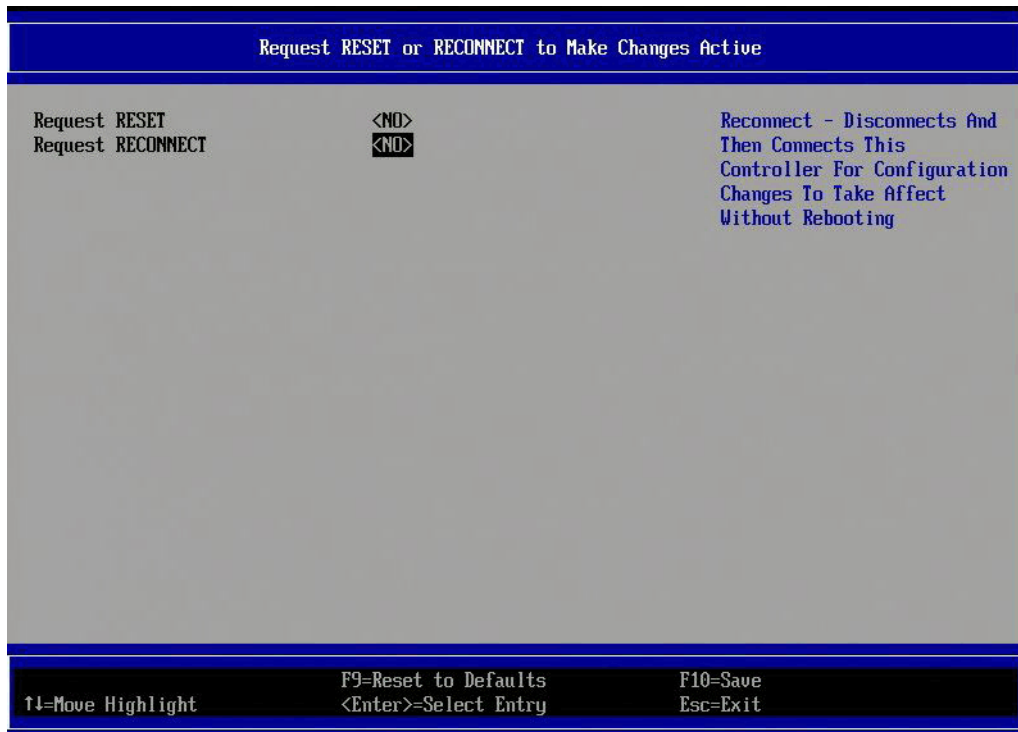


Figure 55: Request RESET or RECONNECT to Make Changes Active Screen - Reconnect



## 3. Do one of the following:

To request a reset:

- a. Set **Request RESET** to yes to notify the system BIOS that you want to perform a system reset.
- b. Exit the UEFIBoot (HII) utility and return to the system BIOS setup screens.
- c. A pop up window prompts you to reset the system. Any changed Emulex adapter settings become active during the subsequent reboot.

To request a reconnect:

- d. Set **Request RECONNECT** to yes to notify the system BIOS that you want to perform a disconnect and reconnect on the adapter port.
- e. The changed Emulex adapter settings are activated without a system reset.

## 6.15 Emulex Firmware Update Utility

**NOTE:** This feature is available in the LPe16000-series, LPe31000-series, and LPe32000-series adapters only.

To update the firmware on an adapter, perform the following steps:

1. From the Device Configuration screen (Figure 25), select the adapter whose firmware you want to update and press **Enter**.
2. From the Main menu (Figure 26), select **Emulex Firmware Update Utility**.

Press **Enter**, The **Select Device** menu appears Figure 56.

Figure 56: Select Device Screen



3. A list of devices appears. Select the storage device that contains the firmware file. The device can be a USB flash drive or a local disk.
4. After you select the storage device, press **Enter**. The **Select File or Folder** screen appears.

**Figure 57: Select File or Folder Screen**



5. Browse and select the folder that contains the firmware image. Select the firmware file and press **Enter**. The **Start Update** screen appears [Figure 58](#).



Figure 58: Start Update Screen



6. Select **Start Downloading** and press **Enter**. When the operation is complete, the **Update Status** will indicate the completion status.

## 6.16 Enabling or Disabling HPE Shared Memory Feature (HPE 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 HPE Shared Memory Feature, as defined in the Option Card Sensor Data Reporting specification.

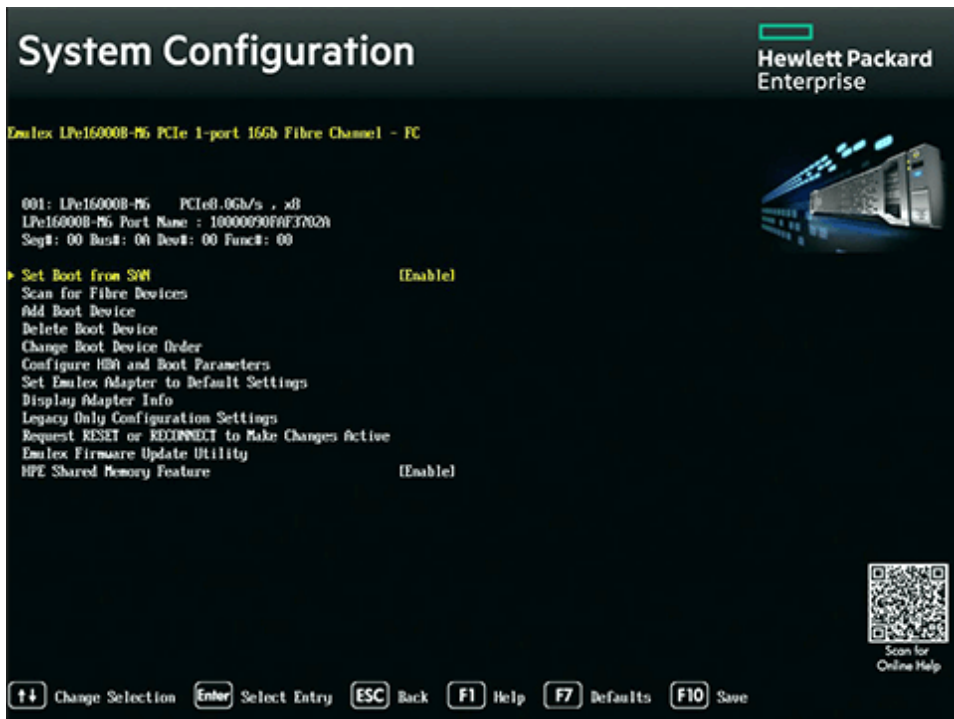
**NOTE:** This menu is for HPE systems only and does not appear on other systems.

**NOTE:** The HPE Shared Memory Feature is not available on Gen10 systems.

To enable or disable the HPE Shared Memory Feature, perform these steps:

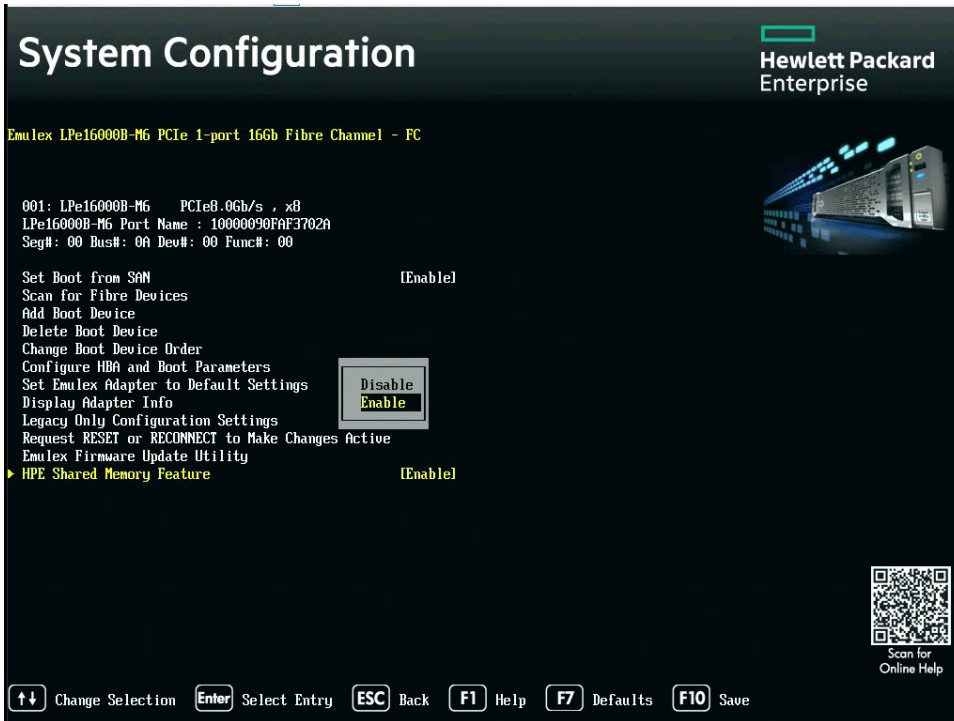
1. Open the HPE **System Configuration** menu ([Figure 59](#)).

Figure 59: HPE System Configuration Menu Screen



2. Navigate to **HPE Shared Memory Feature** and press **Enter**.  
The Disable/Enable menu appears. (Figure 60).

Figure 60: HPE Shared Memory Feature Menu Screen



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

## 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 Boot BIOS

The following table lists x86 Boot BIOS issues and their resolutions.

**Table 8: x86 Boot BIOS 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 Boot BIOS has been loaded and enabled.
Retry This Adapter Message	The message <code>Retry This Adapter</code> 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 <code>Cannot Mount Root File System</code> appears during bootup.	Make sure the correct storage device is identified in the <code>scsi_vhci.conf</code> file.
Cannot Find UNIX Kernel Message (Solaris SFS Driver)	The message <code>Cannot Find UNIX Kernel</code> 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 <code>luxadm display &lt;device&gt;</code> command. Refer to the luxadm documentation from Oracle for more information.
No Such Partition Message (Solaris SFS Driver)	The message <code>No Such Partition</code> appears during bootup.	Make sure the correct boot device is selected at the GRUB menu. Refer to the GRUB documentation from Oracle and the <code>/boot/grub/menu.lst</code> for more information.
Link is down due to Unsupported Optic Installed or Unsupported Optic	These messages appear while scanning for targets or configuring boot devices in the Boot BIOS or during POST.  Link is down due to Unsupported Optic Installed  or In the Link Speed Selection menu  Unsupported Optic Installed is displayed  or In the Link Status field Unsupported Optic is displayed.	Replace any unsupported optics with supported optics.

## 7.2 OpenBoot

The following table lists OpenBoot issues and their resolutions.

**Table 9: 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 <code>fsck /etc/vfstab</code> 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 <a href="#">Section 2.3.1, Configuring Boot from SAN on Solaris (x86 and x64)</a> .
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 <code>/kernel/drv/lpfc.conf</code> 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: <ol style="list-style-type: none"> <li>1. Type <code>cfgadm -a</code> to list the target.</li> <li>2. Type <code>cfgadm -vc configure c1::c5t2200002037AE0091</code> to configure the FC target.</li> <li>3. Type <code>cfgadm -c unconfigure c1</code> to remove the FC target.</li> </ol> It also might be necessary to add an entry for the boot drive to the <code>sd.conf</code> file.
The Displayed List of Emulex Adapters Ends with "fibre-channel" (Solaris LPFC Driver)	After all 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 <code>fibre-channel</code> , for example: <code>/pci@1f,2000/fibre-channel</code> instead of <code>lpfc@#</code> , for example: <code>/pci@1f,4000/lpfc@2</code>	The OpenBoot code is not loaded in the adapter firmware. You must install OpenBoot before you can set up boot from SAN on the adapter.

## 7.3 UEFI Boot

The following table lists UEFI Boot issues and their resolutions.

**Table 10: UEFI Boot Troubleshooting**

Issue	Situation	Resolution
Link is down due to Unsupported Optic Installed Or Unsupported Optic	This message appears while scanning for targets or configuring boot devices. Link is down due to Unsupported Optic Installed In the Link Speed Selection menu Unsupported Optic Installed is displayed or In the Link Status field Unsupported Optic is displayed.	Replace any unsupported optics with supported optics.
Not able to UEFI Secure Boot	UEFI Secure Boot fails	For the UEFI Secure Boot to function, the following requirements must be met: <ul style="list-style-type: none"> <li>■ Server hardware support must be enabled.</li> <li>■ The operating system must support UEFI secure boot.</li> <li>■ The UEFI driver must support UEFI secure boot (UEFI signed).</li> <li>■ The operating system device driver must support UEFI secure boot (operating system specific).</li> <li>■ The Common Information Model (CIM) provider must support UEFI secure boot (operating system specific).</li> </ul>

