



# Boot Code

*User Manual*

*For Emulex<sup>®</sup> Adapters*

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## Introduction

This manual describes installing, updating, enabling and configuring Emulex® Fibre Channel (FC) boot code. This manual 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 storage area network (SAN) by way of Emulex LightPulse® adapters using Emulex FC boot code.

When booting from SAN, the storage device is typically identified by its World Wide Port Name (WWPN) and a logical unit number (LUN). By extending the server system boot basic input/output system (BIOS), boot from SAN functionality is provided by the 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.

Emulex provides the following types of boot code:

- x86 BootBIOS works with the existing BIOS on x64 and x86 systems.
- OpenBoot works with the existing system firmware on Sun SPARC systems. OpenBoot is also called FCode.
- EFIBoot provides system boot capability through the use of the EFI (Extensible Firmware Interface) Shell. It also functions on UEFI 2.1-based x64 platforms through the HII (Human Interface Infrastructure) interface.

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**Note:** Emulex drivers support multipath boot configurations. Refer to your storage vendor's documentation for details on how to configure multipath booting.

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## Emulex Boot Code Files

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In addition, Emulex is unique in providing Universal Boot images that contain x86 BootBIOS, OpenBoot, and EFIBoot boot code and Pair Boot boot code images that contain x86 BootBIOS and EFIBoot boot code. These images provide multi-platform support for boot from SAN. Universal Boot and Pair Boot transparently determine your system platform type and automatically executes the proper boot code image in the adapter. These code images reside in adapter flash memory, allowing easier adapter portability and configuration between servers.

Universal Boot contains the following types of boot code:

- x86 BootBIOS
- OpenBoot
- EFIBoot

Pair Boot contains the following types of boot code:

- x86 BootBIOS
- EFIBoot

## Boot from SAN

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

**Note:** Note that not all procedures are required. Emulex host bus adapters (HBAs) usually ship from the factory with the latest version of boot code installed and enabled, so you would 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. And you may want to update the boot code if a newer version is available on the Emulex Web site at <http://www.emulex.com>.

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

**Table 1: Boot from SAN Procedures**

Architecture	Operating System	Procedure
x86 and x64	Windows 2008	<i>Install Windows Server 2008 on an FC Boot Disk (x86, x64 and Itanium) on page 5</i> <i>Install Windows Server 2003 on an FC Boot Disk (x86, and x64 and Itanium) on page 5</i>
	Windows 2003	
	Linux	<i>Configure Boot from SAN on Linux or VMware (x86 and x64) on page 6</i>
	VMware	
	Solaris (SFS driver)	
SPARC and PowerPC	Linux	<i>Configure Boot from SAN on Linux (PowerPC) on page 7</i>
	Solaris (SFS driver)	<i>Configure Boot from SAN on Solaris SFS (SPARC) on page 8</i>
	Solaris (LPFC driver)	<i>Configure Boot from SAN on Solaris LPFC (SPARC) on page 9</i>
Itanium (IA64) and EFI-based systems	Windows 2008 Windows 2003	<i>Configure Boot from SAN on Windows Server 2008 and Windows Server 2003 (Itanium) on page 3</i>
	Linux	<i>Configure Boot from SAN on Linux (Itanium) on page 7</i>

## Windows Server 2008 and Windows Server 2003

### Configure Boot from SAN on Windows Server 2008 and Windows Server 2003 (x86 and x64)

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
3. Enable the adapter to boot from SAN (see *Enable an Adapter to Boot from SAN* on page 20).

4. By default, the boot adapter uses auto topology with loop first. If you want to set the boot adapter to use a different topology, change it (see *Change Topology* on page 22).
5. Configure boot devices (see *Configure Boot Devices* on page 16).
6. If desired, configure the boot options on the adapter (see *Configure Adapter Parameters* on page 19).
7. Install the operating system on an FC boot disk:
  - For Windows Server 2008, see *Install Windows Server 2008 on an FC Boot Disk (x86, x64 and Itanium)* on page 5.
  - For Windows Server 2003, see *Install Windows Server 2003 on an FC Boot Disk (x86, and x64 and Itanium)* on page 5.

## **Configure Boot from SAN on Windows Server 2008 and Windows Server 2003 (Itanium)**

1. If necessary, install or update the boot code on the adapter (see *Updating a Single Adapter* on page 52).
2. If necessary, enable the boot code on the adapter (see *Enable or Disable the BIOS* on page 35).
3. Configure boot devices (see *Configure Boot Devices* on page 43).
4. If desired, configure the boot options on the adapter (see *Configure Adapter Parameters* on page 36 and *Configure Boot Parameters* on page 39).
5. Install the operating system on an FC boot disk:
  - For Windows Server 2008, see *Install Windows Server 2008 on an FC Boot Disk (x86, x64 and Itanium)* on page 5.
  - For Windows Server 2003, see *Install Windows Server 2003 on an FC Boot Disk (x86, and x64 and Itanium)* on page 5.
  - For a new installation of Windows 2008 UEFI Aware OS on a UEFI-based xx64 Server, see the following topic.

## **New Installation of Windows 2008 UEFI- Aware Operating System on a UEFI-based x64 Server**

This installation procedure assumes LUN(s) are created in the SAN storage device and zoned appropriately to the host HBA's WWN.

1. From the server system UEFI setup, ensure that CD/DVD is the first device in the Boot Order list.
2. Enable Boot from SAN in the Emulex UEFI configuration utility.
3. Configure the Boot target and LUN in Emulex UEFI configuration utility to point to the desired target.
4. Boot the host server with the Windows Server 2008 DVD inserted. Follow the on-screen prompts to install the appropriate version of Windows Server 2008.
5. The Windows installation will expose all available/visible LUNs as disks and partitions numbered 0 to N, where N is the highest number available. These numbers typically are the LUN numbers assigned by the array.
6. Select the disk you want to install the operating system on.
7. Follow system prompts in the Windows installation.

---

**Note:** The OS image will be installed with the GPT disk partition. See "The GUID Partition Table" on page 4 for a brief description of GPT disk partitions.

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8. After the installation is complete, a Boot Option variable called Windows Boot Manager will be populated with a Media Device path pointing to the Windows boot loader utility. This Boot Option variable, Windows Boot Manager, can be found in the Start Options menu of the Host Server UEFI.
9. The Windows Boot Manager option will be inserted as the first boot option in the Boot Order list of the Host Server UEFI. The CD/DVD boot will now be the second device in the Boot Order list.
10. Upon reboot, the system will boot from the LUN set up on the SAN.

### **Direct a UEFI-Based Server to a Windows Server 2008 OS 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 HBA's WWN and an EFI-aware OS resides on the target LUN.

1. Enable Boot From SAN in the Emulex UEFI configuration utility.
2. Configure the Boot Target and LUN in Emulex UEFI configuration utility to point to your desired target.
3. Select **Boot Manager** from System UEFI configuration manager.
4. Select **Add Boot Option**.
5. Identify the desired target in the list, and continue down the explorer path until the file "bootmgfw.efi" is found. This file is the boot loader utility for your Windows 2008 EFI-aware OS install.
6. Input a boot device description (e.g. 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 your previous input Description name (Win2K8\_UEFI\_SAN) to the desired position in the boot order.
9. Select **Commit Changes**. The Start Options list will now reflect the boot order changes.

Upon reboot, the server is now able to boot from this target LUN on the SAN.

### **The GUID Partition Table**

The Globally Unique Identifier (GUID) Partition Table (GPT) was introduced as part of the Extensible Firmware Interface (EFI) initiative. GPT provides a more flexible mechanism for partitioning disks than the older Master Boot Record (MBR) partitioning scheme that has been common to PCs. The GPT disk itself can support a volume up to  $2^{64}$  blocks in length. (For 512-byte blocks, this is 9.44 ZB - zettabytes. 1 ZB is 1 billion terabytes). It can also support theoretically unlimited partitions.

MBR is the standard partitioning scheme that's been used on hard disks since the PC first came out. It supports 4 primary partitions per hard drive, and a maximum partition size of 2TB.

Microsoft Windows Server 2008 will install by default with a GPT formatted disk on an UEFI-Aware Server.

See also:

[http://www.microsoft.com/whdc/device/storage/GPT\\_FAQ.msp](http://www.microsoft.com/whdc/device/storage/GPT_FAQ.msp)

## Install Windows Server 2008 on an FC Boot Disk (x86, x64 and Itanium)

This procedure installs Windows Server 2008 onto an unformatted Fibre Channel disk drive and configures the system to boot from the SAN disk drive.

---

**Note:** The computer's system BIOS may require that another controller take precedence over the Emulex adapter during boot. If this occurs, you must disconnect or disable the other adapter. This will allow you to configure and build your operating system on the drive connected to the Emulex adapter.

---

1. From <http://www.emulex.com>, download the distribution executable file for the latest version of the Emulex driver to your local drive. The file you download is an executable (.exe) file.
2. In Windows Explorer, double-click the distribution executable file. A window displays the driver version information.
3. Click **Next** to access the Location window, or click **Cancel** to close the window. If you click **Next**, the default installation location is displayed. If desired, browse to a different location.
4. Click **Install** to continue the installation. A progress window is displayed. As each task is completed, the corresponding checkbox is automatically selected. After all tasks are completed, a confirmation window is displayed.
5. Clear the Run AutoPilot Installer checkbox and click **Finish** to close the distribution executable file.
6. In Windows Explorer, navigate to the folder you specified in step 3.
7. In the \AutoPilot Installer\Drivers\*drivername* folder, open the folder that corresponds to your computer type, such as x86. *drivername* is the type of driver you downloaded (for example, Storport Miniport).
8. Copy all the files in this folder onto a formatted floppy disk or a USB device.
9. Boot the target system with the Windows Server 2008 setup media. The Install Windows splash screen is displayed.
10. Verify and if necessary change the Language, Time and Date and Keyboard values. Click **Next**. Another splash screen is displayed.
11. Click **Install Now**. The Where do you want to install Windows? screen is displayed.
12. Click **Load Driver**. Browse to the floppy disk or USB device specified in step 8 where the driver is located to load the Storport Miniport driver for the appropriate operating system. Once selected, the correct driver location and driver are displayed under the Select driver to be installed screen.
13. Select **Next**. After the driver is loaded, the Where do you want to install Windows? screen is displayed.
14. Select the same drive you configured as the boot device (for x86 and x64 systems, see *Configure Boot Devices* on page 16. For Itanium systems, see *Configure Boot Devices* on page 16)

## Install Windows Server 2003 on an FC Boot Disk (x86, and x64 and Itanium)

This procedure installs Windows Server 2003 onto a previously unformatted Fibre Channel disk drive and configures the system to boot from the SAN disk.

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**Note:** The computer's system BIOS may require that another controller take precedence over the Emulex adapter during boot. If this occurs, you must disconnect or disable the other adapter. This will allow you to configure and build your operating system on the drive connected to the Emulex adapter.

---

1. From <http://www.emulex.com>, download the distribution executable file for the latest version of the Emulex driver to your local drive. The file you download is an executable (.exe) file.
2. In Windows Explorer, double-click the distribution executable file. A window is displayed with driver version information.
3. Click **Next** to access the Location window, or click **Cancel** to close the window. If you click **Next**, the default installation location is displayed. If desired, browse to a different location.
4. Click **Install** to continue the installation. A progress window is displayed. As each task is completed, the corresponding checkbox is automatically selected. After all tasks are completed, a confirmation window is displayed.
5. Clear the Run AutoPilot Installer checkbox and click **Finish** to close the distribution executable file.
6. In Windows Explorer, navigate to the folder you specified in step 3.
7. In the \AutoPilot Installer\Drivers\*drivername* folder, open the folder that corresponds to your computer type, such as x86.*drivername* is the type of driver you downloaded (for example, Storport Miniport).
8. Copy all the files in this folder onto a formatted floppy disk or USB floppy.
9. Boot the target system with the Windows Server 2003 setup media.
10. Follow the prompts that appear on the screen until the following message is displayed:  
`Press F6 if you need to install a third party SCSI or RAID driver`
11. Press **<F6>**. The following message is displayed:  
`Setup could not determine the type of one or more mass storage  
devices installed on your system, or you have chosen to  
manually specify an adapter.  
Currently, Setup will load support for the following mass  
storage device(s):  
<additional information>  
S=Specify Additional Device    ENTER=continue    F3=Exit.`
12. Press **<S>** to specify additional devices. The following message is displayed:  
`Please insert the disk labeled Manufacturer-supplied hardware  
support disk into Drive A:. Press ENTER when ready.  
ENTER=continue    ESC=cancel    F3=Exit`
13. Insert the floppy disk or USB floppy onto which you copied the driver files in step 8 and press **<Enter>**. A list of devices is displayed.
14. Select the adapter from the list and press **<Enter>**. The following message is displayed:  
`Setup will load support for the following mass storage device(s):  
Emulex xxxxx PCIxx Fibre Channel Adapter`
15. Press **<Enter>**.
16. Remove the USB floppy or floppy disk that contains the driver files.
17. Follow the remaining prompts to complete the installation.

---

## Linux and VMware

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### Configure Boot from SAN on Linux or VMware (x86 and x64)

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).

3. Enable the adapter to boot from SAN (see *Enable an Adapter to Boot from SAN* on page 20).
4. By default, the boot adapter uses auto topology with loop first. If you want to set the boot adapter to use a different topology, change it (see *Change Topology* on page 22).
5. Configure boot devices (see *Configure Boot Devices* on page 16).
6. If desired, configure the boot options on the adapter (see *Configure Adapter Parameters* on page 19).
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.

## Configure Boot from SAN on Linux (PowerPC)

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).

---

**Note:** If you are installing SLES 10, step 3 can be eliminated as the install process updates the system's boot order to point to the newly installed device.

---

3. See the system documentation for instructions on accessing the System Management Services (SMS) feature to set the boot list. SMS is resident in the system firmware.

## Configure Boot from SAN on Linux (Itanium)

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
3. Configure boot devices (see *Configure Boot Devices* on page 43).
4. If desired, configure the boot options on the adapter (see *Configure Adapter Parameters* on page 36 and *Configure Boot Parameters* on page 39).
5. 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.

## Solaris

---

### Configure Boot from SAN on Solaris SFS (x86 and x64)

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
3. Enable the adapter to boot from SAN (see *Enable an Adapter to Boot from SAN* on page 20).
4. By default, the boot adapter uses auto topology with loop first. If you want to set the boot adapter to use a different topology, change it (see *Change Topology* on page 22).
5. Configure boot devices (see *Configure Boot Devices* on page 16).
6. If desired, configure the boot options on the adapter (see *Configure Adapter Parameters* on page 19).

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 *Determine LUNs to Select for Boot from SAN* on page 8.

---

## Determine LUNs to Select for Boot from SAN

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 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.

## Configure Boot from SAN on Solaris SFS (SPARC)

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
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
```

4. 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 (such as shown above), for each Emulex adapter in turn. 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
```

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

```
reset-all
```

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

## Configure Boot from SAN on Solaris LPFC (SPARC)

---

**Note:** Solaris PCI code is used in the example paths displayed in this section. You must enter similar path names, specific to your system. If you have a Solaris SBus system:

Change *pci* references to *sbus*

Change *emlx* references to *lpfs*

For example, the command to select the Emulex adapter for a PCI system (LPFC driver) is:

```
" /pci@1f,4000/emlx@2" select-dev
```

The corresponding command for an SBus system is:

```
" /sbus@1f,4000/lpfs@2" select-dev
```

---

1. If necessary, install or update the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
2. If necessary, enable the boot code on the adapter (see *Install, Update and Enable Boot Code* on page 14).
3. Type the following at the OBP prompt:  

```
show-devs
```

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

```
/pci@5d,700000/emlx@2
```
4. 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 (such as shown above), for each Emulex adapter in turn. 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/emlx@2" select-dev]
set-sd-boot
unselect-dev
```
5. After all Emulex adapters have been enabled to boot from SAN, reboot the system with the following command:  

```
reset-all
```
6. Install the operating system on an FC boot disk:
  - To install the operating system from a network image, see *Install Solaris from a Network Image* on page 9.
  - To migrate an operating system image from a local SCSI disk to an FC device, see *Install Solaris by Migrating an Image from a Local SCSI Disk* on page 11.

### Install 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 Sun Microsystems System Administration Guide: Devices and File Systems.

---

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 disc.

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

---

**Note:** For Solaris 10 only: remove the SUNWemlxu and SUNWemlxs from the  
 /install\_dir\_path/Solaris/Tools/Boot  
 Unzip the lpfc driver /temp  
 pkgadd -R /install\_dir\_path/Solaris/Tools/Boot -d /temp  
 Modify the lpfc.conf file to use persistent binding. For more information, refer to the  
 Emulex LPFC Driver for Solaris User Manual.

---

5. 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.

---

**Note:** The setup\_install\_server command indicates whether you have enough disk space  
 available for the Solaris Software disc images. To determine available disk space, use  
 the df -kl command.

---

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

If the install server is on the same subnet as the system to be installed or you are using DHCP,  
 you do not need to create a boot server. Proceed to Step 7.

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 cop-  
 ied:

- If the path to the install server's directory is displayed and anon=0 is displayed in the  
 options, proceed to Step 7.
- If the path to the install server's directory is not displayed or you do not have anon=0 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 file.

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

- b. Verify that the nfsd daemon is running.

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

```
# svc -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
```

- If the install server is running the Solaris 9 OS, or compatible version, type the following  
 command.

```
# ps -ef | grep nfsd
```

If the nfsd daemon is running, continue to Step c. If the nfsd daemon is not running, start  
 it.

```
# /etc/init.d/nfs.server start
```

- c. Share the install server.

```
# shareall
```

7. Change directories to root (/).

```
# cd /
```



8. Eject the Solaris DVD.
9. (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. Refer to the Sun Microsystems Solaris 10 10/08 Installation Guide.

## Install Solaris by Migrating an Image from a Local SCSI Disk

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, DID or ALPA returned from the probe and write down the corresponding boot entry.

4. To enable boot from SAN, set the boot device ID to the SAN device you want to boot from, 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:** Emulex recommends using the WWPN in most cases. The DID and AL\_PA may 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.

---

**Note:** If the Fibre Channel disk is not found when the system is rebooted, enter `touch / reconfigure` and reboot. If the disk is still not discovered, edit the `/kernel/drv/lpfc.conf` file and change the topology from 4 to 2 (or from 2 to 4). It may also be necessary to add an entry for the boot drive to the `sd.conf` file.

---

6. Run the format utility:

```
format
```



7. Select the target disk which will become the new boot disk (for example, c1t1d0).
8. Select the partition option and partition the disk as desired.
9. Select the label option and write a volume label to the target disk.

For help with the format utility, see the man page "man format".

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

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

11. Create a filesystem for each partition that contains a mounted filesystem:

```
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, 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 Fibre Channel boot disk. For example, if the Fibre Channel boot disk is c1t1d0, replace all local disk entries of c0t0d0 with c1t1d0.

Currently file shows:
<pre> /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) </pre>
Edit file to show:
<pre> /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) </pre>

17. Reboot the system:

```
sync
sync
halt
reset-all
```

18. Boot to disk:

```
boot disk
```

The system should boot to the Fibre Channel disk.

19. View the current dump device setting:

```
dumpadm
```

20. Change the dump device to the swap area of the Fibre Channel drive:

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

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

## Install, Update and Enable Boot Code

Emulex utilities allow you to install boot code, update boot code to a newer version and enable boot code. The utility that you will use depends on the operating system and, in some cases the driver type or system architecture. Table 2 indicates the utilities you can use to install and update boot code, and Table 3 indicates the utilities you can use to enable boot code.

**Table 2: Utilities that Install and Update Boot Code**

Operating System	HBAnyware Utility	HBACmd Utility	EFI Utility	emlxadm	Offline Utilities
Windows	X	X	X		X
Linux	X	X	X		X
Solaris LPFC	X	X			X
Solaris emlxs (SFS)	X	X		X	
VMWare	X	X			X

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

- HBAnyware utility: See the *HBAnyware Utility User Manual*.
- HBACmd utility: See the *HBAnyware Utility User Manual*.
- EFI utility: See *EFIBoot* on page 32
- emlxadm: See the *FCA Utilities User Manual*.
- Offline utility: See the *Offline Utilities User Manual*.

**Table 3. Utilities that Enable Boot Code**

Operating System	HBAnyware Utility	HBACmd Utility	EFI Utility	Offline Utilities
Windows	X	X	X	X
Linux	X	X	X	X
Solaris LPFC	X	X		X
Solaris emlxs (SFS) <sup>a</sup>				
VMware	X	X		

a. Boot code for Solaris emlxs (SFS) systems is enabled automatically when it is installed, so no utility is needed.

## BIOS Utility

Before using the BIOS utility, ensure that the boot code is loaded and enabled on the adapter as described in *Install, Update and Enable Boot Code on page 14*.

---

**Note:** This section reflects the most recent release of the BIOS utility. Some selections may not be available if you are using an older version of the utility.

---

### Start the BIOS Utility

1. Turn on the computer.
2. Press and hold down **<Alt>** or **<Ctrl>** and press **<E>** immediately (within five seconds) when the bootup message to start the BIOS utility is displayed. An adapter listing is displayed (Figure 1).

```

Emulex LightPulse BIOS Utility, TB2.01a2
Copyright (c) 1997-2007 Emulex. All rights reserved.

Emulex Adapters in the System:

LPe11002-M4:      PCI Bus, Device, Function (07,00,00)
LPe11002-M4:      PCI Bus, Device, Function (07,00,01)
LP10000:          PCI Bus, Device, Function (03,02,00)
LP10000:          PCI Bus, Device, Function (03,02,01)
  
```

Figure 1: Adapter Listing screen

---

**Note:** If the bootup message does not appear, you must enable x86 BootBIOS. See *Enable an Adapter to Boot from SAN on page 20* for more information.

---

3. Select the adapter to configure by entering its number. The main configuration menu is displayed (Figure 2).

```

Adapter 01:          PCI Bus, Device, Function (07,00,00)

LPe11002-M4:      I/O Base: 6000  Firmware Version: 2S2.72A2
Port Name: 10000000 C94BFB44  Node Name: 20000000 C94BFB44
Topology: Auto Topology: Loop First (Default)
The BIOS for this adapter is Disabled

1.  Configure Boot Devices
2.  Configure This Adapter's Parameters
  
```

Figure 2: Main Configuration Menu

Under normal circumstances, the first procedure you will need to perform in the BIOS Utility is to configure boot devices (page 16). However, in the following two situations, you will need to 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 "Enable an Adapter to Boot from SAN" on page 20).
- You want to use a topology other than the default (auto topology with loop first): You must change the topology setting before boot devices (see "Change Topology" on page 22).

## Configure Boot Devices

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

To configure boot devices:

1. When the Main menu is displayed, select <1>, Configure Boot Devices.

A list of 8 boot devices is shown (Figure 3). Emulex recommends that you configure only the bootable devices. 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.



Figure 3: List of Saved Boot Devices screen

2. Select a boot entry. Figure 4 is displayed.

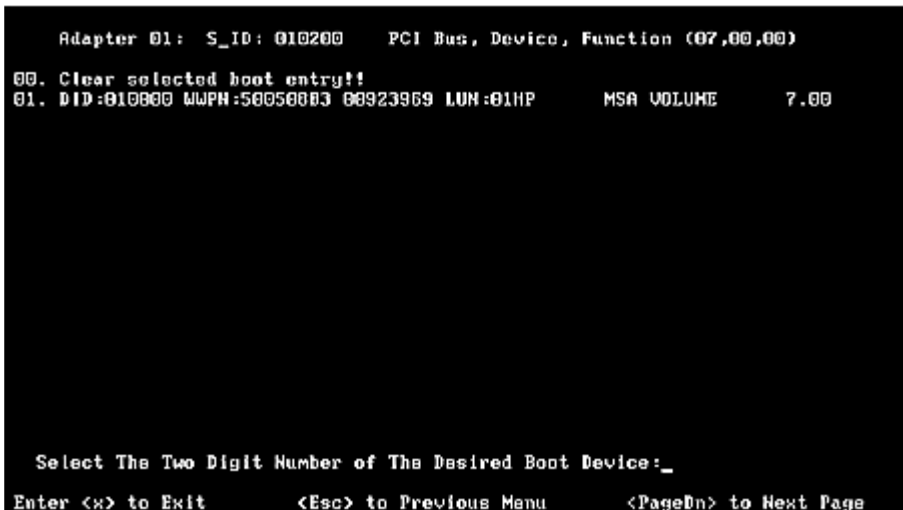


Figure 4: Device Selection list Example (Array) screen

**Note:** To minimize the amount of time needed to locate the boot device, Emulex recommends that you select the drive with the lowest AL\_PA as the boot device.

3. Select <00> to clear the selected boot entry, or select a device to configure booting by WWPN or DID.

4. If you select a device, you are asked for the starting LUN. Enter the starting LUN (Figure 5). The starting LUN can be any number from 0 to 255.

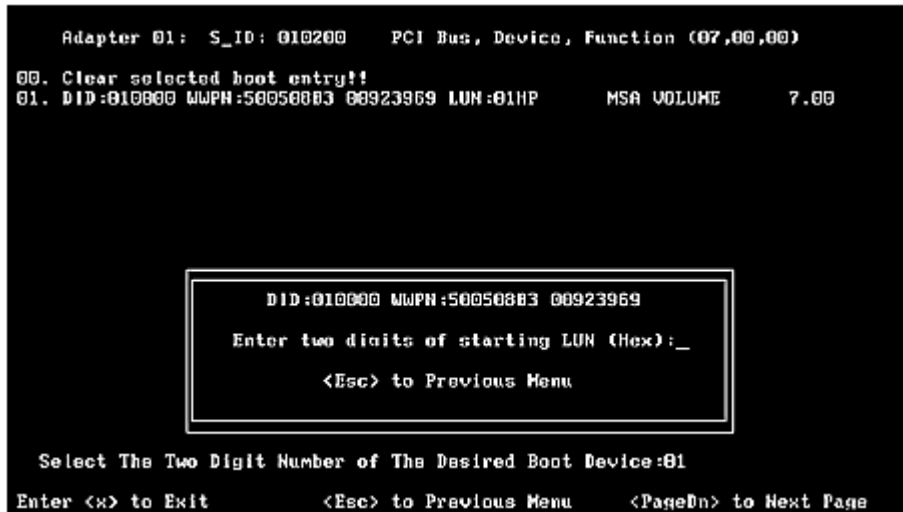


Figure 5: LUN listing screen

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

Type the two digits corresponding to the entry you are selecting. The boot device menu (Figure 6) displays the following options:

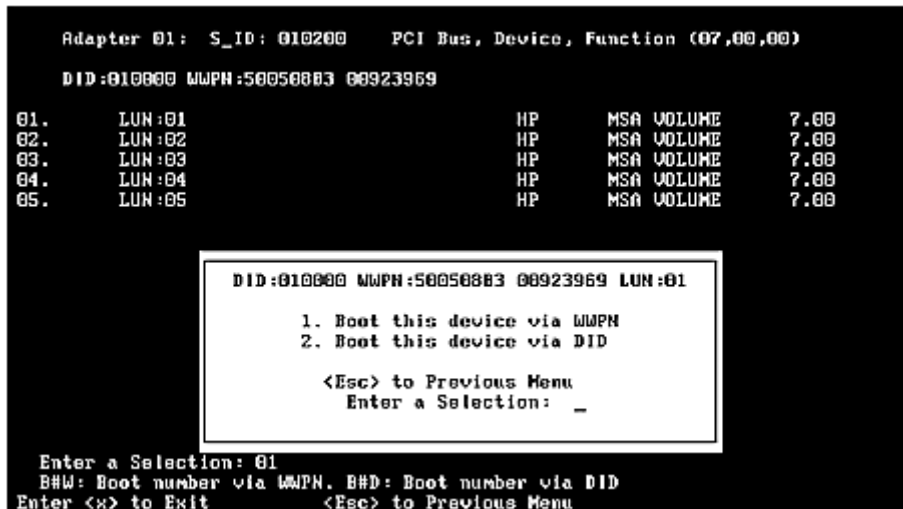


Figure 6: Boot Devices menu

1. Boot this device by WWP
2. Boot this device by DID

5. 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). 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.

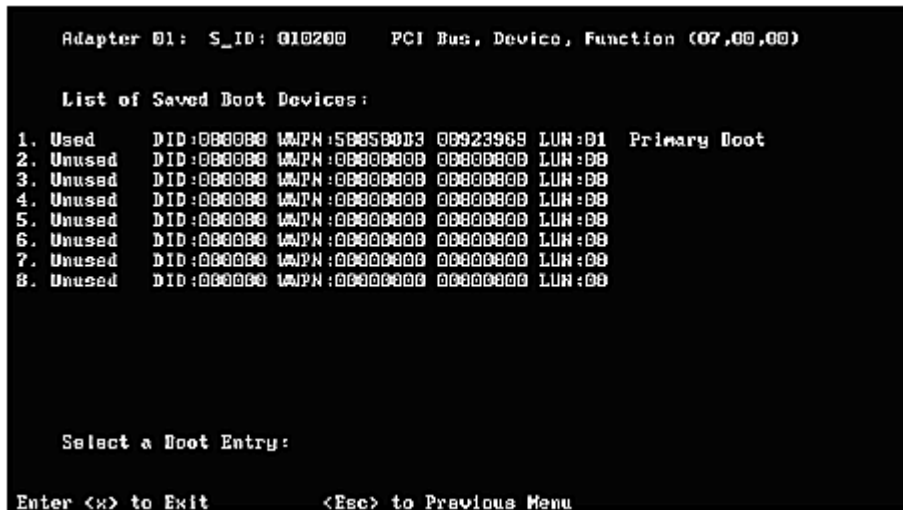


Figure 7: Primary Boot Device Set Up screen

6. Press **<X>** to exit and reboot the system for the new boot path to take effect.

## Configure Adapter Parameters

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

To configure adapter parameters:

1. When the Main menu is displayed, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).

```

Adapter 01:                PCI Bus, Device, Function (07,00,00)

LPe11002-M4:      I/O Base: 6000  Firmware Version: ZS2.72A2
Port Name: 10000000 C94BFB44  Node Name: 20000000 C94BFB44
Topology: Auto Topology: Loop First (Default)
The BIOS for this adapter is Disabled

1.  Enable or Disable BIOS
2.  Change Default ALPA of this Adapter
3.  Change PLOGI Retry Timer (+Advanced Option+)
4.  Topology Selection (+Advanced Option+)
5.  Enable or Disable Spinup Delay (+Advanced Option+)
6.  Auto Scan Setting (+Advanced Option+)
7.  Enable or Disable EDD 3.0 (+Advanced Option+)
8.  Enable or Disable Start Unit Command (+Advanced Option+)
9.  Enable or Disable Environment Variable (+Advanced Option+)
10. Enable or Disable Auto Boot Sector (+Advanced Option+)
11. Link Speed Selection (+Advanced Option+)

Enter a Selection:

Enter <x> to Exit          <Esc> to Previous Menu

```

Figure 8: Adapter Configuration menu

Default settings are acceptable for most installations. In the BIOS utility, press **<D>** to reset the selected adapter to default values.

## Adapter Configuration Menu Summaries

1. **Enable or Disable BIOS.** Enable the selected adapter to boot from SAN. You must enable at least one adapter to boot from SAN to use remote boot functionality.
2. **Change Default ALPA of this Adapter.** This option applies only to arbitrated loop (FC-AL). The factory default is 00 (hexadecimal). All adapters or boot drives can be configured to other AL\_PAs (Arbitrated Loop Physical Address) rather than their default values. See *Change the Default AL\_PA (Arbitrated Loop Physical Address)* on page 21 for more information.
3. **Change PLOGI Retry Timer (+Advanced Option+).** Set the interval for the port log in retry timer. The factory default is No PLOGI Retry: 0 msec. See *Change the PLOGI Retry Timer* on page 22 for more information.
4. **Topology Selection (+Advanced Option+).** If it is necessary to change the topology, do so before you configure boot devices. The default topology is auto topology with loop first. For FC-AL, each adapter has a default AL\_PA of 01 (Hex). See *Change Topology* on page 22 for more information.
5. **Enable or Disable Spinup Delay (+Advanced Option+).** Enable or disable the spinup delay. The factory default is disabled. See *Enable or Disable the Spinup Delay* on page 23 for more information.



6. Auto Scan Setting (+Advanced Option+). Enable the first device in the boot entry list to issue a Name Server Inquiry. The factory default is disabled. If there is more than one adapter with the same PCI Bus number in the system, and each has a boot drive attached, the first PCI-scanned adapter is the boot adapter. The first adapter is usually in the lowest PCI slot in the system. This information can be viewed from the BIOS utility. See *Set Auto Scan* on page 23 for more information.
7. Enable or Disable EDD 3.0 (+Advanced Option+). Enable or disable the Enhanced Disk Driver (EDD) option, which is available on Intel IA-64 servers only. The factory default is disabled. See *Enable or Disable EDD 3.0* on page 24 for more information.
8. Enable or Disable Start Unit Command (+Advanced Option+). You must know the specific LUN to issue the SCSI Start Unit Command. The factory default is disabled. See *Enable or Disable the Start Unit Command* on page 25 for more information.
9. Enable or Disable Environment Variable (+Advanced Option+). Enable or disable the ability to set the boot controller order, if the system supports the environment variable. The factory default is disabled. See *Enable or Disable the Environment Variable* on page 25 for more information.
10. Enable or Disable Auto Boot Sector (+Advanced Option+). (Applies only to HP MSA1000 arrays.) This option automatically defines the boot sector of the target disk for the migration boot process. The factory default is disabled. See *Enable or Disable Auto Boot Sector* on page 26 for more information.
11. Link Speed Selection (+Advanced Option+). Select the adapter link speed. The factory default is Auto Select. See *Select Link Speed* on page 26 for more information.

## Enable an Adapter to Boot from SAN

To enable an adapter to boot from SAN:

1. On the Adapter Configuration menu, select **<1>** Enable or Disable BIOS. The current status of the boot BIOS is displayed (Figure 9).

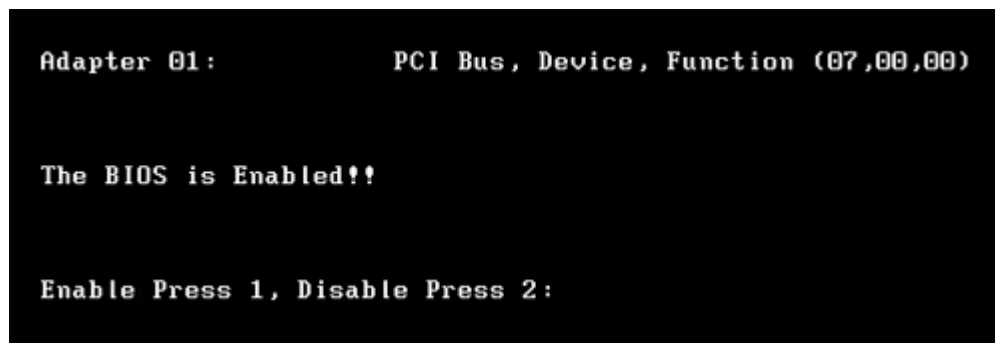


Figure 9: BIOS status screen

2. To enable the boot BIOS, select **<1>**, or to disable it, select **<2>**.

At least one adapter must be enabled to boot from SAN in order to use remote boot functionality.

## Change the Default AL\_PA (Arbitrated Loop Physical Address)

This option allows you to change the AL\_PA of the selected adapter. The default value of the AL\_PA for the adapter BIOS is 00 (hex).

**Note:** This option applies only to arbitrated loop (FC-AL).

To change the default AL\_PA:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<2>**, Change Default ALPA of this adapter. Figure 10 is displayed.

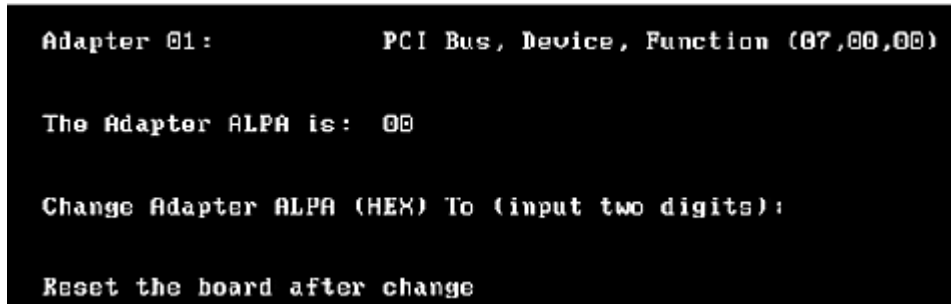


Figure 10: Change Default ALPA screen

3. Type the AL\_PA, in hexadecimal notation, to the value you want to make the default. Table 4 below lists the valid AL\_PA values.
4. Press **<X>** to exit the BIOS utility and reboot the system.

**Note:** If the adapter's AL\_PA is changed, it does not show 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
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	

## Change the PLOGI Retry Timer

This option allows you to set the interval for the PLOGI (port log in) retry timer. This option is especially useful for Tachyon-based RAID arrays. Rarely, a Tachyon-based RAID array resets itself and the port goes offline temporarily. When the port returns to operation, the PLOGI retry interval scans the loop to discover this device. This default setting is No PLOGI Retry: 0 msec.

To set the interval for the PLOGI retry timer:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<3>**, Change PLOGI Retry Timer (+Advanced Option+). Figure 11 is displayed.

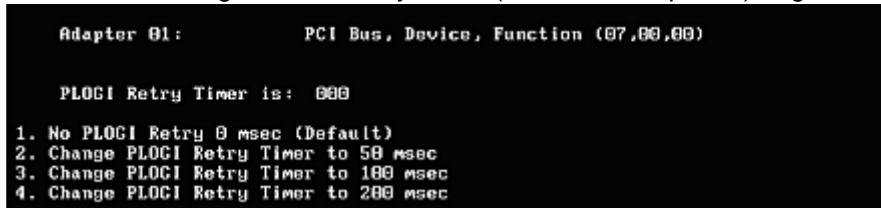


Figure 11: Change the PLOGI Retry Timer screen

3. Select the PLOGI retry timer interval. The time it takes for one PLOGI to scan the whole loop (if 126 AL\_PAs are on the loop) is shown below:
  - 50 msec takes 5 to 6 seconds per device.
  - 100 msec takes 12 seconds per device.
  - 200 msec takes 22 seconds per device.
4. Press **<X>** to exit the BIOS utility and reboot the system.

## Change Topology

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

To select the adapter topology:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<4>**, Topology Selection (+Advanced Option+). Figure 12 is displayed.

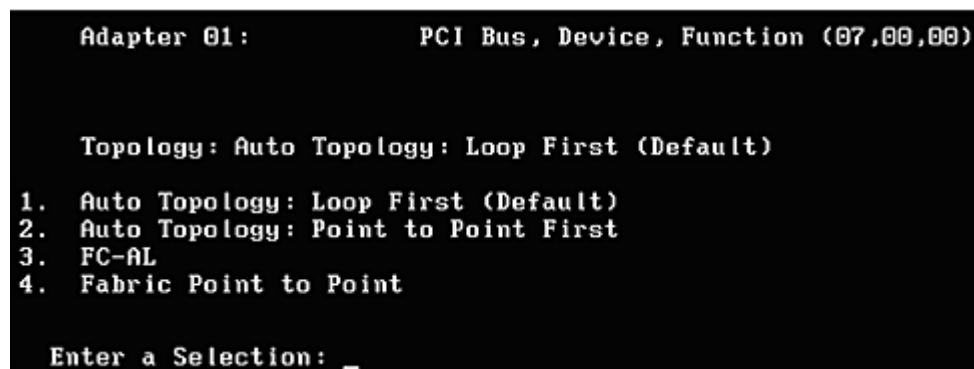


Figure 12: Topology menu

3. Select the topology for the adapter:
  - Select **<1>** for auto topology with loop first (default).

- Select **<2>** for auto topology with point-to-point first.
  - Select **<3>** for FC-AL.
  - Select **<4>** for fabric point-to-point.
4. Press **<X>** to exit the BIOS utility and reboot the system.

## Enable or Disable the Spinup Delay

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

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

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

If no boot devices have been defined, and auto scan is enabled, then the BIOS waits for five minutes before scanning for devices.

- In a private loop, the BIOS attempts to boot from the lowest target AL\_PA it finds.
- In an attached fabric, the BIOS attempts to boot from the first target found in the NameServer data.

To enable or disable the spinup delay:

1. On the Main Configuration menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<5>**, Enable or Disable Spinup Delay (+Advanced Option+) (Figure 13).



Figure 13: Enable or Disable Spinup Delay screen

3. Select **<1>** to enable the spinup delay, or select **<2>** to disable it.
4. Press **<X>** to exit the BIOS utility and reboot the system.

## Set Auto Scan

This option allows you to set auto scan. The factory default setting is disabled. Auto Scan is available only if none of the eight boot entries are configured to boot from DID or WWP. The Configure Boot Devices menu is used to configure up to eight boot entries for fabric point-to-point, public loop or private loop configurations. With auto scan enabled, the first device issues a Name Server Inquiry. The boot device is either the first DID, LUN 0, or not LUN 0 device returned, depending on the option you select. This device is the only boot device and it is the only device exported to the Multi-boot menu.

To set auto scan:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).

2. Select <6>, Auto Scan Setting (+Advanced Option+). Figure 14 is displayed.



Figure 14: Set Auto Scan menu

3. Select the auto scan option:
  - Select <1> to disable auto scan.
  - Select <2> to scan for 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. This device only is exported to the multi-boot menu.
  - Select <3> to scan for the first LUN 0 device.
  - Select <4> to scan for the first device other than LUN 0.
4. Press <X> to exit the BIOS utility and reboot the system.

## Enable or Disable EDD 3.0

This option allows you to enable or disable the Enhanced Disk Drive (EDD) option, available on Intel Itanium servers only. Enabling EDD 3.0 displays the path to the boot device. The default setting is disabled.

---

**Note:** An x86 series system could hang during Windows 2000 Server installation if EDD 3.0 is enabled.

---

To enable or disable EDD 3.0:

1. On the Main menu, select <2>, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select <7>, Enable or Disable EDD 3.0 (+Advanced Option+). Figure 15 is displayed.

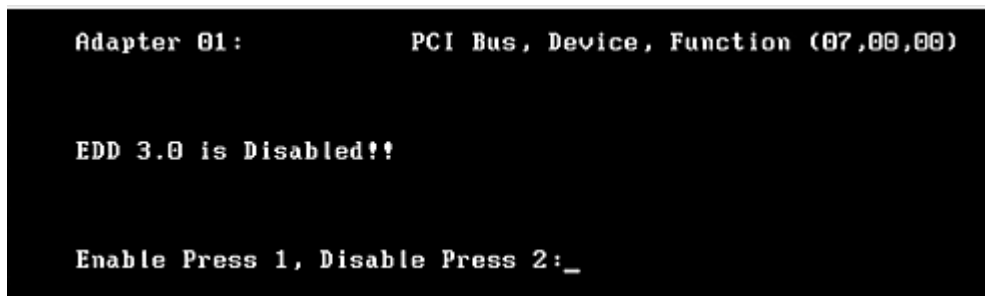


Figure 15: Enable or Disable EDD 3.0 screen

3. Select <1> to enable EDD 3.0, or press <2> to disable it.
4. Press <X> to exit the BIOS utility and reboot the system.

## Enable or Disable the Start Unit Command

This command is used to issue the SCSI start unit command. 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:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<8>**, Enable or Disable Start Unit Command (+Advanced Option+) (Figure 16).

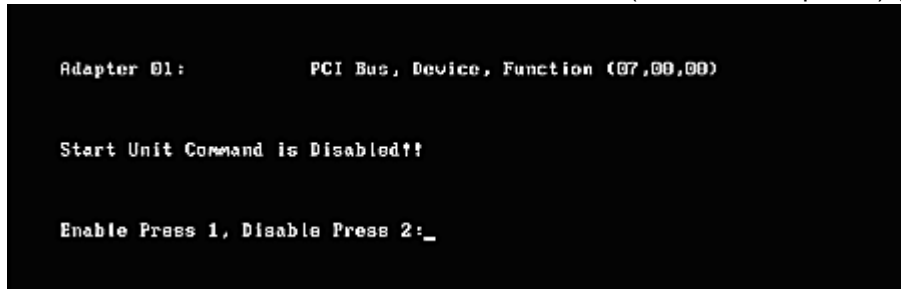


Figure 16: Enable or Disable Start Unit Command screen

3. Select **<1>** to enable the start unit command, or **<2>** to disable it.
4. Press **<X>** to exit the BIOS utility and reboot the system.

## Enable or Disable the Environment Variable

This option allows you to set the boot controller order if the system supports the environment variable. The default setting is disabled.

To enable or disable the environment variable:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<9>**, Enable or Disable Environment Variable (+Advanced Option+) (Figure 17).

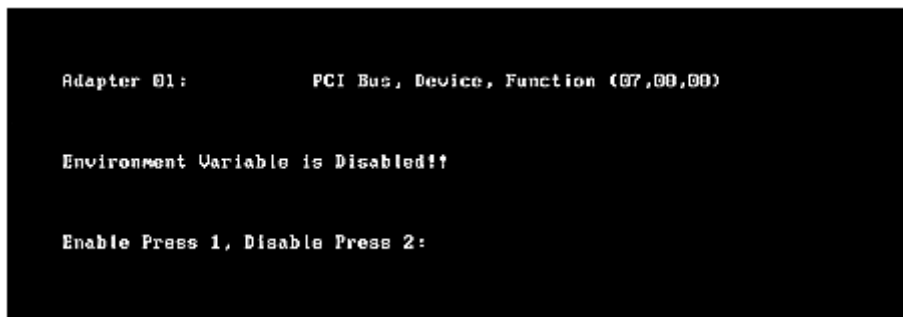


Figure 17: Enable or Disable Environment Variable screen

3. Select **<1>** to enable the environment variable, or **<2>** to disable it.
4. Press **<X>** to exit the BIOS utility and reboot the system.

## Enable or Disable 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:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<10>**, Enable or Disable Auto Boot Sector (+Advanced Option+) (Figure 18).

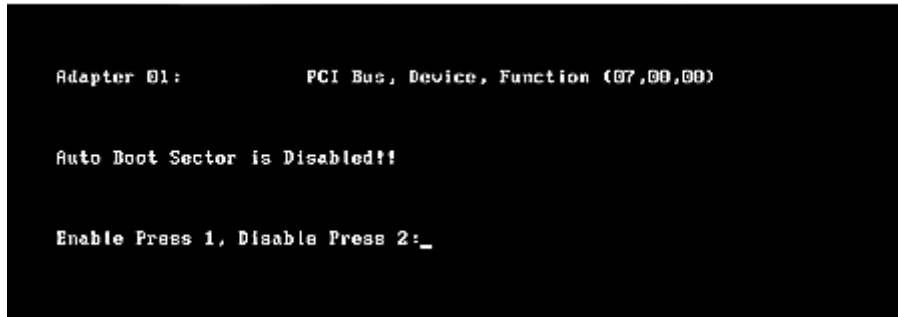


Figure 18: Enable or Disable Auto Sector Format Select screen

3. Select **<1>** to enable auto boot sector, or **<2>** to disable it.
4. Press **<X>** to exit the BIOS utility and reboot the system.

## Select Link Speed

This option allows you to select the adapter's link speed. The default link speed is Auto Select, which automatically selects the link speed.

To select the adapter's link speed:

1. On the Main menu, select **<2>**, Configure This Adapter's Parameters. The adapter configuration menu is displayed (Figure 8).
2. Select **<11>**, Link Speed Selection (Figure 19).

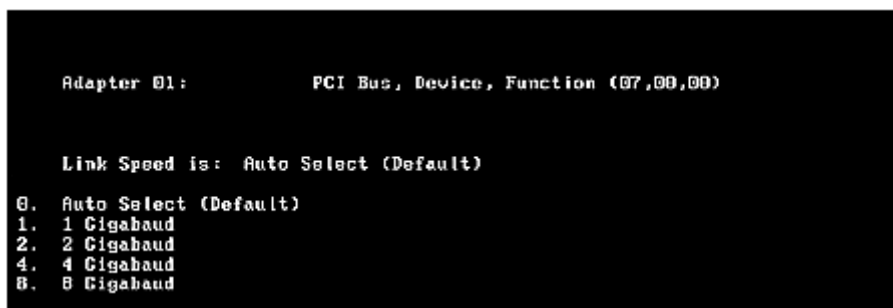


Figure 19: Link Speed Selection menu

3. Select one of the following:
  - **<0>** for Auto Select (the adapter's speed is selected automatically based on its model).
  - **<1>** for 1 Gigabaud.
  - **<2>** for 2 Gigabaud.
  - **<4>** for 4 Gigabaud.

- <8> for 8 Gigabaud.

---

**Note:** Emulex's 8 G/bs adapters do not support 1 G/bs link speed.

---

4. Press <X> to exit the BIOS utility and reboot the system.

## Reset to Default Values

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
Enable/Disable BIOS	Disabled	Enabled Disabled
AL_PA Value	0x00 Fibre	See AL_PA reference table
EDD 3.0	EDD 2.1	EDD 2.1 Disabled
PLOGI Retry Timer	Disabled	Disabled 50 msec 100 msec 200 msec
Spinup Delay	Disabled	Enabled Disabled
Auto Scan	Disabled	Enabled Disabled
Start Unit	Disabled	Enabled Disabled
Environmental Variable	Disabled	Enabled Disabled
Auto Boot Sector	Disabled	Enabled Disabled
Topology	Auto (start FC-AL)	Auto (start FC-AL) Point-to-Point Auto (start Point-to-Point) FC-AL
Link Speed	0	0 = Auto select 1 = 1 Gb/s 2 = 2 Gb/s 4 = 3 Gb/s 8 = 8 Gb/s



To reset parameters to their factory default settings:

1. On the BIOS Utility screen press **<d>**. All settings revert to their factory default values.

```

Adapter 01:          PCI Bus, Device, Function (24,00,00)

LPc1205-C10v: Mem Base: 97900000  Firmware Version: US1.11A4
Port Name: 10000000 C95B367A   Node Name: 20000000 C95B367A
Topology: Auto Topology: Loop First (Default)
The BIOS for this adapter is Enabled

1. Configure Boot Devices
2. Configure This Adapter's Parameters

Enter a Selection: _

Enter <x> to Exit      <d> to Default Values      <Esc> to Previous Menu

```

Figure 20: BIOS Utility screen

## Use Multi-Path Boot from SAN

Multi-boot BIOS is in compliance with BIOS Boot Specification (BBS). The system must have a Multi-boot system BIOS in order to take advantage of this feature. Multi-boot 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 floppy drive. The Emulex BIOS supplies the first eight drives to the system BIOS menu. The Multi-boot BIOS can override the FC drive that is selected in the BIOS utility.

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

# OpenBoot

OpenBoot commands are supported by the Sun SPARC system.

## Attribute Commands

### **boot - id**

Syntax: `.boot - id`

Description: Displays the current boot device id.

Parameters: None

### **.devalias**

Syntax: `.devalias`

Description: Displays the boot list.

Parameters: None

### **.fcode**

Syntax: `.fcode`

Description: Displays the current version of OpenBoot.

Parameters: None

### **.host-did**

Syntax: `.host-did`

Description: Displays the actual current AL\_PA of the adapter.

Parameters: None

### **.nvram**

Syntax: `.nvram`

Description: Displays the current flags for OpenBoot.

```
show-devs
"/pci@1f,0/pci@1/lpfc@1" select-dev
/* select lpfc@1 (for example) */
.nvram
```

Parameters: None

### **.probe-scsi-all**

Syntax: `.probe-scsi-all`

Description: Displays the current SCSI and FC devices.

Parameters: None

### **.show-devs**

Syntax: `.show-devs`

Description: Displays a list of the devices found.

Parameters: None

**.topology**

Syntax: .topology

Description: Displays the current topology.

Parameters: None

**Functional Commands****.remove-boot-id**

Syntax: .remove-boot-id

Description: Removes the boot id from boot list.

```
"/pci@1f,0/pci@1/lpfc@1" select-dev
remove-boot-id      /* to clear boot id settings */
unselect-dev
or
"/pci@1f,0/pci@1/lpfc@1" select-dev
set-default-mode /* to clear boot id settings */
unselect-dev
```

Parameters: None

**set-default-mode**

Syntax: set-default-mode

Description: Resets to the default value mode.

Parameters: None

**set-link-speed**

Syntax: set-link-speed

Description: Shows the current link-speed setting. Changes and sets the link speed. The default is 0=Auto Select Link Speed.

Parameters: 0=Auto Select Link Speed (Default), 1=1 Gb/s Link Speed -- Only, 2=2 Gb/s Link Speed -- Only, =4 Gb/s Link Speed -- Only

**set-max-lun**

Syntax: set-max-lun

Description: Shows the current maximum LUN support. Changes and sets the support setting, the default max lun is 256.

Parameters: 0=Set Max Lun to 255 (Default), 1=Set Max Lun to 1023, 2=Set Max Lun to 2047, 3=Set Max Lun to 4095

**set-post-linkup**

Syntax: set-post-linkup

Description: Controls if a linkup is to occur during a POST. The default is off.

Parameters: 0=Set Linkup Switch OFF (Default), 1=Set Linkup Switch ON

**Table 6: Signature Table**

<b>Signature</b>	<b>OpenBoot signature</b>
Valid_flag	internal flag for OpenBoot
Host_did	shows host DID number
Enable_flag	internal flag for OpenBoot
Topology_flag	topology flag for OpenBoot
Link_Speed_Flag	set link speed
Diag_Switch	set fcode diag switch
Boot_id	shows target ID number
Lnk_timer	internal use for OpenBoot
Plogi_timer	internal use for OpenBoot
LUN	shows boot LUN in use
DID	shows boot ID in use
WWPN	shows boot WWPN in use

---

**Note:** Target ID can be bound to either DID (destination ID) or WWPN (worldwide port name) and saved in an adapter nvram. It can also be saved in an environmental variable boot-device.

---

## EFIBoot

The Emulex EFIBoot boot code can be used on server platforms with EFI or UEFI-based system firmware, with or without an EFI shell. If your system firmware is EFI version 1.1 or UEFI version 2.0, the EFI utility can be invoked from the EFI Shell prompt. If your system firmware is UEFI 2.1, it expects the HII (Human Interface Infrastructure) interface to be present and implemented by the server manufacturer. The usage of EFIBoot code under the HII is described later in the chapter.

---

**Note:** This section reflects the most recent release of the EFI utility. Some selections may not be available if you are using an older version of the utility.

---



---

**Note:** EFIBoot is not supported on converged network adapters (CNAs) such as the LP21000 and LP21002

---



---

**Note:** If you have several adapters in your system, the EFI system firmware or boot code uses the highest version driver that is on one of your adapters. Adapters with older versions of EFIBoot are managed by the more recent version, but only as long as the adapter with the most recent version is in the system. The adapters must be updated to actually update and not just use the most recent version available.

---

### Install the EFI Utility

Before you install the EFI utility, download the EFIBoot zip file and extract the contents to a floppy disk, CD, USB device or hard drive. The EFIBoot zip file includes the .prg file, the elxclversion.efi file (where *version* corresponds to the EFIBoot code version) and the readme.txt file. The elxclversion.efi file contains the EFI utility.

To install the EFI utility:

1. Start your system. A menu similar to Figure 21 is displayed. The menu items vary depending on the configuration of your system.

```
EFI Boot Manager ver 1.10 [14.61] Firmware ver 2.01 [4322]
```

```
Please select a boot option
```

```
Red Hat Linux Advanced Workstation
Windows XP 64-Bit Edition Version 2003
EFI Shell [Built-in]
CDROM
Boot Option Maintenance Menu
System Configuration Menu
```

```
Use ↑ and ↓ to change option(s). Use Enter to select an option
```

Figure 21: Boot Option menu

2. Select **EFI Shell** from the menu. An EFI shell starts and the shell prompt is displayed.
3. Change to the drive where the Emulex EFIBoot file was extracted. To see a list of drives, type:

```
map -r <Enter>
```

A list of drive names is displayed (Figure 22)

```
Shell> map -r
Device mapping table
fs0 : Acpi(PNP0A03,0)/Pci(1F|0)/Acpi(PNP0604,0)
blk0 : Acpi(PNP0A03,0)/Pci(1F|0)/Acpi(PNP0604,0)
blk1 : Acpi(PNP0A03,0)/Pci(1F|1)/Ata(Secondary,Master)

Shell>
```

Figure 22: Drive List example

4. Change to the desired drive by entering the drive name followed by a colon. For example, type:

fs0:

5. Load the EFI utility file:

```
load filename.efi <Enter>
```

where filename is the The following message is displayed:

```
load elxcli400A2.efi
```

```
load:Image fs0: \elxcli400A2.efi loaded at 0x3FCD7000 - Success
```

The EFI utility is now resident in memory, and can be accessed through the `drvcfg` shell command.

---

**Note:** The utility is available only until the next reboot. However, if the `driver.prg` file has been stored in the flash memory on the adapter, the utility is available at every startup as long as the adapter is in the system.

---

## Start the EFI Utility

To access the main EFI utility:

1. View Emulex driver image handle information. At the shell prompt type:

```
drivers <Enter>
```

A list of drivers is displayed (Figure 23).

```
fs0:\> drivers
          T  D
          Y C I
          P F A
V  VERSION  E G G  MD  #C  DRIVER NAME  IMAGE NAME
=====
15 00000001 B - - 1 1 DebugPort Driver 73E9457A-CEA1-4
52 00000001 D - - 1 - National(R) PC8741x SIO Driver C5DAC13B-8D24-4
5B 00000000 ? - - - BIOS(INT10) VGA Mini Port Driver BBDAC3A1-B06F-4
5C 00000000 ? - - - BIOS(INT16) Keyboard Driver 5479662B-6AE4-4
5D 00000000 ? - - - BIOS(UNDI) Simple Network Protocol D0CAA91E-2DE4-4
5E 00000010 ? - - - BIOS(INT13) Block Io Driver 4495E47E-42A9-4
5F 00000024 ? - - - BIOS(INT10) Video Driver 29CF55F8-B675-4
60 00000010 D - - 2 - Platform Console Management Driver 51CCF399-4FDF-4
61 00000010 D - - 1 - Platform Console Management Driver 51CCF399-4FDF-4
62 00000010 B - - 1 1 Console Splitter Driver 408EDCEC-CF6D-4
63 00000010 ? - - - Console Splitter Driver 408EDCEC-CF6D-4
64 00000010 B - - 2 2 Console Splitter Driver 408EDCEC-CF6D-4
65 00000010 B - - 2 2 Console Splitter Driver 408EDCEC-CF6D-4
69 00000010 D - - 1 - UGA Console Driver CCCB0C28-4B24-1
6A 00000010 B - - 1 1 Serial Terminal Driver 9E863906-A40F-4
6B 00000010 ? - - - VGA Class Driver BF89F10D-B205-4
6C 00000010 D - - 9 - Geperic Disk I/O Driver 490E1CEA-B81C-1
C2 00032013 B X X 1 24 Emulex SCSI Pass Thru Driver \elxcli320a3.e
```

Figure 23: Driver Listing screen

2. Run the `drvcfg` command followed by the driver image handle for the Emulex SCSI Pass Thru Driver, for example, C2 (your driver image handle number may be different):

```
drvcfg-s c2 <Enter>
```

A list of all the adapters in the system is displayed (Figure 24). Your list may vary depending on the boot package you are using. Locate the adapter to enable, update, configure or troubleshoot. Use the up/down arrows on your keyboard to select it, and press **<Enter>**.

```
-----
Emulex FC EFI-Bios Utility, Ver: 4.00A0
-----

Emulex Adapters in this System: 001 thru 006

001: LP11002          PCI-X 133MHz      Seg#: 00 Bus#: 80 Dev#: 01 Func#: 00
002: LP11002          PCI-X 133MHz      Seg#: 00 Bus#: 80 Dev#: 01 Func#: 01
003: LP1150-F4        PCI-X 66MHz       Seg#: 00 Bus#: 80 Dev#: 02 Func#: 00
004: LP10000DC-S      PCI-X 66MHz       Seg#: 00 Bus#: E0 Dev#: 01 Func#: 00
005: LP10000DC-S      PCI-X 66MHz       Seg#: 00 Bus#: E0 Dev#: 01 Func#: 01
006: LP10000-M2       PCI-X 66MHz       Seg#: 00 Bus#: E0 Dev#: 02 Func#: 00
```

Figure 24: Adapter Listing screen

The EFI Main Utility menu is displayed (Figure 25).

```

Emulex FC EFI-Bios Utility, Ver: 4.00A0
-----
001: LP11002          PCI-X  133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
      HBA Status: Not Ready      Boot Bios : Enabled
      EFI  Boot : BE3.20A0       Firmware  : BS2.70A5
-----

1. Setup Utility
2. Firmware Update

```

Figure 25: Main EFI-Bios Utility menu

## EFI Utility Conventions

The EFI utility has menus and configuration screens with a navigation bar at the bottom of the each one:

- Press the up/down arrows on your keyboard to move through and select menu options or configuration fields. Screens with adapter listings and information display up to eight rows at a time. If applicable, press the up/down arrows to scroll to additional adapters.
- Press the left and right arrows to scroll through pages of information.
- Press **<Enter>** to select a menu option, to select a row in a configuration screen, or to change a configuration default.
- Usually, press **<Esc>** to return to the previous menu. There are a few exceptions to this convention.
- Press **<F1>** to view online help for a menu item.

## Configure EFIBoot via EFI Shell Invocation

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

- Enable or disable the BIOS
- Configure HBA parameters
- Configure boot parameters
- Reset to default values
- Save and restore configurations

**Note:** You must issue a **connect -r** command in the EFI shell or reboot for any changes to take effect.

### Enable or Disable the BIOS

The BIOS must be enabled before it can be configured.

To enable the BIOS:

1. On the Main EFI-Bios Utility menu, select **1. Setup Utility** and press **<Enter>**. The EFI-BIOS Setup Utility menu is displayed (Figure 26).

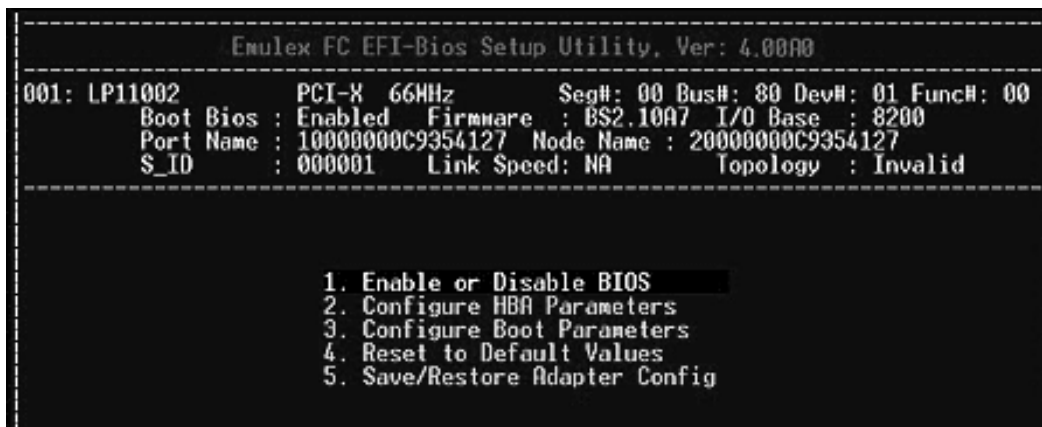


Figure 26: EFI-BIOS Setup Utility menu

2. Select **1. Enable or Disable BIOS** and press **<Enter>**. The current BIOS status is displayed (Figure 27).

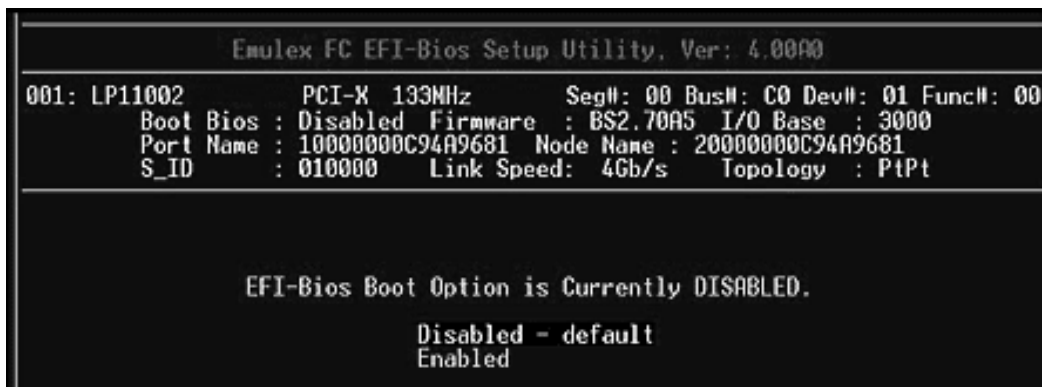


Figure 27: BIOS Status screen



- If the current status is disabled, select **Enabled** and press **<Enter>**. The status changes to enabled (Figure 28).

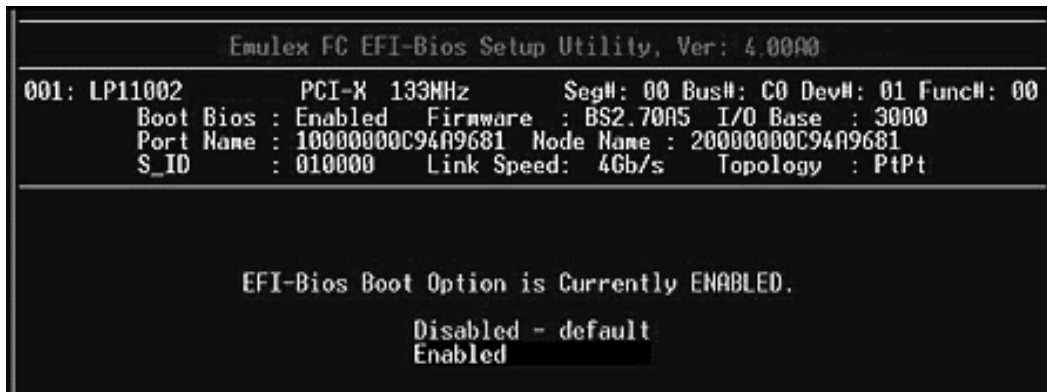


Figure 28: BIOS Enabled screen.

---

**Note:** You can configure EFIBoot systems for up to eight boot devices. Configure one boot device at a time.

---



---

**Note:** Press **<Esc>** to return to the EFI utility menu.

---

## Configure Adapter Parameters

The EFI utility enables you to configure the following adapter parameters:

- Default arbitrated loop physical address (AL\_PA)
- Topology
- Port login (PLOGI) retry timer
- Link speed

On the EFI-BIOS Setup Utility menu (Figure 26) select **2. Configure HBA Parameters** and press **<Enter>**. The Adapter Configuration (Figure 29) is displayed.

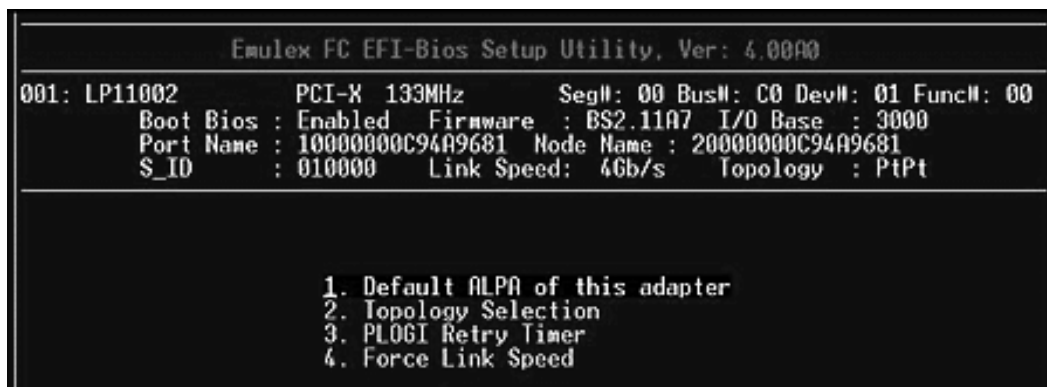


Figure 29: Adapter Configuration menu

## Change the Default AL\_PA

When a device is connected to an FC arbitrated loop, the loop initialization process (LIP) automatically assigns an AL\_PA to the device. This number is assigned to the device as long as it is connected to the loop and powered up. When the device is removed from the loop or turned off, as it is reconnected or

when another LIP occurs, the device may be assigned a different AL\_PA. The HardALPA=0xn parameter allows you to permanently assign an AL\_PA to a host adapter. This does not alter the adapter flash memory. The default for this parameter is 0x00. All valid AL\_PA values are listed in Table 7.

**Table 7: Valid AL\_PA Values**

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

To change the default AL\_PA:

1. On the Adapter Configuration menu, select **1. Default ALPA of this adapter** and press **<Enter>**. A screen similar to Figure 30 is displayed.



Figure 30: Default AL\_PA Setup screen

2. Select the HardALPA value field, use the up/down arrows to change the default value, and press **<Enter>**. The new value is displayed.

**Note:** Press **<Esc>** to return to the EFI utility menu.

## Change the Topology

Emulex drivers support arbitrated loop and point-to-point topologies.

To change the topology:

1. On the Adapter Configuration menu, select **2. Topology Selection** and press **<Enter>**. The screen shown in Figure 31 is displayed.

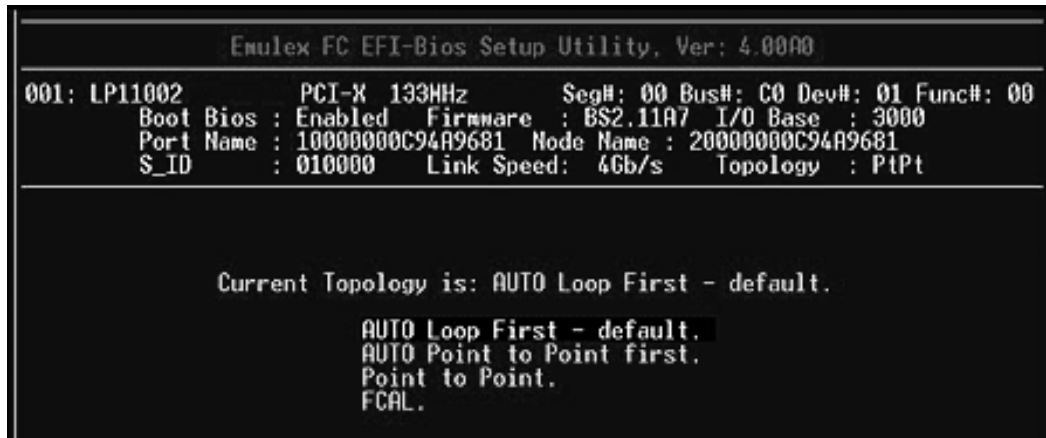


Figure 31: Topology Options screen

2. Use the up/down arrows to select a different topology and press **<Enter>**. The screen is refreshed with the new value.

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

Press **<Esc>** to return to the EFI utility menu.

## Change the PLOGI Retry Timer

This option allows you to set the interval for the port login (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.

To change timer values:

1. On the Adapter Configuration menu, select **3. PLOGI Retry Timer** and press **<Enter>**. The screen shown in Figure 32 is displayed.

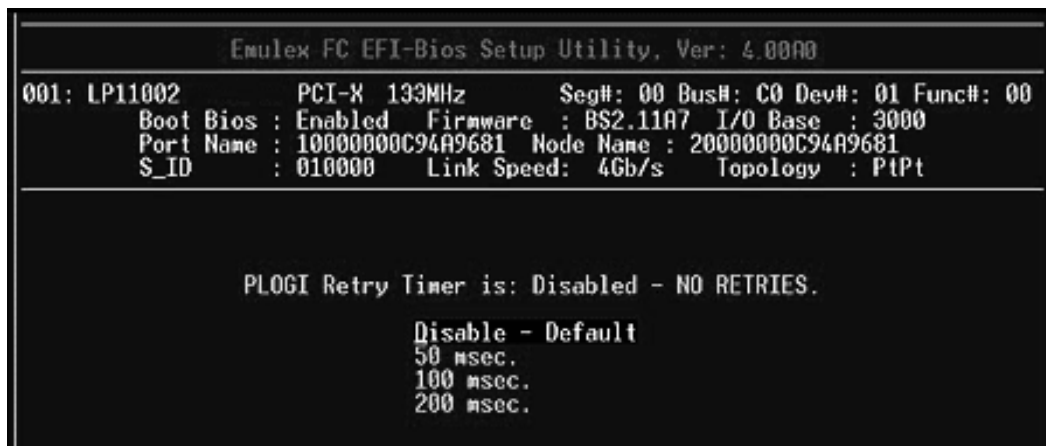


Figure 32: PLOGI Retry Timer Setup screen

2. Use the up/down arrows to select a retry timer option and press **<Enter>**. The screen is refreshed with the new value.

---

**Note:** Press **<Esc>** to return to the EFI utility menu.

---

The time it takes for one PLOGI to scan the whole loop (if 126 AL\_PAs are on the loop) is shown below:

- 50 msec takes 5 to 6 seconds per device.
- 100 msec takes 12 seconds per device.
- 200 msec takes 22 seconds per device.

## Change the Link Speed

Use this feature to change, or force, the link speed between ports instead of doing an auto negotiating. The supported link speeds depend upon the adapter. The screen (Figure 33) will only show options that are valid for the current adapter.

To change the link speed:

1. On the Adapter Configuration menu, select **4. Force Link Speed** and press **<Enter>**. The screen shown in Figure 33 is displayed.

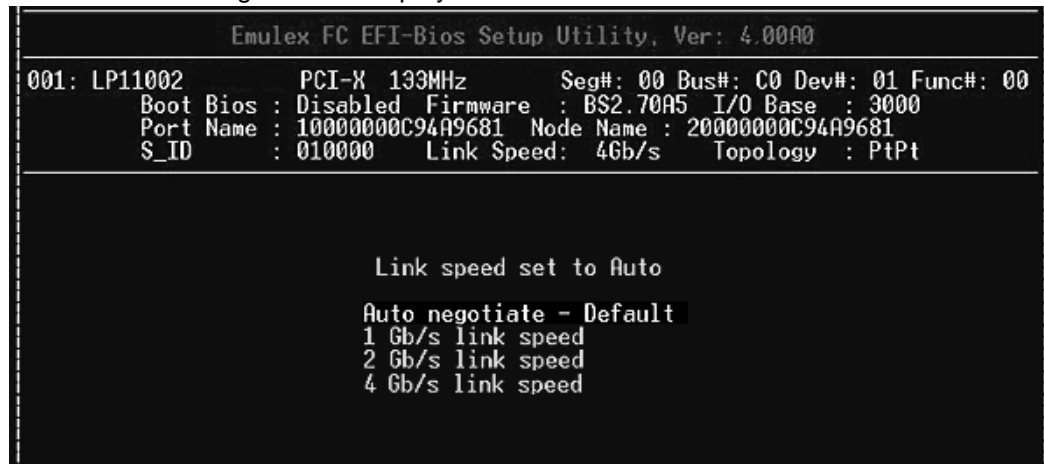


Figure 33: Force Link Speed Setup screen

2. Use the up/down arrows to select a link speed and press **<Enter>**.

Possible link speed choices:

- 1 Gb/s
- 1 & 2 Gb/s
- 1, 2 and 4 Gb/s
- 2, 4 and 8 Gb/s

---

**Note:** Emulex's 8 Gb/s adapters do not support 1 Gb/s link speed.

---

3. The screen is refreshed with the new value.

---

**Note:** Press **<Esc>** to return to the EFI utility menu.

---

## Configure Boot Parameters

The EFI utility enables you to configure the following boot parameters:

- Device path

- Maximum LUNs per target
- Boot target scan
- Boot devices
- Delay device discovery

To configure boot parameters, on the EFI-BIOS Setup Utility menu (Figure 26) select **3. Configure Boot Parameters** and press **<Enter>**. The menu shown in Figure 34 is displayed.



Figure 34: Boot Configuration menu

## Change the Device Path

This option allows you to make the Fibre Channel driver appear as a SCSI driver. This is useful for older Itanium systems that do not have native support in the EFI system firmware or boot code for FC device paths.

To change the device path:

1. On the Boot Configuration menu, select **1, Device Path Selection** and press **<Enter>**. The screen shown in Figure 35 is displayed.



Figure 35: Device Path screen

2. Use the up/down arrows to change the path and press **<Enter>**. The screen is refreshed with the new value.

**Note:** The device path is typically not changed. The SCSI device path is used for legacy systems.

Press **<Esc>** to return to the EFI utility menu.

## Change the Maximum LUNs per Target Setting

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:

1. On the Boot Configuration menu, select **2. Maximum LUNs/Target** and press **<Enter>**. The screen shown in Figure 36 is displayed.

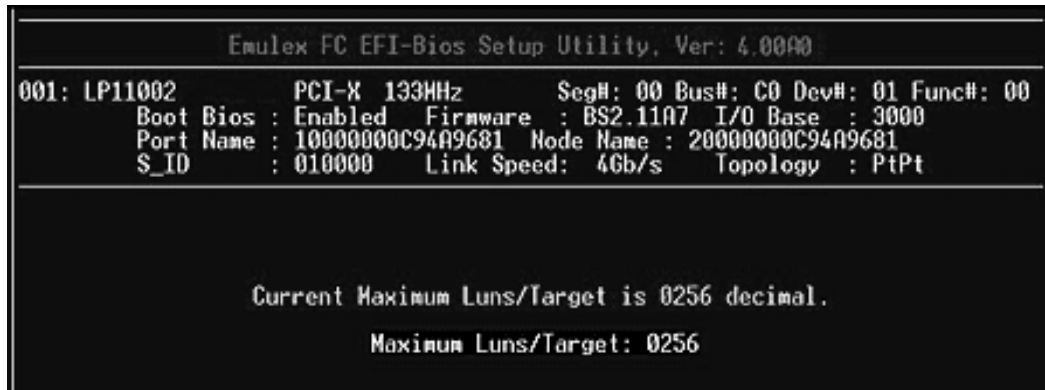


Figure 36: Current Maximum LUNs screen

2. Use the up/down arrows to change 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 number of LUNs in a device.

Press any key to return to the configuration menu.

## Set Up Boot Target Scan

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 is used to configure up to eight boot entries for fabric point-to-point, public loop or private loop configurations..

With boot scan enabled, the first device issues a Name Server Inquiry.

To set up a boot target scan:

1. On the Boot Configuration menu, select **3. Boot Target Scan** and press **<Enter>**. The screen shown in Figure 37 is displayed.

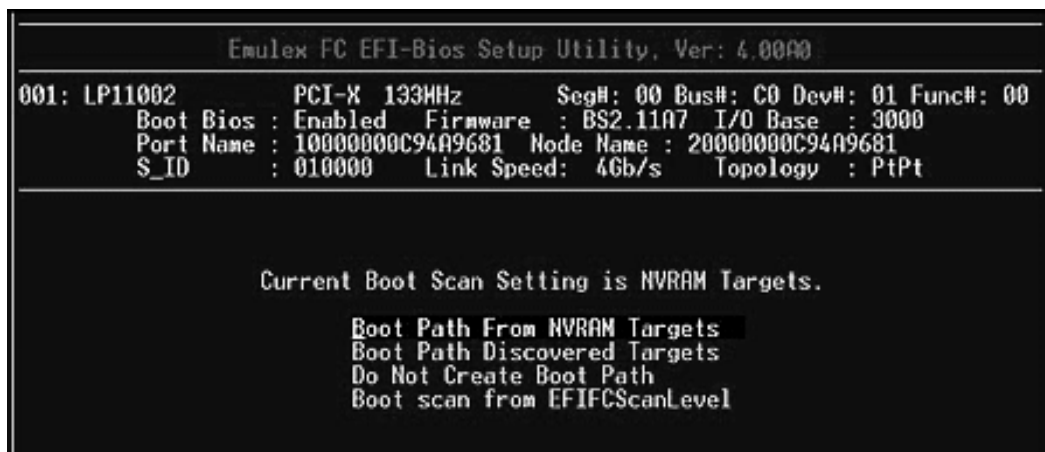


Figure 37: Boot Scan Options screen



2. Use the up/down arrows to select a boot scan setting and press **<Enter>**.

The boot scan options are:

- Boot Path from NVRAM Targets - Boot scan discovers only LUNs that are saved to the adapter's non-volatile random access memory (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.
- Boot Scan from EFiFcScanLevel - Allows 3rd party software to toggle between Boot Path from NVRAM and Boot Path from Discovered Targets by manipulating an EFI system NVRAM variable. After the scan is set to EFiFcScanLevel, the scan method can be changed without entering the EFI Boot configuration utility.

If EFiFcScanLevel is selected, the scan is determined by the value of the EFiFcScanLevel variable maintained by the EFI 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 3rd party software from the EFI shell command prompt.

If you select Boot Scan from EFiFcScanLevel:

- If the EFiFcScanLevel variable already exists, the screen in Figure 38 shows the current setting and allows you to select a new setting.

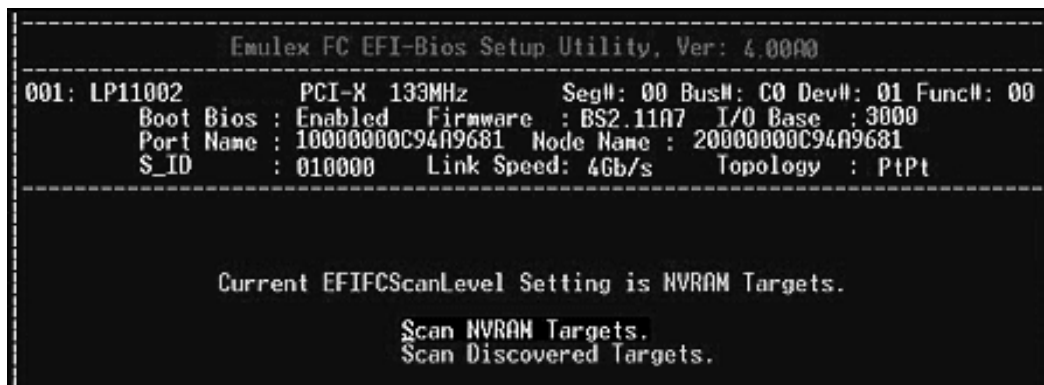


Figure 38: Existing EFiFcScanLevel Variable screen

- If the EFiFcScanLevel variable does not exist in the EFI BIOS NVRAM store, the EFIBoot configuration utility prompts you to create it, as shown in Figure 39.

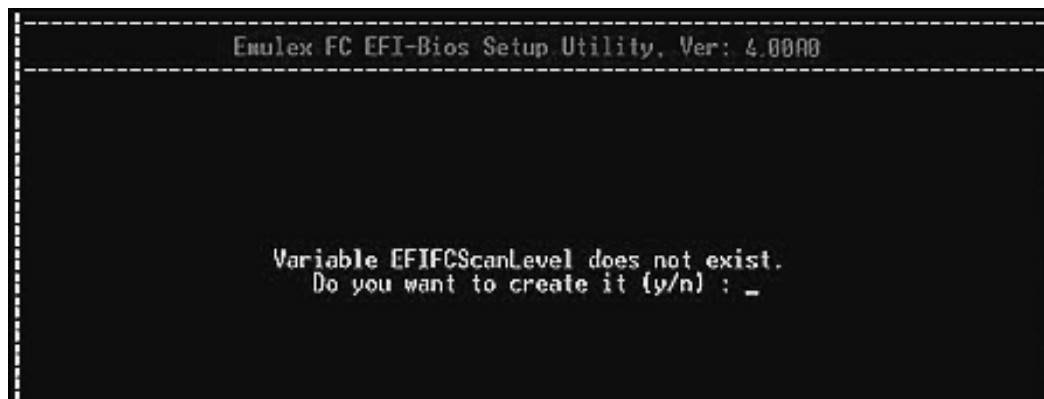


Figure 39: No Existing EFiFcScanLevel Variable screen

Press <Y> for Yes or <N> for no. If you press <Y> to create the variable, the utility creates it and presents you with a menu to select the initial value. Valid values are NVRAM and Discovered Targets. A new variable is created and the boot path is changed.

**Note:** If you have a large SAN and set the boot path to "Boot Path Discovered Targets," discovery takes a long time.

Press <Esc> to return to the EFI utility menu.

## Configure Boot Devices

This list allows you to select up to eight boot devices that will be enumerated by the boot driver. Whether they are used for boot or not depends on how you configure the boot manager in the EFI system firmware or boot code.

To configure an EFI boot device:

1. On the Boot Configuration menu, select **4. Configure Boot Devices** and press <Enter>. The screen shown in Figure 40 is displayed.

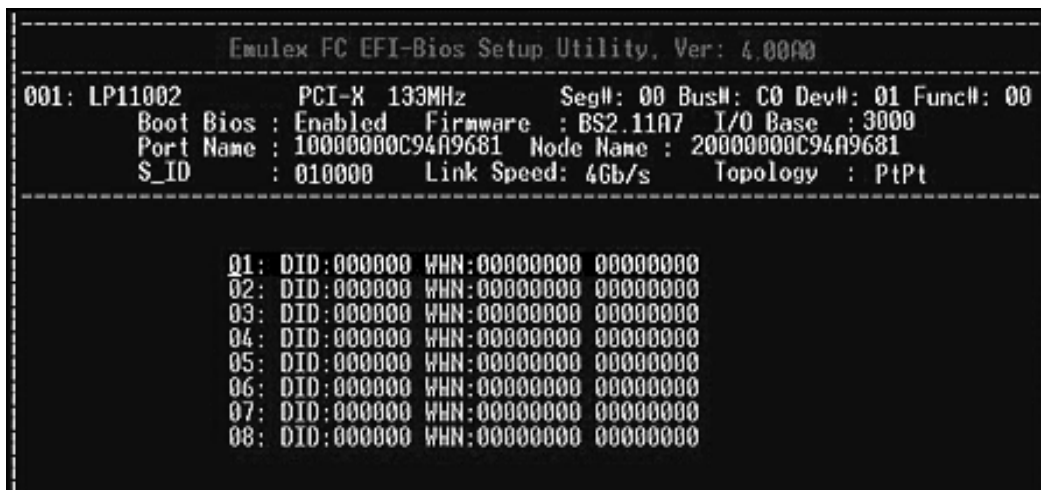


Figure 40: Device Rows screen

2. Select a device row and press <Enter>. The screen shown in Figure 41 displays the selected device row.

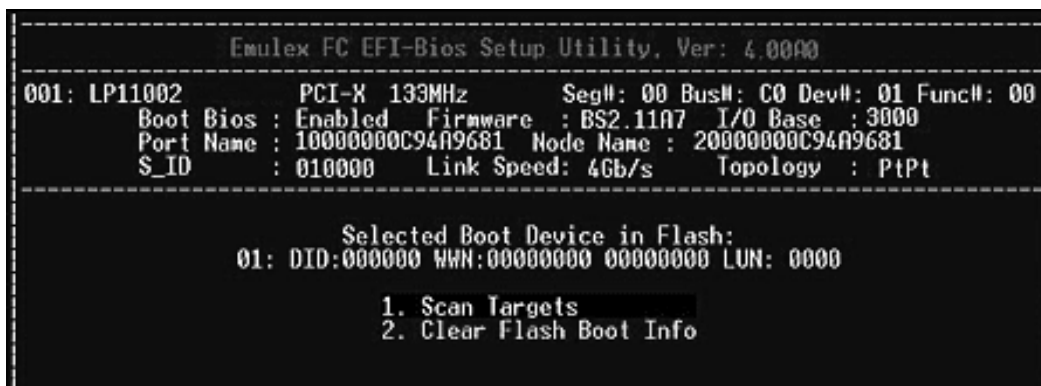


Figure 41: Boot Device Configuration Options menu

**Note:** Press <Esc> to return to the list of devices.



3. Select **1. Scan Targets** and press **<Enter>**. The system scans the adapter and shows your targets, as shown in Figure 42.

```

Emulex FC EFI-Bios Setup Utility, Ver: 4.00A0

001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
    Boot Bios : Enabled  Firmware  : BS2.11A7 I/O Base  : 3000
    Port Name  : 10000000C94A9681  Node Name  : 20000000C94A9681
    S_ID       : 010000    Link Speed: 4Gb/s    Topology   : PtPt

-----

Here are targets numbers 001 thru 001:

001: DID:010400 WHN:500805F3 0004C699
  
```

Figure 42: Target Listing screen

---

**Note:** Eight targets are displayed per screen. If more than eight targets are configured, press the right arrow key to view additional targets eight at a time.

---

4. Select a target row and press **<Enter>**. LUNs for the target are displayed, as shown in Figure 43.

```

Emulex FC EFI-Bios Setup Utility, Ver: 4.00A0

001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
    Boot Bios : Enabled  Firmware  : BS2.11A7 I/O Base  : 3000
    Port Name  : 10000000C94A9681  Node Name  : 20000000C94A9681
    S_ID       : 010000    Link Speed: 4Gb/s    Topology   : PtPt

-----

Here are Luns numbers 0000 thru 0007:

0001: Mode: Peripheral dev LUN: 0000
0002: Mode: Peripheral dev LUN: 0001
0003: Mode: Peripheral dev LUN: 0002
0004: Mode: Peripheral dev LUN: 0003
0005: Mode: Peripheral dev LUN: 0004
0006: Mode: Peripheral dev LUN: 0005
0007: Mode: Peripheral dev LUN: 0006
0008: Mode: Peripheral dev LUN: 0007
  
```

Figure 43: LUN Listing Screen

---

**Note:** Eight LUNs are displayed per screen. If more than eight LUNs are configured for the target, press the right arrow key to view more LUNs.

---

5. Select a LUN and press **<Enter>**. The screen shown in Figure 44 is displayed.

```

Emulex FC EFI-Bios Setup Utility, Ver: 4.00A0

001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
    Boot Bios : Enabled  Firmware : BS2.11A7 I/O Base : 3000
    Port Name : 10000000C94A9681 Node Name : 20000000C94A9681
    S_ID      : 010000 Link Speed: 4Gb/s Topology : PtPt

Selected Boot Device:
001: DID:010400 WWN:500805F3 0004C699 Mode: Per LUN: 0000

1. Boot this device via WWN.
2. Boot this device via DID.

```

Figure 44: LUN Boot Options menu

---

**Note:** Press **<Esc>** to return to the list of devices.

---

6. Select **1. Boot this device via WWN** and press **<Enter>**. Figure 45 shows the LUN selected in step 5.

```

Emulex FC EFI-Bios Setup Utility, Ver: 4.00A0

001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
    Boot Bios : Enabled  Firmware : BS2.11A7 I/O Base : 3000
    Port Name : 10000000C94A9681 Node Name : 20000000C94A9681
    S_ID      : 010000 Link Speed: 4Gb/s Topology : PtPt

01: DID:000000 WWN:500805F3 0004C699 Mode: Per LUN: 0000
02: DID:000000 WWN:00000000 00000000
03: DID:000000 WWN:00000000 00000000
04: DID:000000 WWN:00000000 00000000
05: DID:000000 WWN:00000000 00000000
06: DID:000000 WWN:00000000 00000000
07: DID:000000 WWN:00000000 00000000
08: DID:000000 WWN:00000000 00000000

```

Figure 45: Device Rows with a Selected LUN to Boot with WWNN screen

---

**Note:** Press **<Esc>** to return to the EFI utility menu.

---

## Cancel a Boot Device

To cancel boot device:

1. On the Boot Configuration menu, select **4. Configure Boot Devices** and press **<Enter>**. The screen shown in Figure 46 is displayed.

```

Emulex FC EFI-Bios Setup Utility, Ver: 4.00A0

001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
  Boot Bios : Enabled  Firmware : BS2.11A7  I/O Base : 3000
  Port Name : 10000000C94A9681  Node Name : 20000000C94A9681
  S_ID      : 010000      Link Speed: 4Gb/s      Topology : PtPt

01: DID:000000 WHN:500805F3 0004C699 Mode: Per LUN: 0000
02: DID:000000 WHN:00000000 00000000
03: DID:000000 WHN:00000000 00000000
04: DID:000000 WHN:00000000 00000000
05: DID:000000 WHN:00000000 00000000
06: DID:000000 WHN:00000000 00000000
07: DID:000000 WHN:00000000 00000000
08: DID:000000 WHN:00000000 00000000

```

Figure 46: Boot LUNs

2. Select a device row and press **<Enter>**. The screen shown in Figure 47 is displayed.

```

-----
Emulex FC EFI-Bios Setup Utility, Ver: 4.00A0
-----
001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
  Boot Bios : Enabled  Firmware : BS2.11A7  I/O Base : 3000
  Port Name : 10000000C94A9681  Node Name : 20000000C94A9681
  S_ID      : 010000      Link Speed: 4Gb/s      Topology : PtPt
-----

      Selected Boot Device in Flash:
      01: DID:000000 WHN:00000000 00000000 LUN: 0000

          1. Scan Targets
          2. Clear Flash Boot Info

```

Figure 47: Selected Boot Device

3. Select **2. Clear Flash Boot Info** and press **<Enter>**. The system clears the target as the remote boot device.

## Change Device Discovery Delay

This parameter sets a delay to occur after an loop initialization and before a scan is initiated to discover the target. The default is off or 0 seconds. Change the default if you have an HP MSA1000 or HP MSA1500 RAID array and if both of the following conditions exist:

- The MSA array is direct connected or part of an arbitrated loop (for example, daisy chained with a JBOD).
- The boot LUN is not reliably discovered. In this case, a delay may 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 above conditions exist, typically set this parameter to 20 seconds. However, the delay only need be only enough for the array to be reliably discovered after a reset. Your value may be different.

To change the delay device discovery value:

1. On the Boot Configuration menu, select **5. Delay Device Discovery** and press **<Enter>**. The screen shown in Figure 48 is displayed.



Figure 48: Delay Device Discovery screen

2. Use the left /right arrows to select values in 10-second increments and press **<Enter>**.

## Reset to Default Values

The EFI utility enables you to reset EFI boot parameter to their factory default settings. These defaults are listed in Table 8.

**Table 8: Adapter Defaults**

Parameter	Default	Valid Values
Enable/Disable BIOS	Disabled	Enabled Disabled
AL_PA Value	0x00 Fibre	See AL_PA reference table
Device Path	FC	Fibre Channel (FC) SCSI
PLOGI Retry Timer	Disabled	Disabled 50 msec 100 msec 200 msec
Boot Target Scan	Boot path from NVRAM targets	Boot path from NVRAM targets Boot path discovered targets Do not create boot path
Max LUNs Setting	0256	0–4096
Topology	Auto (start FC-AL)	Auto (start FC-AL) Point-to-Point Auto (start Point-to-Point) FC-AL
Delay Device Discovery	0000	0000–0255
Link Speed	0	0 = Auto select 1 = 1 Gb/s 2 = 2 Gb/s 4 = 3 Gb/s 8 = 8 Gb/s

To reset parameters to their factory default settings:

1. On the EFI-BIOS Setup Utility menu (Figure 26) select **4. Reset to Default Values** and press **<Enter>**. The screen shown in Figure 49 is displayed.

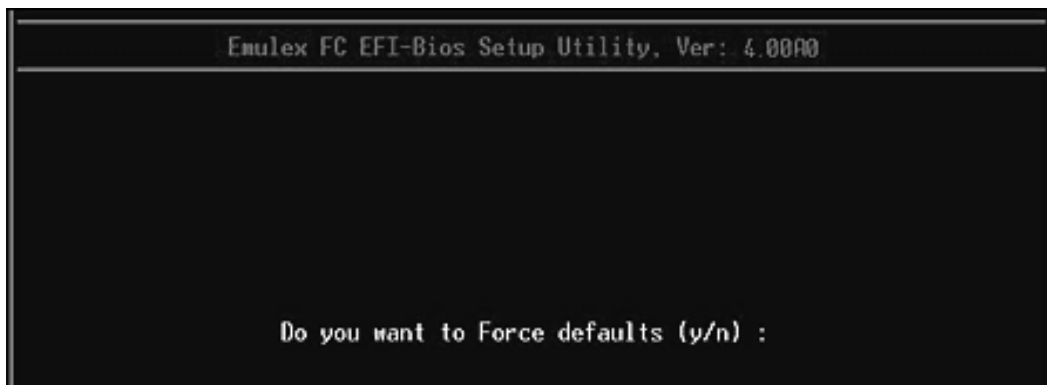


Figure 49: Force Defaults Dialog screen

2. Press **<Y>**. All settings revert to their factory default values.

## Save and Restore Configurations

The EFI utility enables you to save a specific configuration to a file and to restore a previously saved configuration from NVRAM or a file. This allows you to easily apply a specific configuration across multiple adapters or systems, and to restore the appropriate settings if unintended changes are made.

To save or restore a configuration, on the EFI-BIOS Setup Utility menu (Figure 26) select **5. Save/Restore Adapter Config** and press **<Enter>**. The screen shown in Figure 50 is displayed.

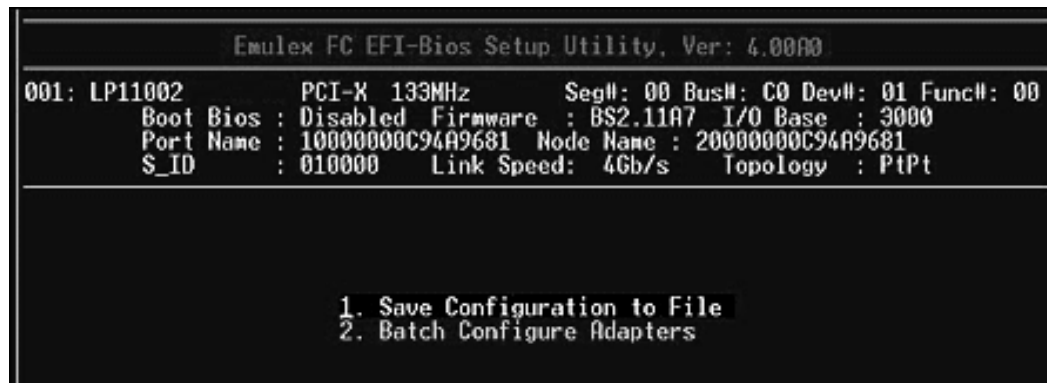


Figure 50: Save Configuration menu

## Save the Configuration to a File

Saving a configuration to a file allows you to reuse the configuration at a later time, such as to restore a changed configuration or to migrate the configuration across other adapters or systems.

The file must be saved to a formatted storage medium with a valid file system recognized by the EFI system firmware or boot code. This can include partitioned and formatted hard drives with a file allocation table (FAT) file system, floppy disk or USB device.

To save configuration to a file:

1. On the Save Configuration menu, select **1. Save Configuration to File**. The screen shown in Figure 51 prompts you to enter a directory path to the file where the configuration is to be saved.

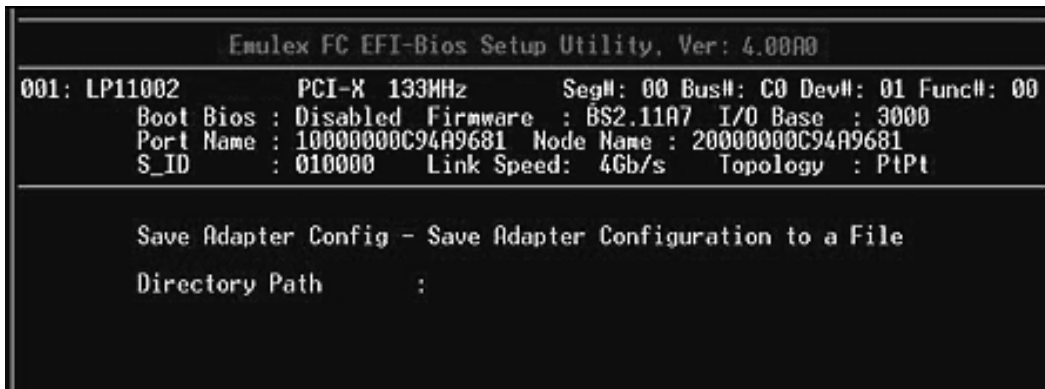


Figure 51: Save Configuration Path screen

2. After you enter the directory path, you are prompted to enter the file name. Do so, and then press **<Enter>**. The screen shown in Figure 52 displays the status of the save.

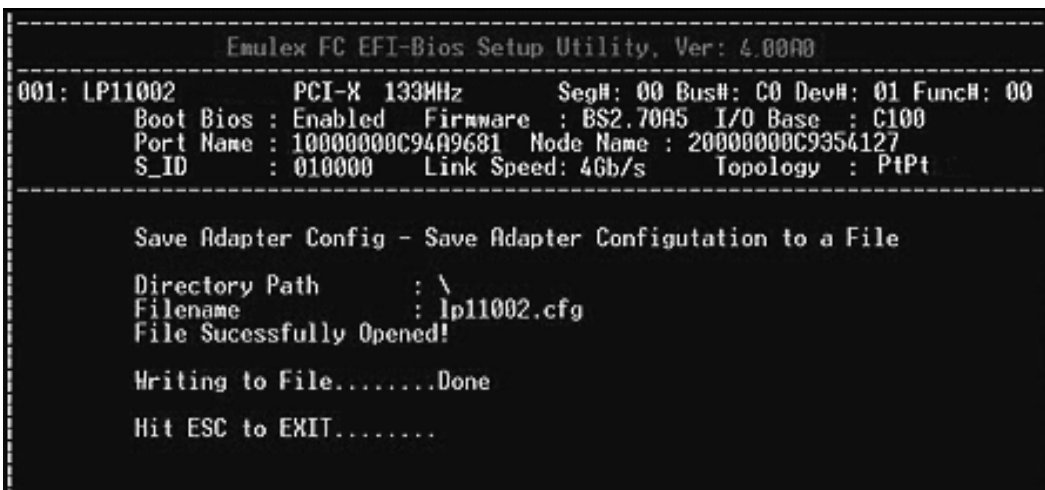


Figure 52: Completed Save Configuration to a File screen

## Batch Configuration

Batch configuration migrates an adapter's configuration across several adapters at the same time.

---

**Note:** No other adapter functions can be performed while batch configuration is in progress.

---

There are two ways to perform batch configuration:

- Migrate the configuration of one adapter to other adapters in the system.
- Migrate the configuration stored in a previously saved configuration file to the adapters in the system. This allows configurations to be migrated across systems.



To migrate the configuration of one adapter to other adapters in the system:

1. On the Save Configuration menu, select **2. Batch Configure Adapters**. You are prompted to select a source for the configuration (Figure 53).

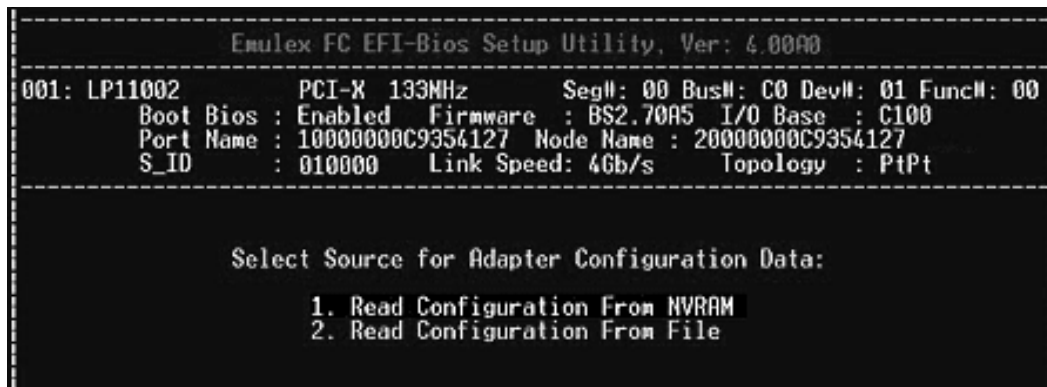


Figure 53: Select Source for Adapter Configuration Data menu

2. Select **1. Read Configuration from NVRAM** and press **<Enter>**. A list of the adapters in the system is displayed (Figure 54).

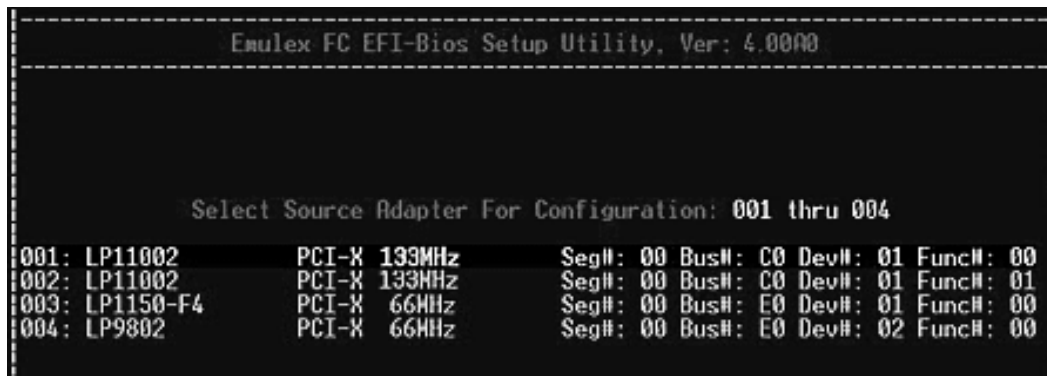


Figure 54: Select Source Adapter for Configuration listing screen

3. Use the up and down arrows on your keyboard to select the source adapter for the configuration and press **<Enter>**. A menu of all adapters in your system, except the source adapter, is displayed (Figure 55).

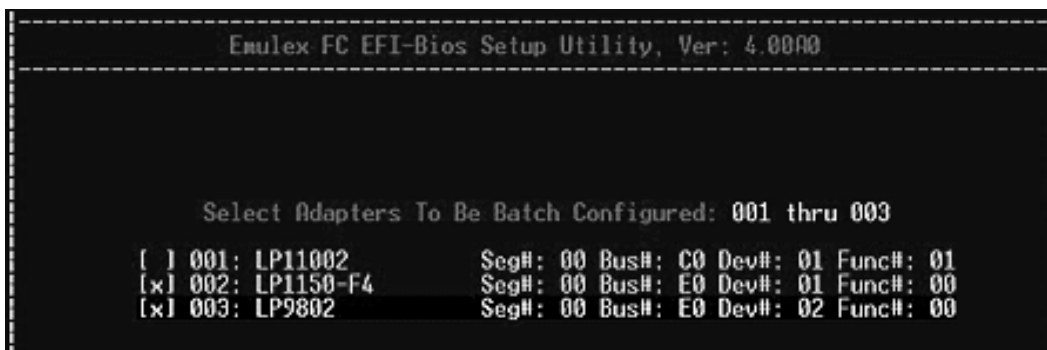


Figure 55: Select Adapters to be Batch Configured listing screen

4. Select (check) the adapters that are to be batch configured. To select an adapter, highlight the row and press the space bar.

- Press **<P>** to configure the selected adapters. If the adapters are configured successfully, a screen similar to Figure 56 is displayed.

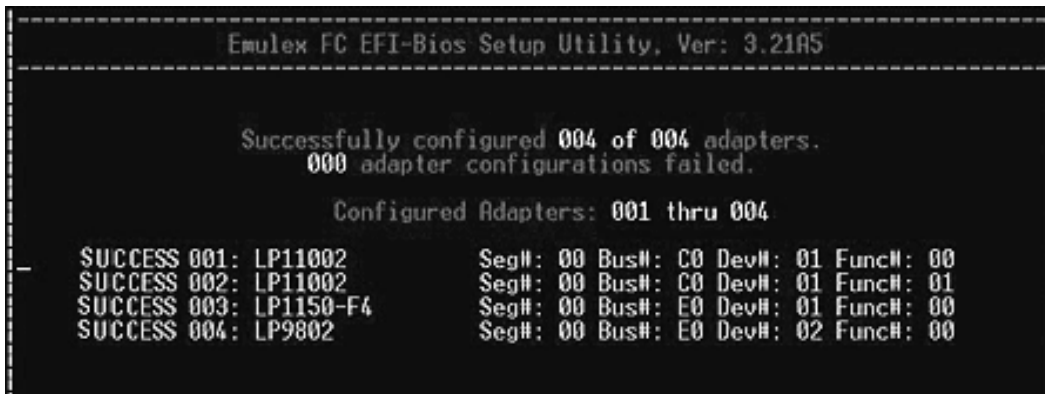


Figure 56: Successful Batch Configuration screen

If all adapters are not configured successfully, a screen similar to Figure 57 is displayed.

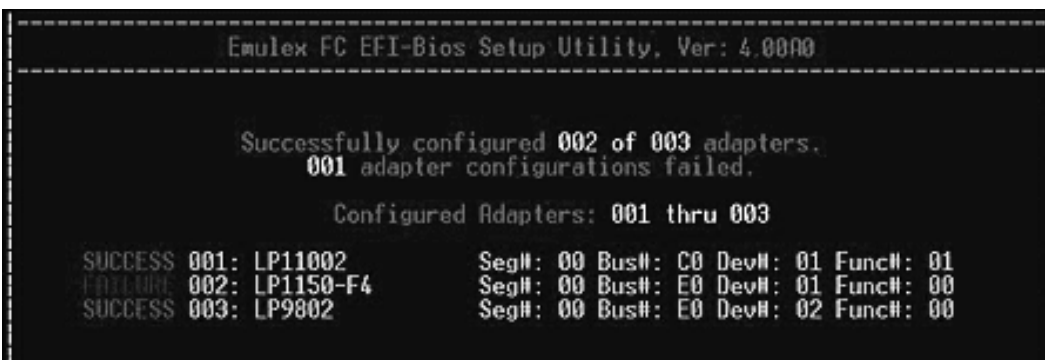


Figure 57: Unsuccessful Adapter Configuration screen

To migrate the configuration stored in a configuration file to the adapters in the system:

- On the Save Configuration menu, select, **2. Batch Configure Adapters**. You are prompted to select a source for the configuration (Figure 53).
- Select **2. Read Configuration From File**. The screen shown in Figure 58 prompts you to enter a directory path to the previously saved configuration file.

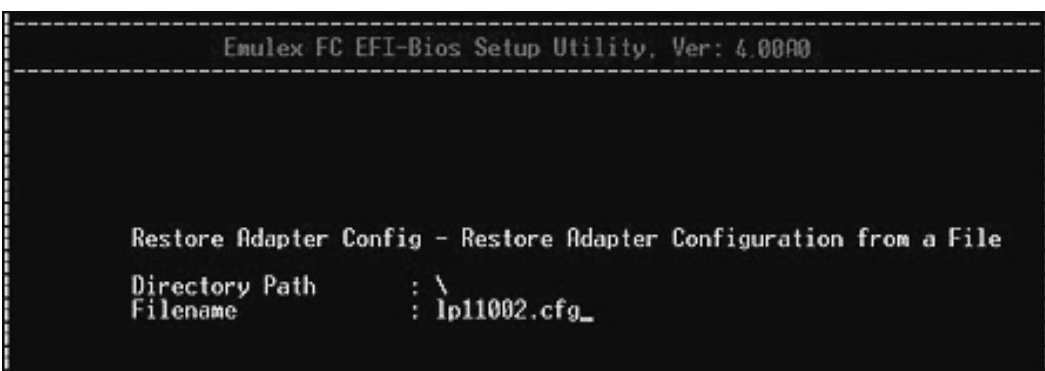


Figure 58: Read Configuration Path screen

- Enter the directory path and file name and press **<Enter>**. A list of the adapters in the system is displayed (Figure 55).



4. Select (check) the adapters that are to be batch configured. To select an adapter, highlight the row and press the space bar.
5. Press <P> to configure the selected adapters. If the adapters are configured successfully, the screen shown in Figure 56 is displayed.

If all adapters are not configured successfully, the screen shown in Figure 57 is displayed.

## Updating an Adapter's Firmware or Boot Code

### Updating a Single Adapter

**Note:** If you are updating boot code on an adapter that is already attached to a boot device, it is recommended that you use the EFI utility, and not another utility such as the HBAnyware utility, to perform the update.

To update the boot code using the EFI utility:

1. On the main EFI utility menu, select **2. Firmware Update**, and press <Enter>.
2. On the Firmware Update Utility menu, select **1. Update Selected Adapter**, and press <Enter>.

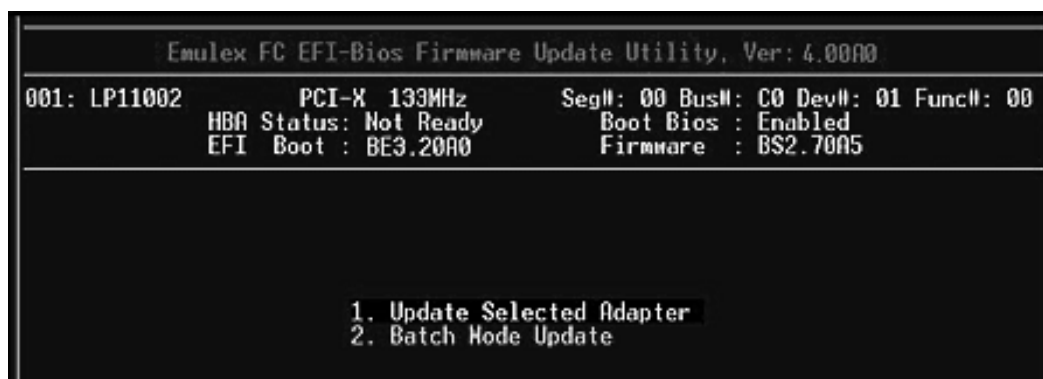


Figure 59: Update Selected Adapter

3. Enter the directory path and filename in the screen that is displayed (Figure 60). Press <Enter>.

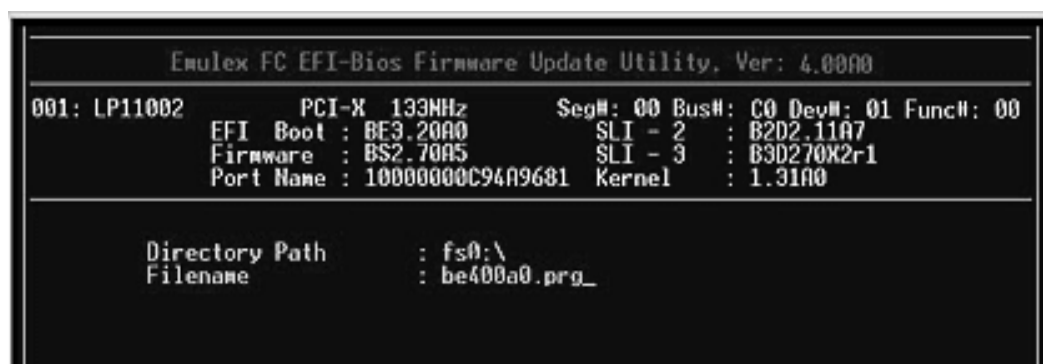


Figure 60: Directory Path and Filename Information

The boot code is updated on the selected adapter. Information similar to Figure 61 is displayed.

```

Emulex FC EFI-Bios Firmware Update Utility, Ver: 4.00A0

001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
      EFI Boot : BE3.20A0          SLI - 2 : B2D2.11A7
      Firmware : BS2.11A7          SLI - 3 : B3D270X2r1
      Port Name : 10000000C94A9681 Kernel : 1.31A0

Directory Path      : fs0:\temp\ebc
Filename            : be400a0.prg
File Open           : Done
Validate Adapter    : Done
Flash Erase         : Done
Flash Program       : Done
Wakeup Program      : Done
  
```

Figure 61: Successful Boot Code Update screen

4. Reboot the system for this change to take effect.

## Update Firmware or Boot Code Across Multiple Adapters

1. On the main EFI utility menu select **2. Firmware Update**, and press **<Enter>**. The Firmware Update Utility menu is displayed (Figure 59).
2. Select **2. Batch Mode Update**, and press **<Enter>**. A list of all adapters of the model selected when you started the EFI utility is displayed (Figure 62).

```

Emulex FC EFI-Bios Firmware Update Utility, Ver: 4.00A0

Compatible adapters in this System: 001 thru 002

[ ] 001: LP11002      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
[ ] 002: LP11002      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 01
  
```

Figure 62: Compatible Adapter List

3. Check the adapters you want to update. To select an adapter, use the up/down arrow keys to highlight it, and press the space bar.
4. Press **<P>** to update the firmware or boot code. You are prompted for a directory path and file name for the firmware or boot code image file (Figure 63). Enter the path and file name, and then press **<Enter>**.

```

Emulex FC EFI-Bios Firmware Update Utility, Ver: 4.00A0

Enter firmware path for adapter family

Directory Path      : fs0:\400a0\prg
Filename            : be400a0.prg
  
```

Figure 63: Batch Mode Update path screen

The boot code update begins on the first adapter. Information similar to Figure 64 is displayed for each adapter:

```

-----
Emulex FC EFI-Bios Firmware Update Utility, Ver: 4.00A0
-----
001: LP11002      PCI-X 133MHz      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
      HBA Status: Not Ready      Boot Bios : Enabled
      EFI Boot : BE3.20A0        Firmware  : BS2.70A5
-----

      Updating adapter number: 001 of 002

      Validate Adapter      : Done.
      Flash Erase           : Done.
      Flash Program         : Done.
      WakeUp Parameter      : Updated._
  
```

Figure 64: Boot Code Update Progress screen

After all adapters are updated, a listing with success or failure status is displayed (Figure 65).

```

-----
Emulex FC EFI-Bios Firmware Update Utility, Ver: 4.00A0
-----

      Successfully updated 002 of 002 adapters. 000 adapter updates failed.

      Adapters selected for update: 001 thru 002

-   SUCCESS 001: LP11002      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 00
      SUCCESS 002: LP11002      Seg#: 00 Bus#: C0 Dev#: 01 Func#: 01
  
```

Figure 65: Successful Batch Update screen

## EFIBoot Reference

### Driver Handle Table Column Definitions

To view Emulex driver handle information, at the shell prompt type:

```
drivers
```

A list of drivers is displayed.

```
fs0:\> drivers
```

D	R	V	E	G	C	F	I	A	#D	#C	DRIVER NAME	IMAGE NAME
VERSION												
15	00000001	B	-	-	1	1			1	1	DebugPort Driver	73E9457A-CEA1-4917-
52	00000001	D	-	-	1	-			-	-	National(R) PC8741x SIO Driver	C5DAC13B-8D24-4B8E-
5B	00000000	?	-	-	-	-			-	-	BIOS[INT10] VGA Mini Port Driver	BBDAC3A1-B06F-4A4E-
5C	00000000	?	-	-	-	-			-	-	BIOS[INT16] Keyboard Driver	5479662B-6AE4-49E8-
5D	00000000	?	-	-	-	-			-	-	BIOS[UNDI] Simple Network Protocol	D0CAA91E-2DE4-4B0D-
5E	00000010	?	-	-	-	-			-	-	BIOS[INT13] Block Io Driver	4495E47E-42A9-4007-
5F	00000024	?	-	-	-	-			-	-	BIOS[INT10] Video Driver	29CF55F8-B675-4F5D-
60	00000010	D	-	-	2	-			-	-	Platform Console Management Driver	51CCF399-4FDF-4E55-
61	00000010	D	-	-	1	-			-	-	Platform Console Management Driver	51CCF399-4FDF-4E55-
62	00000010	B	-	-	1	1			1	1	Console Splitter Driver	408EDCEC-CF6D-477C-
63	00000010	?	-	-	-	-			-	-	Console Splitter Driver	408EDCEC-CF6D-477C-
64	00000010	B	-	-	2	2			2	2	Console Splitter Driver	408EDCEC-CF6D-477C-
65	00000010	B	-	-	2	2			2	2	Console Splitter Driver	408EDCEC-CF6D-477C-
69	00000010	D	-	-	1	-			-	-	UGA Console Driver	CCC80C28-4B24-11D5-
6A	00000010	B	-	-	1	1			1	1	Serial Terminal Driver	9F863906-A40F-4875-
6B	00000010	?	-	-	-	-			-	-	VGA Class Driver	BF89F10D-B205-474F-
6C	00000010	D	-	-	9	-			-	-	Generic Disk I/O Driver	490E1CEA-B81C-11D4-
C2	00032013	B	X	X	1	24			1	24	Emulex SCSI Pass Thru Driver	\Velxcli320a3.efi

Figure 66: Driver Listing screen

### Driver Handle Table Column Definitions

**Drv** - The device driver handle number.

**Version** - The driver version.

**Type** - The device type. D indicates a device driver. B indicates a Bus driver.

**Cfg** - If this column is marked with an X, the driver is supported by the EFI utility (configuration protocol).

**Diag** - If this column is marked with an X, the driver is supported by the EFI diagnostic protocol.

**#D** - The number of devices for the driver.

**#C** - The number of child devices for the driver (Bus drivers only).

**Driver Name and Image Name** - The driver and image name.

## Topology Information

### Arbitrated Loop Operation

- FC-AL (Loop) topology only is used. After successful loop initialization, the driver attempts login with FL\_PORT (switched fabric loop port).
- If FL\_PORT login is successful, public loop operation is entered.
- If FL\_PORT login is unsuccessful, private loop mode is entered.

### Point-to-Point Operation

- If F\_PORT (point-to-point) login is successful, fabric mode is used.
- If F\_PORT login is unsuccessful, N\_PORT-to-N\_PORT direct connection topology is used.
- If a switch is discovered, the driver performs the following tasks:
  - FL\_PORT login (FC-AL topology) or F\_PORT login (Point-to-Point topology).
  - Simple Name Server login.
  - State Change Registration.
  - Symbolic Name Registration.
  - FCP Type Registration if RegFcpType is set to 1.
  - Driver logs out and re-logs in. The name server indicates that registration is complete.
  - Simple Name Server Query for devices (the registry parameter SnsAll determines whether all N\_PORTS are requested or only SCSI FCP N\_PORTS).
  - Discovery/device creation occurs for each target device described by the name server.
  - RSCN and LOGO/PRLO are handled by the driver. Reception of either causes new discovery/logins to take place.

---

**Note:** In a fabric environment, the order in which disk devices are created is based on the name server response data (which is not guaranteed to be in any special order). Between successive boots, the same device may be identified with a different physical device number. However, any devices that have been assigned a device letter through the disk administrator continue to use that letter regardless of the physical device number.

---

## Configure EFIBoot via UEFI HII (Human Interface Infrastructure) in a UEFI 2.1 System

---

**Note:** EFIBoot is not supported on converged network adapters (CNAs) such as the LP21000 and LP21002

---

**Note:** If you have several adapters in your system, the UEFI system firmware or boot code uses the highest version driver that is on one of your adapters. Adapters with older versions of EFIBoot are managed by the more recent version, but only as long as the adapter with the most recent version is in the system. The adapters must be updated to actually update and not just use the most recent version available.

---

### Start the Emulex Configuration Utility

Depending on the OEM UEFI configuration, the Emulex Configuration Utility may appear under different setup menus in OEM system firmware or BIOS. This description applies to systems where the Emulex Utility is found under "System Settings."

To start the Emulex Configuration utility:

1. From the System Settings screen, select **Emulex Configuration Utility** and press **<Enter>**.

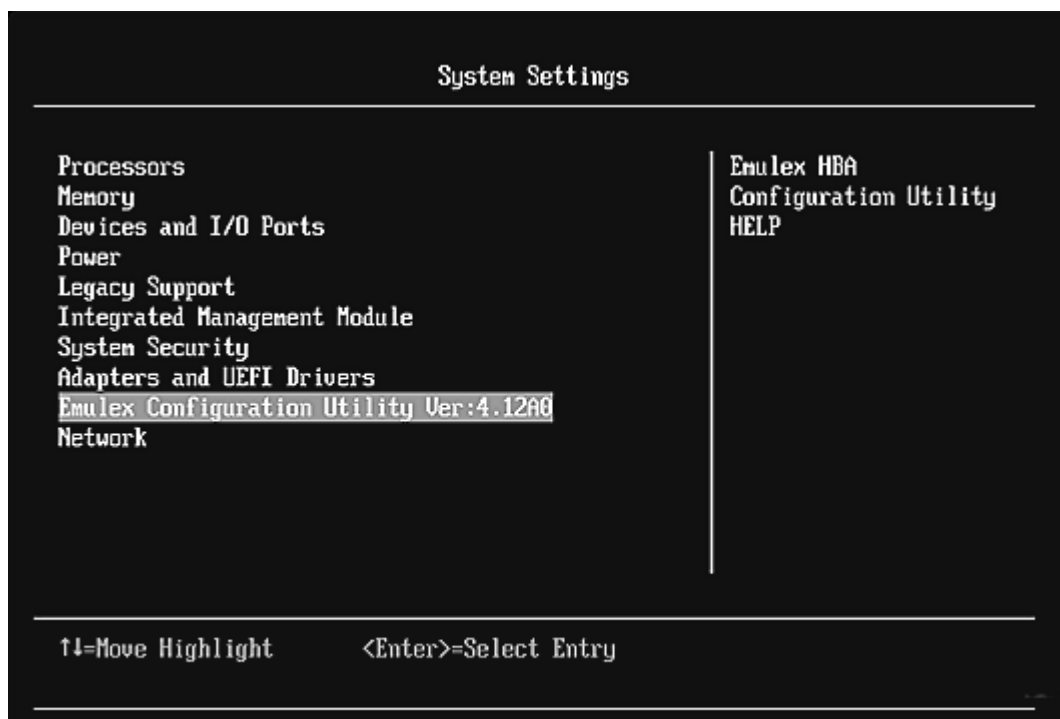


Figure 67: System Settings screen

- The Emulex Configuration Utility screen appears with **Emulex Configuration Setup Utility** selected. Press **<Enter>**.

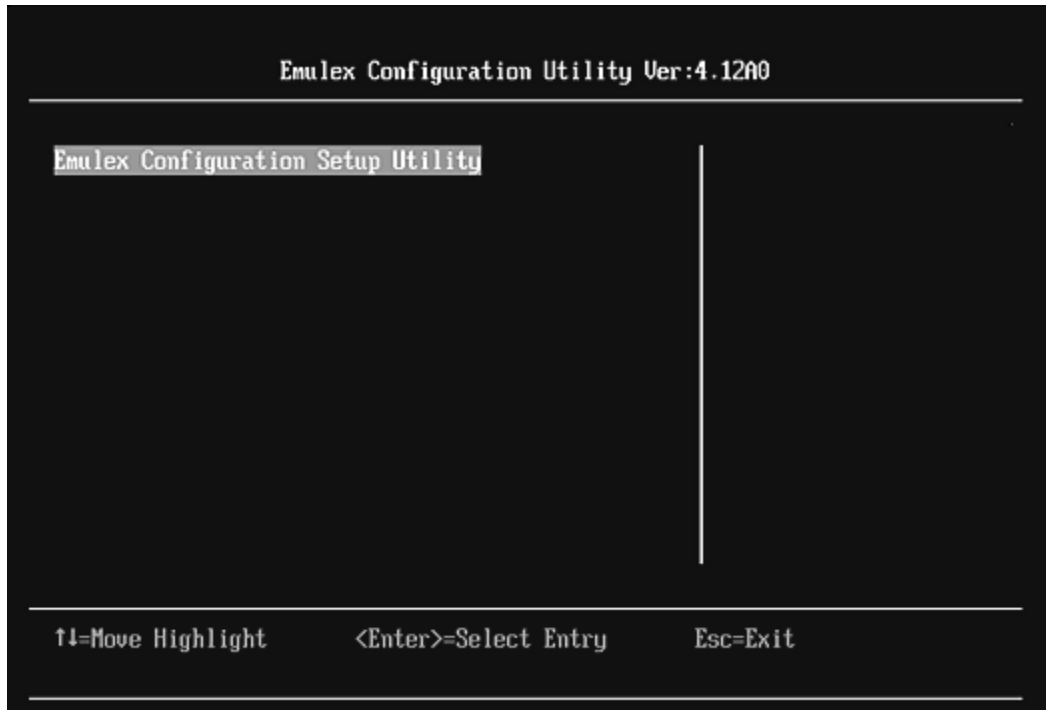


Figure 68: Emulex Configuration Setup Utility screen

A list of all the adapters in the system is displayed. Your list may vary depending on the installed adapters. Locate the adapter you want to configure. Use the up/down arrows on your keyboard to select it, and press **<Enter>**.

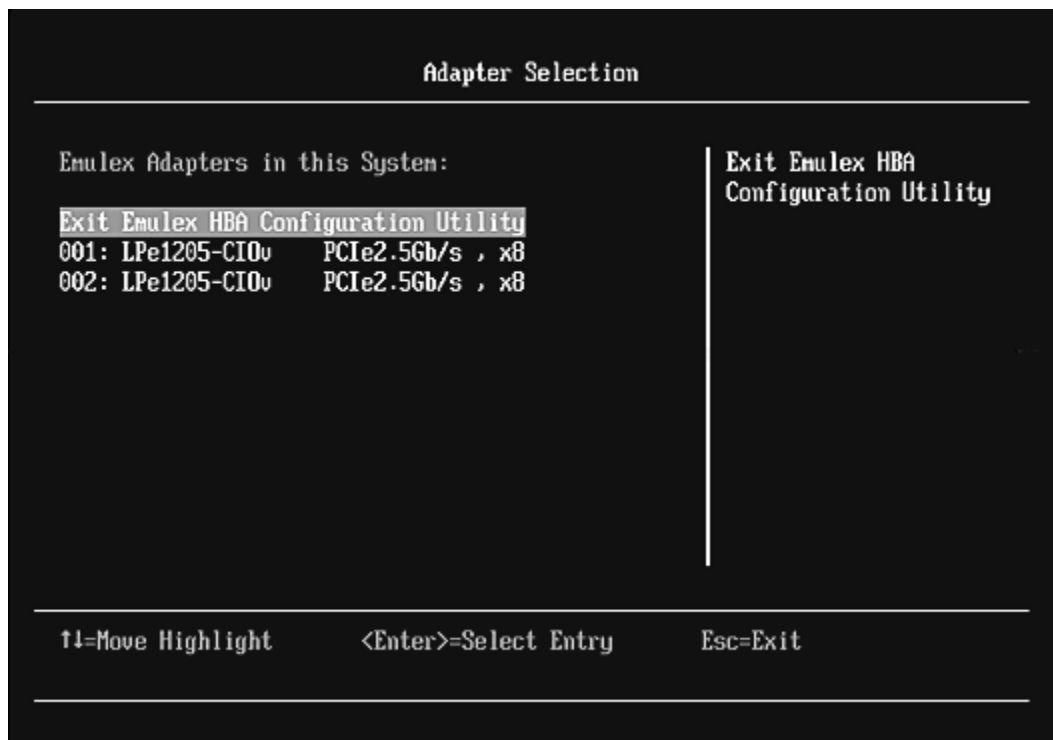


Figure 69: Adapter Selection screen

The Emulex Adapter Configuration Main Menu is displayed. Select the function you want and press <Enter>.

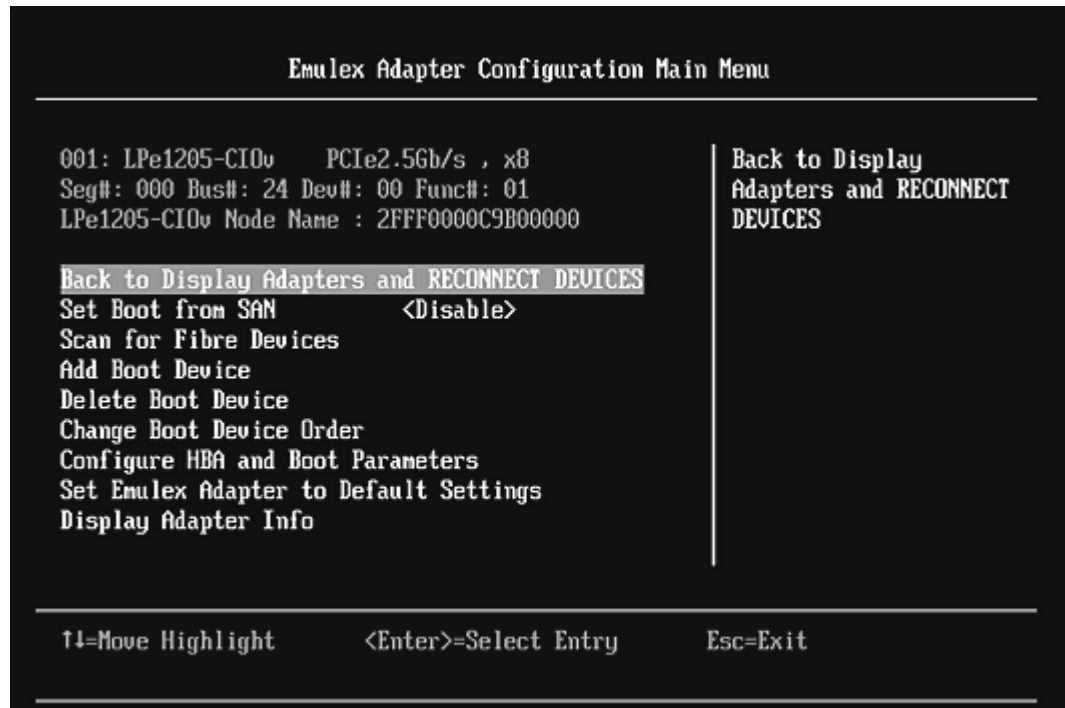


Figure 70: Emulex Adapter Configuration Main Menu menu



## EFI Utility Conventions in UEFI/HII

The EFI utility has menus and configuration screens. Use the following methods to navigate them:

- Press the up/down arrows on your keyboard to move through and select menu options or configuration fields. When multiple adapters are listed, use the up/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.
- Ensure you select **Back to Display Adapters and RECONNECT DEVICES** from the Main menu when you are finished configuring an adapter. You are returned to the adapter list.

## Configure EFIBoot in UEFI/HII

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

- Set Boot from SAN
- Scan for Fibre Devices
- Add and delete boot devices
- Change boot device order
- Configure HBA and boot parameters
- Set adapters to their default settings
- Display adapter information

### Set Boot from SAN

To set boot from SAN:

1. From the Adapter Selection screen, select the adapter whose boot from SAN setting you want to change and press **<Enter>**.
2. From the Main menu, select **Boot from SAN**. The current boot setting is displayed. Press **<Enter>**. A Disable/Enable menu appears.

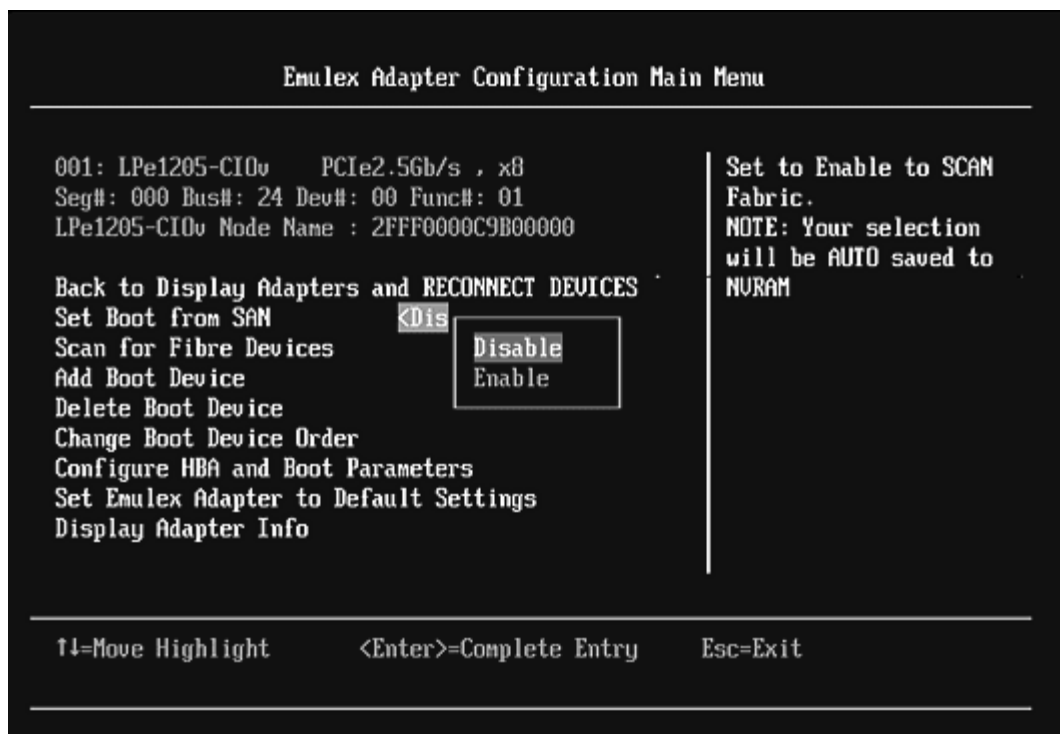


Figure 71: Main Menu, Boot from SAN Options menu

3. Make your selection and press **<Enter>**. The utility displays the new boot from SAN setting.

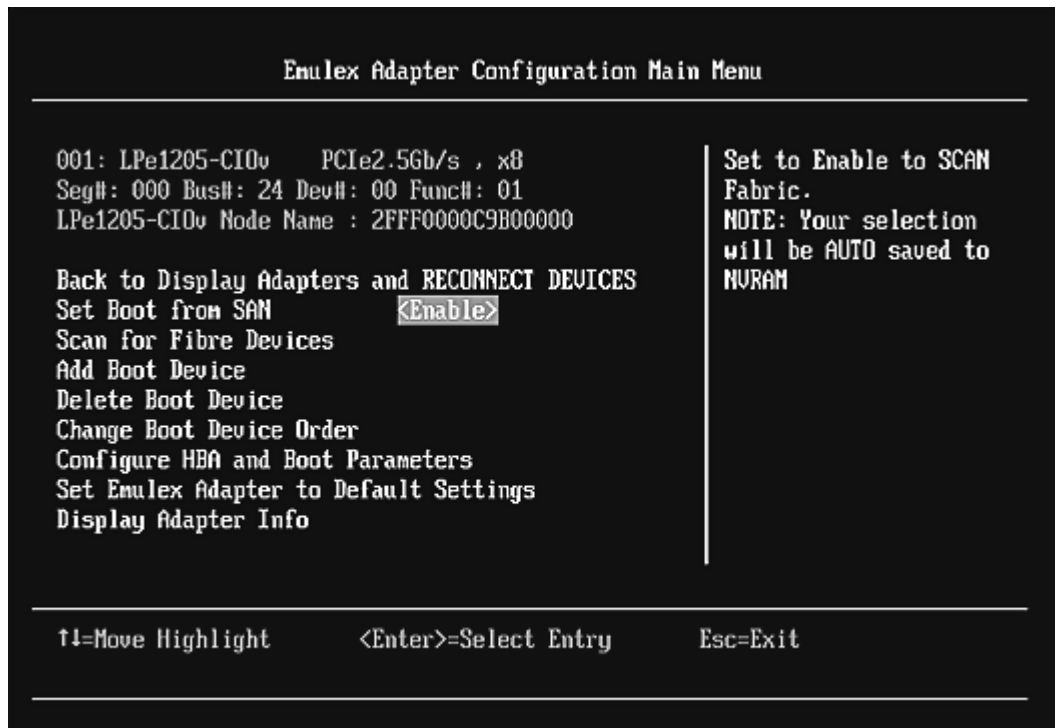


Figure 72: New Boot from SAN setting

## Scan for Fibre Devices

---

To scan for Fibre devices:

1. From the Adapter Selection screen, select the adapter that you want to scan for Fibre devices and press **<Enter>**.

- From the Main menu, select **Scan for Fibre 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. To add or configure boot devices, see the following sections.

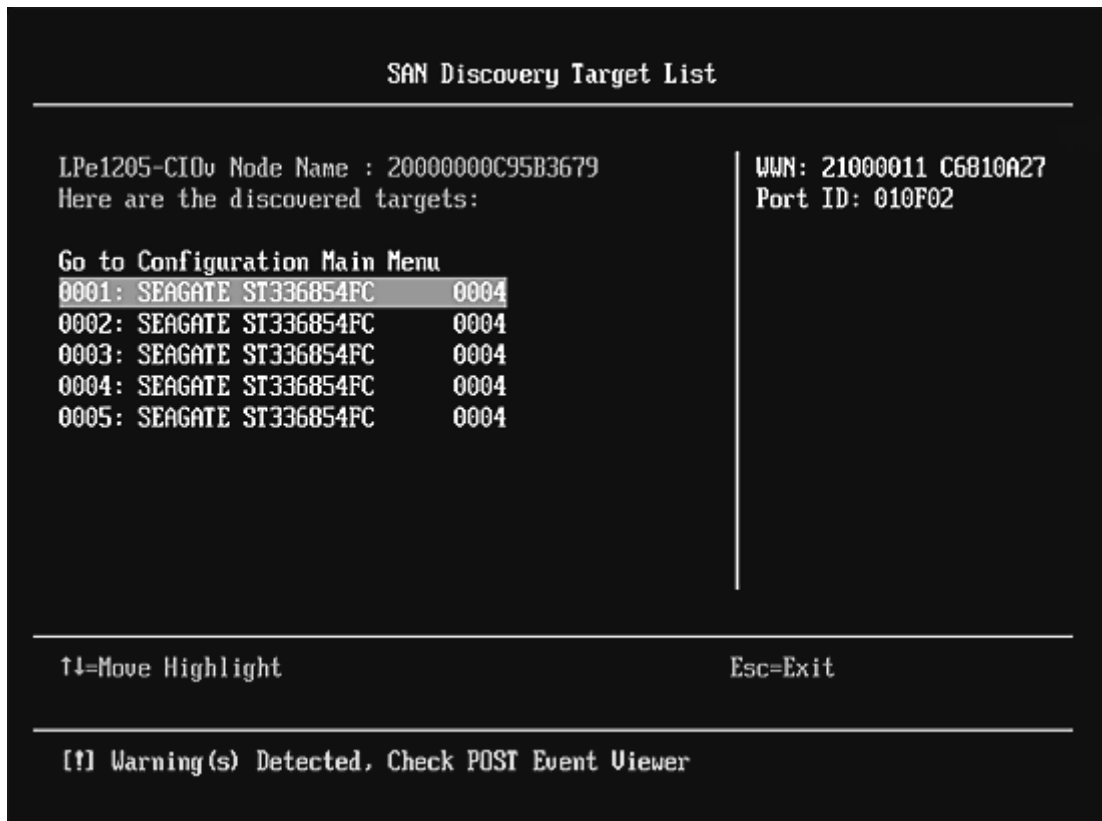


Figure 73: Discovered Targets screen

## Add Boot Devices

To add a boot device:

- From the Adapter Selection screen, select the adapter to which you want to add a boot device and press **<Enter>**.

- From the Main menu, select **Add Boot Device** and press **<Enter>**. A screen appears displaying the discovered targets.

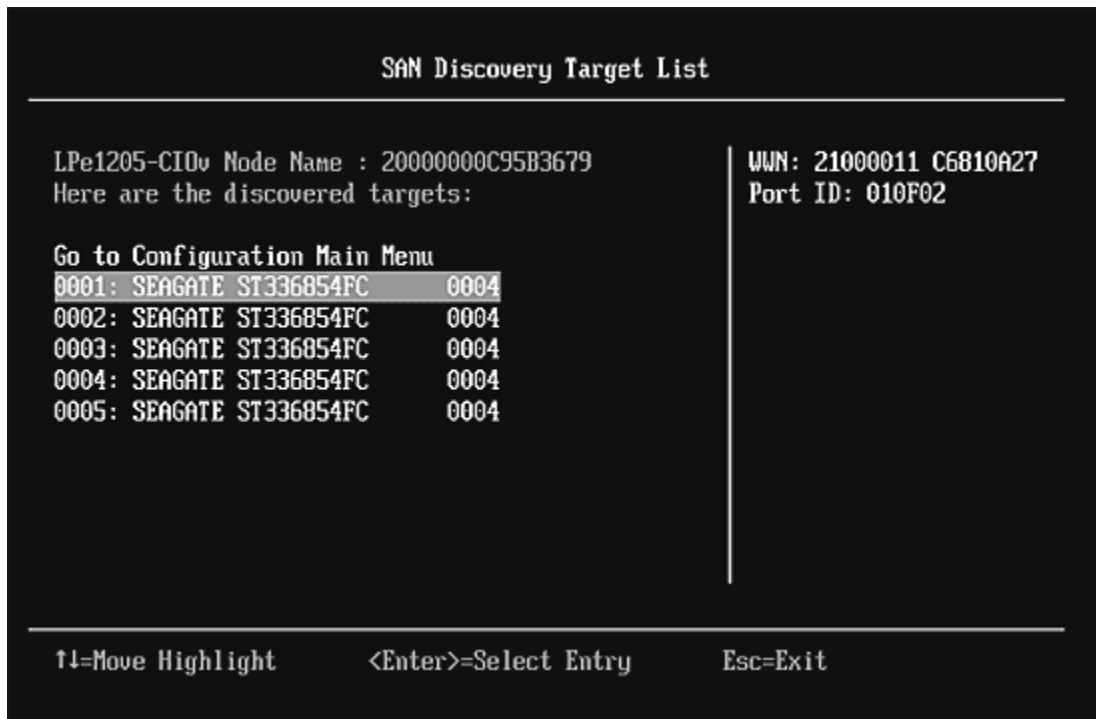


Figure 74: Discovered Targets screen

- Select the target you want and press **<Enter>**. A list of bootable LUNS is displayed.

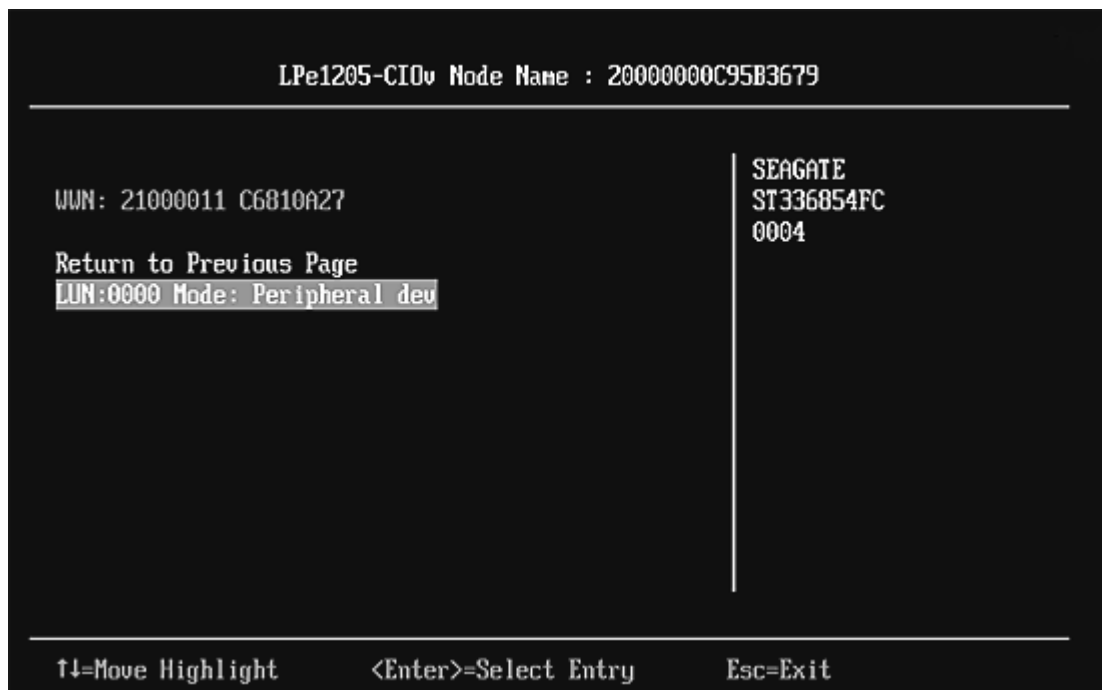


Figure 75: Boot Device screen

4. Select the boot device you want to add and press **<Enter>**. A menu appears enabling you to commit or discard your changes.

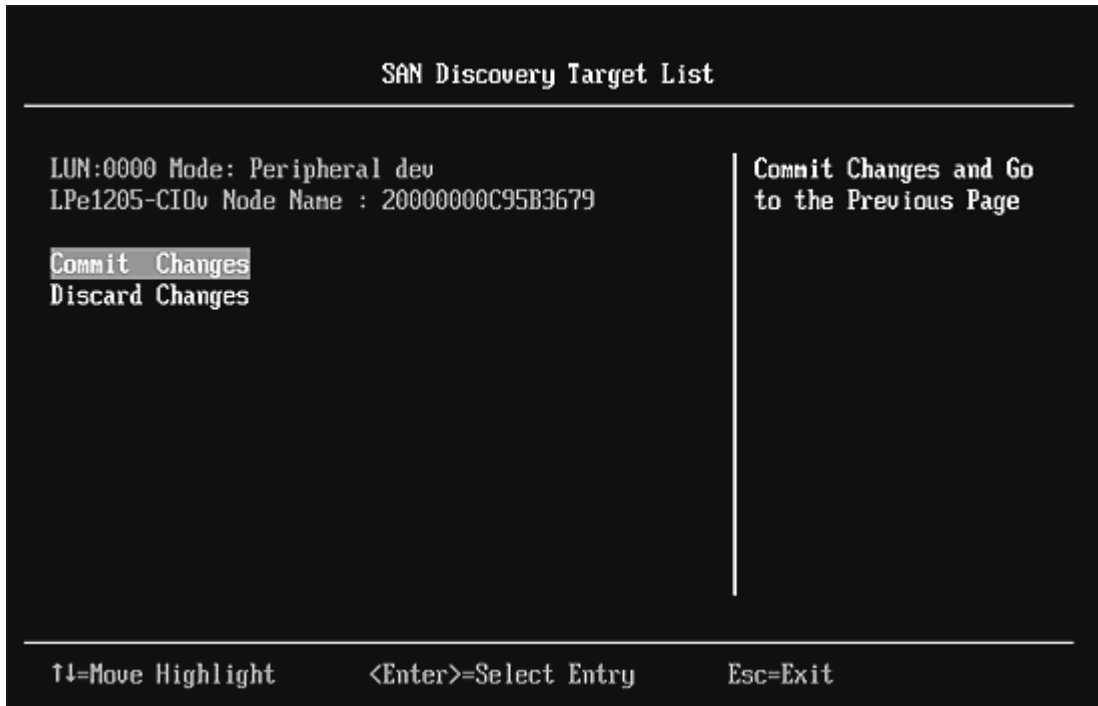


Figure 76: Commit/Discard Changes menu screen

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

## Delete Boot Devices

---

To delete boot devices:

1. From the Adapter Selection screen, select the adapter from which you want to delete a boot devices and press **<Enter>**.

- From the Main menu, select **Delete Boot Device** and press **<Enter>**. A list of boot devices is displayed.



Figure 77: Boot Device screen

- Select the boot device you want to delete and press **<Space>**. The device appears with an **X** beside it.

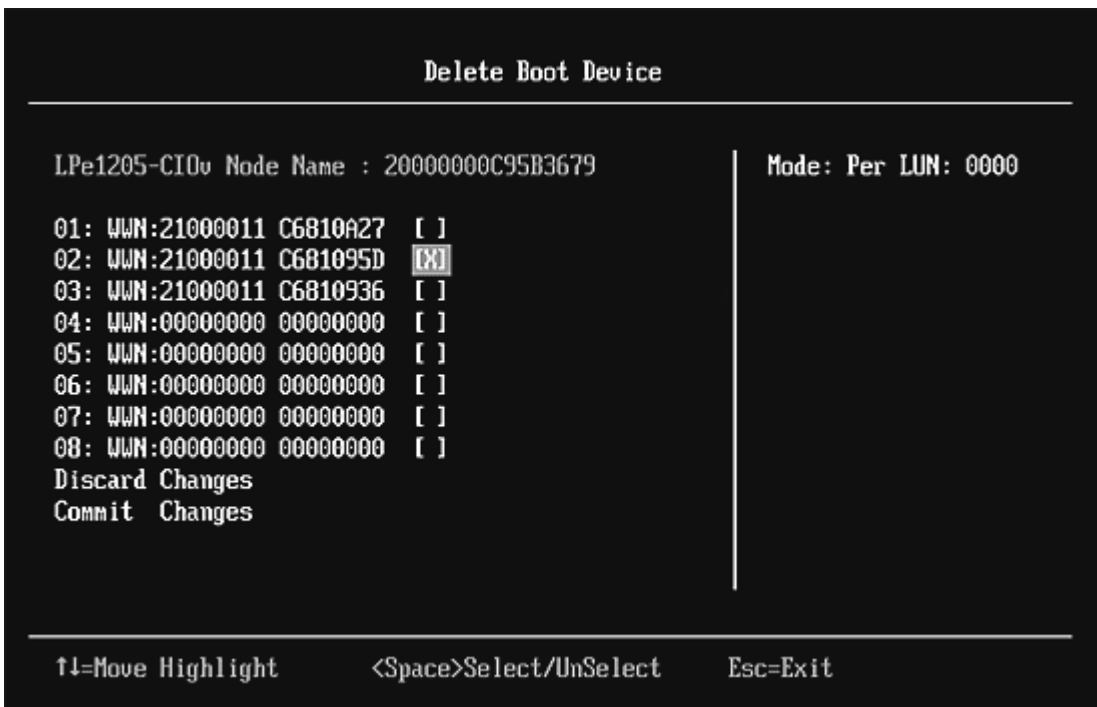


Figure 78: Selected Boot device appears with an X

- Select **Commit Changes** and press **<Enter>**.

## Change Boot Device Order

To change boot device order:

1. From the Adapter Selection screen, select the adapter whose boot device order you want to change and press **<Enter>**.
2. From the Main menu, select **Change Boot Device Order** and press **<Enter>**. A screen displaying the discovered targets appears.



Figure 79: Discovered Targets screen



3. Select **Boot Device Order** and press **<Enter>**. A screen appears displaying the boot device order.

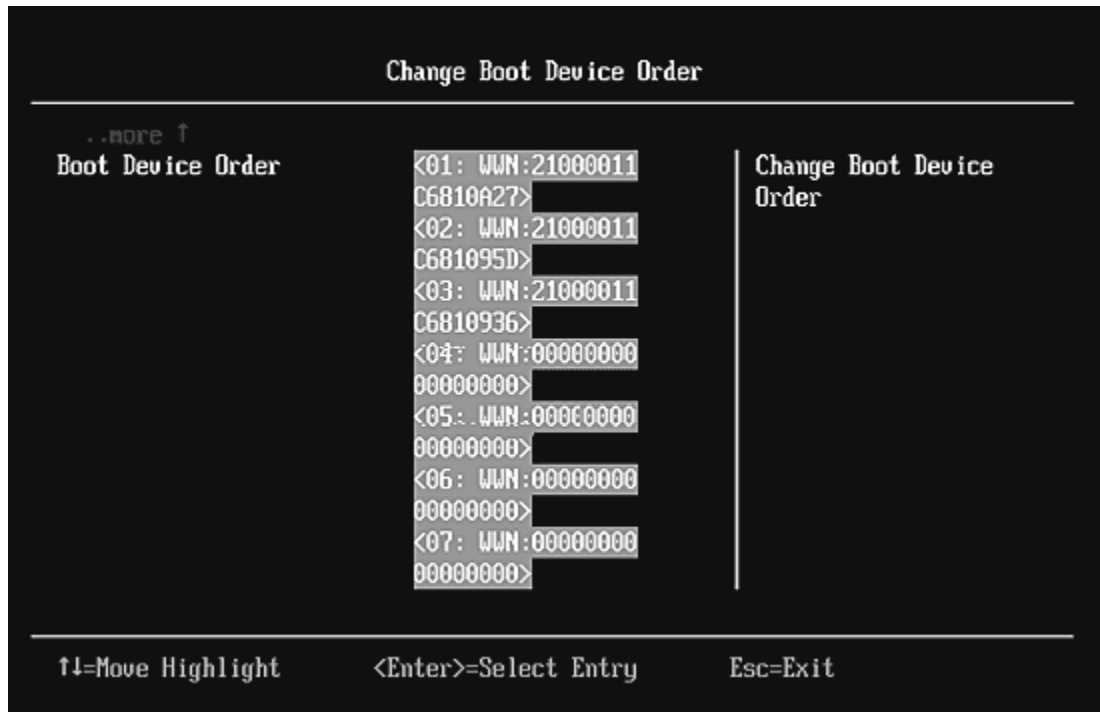


Figure 80: Boot Device Order screen

4. Press **<Enter>**. The Boot Device Order menu screen appears.

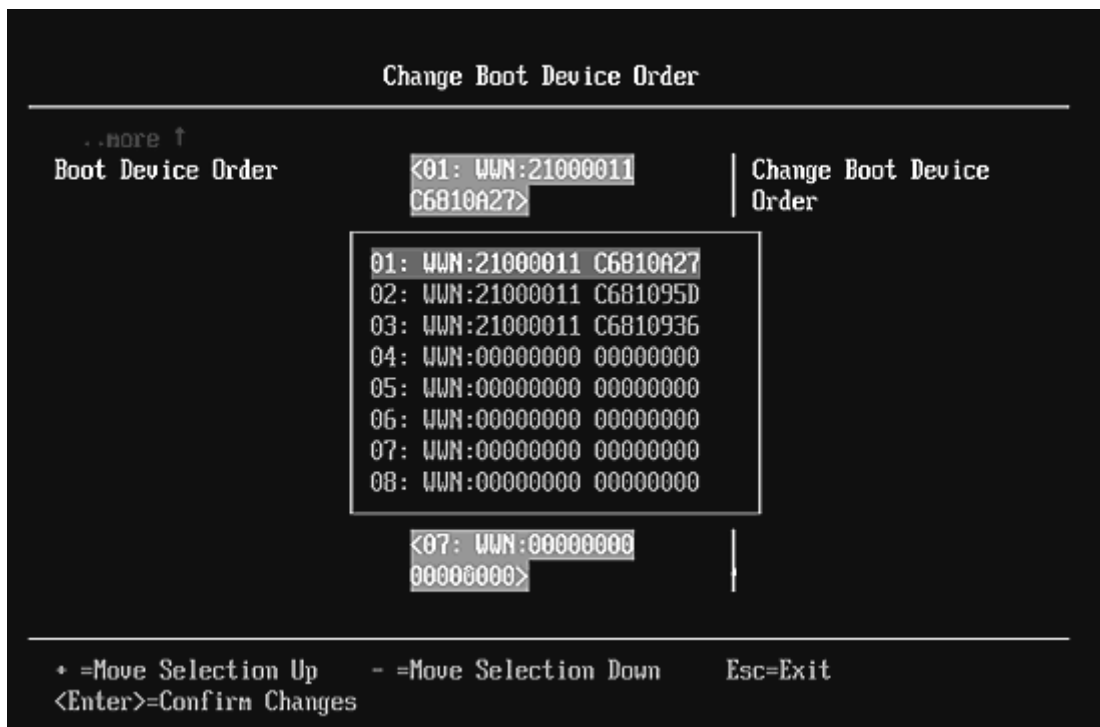


Figure 81: Boot Device Order menu screen

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> and choose **Commit Changes**.

## Configure Adapter Parameters

The EFI utility enables you to configure the following adapter parameters:

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

To configure adapter parameters:

1. From the Adapter Selection screen, select the adapter whose parameters you want to configure and press <Enter>.
2. From the Main menu, select **Configure HBA and Boot Parameters** and press <Enter>. The Configuration menu screen appears.

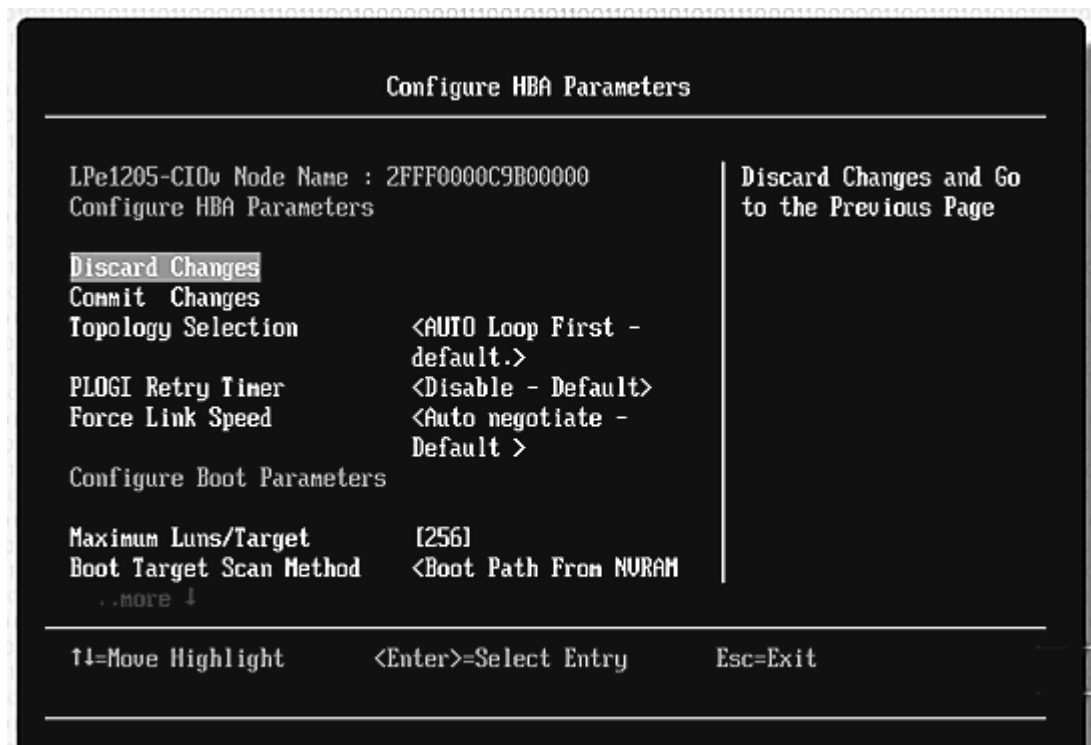


Figure 82: Adapter Configuration menu screen

## Change the Topology

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

- Auto Loop first - default
- Auto point to point first
- Point to point
- FCAL

To change the topology:

1. From the Adapter Selection screen, select the adapter whose topology you want to change and press **<Enter>**.
2. From the Configure HBA Parameters menu, navigate to **Topology Selection** and press **<Enter>**. The Topology menu screen appears.

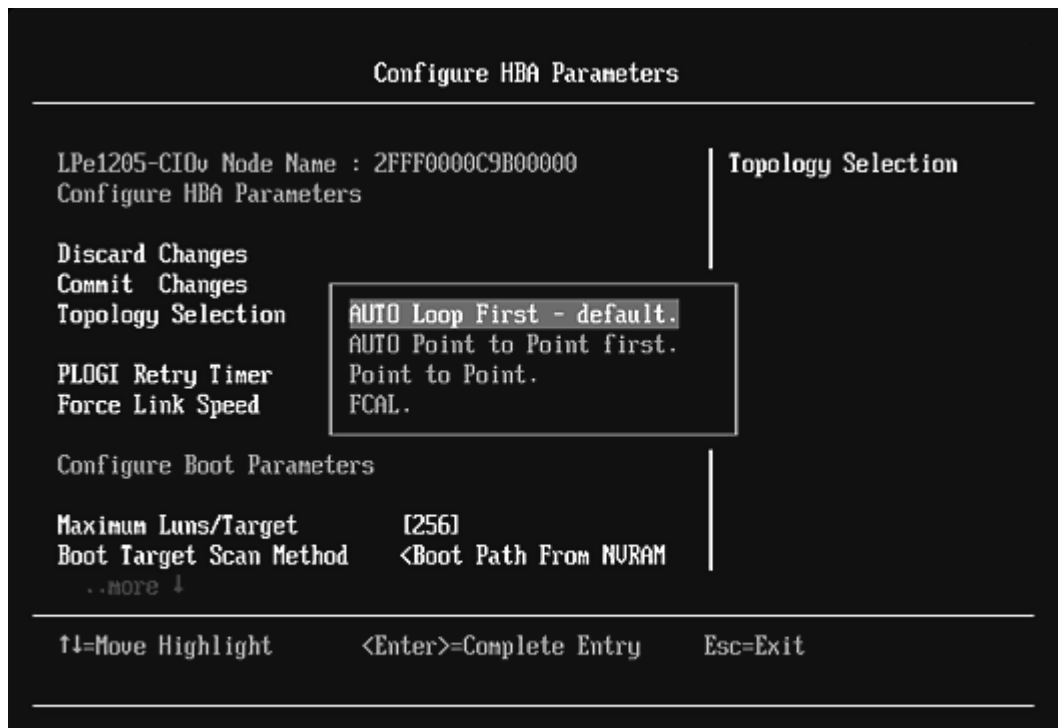


Figure 83: Topology menu screen

3. Select a topology and press **<Enter>**. The screen is refreshed with the new value.

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

Press **<Esc>** to return to the EFI utility menu.

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

## Change the PLOGI Retry Timer

This option allows you to set the interval for the port login (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:

- Disable - Default
- 50 Msec
- 100 Msec
- 200 Msec

To change timer values:

1. From the Adapter Selection screen, select the adapter whose PLOGI retry timer information you want to change and press **<Enter>**.
2. From the Configure HBA Parameters menu, navigate to **PLOGI Retry Timer** and press **<Enter>**. The PLOGI Retry Timer menu appears.

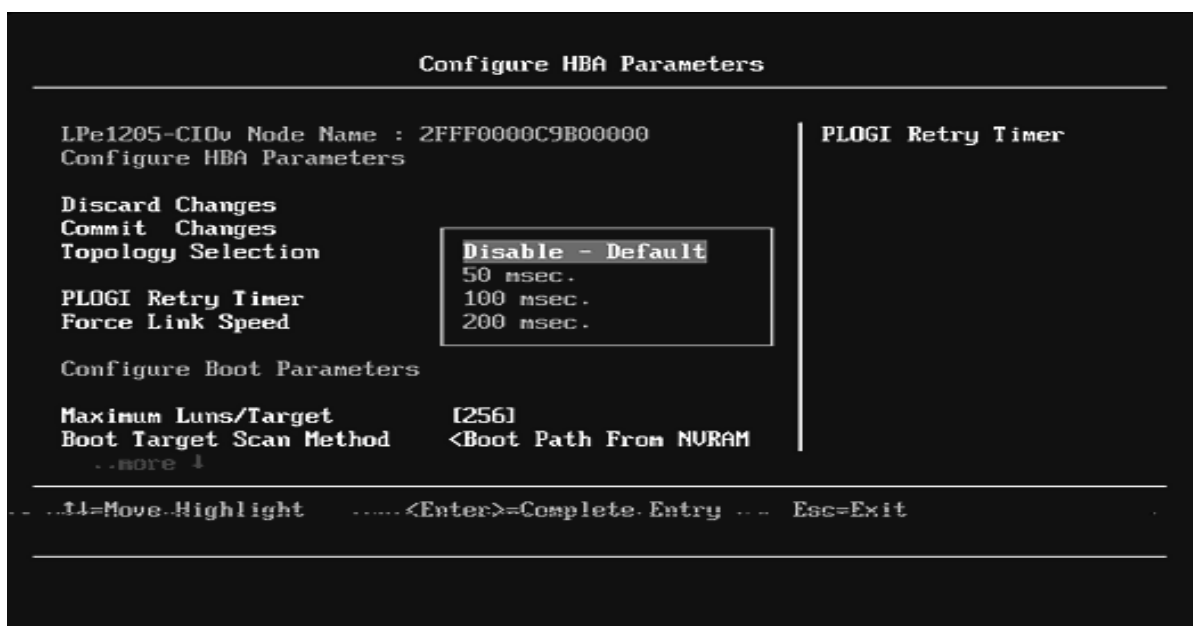


Figure 84: PLOGI Retry Timer menu screen

3. Select a retry timer option and press **<Enter>**. The screen is refreshed with the new value.

**Note:** Press **<Esc>** to return to the EFI utility menu.

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

## Change the Link Speed

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

Possible link speed choices:

- Auto negotiate - Default
- 1 Gb/s
- 2 Gb/s
- 4 Gb/s
- 8 Gb/s

To change the link speed:

1. From the Adapter Selection screen, select the adapter whose link speed you want to change and press **<Enter>**.
2. From the Configure HBA Parameters menu, navigate to **Force Link Speed** and press **<Enter>**. The Force Link Speed menu appears.

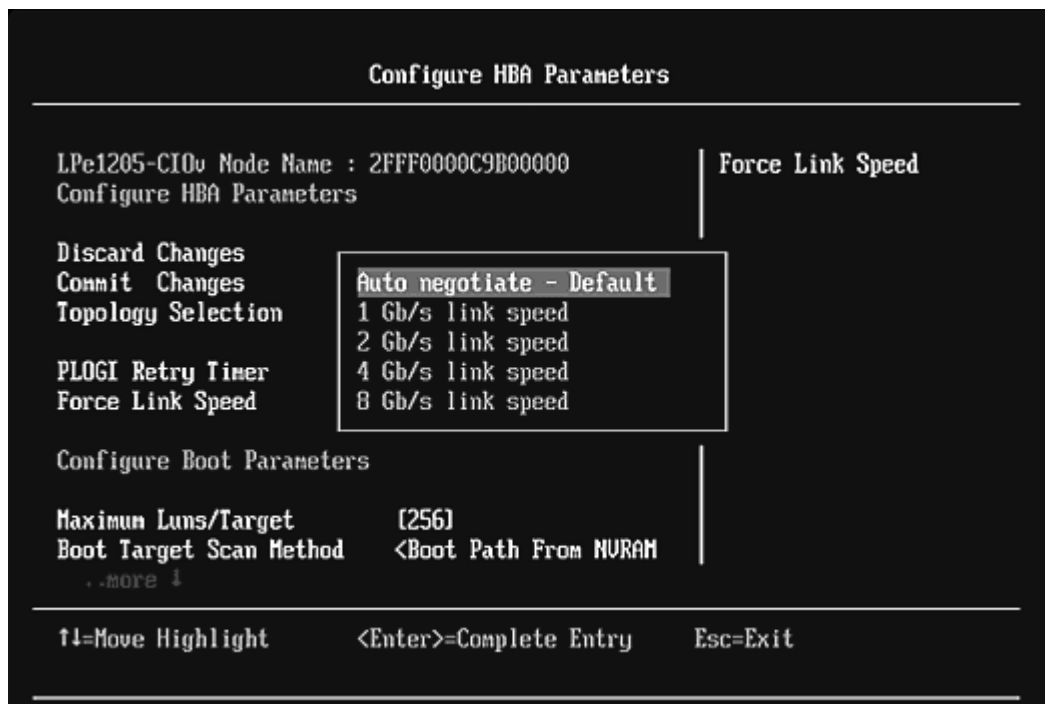


Figure 85: Force Link Speed menu screen

3. Select a link speed and press **<Enter>**.

**Note:** Emulex's 8 Gb/s adapters do not support 1 Gb/s link speed.

4. The screen is refreshed with the new value.

**Note:** Press **<Esc>** to return to the EFI utility menu.

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

## Configure Boot Parameters

You can change the:

- Maximum LUNS/Targets
- Boot Target Scan method
- Device Discovery Delay

### Change 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:

1. From the Adapter Selection screen, select the adapter whose maximum LUNs per target information you want to change and press **<Enter>**.
2. From the Configure Boot Parameters menu, navigate to **Maximum LUNs/Target** and press **<Enter>**. The screen becomes editable.

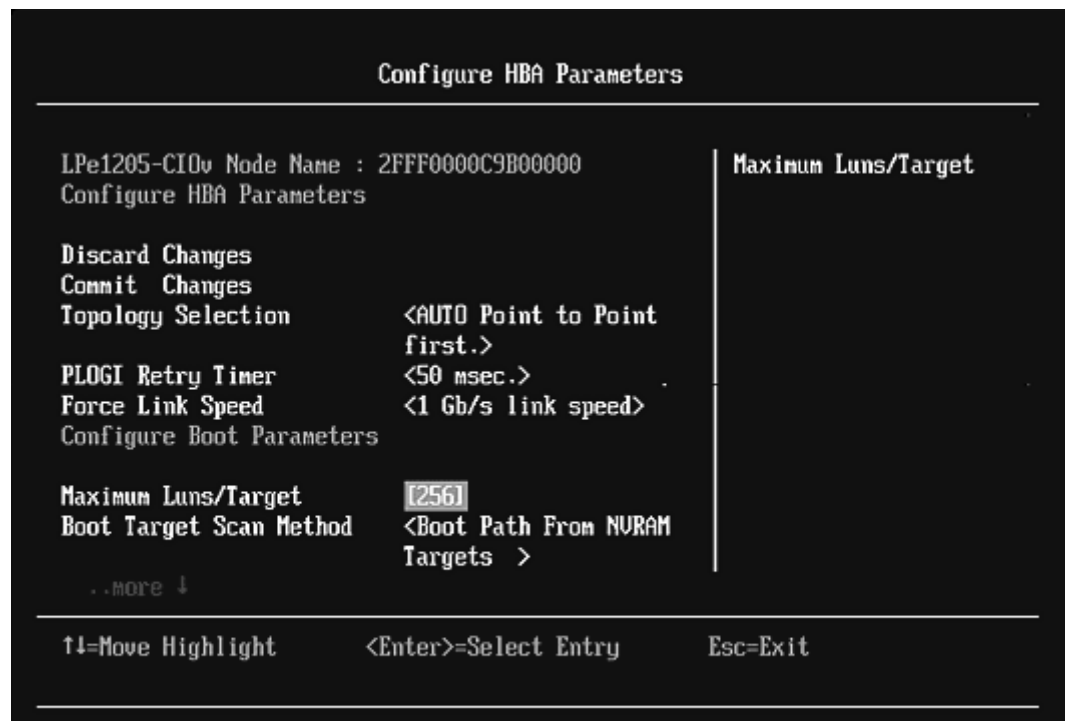


Figure 86: Maximum LUNs/Target screen

3. 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.

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

## Change 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 is used to configure up to eight boot entries for fabric point-to-point, public loop or private loop configurations. With boot scan enabled, the first device issues a Name Server Inquiry.

The boot scan options are:

- **Boot Path from NVRAM Targets** - Boot scan discovers only LUNs that are saved to the adapter's non-volatile random access memory (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 boot path.**
- **Boot Scan from EFIFcScanLevel** - Allows 3rd party software to toggle between Boot Path from NVRAM and Boot Path from Discovered Targets by manipulating an EFI system NVRAM variable. After the scan is set to EFIFcScanLevel, the scan method can be changed without entering the EFI 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 3rd party software.

To change the boot target scan method:

1. From the Adapter Selection screen, select the adapter whose boot target scan method you want to change and press **<Enter>**.
2. From the Configure Boot Parameters menu, navigate to **Boot Target Scan Method** and press **<Enter>**. The Boot Target Scan Method menu appears.

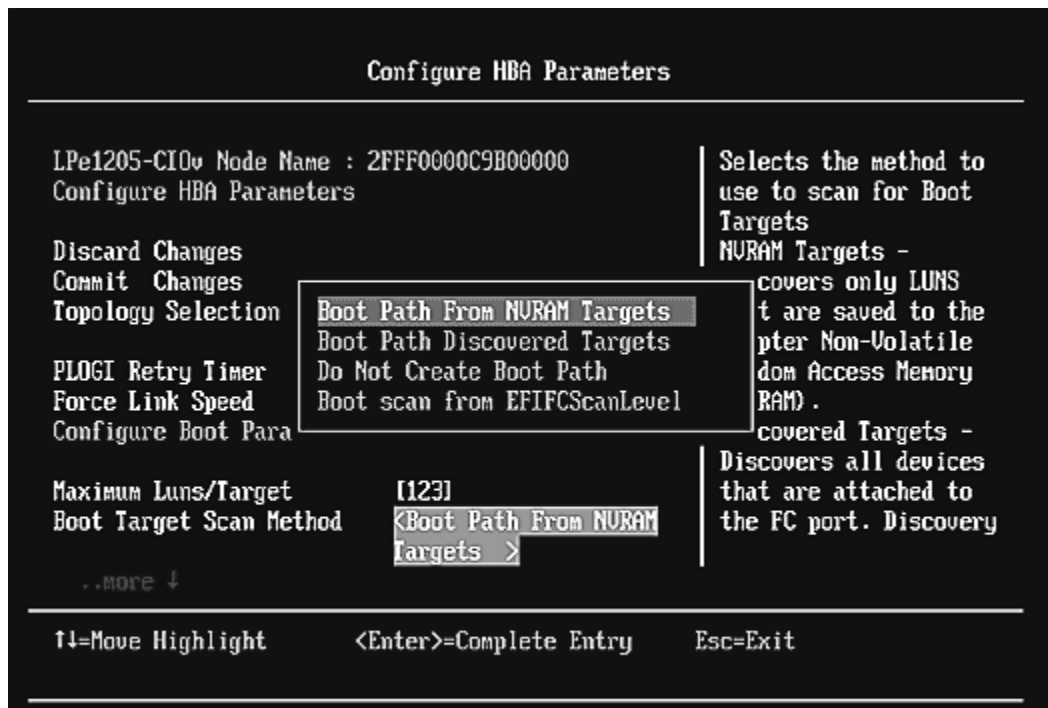


Figure 87: Boot Target Scan Method menu screen

3. Select a boot scan setting and press **<Enter>**. The screen is refreshed with the new value.

**Note:** If you have a large SAN and set the boot path to "Boot Path Discovered Targets," discovery takes a long time.

Press **<Esc>** to return to the EFI utility menu.

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

## Change Device Discovery Delay

This parameter sets a delay to occur after an loop initialization and before a scan is initiated to discover the target. The default is off or 0 seconds. Change the default if you have an HP MSA1000 or HP MSA1500 RAID array and if both of the following conditions exist:

- The MSA array is direct connected or part of an arbitrated loop (for example, daisy chained with a JBOD).
- The boot LUN is not reliably discovered. In this case, a delay may 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 above conditions exist, typically set this parameter to 20 seconds. However, the delay only need be only enough for the array to be reliably discovered after a reset. Your value may be different.

To change the delay device discovery value:

1. From the Adapter Selection screen, select the adapter whose device discovery delay settings you want to change and press **<Enter>**.
2. From the Configure Boot Parameters menu, **Delay Device Discovery** and press **<Enter>**. The screen becomes editable.

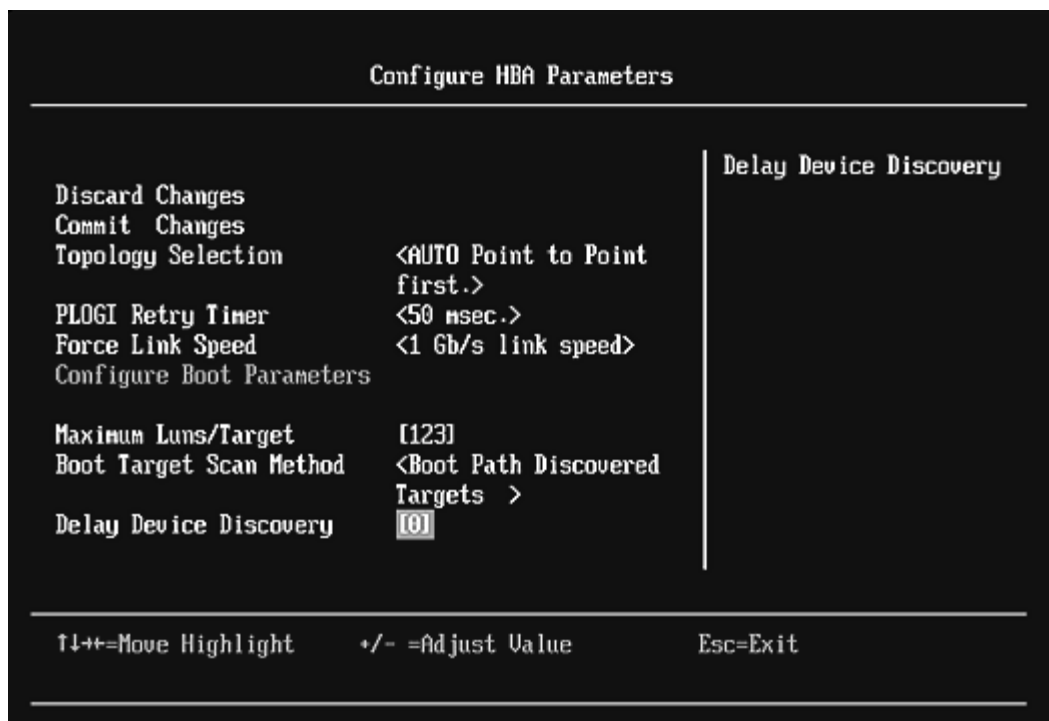


Figure 88: Delay Device Discovery screen



3. 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.
4. Select **Commit Changes** and press **<Enter>**.

## Reset Emulex Adapters to Default Values

The EFI utility enables you to clear the NVRAM target list and set all boot device WWNNs back to 0. These defaults are listed in Table 9.

**Table 9: Adapter Defaults**

Parameter	Default	Valid Values
Enable/Disable BIOS	Disabled	Enabled Disabled
AL_PA Value	0x00 Fibre	See AL_PA reference table
PLOGI Retry Timer	Disabled	Disabled 50 msec 100 msec 200 msec
Boot Target Scan	Boot path from NVRAM targets	Boot path from NVRAM targets Boot path discovered targets Do not create boot path
Max LUNs Setting	0256	0–4096
Topology	Auto (start FC-AL)	Auto (start FC-AL) Point-to-Point Auto (start Point-to-Point) FC-AL
Delay Device Discovery	0000	0000–0255
Link Speed	0 (Auto-select)	<0> = Auto Select (the adapter's speed is selected automatically based on its model). <1> = 1 Gb/s <2> = 2 Gb/s <4> = 4 Gb/s <8> = 8 Gb/s

To set Emulex adapters to their default settings:

1. From the Adapter Selection screen, select the adapter whose default settings you want to change and press **<Enter>**.

- From the Main menu, select **Set Emulex Adapters to Default Settings** and press **<Enter>**. A menu screen appears enabling you to set defaults or cancel default settings.

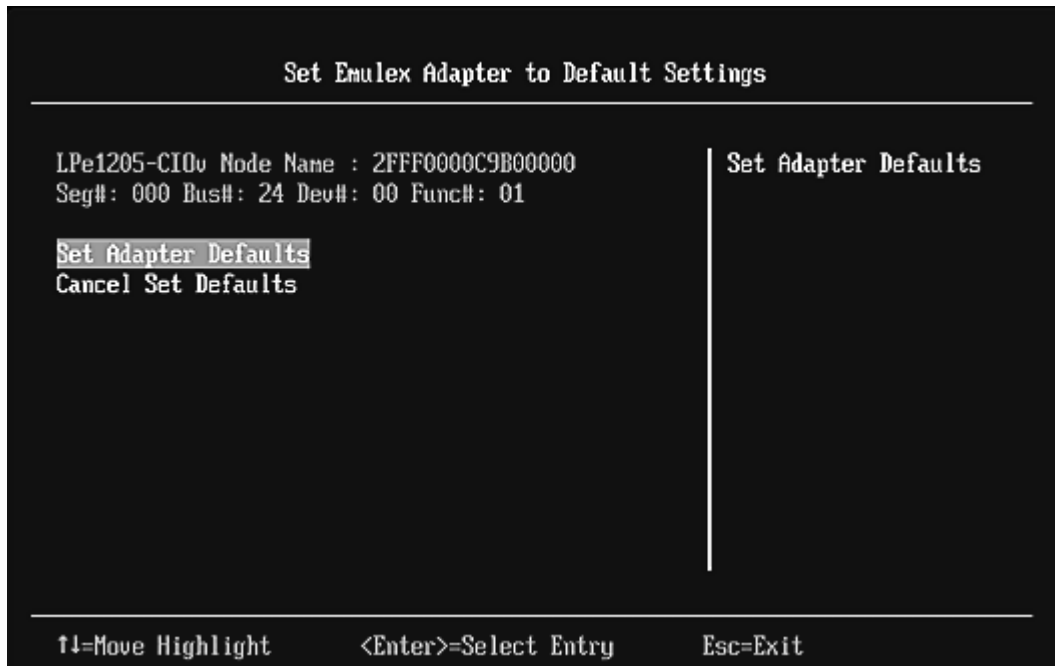


Figure 89: Adapter Defaults menu screen

- Select **Set Adapter Defaults** and press **<Enter>**. The Adapter Selection screen appears.

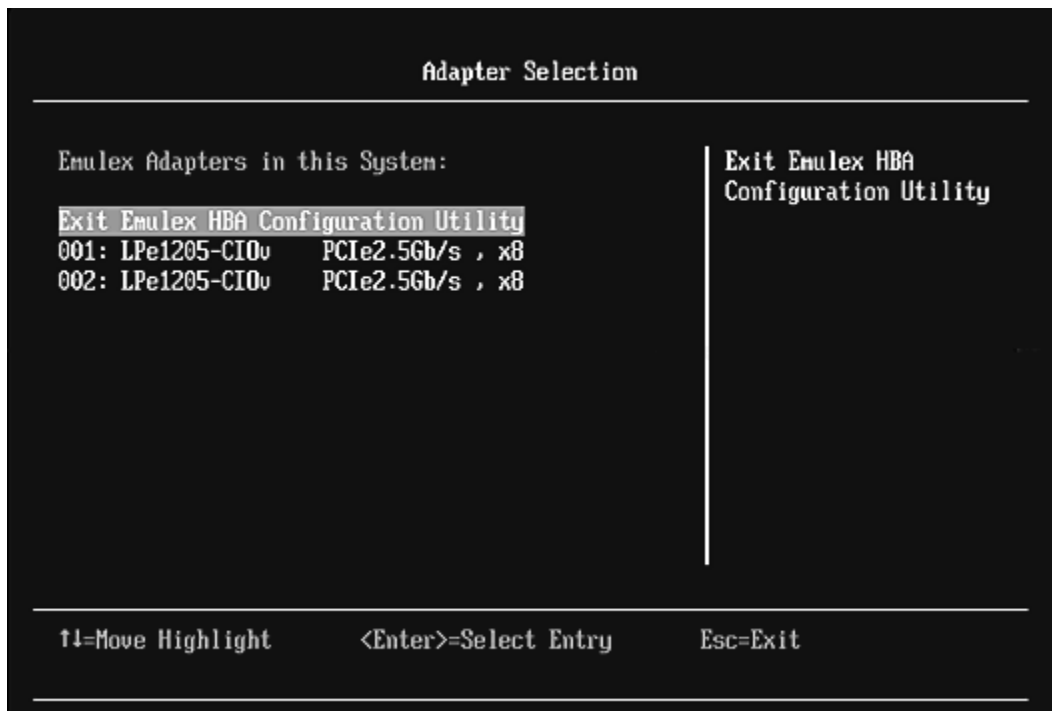


Figure 90: Adapter Selection screen

- Select the adapter whose setting you want to return to their defaults and press **<Enter>**. The Main Configuration Menu appears.

5. Select **Set Emulex Adapter to Default Settings** and press <Enter>. The Adapter Default Settings menu screen appears.

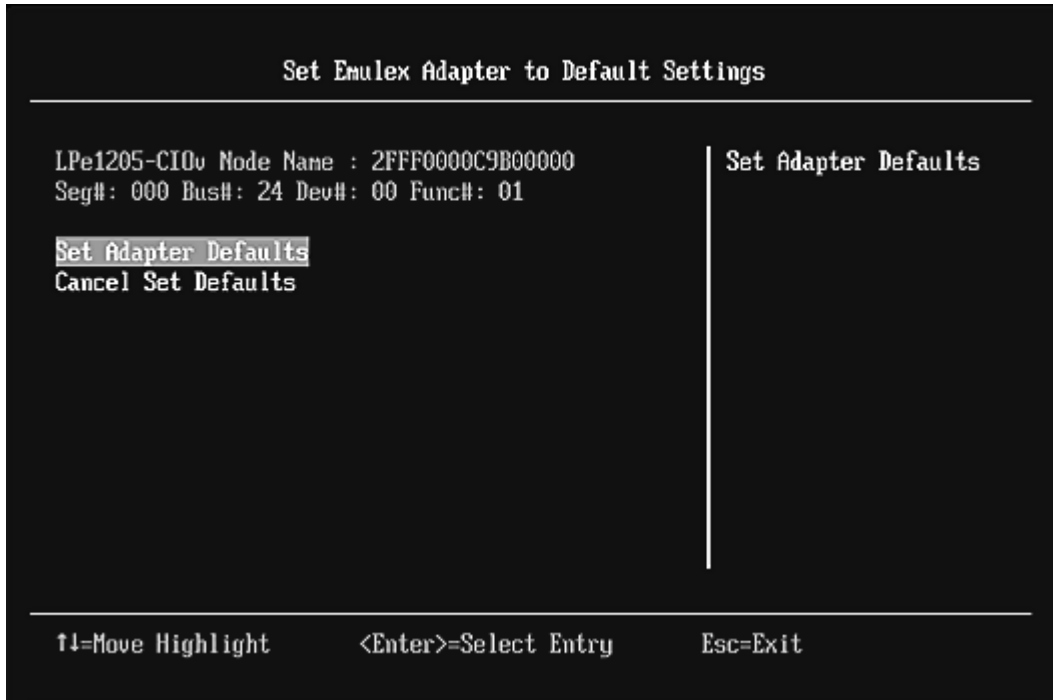


Figure 91: Adapter Defaults menu screen

6. Select **Set Adapter Defaults** and press <Enter>. The adapter is returned to its default settings. Press <Esc> to return to the adapter list.

## Display 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
- EFI Boot version

To display adapter information:

1. From the Adapter Selection screen, select the adapter whose information you want to view and press <Enter>.

- From the Adapter configuration Main menu, select **Display Adapter Info** and press **<Enter>**. A screen appears displaying information about the selected adapter.

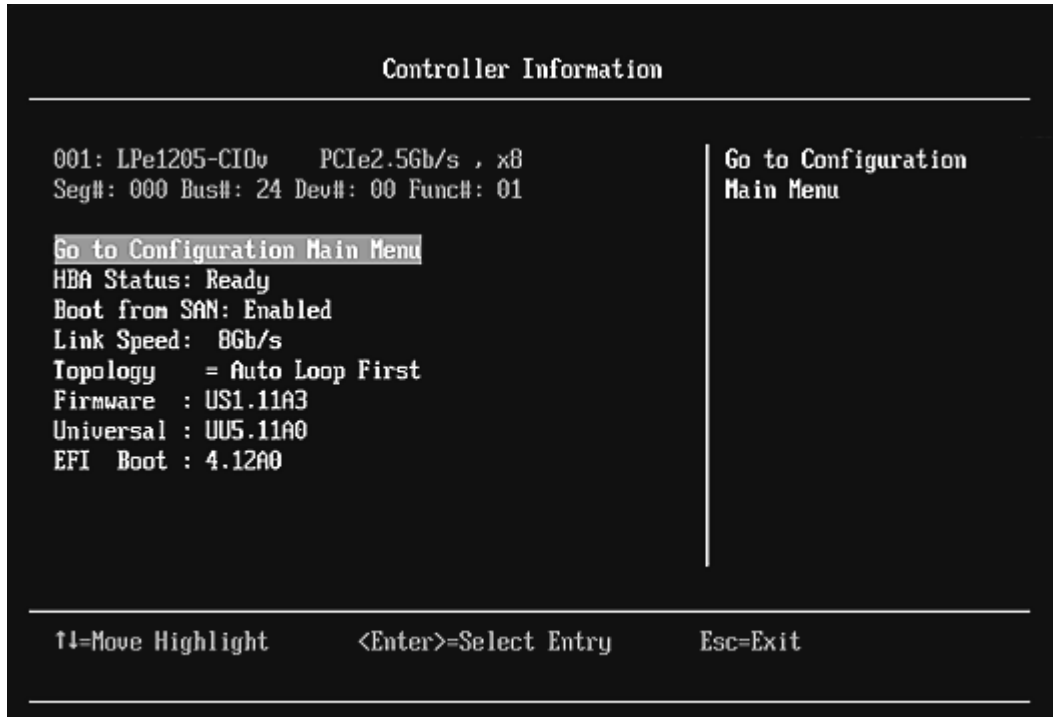


Figure 92: Adapter Information screen

## Troubleshooting

There are circumstances in which your system may operate in an unexpected manner. The Troubleshooting section explains several of these circumstances and offers one or more workarounds for each situation.

### x86 BootBIOS

---

#### The Bootup Message Does Not Appear As the System Boots

**Situation:** You want to access the BIOS utility, but the bootup message does not appear.

**Resolution:** Make sure that x86 BootBIOS has been loaded and enabled.

#### Retry This Adapter Message

**Situation:** The message "Retry This Adapter" appears during BIOS scanning.

**Resolution:** Check the hardware configuration or reconfigure the adapter BIOS using the BIOS utility.

#### Cannot Mount Root File System Message (Solaris SFS Driver)

**Situation:** The message "Cannot Mount Root File System" appears during bootup.

**Resolution:** Make sure the correct storage device is identified in the `scsi_vhci.conf` file. The XP128 storage array is used in the following example:

```
# cd /kernel/drv
# pg scsi_vhci.conf
#
# Copyright 2004 Sun Microsystems, Inc. All rights reserved.
# Use is subject to license terms.
#
# pragma ident    "@(#)scsi_vhci.conf    1.9    04/08/26 SMI"
#
name="scsi_vhci" class="root";
.
.
.
device-type-scsi-options-list =
"HP      OPEN-3*4", "symmetric-option";
symmetric-option = 0x1000000;
#
```

#### Cannot Find UNIX Kernel Message (Solaris SFS Driver)

**Situation:** The message "Cannot Find UNIX Kernel" appears during bootup.

**Resolution:** Set up the correct LUN to boot in the BIOS utility. The correct LUN can be seen at the end of the Device Address line when you issue a `luxadm display <device>` command; See the `luxadm` documentation from Sun for more information.

#### No Such Partition Message (Solaris SFS Driver)

**Situation:** The message "No Such Partition" appears during bootup:

**Resolution:** Make sure the correct boot device is selected at the GRUB menu. See the GRUB documentation from Sun and the `/boot/grub/menu.lst` for more details.

## OpenBoot

---

### **The System Cannot mount or fsck /etc/vfstab a FC Boot Disk (Solaris LPFC Driver)**

**Situation:** During the boot process, the system cannot mount or fsck /etc/vfstab a FC boot disk.

**Resolution:** Make sure that persistent binding is implemented correctly.

### **A Loaded File Is Not Executable (Solaris LPFC Driver)**

**Situation:** After entering boot disk, a message states that the file that was loaded is not executable.

**Resolution:** The boot block may not be installed correctly to the FC drive. See *Configure Boot from SAN on Solaris LPFC (SPARC)* on page 9.

### **The System Hangs or Reboots After Displaying Driver Information (Solaris LPFC Driver)**

**Situation:** The system hangs for a long time after displaying driver information, or it reboots after displaying driver information.

**Resolution:** Possible incorrect topology set in the /kernel/drv/lpfc.conf file on the target disk.

### **FC Disk Is Not Found (Solaris LPFC Driver)**

**Situation:** You have performed the setup tasks and the FC disk is not found when you reboot the system.

**Resolution:** If the FC disk is not found when the system is rebooted, it may be necessary to do the following:

1. Type "cfgadm -a" to list the target.
2. Type "cfgadm -vc configure c1::c5t2200002037AE0091" to configure the FC target.
3. Type "cfgadm -c unconfigure c1" to remove the FC target.

It may also be necessary to add an entry for the boot drive to the sd.conf file.

### **The Displayed List of Emulex Adapters Ends with “fibre-channel” (Solaris LPFC Driver)**

**Situation:** 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 “fibre-channel”, for example:

```
/pci@1f,2000/fibre-channel
```

instead of “lpfc@#”, for example:

```
/pci@1f,4000/lpfc@2
```

**Resolution:** The OpenBoot code is not loaded in the adapter’s firmware. You must install OpenBoot before you can set up boot from SAN on the adapter (see page [insert cross reference]).

## EFIBoot Diagnostic Utility

The EFI Diagnostic Utility tests all adapters in your system.

### Conventions

- Press the up/down arrows on your keyboard to move through and highlight menu options or configuration fields. Menus with adapter listings and information display up to eight rows at a time. If applicable, press the up/down arrows to scroll to additional adapters.
- Press the left/right arrows on your keyboard to scroll through pages of information.
- Press **<Enter>** to select a menu option.
- Press **<Esc>** to return to the previous menu.
- Press the space bar to select or check a test data pattern. All patterns are selected by default.
- Press **<F1>** to view online help for a menu item.
- Press **<F2>** to clear the status (Passed, Failed or Unsupported) of each test on a data test pattern menu. This clears the menu, but does not clear the results log.
- Press **<F3>** to execute a selected test pattern.
- Press **<F4>** to reset the data patterns back to the default (all checked).
- When you view any of the Adapter Data information, press any key to return to the Diagnostic Main menu.

### Accessing the EFI Diagnostic Utility

**Note:** Before you can use the EFI utility for the first time, you must install it.

To access the main EFI utility:

1. To view Emulex driver image handle information, at the shell prompt type:

```
fs0:\> drivers
```

A list of drivers is displayed (Figure 23 on page 34.)

2. Enter this command, followed by the driver image handle for the SCSI Pass Thru driver. For example, C2 (your driver image handle may be different:

```
drvdiag-s c2
```

3. Press **<Enter>**. Information similar to Figure 93 is displayed, listing all adapters in the system:

Emulex FC EFI-Bios Utility, Ver: 4.00A0					
Emulex Adapters in this System: 001 thru 006					
001: LP11002	PCI-X 133MHz	Seg#: 00	Bus#: 80	Dev#: 01	Func#: 00
002: LP11002	PCI-X 133MHz	Seg#: 00	Bus#: 80	Dev#: 01	Func#: 01
003: LP1150-F4	PCI-X 66MHz	Seg#: 00	Bus#: 80	Dev#: 02	Func#: 00
004: LP10000DC-S	PCI-X 66MHz	Seg#: 00	Bus#: E0	Dev#: 01	Func#: 00
005: LP10000DC-S	PCI-X 66MHz	Seg#: 00	Bus#: E0	Dev#: 01	Func#: 01
006: LP10000-M2	PCI-X 66MHz	Seg#: 00	Bus#: E0	Dev#: 02	Func#: 00

Figure 93: Adapter Listing screen

4. Use the up/down arrows and to select (highlight) an adapter and press **<Enter>**. The Diagnostic Main menu is displayed:

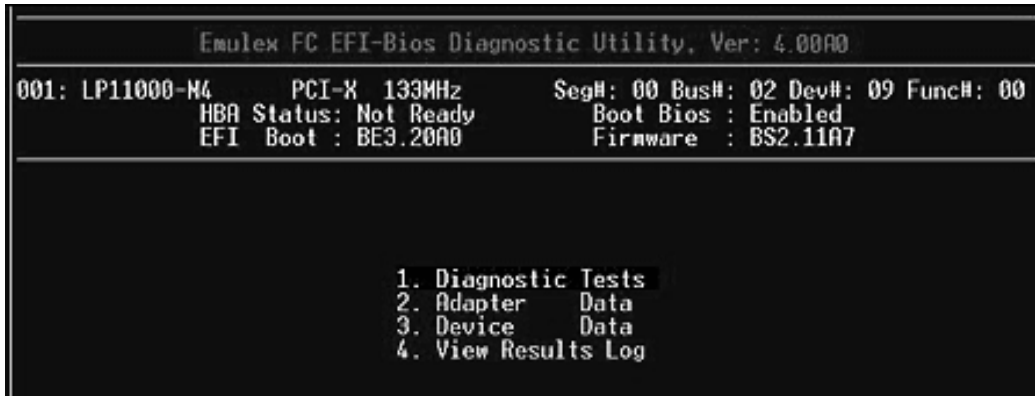


Figure 94: Diagnostic Main menu

## Running Loopback Tests

Test patterns for the PCI Loopback, Internal Loopback and External Loopback tests may be selected to be run individually. Test indicators are Passed, Failed or Unsupported. Unsupported is displayed if the test is not supported. For example, if an unsupported link speed is selected, a test is not performed at the unsupported speed, and a status of Unsupported is displayed in front of the link speed on the link speed menu.

To run a single test:

1. Access the Diagnostic Main menu (Figure 94) and select **<1>**. Diagnostic Tests. Press **<Enter>**. The Diagnostic Tests menu is displayed:

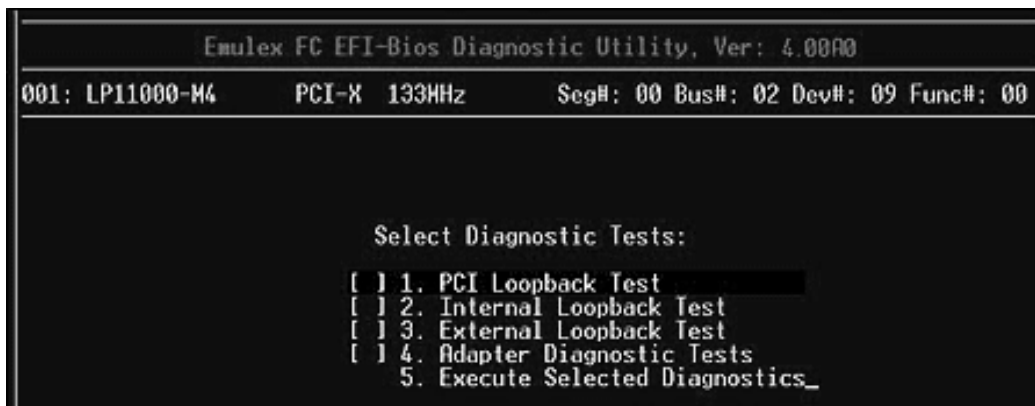


Figure 95: Diagnostic Tests menu

2. Use the up/down arrow keys to highlight a test and press the space bar. That test is checked.
3. Press **<F3>**. The selected test runs.

To run multiple tests from the Diagnostic Tests menu:

1. On the Diagnostic Main menu (Figure 94), select **<1>**. Diagnostic Tests. Press **<Enter>**. The Diagnostic Tests menu is displayed (Figure 95).
2. Use the up/down arrow keys to highlight tests and press the space bar to select or deselect.
3. Highlight **<5>**. Execute Selected Diagnostics. Press **<Enter>**. The selected tests run.



To run individual Loopback test patterns:

1. Access the Diagnostic Main menu (Figure 94) and select <1>. Diagnostic Tests. Press <Enter>. The Diagnostic Tests menu is displayed (Figure 95).
2. Use the up/down arrow keys to highlight a test. Press <Enter>.
3. Another menu is displayed. Select one or more individual patterns for the diagnostic test. For example:

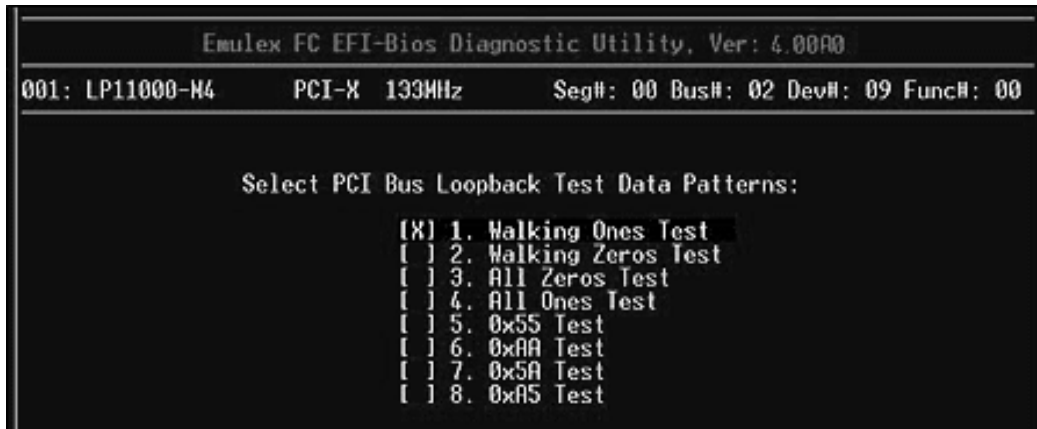


Figure 96: PCI Loopback Test Data Patterns menu

4. Press <Esc> one or more times as necessary to display the Diagnostic Tests menu.
5. Use the up/down arrow keys to highlight <5>. Execute Selected Diagnostic. and press <Enter>. The selected tests run. After tests are performed, the status of each selected pattern is displayed. For example:

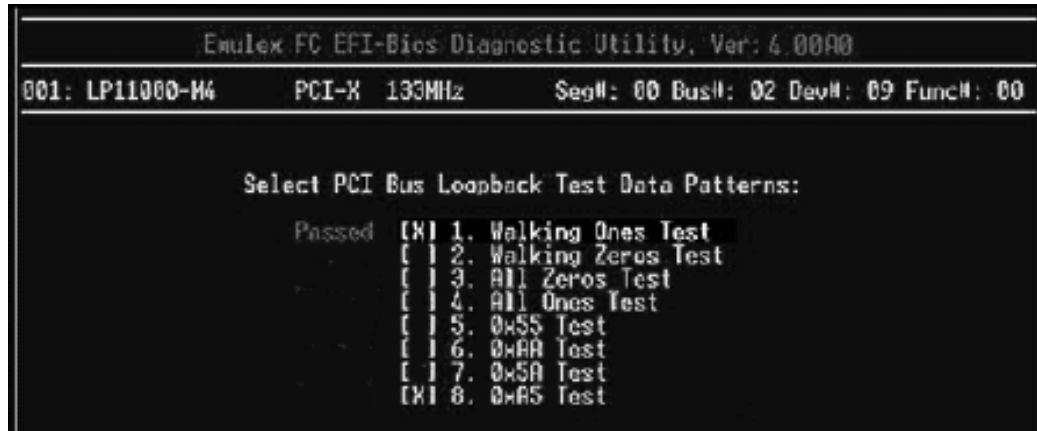


Figure 97: PCI Loopback Test Data Pattern Status menu

## Diagnostic Test Specifics

### PCI Loopback Test

The PCI loopback test executes the RunBuiDiag64 mailbox command once for each test pattern. The data length for each test is 128 bytes. A loopback connector is required for this test.

### Internal and External Loopback Tests

Internal and external loopback tests execute the ElsEcho FCP command to send 124 bytes from the transmit to the receive side of an FC port. A loopback connector is required for the external loopback test.

Internal and external loopback test menus have two configurations (data patterns and link speeds). The data test patterns are the same as the PCI Loopback patterns (Figure 96).

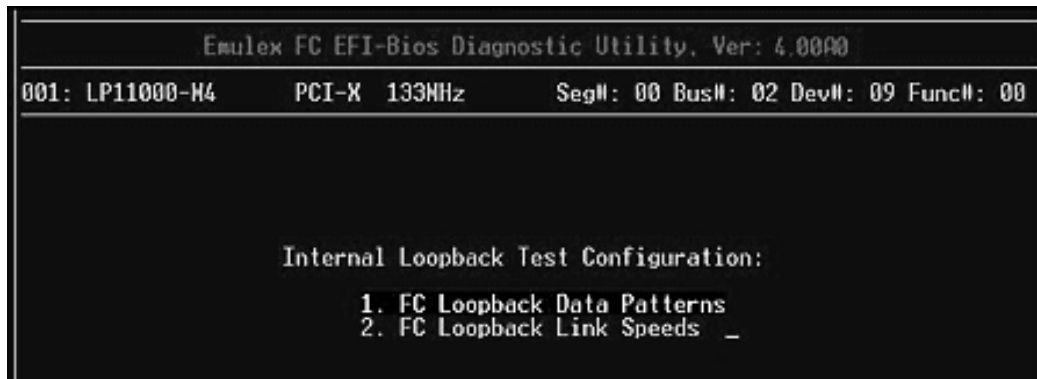


Figure 98: Internal Loopback Test Configuration menu

Internal and external loopback link speeds have the same three options. Link speed defaults to one Gb for both internal and external tests.

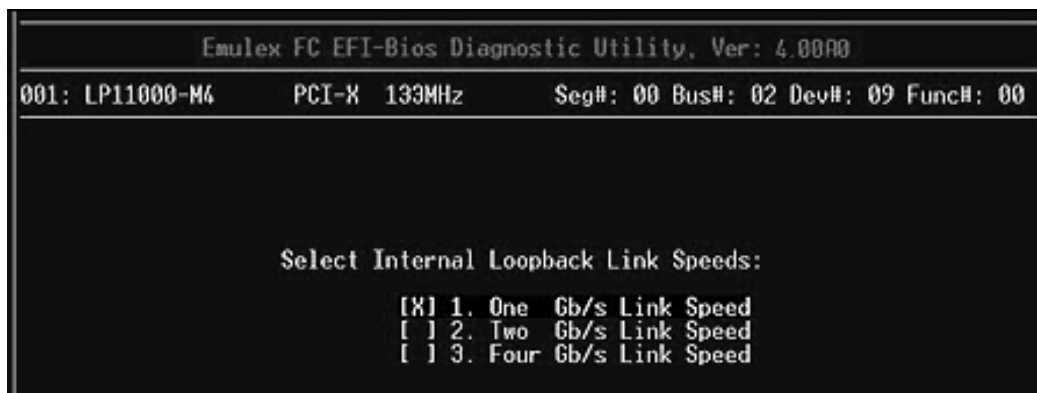


Figure 99: Internal Loopback Link Speeds menu

As tests are performed a screen similar to the following is displayed:

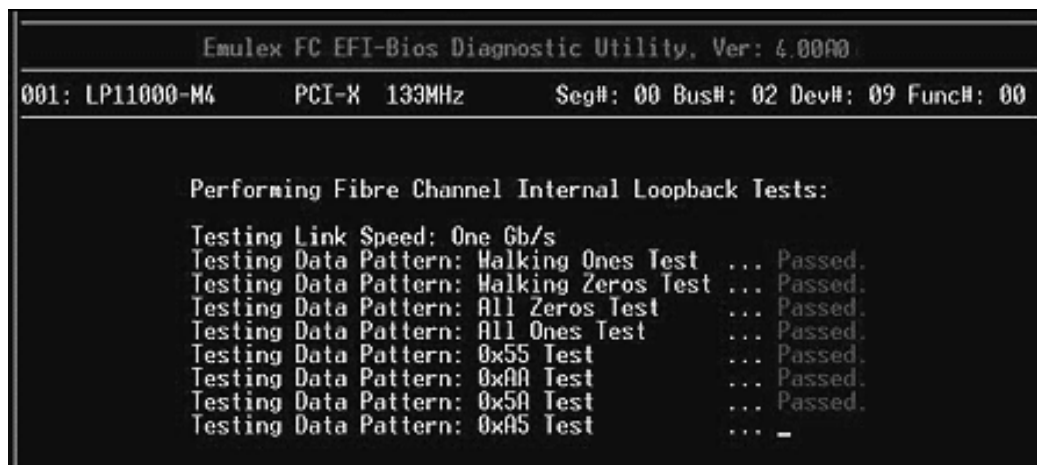


Figure 100: Internal Loopback Test progress screen

Test results are displayed on the Test Data Pattern menu and saved to results log.

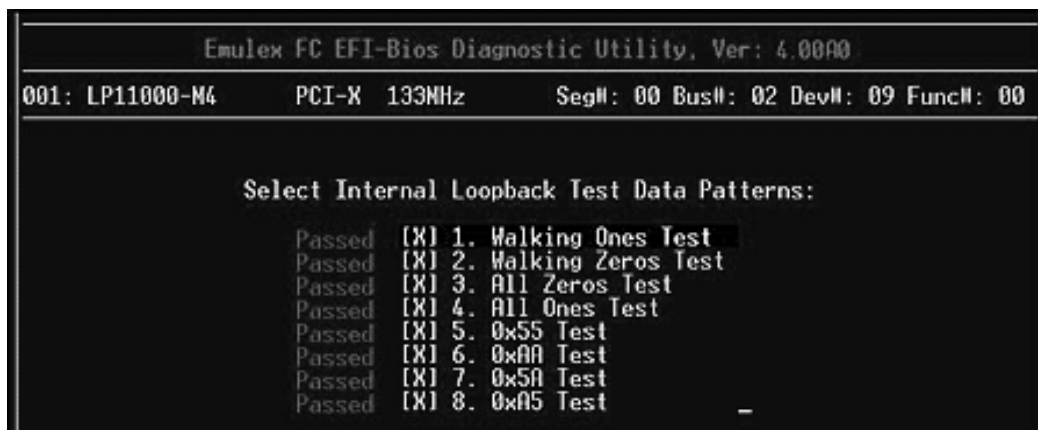


Figure 101: Internal Loopback Test Data Pattern results screen

## Running Adapter Diagnostic Tests

The Adapter Diagnostic Tests include adapter restart, display of some configuration parameters, results of linkup and target login. These actions cannot be selected individually. If any one of these tests fail, Failed is displayed on the Diagnostic Test menu (Figure 95).

When you run adapter diagnostic tests, a screen similar to the following is displayed:

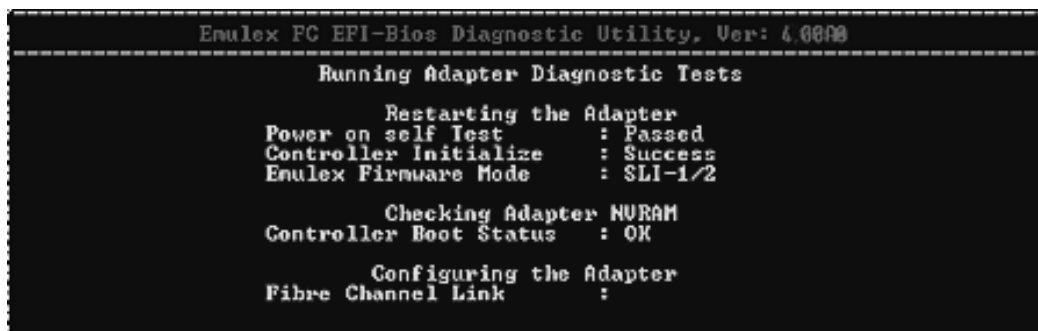


Figure 102: Running Adapter Diagnostic Tests In progress screen

If all tests pass, "Passed" is displayed on the Diagnostic Utility menu. For example:



Figure 103: Select Diagnostic Tests - Adapter Diagnostic Tests Passed screen

If any one of these tests fail, Failed is displayed on the Select Diagnostic Tests screen.

## Viewing Adapter Data

To view data for a specific adapter:

1. Access the Diagnostic Main menu (Figure 94) and select <2>. Adapter Data. Press <Enter>. The Adapter Data menu is displayed:

```

Emulex FC EFI-Bios Diagnostic Utility, Ver: 4.00A0
-----
001: LP11000-M4      PCI-X 133MHz      Seg#: 00 Bus#: 02 Dev#: 09 Func#: 00
      HBA Status: Ready      Boot Bios : Enabled
      EFI Boot : BE3.20A0      Firmware  : BS2.11A7
-----

1. Config  Info
2. Firmware Info
3. Vpd     Info
4. Ctrl    Info
5. Slim    Info
6. PCI     Info

```

Figure 104: Adapter Data menu

## Examples

```

Emulex FC EFI-Bios Configuration Information, Ver: 4.00A0
-----
001: LPe11000      PCIe  2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----
Parameters
EFI Bios      = Enabled      Device Path    = Fibre
Luns/Target   = 0256        Hard ALPA     = 0x00    Boot Scan     = All
Topology      = Auto Loop First  PLOGI Retry Timer = Disabled
-----
Boot Devices
No  ProtID  WWPN          LUN
01  000000  21000011C6810A0F  0000000000000000
02  000000  0000000000000000  0000000000000000
03  000000  0000000000000000  0000000000000000
04  000000  0000000000000000  0000000000000000
05  000000  0000000000000000  0000000000000000
06  000000  0000000000000000  0000000000000000
07  000000  0000000000000000  0000000000000000
08  000000  0000000000000000  0000000000000000

```

Figure 105: Configuration Information screen

```

Emulex FC EFI-Bios Firmware Information, Ver: 4.00A0
-----
001: LPe11000      PCIe  2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----
Universal : ZU5.02A1      SLI - 2 : Z2D2.70A5
Firmware  : ZS2.70A5      SLI - 3 : Z3D2.70A5
Port Name : 10000000C969B773  Kernel  : 1.20A2

```

Figure 106: Firmware Information screen

```

Emulex FC EFI-Bios VPD Information, Ver: 4.00A0
001: LPe11000      PCIe  2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----
Product ID       : FE00
Product Name     : NA
Part Number      : NA
Eng Date Code    : NA
Serial Number    : 10000000C969B773
Misc Info        : PCIe 2.5Gb/s, x4
Mfg Date         : NA
Checksum         : 38
EFI Version      : ZU5.02A1
Asset Tag        : NA
Firmware Ver     : ZS2.70A5
WWN              : 10000000C969B773
SUID             : 10DF
SSID            : FE00
Total Checksum   : EF
  
```

Figure 107: Vendor Product Data (VPD) screen

```

Emulex FC EFI-Bios Controller Information, Ver: 4.00A0
001: LPe11000      PCIe  2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----
WWPN             : 10000000C969B773
WWNN             : 20000000C969B773
Fw Major         : 27
Fw minor         : 15
Fw sub minor     : E8
Fw Chip Rev      : 00
Pci Bus Speed    : Speed 2.5Gb/s, Width x4 (neg) / x4 (max)
Self Topology    : Loop Private
SM WWN           : 0000000000000000
SU WWN           : 0000000000000000
Port Id          : 000001
Loop Id          : 01
Max Frame Size   : 00
Link Speed       : 2 Gb/s
-----
Press any Key to Return to Previous Menu ...
  
```

Figure 108: Controller Information screen

```

Emulex FC EFI-Bios Slim Information, Ver: 4.00A0
001: LPe11000      PCIe  2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----
Signature : BIOS  Topology : Loop
00 42 49 4F 53 04 0F 0F 0F 00 00 00 00 00 00 00 BIOS
10 11 00 00 21 0F 0A 81 C6 00 00 00 00 00 00 00
20 11 00 00 21 0A 07 81 C6 00 00 00 00 00 00 00
30 11 00 00 21 8F 07 81 C6 00 00 00 00 00 00 00
40 11 00 00 21 94 07 81 C6 00 00 00 00 00 00 00
50 00 00 00 00 00 00 00 00 00 00 00 00 00 00
60 00 00 00 00 00 00 00 00 00 00 00 00 00 00
70 00 00 00 00 00 00 00 00 00 00 00 00 00 00
80 00 00 00 00 00 00 00 00 00 00 00 00 00 00

1. WWN:21000011C6810A0F LUN:0000      2. WWN:21000011C681090A LUN:0000
3. WWN:21000011C681098F LUN:0000      4. WWN:21000011C6810994 LUN:0000
-----
Press any Key to Return to Previous Menu ...
  
```

Figure 109: Service Level Interface Memory (SLIM) Information screen



```

Emulex FC EFI-Bios PCI Configuration Viewer, Ver: 4 00A3
-----
001: LPe11000      PCIe   2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----

      PCI Configuration Space Offsets: 0x00 to 0x7F

      x0 x1 x2 x3 x4 x5 x6 x7 x8 x9 xA xB xC xD xE xF
0x0x DF 10 00 FE 47 01 10 00 02 00 04 0C 20 00 00 00
0x1x 04 10 04 E0 00 00 00 00 04 00 04 E0 00 00 00 00
0x2x 01 C0 00 00 00 00 00 00 00 00 00 00 DF 10 00 FE
0x3x 00 00 00 E0 58 00 00 00 00 00 00 00 FF 01 00 00
0x4x 08 00 00 00 10 00 01 00 A4 09 00 00 10 28 00 00
0x5x 41 E4 03 00 00 00 41 00 01 60 02 00 00 00 00
0x6x 05 44 86 00 00 00 00 00 00 00 00 00 00 00 00
0x7x 03 44 00 00 00 00 00 00 00 00 00 00 00 00 00

<<-/->> to Display Prev/Next Page.  F2 To Change Data Size.

```

Figure 110: Peripheral Component Interconnect (PCI) Information screen

**Note:** View up to 256 bytes of PCI configuration space using paging. 128 bytes are displayed at a time. Use the <F2> key to select byte, word, or dword display.

## Viewing Device Data

The device data is stored in the results log and is displayed on the console in ASCII and hex format.

To view data for attached block devices:

1. Access the Diagnostic Main menu (Figure 94) and select <3>. Device Data. Press <Enter>. The Device Data Target Selection menu is displayed.

```

Emulex FC EFI-Bios Device Data Utility, Ver: 5 00A3
-----
001: LPe11000      PCIe   2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----

      Here are targets numbers 001 thru 004:

001: DISK  DEV:SEAGATE  ST336854FC      Emulex SCSI Pass Thru Driver
002: DISK  DEV:SEAGATE  ST336854FC      Emulex SCSI Pass Thru Driver
003: DISK  DEV:SEAGATE  ST336854FC      Emulex SCSI Pass Thru Driver
004: DISK  DEV:SEAGATE  ST336854FC      Emulex SCSI Pass Thru Driver

```

**Note:** Up to eight devices are displayed per page. If there are more than eight devices, use the left/right arrow keys to scroll to the previous/next page.

Figure 111: Device Data Target Selection menu

2. Use the up/down arrow keys to highlight an attached block I/O device and press <Enter>. A screen similar to Figure 112 is displayed.

```

Emulex FC EFI-Bios Device Data Utility, Ver: 4 00A3
-----
001: LPe11000      PCIe   2.5Gb/s, x4  Seg#: 00 Bus#: 8B Dev#: 00 Func#: 00
-----

      Device Name           : SEAGATE ST336854FC      0004
      Logical Unit Number   : 00000000
      Device Path           :
      Fibre\WWN21000011C6810A0F.Lun0000\SEAGATE ST336854FC      0004
      World Wide Mode Number : 21000011C6810A0F
      Device Block Size     : 512 Bytes.
      Number of Blocks <LBA> : 00000445DCCC
      Device Capacity       : 0034 Gigabytes.

      Enter Starting LBA <HEX> :

```

Figure 112: Device Data screen

- To read the individual block from the media, specify the logical block address (LBA) and press **<Enter>**. 256 bytes of sector data display per screen. Use the left/right arrow keys to scroll through the data. Information similar to the following is displayed:

```

Emulex FC EFI-Bios Device Data Utility, Ver: 4.00A0
-----
Device Data LBA 0000000000001 Offsets: 0x000 to 0x0FF
x0 x1 x2 x3 x4 x5 x6 x7 - x8 x9 xA xB xC xD xE xF
0x00x 45 46 49 20 50 41 52 54 - 00 00 01 00 5C 00 00 00 EFI.PART.....
0x01x BF 26 DB 22 00 00 00 00 - 01 00 00 00 00 00 00 00 ..E.....
0x02x CB DC 45 04 00 00 00 00 - 22 00 00 00 00 00 00 00 ..E.....F
0x03x AA DC 45 04 00 00 00 00 - E8 7C F4 91 88 B9 EB 46 ..E.....
0x04x 8F 34 CB 93 1F 7C C7 7E - 02 00 00 00 00 00 00 00 .4.....
0x05x 00 00 00 00 00 00 00 00 - 35 4B 62 F2 00 00 00 00 .....5Kb.....
0x06x 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x07x 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x08x 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x09x 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x0Ax 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x0Bx 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x0Cx 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x0Dx 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x0Ex 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
0x0Fx 00 00 00 00 00 00 00 00 - 00 00 00 00 00 00 00 00 .....
<<-/->> to Display Prev/Next Page....Press Esc to Exit...

```

Figure 113: LBA Data screen

## Viewing the Results Log

The results log stores diagnostic test results, adapter diagnostics and device data. The results log stores up to 8k of data (about 1,600 rows). Once the buffer is full, no more data is logged.

**Note:** There is no reminder when the buffer is full.

To view the results log:

- Access the Diagnostic Main menu (Figure 94) and select **<4>**. View Results Log. Press **<Enter>**. A screen similar to the following is displayed:

```

Emulex FC EFI-Bios Diagnostic Utility, Ver: 4.00A0
===== [ EMULEX DIAGNOSTIC UTILITY RESULTS LOG ] =====
Copyright (c) 2003-2007 Emulex. All rights reserved.
Emulex Efi Driver Diagnostic - Standard:
Date: 02/15/2007
Start Time: 13:02:01
Performing Diagnostics on Adapter:
001: LP11000-M4 PCI-X 133MHz Seg#: 00 Bus#: 02 Dev#: 09 Func#: 00

F1 - Help    F2 - Clear Diagnostic Log    F3 - Save Log Data To File
<1/1>/<Home>/<End> to scroll  <ESC> to Prev Menu.

```

Figure 114: Results Log screen

To scroll through the results log:

- Use the up/down arrow keys to scroll one row at a time.
- Use the Home/End keys to scroll one page at a time.

**Note:** The Page Up and Page Dn keys do not navigate the results log.

To view help on the results log screen.

1. Press **<F1>**. Help text is displayed.
2. Press **<Esc>**. Log results are displayed.

To save results log information:

1. View the results log.
2. Press **<F3>**. The Log to File screen is displayed.



Figure 115: Log to File screen

3. Enter the directory path and press **<Enter>**. The Filename field is displayed.
4. Enter the filename and press **<Enter>**.

---

**Note:** The filename must be unique.

---

Once the file is successfully saved, a screen similar to the following is displayed:



Figure 116: Successful Log to File screen

To clear the log result, press **<F2>**. The results on the diagnostic tests are erased, and a new time and date is written to the log.